

**THE NOTION “INITIALS” AS AN EFFECTIVE COMMUNICATION
STRATEGY IN CONVERSATION BETWEEN PILOT AND
AIR TRAFFIC CONTROLLER**

**MOHAMAD ROMY
F022191020**

A THESIS



**ENGLISH LANGUAGE STUDIES
FACULTY OF CULTURAL SCIENCE
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2020**

**THE NOTION “INITIALS” AS AN EFFECTIVE COMMUNICATION
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AIR TRAFFIC CONTROLLER**

THESIS

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Mohamad Romy

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THESIS

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STRATEGY IN CONVERSATION BETWEEN PILOT AND AIR
TRAFFIC CONTROLLER

Written and Submitted by

MOHAMAD ROMY

Register Number: F022191020

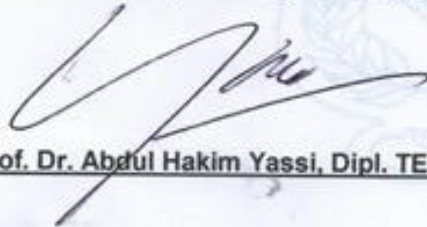
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Head of
The Supervisory Committee

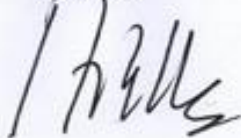
Member of
The Supervisory Committee



Prof. Dr. Abdul Hakim Yassi, Dipl. TESL., M.A. Dr. Abidin Pammu, Dipl. TESOL., M.A.

The Head of English Language Studies
Program

The Dean of Faculty
of Cultural Sciences



Dr. Harlinah Sahib, M.Hum.
NIP. 196211281987032001



Prof. Dr. Akin Duli, M.A.
NIP. 196407161991031010

PERNYATAAN KEASLIAN TESIS

Yang bertanda tangan di bawah ini:

Nama : Mohamad Romy

Nomor Pokok. : F022191020

Program Studi : Bahasa Inggris

Menyatakan dengan sebenarnya bahwa tesis yang saya tulis ini adalah benar-benar merupakan hasil karya saya sendiri, bukan tulisan atau pemikiran orang lain. Apabila dikemudian hari terbukti atau dapat dibuktikan bahwa sebagian atau keseluruhan tesis ini hasil karya orang lain, maka saya bersedia menerima sanksi atas perbuatan tersebut.

Makassar, 21 Desember 2020

Yang menyatakan



MOHAMAD ROMY

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This thesis is far from perfect, but researchers hope that this research will be useful for both theoretical and practical fields. For this reason, constructive criticism and thoughtful suggestions are welcomed.

Makassar, 21 Desember 2020

A handwritten signature in black ink, appearing to read 'Mohamad Romy', with a long horizontal stroke extending to the right.

Mohamad Romy

ABSTRACT

MOHAMAD ROMY. The Notion “Initials” As An Effective Communication Strategy In Conversation Between Pilot And Air Traffic Controller. (Supervised by Abdul Hakim Yassi and Abidin Pammu).

Air-ground communication is the primary means of communication utilized by air traffic service units to provide the service to air traffic. It is expected that the exchange of information will run smoothly to maintain an orderly flow of air traffic. An interrupted communication process may create a difficult situation that will interfere with flight safety. This research was aimed to understand the effective communication strategy in the aviation industry especially in a conversation between Air Traffic Controller – Pilot, and to provide a possible solution to overcome the communication workload problem that has greatly affected aviation safety.

The method used in this research is a quantitative. Data were collected from the MATSC voice recording facility and interviews with an air traffic controller informant, and twenty active air traffic controllers as a respondent questionnaire and gathered it in a certain formula chart to get percentage value.

The research has found that the use of the word "initials" is an important part of air traffic control activities. The fact that the use of the word "initials" is not in standard phraseology (as stated in ICAO Document 4444), but often used in everyday communication between Air Traffic Controllers and pilots, especially in giving instructions that are temporary in nature. This word is quite crucial in maintaining flight safety because it can reduce controllers' workload (reducing "non-routine communication") and prevent false assumptions from pilots. In addition, it also makes communication between Air Traffic Controllers - pilots more effective and efficient.

Keywords: *Effective Communication Strategy, Aviation industry, Air Traffic Controllers, Pilot, ICAO, Communication workload.*

ABSTRAK

MOHAMAD ROMY. Pengertian "Inisial" Sebagai Strategi Komunikasi Yang Efektif Dalam Percakapan Antara Pilot Dan Pengendali Lalu Lintas Udara. (Disupervisi oleh Abdul Hakim Yassi dan Abidin Pammu).

Komunikasi udara-darat adalah alat komunikasi utama yang digunakan oleh unit-unit layanan lalu lintas udara untuk menyediakan pelayanan lalu lintas udara. Pertukaran informasi diharapkan dapat berjalan lancar untuk menjaga keteraturan arus lalu lintas udara. Proses komunikasi yang terhambat dapat menciptakan situasi sulit yang akan mengganggu keselamatan penerbangan. Penelitian ini bertujuan untuk memahami strategi komunikasi yang efektif dalam industri penerbangan khususnya dalam percakapan antara Pengendali Lalu Lintas Udara - Pilot, dan untuk memberikan sebuah solusi yang mungkin dapat mengatasi masalah beban kerja komunikasi yang sangat mempengaruhi keselamatan penerbangan.

Metode yang digunakan dalam penelitian ini adalah kuantitatif. Data dikumpulkan dari fasilitas perekaman suara MATSC dan wawancara dengan informan pengendali lalu lintas udara, serta dua puluh orang pengendali lalu lintas udara aktif sebagai responden kuesioner dan dikumpulkan dalam grafik rumus tertentu untuk mendapatkan nilai persentase.

Penelitian ini menemukan bahwa penggunaan kata "initials" merupakan bagian penting dari kegiatan pengendalian lalu lintas udara. Fakta bahwa penggunaan kata "initials" tidak ada dalam *phraseology* standar (sebagaimana tercantum dalam Dokumen ICAO 4444) tetapi sering digunakan dalam komunikasi sehari-hari antara Pengendali Lalu Lintas Udara dan pilot, terutama dalam memberikan instruksi yang bersifat sementara. Kata ini cukup krusial dalam menjaga keselamatan penerbangan karena dapat mengurangi beban kerja Pengendali Lalu Lintas Udara (mengurangi "komunikasi non-rutin") dan mencegah asumsi yang salah dari pilot. Hal ini membuat komunikasi antara Pengendali Lalu Lintas Udara - pilot lebih efektif dan efisien.

Keywords: *Strategi Komunikasi yang Efektif, Industri Penerbangan, Air Traffic Controller, Pilot, ICAO, Beban Kerja Komunikasi.*

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CHAPTER I

INTRODUCTION

This chapter consists of several subchapters which are going to be explained. Those subchapters are as follows: (1) Background of the Research, (2) Research questions, (3) Objectives of the research, (4) Research significance to study, and (5) Conceptual framework.

A. Background of The Research

Air traffic management, as regulated in Document 4444 (Air Traffic Management), generally uses a predetermined English language called Phraseology. This is also regulated in Annex 10 (Aeronautical Telecommunications Vol III Communication Systems) and Document 9432 (Manual Radiotelephony) which states: ICAO phraseologies are developed to provide efficient, clear, concise, and unambiguous communications, and constant attention should be given to the correct use of ICAO phraseologies in all instances in which they are applied. However, outside from these rules, there is a word that are often used by Air Traffic Controllers (mostly referred to as "ATC/controllers") and understood by pilots. This word becomes frequently used by controllers when there is a request from pilots that cannot be directly given due to various factors, such as the presence of other aircraft in the area that have been served or agreements between sectors. This word is "initials". Every time controllers gives an order, which intent not to fulfil the wishes of pilot, the word "initials" is used at the beginning or at the end of the command.

Over the years, the use of the word "initials" has become a habit used by controllers in Indonesia and understood by domestic and international pilots. If this word is not added to an instruction or clearance, pilot will ask again whether the order given to them is the final order or not. It has been understood as a word of politeness which says that this is only temporary and efforts are being made to get what pilot wants. Sometimes this word is used by the controllers to calm pilots when their requests, for example optimal altitude, cannot be fulfil because other aircraft are ahead or behind it, or if other sectors cannot provide optimal altitude.

Since researcher worked as Air Traffic Controller from 1997, the use of the word "initials" has been introduced in working methods by Supervisors. The use of the word "initials" begins when the aircraft is still on the ground by giving ATC Clearance as the following example:

Example 1:

ATC : "GIA123 ATC Clearance, clear to Jakarta via W52 flight level 240 initials".

The word "initials" is also used by APP and ACC units, which not only provide aircraft altitude instructions but also added while provide instructions for turning left or right.

At present the use of the word "initials" is not mentioned in the ICAO document, this created a debate among controllers, and also some of them have seen controllers' working methods in neighbouring countries such as Australia and Singapore where giving instructions or clearance without adding the word "initials".

These are some examples regarding the instruction or clearance given by controllers (ATC) in Makassar Air Traffic Control Center, without and with word "initials":

Example 2:

ATC. : "GIA321, due to traffic, climb to flight level 280"
 Pilot. : "Roger, climb to flight level 280 GIA321, confirm is it our final level?"
 ATC : "Negative, after clear of traffic your final level is flight level 320, we will advise"
 Pilot. : "Roger"

Example 3:

ATC : "GIA123, due to traffic, climb to flight level 280 **initials**"
 Pilot : "Roger, climbing to flight level 280 **initials** due to traffic GIA123"

In these examples, we can see if using the word "initials" can reduce the workload of communication.

Example 4:

ATC : "GIA345, climb to **F280**"
 Pilot. : "Roger, climb to **F380**" (because Pilots requested Flight Level is F380)

In communication between the controller-pilot, there is a process of "readback" and "hearback" which, if not done properly, can lead to an incident or accident. McMillan (1998) said that readback of pertinent parts of a controller's instructions

does not guarantee that the readback message has been accurately received. Too often, confirmation is given of an incorrect readback.

The Aviation Safety Reporting System (USA) has labelled this phenomenon *hearback* and cited four major causes (Hawkins, 1993):

- similar aircraft callsigns resulting in confusion in transmission or reception;
- only one pilot on board working and monitoring the frequency;
- numerical errors, such as confusing 'one zero thousand' with 'one one thousand';
- **Expectancy—"hearing what one expects to hear."**

So in Example 4, pilot expects to hear what he expects to hear, and do as he wishes, compare with Example 5 below;

Example 5:

ATC : "GIA345, climb to **F280 initials**"

Pilot : "Roger, climb to **F280 initials** GIA345" (requested Flight Level is F380)

By hearing the word "initials" pilot will realize that this is a temporary height he gets and will not ask further because he knows there will be further commands from controllers.

