ไวยากรณ์อ้างอิงของภาษาโทรวิทยุในการสื่อสารระหว่างนักบินและหอบังคับการบิน

นางสาว ปนีตา นิตยาพร

A REFERENCE GRAMMAR OF RADIOTELEPHONY
IN AIR-GROUND COMMUNICATION

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A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in Linguistics
Department of Linguistics
Faculty of Arts
Chulalongkorn University
Academic Year 2009

Thesis Title   A REFERENCE GRAMMAR OF RADIOTELEPHONY IN AIR-GROUND COMMUNICATION

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ปนีดา นิตยาพร : ไวยากรณ์อ้างอิงของภาษาโทรวิทยุในการสื่อสารระหว่างนักบินและหอบังคับการ
บิน. (A REFERENCE GRAMMAR OF RADIOTELEPHONY IN AIR-GROUND
COMMUNICATION) อ. ที่ปรึกษาวิทยานิพนธ์หลัก: รศ.ดร. วิโรจน์ อรุณมานะกุล, 347 หน้า.

งานวิจัยนี้มีจุดมุ่งหมายที่จะศึกษาไวยากรณ์อ้างอิงของภาษาโทรวิทยุที่ใช้ในการสื่อสารระหว่างนักบิน
และหอบังคับการบิน ตลอดจนการเบี่ยงเบนของไวยากรณ์ที่เกิดขึ้นจากการใช้ภาษาในบริบทการสื่อสารจริง โดย
การแบ่งเนื้อหาการศึกษาออกเป็น 4 ด้าน กล่าวคือ สัมพันธสาร คลังศัพท์ วากยสัมพันธ์ และวิทยาหน่วยคำ
ตามลำดับ ทั้งนี้เพื่อเป็นการนำเสนอลักษณะเฉพาะของภาษาโทรวิทยุซึ่งถือเป็นอนุภาษาหนึ่งที่ถูกสร้างขึ้นและ
นำไปใช้ในบริบทของการสื่อสารที่มีความแตกต่างจากบริบทการสื่อสาร โดยทั่วไปกล่าวคือเป็นการสื่อสารผ่าน
ทางเทคโนโลยีทางการสื่อสารด้วนคลื่นวิทยุ และชี้ให้เห็นถึงความโดดเด่นของระบบสัมพันธสาร และรูปแบบ
ทางภาษาที่แสดงถึงความสัมพันธ์อันแนบแน่นระหว่างตัวภาษา ผู้ใช้ภาษาและบริบททางสังคม ตลอดจนความ
แบี่ยงเบนของลักษณะบางประการของตัวภาษาในอันที่จะตอบสนองความต้องการของผู้ใช้ภาษาได้อย่างเต็ม
ประสิทธิภาพในการบรรลุเป้าประสงค์ของการสื่อสารดังกล่าว ดังนี้วัตถุประสงค์หลักของการศึกษาจึงมุ่งเน้นไป
ที่การสร้างไวยากรณ์อ้างอิงของภาษาโทรวิทยุ และการแสดงการเบี่ยงเบนของภาษาที่เกิดขึ้น ด้วยการวิเคราะห์
ข้อมูลทางภาษาทางด้านสัมพันธสาร คลังศัพท์ วากยสัมพันธ์ และวิทยาหน่วยคำ ข้อมูลที่ใช้ในการศึกษาแบ่ง
ออกเป็น 2 กลุ่ม กล่าวคือ กลุ่มที่หนึ่งเป็นข้อมูลที่ได้จากหนังสือคู่มือการใช้ภาษาโทรวิทยุปี2549 เพื่อใช้ใน
การศึกษาไวยากรณ์อ้างอิงของภาษาดังกล่าว และกลุ่มที่สองเป็นข้อมูลที่ได้จากการใช้ภาษาจริงจากการถอด
ความจากกล่องดำระหว่างปี 2536-2546ซึ่งได้มาจาก 2   เว็บไซค์กล่าวคือ aviation-safety.net   และ
www.tailstrike.com การวิเคราะห์ของมูลทั้งสองกลุ่มกระทำโดยใช้ทฤษฎีและกลวิธีในการจัดกระทำอย่าง
เดียวกัน เพื่อให้สามารถบรรลุวัตถุประสงค์ของการศึกษาได้อย่างสมบูรณ์

จากการวิเคราะห์แสดงให้เห็นอย่างชัดเจนว่าภาษาโทรวิทยุเป็นอนุภาษาที่มีคุณลักษณะทางไวยากรณ์ที่
มีความแตกต่างและโดดเด่นจากการนำเอาคุณสมบัติทางภาษาบางประการที่มีความสำคัญอย่างแท้จริงจาก
ภาษาอังกฤษซึ่งเป็นภาษาต้นแบบมาใช้ในแบบเฉพาะตัว ซึ่งบางส่วนมักถือว่าไม่ถูกต้องตามหลักของไวยากรณ์
ในภาษาต้นแบบ ส่วนการเบี่ยงเบนที่เกิดขึ้นกับตัวภาษาเมื่อมีการนำไปใช้จริงนั้นเกิดขึ้นอย่างเห็นได้ชัดในทุก
ระดับ อย่างไรก็ดีไม่มีจุดบ่งชี้ที่ชัดเจนว่าการเบี่ยงเบนดังกล่าวเกิดขึ้นในสัมพันธสารและวากยสัมพันธ์มากที่สุด
ดังที่ได้ตั้งสมมติฐานไว้

การเบี่ยงเบนที่เกิดขึ้นนั้นเกิดจากการนำเอาคุณลักษณะที่ปรากฏอยู่แล้วในภาษาอังกฤษมาใช้ ซึ่งเป็นผล
จากความคุ้นเคยและเคยชินกับระบบภาษาต้นแบบของผู้ใช้ภาษาเพื่อให้สามารถตอบสนองความต้องการของคน
ได้อย่างเต็มประสิทธิภาพมากยิ่งขึ้น อย่างไรก็ดีคุณลักษณะทางภาษาที่มีการเบี่ยงเบนไม่ได้เกิดจากการผนวกรวม
กับคุณสมบัติบางประการจากภาษาต้นแบบเท่านั้น แต่มีการสร้างรูปแบบของภาษาขึ้นมาใหม่ด้วยการต่อ
ยอดจากระบบอ้างอิงที่มีมา ดังนั้นการพัฒนาของอนุภาษาโทรวิทยุนี้จึงเป็นไปในสองทิศทาง กล่าวคือมีแนวโน้ม
ของการพัฒนาไวยากรณ์ให้มีความใกล้เคียงกับภาษาต้นแบบพร้อมกับการพัฒนาไวยากรณ์เฉพาะแบบของ
ตนเองให้มีความโดดเด่นมากยิ่งขึ้น

ภาควิชา ภาษาศาสตร์............................   ลายมือชื่อนิสิต ....

สาขาวิชา ภาษาศาสตร์............................   ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก ....

ปีการศึกษา 2552............................

4880906622 : MAJOR LINGUISTICS

KEYWORDS :   AIR-GROUND COMMUNICATION / RADIOTELEPHONY / SUBLANGUAGE / REFERENCE GRAMMAR / DISCOURSE / LEXICON / SYNTAX / MORPHOLOGY

PANEETA NITAYAPHORN: A REFERENCE GRAMMAR OF RADIOTELEPHONY IN AIR-GROUND COMMUNICATION. THESIS ADVISOR: ASSOC.PROF. WIROTE AROONMANAKUN, Ph.D., 347 pp.

The study aims at demonstrating the entire reference grammar of radiotelephony and its distinctive characteristics as well as the conceivable deviation occurred at four domains; namely discourse, lexicon, syntax and morphology, in order to explain and describe the nature of sublanguage performed in the specific settings and purposed through a technological equipment, the intimate relation between language, participants and social encounters demonstrating in discourse structures and linguistic elements as well as the nature of language users who manipulate the language to correspond their basic needs of social interaction in order to effectively accomplish the deemed communication goal. The objectives of the study are to construct the reference grammar of radiotelephony in air-ground communication in four linguistic domains; discourse, lexicon, syntax and morphology and to compare the constructed reference grammar with the actual usage. The study is conducted with two set of data; one is the data of prescribed or defined language accumulated from Manual of Radiotelephony (2006) issued by International Civil Aviation Organization (ICAO) to describe a reference grammar or the norm of linguistic patterns of radiotelephony and two is the data of actual language in air-ground communication collected from cockpit voice recorder (CVR) acquired from two websites which are http://aviation-safety.net and http://www.tailstrike.com accordingly from year 1994-2004 to discover the deviated linguistic properties occurring in actual air-ground communication. The steps of analysis to examine the data from two sources are strictly and separately conducted under the same specific frameworks and criteria.

The main findings of the study has illustrated that reference grammar of radiotelephony is truly represented in rigid set of linguistic properties at all domains acquired from the minimum necessities of the natural English language to create its unique characteristics which some do not exist and commonly determined as ungrammatical features in its corresponding language. The variations in the actual usage are solidly evident at all domains, but there is no absolute indication that they largely occur in syntactic and discourse levels as hypothesized. Most of the evidences illustrate that additional features are commonly from the existing conventional properties from the regular language because of the acquaintance of the customary of the regular patterns which the speakers automatically perform at some points as well as to efficiently fulfill the communicative needs. Therefore, there is a great tendency that radiotelephony will be more united with its corresponding natural language as well as to grow out of its origin since there are also some descriptions expanded from constructed reference. In short, radiotelephony is a sublanguage that continues to develop at all linguistic domains by acquiring more of the governed linguistic properties of natural English language together with extending some features from its confined and unique linguistic patterns.

Department : Linguistics   Student's Signature :

Field of Study : Linguistics   Advisor's Signature :

Academic Year : 2009

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

1.1 Rationale

In a speech community, the essential function of the language in general is to create mutual understanding among members. However, it is widely accepted that even in the same community with monolingual speakers, language variation is a natural phenomenon frequently occurred in a language community. Variations are characterized by having a more or less unitary grammatical, lexical and phonological system to distribute the mutual intelligibility (Corder, 1979:53). Therefore, the language which is somehow different from the language ordinarily used to convey message in particular groups of institutional members is coined as '*sublanguage*', a subset of standard natural language.

The term '*sublanguage*' was introduced by Zellig Harris (1968: 152) to denote a portion of natural language differing from other portions of the same language syntactically and/or lexically. This concept is supported by the circumstances in which languages generally emerge: scientists, technicians, mechanics and people in general establishing communication about a specific subject matter in a professional or erudite way gradually begin to manipulate and adapt the rules of the language they use in accordance with their communicative needs (Barcena & Read, 2000: 355).

Examples of *sublanguages* are the languages of weather reports, aircraft repair manuals, scientific articles about pharmacology, hospital radiology reports, and real estate advertisements (Grishman, 2002).

Most scholars notice and define sublanguage in a way that it is a composite of subsystems of natural language which is the result of communication between specialists, comprising lexemes, morphemes, and constructions that are easily identifiable with a specific human language. The fact that the more specialized and structured the content of the domain is, the more rigid the barriers between what can and cannot be said are. This is why it is easier to recognize a technical or scientific sublanguage as compared to; for instance, a journalistic sublanguage and, in fact, the sublanguage phenomenon is more frequently observed in technical and scientific communication (Barcena & Read, 2000: 355-6).

The previous studies of *sublanguages* mostly centered the languages which are used among professionals in various field such as medical language, scientific language and legal language which they all have important distinctive features in lexical, syntactic and discourse levels (Charrow et al, 1982). At lexical level of sublanguage, the numbers of vocabulary are quite limited and uniquely whereas at

syntactical level is often also categorized by a restricted set of patterns which might be described as a subsystem of natural language or as an independent system.

Consequently, the relationship between a sublanguage and its corresponding standard natural language is not best described as one of inclusion (or complete independence), but as one of semi-autonomy or partial intersection since both lexical and syntactical elements of the language are generally originated and commonly excerpted from the natural language.

One among various sublanguages denoted in the specialized communication setting is '*radiotelephony*', a language particularly used in a conversation conducted between pilots and air traffic controllers or '*air-ground communication*' to maneuver the flight operation in order to ensure safe and efficient performance. Task-oriented, high-workload, and high-technology context is the best description of communication setting in which pilots and air traffic controllers have encountered and the particularized language called '*radiotelephony*' is emerged.

In aviation discourse, there are two prime communication conducted; '*air-ground communication*' and '*pilot-pilot communication*'. The study is highlighted on the first part; 'air-ground communication' and thoroughly focused on its language properties. The fact that *air-ground communication*, tremendously relied on the context of situation in order to interpret the social encounter and explicitly reflected through the special set of linguistic features greatly capture my interest. Furthermore, there are very few studies revealed the genuine characteristics of this particular language which is uniquely created to use internationally for pilots and air traffic controllers around the world.

Generally, linguistic elements of *radiotelephony*, restrictedly used in aviation discourse is mostly delineated as very close to robotic-liked or telegraphic language carried through a limited set of linguistic units, either morphological or syntactical units within the rigid discourse strategies which only few people involving in the same expertise would understand. It is also depicted that linguistic reduction or expansion from its corresponding natural language properties is intentionally regulated to efficiently serve the institutional practice, nature of technological medium, specific characteristic of communication and task objective but there is no strong evidence from any researches to support any of these as most of aviation discourse studies are commonly conformed in three major areas; language use and discourse strategies of pilot-pilot communication (Nevile, 2007), specific language properties of radiotelephony mainly causing miscommunication (Cushing, 1997), and communication strategies of crew coordination in-flight (Dietrich, 2003). The details of each area of the studies will be described in chapter 2. Indeed, none of them centers on analyzing the generalized linguistic elements of *radiotelephony*, especially at micro-linguistic level: discourse, lexicon, syntax and morphology.

With all these restraints; constructed by a small group of professionals, surrounded by and concerned with advanced aviation technologies, conducted in non face-to-face communication context and accompanied by several task loads, have made the language even more interesting in a way that how it is constructed and shaped.

Thus, the detailed study of *radiotelephony* in terms of its linguistic features is extremely in need especially for the educational purpose to elaborately arrange the language curriculum for pilot trainees and experienced pilots to be compatible with the defined language in the manual and its actual usage since there are numbers of reports pointed out that misuse of radiotelephony mostly leads to fatal incidents or accidents (Cushing, 1997: 4). It is undeniable that as long as no such study is conducted, it would be very difficult to detail and set a direction of a curriculum and course content to avoid such communication errors.

To provide a brief background of 'radiotelephony', the context of 'air-ground communication' will be explicitly disclosed. '*Air-ground communication*' is a voice communication carried through radio transmission. Most aircraft are equipped with at least one high-quality radio for a communication which operates in the very high frequency (VHF) radio band. The VHF band is between 108 MHz and 137 MHz, which covers its use for commercial and general aviation, radio navigational aids, air traffic control and others. Aircraft fly high enough so that their transmitters can be received hundreds of miles away. The transmission is controlled by push-to-talk system; therefore the speaker needs to push the button every time in order to relay the message. Otherwise, the message cannot be dispatched to the co-participant.

Since '*air-ground communication*' is a conversational discourse via specific technological equipment, occasionally interrupted with high frequency noise, the communication pattern and the language use are definitely unique. To conduct the efficient air-ground communication, '*radiotelephony*' is deliberately designed for pilots and air traffic controllers represented in narrow, specialized and rigid linguistic subset of English language by the working group of *International Civil Aviation Organization (ICAO)*, named '*International Language for Aviation (ILA)*'. Consequently, linguistic systems of sublanguage are generally based on and extracted from natural language.

However, '*radiotelephony*' is slightly different from the usual description of 'sublanguage', a language which is a result of restriction on and deviation from the standard grammar of a natural language; often grows in a natural way through the use of the standard language, albeit in special circumstances (Lehrberger, 1986 cf. Ciravegna, 1995: 688), as it is <u>not</u> developed naturally from its corresponding language.

Instead, it is carefully constructed by a small group of specialists over a relatively short period of time intending to minimize the complexity and flexibility of

natural language that can arise as a result of ambiguity and misunderstanding. Hence, the property of radiotelephony is rather similar to that of *artificial language* which is as well created in the same way especially with the purpose of reducing the ambiguity of vagueness inherent in natural language that more formal linguistic schemata are commonly used (Frawley, 2003).

However, some of the criteria of artificial language are too narrow to represent the language such as it does not alter in time which means that usage never deviates from the rules which is not quite right for radiotelephony as there is evidence that the deviation as well occurs. As a result, I prefer coining radiotelephony as one of those sublanguages which is highlighted by its ultimate purpose of being an international language which has to be taught to every pilot and air traffic controller, native or non-native, in any ground training school. Nonetheless, this particular conflict will be further discussed in chapter 2.

To discover the genuine linguistic characters of radiotelephony, the reference properties are defined and compared with the actual ones. It is not only to describe the language as the way it is prescribed but also to unveil the possible differences at several language domains when radiotelephony is conducted in authentic communication. Therefore, the study is carried out in two major parts. First, the language samples in '*Manual of Radiotelephony*' issued by the International Civil Aviation Organization (ICAO) is analyzed in order to exhibit reference linguistics features of this particular sublanguage at four different domains; namely discourse, lexicon, syntax and morphology. Second, the language samples in actual usage collected from numbers of cockpit voice recordings is analyzed accordingly in order to compare whether there is any deviation occurred from its reference linguistic patterns.

However, the deviation occurred in actual '*radiotelephony*' is hypothesized with reference to my pilot study, that it *possibly* come off at four linguistic domains which potentially leads to the development of its features to be closer to its corresponding natural language (standard English language) and eventually becomes a *natural sublanguage* with extended morphological and syntactical features relatively to the linguistic properties of standard English language. Hence, the proportion of shared linguistic elements between them is probably at higher rate, but some of special terminologies and particular syntactical constructions of radiotelephony still remain.

Four different domains of the analysis both to explicitly and elaborately illustrate reference features and to compare between the reference and the actual features are discourse, lexicon, syntax and morphology. The analysis is conducted in accordance with descriptive method correlated to linguistic theories and specialized knowledge in the field of aviation which are briefly explained as follows.

The very first area of analysis is at discourse level. To unveil *discourse organization* of air-ground communication, generated through specific medium in defined situational parameters, Model of Conversational Analysis developed by Sinclair & Coulthard (1974) is applied altogether with conventional concepts of turn organization and moves (Sacks et al., 1974). The model will be simplified to be more cooperative with the uniqueness and rigid discourse of air-ground communication. The study on this part is carried out to provide clearer picture of how the discourse is organized in air-ground communication in which the sublanguage as radiotelephony is conducted.

Again, the data from both resources is patternized to demonstrate the reference discourse structures and how they are applied in the natural setting. The study on this part is carried out to provide clearer picture of how the discourse is organized in air-ground communication in which the sublanguage as radiotelephony is conducted. Even though discourse organization of air-ground communication may not exhibit a vast variety when comparing to the natural language, it is expected to show the rigid and systematic sequence of organization in the discourse.

To analyze at lexicon level, all the words and phrases appeared in the manual is listed and grouped in accordance with its prime conceptual reference and then defined in alphabetical order. After that, they are classified with reference to the three main word-formations according to Shortis (2001): *composite*, *shift* and *shortening* respectively to statistically demonstrate the most frequent formation utilized to build words in radiotelephony. Since it is said that sublanguage has a higher average word length than natural language as the new words are created in the specific formation in order to cope with the fast development of science and technology which is the core of the language itself (Sager et al, 1980:42). Again, to prove such claim, the strong evidence from the finding is substantially required.

The criterion of word-formation is also used with the data documented from authentic voice recording to point out whether there is any new lexical item which is not issued in the reference language arisen from the actual context. However, it is predicted to be very less number because it is highly possible that the same group of words is effectively functioning to fulfill the participants' needs to achieve communication goal in flight operations.

Next, syntactical patterns of radiotelephony are examined to discover its syntagmatic and paradigmatic relations, regarding to communicative functions and grammatical properties consecutively. According to several studies of sublanguage, syntactical properties are always confined in a small set of grammar rules which is certainly not conventional sentences created as in its corresponding natural language. In other words, the syntactic pattern of sublanguage is minimized to suit the distinct area of usage within the specific field of knowledge as well as to reduce ambiguous or cumbersome in natural syntax.

The analysis is conducted under the belief that the syntactical pattern of the sublanguage is minimized more than maximized when comparing to its traditional syntactical features, by creating the test frame, the traditional grammatical device to categorize form-classes or parts of speech by focusing on its position in the set frame to illustrate the restricted sets of form-classes comparing to those in its corresponding language as well as to learn its sentence components.

Both data accumulated from the manual and an actual voice recording is carried out under the same framework. The finding of the data from the manual is used as a reference syntactical construction of radiotelephony, whereas the finding of the data from voice recording will be used to prove whether there is any variation occurred in the actual usage of the language as it is hypothesized that the changes emerged in the authentic usage somehow extend language properties of the sublanguage to be much united with its corresponding natural language.

The very last area of the study is at morphological level; the traditional analysis of morphemes, compare and contrast (Nida, 1949), is complied to discover the functions and appearances of those specific grammatical bound morphemes, one of the prime characteristics of natural English language It is predicted to be at very least numbers of grammatical morphemes as to refrain from linguistic complexity.

In conclusion, the analysis of radiotelephony, engaged in air-ground communication, is deliberately conformed in four crucial linguistic domains; discourse, lexicon, syntax and morphology by examining two sets of data; one from the manual and another from the actual communication. It is to aim at demonstrating the entire reference linguistic properties and its distinct characteristics as well as the conceivable deviation occurred at each domain, in order to explain and describe; (1) the nature of sublanguage performed in the specific settings and purposed through a technological equipment, (2) the intimate relation between language, participants and social encounters in terms of linguistic elements and discourse structures and (3) the nature of language users who manipulate the language to correspond their basic needs of social interaction in order to effectively comprehend the conveyed message without miscommunication to accomplish the communication goal.

1.2 Objectives of the Study

1. To construct the reference grammar of radiotelephony in air-ground communication in four linguistic domains, namely discourse, lexicon, syntax and morphology.
2. To compare the constructed reference grammar with actual usage.

1.3 Statements of Hypothesis

1. The grammar of radiotelephony has distinctive characteristics at all linguistic levels and exhibits properties of a sublanguage.
2. Actual usage of radiotelephony deviates from the constructed reference grammar the most at the syntactic and discourse levels.

1.4 Scope of the Study

Data of prescribed or defined radiotelephony from *Manual of Radiotelephony (2006)* issued by International Civil Aviation Organization (ICAO) whereas data of actual language is collected from cockpit voice recorder (CVR) recorded in the blackbox which is the device consisting of microchips to digitize and store flight data and voice in the cockpit throughout the entire fight. The communication in the blackbox will be transcribed only when the crash takes place by the National Transportation Safety Board (NTSB), the international organization which is responsible for the investigation of every air incident and accident. The data is acquired from *http://aviation-safety.net* and *http://www.tailstrike.com*.

1.5 Definitions of Terms

1. *Air-ground communication* is one of the two crucial parts of aviation discourse. It is a conversation conducted between a pilot and an air traffic controller through the radio transmission to maneuver the flight operation from the beginning to the very last phase of flight to guarantee the absolute flight safety.
2. *Prescribed/defined language* is a particular set of linguistic units and discourse structures which is specifically initiated for the particular purpose in air-ground communication between pilots and air traffic controllers during flight operations. The set of designed language is created by the international organization named 'International Civil Aviation Organization (ICAO)'. It is restrictedly required for every commercial pilot to perform the language according to the manual of radiotelephony.
3. *Radiotelephony* is the term to call the sublanguage conducted between pilots and air traffic controllers in air-ground communication.
4. *Sublanguage* is a subvariety of language used in a particular field in specific subject matters by a particular social group within the array of specialized purpose. The language used to communicate mostly in a specialized technical and scientific domain; for example, the language of weather reports, expert scientific polemic, biomedical domain, radiological reports, etc. They are not

constructed as formal languages but grew through the use of a natural language for communication in limited fields within restricted set of morphology, syntactical patterns and discourse features.

5. *Artificial sublanguage* is not purely evolved from the natural language, but deliberately designed and constructed by a small group of people with the ultimate purpose of being an international language. The language system is as well restricted in a distinct and narrow set of linguistic elements derived from its corresponding natural/standard language.

1.6 Significance of the Study

1. To set an appropriate language curriculum with reference to essential linguistic elements for pilots in order to enhance their proficiency in communicative skills especially when applying radiotelephony during the flight operation.

2. To help improve the language system of radiotelephony defined and used in air-ground communication to prevent misunderstanding.

CHAPTER II

THEORETICAL BACKGROUND

2.0 Introduction

In this chapter, theories, concepts, methodologies and relevant studies will be reviewed as a framework in order to accomplish the objectives of the study and to conduct four linguistic domains of analysis; namely discourse, lexicon, syntax and morphology.

The review consists of the concepts of sublanguage to provide a general prospect of the distinctive characteristics of radiotelephony which is the focal of the study along with the notions of specific paradigm applied in the study which are carefully selected to be able to reflect the nature of radiotelephony; theories of conventional discourse analysis and Model of Conversational Analysis developed by Sinclair & Coulthard (1974) to illustrate exchange patterns at discourse level, a framework of word-formation classification to describe the terms at lexicon level, a perspective of test frame to examine syntactical properties and arrangements at syntactical level and a concept of morphological analysis device to investigate distinctive affixation morphemes at morphological level accordingly.

2.1 Concepts of Sublanguage

A community of speakers is normally linked by some common knowledge, which somehow goes beyond that of speakers of the standard language. This concept of sublanguage is supported by the circumstances in which sublanguages generally emerge. The scientists, technicians and people in general establishing communication on a specific subject matter in a professional or erudite way gradually begin to manipulate and adapt the rules of the language they use in accordance with their communicative needs (Barcena & Read, 2000: 355). The term '*sublanguage*' was made known by Zellig Harris (1968: 152) who used the term to describe a portion of natural language differing from other portions of the same language syntactically and/or lexically. To explicitly comprehend the sublanguage, several definitions from different scholars are posited below;

(a) 'When natural language is used in a sufficiently restricted setting, we may be justified in calling the resultant forms a sublanguage.' (Kittredge, 1982: 79)

(b) 'Sublanguages occur for specialized social and work groups such as weather reports or stock quotes which may have quite large grammars and lexicons or relatively simple ones.' (Sidner & Forlines, 2002: 4)

(d) '[A sublanguage is] the particular language used in a body of texts dealing with a circumscribed subject area (often reports or articles of a technical specialty or science subfield), in which the authors of the documents share a common vocabulary and common habits of word usage.' (Hirschman & Sager, 1982: 28)

(e) 'A sublanguage is the specialized form of a natural language which is used within a particular domain or subject matter. Examples of sublanguages are the languages of weather reports, aircraft repair manuals, scientific articles about pharmacology, hospital radiology reports, and real estate advertisements. A sublanguage is characterized by a specialized vocabulary, semantic relationships, and in many cases specialized syntax.' (Grishman, 2002)

(f) 'A sublanguage is a language resulting from restriction on and deviation from the standard grammar of a natural language; often a sublanguage grows in a natural way through the use of the standard language, albeit in special circumstances' (Lehrberger, 1986 cf. Ciravegna, 1995: 688)

(g) Sublanguages are defined as 'those sets of sentences whose lexical and grammatical restrictions reflect the restricted sets of objects and relations found in a given domain of discourse.' (Kittredge & Lehrberger, 1982: 2)

As the matter of fact, sublanguage can be considered very close to natural language which is used among a particular group of people in a particular area or what we have known as '*dialects*' as mentioned by Sager, Dungworth and McDonald (1980: 63) that dialects form a contrasting set of sublanguages used by geographically determined speech communities as well as they are comparable linguistically by formal similarities, pragmatically by mutual intelligibility, historical and political criteria. *Sociolects* are also concluded as sets with in dialects according to Sager, Dungworth and McDonald (1980: 63). They reflect the social structure of a speech community and can be described with regard to their distance from or proximately to sociolinguistic concept of '*standard*' language, which is the norm of natural language based on a single or an amalgam of sociolects.

Nonetheless, most scholars notice and define sublanguage in a way that it is a composite of subsystems of natural language which is the result of communication between specialists, comprising lexemes, morphemes, and constructions that are easily identifiable with a specific human language. The fact that the more specialized and structured the content of the domain is, the more rigid the barriers are between what can and cannot be said. This is why it is easier to recognize a technical or scientific sublanguage as compared to; for instance, a journalistic sublanguage and, in fact, the sublanguage phenomenon is more frequently observed in technical and scientific communication (Barcena & Read, 2000: 355-6).

In short, sublanguage is a subset of a natural language used to converse in specific subject matters by a particular social group or professional, mostly in a specialized technical and scientific domain within the array of specialized purpose; for examples, the language of weather reports, expert scientific polemic, biomedical domain, and radiological reports as well as the language used in banking or veterinary medicine or naval architecture. However, they are not constructed as formal languages but grew through the use of a natural language for communication in limited fields (Grishman & Kittredge, 1986: 19) within a restricted set of morphology, syntactical patterns and discourse features.

Accordingly, since they commonly arise in the field of science and technology, the system also permits the specialists who use the language to 'pack' the relationship among complex concepts into single concepts with specific word formation and derivation techniques in order to make them transparent and easy to understand. Most studies of sublanguages conformed in several fields of professions illustrate the fact that sublanguages have own important and distinctive features in lexical, syntactical and discourse levels with a low level of language complexity which strongly support the concept of language *packing*.

Sublanguage is also categorized by the high frequency of specialized terminology as formerly stated and often also by a restricted set of syntactical patterns which might be described as a subsystem of natural language or as an independent system. Nonetheless, it is often believed that sublanguage grammars would derive from natural languages simply by deleting a number of rules that are not relevant. As in the notion of sublanguage which has also been lately applied to the language of certain scientific and technical areas, the characteristics of sentential units may be shortened to an extent for rapid communication and maximum precision that they cannot be considered as grammatical utterances in the standard natural language; for example, if they have determiners, auxiliaries or main verbs omitted (both deleted from general rules), modification of others to cover particular cases and insertion of new ones are usually required for a complete description of a sublanguage (Barcena & Read, 2000: 356).

Gerr (1942) viewed the characteristics of *language of Science and Technology* which is considered as a core of sublanguages that it consists of three elements;

(1) An increase in the *size and complexity of vocabulary* to keep pace with a growing body of knowledge, for instance, compounding, the combination of two or more words into a new syntagmatic unit with a new meaning independent of the constituent parts, is common to both natural and sublanguage but in a sublanguage, compounds are created more systematically and regularly to fit into terminology system. They are generally developed from regular occurring collocations and

convert phrases into fully lexicalized or terminologized units, e.g. a *stud* for *clamping* – '*clamping stud*', a *bearing* with *needle roller* – '*needle (roller) bearing*', etc. Some compounds which are bounded together may elide an unstressed vowel or a consonant, making pronunciation difficulty. Additional consonant or vowel are inserted for reason of euphony, e.g. cell-*o*-phone, electr-*o*-motive, speed-*o*-meter, draught-*s*-man, craft-*s*-man, etc. (Sager et al, 1980: 265-6);

(2) The rationalization of this vocabulary through the *multiplication of functional or operational terms* such as *speed* and *velocity* used often synonymously in general reference but in special reference, *speed* is usually reserved for the rate at which a body moves whereas *velocity* includes consideration of direction movement;

(3) The rationalization of linguistic formulation as a whole through *progressive reduction of syntactic complexity to the absolute minimum established* by the requirements of formal logic analysis and expository, as well as through the extended use of functional terms. For example, declarative sentence is the vast majority of sentences in the discourse in accordance with the strong information intention of the language. The formulation is simply constructed, consisting of two nominal linked by verbs such as be, have or give, e.g. '*Natural rubber is a polymer of isoprene.*', '*Each control system has a conventional tape reader.*', '*This design gives very low backlash.*', etc. (Sager et al, 1980: 186-7).

Therefore, in general, the relationship between a sublanguage and its corresponding standard language is not best described as one of inclusion (or complete independence), but as one of *semi-autonomy* or *intersection*. Sager (1986: 4) also supported this claim that a sublanguage grammar is not necessary 'a subset of the grammar of the parent (or natural) language and in fact intersects it'.

Consequently, even if sublanguage is certainly a mean of linguistic communication required for conveying special subject information among specialists in the same subject and certainly, under the same specialized purpose, there is also the constraint of the language that it cannot be used outside the context where the language is constructed since the very beginning. Then, the possible conversations are not as natural and free flowing as a full natural language (Sidner & Forlines, 2002: 4). Mackey & Mountford (1978: 5) also supplemented that a restricted language as sublanguage would not allow the speakers to communicate effectively in novel situations, or in contexts outside vocational environment. Indeed there are very few contexts for which a restricted repertoire is entirely satisfactory.

2.1.1 Properties of Sublanguage

Generally, there are six domains of language properties of sublanguage with reference to Kittredge (1982) and Lehrberger (1981):

(1) *Restricted domain of reference and morphological characteristics*: The set of objects and relations to which the linguistic expressions refer is relatively small. The most obvious feature of the sublanguage is its specialized lexicon. Not only is the set of word forms and their possible meanings highly restricted, but the productive word-formation rules may be of a particular kind, sometimes unique to the sublanguage or to a family of related sublanguages.

Texts in medicine and pharmacology; for example, may contain a rich variety of names for diseases and drugs, which are constructed using characteristic affixes. According to the study on *biomedical language* (Friedman, Kra and Rzhetsky, 2000: 225), within specialized domains, words often take on different meanings than in the general world domain, and therefore specialized domain vocabularies are needed to process domain text. For example, in the clinical domain *capsule* may denote a body location component whereas in natural domain, it represents a small container which has a measured amount of a medicine inside and which dissolves when swallowing it.

In multi-word terms, the issue is more complex because a term may have a meaning that is compositional and therefore denotes the meaning of the components, or that is non-compositional and denotes something different than the combined meaning of the components. For example, in radiological reports of the chest, *'no active disease'* not only means that there is no current disease activity but also denotes that there are signs of a previous condition in the X-ray. Thus, the phrase *'no active disease'* takes on a specialized meaning in the domain as if it were a single word.

According to the work of Mellinkoff in '*The Language of the Law*', there are six characteristics of vocabulary identified in legal language (cf. Charrow et al, 1982):

a) Frequent use of common words with uncommon meaning (using *action* for *lawsuit*, *of course* for *as a matter of right*, etc.)

b) Frequent use of Old and Middle English words once in use but now rare (*aforesaid, whereas, said* and *such* as adjectives, etc.)

c) Frequent use of Latin words and phrases (*in propria persona, amicus curiae, mens rea*, etc.)

d) Use French words not in the general vocabulary (*lien, easement, tort*, etc.)

e) Use of terms of art (*month-to-month tenancy, negotiable instrument, eminent domain*, etc.)

f)   Use of argot: words and phrases (*pierce the corporate veil, damages, due care*, etc.) or '*professional language*' used by a particular group of people in-group communication and not easily understood by others.

These characteristics of lexemes in legal language is rather complicated with the combination of several borrow words from different natural languages. As mentioned, at lexical level of sublanguages, the numbers of vocabulary are quite *limited* and *unique* confined in a small set related to the particular professional subject matters in a specific context comparing to the set in natural language.

Military sublanguages make frequent use of acronyms, a word-formation that takes the first letter of each word in a compound word or noun phrase and use them to make a word, which obey describable rules of noun phrase formation in the grammar. This also frequently found in the *language of ICT* (Information and Communication Technology) (Shortis, 2001: 59) such as RAM (random access memory) and ROM (read only memory). Many sublanguages employ symbolic expressions such as mathematics or abbreviations which can be shown to have their own morphological characteristics.

As well as that it allows *verbs to be neither transitive nor intransitive*, e.g., the verb *procure* can be either 'transitive' as in 'He *procures* work', or 'intransitive' as in 'They *procure* at the airport' in standard language but in Navy message, the verb *procure* has only the transitive form as in 'Attempt to *procure* parts locally'.

The lexicon in sublanguages can also be deviated from their general semantics or senses and functions in natural language; for example, *overhead* is an adverb in standard English which is extended to be a preposition in the corresponding sublanguage used by airline pilots, as in 'Our route tonight takes us *overhead* Paris'; and in the medical diagnosis sublanguage an additional transitivity pattern is needed for the verb *to present* as in 'The patient *presented* with the following symptoms'.

All in all, the characteristics of lexicons appeared in sentences in the domain of sublanguage are vocabulary set is limited, word usage has distinctive patterns and semantic ambiguities are rare

(2) *Restricted domain of syntactic construction*: Early work on restricted language has shown that the syntactic description of a naturally occurring sublanguage may differ significantly from that of an unrestricted language. In the highly constrained style of weather bulletins, there is little resemblance between the syntactic structure of telegraphic forecasts and that of general language. In less stereotyped sublanguages such as medical records, there may be both elliptical sentence forms and their full sentence paraphrases in the sublanguage.

Most sublanguages of English observe the syntactic patterns of '*standard*' English but may differ markedly in the frequency of usage of various constructions. For example, many of the question forms, stylistic inversions, and exclamatives of conversational English are totally absent from technical literature. Grammars for processing technical language may therefore delete the similar production rules for analysis in technical domains.

Montgomery & Glover (1986), syntactical patterns of '*Reporting and analysis of space events*' are mostly in passive construction, e.g., 'TERREX 492 WAS DEORBIED INTO THE DELTA CONFEDERATION EARLY ON REVOLUTION 85'. The study of *telegraphic sublanguage* (Navy message) conducted by Fitzpatrich et al (1986: 42-3) also described the limited characteristics of sublanguage grammar in three patterns, the *gapped object*, e.g., 'Attempt to procure _____ locally to deliver _____ on 05 April', *passive construction*, e.g., 'The ship was left…' and *middle verb data*, e.g., 'A five inch *split* in hull opened' as well as allowing *verbs to be neither transitive nor intransitive*, e.g., the verb *procure* can be either 'transitive' as in 'He *procures* work', or 'intransitive' as in 'They *procure* at the airport' in standard language but in Navy message, the verb *procure* has only the transitive form as in 'Attempt to *procure* parts locally'.

Fitzpatrich, Bachenko and Hindle (1986) has studied the characteristic of telegraphic language as Navy message sublanguage and found out that its syntactic construction is difficult to describe because it has no internal consistency independent of the standard of natural language. Furthermore, telegraphic sentences are mostly in reduced forms which in fact occur also in natural language in a certain context. One of the syntactical pattern of telegraphic language is *gapped objects*; for example, '72 manhours expended to correct _____.' and 'Attempt to procure _____ locally to deliver _____ on 05 April.', *passive construction*, e.g., 'The ship was left…' and *middle verb data*, e.g., 'A five inch split in hull opened' as well as allowing verbs to be neither transitive nor intransitive, e.g., the verb procure can be either 'transitive' as in 'He *procures* work', or 'intransitive' as in 'They *procure* at the airport' in standard language but in Navy message, the verb *procure* has only the transitive form as in 'Attempt to *procure* parts locally'.

A sublanguage may differ from the whole language by omitting some grammatical properties of the language or by allowing different reductions. The domain-specific syntactic constraints and reductions are not necessarily the same as those of general English. Friedman, Kra and Rzhetsky (2000: 224) have observed this feature within the clinical domain as many well-formed sentences are telegraphic, in that there often are missing subjects and verbs, because that information is implicit in the context. For example, in a section of a report corresponding to *chief complaints*, sentences may consist of noun phrases only. In

this context a noun phrase, such as *pain*, has an operator, such as *is associated with the patient*, which is expected in this context and therefore can be omitted.

On the other hand, some sublanguages may use syntactic constructions unknown in the general language, in which case the appropriate productions must be included in the sublanguage grammar. In addition, the use of tense or tense may also vary to fit a distinctive pattern.

As a result, the application of a standard grammar rule of natural language to a specific sublanguage possibly leads to an ungrammatical sentence in that sublanguage or vice versa since some of the rules are not to be found while other rules are to be designated where should not present in natural language; for example, the omission of articles, a mixture of numbers and letters, direct object omission in transitive verbs is unacceptable in standard French but common in French cooking recipes; in Spanish job ads, any part of speech can be capitalized in order to stand out visually (Barcena & Read, 2000: 356).

(3) *Restricted domain of discourse considerations*: Recent research has shown that the way in which sentences are combined to form coherent text can vary considerably from one sublanguage to another. Separate sublanguages may make different use of a language's linguistic means of textual cohesion. Certain technical sublanguages contain no occurrences of anaphoric pronouns, while others make use of special anaphoric devices. Even when a technical sublanguage uses pronominal anaphora, it often appears that the sublanguage effectively restricts it to cases where the antecedent noun phrase occurs in the preceding sentence or even in an earlier clause in the same sentence.

In any given language, the semantic coherence and grammatical cohesion of a text can be signaled by a variety of linking devices. Each sublanguage seems to make a rather distinctive and limited selection such as in stock market reports which avoid repetition of the same verb in successive sentences by using synonyms instead, whereas technical manuals apparently avoid synonymy at the expense of lexical repetition.

Within this domain, sublanguages also possess the distinct discourse structure or organization varied from one to one. The organization of sublanguages are constructed to be compatible with its restricted contexts and professions which is, of course, several rules have to be applied differing from natural language that the organization is totally based on the basic principle of natural communication. For example, news interview, a unique sublanguage, has got a specific turn-taking organization. It exploits only question-answer exchanges to form a particular turn-taking system in the discourse. Interviewers restrict themselves to questioning and interviewees restrict themselves to answering the questions, or at least responding to

them (Heritage, 1998: 6-7). In natural language, a restricted organization like this barely occurred.

(4) *Restricted purpose and orientation*: The relationships among the participants in the linguistic exchange are of a particular type and the purpose of the exchange is oriented towards certain goals.

(5) *Restricted mode of communication*: Communication may be spoken or written, but there are constraints on the form of expression, which may include 'bandwidth' limitations. Compressed or telegraphic language forms may reflect the time and space constraints of certain communication modes.

(6) *Community of participants sharing specialized knowledge*: The best canonical examples of sublanguages are those for which there exists an identifiable community of users who share specialized knowledge and who communicate under restrictions of domain, purpose, and mode by using the sublanguage. These participants enforce the special patterns of usage and ensure the coherence and completeness of the sublanguage as a linguistic system.

These are all the domains which obviously make the languages different from the natural language. 'Radiotelephony', a language for pilots and air traffic controllers, is unquestionably categorized as *sublanguage*. Mackey & Mountford (1979:4) also supported the claim that the language of international pilot-air traffic control which could be regarded as '*special*', in the sense that the repertoire required by the controller is strictly limited and can be accurately determined situationally. The language is uniquely created within narrow, specialized and rigid subset of linguistic features of English language by the organization named *International Civil Aviation Organization (ICAO)*.

2.1.2 Radiotelephony as a Sublanguage

According to the way radiotelephony is constructed, it causes the language be rather distinct from any other sublanguage as radiotelephony is not purely evolved from the natural language, but it is deliberately designed and constructed by a small group of people (an international organization in this case) with the ultimate purpose of being an international language used by pilots and air traffic controllers around the world in order to not only ease the difficulty in communication among various nationalities but also to reduce complexity and flexibility of natural language causing confusion and misunderstanding. Since it is basically defined that sublanguage is commonly and naturally emerged from its corresponding language, classifying radiotelephony as a sublanguage would be in question.

According to this matter, it seems that radiotelephony is pretty close to one of the crucial properties of an artificial language since it is a planned, constructed,

or invented language which intends for communicative use between humans through specific purpose or intellectual agency which has deliberately designed by one person or a small group of people over a relatively short period of time rather than having naturally evolved as part of a culture as with natural language based on a set of prescribed rules.

However, some of the criteria of artificial language are too narrow to represent the language such as it does not alter in time which means that usage never deviates from the rules which is not quite right for radiotelephony as there is evidence that the deviation also occur. For example, conjunction '*and*' is used in the language referring to Nevile (2006:279) even though it should be omitted according to the restricted domain of syntactic construction. Nevile stated that '*and*' is a local means for maintaining an ongoing sense of pilot's conduct of a flight as a whole. They use '*and*' to pilots present some new talk or task as connected in a larger macro-sequence of work for their flight. It is evidence of pilot's orientation to sense of sequence that can extend well beyond pairs of turns at talk and allows pilot to make salient the sequentially of their work where the officially prescribed wordings, it must be left out.

Consequently, to categorize radiotelephony as an artificial language does not exactly cover its properties. Also, when the artificial language is mentioned, it mostly indicates to computer programming language or specific language which is purely invented by no means of naturalness of language and communication principle, coined '*priori*'. Indeed, radiotelephony is the language that is traveling almost to the boundary of being an artificial language because of its originality.

Despite unique properties and constraints of radiotelephony, I determine to categorize radiotelephony as *sublanguage* since the term somehow explicitly describes a prime concept of radiotelephony well.

To elaborately describe brief language properties of radiotelephony, the six domains of language characteristics according to Kittredge (1982) and Lehrberger (1981) are unfolded as follows:

(1) *Restricted domain of reference and morphological characteristics*: As any other sublanguages, radiotelephony is claimed to possess small set of objects and linguistic references. Its specialized lexicon and specific word-formation are the highlight features of this language. Numbers of lexicons are formulated with some particular word-formations to express the specific objects, technologies, flight procedures and information related to the field of aviation. Therefore, the formation of lexicon in radiotelephony has to be examined.

(2) *Restricted domain of syntactic construction*: The syntactic patterns of sublanguage very much differ from the natural language as some grammatical properties of the natural language are omitted or reduced in order to avoid

ambiguity and redundancy as the context becomes more predictable in a small circle of a specialist user group (Sager et al, 1980).

According to ICAO Standards (Annex 10) that currently prescribed the application of radiotelephony, there is a small set of syntactic rules. These rules sometimes are proclaimed not a subset of the general grammar of its corresponding language since they are specific differing from the grammar of the natural language as a whole.

Consequently, this is one of several reasons why radiotelephony is very unique in terms of its outstanding and extraordinary language properties. However, whether the language contains the same syntactical features as stated is left unanswered for now.

(3) *Restricted domain of discourse considerations*: The same as any technical sublanguages, radiotelephony is claimed to exhibit the importance of *sequencing* in the discourse. Organization within the discourse is also rigid because of the constraints of communication mode, mean and time limit. Radiotelephony is based on the non face-to-face communication which the participants are only able to commute restrictedly by the mean of orality or verbal acts since the communication is performed through radio transmission. Hence, the organization of turns is possibly confined to diminish the constraints and smooth the communication.

(4) *Restricted purpose and orientation*: The role of air traffic controller is to manage and control the traffic over the airspace whereas pilots have to control the aircraft and periodically follow the instructions. Both share the same ultimate goal, a safe journey to the destination somehow through making the professional conversation.

(5) *Restricted mode of communication*: Communication is solely in a spoken mode, but there are constraints on the form of expression because of the limitation of a communication mean, radio transmission, which will be recorded through the entire flight. The recording is used only when there is an incident or accident.

This is considered as a special feature of radiotelephony as the mode of communication is involved in the way that the language is constructed. Sager et al (1980) extended this particular point that the intervention of machines as mediators between speaker/writer and listener/reader has led to a new range of techniques of communication and rearranging the numerical and temporal relationships between senders and recipients of messages which it is very influential in the linguistic formulation of the content as well as the choice of terminology and expression.

(6) *Community of participants sharing specialized knowledge*: radiotelephony is the language used among pilots and controllers in order to perform a specific task towards a specific purpose. The language supposes to be strictly conformed only in the aviation industry during the working period of flying.

The participants need to have mutual specialized knowledge, comprehend the special patterns and acquire linguistic features of the language.

It is rather similar to other sublanguages that to acquire the sublanguage, people are trained to firstly become specialists of special subjective language. Thus, the acquisition of sublanguage is a matter of conceptual learning which is gradually developed beyond the basic needs of communication in specific situation. In this case, they all are trained in the training school to acquire the distinct linguistic constructions and practices before the actual flight. Hence, some parts of the distinct language patterns might not be able to easily comprehend by the outsiders especially their restricted domains of morphological characteristics, syntactic construction and discourse.

Therefore, it would be appropriate to define radiotelephony as a *sublanguage* which contains specific sets and rules of linguistic properties as well as the domain of usage and confined mutual knowledge that the participants of these languages have to acquire and share which the detail of each linguistic domains has to be clearly examined to prove whether it is demonstrated as claims or not.

Next, the concepts of discourse analysis and involved theories and methodologies are demonstrated to clarify the very first domain of the study which is to describe the uniqueness of the discourse structure where radiotelephony emerges.

2.2 Concepts Related to Discourse and Discourse Analysis

To comprehend the basic concepts of air-ground communication, some background of relevant theories concerning 'discourse' is orderly explicated. It is to increase understanding in the factors concerned in the analysis of the first domain of the study. First, the concept of discourse in general, the involvement between discourse and technology as well as characteristics of spoken discourse are demonstrated to provide the brief insight in the way that they help contributing in shaping incomparable air-ground discourse structure, and then concepts of conversational analysis in discourse analysis as well as methodologies to accomplish in analyzing the air-ground discourse structure are elaborately described.

2.2.1 Discourse

At first, the concept of discourse should be explicitly clarified. Many linguists has generally defined 'discourse' as anything beyond the sentence, language use and a broader range of social practice that includes nonlinguistic and nonspecific instances of language (Schiffrin, Tannen & Hamilton, 2003:1). Moreover, as the language is used to accomplish social actions, such actions are as an integral part of discourse: actions are achieved in culturally defined interactional contexts in which what one person does is treated as a basis for what another does (Schiffrin, 1992:12).

Johnstone (2002:2-3) also defined discourse in the same way – discourse usually means actual instances of communication in the medium of language; no matter they are talking, writing or signing which involve patterns of belief and habitual action as well as patterns of language. It is an idea as well as ways of talking that influence and is influenced by ideas.

There are more concepts of 'discourse' coined by several linguists as follows:

Brown & Yule, (1983:1): The analysis of discourse is, necessary, the analysis of language use. As such, it cannot be restricted to the description of linguistic forms independent of the purposes or functions which those forms are designed to serve human affairs.

Gee (1999:25): Discourse always involves more than language. It always involve coordinating language with ways of acting, interaction, valuing, believing, feeling, with bodies, clothes, non-linguistic symbols, objects, tools, technologies, times and places.

Van Dijk (1997:1): Discourse usually refers to a form of language use, public speeches or more generally to spoken language or ways of speaking. The participants are doing something, that is, something else beyond just using the language in order to communicate ideas or beliefs (or to express emotion), and they do so as a part of more complex social events. To sum up, the concepts of discourse are in three dimensions; language use, the communication of beliefs and interaction in social situations

In brief, discourse is factual illustration or real world data as a linear sequence of smaller units, e.g. sentences, turns, propositions produced in communication to perform social interaction which is, indeed, beyond the sentence or linguistic pattern. Discourse, by no mean, is shaped by the world, language, participants, prior discourse, its medium and purpose or vice versa. Hence, it would be implied that the study of discourse leads us to the unveiled truth about ourselves.

Discourse is categorized into two major types; spoken discourse and written discourse. Common spoken discourse which scholars pay highly attention

to, is commonly known as 'conversation'. Several linguists share their concepts on 'conversation' as in the following;

Schiffrin, 1988:253: Conversation is also any discourse which produced by more than one person. Discourse, then, includes both dialogic and monologic forms in either spoken or written modes; conversation includes just spoken dialogue.

Stubbs (1993:21): Conversation is a joint production…it means that speakers must understand their audience: they must have some idea what the audience already knows and what they want to know, and therefore of how to select and present information.

Have (1999:3-4): Conversation is one of the most mundane of all topics which is chaotic and disorderly. People are talking with each other, just for the purpose of talking, as a form of 'sociability', or it can be used to indicate any activity of interactive talk, independent of its purpose.

Thornbury & Slade (2006:5-8): Conversation accounts for the major proportion of most people's daily language use. It is spoken and takes place spontaneously in real time and a shared context. In addition, it is interactive, jointly constructed and reciprocal as well as informal and a critical site for negotiation of social identities. Its function is primary interpersonal and to express wishes, feelings, attitudes and judgments.

Schegloff (1992) has called this social phenomenon 'Talk-in-action' which is the fundamental resource through which business of societies is managed, their cultures are transmitted, the identities of their participants are affirmed, and their social structures are reproduced.

It can be concluded that conversation is one among other spoken discourse which is tightly bound language, participants, social construction together. People express and exchange knowledge, information, identities, thoughts, emotion and more by the mean of orality to preserve their social relations and accomplish the interaction goal.

The study of spoken discourse is mostly conducted in general social context as in ordinary conversation, not until the late 1970s that the study of 'institutional conversation' began to emerge focused on more restricted context of particular social construction such as conversation in law courts, classroom, news interview, operation room, commercial aircraft, etc.

The 'ordinary conversation' and 'institutional conversation' are defined as 'master institution' and its more restricted local variants accordingly…'ordinary conversation' encompasses a vast array of rules and practices, which are deployed in pursuit of every imaginable kind of social goal, and which embody an indefinite array of inferential frameworks. 'Institutional conversation', by contrast, generally

involves a reduction in the range of interactional practices deployed by participants, restrictions in the contexts they can be deployed in, and it frequently involves some specialization and respecification of the interactional relevance of practices that remain (Heritage, 1998 and Drew & Heritage, 1992).

'*Air-ground communication*' is also one of the spoken discourse which is certainly considered as '*institutional conversation*' since it is conducted in specialized and restricted speech setting; task-oriented, high-workload, and high-technology context of in-flight operation. The participants have to handle numbers of restrictive tasks and information from different resources to finally achieve the same ultimate goal; ensuring safe and expeditious performance in maneuvering the flight smoothly to the destination. Air traffic controller instructs and directs the movement of the aircraft on and in vicinity of an airport and over the airspace whereas pilot conform standard callouts, state intentions, ask questions, and convey information. Furthermore, the conversation is restrainedly initiated through radio transmission which even makes the discourse in high level of uniqueness as only oral mode must be performed.

Indeed, the language structure and organization at discourse level used in the conversation especially in air-ground communication is not the same as those in any other communication context.

2.2.2 Discourse and Technology

To comprehend the relation between air-ground communication discourse and its particular mean of interaction through artificial medium as radio transmission, the general concept of discourse and technology will be examined.

All discourse is mediated in one way or another; no matter what the medium of communication is, it affects discourse. Each set of technological constraints means a different set of possibilities, preferences, and restrictions. For example, whereas face-to-face communication involves the use of the articulatory organs and muscles to produce sound altogether with body medium when participants have difficulty in speaking or hearing, non face-to-face communication such as telephone conversation and computer-mediated chat as well as air-ground communication is generally carried out by limited interactional means, mostly linguistic ones.

Shortis (2001:2) posited that there is no homogenous speech community where everyone's understanding is the same: individual experience of new communication technology, like anything else, varies widely and changes rapidly. Communication technologies continue to change rapidly, both technologically and in participants' associated communication practice. New technical possibilities lead to new types of medium as people find different ways of communicating with each

other and through that to new social possibilities. Therefore, it is unquestionable that discourse and medium are interacted in a way that constitutes a specific linguistic unit and structure in discourse. Again, suffice it to say that spoken discourse remains the interactional type from which these electronically mediated interactions derive many of their characteristics (Thornbury & Slade, 2006:25).

Johnstone (2002) pointed out the dimensions along with medium might influence discourse as follows:

(1) Medium and discourse form may be related. Discourse in one medium may be more complex syntactically, have more words, be less cohesive or cohesive in different way, have different kind of macrostructure or perhaps less structure, and so on.

(2) Medium and discourse processing may be related. It may, for example be easier to recall or interpret information in one format than in another.

(3) Discourse medium and interpersonal relations might be related. For example, one medium might be better for sharing feelings than another, one medium might enable collaborative work more effectively than another, a conversation might be more oriented towards information exchange in another. Different media might encourage people to regulate their behavior and imagine their rights and responsibilities in different ways

(4) Medium might be implicated in knowledge-making and knowledge use, for example one medium might encourage the idea that one participant is the author and others the readers, while another medium might encourage the idea that text and knowledge are jointly constructed; one medium might facilitate the making of abstractions or critical judgments more than another; a more ephemeral medium might make self-reflection less likely whereas a more permanent medium might encourage it.

It can be implied that these dimensions exhibit the possibility that each discourse mediated with different medium will be constructed and organized in its unique way depending on the constraints of that specific communication medium. The medium of air-ground communication discourse is radio transmitting device which is controlled by push-to-talk system. It is no doubt that the distinctively medium affects both discourse structure and organization in numerous ways. To convey meaningful message in a short period of time along with interrupted high frequency noise as well as to avoid ambiguity, the linguistic set is limited enormously and the sequence of the units in each turn is regulated.

2.2.3 Situational Parameters in Spoken Discourse

Since air-ground communication is base on oral discourse, it is necessary to describe the situation in which the interaction occurs as it overtly associates with linguistic features and the overall conversation pattern to conform the unique character of each particular institutional discourse or else. The situation parameters (Biber, 2004:150-1; cited in Johnstone, 2004:150-1) reviewed below will provide brief understanding of communication context in which participants encounter and how it contributes to variants in spoken discourse.

I.   *Communication characteristics of participants*

     (a) Addresser(s): Is there one or more? Is the addresser an institution (such as a university, a government, or a private sector)?

     (b) Addressee(s): Is the discourse addressed to self or other(s)? Is there one or more than one addressee?

     (c) Is there an audience in addition to the specified addressee(s)?

II.   *Relations between addresser and addressee*

     (a) Relative status and power: Does addresser(s) or addressee(s) have higher status? More power?

     (b) Extent of shared knowledge: Do addresser(s) and/or addressee(s) have more specialist knowledge about the topic? More personal, experiential knowledge?

     (c) Interactiveness: How much do addresser(s) and addressee(s) interact?

     (d) Personal relationship(s): Do the participants like, respect, or fear each other? Are they kin, friends, enemies, colleagues, etc.?

III.   *Setting*

     (a) Characteristics of the place of communication: Is it public or private? In what domain is it: business of workplace, education, governmental or legal, religious, etc.? What, if any, is the role of other media besides, or in addition to, face-to face interaction? For example, is the communication filmed?

     (b) Extent to which place is shared: Are participants in the same place? Is the place familiar?

     (c) Extent to which time is shared: Are participants interacting synchronously, or are they at a temporal remove?

IV.   *Channel*

     (a) Model: Is the primary channel of communication written, spoken, signed, or mixed?

     (b) Permanence: Is the communication permanent (recorded) or temporary?

(c) Medium: If the communication is recorded, is it taped, transcribed, printed, recorded electronically, etc.? If it is transient, is it face-to-face or over the phone, radio, etc.?

(d) Is the communication embedded in a larger text from a different register?

V.   *Relation of participants to the text*

(a) What are the production circumstances for the addresser(s)? Is the text revised or edited? Scripted or planned on-line?

(b) What are comprehension circumstances for the addressee(s)? Does comprehension have to occur on-line, in real time? If not, what are the time constraints?

(c) How do addresser(s) and addressee(s) evaluate the text? Do they evaluate what is said or written in the situation in terms of its importance, value, beauty, popularity, etc., or some combination?

(d) What is the addresser(s)' attitudinal stance toward the text? Are they emotionally involved in the communication? Do they feel reverent, excited, bored, etc.?

(e) How do the addressee(s) stand with regard to the text? Are they deciding whether or not to believe it? Whether or not to doubt it?

VI. *Purposed, intents, and goals*

(a) Factuality: Is the communication in this situation supposed (by the participants) to be based on fact, or is it supposed to be imaginative, speculative, or some mixture?

(b) Purposes: Is the purpose of the situation, and the communication in it, to buy or sell things? To persuade? To transfer information? To entertain? To express feelings? Some combination?

VII. *Topic*

(a) What is the level of discussion: general, specialized, or popular?

(b) What is/are the specific topic(s): finance, science, religion, politics, etc?

These parameters are the prime key to unveil the distinctive characteristics of institutional spoken discourse since the context of interaction is undeniably tightly tied to the language use and communication strategies. Therefore, to provide detailed background of air-ground communication in which radiotelephony is conducted, each parameter will be enlarged in chapter 4.

2.2.4 Discourse Analysis: Basic Concept of Conversation Analysis

To analyze 'air-ground communication' spoken discourse, basic concept of conversation analysis in discourse analysis will be brought in as a primary tool of study. Its general concept and methodology will be overviewed in this session.

Conversation analysis was developed in the early 1960s in California. The central goal of conversation analysis research is the description and explication of the competences that ordinary speakers use and rely on in participating in intelligible, socially organized interaction (Atkinson & Heritage, 1994:1).

Many insights into the structure of conversation come from the pioneered work of Sacks et al. (1974) to provide better examples of the purely local functioning of conversational devices and interactional formats such as turn-taking, opening up closings (Have, 1999:8). They described turn-taking as a fundamental stage of communication and a set of rules adhered to by speakers to govern the conversational behavior. Their findings explicitly show that everyday conversation is actually organized and systematic. In particular, Sacks insisted (1) that ordinary talk is systematically and strongly organized; (2) that its analysis should be based upon naturally occurring data; and (3) that analytic interests should not be constrained by external consideration (Atkinson & Heritage, 1994:17).

Schegloff & Sacks (1973:290) have summarized the assumptions that guide the form of research, and analytic resource; conversation analysts have tended to present their findings by demonstrating regular forms of organization in a large variety of materials produces by a range of speakers.

From the late 1970s onwards, later scholars of conversation analysis study tuned their attention to institution-based material such as courtroom proceedings, meetings, and various kinds of interviews in order to apply the acquired knowledge of conversational organization specifically to these institutional interactions to illustrate how these institutions were '*talked into being*' (Have, 1997:8). Heritage (1997:162) differentiated these two kinds of conversation analytic research; conventional conversation analysis and institutional conversation analysis, going on today that though they overlap in various ways, they are distinct in focus. The first examines the institution of interaction as an entity in its own right whereas the second studies the management of social institutions in interaction.

Still, the study of spoken discourse in institution applies the same assumption which is proved successful in studying ordinary conversation. The assumption is that it is fundamentally through interaction that context is built, invoked and managed, and that it is through interaction that institutional imperatives originating from outside the interaction are evidenced and made real and enforceable for participants (Heritage, 1998:4).

2.2.5 Concepts Related Conversational Analysis

        To conduct the analysis '*air-ground communication*' at discourse level, basis principle of turn-taking, adjacency pairs and speech acts involved in conversational analysis as well as simplified version of Model of Conversational Analysis developed by Sinclair & Coulthard (1974) are implemented. Therefore, they have to be explicitly overviewed.

2.2.5.1 Turn-taking

        Turn-taking is based on the ideas from turn-taking system of Sacks et al. (1974). As Sacks has observed, the basic fact about 'conversation' is that there is one person speaking at a time, while speaker change recurs with minimal gap and minimal overlap. '*Turn*' is commonly defined as all of one speaker's utterances up to the point when another person takes over the role of speaker (Gramley & Patzold, 2002:184). To achieve the conversation, participants have to accomplish on a turn-by-turn basis or at transition relevance place (TRP), the point where a next turn can be expected, at the end of any turn constructional unit (TCU) which is the component of conversation's turn-taking system, consisting of syntactic units (sentences, clauses, noun phrases, and so on). Sacks, Schegloff and Jefferson defined in their classic paper (cited in Have, 1997:111):

> '*There are various unit-types with which a speaker may set out to construct a turn. Unit-types of English include sentential, clausal, phrasal, and lexical constructions. Instances of unit-type so usable allow a projection of the unit-type under way, and what, roughly, it will take for an instance of that unit-type to be completed. The first possible completion of a first such unit constitutes an initial transition relevance place. Transfer of speakership is coordinated by reference to such transition relevance places, which any unit-type instance will reach.*'

        Turn constructional unit (TCU) is the recognizing point of potential speaker change indicated by linguistic unit; minimum semantic units that can constitute one complete turn to talk. The following instance, each of these turns is considered as a turn constructional unit (TCU);

        A: Do you want to go shopping with me?

        B: Great idea.

        With reference to Sacks (1974), there are three possible ways in which speak change can be organized (cited in Levinson, 1987:298);

        (1) If current speaker select next speaker in current turn, then current speaker must stop speaking, and next speaker must speak next, transition occurring at the first transition relevance place after next speaker-selection.

(2) If current speaker does not select next speaker, then any (other) party may self-select, first speaker gaining rights to the next turn.

(3) If current speaker has not selected next speaker, and no other party self-selects under option (2), then current speaker may (but need not) continue.

In short, *turn-allocation* can be performed in three different ways; a next speaker can be selected by the previous one, a speaker can self-select, or the present speaker can continue speaking. Turn-taking in air-ground communication, by no mean, is based on these rules. However, the possibility to follow the third rule is very rare because of a constraint of the talk which once the information is completely conveyed in a single turn, there is no need for the speaker to continue. To allocate the turn, the participant commonly has to strictly perform name-calling method or call sign addressing. Therefore, there is high tendency that the first rule is mostly applied in the discourse.

Certainly, many kinds of institutional interaction use the same turn-taking organization as ordinary conversation (Heritage, 1998). Some, however, involve very specific and systematic transformation as air-ground communication in conversational turn-taking procedures. These special turn-taking can be very important in studying institutional interaction because they have the potential to alter the parties' opportunities for action, and to recalibrate the interpretation of almost every aspect of the activities that they structure (Heritage, 1998:5).

There are several papers in conversation analysis dealing with the problem in settings where social interaction is formally distinct from conversational interaction. Therefore, turn-taking procedures might differ among various forms of interactions. The use of distinctive and normatively sanctioned turn-taking procedures indicates the participants' pervasive orientation to particular social contexts and their own identities within them by comparison with ordinary conversation (Goodwin & Heritage, 1990:295).

In conversation, what the speakers say and the actions they perform are unpredictable so does the turn-taking system but in institutional talk, some can especially in air-ground communication discourse, which turns are organized in an explicit and predictable ways. Some of the turns in the communication are possibly foreseen if it occurred exactly at each phase of flight since the interaction is sometimes tightly tied with the constituted actual action at time of talk; for instance, when pilots are contacted and instructed through radio transmission by air traffic controller that they have a clearance for take off, they will learn automatically to grab the next turn to reconfirm the clearance while rolling the plane on a runway. Furthermore, since the conversation has to be delivered through '*push-to-talk*

system', it is easier for the participants to recognize a transition relevance place (TRP) which is the point where a next turn can be expected.

2.2.5.2 Adjacency Pairs

Discourse organization refers to the idea that one thing can lead to another. This means the orderliness of the discourse that any utterance in interaction is considered to have been produced for the place in the progression of the talk where it occurs, especially just after the preceding one, while at the same time it creates a context for its own next utterance (Have, 1997:113). These sequential relations provide a conventional solution to the problem of how to make a relevant next turn in conversation (Jacobs & Jackson, 1983:48). A conversation is commonly a string of at least two sequential turns. Some turns are more closely related than others. A class of sequences of turns called 'adjacency pairs' which have the following features (Coulthard & Brazil, 1979):

(1) They are two utterances long.

(2) The utterances are produced successively by different speakers.

(3) The utterances are ordered – the first must belong to the class of 'first pair part', the second to the class of 'second pair part'.

(4) The utterances are related and thus not any second part can follow any first part, but only an appropriate one. Thus, a rule that makes the appearance of the second pair part conditionally relevant on the occurrence of the first pair part (Schegloff, 1972: 107).

(5) The first pair part often selects next speaker and always selects next action, in other words the first part of a pair predicts the occurrence of the second.

The concept of '*adjacency pairs*' is the major instrument for the analysis of sequential organization. It is an essential part of the adjacency pair format that the relationship between the two parts is a normative one, for instance greeting/greeting, question/answer, request/grant (or refusal), and invitation/acceptance (or refusal) which after a first pair part, the immediate next utterances, heard as a relevant response to the first, is a suitable second pair part, for examples;

Question/answer:

A: Do you like fish?

B: No, I don't like it.

Request/grant:

A: Could you walk me home?

B: Absolutely.

Greeting/greeting:

    A: Hello

    B: Hello

Adjacency pair organization is an elementary framework through which conversational participants constrain one another, and hold one another accountable, to produce coherent and intelligible courses of action (Goodwin & Heritage, 1990:288). The basic rule of adjacency pair operation is: given the recognizable production of a first pair part, on its first possible completion its speaker should stop and a next speaker should start and produce a second pair part from the pair type of which the first is recognizably a member (Schegloff & Sacks, 1973:256).

Each participant must analyze the developing course of others' actions in order to produce appropriate reciprocal action. On the other hand, if there is no response or no suitable match to the first pair part in accountable matter, it is 'noticeable absence' and the absence can become the object of remedial efforts and justifiable negative inferences (Goodwin & Heritage, 1990:287). The third position is optional added to the two utterances in a format, as an acknowledgement or evaluation by the first speaker, but not normatively required, for example;

Question/answer/acknowledge

A: Have you done with your homework?

B: Yeah.

A: Good.

However, there are cases that sequential organization of discourse becomes more complex, a new sequence is inserted between the first- and the second pair part. Schegloff (1972) defined it as '*insertion sequence*' which is either an adjacency pair or an expansion of that adjacency (adapted from Levinson, 1987:304);

1. base adjacency pair	first pair part	A:	May I have a bottle of Mich?
2. insertion sequence	first pair part	B:	Are you twenty one?
3. insertion sequence	second pair part	A:	No.
4. base adjacency pair	second pair part	B:	No.

These embedded expansions are speech act sequences inserted between the pairs which are interpreted with respect to the superordinate adjacency pair (Craig & Tracy, 1983:49). Nonetheless, the sequence can be enlarged or expanded not only with 'insertion sequence' but also 'pre-sequence' which can be referred to as both a certain kind of turn and a certain kind of sequence containing that type of turn which functions as a preparation for a next pair, in other words, it can be an implication for what can follow (Thornbury & Slade, 2006:116);

1.	pre-sequence	first pair part	A:	What are you doing tonight?
2.	pre-sequence	second pair part	B:	Nothing.
3.	base adjacency pair	first pair part	A:	Do you want to have a drink?
4.	insertion sequence	first pair part	B:	Where?
5.	insertion sequence	second pair part	A:	Down the pub.
6.	base adjacency pair	second pair part	B:	Great.

These are all the general features regularly occurred in ordinary conversation. Consequently, the sequence of organization is possibly formed very simple with only base adjacency pair, comprising of the first- and second pair part, to more complex on with the insertion sequence and pre-sequence modified into the base adjacency pair in order to enable participants to abort a projected interaction sequence or to induce preferred sequence.

Nevertheless, in air-ground communication discourse, it can be predicted that there is very least chance of insertion sequence and pre-sequence initiation because of its unique way of communication which allows participant to sternly follow the adjacency pair structure, such as when an air traffic controller direct the aircraft to a specific flight level, '*Fastair 345, climb to flight level 230*' The response move from a pilot must be '*Climbing to flight level 230, Fastair 345*' The structure of the discourse is simple and regulated in rigid sequence to avoid misunderstanding. As well as that each move created in the exchange must be direct to the objective of communication; therefore, the additional sequence to prepare or to introduce the base adjacency pair is not essential. Consequently, it is rather difficult to capture 'insertion sequence and pre-sequence' in the organization. This will be a noticeable deviance from the normative conversation of the institutional interaction as in air-ground communication but the actual sequence of organization is somehow remained the same as its defined pattern.

Heritage (1997: 169) posited that in analyzing sequences, it is essential to look at how particular courses of action are initiated and progressed and, as part of this, how particular action opportunities are opened up and activated, or withheld from and occluded. To accomplish the analysis of sequence of organization, sequence of action which is performed acts within the discourse should be examined. Jacobs & Jackson (cited in Craig & Tracy, 1983:16-7) indicated that conversation is much like other rule-governed games. Players have goals they are trying to achieve, and pursue those goals within the constraints imposed by the rules and the strategies most likely to succeed; and the basic move in the game is '*speech acts*'.

2.2.5.3 Speech Acts

Speech acts theory originates in Austin's observation (1962) indicated that sentences can often be used to report states of affairs (Brown & Yule, 1984:231). It is a concept in linguistics and the philosophy of language which is that 'in saying something can also contribute to doing something' or 'an action performed by means of language' (Austin, 1962).

Austin's idea on what he called 'performative utterance' was published under the title 'How to Do Things with Words'. 'Performative utterance' is the use of language, often involving some ritual aspect, which is a kind of action and the very utterance would bring about some result with no truth condition (no asking or proving whether it is true), for examples; 'I now pronounce you husband and wife', 'I name this ship the Queen Elizabeth', 'I give and bequeath my properties to my youngest sister', etc.

John Searle (1969: 23-24) further developed this approach. In performing speech acts, at least three kinds of acts noted below needs to be completed:

1. *Utterance acts*: a speaker utters expression from language to a hearer in the context of utterance.
2. *Propositional acts*: referring and predicating shown in the utterance
3. *Illocutionary acts*: a speaker's intention upon someone or something expressing through stating, questioning, promising, commanding, etc.
4. *Perlocutionary acts*: a notion of the consequences or effects such acts have on the actions, thoughts, or beliefs, etc. of hearers.

These acts are intimately related; in uttering e (expression), S (speaker) says something to H (hearer); in saying something to H, S does something; and by doing something, S affects H (Bach & Harnish, 1984: 3). Certainly, the success of perlocutionary act depends on H's identifying one of other acts and also clarifying the relationships among them.

The concept of an illocutionary act is central to Searle's understanding of speech acts. An illocutionary act is the expression of a proposition with the purpose of doing something else. The effectiveness of speaker's intention requires that the intention be recognized by the hearer. The illocutionary force of an utterance is essentially something that is intended to be understood (Strawson, 1964: 459). The examples of illocutionary acts are 'I will return this book to you next week' and 'Please hand me that pencil'. In the first example the illocutionary act has the force of a promise to return a book. The second example is an illocutionary act with a force of the form 'I' request that in which the speaker is soliciting a reaction.

There are 5 different types of 'illocutionary acts' introduced in his book, 'Speech Acts: An Essay in the Philosophy of Language';

1. Assertives: representing as actual a state of affairs – asserting, describing, predicting, confirming, answering, denying, informing, etc.

2. Directives: making an attempt to get the hearer to do something – requesting, commanding, questioning, permitting, advising, etc.

3. Expressives: expressing propositional attitudes of the speaker about a state of affairs – apologizing, greeting, congratulating, complimenting, thanking, etc.

4. Commissives: committing the speaker to a future course of action - promising, offering, inviting, etc.

5. Declarative: performing an action which brings into existence a state of affairs by representing oneself as performing that action – judging, naming, confessing, appointing, etc.

Speech act theory is valuable for conversation analysis as it provides an account of how utterances or turns go together as adjacency pairs in conversational discourse to particularly form a coherent sequence.

It is typical of many discussions of discourse structure which rely on an analysis of sequence of actions, that rather little attention is paid to the linguistic aspects of the realizations of these actions despite the linguistic form and its function are inseparable. Sinclair & Coulthard (1975:13) posited that the level of language function, the central interest in their study is the level of the function of a particular utterance, in a particular social situation and at a particular place in sequence, as a specific contribution to a developing discourse.

2.2.5.4 Model of Conversational Analysis

Since air-ground discourse basically relies on specific pairs or moves in each particular exchange, the analysis is primarily conducted to thoroughly discover the well-regulated formation of each pair-part or move in order to systematically build diagram to demonstrate the rigid pattern of each exchange in conversation between pilot and controller conducted in radiotelephony. Therefore, the framework of air-ground discourse analysis which is able to provide such a deemed end-product is *Model of Conversational Analysis* developed by Sinclair & Coulthard (1974). Each utterance in conversation described as one pair part of an adjacency pair and its function to exhibit the illocutionary acts, a speaker's intention upon someone or something expressing through stating, questioning, promising, commanding, etc., can be referred to as a move (Thornbury & Slade, 2006:117). '*Move*' is the basic element of either semantic or pragmatic unit in interactive talk – it is the smallest unit of potential interaction (Eggings & Slade, 1997). A move may

take one or more sentences, and it may take one or more turns in conversation. In social interaction, a move consists of the amount of talk required to perform one action in 'language game' in which interlocutors are engaged (Johnstone, 2004:74). For example: In traditional classroom conversation (Stubbs, 1983:131-2);

Teacher:	Can you tell me why you eat all that food?	(initiation)
Pupil:	To keep you strong	(response)
Teacher:	To keep you strong yes - to keep you strong	(feedback)

There are three moves in this exchange; a teacher's initiation can be followed by a student's response, then a feedback move by the teacher.

This model will explicate the two domains of study in a very concrete and systematic way as it will clearly demonstrate movement in the discourse or so-called the interactivity of conversation as well as allow the organization between defined and actual language pattern to be orderly compared which convincingly leads to achieve the study objectives.

The analysis system of discourse organization is later developed by Sinclair & Coulthard to be more systemized. It is shaped and modified to be more appropriate for their work on classroom discourse in 1974 in order to work on the data upwards from the smallest to the largest linguistic units. Thereafter, Francis & Houston (1987) proposed the slightly conformed system based on Sinclair & Coulthard model. The new system of analysis is hierarchically divided into 5 levels from the smallest to the largest units as demonstrated below;
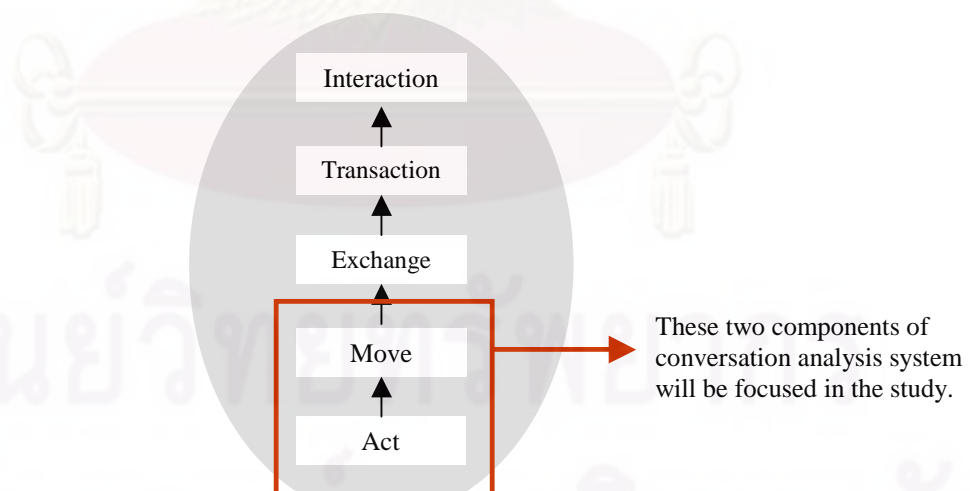
Figure 2.1 – The System of Conversation Analysis

With reference to the rank scale above, acts are the units at the lowest rank of discourse level of language patterning and are realized at the level of grammar and lexis (Francis & Houston, 1987). There are three major acts which probably

occurred in all form of spoken discourse, elicitation (to request a linguistic response), directive (to request a non-linguistic response) and information (to pass on ideas, facts, opinions and information). These acts are basically realized by interrogatives, imperatives and declaratives respectively, but there are occasions when this is not so.

    The classes of acts in everyday conversation are extended from three acts to 22 acts in Sinclair & Coulthard model, but 32 acts in Francis & Houston model. The following acts carefully *selected and developed* from both models are employed in the study of air-ground discourse as follows:

	Label	Realization and Function
1.	framer	Realized by the items – 'well', 'OK', 'now', '(all)right', 'anyway', 'oh', 'look', or else as pre-head of the move in a Structuring exchange to mark boundaries in conversation or to mark the onset of a move.
2.	greeting	Realized by a closed class items which form the first pair part of the adjacency pair used in rituals of greeting and leave-taking or any social tokens as the head or the post-head of a move in the exchange to perform self-explanatory or to maintain social relation among the participants.
3.	reply-greeting	Realized by a closed class items which form the second pair part of the adjacency pair used in rituals of greeting and leave-taking or any social tokens as the head or the post-head of a move in the exchange to perform self-explanatory or to maintain social relation among the participants.
4.	summon	Realized by calling of the name as the head of an opening move in a Summon exchange or as the pre-head of other moves to engage another participate in a conversation or to attract his/her attention.
5.	reply-summon	Realized by 'yes', 'what?' and other indications of attention as the head of an answering move in a Summon exchange to indicate willingness to participate in a conversation.
6.	starter	Realized by statement, question or command or moodless item as the pre-head of an opening, answering, eliciting, informing, directing or behaving move to provide information about or direct attention towards the act realizing the move ahead.
7.	inquire	Realized by statement or question (both yes/no question and WH-question) which seek or request for information or clarification of a preceding utterance as the head of an eliciting move to elicit the information.

	Label	Realization and Function
8.	informative	Realized by statement or by 'yes and 'no' items as the head of an informing move at I (Inform exchange); or R (Elicit exchange) to supply information of to give a decision between 'yes' and 'no'.
9.	repeat	Realized by 'yes' or 'no' or by repetition or paraphrase (either question or statement) as the head or post-head of an informing/eliciting/directing move to emphasize the preceding utterance.
10.	confirm	Realized by 'yes' or 'no' or by repetition or paraphrase or statement as the head of an informing move to give agreement or to confirm the correctness of preceding utterance.
11.	reject	Realized by statement or 'yes' and 'no' items and their variants as the head of an answering move in a Structuring, Greet and Summon exchange or the head of an informing move or pre-head of a behaving move in a Direct exchange to refuse to acquiesce to a suggestion, to refuse to give an answer/an agreement or to indicate non-comply with a directive or inquire.
12.	terminate	Realized by 'yes' or 'no' or specific phrase/statement as the head and/or post-head of an acknowledging move to acknowledge a preceding utterance and to terminate an exchange as well as to perform ritual token to express social engagement, commonly comes as the adjacency pair as the head of a closing move in the summon exchange.
13.	reply-terminate	Realized by specific phrase/statement as the head of an acknowledging move to state the second pair part of the adjacency pair used in rituals of social engagement between the participants in the summon exchange.
14.	receive	Realized by 'yes', 'no', 'OK', 'mm', statement or non-verbal (silence) as the head of an acknowledging move or pre-head of an informing move at R (Elicit exchange) to acknowledge a preceding utterance or to indicate that the informative or action is forthcoming.
15.	directive	Realized by command (imperative) as the head of a directing move to request a non-verbal response.
16.	comment	Realized by statement as the post-head of all moves except framing to exemplify, expand, explain, justify, provide additional information upon the preceding utterance or evaluate one's utterance.

Table 2.1 – Classes of Acts

Acts combine to form moves, and moves occupy places in the structure of exchanges. Describing the different types of moves is to be conformed in the patterns of conversational structure that is the way participants negotiate the exchange of meaning in the discourse (Thornbury & Slade, 2006). According to Halliday's functional description (1994:69), the basic initiation moves in conversation are the four primary speech functions or acts of command, statement, offer and question or with reference to Sinclair & Coulthard model, they are directing, informing, and eliciting accordingly. A command is typically realized by an imperative, a statement by a declarative, and a question by interrogative (Thornbury & Slade, 2006:118);

Speech function/act	Syntactical structure	Example
command	imperative	'*Eat your vegetables.*'
statement	declarative	'*I love vegetables.*'
offer	no corresponding congruent form	'*Would you like some vegetables?*'
question	interrogative	'*What kind of vegetables do you like?*'

Table 2.2 – Initiation Move Structure

Besides, initiation move, there are two more moves to constitute an interactive conversation, response and follow-up moves which can also be assigned a speech acts. However, move structure is able to comprise of more than one act which is defined as complex move. A table below illustrates simple move with one assigned act (Thornbury & Slade, 2006:118);

Initiating speech function/act	Response	Follow-up
Command	compliance	refusal
Get married first.	*Okay.*	*Under no condition.*
statement	acknowledgement	contradiction
I am getting married.	*Wonderful news!*	*Over my dead body.*
offer	acceptance	rejection
Do you want to get married?	*Absolutely.*	*Certainly not.*
question	answer	disclaimer
Are you getting married?	*Yes.*	*What do you mean?*

Table 2.3 – Move Structure

Similar to the specifically selected acts, these six moves are adjusted to be compatible in the analysis of air-ground discourse (adapted from Francis & Houston, 1987) as the followings;

1. *Opening*: greeting, summon

   Its function is to initiate a conversation, or to impose structure on it in some way, and to obtain a warrant for doing so.

2. *Answering*: reply-greeting, reply-summon, reply-terminate

   Its function is to indicate willingness to participate in a conversation, or to provide a warrant for suggestions as to structuring made by the other participant.

3. *Eliciting*: inquire

   Its function is to elicit information, a decision between 'yes' and 'no' agreement, ask for a specific permission, clarification or repetition.

4. *Informing*: informative, confirm, reject, repeat

   Its function is to offer information, or to supply an answer appropriate to a preceding eliciting move.

5. *Acknowledging*: reply-greeting, receive, comment, terminate

   Its function is to provide positive or negative upon preceding utterance.

6. *Directing*: directive

   Its function is to determine an immediate or future action from the co-participant.

7. *Closing*: terminate, greeting

   Its function is to conclude the turn by stating social tokens which generally the first pair part of the adjacency pair to maintain social relation between the participants.

In the spoken discourse, moves are sequences in the exchange. Functional linguists refer to the sequence of moves concerned with negotiation a proposition stated or implied as an exchange which have two obligatory elements of structure, I (Initiation) and R (response), whereas F (follow-up) is optional.

The following diagram displays the basic moves possibly appeared in '*elicit exchange*' determined to solicit particular information from the responders;
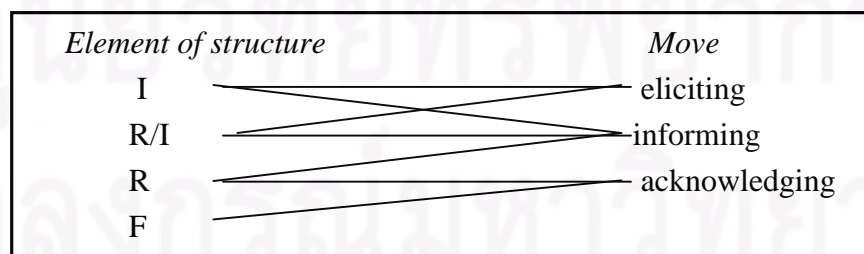
Figure 2.2 – Element of Structure of Exchange

To analyze the data, the last three units, exchange, transaction and interaction (see figure 1) are excluded because they aim at analyzing the whole

conversation which there is topic shifts happening all the time during talk. In contrast, air-ground communication discourse is only the part of the entire aviation discourse which the interaction occurs from time to time in one complete discourse. Thus, it is rather difficult to define the transaction boundary since there is *no topic shift* from one to another as other ordinary conversation discourse.

