

# Understanding Phraseology in Air Ground Communication for Traffic Controller's Aviation

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**Abstract:-** This research addresses the discussion on recognizing phraseology in Air Ground Communication for traffic controllers' aviation. The aims of this study are formulated as follows: 1) to reveal the construct patterns of phraseology used between Air Traffic Controller (ATC) operators and Pilots in communication, and 2) to find out the phraseology types in Air Ground Aviation communication. The data of this study are taken from Air Navigation (AirNav) of Makassar-Indonesia. The data are the English interaction between ATC operator, and Pilot speaking in commands or statements known as words and phrases (phraseology). The study uses a qualitative method. The data collection tools are a voice recorder for recording the data, a camcorder for interviewing, and then analyzing the subject. The results of the study show: First, there are five types of phraseology used by ATC in this study: RCP (Radar Control Phraseology), AERO-CP (Aerodrome Control Phraseology), APP-CP Area Control Phraseology), AREA-CP (Area Control Phraseology), and GP (General Phraseology). Second, the patterns of phraseology used so far are generally systemized, but it is occasionally justified depending on the situation. Third, there are no certain patterns used instead of first check and last check. Fourth, ATC is required to speak a standard phraseology commonly used which has been standardized by ICAO. and the last, the ATC operator could integrate the phraseology types based on the particular condition and situation, if required.

**Keywords:-** Phraseology; ICAO; ATC Operator; Pilot Communication; Aviation.

## I. INTRODUCTION

Language is a means of communication [1] to interact with each other. It is also a complicated, changed, and subtle thing [2]. Furthermore, phraseology is a unique language used in aviation in the world. It becomes an important point in the aviation system since it works to avoid collisions, control and smooth the flow of traffic, and provide pilots with information and other support. Communication between ATC operator and pilot must follow the operational procedures of standardized

phraseology [3]. The principle of communication between the ATC operator and the pilot applies Clark and Schaefer (1989) proposed the Ground Criterion Theory, which includes the listener (agents) and the speaker to achieve a state of common understanding (or even trust) about what is being said and meant [4].

Montgomery [5] He stated that the way individuals consider, experience, and communicate with each other is formed by language. Language might be studied as a communication system. A basic system for the process of building mature communities is a systemic knowledge of the language in use and a practical awareness of how a language works. The language is used precisely in the field of aviation by pilots, air traffic controllers (ATC) and some other employees associated with the aviation sector.

Cowie [6] stated that In language studies, phraseology is the study of fixed or set expressions, like phrasal verbs, idioms, and some other types of lexical multi-word units (sometimes jointly referred to as phrasemes), in which, when used independently, from the sum of their meanings, the component parts of the expression take on a meaning more specific or otherwise not predictable.

The study of language under the framework of linguistics is phraseology. This refers to the language used by the ATC to communicate with pilots. The ATC language, which is called phraseology, is used. In the aviation system, phraseology is standardized by ICAO. That is why all communication between ATC operator and pilot, under control by system and recorded, prefers using the standardized phraseology as ruled in ICAO.

In Document 4444 of ICAO [7], it is stated that ATC operator used six types of phraseology. These types are highlighted as follows; 1) GP (general phraseology) is used in general operation. Two words are commonly used; <CONTACT> and <CONFIRM>. 2) AERO-CP (Aerodrome Control Phraseology). This kind of phraseology is used in airport environments. <CLEARED TO LAND> and <CLEARED TO TAKE OFF> are two phraseologies

common to use. 3) APP-CP (Approach Control Phraseology). This kind of phraseology is used when flight operation is nearer to the airport (aerodrome area). 4) AREA-CP (Area Control Phraseology). This AREA-CP is used in an area where the aircraft is in close proximity or has already reached a certain cruising level position. 5) For the use of the radar, RCP (Radar Control Phraseology) is used. It is to assist controllers for landing process, to avoid incident and accident, and 6) CP (Coordination Phraseology) is managed by ground to ground station for making any responsibility from one traffic controller to another unit. This CO is to coordinate among all the unit. Especially for APP-CP, referring to point no. 3, is expected to combine with a navigation system such as VOR (Very High Omni Range), NDB (Non-Directional Beacon), and ILS (Instrument Landing System).

Based on the observation, there are phraseological patterns that were used by ATC operator and also the pilot. The pattern is in line with the standard operation procedures in Document 4444 of ICAO. Some steps of situation where phraseology will be used by controller in order to affect a change of frequency.