Note: These examples are written based on events experienced by the researcher since becoming controller from 1997.

Every day, controllers at Makassar Air Traffic Services handle around 200 transcontinental flights, 300 local and international flights, and also as much as 1500 domestic flights to and from other airports in its airspace. Therefore efficiency and safety are very much needed, especially in giving instructions to pilots. Efficient instructions are instructions that are clear and understandable by pilot (can be identified by the correct "readback" process). However, controllers' workload will increase if the instructions given cause obscurity or confusion in which ultimately makes pilot ask again as described in example 1 above. This is why there is a need for a solution to overcome this. The use of word "initials" which in the beginning only as a habit eventually becomes something that can make communication between ATC and pilots more effective and efficient. This can reduce the workload of controllers which in turn will maintain flight safety.

B. Research Questions

Based on the phenomena which has been illustrated above, this study aims to answer the questions as follows:

1. How often the word "initials" is used by controllers in giving instructions or clearance?
2. What is the function of "initials" uttered by controllers?

C. Objectives of The Research

By doing this research, it is expected that this research will be able to :

1. Explain the number of times the word "initials" is used by controllers in giving instructions or clearance.
2. Describe the function of "initials" uttered by controllers in Makassar Air Traffic Service Center.

D. Significances of The Research

Both practically and theoretically, this research becomes very important for controllers, because the use of the word "initial" which act as a strategy of refusal by controllers, ultimately becomes one of the many ways to reduce the communication workload; for pilots, as it reduces the misperception of altitude they can get when they hear the word "initials."

The results of these two points will ultimately maintain flight safety significantly. If the word "initials" brings benefits to air traffic services and maintain flight safety, it is hoped that it will be taken to the ICAO's large forum to be considered for inclusion in ICAO Document 4444 chapter 12 (Phraseology) and also in the "pre-defined text" in Controller-Pilot Data-link Communication (CPDLC).

E. Conceptual Framework

This research aims to prove that the use of the word "initials" by controllers is one way to improve communication effectiveness and prevent miscommunication, therefore this study applies the following conceptual framework:

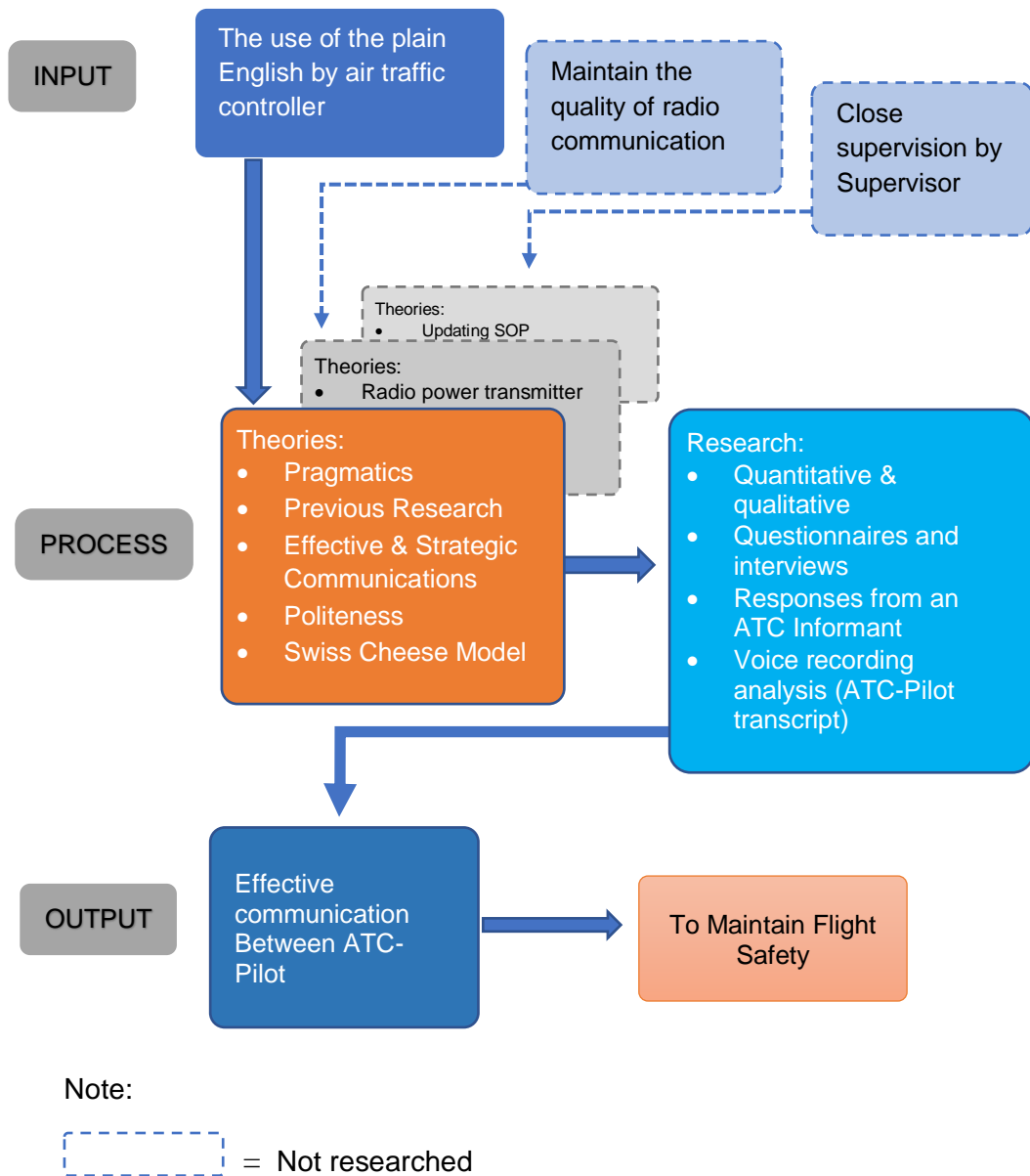


Figure 1. Conceptual Framework

CHAPTER II

REVIEW OF LITERATURE

This chapter consists of several subchapters which are going to be explained. Those subchapters are as follows: (1) Previous studies, (2) Theoretical Discussions, (3), Air Traffic Services, (4) Phraseology (5) ATC Workload in Ujung Pandang ACC, (6) Separation, (7) Theoretical framework.

A. Previous Studies

There have been a number of studies already conducted in relation to air traffic communication. Provided below are previous studies which have been conducted by McMillan, Pliso, and Hamzah. Their works has given the researcher a better perspective and make a good judgement upon studying air traffic communication. These studies are focused on miscommunication between controllers-pilots, efficient communication, ambiguity, etc, which would be beneficial for maintaining flight safety.

The first important study is by McMillan who conducted a research in 1998. This research was studying matters which may cause miscommunication within the communication in an air traffic controller environment. McMillan began this research based on his experienced as ATC when he was sequencing traffic into Sydney, and also some accidents occurred years before such as the collision between the Pan Am and KLM Boeing 747's at Tenerife in March 1977 and the Garuda A300 Airbus crash at Medan, Sumatra in September 1997. Investigation found that those accidents caused by miscommunication between controller and pilot.

This research is very important for the development of aviation English. McMillan explained many aspect of linguistics in aviation perspectives such as code switching, homonyms and homophony, speech acts, culture, etc, in related to the miscommunication, and found that there are many aspects, including environment and controller's psychological condition, identified as contributors in

miscommunications. This finding is very helpful for the controllers as they can understand the types of miscommunication and how miscommunication occurs.

What McMillan wrote in his research can be related to my research, especially the discussion that many things can influence miscommunication between pilot controllers such as "noise" in communication, pilot expectations, efficient communication, and ambiguity, which can have a major impact on aviation safety.

The second important research is by Pliso who conducted research in Switzerland air traffic control facility in 2014, and She was trying to find out which group of pilot tend to use non-standard phraseology. Pliso started her research from the awareness that the usage of standard phraseology in air-ground communication is so important to minimize miscommunication. Through the analysis of the collected data, her paper showed that native English speaking pilots deviate from the prescribed standard phraseology by resuming to plain English. What Pliso did not take into account is the level of stress that pilots might have experienced, the length and complexity of message, the amount of workload, and all other components that could possibly be responsible for the natives resuming to plain language, thus deviating from standard phraseology.

Referring to this research, the researcher has continued and proved that the use of simple English (in this case the word "initials") is very helpful in providing air traffic services and maintaining flight safety.

The third study is by Hamzah who conducted research at Malaysian air traffic control facilities in 2018. The research pinpoints problematic areas in the controller-pilot interaction. It shows that procedural deviation happened frequently in routine controller-pilot communication leading to vague and even incomprehensible messages, even when both controller and pilot speak English very well. The research provides examples of deviations like adding a pronoun to phrases that could throw off the receiver leading to unnecessary lengthening of the interaction. Hamzah also found that Another factor leading to miscommunication is unclear instructions (usually from the controller) or unclear requests (usually from the pilot). One of the reasons for this is again the insistence on using plain English instead of the standard phraseology even in cases where there is no necessity to do so.

Based on the findings of this study, the researcher does not fully agree with what Hamzah said in his research, this is also based on the findings of two previous

researchers who generally state that the use of words other than standard phraseology can also reduce the emergence of danger due to miscommunication. This is also stated in Batubara's research (2015) which states that in another case and situation, ATC sometimes used non-standard phraseology in communication with pilot. Thus, between ATC and pilot, there was no worries occur when they communicate each other as long as they can get the point what they mean.

B. Theoretical Discussions

1. Pragmatics

Pragmatics is a subfield of linguistics that studies how people comprehend and produce a communicative act or speech act in a concrete speech situation in the form of utterances. According to Yule (1996), pragmatics is the study of the relationship between linguistic form and the users of those forms.

There are four areas that pragmatics is concern with, as follow:

- a. "Pragmatics is the study of speaker meaning." Pragmatics concern with the study of meaning uttered by the speaker or written by the writer and interpreted by the listener or reader.
- b. "Pragmatics is the study of contextual meaning." It includes the relationship of what people mean in a specific context and how the context affects what is said.
- c. "Pragmatics is the study of how more gets communicated than is said". This approach also explores how the listener can interpret what the speaker's proposed meaning. This type of study discovers how a great deal of what is unsaid is predictable as part of what is communicated.
- d. "Pragmatics is the study of the expression of relative distance." The choice between said and unsaid was determined by the notion of distance. Closeness, whether it is physical, social, or conceptual, implies shared experience. On the supposition of how close or distance the listener is, the speaker decides how much needs to be said.