The topic in the communication solely concerns and relates to the various operational stages of the flight. Hence, only the discourse structure which comprises of moves will be mainly discussed in the study to analyze discourse organization of air-ground communication. On top of that, the analysis at discourse level is <u>not</u> the prime objective of the study since the main focus is on *radiotelephony*, a sublanguage, solely used in the setting of air-ground communication. Consequently, discourse organization will be *briefly described* to allow the clearer picture of *moves* in the discourse in chapter 3.

In the study, the exchange will be categorized into three major types of exchanges; *direct exchange*, *elicit exchange* and *inform exchange*, which all are the main functions of air-ground communication. The data from both sources is examined according to these integrated theories and concepts to review the standard pattern of discourse organization comparing to that in the actual discourse to measure the deviation occurred which is predicted to be more flexible and complicated than the prescribed pattern which is extremely systematic and simple.

The second domain of the study is at lexical level; therefore, the underlying of word-formation concept which is deemed to be used as a framework of the analysis is explained in the next section.

2.3 Lexicon Analysis: Concept of Word-Formation

The lexical item with a special reference specified in restricted discipline is called *term* (Sager et al, 1980). As we shall see that sublanguage mostly has not only a distinctive set of lexical items which is restricted in the field of professions; for instance, in aviation context numbers of lexical items are related to the flight operation, advanced instruments, weather conditions and specific procedures, but also a unique formation of words. Therefore, the items practically used in radiotelephony are as well terms, either *technical term*, used in single subject field such as ADF (Automatic Direction-Finding) an equipment utilizes ground equipment for automatically determining the line of position of aircraft transmitting radiant energy and *general term*, applied in multiple subject fields; for example, vector which can be used in three different subject fields; aviation (a course taken by an aircraft), mathematics (a quantity that has both size and direction), and

biology (an insect that carries a particular disease from one leaving thing to another).

However, since radiotelephony is one among many sublanguages, which commonly include elements of general language, and sometimes found in ordinary subject field with confined definition; for instance, lighting, generally defined as an arrangement or type of light in place, becomes essential equipment that produces lights on taxiway or runway to guide an aircraft. Sager (1980:255) explained on this particular point that the process of developing special reference requires the definition of the concept or concepts that have been developed, usually entails reducing the extension of the general language word. Hence, to use existing resources, the reference of general language notions can be extended or narrowed down to refer to specific items in a special subject without losing their usefulness in general language.

In short, the lexicon of special subjects in sublanguages consists of three major groups of words (Sager, 1980:242):

(1) General language words used in all disciplines without distinction and general language words appropriate to a particular discipline

(2) General language words used specifically with some restriction or modification of meaning in a particular discipline

(3) The terms specific to a discipline which are normally used only by specialists. These are either created for a particular subject or are general language words redefined for the purpose and thus terminologised

In the study, all the reference terms appeared in the manual are collected and classified in several conceptual classes, based on the prime semantic feature of each term, whether it designates object (substance, material, product, apparatus), property, process or operation. Then, each is provided a detailed definition according to its actual reference in aviation field. As the main focuses of the study are on the second and the third brief concepts mentioned, those lexicons in the group of common words in the first concept are neglected as they have no significance in meaning, form and function to represent the distinct feature of radiotelephony in this particular domain.

The next investigation is their designations through varieties of modification processes of existing resources by means of derivation and compounding (Sager, 1980:257), to reveal more of a unique character at lexicon level since the study of '*lexicon*' is the study of the structure of words – the study of the rules governing the formation of words in a language (Tsui, 1994:21) and the small meaningful units in the language (Murray, 1995:141).

Word, linguistically, demonstrates the pattern of its formation, which generally relate to the language pattern. Studying word formation is likely a process of tracing out and describing the elements of a word with their modifications of form and sense, so firstly the elements which are comprised a word in general should be recognized.

According to Sager et al (1980:42), lexical item conformed in science and technological field has a higher average word length than natural language as the new words are created in the specific formation in order to cope with the fast development of science and technology which is the core of the language. In addition, the language of ICT (Information and Communication Technology), also considered a sublanguage, is an example of the language which its lexical items are associated with new technologies emerging. A group of people creates a specialist vocabulary as much concern with social purposes as specialized reference. Sager (1980) extended that the group will tend to re-lexicalize words by inventing new terms or re-using words for new meanings. For example, 'dashboard' used to refer to a board which stopped the stones from horses' feet hitting the carriage and its occupants, and then came to refer to a partition between a vehicle engine and its passengers. There may also be a process of over-lexicalization in which there will be more words than are necessary for communicating the specialized meaning. Interestingly, they are almost all built by the process of *compounding*.

The various process of word-formations by which words or terms in this case can be built will be outlined and adjusted to be suitable for picturing the classifications of the words used in radiotelephony as the way they are constructed. It is highly possible that there are some astonishing differences in patterns of these specialized words.

With reference to Algeo (1995), in *Cambridge History of English Language*, a classification system for word-formation is developed based on four factors; whether the word has a word element based on earlier words, whether a word omits any part of a word element, whether a word combines two word elements, and whether any of word elements are from another language. The conventional types of word formations; affixation, compounding, conversion, backformation, acronym or initialism, clipping and blending, are grouped into six categories: composite, shift, shortening, creation, blend and loan.

(1) *Composite*: words made from combinations of words or parts of other words through affixation or compounding process.

(2) *Shift*: shift of meaning or shift of word class or 'functional shift' such as noun to verb, noun to adjective, etc.

(3) *Shortening*: parts of the word left out for economy such as clipping, acronym, initialism and backformation.

(4) *Creation*: no links with previous words.

(5) *Blend*: combine – shortening and compounding

(6) *Loan*: words borrowed from other languages which may not follow the usual patterns of sound and spelling in the borrower language.

Furthermore, Algeo exhibits the different percentages for types of word formation in a set of samples taken from different (English) dictionaries. It is demonstrating the importance of composite, especially compounding, over other types of word formation as a regular process found. Shift and shortening are also important, with very few creation, blend and loan. In English, words are often created by conversion or functional shift to vary use of the same form. Thus, it is questionable whether items in radiotelephony are mostly formulated within the same process frequently applied in natural English language or not.

However, in the study, types of word-formations in accordance with conventional classification system (Sager et al, 1980 and Algeo, 1995) and new classification system (Shortis, 2001:56-9) are integrated to implement in the study as follows:

1) *Composite*: the process of constructing words by combining words or word elements. Sager et al (1980) stated that English has both analytic and synthetic means of word formation and these are used extensively in sublanguages. Analytic means are the combination of independent lexical items into larger units whereas synthetic means are the modification of items by means of affixes. Therefore, this process is definitely divided into two formations as follows;

1.1) *Compounding*: it is the process of forming new words by combining two or more existing roots or stems into a new syntagmatic unit with a new meaning independent of constituent parts. Compounds are developed from regularly occurring collocations and convert phrases into fully lexicalised units. Compounds in English are numerous since compounding is one of the most prolific processes of word formation in the language (Murray, 1995:176). In sublanguages the vast majority of compounds are nouns and are formed by linking one or several nouns, names, adjectives or particles to the nuclear noun. There is also quite a number of compounding in 'radiotelephony' such as airway (air + way), glide path (glide + path), touchdown (touch + down), airspace (air + space), etc.

1.2) *Affixation*: it is the process of forming new words by adding prefixes or suffixes to roots or other derived words, which possibly alters its semantic features, broadening/widening or narrowing. For example, '*recleared*' prefix *re-* and suffix *-ed* are permanently added to the root 'clear' with the broadening meaning 'a change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof'. Suffix *-ed* is commonly defined as grammatical

bound morpheme, meaning 'past' or 'past participle'. The number of affixes in sublanguage is considerably greater than in general language which certain affixes are used with limited meanings or functions in different subject fields.

2) *Shift or Conversion*: it is the process by which a word changes either its word class or its semantic properties (broadening, narrowing or redefining) to become a new lexical item, without adding any affix. Mostly, the process is common from noun to verb or vice versa. For example, '*departure*' which is categorized as a noun in general English. However, in the aviation context, the word is as well used as a verb: 'Fastair345 *departure* runway three-two.' Then, departure is converted form one category into another without changing in form.

3) *Shortening*: it is the process which some word elements are reduced or left out for economic reason to compress information both syntactically and lexically which can be done by one of these two formations:

3.1) *Acronym* or *Initialism*: it is the process of forming new words by shortening the words to such an extent that only the initials or first few letters of each remain. It is to compress the words in to one short form. The only difference between acronym and initialism is that an acronym is pronounced as if it is a normal word such as ATIS (aerodrome flight information service) which is read as A-TIS, SID (standard instrument departure) as SID, etc.; whereas an initialism is sounded as the letters in sequence, for instance DME (distance measuring equipment), pronounced as D-M-E, ATC (Air traffic control) as A-T-S, ILS (Instrument landing system) as I-L-S, RVR (runway visual range) as R-V-R, etc. This process is much more common in written than in spoken language; but if abbreviation is spoken, it clearly belong to sublanguage, depending partly on its frequency of occurrence, the ease with which it can be pronounced and the length of the abbreviation in relation to the original expression. So does radiotelephony, as the communication context requires a rapid exchange of information. Hence, it is believed that numbers of items are formed in accord with this particular process.

3.2) *Clipping*: it is the process of forming new words by shortening or clipping down a multisyllabic word. It is considered as a new process in English language, widely practiced in general usage in which the short form can often be used only in the casual mode of expression. New term formed by clipping can omit an initial, a middle or which is most frequently the case, a final element. This formation is as well found in radiotelephony such as level (flight level), ident (identification), and nav (navigation). Besides, it is interesting that not only words are clipped down in this particular language but also phrases and sentences are shortened such as NOTAM (notice to airmen), SELCAL (selective calling code for transmitting), WILCO (will comply), CAVOK (cloud and visibility are ok), etc.

Certainly, there are many short forms in use in sublanguage which are coined for spoken use by a special group of profession and have no validity outside it.

3.3) *Backformation*: it is the process of forming new words by dropping an affix to form an original item. It can also be described as the antonym of affixation since elements are subtracted to produce a different word category instead of adding elements which indicate a change of meaning or a word category. This process occurs principally in the formation of verbs being formed from a noun such as edit, created by the removal of the noun-identifier {–or} in 'editor'. However, it is relatively infrequent in sublanguage. At this point, this particular formation is possibly implemented in the actual lexicon since the analysis is only conducted when there is an existing item with affixation in the reference lexicon.

To systematically analyze at lexicon domain, categorizing lexical items exhibited in the data into conceptual classes is what to begin with. After that each class is carefully examined and classified into types of word-formations to explicitly exhibit the distinctive formats at lexical level of radiotelephony.

The third domain of the study is at syntactical level. Some concepts of syntactical analysis applied in the study are displayed in the next section.

2.4 Syntactical Analysis

The study of syntactical domain is carried out under the structural framework which is generally applied in analyzing the empirical data of sublanguages. Since the framework has a great potentiality in systematically revealing the genuine and unique characteristics of rigid language form and structure, basic concepts of test frame is applied to illustrate both paradigmatic and syntagmatic relations of lexical items in radiotelephony as well as to classify them into different form-classes whereas the notions of sentence classification and phrase-structural rule are used to generate the concrete pattern of syntactical arrangement in radiotelephony. Therefore, all the concepts applied in syntactical analysis are described below.

2.4.1 Concept of Test Frame

Since sublanguages do not exist as separate entities but as sub-systems of natural language, its dependence on general language is more marked at syntactical level than at lexical level since the relatively few special syntactic features do not constitute an independent grammatical system. The grammatical system of a natural language possesses a much greater stability and resistance to innovation with the result that sublanguages make use of syntactic devices already existing in the language concerned instead of creating new ones, though these devices may be

redesigned for other functions and thus have different distribution (Sager et al, 1980:184-5).

According to several studies of sublanguage, syntactical properties are, indeed, confined in a restricted set of grammatical patterns and rules which is certainly not conventional sentences created as in its corresponding natural language as some grammatical properties of its corresponding natural language are omitted or reduced in order to reduce ambiguity or cumbersome and redundancy of the natural syntax as well as to suit the distinct area of usage within the specific field of knowledge. Gerr (1942) also supported that the rationalization of linguistic formulation as a whole established through progressive reduction of syntactic complexity to the absolute minimum.

The basic assumption of the grammatical analysis of sentences is that all the structural signals in English from which radiotelephony is emerged are strictly formal matters that can be described in physical terms of forms, correlations of these forms and arrangements of order (Fries,1952: 58), meaning that the forms and arrangement of sublanguages are certainly operated in system which have signaling significance only when they are parts of the entire structural patterns.

As a sentence is _not_ a group of words as words but rather a structure made up of form-classes or parts of speech, to discover the arrangement of syntactical patterns of sentences, one may not need to know the lexical meanings of the words but he must know the form-classes to which the words belong (Fries, 1952:64). In other words, lexical items or words all have internal structure which indicates their grammatical identity to demonstrate their functions in the language as well as their certain position appeared in the sentences.

Therefore, to classify form-classes of radiotelephony, the concept of test frame in accordance with Fries (1952) – all words that could occupy the same *set of positions* in the patterns of single free utterances (a stretch of speech by one person marked of by a shift of speaker) must belong to the same part of speech. It is hypothesized that if any word from the data collected fits into each significant position without a change of the structural meaning within one minimum free utterance set as a test frame, the groups of those words which can be placed in the same position belong to the same form-class. Referring to Fried (1952), it is not essential to neither define the structural meaning nor to indicate the structural significance of any particular position. The only thing that matters is making certain whether with each substitution, the structural meaning is the same as that of a test frame or different from it.

To elaborately describe the concept of test frame, some of test frames used in his study on English language are exampled below. The minimum free utterance test frame that formed to in search for groups of form-classes is '*The concert was*

good'. After the frames are set up, all the items from the targeted materials are to substitute for '*concert*' in test frame to identify the very first form-class in the language which Fries (1952) named as *Class1*. There are a great amount of words, be able to replace *concert* as the followings;

> The *concert* was good
> *food*
> *taste*
> *container*
> *difference*
> *privacy*
> *family*
> *company*

However, he sooner found that frame adjusted is needed since many words with 's' ending such as meals, reports and lessons to be as follows:

> *Class 1*
> (The) _____ is/was good
> _____ are/were good

Actually he also created another two frames; '*The clerk remembered the tax*' and '*The team went there*' to explore whether there is any special characteristics embedded in each word. In short, any items which can be placed in the blank are classified as *Class 1*. Their prime features are explained in correlation with the certain position in the test frame.

The process is continued by seeking substitution in another position with the same test frames. Again, any words which fit to the position are coined as Class 2, 3 and 4 accordingly. But, if one can be fit in several test frames, it is defined as a multi-function word which belongs to more than one form-class.

This particular criteria is implemented in the study on the assumption that radiotelephony is the new language in order to avoid the influence of knowledge upon the canonical English grammatical system in which it is emerged. Therefore, words are explained as the way it appears in the set test frames without applying the canonical English language system as a guideline in describing the language.

2.4.2 Concept of Sentence Classification

To thoroughly illustrate the domain of syntax in radiotelephony, only word classification in several form-classes cannot represent the distinct linguistic character of this particular sublanguage. But, how those form-classes sequenced in sentences are as well important as radiotelephony is the language created to be

suitable for radio communication which is required a rapid exchange of information. As a result, its sentence structure or pattern is convincingly vast different from those in canonical English sentences.

Nonetheless, to serve the nature of radiotelephony which the prime dominant communicative functions aim at triggering actions and sharing information (Mell & Godmet, 2002:2) through three defined set of speech acts; commanding, informing and questioning which are direct exchange, inform exchange and elicit exchange respectively mainly found in my pilot study on *Conversational Analysis: Final message before a disaster* (2007), the descriptions of patterns or arrangements of the sentences collected from the data; the manual and the actual voice recording are generalized as well as illustrated the ties among the form-classes generating in the sentences based on this agreement.

In this section, concepts of fundamental syntactical structure of sentences categorized in relation to the acts they perform in conventional English language is reviewed to provide clearer picture of the analysis.

Sentences can be classified on the basis of their communicative functions or illocutionary force and syntactical properties. The fundamental sentence types according to communicative functions are *imperative, declarative, interrogative* and *exclamative* as shown in the diagram below (diagram 1). The first three are commonly termed *indicative* as their grammar category typically used for the exchange information (Downing & Locke, 2006:117).

Independent clause → indicative → declarative / interrogative / exclamative; Independent clause → imperative
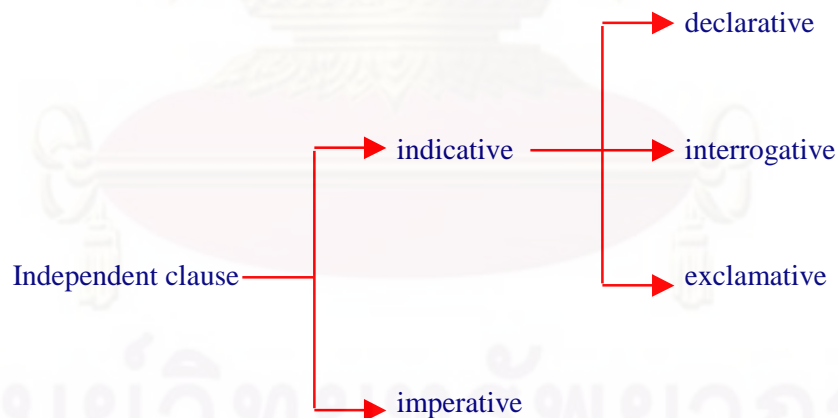
Diagram 1 – Basic Sentence Types

Declarative sentence is the most straightforward sentence type as its syntactic configurations are usually displayed unmarked; the subject comes first in the sentence, followed by the predicate (Aarts, 1997:55). Declarative is generally used to *make a statement to provide an information* such as 'You haven't closed the door' in any regular conversation, 'C172 at the south side hangars' and 'ten miles south two five hundred feet for landing' in air-ground communication.

Interrogative sentence, on contrary, is used to *elicit or ask a question*. It can be either polar (yes/no interrogative) with yes or no as an answer or non-polar (wh- interrogative) with an infinite range of answer. For examples, 'When did you leave?', 'Can you see this?', 'Are you ready for immediate departure?', etc. As with declarative, there is no watertight one-to-one relationship of the syntactic form (Aarts, 1997:57).

Next, *imperative sentence* is used to issue a *directive; order/command, request, offer, warning, prohibition and instruction*. The traditional term 'command' is nowadays applicable only in contexts of great inequality of power such as the military (Downing & Locke, 2006:117). Notice that very simple syntactical structure of imperative does contain mainly a verb in its base form without subject; for instance, 'Mind your own business', 'Close the door' in general conversation, 'say again your call sign' and 'contact 1219.1' in air-ground communication. The very last sentence type is *exclamative sentence* is formed with an initial wh-word as a noun phrase to utter an exclamation, expressing strong emotion such as 'What a book he bought', 'What a load of nonsense he talks', etc.

Sentences in radiotelephony as mentioned are based on three types of sentences: imperatives, declaratives and interrogatives as to *triggering actions* and *sharing information*.

'*Triggering actions*' is the core function of air-ground communication. Giving an order, instructing and requesting actions or permission to do something are communicative functions of imperative sentence that trigger specific responses. Supporting the core is '*sharing information*' in the sense that appropriate actions can only be triggered when pilot and controller are in possession of sufficient shared information about the current situation through declarative sentence and interrogative sentence.

Hence, exclamative sentence is elided from sentence types applied in the study since it is impossible to be performed in air-ground communications referring to specific language prescribed in the manual and its confined situational parameters.

After categorizing all the samples in the data into basic constructions with regard to its communicative functions, then the sentences in each subtype are described in correlation with form-class arrangements to elaborately demonstrate how the sublanguage as radiotelephony is constructed at sentence level. The reference syntactical components of each sentence types discovered in the manual are systematically displayed in '*phrase-structure rule*' which is a way to describe a given language's syntax by breaking a sentence down into its *constituent parts*, a word or a group of words that functions as a single unit within a hierarchical structure, with specific symbols and abbreviations representing phrase categories

and lexical categories respectively to deliberately display the uniqueness of syntactical arrangements in radiotelephony. Phrase structure rule is usually of the form; *A = B C* meaning that the constituent *A* is separated into the two sub-constituents *B* and *C*. In natural English language, phrasal categories include the noun phrase, verb phrase, and prepositional phrase while lexical categories include noun, verb, adjective, adverb, and many others but in radiotelephony, the categories are coined differently. Consequently, the explanation of symbols and abbreviations will be illustrated in the next chapter.

As well as that the reference structural patterns discovered are eventually compared to those occurred in its corresponding natural English language. The parallel comparison will be done between the reference structural patterns and those collected from the actual data to evidence whether the deviation occurred when conducting in genuine air-ground communication. It is believed that the reference syntactical pattern of this sublanguage is minimized more than maximized when comparing to its traditional syntactical features.

The coming up section is focused on the general concepts of compare and contrast which is the principle framework to use in morphological analysis in radiotelephony.

2.5 Morphological Analysis: Concept of Compare and Contrast

The last domain of analysis is at morphological level which is the smallest linguistic particle in the study. The investigation aims at finding out about *grammatical morphemes* of radiotelephony.

According to Bloomfield (1933), morpheme is a linguistic form which bears no partial phonetic-semantic resemblances to any other form. It is to consider morphemes to be primarily structural units rather than semantic ones. However, for some scholars, morphemes are the smallest individually meaningful elements in the utterances of a language. Whichever aspects, sense, are essential characters of morphemes.

There are two common morphemes in a language, lexical morphemes, expressing meanings that can be relatively easily specified by pointing out examples of things, events or properties, and grammatical morphemes which relate to the sense of grammatical concepts such as number, gender, tense and aspects. Since radiotelephony is emerged from the natural English language, lexical morphemes appeared in the data are definitely the subgroup of its corresponding lexicon. The only feature representing their uniqueness is the distinct formation which is the focal purpose of the second domain of the study. Therefore, in this fourth domain of analysis, the main discovery points to grammatical morphemes.

In analyzing words into morphemes in a language commonly known, it is easily discover the separate parts because similar words can be recalled with which is to compare the words under analysis. On the other hand, in working with an unfamiliar language, it is necessary to have a group of similar forms to compare and from which to extract in recurring parts (Jensen, 1990:19). But, one principle should be remembered is that a word must be exhaustively divided into morphemes – if a word is divided into morphemes at all, each part must be a morpheme and there must not be any unanalyzed residue (Jensen, 1990:21). The traditional analysis of morphemes is based on compare and contrast (Nida, 1949) which is as well complied in the study to demonstrate significant grammatical morphemes of radiotelephony.

The very last area to reviewed in this chapter is the conclusive previous works related to aviation communication studies in order to provide the information on several aspects of aviation studies as well as to point out how essential to examine reference grammar of radiotelephony in this particular study.

2.6 Previous Studies on Aviation Communication

From the past to present, there are quite a number of sublanguage studies. Unfortunately, there are rather few in the area of aviation communication especially the communication between pilot and air traffic controller. Therefore, I decided to include all of the studies which are associated within the field of aviation communication to provide broader view of language studies in this particular setting. The studies concerning aviation communication which will later be explicated can be roughly categorized into three different aspects according to their scope or framework as the followings;

(1) *The first scope of the studies* centers on language properties of the communication arisen among pilots during flight operation. It concerns the routine talk in airline cockpit using insights and practices of ethnomethodology and conversation analysis. Muarice Nevile (2006) has been conducting several studies in this particular framework. His studies usually aims at explicating how pilots talk and interact with one another routinely, as they establish what is going on around them, who knows what, who is doing what, and what they are to do next. He explores how, through processes of talk-in-interaction, pilots develop and make available to one another their situated and moment-to-moment understandings as they work together as a flight crew to perform necessary activities and tasks to fly their airplane.

The work was conducted by using video data of pilots at work on regular scheduled passenger flights to show how every airline flight is simultaneously and

necessarily a technological triumph and an interactional accomplishment (Nevile, 2001). I would like to clarify the term '*talk-in-interaction*', a main concept that Nevile frequently referred to in his works. '*Talk-in-interaction*' from his point of view does not concern only verbal aspects performed during the interaction but also another range of available resources such as non-verbal to be interpreted as meaningful contributions to the ongoing work during the interaction. Routine cockpit talk, another key term in the studies, is the talk, occurring when nothing seriously wrong happens, the talk that is automatically wiped by the continuous recording loop of the cockpit voice recorder, and the talk that gets the job done (Nevile, 2004: 1).

Most of his studies demonstrate the dynamic of prescribed sublanguage units and pattern in the discourse which pilots are scripted to utter closely associated with the tasks at each phase of the flight. It is to help pilots to work better together as a team to share information, assess situations, perform tasks, plan and make decisions, and identify and resolve problems. To accomplish the activities during flight operation, they have to generate verbally and non-verbally practice through out the flight. The linguistic units of the language between pilot and pilot are also confined especially in the talk that directly concerns the routine task at some points in flight; for example, during taxiing they still have to perform the task according to the provided checklist. Such actions are acceptably performed with wordings that are officially prescribed for pilots (Nevile, 2006:279-80).

One of his studies is related to the use of additive conjunction '*and*' even though this particular unit can be omitted according to the official manual. It is to point out that even in the language which the construction of linguistic units and organization are defined, the deviation is unavoidable occurred which explicitly demonstrates the dynamicity of this sublanguage. Referred to his finding in '*Making sequentially salient: and-prefacing in the talk of airline pilots*', 'and' is a local means for maintaining an ongoing sense of the conduct of a whole flight as the pilots' work is formally organized in discrete orders. It is frequently occurred at the beginning of the turn in order to (1) completing a task, (2) initiating a task, and (3) initiation a shared awareness.

Nevile (2006: 282) claimed that and-prefacing is one available resource by which pilots present their ongoing understandings of how the many discrete actions they conduct are connected and ordered as parts of a larger sequence that is the pilots' conduct of the flight as a whole. *And*-prefacing presents a new action as adding to something prior, as some relevantly next thing to do. By initiating an action with an *and*-preface, a pilot can make maximally hearable that something prior is completed or somehow past, that it is here-and-now appropriate to move to some next action, indeed even to the next one. *And*-prefaced talk is therefore one

way that airline pilots can make explicitly available to one another, through their talk, their understandings of timing for their work, of what they have done, and where they are up to right now.

The *first* function of *and*-prefacing is to complete the task. It precedes the second turn which is the response to the first-pair part within a single adjacency pair sequence of talk. For example (C = Captain, FO = First officer or co-pilot, PNF = Pilot-not-flying and PF = Pilot-flying):

> 4 C/PNF: s-s-s-s (.) clear left,
>
> 5 (0.8)
>
> 6* FO/PF: **a::nd** it's all clear right.

The prescribed wording for such situations is for the pilots to say minimally '*clear left*'/'*clear right*', however, in this case the second turn is *and*-prefaced (line 6). The *and*-preface makes a clear connection of the '*clear right*', a call to the immediately prior turn. It illustrates that the two turns, '*clear right*' followed and occurred as relevantly next to '*clear left*', are tightly coupled, and that they occur in a sequence as two parts of one task. It can make salient that the second turn in the pair is and should be heard as a second, as a turn that is not initiating a task but completing that task.

The *second* is to initiate the task in a way that a new sequence of talk that is not part of the immediately prior sequence of talk, '*but is presented as connected and following relevantly and legitimately after*' (Nevile, 2006: 295). For example:

> 5 FO/PNF: check.
>
> 6 (0.3)
>
> 7* C/PF: **and** taxi pre takeoff checklist.
>
> 8 (0.5)
>
> 9 FO/PNF: taxi pre takeoff checks::, flight instruments:,

The C/PF completes a pre-takeoff briefing, and the FO/PNF acknowledges hearing and understanding this (line 5). The C/PF then calls for the '*taxi pre-takeoff*' checklist (line 7) by using *and*-prefacing to initiate the new sequence of turn.

And the *last* is to present an awareness as connected and occurring next as a part of a larger sequence of actions and circumstances that together constitute a flight. The *and*-prefacing commonly occurs when the airplane is at one thousand feet before landing or reaching a target altitude while climbing or descending. Pilots are required to notice and talk to establish a shared awareness of such significant altitude changes. For example:

> 6* FO/PNF: **and** one to go.
>
> 7 (1.3)
>
> 8 C/PF: <yes it's checked>

On approach to the airport, the pilots' talk concerns the distance from the runway, then the FO/PNF notes that the plane, on descent, is soon to be 1000 feet from its target altitude ('**and** one to go', line 6).

Unfortunately, the study which directly concerns the linguistics units in general of the language is extremely rare since the scholars tend to be interested in analyzing the wordings transcribed from the cockpit voice recorder that somehow lead to misunderstanding and ambiguity in conducting the flight separately from their contexts. On top of that the study of the fundamental linguistic features and patterns of the particular sublanguage in 'air-ground communication' remains unveiled.

Non-verbal mode embedded in verbal practices in the cockpit is also studied by Nevile (2005) in '*Seeing the point: attention and participation in the airline cockpit*'. Since it doesn't relevant much to my interest, brief findings will be provided. In task-oriented interaction in the cockpit setting, reasoning and understanding is made visible and interpretable through not only in verbal mode, but a range of other non-verbal such as gesture and gaze, the placement and handling of objects, and the movement and orientation of bodies within significant spaces.

The paper analyzed one of the resources, pointing which is naturally occurring in the interaction in the airline cockpit. Pilots do routinely point to things to organize, create and treat as relevant and meaningful for what they are doing. *Pointing* in the cockpit is a means for embodying varied forms of attention and participation. A point is produced in surrounding space relative to its target and to the other pilot's field of vision. Systematic variations in the manner of pointing can relate to the kind of action being undertaken and the speaker's expectations of how what is said is to be dealt with by a participant.

In '*Talking without overlap in the airline cockpit: Precision timing at work*', Nevile (2007), the discourse organization is examined. The study mainly investigates the organization for interaction in the cockpit. It pursues an observation that moment of overlapping talk when two or more parties talk simultaneously which are generally rare in actual cockpit interaction because they are instructed in training not to speak simultaneously. However, cockpit talk is highly conducive to overlap which is another diversity of the actual usage, but the occurrence of overlapping in pilot-controller is certainly unanswered.

The works of the very first scope of aviation communication study is the attempt to describe the use of sublanguage uttered by pilots both at lexical level and discourse level within the context of routine activities in flight. The close relation between '*talk*' and '*action*' is strongly tied and tremendously influenced the way of conducting the interaction and generating the language to accomplish those actions.

The most outstanding point which is introduced by the works of Nevile (2006: 280) concerning the set of prescribed sublanguage is that '*in reality pilots routinely modify or embellish these official wordings as they are realized as naturally occurring routine talk-in-interaction*'. Many people seem to be misled by the definition of prescribed or defined sublanguage as it seems to be rather static and the participants should sternly follow the controlled linguistic set without any freedom to create the deviation which, in this case has been proved that it is not true.

(2) *The second scope of the studies* solely points out units at microlinguistic level in the communication conducted by pilot-controller which eventually leads to miscommunication during flight or even fatal accidents. It is hearsay a problem-based solving in order to point out units at microlinguistic level in the communication conducted by pilot-controller which eventually lead to problems in flight or even fatal accidents. They are mostly done by separating the particular lines from its context that contain wordings or phrases claimed to be ambiguous and incomprehensible which always lead to the conclusion that by not using the officially prescribed language, the pilots may have contributed in some way to the sequence of events leading to the accident.

In '*Aviation language problem: improving air-ground communication*' (Boschen & Jones, 2004), stated the problem of communication by squeezing the single wording or two, from several air incidents and accidents to issue the linguistic causes of the problem in the language such as bad formulation: the controller used the word which its denotation is basically different from what he wanted to convey. Therefore, it led to misunderstanding; for example, '*Can you make the runway?*' which somehow can be meant '*build*'. However, they also posited that the duplication of Federal Aviation Administration (FAA) of singular meaning especially the ones that may concern the critical expressions is the cause of ambiguity; for example, words commanding instant action with three FAA expressions; IMMEDIATELY, EXPEDITE and WITHOUT DELAY. These words take a longer time to say so it would replace with the simple word 'NOW'. This study is solely based on describing the language according to the interpretation of participants in the interaction through the report of incidents and accidents. Indeed, it is the analysis which depends mainly on the background language knowledge of the researchers who are native speakers, involved in the aviation field.

In '*Fatal words: communication clashes and aircraft crashes*' by Cushing (1997) stated that '*While voice has a natural appeal as the preferred means of communication both among humans themselves and between humans and machines since it is the form of communication people find most convenient. The complexity and flexibility of natural language are problematic, because of the confusions and*

*misunderstandings that can arise as a result of ambiguity, unclear reference,
intonation differences, implicit inference and presupposition as well as form more
general peculiarities of human interactions face-to-face and over the radio.*'

To study the miscommunication in aviation interaction, language-based
communication problems are analyzed through the specific part of the discourse
delicately selected from representative of a wide range of fatal or near-fatal aviation
accidents in which language misunderstandings or omissions or communication
confusion of various other sorts have played a contributing or even central role
(Cushing, 1997: 4). He classified the problem based on the language in four areas;
ambiguity, reference, inference and repetition. In identifying the problem, he quoted
one or two particular lines from the entire discourse and explained what and why
the problem occurred. For example:

 a) *Ambiguity*: A controller, knowing that B1 has called but not sure
    what the request has been replied – 'B1, Ground, *go ahead*', and
    then proceeded to talk to aircraft while waiting for a reply. B1
    misinterpreted the phrase '*go ahead*' as referring to his flight
    maneuvering rather than his speaking, and was halfway down his
    normal route of travel before the controller realized what had
    happened (p. 9).

 b) *Reference*: One of two fighters on instrument route developed
    mechanical problems and stated '*We need a clearance back to base*',
    after which the controller then issued an IFR clearance, to which the
    aircraft replied – '*We are in a left turn and we are climbing to
    17,000*'. The controller interpreted '*we*' as meaning that both aircraft
    were returning to home station, when in fact only the lead aircraft
    wanted to return, a misunderstanding resulting from an uncertainty in
    the reference of the pronoun '*we*' (p.18).

 c) *Inference*: An aircraft that had been assigned by the Tower an
    altitude of 2,000 feet was then told by Departure Control to maintain
    4,000 feet and acknowledged. At 2,000 feet, the controller said
    '*Level 2,000*', and the pilot responded '*We are two for four*',
    meaning that '*we were two climbing 4,000*', to which the controller
    replied '*Roger*'. At about 2,600 feet the pilot leveled off and pointed
    out a large air carrier which appeared to be above and in front of his
    aircraft about ¾ of a mile. Then, he soon realized that the controller
    wanted him to maintain 2,000 feet. In fact, the controller should have
    said '*maintain 2,000*' and the pilot's respond could have been more
    precise (p. 33).

    d) *Repetition*: Sometimes dangerous near-miss situations arise when partial readbacks rather than full ones occur, as the following example (p. 41):

1. Controller clears aircraft A to <u>descend</u> to <u>flight level</u> 280.
2. Controller clears aircraft B to <u>climb</u> to <u>flight level</u> 270.
3. Controller issues aircraft A, a <u>heading</u> of 240.
4. Pilot acknowledges with '***Roger two four zero***'.
5. Aircraft A descends through aircraft B's altitude.
6. Controller observes aircraft A at altitude 27,200 and questions pilot.
7. Pilot claims he was cleared to flight level 240 and the controller acknowledged it.

A readback can sometimes be ineffective because its source has not been made clear. A pilot requested a climb from FL 280 to 350 and received clearance to climb to 310. While leveling at 310, he heard a clearance to climb to 350, read it back and commenced climb, but just under 320 the Center called and said '*That clearance wasn't for you, it was for somebody else. Return to 310*' (p.42).

According to his explanation, it is extremely difficult to the outsiders or even the insiders to understand what the problems basically relied on; the contamination of natural language, the misuse of prescribed sublanguage, the limited of prescribed sublanguage, or else because every description was *decontextualized or demonstrated separately from its context* that causes his contribution extremely vague, arduously comprehensible and rather unsystematic.

Another research is as well relating to the miscommunication in flight operation carried out by Tajima (2004) in '*Fatal miscommunication: English in aviation safety*' also supported Cushing's assumption on the benefit of exactly followed the scripted wordings. The main objective is to critically analyze the use of English in the field of aviation. Even though proper use of phraseologic English (prescribed sublanguage) is a crucial prerequisite for pilots and air traffic controllers to participate in the field, fatal accidents due to miscommunication where sufficient and improper English were contributing factors have still occurred (p. 451). Hence, it reexamines some salient aviation accidents in order to analyze how communication breakdowns occurred and how to avoid or limit them as well as propose some suggestion for aviation personnel to cooperatively achieve a better communicative context in aviation (p. 467).

One example of the analysis is the case of Eastern Airlines flight 401 flying from New York to Miami, crashed into the Everglades near Miami International Airport.

The controller asked the pilot (p. 461),

23:41:40 Controller: 'Eastern, ah, four oh four, *how are things coming here*?'

23:41:44 Captain: '*Okay*, we'd to turn around and come, come back in.'

23:42:12 *The plane crashed into the Everglades.*

He explained that the controller should explicitly ask the captain with phraseologic expressions as '*Confirm you are descending*' or '*Report your altitude*' instead of '*how are things coming here?*' which misled the captain as he believed that the controller has asked him about the landing gear problem which previously took place. As a result, the captain responded '*okay*' without clarifying what the controller meant that somewhat made the controller wrongly presupposed that the descent was under the pilot's intention control. The series of wrong choices of wordings and fault presuppositions eventually induced the fatal accident. Tajima (2004) also claimed that this is the clear example of not preceding the phraseology defined in the sublanguage.

These three studies in this confined scope are pursuing exactly the same purpose which is the attempt to exhibit the problem of miscommunication occurred in the way that participants don't strictly perform the language according to the way it is defined and patternized. However, they all are conducted unsystematically without any strong support or framework of any linguistic theory as the description of the actual language has done case by case of each reported incidents and accidents with the application of their basic knowledge of English language and scripted phraseologic expressions as well as the knowledge in the field of aviation which mostly conducted off the context, or '*decontextualization*'. As the matter of fact, it is difficult to believe how they could come up with the conclusion without generally analyzing the actual use of the language within its context to demonstrate genuinely understand the dynamic of linguistic features and discourse organization is questionable.

(3) *The third scope of the studies* focuses on the communication strategies of the crew in order to maximize efficiency in crew coordination as well as to minimize miscommunication and errors as to promote the concept of crew resource management. It is directed to the communication strategies of the crew in order to maximize efficiency in crew coordination as well as to minimize miscommunication and errors especially in the crisis or critical situation during flight as to promote the concept of crew resource management. Since the study in this specific framework is not quite relevant to the elements of the language but the strategies of effective communication in aviation setting, brief review will be presented.

The study of '*Communication under high task load*' was conducted by Dietrich (2003) proposed seven communication strategies to reduce the

complications in pilot-pilot communication as they are connected to one-third of the air accidents;

a) Team members speak more simply under conditions of high task load: they often use questions, 87.7% of all questions are *yes/no* and *wh*-question but yes/no questions are used more frequently that *wh*-question about 70%. Under the same dual task conditions, *yes/no*-questions are less impaired than *wh*-questions when cognitive demands increase, such as the amount of knowledge or the working memory load, involved in the question-answering task. In short, more simple linguistic means should be used.

b) There are more utterances per minute in the segments of high workload, and the utterances were longer, leading to a substantial difference of speech time per minute. It implies that speaking more or less may be a good or bad communication strategy.

c) Good team speaks more.

d) Crews who communicate their intentions more frequently achieve better performance in maneuvering the airplane.

e) Speech acts of seeking reassurance occurred more frequently in the high-performance crews and so does positive speech acts of agreement or negotiation, like acknowledgements and affirmations

f) Under conditions of high workload the proportion of problem solving utterances of the captain is significantly higher in good teams than in poorly performing teams.

g) Acts of indicating interest and affirming acts are typical for high-performance captains. They are more encouraging towards contributions from their co-pilot.

At the end of his finding, he made an interesting conclusion which is rather different from others that standardization of phraseology (scripted wordings) is *not* considered to correlate with errors or severe incidents and accidents in high risk environment of aviation setting, and the efficiency of team communication can be improved by standard communication formats, feedback, and redundancy.

In '*Shared mindfulness in cockpit crisis situation*' by Krieger (2005) aims at examining shared mindfulness in 10 aviation student interaction in a decision-making crisis situation to identify the communication behaviors and to determine whether shared mindfulness leads to more effective pilot decisions. His findings reveal seven communication strategies that create shared mindfulness in the interaction emerged from the data (p. 160-2);

a) *Seeks information*: pilots seek information in the interaction via seeking their partner's input or opinion, clarifying or confirming their partner's communication including correcting erroneous information.

b) *Reasons from a positive perspective*: pilots demonstrates reasoning that focuses on what is available and feasible while noticing and incorporating discrepant and/or disconfirming information and comparing those data against the proposed option(s).

c) *Perceives multiple perspectives*: pilots demonstrate the ability to perceive multiple information inputs, conditions, alternatives, and people perspectives. In so doing, they remain open to novelty actively processing the current state yet can sustain attentional focus to the task.

d) *Projects thoughts and feelings*: pilots verbally and non-verbally project their thoughts and feelings in an interaction to engender accurate, real-time, mutual understanding.

e) *Mindfully acknowledges partner communication*: pilots acknowledge each other's communication and demonstrate via a substantive response that the message has been received and critically processed.

f) *Uses participative language*: pilots use language that emphasizes the tentative, conditional nature of information and the environment and demonstrate, through the use of inclusive terminology, joint ownership in the decision-making process.

g) *Demonstrates fluid turn taking*: A ping-pong pattern of communication that facilitates achieving maximum participation by both pilots.

Additionally, she also explored the factors connected to effective decision-making; (a) reasoning from a positive perspective; (b) using a kaleidoscopic perspective; (c) speaking thoughts and feelings aloud, precisely, and conditionally; and (d) acknowledging communication substantively. Finally, she insisted that '*in aviation context, it is particularly important to use precise, concrete, standard terms so that an accurate descriptions of the human and environmental conditions is presented*' (p.152).

McKinney et al (2005) stated in his study on '*How swift starting action team get off the ground*' that the amount of communication on the flight crew varied from constant communication chatter to about three or four sentences a minutes, depending on task. Therefore, to increase the team performance and to practice well immediately and manage crises in high risk environment, there are four propositions that pilots need to follow (p. 210-222);

a) *Proposition 1*: the performance of the team is dramatically improved by deliberately and salient early selection, expression, and commitment to specific communication value that intense the importance of communication and inform other members of how individuals wish to communicate.

b) *Proposition 2*: the performance of the team is improved by the team's ability to collaborative select and hone via trial and error distinct, reliable, and highly varied communication interactions; for example, crew are taught a specific interaction referred to '*challenge and response*' which is used to ensure compliance with a procedure; when wing flaps are set for takeoff, the captain will say '*flaps*', and the co-pilot should spontaneously respond with '*flaps 50%*'.

c) *Proposition 3*: when crisis strikes, the performance of the team is dramatically improved if it has developed a capacity to learn new interactions through practice in and valuing of new interaction creation; for example, *the use of directive and immediate response, suggest/suggest/suggest, priority-establishing and agreement, candor, invitation and think-aloud, debate and confidence-in-response, query-with-implied-suggestion and agreement,* and *think-aloud and interrupt-if-disagree*.

d) *Proposition 4*: the performance of the team is dramatically improved if the crew is aware of their communication responsibilities and their role in building working communication interactions.

These studies have concerned centers of coordination focusing on how collaboration is achieved through the use of various tools and strategies to respond to routine, problems and difficulties in maintaining schedules and coordination activities under high work intensity and a potential for fatal errors in this particular aviation settings.

To sum up, the works within the third scope are to illustrate and illuminate the actual pilot-pilot communication strategies in order to strengthen the effective communication as well as to increase the efficiency of team performance specifically in the crisis or even the high workload routine of flight operation.

In accordance with the reviewed studies of aviation communication, the direct study of air-ground communication especially concerning radiotelephony, the sublanguage solely used in the communication, is rare to none. Almost all of the papers neglect the thorough investigation on distinct linguistic features and unique discourse structure of the language. Furthermore, most of them intensely highlight either the linguistic points that actually direct to ambiguity and miscommunication or the language properties analyzed separately from its context

(decontextualization) without any linguistic theory applied as a framework of the study. Consequently, the findings may mislead the natural language properties of radiotelephony as no research has been conducted to provide the unique characteristics of linguistic formats and discourse features of this artificial sublanguage.

Also, there is a strong evidence in the studies that radiotelephony is treated as a static substance which has to be as the way it is regulated, without any deviation as in its corresponding natural language even though there is a great opportunity that deviation will occur in the actual context of communication. Nevile (2006: 280) criticized on this matter that '*in reality pilots routinely modify or embellish these official wordings as they are realized as naturally occurring in routine talk-in-interaction*'. Therefore, radiotelephony is more or less based on the same stand.

Thus, the essential aspect of *air-ground communication* which is obviously neglected from the aviation communication study is the analysis of linguistic properties as a whole in both standard prescribed language in manual and the actual language within genuine aviation context in order to fully gain the insights of the unique characteristics of this particular sublanguage which will tremendously and eventually instigate a grounded contribution to language curriculum design as well as a guideline to develop linguistic properties of radiotelephony to be more appropriate and more effective as an international language applied among pilots and air traffic controllers around the world.

Literature review in this chapter is to be applied as a framework in the study of four domains of analysis which are at discourse level, lexical level, syntactical level and morphological level respectively.

CHAPTER III

METHODS OF ANALYSIS

3.0 Introduction

To successfully carry out the study with reference to objectives and the analysis of four linguistic domains of radiotelephony, there are definite criteria of data selected to effectively compare and contrast between prescribed linguistic features and actual linguistic elements as well as specific methodologies to dynamically enhance an explanation and interpretation of data analysis at four different linguistic levels: discourse, lexicon, syntax and morphology which are consecutively delivered in this chapter.

3.1 Data

In conducting the study, two sets of data will be analyzed. One is the data of prescribed or defined language accumulated from *Manual of Radiotelephony (2006)* issued by International Civil Aviation Organization (ICAO) which is altogether **556** messages whereas another set of data is actual language in air-ground communication collected from cockpit voice recorder (CVR), recorded in the blackbox which is the device consisting of microchips to digitize and store flight data and voice in the cockpit throughout the entire fight. The communication in the blackbox will be transcribed only when the crash takes place by the National Transportation Safety Board (NTSB), the international organization which is responsible for the investigation of every air incident and accident. This particular set of actual data will be acquired from two websites which are *http://aviation-safety.net* and *http://www.tailstrike.com* accordingly from year 1994-2004 (10 years). The total numbers of messages from the second resource are **563** messages.

3.2 Research Methodology

The analysis will be conducted at four linguistic domains which are discourse, lexicon, syntax and morphology accordingly. It is to review the linguistic characteristics of radiotelephony from the broad to narrow aspects. The top-down analysis is carried under the specific framework and criteria.

The study is processed in two major parts. The first part is highlighted on the first set of the data from the manual in order to describe a reference grammar or the norm of linguistic patterns of radiotelephony whereas the second part mainly focuses on the use of radiotelephony in actual air-ground communication.

It is mainly to describe and compare language properties at designated levels of analysis between the two sets of data and to point out the possible deviation which occurred in the actual data apart from the reference ones as well as to elaborately illustrate any distinctive linguistic elements departed from its corresponding Standard English language. The steps of analysis to examine the data from two sources are strictly and separately conducted with the same methodology.

3.3 Stages of Research

3.3.1 Data Gathering

3.3.1.1 Collecting the data from two sources, *Manual of Radiotelephony (2006)* approved by International Civil Aviation Organization (ICAO) and the websites, *http://aviation-safety.net* and *http://www.tailstrike.com*, the actual radiotelephony in air-ground communication transcribed from cockpit voice recorder (CVR). Tokens gathered from each set are arranged separately.

3.3.1.2 Numbers of the data is counted with reference to numbers of the turns as it is issued and transcribed in the form of conversation between a pilot (PT) and an air traffic controller (ATC).

For example: according to the actual data below, there are 6 messages;

PT	Good afternoon, approach BOU 683 departed left turn
ATC	BOU 683 continue turn left on heading 120 initial 2000 feet
ATC	GIA 152 turn right heading 040, report established on localizer
PT	Turn right heading 040 GIA 152
ATC	Turning right sir
PT	Roger 152

(Source: CVR transcript Garuda Flight 152, 26 September 1997; http://aviation-safety.net)

As numbers of selected data from the two sources are rather small, 556 messages from the manual and 563 messages from the websites, all of them are examined.

3.3.2 *Discourse Analysis*:

To analyze at discourse level, both sets of data are classified and interpreted in accord with the concept of 'move' and 'act' in Model of Conversational Analysis developed by Sinclair & Coulthard (1974) along with the underlying notion of conventional theoretical framework of conversational analysis.

The structures discovered from the data in the manual are coined as reference patterns which the organization designates both pilot and air traffic controller to conform whereas the ones found from the websites are the actual patterns which are used in authentic air-ground communication.

3.3.2.1 Each pair of exchange is sorted and put into the table as presented below to demonstrate the detailed element of each exchange under designated labels in correlation with those used by Sinclair & Coulthard (1974);

L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
3.	ATC	Station calling Georgetown ground say again your call sign	summon inquire	pre-head head	eliciting	I	Elicit	4
4.	PT	Georgetown ground Fastair 345	reply-summon informative	pre-head head	informing	R		
5.	PT	Fastair 345 Wickin 47 flight level 003 Marlow 07 correction Marlow 57	summon informative	pre-head head	informing	I	Inform	5
6.	ATC	Fastair 345 roger	reply-summon receive/terminate	pre-head head	acknowledging	R		

(Source: TABLE OF DISCOURSE ANALYSIS: MANUAL OF RADIOTELEPHONY)

The label in each column of TABLE OF DISCOURSE ANALYSIS: MANUAL OF RADIOTELEPHONY is defined as follows:

a) *L.O.D* stands for line of dialogue which is the number of message sequencing collected from the source. Referring to the example above, the exchanges analyzed consist of message line number 3, 4, 5 and 6 from the data.

b) *Source* is to identify the interlocutors of each message which can be either a pilot (PT) or an air traffic controller (ATC) to learn who tends to initiate and dominate which type of exchange.

c) *Content* displays the thorough detail of each message examined.

d) *Act* is used to report states of affairs or an action performed by means of language as a unit at the lowest rank of discourse level in relation to acts classified in Model of Conversational Analysis (Sinclair & Coulthard, 1974). As to the model, there are 16 acts; framer, greeting, reply-greeting, summon, reply-summon, starter, inquire, informative, repeat, confirm, reject, terminate, reply-terminate, receive, directive and comment.

e) *Move* refers to the function to exhibit the illocutionary acts of each pair part of an adjacency pair or an exchange which are opening, closing, answering, directing, informing, eliciting and acknowledging.

f) *e.s* is abbreviated from element of structure composed of pre-head, head and post-head (describing the pattern of acts) and I (Initiation), R (response) and F (follow-up) (describing the pattern of moves) to explicitly illustrate the internal structure of each exchange.

g) *Exchange* is the sequence of moves concerned with negotiation a proposition stated or implied in a move, or pair parts of an adjacency pair which contains at least two sequential turns. There are four types of exchanges discussed in the study which are summon exchange, direct exchange, inform exchange and elicit exchange.

h) *ex.* stands for number of exchange to identify the item when the discussion at each stage is required. As in the example above, number 4 and 5 of 278 exchanges are displayed.

3.3.2.2 After all the data is examined and sorted, the structure of each type of exchanges is generalized and diagrammed as the example of the reference pattern of direct exchange;
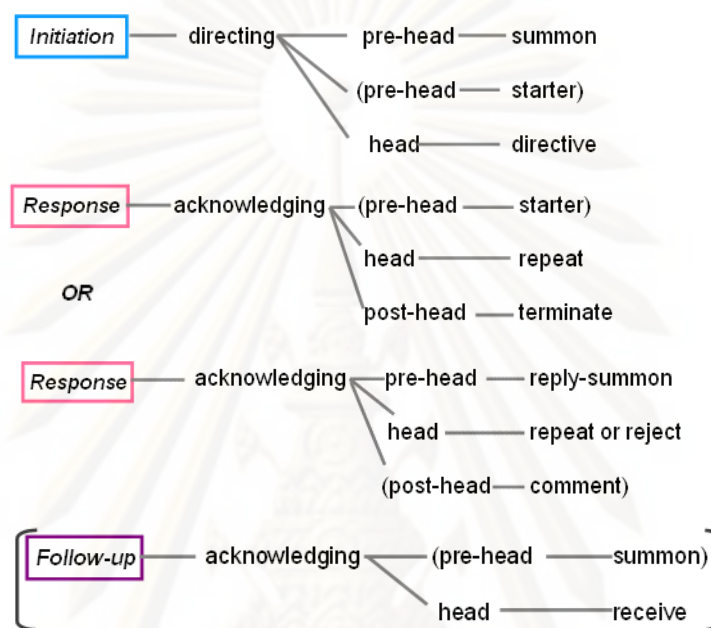
(Source: Diagram 5.1 – Reference Structure of Direct Exchange, chapter 5: 94)

The structure is described in detail along with some of examples on every possible pattern which appears in the data in order to provide crystal clear picture of discourse organization of radiotelephony.
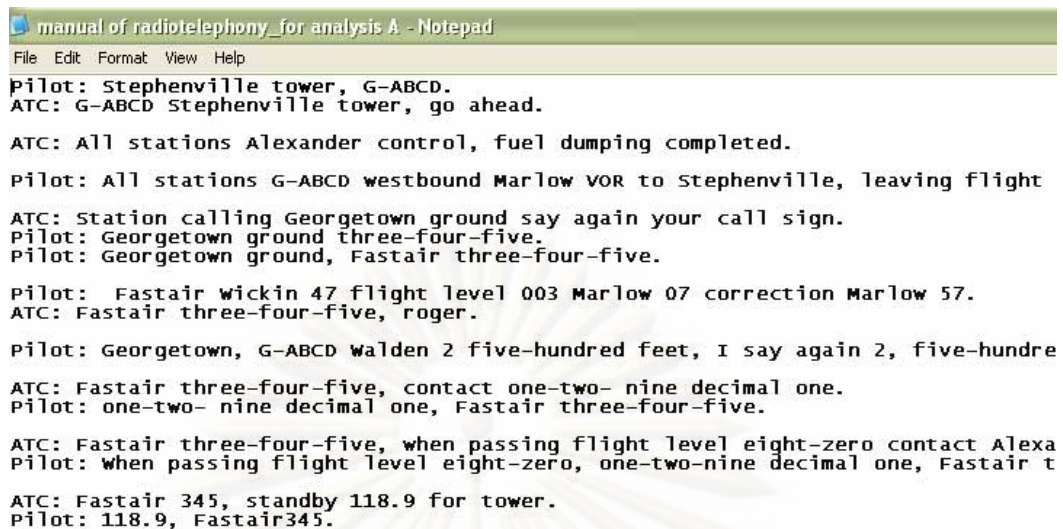
3.3.2.3 The compare and contrast process is carried out when the discourse structures of each set of data is done to point out the deviations occurred at the time that the language is used in the real communication. The process is carefully conducted between the same type of reference and actual exchange structure.

3.3.3 Lexicon Analysis:

To analyze at lexical level, there are two main analysis conducted

3.3.3.1 The reference data is accumulated and processed through two different programs to discover the lexical items of radiotelephony in order to create a complete list of technical terms in the language in alphabetical order.

a) The reference data collected from *Manual of Radiotelephony (2006)* is printed in the form of text document below;

Figure 3.1 – Data printed in Notepad

b) Then, the file is processed with the concordance program, AntCon3.2.2w (2007) in order to learn all possible word tokens which appear in *Word Frequency List*.

Figure 3.2 – Data processed in AntConc 3.2.1w

c) To decide whether the tokens displayed are compounded, meaning that they both persistently co-occurred when appeared in the data, Collocation Extract 3.07 along with *Collocates* in AntCon3.2.2w (2007) are used to evidently provide the samples of collocated tokens.

Figure 3.3 – Data processed in Collocation Extract 3.07

According to the list above, for example, *flight* and *level* consistently occur together as one compound token. Therefore, they both are designated in the glossary as a lexical item, *flight level*. After that the item is defined in relevant to its semantic properties in aviation field, '*a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals, relating to the vertical position of an aircraft in flight and meaning variously, height and altitude*'. The outcome is confirmed by using *Collocates* in AntCon3.2.2w (2007) below.

Figure 3.4 – Items collocation processed in AntConc 3.2.1w

However, *flight* and *level* are as well solely appeared in the data as a free morpheme.

d) To assure that there may be a possibility of the cluster items, Concordance list in AntConc 3.2.1w is also used. At this point only the lexicon, *flight*, is discussed to allow clearer view of the analysis.
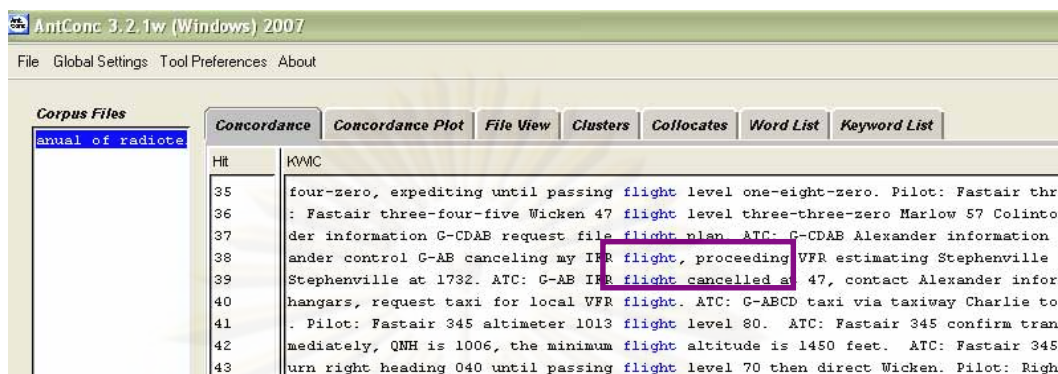
Figure 3.5 – Data processed in Concordance of AntConc 3.2.1w

This item is not only a collocated item to *level*, but also occurred as a single morpheme.

e) All the tokens found in the reference data are examined as such to create the complete lexicon list of radiotelephony. Only the tokens referring to grammatical functions such as auxiliary verbs, connectors or any common generic words which are usually applied in regular corresponding English language without certain aviation-related properties are excluded because the glossary is reserved for the items which focally used in aviation field and specifically defined in air-ground communication.

f) After accomplish steps 3.1.1-3.1.5, the items are classified in accord with their prime semantic property which are altogether 11 conceptual groups; *facility, weather, operational path, unit of service, system, area, parameter, status, process, flight performance,* and *communication expression*. The members in each group are arranged in alphabetical order as the following;

For example: *Flight Performance*

No.	Lexical Item	Definition
1	abeam	to beam a fix, point, or object when that fix, point, or object of an aircraft which is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point
2	airborne	a condition that an aircraft is lifted and kept in the air by aerodynamic forces
3	air-taxi	to control a helicopter to move along the ground under its own power before take-off or after landing or used to describe a helicopter/VTOL aircraft movement conducted above the surface but normally not above 100 feet above ground level
4	backtrack	to go back in the direction from which you have come
5	climb	1) to increase aircraft's altitude by the use of power 2) the act of increasing aircraft's altitude of an aircraft by the use of power
6	commence	to begin/start
7	descend	to lose altitude, usually in a planned maneuver or to come/go down from a higher to a lower level at the approach phase
8	direct	1) to guide or control the movement of an aircraft 2) to go straight to a particular direction

Figure 3.6 – Lexical Items classified in the Concept of Flight Performance

3.3.3.2 The data is examined in correlation with the criteria of word-formations (conventional classification system (Sager et al, 1980 and Algeo, 1995) and new classification system (Shortis, 2001:56-9); *Composite*, *Shift* and *Shortening* to reveal unique characters at lexicon level of radiotelephony.

a) Each item in the reference is categorized into four word-formations such as the term, *flight level* is formatted with the process of composite, the compounding between *flight* and *level* with the very new definition which differs from the definition issued in any regular English dictionary (*flight* = a scheduled airline journey, and *level* = the height of something relation to the ground).

b) The classification is done under one condition – if there is the item issued in any regular English dictionary even though it is through the process of word-formation, it is determined as a base form of the item. For example, 'landing' as the composite of 'priority landing' which is printed and defined in Oxford Advanced Learner's Dictionary 7th edition (2007), 'an act of bringing an aircraft or a spacecraft down to the ground after a journey' is considered as a single base form of lexical item as the affixation added to 'land' is the already used mechanism in canonical corresponding English language which does not contribute to indicate the distinctive formation of lexicon in radiotelephony.

c) The frequency count in percentage of each formation is done to provide the proportion of the formula the lexicon in radiotelephony is formed.

d) The actual set of the data is also examined with reference to the complete reference lexicon list and the criteria of word-formations in order to explicitly compare both sets of data to describe the deviation which possibly occurred when the particular term is applied in the actual communication. This particular step is conformed to the assistance of Concordance list in AntConc 3.2.1w.
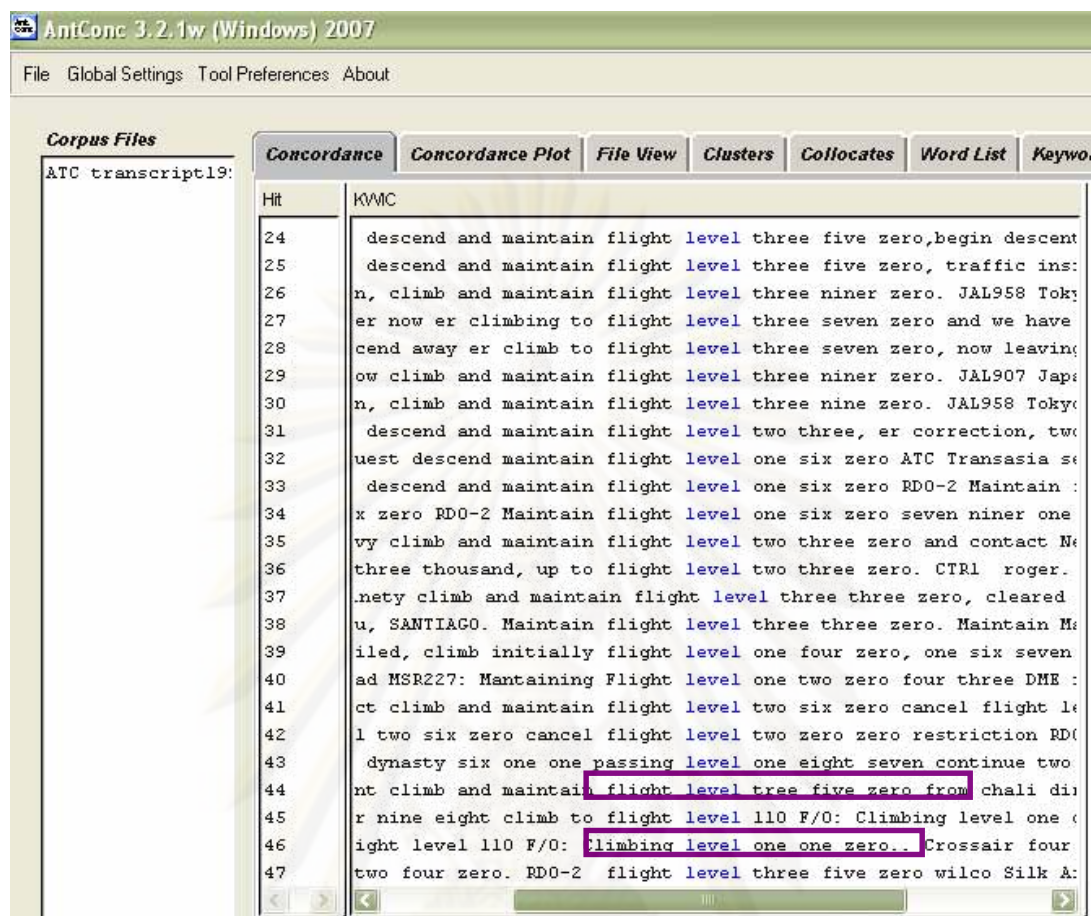
For example:

Figure 3.7 – Lexical Items classified in Concordance of AntConc 3.2.1w

For example, *flight level* sometimes appears in the actual data with only one morpheme, *level* without any semantic change. *Flight level*, in this case is gone through clipping process in *shortening* formation. It can be concluded that flight level and level are utilized in the same way in the actual conversation.

3.3.4 Syntactical Analysis

At syntactical domain, the data is examined to classify all the items proper form-classes and to generalize the structural patterns of sentences in radiotelephony. Both data collected from the manual and the actual voice-recording are scrutinized, based on the same steps of analysis.

3.3.4.1 The *first part* of syntactical analysis is to categorize lexical items into form-classes.

a) The data is explored to categorize items into specific form-classes by applying the concept of test frame (Fries, 1952) under the basic assumption that all words that occupy the same *set of positions* in the patterns of the set test frame are in the same form-class. The fundamental concept of analysis is that radiotelephony is the new language. As a result, the study is done without the influence of syntactical

knowledge upon conventional English language. There are four test frames designed and extended to thoroughly classify all the items in the data as the following;

(1) *Test Frame A*: Fastair345 (do) (not) report (again) (the) (new) low pass (unsafe)

(2) *Test Frame B*: Fastair345 <u>go around</u>

(3) *Test Frame C*: Fastair345 report radar failure <u>and</u> decompression

(4) *Test Frame D*: <u>What</u> is the delay?

Each particle of the test frame can be replaced by a group of lexical items which determines different syntactical and semantic roles in the language to classify in diverse form-classes; for example, any items in the data which can replace the position of 'low pass' is designated to belong in the same class whereas any item that can be in the place of 'report' is assigned to belong to another form-class. Therefore, the position of each group of lexical items is mainly the strategy to classify all the items into appropriate form-class.

Every slot in the test frame A will be used to categorized different form-class whereas test frame B, C and D are used to classify the items that can replace the underlined words; 'go around', 'and' and 'what'.

b) Each item in the data is posited in the test frame to learn whether it is able to be substituted with a specific item in a particular position or not such as any item which can replace *Fastair345* and *low pass* in test frame A are in the same form-class;

Test frame A: <u>*Fastair345*</u> report the new <u>*low pass*</u> unsafe

Fastair345	report	again	the	new	***low pass***		unsafe
Alexander Radio					*action*	*surveillance*	
All stations					*advised*	*base*	
Approach					*aerodrome*	*boundary*	
Apron					*airborne*	*brakes*	
Arrival					*aircraft*	*breaking action*	
Control					*airspace*	*call sign*	
G-ABCD					*airway*	*centre-line*	
G-CD					*alert*	*circuit*	
Georgetown					*alternatives*	*clean speed*	
Ground					*altimeter*	*clear of traffic*	
Georgetown Ground					*altitude*	*clearance*	
Georgetown Departure					*approach speed*	*closing*	
Radio					*apron*	*coming*	
Station calling					*ATIS*	*condition*	
Stephenville Tower					*automatic dependent*	*congestion*	

Figure 3.8 – Lexical Items classified in Test Frame A

c) After all the items are tested and placed in the test frames, each form-class found is named and defined in relation to two prime types of form-classes; C class-type, an opened class of free morphemes which plays vital roles as the core of the language and F class-type, a closed class of free morphemes which usually contain grammatical functions, but not referential meaning. Any form-class that belongs to C class-type is coined as C1, C2, C3, and so on while those belong to F class-type is

named as F1, F2, F3, ... accordingly. For example, the items which are able to replace *Fastair345* and *low pass* in test frame A is **C1**, indicating most of semantic nature of prototypical noun class, naming a person, place, thing, quality, or action, in canonical English language.

d) The outcome of form-class analysis of each data set is compared in order to point out any difference which possibly occurs to the language in actual usage. It is noted that form-classes found in the analysis of the data from the manual are used as the reference ones.

3.3.4.2 The *second part* of syntactical analysis is to generalize the structural patterns of sentences in the language.

a) To discover syntactical structures of radiotelephony, the arrangements found in the data are classified in relation to fundamental pattern of syntactical composition at phrasal level and clause level as well as the prime communicative functions as of regular English language in order to describe the genuine syntactical patterns of radiotelephony.

b) After categorizing all arrangements with regard to its syntactical patterns as phrase and clause, then each type of each data set are *described* in correlation with form-class arrangements to elaborately demonstrate the reference and the actual syntactical constructions of radiotelephony. Later on, the generalization of syntactical structure of each type is illustrate with the application of common symbols and abbreviations which are used to describe regular English structure. It is noted that all the symbols and abbreviations are only for providing clearer view of the constructions; therefore they do not contain the similar syntactical properties as of the natural English.

Symbols and Abbreviation:

S (sentence)	equivalent to a sentence or a clause
Q (question particle)	equivalent to interrogative formation
NP (noun phrase)	equivalent to C1
VP (verb phrase)	equivalent to C2 phrase
RP (Responding phrase)	equivalent to C5 phrase
CP (complement phrase)	equivalent to F1b phrase as a complement phrase
N (noun)	equivalent to C1a and C1b
V (verb)	equivalent to C2
Adj (adjective)	equivalent to C3
Adv (adverb)	equivalent to C4
R (responding expression)	equivalent to C5
Conn (connector)	equivalent to F1a
Comp (complementizer)	equivalent to F1b
Det (determiner)	equivalent to F2
Aux (auxiliary)	equivalent to F3 and F4
Wh (WH-word)	equivalent to F5
Neg	negation
=	consist of
/	or
()	optional constituent
{ / }	either…or… appeared in the structure

Table 3.1 – Symbols and abbreviations implemented in describing syntactical structure

For example:

Fastair345 Georgetown Ground, one of patterns of NP.

It demonstrates that a single unit of the utterance composes of N and N which both are members of C1a. The first N refers to second person singular while the second N refers to first person singular. Therefore, according to the sample, the internal pattern of NP consists of series of N with restricted sequence; N with a second person singular reference should be placed before N with a first person singular reference. In short, the pattern of this particular syntactical structure is NP = N N.

c) The discussions on the differences between the reference structures and its canonical ones as well as between the reference structures and the actual ones are elaborately carried out to state not only the distinctive character of the sublanguage but also the variation that occurs in authentic conversational context.

3.3.5 *Morphological Analysis*

To analyze at morphological level, the *grammatical morphemes* of radiotelephony; namely {–s}, {–ed} and {–ing} which are the main noticeable bound morphemes in the language, are singled out based on the traditional analysis of morpheme, *Compare and Contrast* (Nida, 1949). Only pairs of tokens, base-form free

morpheme and base-form attached with bound morpheme, are involved in the analysis process.

　　3.3.5.1 The data from the manual is firstly explored to be prescribed as reference grammatical morphemes of the language. According to the finding at lexical level which is processed with the assistance of AntCon3.2.2w (2007) and Collocation Extract 3.07, pairs of items are searched for to basically learn what are considered grammatical morphemes in the language

For example:

report	report*ing*
request	request*ing*

At this point, it is evident that {–ing} is grammatical bound morpheme.

　　3.3.5.2 To generalize grammatical functions each bound morpheme performs, their appearance in the sentence must be compared.

For example:

report:	G-AB <u>report</u> level
report*ing*:	Fastair345 resume position <u>report*ing*</u>
request:	G-AB <u>request</u> descent
requesting:	passenger with suspected heart attack <u>request*ing*</u> priority landing Walden

{-ing} is an affixation that usually follows C2, a form-class which usually describes an action, occurrence, or indicates a state of being as well as to respond upon a statement, command or question, commonly appearing in the position after C1 in the sentence, as a bound morpheme. {–ing}, in this case, functions as a derivation morpheme to converse C2 to C1 which is the process to form a new item in the language.

　　3.2.5.3 The finding of the reference grammatical morphemes in radiotelephony is discussed with the ones in its canonical corresponding English language to point out similarities and differences.

　　3.2.5.4 The data from the actual air-ground communication recording is also processed under the similar framework to finally compare with the reference grammatical morphemes to find out whether any difference is noticeable.

3.4 Summary

All the findings are carefully organized, summarized and discussed to explicitly illustrate the highly distinctive linguistic characteristics of radiotelephony at four domains; discourse, lexicon, syntax and morphology in order to prove two hypothesis of the study listed as follows:

1. The grammar of radiotelephony has distinctive characteristics at all linguistic levels and exhibits properties of a sublanguage.
2. Actual usage of radiotelephony deviates from the constructed reference grammar the most at the syntactic and discourse levels.

In the next chapter, the situational parameters which air-ground communication is conformed are discussed in detail to allow clearer view of conversational scenario radiotelephony is used.

CHAPTER IV

SITUATIONAL PARAMETERS OF AIR-GROUND COMMUNICATION

4.0 Introduction

In this chapter, the detailed description of air-ground communication context is thoroughly described in order to illustrate the situation in which radiotelephony is conducted as it explicitly affiliates to the uniqueness of the discourse character and distinctive linguistic properties of radiotelephony. The most important point is that the situational parameters can be a great distribution to accomplish the core objective of the study which is to discover the reference grammar of radiotelephony to determine the language as a sublanguage.

4.1 Situational Parameters of Air-ground Communication

The situational parameters (developed from Biber, 2004:150-1; cited in Johnstone, 2004:150-1) reviewed below will provide utmost understanding of air-ground communication context in which pilots and air traffic controllers encounter and how it influences on the distinguished features of radiotelephony. In this section, nine situational parameters representing the incomparable being of air-ground communication are elaborately described and discussed as the followings;

4.1.1 Characteristics of working environment and responsibilities of participants

To provide fundamental background of air-ground communication, general overview of specific responsibilities and workplace environments of pilot and air traffic controller who are the prime participants is deliberately explained.

The prime duty of a commercial pilot is to control and direct the aircraft with full load of passengers to the destination. On each flight, there are at least two pilots working together and take turns to perform as pilot-flying who is the pilot in control of the aircraft and generally responsible for making most routine decisions about the conduct of the flight and pilot-not-flying who assists pilot-flying and is responsible for most air-ground communications. Along the flight path, pilots need to be vigilant to monitor all the core instruments and the in-sight traffic.

Most of the time during flight operation, pilots are in the cockpit to accomplish the task of flying. The cockpit is an almost bewildering array of buttons, switches, dials, lights, levers and displays. There is also a range of aural alerts and recorded voice warnings. In the cockpit of an airliner the two pilots sit side by side, the captain is always seated on the left whereas the first officer is always seated on the right. In front of them is the main instrument panel with numbers of buttons and

primary displays for the aircraft's location and progression along the navigated flight path, altitude, speed and engine performance (Nevile, 2004:84).

4.1.1.1 *Pilots' Responsibilities*: Usually the pilot main responsibilities are depending on flight profile commonly conducted in every commercial flight.

There are seven phases of commercial flight profile which pilots have to perform different tasks from the departure to the destination airport as illustrated in the figure below (cited from HowStuffWorks.com);
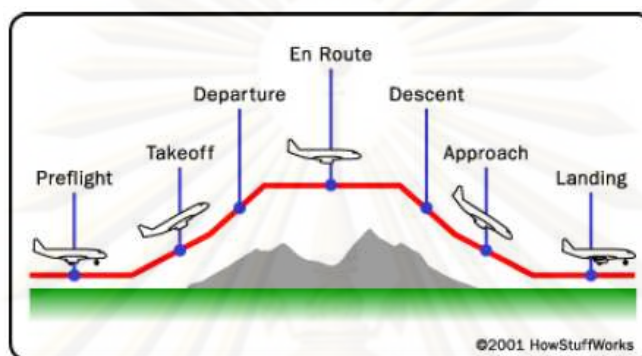
Figure 4.1 – Commercial Flight Profile (Source: www.howstuffworks.com)

a) Preflight: This portion of the flight starts on the ground. The weather information has been received and reviewed by the pilots and a flight plan including airline name and flight number, type of aircraft and equipment, intended airspeed and cruising altitude, and route of the flight has been filed. Prior to takeoff, the pilots perform the flight check routine, request for aircraft push-back from the terminal's gate, and taxi out to the designated takeoff runway in accordance with an air traffic controller's instructions.

b) Takeoff: The pilots receive a permission from the control tower to take off. The aircraft is powered up and started the takeoff roll.

c) Departure: Upon lift off, the pilots change a radio frequency to receive new flight instructions. They are instructed to follow a pre-determined, preferred routing which will take the aircraft up and away from the departure airport and on its designated route. The pilots are then issued a further altitude and routing clearance.

d) En Route: The pilots receive instructions as to what altitude and heading to maintain, as well as to which radio frequency to tune. This portion of the flight can be as short as a few minutes or as long as many hours depending on the distance between the departure and the destination airports. As the aircraft is about to reach its destination, the pilots change a radio frequency and receive new instructions for altering altitude and/or heading for the descent.

e) Descent: After receiving instructions for changing the heading and/or altitude, the pilots start to descend and maneuver the aircraft to the destination airport.

f) Approach: The pilots will receive an approach clearance to the destination airport and the aircraft has been placed in line with other aircraft preparing to land at

the same airport. The pilots conform a specified procedure in order to get in line for the designated landing runway.

g) Landing: This is the very last portion of flight. The pilots have to receive landing clearance from an air traffic controller and land the aircraft on the designated runway. The flight is then routed across the taxiways to its destination gate at the terminal.

These are specific phases of every commercial flight that must be performed. Each phase determines particular tasks for pilots to accomplish which won't be successful without an efficient contact with an air traffic controller for exact instructions and information.

4.1.1.2 *Air Traffic Controllers' Responsibilities*: An air traffic controller, on the other hand, is a person who works on ground and responsible for directing and instructing each aircraft to perform each phase of flight systematically and effectively and maintaining a safe flow of air traffic, as well as preventing collisions between aircraft.

A typical workday for air traffic controllers depends on their allocated shift which may vary considerably given 24-hour nature of the job. Each controller is assigned to be responsible for a certain amount of aircraft scheduled to take off and land as well as fly over the airspace at that moment during his/her shift. The controller has to be aware of how the previous controller ended the shift where certain aircraft are in order to conduct proper communication and transmit sufficient information and instructions to those aircraft.

The scenario in the control center which there is a group of controllers working together at the same shift is full of voice communication. They not only need to concentrate on the communication but also to work with computer software and radar systems in order to maintain visual awareness of the entire airfield and a smooth flow of traffic both on the ground and in the air.

Mostly the particular responsibilities depend on the specific type of controllers monitoring at each phase of flight profile.

There are several groups of air traffic controllers who have specific duties of handling the aircraft depending on the vicinity of the aircraft in each phase of flight as follows (cited from Gate to Gate, 2000:13-14):

a) Ground Controller: Monitors all ground movements around the airport. The ground controller issues push back from the gate and taxi instructions to get the aircraft to the runway.

b) Local Controller: Gives clearance for takeoff and instructs pilots to next radio frequency for contact with the departure controller. Also, gives clearance for landing and initial instructions for taxiway routing, then instructs the pilot to contact ground control.

c) Departure Controller: Routes air traffic immediately upon takeoff via a preferential departure route, leading away from the departure airport as the aircraft ascends to the en route phase of flight.

d) Center/Radar Controller: The radar controller is in charge of the sector. This controller maintains positive separation among all aircraft under his/her control. Separation standards from a Center are defined as 5 miles laterally or longitudinally for aircraft flying at the same altitude, or 1,000 feet vertical separation below 29,000 feet and 2,000 feet vertical separation above 29,000 feet. The radar controller is responsible for all air-to-ground communications. Coordination with other sectors and facilities is a duty shared by both the radar controller and the radar associate controller.

e) Approach Controller: Directs several lines of descending aircraft into one smooth flowing line of aircraft as their courses take them closer to the destination airport.

This variety of air traffic control operations, personnel and locations all coordinate to ensure a smooth and efficient flow of air traffic across the airspace. However, numbers of groups of controllers may vary from aerodrome to aerodrome determined by the size and the traffic around the area.

To furnish the responsibilities of air traffic controllers in the entire flight profile, the elaborated stages of working procedures associated with each group of air traffic controllers are illustrated as the followings;

a) At the preflight stage, a Ground controller in the airport's control tower gives a departure clearance for a particular aircraft to push back from the gate, and directs the aircraft onto the appropriate taxiway to take towards the takeoff runway and be ready for takeoff. Also, the Ground controller has to ensure that the aircraft does not cross an active runway or interfere with ground vehicles.

b) Later on, a Local Controller who is responsible for maintaining safe distances between aircraft as they take off issues the final clearance for take off when it is deemed safe. Shortly after takeoff, the controller provides a new radio frequency for the aircraft to contact a Departure Controller. The aircraft is monitored until it is 5 miles from the departure airport.

The aircraft is now in the departure phase of flight. During this phase, the departure controller instructs the pilot to route away from the airport via an assigned heading with a climb clearance to a new altitude in which the controller monitors the track of the aircraft to maintain safe distances between ascending aircraft and performs an electronic transfer of the aircraft to the next controller prior to the aircraft entering the receiving controller's airspace.

c) After departure, the aircraft is handed off to a Center/Radar controller. The aircraft is now moving into the en route phase of flight. The Center controller monitors the flight and gives instructions to the pilots as the aircraft passes through

the center's airspace from sector to sector. The directions provided to each aircraft regarding such aspects as speed and altitude to maintain a safe separation between aircraft within each sector.

d) Once the aircraft is within approximately 150 miles of its destination airport, it begins its descent phase, when it moves from its cruising altitude to a lower altitude. Approximately 50 miles from the airport the aircraft is passed off to an Approach controller where the descent continues during the approach phase of flight. The Approach Controller is blending several streams of descending aircraft into one smooth flowing stream of aircraft to line up for a particular runway. The Approach controller directs pilots to adjust the aircraft's heading, speed and altitude to line up and prepare to land along standard approach corridors.

e) The flight is then handed off to a Local Controller who is stationed at the destination airport's control tower. At this point, the aircraft is at the landing phase of flight. The Local Controller checks the runways and the skies above the runway with binoculars and surface radar. When it is safe, the Local controller issues the clearance to land as well as updates weather conditions and monitors the spacing between landing aircraft. The Local controller directs the aircraft to an exit taxiway once it is landed and gives a new radio frequency for the Ground controller.

e) Then, the Ground Controller at the destination airport instructs the aircraft on which taxiways to use to ensure that the taxiing aircraft does not cross active runways or interfere with ground vehicles. The appropriate terminal gate is provided for the pilots to park the aircraft.

This is the entire network of controllers and facilities that monitor and control the aircraft on the ground and in the airspace around and above each aerodrome.

In short, the participants of air-ground communication have high-level of specific responsibilities and workloads to harmoniously operate the aircraft from the departure to the destination airport under the rich information environment which is required them to handle and manage it effectively. An air traffic controller provides essential information and instructions to operate the fight whereas a pilot acknowledges and follows the instructions as well as informs, inquires and negotiates for the best flight solution.

On top of that, air-ground communication is conducted in accord with sophisticated flight procedures under the prime domain of utmost *safety and efficiency*.

4.1.2 Communicative characteristics of participants

Air-ground communication is strictly dyadic which means only two persons, a pilot from one particular airline and an air traffic controller who is accountable for that certain aircraft are reserved for the conversation. The fundamental agreement between participants is to state the turn one at a time, therefore during the one-on-one interaction, no interruption from other aircraft should be developed.

For pilots, it is possible that there are numbers of pilot audiences from different airlines who listen to the interaction because they all share the same radio frequency during operating over a particular airspace to communicate upon matters concerning flight operations. As a result, they have to pay maximum attention to the exchanges and wait until each is completed, then they will begin their conversation with an air traffic controller.

For air traffic controllers, as one controller has to handle a certain numbers of aircraft at the same period of time in the responsible vicinity, there are definitely numbers of pilots who needs to receive instructions, get permissions, report information and request for specific flight data from the controller. Therefore, it is necessary that the speaker has to continue encoding the message without any gap in a turn if s/he hasn't finished with the communication. Allowing silence may signal to other participant audience to instantly grab the turn.

It is to be understood that a controller mostly initiate the communication as the conduct of the flight depends largely on controller's instructions and information whereas a pilot only establishes the interaction when necessary information on particular flight parameters is to be conveyed at a specific flight path, when it is upon request from the controller or when the pilot needs to ask for permission or state the intention to perform specific flight activities.

The characteristic of air-ground communication is more like talk-in-action referring to the interaction which occurs moment-to-moment in talking, understanding, seeing and acting. On top of that, a great amount of information needs to be rapidly exchanged within a short period of time as the interactions from and to one controller are conformed continuously at each stage of flight path.

4.1.3 Relations between the participants

Both a pilot and an air traffic controller are theoretically at an equal status since they are more or less similar to two groups of the same company's employees working for different departments who coordinate on the same task in order to achieve it. Even so, since the role of an air traffic controller is pretty much alike a traffic police to manage and control the traffic on the ground and over the airspace, s/he somehow has a little higher level of authority over pilots. According to a controller's main duty mentioned earlier, s/he is reserved to provide the pilots with proper information, instructions and flight parameters to either smooth the flight operations or to avoid the mid-air collision as well as pave them to their destination airport safely.

In contrast, pilots have to mostly follow the instructions and directly report their presence to the air traffic controller when reaching a particular waypoint along the airway. Nonetheless, it doesn't mean that pilots cannot negotiate for an alternative to operate the aircraft because the basic assumption of this social interaction is that

they have to respect each other as they are depending on exchanging the information to fulfill the accomplish the same goal.