A. Aircraft Identification.

EXAMPLE 1

Aircraft identification <CONTACT>	Callsign must clear, location and frequency (terminal function)
<AT>	State clearly the time, altitude or fix <OVER>.
<NOTE>	Maintaining a listening from ACT controller tell the fixing or altitude position
<ATC Operator>	Eviting restrictions on frequency change whenever pilot compliance is assumed upon receipt

Pilots should utilize the following phraseology to establish interaction with the selected facility: when a report on the position will be made.

EXAMPLE 2

(name <CENTER>	(aircraft identification), (position), OVER
<PILOT>	(Mention the right position)

B. Specific Condition: there will be no report on the position..

EXAMPLE 3

Name <CENTER>	Identify the aircraft
<ESTIMATING>	Clarify time and point
<AT>	State the altitude and or the flight level)
<CLIMBING>	(it also may descend)
<MAINTAIN>	(state the altitude of flight level) <OVER>

C. No position report is required when operating in a radar environment..

EXAMPLE 4

(nama <CENTER>	State the aircraft identification (callsign)
<AT>	Where appropriate, state the exact altitude or flight level.

EXAMPLE 5

<LEAVINGL>	(Position of altitude level or flight level)
<CLIMBING>	It can also descend (depend on the instruction)
<TO MAINTAIN>	(Position of altitude level or flight level) OVER!
< FOR NOTE>	To make sure the exact altitude position (flight level)

The point to state here is the specific altitude or flight level position of the nearest 100-foot rise. This is an initial action contacting to ATC operator with the required information prior using MODE C.

In the interaction between ATC controllers inform the pilot to verify soon that they are at a particular altitude or high level. In this condition, the phraseology used will be <VERIFY AT> (mention the altitude). But in descending or climbing situation, the ATC controller will ask the pilots to <VERIFY ASSIGNED ALTITUDEAS.>. Here the pilot should directly have an altitude confirmation reported by the ATC controller.

Communication, Luhmann [8] defined as a means of sharing information, message, and understanding speaker and listener. In other words, every communication is the process of sending and receiving information through any medium. People communicate in different ways.

The interaction between ATC operator and pilot in air traffic controllers are two ways communication (interpersonal communication) Their communications include feedback (*hearback*) from sender to receiver and the receiver repeat it and lets the sender knows whether the message has been understood correctly. There is no a *yes* or *no* answer in their conversation/ communication. Hearback is a reception to repeat back the information. In ICAO Annex 10 Vol II [9] stated that Readback or Hearback is interpreted as a procedure in which the receiving station repeats the sound of the message as it was delivered to show the message was received well and serves as confirmation. The main point of this research is about the communication strategy used between ATC operator and pilot in communication. In this context, two ways communication between sender and receiver could have controlled each other, and this is where hearback or readback comes in. In the ESP context, the use of phraseology for the use of language is specifically used in the aviation industry, not used elsewhere.

**II. RESEARCH OBJECTIVES**

The purposes of this study are formulated as follows; 1) to identify the construct patterns of phraseology used between ATC (Air Traffic Controller) operators and Pilots in communication, and 2) to reveal the types of phraseology in Air Ground Aviation communication.

**III. RESEARCH METHODOLOGY**

This study applies exploratory and descriptive methods with the techniques of collecting library data and field data in the form of interviews with ATC operators and pilots. Interviews were carried out on the sidelines of the interviewees' busy schedule, of course by applying the Covid19 protocol. Interviews with pilots asked more about their experience in communicating with ATC operators. Because the topic of this research is phraseology, the focus of attention is how to use phraseology in communication between the ATC operator and the pilot. Data collection was also carried out by focusing on field observations. Field data obtained through recording techniques and notes taking. After that, making the interviews to strengthen field information and clarification. The data collected is classified and reduced, then categorized according to their nature. The results of the clarification found that there were five types of phraseology usage although based on the literature data, there were six types.

The data to be presented is the phraseology types used in ATC operator and pilot communication. In this situation, they use GP (general phraseology), wherever flight operations are in progress.

EXAMPLE 6

<ATC operator>	<i>Selamat pagi Indonesia</i> one seven nine four go ahead
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By the statement above, ATC operator received a message from a pilot, and then the pilot replies through a request flight level to confirm. This kind of communication happens where the aircraft is still in the aerodrome, not yet in flight.

When this communication occurs, the ATC controller is in the aerodrome controller. It can be seen that the ATC controller is to greet the pilot is not all phraseology. It is a combination with Indonesian where this aerodrome is in Indonesia. The greet of ATC controller by saying Indonesia is also seen in the following example:

Example 7

<PILOT>	INDONESIA, two eight five one thousand five hundred feet
<ATC Controller>	two eight five one thousand five hundred feet

The communication above is initiated by pilot to inform ATC controller the right position; two eight five one thousand five hundred feet. And the ATC controller replied the pilot with readback by saying the same what she/he hear; two eight five one thousand five hundred feet.