In ICAO Doc 9835 Manual on the Implementation of the ICAO Language Proficiency Requirements, Pragmatic competence refers to a number of skills used to make or give meaning to language in a given situation or context. These include:

- a. strategic competence refers to how language users mobilize or balance their resources to activate skills and procedures, in order to fulfil the demands of communication in context and successfully complete the task in question in the most comprehensive or most economical way feasible;
- b. discourse competence refers to the ability to combine sentences or utterances to make coherent, whole texts;

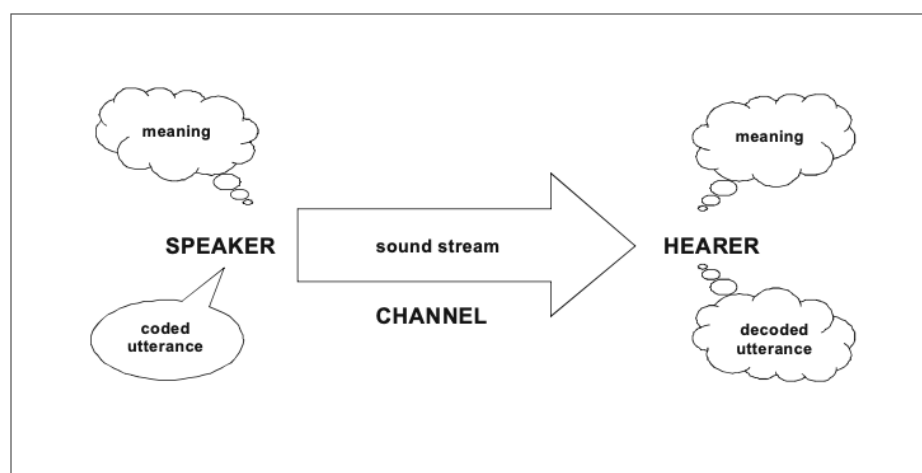


Figure 2. Traditional model of communication

Source: ICAO Doc 9835 Manual on the Implementation of the ICAO Language Proficiency Requirements

- c. functional competence refers to the awareness of and ability to make use of the rules governing the way in which language structures are interpreted conventionally or in a given context — “language functions” — and the ways in which these functions are commonly sequenced to establish conversational structures (interactive scripts or schemata); and
- d. evaluation of outcomes of the use of language in the real world, for example, impacts on safety or impacts on efficiency.

2. Communication

The word Communication is originated from the Latin word “Communicare” which means, to share. Wood (2009) explained that Communication is a systemic process in which people interact with and through symbols to create and interpret meanings. The first important feature of this definition is process. Communication is a process, which means it is ongoing and always in motion, moving ever forward and changing continually. It’s hard to tell when communication starts and stops, because what happened long before we talk with someone may influence interaction, and what occurs in a particular encounter may have repercussions in the future. We cannot freeze communication at any one moment.

a. Models of communication.

Communication is important for personal, relationship, professional, and cultural reasons. Because communication is a cornerstone of human life. Wood (2009) explained the process to understand what’s involved in communication by using the models of communication. Theorists create models to describe how things work. Over the years, scholars in communication have developed a number of models, which reflect increasingly sophisticated understandings of the communication process.

1) Linear Models

One of the earliest models, created by Laswell (1948), described communication as a linear, or one-way, process in which one person acted on another person. This model consisted of five questions that described early views of how communication worked:

- Who?
- Says what?
- In what channel?
- To whom?
- With what effect?

A year later (1949), Claude Shannon and Warren Weaver created an advanced model that included noise, or interferences, which distort understanding between communicators. Figure 3 shows Shannon and Weaver’s model. Although these

early models were useful starting points, they were too simplistic to capture the complexity of most kinds of human communication.

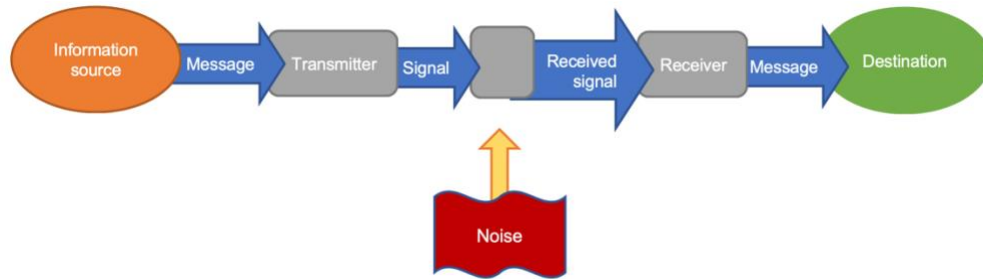


FIGURE 3 : A Linear Model of Communication

Source: Adapted from Shannon, C., & Weaver, W. (1949). *The Mathematical Theory of Communication*. Urbana: University of Illinois Press.

2) Interactive Models

The major shortcoming of linear models was that they portrayed communication as flowing in only one direction, from a sender to a receiver. This suggests that speakers only speak and never listen. The linear model also implies that listeners only listen and never send messages.

Realizing that “receivers” respond to “senders” and “senders” listen to “receivers” led communication theorists (Schramm, 1955) to adapt models to include feedback. Feedback may be verbal, nonverbal, or both, and it may be intentional or unintentional. Research has confirmed Schramm’s insight that feedback is important. Supervisors report that communication accuracy and on-the-job productivity rise when they encourage their subordinates to give feedback—ask questions, comment on supervisors’ messages, and respond to supervisory communication (Deal & Kennedy, 1999).

Wood (2009) explained the interactive model also showed that communicators create and interpret messages within personal fields of experience. The more communicators’ fields of experience overlap, the better they understand each other. Adding the concept of fields of experience to models clarifies why misunderstandings sometimes occur. Adding fields of experience and feedback allowed Schramm and other communication scholars to develop models of communication as an interactive process in which both senders and receivers participate actively (Figure 4).

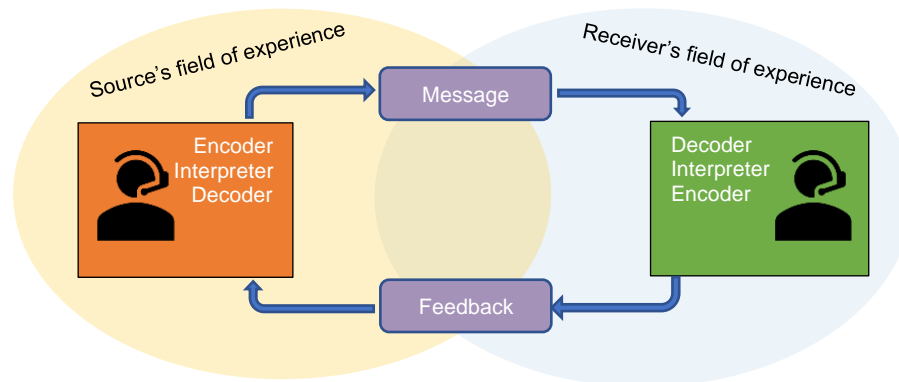


FIGURE 4: An Interactive Model of Communication

Source: Adapted from Schramm, W. (1955). *The Process and Effects of Mass Communication*. Urbana: University of Illinois Press.

3) Transactional Models

A serious limitation of interactive models is that they don't acknowledge that everyone involved in communication both sends and receives messages, often simultaneously. While giving a press release, a speaker watches reporters to see whether they seem interested; both the speaker and the reporters are "listening," and both are "speaking", (Wood, 2009).

Interactive models also fail to capture the dynamism of communication. To do this, a model would need to show that communication changes over time as a result of what happens between people. An accurate model would include the feature of time and would depict features of communication as dynamically varying rather than constant. Figure 5 is a transactional model of communication that highlights these features and others we have discussed.

Wood (2009) made a Model that includes noise, which is anything that interferes with the communication in question. This includes sounds like a lawn mower or others' conversations, as well as "noises" within communicators, such as mental biases and preoccupation. In addition, Wood's model emphasizes that communication is a continuous, constantly changing process. The feature of time reminds us that how people communicate varies over the history of their interaction.

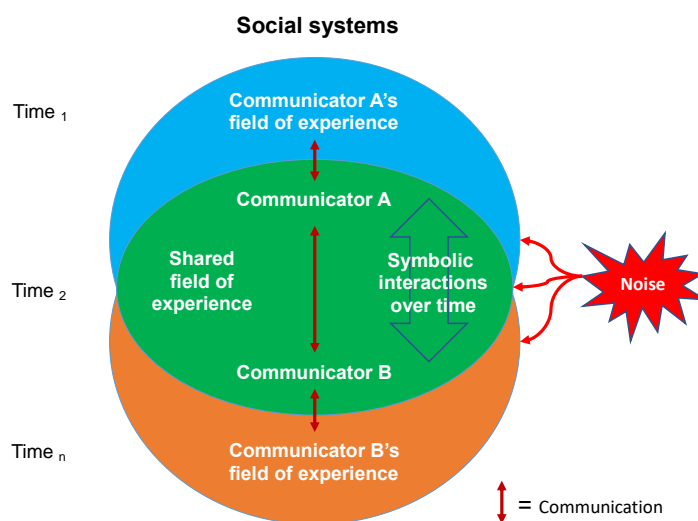


Figure 5: A Transactional Model of Communication

Source: Adapted from Wood, J. T. (2004). *Interpersonal Communication: Everyday Encounters* (4th ed.). Belmont, CA: Wadsworth.

b. Communication strategy.

Tarone (1980) defines communicative strategies as mutual attempts of two interlocutors to agree on a meaning in situations where requisite meaning strategies do not seem to be shared.

Another definition of communication strategies is by Faerch and Kasper (1984) define that to achieve the desired communicative goal, a range of devices named communication strategies may be drawn to convey the intended meaning or even to abandon the original meaning and resort to a simpler and more easily achieved goal.

Yassi (2016) defined communication strategies based on three definition above which denote some similar key points on the notion of communication strategies, namely (1) Systematic and conscious techniques, plans, and attempts by speakers, (2) Speakers manage to get their proposition across, (3) Reaching a mutual understanding between interlocutors on the meaning. These are bit similar to what Tarone (1983) points out that the necessary criteria for using communication strategies are (1) Speakers want to communicate meaning X to listener. (2) Speakers believe they do not have the required linguistic or sociolinguistic structure to communicate X, and (3) Speakers choose to either avoid or try out ways to communicate X. Therefore, the goal behind communication

strategies is the negotiation of meaning, where both the speaker and the hearer are involved. Successful communication is the responsibility of both speaker and hearer.

Myers-Scotton and Ury's (1977) defined another definition of communication strategies, that the communication strategies can be unconscious or conscious effort. It involves a speaker's exercise of his sociolinguistic competence in structuring interaction to effect outcomes favourable to him/her self.