All in all, at each stated phase of the flight and in the case of distress and urgency situations, the communication will be conducted under the dependency relationship between the participants.

4.1.4 Characteristics of the place of communication

Air-ground communication is performed in correlation with the ground of non face-to-face communication. The participants engage in the interaction from different workplaces. A pilot is in the active aircraft while an air traffic controller works in a control center building. The communication is possibly conducted either on the ground at preflight, takeoff and landing phases of flight or in the airspace at departure, en route, descent and approach phases of flight for the pilots, but for the controllers, the conversation is always initiated from the ground stations. It is necessary to learn that the communication is reserved only in the workplace based on the same amount of tasks and goals to accomplish.

The place in which the controllers work may belong to either government or private domains determined by the policy of each country the same as the aircraft in which the pilots attain the tasks.

The communication is restricted to conduct mostly in confined format with numbers of regulations to comply since there is an international organization in charge to standardize the working stages and the interaction patterns. Furthermore, the entire conversation is recorded at work stations, the aircraft and the control center building, in case of any possible air accident.

High technology workplace with explicit operational procedures is the most suitable word to describe the places where air-ground communication is conducted to literally complete routinised activities.

4.1.5 Mode of Communication

Air-ground communication is restricted to be practiced only through a radio transmission which is occasionally interrupted with high frequency noise. Most aircraft are equipped with at least one high-quality radio for a communication which operates in the very high frequency (VHF) radio band. The VHF band is between 108 MHz and 137 MHz, which covers its use for commercial and general aviation, radio navigational aids, air traffic control and others. The aircraft fly high enough so that their transmitters can be received hundreds of miles away.

The transmission is controlled by push-to-talk system; therefore the speaker needs to push the button every time in order to relay the message. Otherwise, the message cannot be dispatched to the co-participant. As the system contributes to instant information exchange because of the space and time constraints, the management of air traffic within this system largely depends on the timely exchange of information between pilots and air traffic controllers.

The communication process through a particular form of technology as a radio transmission generated at a distance is designated mode of communication to be mainly in orality.

In conclusion, air-ground communication is dominated by not only several constraints of speedy information exchanged in a short period of time because of its unique communicative characteristic, but also artificial medium (a radio transmission) and restrained communication mode (orality).

4.1.6 Relation of participants to the content of communication

The relation is almost similar to the one in ordinary conversation which the participants have to comprehend the communication in real time but within certain duration in order to appropriately and accurately exchange information, provide instructions and follow directions which are highly associated with various flight activities.

The major difference is that the participants need to be alert almost all the time to thoroughly receive details of essential information without any emotion involved. The basic assumption of the interaction is based on the evidential fact, thus the participants don't need to evaluate the content whether it is accurate or not. But they have to be fully aware of the information conveyed by deliberately reviewed before transmitting.

Even though the production of the interaction is not scripted beforehand, it is somehow governed by the particular stages of flight profile which apparently indicate and direct how the content of the communication supposes to be and what kinds of text the participants should deliver.

4.1.7 Purposes, intents, and goals of the communication: The participants in air-ground communication share the same ultimate institutional goal which is maneuvering the flight to the destination airport on safety and efficiency basis. An air traffic controller provides essential information and instructions to assist the fight operations whereas a pilot acknowledges and follows the instructions as well as informs, inquires and negotiates for the best flight solution.

The fundamental ground which a pilot and an air traffic controller always have is the objective to commute solely on the social activities or tasks of flight operation delivered in almost restricted sequence in accordance with seven phases of flight profile. Therefore, they have to interchangeably initiate the contact through out the flight to accomplish those tasks. It can be concluded that air-ground communication is the interaction with distinguished task- and goal-oriented which the participants engage in achieving the similar institutional purpose, intent and goal.

4.1.8 Topic of communication: The only topic in air-ground communication concerns aviation-related matters which are flight instructions, flight parameters, weather information, and specific aerodrome information. It is unlike any regular

conversation that the speakers always introduce, develop and change the topics as it is an important dimension of conversation structure (Thornbury & Slade, 2006: 127)

The information and instructions transmitted through a radio transition between a pilot and an air traffic controller have centered the safe and expeditious operation of the aircraft, air traffic controllers instruct and direct the movement of the aircraft on and in vicinity of an airport and over the airspace whereas pilots perform standard callouts, state intentions, ask questions, and convey information. Therefore, any other matters which are not relevant to flight operations are not allowed to state in the interaction.

4.1.9 Sharing specialized knowledge of participants in the communication: As air-ground communication is conserved between a pilot and an air traffic controller under the specific condition of performing safe and effective flight, the participant must share specialized knowledge upon any circumstance concerning nature of responsibility, working environment, advanced technologies and intricate procedures of flight operations.

The essential medium in air-ground communication is a set of language which can be used as a lingua franca among several nationalities of pilots and controllers who equally participate in the commercial aviation industry providing air service around the world in order to perform a specific task, operating the aircraft, towards a specific purpose.

The language is strictly conformed only in the aviation industry during the working period of flight operation. The participants need to have mutual specialized knowledge and comprehend the special patterns of language. The fact is that they all must be trained in the flying training school to acquire the distinct linguistic constructions and practices before the actual flight.

4.2 Summary

It can be concluded that since the communication is taken place in fairly routine and predictable situation, a high degree of shared knowledge among the participants is undeniably important.

These parameters are definitely the prime key to unveil the distinctive characteristics of air-ground communication, a particular type of social interaction in which the participants orient to an institutional context to accomplish their eminent activities, which is undeniably tightly tied to the production and interpretation of the interaction and the occurrence of procedural format in the language.

To conduct the efficient air-ground communication, the specialized sublanguage appointed in the communication or 'radiotelephony' is deliberately created and designed for pilots and air traffic controllers represented in, hearsay, narrow, specialized and rigid linguistic subset of English language with unique

discourse patterns by the working group of International Civil Aviation Organization (ICAO) which is a major agency of the United Nations, codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth by adopts standards and recommended practices concerning air navigation, its infrastructure, flight inspection, prevention of unlawful interference, and facilitation of border-crossing procedures for international civil aviation, named 'International Language for Aviation (ILA)'.

Radiotelephony is developed under the ultimate purpose of being an international language in order to ease the difficulty in communication among various nationalities and enhance 'safety and efficiency' which is a crucial manifest in flight operations.

In the next chapter, a reference grammar of radiotelephony at all aspects of linguistic properties, namely discourse, lexicon, syntax and morphology of will be exhaustively recited.
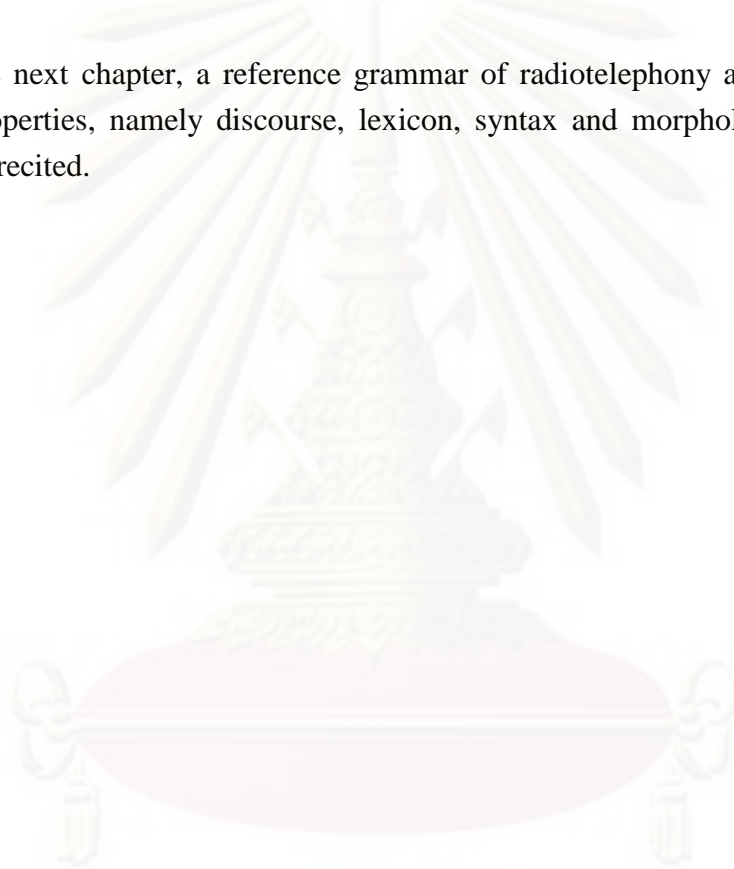
CHAPTER V

A REFERENCE GRAMMAR OF RADIOTELEPHONY

5.0 Introduction

In this chapter, four aspects of linguistic properties; discourse, lexicon, syntax and morphology is thoroughly described respectively with reference to analysis findings of a set of data collected from *Manual of Radiotelephony (2006)* issued by International Civil Aviation Organization (ICAO) containing 556 messages or 278 exchanges in order to unveil the insights of radiotelephony, the sublanguage conducted in air-ground communication.

5.1 Discourse Structure of Air-ground Communication

To analyze at discourse level, the data are classified and interpreted in accord with the concept of 'move' and 'act' in Model of Conversational Analysis developed by Sinclair & Coulthard (1974) along with the underlying notion of conventional theoretical framework of conversational analysis in order to learn the rigid organization of turn taking and internal structure of the composition of each particular type of the exchange. Each pair of exchange under the same determined communicative function is sorted and demonstrated in the designated table; TABLE OF DISCOURSE ANALYSIS: MANUAL OF RADIOTELEPHONY, to display the detailed element of each exchange under specific labels in correlation with those used by Sinclair & Coulthard (1974) as follows:

a) *L.O.D* indicates the number of message sequencing collected from the source.

b) *Source* is to identify the interlocutors either a pilot (PT) or an air traffic controller (ATC).

c) *Content* displays the detail of message.

d) *Act* is used to report states of affairs performed by means of language as the lowest rank unit of discourse level with reference to acts classified in Model of Conversational Analysis (Sinclair & Coulthard, 1974).

e) *Move* refers to the function to exhibit the illocutionary acts of each pair part of an adjacency pair or an exchange.

f) *e.s* is to demonstrate an element of internal structure of each exchange.

g) *Exchange* is the sequence of moves or pair parts of an adjacency pair which contains at least two sequential turns.

h) *ex.* stands for number of exchange to identify the item when the discussion at each stage is required.

After all the data is carefully examined and sorted with reference to the criteria stated, the findings have illustrated that there are three main types of exchange in reference radiotelephony; *direct exchange, inform exchange* and *elicit exchange*. According to the data, the most frequent exchange found is direct exchange (155 exchanges), inform exchange (68 exchanges) and elicit exchange (55 exchanges) respectively from the total numbers of 278 exchanges. Also, there is a presence of supplementary exchange; *summon exchange*, which is an optional exchange to fully perform identification-recognition process before proceeding to initiating one among the three core exchanges.

All types of exchanges are base of the confined sequences of moves with rigid alternatives of acts embedded in each move closely related to the fundamental pair-part of the natural spoken discourse. However, the restricted organization is conformed with no overlapped or insertion sequence as in natural conversation in its corresponding language.

Next, the fundamental background of air-ground discourse as well as the conclusive of turn-taking strategy are firstly explained in order to explicitly comprehend the nature of this particular discourse, and then each exchange found in the data is elaborately described in correlation to its frequency count from the most numbers found to the least; *direct exchange, inform exchange*, *elicit exch*ange and *summon exchange* accordingly.

5.1.1 Fundamental background of air-ground communication

Basically, air-ground communication is a dyadic non face-to-face conversation which occurs between a pilot and an air traffic controller who perform their activities from different workplaces, an aircraft and a controller center. While controlling the aircraft, a pilot needs to perform a professional communication through a specific radio frequency with an air traffic controller who is more or less the same as a traffic police. A controller also has to initiate the conversation with a pilot from time to time to ensure the aircraft position and to enforce it on the accurate flight path. Within a particular airspace, there are numbers of aircraft operating in and out to their destinations. Therefore, it is necessary to systematically deliver messages and instructions back and forth.

In accordance with International Civil Aviation Organization (ICAO), an air-ground communication process is roughly designated as stated in a figure below in order to be compatible with its distinctive situational parameters detailed in chapter 4.
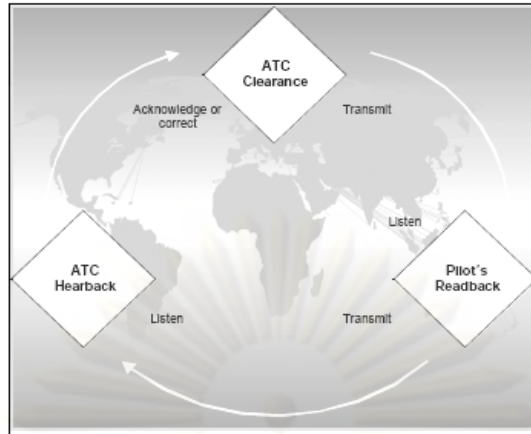
Figure 5.1 – Air-ground Communication Process Model (Flight Safety Foundation, 2000)

This communication model displays a graphical representation of what the participants in the air-ground communication should perform. The process often referred to as the readback/hearback loop. It is a procedure developed for actively listening and confirming messages between a pilot and an air traffic controller.

Four stages of the communication process in relation to the model are illustrated in details as follows:

a) The first stage involves an air traffic controller compiling a message in the form of a command or an instruction and encoding it into words. These are then transmitted to the pilot verbally through a specific radio frequency.

b) The second stage involves a pilot actively listening to the message. This relies on a pilot analyzing the transmission and extracting the critical information.

c) The third stage involves a pilot transmits the received information back to an air traffic controller which is commonly referred to as a 'readback'. Extracting and reading back the crucial parts of a message or a clearance demonstrates to an air traffic controller that a pilot has sensed the inward message and decoded it into something meaningful. This now establishes a mutual understanding between a pilot and an air traffic controller. That is, the intended meaning of the sender and the perceived meaning of the receiver are the same. The *readback* should be done on air traffic controller clearances (an authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace), clearances and instructions to enter, land on, take off, hold short of, or cross and backtrack on any runway, runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and transition levels, whether issued by a controller or contained in ATIS broadcasts. It is noted that this stage can also be done through specific response terms such as affirm, roger, etc.

d) The final stage involves an air traffic controller actively listening for a correct readback from a pilot. This is known as a 'hearback'. This allows a controller to identify any misunderstandings and make necessary corrections.

On the other hand, if a pilot initiates the turn, s/he will conduct the first stage of communication process himself. After that, the second and third stages belong to a controller to listen, verify and acknowledge the received information. Eventually, a pilot will conduct the final stage which is known as 'hearback'. Nonetheless, the hearback stage may be optional if there is nothing to correct.

The communication process model is generally designated as the brief frame of air-ground discourse. The exchange found in the reference data is as well base on this model, but how the participants perform the process through the moves in the exchange is to be described later.

5.1.2 Fundamental notion of turn-taking strategy

Before the internal structures of 278 exchanges or 556 messages, gathered and classified in *direct exchange*, *elicit exchange*, *inform exchange* and *summon exchange* in accord with the communicative functions is thoroughly reviewed, the fundamental notion of turn taking in air-ground discourse is firstly explained.

Turn organization in air-ground communication is based on a non face-to-face conversation which the participants are only able to commute restrictedly by the mean of orality or verbal acts. The fundamental agreement is to issue the turn, defined as all of one speaker's utterances up to the point when another person takes over the role of speaker, one at a time. Also, the interruption from other aircraft is prohibited during the one-on-one interaction, even though the basic fact about general 'conversation' is that there is one person speaking at a time, while speaker change recurs with minimal gap and minimal overlap (Sacks et al., 1974).

In regular conversation, although there are overlaps and interruptions, the way interactants talk or allocate turns is not random. It is systematic and the signals are clearly understood by speakers familiar with the situational parameters or cultural context (Thornbury & Slade, 2006: 123). With reference to Sacks (1974), turn-allocation can be performed in three different ways; a next speaker can be selected by the previous one, a speaker can self-select, or the present speaker can continue speaking.

Turn-taking in air-ground communication, by no mean, is based on these rules but with no presence of prolong silences, overlaps and interruptions to avoid the complications as the interaction relies on rapid information flow from and to one air traffic controller and numbers of pilots from different aircraft operating within the same airspace at each stage of flight profile.

However, the possibility to follow the third rule is very rare because of a constraint of the talk which once the information is completely conveyed in a single

turn, there is no need for the present speaker to continue unless s/he has more information or additional inquiries to deliver. Therefore, at each turn, it is agreed that the participant has to continue encoding the information into words, again without any gap or fillers.

Chiefly in formal spoken English contexts, the turn taking is more ordered. The person with higher status basically assigns the turns. By contrast, the turn-taking in casual conversation is not assigned by any particular person (Thornbury & Slade, 2006: 124-5).

In air-ground communication, it is true that pilots and air traffic controllers have to interchangeably initiate the exchange through out the flight profile. Nonetheless, though the relationship between pilots and air traffic controllers is more like co-workers technically at an equal status to accomplish the same institutional goal, the turn allocation which should not be conserved by one particular participant, is more likely to be assigned by air traffic controllers.

As, for them, it is one-to-many communication since a controller for duration of time has to contact several pilots from various aircraft to provide essential information and instructions depending on the flight profile of each aircraft on course. As a result, pilots mostly have to answer to the turns designated by a controller. Despite, there are times that a pilot initiates the turn only when specific information or inquiries need to be conveyed. These restricted contextual parameters strongly influence on the entire structure of turn allocation in air-ground communication.

To achieve the conversation, participants have to accomplish on a turn-by-turn basis or at transition relevance place (TRP), the point where a next turn can be expected, at the end of any turn constructional unit (TCU) which is the component of conversation's turn-taking system, consisting of syntactic units (sentences, clauses, noun phrases, and so on) or the minimal semantic unit that can constitute one complete of talk.

Then, how the co-participant notices a transition relevance place (TRP). Since the participants in air-ground communication have to accomplish the talk on a turn-by-turn basis as any spoken discourse, they also have to learn that the turn is allocated to whom and when should be the end of a turn constructional unit (TCU) to start their own turn.

As the matter of fact, it is pretty easy to notice the TRP since, to initiate the turn, a pilot or a controller always has to address the target participant and/or oneself with the specific call sign, a certain artificial name for identification purpose. After that the co-participant will realize at once that the turn is allocated by and to whom and the response to the initial turn should be performed. Consequently, pilots from any aircraft over the same airspace sharing the same frequency should be alert at all times in case that an air traffic controller calls or vice versa.

In ordinary conversation, there are several methods or strategies to initiate and allocate the turn through both verbal and non-verbal modes. However, in this particular institutional talk, the strategy is limited into one. The speaker needs to use the ritual inquiry to initiate the exchange by addressing the call sign to prevent confusion and misunderstanding during the exchanges as the participants are involved in non face-to-face conversation through only the orality mode.

Each aircraft is named with reference to the identification of airlines, aircraft type or configuration. According to the data, *Fastair 345* is termed as a call sign by using the name of the airlines immediately come after with its flight number or *G-ABCD* is cited from the aircraft configuration which basically varies from one to one aircraft (the detail of generating a call sign lexical item will be explained in the lexical analysis part).

Similarly, an aeronautical station or control center is defined by its location and task-oriented; for instance Georgetown Ground Controller which is one of the aeronautical service units, when it is called out to perform the opening turn, the call sign will start with the location of the unit; in this case, the unit is in Georgetown, followed by a type of service unit. It, then, becomes *Georgetown Ground* or it can be reduced to only the name of its location which is *Georgetown*.

These call signs are officially designated and registered as each participant's identification in air-ground communication to be used among airmen and controllers around the world. Hence, each call sign must not be identical in any way.

The fundamental ground is that both pilots and air traffic controllers always have is the objective to commute solely in the purpose associated with tasks of flight operations delivered in restricted sequence of seven phases of commercial flight profile with certain information required at each phase.

Therefore, in air-ground communication, it is stated that when conversing in the set, the participants are strongly recommended to avoid adding social expression as greeting token to each move at the opening stage and leave-taking at the closing stage of the exchange. It is evident that there is no greeting and leave-taking token demonstrated in the data. This is different from regular conversational routines in any other spoken discourse as identification-recognition response and greeting tokens are determined as a standard etiquette of any spoken discourse.

According to the data, there are two possibilities for the participants to allocate the turn.

(1) The only one call sign is used. For an air traffic controller, it is very common to directly summon the target participant's call sign in order to assign the turn to a particular aircraft he needs to converse with. This pattern is very regular in any spoken discourse to call out the name of the target person to commute with;

Example (a):

ATC	**Fastair 345**	summon	pre-head	directing	I	Direct
	contact 121.1	directive	head			
PT	121.1	repeat	head	acknowledging	R	
	Fastair 345	terminate	post-head			

(Table of discourse analysis A: exchange 7)

On the other hand, a pilot tends to begin the turn by calling his own call sign to identify himself. This pattern never occurs in natural spoken discourse to call out the speaker name to initiate as well as to indirectly allocate the turn as in air-ground discourse. The reason is that it is many-to-one communication in which there is only one air traffic controller in the particular area who is in charge and assigned to be responsible for that certain aircraft whereas there are many pilots from different aircraft determine to initiate the communication. Therefore, it is not essential to allocate the turn by specifying the call sign of an air traffic controller as he unquestionably has to be a target participant;

Example (b):

PT	**G-CD**	summon	pre-head	informing	I	Inform
	runway vacated	informative	head			
ATC	G-CD	reply-summon	pre-head	acknowledging	R	
	roger	receive	head			

(Table of discourse analysis A: exchange 50)

(2) The target's participant call sign followed by own call sign is used to allocate the turn by not only calling out the name of a person whom the speaker wants to converse with but also identify own self at the same time. This particular possibility is generally conducted by a pilot who wants an air traffic controller to engage in the communication;

Example (c):

PT	**Apron Fastair 345**	summon	pre-head	eliciting	I	Elicit
	stand 27	starter	pre-head			
	request push-back	inquire	head			
ATC	Fastair 345	reply-summon	pre-head	informing	R	
	push-back approved	informative	head			

(Table of discourse analysis A: exchange 41)

Then, once the turn is allocated to a particular participant by summoning the call sign, the speaker commonly continues with the next act which is the first topic or reason-for-call without waiting for identification-recognition response from the co-participant as the speaker assumes that the target is going to conceive the message and definitely available to the exchange.

In brief, allocating or taking the turn strategy in air-ground communication emphasizes on indicating names especially a name of a pilot who is the co-participant in order to verify the target participant and the speaker. This ritual process is totally

different from other spoken discourses which largely focus on addressing a target's name to allocate the turn to perform identification-recognition process.

5.1.3 Types of reference exchanges in radiotelephony

Each exchange found in the data is elaborately described in correlation to its frequency count from the most numbers found to the least; *direct exchange, inform exchange, elicit exch*ange and *summon exchange* accordingly.

5.1.3.1 *Direct exchange*

The very first prime exchange is *direct exchange* which is frequently demonstrated in the data, 155 of 278 exchanges. Direct exchange largely aims at prospecting particular non-verbal actions to be complied by the co-participant whom the speaker has the right or authority over. Nevertheless, it is possible for the speaker to obtain either compliance or non-compliance as a response.

Conducting an aircraft onto accurate and appropriate flight path through the direct exchange is mainly carried out by an air traffic controller. A pilot always either complies with or rejects the directive. In accord with 155 exchanges, the pattern appointed in the data is as the following diagram:
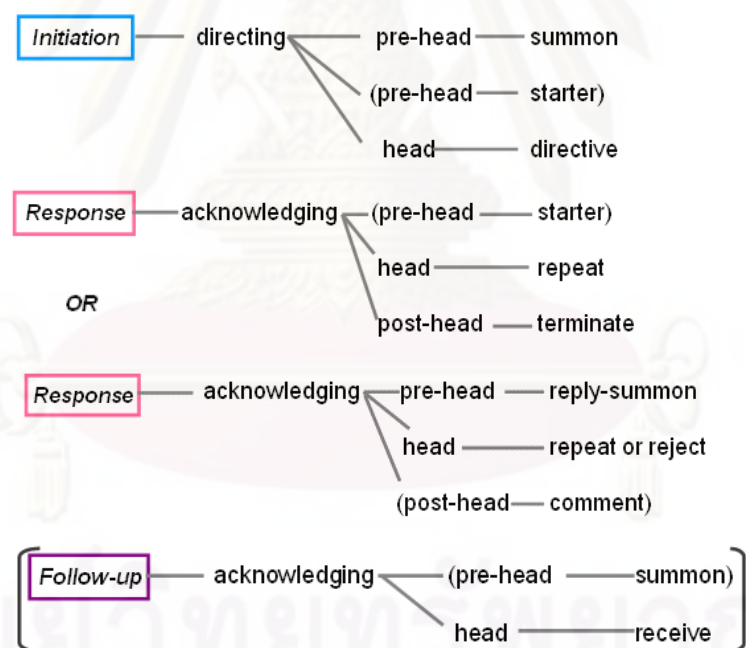
Diagram 5.1 - Structure of Direct Exchange

The internal structure of direct exchange consists of two mandatory moves, initiation and response moves which are generally equivalent to the first- and the second-pair part in natural exchange as well as a follow-up move as an additional move to evaluate correctness of the information supplied in the response.

Direct exchange consists of directing and acknowledging moves as an initiation and response respectively. To begin directing move, the speaker starts with

summon act, stating the target participant's call sign, then proceeds with starter act (optional) which is the particular information leading on to either the head act followed. The head act, directive comes at last to provide a specific instruction as the diagram below;
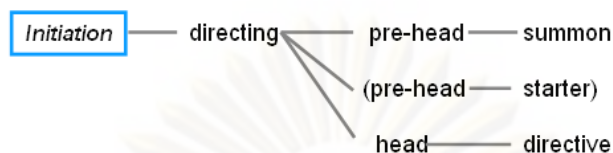
Diagram 5.2 - Structure of Initiation in Direct Exchange

There are two possibilities to perform an acknowledging move as a response to a directing move. The regular response pattern (1) of acknowledging move usually contains three acts; starter act (optional), repeat act to signify that the information is conceded as well as emphasized, mostly represented in repetition or paraphrase of the entire/part of the message in directive act which is realized as '*readback*' stage in communication process model, and terminate act to terminate an exchange and to confirm that it is the allocated participant, realized by calling own call sign. It is noted that starter move is optional in both initiation and response moves.

(1)

Diagram 5.3 - Structure of Response Pattern (1) in Direct Exchange

For examples:

Example (a): A controller begins with the call sign of the target aircraft, *G-AB*, followed by starter act containing the information concerning the instruction followed as the head of directing move while a pilot begins with repeating partial of instruction as a head act and ends the exchange with own call sign to point out the responder which is a part of identification-recognition process.

ATC	G-AB	summon	pre-head	directing	I	Direct
	identification lost due to radar failure	*starter*	*pre-head*			
	Contact Alexander control on 128.7	directive	head			
PT	128.7	repeat	head	acknowledging	R	
	G-AB	terminate	post-head			

(Table of discourse analysis A: exchange 98)

Example (b): A controller directly states directive act to provide specific instruction without stating a starter act whereas a pilot starts with the preceding information correlated to the instruction given before repeating the entire instruction, then ends the exchange with his call sign.

ATC	G-AB	summon	pre-head	directing	I	Direct
	climb to flight level 70	*directive*	*head*			
PT	Leaving 2500 feet	starter	pre-head	acknowledging	R	
	climbing to flight level 70	repeat	head			
	G-AB	terminate	post-head			

(Table of discourse analysis A: exchange 24)

Another possible structure of acknowledging move, response pattern (2), the speaker begins with reply-summon act which commonly is own call sign to assure that it is the designated participant as in the examples below. The participant, a pilot, as well adds the controller's call sign before own call sign which is the complete traditional way of reply-summoning in air-ground communication as in example A below.

(2)

Diagram 5.4 - Structure of Response Pattern (2) in Direct Exchange

After that, two possible acts are selected whether to reject (example (c)) or to repeat (example (d)) the directive act from the preceding move. The post-head of acknowledging move, comment act used to provide additional information upon the preceding message chiefly when the participant rejects the directive is optional.

Example (c):

ATC	Fastair 345 Georgetown departure	summon	pre-head	directing	I	Direct
	cleared to Colinton flight level 290 cross Wicken	directive	head			
	flight level 150 or above maintain flight level 130					
PT	Georgetown departure Fastair 345	reply-summon	pre-head	informing	R	
	unable to cross Wicken flight level 150 due weight	*reject*	*head*			
	maintaining flight level 130	comment	post-head			

(Table of discourse analysis A: exchange 19)

Example (d):

ATC	Fastair 345	summon	pre-head	directing	I	Direct
	stop immediately	directive	head			
PT	Fastair 345	reply-summon	pre-head	acknowledging	R	
	stopping	*repeat*	*head*			

(Table of discourse analysis A: exchange 49)

Comparing between two patterns of the responses, response pattern A and response pattern B, both includes directing move and acknowledging, but they are slightly different in numbers and sequence of acts conducted in each move.

In addition, direct exchange also contains the optional follow-up which is the final turn of the exchange to perform '*hearback*', one of the four stages of communication process model in order to confirm that the direction repeated in preceding utterance is accurate.

Diagram 5.5 - Structure of Follow-up in Direct Exchange

The speaker who determines the directing move at initial stage, is responsible for the turn by beginning with summon act, the co-participant's call sign, and then with receive act with a designated response item, *roger*, to ensure that the message recited is perfectly correct and indicate the end of the move;

Example (e):

ATC	G-AB descend to 3500 feet QNH 1015 transition level 50	summon directive	pre-head head	directing	I	Direct
PT	Leaving flight level 70 for 3500 feet QNH 1015 transition level G-AB	repeat terminate	head post-head	acknowledging	R	
ATC	*G-AB* *roger*	*summon* *receive*	*pre-head* *head*	*acknowledging*	*F*	

(Table of discourse analysis A: exchange 143)

Or the speaker starts solely with receive act by stating the co-participant's call sign to express the acknowledgement to a previous message and to end the move at the same time as in the example below;

Example (f):

ATC	G-CD leave control zone via route Whiskey, 3000 feet or below, report Whiskey one	summon directive	pre-head head	directing	I	Direct
PT	Cleared to leave control zone special VFR, via route Whiskey 3000 feet will report Whiskey one	receive/repeat comment	head post-head	acknowledging	R	
ATC	*G-CD*	*receive*	*head*	*acknowledging*	*F*	

(Table of discourse analysis A: exchange 127)

The complete organization as example (e) and (f) which is strongly associated with absolute stages of communication process model is the only two exchanges found in the data, even though it is recommended to complete every exchange with the follow-up stage to verify the preceding message. However, as it is mentioned that hearback stage can be omitted if the responder is certain that the message is correctly received.

To sum up, the structure of direct exchange is rigidly reserved in two parts, the first-pair part, an utterance made by a speaker, is directing move and the second pair-part, an expected response from a responder, is acknowledging move accordingly. Though, the internal formation of each move is varied, depending on act selected to conform as a head act.

In regular conversation, direct exchange definitely consists of two basic moves, command; '*Don't pick it up*' and response to command either compliance '*Okay*' or refusal '*I don't care*' (adapted from Thornbury & Slade, 2006:120). Nonetheless, numbers and details of prime acts are the same. The follow-up move is truly optional in regular spoken direct exchange, but sometimes found only in a particular discourse such as in classroom discourse rather than other discourse (Burton, 1981) with '*Mhm, mhm*', and '*Yeah*' to indicate that the information has been received, understood and accepted in terms of correctness.

Similarly, the follow-up is not necessarily element in the direct exchange in air-ground communication, but initiation move and response move are mandatory. Moreover, the linguistic form to express act in the follow-up is limited to specific terminology, comparing to regular spoken discourse the choice is pretty broad.

One thing to recognize is that sequence of acts in air-ground discourse is very rigid with the minimum element of direct exchange in general spoken discourse which can be much more diverse with overlapping and insertion sequence in natural setting.

5.1.3.2 *Inform exchange*

The second exchange is *inform exchange*, the second frequent-found exchange in the reference data, 68 from 278 exchanges. Inform exchange has the function of providing specific information. To interchangeably report specific information along the flight path, the participants share the equal amount of opportunities in initiating the exchange whereas in direct exchange an air traffic controller mainly begin the initiation move. The organization of inform exchange is formulated below:
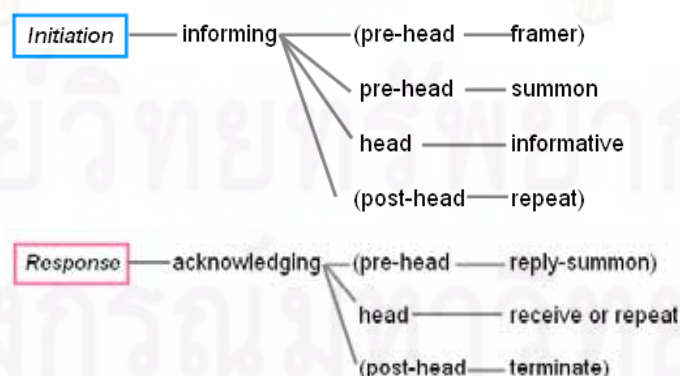
Diagram 5.6 - Structure of Inform Exchange

The initiation of inform exchange contains either framer act or summon act or both as a pre-head, then followed by a head, informative act. The post-head with repeat act is optional as the diagram below;
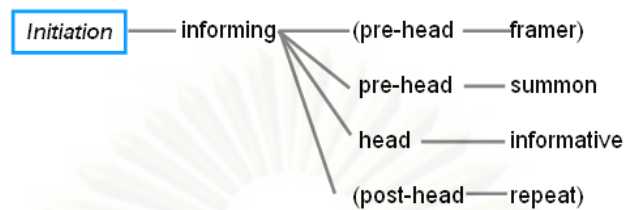
Diagram 5.7 - Structure of Initiation in Inform Exchange

To initiate informing move, the speaker generally starts with summon act. If the speaker is a pilot, there are two possibilities of summoning, either the target participant's call sign, followed by own call sign (example (c)) or only own call sign (example (a)). But, if the speaker is a controller, mainly the target participant's call sign is addressed (example (b)), then the speaker may or may not state own call sign. However, referring to the data, the aircraft's call sign is regularly stated by both participants. No matter who initiates the first move; for examples,

Example (a):

PT	*Fastair 345* Wickin 47 flight level 003 Marlow 57	*summon* informative	*pre-head* head	informing	I	Inform
ATC	Fastair 345 roger	reply-summon receive	pre-head head	acknowledging	R	

(Table of discourse analysis A: exchange 5)

Example (b):

ATC	*G-AB* Instrument Meteorological conditions reported in the vicinity of Kennington	*summon* informative	*pre-head* head	*informing*	I	Inform
PT	G-AB roger maintaining IFR	reply-summon receive comment	pre-head head post-head	acknowledging	R	

(Table of discourse analysis A: exchange 38)

In case of emergency, the speaker will add one act prior to summon act. The framer act is recognized by specific terminology; *Pan Pan, Pan Pan, Pan Pan* and *Mayday, Mayday, Mayday* to mark the onset of a move related to distress or emergency situation;

Example (c):

PT	*Pan Pan, Pan Pan, Pan Pan* Walden tower G-BBCC intercepted urgency call passenger with suspected heart attack requesting priority landing	*framer* summon informative	pre-head head head	informing	I	Inform
ATC	G-BBCC roger	reply-summon receive	pre-head head	acknowledging	R	

(Table of discourse analysis A: exchange 233)

After summoning, the speaker delivers informative act, a head of informing move. Sometimes, if the speaker wants to emphasize on the preceding message in informative act, he commonly repeats the entire or part of the message after the phraseology, *I say again* to state repeat act as a post-head of informing move;

Example (d):

PT	Georgetown, G-ABCD Walden 500 feet *I say again* 500 feet	summon informative repeat	pre-head head post-head	informing	I	Inform

(Table of discourse analysis A: exchange 6)

To respond in acknowledging move, the responder has several possibilities to choose according to the diagram below;
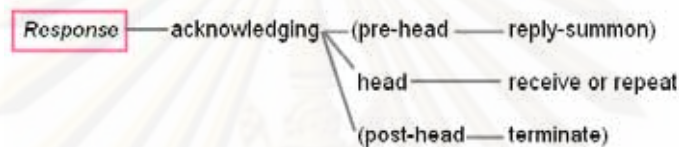
Diagram 5.8 - Structure of Response in Inform Exchange

(1) Starting with reply-summon act which is the co-participant's call sign with or without own call sign, in case the co-participant is a controller. And continue with receive act, *roger*, to indicate that the information is conceived and to end the exchange at the same time;

Example (e):

PT	G-CD runway vacated	summon informative	pre-head head	informing	I	Inform
ATC	*G-CD* *roger*	*reply-summon* *receive*	*pre-head* *head*	acknowledging	R	

(Table of discourse analysis A: exchange 50)

Or simply reply with own call sign to state that the message is acquired and to close the exchange (for pilots only);

Example (f):

ATC	Fastair 345 radar control terminated	summon informative	pre-head head	informing	I	Inform
PT	*Fastair 345*	*receive*	*head*	acknowledging	R	

(Table of discourse analysis A: exchange 225)

Or generally state repeat act to not only express that the message is received but also to emphasize on the message by repeat the entire or part of the message after the reply-summon act as a pre-head;

Example (g):

ATC	Fastair 345 report the Airbus on final in sight	summon informative	pre-head head	informing	I	Inform
PT	Fastair 345 ***Airbus in sight***	reply-summon *repeat*	pre-head *head*	acknowledging	R	

(Table of discourse analysis A: exchange 60)

The target participant may begin with reply-summon act, then receive act and ends the move with comment act to provide additional information to the preceding act or move;

Example (h):

ATC	G-AB Instrument Meteorological conditions reported in the vicinity of Kennington	summon informative	pre-head head	informing	I	Inform
PT	G-AB *roger* *maintaining IFR*	reply-summon *receive* *comment*	pre-head *head* *post-head*	acknowledging	R	

(Table of discourse analysis A: exchange 38)

(2) Starting with repeat act, then terminate act with own call sign (for pilots only);

Example (i):

ATC	Fastair 345 unknown traffic 1 o'clock 3 miles opposite direction fast moving.	summon informative	pre-head head	informing	I	Inform
PT	***Looking out*** ***Fastair 345.***	*repeat* *terminate*	*head* *post-head*	acknowledging	R	

(Table of discourse analysis A: exchange 109)

Even though the internal structure of inform exchange is rather complicated, still it is predictable and systematic. In general spoken discourse, inform exchange is characterized as a more general category which covers not only utterances which provide information, but also those which report events or states of affairs, recount personal experience, and express belief, evaluative judgments, feelings and thoughts (Tsui, 1994:135).

The organization of the exchange in regular conversation may vary, depending on the social context. However, the primary structure is divided into two parts; the first-pair part is statement; '*I am getting married*' and the second pair-part is acknowledgement; '*Wonderful news*' or contradiction; '*Over my dead body*' (Thornbury & Slade, 2006:120). Generally, the overall structure of inform exchange either in air-ground communication or simple conversation is based on the same basic pattern, except that the formulation of acts in air-ground communication is much more rigid and foreseeable.

5.1.3.3 *Elicit exchange*

The very last prime exchange is *elicit exchange* representing the function of seeking or requesting mainly for obligatory linguistic/verbal response from the co-participant which is simply realized by the syntactical forms of either interrogatives or imperatives.

There are altogether 55 from 278 exchanges discovered in the data. Two third of the exchanges are initiated by a pilot, when he asks for either information or permission to do a specific operation, whereas the remaining is conducted by a controller to request for flight parameters. It is absolute essential for a pilot to inquire a permission to operate any action of the flight profiles either routine or non-routine ones regardless of air traffic movement standard ordinance around the aerodrome and over the airspace.

The structure of elicit exchange is generated as the following;
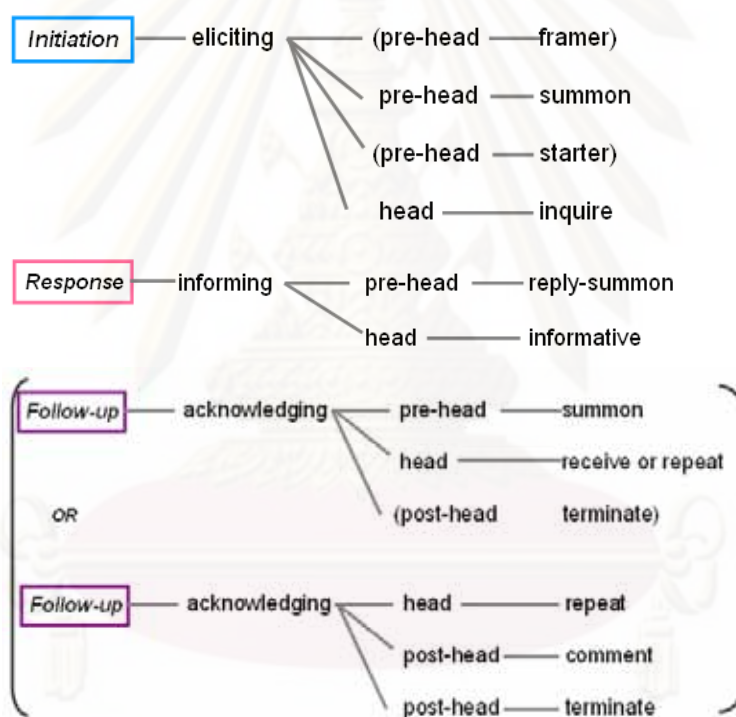
Diagram 5.9 - Structure of Elicit Exchange

The structure of the exchange composes of two focal moves; eliciting move as the initiation and informing move in the response. There are a number of possibilities to construct the initiation;
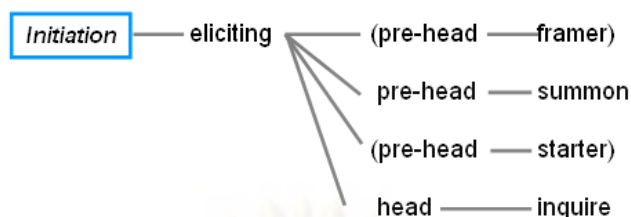
Diagram 5.10 - Structure of Initiation in Elicit Exchange

1) In case of routine discourse, the participant starts the turn with summon act of addressing the target co-participant's call sign. After that, he may or may not continue with starter move to provide specific information related to the present condition of the aircraft. Then, the initiation is closed with inquire act which is the head of eliciting move which is to propose for the specific information related to flight operations;

Example (a): The move with summon act, starter act and inquire act accordingly.

PT	*Stephenville tower G-ABCD* *at the south side hangar* *request taxi for local VFR flight*	*summon* *starter* *inquire*	*pre-head* *pre-head* *head*	eliciting	I	Elicit
ATC	G-ABCD taxi via taxiway Charlie to holding point runway 24 wind 250 degrees 8 knots QNH 1010 time 23	reply-summon informative	pre-head head	informing	R	

<div align="right">(Table of discourse analysis A: exchange 42)</div>

Example (b): The move with only summon act and inquire act.

ATC	*G-CD* *are you ready for immediate departure?*	*summon* *inquire*	*pre-head* *head*	eliciting	I	Elicit
PT	G-CD affirm.	reply-summon informative	pre-head head	informing	R	

<div align="right">(Table of discourse analysis A: exchange 56)</div>

2) In case of non-routine discourse, commonly in emergency situation, framer act is required before summon act as a pre-head of eliciting move to mark boundaries in conversation or onset of the move with specific phraseology, *Pan Pan, Pan Pan, Pan Pan* or *Mayday, Mayday, Mayday*;

Example (c):

PT	*Pan Pan, Pan Pan, Pan Pan* Walden tower G-ABCD 2000 feet heading 190 above cloud unsure of my position request heading to Walden	*framer* summon starter inquire	*pre-head* pre-head pre-head head	eliciting	I	Elicit
ATC	G-ABCD Walden tower fly heading 160	reply-summon informing	pre-head head	informing	R	
PT	Heading 160 G-ABCD	repeat terminate	head post-head	acknowledging	F	

<div align="right">(Table of discourse analysis A: exchange 231)</div>

The diagram below demonstrates the internal structure of the response. In the response, only two certain acts, reply-summon act and informative act, are structured in informing move to grant requested permission or to render needed information as the example (a), (b) and (c) above. Both acts are required to conduct the informing move. To state the reply-summon act, the target participant is firstly addressed, then may or may not proceed with own call sign;
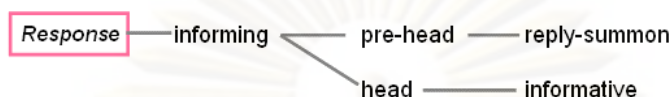
Diagram 5.11 - Structure of Response in Elicit Exchange

If a controller is the target co-participant, informing act is to provide specific information in correlation to the preceding inquiry. Hence, informative act in the elicit exchange signifies not only to provide required information but also to deliver a specific instruction. But, if a pilot is the target co-participant, informing act is just a reply to the question with designated response expressions, either '*affirm*' or '*negative*', denoting *yes* and *no* respectively as in example (b), or to deliver exact information required as in;

Example (d):

ATC	Fastair 345	summon	pre-head	eliciting	I	Elicit
	report distance from Stephenville	inquire	head			
PT	Fastair 345	reply-summon	pre-head	informing	R	
	37 miles	*informative*	head			

(Table of discourse analysis A: exchange 198)

The optional move is acknowledging move in the follow-up. There are two possible patterns; (1) and (2), to conduct '*readback*' stage in the communication process. The follow-up pattern (1) starts with receive or repeat act to either indicate that the information is acquired or to indirectly confirm the accuracy of preceding message. And then, the speaker, mainly a pilot, closes the move by calling out own call sign to represent terminate act as well as to perform identification process. But, if the speaker is a controller, he usually begins acknowledging move with summon act with the co-participant's call sign and receive act with the word '*roger*';

Diagram 5.12 - Structure of Follow-up Pattern (1) in Elicit Exchange

Example (e):

ATC	Fastair 345	summon	pre-head	eliciting	I	Elicit
	report heading	inquire	head			
PT	Fastair 345	reply-summon	pre-head	informing	R	
	heading 050	informative	head			
ATC	***Fastair 345***	***summon***	***pre-head***	acknowledging	F	
	roger	***receive***	***head***			

(Table of discourse analysis A: exchange 102)

Or a controller expresses solely with receive act by stating the co-participant's call sign to express the acknowledgement to a previous message and to end the move;

Example (f):

ATC	G-CD	summon	pre-head	eliciting	I	Elicit
	do you want vectors	inquire	head			
PT	G-CD	reply-summon	pre-head	informing	R	
	negative vectors, traffic in sight	informative	head			
ATC	***G-CD***	***receive***	***head***	acknowledging	F	

(Table of discourse analysis A: exchange 113)

Another pattern of the follow-up composed of repeat act by paraphrasing or duplicate all or part of the preceding message. Then, comment act to literally extend the move by giving additional information relevant to the previous message, and the terminate act is conducted by addressing own call sign to close the move. Both comment act and terminate act are post-head of the exchange;

(2)

Diagram 5.13 - Structure of Follow-up Pattern (2) in Elicit Exchange

Example (g):

PT	Georgetown ground Fastair 345	summon	pre-head	eliciting	I	Elicit
	IFR to Colinton,	starter	pre-head			
	request departure information	inquire	head			
ATC	Fastair 345	reply-summon	pre-head	informing	R	
	departure runway 32 wind 290 degrees four knots, QNH 1022, temperature -2, dewpoint -3, RVR 550 metres, time 27	informative	head			
PT	***runway 32, QNH 1022,***	***repeat***	***head***	acknowledging	F	
	will call for start up,	***comment***	***post-head***			
	Fastair 345	***terminate***	***post-head***			

(Table of discourse analysis A: exchange 39)

The fundamental structure of elicit exchange strictly includes the initiation and the response, but not the follow-up. The follow-up is hardly found in the data which

can be implied that it is not necessary that the speaker who initiates the exchange need to illustrate his acknowledgement through any linguistic form.

In general spoken discourse, elicit exchange similarly contains question, referring to the discourse function not the interrogative form, '*Are you getting married?*' and answer; '*yes*'. Then, some speaker might generate the follow-up of disclaimer, '*What do you mean?*' (Thornbury & Slade, 2006:120) which somewhat leads to another exchange. However, numbers and sequence of the moves may be varied depending on the situational context of the discourse while the organization of elicit exchange in air-ground discourse is more unyielding and mostly prescribed with designated eliciting and informing moves.

According to Thornbury & Slade, 2006 and Tsui, 1994, the realization of speech function '*question*' is in interrogative form to signify several subclasses of elicitation; elicit:inform (to invite the addressee to supply a piece of information; *what time will you be finished?*), elicit:agree (to invite the addressee to agree with the speaker's assumption; *Lovely day, isn't it?*), elicit:commit (to inquire commitment of some kind; *Can I talk to you?*), elicit:repeat (to prospect a repetition; *What did you say?*) and elicit:clarify (to prospect the clarification of a prior utterance; *What do you mean?*). Only one subclass is realized by a declarative form which is elicit:confirm (to invite the addressee to confirm the speaker's assumption; *So the meeting is on Friday*).

In contrast, '*question*' in inquire act is primarily recognized by imperative form beginning with '*request*' to again ask the co-participant to supply specific information in order to conduct a certain flight operation or indirectly inquire a permission to perform the action which as well need particular information from the addressee. Interrogative form is found only in two out of 55 exchanges as to invite the addressee to present a piece of information. The same as any other types of exchanges, almost every move in elicit exchange should have summon act to issue either addresser's call sign or addressee's call sign which emerges in neither face-to-face nor non face-to-face in regular conversation, merely at the beginning of the initiation.

5.1.3.4 *Summon exchange*

Summon exchange is the supplementary exchange introduced to air-ground discourse as an option for the participants to generate as the opening stage which is commonly followed by any of the prime type of exchange or in other word, to start the conversation as identification-recognition process.

Referring to the data, a complete summon exchange which is associated with the opening stage of the communication beginning with calling the target participant's name to engage him in a conversation or to attract his attention is rarely present, only 5 from 278 exchanges are found.

The internal structure of summon exchange is very rigid and simple with a limited possibility as displayed in the diagram below;
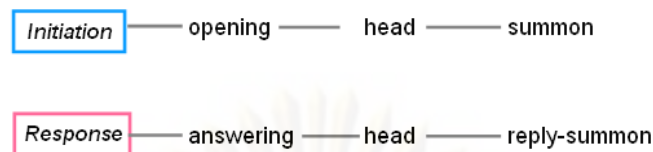
Diagram 5.14 - Structure of Summon Exchange

The exchange basically begins with summoning a call sign of a target participant followed constantly by a call sign of a speaker who initiates the turn as the head of the opening move. After that, the target participant will reply the summon by calling out the speaker's call sign and then his call sign accordingly as the head of answering move to assure that it is the designated participant and whom the speaker is talking to as well as to indicate willingness to participate in a conversation. At this stage, the target participant may or may not include the signal the co-participant to take the floor by using the terminology, '*go ahead*' to allow the speaker to continue on with his next exchange.

Two possible summon exchanges collected from the data are sampled below;

Example (a): The summon exchange with the terminology, '*go ahead*';

PT	Stephenville Tower, G-ABCD	summon	head	opening	I	Summon
ATC	G-ABCD Stephenville Tower **go ahead**	reply-summon	head	answering	R	

(Table of discourse analysis A: exchange 1)

Example (b): The summon exchange without the terminology, '*go ahead*';

PT	Stephenville Approach G-DCAB	summon	head	opening	I	Summon
ATC	G-DCAB Stephenville Approach	reply-summon	head	answering	R	

(Table of discourse analysis A: exchange 138)

It is interesting that all the data found are firstly initiated by a pilot which possibly implies that to begin the conversation, a pilot is recommended to call out both the designated participant's call sign to address whom he wants to commute with and own call sign to identify who he is if he wants to conduct the complete pattern of identification-recognition process.

Summon exchange is rather uncommon in regular spoken discourse as there are confined with as set of moves and the detail in each move which is more like a formulaic pattern to perform whereas in common setting, the speaker usually starts with a target participant's name as the first-pair part of the exchange and the responder reply with any linguistic form to express the recognition as the second-pair part which is usually conducted when there are more than one possible participant involved in the conversation.

In air-ground communication, the absolute discourse pattern composes of summon exchange to state the intention of the addresser to initiate the communication and determined exchange, either direct exchange, inform exchange, or elicit exchange to deliver the prime purpose of that communication. Nonetheless, summon exchange does not basically appear when the conversation is commenced which can be implied that as the beginning for each prime exchange only requires summoning as a pre-head rather than to entirely conduct the complete summon exchange;

Example (c):

PT	*Alexander control G-DCAB.*	*summon*	*head*	*opening*	*I*	*Summon*
ATC	*G-DCAB Alexander control.*	*reply-summon*	*head*	*answering*	*R*	
PT	G-DCAB	summon	pre-head	eliciting	I	Elicit
	20 miles north of Wicken flight level 80 Wicken at 33	starter	pre-head			
	request clearance to cross airway A1 at Wicken	inquire	head			
ATC	G-AB is cleared to cross A1 at Wicken flight level 80	informative	head	informing	R	
PT	Cleared to cross A1 at Wicken flight level 80	repeat	head	acknowledging	F	
	G-AB	terminate	post-head			

(Table of discourse analysis A: exchange 215-6)

Regardless of the above example, summon exchange is only initiated preceding elicit exchange without any change in the internal structure of the two. As a result, summon exchange is the adjacency pair which is placed in rigid sequence, prior to the intended exchange to engage another participant in a conversation or to attract his attention before leading to the proposed exchange.

In conclusion, as air-ground communication is complied with instruct-respond basis, direct exchange is frequently found in the data. It is to illustrate that providing instructions and directions from an air traffic controller to a pilot is the essential aspect of the communication whereas inform exchange is the second priority in the discourse to interchangeably give and take the information in order to smooth the flight operations. Elicit exchange; on the other hand, usually commenced by a pilot to mainly request for permission more than to ask for specific information is less found in the data

Discourse structure of air-ground communication is represented in almost *rigid, predictable pattern with prescribed moves and acts* in each turn since the communication is generally influenced by several constraints, different from any regular spoken discourse such as rapid information change in a short period of time since it is one-to-many discourse, artificial medium (radio transmission) which does not allow a long comfortable conversation as it is based on push-to-talk system and interfered with noise, restricted to oral mode as it is non face-to-face communication required explicit formula in the exchange to avoid ambiguity, and task- and goal-oriented centered as to pose messages mainly associated with flight operations.

Nevertheless, the principle moves in each exchange are technically based on prominent structure of the common interaction in general spoken discourse to direct, inform and elicit. The pointed difference is the types and the sequences of acts performed in each move which are more ritualized expressed in almost formulaic linguistic pattern.

5.2 Lexicon in Radiotelephony

To analyze at lexical level, there are two main analysis conducted. The very first is to accumulate all of the lexical terms with the application of AntCon3.2.2w (2007) and Collocation Extract 3.07 in order to create the complete lexicon list of radiotelephony. Tokens referring to grammatical functions such as auxiliary verbs, connectors or any common generic words which are usually applied in regular corresponding English language without certain aviation-related properties are excluded because the glossary is reserved for the items which are focally used in aviation field and specifically defined in air-ground communication. Then, the items are arranged in alphabetical order and grouped in accord with their prime semantic property.

The second analysis is to examine all the terms listed in the lexicon with the criteria of word-formations (conventional classification system (Sager et al, 1980 and Algeo, 1995) and new classification system (Shortis, 2001:56-9); *Composite*, *Shift* and *Shortening* to reveal unique characters at lexicon level of radiotelephony. However, the classification is done under one condition – if there is the item issued in any regular English dictionary even though it is through the process of word-formation, it is determined as a base form of the item since it is the already used mechanism in canonical corresponding English language which does not contribute to indicate the distinctive formation of lexicon in radiotelephony.

The findings of analysis at lexical level are explained and discussed; glossary of lexical items and word-formation applied as well as denotation in radiotelephony respectively.

5.2.1 *Glossary of lexical items of radiotelephony*

To explicitly demonstrate a distinctive set of lexical items which is restricted in the field of aviation, the complete list of technical terms in radiotelephony is to be created in accordance with the framework detailed above. The numbers of lexical terms collected from the reference data and processed through two data analysis programs, AntCon3.2.2w (2007) and Collocation Extract 3.07 to learn the occurrence of both single-unit terms and multi-unit terms.

As mentioned, some of the terms in radiotelephony are not only a single-unit item, but also quite a great numbers of multi-unit terms which are commonly

considered as phrases and clauses in canonical English language such as *rate of descent, clear of traffic, tough and go, line up and wait, I say again, how do you read*, etc. Therefore, they are determined a lexical term as the elements are always collocated in the data when analyzed through AntCon3.2.2w (2007) and Collocation Extract 3.07 and also are officially issued as a fixed expression in radiotelephony.

According to the findings, there are altogether 259 items which directly denote particular things or else associated with aviation and air-ground communication whereas the rest 297 items are generic items with no specific reference and function words. The items listed in the glossary include general language words used specifically with some restriction or modification of the reference or even redefined for aviated purpose and the words specifically created to match a discipline used only by aviators.

These items are categorized solely by the prototypical semantic properties into 11 conceptual groups, regardless of aviation activities and flight profiles; *facility, weather, operational path, system, area, parameter, unit of service, status, process, flight performance* and *communication expression* for the purpose of systematizing to be easily implemented in teaching and learning process. However, it is noted that the conceptual classifications are specifically designated for this particular study without any reference from any source. The description of each concept and its member arranged in alphabetical order as well as the definition coined for each member is illustrated as follows:

(1) *Facility*: all 15 items basically denote the things or constructions that are needed for a particular purpose or activity in conducting flight operations.

No.	Lexical Item	Definition
1	ADF (Automatic Direction-Finding)	a ground equipment for automatically determining the line of position of aircraft transmitting radiant energy
2	aircraft	a plane, helicopter or other vehicles that flies
3	altimeter	a pressure or radio instrument for measuring vertical distance or altitude (the height of the aircraft above sea level)
4	brakes	a device used for preventing the aircraft from moving after it has come to a stop
5	centre line	a middle long thin mark on the surface of taxiway or runway
6	DME (Distance Measuring Equipment)	an equipment used during airborne and on the ground to measure the distance in nautical miles
7	engine	a piece of machine that converts energy (fuel) into mechanical force or motion to the aircraft. Each aircraft needs to equipped with at least 2 engines
8	gear	landing wheel assemblies of an aircraft or undercarriage
9	lighting	an equipment that produces lights on taxiway or runway to guide an aircraft
10	NAVAID (Navigation Aid)	any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight
11	radio	1) a call sign of an aeronautical station 2) a piece of equipment for air-ground communication or sending and receiving radio signals
12	runway	a long narrow strip of level, usually paved ground with a hard surface that an aircraft takes off from and lands on
13	set	a group of aircraft or related aircraft equipment, parts or systems used together or which belong together
14	taxiway	a hard path or tarmac surface connecting the ramp or apron with the runway(s) that an aircraft uses to move along
15	transponder	a piece of equipment that receives radio signals and automatically sending out another signal in reply

Table 5.1 – Glossary of Terms with Facility Concept

(2) *Weather*: 10 terms directly relate to characteristics of weather which commonly concern the flight performance. Most of the times these terms appear in the weather report broadcast through certain radio service named ATIS or VOLMET.

No.	Lexical Item	Definition
1	CAVOK (Cloud And Visibility are OK)	a weather report indicating that the visibility and cloud are apparently clear in values or conditions which has no effect on flight performance
2	IMC (Instrument Meteorological Conditions)	descriptions of the scientific study of weather conditions expressed in terms of visibility, distance from cloud and ceiling, less than the minima specified for visual meteorological conditions
3	MET (Meteorology)	a scientific study of the earth's atmosphere and its changes, used especially in forecasting the weather
4	moderate	a weather condition which is neither very good, hot, etc. nor very bad, cold, etc.
5	overcast	a sky covered with clouds
6	visibility	an ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.
7	VMC (Visual Meteorological Conditions)	meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima. Or conditions in which pilots have sufficient visibility to fly an aircraft, maintaining visual separation from terrain and other aircraft
8	wake turbulence	phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air
9	wind calm	local wind moving less than 1 kilometer per hour
10	windshear	extreme local wind gradient which can be dangerous

Table 5.2 – Glossary of Terms with Weather Concept

(3) *Operational path*: the focal description of the members is the particular pattern the aircraft is designated to fly on which will be various depending on several objectives and limitations.

No.	Lexical Item	Definition
1	aerodrome traffic circuit	a specified path to be flown by an aircraft operating in the vicinity of an aerodrome
2	approach	1) a call sign for Approach control service which is an air traffic control service for arriving or departing controlled flights 2) a path towards the final stage of flight when the aircraft is maneuvered into position, relative to the landing area, in preparation for landing
3	base (leg)	a flight path at right angles to the landing runway off its approach end, normally extending from the downwind leg to the intersection of the extended runway centerline
4	circuit	a specified path to be flown by aircraft operating in the vicinity of an aerodrome in a pattern of take off , climb out, turn onto crosswind leg, turn onto downwind leg, turn onto base leg, turn onto final approach and landing
5	course	an intended direction of flight in the horizontal plane measured in degrees from the north
6	downwind (leg)	a flight path of the airfield traffic circuit which run parallel to the landing runway, but in the opposite direction to the approach to land which is made into wind. The downwind leg normally extends between the crosswind leg and the base leg
7	en route	on the way while traveling from or to a particular place or point
8	final	1) a condition that an aircraft is on the final approach course or is aligned with a landing area 2) which comes at the end or last
9	flight	a scheduled airline journey, a journey through air in a vehicle as a plane
10	flight path	a line, course, or track along which an aircraft is flying or intended to be flown
11	flight plan	a flying plan which requires an approval from air traffic control unit for clearance and other necessary services
12	flight planned route	a flying route of a particular flight as a part of the flight plan
13	glide path	a path of longitudinal axis degreed with a touch-down point followed by the aircraft down the glide slope as a part of Instrument Landing System (ILS)
14	long final	an aircraft is on the final approach course or is aligned with a landing area which is between 8 and 4 Nm
15	pattern	an aircraft track in the aerodrome circuit
16	radial	a pattern of lines that go out from the central point towards the edge of a circle (line of radio baring from VOR beacon)
17	straight-in	a direct route towards a particular point or on a particular pathway
18	track	a projection on the earth's surface of the path of an aircraft flying or intended to be flown, the direction of which path at any point is usually expressed in degrees from the north

Table 5.3 – Glossary of Terms with Operational Path Concept

(4) *System*: the items generally refer to an organized set of things or equipment that is constantly connected and work together in a particular way to assist the flight operations to be more stabilized and safe.

No.	Lexical Item	Definition
1	automatic dependant surveillance	a surveillance technique in which aircraft automatically provide via a data link. The data is derived from onboard navigation and position fixing systems, including aircraft identification, four dimensional position and additional data as appropriate
2	GCA (Ground Controlled Approach)	a radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio
3	ILS (Instrument Landing System)	a precision instrument approach system which normally consists of the following electronic components and visual aids
4	INS (Inertial Navigation System)	an area navigation (RNAV) system which is a form of self-contained navigation
5	localizer	a component of an ILS which provides course guidance to the runway as a part of instrument landing system
6	LORAN (Long Range Air Navigation)	an electronic navigational system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters
7	PAPI (Precision Approach Path Indicator)	an airport lighting facility, similar to VASIS, providing vertical approach slope guidance to aircraft during approach to landing
8	QDM	a kind of radio navigation system which is a magnetic bearing to a station
9	RNAV (Area Navigation)	a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground
10	SELCAL (Selective-Calling Radio System)	a high-frequency system enabling an air traffic control to alert a particular aircraft, by means of flashing light or aural signal in the cockpit
11	SID (Standard Instrument Departure)	a preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedure printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure
12	STAR (Standard Instrument Arrival)	a preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form
13	surveillance radar approach	an approach control radar system used to detect and display an aircraft's position in the terminal area, primary radar scanning often 360 degrees
14	TACAN (Tactical Air Navigation)	an ultra-high frequency electronic rho-theta air navigation aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station
15	TCAS (Traffic Collision Avoidance System)	an airborne collision avoidance system based on radar beacon signals which operates independent of ground-based equipment
16	TCAS resolution advisory	an advice providing from Traffic Collision Avoidance System (TCAS) issued to alert pilots to avoid other known or observed air traffic
17	VASIS (Visual Approach Slope Indicator System)	a system of lights on the side of an airport runway threshold that provides visual descent guidance information during the approach to a runway
18	VORTAC	a combination of VHF omni-directional radio range (VOR) and UHF tactical air navigation aid (TACAN) - A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site

Table 5.4 – Glossary of Terms with System Concept

(5) *Area*: a specific space or point either on the ground or in the sky in which the aviation activity is performed or assigned to be conducted is the main concept of any items in this category.

No.	Lexical Item	Definition
1	aerodrome	a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft
2	aerodrome traffic	all traffic on the maneuvering area of an aerodrome and all aircraft flying in the vicinity of an aerodrome
3	air traffic	all aircraft in flight or operating on the maneuvering area of an aerodrome or aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas
4	air traffic	all aircraft in flight or operating on the maneuvering area of an aerodrome or aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas
5	airspace	a part of the atmosphere above the surface, subject to the laws of a particular country or controlling authority
6	airway	a control area or portion thereof established in the form of corridor equipped with radio navigational aids a particular route regularly used by planes
7	apron	a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, refueling, parking or maintenance but not being part of the maneuvering area
8	controlled airspace	an airspace of defined dimensions within which an air traffic control service is provided in accordance with the airspace classification
9	CTR (Control Zone)	a designated air traffic control area for IFR flights both going in and out of the airport
10	fade area	a particular part of an airspace that the strength of a radio signal is reduced or disappeared
11	field	an area around the aerodrome
12	fuel dumping track	the specific controlled area to dump fuel
13	gateway	the start or the termination point for an aircraft at an aerodrome/airport
14	holding fix	a geographical location that serves as a reference for a holding procedure
15	holding point	a specified location, identified by visual or other means, in the vicinity of which the position of an aircraft in flight is maintained in accordance with air traffic control clearances
16	maneuvering area	a part of an aerodrome to be used for the take-off, landing and taxiing of aircraft excluding aprons
17	midpoint	the middle point of the runway
18	movement area	a part of an aerodrome to be used for the take-off, landing and taxiing of aircraft consisting of maneuvering area and apron
19	offset	a position that is away from the center such as offset parallel runways meaning staggered runways having centerlines which are parallel
20	outer marker	a marker beacon at or near the glide slope intercept altitude of an ILS approach or ILS (marker) beacon, usually on center line of approach at about 4.5 nautical miles from the runway threshold
21	radar control	an area that an air traffic control is managed by the information displays on the radar
22	radar cover	an area that there is the use of radar for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path

No.	Lexical Item	Definition
23	ramp	a defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. Generally, the pre-flight activities are done in ramps; and areas for parking and maintenance are called aprons
24	reporting point	a specified geographical location in relation to which the position of an aircraft can be reported
25	stand	an aircraft parking spot/bay
26	terrain	an area of land especially in relation to its physical geography that is the obstacle to safety of flight operation
27	touchdown	the portion of a runway, beyond the threshold, where it is intended landing aircraft first contact the runway
28	vicinity	an area nearby/around a particular place over the aerodrome

Table 5.5 – Glossary of Terms with Area Concept

(6) *Parameter*: the items truly concern something mostly related to numbers that decides or limits the way in which flight operations or flight performance are done.

No.	Lexical Item	Definition
1	AGL (Above Ground Level)	an altitude expressed in feet measured above ground level
2	alternatives	another possibility or choice of a parameter, track, aerodrome or any concerned flight operation
3	altitude	the height of a level, point, or object (the vertical distance of an aircraft) measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL)
4	AMSL (Above Mean Sea Level)	an altitude expressed in feet measured above mean sea level (the average height of the ocean's surface)
5	approach speed	the recommended speed contained in aircraft manuals used by pilots when making an approach phase to landing
6	clean speed	the speed that an aircraft uses when all movable parts are retracted in order to reduce parasite drag
7	decimal	a numerical fracture unit being inserted into the numerator at the position from the right corresponding to the power of ten of the denominator
8	dewpoint	a temperature at which water vapor will begin to condense
9	estimate	an approximate calculation of the time an aircraft reaching a particular point or position
10	ETA (Estimated Time of Arrival)	the time the flight is estimated to arrive at the gate (scheduled operators) or the actual runway on time for nonscheduled operators
11	ETD (Estimated Time of Departure)	the time the flight is estimated to depart from the gate (scheduled operators) or the actual runway on time for nonscheduled operators
12	FIR (Flight Information Region)	an airspace of defined dimensions within which Flight Information Service and Alerting Service are provided
13	flight level	a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals, relating to the vertical position of an aircraft in flight and meaning variously, height and altitude
14	frequency	a number of radio wave to broadcast the communication calculated in cycles for every second, mostly stated in digit code
15	heading	a direction in which the longitudinal axis of the aircraft is pointing, expressed in degrees from the north
16	HF (High Frequency)	high frequency of radio transmission (3 to 30 MHz)
17	level	a generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level
18	low altitude	the height of a level, point, or object (the vertical distance of an aircraft) measured in feet Above Ground Level (AGL) ranging from 700-18,000 feet
19	minima	weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.
20	NOTAM (Notice To Airmen)	a notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
21	QNH (Quasi-Non-Hydrostatic)	an altimeter sub-scale setting to obtain elevation when on the ground or the barometric altimeter setting which will cause the altimeter to read altitude above mean sea level within a certain defined region, reported by a particular station

No.	Lexical Item	Definition
22	rate of descent	a measurement of speed used in lowering an aircraft mostly at the approach phase
23	RVR (Runway Visual Range)	an instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end
24	SIGMET (Significant Meteorology)	the information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations
25	SNOWTAM (Snow To Airmen)	a notification of runway/taxiway/apron status with respect to snow, ice and standing water
26	speed	a specific rate of aircraft motion over a distance in time
27	threshold	a beginning of the part of the runway usable for landing
28	transition level	the level of an aircraft passing from one place, state, or condition to another
29	UHF (Ultra-High Frequency)	ultra-high frequency of radio transmission (300 to 3000 MHz)
30	vectors	a heading given to pilot to provide navigational guidance by radar
31	VHF (Very High Frequency)	very high frequency of radio transmission (30 to 300 MHz)
32	VOLMET (Volume Meteorological Information)	a worldwide network of radio stations that broadcast Terminal Aerodrome Forecast (TAF), Significant Meteorology (SIGMET) and weather reports on shortwave frequencies using automated voice transmissions

Table 5.6 – Glossary of Terms with Parameter Concept

(7) *Unit of Service*: every single item is a set name or code for several support
service provided in order to smooth the flight activities as well as to primarily solve
any kinds of problems concerned.

No.	Lexical Item	Definition
1	ACC (Area Control Centre)	an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight
2	Approach	1) a call sign for Approach control service which is an air traffic control service for arriving or departing controlled flights 2) a path towards the final stage of flight when the aircraft is maneuvered into position, relative to the landing area, in preparation for landing
3	Apron	a call sign for Apron control which is the control service for any aircraft circulating on the airport ramp or apron to provide advisory and flight information service as well as allocate the parking stand to arriving aircraft and deliver the ATC clearance to aircraft departing from the stand. Apron control also acts as the link between the aircraft flight crews and the airport in general. Most aircraft requests for airfield or general services are in fact routed through the Apron control who then liaise with the relevant service providers
4	Arrival	a call sign for Approach control radar arrivals which is a function of an approach control facility providing air traffic control service to direct several lines of descending aircraft into one smooth flowing line of aircraft as their courses take them closer to the destination airport
5	ATC (Air Traffic Control)	a service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic
6	ATIS (Automatic Terminal Information Service)	the continuous broadcast of recorded non-control information (Voice-ATIS) or send digital information to an aircraft when it is too far to make voice radio communication (D-ATIS), containing essential information, such as weather information, which runways are active, available approaches, and any other information required by the pilots
7	ATS (Air Traffic Service)	a generic term for stating services providing such as FIS, alerting service, air traffic control service (area control service, approach control service or aerodrome control service)
8	call sign	a name of an aeronautical station or an aircraft used during radio transmission to identify the interlocutors
9	Control	a call sign for Area control service which is an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight
10	data link	the means of connecting one location to another for the purpose of transmitting and receiving digital information, used to send information between aircraft and air traffic controllers when an aircraft is too far from the ATC to make voice radio communication and radar observations possible. Such systems are used for aircraft crossing the Atlantic and Pacific oceans.
11	Departure	1) a call sign for Approach control radar departures which is a function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft 2) an exact place of departure for an aircraft marked on the chart 3) to leave, a plane leaving a specific place at a particular time
12	FIC (Flight Information Centre)	a unit established to provide Flight Information Service and Alerting Service
13	FIR (Flight Information Region)	an airspace of defined dimensions within which Flight Information Service and Alerting Service are provided

No.	Lexical Item	Definition
14	FIS (Flight Information Service)	a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights
15	Ground	a call sign for Surface movement control which is the air traffic control service to control aircraft and vehicles in controlled areas (typically including taxiways and parking areas, but excluding runways) on the ground at an airport
16	H24	continuous day and night service
17	NDB (Non-Directional Radio Beacon)	an L/MF or UHF radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his/her bearing to or from the radio beacon and 'home' on or track to or from the station
18	Precision	a call sign for Precision approach radar which is a unit of control service that equipped with primary radar equipment used to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown
19	Radio	1) a call sign for Aeronautical station which is a land station in the aeronautical mobile service to transmit radio beacon to provide position-indication to the aircraft 2) a piece of equipment for air-ground communication or sending and receiving radio signals
20	Station	1) a particular assigned location to perform different aviated-activity 2) a generic call sign of any aircraft operating within the control area
21	Station calling	a generic call sign of any aircraft contacting an air traffic controller during particular moment, used when a controller cannot identify that particular aircraft
22	Tower	a call sign for Aerodrome control service is a terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area or air traffic control service for aerodrome traffic

Table 5.7 – Glossary of Terms with Unit of Service Concept

(8) *Status*: the condition in which the flight has experienced or involved both in regular and irregular situation is the basic denotation of the members.

No.	Lexical Item	Definition
1	alert	a warning of danger or of a problem or a notification to a position that there is an aircraft-to-aircraft or aircraft-to-airspace conflict or any condition that might harm the flight profile or an aircraft
2	braking action	a report of conditions on the airport movement area providing a pilot with a degree/quality of braking that he/she might expect. Braking action is reported in terms of good, fair, poor, or nil
3	blind transmission	a transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the call station is able to receive the transmission
4	cleaned	a condition of an aircraft that allows an uninterrupted flow over surfaces, without protrusions such as racks or landing gear
5	closing	a progressive act of making the distance between an aircraft and a particular point of final approach track smaller
6	decompression	the restoration to atmospheric pressure condition of someone or something which has spent time under higher pressure, related significant deviations from nominal flight
7	delay	a situation in which something especially a stage of flight operations happens later or more slowly than you expected or behind schedule
8	discretion	according to what the pilot wishes to perform that particular flight activity
9	distress	a situation in which an aircraft is in great danger and likely to sink or crash
10	in progress	happening or being done at the time of talk or at this time
11	in sight	an area or distance within which somebody can see or something can be seen
12	out of service	not working or functioning properly
13	parallel	an aircraft performing a certain activity in the same distance apart at every point along the whole length, but in the same direction of the path
14	unreadable	unable to get the information or hear a radio transmission
15	urgency	a condition concerning the safety of an aircraft or other vehicle, or of person on board or in sight, but which does not require immediate assistance

Table 5.8 – Glossary of Terms with Status Concept

(9) *Process*: the main semantic property of the members is associated to the series of actions which are strictly done in confined sequences; mostly the process is conformed with reference to the regulated manual.

No.	Lexical Item	Definition
1	altimeter setting	an adjustment of the barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92)
2	broadcast	a transmission of information relating to air navigation that is not addressed to a specific station or stations
3	departure	1) a call sign for Approach control radar departures which is a function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft 2) an exact place of departure for an aircraft marked on the chart 3) to leave, a plane leaving a specific place at a particular time 4) relevant to a plane leaving a specific place at a particular time
4	descent	a planned loss of altitude, usually in a planned maneuver or to come/go down from a higher to a lower level as an essential component of an approach to land an aircraft
5	fuel dumping	the flight operation to jettison an amount of fuel to reduce aircraft's weight in order to perform irregular landing
6	holding procedure	a predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or a specified point while awaiting further clearance from air traffic control
7	IFR (Instrument Flight Rules)	rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan
8	low approach	an approach over an airport or runway following an instrument approach or a VFR approach including the go-around maneuver where the pilot intentionally does not make contact with the runway
9	missed approach	1) a maneuver conducted by a pilot when an instrument approach cannot be completed to a landing 2) a term used by the pilot to inform ATC that he/she is executing the missed approach
10	navigation	planning, controlling and recording the direction of an aircraft
11	operating	an act of using or controlling a piece of equipment
12	precision (radar) approach	a standard instrument approach procedure in which an electronic glide slope or glide path is provided; with the use of radar equipment to conduct an approach wherein the controller issues guidance instructions to the pilot based on the aircraft's position in relation to the final approach course, the glide path, and the distance from the touchdown point on the runway as displayed on the radar scope
13	priority landing	the right of a vehicle to go before other traffic at the landing phase which is to set an aircraft onto the ground mostly in case of emergency situation
14	radar identification	a process of ascertaining that an observed radar target is the radar return from a particular aircraft or a process of correlating a particular radar blip or radar position symbol with a specific aircraft
15	radar approach	an approach, executed by an aircraft, under the direction of a radar controller
16	radar vectoring	a provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar
17	recycling	a process of using/doing something again or resetting
18	separation	the spacing of aircraft to achieve their safe and orderly movement in flight, levels or tracks and while landing and taking off
19	sequencing	an arrangement of an aircraft pattern to be in order during the landing phase
20	spacing	an act of arranging things so that they have regular spaces between them

No.	Lexical Item	Definition
21	touch and go	an operation by an aircraft that lands and departs on a runway without completely stopping or exiting the runway for practicing landing and take-off patterns
22	VFR (Visual Flight Rules)	rules that govern the procedures for conducting flight under visual conditions. It is used by pilots and controllers to indicate type of flight plan
23	visual approach	an approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain

Table 5.9 – Glossary of Terms with Process Concept

(10) *Flight Performance*: all the terms refer to the specific act performing by the aircraft in several flight profiles. It demonstrates the possible efficiency which one aircraft has to be able to do.

No.	Lexical Item	Definition
1	abeam	to beam a fix, point, or object when that fix, point, or object of an aircraft which is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point
2	airborne	a condition that an aircraft is lifted and kept in the air by aerodynamic forces
3	air-taxi	to control a helicopter to move along the ground under its own power before take-off or after landing or used to describe a helicopter/VTOL aircraft movement conducted above the surface but normally not above 100 feet above ground level
4	backtrack	to go back in the direction from which you have come
5	climb	1) to increase aircraft's altitude by the use of power 2) an act of increasing aircraft's altitude of an aircraft by the use of power
6	commence	to begin/start
7	descend	to lose altitude, usually in a planned maneuver or to come/go down from a higher to a lower level at the approach phase
8	direct	1) to guide or control the movement of an aircraft 2) to go straight to a particular direction
9	disconnect	a condition that a part of equipment is separate from its host
10	extend	to continue for a particular distance or direction
11	fly	to cause an aircraft to move through the air in a controlled manner
12	go around	to climb into the circuit and maneuver into position for a new approach and landing
13	hold	to keep an aircraft in a particular position on the ground or in the air while waiting for further clearance from air traffic control
14	intercept	to stop, deflect, divert or interrupt the intended path or signal of something, mostly the glide slope/path on a precision approach
15	land	to set an aircraft onto the ground or another surface such as ice or water, after a flight
16	leave	to go away from a place or a position
17	line up	to move an aircraft into a position ready for departure
18	low pass	the act of moving past lower than usual over the aerodrome or control tower
19	omit	to leave out a particular point or position on flight path
20	orbit	1) to move around in circle 2) a move in circle
21	proceed	to continue doing something especially the usual or correct way
22	push-back	an airport procedure during which an aircraft is pushed backwards away from an airport gate by external power. Pushbacks are carried out by special, low-profile vehicles called pushback tractors or tugs
23	remain	to stay in a particular place or position and not leave it
24	reset	to set a specific radio frequency, code or number again
25	return	to come/go back from one place to another
26	squawk	1) to activate specific codes/modes/functions on an aircraft transponder 2) an aircraft transponder code for an aircraft identification
27	start-up	1) to perform the procedure of commencing the engines 2) a procedure to start the aircraft engines
28	take off	1) to leave the ground 2) a procedure when an aircraft leaves the ground
29	taxi	1) to move an aircraft along the ground under its own power before take-off or after landing 2) an act of moving an aircraft along the ground under its own power before take-off or after landing
30	vacate	to leave a position so that it is available for other aircraft

Table 5.10 – Glossary of Terms with Flight Performance Concept

(11) *Communication Expression*: the terms are particularly correlated to the expressions used to effectively indicate, instruct, inform and command upon specific flight activities. As numbers of members of this concept are large the table of glossary is divided into 2 portions as follows:

No.	Lexical Item	Definition
1	acknowledge	to let me know that you have received and understood this message
2	affirm	an expression to confirm the information, only used by a pilot or 'yes'
3	approved	the state that a particular action is officially granted
4	break	an expression indicates the end of the message, and the beginning of another or 'I hereby indicate the separation between portions of the message'
5	break break	an expression indicates the end of the message to one aircraft, and the beginning of another message to another aircraft or 'I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment'
6	call	1) to initiate voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call 2) an initial voice contact between a facility and an aircraft
7	cancel	to annul the previously transmitted clearance
8	check	1) to examine something in order to find out whether it is as it should be 2) an examination of a system or procedure in order to find out whether it is functioning as the way it should be
9	clear of traffic	an expression used by air traffic controllers to inform that there is nothing on the passage way that blocks or gets in the way
10	clearance	1) an authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace 2) disappearance of something unwanted, clean/safe environment
11	cleared	to give or obtain an official permission for something to happen or 'I give permission for you to proceed under the conditions stated'
12	completed	a particular flight procedure or activity is thoroughly done
13	confirm	an expression used by both to state inquiry act or 'Have I correctly received the following…?' or 'Did you correctly receive this message?'
14	contact	1) an expression used by an air traffic controller to instruct a pilot to establish radio communication with (followed by the name of the facility and, if appropriate, the frequency to be used) 2) being in communication with
15	correct	an expression indicates that the message repeated is accurate
16	correction	an error has been made in this transmission (or message indicated)
17	disregard	to pay no attention to that previous transmission
18	established	1) an expression used by pilots as a information to confirm as stable in a particular flight condition is contained, such as a flight level or glide slope, etc 2) an expression used by an air traffic controller as a request to request a confirmation when a particular flight status id contained
19	expedite	an expression used by ATC when prompt compliance is required to avoid the development of an imminent situation. Expedite climb/descent normally indicates to a pilot that the approximate best rate of climb/descent should be used without requiring an exceptional change in aircraft handling characteristics.
20	go ahead	to give a permission to deliver the message or 'proceed with your message'
21	heavy	a specific terminology for describing the aircraft which has got massive weight, usually followed the aircraft configuration in a call sign
22	hold short	an instruction for an aircraft to stop before the CAT I/II/III signs/making at the holding point that an aircraft must not pass the line

No.	Lexical Item	Definition
23	how do you read	an expression used by air traffic controllers to ask for an estimation of the quality of the transmission on a scale of 1 (unreadable) to 5 (perfectly readable)
24	I say again	an expression indicating 'I repeat to make the message clearer or to emphasize on the message'
25	ident	a request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft
26	line up and wait	an instruction for an aircraft to enter the runway intended for take off and wait for a takeoff clearance
27	looking out	an expression used by pilots to comply with a warning of traffic in vicinity as an act of alerting for the traffic
28	maintain	an instruction to continue in accordance with the conditions specified such as altitude and flight level or in its literal sense
29	Mayday	the international radiotelephony distress signal. When repeated three times, it indicates imminent and grave danger and that immediate assistance is requested
30	monitor	1) an expression used by an air traffic controller to ask a pilot to listen to radio broadcast in order to find out information that might be useful 2) an expression used by pilots to watch and check something over a period of time in order to see how it develops, so that any change can be made
31	negative	1) no 2) permission is not granted 3) that is not correct
32	OK	a condition that something is functioning properly
33	Pan Pan	an urgency signal when the aircraft is in danger or there is an important message to pass on/report mostly concerning the safety in flight operation
34	radar control terminated	an expression used by ATC to inform a pilot that he/she will no longer be provided any of the services that could be received while in radar contact
35	read	to hear / understand somebody speaking on a radio set
36	readback	an expression used by an air traffic controller to ask a pilot to repeat all of the message exactly as received
37	recleared	a change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof
38	report	to give information about something that exists or has happened or 'pass me the following information'
39	request	to ask for something or to ask someone to do something in a polite and formal way, 'I should like to know…' or 'I wish to obtain…'
40	resume	an expression used by an air traffic controller to start something again after stopping temporarily
41	resume own navigation	to advise a pilot to resume his/her own navigational responsibility. It is issued by an air traffic controller after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored
42	roger	a procedural phraseology meaning 'I have received all of your last transmission'
43	runway vacated	an expression used by pilots when requested to be cleared of the runway to report only when the entire aircraft is beyond the relevant runway-holding position
44	say again	repeat all, or the following part, or your last transmission
45	speak slower	an expression used to ask the participant to reduce rate of speech
46	standby	1) to indicated that the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority 2) to wait as in 'stand by for clearance'
47	traffic in sight	an expression used by pilots to inform a controller that previously issued traffic is in sight
48	unable	to indicate inability to comply with a specific instruction, request, or clearance or 'I cannot comply with your request, instruction or clearance'

No.	Lexical Item	Definition
49	verify	to check and confirm with me
50	wilco (will comply)	an expression indicating 'I understand your message and will comply with it'
51	word twice	1) an expression as a request when communication is difficult or 'Please send every word or group of words twice' 2) an expression as information when communication is difficult; every word or group of words in this message will be sent twice

Table 5.11 – Glossary of Terms with Communication Expression Concept

As demonstrated, lexical terms of radiotelephony are involved in the stances generally concerning the flight information, instrument, movement, action and service station because they all are essential in accomplish the objective of airline industry that is 'efficiency and safety'.