In addition, The ATC controller provides information or instructions to the pilot; five seven three one descend to three thousand feet. This is an example of Area Control Phraseology (AREA-CP). And the pilot replied REQUEST. What to request is like in example 9

EXAMPLE 8

<ATC Controller>	INDONESIA five seven three one descends to three thousand feet
<Pilot>	Request

Here is clear that ATC operator, based on the data, Area Control Phraseology used to give information about aircraft identification which is the "Indonesia four five six (GIA 456)." In the Area Control Service, aircraft identification can be found. Using radar, radar control phraseology (RCP) is used. This radar helps to direct the course, land, avoid accidents, etc. by controllers. Here in both the Area Control Center (ACC) and the Approach Control Office, tools are used (APP). This facility is used by almost all airports in the world, particularly at international airports. Radar control itself is a tool used in the operation of air traffic control services to find indicators directly. This can be seen in the following example:

EXAMPLE 9

<ATC Controller>	Turn left heading three zero four continue to six thousand.
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Based on the data, it is clear that ATC Operator may inform the pilot to continue his flight to level six thousand. It is important to stress here that it is only one the characteristic of non-standard phraseology, so far this cannot be found in international phraseology, which is generally used in the world as standardized phraseology. The non-standard phraseology is highly discouraged because it may screw up traffic conflicts communication, and potentially result accidents. In certain situation, The ATC operator mostly used standard phraseology to interact only with the pilot, but in the event of an exception, they could also use a non-standard one as long as some errors and miscommunication may not be made.

EXAMPLE 10

<ATC Controller>	Standby Sir! Traffic number one runway zero four. Once again, the word "Sir" is a non-standard phraseology in aviation communication
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There is no 'Sir'!! word or phrase in standard phraseology. All interaction and communication are done to the point. No pleasantries in this conversation. In fact, an ATC for example, will use the communication as shown below.

EXAMPLE 11

<ATC Controller> (could state)	Standby, Sir! Traffic number one runway zero four (standby, traffic 1 runway 04) the ATC controller realizes of using a non-standard phraseology never been anxious by pilot so far they can communicate each other
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The next point is about the patterns of phraseology in aviation. In some professional contexts, the execution of very specific tasks may depend entirely on verbal communication between the expert and his or her party. When the communication-dependent situations are recurring enough, linguistic standards can be created by institutions and/or authorities, which then apply them. What needs to be done for linguistic standards is in general to create less clear communication and simplify rules (at the syntactic, lexical and semantic levels) [10]. Linguistic standardization also allows different speakers to minimize their cognitive efforts and linguistic in performing existing tasks thanks to their shared knowledge [11].

The ATC sector provides an instructive example of established language norms: that is, the technical language used by ATCs and pilots to carry out unambiguous and effective radioactive communication. You must speak the language, as civil aviation uses the six official languages spoken by the language. Usually, international flights are conducted in English, which is used as the lingua franca [13] [14]: this allows for dialogue between air traffic controllers and pilots who do not have to speak the same native language. For example, aircraft flying in India controlled airspace may receive control service in Indian or English, depending on the pilot's native language. The ICAO's Annex 10 volume 2 [15] explicitly confirmed English's role as the common language for aeronautical aviation.

The normal pattern of phraseology used between ATC operator and pilot already clear in Annex 10. The types of phraseology were necessary to identify and categorize the phraseology patterns used in the communication of the controller, as the source of the elaboration of the parts should be classified: example, "Indonesia two seven one descend to five thousand feet" Aircraft identification Level adjustment or flight level Area, the example can be seen as in the following.

EXAMPLE 12

ATC Controller	Standby <i>Sir</i> , traffic number one runway zero four
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Based on the all examples, it may be summarized that ATC operator/ Controller make use almost all (except coordination phraseology) types of phraseology to communicate with the pilot. It is usual general phraseology

can be applied for all situations and or to combine with another in order to maintain clear information.

IV. FINDING AND DISCUSSION

A. Findings

According to ICAO's standardized phraseology, there are six types, but in this research, it is found only five types. They are GP, AREA-CP, RADAR-CP, AERO-CP, and APP-CP. In addition, the researcher also found a non-standard phraseology.

In this research, the subjects are the ATC Controllers who control the aircraft traffic and the pilots communicate with them. In using phraseology, before deriving their orders, controllers never make certain patterns, they speak as they want to speak, and their thinking is faster than their pronunciation [16].