Based on the definition of communication strategies above, is more likely to suggest that the strategies employed by the speaker are simply aimed at avoiding a communication breakdown which is likely to occur due to speaker's lack of target language proficiency (Yassi, 2016).

When the participants are aware of that they do not understand each other, they will resort to a number of strategies. Tarone (1983) listed five types of strategies learners resort to when faced some difficulties in conveying the message as follows:

1) Avoidance

These are risk-avoiding strategies, mostly used by the learners who fear making mistake. There are two types of this kind, namely (1) Topic Avoidance, the learner simply tries not to talk about concepts for which the target language item or structure is not known, and (2) Abandonment, The learner begins to talk about a concept but is unable to continue and stops in mid-utterance.

2) Paraphrase

The learners reword their message to make himself understood. There are three types this kind; (1) Approximation. Use of a single target language vocabulary item or structure, which the learner knows is not correct, but which shares enough semantic features in common with the desired item to satisfy the speaker (e.g. pipe for waterpipe). (2) Word Coinage. The learner makes up a new word in order to communicate a desired concept (e.g. airball for balloon). (3) Circumlocution. The learner describes the characteristics or elements of the object or action instead of using the appropriate target language item or structure ("She is, uh, smoking something. I don't know what's its name. That's, uh, Persian, and we use in Turkey, a lot of.")

3) Transfer (Borrowing)

The learners borrow from any language they know. There are two of this type; (1) Literal Translation. The learner translates word for word from the native language

(e.g. "He invites him to drink," for "They toast one another."). (2) Language Switch. the learner uses the native language term without bothering to translate (e.g. balon for balloon, tirtil for caterpillar)

4) Appeal of Assistance

The learners seek help from the person he/she speaking to, the learner asks for the correct term (e.g. "What is this? What called?")

5) Mime

The learners use nonverbal strategies in place of a lexical item or action (e.g. clapping one's hands to illustrate applause)

c. Politeness strategy.

The theoretical basis drawn from this research is based on the book Politeness: Some Universals in Language Usage by Brown, Penelope and Levinson, C. Stephen (1987). The theory of politeness will be tested with what happens in the process of regulating air traffic, which is related to the use of phraseology in ICAO Document 4444. It will also be compared to the quote theory about politeness and politeness strategies.

1) Negative and positive face

The definition of 'face' is not just appearance or appearance, but rather an individual image, according to Goffman (1967), face is an image of self-delineated in terms of approved social attributes-albeit an image that others may share, as when a person makes a good showing for his profession of religion by making good showing of himself.

Based on this, it can be seen that the 'face' is a self-image that describes social attributes, where the assumption of an individual's self has an appearance in public. Brown and Levinson (1987) suggest that the 'face' is something that is emotionally noted in the interaction. Explained by Yule (1996) by arguing that the 'face' is a person's public self-image. Based on this, it is known that the 'face' is a person's self-image.

From these three opinions it can be concluded that the 'face' is a self-image or public self-image which plays a major role in every culture, and this shapes how the character of the speaker is considered by the speaker partner.

There are two types of faces based on Brown and Levinson's theory supported by Yule (1996) as follows : (1) A person's negative face is the need to independent, to have freedom of action, and not to be imposed by others. The word 'negative' here doesn't mean 'bad', it's just the opposite pole from 'positive'; (2) A person's positive face is the need to be accepted, even liked, by others, to be treated as a member of the same group, and to know that his or her wants are shared by others. In simple terms, negative face is the need to be independent and positive face is the need to be connected.

From Yule's opinion it can be concluded that 'face' can be divided into two, namely *negative* and *positive faces*. A *negative face* is one's need to be independent, have freedom of action, and do not want to be dropped by others. The word *negative* here does not mean 'bad', but only the opposite of positive. While *positive face* needs to be accepted, even liked, and known by others, treated as members of the same group, and desires to be owned by others.

Briefly, Yule (2010) compares negative faces and positive faces as follows:

Table 1: The difference between negative and positive face

	Negative face	Positive face
Expectations	Free of burden	Social approach
Needs		<ul style="list-style-type: none"> • To be connected • To be accepted as a group member with the same goals • To be independent • To have freedom to act, and not be burdened.
Emphasis	To respect and care	To solidarity and similarity

2) Face-Threatening Act

Face-Threatening Acts (FTA) can be defined as acts that inherently damage the face of the addressee or the speaker by acting in opposition to the wants and desires of the other (Brown & Levinson, 1978: 26). They divided Face Threatening Act (FTA) into:

- a) Positive FTA: the speaker or hearer does not care about the other person's needs or feelings.

- b) Negative FTA: negative face is threatened when an individual does not avoid or intends to avoid the obstructions of his interlocutor's freedom of action.

3) Politeness Strategy Brown and Levinson

Politeness Strategy is a strategy that is used to avoid or minimize disfiguration of self-image from Face-Threatening Act by a speaker (Brown and Levinson 1987:68). Based on that, there are five Politeness Strategies, they are:

- a) Bald on Record, is a politeness strategy without further ado. This means that the speaker conveys directly what actually has to be done without using other meanings or expressions. This is usually used also for urgent matters (e.g. "Watch out", "be careful"). According to Brown and Levinson (1978:94), Bald on Record deals with Grice's Maxims (1975) which reveals that to get the maximum advantage in communication, people should consider the quality, quantity, relevance, and also manner. It means that, people ought to tell the truth, not to say something less or more than is required, be relevant with the topic discussed and avoid ambiguity.
- b) Positive Politeness, is redress directed to the addressee's positive face, his perennial desire that his wants (or the action/acquisition/values resulting from them) should be thought of as desirable (Brown and Levinson, 1987:101). The speaker trying to make the listener feel supported. This is useful for maintaining friendly relations in groups. This type of strategy is usually seen in groups of friends or where people in social interactions know each other well. Bousfield (2008:57) said "Positive face refers to every individual's basic desire for their public self-image that want to be shown engagement, ratification, and appreciation from others the want to be wanted".
- c) Negative Politeness, is redressive action addressed to the addressee's negative face: his want to have his freedom of action unhindered and his attention unimpeded (Brown and Levinson, 1987:129). This is usually oriented from the hearer's negative face. Negative face is the desire to remain autonomous so the speaker is more appropriate to include an out for the listener, through distancing styles like apologize (Mills, 2003). Negative face represents the want of every action to get freedom from impingement (Bousfield, 2008:57).
- d) Off Record, is an indirect strategy which is the final politeness strategy outlined by Brown and Levinson. This strategy includes rhetorical questions of

metaphor and irony, disparaging, tautology, and using connotations instead of direct requests.

- e) Do not do FTA. Apart from implementing the strategies above, sometimes the speaker Do not do FTA or zero strategies. if the speaker decides that degree of the FTA is too great, he may decide to avoid offending the hearer at all with this particular FTA, or he prefers to say nothing verbally or non-verbally. (Leech, 1983: 72)

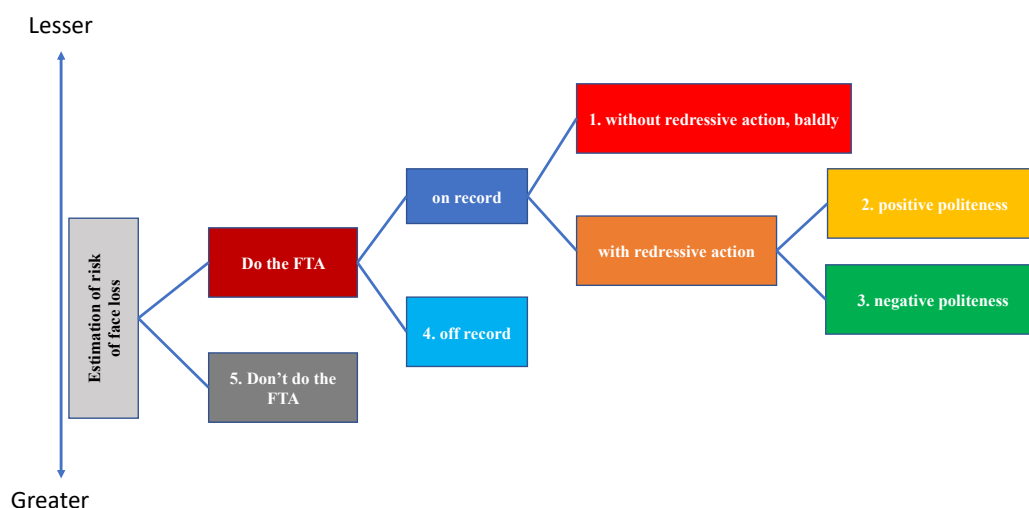


Figure 6. Circumstances determining choice of strategy

Source: Adapted from Brown, Penelope and Levinson, C. Stephen. 1987. *Politeness: Some Universals in Language Usage*. United Kingdom: Cambridge University Press.

According to Leech (1983 : 31), there are three sociological factors affect the choice of politeness strategy and seriousness of the face threatening action, social distance between speaker and listener, the power difference between the speaker and listener and seriousness of the face threat.

- a) Social Distance Between Parties (Symmetric Relation).

Distinguishes kin or friend from a stranger with whom you may have the same social status, but who is still separate because of social distance. Different acts may be seen as face-threatening or non-face threatening depending on the social distance between speaker and listener.

Example: We may use less elaborate positive strategies or we may choose to use positive rather than negative politeness when speaking with family rather than a stranger.

b) Power Relations Between Parties (Asymmetric Relation).

We are inclined to speak to our social equals differently than those whose status is higher or lower than our own in a given situation.

Example: If a professor is working in her office and people are being very loud and disruptive in the next room, she will go over there and tell them to be quiet but the way she does it will differ depending on who it is. If they are students she will use the bald on-record strategy to make sure there is no confusion in what she is asking, saying: "Stop talking so loud!". But if they are colleagues she will claim common ground with them using the positive politeness strategy or frame an indirect request for them to stop talking, saying: "I'm working on a lecture and it's really hard to concentrate with all this noise." Additionally if they are really high status directors of the department she may end up saying nothing at all or apologize for interrupting them, refraining from the face-threatening act.

c) The Absolute Ranking Of The Threat Of The Face-Threatening Act.

Some impositions are considered more serious than others. Highly imposing acts like requests demand more redress to mitigate their increased threat level.

Overall the formula for the weight of a face-threatening act is:

Weight = Social distance (speaker, hearer) + power difference (speaker, hearer)
+ rank of imposition

There are two ways of looking at politeness (Leech, 2014 : 88):

a) Pragmalinguistic (formerly "absolute") politeness scale.