Among 11 conceptual groups, *communication expression* does conclude the most numbers of technical terms, 52 items. It can be implied that this sublanguage is deemed to emphasize on creating particular items to express actions or situations possibly occurring in flight profiles as well as to avoid any linguistic difficulty that might happen between the interlocutors because of language barrier.

The items listed in the glossary are designated with a certain description to achieve in conveying explicit information, status and procedure with less use of numbers of items as possible since air-ground communication is confined with the limitation of time, a transmitting device and the nature of the aviated activity as mentioned in chapter 4.

All in all, it is true that the language as radiotelephony have a higher average word length than general language as claimed by Sager et al (1980) since the majority of the terms are multi-unit words while shorter words are the most frequently in regular English. Furthermore, the lexical terms accumulated and classified are obviously based on the items already existed in its corresponding natural English language; some of them have got the same alphabetical appearances with different semantic properties whereas some have gone through the strategies of creating new words or what we call 'word-formation' which is discussed in the next section of lexicon analysis.

5.2.2 *Word-formation applied in crating lexical terms of radiotelephony*

To reveal more of a unique character at lexicon level, their designations through varieties of modification processes of existing resources by means of word-formations are described. The formations stated in the study are already integrated and defined from several concepts and theories to be suitable for directly applying in the analysis. According to the finding, four types of word-formations are mainly found which are *compouding, affixation, shift* and *shortening* (their detailed definitions are already discussed in chapter 2) along with additional formation, *others*. In accord with

the data, there are a group of lexical items which cannot be classified in any of four designated word-formations. Therefore, the category, *others*, is initiated in order to define these words.

To explicitly demonstrate the word-formation applied in creating lexical terms in radiotelephony; the proportions of word-formation types found are separately illustrated with reference to the frequency count in the chart below;
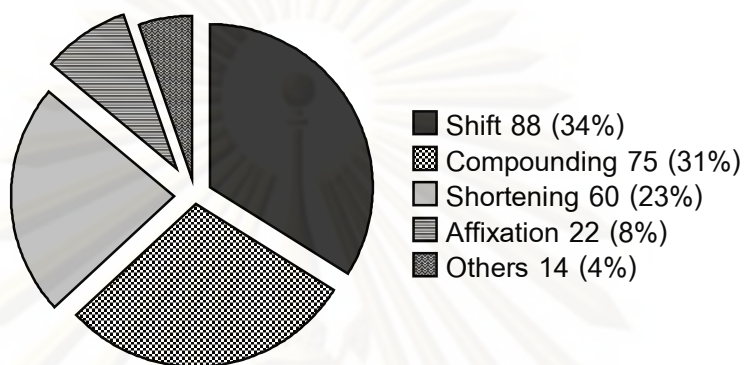
Figure 5.2 - Word-formation Types of Lexical Items in Radiotelephony

Referring to the diagram, out of 259 tokens, 75 tokens are built with the formation of compounding, 22 tokens with affixation, 88 tokens with shift, 60 tokens with shortening and 14 tokens with other formations. The discussion upon each formation is elaborately delivered in accordance with the frequency count.

5.2.2.1 *Compounding*: it is the process of constructing words by combining words or word elements. The finding does confirm that *compounding* is common not only to general language but also to the sublanguage as radiotelephony to create items in order to be fit into the specific need in aviation communication classified in several conceptual groups of terms introduced earlier. The vast majority of terms are formed by linking one or more items to the nucleus, usually at the last element. The nucleus mostly in other sublanguage indicates the category to which the concept belongs (Sager et al, 1990: 268), but the nucleus of the compounds in radiotelephony does not always apparently determine the concept they belong to such as windshear, backtrack, word twice, long final, data link, wind calm, etc. These compounds need to be interpreted with reference to aviation knowledge to realize their focal semantic features and to put them in the category they belong.

Numbers of compounding elements are up to three units which rarely occur in its corresponding language. However, the compound element is commonly designated in two elements as shown in the table below;

2 elements		3 elements
aerodrome traffic	low altitude	aerodrome traffic circuit
air traffic	low approach	automatic dependant surveillance
airborne	maneuvering area	clear of traffic
aircraft	Mayday	controlled airspace
airspace	missed approach	flight planned route
air-taxi	movement area	fuel dumping track
airway	outer marker	out of service
altimeter setting	Pan Pan	precision radar approach
approach speed	priority landing	radar control terminated
backtrack	push-back	rate of descent
blind transmission	radar approach	surveillance radar approach
brake brake	radar control	TCAS resolution advisory
call sign	radar cover	
centre line	radar identification	
clean speed	radar vectoring	
dewpoint	read back	
fade area	reporting point	
flight level	runway vacated	
flight path	say again	
flight plan	speak slower	
fuel dumping	straight-in approach	
gateway	take-off	
glide path	taxiway	
go ahead	touchdown	
hold short	transition level	
holding fix	visual approach	
holding point	wake turbulence	
holding procedure	wind calm	
in progress	windshear	
in sight	word twice	
long final		

Table 5.12 – Table of Compounding Items in Radiotelephony

(1) *2-element compounds* are quite varied because of the elements combining to form an item. Most of them are obviously compounded with words that indicate most of semantic nature of prototypical noun class, naming a person, place, thing, quality, or action, in canonical English language, for instance, *movement area, flight level, transition level, approach speed, flight plan, radar approach, gateway*, etc. The nucleus of the compounds is the second element. Some of the elements have gone through the process of affixation before being attached to another element such as radar *vectoring* and runway *vacated*. The affixation {–ing} is the mechanism to converse verb to noun whereas {–ed} is to converse verb to adjective or as a past participle of passive construction in canonical English language. In this case, both affixations are meant to form so-called prototypical noun class according to their

defined semantic properties detailed in glossary tables. Nonetheless, suffix {–ed} and {-ing} will be focused in the discussion on morphological analysis later on.

Besides the compounding between so-called prototypical noun-class words, there are a small numbers of 2-element compound members that are composed of the particle indicating a relation between things mentioned or adposition in canonical English language. The positions of the particles in compounds are either in front of the nucleus, *in sight* (area or things which a person can visualize within the certain distance) and *in progress* (something happening or being done at the time of talk or at this time) or at the back of the nucleus; *push-back, take off, go ahead, touchdown, straight-in*, etc.

Another compounding to be discussed here is double compound which the compound is created by combining the same words; *Pan Pan* (the urgency signal when the aircraft is in danger or there is an important message to pass on/report mostly concerning the safety in flight operation) and *break break* (I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment). This particular compound is hardly found in its corresponding language.

As we shall see, 2-element compounding formation in radiotelephony is generally reserved the traditional characteristics of compounding technique as in the corresponding canonical English language, though there are some distinctive characters of compounding in the finding, fronting particle compound and double compound.

(2) *3-element compounds* are fewer numbers than 2-element compounds. The specialty of these compounds is that some of them are not just specialized terms denoting a particular object, or a part of operation but the entire instruction or process of an operation such as *out of service* (not working or functioning properly), *rate of descent* (a measurement of speed used in lowering an aircraft mostly at the approach phase) and *radar control terminated* (any of the services that could be received while in radar contact provided used by an air traffic controller is no longer available). The way these specialized terms compounded is quite extraordinary since it is almost like a common phrase in canonical English language. Even so, in radiotelephony, they are all designated as multi-word terms as they are always collocated in the data and officially issued to be used by either a pilot or an air traffic controller.

The rest of 3-element compounds are literally the same in the composition of the compound as 2-element compounds discussed earlier which generally refer to system or equipment such as *precision radar approach* (a standard instrument approach procedure), *aerodrome traffic circuit* (a specific path to be flown by an aircraft operating in the vicinity of an aerodrome), etc. But, one, *TCAS resolution advisory*, which is slightly different in the process as an element of the term is through the formations of both compounding and shortening. *TCAS* stands for *Traffic*

Collision Avoidance System as 4-element compound, and then first few letters of each remain are used as acronym. After that *TCAS* as one lexical term is compounded with other items to form another new specialized term. The complexity of the process is rather rare in Standard English language.

The compound which essentially appears in radiotelephony is a call sign, a name of an aeronautical station or an aircraft using during radio transmission to identify the interlocutors. The aircraft call sign is categorized in four different types, general aircraft, commercial aircraft, military aircraft and priority handling aircraft.

a) *General aircraft*: these aircraft include private aircraft, or belonging to a large corporation. At first, the call sign is the entire registration code (e.g. N234S for an aircraft registered in the USA) for the first transmission. After a couple of transmissions, the last two or three characters can be used. Sometimes the call sign is the compound of aircraft's model followed by the last two or three characters of the registration code such as Private Cessna Citation, registration N1451W: 'November one four five one whisky' or 'Citation five one whisky'.

b) *Commercial aircraft*: the flight number is used as reference, preceded by what is called the airline's call sign, and followed by the word 'heavy' if it is an aircraft capable of generating a large amount of wake turbulence or has got massive weight. Once the identification is done, after a couple of transmissions, the word 'heavy' can be left out, and for expedited communications, the airline's call sign can be omitted such as Air Canada flight ACA870, an Airbus A330: 'Air Canada eight seven zero heavy'

c) *Military aircraft*: among the most important military call signs, there is of course 'Air Force One', which identifies any aircraft carrying the President of the United States. In the case of a helicopter, it becomes 'Marine One'. The pattern is similar for other types of transports. 'One' will be replaced by 'Two' when the aircraft is carrying the Vice President; 'Air Force Two', 'Marine Two', etc. In the case of members of the President or Vice President's family, the call signs used are 'Executive One Foxtrot' or 'Executive Two Foxtrot'. In many countries, military aircraft use 'tactical call sign' depending on the mission, followed by a series of numbers such as Liberty 24, Voter 51, Kasey 15, Top Gun 71, Jolly 31, Navy Rescue 18.

d) *Priority handling aircraft*: the usage of the item *Lifeguard* indicates a priority status of the aircraft in what could be called a life-or-death situation, i.e. transportation of time-sensitive cargo (such as organs for transplants) or medical emergencies. For example, 'Lifeguard TWA 800 heavy'.

Similarly, aeronautical station is created by its location and task-oriented; for instance New York Approach is one of the aeronautical service units, 'Approach Control'. The call sign will start with the location of the unit; in this case, the unit is in New York, followed by a type of service unit. It, then, become New York Approach. As mentioned, 'Approach' is a reduced form of the compound, 'Approach Control' which is designated in the manual for every airman to comply.

Compounding is the second most frequent word-formation found in the data. It can be implied that to create lexical terms in radiotelephony, it generally relies on compounding existing items of its corresponding English language. The complex texture of compounding elaborately displays the characteristic of lexicon in radiotelephony since they all indicate complication objects, procedures, systems or else concerning perplexing profiles of aviation activities.

5.2.2.2 *Affixation* is the process of forming new words by adding prefixes or suffixes to the root. According to Sager et al (1990), there is no affixation-rule difference for the sublanguage and its corresponding English language. Referring to Sager et al (1990), certain affixes are used with limited meanings or functions in sublanguages, but the rules to apply them are identical for the sublanguage and its corresponding natural language. There are only 22 affixed lexical terms in radiotelephony in the data as the following;

Affixation		
-ing	-ed	Others
closing	cleaned	altimeter
heading	cleared	localizer
looking out	completed	transponder
operating	displaced	overcast
recycling	established	midpoint
sequencing	recleared	breaks
spacing	vacated	intentions
		vectors

Table 5.13– Table of Affixed Items in Radiotelephony

Almost all of the affixes used in the process are suffixes; -ing, -ed, -s and –er. Only few terms are prefixed with re-, trans-, over- and mid-. Most of the new items are attached by –ing in order to state the description of process, parameter and special equipment in the aviation field, and –ed to illustrate communicational expressions or conditions of particular procedure and flight performance.

Most terms built by adding –ing and –ed out of their base forms in canonical English lexicon appear in the data as such since there is no base form directly borrowed and used as a terms in radiotelephony. Only one token with the existent of its base form as in generic item is *clear* (there is nothing on the passage that blocks or gets in the way – *clear of traffic*). As it is very common to this language in avoiding polysemy or any types of words which may lead to ambiguity in communication, it

can be hypothesized at this point that –ed added to clear is to create the different items denoting 'to give or obtain an official permission for something to happen'.

The rest of affixes introduced extra meaning to the stem such as –meter (for metric scale measurement), -er (for creating a name of aircraft equipment), over- (for indicating that the condition is more than usual), trans- (for demonstrating the condition of crossing), re- (for showing that the reference is restored to original condition) and mid- (for pointing out that the reference is in the middle).

One suffix which is rather difficult to define is –s. Commonly, in natural language, -s represents plurality of the base form it is attached. But, *vector*, in accordance with the regular English dictionary, is a course taken by an aircraft. However, when –s is added, its property becomes 'a heading given to a pilot to provide navigational guidance by radar' as well as *intentions* (what you intend or plan to do) turns to 'what a pilot plan to do in order to solve any difficulty occurred during flight'. For an unknown reason, suffix –s is added to the origins to crate these new terms without indicating plurality or else.

It is noted that these affixes are permanently bounded to the stems as new lexical items with confined connotation. *Brakes* (a device used for preventing the aircraft from moving after it has come to a stop) is another new term built by adding –s in order to avoid the occurrence of polysemy since *break* without suffix –s, in radiotelephony, is also redefined to denote different reference, 'I hereby indicate the separation between portions of the message'.

5.2.2.3 <u>*Shift*</u> is the process by which a word changes either its *prime semantic properties* (broadening, narrowing or redefining) or its form-class to become a new lexical item, without adding any affix. Referring to the data, this word-formation process is the most applied to build new lexical terms in radiotelephony, 88 tokens from 259 tokens.

It is to make use of existing designated items in its corresponding English language with the mean of developing special reference and concept. The new definition usually entails reducing the extension of that particular general English word. The table below demonstrates items which are through the process of broadening, narrowing, redefining or form-class converting.

Semantic Shift					Functional Shift
Narrowing			Broadening	Redefining	
acknowledge	discretion	omit	check	abeam	departure
aerodrome	disregard	orbit	monitor	frequency	
affirm	distress	pattern	negative	downwind	
alert	en route	radial	radio	go around	
alternatives	engine	read	taxi	ground	
brake	estimate	remain		heavy	
broadcast	expedite	report		lighting	
call	extend	request		lifeguard	
cancel	field	reset		minima	
check	final	resume		offset	
circuit	flight	separation		marker	
climb	fly	set		ramp	
confirm	gear	speed		roger	
contact	heavy	start-up		squawk	
correct	hold	station		stand	
correction	intercept	terrain		standby	
course	land	threshold		tower	
decompression	leave	track		unreadable	
delay	line up	unable			
descend	maintain	urgency			
descent	moderate	vacate			
direct	navigation	vicinity			
disconnect	OK	visibility			

Table 5.14 – Table of Shifted Items in Radiotelephony

5.2.2.3.1 *Semantic Shift*:

(1) Narrowing: the reference of general lexical items in natural English language encompass a certain narrowing to refer to specific discipline, process, operation, object in aviation field, but the prototypical semantic feature as well as its function are maintained. Most of them are processed to narrow down or eliminate some of the semantic properties in order to strictly denote only one specific concept directly related to aviation, since it is quite common for regular lexical items in English language to contain more than one reference. For examples, *course* commonly means 'a series of lesson or a direction or route followed by a ship or an aircraft'. But when it becomes aviation term, the meaning is reduced and framed to be more specific 'an intended direction of flight in the horizontal plane measured in degrees from the north', *threshold* (the point just before the new situation begins) becomes more rigid and specific in the meaning, 'a beginning of the part of the runway usable for landing', etc.

The process of narrowing is mostly used to confine the reference of lexical terms in radiotelephony. As the matter of fact, it is more like a natural process of bringing a general word with several denotations to utilize in a specific field of

profession in which the original semantic properties are squeezed and shaped to be more compatible with the context of communication.

(2) Broadening: some of them are modified to extend detail of a concept but still sustain prime semantic property such as *monitor* 'to watch and check something over a period of time in order to see how it develops, so that you can make any necessary changes'. In radiotelephony, the definition of monitor is enlarged to meet the activity of the interlocutors while performing assigned tasks; (1) used by an air traffic controller to ask a pilot to listen to radio broadcast in order to find out information that might be useful and (2) used by pilots to watch and check something over a period of time in order to see how it develops, so that any change can be made.

When the reference of lexeme is widened, it usually becomes polysemy even such as *radio* after modification, not only denotes *a piece of equipment* for air-ground communication or sending, but also a call sign for *an aeronautical station* which is a land station in the aeronautical mobile service to transmit radio beacon to provide position-indication to the aircraft (Table 5.16: 135). All of the lexical terms under the process of broadening are generally coined with two references.

(3) Redefining: another technique used to create new terms is to redefine the meaning which means the new connotation is completely different from the original one; for instance, *squawk* regularly denotes '(1) to make a loud sharp sound or (2) to speak or make a noise in a loud, sharp voice because you are angry, surprised, etc.' The word is redesignated to (1) to activate specific codes/modes/functions on an aircraft transponder or (2) an aircraft transponder code for an aircraft identification, *heavy* (a large strong man whose job is to protect a person or a place) becomes 'an aircraft capable of takeoff weights of more than 255,000 pounds whether or not they are operating at this weight during a particular phase of flight', *marker* (an object or a sign that shows the position of something) refers to 'an electronic navigation facility transmitting a 75 MHz vertical fan or bone-shaped radiation pattern indicating to a pilot, both aurally and visually when passing over the facility'.

However, most of the items classified under this subcategory of word-formation somehow maintain partial sense of the origin with some modification of the meaning to be more specific and fit to the reference in the aviation field such as *abeam* (a fix, point, or object when that fix, point, or object is approximately 90 degrees to the right or left of the aircraft track) which some of its original reference (in a line at right angles to the ship's length) is redefined to cover the possibility of aircraft movement.

5.2.2.3.2 *Functional Shift*: it allows the items to fulfill different grammatical functions by extending its form-class which automatically cause the item to hold poly-function nature of possessing more than one definition without changing its form. Functional shift is most common from verb to noun and vice versa in regular English lexeme. According to the data, the only token is discovered. The term *departure*

which is solely categorized as a noun in its corresponding English language, denoting an exact *place of departing* for an aircraft marked on the chart as well as *a call sign for approach control radar departure*, is also conversed to be what we called a verb in canonical English language to describe or indicate *to leave a specific place or position at a particular time* such as 'Fastair345 *departure* runway 32'. Therefore, this possibility considerably increases the range of designation since it can co-exist with grammatical or semantic derivation.

5.2.2.4 *Shortening* is the process that the elements of lexical items are reduced or left out for economic reason to compress information both syntactically and lexically which can be done by one of these two formations: *acronym* or *initialism*, and *clipping*.

Referring to the data, the third word-formation frequently used is shortening; 60 tokens from 264 tokens as the following;

Acronym	Initialism		Clipping	2-formation Combining
ATIS	ACC	HF	approach*	TACAN
CAVOK	ADF	IFR	apron*	VORTAC
LORAN	AGL	ILS	arrival*	
NOTAM	AMSL	IMC	control*	
PAPI	ATC	INS	departure*	
SID	ATS	MET	precision*	
STAR	CTR	NDB	base	
TCAS	DME	QDM	clearance	
VASIS	ETA	QNH	downwind	
	ETD	RVR	ident	
	FAF	UHF	traffic	
	FIC	VFR	H24	
	FIR	VHF	NAVAID	
	FIS	VMC	RNAV	
	GCA	VOR	SELCAL	
			SIGMET	
			SNOWTAM	
			VOLMET	
			wilco	

* call signs of aeronautical stations using during radio transmission of air-ground communication

Table 5.15 – Table of Shortening Items in Radiotelephony

5.2.2.4.1 *Acronym* / *Initialism* is to shorten the item to such an extent that only initials or first few letters of each remain in order to compress the words in to one short form. The difference between acronym and initialism is how the end product is pronounced. An acronym is pronounced as if it is a single lexeme whereas an initialism is sounded as the letters in sequence.

All of 39 tokens are firstly through the process of compounding before the elements are clipped into series of letters, ranged from 3 to 5 alphabet letters and commonly designate equipment, system and process; for instance, ILS (Instrument

Landing System), ATC (air traffic control), VFR (Visual Flight Rules), ACC (Area Control Center), PAPI (Precision Approach Path Indicator), FAF (Final Approach Fix), NOTAM (Notice To Airmen), etc. Out of 36 tokens only 8 items are acronyms which are VA-SIS, T-CAS, PA-PI, SID, A-TIS, NO-TAM, LO-RAN and STAR while the rest are initialism. The shortening does not only occur at lexical level but also at sentence level such as CAVOK, initialized from 'cloud and visibility is OK'.

5.2.2.4.2 *Clipping* is the process of cutting down a multi-syllabic lexeme, an initial, middle or final element. Six asterisk lexical terms refer to call signs of aeronautical stations used during radio transmission of air-ground communication. These stations are to offer assistance and systematically manage aviated activities of each operative aircraft; apron (apron control), approach (approach control), departure (approach control radar departure), control (area control service), precision (precision approach radar), and arrival (approach control radar arrival). However, when the terms are shortened by removing at least one element, some of them possibly become homonym of other existing items which instantly turns the items to perceive more than one reference; such as *apron* as well cites a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading, *departure* refers to an exact place of departure for an aircraft marked on the chart, *approach* denotes a path towards the final stage of flight when the aircraft is maneuvered into position, relative to the landing area, in preparation for landing, etc.

Other items such as clearance (air traffic control clearance), base (base leg), downwind (downwind leg), traffic (air traffic) and ident (identification), either initial or final elements are cropped with restricted single definition. There is also a group of clipping items that rear part of each element and final elements are trimmed, the remains are compounded as one lexical term; for examples, SIGMET (significant meteorology), SELCAL (selective-calling radio system), VOLMET (volume meteorological information), RNAV (area navigation) or only particular parts of the element are crossed out; wilco (will comply), SNOWTAM (snow to airmen), H24 (24-hour service) and NAVAID (navigation aid).

5.2.2.4.3 *Double shortening*: only two tokens are the product of more than one word-formation process such as TACAN (tactical air navigation) is created by using the format of clipping with 'tactical' and of initialism with 'air navigation', and VORTAC (VHF omni-directional radio range (VOR) and UHF tactical air navigation) which applies double shortening formations, initialism and clipping)

As air-ground communication context requires a rapid exchange of information, this particular word-formation is pretty common in creating terms in radiotelephony in order to conduct short and precise conversation. Though, the process is relatively new in natural English language and generally reserved in the casual mode of expression (Sager et al, 1990).

5.2.2.5 *Others*: the 14 tokens left are unable to classify in any of the three word-formations stated above. 6 out of 14 lexical items serves more than one subfield which are *return*, *commence*, *proceed*, *verify, altitude* and *decimal*. Some of them are directly borrowed from canonical English lexical items without any specific change of the prime semantic properties. Even though it is framed that any common generic words which are usually applied in regular corresponding English language without certain aviation-related properties are excluded from the lexical term list, *return*, *commence*, *proceed*, and *verify* are commonly used in the communication to indicate specific activity in each flight profile. All of them reserves basic functional features as to describing an action in canonical lexicon. The rest of them are precisely acquired from other fields such as *altitude* (geographical term) and *decimal* (mathematical term) with unchanged semantic features.

Another 8 tokens are fixed expressions or phraseological units which are the combinations of lexical items repeatedly used among the participants and coined to be discrete multi-lexical terms. These particular items are through the process of *lexicalization* which an expression considered as phrases or clauses in regular English language are conceptualized into a single lexical unit denoting a particular reference in specific procedure, protocol and condition of flight profiles; *touch and go* (an operation by an aircraft that lands and departs on a runway without completely stopping or exiting the runway for practicing landing and take-off patterns), *reading you three* (rather unclear radio transmission, you are readable but with difficulty)*, reading you five* (clearly radio transmission, I can hear you loud and clear)*, resume own navigation* (an advise for a pilot to resume his/her own navigational responsibility issued by an air traffic controller after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored), *I say again* (an expression displaying that the speaker repeats to make the message clearer or to emphasize on the message) *traffic in sight* (an expression used by pilots to inform a controller that previously issued traffic is in sight) and *line up and wait* (an instruction for an aircraft to enter the runway intended for take off and wait for a takeoff clearance.

Another item which is quite unique comparing to others is *how do you read* (an expression used by air traffic controllers to ask for an estimation of the quality of the transmission on a scale of 1 (unreadable) to 5 (perfectly readable)) with the full act of inquiry. This multi-word inquiry is as well officially issued in the manual of radiotelephony as a fixed communication expression to request for the condition of radio transmitting during a certain air-ground communication. The term cannot be considered as a regular interrogative as in canonical English language because the term is determined to be strictly collocated with a certain designated definition.

All of these lexicalized terms are under the category of communication expression. It can be implied that to avoid the risk of misunderstanding, it is necessary

for the participants to convey a complete message of specific procedures and protocols by using exact phrseological unit since the items through conventional compounding may not be clear enough. Also, it is to prevent the complicated application of long strings of lexical items which probably cause ambiguity. As a result, these set phrases are determined as a multi-lexical term designating a single aviated concept in radiotelephony.

Besides the findings discovered from the collected data, the spelling letters in radiotelephony is also interesting since the system is different from the way it is in its corresponding language. The first attempt of spelling letters in radiotelephony started in 1930 using of city names as the code;

A-Amsterdam	H-Hannover	O-Ontario	V-Victoria
B-Baltimore	l-ltalie	P-Portugal	W-Washington
C-Canada	J-Jerusalem	Q-Quebec	X-Xantippe
D-Denmark	K-Kimberley	R-Rivoli	Y-Yokohama
E-Eddiston	L-Liverpool	S-Santiago	Z-Zululand
F-Fransisco	M-Madegascar	T-Tokio	
G-Gibraltar	N-Neuchatel	U-Uruquay	

But some of the city names used is very difficult to pronounce by some nationalities, so there were minor changes in the Madrid Conference in 1932; K-Kimberley became Kilogram and Z- Zululand became Zurich. This system lasted until 1945. As the US Air Force had already made up their own code during the war, made of shorter words, more suitable for radiotelephony and military operation;

A-Affirm	G-George	M-Mike	S-Sail	Y-Yoke
B-Baker	H-Hypo	N-Negat	T-Tare	Z-Zed
C-Cast	I-Inter	O-Option	U-Unit	
D-Dog	J-Jig	P-Prep	V-Victor	
E-Easy	K-King	Q-Queen	W-William	
F-Fox	L-Love	R-Roger	X-X-Ray	

So, just before the end of the war in December 1944, the Americans decided to call-up an International Civil Aviation (ICAO) Conference in Chicago, in a move to impose their procedures to the rest of the world. In March 1947, the first ICAO alphabet spelling system was set up in 1947;

A-Abel	H-How	O-Oboe	V-Victor
B-Baker	I-Item	P-Peter	W-William
C-Charley	J-Jig	Q-Queen	X-X-Ray
D-Dog	K-King	R-Roger	Y-Yoke
E-Easy	L-Love	S-Sugar	Z-Zebra
F-Fox	M-Mike	T-Tare	
G-George	N-Nan	U-Uncle	

But some words were still very difficult to pronounce for some nationalities like O-Oboe and T-Tare, etc. and again in 1954, International Civil Aviation (ICAO) had decided to revise and came up with the alphabets commonly used today in air-ground communication, using generic English lexemes;

A-Alfa	H-Hotel	O-Oscar	V-Victor
B-Bravo	I-India	P-Papa	W-Whiskey
C-Charley	J-Juliet	Q-Quebec	X-X-Ray
D-Delta	K-Kilo	R-Romeo	Y-Yankee
E-Echo	L-Lima	S-Sierra	Z-Zulu
F-Foxtrot	M-Mike	T-Tango	
G-Golf	N-November	U-Uniform	

The spelling letters in radiotelephony is very essential in the communication especially when the interlocutors state the particular point or area such as taxiway, parking spot, etc. in the aerodrome as well as some of the aircraft call signs. These items are added in the lexical set of radiotelephony.

5.2.3 Denotation in Radiotelephony

Lexical terms in radiotelephony are commonly determined only one reference since the language is designed to use in specific kind of communication. Therefore, the terms coined and created are deemed to be simple in terms of its denotation to avoid complexity and ambiguity in the conversation. As well as that the same reference should not be designated in more than one lexical item to keep clear of diversity in choices in the language. As a result, one-on-one relationship between the item and its reference is the most preference in radiotelephony. Nonetheless, the occurrence of polysemy in the language through the process of word-formation is somewhat unpreventable.

The word-formations which commonly cause polysemy items containing more than one reference in radiotelephony are shift, either broadening and redefining, and shortening (clipping) are listed in the table below;

Lexical Term	Word-formation	Definition
approach	clipping	1) a call sign for Approach control service which is an air traffic control service for arriving or departing controlled flights 2) a path towards the final stage of flight when the aircraft is maneuvered into position, relative to the landing area, in preparation for landing
apron	clipping	1) a call sign for Apron control which is the control service for any aircraft circulating on the airport ramp or apron to provide advisory and flight information service as well as allocate the parking stand to arriving aircraft and deliver the ATC clearance to aircraft departing from the stand. Apron control also acts as the link between the aircraft flight crews and the airport in general. Most aircraft requests for airfield or general services are in fact routed through the Apron control who then liaise with the relevant service providers 2) a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, refueling, parking or maintenance but not being part of the maneuvering area

Lexical Term	Word-formation	Definition
arrival	clipping	1) a call sign for Approach control radar arrival which is a function of an approach control facility providing air traffic control service to direct several lines of descending aircraft into one smooth flowing line of aircraft as their courses take them closer to the destination airport 2) an exact place of arrival for an aircraft marked on the chart
check	broadening	1) to examine system or equipment in order to find out whether it is functioning properly 2) an examination of a system or procedure in order to find out whether it is functioning or be as the way it should be
clearance	clipping	1) an authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace 2) disappearance of something unwanted, clean/safe environment
control	clipping	1) a call sign for Area control service which is an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight 2) to make the instrument or system work as to correlation with the particular flight activity
departure	function shift clipping	1) a call sign for Approach control radar departure which is a function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft 2) an exact place of departure for an aircraft marked on the chart 3) to leave a specific place or position at a particular time
monitor	broadening	1) an expression used by an air traffic controller to ask a pilot to listen to radio broadcast in order to find out information that might be useful 2) an expression used by pilots to watch and check something over a period of time in order to see how it develops, so that any change can be made
negative	broadening	1) no 2) permission is not granted 3) that is not correct
radio	broadening	1) a call sign for Aeronautical station which is a land station in the aeronautical mobile service to transmit radio beacon to provide position-indication to the aircraft 2) a piece of equipment for air-ground communication or sending and receiving radio signals
squawk	redefining	1) to activate specific codes/modes/functions on an aircraft transponder 2) an aircraft transponder code for an aircraft identification
station	clipping	1) a call sign of any aircraft operating within the control area 2) a particular assigned location to perform different aviated-activity
taxi	broadening	1) to move an aircraft along the ground under its own power before take-off or after landing 2) an act of moving an aircraft along the ground under its own power before take-off or after landing

Table 5.16 – Table of Polysemy in Radiotelephony

Most of polysemy in radiotelephony is through the process of broadening and clipping which make the items denote more than one reference. One of the tokens is different from others, *departure*. This item firstly through the process of functional shift which produces an additional meaning to the item which is 'to leave a specific

place or position at a particular time' and then, when a call sign, approach control radar departure is clipped to 'departure'. The word automatically become a homonym which eventually leads to another meaning adding to *departure* which is 'a call sign for approach control radar departure which is a function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft'. As a result, *departure* is the item denoting three different references.

The rest of polysemy terms generally designate two references by the application of one word-formation except a specific response expression in radiotelephony, the original meaning of *negative* is broadened to finally contain three denotations; *no, permission is not granted* and *that is not correct*.

However, the possibility of confusing and ambiguity because of the use of these items might <u>not</u> be an issue since almost all of the terms tend to have rather confined context according to its function in the utterance to help the participant in the communication to determine the meaning such as *approach* as in 'Georgetown *Approach* Fastair 345 heavy flight level 80 estimating north cross 46 information Delta' and 'G-CD continue *approach* wind 270 degrees 7 knots'. It is quite clear that the first sample, approach refers to an aeronautical call sign whereas the second sample, it denotes a path towards the final stage of flight.

In conclusion, the lexical items in radiotelephony are still based on those in its corresponding English language, but through processes of diverse word-formations, numbers of aviated terms are created to express specific concepts in aviation field. Apparently, the creation of lexemes in radiotelephony heavily relies on four word-formations, *compounding*, *shift* and *shortening* accordingly as well as the process of lexicalization. To avoid ambiguity and complexity possibly occurred in air-ground communication which focally aims at rapid information transfer, most of the terms are restricted to single denotation and grammatical function even though there are still some containing more than one reference and function because of the shift and shortening process. Therefore, no existence of synonym as well as very few polysemy discovered in the reference data.

5.3 Syntax in Radiotelephony

To analyze syntactical features of radiotelephony, the study is divided in two parts; the first is to categorize lexical items in the reference data into proper form-classes and the second is to elaborately illustrate syntactical structures of actual radiotelephony. The description of criteria as well as the findings of each area of analysis is explicitly explained.

5.3.1 Form-class in Reference Radiotelephony

The third domain of analysis in the study is at syntactical level of radiotelephony. The *first part* of the analysis is to categorize lexical items into form-classes. The reference data from the manual of radiotelephony (2006) is examined to classify the accumulated tokens into specific classes. To categorize lexical items, the concept of test frame (Fries, 1952) under the basic assumption that all words that occupy the same *set of positions* in the patterns of the set test frame are in the same form-class is implemented. Four different test frames are built to effectively group numbers of items compiled from the data as follows:

(1) *Test Frame A*: Fastair345 (do) (not) report (again) (the) (new) low pass (unsafe)
(2) *Test Frame B*: Fastair345 go around
(3) *Test Frame C*: Fastair345 report radar failure and decompression
(4) *Test Frame D*: What is the delay?

Each particle of the test frame can be replaced by a group of lexical items which determines different syntactical and semantic roles in the language to classify in diverse form-classes; for example, any items in the data which can replace the position of 'low pass' is designated to belong in the same class whereas any item that can be in the place of 'report' is assigned to belong to another form-class. Therefore, the position of each group of lexical items is mainly the strategy to classify all the items into appropriate form-class.

Actually, the test frame A almost covers all possibilities but there are still some of the tokens which cannot be tested with the test frame A. Hence, the test frame B is designed to classified any item that can be replaced 'go around' whereas the test frame C is created to classify a group of items which can be substitute with 'and'. Also, the test frame D is built to group the items which can replace 'What'. It is noted that any particle in parenthesis are optional in syntactical structure of radiotelephony. Therefore, every slot in the test frame A will be used to categorized different form-class whereas test frame B, C and D are used to classify the items that can replace the underlined words; *go around, and* and *What* respectively.

However, as radiotelephony is the language that heavily relies on the situational context to interpret the message. Therefore, semantic roles of tokens in general when they are at specific position in the test frames are also brought into

consideration in order to effectively arrange them into form-class such as a group of items that can be in the position of 'unsafe', approved, expected, resumed, etc. as it is not common for a noun modifier to be posited after a noun, but when semantic roles of tokens according to the situational context is brought into the analysis e.g. *Fastair 345 start up approved, right hand pattern expected*, and *Fastair 345 flight level 310 resumed*. These items seem to also be in the place of 'report' after a noun-like item, but they all obtain the same semantic roles which to give additional information to the property of the item it is followed. Thus, they are considered to be in the same class as those items in the position of 'new' before 'low pass' which is the position of prototypical adjective in the natural English language.

The finding of reference form-classes in radiotelephony are categorized in 2 prime class-types with reference to the positions of lexical items in the test frames and their prime semantic roles; *C class-type* and *F class-type*. Next, each class-type and its subclasses is elaborately described and discussed to illustrate the distinctive syntactical characters of the language.

5.3.1.1 *C class-type* is a major group of free morphemes playing vital roles as the core of the language, expressing referential meaning related to things, actions, processes, operations, events and qualities while indicating focal grammatical properties. This class type is pretty much the same as any open classes in canonical English language which tends to possess a large amount of members. Generally, there are 4 open form-classes in natural English; noun, verb, adjective and adverb where as C class-type in radiotelephony can be divided in 5 different subclasses; C1, C2, C3, C4 and C5 in accordance with their certain positions in the test frames.

(1) *C1* is the largest, open lexical category in radiotelephony whose members can occur as the focal lexeme in the sentence. Any item that can be placed in the position of *Fastair345* and *low pass* in Test Frame A, are considered as a member of C1. C1 indicates most of semantic entities of prototypical noun class in canonical English; naming a person, place, thing, quality, or action, so does C1 in radiotelephony. There are certain members of C1 (C1a) that commonly appear at the *beginning of the utterance* (those replaced *Fastair345*) whereas the rest of the members (C1b) is general put at the position of *low pass* posited *after C2* (a form-class that describe or indicate a state of being). Even though the position of the members is *not* absolute as any regular noun in natural English, the Test Frame below is designed only to classify the members of C1 from any other classes.

Test Frame A: *Fastair345* report (again) (the) (new) *low pass* (unsafe)

Fastair345	report	again	the	new	*low pass*		unsafe
Alexander Radio					*action*	*east*	
All stations					*advised*	*engine*	
Approach					*aerodrome*	*established*	
Apron					*airborne*	*estimate*	
Arrival					*aircraft*	*extending*	
Control					*airspace*	*fade area*	
G-ABCD					*airway*	*field*	
G-CD					*alert*	*final*	
Georgetown					*alternatives*	*FIR*	
Ground					*altimeter*	*flight*	
Georgetown Ground					*altitude*	*flight level*	
Georgetown Departure					*approach speed*	*flight planned route*	
Radio					*apron*	*frequency*	
Station calling					*ATIS*	*fuel dumping*	
Stephenville Tower					*automatic dependent*	*fuel dumping track*	
You					*surveillance*	*gate*	
					base	*gateway*	
					boundary	*gear*	
					brakes	*glide path*	
					breaking action	*heading*	
					call sign	*holding*	
					centre-line	*holding point*	
					*check**	*ident*	
					circuit	*identification*	
					clean speed	*IFR*	
					clear of traffic	*ILS*	
					clearance	*indication*	
					closing	*information*	
					coming	*Instrument Meteorological*	
					condition	*Condition*	
					congestion	*landing*	
					contact	*leaving*	
					control zone	*lighting*	
					cross	*localizer*	
					decompression	*long final*	
					delay	*looking out*	
					departing	*low altitude*	
					*departure**	*low approach*	
					descent	*maintenance*	
					dewpoint	*maintaining*	
					direction	*midpoint*	
					discretion	*minima*	
					distress	*moving*	
					DME	*navigation*	
					downwind	*(name) NDB*	

* poly-functional items

Table 5.17 – Table of C1 Form-class in Reference Radiotelephony

Fastair345	report	again	the	new	*low pass*		unsafe
					north	spacing	
					northbound	squawk*	
					northwest	squawking	
					obstacle	stand	
					offset	start-up	
					operating	straight-in approach	
					orbit*	stop*	
					orbiting	surface	
					outbound	surveillance radar approach	
					outer marker	takeoff	
					overcast	taxi	
					pattern	taxiway	
					position	TCAS climb	
					precision approach	TCAS resolution advisory	
					priority landing	terminating	
					procedure	threshold	
					push-back	time	
					QDM	touch and go	
					QNH	touchdown	
					radar control	track	
					radar cover	traffic insight	
					radar control terminated	transition level	
					radial	transmission	
					ramp	transmitting	
					rate of descent	transponder	
					reading you three	VASIS	
					reading you five	vectors	
					reply	vehicle	
					reporting	vicinity	
					requesting	visual	
					route	visual approach	
					runway	(name)VFR	
					runway vacated RVR	VMC	
					selcal	(name) VOR	
					separation	wake turbulence	
					sequencing	westbound	
					set	wind calm	
					southeast	windshear	

*poly-functional items

Table 5.17 (cont'd) – Table of C1 Form-class in Reference Radiotelephony

In radiotelephony, the member of C1 includes cardinal numbers which commonly refer to a parameter of unit, system or equipment concerning flight operations. A group of number can be placed at the position of any regular C1 members to point out a parameter both a speaker and a listener understand without the presence of defined unit, system or equipment they belong to. As well as that *spelling letters* and a *combination code* consisting of either a spelling letter and a cardinal number or C1 and a spelling letter such as *Alpha1, taxiway Bravo, information Charlie, Mike,* etc. are determined as C1 members since they always refer to a specific

position, area or place either on the ground or in the airspace. However, cardinal numbers are also functioned as a modifier to C1 if they are placed after a particular C1 to provide exact information as a nominal post-modifier to it such as *flight level 380, heading 060*, etc.

Furthermore, there is another group of lexical items that as well belong to C1 class. The units of measurement in radiotelephony indicate the exact amount of speed, distance, height, temperature and radial of the parameters related to flight operations which are regularly designated as a member of noun class in its corresponding language. The common position of these items is behind the cardinal numbers such as *3500 feet, 360 degrees, 7 knots, 2 o'clock, 20 minutes*, etc. There are 8 items in this group which are *feet, degrees, kilometers, knots, meters, miles, minute(s)* and *o'clock*.

As mentioned above, the positions of almost all of the members except *you* are *not* absolute. The members are reserved mostly in the form of series of words and/or a fixed multi items and/or letters and/or numbers to identify an aircraft and aeronautical stations or *call signs* such as *All Stations* (aircraft operating in the control area), *Station Calling* (an aircraft unidentified initiates the call), *Fastair345*, *G-CD* (an aircraft call sign), and *(City/Town name) Aeronautical Station* (a unit of service's call sign). They are considered as proper nouns in natural English.

The fact is that these items are more like independent markers or summoning items at the opening stage of the communication the position of C1a (an aircraft and aeronautical call signs) than a sentence subject as it normally should be considered according to its position as in regular English sentence. There are three possible ways that they exist in the utterance; occurred at the beginning of the utterance such as '*Fastair345* caution construction work adjacent to gate 37' and '*Fastair345* accept flight level 220', co-occurred at the beginning of the utterance such as '*All stations* (general aircraft call sign) *Walden Tower* (aeronautical station call sign) present weather wind 360 degrees 5 knots' and '*Alexander Radio* (aeronautical station call sign) *Fastair345* (aircraft call sign) selcal AHCK' , or at the end of the utterance such as 'report again the new low pass unsafe *Fastair345*'.

On the other hand, another member, *you*, is a standard member of pronoun class referring most frequently to a reference of the immediate addressee in its corresponding language. As the position and role of the item is not different from any regular C1a members when placed at the beginning of a sentence, it is not necessary to assign an additional form-class; instead it should be determined to be in C1 form-class. Nonetheless, it is noted that *you* always functions as a sentence subject and definitely appear at the beginning of the sentence, commonly followed by C2 such as '*you* are unreadable' and '*you* are number2'.

However, the rest of the C1 member are pretty much the same as any prototypical noun which can also be placed as a head of a phrase or a sentence such

as, '*push-back* approved', '*passing* flight level 70', '*fuel dumping* completed', '*altitude* should be 3000 feet'.

In its corresponding language, noun class or C1 class in radiotelephony is the largest class of words (Cater & McCarthy, 2006: 297) and commonly form by composite formation exactly the same as in radiotelephony. According to the table above, numbers of C1 members are either compounds or affixed with –ing. The interesting point is to decide whether suffix –ing is in this case, a bound morpheme to form C1 in radiotelephony or it is just the complement of lexical unit since the very beginning. Less numbers of C1 affixed with –ing that have their base forms in C2 class (describing an action, occurrence, or indicating a state of being) such as hold-holding, land-landing, leave-leaving, maintain-maintaining, etc.

Nonetheless, it is too early to claim that suffix –ing which is the basic mechanism in natural English to converse verb class to noun class in order to extend the use of existing unit, actually plays the same role in this sublanguage as some of the words has no base form to compare even though there is an evidence to more or less support that claim (this point is later discussed in detail in morphological analysis). Consequently, some of them are counted as a single lexeme such as heading, transmitting, closing, fuel dumping, warning, sequencing, etc.

One of the character of this form-class in natural language is plurality which can be distinguished from singularity by inflectional ending –s. In radiotelephony, there is *a plurality marker*. But, almost all of the members are neutral even though some such as *intentions*, *brakes* and *vectors*, seem to obtain this inflectional ending as explained in lexicon section. However, the word 'minute' and 'delay' are the prove that a plurality marker somewhat exists in radiotelephony as it obtains suffix –s to indicate plurality and none to indicate singularity as in 'landing delays at Georgetown 20 *minutes*', 'Fastair 345 expected *delay* 10 minutes' and 'expect one *minute* delay due B747 taxing behind', 'landing *delays* at Georgetown 20 minutes' accordingly.

Nonetheless, why it is not consistence in the language – it can be explained that plurality in radiotelephony might not be an essential feature as it doesn't make much difference in the communication. But, since it is a very common property of any countable noun in natural English language, the trace of using this plural marker in the language is somewhat noticeable.

In short, the majority of the members still obtain the core properties as its original noun class in regular language as possibly be the head word in the sentence functioning as subject or direct object of C2 which is equivalent to verb class in natural language as well as the plurality bound morpheme {–s} which some of the members attain. However, the variant of positions of C1a in the sentence where particular members are placed as well as the elimination of another regular inflectional marker, possessive ending {–'s}, in radiotelephony, somehow make C1 class to become distinctive. Nonetheless, what to be maintained when comparing to

canonical English, are remained; position, semantic roles and the largest form-class containing massive amount of members.

(2) *C2* is the second largest form-class in radiotelephony, usually describing an action, occurrence, or indicating a state of being as well as to respond upon a statement, command or question and to instruct a particular flight activity, which commonly appears in the position of *report*, generally following C1 (*Fastair345*) in Test Frame A. The items which can replace *report* are designated as C2a which is the members that need to be followed by C1b as an object to complete its meaning. C2a is more or less the same as transitive verb in canonical English language.

Test Frame A: Fastair345 *report* (again) (the) (new) low pass (unsafe)

Fastair345	*report*		again	the	new	low pass	unsafe
	abeam	hold short					
	able	is					
	accept	join					
	acknowledge	leave					
	adjust	lose					
	advise	make					
	approve	monitor					
	are	omit					
	attempt	proceed					
	avoid	read					
	be	recleared					
	cancel	reduce					
	check*	remain					
	cleared	report					
	climb	request					
	commence	reset					
	confirm	resume					
	contact	return					
	continue	say					
	direct	squawk*					
	enter	start					
	expect	stop*					
	expedite	take					
	extend	turn					
	fly	unable					
	follow	use					
	give	vacate					
	maintain	want					
	hold						

*poly-functional items

Table 5.18 – Table of C2a Form-class in Reference Radiotelephony

The rest of C2 items are fit into the test frame B as they don't need to be followed by any C1b to fulfill its reference. Therefore, any tokens which can be in the same slot of '*go around*' in the test frame B, Fastair345 *go around* is considered C2b. C2b is generally similar to intransitive verb in natural English language. However, the majority of C2 in radiotelephony is C2a since there are only 12 items which are

air-taxi, backtrack, departure, descend, go, go around, orbit*, line up, line up and wait, resume own navigation, say again* and *taxi*.

In general, this form-class is similar to verb class in regular English language as the members carry a great deal of information, describing actions, events and states as well as the position in the sentence. However, C2 can also appear at the beginning of imperatives, similar to those in verb class in which a subject is not required in the main clause of a sentence, such as '*report* again on final', '*direct* Wicken Fastair 345', etc. since the language involved in the communication mostly concerns some sort of instructing and directing.

As the second largest form-class in the language, C2 consists of quite a great numbers of members the same as verb class in its corresponding language. Even so, there are some characters of C2 deviating from those in verb class. The fact is that C2 all are in their base forms as a non-finite verb which are not transformed or marked by any inflectional suffix to encode information about time frame (tense and aspect), to give information about the roles of different participants in an event (voice) and indicate person. It is important to learn that C2 in the sentence commonly express present event at present time but they remain unmarked when indicating person (third person singular is formed by adding suffix –s to the base form in regular English). Therefore, those grammatical markers are omitted to avoid complexity and misunderstanding when the activity should or should not be performed.

Only two members; *cleared* and *recleared* which have suffix-ed, usually indicating either past or past participle in canonical English verb, permanently attached to them and perform as C2 to narrate specific commands to conduct the aircraft. Some might interpret these two words as reduced participle form in passive voice since they both used by an air traffic controller to be cleared for doing a certain aviated activity or be recleared from the previous clearance (an authorization to proceed under specified traffic conditions within controlled airspace). But, in this study, they are better determined as the base form.

In regular English, some of words are multi-function lexemes as they can perform the roles of verb as well as noun or what is called in the regular language, cross classification that is the ability of the items to be either a noun or a verb, depending on how they are used. This phenomena is as well found in radiotelephony, yet in limited amount such as those with asterisk mark (*); *check*, *departure*, *orbit*, *squawk* and *stop* which are appointed as such at the first place. These poly-functional items apparently don't seem to be a problem in this case as the slots or positions of the cross-function items are different.

(3) *C3*, the third open form-class, consists of tokens that signify properties, qualities or states attributed to C1 by giving more information about C1's reference. It is essential to learn that members of C3 occur at the position **after C1** as to replace *unsafe* whereas some are placed **before C1** as to replace *new* in Test Frame A

respectively. However, the position of each member can be switched differing from the positions of C1a and C1b which are quite absolute. Therefore, it is not necessary to divide the members into two subgroups. On top of that, the case that C3 can be appeared at both positions in the same sentence at the same time is extremely rare. The members of C3 are as the followings:

a) Test Frame A: Fastair345 report (again) (the) (new) low pass <u>*unsafe*</u>

Fastair345	report	again	the	new	low pass	*unsafe*	
						available	*In sight*
						cleaned	*observed*
						closed	*OK*
						completed	*out of service*
						disconnect	*received*
						displaced	*released*
						established	*serviceable*
						failed	*unserviceable*
						identified	

Table 5.19 – Table (a) of C3 Form-class in Actual Radiotelephony

b) Test Frame A: Fastair345 report (again) (the) <u>*new*</u> low pass (unsafe)

Fastair345	report	again	the	*new*		low pass	unsafe
				central	*minimum*		
				cleaned	*moderate*		
				fast	*normal*		
				forced	*opposite*		
				full	*present*		
				further	*revised*		
				good	*right-hand*		
				inbound	*short*		
				large	*special*		
				left-hand	*unknown*		
				local			
				medium			

Table 5.20 – Table (b) of C3 Form-class in Reference Radiotelephony

The members of C3 as post-modifiers include cardinal numbers which indicate the exact parameter or position of preceding C1b. If the position of the cardinal numbers and spelling letters are after C1b such as *flight level <u>360</u>*, *heading <u>120</u>*, etc., they instead of being C1b themselves, are automatically determined as C3. Again, if a group of cardinal numbers or a spelling appears solely with no preceding C1b, it is still designated as C1b since what it refers to is truly understood by both participants in the conversation, even without the presence of C1b it usually modifies.

Again, most of the characters of C3 illustrated are pretty much the same as the features of adjective class in its corresponding language. However, very rare numbers of adjective are post-modifiers unless that adjective modifies the whole unit of

nominal group or noun phrase to express degree judgments; for instance, 'The house is big *enough*'. In contrast, the members of C3 as pre-modifiers and post-modifiers are almost even. The distinct form of C3 in radiotelephony is with permanent suffix –ed which is commonly used to converse verb origin to be adjective in regular English as their base form do not exist in the data. These items are commonly placed after C1 they modify.

There are also C2 equipped with this derivational morpheme placed at the same position such as in 'flight level 310 *resumed*', 'start-up *approved*', 'right hand pattern *expected*', etc. which is similar to the reduced pattern of passive voice construction in it canonical English. However, since there are already a certain group of C3 items which occurred at the same position with the same function which is to modify the preceding element, they are all considered as the members of C3 in order to make the syntactical pattern of radiotelephony become more unity and systematic.

It is noted that in radiotelephony if any C3 is used as a pre-modifier of any C1b or a prenominal adjective in regular English regardless of its position in the sentence such as *north* cross, *emergency* descent etc. without being coined as compounding lexical terms is determined to function as C3.

(4) *C4* commonly modifies, describes or limits C2 to display how, when, where, which one, how many or what quality. The members are fairly free as to where they can be posited in the sentence. They sometimes appear at sentence-internal positions 'G-CD take off *immediately* or hold short of runway' or sentence-finally position such as 'Fastair345 turn right *immediately*'. Therefore, in the Test Frame A, any item that is at the position of *again* is classified as C4.

However, when the members of C4 are at the end of the sentence following C1, they are as well at the same position of C3 in Test Frame A. Therefore, the use of aviation knowledge upon its semantic roles as well as the context the items are involved in the analysis to distinguish between the two subclasses. Additionally, numbers of members are rather small comparing to those three mentioned form-classes.

Test Frame A: Fastair345 report <u>*again*</u> (the) (new) low pass (unsafe)

Fastair345	report	***again***		the	new	low pass	unsafe
		en route *immediately* *later* *left* *next* *now*	*parallel* *right* *slowly* *straight ahead* *temporarily*				

Table 5.21 – Table of C4 Form-class in Reference Radiotelephony

C4 is equivalent to adverb class in regular English language which is usually problematic in terms of its definition and form. However, adverbs is basically labeled

with a wide range of functions that they are any structure modifying a verb, adjective or even an adverb, mostly indicating the time, manner, place, degree and frequency of an event, action or process while C4 is confined to modify only C2 in the sentence to signify chiefly time and manner. Comparing to adverb modifying verb, the position of C4 is often after C2 whereas the position of adverb can be either before or after a verb it modifies.

(5) *C5* consists of a certain amount of members, commonly appearing at the beginning of the first unit of utterances or before C1 that denotes the participants involved in the communication. C5 operates as a response to the instructions as to accept or refuse and as a specific linguistic code or a *fixed expression* concerning safety and procedures in flight operations. Two members, *Pan Pan* and *Mayday* both are stated three times consecutively before the designated message. Again, Test Frame A is used to illustrate C5 position in the sentence.

Test Frame A: _____ Fastair345 (report again the new low pass unsafe)

C5	Fastair345	report	the	new	low pass	unsafe
affirm *correct* *go ahead* *Mayday, Mayday, Mayday* *negative* *Pan Pan, Pan Pan, Pan Pan* *roger* *wilco*						

Table 5.22 – Table of C5 Form-class in Reference Radiotelephony

Even though C5 members are commonly in the position before C1a, it is also possible to posit after C1a, but very rare e.g. *roger* G-AB, G-CD *negative* and Fastair 345 *affirm*. Actually, C5 is similar to a responding exclamation; yes and no in natural language. However, the main reason to create this form-class is that there is an intention to create particular lexical terms with specific reference and to design where it should appear. Since radiotelephony is designed to be conversed only in air-ground communication based on non face-to-face communication with ultimate goal, the members of C5 are elaborately coined to contribute to effective flow of information, instructions and responses.

5.3.1.2 *F class-type* is the minor group of closed word class with limited numbers of free morphemes, mainly containing grammatical functions but generally not referential meaning as those in C class-type because it is rather complicated to specify them with a neat definition. Nevertheless, there are still some of them determined to demonstrate a certain reference together with a definite grammatical function. The numbers of F class-type members as mentioned are much lesser than those in C class-type. F class-type in radiotelephony is divided into 5 subclasses, F1 - F5 as follows:

(1) *F1* is used to connect items together in diverse levels; words, phrases or clauses. It usually stands between the items it conjoins. F1 basically indicates a relation in time between two events or a relation in place between two and more things as well as expresses a variety of logical relations between phrases, clauses and sentences. The Test Frame B is created to categorize this particular minor form-class of radiotelephony, so any item in the place of *and* in the Test Frame B is the member of F1. According to its position in the sentence, F1 is commonly posited between C1 or C1 phrase.

Test Frame B: Fastair345 report radar failure *and* decompression lost

Fastair345	report	radar failure	*and*			decompression lost
			above	*due*	*to*	
			adjacent to	*from*	*until*	
			after	*I say again*	*via*	
			ahead of	*if*	*when*	
			at	*in*	*while*	
			before	*near*	*with*	
			behind	*on*	*within*	
			below	*or*		
			by	*through*		
			correction			

Table 5.23 – Table of F1 Form-class in Reference Radiotelephony

F1 is the collections of preposition and conjunction in its corresponding language. Because of the similarity of the members' primary position and roles in the reference data which is to conjoin and be posited between two references, the words or so-called prepositions and conjunctions in canonical English that fit in the frame are determined as F1.

However, F1 members are classified into two subgroups due to the specific function each group indicated. The F1a members are the complementizers or so-called prepositions in the canonical English. Their prime function is to indicate that any particle followed any of its member is somewhat a complement to the preceding item or phrase to fulfill the intended massage of the speaker mostly expressing a relation in space and time such as 'passenger *with* suspected heart attack', 'start-up *at* own discretion', '*after* passing north cross descend to flight level 80', 'report again *on* final, climb straight ahead *until* 2500 feet', etc.

Another subclass of F1 (F1b) is the connector or so-called conjunction in the regular English language which commonly expresses a variety of relations between phrases and clauses; some of them used to link elements of equal grammatical status as in 'Alternatives are flight level 220 *or* flight level 260', 'advise *if* able to proceed parallel offset', 'maintain flight level 230 *while* in controlled airspace', '*when* passing flight level 380 contact Alexander control 129.1' and 'Bravo *and* backtrack, runway 06'. However, two of the members, *I say again* and *correction*, are rather different

form other members that are very generic in regular language because they both hold focal character of F1 which is to correlate between two references or in this case, two messages delivered either by an air traffic controller or a pilot to denote 'I repeat to make the message clearer or to emphasize on the message' and 'an error has been made in this transmission and the correct version is....' Accordingly as in 'Fastair 345, Wickin 47, flight level 003, Marlow 07 *correction* Marlow 57' and 'cancel take-off *I say again* cancel take-off'. Therefore, according to the data, there are 7 members of F1b; *and, correction, I say again, or, if, when*, and *while*.

The majority of F1 mainly functions as a complementizer rather than a connector. Almost all of the F1 members are able to maintain their core properties, characteristic of use and form as the way they are in natural English except *due to*, this 2-element F1 or conjunction occasionally, for unknown reason, the final element is omitted such as 'will shortly lose identification temporarily *due* fade area'.

(2) *F2* is a C1 pre-modifier that expresses the type of reference C1 or C1 phrase holds in the sentence; possessive (*my, own, your*), article (*a, the*), demonstrative (*this*) and indefinite determiner (*all, another, few, no*). The members are always co-occurred with C1 and definitely come before other elements of C1 modifier. Thus, the items that can replace *the* in Test Frame A are members of F2.

Test Frame A: Fastair345 report (again) *the* (new) low pass (unsafe)

Fastair345	report	again	*the*		new	low pass	unsafe
			a *another* *few* *my*	*no* *own* *this* *your*			

Table 5.24 – Table of F2 Form-class in Reference Radiotelephony

F2 is similar to determiner form-class in the corresponding language because the members are designated to have the same grammatical functions and semantic roles. Determiner in natural English is the most common noun modifier since noun rarely stand alone and usually accompanied by at least this kind of pre-modifier (Berk, 1999).

The F2 members are subset of regular determiners in natural English language which still contain the same characteristic of use; for example, *a* is simply used to introduce C1 or noun as a new information in to the discourse, *the* indicates mainly the specific C1 entity, not pointing out that modified C1 is already introduced into the conversation as in regular language. Even though F2 members are considered very common in canonical English language, most of C1 in radiotelephony usually appears in the sentence without any F2 to indicate them in any way.

Some of the members signify possessive sense as *my* and *your* referring to 1st person singular and 2nd person singular accordingly, while some are quantifiers such

as *all* and *few* and so on. Apparently, F2 class is rather confined in size, but varies in terms of use and semantic roles.

(3) *F3* consists of only three items; *do*, *will* and *should*. They all are fit in the position before C2, functioning as to give extra semantic or syntactic information to C2. They are usually followed by C2, mostly to express negation, interrogative, intention or possibility. Any item that can be at *do* in Test Frame A is considered F3.

Test Frame A: Fastair345 *do* not report (again) (the) (new) low pass (unsafe)

Fastair345	***do***	not	report	again	the	new	low pass	unsafe
	should *will*							

Table 5.25 – Table of F3 Form-class in Reference Radiotelephony

This form-class is close to subclass of verb, auxiliary verb and modal verb, in regular English. They both are the complement of a lexical verb to provide additional detail or encode meanings connected with degrees of certainty and necessity. *Do* in F2 determine either negation or interrogative, but not C2 itself as in natural language that do can also be a verb as well as a substitute for a lexical verb. *Will*, on the other hand, expresses future intention of the addresser to perform an act or a particular state of being which about to occur such as 'G-AB *will* shortly lose identification temporarily' while *should* is more likely to indicate a logical expectation upon a parameter of something, commonly co-occurring with C2, *be* such as 'altitude *should* be 3000 feet'.

(4) *F4* is the optional element to indicate negation. Negator 'not' has a unique place of occurrence; basically followed F3; either *do* or *will* in the Test Frame A (extended) above. *Not* in radiotelephony is rather different from the same reference in its corresponding language as sometimes it doesn't co-occur with F3 as it can appear in front of F1 to indicate negative position of an aircraft when performing a particular activity or before C3 to define that a property of C1 is not possible at the time of talk such as 'Fastair 345 cleared low pass *not* below 500 feet' and 'Fastair 345 reply *not* received' respectively.

Not is as well a core negative word in canonical English language that signals negation in the sentence. However, there is no presence of contracted negative form in the data which is frequently found in natural language.

(5) *F5* is simply called wh-words in canonical English language because most of them start with wh-, usually appeared at the beginning of interrogatives or questions in order to solicit particular information about the identity of something, and the circumstances surrounding actions and events. Since there is only one member in this form-class, *what* in '*what* is the delay?' of the test frame C. It is not necessary to demonstrate the test frame table here.

In natural language, there are quite a certain amount of wh-words or interrogative words to express the specific need of information in different aspects, but in radiotelephony, only one item is found.

To sum up, form-class in radiotelephony is divided into 2 major types, *C class-type* and *F class-type*. They both are similar to open class and closed class accordingly in canonical English language. Each type consists of own subclasses; C1 to C5 belong to C class-type while F1 to F5 belong to F class-type. Therefore, the total numbers of word classes in the language are 10. The particular position in the test frame, grammatical function, characteristic of use and semantic role determines the distinct properties of each form-class.

Multi-grammatical function items are present in the language which is pretty similar to its corresponding language such as most of the time C1b can also work as C3 in case of modifying C1b it follows or some C1b are as well performed as C2. However, this seems to be quite contrast to the prime objective of radiotelephony which tries to eliminate the complexity of the language. It can be implied that the creation of a language from a natural one somehow is difficult to avoid bringing some properties of its corresponding language along. Therefore, it is pretty common to visualize complexity underneath simplicity.

Comparing to the classes in its corresponding language, four prime classes; noun, verb, adjective and adverb, are also the main classes in radiotelephony which are C1, C2, C3 and C4 consecutively with slightly different detail in numbers of members, inflectional markers, positions and characteristics of use. But most of the focal features are contained. Some classes are added such as C5 and F4 whereas some are merged into another class such as possessive pronoun is included in F2 and excluded auxiliary and modality from conventional C2 to be F3 in order to represent the unique entity of the language as well as included preposition and conjunction under F1.

5.3.2 Syntactical Structure in Reference Radiotelephony

The *second part* of the analysis at syntactical level is to generalize the structural patterns of sentences or units in the utterance. To discover the grammatical arrangement of radiotelephony, prototypical types of arrangements classified in accordance with basic syntactical structure and prime communicative functions or illocutionary force as of canonical English language are used to describe the syntactical patterns.

The conformations of the syntactical arrangements are demonstrated in phrase-structure rules which are commonly used to break a natural language sentence down into its constituent parts with prototypical symbols and abbreviations applied with canonical English to gain more understanding to the language structure instead of creating the new ones and to provide a clear view of the syntactical formation of reference radiotelephony.

However, since the form-classes of radiotelephony are coined, contrary to those in regular English language in names, the typical and some extra symbols

(created to represent additional form-class and specific feature) applied in the analysis to generate the phrase-structural rule of each syntactical pattern are explained as the followings;

Symbols and abbreviations (Table 3.1: 74):

S (sentence)	equivalent to a sentence or a clause
Q (question particle)	equivalent to interrogative formation
NP (noun phrase)	equivalent to C1
VP (verb phrase)	equivalent to C2 phrase
RP (Responding phrase)	equivalent to C5 phrase
CP (complement phrase)	equivalent to F1b phrase as a complement phrase
N (noun)	equivalent to C1a and C1b
V (verb)	equivalent to C2
Adj (adjective)	equivalent to C3
Adv (adverb)	equivalent to C4
R (responding expression)	equivalent to C5
Conn (connector)	equivalent to F1a
Comp (complementizer)	equivalent to F1b
Det (determiner)	equivalent to F2
Aux (auxiliary)	equivalent to F3 and F4
Wh (WH-word)	equivalent to F5
Neg	negation
=	consist of
/	or
()	optional constituent
{ / }	either…or… appeared in the structure

5.3.2.1 *General descriptions of syntactical arrangement in reference radiotelephony*

Radiotelephony is the language which is designed for communicating in specific situational parameters, so that the patterns of statements in the utterance are rather distinctive in format and organization. Consequently, an utterance or each exchange basically composes of a single lexical item, a phrase, a clause and a series of phrases and clauses to complete the entire intended message to deliver to the designated participant. Comparing to natural English language, there is no significant difference since a regular utterance as well consists of phrases and clauses. However, it is extremely rare to discover any utterance which contains long strings of phrasal elements as the ones in radiotelephony. Mostly, in regular oral communication, the speaker tends to deliver the message with a small portion in each turn as there are less constraints and limitations of communication context.

A string of phrases and clauses in an utterance of radiotelephony possibly contains up to eight elements the most in a single turn of talk such as 'Fastair 345, departure runway 32, wind 290 degrees 4 knots, QNH 1022, temperature -2, dewpoint -3, RVR 550 meters, time 27', a chain of C1 phrases or NPs to provide an instruction

with essential information for a pilot to conduct a takeoff roll. Each phrase possesses a complete sense of reference; for example, *departure runway 32* signifies that the runway used for takeoff is number 32, *wind 290 degrees 4 knots* refers to a direction and speed of the wind during the time, etc. This is the very common structure of the utterance found in radiotelephony that chunks of messages are sequenced in the form of phrases within a single turn of talk to get all the information necessarily on a particular flight activity across to save time and avoid broken message.

According to the data, there are four types of phrases, NP, VP, RP and CP and two types of clauses, declarative and interrogative clauses generated in the language. NP, VP and RP are primarily the independent element in the utterance while CP is generally a complement particle to NP and VP. Also, declarative clause and interrogative clause are definitely independent and basically a sole component in the utterance.

At this point, the discussion upon details of each syntactical construction at phrase and clause level is orderly conducted to learn the internal tie of items in each segment as well as its communicative functions, and then the realization of composition of syntactical arrangements according to their prime communicative functions found in the data will be illustrated at last.

5.3.2.1.1 *Syntactical structure at phrase level*

The most basic arrangement of radiotelephony is based on phrasal construction which can denote several communicative functions. NP and RP which fully function as an independent element mainly indicate illocutionary force of assertive as to informing and acknowledging while VP contains more than a force of directives which is the prime function of VP in canonical English language. CP, on the other hand, plays prominent role of a supplementary to NP and VP. The detail of each type of phrases are elaborately explained, described and discussed respectively as follows:

(1) *NP* in canonical English often refers to entities or expressions either concretes or abstractions, consisting of minimally a noun or pronoun which acts as the head of a noun phrase which can be accompanied by dependant elements before or after it and commonly is a part of a sentence. Similarly, NP in radiotelephony greatly determines concrete information on condition, process, parameter, procedure and position concerning flight profiles as well as indicates that the message stated by the co-participant is recognized which is a process of readback in regular communication stages in air-ground communication. NP, of course, composes of a C1 member (detailed in pervious section on form-class) with or without other dependant components, but it usually appears in the utterance as an independent unit.

As the language is largely based on the arrangement of phrases, NP obtains full communicative function of assertive as any declarative clause in regular language to mainly inform and acknowledge as well as to conduct identification stage in air-

ground communication. There are mainly two types of NPs occurred in the data classified according to theirs specific functions since the language is purposely designed to serve particular communicative functions;

(1.1) NP as to conduct identification process: NP = N (N)

In reference data, the structure of each utterance <u>always</u> includes C1a or a group of C1a; for examples, '*G-CD Walden Tower* present weather wind 360 degrees 5 knots', '*Fastair 345* outer marker' '*All stations Alexander Control* fuel dumping completed' or 'Right heading 110 *Fastair 345*'. These are three possible position of the confined or ritual identifying NP, either generated at the beginning or at the end of the utterance of each exchange.

Despite, in relation to the data, this particular NP cannot be considered as a subject or the head of a phrase/clause or a sentence in the internal structure of the utterance. The reason is rather explicit when analyzing the samples stated as there is no semantic connection between the element and other phrase within the utterance. Hence, it is determined as an independent phrase which can co-occur with any other structures which will later be described in the chapter.

The structure of this identifying element consists of two members of C1a which have no contribution to each other in terms of grammatical and semantic roles. The first N refers to a call sign of the designated listener whereas the second denotes the speaker but if there is only one N appeared in NP at both positions, N always determines an aircraft call sign as either self–identification to differentiate own self from others or co-participant-identification to designate the interlocutor. The positions of NP basically indicate the act of the utterance.

To perform acknowledging statement, mostly done by a pilot, NP is commonly placed at the end of the utterance such as 'Leaving flight level 60 for 2500 feet QNH 1008 transition level 50 *Fastair 345*', or 'Leaving flight level 90 *G-AB*' whereas in informing and directing statement NP is placed at the beginning such as '*Fastair 345* Automatic Dependent Surveillance out of service', '*Station calling Stephenville Tower* you are unreadable', and '*Fastair 345* continue approach wind 260 degrees 18 knots'.

This particular NP contains a specific function and positions in the utterance differing from any other NPs. It is also essential to learn that NP as to conduct identification process is mandatory since it almost always appear as one of the segments in every utterance in air-ground communication either at the beginning or at the end of the utterance in each exchange.

(1.2) NP as to provide particular pieces of information and to acknowledge an instruction or information which is represented in several possible internal structures as the followings;

(1.2 a) NP = N: as mentioned, NP in radiotelephony can at least be consisted of a single element of N (C1) such as *downwind*, *stopping*, etc.

This pattern of NP does have a condition when it is generated in the utterance. Almost all of the time if N is one of C1b members, it strictly co-occurs with NP in (1.1) as such as '*G-CD* final', '*Fastair 345* going around', and '118.9 *Fastair345*'.

On the contrary, if N is C1a which is commonly referred to an aircraft call sign, it can independently appear in the utterance with the function of acknowledging. The usage of a call sign or a proper noun to acknowledging interlocutor's message is not possible in canonical English, instead the speaker generally replies only with one of these common responses as yes, no, alright and so on.

(1.2 b) NP = N N: the string of C1 is put together to determine specific area and activity such as *holding position, requesting priority landing, estimating Stephenville, monitoring 123.2, 3500 feet, 360 degrees, 7 knots, 2 o'clock, 20 minutes*, etc.

(1.2 c) NP = NP (Neg) Adj: the internal particles of NP are either N or NP followed by a post-modification Adj or C3 and C1b as a pronominal adjective. This particular pattern does not exist in canonical English language. Negator 'not' placed between NP and Adj indicating a denial of the obligation, is optional in the pattern. For examples, *reply not received, flight level 310 resumed, flight level 240 not available, fuel dumping completed, engine on fire, engine failed, start up approved, turn observed, selcal OK, squawk observed, runway in sight, QNH 1003, Cherokee in sight, flight level 380, heading 110*, etc.

(1.2 d) NP = Adj NP: the pattern contains a pre-modification Adj or C3 and C1 as a pronominal adjective of preceding NP such as *right turn, right-hand downwind, right heading 110, right heading 180, expected delay, north cross, no traffic, emergency descent*, etc.

(1.2 e) NP = Det NP: the member of F2 or Det precedes NP to express the type of reference which NP holds such as *the Airbus, my IFR flight, own discretion, the delay, the vicinity, your minima, this frequency, another circuit* and *a 3-degree glide path*.

(1.2 f) NP = NP NP: the internal structure of NP can also be more complicated by having another NP embedded as a complement to the preceding N or NP such as *wind 340 degrees 10 knots, traffic 12 o'clock 4 miles, maintaining flight level 350, B777 dumping fuel, cloud 2500 feet, Stephenville NDB flight level 70*, etc.

(1.2 g) NP = NP CP: the NP is modified by CP or F1a phrase to add up extra detail to preceding NP such as *heading 090 to Stephenville, passenger with suspected heart attack, start-up at own discretion, descending to flight level 360, estimating Wicken at 07, number 4 in traffic*, etc.

(1.2 h) NP = NP Conn NP: the pattern contains two NPs with Conn or the member of F1b to semantically relate them such as *Marlow 07 correction Marlow 57, Bravo and backtrack, flight level 220 or flight level 260*, etc.

In general, the internal patterns of NP in reference radiotelephony, for the most part are not that different from the regular structure of NP in its corresponding language except NP pattern (1.1), (1.2 a), and (1.2 f) which composes of a series of N or NP with no explicit grammatical relation.

Some tokens are rather difficult to point out when the element plays as a head of the phrase which sometimes needs a background of aviation-related knowledge to comprehend such as '*Monitoring 123.2*' which indicates an act of checking the information by listening from the radio frequency 123.3 over a period of time, or '*estimating Stephenville 15*' denoting the estimated time of reaching a way point named Stephenville. But, some of the samples are easily interpreted such as '*traffic 12 o'clock 4 miles*', designating that there is another aircraft on the same airway which is at 4 miles away of the north of the airplane or '*B777 dumping fuel*', meaning the particular aircraft type is in the process of reducing an amount of fuel to decrease the weight.

Furthermore, there is no pattern of adj working as a post-modification of NP in natural language as in structure (1.2 c): NP (Neg) Adj as to signify properties, qualities or states attributed to C1 by giving more information about C1's reference such as *runway in sight* meaning a visualized runway or *start-up approved*, denoting a approved procedure of start-up procedure.

All in all, the internal patterns of NPs are rather complex and vary as it plays an important function as to provide information as well as to contain rich information within.

(2) RP is the type of phrase reservedly used in air-ground communication to indicate a response to the instructions as to accept or refuse but also a specific linguistic code concerning safety and procedures in flight operations. The internal structure of this particular phrase is RP = R (R) (R).

Generally, RP consists of a single element of R (C5) such as *roger, wilco, affirm, negative, standby,* etc. The only case that it composes of three C5 items is to state the emergency declaration of the aircraft to create high level of attention from an air traffic controller and other aircraft. The lexical *Pan Pan* and *Mayday*, the members of C5 members referring to a specific emergency code are strictly repeated three times as 'Pan Pan, Pan Pan, Pan Pan' and 'Mayday Mayday Mayday' before continuing with other elements in the utterance.

It is noted that RP *strictly co-occurs with NP (1.1)* either before or after in the utterance; for instance, 'G-ABCD Stephenville tower *go ahead*', 'Fastair 345 *affirm*', '*Pan Pan, Pan Pan, Pan Pan* Walden Tower G-ABCD', '*Mayday Mayday Mayday* Walden Tower G-ABCD', etc.

(3) *VP* in natural English language is the heart of a sentence as it carries the great deal of information. The simplest VP has just one verb which is a lexical verb indicating an action, event or state. The lexical verb shows tense, aspect and voice

markers as it commonly encode as well information about time. As a result, the internal structure of VP is rather a complicated affair. Therefore, VP in regular language can be a part of declarative as well as an imperative which typically do not have an overt subject.

In radiotelephony, VP is an independent construction in the language rather than an element of a clause possessing several speech acts namely directing, informing, acknowledging as in a readback process and eliciting, depending on the situational parameter it is conducted in, contrarily to VP in canonical English language which primarily designates directives. It basically contains C2 item or a verb <u>with</u> one or more accompanied elements. The lexical C2 or verb definitely in its base form with no marker bounded. The internal structure of VP in reference radiotelephony usually comes in diverse patterns as follows;

(3.1) VP = V NP: it is the *most common structure* found in the data. The phrase consists of V (C2 item) followed by NP such as *direct Wicken, Cleared straight-in approach, join downwind, request extended holding, cleared visual approach, stop transmitting mayday, leave control zone, intercept urgency call, Maintain flight level 230* and *commence descent*.

(3.2) VP = V Adv or VP Adv: the pattern composes of V or VP with a post-modifier Adv or C4 such as *commence descent now, report Colinton next, climb straight ahead*, and *line up and wait behind*.

(3.3) VP = Aux (Neg) V {NP / CP}: the structure includes auxiliary (F3 item) and optional Neg before V then followed by either NP or CP such as *do not acknowledge further transmission, will continue radar control, will report leaving flight level 350, will report Whiskey one, do not acknowledge further transmissions, will call for start-up,* and *will attempt to land*.

(3.4) VP = V NP NP: the arrangement consists of V and series of NPs such as *direct Stephenville NDB flight level 70, enter controlled airspace flight level 100, hold Stephenville NDB flight level 370*, and *cleared ILS approach runway 24*.

(3.5) VP = V CP or VP CP: this conformation includes either V or VP and CP in the structure such as *cleared to Colinton flight level 290, expect one minute delay due B747 taxing behind, will shortly lose identification temporarily due fade area*, and *commence descent now to maintain a 3-degree glide path*.

(3.6) VP = CP VP: the arrangement is rather similar to pattern (3.5), but the complement phrase commonly begins with any member of F1a is placed at the beginning of VP such as *'after passing north cross descend to flight level 80'*, and *'behind the landing Airbus, line up and wait'*. However, this pattern is very rare in the data as there are only three tokens found.

(3.7) VP = {V / VP} Conn VP: the structure of this VP consists of two VPs conjoined with Conn or F1b member such as *cancel take-off I say again cancel take-off, advise if able to proceed parallel offset*, etc.

(3.8) VP = VP Conn {NP / CP}: the pattern comprises of V or VP conjoined with the following NP or CP with F1b member such as *contact Alexander control 129.1 when passing flight level 380*, *maintain flight level 230 while in controlled airspace*, etc.

The internal structure of VP is rather simpler with few possibilities comparing to the possible contents in regular English with no substantial difference in the internal formation. But the occurrence of only V in the VP in radiotelephony is none. All of the V needs to have at least one accompanied element following.

As well as that there is a peculiar pattern found in the data when V is modified by two C4 or Adv, '*Fastair 345 will <u>shortly</u> lose identification <u>temporarily</u> due fade area*' even though most of C4 generally stay right after C2 it modified - '*report <u>again</u> on final*' or after VP - '*commence descent <u>now</u>*'. Nevertheless, it is too rough to conclude that this is the distinct pattern of C4 in radiotelephony which is impossible to generate in canonical English since there is only one token found.

The extended function of canonical VP to indicate informative is none in the natural language. Even though there is a great amount of tokens denoting acknowledging in NP, there is as well some in VP as to repeat the instruction given; for example, '<u>*Leave north cross heading 110*</u> Fastair 345' – a pilot perform a readback process by repeating the instruction 'Fastair 345 <u>*leave north cross heading 110*</u>' provided by an air traffic controller. Also, there are couples of tokens that a controller and a pilot deliver an assertion to each other using VP such as 'Fastair 345 <u>*accept flight level 220*</u>' (a pilot reports that he is going to accept the fight level offered by a controller), 'Fastair 345 <u>*expect one minute delay due B747 taxing behind*</u>' (a controller inform a pilot that there is a delay occurred because of the traffic), etc.

In short, VP in radiotelephony still reserves common syntactical patterns as those in its canonical English language, but only the communicative function is extended.

Before moving to discuss on the syntactical arrangement at clause level, another type of phrase, CP, shall be explained as it is basically a complement of NP and VP in radiotelephony.

(4) *CP* is a complement phrase which can be considered a prepositional phrase, an adverb phrase, an infinitival phrase and sometimes a complement clause in regular language. Nonetheless, in radiotelephony, the core function of CP is a complement to the preceding unit. Thus, it is almost always a dependant element of NP and VP; even though only few, it can stand alone as a prime unit in the utterance. CP generally comprises of F1a member at the beginning of the phrase which works as a connector between two units in the statement. The main point is to conjoin linguistic components in order to fulfill mostly the speaker's intended reference. The internal structures of CP are as the followings;

(4.1) CP = (Neg) Comp NP: this structure is frequently found in the data. CP includes two basic elements, Comp (F1a item) and NP. Sometimes Neg (not) is included but it is optional in the structure. For examples, 'reduce *to minimum clean speed*, cleared *for ILS approach*', 'construction work *adjacent to gate 37*', 'Leaving flight level 100 *for flight level 60*', 'cleared low pass *not below 500 feet*', 'hold *at the 265 radial of Marlow VOR*', etc.

(4.2) CP = Comp VP: the pattern consists of Comp (F1a item) and VP such as 'cleared *to cross Alpha*' and 'will attempt *to land 5 miles south*'.

The sequenced element in the structure of CP in radiotelephony is quite simple and rather the same as any regular complement phrase in its corresponding language as well as its grammatical function. As mentioned, most of CP performs as a contribution to other elements.

In conclusion, syntactical conformation at phrasal level in radiotelephony is classified mainly in three syntactical structures; NP, RP and VP. The structural patterns of NP in reference radiotelephony are quite divergent with some differences not only in forms but also in functions when comparing to NP arrangements in regular English language as there are some grammatical reductions clearly noticed when a string of Ns are placed together to convey a chunk of a complete message. The basic function of natural NP is a subject or a complement of the higher level structure such as a clause or a sentence while reference NP is more independent with a complete sense of reference as well as an illocutionary force of assertives.

RP which does not exist in canonical English language is simply arranged with only two possibilities composing of either one element or three elements of C5 members. However, this particular phrasal type usually co-occurs with NP (1.1) especially when it denotes an emergency declaration by placing a fixed urgency term three times consecutively.

The arrangements of VP are in varieties of conformations which mostly are as well generated in natural English language, but the communicative functions of VP are diverse as it can denote not only directives but also assertives.

All in all, syntactical structure in radiotelephony is heavily based on phrasal arrangements in order to cope with rapid flow of information in air-ground communication which the internal pattern is still fundamentally constructed in accordance with the existing pattern in its corresponding language.

5.3.2.1.2 *Syntactical structure at clause level*

The syntactical construction at clause level is rarely conducted in radiotelephony. Only two possibilities are found; a clause indicating the act of informing and a clause denoting the act of information seeking which are commonly considered as declaratives and interrogatives in canonical English language.

(1) *A clause indicating the act of informing* is the fundamental statement in regular English. The generalization pattern in natural English is 'subject (noun or

noun phrase) – verb – X, where X is another element present' (Carter & McCarthy, 2006: 532). A clause in radiotelephony usually maintains basic grammatical and communicative functions with the simplest construction, S = N VP as in '*altitude should be 3000 feet*', '*you are number one*' and '*you are unreadable*', etc.

The internal structures of VP as a part of a clause in reference radiotelephony are as follows:

(1.1) VP = V Adj: the pattern composes of V with a post-modifier Adj or C3 as in 'you *are unreadable*', and 'heading *is good*'

(1.2) VP = (Aux) V NP: the structure mainly contains V and NP, but Aux is optionally partial such as in 'you *are number 2*' 'altitude *should be 3000 feet*' and 'Alternatives *are flight level 220 or flight level 260*'.

The internal structure of a clause is very basic and only few tokens are found in the data. The reason that declarative clause in radiotelephony hardly appears in the data even though it is very common syntactical structure in its corresponding nature in natural English language is still unknown. But it can be assumed that economic amount of language as well as the simplicity is the heart of designing the language. Any possibility which may lead to complexity and ambiguity such as the complication in generating the complete sentence is neglected. Thus, syntactical structure in radiotelephony is more common in the form of phrase.

(2) *A clause denoting the act of information seeking* or interrogatives in canonical English basically is classified in two types; polar interrogatives and non-polar interrogatives. Polar interrogative clause is a kind of question soliciting a yes or no answer, where the respondent must choose between alternatives. Normal sequence of the element in polar interrogatives is auxiliary or modal verb – subject – verb – X (other element present). It is considered the most common question form in regular language. On the other hand, non-polar interrogative clause is information seeking question, also called WH-question usually contains an information seeking lexical item; what, when, where, whose, who(m), which, why and how, – verb – subject – X (other element present). It generally requests specific information about something and the circumstances surrounding actions or events.

According to the data, the convention interrogatives in radiotelephony are very rare but found in both forms, polar and non-polar.

(2.1) *Polar interrogatives*: there are two polar interrogatives which contains exactly the same internal structure as a prototypical polar in regular English language: Q = Aux N VP as in '*are you ready for immediate departure*' and '*do you want vectors*' The answer of polar interrogatives in radiotelephony is commonly *affirm* denoting yes and *negative* denoting no, the members of C5.

(2.2) *Non-polar interrogatives*: only one non-polar interrogative clause with information seeking item, what is found. Again the structural pattern is no different from its prototypical one which is Q = Wh V NP as in '*What is the delay*'.