The ATC operator and Pilot conversation was very fast and could not be delayed or even caused an error. In fact, they have to full attention and concentration in using phraseology to control the aircraft. Phraseological patterns thus appear to be the similar as the state of airspace or the situation of air traffic. If they first find the aircraft, they should first mention the identification of the aircraft. First comes, first respond. Or they got some orders or pilot information to control and respond soon, quicker and quicker.

The ATC must use standard phraseology in making communication with the pilot, based on international standards. Nevertheless, frequent conversations between ATC operators and pilots in their own language. And in other cases, ATC Operator and In their interaction, the pilot inserted non-standard phraseology. If they know how to use it in the right way, it won't be risky. Safety in aviation is everything. But they must take the guarantee as their responsibility to use non-standard phraseology. Once again, Aviation safety is first and foremost.

Referring to the Ground Criterion Theory, the conversation between the ATC Operator and Pilot must adhere to the principle of understanding what is heard and what is meant. In regard to non-standard phraseology, it is dynamic. The non-standard phraseology could be the regular phraseology recognized in the aviation world at one time.

B. Discussion

From ICAO rules, there are six types of phraseology but the only five found in field. Based on the rules and standard operational procedures, in deriving the data, each kind of phraseology has its role. In all situations and conditions, it can be used for general phraseology.

Data from the radar control room where the controller concentrated on radar control phraseology were recorded in this study. It means that the airspace communication was handled by a controller that the aircraft was being controlled while in the air.

As discussed earlier, phraseology is not general English, it is the language of how it is used by ATC controllers to communicate with the pilot and to control aircraft activity. Philips [17] explored how official phraseology of air traffic communications differed from natural English. All controls in the world of aviation are related to one another, especially those in the aerodrome area. For smooth flight, for example, the function "gun light to deliver light sign" is also very necessary [18].

Once again, ICAO [9] stated that the key purpose of phraseology is to use specific, concise, clear, and unambiguous language to communicate messages that are routine. The message with phraseology system is subject to the linguistics rules such phonetic, lexical, syntactic and semantic, even they sometimes to be simplified. In this study, it was found that the controller (ATC) still violates the rules of using phraseology. Even among ATC operators and pilots, the way they communicate with each other continues to use common English, which is beyond standard phraseology. In some circumstances, they also incorporate standard and non-standard phraseology into their communication with pilots. Therefore, this research found that as long as it is not confusing. Still, the controllers prefer to combine phraseology with simple or general English.

Falzon [11] stated that communication in air traffic control is mainly conducted using a specialized or operational language known as phraseology. It was created and has been continually updated by ICAO (International Aviation Organization) to cover the most common and ordinary situations encountered in air navigation. It is meant to optimize and ensure safety condition through radiotelephony. In this case, ICAO has absolutely the right to the recent phraseology list as needed.

## V. CONCLUSION

Phraseology is a specific aspect of ESP context, and it is the branch of linguistics. It refers to and reflects the language used in communication with pilots by the ATC Controller to convey meaning in instruction. It is interesting to research because it has become an important part of the aviation industry. Based on the researcher's observations there are two categories of phraseology: standard phraseology and non-standard one. In standard phraseology. It was found GP, AREA-CP, RADAR-CP, AERO-CP, and APP-CP.

Almost all statements (words-phase-expression) are in the form of General Phraseology. In aviation communication mostly come and last in statement. It is also found that In making a command, there was no specific pattern used by ATC, but it should be based on what condition or situation is found in ATC-pilot communication. Whether he/she would like to give commands or information, the patterns can be constructed as ATC needs. Knowing the call sign of aircraft identification and where to go or what to do around the airspace is the most important one [3]. Phraseology as applied in Air Ground Communication had been standardized by ICAO. The ATC operator might combine these types of Phraseologies if needed conditionally. In a specific case and

situation, A non-standard phraseology is sometimes Used in pilot communication by the ATC operator. Therefore, the communication between ATC and pilot, as long as they can get the point what they mean, there was no worry about communicating with each other. It is possible that the non-standard phraseology may onetime become a regular phraseology used in communication with the controller before ICAO ruled in standardization.

## SUGGESTION

The results of this study are expected to be additional reading material for both ATC operators and pilots as well as researchers and students studying phraseology. Phraseology is a field related to linguistics and is also studied in the context of English for specific purposes (ESP). Such research like this must obtain permission from a navigation authority because the data related to aviation is restricted. This is one of the reasons why research like this using field study data is so limited.

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