We can order utterances on a scale of politeness while keeping context invariant. For example, out of context, on the pragma linguistic scale of politeness, we can judge that Can I borrow your camera? is more polite, as a request, than Lend me your camera, and is less polite than Could I possibly borrow your camera? There is a semantic reason for this: in a default⁸ sense, the more a request offers choice to H, the more polite it is. Similarly, Thank you very much is more polite than Thanks, because it intensifies an expression of gratitude, rather than expressing gratitude in a minimal way.⁹ This scale is unidirectional and registers degrees of politeness in terms of the lexigrammatical form and semantic interpretation of the utterance.

b) Sociopragmatic (formerly “relative”) politeness scale.

This is politeness relative to norms in a given society, group, or situation. Unlike the absolute or semantic scale, it is sensitive to context and is a bidirectional scale. Hence it is possible that a form considered more polite on the pragmalinguistic politeness scale is judged less polite relative to the norms for the situation. For example, *Could I possibly interrupt?* could be understood as “too polite,” say, if spoken to family members monopolizing the conversation; it would probably be interpreted as sarcastic and hence offensive. The sociopragmatic politeness scale registers “overpoliteness” and “underpoliteness,” as well as “politeness appropriate to the situation.”

According to Leech (1983 : 176), there are some responses to requests that can be broadly divided into positive, or **compliant responses**, and negative responses, or **refusals**.

- a) Positive responses are like offer in that they observe the Generosity Maxim and are instances of positive politeness. *Yes/Yeah* and *Okay* are common routine replies, often with additional material added. As one would expect with positive politeness, the “*Yes*” answer can easily be intensified, by adding or substituting a modifier like *certainly* in “*Can I have a sponge now?*” “*Certainly*”.
- b) Another compliant way to answer a request is to use *I* followed by an appropriate modal; for example, a natural response to a *Can you...* request is *I can*. It is significant, here, that the hypothetical form of the modal used in the request is rarely mirrored in the response. For example: *Would you would you just hang on a minute?*, *Would you* is answered by *I will* rather than *I would*:
- A : *Would you, would you apologize to Steve on our behalf ?*
 B : *I will.*
- c) The negative politeness that encourages the use of tentative hypothetical forms like *would* is not appropriate to the reply, where positives politeness (in keeping with the Generosity Maxim) encourages a more enthusiastic response. However, there are occasions where the reply to a hypothetical request mirrors the request’s hypothetical character.

Examples :

Student : You *couldn't* give me a few more equations just

Tutor : Equations I certainly *could* I certainly *could*

Strictly, one might regard the *could* in the tutor's reply as inappropriately flouting the Generosity Maxim—which would favour *can* as a more enthusiastically compliant response to a request. Possible explanations for examples like this are:

- (i) that the automatic repetition of the modal verb used in the request is easier from a processing point of view, and;
- (ii) that the extensive pragmatization of the hypothetical *could* lead to its use in responses that are no longer at all hypothetical or tentative in intent.

It is clear from the repeated intensifier *certainly* that the tutor, despite using *could*, is expressing eagerness to oblige.

- d) A refusal, as an FTA, is a dis-preferred response: *No* is far rarer than *Yes*, and direct refusal is avoided, sometimes through evasion or prevarication. In example below, B avoids answering the specific request by stating a general rule, where negation is mitigated by hedging (*I don't think . . .*).

A: Could you break down the profit of the FT group between Les Echoaa and, and the FT in the UK?

B: I don't think we normally do that.

The negative response can be introduced by the prevaricating discourse marker *Well* as a means of avoiding direct negation:

A: Can you do this <-|-> please mummy.

B: Well, wait till we've washed up . . .

It is difficult to track down examples of bald-on-record refusals, but their lack of politeness is likely to be found acceptable only where social distance is small, for example, in this argument over money apparently between a mother and her teenage son:

A: I've only got six hundred and fifty, will you give me some? B: No I won't

A: <yawning> Oh, I'm skint

B: That's your problem

Needless to say, this confrontation between parent and child allows no role for politeness.

4) Yassi's politeness theory framework

Based on his research in 2017, Yassi stated that there are intrinsic differences underlying the failure of the Brown and Levinson (B&L) politeness framework to elucidate the politeness phenomena of ethnic languages in South Sulawesi and may also include cultures of ethnic languages in Indonesia and Asia. Yassi found that there are aspects of cultural schemata background contained in the concept of politeness that is believed and applied by the theoretical framework of B&L set in European-American culture and the politeness phenomena of cultural heritage languages in Asia including Indonesia. B&L views politeness as an instrument while the Bugis-Makassar culture sees politeness as a norm taught from generation to generation (Yassi, 1996).

Yassi stated that the politeness phenomena will vary from one culture to another. In other words, every culture has a specificity to the application of the concept of politeness. Lakoff (1990:34) defined Politeness as a system of interpersonal relations to minimize conflict, to establish levels of mutual comfort, and to show awareness of another person's face. Distance is characterized as an impersonality strategy, obedience as a strategy of doubt, and friendship as a strategy of informality. According to Lakoff, Asian culture generally tends to adopt a compliance strategy, European culture tends to use the distance strategy, while American culture tends to adopt a friendship strategy.

Yassi politeness theory framework is the result of the adaptation and development of B&L politeness theory (1978, 1987) and S&S (1983, 1995). Yassi (1996) developed politeness patterns into six systems, as follow:

- a) Respect is not related to the configuration (-P, + D, -K), for example: interactions between people who don't know each other;
- b) Respectfully related to configurations (-P, + D, + K), for example: interactions between distant families;
- c) Familiar with no configuration (-P, -D, -K), for example: interactions between friends;
- d) Familiar with configuration (-P, -D, + K), for example: interactions between close relatives;
- e) The hierarchy is not related to the configuration (+ P, + D, -K), for example: interactions between superiors and subordinates, and;

- f) Hierarchy is related to configurations (+ P, -D, + K), for example: interactions between parents and children, uncles and nephews, grandparents, and grandchildren/great-grandchildren.

P means power or social status, D means distance, and K means kinship. The sign (+) means the aspect or character that exists, while the sign (-) indicates that the character does not exist. It is believed that these three social variables (P, D, K) contribute positively to the politeness strategies chosen by speakers when communicating with their interlocutors. The following tables clarifies the six system of Yassi's theoretical framework:

Table 2: Yassi's theoretical framework

Social Relations of Speech Participants		P (Power)	D (Distance)	K (Kinship)	Example
Symmetry (Equivalent)	Respect Non-Relatives	-	+	-	ATC-Pilot
	Respect-Relatives	-	+	+	Niece-auntie
	Familiar non-relatives	-	-	-	Between friends
	Familiar-related	-	-	+	Wife-Husband
Asymmetry (Not Equivalent)	Hierarchy non-relative	+	+	-	Staff-Manager
	Hierarchy relative	+	-	+	Son-Father

Yassi (2017) states that the situation of the speech and whoever the participants are, the politeness strategy pattern generally applied by the four ethnic cultures of South Sulawesi, including Indonesia in general, is a negative politeness strategy, which emphasizes the aspect of "respect" (deference) rather than the pattern a positive politeness strategy, which emphasizes the "familiarity" (solidarity) aspect that is commonly used in societies with American culture. This is in line with Lakoff (1990) which says that Asian cultures generally use respectful strategies. The following diagram clarifies the category and direction of Yassi's theoretical framework.

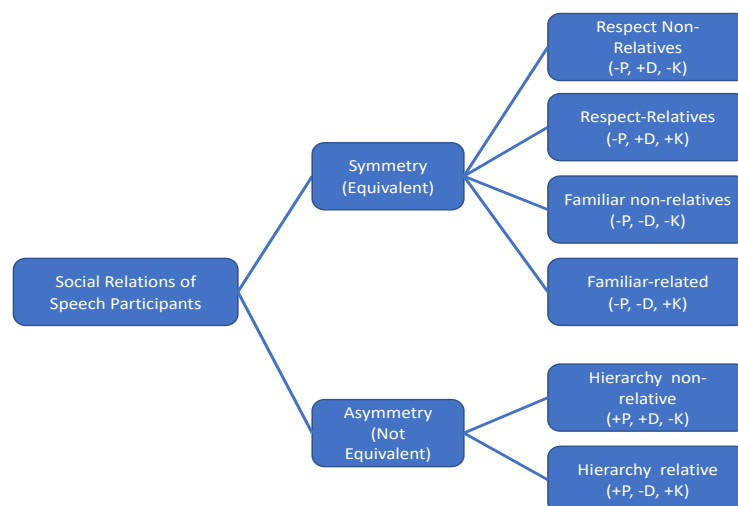


Figure 7. Yassi's Six Modes of Social Interaction (1996, 2011)

Source: Yassi, A. H. 2017. *Ancangan Model Kerangka Teori Kesantunan Yang Efektif Mengkaji Budaya Bahasa-Bahasa Warisan Di Asia: Review Terhadap Keuniversalan Kerangka Teori Kesantunan Brown & Levinson*. Masyarakat Linguistik Indonesia.

d. Effective communication.

Communication has become an integral part of our everyday life. Activities, from basic things like teaching and giving exams to more complex ones like running an organization or controlling airplanes. However, poor communication can lead to inefficiency and disruption of activities. Thus, mere communication does not serve any purpose. It needs to be effective and clear.

An effective communication refers to the process of sharing information between two or more entities which leads to the desired outcome. Tubbs and Moss (2006), state that communication is effective when the stimulus as initiated and intended by the sender, or source, corresponds closely to the stimulus as it is perceived and responded to by the receiver.

Tubbs and Moss (2006) provide the following definitions for types of communication models:

- **Verbal** - any type of spoken communication that uses one or more words;
- **Intentional verbal** - conscious attempts we make to communicate with others through speech;
- **Unintentional verbal** - the things we say without meaning to;

- **Nonverbal** - all of the messages we transmit without words or over and above the words we use;
- **Intentional nonverbal messages** - the nonverbal messages we want to transmit; and
- **Unintentional nonverbal messages** - all those nonverbal aspects of our behavior transmitted without our control.

Effective communication with ATC is a major concern for pilots and controllers everywhere. For this reason, a specialized code—standard phraseology—has evolved for the specific purpose of radiotelephonic communications. Standard phraseology covers a wide range of routine and non-routine situations; nevertheless, there are times when pilots and controllers need to discuss issues outside the boundaries of standard phraseology (Barshi and Farris, 2016: 4).

e. Communication between controller-pilot.

Barshi and Farris (2016) state that communication is complex and involves many factors—linguistic, cognitive, social, environmental, technical and organizational. It is through language, however, that this combination of factors produces either successful or unsuccessful communication. Language-related issues, such as use, proficiency and standardization, have therefore emerged as major concerns for a variety of stakeholders, including pilots and controllers, national civil aviation authorities, and the International Civil Aviation Organization (ICAO).