Since the numbers of interrogatives is very few, it cannot be concluded that in air-ground communication a participant hardly seeks for specific information. Actually, in radiotelephony there is another way to generate the language when a participant needs to have the information which is in VP formations (3.1): V NP and (3.5): VP CP to perform requesting with V, *request*, *report* or *advise* at the beginning of the arrangement such as '*request departure information*', '*request holding instructions*', '*report speed*', '*report distance from Stephenville*', '*advise type of transponder*', etc. These samples are equivalent to non-polar interrogatives to elicit particular response from a responder.

It is interesting that this lexical group used in the pattern of VP usually indicates an explicit act of asking for information causing the participant to instantly comprehend the intention of the speaker without any hesitation. Therefore, it might be another mechanism of the language to prevent ambiguity of the message since the underlying of crating radiotelephony is on safety and efficiency of aviated activity in flight.

VP which is used instead of polar interrogatives also exist with VP pattern (3.7): V Conn VP as in '*advise if able to cross Wicken at 52*' and '*advise if able to proceed parallel offset*' to elicit either acceptance or denial response.

These are all the typical syntactical patterns in radiotelephony. The arrangements can be in either phrasal formation or basic clause formation to point out four main speech acts; directing, informing, acknowledging and eliciting. The internal structural patterns are grounded on simplicity by reducing all possible linguistic complexities which sometimes cause ungrammatical patterns when comparing to those in canonical English language.

5.3.2.2 *Realization of syntactical patterns of radiotelephony*

To provide clearer picture of syntactical structure of reference radiotelephony, the generalization of possible patterns are generated in correlation with the classification of core communicative functions in air-ground communication; namely directing, informing, acknowledging and eliciting.

In fact, the possibilities of arrangements are rather varied and sometimes are difficult to provide absolute realization. Even so, some of distinct organizations are listed to illustrate the unique structure in radiotelephony. It is noted that all the realizations always co-occurred with NP (1.1) in each utterance either at the beginning or at the end of each pattern as to perform identification process which is mandatory in reference air-ground communication.

(1) *Directing*: The directing arrangement is always conducted in VP formation as the following;

a) S = (Aux) (Neg) V (Adv) {NP (NP) / CP}

For example: *cleared straight-in approach, line up runway 06, commence descent now to maintain a 3-degree glide path, do not acknowledge further*

transmission, turn right when airborne, enter controlled airspace flight level 100, hold Stephenville NDB flight level 370, etc.

b) S = VP Conn {VP/ NP/ CP}

VP = V {Adv / N}

For example: *take off immediately or vacate runway, cancel take-off I say again cancel take-off, leaving flight level 100 for flight level 60, contact Alexander Control 129.1 when passing flight level 380,* etc.

c) S = CP VP

VP = V (CP)

For example: *after passing north cross descend to flight level 80, behind the landing Airbus line up and wait*, etc.

(2) *Informing*: informing statement gives the co-participant a piece of new information which can be in the formation of NP, VP, RP or clause as follows:

(2.1) *NP*: there are 2 realizations possibly conducted;

a) S = NP_1 (NP_2 / CP)

NP_1 = N (N) (Adj) / (Adj) N

NP_2 = (Det) (Adj) N

For example: *holding position, requesting priority landing, flight level 310 resumed, heading 110 at 2500 feet, right heading 180, maintaining flight level 350, descending to flight level 360, canceling my IFR flight*, etc.

b) S = NP Conn NP

NP = N Adj

For example: *Marlow 07 correction Marlow 57, flight level 220 or flight level 260*, etc.

(2.2) *VP*: Only one possible pattern used to function as informing;

S = (Aux) V {NP / CP}

For example: *accept flight level 220, expect one-minute delay, unable to cross Wicken, will attempt to land, taxi via taxiway Charlie*, etc.

(2.3) *RP*: the series of R is used to declare emergency situation only;

S = R R R

For example: '*Pan Pan, Pan Pan, Pan Pan*' and '*Mayday Mayday Mayday*'

(2.4) *Clause*: the arrangement is very simple with the composition of N and VP;

S = N VP

For example: *you are number 2, altitude should be 3000 feet, heading is good, you are unreadable*, etc.

(3) *Acknowledging*: it is to either accept the information given or state that the information is received by repeating whole or part of that information which are generally represented in NP, RP and VP. VP and NP are the formations basically used for readback process.

(3.1) *NP*:

    S = N (Adj) (NP)

    NP = N (CP)

For example: *final, expediting, short approach mowing in sight, holding short of runway 14, expediting until passing flight level 180, descending to 3000 feet*, etc.

(3.2) *RP*:

    S = R

For example: *roger, negative, wilco, affirm*, etc.

(3.3) *VP*:

    S = V {NP / CP}

For example: *direct Wicken, cross Wicken at 52, join downwind, cleared visual approach, return to ramp*, etc.

(4) *Eliciting*: eliciting not only designates questioning but also requesting. Therefore, there are two possibilities to indicate this particular speech act; VP and interrogative clause as follows:

(4.1) *VP*: there are three members of C2 which indicate the act of requesting act; *advise, report* and *request*.

    S = V {NP / CP}

For example: *advise if able to proceed parallel offset, advise type of transponder, report speed, report distance from Stephenville request temperature , request holding instructions,* etc.

(4.2) *Interrogatives*:

(a) Q = Aux N VP

For example: *are you ready for immediate departure* and *do you want vectors*.

(b) Q = Wh V NP

For example: *What is the delay*

The realizations of syntactical arrangements to illustrating four prime communicative functions of air-ground communication are rather diverse as certain pattern of particular phrases can denote several speech acts especially VP formation which can denote not only directing but informing, acknowledging and eliciting. It is explicit that syntactical arrangement of radiotelephony is not only distinctive in its composition but also in the illocutionary force it possibly possesses.

5.3.2.3 Composition of syntactical patterns in the utterance of radiotelephony

At this point, all of the possible structural patterns of typical arrangements in reference are clearly demonstrated. However, in each utterance, it almost always contains at least one syntactical arrangement which is the common feature of the utterance in its corresponding language. It is to completely convey all relevant information at one time to cooperate with the constraints of the communicational context.

Despite, each utterance can be very simple consisting of only one element such as *Fastair345, G-CD, downwind* and *stopping* or be very complex containing up to 8 elements such as '*G-CD Walden Tower, present weather, wind 360 degrees 5 knots, visibility 20 kilometers, cloud 2500 feet, QNH 1008*', '*Mayday Mayday Mayday Walden Tower G-ABCD, engine on fire, making forced landing 20 miles, south of Walden, Passing 3000 feet, heading 360*'.

However, the most common length of strings is 2 – 3 elements such as, '*Fastair 345, accept flight level 220*', '*Climbing to flight level 220, Fastair 345*', '*Fastair 345, closing from the right turn, right heading 270*', '*Return to ramp, 118.3, Fastair 345*', etc. The fact is that the possibilities of arrangements in the utterance are diverse which mostly depends on the intention of the speaker to decide on the detail of message delivered at a time.

In conclusion, there are two core types of syntactical structures in radiotelephony; *phrase* and *clause formations*. Most of the structures are represented in the formation of phrases; NP, VP, RP and CP rather than a complete clause. It is interesting that NP and RP are mainly used to serve the communicative functions of informing and acknowledging whereas VP tends to be an independent unit more than a dependent one as a part of a clause with various communicative functions to denote; directing, requesting and acknowledging. CP in radiotelephony, on the contrary, maintains the focal property as a complement to both NP and VP as in regular English language.

Apparently, the internal structure of syntactical structure of radiotelephony is rather simple but unique in the way that each type of arrangements is sequenced in the utterance to demonstrate different communicative functions in air-ground discourse. Some particular patterns illustrated above are definitely not conventional in the natural language. However, to interpret and analyze its arrangements, it highly needs background knowledge of unique grammatical characters of items in each form-class, situational parameter of air-ground discourse as well as aviation-related profiles.

On the whole, the syntactical structure of radiotelephony is more or less a condensed version of natural language as quite a few properties and possibilities are limited or even eliminated to allow the language to be more precise and compatible to effectively use in air-ground communication context.

5.4 Morphology in Radiotelephony

The very last area of the study is at morphological level; the traditional analysis of morphemes, *Compare and Contrast* (Nida, 1949), is implemented to discover the functions and appearances of the *grammatical bound morphemes* of radiotelephony which principally determine grammatical meaning; namely *–s, -ed* and *–ing* as they are the most noticeable in the data as well as they are the prime grammatical morphemes in its corresponding language. Therefore, in this section, derivational morphemes which are used to create new lexeme are excluded as the discussion is conformed in the analysis of lexicon in section two of the chapter.

To conduct the analysis at morphological level, only pairs of tokens, base-form free morpheme and base-form attached with bound morpheme as well as their appearance in syntactical formation, are examined; otherwise there won't be a concrete evidence to point out whether radiotelephony obtains these grammatical morphemes as one of its focal linguistic properties or not. Then, the generalization of existing grammatical bound morpheme in the language is carried out and thoroughly reviewed on its properties by comparing to the ones in its canonical corresponding English language.

In radiotelephony, there are two crucial form-classes required to be involved in every single internal syntactical arrangement to covey the information to the interlocutors; namely C1 class and C2 class which are equivalent to noun class and verb class respectively. Hence, the grammatical bound morphemes of the members of the two word classes definitely express absolute syntactical characters of the language. As a result, the discussion will be conducted in two parts; the first part concerns the morphemes that indicate the grammatical relation to C1 and the second part involves the morphemes that lead to the grammatical relation to C2.

5.4.1 Grammatical morpheme of C1 in radiotelephony

Basically, the prime grammatical morphemes which distinguish a noun from any other word class in canonical English language are possessive and plural inflections. Hence, the possibilities of occurrence with the possessive {–'s} and plural or number {–s} are the focal character of a noun in regular English. On the contrary, in radiotelephony, C1 is usually defined by the possibility of occurrence in a particular position in the sentence more than these inflections. Numbers of C1 members seem to obtain number inflectional marker such as intentions, brakes, vectors, instructions, restrictions, transmissions, etc. While *brakes*, *intentions* and *vectors* are officially designated to be lexical terms with permanent -s bounded to them without any specific grammatical meaning to it in the manual, most of the items are attained with suffix {–s} with unknown reason since there is no base form that is freed from that particular morpheme to compare.

Nevertheless, there is small evidence that number marker may endure in the language as there are 2 items; delay and minute which can appear with or without inflectional morpheme {–s} expressing singularity and plurality of their properties as illustrated in the table below;

Base form	With plural marker - s	Samples of statement
delay	delays	a) Fastair 345 expected *delay* 10 minutes
		b) landing *delays* at Georgetown 20 minutes
minute	minutes	a) expect one *minute* delay due B747 taxing behind
		b) landing delays at Georgetown 20 *minute*s

Table 5.26 – Table of Morpheme {-s} in Reference Radiotelephony

Even though there are only two tokens found in the data, it is fundamentally proved that the existence of plurality inflectional morpheme is truly one of C1 grammatical properties. There is also a secondary evidence to support this assumption as to examine some of the syntactical structures in the data such as '*Alternatives are flight level 220 or flight level 260*' and '*Fastair 345 large flock of birds north of runway 27*'. The very first sample, 'are' which is a verb-like in the sentence indicates that 'alternatives' is plural C1, so does the second sample which 'flock' referring to a group of sheep, goats or birds of the same type, then 'birds' in this particular phrase is unarguable a plural C1. And since {–s} is already a plurality marker in the language, to conclude that both *alternatives* and *birds* are pluralized by being inflected with {–s} is not at all a vague claim.

On the other hand, any item placed before 'is' shall be considered as a singular C1 as in '*heading is good*'. Heading in this case can be determined as either uncountable C1 or singular C1. However, there is no absolute answer since the item affixed with plural marker {–s} does not exist in the data. As a result, C2 members, *is* and *are*, somehow help to primarily prove the presence of number marker in radiotelephony.

However, the items designated to obtain {–s} at the beginning to become a terminology in radiotelephony even with the new reference such as *vectors,* and *intentions* or to avoid the similarity in pronunciation as *brakes* as discussed in lexical analysis section in this chapter state the otherwise as there is no explicit proof from the grammatical arrangements in the context. Consequently, suffix –s might possibly be considered also as a derivational morpheme in the language to create a new lexeme out of its original base. But, this is only the rough assumption which requires a great amount of data to substantiate.

Another core inflectional morpheme of a noun-like item as C1 is possessive ending {'s}. This bound morpheme is completely without a doubt, excluded from the grammatical features of C1 since there is no trace of this morpheme in the language.

5.4.2 Grammatical morpheme of C2 in radiotelephony

In canonical English language, grammatical characterizations of verb are usually not only pointed out by its position in the sentence as a head of predicate, but mostly also grammatical inflectional suffixes to display tense, aspect and voice.

The grammatical morpheme {-s} is commonly marked on a verb as to indicate third person singular subject in present tense to illustrate a grammatical expression on time relation to a present event at the moment of speaking whereas inflectional morpheme {-ed} is marked on any verb to express past tense and perfect aspect to encode information about time frame as well as passive voice as to give information about the roles of different participants as the recipient of the action in an event is the grammatical subject and also, inflectional ending {-ing} as to demonstrate progressive aspect indicating that something is ongoing or unfinished at the moment of speaking. Next, the discussion on each grammatical inflectional morphemes; {-s}, {-ed} and {-ing} are carried out as the followings;

(1) *Inflectional morpheme {-s}*

According to the reference data of radiotelephony, all of the verb-like C2 are basically in their base form as a non-finite verb in the natural language which are not marked by inflectional suffix to encode tense, aspect and voice.

Nevertheless, it cannot be automatically concluded that there is no tense in the language. Actually, the only time indication which C2 illustrates is present tense as the communication context of air-ground communication is usually reserved for conversing on the activity during the time of speaking. It is more explicit when examining a clause in the data; 'you *are unreadable*' and 'heading *is good*'. Both 'is' and 'are' are still in their base form indicating the present time with no form changing that possibly indicates otherwise. Furthermore, the majority of C2 appeared in imperative formation or VP as it has to be in its base form to function directing, requesting and informing which certainly relates to state of being at present time. Thus, it would be difficult to find an evidence of inflectional morpheme {-s} to indicate agreement of present tense in radiotelephony since C2 is confined to appear in very limited structural condition.

(2) *Inflectional morpheme {-ed}*

Even though it is stated that there is no bound morpheme expressing tense, aspect and voice, there is the presence of morpheme {-ed} attached to C2. Some of C2 items are coined with permanent {-ed}, *cleared* and *recleared* to be lexical terms, determining official permissions to conduct a specific flight activity such as taxiing, take-off, push-back or landing and to cancel the previous clearance to perform flight activity respectively while some of C2 occasionally obtain morpheme {-ed}such as;

Base form	With marker - ed	Samples of statement
advise	advised	a) Fastair 345 *advise* type of transponder b) Fastair 345 maintain flight level 350 until *advised*
approve	approved	a) G-CD unable to *approve* due traffic congestion b) Fastair 345 start-up *approved*
expect	expected	a) *expect* one minute delay due B747 taxing behind b) right hand pattern *expected*
extend	extended	a) G-CD *extend* downwind b) Fastair 345 request *extended* holding
resume	resumed	a) *resume* normal rate of descent b) Fastair 345 flight level 310 *resumed*
vacate	vacated	a) G-CD take off immediately or *vacate* runway b) Fastair 345 take first right when *vacated*

Table 5.27 – Table of Morpheme {-ed} in Reference Radiotelephony

It is demonstrated that in radiotelephony, morpheme {-ed} is generally used as a derivational morpheme rather than an inflectional morpheme. Those items in the table affixed with {-ed} are mostly according to its position in the statement and semantic roles as an adjective-like C3 when they follow C1 to extend its properties, qualities or states except *advised* and *vacated* which are more like a noun.

However, they all somewhat are similar to verbs with inflectional morpheme {-ed} to illustrate passive voice but some of the element either subject or auxiliary – be, or both are omitted if comparing to the complete passive construction in canonical English language. But, it would be irrational to specify {-ed} at this point a voice marker without a token of complete formation of passive construction from the data to explicitly indicate as such.

On top of that the underline concept of examining radiotelephony is not through the eyes of conventional English so that C2 with {-ed} primarily functions as a modifier (C3) to the preceding C1. The specific position which is behind C1 is to avoid the misunderstanding. For example, Fastair 345 request *extended* holding, extended is conventionally placed before C1 it modifies, but if there is no C2 in front of this so-called adjective-noun combination, the listener may confuse it as the speaker conducts a particular performance by extending downwind. As a result, extended will be placed behind the C1 as in Fastair 345 downwind extended as when to report of the current condition of the flight performance.

There might be an argument that *advised* and *vacated* possibly are verbs with past tense marker {-ed}, but if interpreting the items according to the words surrounding in the context, there is no sense of expressing past event but they both tend to point out a state of affair which is about to happen.

Nonetheless, {-ed} in radiotelephony is definitely a derivational morpheme rather than an inflectional morpheme that not only extending the use of existing

lexemes by conversing them to be adjective-like items as its convention duty in natural English language but by also shifting them to be noun-like items.

(3) *Inflectional morpheme {-ing}*

Again, suffix {-ing} to point out progressive aspect in reference radiotelephony is none as there is no token representing the syntactical arrangement of progressive aspect; subject – auxiliary – V{-ing}, but commonly works as a derivational morpheme to transform a verb-like C2 to function as a noun. There are numbers of C2 affixed with morpheme {-ing} and generally placed at the beginning of NP as to acknowledge the given instruction;

Base form	With marker - ing	Samples of statement
climb	climbing	a) Fastair 345 *climb* to flight level 220 b) *climbing* to flight level 220
hold	holding	a) Fastair 345 *hold* at Wicken flight level 220 b) *holding* position
descend	descending	a) G-AB *descend* to flight level six-zero b) *descending* to 3000 feet
monitor	monitoring	a) Fastair 345, monitor ATIS 123.25 b) *monitoring* 123.2
request	requesting	a) Fastair 345 *request* clearance to join A1 at Marlow b) *requesting* priority landing
reduce	reducing	a) Fastair 345 reduce to minimum clean speed b) Fastair 345 *reducing* to 210 knots

Table 5.28 – Table of Morpheme {-ing} in Reference Radiotelephony

At this point, the items with morpheme {-ing} or verbal nouns in radiotelephony are rather different from any in its corresponding language as they do not conventionally come with the sense of progressive aspect as to indirectly indicate that the particular action is about to perform or it is performing at the time of speaking, but rather point out that the instruction on conducting a specific activity is recognized and about to be performed, probably performing at the time of the speaking or completely performed. As a result, {-ing} affixed to C2 has no explicit sense of time in radiotelephony.

Therefore, it is more systematic to consider morpheme {-ing} in radiotelephony as a derivational morpheme not an inflectional morpheme with only the interpretation under the notion of aviation knowledge and air-ground communication context since there are also amount of tokens illustrating the same sense with their base form such as *return* to ramp 118.3 Fastair 345, *cross* Wicken at 52 Fastair 345, *vacate* via Alpha Fastair 345, etc. as to acknowledge the instruction

In conclusion, the only apparent grammatical inflectional morpheme in radiotelephony is {-s} as a plural marker to C1 member whereas the rest which commonly affixed to C2 to indicate tense, aspect and voice are not found in the language. Instead, suffix {-ed} and {-ing} are functioning as derivational morphemes

which are the basic mechanisms to extend the use of existing lexemes in the natural language.

Since radiotelephony is designed to obtain a confined set of grammatical properties by excluding the probability of linguistic complications in its corresponding language as to avoid misunderstanding and grammatical confusing when generated the language in the communication which is conducted under the time constraints. Consequently, those grammatical inflections are intentionally eliminated in radiotelephony

5.5 Summary

The overall linguistic properties of constructed reference grammar in radiotelephony are represented in very confined and formulaic patterns. The fundamental features in radiotelephony are certainly acquired from its corresponding English language with numbers of constraints and descriptions are eliminated in order to be suitable with the nature of situation parameters of air-ground communication as well as to make the language to become very simple with very least ambiguity for multi nationality pilots and air traffic controllers around the world. However, at some point, it is truly difficult to systemize some aspect of the properties mostly at syntactical and morphological level as there is no stillness of particular occurrences in the language. Nonetheless, there are a great amount of properties that can define and describe without uncertainly to point out its outstanding linguistic features as a sublanguage.

CHAPTER VI

LINGUISTIC ANALYSIS IN ACTUAL RADIOTELEPHONY

6.0 Introduction

To understand the insights of radiotelephony, the analysis upon several linguistic aspects are unveiled comparing to the constructed reference ones in order to indicate and describe the variants occurred to the language when it is used in the actual air-ground communication. A set of actual discourse collected from Cockpit Voice Recorder (CVR) from two websites, *http://aviation-safety.net* and *http://www.tailstrike.com* from year 1994-2004 in 26 incidents with 563 messages or 283 exchanges are examined under the same criteria implemented in the analysis of the reference data. In this chapter, four aspects of linguistic properties; discourse, lexicon, syntax and morphology of actual radiotelephony is elaborately explained accordingly.

6.1 Discourse Structure of Actual Air-ground Communication

To conduct the analysis, the actual data is processed through the concept of 'move' and 'act' in Model of Conversational Analysis developed by Sinclair & Coulthard (1974) along with the underlying notion of conventional theoretical framework of conversational analysis and displayed in the designated table in displayed the detailed element of each exchange under specific labels, exactly the same as when analyzing the reference data.

The discourse structure in actual air-ground communication is absolutely based on the fundamental principle of communication process model, the fundamental notion of turn-taking strategy and influenced by various constraints associated with distinct situational parameters similar to reference discourse. Again, the common exchanges found in the data are *direct exchange*, *inform exchange*, *elicit exchange* and *summon exchange* with an additional type of exchange, *close exchange*. The last two exchanges are only the supplement not the prime exchanges. The description of each exchange is orderly illustrated according to its frequency count from the most numbers found to the least; *direct exchange, inform exchange elicit exch*ange, *summon exchange* and *close exchange* accordingly.

6.1.1 *Direct exchange*

The direct exchange is the most frequently found in the data, 155 from 283 exchanges are found as the air-ground communication is on instruct-respond basis, solely initiating by an air traffic controller. Basically, the external structure of direct exchange composes of three moves; namely directing move as the initiation,

acknowledging move as the response and optional acknowledging move as the follow-up which are exactly the same as the norm moves in the reference organization.

The figure below illustrates the internal organization of direct exchange consisting of initiation, response and follow-up respectively. It is clearly noticed that the structure of the exchange is very complicated with diverse selective choices of acts in each move comparing to the reference one. The options of acts to carry out and orderly place are very broad, but the primary external pattern of moves is restrictedly reserved.
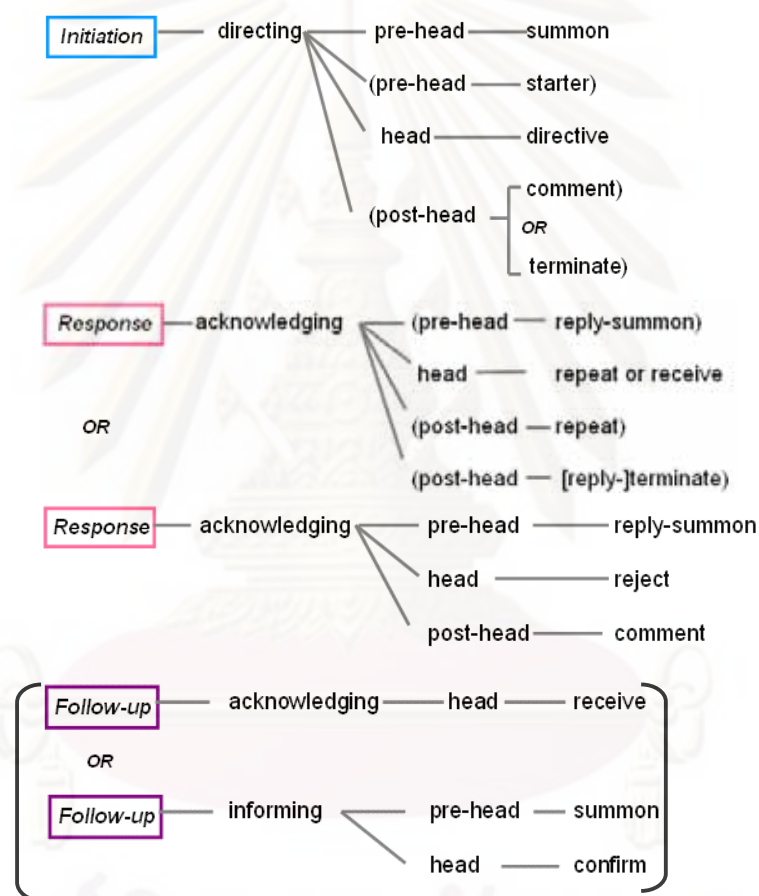
Diagram 6.1 - Structure of Actual Direct Exchange

Therefore, each component of the exchange; initiation (directing move), response (acknowledging move) and follow-up (optional acknowledging move), is respectively explained to provide explicit picture of direct exchange.

The initiation of direct exchange in actual discourse is very similar to the reference one, but there are more options of acts the speaker utilizes as shown in the diagram below;

```
Initiation ── directing ─── pre-head ─── summon
                          (pre-head ─── starter)
                          head ─── directive
                          (post-head ─┬─ comment)
                                      OR
                                      └─ terminate)
```
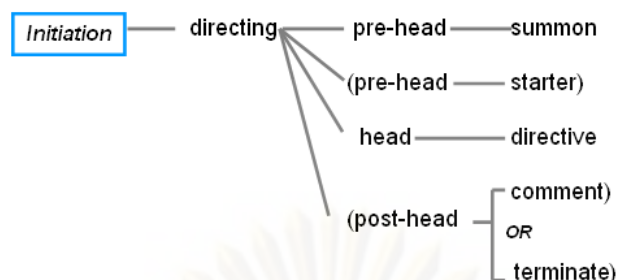
Diagram 6.2 - Structure of Initiation in Actual Direct Exchange

The addresser usually starts with summon act as a pre-head act, calling the addressee's call sign, then possible continues with starter act to provide additional information related to the coming act. After that, directive act is performed as the head of directing move;

Example (a):

ATC	*TWA 800* *amend the altitude maintain 13000*	*summon* *directive*	*pre-head* *head*	*directing*	I	Direct
PT	TWA 800 heavy okay stop climb at 13000	reply-summon receive repeat	pre-head head post-head	acknowledging	R	

(Table of discourse analysis B: exchange 148)

It is as well possible that the addresser *might not perform summon act* at all but ever rare as the only one item found. The speaker prefers to express directive act instantly in case that there is already summon exchange stated as the opening stage of the communication. The structure of summon exchange will be discussed later.

Example (b):

ATC	800	summon	head	opening	I	Summon
PT	go ahead	reply-summon	head	answering	R	
ATC	*tell your mechanic to push you back*	*directive*	*head*	*directing*	I	Direct
PT	okay	receive	head	acknowledging	R	

(Table of discourse analysis B: exchange 127-8)

In actual data, there is an extra optional act as the post-head of the move either comment act or terminate act. Comment act is to provide additional information upon the preceding directive act;

Example (c):

ATC	THA 261 check wheels Cleared to land runway 22, surface wind 290 degrees at 3 *Caution runway wet*	summon directive *comment*	pre-head head *post-head*	directing	I	Direct
PT	Cleared to land runway 22 THA 261	repeat terminate	head post-head	acknowledging	R	

(Table of discourse analysis B: exchange 55)

whereas terminate act is to perform ritual tokens of social expression to manifest the end of directing move in the initiation as well as to preserve social tie which is definitely won't occur in the reference pattern of initiation in direct exchange;

Example (d):

ATC	Fine Air 101 heavy monitor tower 118.3 *see you*	summon directive *terminate*	pre-head head *post-head*	directing	I	Direct
PT	118.3 see you later	repeat reply-terminate	head post-head	acknowledging	R	

(Table of discourse analysis B: exchange 99)

The internal response structure of direct exchange representing '*readback*' stage in communication process model is very contradictory since there are two possible patterns; response pattern A and response pattern B conducted with complicated sequence and numbers of acts conducted, comparing to the patterns with more systematic structure of acts allowed in the reference structure.

The participant seems to freely mix and match the sequence of the reference patterns of acts in order to state the reply in acknowledging move. Nevertheless, the rough structural frame of the compulsory response is still preserved. The patterns are described in accordance with the frequency in the data as the following;
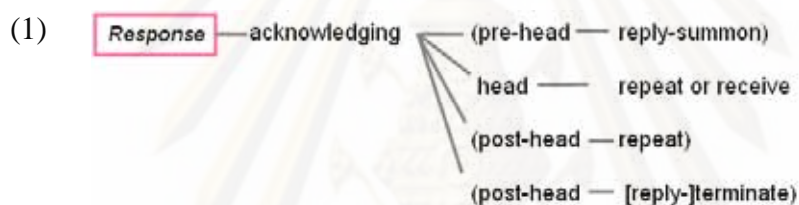
Diagram 6.3 - Structure of Response Pattern (1) in Actual Direct Exchange

The first alternative to generate response move begins with reply-summon act which is again optional. Next, repeat act is initiated by restating the whole message or part of the message received as the head of acknowledging move to both exhibit that the message from preceding move is perceived and emphasized;

Example (e):

ATC	Kiwi Air 17 descend and maintain 6000	summon directive	pre-head head	directing	I	Direct
PT	*Kiwi Air 17 6000*	*reply-summon repeat*	*pre-head head*	acknowledging	R	

(Table of discourse analysis B: exchange 74)

Or the head of the response is also a receive act using specific response expression such as '*roger*', '*wilco*' or '*OK*". If the preference starts instantly with receive act, usually the reply-summon as a pre-head is omitted. Instead, there is a terminate act with the responder's call sign stated to indicate the end of the exchange as well as to identify own self;

Example (f):

ATC	PLL radar contact continue	summon starter directive	pre-head pre-head head	directing	I	Direct
PT	*Wilco* *PLL*	*receive* *terminate*	*head* *post-head*	acknowledging	R	

(Table of discourse analysis B: exchange 22)

The participant may also follow the receive act with repeat act as the post-head of the move to emphasize on the instruction received;

Example (g):

ATC	ACE cargo 70 P continue the left turn heading 260	summon directive	pre-head head	directing	I	Direct
PT	Roger *turn left heading 260*	receive *repeat*	head *post-head*	acknowledging	R	

(Table of discourse analysis B: exchange 61)

(2)

Diagram 6.4 - Structure of Response Pattern (2) in Actual Direct Exchange

The second pattern of response move is mainly applied when the co-participant refuse to perform the instruction delegating in directive act. The move begins with reply-summon act, then reject act is to explain why he cannot comply with the direction. The final required act is to provide extra information on the present circumstance as a reason why the instruction cannot be performed and to state the intention with reference to the preceding move and act;

Example (h):

ATC	ABX 827 Indianapolis 128.4	summon repeat	pre-head head	directing	I	Direct
PT	*ABX 827* *We are going to stay on this frequency a minute* *We are descending through 8000*	*reply-summon* *reject* *comment*	*pre-head* *head* *post-head*	acknowledging	R	

(Table of discourse analysis B: exchange 62)

The third element of direct exchange, follow-up move representing '*hearback*' stage in communication process model is non-required (found only 2 exchanges in the data) similar to the reference one. There are two possibilities which consist of different types of moves as listed as follows;

(1)
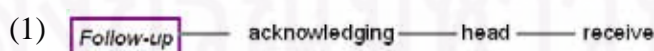
Diagram 6.5 - Structure of Follow-up Pattern (1) in Actual Direct Exchange

The first preference, the addresser is only to acknowledge that the addressee already acquired the message he delivers by saying 'roger'.

Example (g):

ATC	8807 you can vacate at the end	summon directive	pre-head head	directing	I	Direct
PT	Vacating at the end	receive/repeat	head	acknowledging	R	
ATC	***Roger***	***receive***	***head***	***acknowledging***	***F***	

(Table of discourse analysis B: exchange 168)

(2)
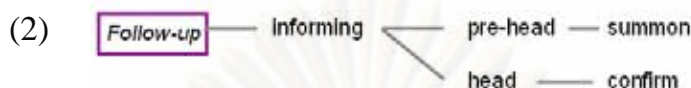
Diagram 6.6 - Structure of Follow-up Pattern (2) in Actual Direct Exchange

The second contains informing move, beginning with summon act to call out the target participant and then proceeding with confirm act to give agreement or to validate the correctness of preceding utterance;

Example (h):

ATC	EgyptAir 990 you're cleared to Hotel via DOVEY Maintain flight level 330 Maintain Mach 0.80	summon directive	pre-head head	directing	I	Direct
PT	EgyptAir 990 cleared to Cairo Zulu 330, 80 Mach	reply-summon repeat	head post-head	acknowledging	R	
ATC	***EgyptAir 990*** ***correct***	***summon*** ***confirm***	***pre-head*** ***head***	***informing***	***F***	

(Table of discourse analysis B: exchange 233)

The follow-up in actual direct exchange is rather divergent, comparing to the reference follow-up especially the second preference which explicitly represents required 'hearback' stage in communication process model as the speaker clearly verifies the correctness of prior utterance through certain linguistic form whereas in reference data, the speaker prefers using receive expression, '*roger*', denoting '*I have received all of your last transmission*' or using the target participant's call sign to express the acknowledgement and to end the move at the same time.

The first preference in the actual is almost alike to the first follow-up pattern (1) in the reference, but in the actual discourse, a controller chooses not to addressing the target participant but jumping into the receive act right away.

Incomplete direct exchange is also presented in the data. For some reasons, only the first pair-part or the initiation is conducted. But, there is no difference in the structure from the complete one. The possible causes are the malfunction of radio transmission system, the unreadiness of the target participant to reply, and the interference from unexpected incident. However, when in the normal context, the complete moves in the exchange are always performed.

6.1.2 *Inform exchange*

Inform exchange which is the second frequent exchange, 86 from 283 exchanges sighted in the data. Chiefly, the composition of inform exchange in actual discourse still holds with only two moves, informing move as the first-pair part and

acknowledging move as the second-pair part, exactly the same as the one in the reference inform exchange.

Even so, the internal structure of each move somehow slightly differs from those in reference pattern in numbers and types of act, but it is not as complex as direct exchange previously described. The entire structure of inform exchange is exhibited below;
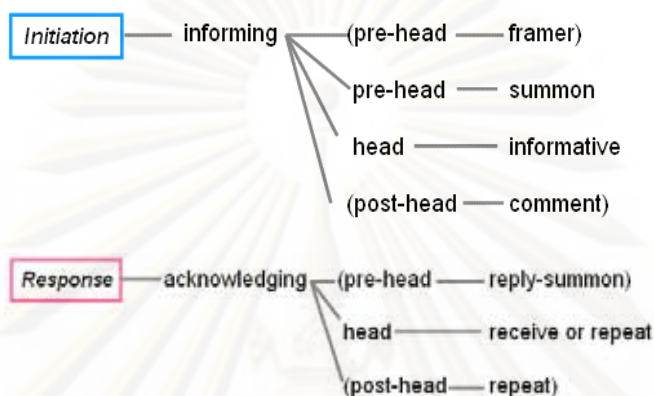
Diagram 6.7 - Structure of Actual Inform Exchange

Even though there is less change within the internal structure of each move, each composite of the exchange is explained one by one, starting from initiation move and response move respectively.
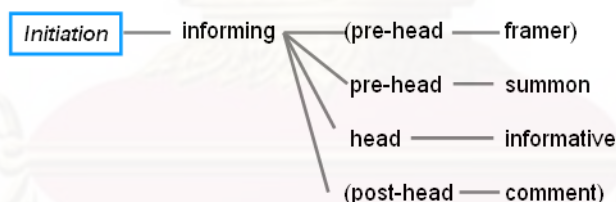
Diagram 6.8 - Structure of Initiation in Actual Inform Exchange

To initiate regular informing move, the speaker, either a pilot or a controller, generally starts with summon act. If the speaker is a pilot, there are two possibility of summoning, either the target participant's call sign, followed by own call sign or only own call sign is stated. But, if the speaker is a controller, the target participant's call sign is addressed, then may or may not proceed with own call sign. However, referring to the data, the aircraft's call sign is regularly stated by both participants, no matter who initiates the informing move. This is similar to the ones in the reference data. After that the speaker continues with informative act as the head of informing move to give specific information.

Example (a):

ATC	**THA 261** **negative PAPI light right side of runway,** **runway edge light interval 120 meters,** **runway end light interval 6 meters, caution** **barrier 400 meters from runway22**	**summon** **informative**	**pre-head** **head**	informing	I	Inform
PT	THA 261 thank you	reply-summon receive	pre-head head	acknowledging	R	

(Table of discourse analysis B: exchange 9)

Summon act in the initiation is not essential to perform every time when starting the turn with the same reason as in the initiation of direct exchange because of the use of summon exchange as the opening stage of the communication. Thus, the speaker may omit summon act as a pre-head of the move in proposed exchange since the participants are already engaged in the conversation which again won't occur in the reference structure even though there is the presence of summon exchange as the lead-in to the next core exchange in the discourse;

Example (b):

PT	Tower Car 99	summon	head	opening	I	Summon
ATC	99, Kennedy	reply-summon	head	answering	R	
PT	***clear of traffic runway 31L***	***informative***	***head***	***informing***	***I***	***Inform***
ATC	99, roger	summon receive	pre-head head	acknowledging	R	

(Table of discourse analysis B: exchange 105-6)

At the beginning of the initiation, the speaker may conduct framer act to appoint the onset of the move in routine conversation with very common linguistic expression, differing from framer act in reference informing move which is preserved for emergency matter;

Example (c):

PT	***Hey*** Tower, American 1572 We are on a 6-mile final for runway 5	***framing*** summon informative	***pre-head*** pre-head head	informing	I	Inform

(Table of discourse analysis B: exchange 67)

The realization of framing act is common linguistic form such as *hey* regarding to the example which won't possibly be found in the reference data is not allowed to apply in the communication because they may lead to ambiguity or misunderstanding.

It is also possible that the speaker as well delivers comment act as the post-head of the move as to provide additional information upon the preceding act, but it is rarely found in the data and there is none in the reference data;

Example (d):

ATC	Kiwi Air 17, fly heading 070 ***radar vectors for your descent***	summon informative ***comment***	pre-head head ***post-head***	informing	I	Inform
PT	Air 17 070	reply-summon receive	pre-head head	acknowledging	R	

(Table of discourse analysis B: exchange 72)

To conduct the second pair-part of inform exchange representing '*readback*' stage in communication process model, the participant need to perform the pattern of acknowledging move as the following diagram;
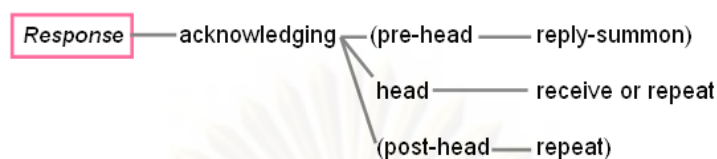
Diagram 6.9 - Structure of Response in Actual Inform Exchange

Reply-summon act as the pre-head of acknowledging move is optional. The responder usually performs receive act to express the acknowledgement to the prior turn as well as to indicate the end of the move with response expression such as 'roger', 'OK' and 'copy' accordingly;

Example (e):

PT	New York Center TWA 800 heavy climbing 1100	summon informative	pre-head head	informing	I	Inform
ATC	TWA 800 Boston Center *roger*	reply-summon *receive*	pre-head *head*	acknowledging	R	

(Table of discourse analysis B: exchange 144)

Example (f):

ATC	American 1420 runway four right RVR 1600	summon informative	pre-head head	informing	I	Inform
PT	*okay*	*receive*	*head*	acknowledging	R	

(Table of discourse analysis B: exchange 79)

Example (g):

ATC	American 1572 you are on the final	summon informative	pre-head head	informing	I	Inform
PT	*Copy*	*receive*	*head*	acknowledging	R	

(Table of discourse analysis B: exchange 65)

However, to express acknowledgement, there are another possible linguistic token to be performed in receive act which is the speaker's call sign (only when the move is carried out by a pilot);

Example (h):

ATC	THA 261 caution runway wet	summon informative	pre-head head	informing	I	Inform
PT	*261*	*receive*	*head*	*acknowledging*	*R*	

(Table of discourse analysis B: exchange 31)

Besides performing receive act as the head, the speaker also possibly expresses the acknowledgement with repeat act presenting in the entire or partial repetition of preceding message;

Example (i):

ATC	Libert 8807 report a 737 on short final in sight on 27	summon informative	pre-head head	informing	I	Inform
PT	8807 ***an aircraft on final and it is a 737***	reply-summon *repeat*	pre-head *head*	acknowledging	R	

(Table of discourse analysis B: exchange 159)

The speaker may close the move with repeat act as the post-head if the previous act is receive act, just to emphasize on the message given which always contains important partial of the entire message. This is also not found in the reference data, instead there is terminate act as the optional post-head of the move with the responder's call sign;

Example (j):

ATC	PDA radar contact to make your heading 240	summon informative	pre-head head	informing	I	Inform
PT	Roger ***heading 240***	receive *repeat*	head post-head	acknowledging	R	

(Table of discourse analysis B: exchange 26)

All in all, the internal structure of actual inform exchange remains as simple as the reference one with slightly distinguishing in numbers and types of acts composed in the moves, some is included and some is excluded. Comparing to direct exchange which is the main exchange frequently conducted in air-ground communication; there are fewer possibilities for the participants to conform.

6.1.3 *Elicit exchange*

The very last main exchange is elicit exchange representing the function of seeking or requesting mainly for obligatory linguistic/verbal response or even asking for a permission to perform a particular action from the co-participant. This exchange can be initiated by both a pilot and a controller. Elicit exchange is the only exchange among the three that almost half of the data (24 out of 51 exchanges) consists of three elements; initiation, response and follow-up. However, the third element of the exchange is still optional.

The components of moves performed in elicit exchange are exactly the same as the reference one, which are eliciting move in the initiation, informing move in the response and acknowledging move in the follow-up but only numbers and types of acts are different as demonstrated in the diagram below;
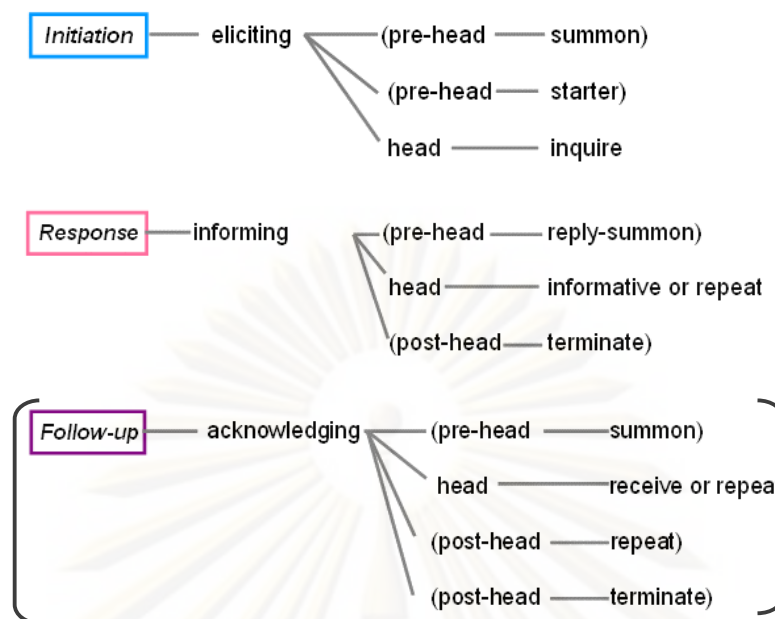
Diagram 6.10 - Structure of Actual Elicit Exchange

The organization of initiation is very simple. The only difference between the actual pattern and the reference pattern is numbers of acts as the optional framer act is excluded from the eliciting move since it will be performed only in emergency case.
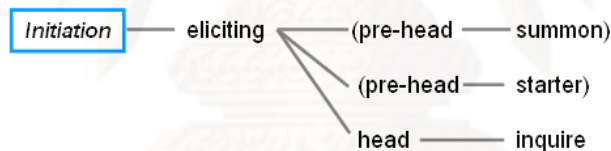
Diagram 6.11 - Structure of Initiation in Actual Elicit Exchange

To initiate eliciting move, the speaker usually begins with summon act to address the target co-participant. After that, he probably continues with starter act to provide specific information mostly related to the present condition of the aircraft. Then, the initiation is closed with inquire act, the head of eliciting move which is to propose for the information or indirectly request for a permission to perform routine flight operation, realized by either interrogative or imperative;

Example (a):

PT	*Tokyo control Airsystem 346 reaching flight level 250 request further low*	*summon starter inquire*	*pre-head pre-head head*	eliciting	I	Elicit
ATC	Airsystem 345 stand by	reply-summon informative	pre-head head	acknowledging	R	
PT	Roger stand by	receive repeat	head post-head	acknowledging	F	

(Table of discourse analysis B: exchange 190)

However, summon act can also be omitted from the move if the participant already opens the communication with summon exchange. So, it is not necessary to begin the proposed eliciting move with summon act;

Example (b):

PT	Tokyo, Navy juliet tango 036	summon	head	opening	I	Summon
ATC	Navy juliet tango 036, go ahead	reply-summon	head	answering	R	
PT	*confirm routing after Oshima*	*inquire*	*head*	eliciting	I	Elicit
ATC	Navy juliet tango 036 after Oshima proceed direct to Yankee Uniform then direct	summon informative	pre-head head	informing	R	
PT	Roger after Oshima, Yankee Uniform and direct thank you	receive repeat terminate	pre-head post-head post-head	acknowledging	F	

(Table of discourse analysis B: exchange 200-1)

Or if elicit exchange is conducted after other exchanges by the same participants, summon act is omitted at the beginning of eliciting move;

Example (c):

ATC	Critter 592 turn left heading 270 descend and maintain 7000	summon directive	pre-head head	directing	I	Direct
PT	270, 7000 592	repeat terminate	head post-head	acknowledging	R	
ATC	*what problem are you having*	*inquire*	*head*	*eliciting*	*I*	*Elicit*
PT	smoke in the cockpit smoke in the cabin	informative	head	informing	R	
ATC	roger	receive	head	acknowledging	F	

(Table of discourse analysis B: exchange 115-6)

According to the samples above, it is explicitly illustrated more natural pattern of the exchange in air-ground discourse. Since the identification-recognition process is already performed both in the separated exchange as in example (b) and as embedded act in the prime exchange as in example (c), there is no need to conduct it again in the next consecutive exchange. This phenomenon also occurs both in direct exchange and inform exchange.

Next, the response or the second pair-part of elicit exchange is explained. In the actual pattern, optional terminate act as the post-head of the move is added while reply-summon act becomes nonobligatory comparing to the reference internal pattern.
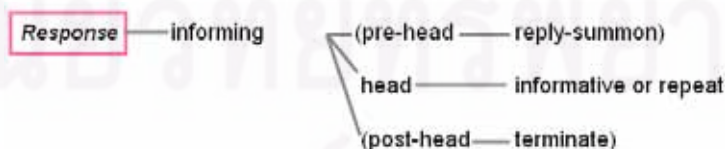
Diagram 6.12 - Structure of Response in Actual Elicit Exchange

At the beginning of the move, the addressee may or may not include reply-summon act to initiate the response move;

Example (d):

PT	Tokyo, Japanair 952 request direct VENUS	summon inquire	pre-head head	eliciting	I	Elicit
ATC	*Japanair 952* stand by	*reply-summon* informative	*pre-head* head	informing	R	

(Table of discourse analysis B: exchange 181)

Regarding to the data, most of the response contains only the head of the move which is informative act or repeat act, both aim at providing information associated with the preceding move;

Example (e):

ATC	Dynasty 676 confirm go around	summon inquire	pre-head head	eliciting	I	Elicit
PT	*Confirm go around*	*repeat*	*head*	informing	R	

(Table of discourse analysis B: exchange 96)

The response may be closed with terminate act, own call sign to either end the exchange and to identify own self if there is no follow-up move conducted;

Example (f):

ATC	THA 261 request position	summon inquire	pre-head head	eliciting	I	Elicit
PT	*FAF outbound* *THA 261*	*informative* *terminate*	*head* *post-head*	informing	R	

(Table of discourse analysis B: exchange 50)

The follow-up move is rather common in actual elicit exchange even though it is not mandatory. There are options to select in order to perform the follow-up as three different acts are non-required. Only receive act or repeat act is preferable.
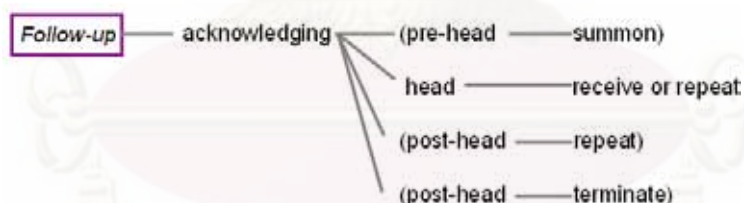
Diagram 6.13 - Structure of Follow-up in Actual Elicit Exchange

To begin acknowledging move in the follow-up, the speaker has to decide whether he wants to perform summon act or not. If not, he commonly starts with receive act or repeat act to propose an acknowledgement of the prior message;

Example (g):

ATC	152 confirm you are making left turn	summon inquire	pre-head head	eliciting	I	Elicit
PT	We are turning right	informative	head	informing	R	
ATC	*152* *OK*	*reply-summon* *receive*	*pre-head* *head*	acknowledging	F	

(Table of discourse analysis B: exchange 17)

There are possible linguistic choices to denote receive act; response expression as 'OK' (example (g)), the responder's call sign (example (h)), and the statement (example (i));

Example (h):

PT	TWA 800 heavy say again the frequency	reply-summon inquire	pre-head head	eliciting	I	Elicit
ATC	132.3	informative	head	informing	R	
PT	*TWA 800 heavy* good day	*receive* terminate	*head* post-head	*acknowledging*	*F*	

(Table of discourse analysis B: exchange 143)

Example (i):

ATC	Streamline 200 say again your intentions	summon inquire	pre-head head	eliciting	I	Elicit
PT	We want to take intersection 16 for 27	informative	head	informing	R	
ATC	*That is fine 16 is approved* Streamline 200	*receive* terminate	*head* post-head	*acknowledging*	*F*	

(Table of discourse analysis B: exchange 155)

The closure of acknowledging move in the follow-up, is either repeat act if the head of the move is receive act to emphasized the received message or terminate act with own call sign or both.

Example (j):

PT	GIA 152, say again	summon inquire	pre-head head	eliciting	I	Elicit
ATC	Turn left heading 240 vectoring for intercept ILS Runway 05	informative	head	informing	R	
PT	Roger *heading 240* GIA 152	receive *repeat* terminate	head *post-head* post-head	acknowledging	F	

(Table of discourse analysis B: exchange 10)

The terminate act in the move is possibly represented in responder's call sign or leave-taking token if the responder's call sign is used to indicate receive act as in example (h);

Regardless to the data, there is an interesting structure of elicit exchange which contains two follow-ups, the first denotes '*readback*' stage while the second signifies '*hearback*' stage as to confirm the correctness of particular information. It indicates the possibility that there might be the fourth element included in the exchange which never happens in the reference pattern even though the only one token is found in the data;

Example (k):

PT	Say again the squawk	inquire	head	eliciting	I	Elicit
ATC	4321	informative	head	informing	R	
PT	4 3 2 1	repeat	head	acknowledging	F	
ATC	*4321*	*confirm*	*head*	*informing*	F	

(Table of discourse analysis B: exchange 24)

In brief, elicit exchange in the actual discourse is rather simple and almost reserved the same preference components as in the reference one. There are only few points which cause the variation in the actual such as more alternative acts in each

move included and a pre-head of the initiation indicating summon act occasionally omitted as well as additional follow-up as the fourth element of the structure.

6.1.4 *Summon exchange*

To begin the communication with summon exchange is more common in the actual data (13 exchanges are found). It mainly aims at drawing attention from the designated participant, either an air traffic controller to turn his interest onto the addresser whom is one among his many potential participants or a pilot to alert for the coming message.

Again, summon exchange is used as the opening stage of communication process for both participants to be ready for engaging in the communication. Later on, the addresser continues with the intended exchange.

The structure of moves in summon exchange is similar to the reference one, but the expression applied and sequenced in each act may be varied;
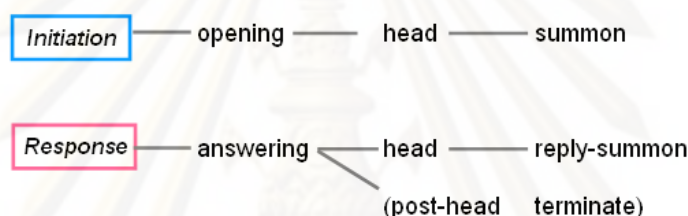
Diagram 6.14 - Structure of Actual Summon Exchange

The summon exchange fundamentally consists of two main moves; opening move and answering move. The addresser begins with summoning a call sign of a target addressee followed constantly by a call sign of the addresser as the head of the opening move which is the conventional pattern of initiation in the reference;

Example (a):

PT	*Tokyo Control Japan air 907*	summon	head	opening	I	Summon
ATC	Japan air 907 Tokyo Control go ahead	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 207)

At this point, summon act may also contain only the addressee's call sign without stating own call sign which is impossibly found in the reference data;

Example (b):

ATC	*EgyptAir 990*	summon	head	opening	I	Summon
PT	go ahead	reply-summon	head	answering	R	
	990	terminate	post-head			

(Table of discourse analysis B: exchange 232)

Or the call sign is simplified by stating only the flight number in case of the target participant is a pilot (example (c)), or the location (example (d)) where the control unit is as well as the call sign of aeronautical control unit regardless of specific duties (example (e)) if the target participant is an air traffic controller;

Example (c):

ATC	**800**	summon	head	opening	I	Summon
PT	go ahead	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 127)

Example (d):

PT	**Tokyo**, Navy juliet tango 036	summon	head	opening	I	Summon
ATC	Navy juliet tango 036 go ahead	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 200)

Example (e):

PT	**Tower** Car 99	summon	head	opening	I	Summon
ATC	99, Kennedy	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 105)

After that, in answering move, there are more possibilities to perform. The conventional pattern is to state own call sign, the co-participant's call sign and a designated expression, 'go ahead' as in example (d).

However, the target participant may also reply the summon by calling out the speaker's call sign and then his call sign accordingly as the head of answering move to assure that it is the designated participant and whom the speaker is talking to as well as to indicate willingness to participate in a conversation;

Example (d):

PT	De Kooy Approach PHDDA	summon	head	opening	I	Summon
ATC	**PHDDA De Kooy Approach**	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 19)

Nonetheless, 8 out of 13 exchanges has shown that the addressee prefers summoning only own call sign if he is a pilot or designated aircraft's call sign if he is a controller (example (b) and (c) above). At this stage, the target participant may or may not include the signal for the co-participant to take the floor by using the terminology, '*go ahead*' to allow the speaker to continue on.

Or the addressee may respond by using only 'go ahead' to verify himself as the target participant instead of stating the call sign (example (c) above). 'Roger' may as well use to replace 'go ahead' which is the restricted term to use as a part of reply-summon move;

Example (e):

PT	New York, EgyptAir 990 heavy, good morning	summon	head	opening	I	Summon
ATC	EgyptAir 990, **roger**	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 235)

Answering move may also contain one more act besides the main reply-summon act by stating the call sign at the end of the move after the word 'go ahead' to either end the turn or to identify oneself as the post-head of the move (example (b) above). These deviations incurred within the internal structure of response move in

summon exchange are clearly visualized when comparing it its reference answering move which strictly composes of only reply-summon act.

Furthermore, in reference summon exchange; there is no social expression as greeting token as a part of neither opening move nor answering move as it is not necessary to maintain a standard social etiquette as of any regular spoken discourse. Summon exchange in air-ground discourse is based solely on identification-recognition response. However, in actual conversation, it is quite common to include greeting token and reply-greeting token in both moves which may be placed in the middle between the call signs or generally after the call signs;

Example (f):

PT	Taipei Tower, *good evening*, Singapore 6	summon	head	opening	I	Summon
ATC	Singapore 6, *good evening*, Taipei Tower	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 210)

Sometimes the target participant doesn't reply the greeting even though it is initiated in the opening move;

Example (g):

PT	New York, EgyptAir 990 heavy, *good evening*	summon	head	opening	I	Summon
ATC	EgyptAir 990, go ahead	reply-summon	head	answering	R	

(Table of discourse analysis B: exchange 226)

According to the reference discourse, the participant is allowed to initiate the communication with summon exchange preceding the intended exchange which also occurs in the actual discourse as the opening stage of the conversation between a controller and a pilot;

Example (h):

PT	*Tokyo control, Japan air 907*	*summon*	*head*	*opening*	*I*	*Summon*
ATC	*Japan air 907, Tokyo control go ahead*	*reply-summon*	*head*	*answering*	*R*	
ATC	Japan air 907 contact Tokyo control 113.5	summon directive	pre-head head	directing	I	Direct
PT	contact Tokyo control 113.5 Japan air 907	repeat terminate	pre-head head	acknowledging	R	

(Table of discourse analysis B: exchange 207-8)

The alternatives generated in actual summon exchange demonstrate deviations occurred both at the external structure and internal structure of the organization when the reference pattern is applied in the authentic communication. It is realized that the main structure of the reference exchange remain more or less the same. The deviations conducted are not consistently found.

6.1.5 *Close exchange*

There is a new exchange introduced to the air-ground communication, *close exchange* functioning as the ending stage the prime exchange especially direct exchange as well as the social engagement between the interlocutors. The organization of close exchange is displayed in the diagram below;
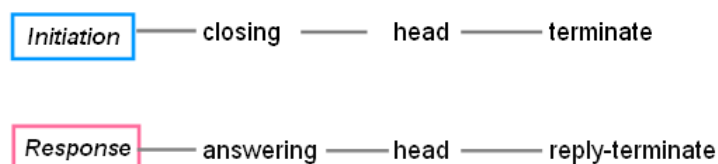
Diagram 6.15 - Structure of Close Exchange

The exchange mainly consists of two moves, closing move containing the initiation with leave-taking token to denote terminate act and answering move to supply the response with leave-taking token to indicate reply-terminate act;

Example (a):

ATC	All nippon 658 resume normal speed contact Tokyo Approach 119.1	summon directive	pre-head head	directing	I	Direct
PT	All nippon 658 normal speed 119.1	reply-summon repeat	pre-head head	acknowledging	R	
PT	*good day*	*terminate*	*head*	closing	I	Close
ATC	*good day*	*reply-terminate*	*head*	answering	R	

(Table of discourse analysis B: exchange 187)

Referring to the data, leave-taking token is commonly used in regular spoken discourse at the closing stage of the communication to indicate farewell to one another. Close exchange is not at all issued in the reference data since ritual social tokens both greeting and leave-taking or else is not necessary in task-oriented talk as air-ground communication. However, it is fundamental in general conversation. Consequently, the participants in air-ground communication are unable to avoid maintaining such a standard social etiquette in actual conversation. However, there are only two tokens found in the data which means that somehow leave-taking token is commonly used as a post-head of the prime exchange rather than creating new pairs of moves in close exchange.

To sum up, there are five categories of exchanges conducted in the actual discourse. The most frequent one is *direct exchange, inform exchange, elicit exchange, summon exchange* and *closing exchange* respectively. The external organization generally stays the same with insignificant changes in each particular pattern; but the internal patterns of acts experience the deviations both in numbers, types and, for some patterns, sequences.

Among these exchanges, the internal structure of direct exchange is more complicated with additional numbers and types of acts than in the reference one. It can be explained that since air-ground communication is on instruct-respond basis, direct exchange is commonly conducted in the discourse. Therefore, the possibility of deviations in the internal structure is higher than any other exchange whereas the rest of exchanges diverge slightly from the reference structure.

Close exchange is introduced to the discourse which does not exist in the reference which explicitly demonstrates the influence from general spoken discourse

on regular basis of the participants who is unable to neglect basic social etiquette in leave-taking.

It can be summarized that even in the rigid external structure of the reference discourse in air-ground communication which is required to be conducted as such, the participants commonly manipulate not only the structure but also the linguistic form to signify the speech act in the actual conversation as long as it does not jeopardize the purpose of the exchange and the understanding among the interlocutors. Nonetheless, the external frame of discourse organization is strictly remained as it is designated in the reference. In brief, it is very natural for any in-practice spoken discourse that *change* is always part of the process, and discourse structure of air-ground communication, though formulated at a certain level, is unable to avoid being as claimed.

6.2 Lexicon in Actual Radiotelephony

Since the two sets of data are from the same language, the lexical items collected from each are almost the same in amount and in reference. Therefore, lexical items in actual radiotelephony are analyzed in accordance with *complete reference lexicon list from the reference data and the criteria of word-formations* in order to seek for the differences occurred when they are applied in authentic communication.

The finding explicitly demonstrates that some of the items are formulated through particular formations causing variations in semantic and functional properties. As well as that there is the increase of polysemy and the occurrence of synonym by the process. Besides, the acquisition of more generic items from the corresponding English language accidentally creates synonyms in the language. The discussion on the findings will be elaborately conformed with reference to word-formations used in the process.

6.2.1 Word-formations applied in creating lexical items of actual radiotelephony

As mentioned all of existing reference lexical items (259 items) are presence in the actual radiotelephony. However, there are some of those items which are processed through specific word-formations; *affixation, shift* and *shortening* to extend the use of existing terms as multi-meaning words (19 items). On top of that there are also brand new lexical items (14 items) introduced to the system by the formation of affixation and borrowing. The only formation which has no contribution to any deviation occurred in the actual lexicon is *compounding*.

Even though the proportion of the variation occurred in the actual lexicon of radiotelephony is very small, it somehow indicates that the expansion of lexicon is

generated when the language is used in authentic communication context. The table below demonstrated the synonyms and polysemy items in actual radiotelephony;

	Word-formation	Sub-formation	Reference Term	Actual Term
Synonym	Affixation		descend - (midpoint)	descending midsection
	Shortening	Clipping	flight level inner marker line up and wait push-back transition level	level marker line up push transition
		Backformation	brakes intentions vectors*	brake intention vector
	Borrowing	-	- (OK) - (contact) - (roger) - (decimal) - (altitude) - (maintain) - (lighting) - (roger) - (affirm)	alright call copy dot height level off light understand yes
Polysemy	Shift	Semantic shift	arrival OK	arrival OK
		Functional shift	airborne go around ident request return vectors*	airborne go around ident request return vector
New items	Composite	Affixation	control gust visibility	controlling gusts invisibility
	Shift	Semantic shift	- - - -	change company roll window

Table 6.1 – Table of Additional Lexical Items in Actual Radiotelephony

Referring to the table above, there are 19 lexical items which are synonyms to the existing reference items; two from affixation, four from semantic shift, eight from shortening and nine form borrowing. Another 8 lexical items become multi-meaning words or polysemy in the actual lexicon; two from semantic shift and six from

functional shift. The last 7 items are the new words introduced into the actual lexicon; three terms are created through affixation to extend the use of existing terms and another four are acquired from generic items of its corresponding language by redefining their semantic properties.

There is only one item, vectors which is processed through two formation; backformation to become synonym (vectors – vector) and then functional shift to become polysemy. Therefore, vectors and vector determine 'a heading given to a pilot to provide navigational guidance by radar' whereas vector denotes both reference meaning and the new denotation 'to provide a heading or navigational guidance to a pilot by radar control unit'.

The detailed description of each item is explicitly carried out according to word-formation types as the following;

6.2.1.1 *Affixation*: the process is used in order to create new terms out of the reference lexicon.

Affix	Item		Definition
	Original	New	
in-	visibility	invisibility	an inability to see and identify prominent unlighted objects by day and prominent lighted objects by night, reported as statute miles, hundreds of feet or meters
-ing	control	controlling	an act of restricting, limiting or managing an aircraft
	descend	descending	a planned loss of altitude or going down from a higher to a lower level as an essential component of an approach to land an aircraft
-s	gust	gusts	numbers of sudden strong rush of wind occurred consecutively causing high risk when operating the aircraft
mid-	-	midsection	the middle of a part of runway structure

Table 6.2 – Table of Affixed Items in Actual Radiotelephony

Two tokens are modified from the existing items, *controlling* and *invisibility* but the other one is the brand new term, *midsection*.

Controlling is built by adding suffix-ing, which is a common bound morpheme to form a gerund in canonical English language, to *control* (to manage an aircraft or equipment in a particular way preferred) in order to designate a new meaning and function 'an act of restricting, limiting or managing an aircraft' and also to avoid being a polysemy with Control (a call sign for area control service) as well as descend (to lose altitude, usually in a planned maneuver) is attached with –ing to form a new term to denote 'going down from a higher to a lower level'. However, the

creation of descending is pretty peculiar in radiotelephony as there is already a lexical term, *descent*, possessed the same designation and function existed in the system. As a result, *descending* and *descent* are synonym with no difference in any aspect and are continued being used in the actual communication.

On contrary, *visibility* (an ability to visualize and identify prominent unlighted objects by day and prominent lighted objects by night) is added with prefix *in-* usually means negation to create the contrastive word, *invisibility* (an inability to see and identify prominent unlighted objects by day and prominent lighted objects by night, reported as statute miles, hundreds of feet or meters).

The stem *gust* is attached by suffix-s to indicate plurality of the puff of sudden rush of wind as a countable one. Both forms are used in the authentic communication referring to almost the same designation, but *gusts* usually demonstrate numbers of sudden rush of wind occurred continuously causing a pilot to have high precaution in controlling an aircraft.

New terms added to the lexicon is midsection creating by adding prefix mid- (in the middle of) to section, and then the term, *midsection* is formed to refer to the middle of a part of runway structure, exactly as the reference term, *midpoint*.

6.2.1.2 *Shift*: this particular formation plays the major role in transforming and extending existing members of lexicon in radiotelephony. Shift formation as mentioned can be divided into two types; semantic shift and functional shift. Almost all of reference terms are through the process of semantic shift; narrowing, broadening and redefining. But in actual data, the items are expanded mostly by functional shift which is to *enlarge* its form-class in order to increase the range of designation.

6.2.1.2.1 *Semantic Shift*: Besides functional shift, some of the items undergo the process of semantic shift such as *arrival*, according to the reference lexicon list, only refers to an aeronautical station 'approach control radar arrival', is broadened its property to as well denote 'an aircraft that arrives and touchdowns at a designated aerodrome specified in a flight plan' and *OK* with the reference denotation, 'functioning properly' is broadened with its original meaning, 'used to say that you agree or satisfy upon something'. Consequently, OK turns to be polysemy denoting both the reference and the new reference, 'functioning properly' and 'used to say that you agree or satisfy upon something'.

Another 4 tokens found are all generic items redesignated to unite with aviation aspect as follows:

Term	Reference semantic property	Redefined semantic property
change	to become different	to adjust the new radio frequency in order to initiate contact different aeronautical stations along the flying course
company	a business organization	a reference aircraft operating in the same area
roll	to move vehicle or else around its longitudinal axis	to prepare equipment or vehicles to be ready to use
window	an opening in the wall or roof of a building, car, etc.	a glass or plastic screen across the front of an aircraft that provides protection from the wind

Table 6.3 – Table of Semantic Shift Items in Actual Radiotelephony

At this point, new terms which do not exist in reference lexicon are brought into the language with specific reference. One of the tokens illustrates that the interlocutors sometimes introduce a common word with literally close semantic reference to occasionally replace existing technical term. In this case, *window* is used to substitute with the terms *windshield* which also means 'a glass or plastic screen across the front of an aircraft that provides protection from the wind'. Consequently, the lexical terms in radiotelephony is increased by a number of synonyms.

6.2.1.2.2 *Functional Shift*: the conversion is to from items indicating most of semantic nature of prototypical noun to the ones indicating a state of being or verb class in regular English language or vice versa. There are 6 existing lexical terms found in the data;

(1) Lexical terms which are extended to as well belong to not only noun class but verb class in accord with canonical English language are as follows:

Item	Reference function and semantic property	Extended function and semantic property
airborne	a condition that an aircraft is lifted and kept in the air by aerodynamic forces	to lift and maintain in the air
ident	a request for a pilot to activate the aircraft transponder identification feature to confirm an aircraft identity	to activate the aircraft transponder identification feature to confirm an aircraft identity
vector*	a heading given to a pilot to provide navigational guidance by radar	to provide a heading or navigational guidance to a pilot by radar control unit

Table 6.4 – Table of Functional Shift Items (1) in Actual Radiotelephony

According to the table above, each item does not only function as a noun but also as a verb so that it can be used several grammatical contexts with broaden range of reference. Nonetheless, one of the three terms is rather complicate. Actually, *vector* in the reference lexicon has got a permanent suffix –s as to designate a lexical term, but when it comes to the authentic usage, vectors is deaffixed to its base form to

develop to another word category with extended semantic property. As a result, *vectors* denotes 'a heading given to a pilot to provide navigational guidance by radar' whereas *vector* is referred to 'to provide a heading or navigational guidance to a pilot by radar control unit' as well as 'a heading given to a pilot to provide navigational guidance by radar' which is its reference denotation.

(2) Lexical terms which are extended to as well belong to not only verb class but noun class in accord with canonical English language are as follows:

Item	Reference function and semantic property	Extended function and semantic property
go around	to climb into the circuit and maneuvering into position for a new approach and landing	an instruction for a pilot to abandon his/her approach to landing
request	to ask for flight information or to ask pilot or controller to perform certain flight operation concern in a polite and formal way ('I should like to know…' or 'I wish to obtain…')	An act of asking for flight information or asking pilot or controller to perform certain flight operation concern formally and politely
return	to go back from one particular position or place to another in the aerodrome	an act of the aircraft to go back from one particular position or place to another the aerodrome

Table 6.5 – Table of Functional Shift Items (2) in Actual Radiotelephony

Go around which its prime function is reserved as a verb and its semantic property is redefined to become a lexical term in radiotelephony, in actual usage the word is truly expanded its function to as well belong to noun class with extended reference. On the other hand, *request* and *return*, before coming to be the terms in radiotelephony, their semantic features are narrowed to single denotation which somehow automatically reduce their grammatical functions into a prime one in verb class. Therefore, the extension of their function in authentic usage causes them to become much closer to their origin in regular language, but with specific reference in aviation field.

6.2.1.3 _Shortening_: the element of the terms especially the ones through compounding process is clipped for the economic reason since the communication is conducted within a short period of time. Both full-length items and their clipped ones are endured in the actual conversation with exactly the same in their connotation. Again, as a result, the synonyms are created.

Item	Clipped Item	Definition
flight level	level	a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals, relating to the vertical position of an aircraft in flight and meaning variously, height and altitude
inner marker	inner	a marker beacon used with an ILS (CAT II) precision approach located between the middle marker and the end of the ILS runway
line up and wait	line up	to enter the runway intended for take off and wait for a takeoff clearance
push-back	push	to push backwards away from an airport gate by external power. Pushbacks are carried out by special, low-profile vehicles called pushback tractors or tugs
transition level	transition	a position along a vertical axis which is change from one to another referring to ATC's instructions

Table 6.6 – Table of Shortening Items in Actual Radiotelephony

All clipped tokens completely replace the full-length ones in authentic context except *level* which sometimes the full-length reference item, *flight level*, is used. According to the table above, there is no concrete generalization of which element should be clipped in order to shorten the compounds. But 3 out of 4 tokens found in the actual data, the final element of the compound is cut out.

Furthermore, there is another formation implemented to form new items in actual radiotelephony which does not use in creating reference terms which is *backformation* or *deaffixation*. It is the process of forming new words in the opposite way to the process of affixation. Instead of adding affix to the stem, this particular process is to eliminate the remaining of existing affix in the item such as *vectors* – vector as stated and *breaks* – break as well as *intentions* - intention.

Break without suffix -s is as well denote the same reference as *breaks* 'a device used for preventing the aircraft from moving after it has come to a stop'. Actually, this term is already discussed in chapter 5 that suffix –s added to *break* is to prevent it to become a homophone with brake (I hereby indicate the separation between portions of the message) in order to avoid ambiguity when conducting the communication. Nonetheless, suffix –s dropped from *breaks* is restrained in actual usage which unavoidably brings about the word to become a homophone with brake.

Also, *intentions* become intention even though the item is designated in the form with permanent suffix –s as a lexical term in radiotelephony. However, in the actual usage, both forms are found in the data with exactly the same reference which leads to one conclusion that *intention* is transformed to be a countable noun whereas suffix –s works as a plural marker.

As a result, the process of clipping and backformation in shortening formation increase the existence of synonyms in the language.

6.2.1.4 *Others*: the process of borrowing is used to bring more items into the lexicon by the users of radiotelephony. Generic words in canonical English lexicon which possess the same semantic features as the ones in radiotelephony lexicon are directly acquired to use parallel with the existing terms.

Item	Borrowed Item	Definition
affirm	yes	an expression to confirm the information, only used by a pilot
OK	alright	used to say that you agree or satisfy upon something
roger	copy understand	a procedural phraseology meaning 'I have received all of your last transmission
altitude	height	the height of a level, point, or object (the vertical distance of an aircraft) measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL)
contact	call	to initiate voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call
lighting	light	an equipment that produces lights on taxiway or runway to guide an aircraft
maintain	level off	to continue maintaining the present altitude or at a steady level
decimal	point	the dot (.) used to separate a whole number from decima fraction when reading the parameter

Table 6.7 – Table of Borrowed Items in Actual Radiotelephony

All in all, the lexical terms in actual radiotelephony are certainly the same set of reference lexicon. However, there are some of the existing terms processed through three main word-formations; *composite, shift* and *shortening*, plus two additional formations; *backformation* and *borrowing*, to become new items introduced to the language.

The occurrence of lexical items containing the same designation leads to even large numbers of synonyms in the sublanguage even though according to the reference lexicon, synonym never exists to keep clear of diversity in lexical choices. Since radiotelephony is mainly created to use as a medium in communication among nationalities, reserved selections of lexical terms is also one of its restrictions.

These can be implied that even the sublanguage as radiotelephony which is strictly invented under several constraints to consist of very rigid lexical set, the development of the language in terms of extending numbers of lexical items always takes place to serve the needs of the users. However, it is too vague to claim that the evolution in actual usage of radiotelephony at lexical level is moving closer to be more or less the same as it corresponding natural English language.

6.3 Syntax in Actual Radiotelephony

The same criterion of analyzing syntactical properties of reference radiotelephony is implemented in the analyzing process of the actual data. Again, the findings are separated in two parts; form-classes and syntactical structures of actual radiotelephony which are described and discussed accordingly.

6.3.1 Form-class in Actual Radiotelephony

To complete the analysis at syntactical level, all lexical items collected from the actual data are firstly classified into form-classes by using the same set of test frames exploited with the reference data which are;

    (1) *Test Frame A*: Fastair345 (do) (not) report (again) (the) (new) low pass (unsafe)

    (2) *Test Frame B*: Fastair345 <u>go around</u>

    (3) *Test Frame C*: Fastair345 report radar failure <u>and</u> decompression

    (4) *Test Frame D*: <u>What</u> is the delay?

The word classes in actual radiotelephony are quite different from the reference ones, not only additional types of classes but also details of functions and semantic roles of each class. Similar to reference form-class, C class-type in actual radiotelephony contains 5 subclasses, C1 to C5. But, F class-type somehow consists of more than 5 reference subclasses, meaning that there are 3 new classes introduced to the syntactical system of radiotelephony in authentic communication context. Hence, there are altogether 13 classes in actual radiotelephony which are later discussed and compared with reference form-classes in several aspects; namely position, function, semantic role and characteristic of use.

6.3.1.1 *C class-type*, in actual radiotelephony, remains the major class to express vital information upon referential meaning related to things, actions, events and qualities. All 5 subclasses, C1 to C5, generally indicate prime grammatical properties in the sentence or unit of utterance. Again, C class-type is classified in 5 different subclasses in accordance with their certain position in the Test Frames.

(1) *C1* in actual radiotelephony is still the largest class with a large number of members, which again are considered as the vital lexeme in the sentence, carrying prime message. As any typical C1, the members commonly refer to objects, people, processes, procedures and abstract entities. The positions of C1a and C1b are literally the same as those in the reference C1 class; C1a members can replace 'Fastair345' whereas C1b members are in the position of 'low pass' in the test frame A.

Test Frame A: *Fastair345* report (again) (the) (new) *low pass* (unsafe)

Fastair345	report	again	the	new	*low pass*			unsafe
All					*ACARS*	*frequency*	*radar contact*	
Aircraft call sign (heavy)					*accelerating*	*gate(s)*	*radar heading*	
Arrival					*airborne*	*gateway*	*report*	
Center					*airport*	*glidepath*	*requesting*	
Control					*alert*	*go around*	*return*	
Ground					*altimeter*	*gust(s)*	*right*	
I					*altitude*	*heading*	*rolling*	
It					*approach*	*height*	*runway*	
Someone					*arrival*	*holding*	*RVR*	
They					*ATIS*	*holding point*	*service(s)*	
Tower					*barrier*	*identification*	*short final*	
We					*beginning*	*ILS*	*SID*	
You					*boundary*	*information*	*south*	
					brake	*inner*	*southbound*	
					braking action	*intentions*	*southeast*	
					caution	*intersection*	*spacing*	
					change	*interval*	*speed*	
					check	*landing*	*squawk*	
					climbing	*leaving*	*stop*	
					closing	*left*	*surface wind*	
					closure	*length*	*surveillance*	
					cockpit	*lifeguard*	*radar approach*	
					company	*light*	*take off*	
					controlling	*localizer*	*taking off*	
					course	*frequency*	*taxi*	
					crossing	*maintaining*	*taxiway*	
					damage	*marker*	*threshold*	
					declaring	*middle*	*thrust*	
					departure	*middle marker*	*touchdown*	
					descending	*minima*	*track*	
					descent	*minimum*	*traffic*	
					discretion	*missed approach*	*traffic in sight*	
					DME	*missed approach*	*transition*	
					edge	*point*	*transponder*	
					end	*north*	*turn*	
					engine	*northeast*	*vector*	
					equipment	*northeast bound*	*vectors*	
					established	*number*	*vehicle*	
					estimating	*outbound*	*vicinity*	
					FAF	*PAPI*	*visibility*	
					failure	*passing*	*visual*	
					favor	*point*	*wake turbulence*	
					field	*position*	*way*	
					final	*priority landing*	*weather*	
					final approach track	*problem*	*wheels*	
					flaps	*QFE*	*wind*	
					flight	*QNH*	*window(s)*	
					flight level	*reaching*	*windshear*	
					flight plan	*report*		
					gear	*request*		

Table 6.8 – Table of C1 Form-class in Actual Radiotelephony

The additional C1a members standing for the references of entities either addresser or addressee in the communication that rigidly function as the head of a sentence are so-called pronouns in regular English such as *I, you, we, they, it, all* and *someone*; contrary to the reference C1a class '*you*' is the only item that is used in the reference language as a subject of a sentence. As well as that the call signs which generally are not a sentence subject in the reference C1 class, can also play the role of sentence subject such as 'Center, *ABX 827* is in a descent', '*Lux 9642* is established on the localizer', but the frequency is rather low, only four tokens are found in the data.

The frequent extra members found in the data are *you* and *we* accordingly. In actual data, it is very common for a pilot to use a general personal pronoun, *we* to verify oneself and *you* to indicate the co-participant after the identification-recognition at the initial stage of the exchange instead of repetitive using call sign as in the reference data whereas a controller still focuses on using *aircraft call sign* and sometimes *you* in a phrase or a sentence in the utterance such as '*G-ABCD Walden tower cleared straight-in approach runway 35 wind 360 degrees 10 knots QNH 1008 you are number one*' to point out the addressee.

According to the table above, the rest of C1 members have no difference in forms, position, and affixation with exactly the same explanation stated in chapter 5 on reference C1 class that most of them are counted as a single lexical unit. Nonetheless, the use of affix {–ing} as a mechanism to converse verb class to noun class in natural English is clearly seen in the actual data. Though, samples are very rare as there are only three C1b members that have gone through this particular process to shift from C2 to C1; control-controlling, descend-descending and hold-holding.

Again, C1 members in the actual data somewhat exhibit singularity and plurality as there are certain items containing {–s} to indicate the plurality as well as the singularity in their base form; e.g. gate-gates, gust-gusts, service-services and window-windows. Therefore, it can be assured that there is *a plurality marker* in radiotelephony even though some of the items obtain suffix {–s} without any concrete evidence whether they are neutral and can be coined neither countable nor uncountable item or there is accidentally no base form to compare because of insufficient amount of the data.

Consequently, it can be concluded that the rigid property of C1b is extended to be just a little bit closer to those in its corresponding language. However, it is too loose to definitely claim that eventually C1b members will either be able to be expressed in both singular and plural items by adding marker {–s} to the stem as up to this point, they still are designated as a individual unit of lexical item with no plurality sense or be switched its form-class from C2 to C1b by simply adding suffix {–ing} to enlarge numbers of members as it regularly occurs in natural language.

Besides typical C1a and C1b, there are a group of items; *me, you, us* and *them* which similarly functions as so-called pronoun members in C1a. But they always follow C2 in the sentence as an object of C2 to express anaphoric reference of a person such as 'inform *them* that you are a lifeguard', 'could you give *me* your current winds', etc. *You* can be a double-function item depending on the position it appears in the sentence. If it is after C2 such as in 'we will take *you* through the final approach track', it plays the role as a personal object of C2. But, if it is at the beginning of a sentence such as in '*you* are on the final', it works as C1a.

All in all, there is no change of the position in the sentence where particular members are placed, but the amount of members in C1 is obviously growing with numbers of common pronouns both as a personal subject and a personal object of C2 taken from its corresponding language. The inflectional markers, {-ing} and {–s} with their specific roles are somehow included as significant features in this particular form-class which possibly become a common property to define C1 class. Thus, there might be a tendency for C1 class to contain more or less the same as its prototypical noun class in its corresponding English language.

(2) *C2*, the second largest form-class, remains expressing a state of being and a response upon a statement, command or question as well as still mostly maintains to be at the position of *report* in Test Frame A. C2 generally follow C1 or sometimes it can be placed at the beginning of imperatives to instruct or command the designated aircraft to perform particular flight activity.

Similar to C2 in the reference, C2 is divided into two subclasses; C2a and C2b. The majority of the members are again C2a which is fit to the slot of 'report' in the test frame A while the members of C2 b are much fewer. However, the numbers of C2b are increased according to C2 which can be substituted with 'go around' in test frame B, 'Fastair345 *go around*'; *airborne, ident, land, level off*, stay, stop and *switch around*.

Test Frame A: Fastair345 *report* (again) (the) (new) low pass (unsafe)

Fastair345	*report*		again	the	new	low pass	unsafe
	abeam	*continue*					
	are	*cross*					
	be	*direct*					
	call	*do*					
	cancel	*expect*					
	change	*expedite*					
	check	*follow*					
	cleared	*get*					
	climb	*give*					
	commence	*got*					
	contact	*has*					

Table 6.9 – Table of C2a Form-class in Actual Radiotelephony

Fastair345	*report*		again	the	new	low pass	unsafe
	have	*proceed*					
	help	*put*					
	hit	*receive*					
	hold	*recleared*					
	indicate	*reduce*					
	inform	*release*					
	intercept	*report*					
	is	*request*					
	join	*resume*					
	keep	*roll*					
	knew	*say(again)*					
	land	*see*					
	let	*set up*					
	look like	*show*					
	lost	*squawk*					
	maintain	*take*					
	make	*tell*					
	monitor	*terminate*					
	need	*turn*					
	observe	*vacate*					
	open	*vector*					
	pass	*wonder*					

Table 6.9 (cont'd) – Table of C2a Form-class in Actual Radiotelephony

Test Frame B: Fastair345 *go around*

Fastair345	*go around*	
	airborne	*line up*
	departure	*line up and wait*
	descend	*say again*
	go	*stop*
	ident	*take off*
	land	*taxi*
	level off	

Table 6.10 – Table of C2b Form-class in Actual Radiotelephony

This form-class is certainly similar to verb class in regular English language as the members carry a great deal of information, describing actions, events and states as well as the position in the sentence, but the members in reference data are almost always in their base form as a non-finite verb which are not marked by inflectional suffix to encode information about time frame (tense and aspect), the roles of different participants in an event (voice) and indicate person. This is one of the unique grammatical features in radiotelephony to exclude any complexity of the language.

On contrary, some, *not* all of the actual C2 members tend to acquire these inflectional markers as the way they always do in the regular language because of the

influence from its corresponding language. Again, most of C2 in the sentence still indicate present event at the moment of speaking such as 'report abeam papa lima bravo', 'we have radar contact', 'TWA 800 make a left turn', etc., but in the actual data, three C2 base form are equipped with suffix {–s} to point out the person while expressing present action such as 'the company 76 heavy <u>knows</u> to follow you', 'that approach <u>terminates</u> at two nautical miles from touchdown', and '592 <u>needs</u> immediate return to Miami' as well as to change *be form* of C2 to match the characteristic of C1a as in the natural language; for example, if C1a are *you, we,* and *they*, be form, *are*, is used – 'we <u>are</u> ready to push', but if C1a is *it* and *call sign*, be form, *is*, is used – 'it <u>is</u> a temporary closure', '827 <u>is</u> in a descent'. Or even C1a is *I*, surely be form of C2 is am – 'I <u>am</u> sorry'. It shall be implied that any additional members in the actual C1 and C2 class tend to bring their embedded grammatical features along, therefore the markers and the characteristics of use which are correlated are almost fully implemented in the actual data.

Some C2 also encodes time frame in the past marked by common inflectional marker, {-ed} or applied irregular past form as simply designated in its corresponding language when they refer to something occurred before the moment of speaking – 'I <u>received</u> the last braking action report' , 'braking action report <u>was</u> 2041'and 'they <u>knew</u> it'. Some also receive suffix {–ed} or transform to irregular form and co-occur with have and is functioning as F3 to indicate past participle to form perfect aspect referring to speaker's perspective on the time of an event - 'you have <u>hit</u> an aircraft', and 'We have <u>had</u> an engine failure', and passive voice - 'it is <u>approved</u>', 'the tower is <u>closed</u> at this time', and 'Lux nine six four two is <u>established</u> on the localizer'. Moreover, some items also contain progressive marker –ing to express something is ongoing or unfinished at the moment of speaking which as well involves the use of F3 – 'we are <u>squawking</u> 0060', 'we are <u>turning</u> right now', and 'It is <u>raining</u> lightly'.