In their daily work, controller and pilot always communicate either through radio or via CPDLC. Morrow, Rodvold, and Lee (1994: 238) define routine controller–pilot communications as a collaborative scheme involving three phases:

- a. **Initiate** : the pilot initiates communication by getting the controller's attention.
- b. **Present** : the controller gives the pilot new information and/or instructions.
- c. **Accept** : the pilot acknowledges and/or reads back the information to confirm mutual understanding and the controller "hears back" the pilot's readback.

The difference between "routine communication" and "non-routine communication" can be seen in the example (5) below, it illustrates nicely the full

cycle of clearance, readback, hearback, correction, and acknowledgment: as follows:

Example 6:

- 23.13 UTC (a) Pilot : CEB279 request descend
 (b) ATC : CEB279 descend level 250
- 23.14 UTC. (c) Pilot : CEB279 to confirm descend level 250?
 (d) ATC : CEB279 affirm descend level 250
 (e) Pilot : Flight Level 250 CEB279

In example (6a) and (6b) are forms “routine communication”, the pilot receiving ATC instructions is expected to read back all the parameters the flight has been cleared for. This readback procedure provides the controller with an opportunity to verify that the full and correct information has been received by the proper crew. In (6a), the controller issues a set of instructions to the crew of Cebu 279. The crew reads back correctly the altitude (6b), and controller received the pilot’s readback (proper hearback), but 1 minute later, pilot confirm the altitude (6c). The controller notices the confirmation and restates the attitude (6d). In (6e) the crew reads back the altitude correctly and closes the cycle of communication.

The confirmation in (6c) above leads to what Morrow, Rodvold, and Lee (1994) call “non-routine communication.” It is non-routine because two further exchanges and more time are necessary to complete a single cycle.

ATC radio procedures are based on the assumption that communication is routine. Non-routine communication increases workload and frequency congestion. One of the aims of the research is to find ways to minimize the need for non-routine communications.

As state in ICAO Document 4444, The flight crew shall read back to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice. The following items shall always be read back:

- a) ATC route clearances;
- b) clearances and instructions to enter, land on, take off from, hold short of, cross, taxi and backtrack on any runway; and
- c) runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained

in automatic terminal information service (ATIS) broadcasts, transition levels.

Other clearances or instructions, including conditional clearances, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

The controller shall listen to the readback to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the readback. Generally controllers call this procedure as a “hearback” procedure.

McMillan (1998) explained that the communications technique required by ICAO is a four-step ‘confirmation/correction closed-loop’:

1. the sender transmits a message;
2. the receiver actively listens to the message;
3. the receiver repeats the message back to the sender;
4. the sender actively listens for the correct readback.

Barshi and Farris (2016) explained the readback and hearback procedure as follow, while pilot receiving ATC instructions is expected to read back all the parameters the flight has been cleared for. This readback procedure provides the controller with an opportunity to verify that the full and correct information has been received by the proper crew.

In general, the communication process between the controller-pilot is as follows:

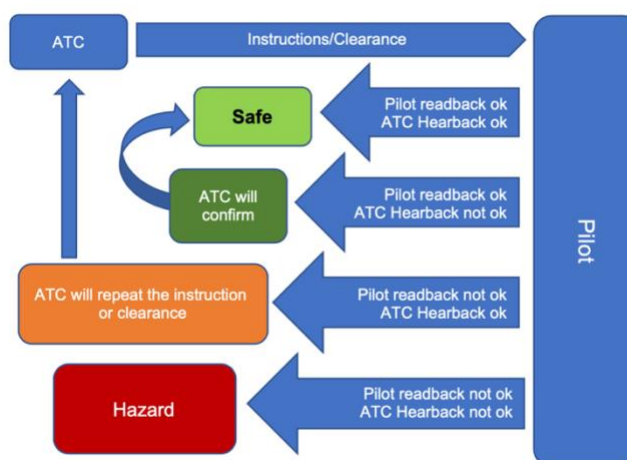


Figure 8: Communication process between controller-pilot

Source: Based on observations in the Radar operating room

3. Swiss Cheese Model

The occurrence of an accident often involves various factors that influence. An accident does not always necessarily occur without prior events that lead to an accident. These events occur gradually but are still within a certain tolerance limit. One time the accumulation of events can result in an accident because it has exceeded the tolerance limit.

Reason who works in the field of psychological error mechanisms (Reason 1975; 1976; 1979), developed a model of human error mechanisms. Reason examines two types of errors: active errors and latent errors. Active errors can be directly felt while the latent errors tend to be hidden in a system until they are joined by other factors to break through the protection system.

Reason accepts that accidents are not solely due to individual operator errors (active errors) but lie in the wider systemic organizational factor (latent conditions) at the top level of the organization. The Reason Model is then known as the Swiss Cheese Model (see figure 9), and it is a famous model explaining the accident causation theory. This theory is focusing on risk analysis and risk management. Reason promotes three elements to become part of organizational accident study, they are: hazards, defences and losses.

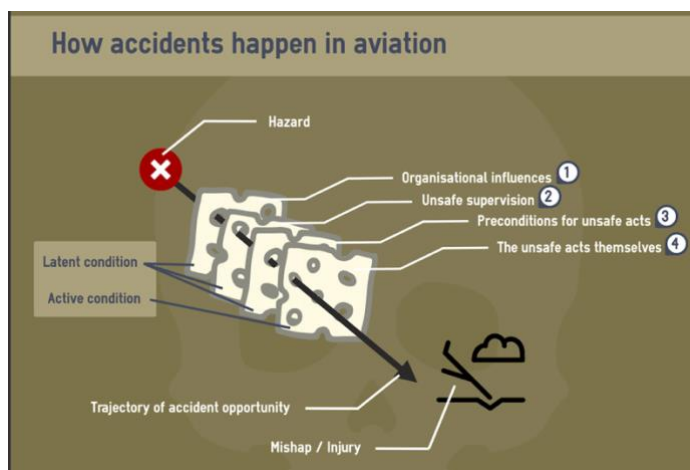


Figure 9: Swiss Cheese Model

Source: <https://aviatortraining.net>, accessed on July 2020

Reason (1997) said that there are two kinds of accident, they are individual accident and organizational accident. The individual accident is an accident which is frequently occurring and the result is a minor loss. Unlike individual accident, organizational accident rarely to occurs, but once it occurs it will be a catastrophe.

While the individual accident may have a person to be the agent and the victim, an organizational accident can have devastating effects on uninvolved populations, assets and environment.

In an organization, an incident or accident cannot be seen only as a single person's mistake. A wide range of investigation to analyse the organization's defence weakness should be conducted. The cause of the accident or incident may be coming from the infrastructure such as regulations or procedures which is supported by the other layer's weakness. Hazard can be dormant or potential. Once a hazard active and breakthrough defence layers, then it can cause an incident/accident which may be followed by some losses.

The defence is protection against attacks or hazards, it may be physical or nonphysical. Typically defence is consist of some layers, multiple layers of defence will ensure the hazard will not breach it. The nonphysical defence may be in the form of regulation which is created to block an identified hazard, thus a good safety management system will be able to predict a hazard before this hazard is capable in breaching the defence layers.

The ideal shape of defence layers should be solid and without holes. But unfortunately, the human who creates the defences has what is so-called human nature. Doing an error is really human, and unfortunately doing errors repeatedly is also human. The comparison between ideal defence layers and defence layers, in reality, will look like figure 4. Safety manager should try to identify the existence of defence weaknesses, and try to fix it to avoid hazard penetration.

Swiss cheese model is derived from the shape of the swiss cheese which has holes here and there. A cheese layer represents a defence layer. The weakness of defence layers will not make an active hazard to cause an incident if only when this weakness is not supported by the next defence layer. A hazard causes an accident and losses only when those defence layers has weaknesses which support one another.

C. Air Traffic Services

As described in ICAO document Annex 11, Air Traffic Services is a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control

service or aerodrome control service). For the purposes of this thesis, researcher will only explain the Air Traffic Control service, where units can provide instructions (positive control) in accordance with ICAO regulations, while other units only provide advice and/or provide instructions from the Air Traffic Control Service Unit

In Appendix 11 it is explained that air traffic control services are services provided for the purpose of:

- 1) preventing collisions:
 - a) between aircraft, and
 - b) on the manoeuvring area between aircraft and obstructions; and
- 2) expediting and maintaining an orderly flow of air traffic.

Whereas the Air traffic control unit is a generic term meaning variously, aerodrome control tower, approach control unit, or area control center.

1. Aerodrome control tower

Aerodrome control tower (ADC), is a unit established to provide air traffic control service to aerodrome traffic. Aerodrome control tower (commonly abbreviated as ADC or Tower) is responsible for making separation arrangements between aircraft in the vicinity of an aerodrome. ADC personnel in working using VHF radio equipment to give instructions directly to the Pilot, starting from the aircraft will start the engine, push-back, taxi, to take-off leaving the vicinity of an aerodrome. Furthermore, the aircraft will be guided by the Approach control unit. This also applies vice versa for arrival aircraft.

2. Approach control unit

Approach control unit (APP), is a unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes. Approach control units (commonly abbreviated as APP) conduct air traffic control using VHF radios and for areas that are quite dense air traffic, these units are usually already equipped with Surveillance technology (RADAR and ADS-B). For areas that are not too dense the amount of air traffic, this unit usually conducts air traffic control based on reports from pilot regarding their position and altitude. The jurisdiction area of the APP unit is between 30 - 60 NM (Nautical Miles) and 0 - FL240 (Flight Level 24,000 Feet) above the mean sea level.

3. Area control centre

Area control centre (ACC), is a unit established to provide air traffic control services to controlled flights in control areas under its jurisdiction. Area control centers (commonly abbreviated as ACC) regulate air traffic using VHF radios (and VHF-Extended Range) and CPDLC (Controller-Pilot Data Link Communication). In Indonesia, there are 2 ACC namely Jakarta ACC which is located at Jakarta Air Traffic Service Center (JATSC), and Ujung Pandang ACC which is located at Makassar Air Traffic Service Center. The Jakarta ACC jurisdiction area is 1/3 of the total area of Indonesian airspace while the Ujung Pandang Jurisdiction Area ACC covers 2/3 of the Indonesian airspace area. This area of jurisdiction is also referred to as Flight Information Region (FIR), as mentioned in ICAO Document 4444, Flight information region (FIR) is an airspace of defined dimensions within which flight information services and alerting services are provided. The height limit which is the responsibility of the ACC Unit is from FL240 to FL600 (24,000 feet - 60,000 feet).

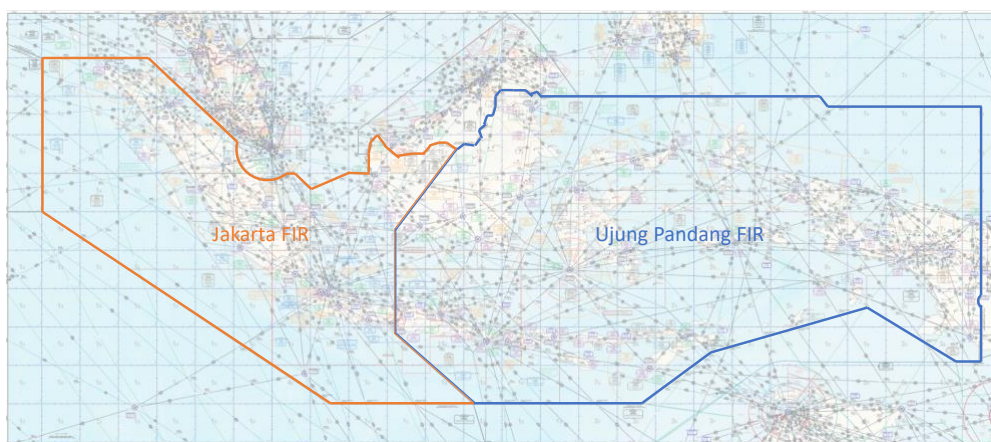


Figure 10. Indonesia Flight Information Region

Source: Enroute Chart Indonesia 2019, Perum LPPNPI (AirNav Indonesia)

In each of these FIR is divided into several sectors in order to facilitate controllers in managing air traffic. For example in Ujung Pandang FIR ACC is divided into 9 sectors namely:

1. UBPN : Upper Balikpapan
2. UPKN: Upper Pangkalan Bun
3. UBLI: Upper Bali

4. UMKS: Upper Makassar
5. USBY: Upper Surabaya
6. UNSA: Upper Nusa Tenggara
7. UAMN: Upper Ambon
8. UMNO: Upper Manado
9. UPUA: Upper Papua

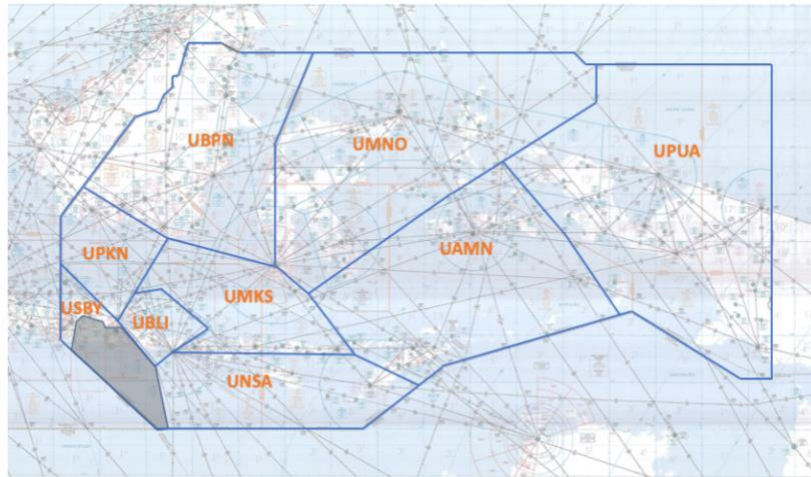


Figure 11. Ujung Pandang ACC Sectors

Source: Enroute Chart Indonesia 2019, Perum LPPNPI (AirNav Indonesia)

For the division of regions based on height as shown below:

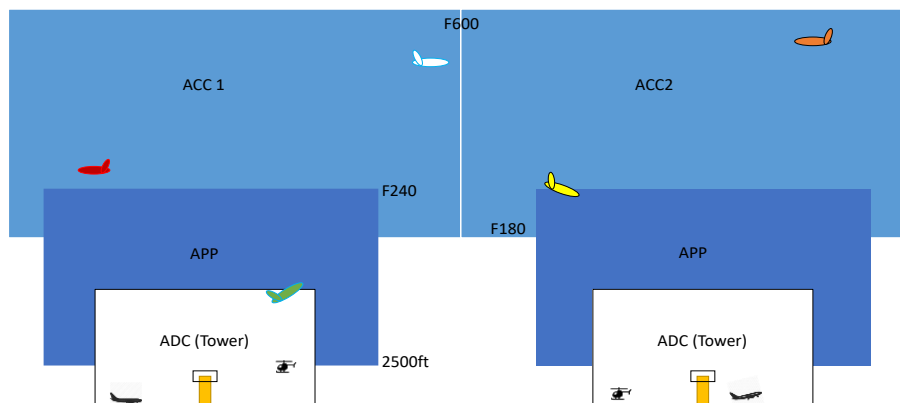


Figure 12. Division of Regions Based On Height

Source: Based on observations in the Radar operating room

D. Phraseology

In daily work, the communication procedures between controllers and pilots must be in accordance with Volume II Appendix 10 - Aeronautical Telecommunications, and pilots, ATS personnel, and other ground personnel. Both parties are required to be thoroughly familiar with the radiotelephony procedures contained therein. Therefore, in the ICAO Document 4444, there are patterns of phraseology used by ATC. The definition of phraseologies are grouped according to types of air traffic service for convenience of reference. However, users shall be familiar with, and use as necessary, phraseologies from groups other than those referring specifically to the type of air traffic service being provided. All phraseologies shall be used in conjunction with call signs (aircraft, ground vehicle, ATC or other) as appropriate.

Based on that, ATC should use standard phraseology in communication with pilot. In the process of this research, the researcher found that phraseology is a form of sentence that grammatically does not comply with the prevailing rules, but when used it can be understood by controllers and pilots. The purpose of using those phrases in the world of aviation is to simplify and reduce misunderstanding, while in practice incidents or accidents are often encountered due to misunderstandings that still arise in the use of phraseology.

Batubara (2015) explained that ATC should use standard phraseology in communication with pilot. However, to other controllers or pilot which had been their responsibility in using it. But in other cases sometimes controllers inserted non-standard phraseology among their communication. It would not take risk if they know how to use it in the right way, it would never make some mistakes although non-standard phraseology often occur an accident or miscommunication but they can take the guarantee to use non-standard phraseology as their responsibility because it can make their jobs run well and more comfortable. She also explained that it is possible that one time the non-standard phraseology can be the regular phraseology used in controller's communication whether the words or phrases will be standardized by ICAO or not.

That's why phraseology is the unique language used by ATC in their daily job, interact with pilots in a communication in order to prevent collisions, organize and expedite the flow of traffic, and provide information and other support for pilots.

Circumstances		Phraseologies
12.3.1.1	DESCRIPTION OF LEVELS (SUBSEQUENTLY REFERRED TO AS "(LEVEL)")	a) FLIGHT LEVEL (number); or b) (number) METRES; or c) (number) FEET.
12.3.1.2	LEVEL CHANGES, REPORTS AND RATES	a) CLIMB (or DESCEND); followed as necessary by: 1) TO (level); 2) TO AND MAINTAIN BLOCK (level) TO (level); 3) TO REACH (level) AT (or BY) (time or significant point); 4) REPORT LEAVING (or REACHING, or PASSING) (level); 5) AT (number) METRES PER SECOND (or FEET PER MINUTE) [OR GREATER (or OR LESS)];

... instruction that a climb (or descent) to a level within the vertical range defined is to commence

Figure 13. Example of ATC Phraseologies in ICAO document 4444
 Source: ICAO Document 4444: Procedures for Air Navigation Services-Air Traffic Management. Montreal: International Civil Aviation Organization.

E. Controllers Workload in Ujung Pandang ACC

To get an idea of the controllers workload we can see from:

1. Amount of traffic per day; An example is UBLI (Upper Bali Sector) data traffic in December 2019 with an average movement of 567 per day, where the highest movement is at 640, and the lowest is 505 movements.
2. Calculation of ATC workload; For example, the ATC Workload calculation data for 2017 is taken as shown below:

No	Personil	routine Task (F1)						Workload Routine Task (Second)	conflict task (C1)		Workload Conflict Task	climb/descent (Cnf)		Workload Climb/Descent Task	JUMLAH PESAWAT	TOTAL WORKLOAD (Minute)	KATEGORI WORKLOAD		
		komunikasi dengan Pesawat Udara		Koordinasi dengan Adjacent Unit atau		Aktivitas Lainnya			Jumlah Kejadian	Durasi (sec)		Jumlah Kejadian	Durasi (sec)					Jumlah Kejadian	Durasi (sec)
		Jumlah Kejadian	Durasi (sec)	Jumlah Kejadian	Durasi (sec)	Jumlah Kejadian	Durasi (sec)												
UWM																			
1	SS	154	14.816	49	1.900	249	8.750	4553.514	17	2.716	46.172	57	6.533	372.381	53	82.868	OVERLOAD		
2	DE	136	14.1666	12	7.917	375	11.650	6390.407	22	2.183	48.033	37	3.616	133.792	51	109.537	OVERLOAD		
3	DK	111	17.4333	16	0.950	278	13.167	5610.722	12	1.483	17.796	48	7.217	346.416	58	99.582	OVERLOAD		
4	FW	191	18.983	8	0.667	304	8.867	6326.657	34	2.950	100.300	48	4.483	215.184	53	110.702	OVERLOAD		
5	RE	168	19.650	15	1.250	504	9.567	8811.178	17	2.267	38.532	52	6.167	320.663	60	152.840	OVERLOAD		
6	YL	1109	18.483	12	0.433	290	10.950	23678.343	36	5.300	190.800	57	8.083	460.731	79	405.498	OVERLOAD		
7	RE	166	13.833	11	0.567	133	5.067	2976.368	7	0.667	4.666	33	2.167	71.458	72	50.876	OVERLOAD		
8	RO	128	8.750	8	0.400	9	0.666	1129.194	3	0.733	2.199	35	2.550	89.250	61	20.344	MEDIUM LOAD		
9	RE	107	6.900	15	1.233	50	3.450	929.295	18	1.666	29.988	39	2.850	111.150	69	17.841	LIGHT LOAD		
10	RE	176	9.750	2	0.083	51	2.300	1833.466	25	7.183	179.575	43	2.750	118.250	62	35.522	HEAVY LOAD		
11	RE	119	11.983	10	0.666	18	1.517	1459.973	16	2.317	37.066	42	4.817	202.297	73	28.322	MEDIUM LOAD		
12	EP	129	15.750	12	0.583	310	11.100	5479.746	23	4.017	92.391	62	9.833	609.646	76	101.030	OVERLOAD		
13	RE	154	19.017	11	0.917	63	5.700	3297.805	19	2.533	48.127	47	5.817	273.399	64	60.322	OVERLOAD		
14	SS	103	8.767	21	2.167	308	11.033	4346.672	18	3.300	59.400	34	4.767	162.078	70	76.136	OVERLOAD		
15	RE	177	22.330	10	0.600	196	5.700	5075.610	18	1.900	34.200	61	6.467	394.466	66	91.738	OVERLOAD		
16	RE	98	11.467	11	0.917	92	2.750	1386.853	18	2.417	43.506	32	4.217	134.944	53	26.088	MEDIUM LOAD		
17	IF	140	13.933	16	0.883	304	12.533	5774.780	17	2.100	35.700	55	7.133	392.315	72	103.380	OVERLOAD		
18	BS	109	12.100	9	0.833	241	9.467	3607.947	7	0.483	3.381	12	1.350	16.200	67	60.459	OVERLOAD		
19	IF	174	11.283	2	0.117	101	3.217	2288.393	23	1.717	39.491	43	3.367	144.781	59	41.211	HEAVY LOAD		

Figure 14. Example of ATC Workload Calculation
 Source: Airspace Capacity Reports 2017 MATSC

Many factors can affect the controllers workload, such as overcoming routes in the sector, supporting equipment, weather, and so on. But from the two data above we can conclude that the workload of controllers is caused by 2 main factors, namely the amount of traffic in the sector and the duration of communication between controllers-pilots. A large amount of traffic must be balanced with efficient communication. If there is a mismatch from the controller to pilot, pilot is indeed required to confirm to the controller back. Therefore, we need a way to avoid this.