What comes along with these grammatical markers is the cross-function of some C2 members, *is, are* and *have* which can also function as an auxiliary when the head C2 is marked to indicate aspect and voice such as;

    a) *is* and *are* in progressive aspect; 'It <u>is</u> raining lightly' and 'We <u>are</u> turning right now'

    b) *have* in present perfect aspect; 'we <u>have</u> hit another aircraft on taxi'

    c) *is* in passive voice; 'the tower <u>is</u> closed at this time'

As a result, the highlight of actual C2 is the way they demonstrate basic properties of displaying tense, aspect, voice as well as conforming to C1a they follow. These characters are truly added even though they do not consistently occur as the reference feature which C2 is reserved in the base from indicating only present action is maintained. The fact is that the objective of the study is trying to point out the evidence of deviation from reference grammatical feature to actual grammatical feature in all aspects. Then, what is included apart from what is designated in the

reference one is briefly illustrated. However, these inflectional morphemes will be discussed in detail in the last section of the chapter.

Again, some of C2 members with multi-function lexemes, perform the roles of C2 as well as C1 are also found. The limited members in the reference *check*, *departure*, *orbit*, *squawk* and *stop*, are added up with *go around, request, return, airborne, ident* and *vector*. Hence, there are 11 lexical units that can perform the roles of C2 and C1 in radiotelephony.

In short, the deviation came about is originally from those in its corresponding language. Consequently, it leads to three assumptions; one is the possible tendency of the variants of C2 grammatical properties by acquiring essential characteristics of regular verbs because of the familiarization to the conventional grammar rules of a speaker to broaden the alternatives in denoting similar reference such as subject-verb agreement in present tense, passive marker and progressive marker and two, in case of past tense marker it is too difficult to point out that past tense is one of the variations as there is no trace of past tense even in the reference. Therefore, it is the basic proof that C2 with past tense marker initially brought in to cover the intentions of the participants to communicate upon something which already happened and concerned the flight operations.

(3) *C3* in actual data maintains to signify properties, qualities or states attributed to C1 by giving more information about C1's reference. The positions of C3 can be either a post-modifier, **after C1** as to replace *unsafe* or a pre-modifier, **before C1** as to replace *new* in Test Frame A consecutively. However, the position of each member can be switched differing from the positions of C1a and C1b which are quite absolute. Therefore, it is not necessary to divide the members into two subgroups. The members of C3 are as the followings:

a) Test Frame A: Fastair345 report (again) (the) (new) low pass <u>unsafe</u>

Fastair345	report	again	the	new	low pass	*unsafe*
						advised
						available
						decreased
						established
						good
						in sight
						inbound
						observed
						ready

Table 6.11 – Table (a) of C3 Form-class in Actual Radiotelephony

b) Test Frame A: Fastair345 report (again) (the) _new_ low pass (unsafe)

Fastair345	report	again	the	new		low pass	unsafe
				current	_low_		
				fair	_negative_		
				full	_no_		
				further	_normal_		
				good	_poor_		
				immediate	_present_		
				last	_right_		
				left			

Table 6.12 – Table (b) of C3 Form-class in Actual Radiotelephony

The characters, functions and semantic roles of C3 in general are reserved as they are in the reference. There are only few points to discuss in order to demonstrate the difference between reference and actual members. Two items, _left_ and _right_, which in the reference are coined only as C1 are as well found functioning as C3. Multi-functioned lexemes cannot just appear within C1 and C2 classes, but also within C3 and C4 classes.

Again, there is no possibility that C3 is in comparative and superlative forms as well as contains own internal structure in which a sentence contains more than one members of C3.

(4) *C4* members are quite limited comparing to members of other C class-types. The semantic role, position, and characteristic of use are preserved in the actual class. It is to modify, describe or limit C2 to chiefly signify time and manner and generally appear as a post-modifier in the sentence. They sometimes appear at sentence-internal positions or sentence-final position either right after C2 or at the rear of the sentence.

Test Frame A: Fastair345 report _again_ (the) (new) low pass (unsafe)

Fastair345	report	again			the	new	low pass	unsafe
		back	_immediately_	_right_				
		below	_just_	_slightly_				
		every day	_left_	_straight ahead_				
		for a while	_lightly_	_still_				
		further	_next_	_there_				
		gently	_nicely_					
		here	_now_					

Table 6.13 – Table of C4 Form-class in Actual Radiotelephony

Most of C4 members as mentioned concern time and manner of C2 which are extremely important in air-ground communication as its objective is to conduct efficient and safe flight performance. However, there are two added members which are quite interesting, _here_ and _there_, denoting location or position which does not

exist in the system yet. As a result, the reference of modification is somewhat enlarged.

The fact that these kinds of words with such a vague reference are commonly neglected in radiotelephony as they may lead to misunderstanding since the speculation without definite affirmation when stating the position along the airspace can put the flight profiles at risk; even though it is very common in general English to refer to the location or position from the speaker's point of view by using these kinds of words. In actual data, *here* and *there* are found only in 'we will stop *here* on the runway' and 'we proceed *there*'.

Nothing significantly deviates in any aspects of C4 class when comparing to the reference one. Some denotes to time reference, some signify manner and some which are new members refers to location or position.

(5) *C5*, the last form-class in C class-type, are enlarged in amount as there are quite a few items borrowed from lexicon in natural English language to indicate <u>responding</u> to the instructions; for instance, yes, *no, all right, copy, understand* and *confirm*. The members are again placed at the beginning of the first unit of utterances or before C1a or some time after C1a. C5 members are as the followings;

Test Frame A: _____ Fastair345 (report again the new low pass unsafe)

C5		Fastair345	report	the	new	low pass	unsafe
affirm	*OK*						
affirmative	*roger*						
approved	*sorry*						
all right	*standby*						
confirm	*understand*						
copy	*wilco*						
correct	*yes*						
go ahead	*thank you*						
negative							

Table 6.14 – Table of C5 Form-class in Actual Radiotelephony

There is no deviation in functions and semantic roles as well as the characteristic of use, but its position is vary as it can be as well placed before other element in the utterance without strictly co-occurred C1a as in the reference such as '*Roger*, tracking 100' which is very similar to the appearance of exclamation in natural English language.

The increase of varieties is explicit in accord with the additional members. However, it is rather strange that the participants bring new items into the system even though there are lexical terms which signify exact the same reference existed. Hence, it automatically introduces synonyms into the language for participants to freely choose.

It is interesting that *thank you*, besides being a common ritual social expression to show gratitude towards someone in canonical English, it is as well used

as a response when an air traffic controller grants the speaker inquiry upon something or a reply to acknowledge the information or instruction given by an air traffic controller which is similar to the meaning of roger, understand and copy in radiotelephony. It is concluded that synonyms do not affect the efficient of the communication in radiotelephony as there is a strong evidence of additional lexical items which designate the similar reference. Instead, it extends the lexical range in the language so that the speaker is allowed to have more alternatives.

The variations in actual C class-type usually occur in C1 and C2 form-classes as they both play the most important role in radiotelephony by holding prime messages in the communication. They commonly relate to grammatical functions and forms, but normally not involve semantic roles and positions which are quite rigid in this language. It is noticeable that deviated matters are very conventional in its corresponding language which at the beginning, are excluded from characteristics of reference classes. Nevertheless, extra grammatical features are acquired by some of the members in each class. Consequently, the development of grammatical properties is definitely continued on.

6.3.1.2 *F class-type* is the minor word class in radiotelephony. The members of actual F class-type are increased from 6 to 8. There are 4 additional subclasses created in the real communication which of course, are rather common in canonical English language. Still, F class-type in actual data possesses grammatical functions not referential meaning as those in C class-type. The numbers of F class-type members as mentioned are much lesser than those in C class-type. F class-type in actual radiotelephony can be divided into 8 subclasses, F 1 - F8 as follows:

(1) *F1* maintains to be used to connect items together at not only word level but also phrase and sentence level, indicating a relation in time between two events or a relation in place between two and more things as well as expresses a variety of logical relations between phrases, clauses and sentences and certainly is posited between the items it conjoins as in Test Frame B.

Test Frame B: Fastair345 report radar failure *and* decompression lost

Fastair345	report	radar failure	***and***			decompression lost
			about	*from*	*then*	
			above	*if*	*through*	
			after	*in*	*to*	
			at	*into*	*until*	
			but	*of*	*via*	
			by	*on*	*when*	
			correction	*or*	*whether*	
			due to	*out of*	*with*	
			during	*so*		
			for	*that*		

Table 6.15 – Table of F1 Form-class in Actual Radiotelephony

According to the actual data, F1 tends to tie units at word or phrase levels more than sentence level. Again, the members of F1 are classified in two subclasses; F1a and F1b. The majority of F1 is in the group of F1a similar to the reference F1, but there are more members added such as 'that' in 'confirm *that* you have hit an aircraft'. Basically, *that* is considered as a complement marker to indicate the sentence it precedes as the post-modifying to a noun. As a result, in radiotelephony, it is classified as F1 to connect units together and in this case, modify what comes before that-clause. There is only one token found in the data which *that* functions as F1 while the rest tokens of *that* work as F2 which will be discussed later.

Into which is one of the new members of F1a is also interesting as it is strictly collocated with C2, *taxi* and NP, *position and hold* as in 'taxi <u>into</u> position and hold'. *Into* is placed in between the two units. The entire expression is to provide an instruction for pilots to taxi onto the departure runway in takeoff position and stop to wait for takeoff clearance.

There are also few new members included as F1b members such as *but* – 'I need time *but* you can stay on this frequency', *so* – 'tell your mechanic to pull you back *so* we can get an arrival into your gate', *whether* – 'confirm *whether* join final again' and *then* – 'turn left *then* proceed direct to SHIPP'.

Almost all of the F1 members retain their core properties, characteristic of use, semantic roles, positions and forms as in reference F1 class including *due to*, which its final element is frequently omitted in the reference data, but always appears as 2-element lexeme in the actual data.

(2) *F2* is a C1 pre-modifier that expresses possessive (*my, your, our, their*), article *(a, an, the)*, demonstrative (*this, that*) and indefinite determiner (*some, another, any, more*). The members still always co-occur with C1 and definitely come before other elements of C1 modifier.

Test Frame A: Fastair345 report (again) <u>the</u> (new) low pass (unsafe)

Fastair345	report	again	***the***		new	low pass	unsafe
			a	*some*			
			an	*that*			
			another	*the*			
			any	*their*			
			my	*this*			
			our	*your*			
			own				

Table 6.16 – Table of F2 Form-class in Actual Radiotelephony

Since the F2 members in radiotelephony are subset of regular determiners in natural English language, there are some expressing indefinite (*an*), possessive (*our, their*), demonstrative (*that*), and quantity (*some, any*, *more*) included in the class, which usually bring their characteristic of use, functions and roles into the system. For example, *an* is to introduce C1 beginning with vowel in spelling as a new information

in to the discourse – 'We have <u>an</u> aircraft on final', *our* as a possessive referring to 1st person 'we' – 'we are alerting <u>our</u> cabin crew', *that* as to indicate singular C1 – 'you continue on <u>that</u> heading' and *any* as quantifier of C1 – 'do you have <u>any</u> damage?'

Also, in the actual data, F2 signifying articles are dramatically increases comparing to the numbers in the reference data. This can confirm that these items since are often used in natural language, as well become even more common in the authentic communication.

F2 class size is getting broader as there are some new members introduced. Apparently, there is no substantial deviation from its reference as most of the features are contained. Only the frequency count of *a* and *the* in the actual data, is tremendously different in total amount. Additionally, they are mechanism to clearly distinguish singularity and plurality of C1.

(3) *F3* consists of several items as in the table below and always are at the position before C2, functioning as to truly give extra semantic or syntactic information expressing negation, interrogative, intention or possibility, tense, aspect and voice. The Test Frame A is extended to classify this form-class. Any item that can be at *do* position is considered F3.

Test Frame A: Fastair345 <u>*do*</u> not report (again) (the) (new) low pass (unsafe)

Fastair345	***do***	not	report	again	the	new	low pass	unsafe
	can *could* *does* *should* *will* *would* *be going to*							

Table 6.17 – Table of F3 Form-class in Actual Radiotelephony

F3 is considered as an auxiliary verb and modal verb in regular English language. *Can, could, will, and would* are the complement of a lexical verb to encode meanings connected with degrees of certainty and necessity. *Could* and *would* in this case, do not refer to past time context or else but functioned as a more formal or polite alternative to can and will, mostly are in interrogative to request for something such as '<u>could</u> you turn left immediately' and 'it <u>would</u> help us out a lot'. *Be going to*, on the other hand, expresses future intention or prediction of the addresser to perform an act as *will* such as 'we <u>are going to</u> vacate'.

New functions and semantic roles as well as characteristics of use are widening the duty of actual F3 class which eventually leads to language complexity.

(4) *F4* is the negator 'not' commonly followed F3 in the test frame above to make negative statement that something cannot be the case or is not true or is not happening. Referring to the actual data, almost all of tokens *not* is contracted and merged with F3 as contracted negative form; *don't, can't* and *didn't*, to denote

negation in the utterance whereas there is none in the reference data because the token in the data are in written form while the actual data is transcribed from the authentic conversation.

Test Frame A: Fastair345 *do* not report (again) (the) (new) low pass (unsafe)

Fastair345	***don't***	report	again	the	new	low pass	unsafe
	can't *didn't*						

<p align="center">Table 6.18 – Table of F4 Form-class in Actual Radiotelephony</p>

(5) *F5* consists of three members, *how, how far* and *what*, appeared at the beginning of interrogatives as shown in the test frame C below in order to request for specific information about the identity of something, and the circumstances surrounding actions and events;

Test Frame C: *What* is the delay?

What	is	the	delay?
How *How far*			

<p align="center">Table 6.19 – Table of F5 Form-class in Actual Radiotelephony</p>

'How far' is determined to request for a certain distance of something whereas *'How'* and *'What'* are to ask for specific information. In reference data, *How* is considered as a permanent element of a lexical unit, *'How* do you read' since all the elements are determined to co-occur as always to particularly request for the quality of radio transmission. However, in the actual data, how is used to create an interrogative

Since there are 11 out of 13 tokens found using *'what'* to generate non-polar interrogatives in the data, it tends to be the most common F5 in actual radiotelephony whereas there is only one token found in the reference data.

To elicit information, there is higher possibility in the genuine conversation to use conventional interrogative with *what, how* and *how far* as sampled. As well as that more F5 members are discovered, comparing to the reference.

(6) *F6* is defined as social formulaic expression, generally appeared at the beginning of the utterance or as a response to demonstrate greeting, farewell, or returning the appreciation. The positions of F6 are quite varied since it can either follow or precede C1a as well as being placed at the beginning or at the end of the utterance as a single lexicon item to initiate or close the exchanges in order to maintain social relationship among the participants. There are altogether 13 members; *anytime, good morning, good afternoon, good evening, good night, good day, good luck, goodbye, see you (later), so long, thank you very much, thank you, thanks*, and *thanks a lot*.

(7) *F*7 consists of only one member; *please*, normally operating as a polite formula attached to C2 (confirm your message <u>please</u>) and C5 (<u>please</u> standby) either before or after the item. It is used by both a pilot and an air traffic controller to ask for information or tell the interlocutor to perform any flight activity.

(8) *F8* is relatively syntax-independent which does not have any particular grammatical function, as well as does not change the meaning of the utterance. It can be posited at any position in the sentence and generally indicate speaker's hesitation to just fill up gaps in utterances. The members of F8 are *ah*, *eh*, *uh*, *oh* and *you know* as in 'GND *you know* every day you come out', 'TWA eight hundred heavy *ah* say again the frequency', etc. This form-class may as well be considered as common fillers in the discourse since the actual data is transcribed from authentic recording, it is very common to find these while it is impossible to appear in the reference data as it is from written manual.

The last three additional F class-types, F6 to F8 are very basic items frequently found in any actual conversation. However, these classes actually are determined to be excluded from radiotelephony as stated in the official manual. Even so, as it is far too common in its natural language, these items are always used in the communication rather often.

To summarize the form-class in actual radiotelephony, there is rather strong evidence that any classes especially the ones that contain vital grammatical and semantic roles in the sentence such as C1, C2 or even F1 and F3 which directly involve in the deviations occurred to C1 and C2, are going through the change not only its functions but characteristics of use as discussed above. The development of such a confined sublanguage as radiotelephony no matter what, illustrates that when the language is conformed in the actual context; it is unavoidable to experience the modification. The most interesting point is that the deviation in the actual data is to acquire more of linguistic properties from the originals in its corresponding language which makes radiotelephony become more complex and move forwards to where it is emerged from.

6.3.2 Syntactical Structure in Actual Radiotelephony

The second part of the analysis of actual data at syntactical level is to generalize its syntactical patterns generated when the language is practically used in authentic communication context. The analysis is conducted under the same framework as when it was done with the reference data which is to categorize the unit in the utterance in accordance with basic syntactical structure and prime communicative functions. The discussion on the finding is stepped in relation to the types of syntactical arrangements to unveil their internal structures with detailed description by utilizing the same set of symbols and abbreviations (Table 3.1: 74).

Symbols and abbreviations:

S (sentence)	equivalent to a sentence or a clause
Q (question particle)	equivalent to interrogative formation
NP (noun phrase)	equivalent to C1
VP (verb phrase)	equivalent to C2 phrase
RP (Responding phrase)	equivalent to C5 phrase
CP (complement phrase)	equivalent to F1b phrase as a complement phrase
N (noun)	equivalent to C1a and C1b
V (verb)	equivalent to C2
Adj (adjective)	equivalent to C3
Adv (adverb)	equivalent to C4
R (responding expression)	equivalent to C5
Conn (connector)	equivalent to F1a
Comp (complementizer)	equivalent to F1b
Det (determiner)	equivalent to F2
Aux (auxiliary)	equivalent to F3 and F4
Wh (WH-word)	equivalent to F5
Neg	negation
=	consist of
/	or
()	optional constituent
{ / }	either…or… appeared in the structure

6.3.2.1 *General descriptions of syntactical arrangement in actual radiotelephony*

The syntactical patterns of actual radiotelephony mainly are similar to the reference ones as they are commonly based on the formation of phrase. A formation at clause level is as well found in the data with larger number with diverse patterns comparing to the reference. Referring to the data, four types of phrases and two types of clauses are also found; NP, RP, VP and CP as well as declarative clause and interrogative clause.

The composition at the utterance level can start from a single element with a phrase consisting of one lexical item such as '*affirmative*', '*2979*', or '*GIA 152*' to a string of phrases and clauses up to 5 elements such as '*Merpati 152, turn left, heading 240, vectoring for intercept ILS runway 05, from right side traffic rolling*'. Comparing to the reference arrangements, the only insignificant difference is the number of elements that are arranged together in the utterance as in the reference, one utterance can contain up to 8 elements. Consequently, it can be concluded at this point that the fundamental syntactical arrangements in actual and reference radiotelephony are somewhat the same.

However, there are possibly some differences in the detail of each type arrangement which will be thoroughly discussed with reference to its construction as the followings;

6.3.2.1.1 *Syntactical structure at phrase level*

Again, NP and RP certainly obtains communicative function of assertives as any declarative clause in regular language to mainly inform and acknowledge as well as to conduct identification stage in air-ground communication. VP, on the other hands, continues to hold all possible illocutionary forces conducted in air-ground communication which are directing, informing, acknowledging and eliciting. Still, CP is another phrasal type that functions as a complement element of NP and VP as in the reference. The varieties of arrangements of each phrasal formation are demonstrated below;

(1) *NP*: Two types of NP classified by its core function are essential syntactical structure of actual radiotelephony; NP as to conduct identification process and NP as to state informing and acknowledging.

(1.1) NP as to conduct identification process: the internal structure remains the same; NP = N (N) with the same descriptions of C1a members appearing in each element. Still, the position of NP in the utterance is at the beginning or at the end of the utterance in each exchange in the discourse. But, it is mostly posited at the beginning of the utterance, similar to the use of proper noun to select and identify the required participant which is also placed at the same position.

However, in actual radiotelephony, NP is not a mandatory component in the utterance as it always is in the reference. The speaker in the actual context sometimes drops NP whenever they are already involved in the communication causing them to be certain of the identification of the participants. As a result, NP is possibly omitted from the utterance even though it is designated in the reference to be an utmost prerequisite element in every utterance to avoid misunderstanding.

(1.2) NP as to state informing and acknowledging: the internal patterns of NP to inform and acknowledge in the actual are almost the same, but there is the new pattern; NP = CP NP, added to the system. As a result, there are 9 different structural arrangements of NPs as follows:

(1.2 a) NP = N: there is only a single element of an item of C1 such as *GIA 152, 2979*, *approved*, etc. Again, an aircraft call sign (C1a) are used with the function of acknowledging the previous message whereas any N or C1b is determined to acknowledge by a readback process as the important part of the previous message is repeated; for example, '*2979*' is the parameter of the altimeter setting instructed by an air traffic controller. Generally, this particular pattern of NP needs to co-occur with NP (1.1) but in the actual usage NP (1.1) is optional.

(1.2 b) NP = N N: the string of C1b is put together to denote specific area and activity such as *runway 27, Cairo Zulu, leaving approaching, caution wake*

turbulence, 2000 feet, 80 Mach, 230 degrees, 15 knots, 8 nautical miles, 6 meters, etc. It is noted that the unit of measurement is commonly excluded in the actual communication context.

(1.2 c) NP = NP Adj: the internal particles of NP are either N or NP followed by a post-modification Adj or C3 and C1b as a pronominal adjective. This particular pattern does not exist in canonical English language such as *visibility decreased, traffic in sight, heading inbound, runway in sight, FAF outbound, altimeter 2979, maintaining 350, flight level 230*, etc.

(1.2 d) NP = Adj NP: the pattern contains a pre-modification Adj or C3 and C1 as a pronominal adjective preceded NP such as *established localizer, no contact, left turn, short final, lower altitude, emergency descent, windshear alert, normal speed*, etc.

(1.2 e) NP = Det NP: the member of F2 or Det precedes NP to express the type of reference which NP holds such as *the final approach track, the visibility observed, the right engine, another aircraft, your current winds, the approach a 737, the heading 040, a mountainous area, your frequency*, etc.

(1.2 f) NP = N NP: the internal structure of NP can also be more complicated by having another NP embedded as a complement to the preceding N such as *caution runway wet, wind 080 degrees, radar contact 43 miles, caution barrier 400 meters, reaching flight level 250*, etc.

(1.2 g) NP = NP CP: the NP is modified by CP or F1a phrase to add up extra detail to preceding NP such as *27 right via Mike, inner to 31L, 21R at Kilo, vacating at the end, taking off on 27, the visibility observed by tower leaving 250 for 210, an aircraft on final, approaching 4 south with Tango*, etc.

(1.2 h) NP = CP NP: the composition of NP comprises of CP and NP. Even though CP is placed before NP, it still functions as a complement to NP. This pattern is considered ungrammatical in its corresponding language and it is non-existent in the reference. For example, '*after airborne right turn*' and '*from right side Traffic rolling*'.

(1.2 i) NP = NP Conn NP: the pattern contains two NPs with Conn or the member of F1b to semantically relate them such as '*right heading 220 and cleared approach*', '*position and hold*', '*flight level 230 correction 250*', and '*climbing passing 255 correction 245*'.

These are possible internal structures of NPs which have no significant different from the reference ones. Only few minor differences are found in the data which inconceivably cause the major change in general arrangements of NPs. However, there is an additional pattern introduced to the system which doesn't exist in the reference and natural English language. Since the tokens found are in a small amount, it cannot be implied that the pattern will be extensively applied among the speakers in aviation field.

(2) *RP* is the type of phrase reservedly used in air-ground communication to indicate a response to the instructions or an emergency declaration. The internal structure of RP in actual radiotelephony is pretty much the same as in the reference; RP = R (R) (R). But, the phrase can be consisted of a single element of R (member of C5) such as *roger, copy, yes, affirmative*, etc. or double Rs such as *roger stand by* and *all right stand-by* which does not exist in the reference. However, there is no occurrence of triple R appeared in the actual data but it doesn't mean that the emergency pattern is not conducted as such because the internal structure of RP with the strings of R is designated in the manual when declaring the emergency situation.

It is noted that RP does not have to always co-occur with NP (1.1) as RP in the reference pattern which means there are also some tokens which still hold the same rule such as 'Japan air 952 *standby*', 'EgyptAir 990 *correct*', 'Dynasty 676 *understand*', '*Wilco* Silk Air 185', '*Roger* 8807', etc.

(3) *VP*: The internal structures of VPs are in a variety of patterns as in the reference to mainly direct and elicit as well as to inform and acknowledge. VP in actual radiotelephony generally contains <u>at least V or C2 item</u> with or without an accompanied element as VP in the canonical English language, contrary to VP in the reference which V requires to have at least one accompanied element. Thus, in actual radiotelephony, a new pattern, VP = V as well as another two addition arrangements are introduced into the system; VP = VP VP and VP = VP S which the last two surely are ungrammatical patterns in canonical English language. The internal structures of VP in reference radiotelephony are as follows:

(3.1) VP = V: the only particle in VP is V (C2 item) but it has to co-occur with NP (1.1) as in 'Taipei Dynasty 611 *taxi*' and 'THA 261 *go around*'.

(3.2) VP = Aux V {NP / CP}: the structure includes auxiliary (F3 item) before V then followed by either NP or CP such as *will report established localizer, will report established on the localizer*, and *will report established*.

(3.3) VP = VP NP: it is the *most common structure* found in the data. The phrase consists of C2 item (without the presence of Aux) followed by NP such as *contact Tokyo Control 113.5, hold short runway 05L, airborne passing 1600, maintain flight level 160, taxi holding point 27, say again your intentions, turn right heading 040, report FAF heading inbound, continue turn right heading 015*, etc.

(3.4) VP = VP Adv: the pattern composes of V or VP with a post-modifier Adv (C4 item) such as *join Final again, report your position now, contact departure now, maintain 3000 feet for a while*, etc.

(3.5) VP = VP CP: this conformation includes either V or VP and CP in the structure such as *request priority landing on your runway, request descend and maintain flight level 160, hold short of 31R, inform them that you are a lifeguard, confirm routing after Oshima, vector crossing localizer for spacing, expedite your descent to 11*, etc.

(3.6) VP = CP VP: the arrangement composes of CP followed by VP, but the complement phrase is commonly placed at the beginning of VP such as *from Chali direct to Kadlo, behind the traffic line up and wait, after airborne turn right*, and *into position hold runway 06.*

(3.7) VP = VP VP: the pattern comprising of series of VPs does not exist in regular language as it is considered ungrammatical such as *proceed direct Charlie, request descend and maintain flight level 160, stop climb at 1300, request direct Pardi, continue descend two thousand feet, confirm cleared to land*, etc.

(3.8) VP = VP S: this construction is very unusual when comparing to any conventional patterns of VP in the reference and canonical English language since S follows V without any particular connector as in '*confirm you are turning left now*' which is the only token found in the data.

(3.9) VP = VP Conn VP: the structure of this VP consists of two VPs conjoined with Conn or F1b member such as *climb and maintain flight level 230, descend and maintain 5000, line up and hold position, confirm whether join final again, turn left then proceed direct to SHIPP*, etc.

(3.10) VP = VP Conn NP: the pattern comprises of V or VP conjoined with the following NP such as *report FAF when heading inbound*, etc.

In actual radiotelephony, there are three new arrangements of VPs added in the system, one of them is the simplest pattern of VP in natural English language; VP = V whereas another two structures; VP = VP VP and VP = VP S, are determined non-grammatical patterns in canonical English language. It roughly designates that there is a variant occurred in a rigid linguistic system of radiotelephony in authentic usage even though the occurrences are not consistent as there are rather small numbers of tokens found. The development emerged somehow indicates that the language starts to move forwards on its own.

Next, the internal structures of complement phrase (CP) are illustrated as it commonly functions as a complement of preceding NP and VP.

(4) *CP* always starts with F1a member to give further information about or to complete the meaning of the core element; either NP or VP. Despite, it is generally a dependant element of NP and VP even though sometimes it also works as a prime unit in the utterance such as '*Via whiskey to runway 06*, Dynasty 611', '*Into position hold runway 06*, Dynasty 611', etc. with the communicative function of acknowledging, commonly appearing in the readback stage in air-ground discourse. The internal structures of CP are based on two reference arrangements with one additional pattern as the followings;

(4.1) CP = Comp NP: the pattern includes Comp (F1a item) and NP. In the actual data, there is no occurrence of optional Neg (not) in the structure such as report a 737 *on short final*, approach level 150 *with Golf*, intersection *for departure*, change

to my frequency 125.92, taxi *into position and hold*, continue taxi *via taxiway whiskey*, contact ground 121.9 *for the taxi*, etc.

(4.2) CP = Comp VP: the pattern consists of Comp (F1a item) and VP such as turn right heading 220 *to intercept*, heading 270 *to join the WINCO transition*, cleared *to push*, etc.

(4.3) CP = Comp S: the internal structure contains Comp (F1a item) and S as in 'confirm *that you have hit an aircraft*' which is the only one token found in the data. Even though the pattern is rather common in regular English language, it is the first time appearing in the syntactical system of radiotelephony.

The position of CP can not only be after VP or NP but also before them as in VP pattern (3.6): VP = CP VP such as '*after passing north cross* descend to flight level 80' and in NP pattern (1.2 h): CP NP such as '*after airborne* right turn'. Nonetheless, the last possibility, NP = CP NP does not exist in the reference data and in canonical English language.

The last pattern (NP = CP NP) is again an extra arrangement which does not appear in the reference but very conventional in the natural language. It can be assumed that a speaker intends to expose more of regular patterns of natural properties and bring them into the language; even though the rest of the existing patterns are also common in natural language. To sum up, the internal structures of CPs mostly stay the same without any obvious modification.

To sum up, the structural arrangements of syntactical structures at phrase level in actual radiotelephony are not that different from the ones in the reference as most of the patterns found are almost identical. Certainly, there are few divergent conditions in terms of usage and a new pattern introduced. Even so, the fundamental patterns and its communicative function remain unchanged.

6.3.2.1.2 *Syntactical structure at clause level*

The syntactical arrangements at clause level in actual radiotelephony are also found in two main possibilities to provide information and to seek information respectively. The numbers of tokens generated at clause level is relatively higher than those found in the reference data, but the internal patterns generally stay the same.

(1) *A clause indicating the act of informing*: there are a great amount of a complete so-called declarative clause found in the actual data comparing to the numbers found in the reference which commonly maintains basic grammatical and communicative functions with a little bit more complicated construction obtaining full grammatical units in a clause. There are two patterns discovered as follows:

(1.1) S = NP VP

(1.1.1) The internal structures of NP are rather simple as they appear in pattern (1.2 a): N as *I, you, we* and *aircraft call signal*, pattern (1.2 d): Adj N such as *braking action report*, and pattern (1.2 g): NP CP as *the visibility observed by tower*.

(1.1.2) The internal structures of VP, as a part of a clause in actual radiotelephony, are listed below;

(1.1.2 a) VP = Aux V: the pattern composes of Aux and V such as 'we *are going to vacate*', 'we *are vacating*', 'it *is approved*' and 'we *are going to taxi*'.

(1.1.2 b) VP = VP Adv: the structure mainly contains VP (Aux V) and Adv such as 'it *is raining lightly*', 'your traffic *departure now*' and 'we *are turning right now*'.

(1.1.2 c) VP = VP NP: the first element, VP can be either V or Aux V whereas NP can be in any pattern stated above such as 'we *have radar contact*, 'we *are alerting our cabin crew*', 'we *will take you through the final approach track*', 'it *is no problem*', '9642 *is established ILS runway 24*', 'braking action report *was 2041*', etc.

(1.1.2 d) VP = VP CP: there are two components in this pattern; VP and CP, both can be in any patterns of VP and CP such as 'we *want to take intersection 16 for 27*', 'I *want to make another try to join final*', 'ABX 827 *is in a descent*, 'you *can stay on the inner*', 'the visibility observed by tower *is about 1,000 meters*', etc.

(1.2) S = S Conn S: this pattern of S is firstly introduced in the syntactical system of radiotelephony when two Ss are conjoined with F1b member such as '*I have your oceanic when you are ready*', '*I need time but you can stay on this frequency*', '*tell your mechanic to pull you back so we can get an arrival into your gate*', etc.

Only one clause found in the data that is the combination between grammatical structure of radiotelephony and of conventional English language, '9642 *is established ILS runway 24*'. The internal NP of this pattern consists of a group of Ns which has no grammatical correlation as to modify or indicate each other in any way, but they are two independent items placed in order as to complete a set of information that 'ILS (Instrument Landing System) of runway number 24'.

In addition, there is an ungrammatical pattern occurred at clause level according to its corresponding language as in 'your traffic *departure now*'. In radiotelephony, '*departure*' also functions as a verb but in this case there is no agreement mark to demonstrate the relation with its third person singular subject to indicate present simple tense whereas the rest of the tokens generally strict to the conventional grammatical rules of tense, aspect and voice marker. It can be primarily interpreted that since radiotelephony is designed to reduce all of the complexity of the natural English which these particular markers are completely wiped out. Therefore, when generate a clause; the speaker continues to apply this particular rule – no existence of those markers on a verb. Or it may be just a simple mistake made by a speaker at that point.

(2) *A clause denoting the act of information seeking*: according to the data, interrogative clause is in a limited amount in the actual data represented in the formations of polar interrogatives and non-polar interrogatives.

(2.1) *Polar interrogatives*: the internal segments of polar interrogatives are similar to the basic pattern in regular English language with the effect of Subject – Auxiliary Inversion: Q = Aux N VP. For examples, '*do you read*', '*Can you taxi*', '*do you have any damage*', '*is runway in sight*', etc.

(2.2) *Non-polar interrogatives*: there are two structural patterns which are Q = Wh V NP as in '*What is your rate of climb*' and Q = Wh Aux V NP as in '*how far can you see runway*' and '*what will you do next*'. The second formation is again just introduced to the system even though it is one of the regular structures in prototypical interrogatives in its corresponding language.

In actual radiotelephony, there is also the use of VP to solicit information from the responder with VP pattern (3.3): VP NP such as '*request position*', '*report your heading*', '*say speed*', '*say altitude leaving*', '*report FAF when heading inbound*', etc. It is noted that Vs at the beginning of VP are *request*, *report* and *say*, but there is no token using '*advise*' as in the reference whereas the use of *say* in this case is only found in the actual data. All the imperative samples require the co-participant to provide specific information the same as non-polar interrogatives.

VP which is used instead of polar interrogatives also exists in the actual data but in different forms comparing to the reference ones. There are two patterns used to elicit either acceptance or denial response; VP pattern (3.1): V NP and pattern (3.5): VP CP. '*Confirm*' is used as a head of VP such as '*confirm whether to join Final again*', '*confirm that you have hit an aircraft*', '*confirm requesting lower altitude*', etc.

Numbers of clauses generated in actual radiotelephony commonly with canonical elements as in its corresponding language are much higher when comparing to a very small numbers of tokens found in the reference data. It somehow demonstrates that there is a tendency that the speakers start to bring the common linguistic knowledge of natural English of generating a clause instead of using confined constructed patterns of phrases to deliver a message into the actual communication since it might be the language pattern they are quite acquainted to and can cover the possibilities of conveying the intended message.

All in all, there are also two main syntactical arrangements generated in the formations of phrase and clause in actual radiotelephony similar to those in the reference. Three prime phrasal conformations; NP, RP and VP are mostly constructed to indicate communicative functions of directing, informing, acknowledging and eliciting which are the core speech acts conforming in air-ground communication rather than possible patterns of clauses. The internal structures of each type are almost the same as in the reference with few new patterns brought into the system which some do exist in regular English language while some do not even endure in the natural language as it is determined a non-grammatical patterns.

6.3.2.2 *Realization of syntactical patterns of actual radiotelephony*

The syntactical patterns used in actual usage are generalized in order to visualize the realization of arrangements constructed to denote four prime communicative functions; directing, informing, acknowledging and eliciting. Since the internal arrangements are slightly deviated from those designated in the reference, the generalization of each arrangement indicating a particular act is generally the same.

(1) *Directing*: The directing arrangement is always conducted in VP formation as the following;

a) S = (Aux) V (Adv) {NP (NP) / CP}

For example: *continue holding, descend 2000 feet, taxi to runway 27R, cleared for approach, turn right immediately, join downwind runway 24, hold position due wake turbulence*, etc.

b) S = VP Conn VP

VP = V (Adv) / V (NP)

For example:*, descend and maintain 5000, line up and hold position, confirm whether join final again, turn left then proceed direct to SHIPP, maintain flight level 230 and contact New York Center 134.55*, etc.

c) S = CP VP

VP = V {Adv / NP / CP}

For example: *from Chali direct to Kadlo, behind the traffic line up and wait, after airborne turn right, into position hold runway 06*, etc.

d) S = V VP

VP = V N / V CP

For example: *proceed direct Charlie, request descend, stop climb at 1300, request direct Pardi, continue descend 20000 feet*, etc.

(2) *Informing*: informing statement gives the co-participant a piece of new information which can be in the formation of NP, VP, RP or clause as follows:

(2.1) *NP*: there are 2 realizations possibly conducted;

a) S = NP$_1$ (NP$_2$) (CP)

NP$_1$ = (Det) (Adj) N (Adj)

NP$_2$ = (Adj) N

For example: *left turn, maintaining 350, coming out delta alpha with tango, runway in sight, north boundary wind 310 at 29, smoke in the cockpit, negative PAPI light, right side of runway, your position 11 miles on W-11*, etc.

b) S = NP₁ Conn {NP₂ / VP}

    NP₁ = (Adj) N (N) (Adj)

    NP₂ = N

For example: *climbing 255 correction 245*, *right heading 220 and cleared approach*', '*position and hold*', '*flight level 230 correction 250*', '*climbing passing 255 correction 245*', etc.

c) S = CP NP

For example: *after airborne right turn* and *from right side traffic rolling*.

(2.2) *VP*: Only one possible pattern used to function as informing;

    VP = (Aux) V (NP) (CP)

For example: *taxi, go around, maintain flight level 370, cleared to land, report a 737 on short final, will report established on the localizer*, etc.

(2.3) *RP*: the series of R is used to declare emergency situation only;

    S = R R R

For example: '*Pan Pan, Pan Pan, Pan Pan*' and '*Mayday Mayday Mayday*'

(2.4) *Clause*: the arrangement is very simple with the composition of N and VP or series of S;

a) S = NP VP

For example: *Tower Air 41 is in position 4L, Lux 9642 is established on the localizer*, we *want to take intersection 16 for 27*, I *want to make another try to join final*, we *are alerting our cabin crew*, etc.

b) S = S Conn S

For example: *I have your oceanic when you are ready, I need time but you can stay on this frequency, tell your mechanic to pull you back so we can get an arrival into your gate*, etc.

(3) *Acknowledging*: it is to either accept the information given or state that the information is received by repeating whole or part of that information which are generally represented in NP, RP and VP. VP and NP are the formations basically used for readback process.

(3.1) *NP*:

    S = NP (CP)

    NP = (Adj) N (Adj) / N (N)

For example: *2979, SilkAir185, right turn 300, runway heading, following Gateway, climbing 13000, right heading 220, 250 at the marker, 27R via Mike*, etc.

(3.2) *RP*:

    S = R (R)

For example: *roger, copy, OK, roger stand by, wilco, all right stand-by, affirm*, etc.

(3.3) *VP*:

    S = V {NP (CP) / CP}

For example: *confirm go around, taxi holding point 27, climb and maintain flight level 390, descend 3000 for runway 05, join the WINC at 1600, cross MISTR at 35000*, etc.

(4) *Eliciting*: eliciting not only designates questioning but also requesting. Therefore, there are two possibilities to indicate this particular speech act; VP and interrogative clause as follows:

(4.1) *VP*: there are three members of C2 which indicate the act of requesting act; *advise, report* and *request*.

    S = V {NP / CP / S}

For example: *request position, report your heading, say speed, say altitude leaving, confirm whether to join Final again, confirm that you have hit an aircraft, 'confirm requesting lower altitude, confirm you are turning left now*, etc.

(4.2) *Interrogatives*:

a) Q = Aux N VP

For example: *do you read, can you taxi, do you have any damage, is it raining at the airport, could you turn left immediately, are you ready to go*, etc.

b) Q = Wh V NP

For example: *What is your rate of climb*.

c) Q = Wh Aux V NP

For example: *how far can you see runway* and *what will you do next*.

The realizations of syntactical arrangements demonstrated above are commonly used in actual usage which most of them are more or less the same as those found in reference data with only few differences since there are new patterns of structures firstly introduced in the language. Again, VP is heavily applied in any possible communicative functions.

6.3.2.3 *Composition of syntactical patterns in the utterance of radiotelephony*

Basically, the utterance in radiotelephony mostly consists of more than one syntactical element. Only one possibility is that a speaker uses an aircraft call sign as to acknowledge information or instruction, then a single element of NP is generated in the utterance. However, in actual radiotelephony, the tendency of having only one element in the utterances is increasing as there are quite a few tokens found in the data. It usually occurs in the situation where the participant is certain of the identification of the co-participant or vice versa which is rather common in regular conversation. Consequently, NP (1.1) strictly required as a mandatory element in reference utterance as to declare the identification process is sometimes omitted such as *132.3, 2979, roger, clear of traffic runway 31L, cleared to land*, etc.

Nonetheless, the majority of the utterances are still comprised of at least two elements or more. The most numbers of elements found in the data is five whereas the

utterance in the reference can obtain up to 8 elements such as '*De Kooy Approach, PHILL just airborne, passing 500, climbing 2000, left turn, heading 120*', '*THA 261, negative PAPI light right side of runway, runway edge light interval 120 meters and runway end light interval 6 meters, caution barrier 400 meters*', etc. Even so, the general arrangements of the utterance in actual radiotelephony are almost the same as in the reference.

Furthermore, there are also a group of items representing social expressions (F5 items) and a polite expression (F6 item or please) are included in the actual utterance. It is very common to find this particle in regular English conversation, but they are all *excluded* in reference radiotelephony.

Social expression are able to co-occur with NP (1.1) in between the two Ns such as 'Singapore 6, *good evening*, Taipei Tower hold short runway 25L' or as a farewell particle at the end of the utterance such as 'Singapore 6 contact tower 129.3 *good day*' or as an element in the utterance such as '*thank you* THA 261' to maintain the social relationship between the participants which regularly occurred in natural conversation. Polite expression or please is commonly placed at either the beginning of the utterance after NP (1.1) or at the end of the core element before NP (1.1) such as 'Kiwi Air 17 expedite your descent to eleven *please*', 'Intersection 16 *please* Streamline 200', '*please* stand by for a moment', 'could you give me your current winds *please*', etc. to increase the level of politeness into the utterance. This expression can be used as a particle of declaratives, imperatives and interrogatives.

In conclusion, in actual radiotelephony, there are also two core types of syntactical arrangements; *phrase* and *clause formations*. Most of the structures found in the data are represented in the formation of phrases; NP, VP, RP and CP rather than a complete clause. However, the proportion of clause is increased as there are more tokens found in the data.

Some particles of the internal patterns of all possible phrases are slightly changed as well as that new patterns are generated. Some directly brought from its corresponding language while some developed from the language itself which are surely considered ungrammatical structure in canonical English language.

Generally, the internal structures of syntactical structure as well as the arrangements in the utterance of actual radiotelephony are quite similar to those in the reference with small apparent developments as there are only few new features supplemented.

Furthermore, it is too vague to claim that the language definitely enlarges its own grammatical structure since the variants commonly come from the background knowledge of natural English of the speakers causing them to automatically generate the language in its conventional way. Even so, there are also a concrete evidence that somehow the language begins to move on its own since there are some deviations occurred which are not acquires from regular English language. Nonetheless, at this point, radiotelephony seems to acquire more of conventional features from its

corresponding language as well as to extend some properties from the special properties of the language itself.

6.4 Morphology in Actual Radiotelephony

The analysis at morphological level of actual radiotelephony is conducted under the same criteria as of the analysis of the reference data as to apply *Compare and Contrast* (Nida, 1949) to examine the functions and appearances of the *grammatical bound morphemes* of radiotelephony. The discussion is as well stepped in correlation with grammatical morphemes relating to C1 and grammatical morphemes relating to C2 accordingly.

6.4.1 Grammatical morpheme of C1 in actual radiotelephony

In actual radiotelephony, there is also an evidence that inflectional morpheme {-s} to indicate plurality of C1 existed in the language as there are an amount of tokens to compare as the followings;

Base form	With marker {- s}	Samples of statement
gate	gates	a) You can land and taxi to the *gate*
		b) I pulled up connecting *gates* out of the ACARS
gust	gusts	a) wind 020 at 28, *gust* to 50
		b) the wind is now 170 at 24, *gusts* 35
intention	intentions	a) Singapore 6, say *intention*
		b) Yukla 27 heavy, say *intentions*
window	windows	a) what happened on the *window*
		b) It is a temporary closure due to problem with one of the *windows*

Table 6.20 – Table of Morpheme {-s} in Actual Radiotelephony

All the samples lead to the absolute assumption that there is *a plurality marker* in radiotelephony even though some of the items obtain suffix –s without any concrete evidence whether they are neutral and can be coined neither countable nor uncountable item or there is accidentally no base form to compare because of the limited amount of data. Still, there is no occurrence of possessive ending {-'s} in actual radiotelephony.

6.4.2 Grammatical morpheme of C2 in actual radiotelephony

Contrary to reference radiotelephony, grammatical inflectional morphemes {-s}, {-ed} and {-ing} to include extra grammatical reference; tense, aspect and voice are explicitly marked in the language. However, most of the samples have no base form to compare but the syntactical structure these C2 emerged in is confined and

very precise to primarily conclude that these inflectional morphemes are present in the language.

(1) *Inflectional morpheme {-s}*

Since the tense in radiotelephony is based on present time, most of C2 appear without any bound morpheme {-s} in imperative formation as well as some in a clause formation, suffix {-s} to indicate subject-verb agreement in present tense doesn't exist such as '*report* abeam papa lima bravo', '*say* altitude leaving', 'TWA 800 *make* a left turn', 'your traffic *departure* now', etc. It is interesting that even the language is generated in a clause, the grammatical morpheme {-s} is omitted as the way it is designated non-existent property in reference radiotelephony.

However, in the actual data, there is a firm evidence to confirm that this particular grammar particle is somehow brought in the language when the speaker tends to create the language in the form of clause such as 'that approach *terminates* at two nautical miles from touchdown', and '592 *needs* immediate return to Miami' Consequently, there are two possibilities found in the data to indicate the same grammatical reference, one with conventional grammatical morpheme {-s} the same as in the natural language and one without as designated in reference radiotelephony.

At this point, the deviation is clearly noticed in the actual data which can simply explain that the use of morpheme {-s} in present simple to indicate third person singular is one if the most basic grammatical properties in canonical English. Hence, it is very common that the speaker who certainly has grounded language knowledge may simply deliver the language in its conventional conformation. Then, there is a grammatical variant occurred in the system when two different rules denoting the same reference are implemented.

(2) *Inflectional morpheme {-ed}*

Again, in actual radiotelephony, suffix {-ed} is reserved the function of a derivation morpheme as to change C2 to an adjective-like C3 for examples, observed and decreased as in 'the visibility *observed* by tower is about 1,000 meters', 'invisibility *decreased* to 1,000 meters' respectively. But, an application of past tense is marked on C2 with {-ed} as a inflectional morpheme is also introduced in radiotelephony according to the actual data as in 'I *received* the last braking action report'. Even though it is rather vague to claim that {-ed} in '*receive*' is past tense marker, but when other tokens expressing the past tense with irregular past form designated in its corresponding language as in 'braking action report *was* 2041'and 'they *knew* it' are examined, it can be assumed that {-ed} is functioning as a past tense marker. Nonetheless, the occurrence of past tense is still very rare as the content of air-ground communication generally relates to activities at the present time. Then, past tense as well as its marker is not favor in the language.

Some C2 encodes passive voice to give information about the roles of different participants as the recipient of the action in an event is the grammatical

subject, e.g. 'braking action was *reported* poor by a Cessna 402', 'it is *approved*', 'the tower is *closed* at this time', and 'Lux 9642 is *established* on the localizer'. It is remarkable in this case that {-ed} plays the role of inflectional morpheme in radiotelephony which is clearly marked on C2 with a complete passive construction as in canonical English language.

In short, besides suffix {-ed} is a derivational morpheme, it also is an inflectional morpheme marked on a verb to point out tense and voice in radiotelephony.

(3) *Inflectional morpheme {-ing}*

There is no change of the prime property of suffix {-ing} as a derivational morpheme in actual radiotelephony, e.g. '*climbing* 11,000', 'Streamline 200 *requesting* taxi', '*leaving* approaching 190', 'Silk Air 185 *maintaining* 350', etc. As well as that {-ing} in actual radiotelephony is also a inflectional morpheme indicating progressive aspect. There are quite a few tokens demonstrated that C2 obtains morpheme {-ing} to display that the state of being is ongoing or unfinished at the moment of speaking; for examples, 'we are *squawking* 0060', 'we are *turning* right now', 'we are *alerting* our cabin crew' and 'It is *raining* lightly'.

The finding of grammatical morphemes related to C2 is generally based on the sentence structure of the tokens as there is no base form of C2 and C2 affixed with each morpheme to elaborately compare. Thus, the background knowledge of conventional constructions of canonical English language is applied. It is apparent that there is no difference in the format when these inflectional morphemes are marked on C2 in the tokens as all of the grammatical rules are strictly implemented.

To sum up, there is an occurrence of the inflectional morphemes to mark present and past tense, present progressive aspect and passive voice, contrary to the reference one which none of these morphemes attached to a verb-like C2 in order to indicate further grammatical properties of time frame and information about the role of participant is found.

It can be explained in two aspects; one is that grammatical features excluded from the language are brought back to the system because of the basic knowledge of natural English that the speakers obtain. Therefore, when they start generating more of clauses, these features acquired from the natural language are automatically applied. And two, the confined grammar designated in reference radiotelephony is not broad enough to cover basic needs of exchanging information in air-ground communication.

Consequently, the expansion of grammatical features by the use of these inflectional morphemes is essential which means that the language is consuming more of linguistic characters of its corresponding language as well as growing the use of existing structural pattern based on the use of base verb as discussed in inflectional morpheme {-s} at the same time. In the end, there is more than one possibility for the

speaker to apply in order to signify the same reference which increases the flexibility in the language system.

6.5 Summary

The linguistic properties of actual radiotelephony are mostly well maintained as the way they are constructed in the reference. Nonetheless, the movement of the language is explicitly illustrated with rather solid evidence at all domains. The deviations occurred mostly are from the existing conventional features of canonical English language which are either intentionally or accidentally brought into the language as well as from enhancing the existing properties of the constructed ones. Therefore, what happened to the language when it is used in authentic communication is elaborately display the expansion of radiotelephony causing the unavoidably effect on the rigid linguistic system as to make it become less confined and more complex.

CHAPTER VII

CONCLUSION AND DISCUSSIONS

7.0 Introduction

In this chapter, the conclusive summary of the study is narrated in order to provide the overview of constructed reference grammar of radiotelephony as well as the deviation occurred at each linguistic domain; discourse, lexicon, syntax and morphology. The chapter begins with the overall conclusion of the findings and later on the discussions upon each aspect are carried out.

7.1 Conclusion of the Findings

As socialized individuals, human beings spend much of their lives talking or interacting with others. Interacting is not just a mechanical process of taking turns at producing sounds and words. It is a semantic activity as a process of making meanings (Eggins & Slade, 1997: 6). This process of exchanging meanings is functionally motivated since the participants interact with each other in order to accomplish a wide range of goals. Very often that the communication is initiated to achieve specific tasks; for examples, to buy, to sell, to find out information, to pass on knowledge, to make appointments, to get jobs, and to jointly participate in practical activities.

In air-ground communication, the participants; namely pilots and air traffic controllers are as well participating in the exchanging to accomplish a specific goal of conducting the flight operations under the prime domain of utmost *safety and efficiency*. To achieve the designated intent, radiotelephony which is the crucial medium language is elaborately designed to be compatible with the situational parameters of the communication and to reach the appointed objective.

In the study, the ultimate purpose is not only to look over the generalization of the organization and communication strategies at discourse level but also to look into the language to examine its linguistic properties at lexical level, syntactical level, and morphological level in order to construct the reference grammar of radiotelephony in air-ground communication as well as to compare the constructed reference grammar with the actual one in authentic communication to prove two hypotheses as follows:

1. The grammar of radiotelephony has distinctive characteristics at all linguistic levels and exhibits properties of a sublanguage.

2. Actual usage of radiotelephony deviates from the constructed reference grammar the most at the syntactic and discourse levels.

According to the findings, they are explicitly verified that the first hypothesis is undoubtedly true whereas the second hypothesis is inconclusive.

First, the grammar of radiotelephony definitely has distinctive characteristics at all linguistic levels which represent the uniqueness of being a sublanguage. Radiotelephony is a subset of a natural English language used to converse in specific subject matters by a particular social group or professional, mostly in a specialized technical and scientific domains within the array of specialized purpose within a restricted set of lexicon, morphology, syntactical patterns and discourse features.

Radiotelephony is truly developed through the broad linguistic attributes of its corresponding language which are narrowed down to the possible minimums to eliminate all possible complexities as well as to serve simplicity, then integrated with some of specific linguistic fulfillments to tailor the language to be suitable for the context of communication and the needs of the interlocutors, demonstrating in unique assets of discourse organization and strategies, word-formation patterns, syntactical properties and structural arrangements and unique usage of morphological particles.

On top of that it can also be implied that the minimum properties issued in radiotelephony are the necessities asset of its corresponding language to at least accomplishing the communication while the rest of the properties are more like an accessory to make the language become more natural with complications.

Second, the movement of constructed reference grammar of radiotelephony is more or less pictured in the actual usage at every domain which will be later discussed in the next section. However, there is no absolute indication to pinpoint the degree of deviation occurred at each domain. Therefore, it is truly vague to conclude that the variation largely comes about at the syntactic and discourse levels as hypothesized.

In accordance with the findings, it is strongly validated that the deviation did take place at all linguistic levels in actual radiotelephony. The evidences point out that most of extended properties already exist in its corresponding language and they are directly brought into the system mostly because of the acquaintance of the users towards the foundation of regular English language features. Hence, there is a possible tendency that radiotelephony is going to be much united with its corresponding natural language even though it is as well apparent that there are some additional descriptions indeed developed from the constructed reference which somehow pull the language itself to be a little bit away from its origin.

Consequently, radiotelephony is somewhat growing and struggling in between of moving more inward and more outward from its governed linguistic properties of natural English language it is emerged from the very beginning. The figure below demonstrates the development of radiotelephony from its constructed reference to the actual one;
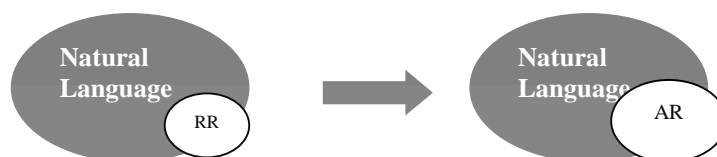
Figure 7.1 - The Development of Linguistic Properties of Radiotelephony

Note: RR = Reference Radiotelephony   AR = Actual Radiotelephony

All in all, the study has proved that radiotelephony is genuinely a sublanguage which contains confined and distinct set of linguistic properties derived and grew from natural English language to use in a radio communication in an aviation field. Furthermore, the sublanguage is truly developed when used in authentic communication context which leads to variations at all linguistic domains, but the degree of variants are inexplicitly visualized.

7.2 Discussions on the Findings

To support the stated assumptions, elaborate overview of the focal characters of reference grammar of radiotelephony as a sublanguage as well as the conceivable variances occurred at each linguistic domain; discourse, lexicon, syntax and morphology are delicately carried out as follows:

7.2.1 Radiotelephony at Discourse Level

At discourse level, it is strongly proved that the structure of constructed reference air-ground discourse is rather rigid and unique comparing to the regular discourse structure in its corresponding natural English language.

7.2.1.1 *Reference discourse structure of air-ground communication*

The reference discourse in which radiotelephony conformed is absolutely based on concepts of turn organization as in any regular oral communication in general context. In an oral discourse, the turn-taking system of what the participants say and the actions they perform are varied, complicated and sometimes unpredictable but the structure of turns in air-ground discourse is rather systematic, simple and usually predictable since the communication is constructed within the scope of designated readback/hearback loop (Figure 5.1: 89), commonly tied to the constituted activities of flight profiles. The generalizations of the reference external discourse structure denoting *directing, informing* and *eliciting* which are the main communicative functions in air-ground discourse are illustrated in two sets of exchanges in the figure below;

	(a) **controller** direct/elicit
1.	(b) **pilot** readback
	(c) **controller** listen and verify
	(a) **pilot** inform/elicit
2.	(b) **controller** readback
	(c) **pilot** listen and verify

Figure 7.2 - Designated Structure of Air-Ground Communication

The common ground of the external structure of the discourse is literary the same as any in regular conversation upon the similar fundamental communicative functions which is to consist of at least two components; initiation (a) and response (b) or the first- and the second-pair part. However, in natural conversation, there is a possibility that the sequence of the pairs are not this simple as sometimes the participants tend to increase complexity by inserting a new sequence before the second-pair part is initiated which may lead to incomplete element within the same type of exchange as only one pair part is conducted (Thornbury & Slade, 2006:115).

On the contrary, the exchange in air-ground discourse is strictly conformed in a complete pair of initiation and response, meaning it is impossible to find incomplete set of adjacency pair in each type of exchange. Because of the specific context of a non face-to-face communication of air-ground discourse, the second-pair part or the response move is a very essential indication to point out the success of conveying the message across.

Actually, the exchanges possibly obtain the third component (c) as to evaluate correctness of the information supplied in the response which generally appears in direct exchange and elicit exchange but in general discourse the occurrence of the third component is very rare, usually found only in classroom discourse (Burton, 1981). In air-ground discourse, it is equivalent to hearback stage in communication model indicating that the message recited is perfectly correct and allowing a participant to identify any misunderstandings and make necessary corrections in direct exchange as well as to simple denoting that the message is already received in elicit exchange (example e and f: 97).

As the matter of fact, air-ground communication relies heavily on instruction-response basis confined with time constraint which strongly requires high degree of explicitness and accuracy while rapidly exchanging the information. Consequently, the construction and sequence of turns in each exchange are designated to be rather solid in order to prevent any ambiguity which may eventually causes fatal incidents or accidents. On top of that, the reason that the turns in air-ground discourse can maintain in precise order is that there is no presence of overlaps and interruptions as the exchange is sternly based on one-on-one interaction as only two persons are reserved in the communication at a time.

At this point, the large difference between air-ground discourse pattern and general spoken discourse pattern is definitely demonstrated. The participants in air-ground discourse have to conform the turns orderly as designated in any circumstances, the only choice they can make is to include or exclude the third move in the exchange while the participants in any regular oral discourse are freely allowed to generate turns as complicated as they intend with varieties of choices depending on the context of each communication. Therefore, while the nature of spoken discourse especially everyday conversation is frequently characterized as lacking in explicitness, ambiguous, incomplete and repetitive (Milroy & Milroy, 1985), the fundamental of air-ground discourse is totally in the opposition except the repetitiveness. Repetitiveness is also the nature of air-ground communication discourse to endure the accuracy of the message as most of the second-pair parts of direct exchange and inform exchange are to mainly repeat specific information given as to indirectly confirm the correctness of the message.

Besides all these, in air-ground discourse contains restricted structure of identification-recognition process which is absolutely impossible to perform in any regular discourse because of its formulaic outline (chapter 5: 106-7). The particle inside the move composes of a formulaic series of specific call signs to allow the speaker to continue on with his/her next exchange (example a and b: 107) whereas in common discourse, there is no ritual summon with specific sequence of names as such, instead it is very simple by a speaker begins with calling out the name of designated participant and then a target participant simply reply with response exclamation as 'yes' or else to declare own self.

Apparently, the internal structure of existing types of exchanges in air-ground discourse is as well determined to conduct in very fundamental pattern as each move is confined in one principle head with a single act. An interesting point which causes the internal structure of the core exchanges in air-ground discourse rather distinctive is that at each move of each exchange usually consists of an aircraft call sign as a particle of the head to denote summon act to point out the co-participant and terminate act to end the exchange with self-identification as well as to indirectly inform the speaker that the designated co-participant receives the message or as the head itself in receive act as to accept the correctness of the instruction provided along with assuring that it is the designated co-participant. Thus, an aircraft call sign is a prime component in each move as to allocate the turn or signify the identification process in order to ensure that the designated participants are involved in the exchange. This case is impossible in common conversation that the identification process is done all the time during the exchanges. The reason is that it is extremely difficult to identify the participant in non face-to-face communication without the identification-recognition process. In air-ground communication, the process is strongly intense as particular information has to be passed on to the specific participant only. Otherwise, the

movement of the aircraft would be misconduct which possibly affects the overall traffic pattern in the airspace and may lead to a tragic accident.

In short, both external and internal compositions of air-ground discourse are designed based on the most simple and conventional arrangement of three basic exchanges; directing, informing and eliciting in regular English spoken discourse. Nonetheless, formulaic patterns, confined sequence of turns, prescribed pair-parts set and a rigid group of the linguistic form to signify particular speech act (summon and reply-summon acts) make the discourse very unique and almost robotic-like since all the possible complexities which commonly occurred in natural oral discourse are entirely eliminated. The discourse structure of air-ground communication definitely indicates the essence of being a sublanguage.

7.2.1.2 *Derivation of discourse structure in actual air-ground communication*

The derivations of structure occurred in the actual discourse is somehow evident mostly in internal structures rather than external structures of the exchanges since the fundamental external arrangements of the exchanges are basically reserved. The exchanges are primarily consisted of initiation move and response move as mandatory elements whereas follow-up move or the third element is optional which restrictedly conducted in direct exchange and elicit exchange similar to the reference ones. Nonetheless, there are a new optional exchange and more alternatives introduced to the arrangements of the constructed external structures. The variants discovered in the actual discourse are listed below;

(1) A new supplementary exchange, *close exchange*, is introduced in actual air-ground discourse as to terminate the communication. The close exchange generally comes after the core exchange to indicate the end point of the entire of conversation which doesn't exist in the constructed discourse. The exchange contains closing and answering moves with a leave-taking token as the head of terminate and reply-terminate act;

ATC	All nippon 658 resume normal speed contact Tokyo Approach 119.1	summon directive	pre-head head	directing	I	Direct
PT	All nippon 658 normal speed 119.1	reply-summon repeat	pre-head head	acknowledging	R	
PT	*good day*	*terminate*	*head*	*closing*	*I*	*Close*
ATC	*good day*	*reply-terminate*	*head*	*answering*	*R*	

(Table of discourse analysis B: exchange 187)

This exchange is very common in regular discourse as it is a basic social exchange in the natural spoken communication to maintain descent social etiquette of the participants involved in the conversation when they both decide to terminate the dialogue. Therefore, bringing this common feature into air-ground communication is to allow the exchange to be more natural as any spoken discourse in which the participants are usually engaged. Also, it indicates that leave-taking process is somehow unavoidably conducted since the participants are extremely acquainted to this social norm.

(2) The external and internal patterns of particular exchanges are reformed as to increase more alternatives of the rigid discourse arrangement as the following;

(2.1) A second pair-part of summon exchange is merged with the first-pair part of the next designated exchange as in;

PT	*Taipei Tower, good evening, Singapore 6*	*summon*	*head*	*opening*	*I*	*Summon*
ATC	*Singapore 6, good evening, Taipei Tower* hold short runway 05L	*reply-summon* directive	*head* head	*answering* directing	*R* I	Direct
PT	Hold short runway 05L Singapore 6	repeat terminate	head post-head	acknowledging	R	

(Table of discourse analysis B: exchange 210)

The merged pattern of summon exchange and direct exchange increases the naturalness into the discourse as the pattern become less rigid with several robotic-like repetition of identification-recognition process.

(2.2) The fourth turn or additional follow-up move is possible included in elicit exchange. The first follow-up is mainly to indirectly inform the co-participant that the message is received and to readback the information to ensure the accurateness whereas the extra follow-up is used to confirm again the correctness of the given information. This pattern generally occurs when the participants need maximum confidence in the exactness of the information provided such as;

PT	Say again the squawk	inquire	head	eliciting	I	Elicit
ATC	4321	informative	head	informing	R	
PT	4 3 2 1	repeat	head	acknowledging	F	
ATC	*4321*	*confirm*	*head*	*informing*	*F*	

(Table of discourse analysis B: exchange 24)

Besides the deviations occurred on the external exchange, there are some explicit variations took place in the internal structure of the exchanges;

(2.3) The particle of the head in initiation move, response move and follow-up move in three focal exchanges is optional whereas it is mandatory in the reference pattern. It is commonly omitted especially when summon exchange is conducted or when the participants are certain that there is no need to state identification-recognition process such as;

ATC	800	summon	head	opening	I	Summon
PT	go ahead	reply-summon	head	answering	R	
ATC	tell your mechanic to push you back	directive	head	directing	I	Direct
PT	okay	receive	head	acknowledging	R	

(Table of discourse analysis B: exchange 127-8)

There is no use of linguistic form to state identification-recognition process as a particle of the heads both in initiation and response moves as there is a summon exchange performed. As a result, the internal composition of each head is even much simpler.

(2.4) The internal structure of each head in summon exchange can be also at this minimum as in the sampled exchange 127-8 displayed above when the head of opening move is only the determined participant's call sign and the head of answering move is only specific response expression or a target participant call sign to accept the

conversation which is exactly similar to the internal pattern of identification-recognition process in regular spoken summon exchange.

Furthermore, the sampled exchange 210 in (2.1) demonstrates the maximum amount of particles with greeting tokens that can be sequenced as the head on opening and closing move of summon exchange. A *greeting token* as good evening or else is definitely excluded form any of the pair parts of reference summon exchange as it is considered not necessary to maintain a standard social etiquette as of any spoken discourse whereas there is an existence of these social expression as a particle of the head in either opening move or answering move in summon exchange.

To sum up, there are strong evidences of deviations coming off; a new social exchange to emphasize on the end point of the communication, an additional of the fourth turn in the exchange, the merged turn between the consecutive two exchanges and some variances in the internal structure of the exchanges as the additional options along with the usage of constructed reference structures. All of these represent the development of the discourse in the authentic communication which is the attempt to make the strict and extremely systematic structure become more flexible with more alternatives and definitely more natural. Nevertheless, the new occurrence brought in the actual discourse structure is not a new invention which moves away from the general norm of spoken discourse in its corresponding language. Instead, it is more like the acquaintance of the customary of the regular patterns which the speakers automatically perform at some points in the air-ground discourse.

7.2.2 Radiotelephony at Lexicon Level

The numbers of terms in radiotelephony are quite *limited* and *unique* confined in a small set related to the particular professional subject matters in a specific context comparing to the set in natural language. Therefore, another half of the items used in the language are common generic brought from its corresponding language without any change in their references.

7.2.2.1 *Reference lexicon in radiotelephony*

Lexical terms created in order to be specially used in radiotelephony, usually denote *flight information, flight activity, instrument, system, service station* and *expression*. There are quite a great amount of items designating specific expression in radiotelephony as to make the communication precise and poise without generating long stretch of linguistic forms because of the time constraint of each communication; for example, *clearance* denotes 'an authorization by air traffic control for the purpose of preventing collision between known aircraft and for an aircraft to proceed under specified traffic conditions within controlled airspace', *heavy* signifies 'a specific terminology for describing the aircraft which has got massive weight, usually followed the aircraft configuration in an aircraft call sign', etc.

Most of the terms are generally based on one-on-one relationship between the item and its reference to avoid complexity and ambiguity when the conversation takes place because of the constraints of communication context. Even so, there is the presence of polysemy in the reference lexicon through the specific process of word-formations, but in limited numbers (chapter 5: 140-1). However, they are still completely understood as the linguistic context and the position in the utterance helps indicate the speaker's intended denotation such as *approach* which can refers to either a controller or a flight procedure. Usually *approach* with the first reference is paced at the beginning of the utterance normally co-occurring with an aircraft call sign in identification-recognition process whereas the item with the second reference mostly appears after C2.

Multi-word term, a term with components of lexical items which sometimes have a meaning that is compositional and therefore denotes the meaning of the components, or that is non-compositional and denotes something different than the combined meaning of the components, is the core character of lexicon in radiotelephony. Therefore, it is true that lexical terms in radiotelephony is also based on the concept of language packing, permitting the specialists who use the language to 'pack' the relationship among complex concepts into single concepts with specific word-formation and derivation techniques in order to make them transparent and easy to understand (Grishman & Kittredge, 1986: 21).

Certainly, all of the existing lexical terms in reference radiotelephony are built based on common word-formations used in regular English language; *compouding, affixation, shift* and *shortening* with the same description of their fundamental strategies. The discussions are carried with reference to the frequency of the applications of word-formations used in radiotelephony;

(1) The most frequent formation used to create terms is '*shift*', commonly in semantic rather than in function. *Shift* assists to build the terms to make use of existing words in natural language by changing their original properties to be compatible with the aviation field. Generally, their semantic properties are through narrowing process. The initial broad sense of the generic word is compressed to be more relevant to a specific aspect of aviation profile. Some of the common words such as *radio, monitor, check, taxi* and *negative* are broaden as to completely cover the possible aviated angles which truly make these items become polysemy while some are redefined to denote completely different reference from its original property.

(2) The second most frequent formation used to create terms is *compounding*. The compounding process causes muti-word terms in several lengths in reference lexicon as the items can be composed of 2 elements to 3 elements. The 2-element compounds are rather common in its corresponding language since most of the compounds in regular English language usually contain two elements. Even so the 2-element compounds with the repetition of a base-form item, e.g. *Pan Pan* and *break*

break, are pretty irregular in canonical English language. As well as that it would be very common if the 2-element compounds with an adposition if an adposition is posited at the end of the compound such as *push-<u>back</u>, take <u>off</u>, touch<u>down</u>, straight-<u>in</u>*, etc. but in the reference lexicon, there are two compounds which the positions of the particles are in front of the nucleus, <u>*in*</u> *sight* and <u>*in*</u> *progress*.

On the other hand, 3-element compounds are rare in natural English language but there are quite a few in radiotelephony (chapter 5: 128). They are particularly coined as single multi-word terms since the elements are firmly implanted within the compounds. The compounds in radiotelephony usually demonstrate complexity in compounding pattern as they tend to denote particular process, system and procedure which are as well complicated. Therefore, the elements composed in the compounds are generally at length with the combination of varied parts of speech.

(3) The third frequent formation used is *shortening*. It is as well a common character of lexicon in radiotelephony as the long-stretch items are shortened with different techniques and are used as common lexical terms such as ILS, VFR, ACC, PAPI, FAF, NOTAM, CAVOK, ident, etc. This character has confirmed the description of radiotelephony as a sublanguage since many sublanguages employ symbolic expressions such as abbreviations (Shortis, 2001: 59). Almost of the shortening terms refer to facility, system or procedure. The interesting point is that there is a double shortening process, clipping and initialism, when the terms are forced through both processes, e.g. TACAN and VORTAC.

In regular language, the shortening words are quite rare mostly conducted in terms of simplicity in casual context of communication, but the shortening terms in radiotelephony aim at simplifying a long stretch of compounding word to be easily produced when sending message across in rapid exchange of formal communication as well as to reduce the complication when interpreting the message.

(4) The forth frequent formation used is *affixation*, the simply way to create a new lexical item by adding affix to the stem either before or after. The lexical terms in reference radiotelephony as well share the feature from its corresponding language. Therefore, there are couples of items which do have the derivation bound morpheme permanently attached representing a function totally differing from what it possesses in regular English language such as *cleared, recleared, intentions, vectors* and *brakes* (chapter 5: 131) with the general sense of regular based-form verbs and nouns.

Besides the word-formation stated above, there is also the additional process which is quite common for any sublanguage to create terms in rediotelphony which is *lexicalization*. It is the process that phraseological unit or set phrase repeatedly used in the language to determine particular procedure mostly procedure, protocol and condition of flight profiles are conceptualized into a single lexical unit with single reference. Even though the tokens found are not that many, they demonstrate the uniqueness of terms in radiotelephony. Some of them are considered a phrase such as

touch and go, *reading you three*, *resume own navigation*, *traffic in sight*, etc. whereas some are determined a clause, e.g. *I say again* and *how do you read*, in the canonical English language.

As we shall see that most of word-formations implemented in creating lexical terms in reference radiotelephony are rather common since they are generally used in natural English language. However, the regular process with specific technique leading to irregular end products causes a distinctive set of lexical items. As a result, the lexicon in radiotelephony is one among other linguistic characteristics which demonstrates the uniqueness of this sublanguage.

7.2.2.2 *Derivation of lexicon in Actual radiotelephony*

Similarly, the lexicon of actual radiotelephony is as well the *same* set of the lexicon in the reference built from the same formation. Nevertheless, there are some variations occurred with some of the existing lexical terms which are processed through particular word-formations to become brand new terms or synonym to the original ones as well as the application of specific technique of word-formation to create new lexical terms;

The new lexical terms created for the actual usage are highlighted on the formations of *shift* and *shortening* as well as *borrowing* discussed below;

(1) *Shift* in both semantic and function aspects generally occur with the existing items; some of the terms are extended form verb to noun or vice versa such as *go around, request, ident, airborne*, etc. (chapter 6: 198-9). The language users of radiotelephony tends to apply the same mechanism to make use of existing items as in regular language as to extend the application of the terms.

(2) *Shortening* is limited to one technique which is *clipping* the existing items in reference lexicon; therefore, the synonym of the original and the clipped ones are arisen in the actual radiotelephony without a change of semantic properties, e.g. (resume) own navigation, (flight) level, inner (marker), line up (and wait), push(-back) and transition (level). The possible cause of shortening terms in the actual usage is rather clear as to make them become more economic to suite for nature of air-ground communication which rapid exchange of information is fundamental.

Also, the technique of *backformation* or *deaffixation*, is particularly used to as well form a new item only in actual lexicon by eliminating the remaining affix in the existing items such as *vectors* – vector, *breaks* – break and *intentions* – intention. It is noted that the original ones with the affix are still in the system.

(3) *Borrowing* is to bring the generic words in regular English lexicon to be used along with the existing items in the reference lexicon denoting the same semantic property such as affirm – *yes*, OK – *alright/approved*, roger – *copy/understand*, contact – *call*, etc. These generic items brought from natural English language indicate that the users tend to look for common words which are regularly

used in general communication and denote similar reference in order to increase alternatives in such as rigid lexical choices in the reference lexicon.

The creation of these new terms basically increases the amount of polysemy and introduces synonym in the lexicon. Referring to the data, there are numbers of polysemy occurring through the formations of *shift* whereas the large amount of synonym emerged from the formations of *shortening* and *borrowing*.

In conclusion, the deviation at lexical level in actual radiotelephony is generally from the extent of existing terminologies built through the three main word-formations in reference radiotelephony to fulfill the needs in communication of the users. The growing numbers of lexicon in the actual usage by implementing common word-formations used in its corresponding language illustrates that the development has indeed begun in radiotelephony in a way that the common background knowledge and the customary of word-formations of conventional English have played a prominent role somehow.

7.2.3 Radiotelephony at Syntactical Level

The outstanding characteristics of radiotelephony as a sublanguage are unquestionably illustrated in its syntactical properties as they are represented in a confined set of form-class and syntactical structure by allowing different reductions of grammatical features from its corresponding language whereas some syntactic constructions unknown in the regular English language are introduced. Nonetheless, according to Fitzpatrich, Bachenko and Hindle (1986), it is true that the syntactic construction of radiotelephony is also difficult to describe because it has no internal consistency independent of the standard of natural language.

The analysis at syntactical level of radiotelephony is to discover its distinctive lexical items' grammatical properties classified in rigid form-classes and to generalize its syntactical constructions. The findings of constructed reference greatly demonstrate special characteristics of radiotelephony; the form-classes in reference radiotelephony are generally a subset of the natural language, but with restricted and unique grammatical properties whereas syntactical structure is commonly precise with a limited numbers of items within the same construction, but at the utterance level, it probably includes up to eight small constructions at a time.

The characteristics of syntactical properties of radiotelephony definitely reflect the true description of situational parameters of air-ground communication. Since the communication is based on several constraints; rapid information change, restricted communication mode though artificial medium, rigid discourse patterns and designated linguistic units, the syntactical pattern is shaped to be short and precise with the attempt of neglecting any complex features of natural English language to avoid inexplicitness of message.

Also, there is a solid evidence that some of grammatical characteristics of radiotelephony are clearly deviated form its constructed reference in the actual usage both in the numbers of form-classes and some inner properties and in syntactical arrangements. The variances discovered are proved to be in between of acquiring more of linguistic properties from its corresponding language and developing more of linguistics features out of its constructed grammar.

Since the findings at syntactical level of radiotelephony are divided in two parts; form-class and syntactical structure, the discussions upon the syntactical characteristics of radiotelephony as a sublanguage and its derivations in actual usage are carried out as such.

7.2.3.1 *Syntactical properties of form-class in radiotelephony*

Surely that the reference syntax of radiotelephony contains some prime features of canonical English language topped with its own fabricated properties to shape it to be remarkable in some way as a sublanguage, starting with almost common set of form-classes with salient inner properties and continuing on with apparent syntactical construction with unique arrangements when comparing to those in its corresponding language.

7.2.3.1.1 *Reference syntactical properties of form-class in radiotelephony*

The form-class of reference radiotelephony is almost a subset of the natural language with some inner prototypical properties minimized and some new properties introduced. The numbers of classes is limited comparing to those in its corresponding language. However, with the additional features and selected remained features, form-classes in radiotelephony are not at all ordinary.

In regular English, there are numbers of form-classes indicating several functions, contrary to radiotelephony the amount of form-classes are limited to the minimum necessity to be compatible with the nature of situational parameters in which the language conducted. Similar to its corresponding language, there are two main form-classes in the reference; *C class-type* and *F class-type*.

a) *C class-type* in radiotelephony is not different from open-class type in natural language since the lexical members are in a great amount and commonly play an important role in syntactical construction. Generally, there are 4 open form-classes in natural English; noun, verb, adjective and adverb whereas C class-type in radiotelephony are in 5 different subclasses; C1, C2, C3, C4 and C5 in accordance with their certain positions and functions.

C1 – C4 are similar to the four classes in regular language; namely noun, verb, adjective and adverb but C5 is a new form-class, obtaining a prime function in radiotelephony. Even though, the fundamental features of C1 – C3 are almost the same as their prototypical classes, there are some differences in particular features and conditions whereas C4 reserves all of the properties of adverb as in regular English language.

(1) C1 holds almost basic properties of a noun-class; however, there are a certain number of C1 members; aircraft call signs, aeronautical station call signs and general call signs that always have a particular position in the syntactical structure which is at the beginning or at the end of other elements as an independent particle of the utterance with no semantic roles as a subject or else in the construction.

The rest of C1 members are maintained minimum grammatical features of noun since there is no concrete support to assure that they do obtain possessive marker which is one of the prime characteristics of noun. However, they seem to attain plurality asset since there are few tokens with plural marker {-s} indicated as such, but its occurrence is very inconsistent and the form with or without {-s} doesn't cause much difference in semantic property. Hence, it can be implied that plurality is an unnecessary property in radiotelephony. Still, there is a glimpse of plurality in the data because it is a very common feature in natural English that is hard to completely eliminate.

(2) C2, unlike verb in canonical English, is almost always in its base form as a non-finite which is not marked by any inflectional morpheme to indicate tense, aspect and voice. According to the communication context, C2 in radiotelephony tends to obtain present tense with its base form as only referring to the state of being at the time of speaking. Subject-verb agreement in present simple rarely occurs since most of the construction in radiotelephony is in chunks of phrases, but it commonly exists in a clause formation such as 'heading *is good*', 'you *are unreadable*' and 'you *are number 2*' which again is too vague to ensure that it is determined to appear in the language or it is just something that accidentally slipped in the system.

(3) C3 is distinctive in its position in syntactical arrangement as the members can be placed before or after C1 as a pre-modifier and post-modifier respectively such as '*right-hand* downwind', '*expected* delay', 'flight level 310 *resumed*', 'fuel dumping *completed*', 'engine *on fire*', etc. whereas the members in prototypical adjective class is generally posited before a noun.

(4) C5 is a form-class commonly classified as exclamation items in natural English language. The members of this form-class are all formed to especially use as a response in air-ground communication. The main reason to establish this form-class is that C5 is intentionally created to use as another possibility in responding to the instruction which is one of the most essential parts in air-ground communication to assure that the message is acquired properly. Therefore, the items are not only carefully designated with specific reference and grammatical properties but also put in a certain slot in the syntactical construction; either before or after C1a and never co-occurred with other elements in the utterance (chapter 5: 152).

b) *F class-type* in radiotelephony is much simpler than C class-type as the members of five F class-types sternly holds all the common features of any in close-class type in canonical English, but in a great smaller set of subtypes and

amount of members. However, there are some members of a particular class which do not exist in regular English language such as *I say again* and *correction*. Both are members of F1b functioning as conjunctions in its corresponding language (chapter 5: 154).

Nevertheless, there is one F class-type, F4 which does not exist in the natural language because of the distinctive position and features of the member. *F4* is the optional element to indicate negation with only one member '*not*' which is designated as an adverb in natural English language. However, '*not*' does not only occur before C2 or after F3, but also before complement phrase (CP) to indicate a negative position of an aircraft when performing a particular activity or before C3 to define that a property of C1 is not possible at the time of talk such as 'Fastair 345 cleared low pass *not* below 500 feet' and 'Fastair 345 reply *not* received' accordingly.

It is clear that radiotelephony possesses an extraordinary set of form-class with specific features added to the common properties acquired from its prototypical classes in canonical English language. However, syntactical properties of form-classes in radiotelephony are definitely a subset of those in the natural English language with minimum necessities to reduce the complications of this particular sublanguage.

7.2.3.1.2 *Derivation of form-class in actual radiotelephony*

The deviation of form-classes in actual radiotelephony is greatly evident demonstrated in numbers of form-classes as well as extended numbers of members and syntactical properties of each type. Most of extra features are from its corresponding language somehow providing more alternatives to the language itself. The strictly confined rules as in the reference are decreased, meaning there is more flexibility and complication in properties and characteristics of use.

(1) *Numbers of form-classes*: The numbers of form-classes are increased in F class-types from 5 classes to 8 classes since there are more groups of generic items included in the language whereas the numbers of form-classes in C class-types stays the same. Thus, in actual radiotelephony, there are 5 C class-types and 8 F class-types.

Three new F class-types are *F6* defined as a polite or social formulaic expression such as *good morning, good afternoon*, *good-bye*, etc., *F7* containing a polite formula, *please* and *F8* is relatively syntax-independent indicating speaker's hesitation to just fill up gaps in utterances such as *ah, eh, uh*, etc. It is noted that the core functions and properties as well as the positions in syntactical pattern of these new classes are exactly the same as in its corresponding language.

(2) *Extended numbers of members and syntactical properties*: There is a rather strong proof that each form-class attains more members from its corresponding language. Also, any classes especially the ones that contain vital grammatical and semantic roles in the syntactical structure as any in C class-type are involved in the

deviations both at its functions and characteristics of use mostly by acquiring more of linguistic properties from its origin.

(2.1) C class-type: Even though all of the classes still contain most of reference grammatical and semantic properties as well as its appearance in the syntactical arrangements, some common features from the natural language are enhanced especially in C1, C2 and C5 whereas C3 and C4, their properties or else remain as constructed in the reference, except there are more members added;

a) C1: There is no change of the properties and the position of any existing reference members, except C1a (call signs) which its slot is extended to also be posited at the beginning of the clause as a subject such as '*Lux 9642 is established on the localizer*' and '*ABX 827 is in a descent*'. Therefore, the slot of C1a is more flexible than in the reference which means that regular feature of common proper noun is added to C1a.

The members of C1 is increasing with more prototypical personal subject pronouns are included such as *I, you, we, they, it, all* and *someone*; contrary to the reference C1a class '*you*' is the only item that is used in the reference language as a subject of a sentence. These new members commonly placed at the beginning of a clause indicate that there are more clauses generated in actual radiotelephony than in the reference which is usually rare. Also, there is a presence of a personal object pronoun such as *me, you, us* and *them*. The position, semantic roles and grammatical functions of these members are exactly the same as its originals in the natural language.

b) C2: The highlight of actual C2 is the way they demonstrate basic properties of displaying tense, aspect, voice as well as agreement to C1a they follow such as *'I received the last braking action report', 'we are turning right now', 'you have hit an aircraft', 'the tower is closed at this time'* and *'we are ready to push'* accordingly whereas there is almost none in the reference. These characters are truly added even though they do not consistently occur since the reference feature which C2 is reserved in the base form indicating only present action is maintained.

c) C5: There is no deviation in functions and semantic roles as well as the characteristic of use, but its position can be varied as it can appear before other element in the utterance without strictly co-occurred with C1a as in the reference (chapter 6: 202).

(2.2) F class-type: there is not much deviation occurring in this class-type, only the amount of members in each class is increased. Again, the basic properties of the characteristic of use come about with the extra items. However, there is no apparent effect to the prime grammatical and semantic roles of the existing members of each class.

In conclusion, the variations in form-classes are generally from the new members and their embedded conventional properties obtained from the

corresponding language which is clearly noticeable in C1 class and C2 class. The common features carried into the system of C class-type certainly influence on the existing members since they largely cause a degree of flexibility to the confined reference properties and systematic slots as well as to produce more of complexity as there are alternatives to select without any specific condition.

On top of that, new form-classes occurred in actual radiotelephony are very common in the natural language which regularly appeared in any spoken discourse. Therefore, it can be concluded that whatever added into the actual form-classes in radiotelephony are from the high level of the speakers' acquaintance of the foundation of regular English language. Hence, it is very intuitive to these speakers to automatically bring more of basic features from the natural language into radiotelephony.

7.2.3.2 *Syntactical structure of radiotelephony*

The conformation of the syntactical arrangements in radiotelephony is very unique since it is based on the formation of phrase. In a single utterance, there are generally at least two small chunks of words or phrases sequenced to convey intended message with mostly one prime communicative function. Comparing to its corresponding language, there is no prominent difference since a regular utterance as well consists of phrases and clauses. However, it is extremely rare to discover any utterance which contains a long string of short phrasal elements as the ones in radiotelephony with very least presence of discourse markers. Also, the internal structures of each type of phrases are pretty distinctive in terms of their arrangements of lexical items from each form-class as some of them are truly considered ungrammatical in the natural language.

Basically, the fundamental syntactical structure of each construction of phrases and clauses (very rare to find) in radiotelephony is unavoidably obtained from its corresponding language, similar to most sublanguages of English which commonly observe the syntactic patterns of '*standard*' English but may differ markedly in the frequency of usage of various constructions (Friedman, Kra and Rzhetsky, 2000: 224). However, the structure of radiotelephony is as well shaped and decorated to somewhat partially attain own rules that are not found in canonical English language.

7.2.3.2.1 *Reference syntactical structure in radiotelephony*

The characteristics of reference syntactical structure are conformed to the simplicity with confined possibilities, but creating high value of complexity in interpreting as background knowledge of unique grammatical characters of items in each form-class, situational parameter of air-ground discourse as well as aviation-related profiles are strongly required.

The syntactical structures of radiotelephony are rather simple but unique in the way that the members in each form-class are elaborately lined up in the internal

conformations and in the way that each types of arrangements is sequenced in the utterance to demonstrate different communicative functions in air-ground discourse. Certainly, there are some of the patterns which are common in the natural language whereas some are definitely not conventional in the regular English language.

Syntactical structures in radiotelephony are based on *phrase* and *clause* formations. However, most of the arrangements are represented in the patterns of phrases; NP, RP, VP and CP rather than a complete clause. It is noted that NP, RP and VP are independent syntactical units whereas CP works as a complement particle to NP and VP which generally maintains simplest arrangements and focal function as any possible CP in its corresponding language. Also, RP is the type of phrase initiated to use only in radiotelephony which surely does not exist in canonical English language.

It is interesting that NP and RP are mainly used to serve the communicative functions of informing and acknowledging whereas VP tends to specifically indicate all of the existing speech acts in air-ground communication; directing, informing, acknowledging and eliciting which is totally different from the prototypical function of VP in regular English language. Therefore, at phrasal level, the formations of NP and VP are commonly used to declare fundamental acts in radiotelephony whereas RP is mainly applied only to indicate acknowledging.

In radiotelephony, formations of phrases are highlighted as they are mostly in unique arrangements when comparing to those in canonical English language while formations of clauses mainly pointing out the acts of informing and eliciting still fully maintain very basic conventional patterns of so-called declarative clause and interrogative clause as of the natural language. The intense application of phrases in radiotelephony indicates that to conduct rapid exchange of information, small and simple linguistic unit is more preferable than generating a clause which requires higher concentration on word choices, patterns and sequences.

Since the internal arrangements at clause level are alike those in canonical English language which very few tokens are generated in reference radiotelephony, only outstanding arrangements at phrasal level are discussed to demonstrate distinctive character of radiotelephony as a sublanguage;

(1) The internal structures of NP are diverse, but there is no prominent pattern moved away from its prototypical declarative clause in natural English language. and are classified in two types according to their specific functions; *NP as to conduct identification-recognition process* containing C1a or a series of C1a (chapter 5: 159) which is a mandatory element in any utterance placed either at the beginning or at the end of the utterance of each exchange and NP as to illustrate the communicative functions of assertives; informing and acknowledging. Even though most of the conformations are based on possibilities in canonical English language, there are three different patterns which are not conventional as listed below;

NP = N N such as *holding position, estimating Stephenville, monitoring 123.2, 360 degrees,* etc.

NP = NP (Neg) Adj such as *reply not received, flight level 310 resumed, heading 110,* etc.

NP = NP NP such as *maintaining flight level 350, B777 dumping fuel, cloud 2500 feet, Stephenville NDB flight level 70,* etc.

The structural patterns of NP in reference radiotelephony are quite divergent with some differences not only in forms but also in functions when comparing to NP arrangements in regular English language. The internal structures stated above are completely unaccustomed and usually determined an incomplete phrase as there are some grammatical reductions. Consequently, these distinctive internal patterns represent the outstanding characters of NP in radiotelephony.

(2) RP is the very new syntactical construction solely used in air-ground communication to indicate acknowledging. The composition of the arrangement is very simple; RP = R (R) (R). Generally, RP consisting of one C5 member is used to acknowledge the instruction while the series of triple Rs is conducted only to declare emergency with specific two members of C5; *Pan Pan* and *Mayday*. It is to call attention from not only an air traffic controller who is managing the traffic in that particular airspace but also other pilots who maneuvering in the same area to realize that an aircraft is at risk. Since it is life and death situation, the pattern of RP is specially designed to ensure that the crucial message is delivered. Then, the immediate assistance from any concerned function will be provided in time.

(3) VP structure composes of at least two elements; C2 item with at least one accompanied elements to denote several communicative functions depending on in which situational parameter it is conducted while VP in the natural language can compose of a single lexical verb signifying only the act of directives. Most of VP constructions in radiotelephony are quite regular, but there are also some containing unique items which are not conventional in regular English language such as '*will*' posited at the beginning of VP = Aux (Neg) V {NP / CP} such as '*will* continue radar control', '*will* report leaving flight level 350', etc. or some with apparent grammatical reductions when V is followed by NP such as '*cleared straight-in approach*', '*report Colinton next*', etc. Hence, these samples are ungrammatical in canonical English language. Nevertheless, most of the internal structures of VP are rather common as there is no substantial difference when comparing to conventional VP arrangements in regular English. But the combination of elements within the structure is definitely irregular.

The most prominent features of syntactical structure of radiotelephony are on NP and VP which play the important roles to perform several communicative functions in radiotelephony. Furthermore, the internal formations of NP and VP are not quite regular in the natural language as the arrangements in some of the patterns

are never found in canonical English and some usually demonstrate grammatical reductions. Furthermore, RP, an additional syntactical structure in the system even more illustrates the distinguishing syntactical arrangement of the language.

The utterance in radiotelephony is very unique because of possibilities of arrangements. An utterance may contain up to 8 elements, a chain of NPs with a complete sense of reference in each phrase to provide an instruction with essential information for a pilot to conduct a take-off roll. Most of the long arrangements are primarily generated to provide specific information of parameters which directly concern particular flight profile. It is important to learn that the prerequisite element in the utterance is the pattern of NP as to conduct identification-recognition process. The conformation of the utterance in radiotelephony is pretty much telegraphic since shortened sentential units are sequenced to an extent for rapid communication and maximum precision.

At this point, the absolute conclusion of reference syntactical structure is well-represented the uniqueness of this particular sublanguage even though there are some presences of conventional properties of prototypical constructions of NP, VP and clauses. The prominent arrangements which do not exist in its corresponding language are clearly visible both in lower and higher level of the syntactical structures.

7.2.3.2.2. *Derivation of syntactical structure in actual radiotelephony*

In actual usage, the syntactical conformations of radiotelephony as well as the arrangements in the utterance are quite similar to those in the reference. However, there is also apparent deviation of the existing internal structure as well as new syntactical patterns of phrases are supplemented which undoubtedly illustrate the development of the rigid syntactical system of actual radiotelephony in two directions; one, to obtain more of natural features from its corresponding language and two, to extend its specific properties which generally do not exist in the natural language.

The internal structures of phrases and clauses are modified except the arrangements of RP which remain more or less the same without any significant deviation.

(1) At phrasal level, most of the patterns and its communicative functions are maintained while new arrangements are introduced which definitely do not exist in the reference and natural English language;

(1.1) The new composition of NP comprises of CP followed by NP; NP = CP NP. It is noted that CP still functions as a complement to NP such as '*after airborne right turn*' and '*from right side Traffic rolling*'. The new pattern of NP is somehow developed from the syntactical agreements designated in the reference not from obtaining the existing feature in the natural language and truly ungrammatical.

(1.2) Two new arrangements of VP are VP = VP VP and VP = VP S VP (chapter 6: 213) such as *stop climb at 1300, request direct Pardi* and *confirm you are*

turning left now. These structures are again determined non-grammatical patterns in canonical English language and are created from existing patterns of reference syntactical structures. Besides, VP in actual usage can contain at least V or C2 item with or without an accompanied element similar to VP in the canonical English language, but contrary to VP in the reference as V strictly needs at least one accompanied element.

(1.3) The only variation in RP is that it is possible to use a series of two Rs instead of one in actual usage to present acknowledging act such as *roger stand by* and *all right stand-by* which will not be possible in the reference. Nonetheless, the syntactical pattern of RP remains unchanged; RP = R (R) (R).

(2) At clause level, there are more complex internal arrangements generated. Almost all clause formations are based on the regular clause arrangements in canonical English language except '9642 *is established* <u>*ILS runway 24*</u>'. The internal NP of this pattern consists of series of Ns which has no grammatical correlation as to modify or indicate each other in any way, but they are two independent items placed in order as to complete a set of information which actually is very common pattern of NP in radiotelephony. Therefore, when it is merged in the clause arrangement, it becomes the contribution of syntactical structure of radiotelephony and of conventional English language.

On top of that, there is also a minor deviation conducted at utterance level since an element which is always mandatory in the reference utterance becomes optional. The pattern of NP as to conduct identification-recognition process is sometimes omitted when the participants are certain that the identification-recognition process is not essential.

All in all, these new constructions of phrases and clauses in the actual radiotelephony is rather solid enough to claim that radiotelephony starts to demonstrate the development based on its own grammatical supplies which all are not endured in the natural language.

It is concluded that at syntactical level, the deviations of the actual properties are more noticeable than any other level of analysis since it clearly captures the growing of the language in two mainstreams; moving inward to acquire more of properties from its corresponding language and moving outward to develop more of its own properties. Again, it is to confirm that the acquaintance of the speakers in the regular English language is tremendously influenced on the deviation occurred in actual radiotelephony, not only at the syntactical level but the entire of linguistic domains.

7.2.4 Radiotelephony at Morphological Level

The very last domain of grammar in radiotelephony is the essential particle bounded to lexical items as to indicate additional grammatical properties to the stem.

The reference inflectional morpheme is in rather limited numbers as the language is designed to reduce all complexities, and of course, grammatical morpheme is one of them. On the other hand, grammatical morphemes in actual radiotelephony are clearly present with more numbers. Even though the occurrences of variations are very common in regular English language, it is apparent that there is an expansion of the applications of grammatical morphemes in the actual usage.

7.2.4.1 *Reference morphology in radiotelephony*

The only obvious grammatical inflectional morpheme in radiotelephony is {-s} as a plural marker to C1 member, but the occurrence is very rare which leads to possible assumption that plurality in radiotelephony is an unnecessary property as it does not contribute any prominent phenomenon to the grammatical property of the language as the way it does in the natural one. Instead, it is more like a variant to the existing base-form item.

Nonetheless, the presence of plurality is evident. The reason is that may be because it is too common feature of a noun class in natural English that is hard to avoid. Nonetheless, these are all the underlying assumption which requires more support to reach the absolute conclusion.

On the other hand, the rest which commonly affixed to a verb in canonical English to indicate tense, aspect and voice are definitely excluded from radiotelephony as C2 is almost always in its base form. Instead, suffix {-ed} and {-ing} are functioning as derivational morphemes to converse C2 to C3 and C1 accordingly which are the basic mechanisms to extend the use of existing lexemes by transforming verb to be adjective and noun in the natural language.

The very rigid set of morphology which is truly derived from its corresponding language represents the uniqueness of radiotelephony as a sublanguage. Almost all essential grammatical morphemes in regular English are excluded in order to fulfill the simplicity which is one of the deemed objective to create this particular sublanguage.

7.2.4.2 *Derivation of morphology in actual radiotelephony*

Contrary to the reference language, it is more explicit that there is a presence of the grammatical morphemes in actual radiotelephony. At this point, it is truly proved that there is a plurality marker as well as its grammatical contribution in radiotelephony (chapter 6: 230). Furthermore, the occurrences of grammatical morphemes related to C2 are clearly illustrated to indicate tense, aspect and voice. Nevertheless, the deviation occurred is just another alternatives of the language since C2 in the mainstream is strictly maintained in its base form without the needs of these markers. As the matter of fact, tense, aspect and voice indicators are intentionally eliminated from the beginning as there are not necessary in conferring to effective communication.

However, no matter the possibly reason would be, the expansion of grammatical features by the use of these inflectional morphemes provides a better view of the development of the confined sublanguage as radiotelephony. Still, the variations are truly from acquiring fundamental grammatical properties of noun and verb which are more or less the same as C1 and C2 in radiotelephony.

7.3 Summary

In conclusion, the linguistic properties of radiotelephony undeniably represent the prime character of being a sublanguage. The distinctive features are explicitly demonstrated in all linguistic domains; discourse, lexicon, syntax and morphology. The properties are illustrated in rigid and systematic patterns with fundamental descriptions of its corresponding language at the possible minimum by reducing dispensable constraints, based on the principle of simplicity and definiteness along with the emergent particular features determined ungrammatical in the regular language which highly provoke the orators of the necessarily demand of solid background knowledge of the language itself, situational parameters of air-ground discourse and aviation-related education to comprehend and utilize them efficiently and effectively.

On top of that, there are dense substantiations of the deviations at all level of radiotelephony in the actual usage. Most of the variations are from the consuming more of linguistic characteristics of its corresponding language mainly because of the excessive familiarization of the regular English of the users as well as expanding the existing constructed linguistic properties of its own. The development of radiotelephony causes its strictly confined structure to become less formulaic, more flexible and definitely more complicated as there are numbers of possibilities or alternatives in generating the language to be compatible with the communication context of air-ground communication.

7.4 Recommendations for Further Study

As the study is conducted mainly to overview the entire language system of radiotelephony within four domains; namely discourse, lexicon, syntax and morphology, the findings demonstrates the distinct characteristics of radiotelephony at a certain level. Therefore, the study in depth on each domain through the access of the authentic air-ground communication especially syntax and morphology would be a great contribution to aviation educational industry as it can unquestionably point out the possible variations of the language as well as clearer illustrate the propensity of language development.

On top of that, besides the reason of the acquaintance to the natural language of the users as there is no concrete evidence to state otherwise, there might be more possible causes correlating to the deviations in authentic application of radiotelephony which need to be unveiled. As a result, the researcher has to look for possible factors which potentially involve in the language variation such as the nationalities of the users which is totally neglected in the study since the main objective is to broadly unfold fundamental linguistic aspects of radiotelephony.

The comparison of the actual linguistic patterns between native and non-native users who have different background of the first language as well as the knowledge of English language would tremendously contribute to the study of radiotelephony in a way that it might help provide a deep and absolute answer to the cause of variation. According to the findings, there are some tokens indicating that the deviations are from conventional properties of its corresponding language whereas some are from its derived properties. Therefore, it would be very interesting to find out the sources of these manipulations whether they are relevant to being native or non-native or not.

Since the actual data collected in this study is from cockpit voice recorder (CVR) which usually accumulates the conversation before the fatal accident, there are several aspects to discover on the language conducted in life-and-death context such as how the rigid structure of discourse would change and how the syntactical arrangements have altered. As well as that the conversation between the pilots also recorded in CVR is rarely examined in any study. Thus, it would be challenging enough to learn about linguistic units conformed during an emergency situation that how much it moves from regular communication in the workplace.

Moreover, as it requires much effort to generalize some features of particular domains such as syntax and morphology as the consistency of occurrences is very low, the further study on radiotelephony needs to acquire larger amount of actual data in order to discover the absolute conclusion on properties of particular areas. However, the prime obstacle is that the legal actual data can only be collected and examined when the official transcription from National Transportation Safety Board (NTSB) is published which may require several years to conduct, or when receiving the official permission from the airlines which is rather difficult as they all commonly keep the conversation during flight operation confidentially for safety reason. As well as that the researcher definitely needs the grounded knowledge in aviation field otherwise it would be a true difficulty in comprehending and interpreting the data. As a result, those who are intent to work further on this particular sublanguage need to take these limitations into consideration.

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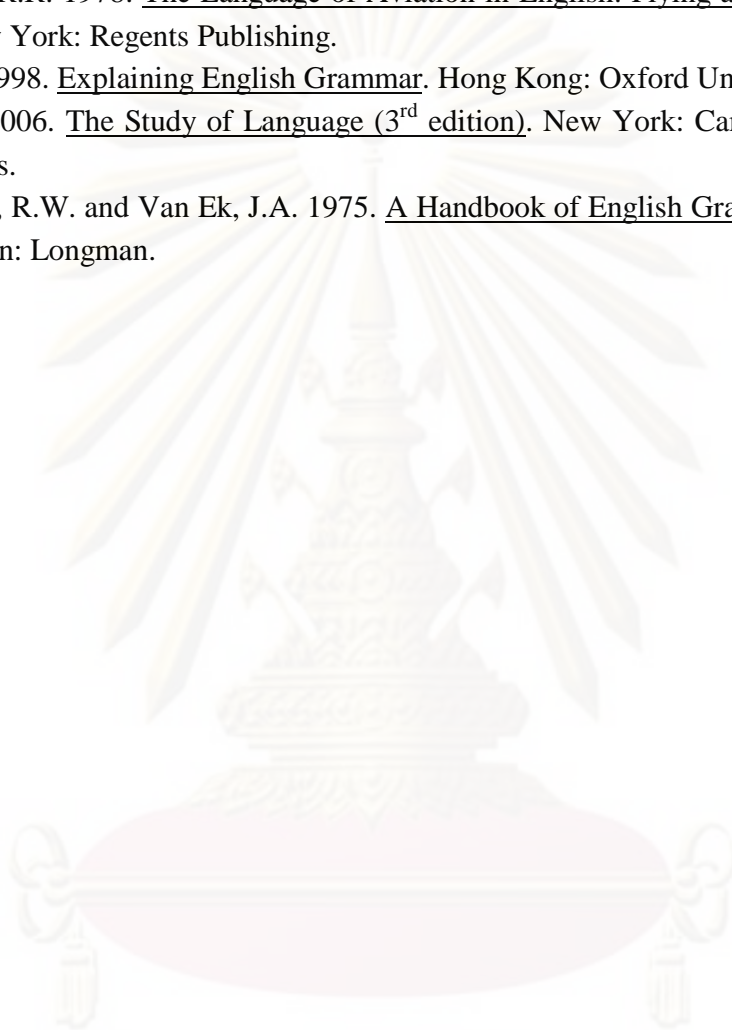
APPENDICES

Appendix A

TABLE OF DISCOURSE ANALYSIS: MANUAL OF RADIOTELEPHONY

L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
1.	PT	Stephenville tower, G-ABCD.	summon	head	opening	I	Summon	1
2.	ATC	G-ABCD Stephenville tower, go ahead.	reply-summon	head	answering	R		
3.	ATC	All stations Alexander control, fuel dumping completed.	summon informative	pre-h head	informing	I	Inform	2
4.	PT	All stations G-ABCD westbound Marlow VOR to Stephenville, leaving flight level two-six-zero, descending to flight level one-five zero.	summon informative	pre-h head	informing	I	Inform	3
5.	ATC	Station calling Georgetown ground say again your call sign.	summon inquire	pre-h head	eliciting	I	Elicit	4
6.	PT	Georgetown ground, (Fastair) three-four-five.	reply-summon informative	pre-h head	informing	R		
7.	PT	Fastair 345 Wickin 47 flight level 003 Marlow 07 correction Marlow 57.	summon informative	pre-h head	informing	I	Inform	5
8.	ATC	Fastair three-four-five, roger.	reply-summon receive/terminate	pre-h head	acknowledging	R		
9.	PT	Georgetown, G-ABCD Walden five-hundred feet, I say again five-hundred feet.	summon informative repeat	pre-h head head	informing	I	Inform	6
10.	ATC	Fastair three-four-five, contact one-two- nine decimal one.	summon directive	pre-h head	directing	I	Direct	7
11.	PT	one-two- nine decimal one, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		

ATC = Air traffic Controller   **PT** = Pilot   **L.O.D.** = line of dialogue
e.s. = element of structure   **ex.** = number of exchange

L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
12.	ATC	Fastair three-four-five when passing flight level eight-zero contact Alexander control one-two-nine decimal one	summon directive	pre-h head	directing	I	Direct	8
13.	PT	when passing flight level eight-zero one-two-nine decimal one Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
14.	ATC	Fastair 345, standby 118.9 for tower.	summon directive	pre-h head	directing	I	Direct	9
15.	PT	118.9, Fastair345.	receive/repeat terminate	head post-h	acknowledging	R		
16.	ATC	Fastair 345, monitor ATIS 123.25.	summon directive	pre-h head	directing	I	Direct	10
17.	PT	Monitoring 123.25, Fastair345.	receive/repeat terminate	head post-h	acknowledging	R		
18.	ATC	Fastair three-four-five, cleared to Kennington, via A1 flight level two-eight-zero, Wicken 3 delta departure, squawk five-five-zero-one.	summon directive	pre-h head	directing	I	Direct	11
19.	PT	Cleared to Kennington, via A1 flight level two-eight-zero, Wicken 3 delta departure, squawk five-five-zero-one, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
20.	ATC	G-CD turn right when airborne, leave control zone via route Echo.	summon directive	pre-h head	directing	I	Direct	12
21.	PT	Right turn via route Echo, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
22.	ATC	G-ABCD, cross A1 at Wicken flight level seven-zero.	summon directive	pre-h head	directing	I	Direct	13
23.	PT	Cross A1 at Wicken flight level seven-zero, G-ABCD.	receive/repeat terminate	head post-h	acknowledging	R		
24.	ATC	G-CD, hold position.	summon directive	pre-h head	directing	I	Direct	14

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
25.	PT	Holding, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
26.	ATC	G-CD contact ground 118.05.	summon directive	pre-h head	directing	I	Direct	15
27.	PT	118.05, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
28.	ATC	Fastair three-four-five, squawk six-four-zero-two.	summon directive	pre-h head	directing	I	Direct	16
29.	PT	Six-four-zero-two, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
30.	ATC	G-CD, QNH one-zero-zero-three.	summon directive	pre-h head	directing	I	Direct	17
31.	PT	QNH one-zero-one-three, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
32.	ATC	G-CD negative, QNH one-zero-zero-three.	summon informative repeat	pre-h head head	informing	I	Inform	18
33.	PT	QNH one-zero-zero-three, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
34.	ATC	Fastair three-four-five, Georgetown departure, cleared to Colinton flight level two-niner-zero, cross Wicken flight level one-five-zero, maintain flight level one-three-zero if unable	summon directive	pre-h head	directing	I	Direct	19
35.	PT	Georgetown departure Fastair three-four-five unable to cross Wicken flight level one-five-zero due weight, maintaining flight level one-three-zero.	reply-summon reject comment	pre-h head post-h	informing	R		
36.	PT	Stephenville tower G-ABCD, radio check on one-one-eight decimal seven.	summon inquire	pre-h head	eliciting	I	Elicit	20
37.	ATC	Station calling Stephenville tower, you are unreadable.	reply-summon informative	pre-h head	informing	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
38.	ATC	G-ABCD tower, reading you three, loud background whistle.	reply-summon informative	pre-h head	informing	R		
39.	ATC	G-ABCD tower, reading you five.	reply-summon informative	pre-h head	informing	R		
40.	ATC	G-AB report level.	summon inquire	pre-h head	eliciting	I	Elicit	21
41.	PT	G-AB, maintaining three thousand feet.	reply-summon informative	pre-h head	informing	R		
42.	ATC	G-AB, report passing flight level eight-zero.	summon directive	pre-h head	directing	I	Direct	22
43.	PT	G-AB wilco.	reply-summon receive/terminate	pre-h head	acknowledging	R		
44.	ATC	G-AB, maintain two thousand five hundred feet.	summon directive	pre-h head	directing	I	Direct	23
45.	PT	Maintaining two thousand five hundred feet, G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
46.	ATC	G-AB climb to flight level seven-zero.	summon directive	pre-h head	directing	I	Direct	24
47.	PT	Leaving two thousand five hundred feet, climbing to flight level seven-zero, G-AB.	informaive repeat terminate	pre-h head post-h	acknowledging	R		
48.	PT	G-AB request descent.	summon inquire	pre-h head	eliciting	I	Elicit	25
49.	ATC	G-AB descend to flight level six-zero.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
50.	PT	Leaving flight level night-zero, descending to flight level six-zero, G-AB.	starter receive/repeat terminate	pre-h head post-h	acknowledging	R		
51.	ATC	Fastair three-four-five after passing north cross, descend to flight level eight-zero.	summon directive	pre-h head	directing	I	Direct	26

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
52.	PT	After north cross, descend to flight level eight-zero Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
53.								
54.	ATC	Fastair three-four-five, stop descent at flight level one-five-zero.	summon directive	pre-h head	directing	I	Direct	
55.	PT	Stop descent at flight level one-five-zero, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		27
56.	ATC	Fastair three-four-five continue **climb to flight level three-three-zero.	summon directive	pre-h head	directing	I	Direct	28
57.	PT	Climbing to flight level three-three-zero, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
58.	ATC	Fastair three-four-five **recleared flight level three-three-zero.	summon directive	pre-h head	directing	I	Direct	29
59.	PT	Recleared flight level three-three-zero, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
60.	ATC	Fastair three-four-five expedite descent to flight level eight-zero.	summon directive	pre-h head	directing	I	Direct	30
61.	PT	Expedite descent to flight level eight-zero, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
62.	ATC	Fastair three-four-five climb to flight level two-four-zero, expedite until passing flight level one-eight-zero.	summon directive	pre-h head	directing	I	Direct	31
63.	PT	Fastair three-four-five climbing to flight level two-four-zero, expediting until passing flight level one-eight-zero.	summon receive/repeat	pre-h head	acknowledging	R		
64.	PT	Fastair three-four-five unable to expedite.	summon reject	pre-h head	acknowledging	R		
65.	PT	Fastair three-four-five Wicken 47 flight level three-three-zero Marlow 57 Colinton next.	summon informative	pre-h head	informing	I	Inform	32
66.	ATC	Fastair three-four-five roger.	reply-summon receive/terminate	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
67.	ATC	Fastair three-four-five next report Colinton.	summon directive	pre-h head	directing	I	Direct	33
68.	PT	Fastair three-four-five wilco.	reply-summon receive/terminate	pre-h head	acknowledging	R		
69.	ATC	Fastair three-four-five omit position, report until FIR boundary, next report Colinton	summon directive	pre-h head	directing	I	Direct	34
70.	PT	Fastair three-four-five wilco.	reply-summon receive/terminate	pre-h head	acknowledging	R		
71.	ATC	Fastair three-four-five resume position reporting.	summon directive	pre-h head	directing	I	Direct	35
72.	PT	Fastair three-four-five wilco.	summon receive/terminate	pre-h head	acknowledging	R		
73.	PT	Alexander information G-CDAB request file flight plan.	summon inquire	pre-h head	eliciting	I	Elicit	36
74.	ATC	G-CDAB Alexander information ready to copy.	reply-summon informative	pre-h head	informing	R		
75.	PT	Alexander control G-AB canceling my IFR flight, proceeding VFR estimating Stephenville at 1732.	summon informative	pre-h head	informing	I	Inform	37
76.	ATC	G-AB IFR flight cancelled at 47, contact Alexander information one-two-five decimal seven.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	 Direct	
77.	ATC	G-AB instrument Meteorological conditions reported in the vicinity of Kennington.	summon informative	pre-h head	informing	I	Inform	38
78.	PT	G-AB roger maintaining IFR.	reply-summon receive informative	pre-h head head	acknowledging informing	R I		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
79.	PT	Georgetown ground Fastair three-four-five, IFR to Colinton, request departure information	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	39
80.	ATC	Fastair three-four-five departure runway three-two wind two-niner-zero degrees four knots, QNH one-zero-two-two, temperature minus two, dewpoint minus three, RVR five-five-zero metres, time two-seven.	reply-summon informative	pre-h head	informing	R		
81.	PT	runway three-two, QNH one-zero-two-two, will call for start up, Fastair three-four-five.	receive/repeat comment terminate	head post-h post-h	acknowledging	F		
82.	PT	Georgetown ground Fastair three-four-five, stand two-four request start up, information Bravo.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	40
83.	ATC	Fastair three-four-five start up approved, QNH one-zero-zero-niner.	reply-summon informative	pre-h head	informing	R		
84.	ATC	Fastair three-four-five start up at three-five, QNH one-zero-zero-niner.	reply-summon informative	pre-h head	informing	R		
85.	ATC	Fastair three-four-five expect start up at three-five, QNH one-zero-zero-niner.	reply-summon informative	pre-h head	informing	R		
86.	ATC	Fastair three-four-five expect departure four-niner start up at own discretion, QNH one-zero-zero-niner.	reply-summon informative	pre-h head	informing	R		
87.	PT	Apron Fastair three-four-five stand two-seven request push-back.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	41
88.	ATC	Fastair three-four-five push-back approved.	reply-summon informative	pre-h head	informing	R		
89.	ATC	Fastair three-four-five standby, expect one minute delay due B747 taxing behind.	reply-summon informative	pre-h head	informing	R		
90.	PT	Stephenville tower G-ABCD at the south side hangars, request taxi for local VFR flight.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	42

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
91.	ATC	G-ABCD taxi via taxiway Charlie to holding point runway two-four wind two-five-zero degrees eight knots QNH one-zero-one-zero time two three and a half.	reply-summon informative	pre-h head	informing	R		
92.	PT	G-ABCD QNH one-zero-one-zero request runway one-four.	summon informative inquire	pre-h pre-h head	eliciting	I	Elicit	43
93.	ATC	G-CD recleared holding point runway one-four, taxi behind Seneca coming from your left.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
94.	PT	G-CD holding point runway one-four traffic in sight.	summon receive/repeat	pre-h head	acknowledging	R		
95.	PT	Stephenville tower G-ABCD at the fuel station VFR to Walden request taxi.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	44
96.	ATC	G-ABCD taxi via taxiway Alpha to holding point runway zero-six wind zero-eight-zero degrees ten knots QNH one-zero-one-two visibility eight kilometers time 04	reply-summon informative	pre-h head	informing	R		
97.	PT	Runway zero-six QNH one-zero-one-two request taxiway Bravo and backtrack G-ABCD.	receive/repeat inquire terminate	head head post-h	acknowledging eliciting	F I	Elicit	45
98.	ATC	G-CD taxi via Bravo approved line up runway zero-six hold short of runway two-four.	summon informative	pre-h head	informing	R		
99.	PT	Bravo and backtrack runway zero-six, hold short of runway two-four G-CD.	receive/repeat terminate	head post-h	acknowledging	F		
100.	PT	G-CD holding short of runway two-four.	reply-summon receive/repeat	pre-h head	acknowledging	R		
101.	ATC	G-CD expedite taxi traffic on final runway two-four.	summon directive	pre-h head	directing	I	Direct	46
102.	PT	G-CD expediting.	reply-summon receive/repeat	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
103.	PT	G-CD runway vacated.	reply-summon receive/repeat	pre-h head	acknowledging	R		
104.	PT	Stephenville tower G-ABCD at the fuel station request taxi to Flying club.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	47
105.	ATC	G-ABCD taxi via taxiway Charlie to holding point runway two-four.	reply-summon informative	pre-h head	informing	R		
106.	PT	Via Charlie holding point runway two-four G-ABCD.	receive/repeat terminate	head post-h	acknowledging	F		
107.	PT	G-CD approaching holding point request cross runway two-four.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	48
108.	ATC	G-CD hold short runway two-four.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
109.	PT	G-CD holding short.	summon receive/repeat	pre-h head	acknowledging	R		
110.	ATC	G-CD cross runway two-four report vacated, continue to Flying club.	summon directive	pre-h head	directing	I	Direct	49
111.	PT	G-CD crossing.	reply-summon receive/repeat	pre-h head	acknowledging	R		
112.	PT	G-CD runway vacated.	summon informative	pre-h head	informing	I	Inform	50
113.	ATC	G-CD roger.	reply-summon receive/terminate	pre-h head	acknowledging	R		
114.	PT	G-HELI request air-taxiing from fuel station to apron.	summon inquire	pre-h head	eliciting	I	Elicit	51
115.	ATC	G-HELI, air taxi direct from fuel station to apron, avoid B747 taxing from stand two-seven to holding point runway two-four.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
116.	PT	Taxi direct from fuel station to apron, traffic in sight, G-HELI.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
117.	PT	Georgetown ground Fastair three-four-five heavy, request taxi information Charlie.	summon inquire	pre-h head	eliciting	I	Elicit	52
118.	ATC	Fastair three-four-five taxi holding point runway two-seven give way to B747 passing left to right QNH one-zero-one-niner.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
119.	PT	Fastair three-four-five holding point runway two-seven QNH one-zero-one-niner	summon receive/repeat	pre-h head	acknowledging	R		
120.	ATC	G-CD report when ready for departure.	summon directive	pre-h head	directing	I	Direct	53
121.	PT	G-CD wilco.	reply-summon receive/repeat	pre-h head	acknowledging	R		
122.	PT	G-CD ready.	summon informative	pre-h head	informing	I	Inform	54
123.	ATC	G-CD line up and wait.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
124.	PT	G-CD lining up.	receive/repeat terminate	head post-h	acknowledging	R		
125.	ATC	G-CD cleared for take-off.	summon directive	pre-h head	directing	I	Direct	55
126.	PT	Cleared for take-off, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
127.	ATC	G-CD **are you ready for immediate departure?	summon inquire	pre-h head	eliciting	I	Elicit	56
128.	PT	G-CD affirm.	reply-summon informative	pre-h head	informing	R		
129.	ATC	G-CD line up, be ready for immediate departure.	summon directive	pre-h head	directing	I	Direct	57
130.	PT	G-CD lining up.	reply-summon receive/repeat	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
131.	ATC	Fastair three-four-five cleared for take-off, report airborne.	summon directive	pre-h head	directing	I	Direct	58
132.	PT	Cleared for take-off wilco, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
133.	PT	Fastair three-four-five airborne five-seven.	summon informative	pre-h head	informing	I	Inform	59
134.	ATC	Fastair three-four-five contact departure one-two-one decimal seven.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
135.	PT	one-two-one decimal seven, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
136.	ATC	Fastair three-four-five report the Airbus on final in sight.	summon informative	pre-h head	informing	I	Inform	60
137.	PT	Fastair three-four-five Airbus in sight.	reply-summon receive/repeat	pre-h head	acknowledging	R		
138.	ATC	Fastair three-four-five behind the landing Airbus, line up and wait behind.	summon directive	pre-h head	directing	I	Direct	61
139.	PT	Behind the Airbus, line up and wait behind, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
140.	ATC	Fastair three-four-five runway zero-niner, cleared for take-off.	summon directive	pre-h head	directing	I	Direct	62
141.	PT	Cleared for take-off runway zero-niner, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
142.	ATC	Fastair three-four-five climb straight ahead until two thousand five hundred feet before turning right, cleared for take-off.	summon directive	pre-h head	directing	I	Direct	63
143.	PT	Straight ahead until two thousand five hundred feet, right turn, cleared for takeoff, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
144.	PT	G-CD request right turn when airborne.	summon inquire	pre-h head	eliciting	I	Elicit	64
145.	ATC	G-CD right turn approved, cleared for take-off.	reply-summon informative directive	pre-h head head	informing directing	R I	 Direct	
146.	PT	Cleared for take-off, right turn, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
147.	ATC	G-CD take off immediately or hold short of runway.	summon directive	pre-h head	directing	I	Direct	65
148.	PT	Holding short, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
149.	ATC	G-CD take off immediately or vacate runway.	summon directive	pre-h head	directing	I	Direct	66
150.	PT	Taking off, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
151.	ATC	G-CD hold position, cancel take-off I say again cancel take-off, vehicle on runway.	summon directive	pre-h head	directing	I	Direct	67
152.	PT	Holding, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
153.	ATC	Fastair three-four-five stop immediately	summon directive	pre-h head	directing	I	Direct	68
154.	PT	Fastair three-four-five stopping.	reply-summon receive/repeat	pre-h head	acknowledging	R		
155.	PT	Fastair three-four-five stopping.	summon informative	pre-h head	informing	I	Inform	69
156.	ATC	Fastair three-four-five roger.	reply-summon receive/repeat	pre-h head	acknowledging	R		
157.	PT	Fastair three-four-five request return to ramp.	summon inquire	pre-h head	eliciting	I	Elicit	70

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
158.	ATC	Fastair three-four-five take next right return to ramp, contact ground one-one-eight decimal three.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
159.	PT	Next right return to ramp, one-one-eight decimal three, Fastair three-four-five.	receive/repeat terminate	head post-h	acknowledging	R		
160.	PT	Walden tower G-ABCD ten miles south two five hundred feet for landing.	summon informative	pre-h head	informing	I	Inform	71
161.	ATC	G-CD join downwind runway two-four wind two-seven-zero degrees five knots, QNH one-zero-one-two.	rsummon/receive directtive	head head	acknowledging directing	R I	Direct	
162.	PT	Join downwind runway two-four QNH one-zero-one-two G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
163.	PT	Walden tower G-ABCD ten miles north two thousand five hundred feet information Bravo, for landing.	summon informative	pre-h head	informing	I	Inform	72
164.	ATC	G-CD join right hand downwind runway three-four wind three-three-zero degrees ten knots QNH one-zero-one-two.	rsummon/receive directtive	head head	acknowledging directing	R I	Direct	
165.	PT	Join right hand downwind runway three-four, QNH one-zero-one-two G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
166.	ATC	G-CD traffic Cherokee taking off runway three-four	summon informative	pre-h head	informing	I	Inform	73
167.	PT	G-CD.	receive/terminate	head	acknowledging	R		
168.	PT	Walden tower G-ABCD ten miles north two thousand five hundred feet for landing.	summon informative	pre-h head	informing	I	Inform	74
169.	ATC	G-CD make straight-in approach runway one-six wind one-niner-zero degrees five knots QNH one-zero-zero-niner.	rsummon/receive directtive	head head	acknowledging directing	R I	Direct	
170.	PT	Straight-in (approach) runway one-six QNH one-zero-zero-niner G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
171.	PT	G-CD downwind.	summon informative	pre-h head	informing	I	Inform	75

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
172.	ATC	G-CD number 2, follow Cherokee on base.	rsummon/receive directtive	head head	acknowledging directing	R I	Direct	
173.	PT	G-CD number 2, traffic in sight.	receive/repeat terminate	head post-h	acknowledging	R		
174.	ATC	G-CD report final.	summon directive	pre-h head	directing	I	Direct	76
175.	PT	G-CD	receive/terminate	head	acknowledging	R		
176.	PT	G-CD final.	summon informative	pre-h head	informing	I	Inform	77
177.	ATC	G-CD continue approach wind 270 degrees 7 knots.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
178.	ATC	G-CD extend downwind number 2 follow Cherokee on 4 miles final.	summon directive	pre-h head	directing	I	Direct	78
179.	PT	Number 2 Cherokee in sight G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
180.	ATC	G-CD make one orbit right due traffic on the runway, report again on final.	summon directive	pre-h head	directing	I	Direct	79
181.	PT	G-CD orbiting right.	reply-summon receive/repeat	pre-h head	acknowledging	R		
182.	ATC	G-CD number 1 make short approach Cherokee on 6 miles final.	summon directive	pre-h head	directing	I	Direct	80
183.	PT	Short approach G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
184.	PT	Fastair 345 long final.	summon informative	pre-h head	informing	I	Inform	81
185.	ATC	Fastair 345 continue approach wind 260 degrees 18 knots.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
186.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
187.	PT	Fastair 345 final.	summon informative	pre-h head	informing	I	Inform	82
188.	ATC	Fastair 345 runway 27 cleared to land wind 270 degrees 20 knots.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
189.	PT	Runway 27 cleared to land Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
190.	PT	Fastair 345 request low pass unsafe left gear indication.	summon inquire	pre-h head	eliciting	I	Elicit	83
191.	ATC	Fastair 345 cleared low pass runway 27 not below 500 feet report final.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
192.	PT	Runway 27 not below 500 feet Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
193.	PT	Fastair 345 request low approach runway 09 for training.	summon inquire	pre-h head	eliciting	I	Elicit	84
194.	ATC	Fastair 345 cleared low approach runway 09 not below 250 feet report final.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
195.	PT	Runway 09 low pass not below 250 feet Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
196.	PT	G-CD request touch and go.	summon inquire	pre-h head	eliciting	I	Elicit	85
197.	ATC	G-CD cleared touch and go.	reply-summon informative	pre-h head	informing	R		
198.	PT	Cleared touch and go. G-CD	receive/repeat terminat	head post-h	acknowledging	F		
199.	ATC	G-CD unable to approve due traffic congestion make full stop cleared to land.	summon informative directive	pre-h pre-h head	directing	I	Direct	86
200.	PT	Cleared to land for full stop G-CD.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
201.	ATC	G-CD make another circuit report downwind.	summon directive	pre-h head	directing	I	Direct	87
202.	PT	G-CD wilco.	receive/repeat terminate	head post-h	acknowledging	R		
203.	ATC	Fastair 345 go around aircraft on the runway.	summon directive	pre-h head	directing	I	Direct	88
204.	PT	Fastair 345 going around.	receive/repeat terminate	head post-h	acknowledging	R		
205.	PT	G-CD going around.	summon informative	pre-h head	informing	I	Inform	89
206.	ATC	G-CD roger report downwind.	reply-summon receive directtive	pre-h head head	acknowledging directing	R I	 Direct	 90
207.	ATC	Fastair 345 take first right when vacated contact ground 118.3.	summon directive	pre-h head	directing	I	Direct	91
208.	PT	First right 118.3 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
209.	PT	Georgetown ground Fastair 345 runway vacated.	summon informative	pre-h head	informing	I	Inform	92
210.	ATC	Fastair 345 taxi to stand 27 via taxiway Alpha.	rsummon/receive directive	head head	acknowledging directing	R I	 Direct	
211.	PT	Taxiway Alpha Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
212.	ATC	Fastair 345 caution construction work adjacent to gate 37.	summon informative	pre-h head	informing	I	Inform	93
213.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
214.	ATC	G-AB report heading and level.	summon inquire	pre-h head	eliciting	I	Elicit	94

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
215.	PT	G-AB heading 110 at 2500 feet.	reply-summon informative	pre-h head	informing	R		
216.	ATC	G-AB for identification turn left heading 080.	summon directive	pre-h head	directing	I	Direct	95
217.	PT	Left heading 080 G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
218.	ATC	G-AB identified 20 miles northwest of Kennington continue present heading.	summon directive	pre-h head	directing	I	Direct	96
219.	PT	G-AB.	receive/terminate	head	acknowledging	R		
220.	ATC	G-AB Not within radar cover. Resume own navigation	summon informative directive	pre-h pre-h head	directing	I	Direct	97
221.	PT	G-AB.	receive/terminate	head	acknowledging	R		
222.	ATC	G-AB identification lost due to radar failure. Contact Alexander control on 128.7.	summon informative directive	pre-h pre-h head	directing	I	Direct	98
223.	PT	128.7 G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
224.	ATC	G-AB will shortly lose identification temporarily due fade area. Remain this frequency.	summon informative directive	pre-h pre-h head	directing	I	Direct	99
225.	PT	G-AB.	receive/terminate	head	acknowledging	R		
226.	ATC	Fastair 345 turn left heading 050 for separation.	summon directive	pre-h head	directing	I	Direct	100
227.	PT	Left 050 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
228.	ATC	Fastair 345 fly heading 050.	summon directive	pre-h head	directing	I	Direct	101
229.	PT	Heading 050 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
230.	ATC	Fastair 345 report heading.	summon inquire	pre-h head	eliciting	I	Elicit	102
231.	PT	Fastair 345 heading 050.	reply-summon informative	pre-h head	informing	R		
232.	ATC	Fastair 345 roger continue heading 050.	summon receive directive	pre-h head head	acknowledging directing	F I	Direct	103
233.	PT	Fastair 345 wilco.	reply-summon receive	pre-h head	acknowledging	R		
234.	ATC	Fastair 345 position 5 miles north of Georgetown, resume own navigation direct Wicken.	summon directive	pre-h head	directing	I	Direct	104
235.	PT	Direct Wicken Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
236.	ATC	Fastair 345 resume own navigation direct Wicken track 070 distance 27 miles.	summon directive	pre-h head	directing	I	Direct	105
237.	PT	070 27 miles direct Wicken Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
238.	ATC	G-CD resume own navigation position 15 miles southeast Kennington.	summon directive	pre-h head	directing	I	Direct	106
239.	PT	G-CD wilco.	reply-summon receive	pre-h head	acknowledging	R		
240.	ATC	Fastair 345 make a three sixty turn left for sequencing.	summon directive	pre-h head	directing	I	Direct	107
241.	PT	Three sixty turn left Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
242.	ATC	G-AB orbit left for delay.	summon directive	pre-h head	directing	I	Direct	108
243.	PT	Orbit left G-AB.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
244.	ATC	Fastair 345 unknown traffic 3 miles opposite direction fast moving.	summon informative	pre-h head	informing	I	Inform	109
245.	PT	Looking out Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
246.	PT	Fastair 345 traffic in sight.	reply-summon receive/repeat	pre-h head	acknowledging	R		
247.	PT	Fastair 345 negative contact, request vectors.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	110
248.	ATC	Fastair 345 turn left heading 050.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
249.	PT	Left 050 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
250.	ATC	Fastair 345 clear of traffic, resume own navigation direct Wicken.	summon directive	pre-h head	directing	I	Direct	111
251.	PT	Direct Wicken Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
252.	ATC	G-CD traffic 5 miles northbound Cherokee at 2000 feet.	summon informative	pre-h head	informing	I	Inform	112
253.	PT	Looking out, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
254.	ATC	G-CD do you want vectors	summon inquire	pre-h head	eliciting	I	Elicit	113
255.	PT	G-CD negative vectors, traffic in sight	reply-summon informative	pre-h head	informing	R		
256.	ATC	G-CD.	receive/terminate	head	acknowledging	F		
257.	ATC	Fastair 345 advise type of transponder.	summon inquire	pre-h head	eliciting	I	Elicit	114
258.	PT	Fastair 345 transponder Charlie.	reply-summon informative	pre-h head	informing	R		
259.	ATC	Fastair 345 squawk 6411.	summon directive	pre-h head	directing	I	Direct	115

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
260.	PT	6411 Fastair 345.	receive/repeat terminate	pre-h head	acknowledging	R		
261.	ATC	Fastair 345 confirm squawk.	summon directive	pre-h head	directing	I	Direct	116
262.	PT	Fastair 345 squawking 6411.	reply-summon receive/repeat	pre-h head	acknowledging	R		
263.	ATC	Fastair 345 reset 6411.	summon directive	pre-h head	directing	I	Direct	117
264.	PT	Fastair 345 recycling 6411.	reply-summon receive/repeat	pre-h head	acknowledging	R		
265.	ATC	Fastair 345 check altimeter setting and confirm level.	summon inquire	pre-h head	eliciting	I	Elicit	118
266.	PT	Fastair 345 altimeter 1013 flight level 80.	reply-summon informative	pre-h head	informing	R		
267.	ATC	Fastair 345 confirm transponder operating.	summon inquire	pre-h head	eliciting	I	Elicit	119
268.	PT	Fastair 345 negative, transponder unserviceable.	reply-summon informative	pre-h head	informing	R		
269.	ATC	G-CDAB reply not received turn left heading 040 if you read	summon informative directive	pre-h pre-h head	directing	I	Direct	
270.	ATC	G-CDAB turn observed position 5 miles south of Wicken VOR will continue radar control.	summon informative	pre-h head	informing	I	Inform	
271.	ATC	Fastair 345 reply not received control squawk ident if you read	summon informative directive	pre-h pre-h head	directing	I	Direct	
272.	ATC	Fastair 345 squawk observed 5 miles south of Wicken VOR will continue radar control.	summon informative	pre-h head	informing	I	Inform	

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
273.	ATC	Fastair 345 low altitude warning, check your altitude immediately, QNH is 1006, the minimum flight altitude is 1450 feet.	summon informative directive informative	pre-h pre-h head post-h	directing	I	Direct	
274.	ATC	Fastair 345 terrain aleart climb to 2000 feet QNH 1006.	summon informative directive	pre-h pre-h head	directing	I	Direct	
275.	ATC	Fastair 345 turn right immediately heading 110 to avoid traffic 12 o'clock 4 miles.	summon directive	pre-h head	directing	I	Direct	120
276.	PT	Right heading 110 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
277.	ATC	Fastair 345 clear of traffic resume own navigation direct Wicken.	summon informative directive	pre-h pre-h head	directing	I	Direct	121
278.	PT	Direct Wicken Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
279.	ATC	Fastair 345 turn right heading 040 until passing flight level 70 then direct Wicken.	summon directive	pre-h head	directing	I	Direct	122
280.	PT	Right heading 040 until passing flight level 70 then direct Wicken Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
281.	ATC	Fastair 345 report passing flight level 70.	summon directive	pre-h head	directing	I	Direct	123
282.	PT	Fastair 345 wilco.	reply-summon receive	head post-h	acknowledging	R		
283.	PT	Fastair 345 passing flight level 70 Wicken at 1537.	summon informative	pre-h head	informing	I	Inform	124
284.	ATC	Fastair 345 contact Alexander control 129.1.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	
285.	PT	129.1 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
286.	PT	Approach G-CD passing the control zone boundary.	summon informative	pre-h head	informing	I	Inform	125
287.	ATC	G-CD contact Alexander information 125.7.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	126
288.	PT	125.7, G-CD	receive/repeat terminate	head post-h	acknowledging	R		
289.	ATC	G-CD leave control zone via route Whiskey, 3000 feet, report Whiskey one	summon directive	pre-h head	directing	I	Direct	127
290.	PT	Cleared to leave control zone via route Whiskey 3000 feet will report Whiskey one	receive/repeat comment	head post-h	acknowledging	R		
291.	ATC	G-CD	receive/terminate	head	acknowledging	F		
292.	PT	Georgetown approach Fastair 345 heavy flight level 80 estimating north cross 46 information Delta.	summon informative	pre-h head	informing	I	Inform	129
293.	ATC	Fastair 345 descend to 4000 feet QNH 1005 transition level 50 expect ILS approach runway 24.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	130
294.	PT	Descending to 4000 feet QNH 1005 transition level 50 runway 24 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
295.	ATC	Fastair 345 expect ILS approach runway 24 QNH 1014.	summon directive	pre-h head	directing	I	Direct	131
296.	PT	Runway 24 QNH 1014 request straight-in ILS approach Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
297.	ATC	Fastair 345 cleared straight-in ILS approach runway 24 report established.	summon directive	pre-h head	directing	I	Direct	132
298.	PT	Cleared straight-in ILS approach runway 24 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
299.	PT	Fastair 345 established runway in sight.	summon informative	pre-h head	informing	I	Inform	133
300.	ATC	Fastair 345 report tower 118.7.	summon directive	pre-h head	directing	I	Direct	134

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
301.	PT	118.7 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
302.	PT	Stephenville tower Fastair 345 heavy.	summon	head	opening	I	Summon	135
303.	ATC	Fastair 345 report outer marker.	reply-summon directive	head head	answering directing	R I	Direct	
304.	PT	Wilco Fastair 345.	receive terminate	head post-h	acknowledging	R		
305.	PT	Fastair 345 outer marker.	summon informative	pre-h head	informing	I	Inform	136
306.	ATC	Fastair 345 cleared to land wind 280 degrees 8 knots.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	137
307.	PT	Cleared to land Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
308.	PT	Stephenville approach G-CDAB.	summon	head	opening	I	Summon	138
309.	ATC	G-CDAB Stephenville approach.	reply-summon	head	answering	R		
310.	PT	G-CDAB PA 31 from Kennington IFR flight level 100 Stephenville 47 information Delta.	informative	head	informing	I	Inform	139
311.	ATC	G-AB cleared direct Stephenville NDB, flight level 70. Enter controlled airspace flight level 100. Hold Stephenville NDB flight level 70, right hand pattern, expected approach time 52.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	140
312.	PT	Cleared to Stephenville NDB, flight level 70. Enter controlled airspace flight level 100. Hold Stephenville NDB flight level 70, right hand expected approach time 52, G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
313.	ATC	G-AB expect ILS approach runway 24.	summon informative	pre-h head	informing	I	Inform	141
314.	PT	Runway 24 G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
315.	ATC	G-AB revised expected approach time 48.	summon informative	pre-h head	informing	I	Inform	142
316.	PT	Roger G-AB.	receive terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
317.	ATC	G-AB descend to 3500 feet QNH 1015, transition level 50.	summon directive	pre-h head	directing	I	Direct	143
318.	PT	Leaving flight level 70 for 3500 feet QNH 1015 transition level G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
319.	ATC	G-AB roger.	summon receive	pre-h head	acknowledging	F		
320.	ATC	G-AB cleared ILS approach runway 24 report crossing Stephenville NDB outbound.	summon directive	pre-h head	directing	I	Direct	144
321.	PT	ILS runway 24 G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
322.	ATC	G-AB Contact tower 118.7.	summon directive	pre-h head	directing	I	Direct	145
323.	PT	118.7 G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
324.	PT	Stephenville tower G-DCAB outer marker.	summon informative	pre-h head	informing	I	Inform	146
325.	ATC	G-AB cleared to land wind 260 degrees 22 knots.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	147
326.	PT	Cleared to land G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
327.	PT	Stephenville approach G-DCAB.	summon	head	opening	I	Summon	148
328.	ATC	G-DCAB Stephenville approach.	reply-summon	head	answering	R		
329.	PT	G-DCAB estimating Stephenville NDB at 18 flight level 70.	summon informative	pre-h head	informing	I	Inform	149
330.	ATC	G-AB cleared NDB approach runway 24 descend to 3000 feet QNH 1011 transition level 50, no delay expected.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	150
331.	PT	NDB approach runway 24 leaving flight level 70 descending to 3000 feet QNH 1011 transition level 50 G-AB.	receive/repeat terminate	head post-h	acknowledging	R		
332.	PT	G-AB over Stephenville NDB 3000 feet field in sight, request visual approach.	informative inquire	pre-h head	eliciting	I	Elicit	151

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
333.	ATC	G-AB cleared visual approach runway 24 number 1 contact tower 118.7.	reply-summon informaive	pre-h head	informing	R		
334.	PT	Cleared visual approach runway 24, 118.7 G-AB.	receive/repeat terminate	head post-h	acknowledging	F		
335.	ATC	Fastair 345 hold at north cross flight level 100.	summon directive	pre-h head	directing	I	Direct	152
336.	PT	Fastair 345 request holding instructions.	rsummon/receive inquire	head head	acknowledging eliciting	R I	Elicit	153
337.	ATC	Fastair 345 hold at north cross NDB flight level 100 inbound track 250 degrees left hand pattern outbound time 1 minute.	summon informative	pre-h head	informing	R		
338.	PT	Fastair 345 request holding procedure.	summon inquire	pre-h head	eliciting	I	Eilicit	154
339.	ATC	Fastair 345 hold at the 265 radial of Marlow VOR flight level 100 inbound track 085 right hand pattern expected approach time 1032.	reply-summon informative	pre-h head	informing	R		
340.	ATC	G-CD cleared to Stephenville VFR QNH 1012 traffic southbound Cherokee 2000 feet VFR estimating control zone boundary 53.	summon directive	pre-h head	directing	I	Direct	155
341.	PT	Cleared to Stephenville VFR QNH 1012 traffic in sight G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
342.	ATC	G-CD report aerodrome in sight.	summon directive	pre-h head	directing	I	Direct	156
343.	PT	Wilco G-CD.	receive terminate	head post-h	acknowledging	R		
344.	ATC	G-CD contact tower 118.7.	summon directive	pre-h head	directing	I	Direct	157
345.	PT	118.7 G-CD.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
346.	PT	Georgetown arrival Fastair 345 heavy flight level 60 approaching north cross information Golf.	summon informative	pre-h head	informing	I	Inform	158
347.	ATC	Fastair 345 radar contact vectoring for ILS approach runway 27 QNH 1008.	rsummon/receive informative	pre-h head	acknowledging informing	R I	Inform	159
348.	PT	Runway 27 QNH 1008 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
349.	ATC	Fastair 345 leave north cross heading 110.	summon directive	pre-h head	directing	I	Direct	160
350.	PT	Leave north cross heading 110 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
351.	ATC	Fastair 345 report speed.	summon inquire	pre-h head	eliciting	I	Elicit	161
352.	PT	Fastair 345 speed 250 knots.	reply-summon informative	pre-h head	informing	R		
353.	ATC	Fastair 345 reduce to minimum clean speed.	summon directive	pre-h head	directing	I	Direct	162
354.	PT	Fastair 345 reducing to 210 knots.	receive/repeat terminate	head post-h	acknowledging	R		
355.	ATC	Fastair 345 descend to 2500 feet QNH 1008, transition level 50 number 4 in traffic.	summon directive	pre-h head	directing	I	Direct	163
356.	PT	Leaving flight level 60 for 2500 feet QNH 1008, transition level 50 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
357.	ATC	Fastair 345 position 10 miles northeast of Georgetown.	summon informative	pre-h head	informing	I	Inform	164
358.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
359.	ATC	Fastair 345 turn right heading 180 for base leg.	summon directive	pre-h head	directing	I	Direct	165
360.	PT	Right heading 180 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
361.	ATC	Fastair 345 12 miles from touchdown reduce to minimum approach speed, turn right heading 230 cleared for ILS approach runway 27 report established.	summon informative directive	pre-h pre-h head	directing	I	Direct	166
362.	PT	Right heading 230 cleared for ILS approach runway 27 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
363.	ATC	Fastair 345 no ATC speed restrictions, contact tower 118.9.	summon information directive	pre-h pre-h head	directing	I	Direct	167
364.	PT	118.9 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
365.	ATC	Fastair 345 make a three sixty turn left for delay.	summon directive	pre-h head	directing	I	Direct	168
366.	PT	Three sixty turn left Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
367.	ATC	Fastair 345 continue present heading through the localizer	summon directive	pre-h head	directing	I	Direct	169
368.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
369.	PT	Wicken approach Fastair 345 heavy.						
370.	ATC	Fastair 345 Wicken approach this will be a surveillance radar approach runway 27 terminating at 1 miles from touchdown obstacle clearance altitude 600 feet maintain 2200 feet check your minima.	summon informative	pre-h head	informing	I	Inform	170
371.	PT	Maintain 2200 feet runway 27 Fastair 345.	receive/repeat terminate	head post-p	acknowledging	R		
372.	ATC	Fastair 345 turn right heading 275 for final report runway in sight.	summon directive	pre-h head	directing	I	Direct	171
373.	PT	Right heading 275 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
374.	ATC	Fastair 345 6 miles from touchdown commence descent now to maintain A 3 degree glide path.	summon informative directive	pre-h pre-h head	directing	I	Direct	172
375.	PT	Fastair 345 descending.	summon receive/repeat	pre-h head	acknowledging	R		
376.	ATC	Fastair 345 check gear down and locked.	summon directive	pre-h head	directing	I	Direct	173
377.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
378.	ATC	Fastair 345 5 miles from touchdown altitude should be 2000 feet.	summon informative	pre-h head	informing	I	Inform	174
379.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
380.	ATC	Fastair 345 go right of track turn left five degrees heading 270.	summon directive	pre-h head	directing	I	Direct	175
381.	PT	Heading 270 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
382.	ATC	Fastair 345 5 1/2 miles from touchdown altitude should be 1900 feet.	summon informative	pre-h head	informing	I	Inform	176
383.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
384.	ATC	Fastair 345 closing slowly from the right 4 1/2 miles from touchdown altitude should be 1700 feet.	summon informative	pre-h head	informing	I	Inform	177
385.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
386.	ATC	Fastair 345 cleared to land wind calm.	summon directive	pre-h head	directing	I	Direct	178
387.	PT	Cleared to land Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
388.	ATC	Fastair 345 4 miles from touchdown altitude should be 1600 feet do not acknowledge further transmissions.	summon informative	pre-h head	informing	I	Inform	
389.	ATC	Fastair 345 3 miles from touchdown altitude should be 1400 feet.	summon informative	pre-h head	informing	I	Inform	
390.	ATC	Fastair 345 on track turn right three degrees heading 272 3 miles from touchdown altitude should be 1300 feet.	informative directive	pre-h head	directing	I	Direct	
391.	ATC	Fastair 345 2 1/2 miles from touchdown altitude should be 1100 feet.	summon informative	pre-h head	informing	I	Inform	
392.	ATC	Fastair 345 2 miles from touchdown altitude should be 900 feet.	summon informative	pre-h head	informing	I	Inform	
393.	ATC	Fastair 345 on track heading is good 1miles from touchdown altitude should be 800 feet.	summon informative	pre-h head	informing	I	Inform	

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
394.	PT	Fastair 345 runway in sight.	summon informative	pre-h head	informing	I	Inform	
395.	ATC	Fastair 345 on track 1 mile from touchdown, approach completed after landing contact tower 118.7.	summon informative	pre-h head	informing	I	Inform	
396.	ATC	Fastair 345 Georgetown precision report heading and altitude.	summon inquire	pre-h head	eliciting	I	Elicit	180
397.	PT	Heading 240 at 3000 feet Fastair 345.	informative terminate	head post-h	informing	R		
398.	ATC	Fastair 345 this will be a precision radar approach runway 27, obstacle clearance altitude 400 feet position 6 miles east of Georgetown turn right heading 260 descend to 2500 feet QNH 1014.	summon informative directive	pre-h pre-h head	directing	I	Direct	181
399.	PT	Precision approach runway 27, heading 260 descending to 2500 feet QNH 1014 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
400.	ATC	Fastair 345 closing from the right turn right heading 270.	summon informative	pre-h head	informing	I	Inform	182
401.	PT	Right heading 270 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
402.	ATC	Fastair 345 on track approaching glide path heading is good.	informative directive	pre-h head	directing	I	Direct	183
403.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
404.	ATC	Fastair 345 report runway in sight.	summon informative	pre-h head	informing	I	Inform	184
405.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
406.	PT	Fastair 345 runway in sight.	summon informative	pre-h head	informing	I	Inform	
407.	PT	Fastair 345 request descent.	summon inquire	pre-h head	eliciting	I	Elicit	185
408.	ATC	Fastair 345 maintain flight level 350 expect descent after gateway.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	186

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
409.	PT	Maintaining flight level 350 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
410.	ATC	Fastair 345 maintain flight level 350 until advised.	summon directive	pre-h head	directing	I	Direct	187
411.	PT	Maintain flight level 350 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
412.	ATC	Fastair 345 descend to flight level 130 cross Wicken flight level 170	summon directive	pre-h head	directing	I	Direct	188
413.	PT	Leaving flight level 350 for flight level 130 cross Wicken flight level 170 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
414.	ATC	Fastair 345 advise if able to cross Wicken at 52.	summon inquire	pre-h head	eliciting	I	Elicit	189
415.	PT	Fastair 345 affirm.	reply-summon informative	pre-h head	informing	R		
416.	ATC	Fastair 345 cross Wicken at 52	summon directive	pre-h head	directing	I	Direct	190
417.	PT	Cross Wicken at 52 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
418.	ATC	Fastair 345 landing delays at Georgetown advise if able to lose time en route.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	191
419.	PT	Fastair 345 affirm.	reply-summon informative	pre-h head	informing	R		
420.	ATC	Fastair 345 advise if able to proceed parallel offset.	summon directive	pre-h head	directing	I	Direct	192
421.	PT	Fastair 345 affirm.	reply-summon informative	pre-h head	informing	R		
422.	ATC	Fastair 345 proceed offset 5 miles right of Alpha 1 until abeam Wicken.	summon directive	pre-h head	directing	I	Direct	193

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
423.	PT	Proceeding offset 5 miles right of Alpha 1 until abeam Wicken Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
424.	ATC	Fastair 345 report revised estimate for north cross.	summon inquire	pre-h head	eliciting	I	Elicit	194
425.	PT	Fastair 345 estimate north cross 1246.	reply-summon informative	pre-h head	informing	R		
426.	ATC	Fastair 345 report Wicken.	summon directive	pre-h head	directing	I	Direct	195
427.	PT	Wilco Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
428.	PT	Fastair 345 Wicken 47 flight level 350 Marlow 55.	summon informative	pre-h head	informing	I	Inform	196
429.	ATC	Fastair 345 roger.	reply-summon receive	pre-h head	acknowledging	R		
430.	ATC	Fastair 345 report 25 miles from Wicken	summon directive	pre-h head	directing	I	Direct	197
431.	PT	Fastair 345 wilco.	reply-summon receive	pre-h head	acknowledging	R		
432.	ATC	Fastair 345 report distance from Stephenville.	summon inquire	pre-h head	eliciting	I	Elicit	198
433.	PT	Fastair 345 37 miles.	reply-summon informative	pre-h head	informing	R		
434.	ATC	Fastair 345 report passing 270 radial Wicken VOR	summon directive	pre-h head	directing	I	Direct	199
435.	PT	Fastair 345 wilco.	reply-summon receive	pre-h head	acknowledging	R		
436.	ATC	Fastair 345 report 25 miles radial 270 Wicken VOR	summon directive	pre-h head	directing	I	Direct	200
437.	PT	Fastair 345 wilco.	reply-summon receive	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
438.	ATC	Fastair 345 descend to flight level 180 when ready	summon directive	pre-h head	directing	I	Direct	201
439.	PT	Descend to flight level 180 will report leaving flight level 350 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
440.	ATC	Fastair 345 climb to flight level 220 report passing flight level 100.	summon directive	pre-h head	directing	I	Direct	202
441.	PT	Climbing to flight level 220 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
442.	ATC	Fastair 345 descend immediately to flight level 200 due traffic.	summon directive	pre-h head	directing	I	Direct	203
443.	PT	Leaving flight level 220 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
444.	PT	Fastair 345 request to leave controlled airspace by descent.	summon inquire	pre-h head	eliciting	I	Elicit	204
445.	ATC	Fastair 345 cleared for descent report passing 5500 feet QNH 1014.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	205
446.	PT	Leaving 7000 feet will report passing 5500 feet QNH 1014 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
447.	PT	Fastair 345 request VMC descent to flight level 60.	summon inquire	pre-h head	eliciting	I	Elicit	206
448.	ATC	Fastair 345 descend to flight level 60, maintain own separation and VMC from flight level 90 to flight level 70, traffic westbound friendship flight level 80 estimating Wicken at 07.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	207
449.	PT	Leaving flight level 100 for flight level 60 maintain VMC flight level 90 to flight level 70 traffic at flight level 80 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
450.	PT	Alexander control Fastair 345.	summon	head	opening	I	Summon	208
451.	ATC	Fastair 345 go ahead.	reply-summon	head	answering	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
452.	PT	Fastair 345 request clearance to join A1 at Marlow.	summon inquire	pre-h head	eliciting	I	Elicit	209
453.	ATC	Fastair 345 cleared to Georgetown flight planned route flight level 240. Join A1 at Marlow flight level 240.	reply-summon informative	pre-h head	informing	R		
454.	PT	Cleared to Georgetown via Marlow flight planned route flight level 240. To enter controlled airspace flight level 240 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	F		
455.	ATC	Fastair 345 correct.	summon confirm	pre-h head	acknowledging	F		
456.	ATC	Fastair 345 remain outside controlled airspace expect clearance at 55.	summon directive	pre-h head	directing	I	Direct	211
457.	PT	Fastair 345 remaining outside.	reply-summon receive/repeat	pre-h head	acknowledging	R		
458.	PT	Fastair 345 request flight level 240	summon inquire	pre-h head	eliciting	I	Elicit	212
459.	ATC	Fastair 345 flight level 240 not available due traffic. Alternatives are flight level 220 or flight level 260 Advise.	reply-summon informative inquire	pre-h head head	informaing eliciting	R I	 Elicit	 213
460.	PT	Fastair 345 accept flight level 220	summon informative	pre-h head	informing	R		
461.	ATC	Fastair 345 cleared to leave A1 via Marlow. Maintain flight level 230 while in controlled airspace.	summon directive	pre-h head	directing	I	Direct	214
462.	PT	Cleared to leave A1 via Marlow. Maintain flight level 230 while in controlled airspace Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
463.	PT	Alexander control G-DCAB.	summon	head	opening	I	Summon	215
464.	ATC	G-DCAB Alexander control.	reply-summon	head	answering	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
465.	PT	G-DCAB 20 miles north of Wicken flight level 80 Wicken at 33 request clearance to cross airway A1 at Wicken	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	216
466.	ATC	G-AB is cleared to cross A1 at Wicken flight level 80	informative	head	informing	R		
467.	PT	Cleared to cross A1 at Wicken flight level 80 G-AB.	receive/repeat terminate	head post-h	acknowledging	F		
468.	ATC	G-AB report Wicken	summon directive	pre-h head	directing	I	Direct	218
469.	PT	G-AB	receive/terminate	head	acknowledging	R		
470.	ATC	Fastair 345 hold at Wicken flight level 220, expect further clearance at 02, landing delays at Georgetown 20 minutes.	summon directive	pre-h head	directing	I	Direct	219
471.	PT	Hold at Wicken flight level 220 Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
472.	ATC	Fastair 345 hold at north cross flight level 100.	summon directive	pre-h head	directing	I	Direct	220
473.	PT	Hold at north cross flight level 100. What is the delay? Fastair 345.	receive/repeat inquire terminate	head head post-h	acknowledging eliciting	R I	Elicit	221
474.	ATC	Fastair 345 expected delay 10 minutes.	summon informative	pre-h head	informing	R		
475.	PT	Fastair 345 roger.	reply-summon receive	pre-h head	acknowledging	F		
476.	PT	Fastair 345 request extended holding	summon inquire	pre-h head	eliciting	I	Elicit	222
477.	ATC	Fastair 345 hold between Kennington and Marlow flight level 100 turn right expect further clearance at 1105	rsummon/receive informative	pre-h head	informing	R		
478.	PT	Hold between Kennington and Marlow flight level 100 right turn Fastair 345	receive/repeat terminate	head post-h	acknowledging	F		

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479.	ATC	Fastair 345 under radar control	summon informative	pre-h head	informing	I	Inform	224
480.	PT	Fastair 345	receive/terminate	head	acknowledging	R		
481.	ATC	Fastair 345 radar control terminated	summon informative	pre-h head	informing	I	Inform	225
482.	PT	Fastair 345	receive/terminate	head	acknowledging	R		
483.	ATC	Fastair 345 automatic dependent surveillance out of service.	summon informative	pre-h head	informing	I	Inform	226
484.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
485.	PT	Mayday mayday mayday Walden tower G-ABCD engine on fire making forced landing 20 miles south of Walden. Passing 3000 feet heading 360.	framer summon informative	pre-h pre-h head	informing	I	Inform	227
486.	ATC	G-ABCD Walden tower roger wind at Walden 350 degrees 10 knots, QNH 1008.	reply-summon receive informative	pre-h head head	acknowledging informing	R I	 Inform	
487.	PT	Mayday mayday mayday Walden tower G-ABCD engine failed. Will attempt to land 5 miles south 4000 feet heading 360	framer summon informative	pre-h head head	informing	I	Inform	228
488.	ATC	G-ABCD Walden tower roger mayday cleared straight-in approach runway 35 wind 360 degrees 10 knots QNH 1008, you are number one.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	 Direct	229
489.	PT	Cleared straight-in approach runway 35 QNH 1008 G-ABCD.	receive/repeat terminate	head post-h	acknowledging	R		
490.								
491.	ATC	All stations Walden tower stop transmitting Mayday.	summon informative	pre-h head	informing	I	Inform	
492.	ATC	Fastair 345 stop transmitting, mayday.	summon informative	pre-h head	informing	I	Inform	

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493.	PT	Walden tower G-CD cancel distress. Engine serviceable, runway in sight. Request landing.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	230
494.	ATC	G-CD wind 350 degrees 8 knots runway 35 cleared to land.	reply-summon informative directing	pre-h head head	informing directing	R I	Direct	
495.	PT	Runway 35 cleared to land G-CD.	receive/repeat terminate	pre-h head	acknowledging	R		
496.								
497.	ATC	All stations Walden tower distress traffic ended.	summon informative	pre-h head	informing	I	Inform	
498.	PT	Pan Pan, Pan Pan, Pan Pan Walden tower G-ABCD 2000 feet heading 190 above cloud unsure of my position request heading to Walden.	framer summon starter inquire	pre-h pre-h pre-h head	eliciting	I	Elicit	231
499.	ATC	G-ABCD Walden tower fly heading 160.	reply-summon informing	pre-h head	informing	R		
500.	PT	Heading 160 G-ABCD.	receive/repeat terminate	pre-h head	acknowledging	F		
501.	PT	Pan Pan, Pan Pan, Pan Pan Walden tower G-ABCD 10 miles north at 2000 feet. Passenger with suspected heart attack request priority landing.	framer summon informative inquire	pre-h head pre-h head	eliciting	I	Elicit	232
502.	ATC	G-CD Walden tower number 1 cleaned straight-in approach runway 17 wind 180 degrees 10 knots QNH 1008 ambulance alerted.	reply-summon informing	pre-h head	infroming	R		
503.	PT	Cleared straight-in approach runway 17 QNH 1008 G-CD.	receive/repeat terminate	pre-h head	acknowledging	F		
504.	PT	Pan Pan, Pan Pan, Pan Pan Walden tower G-BBCC urgency call passenger with suspected heart attack requesting priority landing	framer summon informative	pre-h head head	informing	I	Inform	233

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
505.	ATC	G-BBCC roger.	reply-summon receive/repeat	pre-h head	acknowledging	R		
506.	ATC	G-ABCD Walden tower runway 35 wind 340 degrees 10 knots QNH 1008 no traffic.	summon informative	pre-h head	informing	I	Inform	
507.	PT	Fastair 345 position north cross emergency descent to flight level 100 due to decompression.	summon informative	pre-h head	informing	I	Inform	
508.	ATC	Attention all aircraft in the vicinity of north cross, emergency descent in progress from flight level 350 to flight level 100, leave A1 to the north immediately.	summon informative	pre-h head	informing	I	Inform	
509.	ATC	G-CD Walden tower present weather wind 360 degrees 5 knots visibility 20 kilometres cloud 2500 feet QNH 1008.	summon informative	head head	informing	I	Inform	234
510.	PT	QNH 1008 G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
511.	ATC	Fastair 345 Stephenville wind 360 degrees 25 knots visibility 1000 metres continuous rain overcast 600 feet QNH 1001.	summon informative	pre-h head	informing	I	Inform	235
512.	PT	Fastair 345 QNH 1001 request temperature.	reply-summon receive/repeat inquire	pre-h head head	acknowledging eliciting	R I	 Elicit	236
513.	ATC	Fastair 345 temperature 7.	summon informative	pre-h head	infroming	R		
514.	PT	Fastair 345.	receive/terminate	head	acknowledging	F		
515.	ATC	Fastair 345 RVR runway 27 touchdown 650 metres midpoint 700 metres stop end 600 metres.	summon informative	pre-h head	infroming	I	Inform	237
516.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
517.	ATC	Fastair 345 RVR runway 27 650 metres 700 metres and 600 metres.	summon informative	pre-h head	infroming	I	Inform	238
518.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
519.	ATC	G-CD Walden tower mowing in progress near centre of aerodrome.	summon informative	pre-h head	infroming	I	Inform	239
520.	PT	G-CD mowing in sight.	reply-summon receive/repeat	pre-h head	acknowledging	R		
521.	ATC	Fastair 345 threshold runway 27 displaced 500 feet due broken surface.	summon informative	pre-h head	infroming	I	Inform	240
522.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
523.	ATC	Fastair 345 taxiway Golf closed due maintenance use Alpha to vacate.	summon informative	pre-h head	infroming	I	Inform	241
524.	PT	Vacate via Alpha, Fastair 345.	receive/repeat terminate	head post-h	acknowledging	R		
525.	PT	Alexander radio Fastair 345 selcal AHCK.	summon informative	pre-h head	infroming	I	Inform	242
526.	ATC	Fastair 345 Alexander radio selcal AHCK.	reply-summon receive/repeat	pre-h head	acknowledging	R		
527.	PT	Alexander radio Fastair 345 request selcal check.	summon inquire	pre-h head	eliciting	I	Elicit	243
528.	ATC	Fastair 345 Alexander radio wilco.	reply-summon receive	pre-h head	acknowledging	R		
529.	PT	Fastair 345 selcal OK.	summon informative	pre-h head	informing	F	Inform	
530.	PT	Fastair 345 negative selcal, try again.	summon informative	pre-h head	informing	F	Inform	
531.	ATC	All stations Alexander control B777 dumping fuel flight level 90 south of Kennington Avoid flight between flight level 60 and flight level 100	summon informative	pre-h head	informing	I	Inform	

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
532.	ATC	All stations Alexander control fuel dumping completed.	summon informative	pre-h head	informing	I	Inform	
533.	ATC	G-CD extend downwind due wake turbulence B757 landing ahead.	summon directive	pre-h head	directing	I	Direct	244
534.	PT	Extending downwind, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
535.	ATC	G-CD hold position due wake turbulence airbus departing ahead.	summon directive	pre-h head	directing	I	Direct	245
536.	PT	Holding position, G-CD.	receive/repeat terminate	head post-h	acknowledging	R		
537.	ATC	Fastair 345 caution medium windshear reported at 800 feet 3 miles final runway 27.	summon informative	pre-h head	infroming	I	Inform	246
538.	PT	Fastair 345.	receive/terminate	head	acknowledging	R		
539.								
540.	PT	Stephenville tower G-ABCD request heading to Stephenville.	summon inquire	pre-h head	eliciting	I	Elicit	247
541.	ATC	G-CD Stephenville tower Heading 090 to Stephenville	reply-summon informative	pre-h head	informing	R		
542.	PT	090 G-CD.	receive/repeat terminate	head post-h	acknowledging	F		
543.	PT	Stephenville tower G-ABCD request QDM.	summon inquire	pre-h head	eliciting	I	Elicit	248
544.	ATC	G-CD Stephenville tower QDM 090	reply-summon informing	pre-h head	informing	R		
545.	PT	090 G-CD.	receive/repeat terminate	head post-h	acknowledging	F		
546.	PT	Fastair 345 TCAS climb.	summon informative	pre-h head	informing	I	Inform	249

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
547.	ATC	Fastair 345 roger report returning to clearance.	reply-summon receive inquire	pre-h head head	acknowledging eliciting	R I	 Elicit	 250
548.	PT	Fastair 345 returning to clearance, now maintaining flight level 350.	summon informative	pre-h head	informing	R		
549.	ATC	Alexander control roger.	reply-summon receive	pre-h head	acknowledging	F		
550.	ATC	Fastair 345 climb to flight level 350.	summon directive	pre-h head	directing	I	Direct	251
551.	PT	Fastair 345 unable, TCAS resolution advisory.	reply-summon reject informative	pre-h head head	acknowledging informing	R I	 Inform	 252
552.	ATC	Fastair 345 Alexander control roger report maintaining flight level 310.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	 Direct	
553.	PT	Fastair 345 TCAS climb completed flight level 310 resumed.	summon informing	pre-h head	informing	I	Inform	253
554.	ATC	Alexander control roger.	reply-summon receive	pre-h head	acknowledging	R		

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Appendix B
TABLE OF DISCOURSE ANALYSIS: ACTUAL AIR-GROUND COMMUNICATION

L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
1.	PT	Medan Approach, GIA152 passing 150	summon informative	pre-h head	informing	I	Inform	1
2.	ATC	GIA 152 radar contact 43 miles. Descent to 3000ft for Runway 05, reduce speed to 220	rsummon/receive starter directive	head pre-h head	acknowledging directing	R I	Direct	2
3.	PT	Descend 3000for Runway 05. Reduce speed to 220 knots GIA 152.	receive/repeat terminate	head post-h	acknowledging	R		
4.	PT	Approach, GIA 152, request reason to reduce speed 10000 to 220knots	summon informative	pre-h head	informing	I	Inform	3
5.	ATC	OK traffic departure now start engine release traffic departure at 27	receive informative	head head	acknowledging informing	R I	Inform	4
6.	PT	152 request maintain 210 knots and below 10000.	summon/receive inquire	head head	acknowledging eliciting	R I	Elicit	5
7.	ATC	OK, it's approved	starter informative	pre-h head	informing	R		
8.	PT	MNA 241 passing 10000	summon informative	pre-h head	informing	I	Inform	6
9.	ATC	MNA 241, your position 11 miles on W-11Contact 1212 Happy landing	rsummon/receive informative terminate	head head post-h	acknowledging informing	R I	Inform	7
10.	PT	Good afternoon Thank you	greeting receive/terminate	pre-h head	acknowledging	R		
11.	ATC	Anytime	receive/terminate	head	acknowledging	F		
12.	PT	GIA 152, 3000	summon informative	pre-h head	informing	I	Inform	8
13.	ATC	GIA 152, maintain 3000ft for a while. Maintain heading Medan VOR. Traffic taxi Runway 23	rsummon/receive directive comment	head head post-h	acknowledging directing	R I	Direct	9
14.	PT	Maintain 3000.	receive	head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
15.	ATC	Merpati 152, turn left heading 240 vectoring for intercept ILS Runway 05 from right side Traffic rolling	summon informative	pre-h head	informing	I	Inform	
16.	ATC	GIA 152 do you read?	summon inquire	pre-h head	eliciting	I	Elicit	
17.	PT	GIA 152, say again	summon inquire	pre-h head	eliciting	I	Elicit	10
18.	ATC	Turn left Now heading 240 vectoring for intercept ILS Runway 05.	informative	head	informing	R		
19.	PT	Roger heading 235 GIA 152.	receive repeat terminate	head post-h post-h	acknowledging	F		
20.	PT	GIA 152 heading 235. Confirm we cleared from a mountainous area	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	12
21.	ATC	Affirm, Continue turn left heading 215.	receive directive	head head	acknowledging directing	R I	Direct	13
22.	PT	heading 215, GIA.	receive/repeat terminate	head post-h	acknowledging	R		
23.	PT	Good afternoon, approach BOU 683 left turn	summon informative	pre-h head	informing	I	Inform	14
24.	ATC	BOU 683 continue left turn heading 120 initial 2000ft.	rsummon/receive directive	head head	acknowledging directing	R I		
25.	ATC	GIA 152, turn right heading 040, report established on localizer.	summon directive	pre-h head	directing	I	Direct	15
26.	PT	Turn right heading 040, GIA 152	receive/repeat terminate	head post-h	acknowledging	R		
27.	ATC	Turning right	directive	head	directing	I	Direct	16
28.	PT	Roger, 152.	receive terminate	head post-h	acknowledging	R		
29.	ATC	152, confirm you are turning left now	summon inquire	pre-h head	eliciting	I	Elicit	17
30.	PT	We are turning right now	informative	head	informing	R		
31.	ATC	152 OK, you continue turning left now	reply-summon receive directive	pre-h head head	acknowledging directing	F I	Direct	18