F. Separation

In regulating air traffic, A controller must make a separation between the aircraft as specified in ICAO document 4444, generally consists of:

1. Vertical Separation

Vertical separation is obtained by requiring aircraft using prescribed altimeter setting procedures to operate at different levels expressed in terms of flight levels or altitudes. The vertical separation minimum (VSM) shall be:

- a) a nominal 300 m (1 000 ft) below FL 290 and a nominal 600 m (2 000 ft) at or above this level, except as provided for in b) below; and
- b) within designated airspace, subject to a regional air navigation agreement: a nominal 300 m (1 000 ft) below FL 410 or a higher level where so prescribed for use under specified conditions, and a nominal 600 m (2 000 ft) at or above this level.

2. Horizontal (Lateral) Separation

The main principle is that if aircraft are at the same level (i.e. vertical separation is not applied) then they should be at different positions. In general, there are two types of Horizontal Separation, as follow;

- a) Procedural Separation

is to be provided during procedural control (without surveillance tools such as Radar or ADS-B). It depends on pilot report that refer to ground-based navigational aids such a VOR (VHF-Omni-directional Range), NDB (Non-Directional Beacons) or points. As an example We can see in figure below:

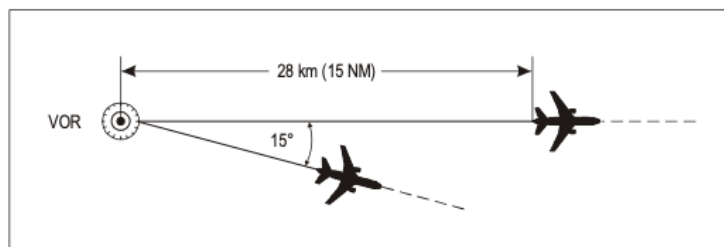


Figure 15. Example of Lateral separation

Source: ICAO Document 4444: Procedures for Air Navigation Services-Air Traffic Management. Montreal: International Civil Aviation Organization.

b) Surveillance Separation

When surveillance systems are used (based on radar, ADS-B, or MLAT) the minimum separation prescribed by ICAO Document 4444 is 5 nm (unless otherwise stated by the appropriate ATS authority). This minimum may be reduced by the appropriate ATS authority but not below:

- 3 NM when the surveillance systems' capabilities at a given location permit this;
- 2,5 NM between succeeding aircraft which are established on the same final approach track within 10 nm of the runway threshold. Some additional criteria must be met to apply this separation minimum.

The separation minimum or minima based on radar and/or ADS-B and/or MLAT systems to be applied are to be prescribed by the appropriate ATS authority based on the equipment used.

Therefore, higher than 5 nm horizontal separation minima may be applied in certain parts of the airspace and/or at certain times. In Indonesian airspace, we implement a 5 NM separation, as figure below:

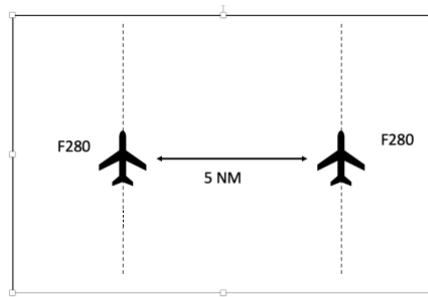


Figure 16. Example of separation surveillance in Indonesia FIR

Source: ICAO Document 4444: Procedures for Air Navigation Services-Air Traffic Management. Montreal: International Civil Aviation Organization.

3. Longitudinal Separation

Longitudinal separation is applied so that the spacing between aircraft is never less than a specified amount as described in ICAO Document 4444 (15, 10, 5 or 3 minutes).

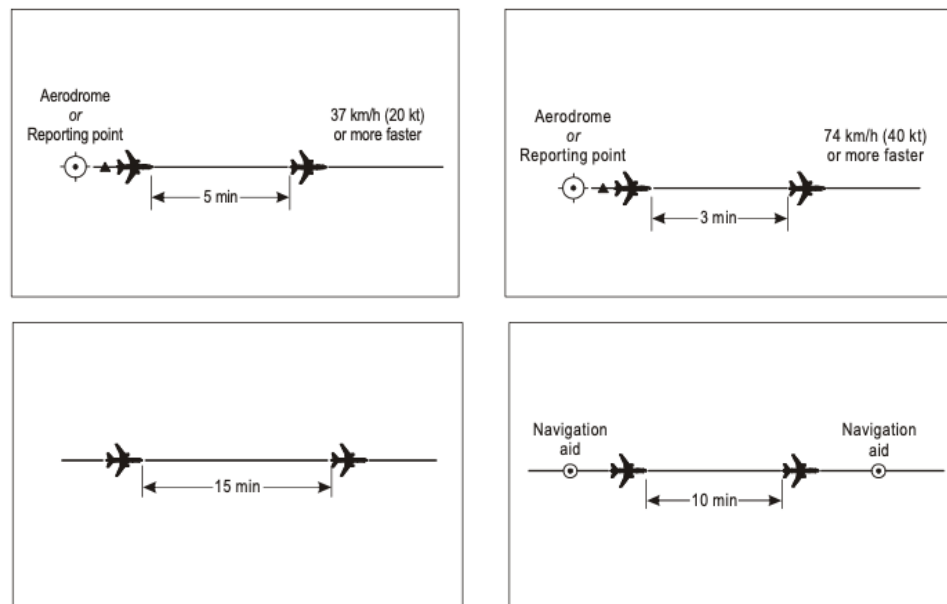


Figure 17. Longitudinal Separation

Source: ICAO Document 4444: Procedures for Air Navigation Services-Air Traffic Management. Montreal: International Civil Aviation Organization.

G. Theoretical Framework

In this study, researcher will compare controllers who work using only the phraseology contained in the ICAO 4444 document, with controllers that work using a strategy communication and a politeness strategy. The researcher will look for data whether using additional "initials" as a form of the communication strategy, can reduce controllers workload and improve flight safety.

Based on these strategies, the research will relate to:

1. Strategy communication to find the most effective communication;
2. Yassi's politeness theory framework which is focusing the strategy politeness between non-relatives (Controllers-pilots);
3. The Potential of hazard and increasing ATC Workload;
4. The Potential of reducing ATC workload for maintaining flight safety.

Based on those theories, the theoretical framework chart as follow:

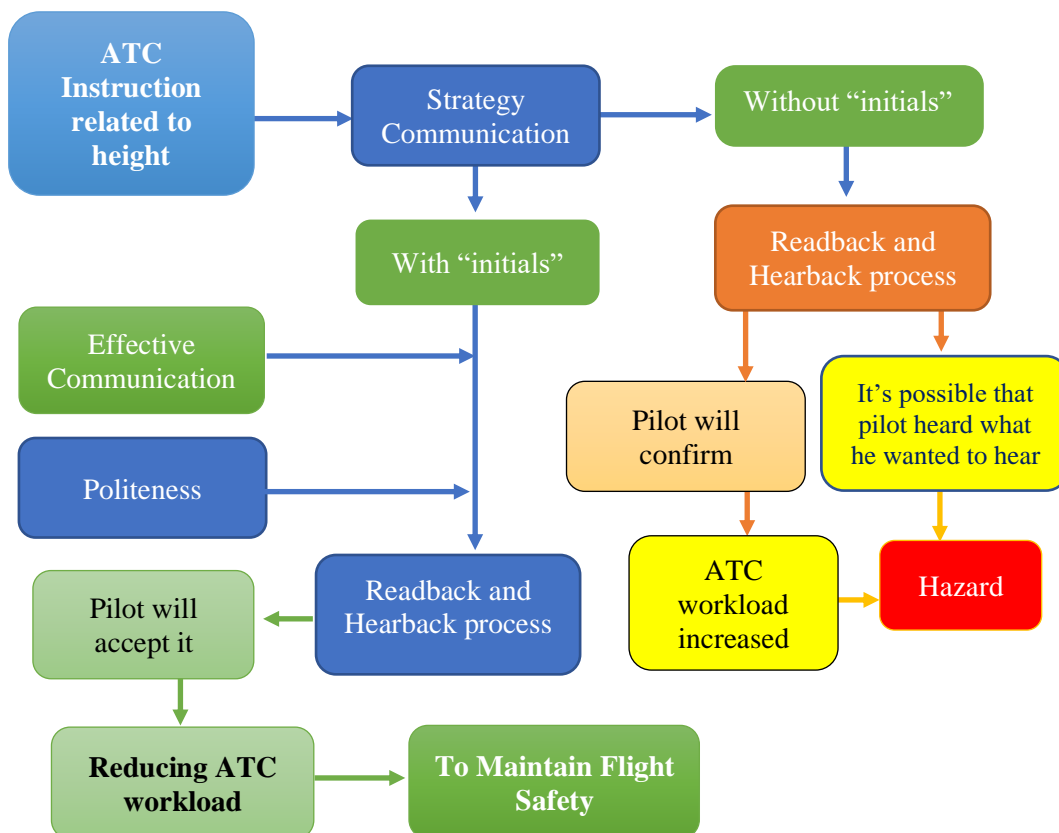


Figure 18. Theoretical Framework