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
32.	PT	turning left now	repeat	head	acknowledging	R		
33.	ATC	OK	receive	head	acknowledging	F		
34.	ATC	GIA 152 continue turn right heading 015	summon directive	pre-h head	directing	I	Direct	
35.	PT	De Kooy Approach PHDDA.	summon	head	opening	I	Summon	19
36.	ATC	PHDDA De Kooy Approach.	reply-summon	head	answering	R		
37.	PT	PDA is at 600 feet and approaching we want to make an emergency landing on De Kooy.	informative inquire	pre-h head	eliciting	I	Elicit	
38.	ATC	PDA able to squawk?	summon inquire	pre-h head	eliciting	I	Elicit	20
39.	PT	Uh, we are squawking 0060.	informative	head	informing	R		
40.	ATC	PDA squawk 4321, the QNH 1010 runway 22 is in use.	summon directive comment	pre-h head post-h	directing	I	Direct	
41.	PT	De Kooy Approach, PHILL just airborne, passing 500, climbing 2000 left turn, heading 120.	summon informative	pre-h head	informing	I	Inform	21
42.	ATC	PLL radar contact continue.	rsummon/receive starter directive	head pre-h head	acknowledging directing	R I	Direct	22
43.	PT	Wilco, PLL.	receive terminate	head post-h	acknowledging	R		
44.	ATC	PDA squawk 4321.	summon directive	pre-h head	directing	I	Direct	
45.	ATC	PHDDA De Kooy Approach.	summon	head	opening	I	Summon	23
46.	PT	PDA go ahead.	reply-summon	head	answering	R		
47.	ATC	PDA squawk 4321, proceed inbound for the runway 22 at De Kooy.	summon directive	pre-h head	directing	I	Direct	
48.	PT	Say again the squawk	inquire	head	eliciting	I	Elicit	24
49.	ATC	4321.	informative	head	informing	R		
50.	PT	4 3 2 1	repeat	head	acknowledging	F		
51.	ATC	4321.	confirm	head	informing	F		
52.	ATC	PDA report your position now	summon inquire	pre-h head	eliciting	I	Elicit	25
53.	PT	11 miles the northeast.	informative	head	informing	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
54.	ATC	PDA we have radar contact, make your heading 240.	summon informative	pre-h head	informing	I	Inform	26
55.	PT	Roger, the heading 240.	receive repeat	head	acknowledging	R		
56.	ATC	Heli15 make your heading 120, we have an emergency landing	summon informative	pre-h head	informing	I	Inform	
57.	ATC	PDA report your POB?	summon inquire	pre-h head	eliciting	I	Elicit	
58.	ATC	PDA report your heading?	summon inquire	pre-h head	eliciting	I	Elicit	
59.	ATC	PDA heading 250.	summon directive	pre-h head	directing	I	Direct	
60.	ATC	PDA , De Kooy Approach, how do you read?	summon inquire	pre-h head	eliciting	I	Elicit	
61.	PT	Good evening, Surat Thani Tower. THA 261 Intermediate Fix RWY 22.	greeting summon informative	pre-h pre-h head	informing	I	Inform	27
62.	ATC	Good evening, THA 261. Report Final Approach Fix QNH 1009.	reply-greeting rsummon/receive directive	pre-h head	acknowledging/ directing	R I	Direct	28
63.	PT	Report FAF 1009.	receive/repeat	head	acknowledging	R		
64.	ATC	THA 261, negative PAPI light, right side of RWY, RWY edge light interval 120 metres and RWY end light interval 6 metres, caution barrier 400 metres from RWY22.	summon informative	pre-h head	informing	I	Inform	29
65.	PT	THA 261, thank you.	reply-summon receive	pre-h head	acknowledging	R		
66.	ATC	THA 261, Surat not in sight, check wheels, cleared to land RWY22, surface wind 310 degrees	summon starter directive	pre-h pre-h head	directing	I	Direct	30
67.	PT	Cleared to land RWY22 THA 261.	receive/repeat terminate	pre-h head	acknowledging	R		
68.	ATC	THA 261, caution RWY wet.	summon informative	pre-h head	informing	I	Inform	31
69.	PT	261.	receive	head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
70.	ATC	THA 261, is RWY in sight?	summon inquire	pre-h head	eliciting	I	Elicit	32
71.	PT	negative 261.	informative terminate	head post-h	informing	R		
72.	ATC	Roger.	receive	head	acknowledging	F		
73.	PT	THA 261 RWY in sight	summon informative	pre-h head	informing	I	Inform	33
74.	ATC	Surat affirm	reply-summon repeat	pre-h head	acknowledging	R		
75.	PT	THA 261 go around.	summon informative	pre-h head	informing	I	Inform	34
76.	ATC	THA 261 Roger.	reply-summon receive	pre-h head	acknowledging	R		
77.	ATC	THA 261, how far can you see RWY?	summon inquire	pre-h head	eliciting	I	Elicit	35
78.	PT	Three miles. stand by.	informative inquire	head head	informing eliciting	R I	Elicit	36
79.	ATC	Roger.	receive	head	acknowledging	R		
80.	ATC	THA 261, what will you do next?	summon inquire	pre-h head	eliciting	I	Elicit	37
81.	PT	Left turn to final RWY22 maintain 2000 feet.	informative	head	informing	R		
82.	ATC	Roger, report FAF.	receive directive	head head	acknowledging directing	F I	Direct	38
83.	PT	Report FAF THA 261.	receive/repeat terminate	head post-h	acknowledging	R		
84.	ATC	THA 261, request position	summon inquire	pre-h head	eliciting	I	Elicit	39
85.	PT	Position 2 DME outbound, after FAF I will make left turn to FAF	informative	head	informing	R		
86.	ATC	Roger. Report FAF heading inbound.	receive directive	head head	acknowledging directing	F I	Direct	40
87.	PT	Report FAF when heading inbound THA 261.	receive/repeat terminate	head post-h	acknowledging	R		
88.	PT	Tower 261 is it raining at the airport?	summon inquire	pre-h head	eliciting	I	Elicit	41
89.	ATC	It is raining lightly.	informative	head	informing	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
90.	PT	Thank you.	receive	head	acknowledging	F		
91.	PT	THA 261 FAF RWY22.	summon inquire	pre-h head	eliciting	I	Elicit	42
92.	ATC	THA 261, Surat not in sight. Check wheels. Cleared to land RWY22, surface wind 291 degrees	reply-summon informative directive	pre-h head head	informing directing	R I	 Direct	 43
93.	PT	Cleared to land RWY22 THA 261.	receive terminate	head post-h	acknowledging	R		
94.	ATC	THA 261, Surat	summon	head	opening	I	Summon	44
95.	PT	Go ahead THA 261	reply-summon	head	answering	R		
96.	ATC	THA 261, Surat what will you do next?	summon inquire	head head	eliciting	I	Elicit	45
97.	PT	I can't see RWY Please stand by for a moment.	informative inquire	head head	informing eliciting	R I	 Elicit	 46
98.	ATC	Roger	informative	head	informing	R		
99.	PT	THA 261 go around	summon informative	pre-h head	informing	I	Inform	47
100.	ATC	261 Roger	reply-summon receive	pre-h head	acknowledging	R		
101.	ATC	THAI 261, please confirm whether to Join Final again	summon inquire	pre-h head	eliciting	I	Elicit	48
102.	PT	Yes I want to make another try to Join Final	informative	head	informing	R		
103.	ATC	Roger. Report FAF.	receive directive	head head	acknowledging directing	F I	 Direct	 49
104.	PT	Report FAF. Thank you THA 261.	receive/repeat terminate	head post-h	acknowledging	R		
105.	ATC	THA 261, request position.	summon inquire	pre-h head	eliciting	I	Elicit	50
106.	PT	FAF outbound THA 261.	informative terminate	post-h head	informing	R		
107.	ATC	THA 261, report FAF heading inbound.	summon inquire	pre-h head	eliciting	I	Elicit	51
108.	PT	Report again FAF heading inbound THA 261.	informative terminate	post-h head	informing	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
109.	ATC	THAI 261, the visibility observed by tower is about 1,000 metres	summon informative	pre-h head	informing	I	Inform	52
110.	PT	Copy visibility decreased to 1,000 metres.	receive inquire	head head	acknowledging eliciting	R I	Elicit	53
111.	ATC	affirm	confirm	head	acknowledging	R		
112.	PT	Is it raining at the airport?	inquire	head	eliciting	I	Elicit	54
113.	ATC	It is raining lightly.	informative	head	informing	R		
114.	PT	Thank you very much 261	receive terminate	head post-h	acknowledging	F		
115.	ATC	THA 261, check wheels Cleared to land RWY22, surface wind 290 degrees Caution RWY wet	summon directive comment	pre-h head post-h	directing	I	Direct	55
116.	PT	Cleared to land RWY22 THA 261	receive/repeat terminate	pre-h head	acknowledging	R		
117.	PT	9981, we go around due to low visibility.	summon informative	pre-h head	informing	I	Inform	56
118.	ATC	Roger. 9981, call Torino radar one-two-one decimal one.	receive reply-summon directive	head post-h head	acknowledging directing	R I	Direct	
119.	ATC	Seven zero two papa, We are taking you through the final approach track for spacing	summon informative	pre-h head	informing	I	Inform	57
120.	ATC	Seven zero two papa, are you able to take up the ILS at Coventry	rsummon/receive inquire	head head	acknowledging eliciting	R I	Elicit	
121.	PT	confirm your message please	inquire	head	eliciting	I	Elicit	58
122.	ATC	Roger could you turn left immediately now heading 010	receive inquire	head head	acknowledging eliciting	R I	Elicit	59
123.	PT	heading 010 now	informative	head	acknowledging	R		
124.	ATC	Roger tracking one zero zero turn left zero one zero please	receive repeat directive	pre-h head head	acknowledging directing	F I	Direct	60
125.	PT	Roger	receive	head	acknowledging	R		
126.	ATC	ACE cargo seven zero papa continue left turn heading two six zero	summon directive	pre-h head	directing	I	Direct	61

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
127.	PT	Roger we turn left heading two six zero, seven zero two papa	receive repeat	head post-h	acknowledging	R		
128.								
129.	PT	Center, ABX eight two seven is in a descent.	summon informative	pre-h head	informing	I	Inform	
130.	ATC	ABX eight two seven, change to Indianapolis one two eight point four.	reply-summon directive	pre-h head	directing	I	Direct	
131.	ATC	ABX eight twenty seven, Indianapolis one two eight point four.	summon repeat	pre-h head	directing	I	Direct	62
132.	PT	ABX eight two seven, we're going to stay on this frequency, we're descending through eight thousand	reply-summon reject comment	pre-h head post-h	acknowledging	R		
133.	ATC	ABX eight twenty seven, emergency descent	summon inquire	pre-h head	eliciting	I	Elicit	63
134.	PT	yes	receive	head	acknowledging	R		
135.	ATC	American fifteen seventy-two, You are five miles from MISTR Cross MISTR at three thousand five hundred, cleared for VOR runway one five	summon starter directive	pre-h pre-h head	directing	I	Direct	64
136.	PT	OK, cleared for the approach cross MISTR at thirty-five hundred American fifteen seventy-two	receive repeat terminate	head post-h post-h	acknowledging	R		
137.	ATC	American fifteen seventy-two, you are on the final	summon informative	pre-h head	informing	I	Inform	65
138.	PT	Copy.	receive	head	acknowledging	R		
139.	ATC	American fifteen seventy-two wind one seven zero at two four, gusts three five.	summon informative	pre-h head	informing	I	Inform	66
140.	PT	Roger.	receive	head	acknowledging	R		
141.	PT	Hey Tower, American fifteen seventy-two, we're on a six-mile final for runway five.	framer summon informative	pre-h pre-h head	informing	I	Inform	67
142.	ATC	American fifteen seventy-two, Bradley tower, wind one seven zero at two five, gust four zero the runway appear clear. You can land and taxi to the gate at your discretion.	rsummon/receive informing	head head	acknowledging informing	R I	Inform	68
143.	PT	Copy.	receive	head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
144.	ATC	Wind-shear alert, center field one seven zero at two five, northeast boundary, one seven zero at two four, one niner zero at twelve at the southeast boundary.	informative	head	informing	I	Inform	69
145.	PT	Copy.	receive/terminate	head	acknowledging	R		
146.	ATC	Kiwi Air seventeen Chicago center altimeter two niner seven niner	summon informative	pre-h head	informing	I	Inform	70
147.	PT	two niner seven niner	receive/repeat	head	acknowledging	R		
148.	ATC	Kiwi Air seventeen, expedite your descent to eleven please.	summon directive	pre-h head	directing	I	Direct	71
149.	PT	expedite to eleven, Kiwi Air seventeen	receive/repeat terminate	head post-h	acknowledging	R		
150.	ATC	Kiwi Air seventeen, fly heading zero seven zero. radar vectors for your descent.	summon informative comment	pre-h head post-h	informing	I	Inform	72
151.	PT	Air seventeen zero five zero.	receive	head	acknowledging	R		
152.	ATC	Eagle flight one eighty four, descend and maintain eight thousand	summon directive	pre-h head	directing	I	Direct	
153.	ATC	Eagle flight one eighty four, descend and maintain eight thousand.	summon directive	pre-h head	directing	I	Direct	73
154.	PT	descend to eight thousand. Eagle flight one eighty four.	receive/repeat terminate	head post-h	acknowledging	R		
155.	PT	Kiwi Air seventeen, heading three six zero.	summon informative	pre-h head	informing	I	Inform	
156.	ATC	Kiwi Air seventeen, descend and maintain six thousand.	summon directive	pre-h head	directing	I	Direct	74
157.	PT	Kiwi Air seventeen, descend and maintain six thousand	reply-summon receive/repeat	pre-h head	acknowledging	R		
158.	ATC	Kiwi Air seventeen, direct Chicago Heights, direct Midway.	summon directive	pre-h head	directing	I	Direct	75
159.	PT	direct Heights direct Midway, Kiwi Air seventeen.	receive/repeat terminate	head post-h	acknowledging	R		
160.	ATC	American fourteen twenty turn right heading two seven zero.	summon directive	pre-h head	directing	I	Direct	76

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
161.	PT	two seven zero, American fourteen twenty.	receive/repeat terminate	head post-h	acknowledging	R		
162.	ATC	American fourteen twenty, turn right heading three zero zero.	summon directive	pre-h head	directing	I	Direct	77
163.	PT	right turn three zero zero American fourteen twenty.	receive/repeat terminate	head post-h	acknowledging	R		
164.	ATC	American fourteen twenty three miles from the marker. Turn right heading zero two zero. Maintain two thousand three hundred until established on the localizer. Cleared ILS runway 4R.	summon/starter directive	pre-h head	directing	I	Direct	78
165.	PT	zero two zero until established, cleared 4R American fourteen twenty	receive/repeat terminate	head post-h	acknowledging	R		
166.	ATC	Windshear alert, wind three five zero at three two, gusts four five. North boundary wind three one zero at two niner. Northeast boundary wind three two zero at three two.	informative	head	informing	I	Inform	
167.	ATC	American fourteen twenty, runway four right, RVR one thousand six hundred.	summon informative	pre-h head	informing	I	Inform	79
168.	PT	okay, American fourteen twenty, established inbound.	receive summon informative	head pre-h head	acknowledging informing	R I	Inform	80
169.	ATC	American fourteen twenty roger, runway four right, cleared to land.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	Direct	81
170.	PT	American fourteen twenty thanks	receive terminate	head post-h	acknowledging	R		
171.	ATC	Yukla two seven heavy, wind three one zero at one one, cleared for takeoff Runway five. Traffic is C-130 three miles north of Elmendorf northwest-bound, climbing out of two thousand.	summon starter directive	pre-h pre-h head	directing	I	Direct	82
172.	PT	Yukla two seven heavy cleared for takeoff, traffic in sight.	reply-summon receive/repeat	pre-h head	acknowledging	R		
173.	PT	Elmendorf tower, Yukla two seven heavy We have an emergency. Lost number two engine, we've taken some birds.	summon informative	pre-h head	informing	I	Inform	83

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
174.	ATC	Yukla two seven heavy, roger. Say intentions.	reply-summon receive inquire	pre-h head head	acknowledging eliciting	R I	Elicit	84
175.	PT	coming back around for an emergency return Yukla two seven heavy	informative terminate	head post-h	informing	R		
176.	ATC	Two seven heavy, roger.	summon receive	pre-h head	acknowledging	F		
177.	PT	Taipei Approach. Good Evening. Dynasty 676, heading 020. Approach level 150 with Golf	summon informative	pre-h head	informing	I	Inform	85
178.	ATC	Dynasty 676, Taipei Approach. Descend and maintain 7000. QNH 1014, Runway 05L.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	86
179.	PT	Descend 7000, 1014, Runway 05L, Dynasty 676.	receive/repeat terminate	head post-h	acknowledging	R		
180.	ATC	Dynasty 676. Turn right heading 050.	summon directive	pre-h head	directing	I	Direct	87
181.	PT	Roger, heading 050, Dynasty 676.	receive repeat terminate	head post-h post-h	acknowledging	R		
182.	ATC	Vector crossing localiser for spacing.	directive	head	directing	I	Direct	88
183.	PT	Dynasty 676, understand.	summon receive	pre-h head	acknowledging	R		
184.	ATC	Dynasty 676. Descend and maintain 4000.	summon directive	pre-h head	directing	I	Direct	
185.	PT	Taipei Approach, Dynasty 676. Heading 050. Approach 7000.	summon informative	pre-h head	informing	I	Inform	89
186.	ATC	Dynasty 676. Turn right heading 090, intercept Runway 05L. Descend and maintain 4000.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	90
187.	PT	Flight heading 090. Descend 4000. Intercept runway 09, 05L Dynasty 676.	receive/repeat terminate	head post-h	acknowledging	R		
188.	ATC	Dynasty 676. 16 miles from airport. Clear ILS. runway 05L approach.	summon starter directive	pre-h pre-h head	directing	I	Direct	91
189.	PT	Clear ILS runway 05L approach, Dynasty 676.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
190.	ATC	Dynasty 676. Contact Tower 118.7	summon directive	pre-h head	directing	I	Direct	92
191.	PT	Tower 118.7 Dynasty 676.	receive/repeat terminate	head post-h	acknowledging	R		
192.	PT	Taipei Tower. Good evening. Dynasty 676, 9-miles on final, ILS runway 09L approach.	summon informative	pre-h head	informing	I	Inform	93
193.	ATC	Dynasty 676, Taipei Tower, Runway 05L, wind 360 at 5, QNH 1015, clear to land.	rsummon/receive starter directive	head pre-h head	acknowledging directing	R I	Direct	94
194.	PT	1015, clear to land. Dynasty 676.	receive/repeat terminate	head post-h	acknowledging	R		
195.	PT	Tower, Dynasty 676, 3 miles on final. Confirm clear to land.	summon starter confirm	pre-h pre-h head	informing	I	Inform	95
196.	ATC	Clear to land. Wind 360 at 3, clear to land.	receive	head	acknowledging	R		
197.	ATC	Dynasty 676, confirm go around	summon inquire	pre-h head	eliciting	I	Elicit	96
198.	PT	Confirm go around.	repeat	head	acknowledging	R		
199.								
200.	PT	Miami ground Fine Air one oh one heavy ready taxi.	summon informative	pre-h head	informing	I	Inform	97
201.	ATC	Fine Air one oh one heavy Miami ground taxi runway two seven right.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	98
202.	PT	taxi two seven right Fine Air one oh one heavy.	receive/repeat terminate	head post-h	acknowledging	R		
203.	ATC	Fine Air one oh one heavy monitor tower one one eight point three see you	summon directive terminate*	pre-h head post-h	directing	I	Direct	99
204.	PT	eighteen three see you later.	receive/repeat reply-terminate*	head post-h	acknowledging	R		
205.	ATC	Fine Air one oh one are you ready to go?	summon inquire	pre-h head	eliciting	I	Elicit	100
206.	PT	about thirty seconds	informative	head	informing	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
207.	ATC	Fine Air one oh one Traffic is five mile final fly heading two seven zero cleared for takeoff two seven right	summon starter directive	pre-h pre-h head	directing	I	Direct	101
208.	PT	cleared for take off two seven right Fine Air one oh one heavy.	receive/repeat terminate	head	acknowledging	R		
209.	ATC	Tower forty-one heavy, you can stay on the inner. Cross three one left at Kilo.	summon directive	pre-h head	directing	I	Direct	102
210.	PT	Inner to three one left at Kilo, thank you, Tower forty-one.	receive/repeat terminate	head post-h	acknowledging	R		
211.	ATC	Tower forty-one heavy, cross runway three one left. monitor nineteen one, good day.	summon directive terminate	pre-h head post-h	directing	I	Direct	103
212.	PT	Tower forty-one, monitor nineteen one. Thanks.	reply-summon receive/repeat reply-terminate	pre-h head post-h	acknowledging	R		
213.	ATC	Tower forty-one heavy, taxi into position and hold. Traffic right to left.	summon directive comment	pre-h head post-h	directing	I	Direct	104
214.	PT	Position and hold four left, Air forty-one heavy.	receive/repeat terminate	head post-h	acknowledging	R		
215.	PT	Tower Car nine nine.	summon	head	opening	I	Summon	105
216.	ATC	Nine nine, Kennedy.	reply-summon	head	answering	R		
217.	PT	clear of traffic runway three one left.	informative	head	informing	I	Inform	106
218.	ATC	Nine nine, roger.	summon receive	pre-h head	acknowledging	R		
219.	PT	Tower, Carnival one thirty-four on the ILS four right.	summon informative	pre-h head	informing	I	Inform	284
220.	ATC	Carnival one thirty-four, Kennedy tower runway four right, braking action reported fair to good towards the middle of the runway and poor at the turn off. Wind three three zero at one two, number two.	rsummon/receive informative	head head	acknowledging informing	R I	Inform	
221.	PT	Tower Air forty-one is in position four left.	summon informative	pre-h head	informing	I	Inform	
222.	ATC	Continue holding.	directive	head	directing	I	Direct	

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
223.	ATC	Tower forty-one heavy, wind three three zero at one one, runway four left, RVR is one thousand eight hundred, cleared for takeoff.	summon starter directive	pre-h pre-h head	directing	I	Direct	107
224.	PT	Cleared for takeoff four left, Tower Air forty-one.	receive/repeat terminate	head post-h	acknowledging	R		
225.	ATC	Critter five ninety two, fly runway heading, runway nine left, cleared for takeoff.	summon directive	pre-h head	directing	I	Direct	108
226.	PT	runway heading, cleared to go nine left, Critter five ninety two.	receive/repeat terminate	head post-h	acknowledging	R		
227.	ATC	Critter five ninety two, contact departure, good day.	summon directive terminate*	pre-h head post-h	directing	I	Direct	109
228.	PT	good day	rterminat/receive	head	acknowledging	R		
229.	PT	Afternoon departure, Critter five ninety two climbing to five thousand.	greeting/summon informative	pre-h head	informing	I	Inform	284
230.	ATC	Critter five ninety two, departure, good afternoon radar contact. climb and maintain seven thousand.	regreet/rsummon receive directive	pre-h head head	acknowledging directing	R I	Direct	110
231.	PT	seven thousand, five ninety two.	receive/repeat terminate	head post-h	acknowledging	R		
232.	ATC	Critter five ninety two, turn left heading three six zero.	summon directive	pre-h head	directing	I	Direct	111
233.	PT	three six zero, five ninety two.	receive/repeat terminate	head post-h	acknowledging	R		
234.	ATC	Critter five ninety two, turn left heading three three zero.	summon directive	pre-h head	directing	I	Direct	112
235.	PT	three three zero, five ninety two.	receive/repeat terminate	head post-h	acknowledging	R		
236.	ATC	Critter five ninety two, turn left heading three zero zero. join the WINCO transition. climb and maintain one six thousand.	summon directive	pre-h head	directing	I	Direct	113
237.	PT	heading three zero zero. join the WINC at sixteen thousand, Critter five ninety two.	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
238.	ATC	Critter five nine two, contact Miami center one thirty two forty five, so long.	summon directive terminate	pre-h head post-h	directing	I	Direct	
239.	ATC	Critter five ninety two contact Miami center, one thirty two forty five.	summon directive	pre-h head	directing	I	Direct	
240.	PT	five ninety two needs immediate return to Miami.	inquire	head	eliciting	I	Elicit	114
241.	ATC	Critter five ninety two roger, turn left heading two seven zero. descend and maintain seven thousand.	summon receive directive	pre-h head head	acknowledging directing	R I	Direct	115
242.	PT	two seven zero, seven thousand, five ninety two.	receive/repeat terminate	head post-h	acknowledging	R		
243.	ATC	what problem are you having	inquire	head	eliciting	I	Elicit	116
244.	PT	smoke in the cockpit smoke in the cabin.	informative	head	informing	R		
245.	ATC	roger.	receive	head	acknowledging	F		
246.	ATC	Critter five ninety two turn left heading two five zero. descend and maintain five thousand.	summon directive	pre-h head	directing	I	Direct	117
247.	PT	two five zero seven thousand.	receive/terminate	head	acknowledging	R		
248.	ATC	American nine sixty turn left heading two seven zero, join the WINCO transition.	summon directive	pre-h head	directing	I	Direct	118
249.	PT	heading two seven zero to join the WINCO transition, American 960	receive/repeat terminate	head post-h	acknowledging	R		
250.	PT	Atlanta ground, Critter five ninety seven approaching four south with Tango.	summon informative	pre-h head	informing	I	Inform	
251.	ATC	Critter five ninety seven Atlanta ground, taxi to runway two seven right via Mike.	summon directive	pre-h head	directing	I	Direct	119
252.	PT	two seven right via Mike, Critter five ninety seven.	receive/repeat terminate	head post-h	acknowledging	R		
253.	ATC	Critter five ninety seven Atlanta tower runway two seven right, taxi into position and hold.	summon directive	pre-h head	directing	I	Direct	120
254.	PT	Position and hold two seven right, Critter five ninety seven.	receive/repeat terminate	head post-h	acknowledging	R		
255.	ATC	Critter five ninety turn left heading two five zero, runway two seven right, cleared for takeoff.	summon directive	pre-h head	directing	I	Direct	121

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
256.	PT	two five zero at the marker, cleared for takeoff two seven right, Critter five ninety seven.	receive/repeat terminate	head post-h	acknowledging	R		
257.	PT	Critter five ninety seven we have a fire in the right engine. We will stop here on the runway.	summon informative	pre-h head	informing	I	Inform	122
258.	ATC	five ninety seven roger, do you need the equipment?	reply-summon receive inquire	pre-h head head	acknowledging eliciting	R I	Elicit	123
259.	PT	affirmative	receive	head	acknowledging	R		
260.	PT	TWA eight hundred gate twenty seven.	summon informative	pre-h head	informing	I	Inform	124
261.	ATC	TWA eight hundred	receive/terminate	head	acknowledging	R		
262.	PT	We are ready to push.	informative	head	informing	I	Inform	125
263.	ATC	TWA eight hundred you cleared to push, gate twenty seven.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	126
264.	PT	cleared to push eight hundred.	receive/repeat terminate	head post-h	acknowledging	R		
265.	ATC	eight hundred.	summon	head	opening	I	Summon	127
266.	PT	go ahead.	reply-summon	head	answering	R		
267.	ATC	tell your mechanic to push you back	directive	head	directing	I	Direct	128
268.	PT	okay.	receive	head	acknowledging	R		
269.	ATC	Kennedy gate TWA eight ready to taxi delta alpha with tango.	summon informative	pre-h head	informing	I	Inform	129
270.	ATC	TWA eight hundred all right contact ground one two one point nine for the taxi	reply-summon receive directive	pre-h head head	acknowledging directing	R I	Direct	130
271.	PT	roger.	receive	head	acknowledging	R		
272.	PT	Kennedy ground TWA eight hundred heavy coming out delta alpha with tango.	summon informative	pre-h head	informing	I	Inform	131
273.	ATC	TWA eight hundred taxi right on alpha and hold short of echo.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	132
274.	PT	TWA eight hundred right alpha hold short of echo.	summon receive/repeat	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
275.	ATC	TWA eight hundred make a left turn on taxiway echo behind Carnival and hold short of runway three one right and monitor tower on one two three point nine	summon directive	pre-h head	directing	I	Direct	133
276.	PT	TWA eight hundred heavy left echo hold short of three one right bye.	reply-summon receive/repeat terminate	pre-h head post-h	acknowledging	R		
277.	ATC	TWA eight hundred heavy caution wake turbulence runway two two right taxi into position and hold.	summon starter directive	pre-h pre-h head	directing	I	Direct	134
278.	PT	TWA eight hundred heavy position and hold two two right.	reply-summon receive/repeat	pre-h head	acknowledging	R		
279.	ATC	TWA eight hundred heavy wind two four zero at eight runway two two right cleared for takeoff.	summon starter directive	pre-h pre-h head	directing	I	Direct	135
280.	PT	TWA eight hundred heavy cleared for takeoff two two right.	reply-summon receive/repeat	pre-h head	acknowledging	R		
281.	ATC	TWA eight hundred heavy contact New York departure one three five point niner good evening.	summon directive terminate*	pre-h head post-h	directing	I	Direct	136
282.	PT	TWA eight hundred heavy good night.	rsummon/receive reply-terminate*	head post-h	acknowledging	R		
283.	ATC	TWA eight hundred heavy New York departure radar contact climb and maintain one one thousand.	summon starter directive	pre-h pre-h head	directing	I	Direct	137
284.	PT	TWA eight hundred heavy climb and maintain one one thousand.	reply-summon receive/repeat	pre-h head	acknowledging	R		
285.	ATC	TWA eight hundred heavy turn left heading one five zero.	summon directive	pre-h head	directing	I	Direct	138
286.	PT	TWA eight hundred heavy turn left heading one five zero.	reply-summon receive/repeat	pre-h head	acknowledging	R		
287.	ATC	TWA eight hundred heavy turn left heading zero seven zero.	summon directive	pre-h head	directing	I	Direct	139
288.	PT	TWA eight hundred heavy turn left heading zero seven zero.	reply-summon receive/repeat	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
289.	ATC	TWA eight hundred heavy turn left heading zero five zero	summon directive	pre-h head	directing	I	Direct	140
290.	PT	TWA eight hundred heavy turn left heading zero five zero.	reply-summon receive/repeat	pre-h head	acknowledging	R		
291.	ATC	TWA eight hundred heavy direct Betty resume own navigation.	summon directive	pre-h head	directing	I	Direct	141
292.	PT	TWA eight hundred heavy direct Betty own navigation.	reply-summon receive/repeat	pre-h head	acknowledging	R		
293.	ATC	TWA eight hundred heavy contact Boston one three two point three.	summon directive	pre-h head	directing	I	Direct	
294.	PT	TWA eight hundred heavy say again the frequency.	reply-summon inquire	pre-h head	eliciting	I	Elicit	143
295.	ATC	one three two point three.	informative	head	informing	R		
296.	PT	TWA eight hundred heavy good day.	receive terminate	head post-h	acknowledging	F		
297.	PT	New York center TWA eight hundred heavy eight thousand two hundred climbing one one thousand.	summon informative	pre-h head	informing	I	Inform	144
298.	ATC	TWA eight hundred Boston center roger climb and maintain one three thousand.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	 Direct	 145
299.	PT	TWA eight hundred heavy climb and maintain one three thousand.	summon receive/repeat	pre-h head	acknowledging	R		
300.	ATC	TWA eight hundred What is your rate of climb?	summon inquire	pre-h head	eliciting	I	Elicit	146
301.	PT	TWA eight hundred heavy two thousand feet a minute here until accelerating out of ten thousand.	reply-summon informative	pre-h head	informing	R		
302.	ATC	roger climb and maintain flight level one nine zero and expedite through fifteen.	receive directive	head head	acknowledging directing	F I	 Direct	 147
303.	PT	TWA eight hundred heavy climb and maintain one nine zero and expedite through one five thousand.	summon receive/repeat	pre-h head	acknowledging	R		
304.	ATC	TWA eight hundred amend the altitude maintain one three thousand thirteen thousand	summon directive	pre-h head	directing	I	Direct	148
305.	PT	TWA eight hundred heavy okay stop climb at one three thousand	reply-summon receive repeat	pre-h head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
306.	ATC	TWA eight hundred you have traffic seven miles southbound, a thousand foot above you, he's Beech nineteen hundred.	summon informative	pre-h head	informing	I	Inform	149
307.	PT	TWA ah eight hundred heavy no contact.	reply-summon informative	pre-h head	informing	I	Inform	
308.	PT	FIC TWA eight hundred.	summon	head	opening	I	Summon	150
309.	ATC	TWA eight hundred.	reply-summon	head	answering	R		
310.	ATC	TWA eight hundred climb and maintain one five thousand.	summon directive	pre-h head	directing	I	Direct	151
311.	PT	TWA eight hundred heavy climb and maintain one five thousand leaving one three thousand.	reply-summon receive/repeat	pre-h head	acknowledging	R		
312.	PT	Ground good evening Streamline 200 requesting taxi	summon inquire	pre-h head	eliciting	I	Elicit	152
313.	ATC	Streamline 200 taxi holding point 27	rsummon/receive directive	head head	acknowledging directing	R I	Direct	153
314.	PT	Taxi holding point 27 Streamline 200	receive/repeat terminate	head post-h	acknowledging	R		
315.	ATC	Streamline 200 intersection for departure	summon inquire	pre-h head	eliciting	I	Elicit	154
316.	PT	Intersection 16 please Streamline 200	informative terminate	head post-h	informing	R		
317.	ATC	Say again please	inquire	head	eliciting	I	Elicit	
318.	ATC	Streamline 200 say again your intentions	summon inquire	pre-h head	eliciting	I	Elicit	155
319.	PT	We want to take intersection 16 for 27	informative	head	informing	R		
320.	ATC	approved Streamline 200	receive terminate	head post-h	acknowledging	F		
321.	ATC	Libert8807 de Gaulle tower on 119.25	summon directive	pre-h head	directing	I	Direct	156
322.	PT	119.25 thanks a lot	receive/repeat terminate	head post-h	acknowledging	R		
323.	ATC	8807, I confirm a departure on Eagle 8 Bravo (Eagle 8 Bravo is the departure procedure for runway 26R)	summon informative	pre-h head	informing	I	Inform	157

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
324.	PT	on 27 8 Bravo	return	head	eliciting	R/I	Elicit	
325.	ATC	8807 a departure on Eagle 8 Bravo	summon informative	pre-h head	informing	R		
326.	PT	roger 8807	receive terminate	head post-h	acknowledging	F		
327.	PT	Sorry, we line up on 27 here.	framer informative	pre-h head	informing	I	Inform	158
328.	ATC	My mistake it will be a departure on Eagle 8 Alpha	reformulate informative	head head	acknowledging informing	R I	Inform	285
329.	PT	8 Alpha It is no problem	repeat terminate	head post-h	acknowledging	R		
330.	ATC	Libert 8807 report a 737 on short final in sight on 27	summon informative	pre-h head	informing	I	Inform	159
331.	PT	8807 an aircraft on final and it is a 737	reply-summon receive/repeat	pre-h head	acknowledging	R		
332.	ATC	Streamline 200 monitor tower 119.25	summon directive	pre-h head	directing	I	Direct	160
333.	PT	119.25 Streamline 200	receive/repeat terminate	head post-h	acknowledging	R		
334.	ATC	Libert 8807 behind the traffic line up behind and wait	summon directive	pre-h head	directing	I	Direct	161
335.	PT	line up and hold position runway 27 Libert 8807	receive/repeat terminate	head post-h	acknowledging	R		
336.	ATC	Libert8807 cleared for take-off 27, wind 230 degrees, windspeed 10 to 15 knots	summon directive	pre-h head	directing	I	Direct	162
337.	PT	Taking off on 27 Libert 8807	receive/repeat terminate	head post-h	acknowledging	R		
338.	ATC	Streamline 200 line up and wait runway 27 number 2	summon directive	pre-h head	directing	I	Direct	163
339.	PT	Line up and wait runway 27 Streamline 200	receive/repeat terminate	head post-h	acknowledging	R		
340.	PT	Ground Libert8807 we have hit another aircraft on take-off.	summon informative	pre-h head	informing	I	Inform	164
341.	ATC	Confirm that you have hit an aircraft Libert8807	receive/inquire summon	head post-h	eliciting	R/I	Elicit	

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342.	PT	Affirmative	informative	head	informing	R		
343.	ATC	8807,	summon	pre-h	acknowledging	F		
		copy.	receive	head				
		Do you want the emergency services?	inquire	head	eliciting	I	Elicit	165
344.	PT	Yes.	receive	head	acknowledging	R		
		We are going to vacate	confirm	post-h				
345.	ATC	8807	summon	pre-h	eliciting	I	Elicit	166
		do you have any damage?	inquire	head				
346.	PT	on the wing	informative	head	informing	R		
347.	ATC	Can you taxi?	inquire	head	eliciting	I	Elicit	167
348.	PT	We're going to taxi we're vacating we're alerting our cabin crew	informative	head	informing	R		
349.	ATC	8807	summon	pre-h	directing	I	Direct	168
		you can vacate at the end.	directive	head				
350.	PT	Vacating at the end	receive/repeat	head	acknowledging	R		
351.	ATC	Roger	receive	head	acknowledging	F		
352.	ATC	PHG 3-0-0-2	summon	pre-h	directing	I	Direct	169
		turn right heading one three zero	directive	head				
353.	PT	Turning right heading one three zero	receive/repeat	head	acknowledging	R		
354.	ATC	PHG 3-0-0-2	summon	pre-h	directing	I	Direct	170
		turn left heading one two zero	directive	head				
355.	PT	Turn left heading one two zero	receive/repeat	head	acknowledging	R		
356.	ATC	Descend two thousand feet	directive	head	directing	I	Direct	171
357.	PT	Continue descend two thousand feet	receive/repeat	head	acknowledging	R		
358.	ATC	Turn left heading zero six five	directive	head	directing	I	Direct	172
359.	PT	Turn left heading zero six five	receive/repeat	head	acknowledging	R		
360.	ATC	PHG 3-0-0-2	summon	pre-h	directing	I	Direct	173
		cleared for the approach report establisher localizer runway zero four.	directive	head				
361.	PT	Cleared for approach will report establisher localizer.	receive/repeat	head	acknowledging	R		
362.	PT	PHG 3-0-0-2	summon	pre-h	informing	I	Inform	174
		established zero four, distance one zero nautical miles to touch down.	informative	head				
363.	ATC	PHG 3-0-0-2	rsummon/receive	head	acknowledging	R		
		continue approach contact tower one one eight decimal seven,	directive	head	directing	I	Direct	
		good day.	terminate	post-h				

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
364.	PT	Colombo Tower, good evening, PHG 3-0-0-2, localizer established zero four and distance eight nautical miles.	summon informative	pre-h head	informing	I	Inform	175
365.	ATC	Colombo Tower, continue approach wind zero six zero degrees one zero.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	
366.	PT	PHG 3-0-0-2 go around will report established	summon informative	pre-h head	informing	I	Inform	
367.	ATC	Cleared to land wind zero six zero degrees one zero.	directive	head	directing	I	Direct	
368.	PT	PGH 3-0-0-2 request priority landing on your runway.	summon inquire	pre-h head	eliciting	I	Elicit	176
369.	ATC	Cleared to land.	informative	head	informing	R		
370.	PT	Request emergency service	inquire	head	eliciting	I	Elicit	
371.	PT	Could you give me your current winds please.***	inquire	head	eliciting	I	Elicit	177
372.	ATC	wind zero one zero at two five.	informative	head	informing	R		
373.	PT	zero one zero at two five. How is that runway?	receive/repeat inquire	head head	acknowledging eliciting	F I	Elicit	178
374.	ATC	braking action report was two zero four one, braking action was reported poor by a Cessna four oh two	informative	head	informing	R		
375.	PT	set us up with the ILS to runway two four, winds on runway one five.	inquire comment	head post-h	eliciting	I	Elicit	179
376.	ATC	eight one four Mike roger turn right zero nine zero, vector ILS two four final approach course	summon receive directive	pre-h head head	acknowledging directing	R I	Direct	180
377.	PT	Tokyo, Japanair nine five two, request direct VENUS.	summon inquire	pre-h head	eliciting	I	Elicit	181
378.	ATC	Japanair nine five two, stand by	reply-summon informative	pre-h head	informing	R		
379.	ATC	Japanair nine five two, contact Narita approach, one two five decimal eight	summon directive	pre-h head	directing	I	Direct	182
380.	PT	Roger.	receive/repeat	head	acknowledging	R		
381.	PT	Tokyo control, Japan air nine five eight, flight level three seven zero.	summon informative	pre-h head	informing	I	Inform	183
382.	ATC	Japan air niner five eight, Tokyo control, roger.	reply-summon receive	pre-h head	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
383.	PT	Tokyo control, Airsystem two nine six, flight level two three zero.	summon informative	pre-h head	informing	I	Inform	184
384.	ATC	Airsystem two nine six, Tokyo control, roger.	reply-summon receive	pre-h head	acknowledging	R		
385.	PT	Good afternoon, Tokyo, American one five seven, flight level three nine zero.	summon informative	pre-h head	informing	I	Inform	185
386.	ATC	American one five seven, Tokyo control, descend and maintain flight level three five zero due to traffic.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	186
387.	PT	Descend to flight level three five zero due to traffic, leaving flight level three nine zero, American one five seven.	receive/repeat terminate	head post-h	acknowledging	R		
388.	ATC	Allnippon six five eight, resume normal speed, contact Tokyo approach one one nine decimal one.	summon directive	pre-h head	directing	I	Direct	187
389.	PT	Allnippon six five eight, normal speed, one one nine decimal one, good day.	reply-summon receive/repeat terminate*	pre-h head head	acknowledging closing	R I	Close	
390.	ATC	Good day.	reply-terminate*	head	answering	R		
391.	ATC	Airsystem three one two, contact Tokyo approach one one niner decimal one.	summon directive	pre-h head	directing	I	Direct	188
392.	PT	One one nine one, Airsystem three one two, good day.	reply-summon receive/repeat terminate	pre-h head head	acknowledging closing	R I	Close	
393.	ATC	Good day.	reply-terminate	head	answering	R		
394.	ATC	Allnippon five six five, contact Tokyo control one three three decimal five.	summon directive	pre-h head	directing	I	Direct	189
395.	PT	One three three decimal five, Allnippon five six five.	receive/repeat terminate	head post-h	acknowledging	R		
396.	PT	Tokyo control, Airsystem three four six, reaching flight level two five zero, request further low	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	190
397.	ATC	Airsystem three four six stand by	reply-summon informative	pre-h head	acknowledging	R		
398.	PT	Roger, stand by	receive repeat	head post-h	acknowledging	F		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
399.	ATC	Airsystem two niner six, confirm requesting lower altitude ?	summon inquire	pre-h head	eliciting	I	Elicit	191
400.	PT	Airsystem two nine six, negative.	reply-summon informative	pre-h head	informing	R		
401.	ATC	Airsystem two niner six, roger.	summon receive	pre-h head	acknowledging	F		
402.	PT	Tokyo control, Airsystem five five two, leaving two one zero.	summon informative	pre-h head	informing	I	Inform	192
403.	ATC	Airsystem five five two, roger.	reply-summon receive	pre-h head	acknowledging	R		
404.	ATC	Airsystem three four six, descend and maintain flight level two one zero.	summon directive	pre-h head	directing	I	Direct	193
405.	PT	Airsystem three four six, leaving two five zero for two one zero, thank you.	reply-summon receive/informative terminate	pre-h head post-h	acknowledging	R		
406.	ATC	Airsystem one seven four, descend and maintain flight level one six zero, cross Spens at flight level one six zero.	summon directive	pre-h head	directing	I	Direct	194
407.	PT	Airsystem one seven four, descend cross Spens one six zero.	reply-summon receive/repeat	pre-h head	acknowledging	R		
408.	ATC	Airsystem three four six, say speed.	summon inquire	pre-h head	eliciting	I	Elicit	195
409.	PT	Airsystem three four six, three one zero knots.	reply-summon informative	pre-h head	informing	R		
410.	ATC	Airsystem three four six, roger, maintain present speed for spacing.	summon receive directive	pre-h pre-h head	acknowledging directing	F I	Direct	196
411.	PT	Airsystem three four six, maintain present speed	reply-summon receive/repeat	pre-h head	acknowledging	R		
412.	ATC	Airsystem two nine six, maintain speed two eight zero knots for spacing.	summon directive	pre-h head	directing	I	Direct	197
413.	PT	Airsystem two nine six, maintain two eight zero	reply-summon receive/repeat	pre-h head	acknowledging	R		
414.	ATC	Airsystem five five two, contact Tokyo approach, one one nine decimal one.	summon directive	pre-h head	directing	I	Direct	198

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
415.	PT	Airsystem five five two, Tokyo approach one one nine one.	reply-summon receive/repeat	pre-h head	acknowledging	R		
416.	PT	Tokyo control, Airsystem two zero six, two five zero.	summon directive	pre-h head	directing	I	Direct	199
417.	ATC	Airsystem two zero six, Tokyo control, roger.	reply-summon receive	pre-h head	acknowledging	R		
418.	PT	Tokyo, Navy juliet tango zero three six	summon	head	opening	I	Summon	200
419.	ATC	Navy juliet tango zero three six, go ahead	reply-summon	head	answering	R		
420.	PT	confirm routing after Oshima	inquire	head	eliciting	I	Elicit	201
421.	ATC	Navy juliet tango zero three six, after Oshima proceed direct to Yankee Uniform then direct	summon informative	pre-h head	informing	R		
422.	PT	Roger, after Oshima, Yankee Uniform and direct, thank you	receive repeat terminate	pre-h post-h post-h	acknowledging	F		
423.	PT	Tokyo control, Skymark zero zero six, maintain flight level three seven zero.	summon directive	pre-h head	directing	I	Direct	202
424.	ATC	Skymark zero zero six, Tokyo control, roger.	reply-summon receive	pre-h head	acknowledging	R		
425.	ATC	Japan air nine zero seven, descend and maintain flight level three five zero, begin descent due to traffic.	summon directive	pre-h head	directing	I	Direct	203
426.	PT	Japan air nine zero seven, descend and maintain flight level three five zero, traffic insight.	reply-summon receive	pre-h head	acknowledging	R		
427.	ATC	Japan air nine zero seven, climb and maintain flight level three nine zero.	summon directive	pre-h head	directing	I	Direct	204
428.	PT	Japan air nine zero seven, climb and maintain flight level three nine zero.	reply-summon receive	pre-h head	acknowledging	R		
429.	PT	Tokyo control, Japan air nine five eight, request descent.	summon inquire	pre-h head	eliciting	I	Elicit	205
430.	ATC	Japan air nine five eight, descend and maintain flight level two three, correction, two five zero.	rsummon/receive informative	head head	acknowledging informing	R I	Inform	206
431.	PT	Japan air nine five eight, descend and maintain two five zero.	reply-summon receive	pre-h head	acknowledging	R		
432.	PT	Tokyo control, Japan air nine zero seven.	summon	head	opening	I	Summon	207
433.	ATC	Japan air nine zero seven, Tokyo control, go ahead.	reply-summon	head	answering	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
434.	ATC	Japan air nine zero seven, contact Tokyo control one three three decimal five.	summon directive	pre-h head	directing	I	Direct	208
435.	PT	contact Tokyo control one three three decimal five, Japan air nine zero seven.	receive/repeat terminate	pre-h head	acknowledging	R		
436.	ATC	Singapore six contact tower one two nine point three, good day.	summon directive terminate	pre-h head post-h	directing	I	Direct	209
437.	PT	One two nine point three good day sir, Singapore six.	receive/repeat terminate	head post-h	acknowledging	R		
438.	PT	Taipei Tower, good evening, Singapore six.	summon	head	opening	I	Summon	210
439.	ATC	Singapore six, good evening, Taipei Tower hold short runway zero five left.	reply-summon directive	head head	answering directing	R I	Direct	211
440.	PT	Hold short runway zero five left, Singapore six.	receive/repeat terminate	head post-h	acknowledging	R		
441.	ATC	Singapore six, surface wind zero two zero at two four, gust four three, say intentions	summon informative comment	pre-h head post-h	informing	I	Inform	212
442.	PT	Thank you sir, Singapore six.	receive	head	acknowledging	R		
443.	PT	Singapore six ready.	summon informative	pre-h head	informing	I	Inform	213
444.	ATC	Singapore six roger, runway zero five left, taxi into position and hold.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	Direct	214
445.	PT	Taxi into position and hold, Singapore six	receive/repeat terminate	head post-h	acknowledging	R		
446.	ATC	Singapore six, runway zero five left, wind zero two zero at two eight, gust to five zero, cleared for takeoff.	summon starter directive	pre-h pre-h head	directing	I	Direct	215
447.	PT	Cleared for takeoff, Runway zero five left Singapore six.	receive/repeat terminate	head post-h	acknowledging	R		
448.	PT	Taipei control transasia seven nine one Request descend maintain flight level one six zero	summon inquire	pre-h head	eliciting	I	Elicit	216

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
449.	ATC	Transasia seven niner one roger descend and maintain flight level one six zero	reply-summon receive directive	pre-h head head	acknowledging directing	R I	Direct	217
450.	PT	Maintain flight level one six zero seven niner one	receive/repeat terminate	head post-h	acknowledging	R		
451.	ATC	nine ninety heavy, wind two four zero at one zero. Runway two two right, RVR six thousand, runway two two right, cleared for take off.	summon starter directive	pre-h pre-h head	directing	I	Direct	218
452.	PT	cleared for take off. Confirm climbing six thousand?	receive/repeat inquire	head head	acknowledging eliciting	R I	Elicit	219
453.	ATC	negative, sir. runway two two right RVR six thousand. You fly the Gateway Climb, climbing to five thousand.	informative informative	head head	informing informing	R I	Inform	220
454.	PT	Following Gateway, clear for take off runway two two right, EgyptAir nine nine zero heavy.	receive/repeat terminate	head post-h	acknowledging	R		
455.	ATC	EgyptAir nine ninety zero heavy contact departure now one two five point seven.	summon directive	pre-h head	directing	I	Direct	221
456.	PT	one two five seven, bye.	receive/repeat terminate	head post-h	acknowledging	R		
457.	PT	Departure, EgyptAir nine eight nine in your frequency.	summon informative	pre-h head	informing	I	Inform	222
458.	ATC	EgyptAir nine ninety zero heavy New York radar contact, climb and maintain one three thousand.	reply-summon receive directive	pre-h head head	acknowledging directing	R I	Direct	223
459.	PT	climbing one three thousand, nine nine zero.	receive/repeat terminate	head post-h	acknowledging	R		
460.	ATC	EgyptAir nine ninety heavy turn left then direct to SHIPP.	summon directive	pre-h head	directing	I	Direct	224
461.	PT	direct to SHIPP, nine nine zero heavy.	receive/repeat terminate	head post-h	acknowledging	R		
462.	ATC	EgyptAir nine ninety heavy climb and maintain flight level two three zero and contact New York center one three four point five five.	summon directive	pre-h head	directing	I	Direct	225

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
463.	PT	one three four five five, two three zero.	receive/repeat terminate	head post-h	acknowledging	R		
464.	PT	New York, EgyptAir nine nine zero heavy, good evening.	summon	head	opening	I	Summon	226
465.	ATC	EgyptAir nine nine zero, go ahead.	reply-summon	head	answering	R		
466.	PT	approaching three thousand, flight level two three zero.	informative	head	informing	I	Inform	227
467.	ATC	roger.	receive	head	acknowledging	R		
468.	ATC	EgyptAir nine ninety, say altitude leaving.	summon inquire	pre-h head	eliciting	I	Elicit	228
469.	PT	leaving, approaching one niner zero, up two three zero.	informative	head	informing	R		
470.	ATC	EgyptAir nine ninety, roger.	summon receive	pre-h head	acknowledging	F		
471.	PT	EgyptAir nine ninety, New York one three two point one five.	summon directive	pre-h head	directing	I	Direct	229
472.	ATC	one three two one five, bye.	receive/repeat terminate	head post-h	acknowledging	R		
473.	PT	New York center EgyptAir nine nine zero heavy, good evening, approaching two two zero to two three zero	summon directive	pre-h head	directing	I	Direct	230
474.	ATC	EgyptAir nine niner zero, New York center roger.	reply-summon receive	head post-h	acknowledging	R		
475.	ATC	EgyptAir nine ninety climb and maintain flight level three three zero, cleared to DOVEY.	summon directive	pre-h head	directing	I	Direct	231
476.	PT	three three zero, direct DOVEY, EgyptAir nine nine zero.	receive/repeat terminate	head post-h	acknowledging	R		
477.	ATC	EgyptAir nine ninety	summon	head	opening	I	Summon	232
478.	PT	go ahead nine nine zero.	reply-summon terminate	head post-h	answering	R		
479.	ATC	EgyptAir nine ninety, cleared to Hotel via DOVEY, Maintain flight level three three zero. Maintain Mach point eight zero.	summon directive	pre-h head	directing	I	Direct	233
480.	PT	EgyptAir nine nine zero, cleared to Cairo Zulu three three zero, eight zero Mach.	reply-summon receive/repeat	head post-h	acknowledging	R		
481.	ATC	EgyptAir nine ninety, correct.	summon confirm	pre-h head	informing	F		
482.	ATC	EgyptAir nine ninety change to my frequency one two five point niner two.	summon directive	pre-h head	directing	I	Direct	234

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
483.	PT	one two five nine two, good day.	receive/repeat terminate	head post-h	acknowledging	R		
484.	PT	New York, EgyptAir ah, nine nine zero heavy, good morning.	summon	head	opening	I	Summon	235
485.	ATC	EgyptAir nine ninety, roger.	reply-summon	head	answering	R		
486.	ATC	Nine six four two turn right heading two two zero to intercept, cleared for approach, report established on the localizer	summon directive	pre-h head	directing	I	Direct	236
487.	PT	Right heading two two zero. cleared approach Will report established on the localizer nine six four two	receive/repeat informative terminate	head head post-h	acknowledging informing	R I	Inform	
488.	PT	Lux nine six four two is established on the localizer	informative	head	informing	I	Inform	
489.	ATC	Luxair niner six four two contact tower on one one eight decimal one, good-bye	summon directive terminate	pre-h head post-h	directing	I	Direct	237
490.	PT	Eighteen one nine six four two , good-bye	receive/repeat terminate	head post-h	acknowledging	R		
491.	PT	Tower, good morning, nine six four two is established ILS two four	summon informative	pre-h head	informing	I	Inform	238
492.	ATC	Luxair nine six four two, RVR three hundred meters	rsummon/receive informative	head head	acknowledging informing	R I	Inform	239
493.	PT	Nine six four two roger	summon receive	pre-h head	acknowledging	R		
494.	ATC	Nine six four two cleared to land wind one eight zero degrees	summon directive	pre-h head	directing	I	Direct	240
495.	PT	Cleared to land nine six four two	receive/repeat terminate	head post-h	acknowledging	R		
496.	PT	Taipei dynasty six one one taxi	summon informative	pre-h head	informing	I	Inform	241
497.	ATC	Dynasty six one one taxi via taxiway sierra sierra hold short taxiway sierra five	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	242
498.	PT	Taxi via sierra sierra hold short sierra five dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
499.	ATC	Dynasty six one one continue taxi via taxiway whiskey to runway zero six	summon directive	pre-h head	directing	I	Direct	243
500.	PT	Via whiskey to runway zero six dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
501.	ATC	Dynasty six one one contact tower one one eight point seven good day	summon directive terminate	pre-h head post-h	directing	I	Direct	244
502.	PT	One eighteen seven dynasty six one one good day	receive/repeat reply-summon terminate	head post-h post-h	acknowledging	R		
503.	PT	Taipei good afternoon dynasty six one one on sierra papa	summon informative	pre-h head	informing	I	Inform	245
504.	ATC	Dynasty six one one taipei tower hold short runway zero six	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	246
505.	PT	Hold short runway zero six dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
506.	ATC	Dynasty six one one runway zero six taxi into position and hold	summon directive	pre-h head	directing	I	Direct	247
507.	PT	Into position hold runway zero six dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
508.	ATC	dynasty six one one runway zero six wind zero five zero at nine cleared for takeoff	summon directive	pre-h head	directing	I	Direct	248
509.	PT	cleared for takeoff dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
510.	ATC	Dynasty six one one contact taipei approach one two five point one good day	summon directive terminate	pre-h head post-h	directing	I	Direct	249
511.	PT	Good day	receive/terminate	head	acknowledging	R		
512.	ATC	Taipei approach dynasty six one one airborne passing one thousand six hundred	summon directive	pre-h head	directing	I	Direct	
513.	ATC	Dynasty six one one taipei approach radar contact climb and maintain flight level two six zero cancel flight level two zero zero	summon directive	pre-h head	directing	I	Direct	250
514.	PT	Recleared two six zero cancel two zero zero dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
515.	ATC	Dynasty six one one Proceed direct to chali resume own navigation	summon directive	pre-h head	directing	I	Direct	251
516.	PT	Proceed direct chali resume own navigation dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
517.	ATC	Dynasty six one one contact taipei control one two six point seven	summon directive	pre-h head	directing	I	Direct	252
518.	PT	One two six seven dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
519.	PT	Taipei control dynasty six one one passing level one eight seven continue two six zero	summon directive	pre-h head	directing	I	Direct	253
520.	ATC	Dynasty six one one taipei control climb and maintain flight level tree five zero from Chali direct Kadlo	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	254
521.	PT	From Chali direct to Kadlo recleared three five zero dynasty six one one	receive/repeat terminate	head post-h	acknowledging	R		
522.	ATC	Silk Air one eight five continue taxi on alpha contact tower one one eight point seven five.	summon directive	pre-h head	directing	I	Direct	255
523.	PT	one one eight seven five Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
524.	PT	Tower Silk Air one eight five on alpha.	summon informative	pre-h head	informing	I	Inform	256
525.	ATC	Silk Air one eight five number two for departure two five right.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	257
526.	PT	Silk Air one eight five.	receive/terminate	head	acknowledging	R		
527.	ATC	Silk Air one eight five line up and wait two five right.	summon directive	pre-h head	directing	I	Direct	258
528.	PT	line up and wait Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
529.	ATC	Silk Air one eight five cancel SID, after airborne turn right direct papa cleared for take off.	summon directive	pre-h head	directing	I	Direct	259
530.	PT	after airborne right turn cleared for take off Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
531.	ATC	Silk Air one eight five contact departure one one nine seven five.	summon directive	pre-h head	directing	I	Direct	269

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
532.	PT	one one nine seven five Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
533.	PT	Arrival Silk Air one eight five airborne thousand six hundred.	summon informative	pre-h head	informing	I	Inform	
534.	PT	Jakata approach Silk Air one eight five.	summon	head	opening	I	Summon	270
535.	ATC	Silk Air one eight five identified, climb to three five zero turn right heading three four zero report passing one five zero.	reply-summon starter directive	head head	answering directing	R I	Direct	271
536.	PT	climb three five zero right turn heading three four zero Silk Air one eight five	repeat terminate	head post-h	acknowledging	R		
537.	PT	Silk Air one eight five request high speed climb.	summon inquire	pre-h head	eliciting	I	Elicit	272
538.	ATC	Silk Air one eight five approved.	reply-summon informative	pre-h head	informing	R		
539.	PT	Thank you.	receive	head	acknowledging	F		
540.	ATC	Silk Air one eight five heading three three zero.	summon directive	pre-h head	directing	I	Direct	273
541.	PT	heading three three zero Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
542.	PT	Silk Air one eight five pass one five zero.	summon informative	pre-h head	informing	I	Inform	
543.	PT	control one two four three five.	summon	head	opening	I	Summon	
544.	PT	DEP Silk Air one eight five contact one two four three five.	summon informative	pre-h head	informing	I	Inform	
545.	PT	twenty four three five Silk Air one eight five.	informative terminate	head post-h	informing	I	Inform	
546.	PT	Jakarta control Silk Air one eight five climbing three five zero.	summon informative	pre-h head	informing	I	Inform	274
547.	ATC	Silk Air one eight five maintain heading climb three five zero, report passing two four zero.	rsummon/receive directive	head head	acknowledging directing	R I	direct	275
548.	PT	flight level three five zero wilco Silk Air one eight five direct Pardi.	receive/repeat informative	head head	acknowledging informing	R I	Inform	276
549.	ATC	all right stand-by.	receive comment	head post-h	acknowledging	R		

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L.O.D.	Source	Content	Act	e.s	Move	e.s	Exchange	ex.
550.	PT	Silk Air one eight five passing two four zero.	summon informative	pre-h head	informing	I	Inform	277
551.	ATC	Silk Air one eight five contact Jakarta one three two decimal seven.	rsummon/receive directive	head head	acknowledging directing	R I	Direct	278
552.	PT	One three two seven Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
553.	PT	Jakarta Silk Air one eight five climbing two five five correction two four five.	summon directive	pre-h head	directing	I	Direct	279
554.	ATC	Silk Air one eight five confirm.	reply-summon receive	pre-h head	acknowledging	R		
555.	PT	Silk Air one eight five climbing three five zero *request direct Pardi.	summon starter inquire	pre-h pre-h head	eliciting	I	Elicit	280
556.	ATC	one eight five direct papa lima bravo report three five zero.	rsummon/receive informative	pre-h head	acknowledging informing	R I	Inform	281
557.	PT	wilco Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		
558.	PT	Silk Air one eight five maintaining three five zero.	summon informative	pre-h head	informing	I	Inform	282
559.	ATC	Silk one eight five maintain three five zero cleared direct to Pardi report abeam papa lima bravo.	rsummon/receive directive	pre-h head	acknowledging directing	R I	Direct	283
560.	PT	three five zero direct Pardi Silk Air one eight five.	receive/repeat terminate	head post-h	acknowledging	R		

ATC = Air traffic Controller   **PT** = Pilot   **L.O.D.** = line of dialogue
e.s. = element of structure   **ex.** = number of exchange

Appendix C
Glossary of Lexicon in Radiotelephony (A –Z)

No.	Lexical Item	Definition
1	air traffic	all aircraft in flight or operating on the maneuvering area of an aerodrome or aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas
2	abeam	to abeam' a fix, point, or object when that fix, point, or object of an aircraft which is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point
3	ACC (Area Control Centre)	an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight
4	acknowledge	to let me know that you have received and understood this message
5	ADF (Automatic Direction-Finding)	a ground equipment for automatically determining the line of position of aircraft transmitting radiant energy
6	aerodrome	a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft
7	aerodrome traffic	all traffic on the maneuvering area of an aerodrome and all aircraft flying in the vicinity of an aerodrome
8	aerodrome traffic circuit	a specified path to be flown by an aircraft operating in the vicinity of an aerodrome
9	affirm	an expression to confirm the information, only used by a pilot or 'yes'
10	AGL (Above Ground Level)	an altitude expressed in feet measured above ground level
11	airborne	a condition that an aircraft is lifted and kept in the air by aerodynamic forces
12	aircraft	a plane, helicopter or other vehicles that flies
13	airspace	a part of the atmosphere above the surface, subject to the laws of a particular country or controlling authority
14	air-taxi	to control a helicopter to move along the ground under its own power before take-off or after landing or used to describe a helicopter/VTOL aircraft movement conducted above the surface but normally not above 100 feet above ground level
15	airway	a control area or portion thereof established in the form of corridor equipped with radio navigational aids a particular route regularly used by planes
16	alert	a warning of danger or of a problem or a notification to a position that there is an aircraft-to-aircraft or aircraft-to-airspace conflict or any condition that might harm the flight profile or an aircraft
17	alternatives	another possibility or choice of a parameter, track, aerodrome or any concerned flight operation
18	altimeter	a pressure or radio instrument for measuring vertical distance or altitude (the height of the aircraft above sea level)
19	altimeter setting	an adjustment of the barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92)
20	altitude	the height of a level, point, or object (the vertical distance of an aircraft) measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL)
21	AMSL (Above Mean Sea Level)	an altitude expressed in feet measured above mean sea level (the average height of the ocean's surface)

No.	Lexical Item	Definition
22	Approach	1) a call sign for Approach control service which is an air traffic control service for arriving or departing controlled flights 2) a path towards the final stage of flight when the aircraft is maneuvered into position, relative to the landing area, in preparation for landing
23	approach speed	The recommended speed contained in aircraft manuals used by pilots when making an approach phase to landing
24	approved	the state that a particular action is officially granted
25	Apron	1) a call sign for Apron control which is the control service for any aircraft circulating on the airport ramp or apron to provide advisory and flight information service as well as allocate the parking stand to arriving aircraft and deliver the ATC clearance to aircraft departing from the stand. Apron control also acts as the link between the aircraft flight crews and the airport in general. Most aircraft requests for airfield or general services are in fact routed through the Apron control who then liaise with the relevant service providers 2) a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, refueling, parking or maintenance but not being part of the maneuvering area
26	Arrival	a call sign for Approach control radar arrivals which is a function of an approach control facility providing air traffic control service to direct several lines of descending aircraft into one smooth flowing line of aircraft as their courses take them closer to the destination airport
27	ATC (Air Traffic Control)	a service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic
28	ATIS (Automatic Terminal Information Service)	the continuous broadcast of recorded non-control information (Voice-ATIS) or send digital information to an aircraft when it is too far to make voice radio communication (D-ATIS), containing essential information, such as weather information, which runways are active, available approaches, and any other information required by the pilots
29	ATS (Air Traffic Service)	a generic term for stating services providing such as FIS, alerting service, air traffic control service (area control service, approach control service or aerodrome control service)
30	automatic dependant surveillance	a surveillance technique in which aircraft automatically provide, via a data link, data derived from onboard navigation and position fixing systems, including aircraft identification, four dimensional position and additional data as appropriate
31	backtrack	to go back in the direction from which you have come
32	base (leg)	a flight path at right angles to the landing runway off its approach end, normally extending from the downwind leg to the intersection of the extended runway centerline
33	blind transmission	a transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the call station is able to receive the transmission
34	brakes	a device used for preventing the aircraft from moving after it has come to a stop
35	braking action	a report of conditions on the airport movement area providing a pilot with a degree/quality of braking that he/she might expect. Braking action is reported in terms of good, fair, poor, or nil
36	break	an expression indicates the end of the message, and the beginning of another or 'I hereby indicate the separation between portions of the message'
37	break break	an expression indicates the end of the message to one aircraft, and the beginning of another message to another aircraft or 'I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment'
38	broadcast	a transmission of information relating to air navigation that is not addressed to a specific station or stations

No.	Lexical Item	Definition
39	call	1) to initiate voice contact between a facility and an aircraft, using the identification of the unit being called and the unit initiating the call 2) an initial voice contact between a facility and an aircraft
40	call sign	a name of an aeronautical station or an aircraft using during radio transmission to identify the interlocutors
41	cancel	to annul the previously transmitted clearance
42	CAVOK (Cloud and Visibility are OK)	a weather report indicating that the visibility and cloud are apparently clear in values or conditions which has no effect on flight performance
43	centre line	a middle long thin mark on the surface of taxiway or runway
44	check	1) to examine something in order to find out whether it is as it should be 2) an examination of a system or procedure in order to find out whether it is functioning or be as the way it should be
45	circuit	the specified path to be flown by aircraft operating in the vicinity of an aerodrome in a pattern of take off , climb out, turn onto crosswind leg, turn onto downwind leg, turn onto base leg, turn onto final approach and landing
46	clean speed	the speed that an aircraft uses when all movable parts are retracted in order to reduce parasite drag
47	cleaned	a condition of an aircraft that allowing an uninterrupted flow over surfaces, without protrusions such as racks or landing gear
48	clear of traffic	an expression used by air traffic controllers to inform a particular that there is nothing on the passage way that blocks or gets in the way
49	clearance	1) an authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace 2) disappearance of something unwanted, clean/safe environment
50	cleared	give or obtain an official permission for something to happen or 'I give permission for you to proceed under the conditions stated'
51	climb	1) to increase aircraft's altitude by the use of power 2) an act of increasing aircraft's altitude of an aircraft by the use of power
52	closing	a progressive act of making the distance between an aircraft and a particular point of final approach track smaller
53	commence	to begin/start
54	completed	a particular flight procedure or activity is thoroughly done
55	confirm	an expression used to state inquiry act or 'Have I correctly received the following…?' or 'Did you correctly receive this message?'
56	contact	1) an expression used by an air traffic controller to instruct a pilot to establish radio communication with (followed by the name of the facility and, if appropriate, the frequency to be used) 2) being in communication with
57	Control	a call sign for Area control service which is an air traffic control facility primarily responsible for ATC services being provided IFR aircraft during the en route phase of flight
58	controlled airspace	an airspace of defined dimensions within which an air traffic control service is provided in accordance with the airspace classification
59	correct	the message repeated is accurate
60	correction	an error has been made in this transmission (or message indicated)
61	course	an intended direction of flight in the horizontal plane measured in degrees from the north
62	CTR (Control Zone)	a designated air traffic control area for IFR flights both going in and out of the airport

No.	Lexical Item	Definition
63	data link	the means of connecting one location to another for the purpose of transmitting and receiving digital information, used to send information between aircraft and air traffic controllers when an aircraft is too far from the ATC to make voice radio communication and radar observations possible. Such systems are used for aircraft crossing the Atlantic and Pacific oceans.
64	decimal	a numerical fracture unit being inserted into the numerator at the position from the right corresponding to the power of ten of the denominator
65	decompression	the restoration to atmospheric pressure condition of someone or something which has spent time under higher pressure, related significant deviations from nominal flight
66	delay	a situation in which something especially a stage of flight operations happens later or more slowly that you expected or behind schedule
67	Departure	1) a call sign for Approach control radar departures which is a function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft 2) an exact place of departure for an aircraft marked on the chart 3) to leave, a plane leaving a specific place at a particular time
68	descend	to lose altitude, usually in a planned maneuver or to come/go down from a higher to a lower level at the approach phase
69	descent	a planned loss of altitude, usually in a planned maneuver or to come/go down from a higher to a lower level as an essential component of an approach to land an aircraft
70	dewpoint	a temperature at which water vapor will begin to condense
71	direct	1) to guide or control the movement of an aircraft 2) going straight to a particular direction
72	disconnect	separating a part of equipment from its host
73	discretion	according to what the pilot wishes to perform that particular flight activity
74	disregard	pay no attention to that previous transmission
75	distress	a situation in which an aircraft is in great danger and likely to sink or crash
76	DME (Distance Measuring Equipment)	an equipment used during airborne and on the ground to measure the distance in nautical miles
77	downwind (leg)	a flight path of the airfield traffic circuit which run parallel to the landing runway, but in the opposite direction to the approach to land which is made into wind. The downwind leg normally extends between the crosswind leg and the base leg
78	en route	on the way while traveling from or to a particular place or point
79	engine	a piece of machine that converts energy (fuel) into mechanical force or motion to the aircraft. Each aircraft needs to equipped with at least 2 engines
80	established	1) an expression used by pilots as a information to confirm as stable in a particular flight condition is contained, such as a flight level or glide slope, etc 2) an expression used by an air traffic controller as a request to request a confirmation when a particular flight status id contained
81	estimate	an approximate calculation of the time an aircraft reaching a particular point or position
82	ETA (Estimated Time of Arrival)	the time the flight is estimated to arrive at the gate (scheduled operators) or the actual runway on times for nonscheduled operators
83	ETD (Estimated Time of Departure)	the time the flight is estimated to depart from the gate (scheduled operators) or the actual runway on times for nonscheduled operators

No.	Lexical Item	Definition
84	expedite	an expression used by ATC when prompt compliance is required to avoid the development of an imminent situation. Expedite climb/descent normally indicates to a pilot that the approximate best rate of climb/descent should be used without requiring an exceptional change in aircraft handling characteristics
85	extend	to continue for a particular distance or direction
86	fade area	a particular part of an airspace that the strength of a radio signal is reduced or disappeared
87	FIC (Flight Information Centre)	a unit established to provide Flight Information Service and Alerting Service
88	field	an area around the aerodrome
89	final	1) a condition that an aircraft is on the final approach course or is aligned with a landing area 2) which comes at the end or last
90	FIR (Flight Information Region)	an airspace of defined dimensions within which Flight Information Service and Alerting Service are provided
91	FIR (Flight Information Region)	an airspace of defined dimensions within which Flight Information Service and Alerting Service are provided
92	FIS (Flight Information Service)	a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights
93	flight	a scheduled airline journey, a journey through air in a vehicle as a plane
94	flight level	a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hPa (1013.2 mb), and is separated from other such surfaces by specific pressure intervals, relating to the vertical position of an aircraft in flight and meaning variously, height and altitude
95	flight path	a line, course, or track along which an aircraft is flying or intended to be flown
96	flight plan	a flying plan which requires an approval from air traffic control unit for clearance and other necessary services
97	flight planned route	a flying route of a particular flight as a part of the flight plan
98	fly	to cause an aircraft to move through the air in a controlled manner
99	frequency	a number of radio wave to broadcast the communication calculated in cycles for every second, mostly stated in digit code
100	fuel dumping	a flight operation to jettison an amount of fuel to reduce aircraft's weight in order to perform irregular landing
101	fuel dumping track	the specific controlled area to dump fuel
102	gateway	the start or the termination point for an aircraft at an aerodrome/airport
103	GCA (Ground Controlled Approach)	a radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio
104	gear	landing wheel assemblies of an aircraft or undercarriage
105	glide path	a path of longitudinal axis degreed with a touch-down point followed by the aircraft down the glide slope as a part of Instrument Landing System (ILS)
106	go ahead	to give a permission to deliver the message or 'proceed with your message'
107	go around	to climb into the circuit and maneuvering into position for a new approach and landing
108	Ground	a call sign for Surface movement control which is the air traffic control service to control aircraft and vehicles in controlled areas (typically including taxiways and parking areas, but excluding runways) on the ground at an airport

No.	Lexical Item	Definition
109	H24	continuous day and night service
110	heading	a direction in which the longitudinal axis of the aircraft is pointing, expressed in degrees from the north
111	heavy	a specific terminology for describing the aircraft which has got massive weight, usually followed the aircraft configuration in a call sign
112	HF (High Frequency)	high frequency of radio transmission (3 to 30 MHz)
113	hold	to keep an aircraft in a particular position on the ground or in the air while waiting for further clearance from air traffic control
114	hold short	an instruction for an aircraft to stop before the CAT I/II/III signs/making at the holding point which an aircraft must not pass the line
115	holding procedure	a predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or a specified point while awaiting further clearance from air traffic control
116	holding fix	a geographical location that serves as a reference for a holding procedure
117	holding point	a specified location, identified by visual or other means, in the vicinity of which the position of an aircraft in flight is maintained in accordance with air traffic control clearances
118	how do you read	an expression used by air traffic controllers to ask for an estimation of the quality of the transmission on a scale of 1 (unreadable) to 5 (perfectly readable)
119	I say again	an expression indicating 'I repeat to make the message clearer or to emphasize on the message'
120	ident	a request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft
121	IFR (Instrument Flight Rules)	rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan
122	ILS (Instrument Landing System)	a precision instrument approach system which normally consists of the following electronic components and visual aids
123	IMC (Instrument Meteorological Conditions)	descriptions of the scientific study of weather conditions expressed in terms of visibility, distance from cloud and ceiling, less than the minima specified for visual meteorological conditions
124	in progress	happening or being done at the time of talk or at this time
125	in sight	an area or distance within which somebody can see or something can be seen
126	INS (Inertial Navigation System)	an area navigation (RNAV) system which is a form of self-contained navigation
127	intercept	to stop, deflect, divert or interrupt the intended path or signal of something, mostly the glide slope/path on a precision approach
128	land	to set an aircraft onto the ground or another surface such as ice or water, after a flight
129	leave	to go away from a place or a position
130	level	a generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level
131	lighting	an equipment that produces lights on taxiway or runway to guide an aircraft
132	line up	to move an aircraft into a position ready for departure
133	line up and wait	an instruction for an aircraft to enter the runway intended for take off and wait for a takeoff clearance
134	localizer	a component of an ILS which provides course guidance to the runway as a part of instrument landing system

No.	Lexical Item	Definition
135	long final	an aircraft is on the final approach course or is aligned with a landing area which is between 8 and 4 Nm
136	looking out	an expression used by pilots to comply with a warning of traffic in vicinity as an act of alerting for the traffic
137	LORAN (Long Range Air Navigation)	an electronic navigational system by which hyperbolic lines of position are determined by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters
138	low altitude	the height of a level, point, or object (the vertical distance of an aircraft) measured in feet Above Ground Level (AGL) ranging from 700-18,000 feet
139	low approach	an approach over an airport or runway following an instrument approach or a VFR approach including the go-around maneuver where the pilot intentionally does not make contact with the runway
140	low pass	an act of moving past lower than usual over the aerodrome or control tower
141	maintain	an instruction to continue in accordance with the conditions specified such as altitude and flight level or in its literal sense
142	maneuvering area	a part of an aerodrome to be used for the take-off, landing and taxiing of aircraft excluding aprons
143	Mayday	the international radiotelephony distress signal. When repeated three times, it indicates imminent and grave danger and that immediate assistance is requested
144	MET (Meteorology)	a scientific study of the earth's atmosphere and its changes, used especially in forecasting the weather
145	midpoint	the middle point of the runway
146	minima	weather condition requirements established for a particular operation or type of operation; e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.
147	missed approach	1) a maneuver conducted by a pilot when an instrument approach cannot be completed to a landing 2) an expression used by the pilot to inform ATC that he/she is executing the missed approach
148	moderate	a weather condition that is neither very good, hot, etc. nor very bad, cold, etc.
149	monitor	1) an expression used by an air traffic controller to ask a pilot to listen to radio broadcast in order to find out information that might be useful 2) an expression used by pilots to watch and check something over a period of time in order to see how it develops, so that any change can be made
150	movement area	a part of an aerodrome to be used for the take-off, landing and taxiing of aircraft consisting of maneuvering area and apron
151	NAVAID (Navigation Aid)	any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight
152	navigation	planning, controlling and recording the direction of an aircraft
153	NDB (Non-Directional Radio Beacon)	an L/MF or UHF radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his/her bearing to or from the radio beacon and 'home' on or track to or from the station
154	negative	1) no 2) permission is not granted 3) that is not correct
155	NOTAM (Notice To Airmen)	a notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
156	offset	a position that is away from the center such as offset parallel runways meaning staggered runways having centerlines which are parallel
157	OK	a condition that something is functioning properly
158	omit	to leave out a particular point or position on flight path

No.	Lexical Item	Definition
159	operating	an act of using or controlling a piece of equipment
160	orbit	1) to move around in circle 2) a move in circle
161	out of service	not working or functioning properly
162	outer marker	a marker beacon at or near the glide slope intercept altitude of an ILS approach or ILS (marker) beacon, usually on center line of approach at about 4.5 nautical miles from the runway threshold
163	overcast	a sky covered with clouds
164	Pan Pan	an urgency signal when the aircraft is in danger or there is an important message to pass on/report mostly concerning the safety in flight operation
165	PAPI (Precision Approach Path Indicator)	an airport lighting facility, similar to VASIS, providing vertical approach slope guidance to aircraft during approach to landing
166	parallel	an aircraft performing a certain activity in the same distance apart at every point along the whole length, but in the same direction of the path
167	pattern	an aircraft track in the aerodrome circuit
168	Precision	a call sign for Precision approach radar which is a unit of control service that equipped with primary radar equipment used to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown
169	precision (radar) approach	a standard instrument approach procedure in which an electronic glide slope or glide path is provided; with the use of radar equipment to conduct an approach wherein the controller issues guidance instructions to the pilot based on the aircraft's position in relation to the final approach course, the glide path, and the distance from the touchdown point on the runway as displayed on the radar scope
170	priority landing	the right of a vehicle to go before other traffic at the landing phase which is to set an aircraft onto the ground mostly in case of emergency situation
171	proceed	to continue doing something especially the usual or correct way
172	push-back	an airport procedure during which an aircraft is pushed backwards away from an airport gate by external power. Pushbacks are carried out by special, low-profile vehicles called pushback tractors or tugs
173	QDM	a kind of radio navigation system which is a magnetic bearing to a station
174	QNH (Quasi-Non-Hydrostatic)	an altimeter sub-scale setting to obtain elevation when on the ground or the barometric altimeter setting which will cause the altimeter to read altitude above mean sea level within a certain defined region, reported by a particular station
175	radar identification	a process of ascertaining that an observed radar target is the radar return from a particular aircraft or a process of correlating a particular radar blip or radar position symbol with a specific aircraft
176	radar approach	an approach, executed by an aircraft, under the direction of a radar controller
177	radar control	an area that an air traffic control is managed by the information displays on the radar
178	radar control terminated	an expression used by ATC to inform a pilot that he/she will no longer be provided any of the services that could be received while in radar contact
179	radar cover	an area that there is the use of radar for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path
180	radar vectoring	a provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar
181	radial	a pattern of lines that go out from the central point towards the edge of a circle (line of radio baring from VOR beacon)

No.	Lexical Item	Definition
182	Radio	1) a call sign of an aeronautical station which is a land station in the aeronautical mobile service to transmit radio beacon to provide position-indication to the aircraft 2) a piece of equipment for air-ground communication or sending and receiving radio signals
183	ramp	a defined area on an airport or heliport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance. Generally, the pre-flight activities are done in ramps; and areas for parking and maintenance are called aprons
184	rate of descent	a measurement of speed used in lowering an aircraft mostly at the approach phase
185	read	to hear / understand somebody speaking on a radio set
186	read back	an expression used by an air traffic controller to ask a pilot to repeat all of the message exactly as received
187	recleared	a change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof
188	recycling	a process of using/doing something again or resetting
189	remain	to stay in a particular place or position and not leave it
190	report	to give information about something that exists or has happened or 'pass me the following information'
191	reporting point	a specified geographical location in relation to which the position of an aircraft can be reported
192	request	to ask for something or to ask someone to do something in a polite and formal way, 'I should like to know…' or 'I wish to obtain…'
193	reset	to set a specific radio frequency, code or number again
194	resume	an expression used by an air traffic controller to start something again after stopping temporarily
195	resume own navigation	to advise a pilot to resume his/her own navigational responsibility. It is issued by an air traffic controller after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored
196	return	to come/go back from one place to another
197	RNAV (Area Navigation)	a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground
198	roger	a procedural phraseology meaning 'I have received all of your last transmission'
199	runway	a long narrow strip of level, usually paved ground with a hard surface that an aircraft takes off from and lands on
200	runway vacated	an expression used by pilots when requested to be cleared of the runway to report only when the entire aircraft is beyond the relevant runway-holding position
201	RVR (Runway Visual Range)	an instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end
202	say again	repeat all, or the following part, or your last transmission
203	SELCAL (Selective-Calling Radio System)	a high-frequency system enabling an air traffic control to alert a particular aircraft, by means of flashing light or aural signal in the cockpit
204	separation	the spacing of aircraft to achieve their safe and orderly movement in flight, levels or tracks and while landing and taking off
205	sequencing	an arrangement of an aircraft pattern to be in order during the landing phase
206	set	a group of aircraft or related aircraft equipment, parts or systems used together or which belong together

No.	Lexical Item	Definition
207	SID (Standard Instrument Departure)	a preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedure printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure
208	SIGMET (Significant Meteorology)	the information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations
209	SNOWTAM (Snow To Airmen)	a notification of runway/taxiway/apron status with respect to snow, ice and standing water
210	spacing	an act of arranging things so that they have regular spaces between them
211	speak slower	an expression used to ask the participant to reduce rate of speech
212	speed	a specific rate of aircraft motion over a distance in time
213	squawk	1) to activate specific codes/modes/functions on an aircraft transponder 2) an aircraft transponder code for an aircraft identification
214	stand	an aircraft parking spot/bay
216	standby	1) to indicated that the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority 2) to wait as in 'stand by for clearance'
217	STAR (Standard Instrument Arrival)	a preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form
218	start-up	1) to perform the procedure of commencing the engines 2) a procedure to start the aircraft engines
219	Station	1) a particular assigned location to perform different aviated-activity 2) a generic call sign of any aircraft operating within the control area
220	Station calling	a generic call sign of any aircraft contacted an air traffic controller during particular moment, used when a controller cannot identify that particular aircraft
221	straight-in	a direct route towards a particular point or on a particular pathway
222	surveillance radar approach	an approach control radar system used to detect and display an aircraft's position in the terminal area, primary radar scanning often 360 degrees
223	TACAN (Tactical Air Navigation)	an ultra-high frequency electronic rho-theta air navigation aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station
224	take off	1) to leave the ground 2) a procedure when an aircraft leaves the ground
225	taxi	1) to move an aircraft along the ground under its own power before take-off or after landing 2) an act of moving an aircraft along the ground under its own power before take-off or after landing
226	taxiway	a hard path or tarmac surface connecting the ramp or apron with the runway(s) that an aircraft uses to move along
227	TCAS resolution advisory	an advice providing from Traffic Collision Avoidance System (TCAS) issued to alert pilots to avoid other known or observed air traffic
228	TCAS (Traffic Collision Avoidance System)	an airborne collision avoidance system based on radar beacon signals which operates independent of ground-based equipment
229	terrain	an area of land especially in relation to its physical geography that is the obstacle to safety of flight operation
230	threshold	a beginning of the part of the runway usable for landing
231	touch and go	an operation by an aircraft that lands and departs on a runway without completely stopping or exiting the runway for practicing landing and take-off patterns
232	touchdown	a portion of a runway, beyond the threshold, where it is intended landing aircraft first contact the runway

No.	Lexical Item	Definition
233	Tower	a call sign for Aerodrome control service is a terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area or air traffic control service for aerodrome traffic
234	track	a projection on the earth's surface of the path of an aircraft flying or intended to be flown, the direction of which path at any point is usually expressed in degrees from the north
235	traffic in sight	a fixed expression used by pilots to inform a controller that previously issued traffic is in sight
236	transition level	the level of an aircraft passing from one place, state, or condition to another
237	transponder	a piece of equipment that receives radio signals and automatically sends out another signal in reply
238	UHF (Ultra-High Frequency)	ultra-high frequency of radio transmission (300 to 3000 MHz)
239	unable	to indicate inability to comply with a specific instruction, request, or clearance or 'I cannot comply with your request, instruction or clearance'
240	unreadable	unable to get the information or hear a radio transmission
241	urgency	a condition concerning the safety of an aircraft or other vehicle, or of person on board or in sight, but which does not require immediate assistance
242	vacate	to leave a position so that it is available for other aircraft
243	VASIS (Visual Approach Slope Indicator System)	a system of lights on the side of an airport runway threshold that provides visual descent guidance information during the approach to a runway
244	vectors	a heading given to pilot to provide navigational guidance by radar
245	verify	to check and confirm with me
246	VFR (Visual Flight Rules)	rules that govern the procedures for conducting flight under visual conditions. It is used by pilots and controllers to indicate type of flight plan
247	VHF (Very High Frequency)	very high frequency of radio transmission (30 to 300 MHz)
248	vicinity	an area nearby/around a particular place over the aerodrome
249	visibility	an ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.
250	visual approach	an approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain
251	VMC (Visual Meteorological Conditions)	meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima. Or conditions in which pilots have sufficient visibility to fly an aircraft, maintaining visual seperation from terrain and other aircraft
252	VOLMET (Volume Meteorological Information)	a worldwide network of radio stations that broadcast Terminal Aerodrome Forecast (TAF), Significant Meteorology (SIGMET) and weather reports on shortwave frequencies using automated voice transmissions
253	VOR	VHF omni-directional radio range
254	VORTAC	a combination of VHF omni-directional radio range (VOR) and UHF tactical air navigation aid (TACAN) - A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site

No.	Lexical Item	Definition
255	wake turbulence	phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air
256	wilco (will comply)	an expression indicating 'I understand your message and will comply with it'
257	wind calm	local wind moving less than 1 kilometer per hour
258	windshear	extreme local wind gradient which can be dangerous
259	word twice	1) an expression as a request when communication is difficult or 'Please send every word or group of words twice' 2) an expression as information when communication is difficult; every word or group of words in this message will be sent twice

BIOGRAPHY

Miss Paneeta Nitayaphorn was born on December 18th, 1973 in Bangkok. She graduated with a B.A. in Linguistics from the faculty of Arts, Thammasat University in 1995. She decided to further the study at Chulalongkorn University in Journalism and graduated with an M.A. in 2000. And then, she continued with another M.A in Teaching English as a Foreign Language from Srinakharinwirot University in 2004.

At present, she works for Thai Airways International Co. (Ltd.) in Flight Crew Language Training Department with full responsibilities for developing curriculum in pronunciation for pilots as well as teaching them. She also built and developed a self-learning webpage, English@Hand for any pilots who have an interest in practicing English skills outside classroom. As well as that, she has been an official interviewer and rater of Flight Standards Bureau since 2007 and the committee of Thailand TESOL since 2006.