The importance of understanding technical terminology in coordination between ATC and the engineer

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Abstract. Technical terminology is very important in the world of aviation. In this case, the author will take up coordination between ATC and the engineer. In MATSC (Makassar Air Traffic Service Center), the engineer has the responsibility of the aircraft navigation equipment and the networking needed for the system. The ATC system used by ATC (Air Traffic Controller) to guide the aircraft from one place to the destination safely. Coordination between ATC and engineer must be understood so that there are no mistakes that cause a big problem of aviation. Terminology related to the system must be understood by both ATC and engineer.

1. Introduction
Communication is the process of delivering messages or information from someone (communicator) to others. Communication must use language that is understood by both parties so that there is no error in the information. In addition, coordination is an activity carried out by many parties from a particular organization to achieve a common goal with the agreement of each party so that there are no mistakes in working.

ATC (Air Traffic Controller) in charge of regulating air traffic, providing the information needed by pilots during flights such as weather information, flight navigation information, and air traffic information. Of all these things, of course, facilitated using adequate equipment, including ATC systems and Communication systems. The equipment used by ATC is the responsibility of the automation, navigation, and communication engineer. In addition, the engineer must also analyze the problem correctly so that repairs can be done quickly and precisely, and if the same problem happens can be resolved immediately.

Terminology is the language used to describe a specific thing, or the language used within a specific field. Technical Term is a term used by related parties in a particular field or unit. In carrying out their duties, Air Traffic Controller and engineer coordinate at any time if there is a problem with the equipment used by Air Traffic Controller in guiding the aircraft, both communication equipment, and navigation equipment. In this case, it is very susceptible to miscommunication due to misunderstanding of the terms used, because Air Traffic Controller and an engineer are different but related units.

A misunderstanding has a very large impact or commonly referred to as the human error. The impact is very detrimental to others concerned with the case of the subject. In the word of aviation besides ATC, who guides aircraft traffic, there are also engineers who also have the responsibility for flight safety. They must ensure that aircraft navigation on the ground is functioning properly so that the aircraft does not lose direction or navigation equipment can receive aircraft signals and know the exact position of the aircraft.
The author takes place the research in MATSC (Makassar Air Traffic Service Center). MATSC is a provider of air traffic guidance services in the Ujungpandang FIR region, covering 2/3 of Indonesia's air regions, for en-route flights above FL (Flight Level) 240 both domestic and international flights. MATSC is the eastern Indonesian air traffic guide.

Air Traffic Controller and engineer at Makassar Air Traffic Service Center have an obligation to maintain air traffic safety in eastern Indonesia, where the engineer as a provider of air communication and navigation devices and the Air Traffic Controller as the user of the equipment that managed by the engineer to communicate and coordination to the pilot and guide the aircraft and provide information in the such as weather or air traffic to aircraft which passing through eastern Indonesian airspace.

The principle of communication is:
1) Communication as a process.
2) Communication as a system.
3) Communication is an interaction and transaction.
4) Communication can occur intentionally or unintentionally.

Coordination is the harmony between activities to achieve goals within an organization so as to create activities that are efficient, synergetic, and have the opportunity to succeed besides coordination also has an important role in achieving the goals of an organization, and there are principles in doing coordination. If coordination between groups or individuals is good, then what will be obtained will be good too. If it lacks coordination, then the results are less satisfying.

According to Annex 10 Vol 2, Communication procedures including those with PANS status said that “Definitions of terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have independent status but is an essential part of each Standard and Recommended practice in which the term is used since a change in the meaning of the term would affect the specification.” From that sentence, it is known that it is highly recommended to use and know the terms related to a matter, in this case, are the equipment they use so that it does not have an impact on changing the real meaning [1].

2. Result and discussion
2.1. Result
The author uses qualitative methods by collecting several examples of coordination between ATC and engineer. The participants are from ATC and engineer work in MATSC (Makassar Air Traffic Service Center). The authors conducted interviews with engineers and ATC about a case that had occurred that were caused by misunderstanding the terms they used. Coordination between ATC and engineer can be conducted by the WhatsApp group or by telephone.

Following are some of the coordination between the ATC and the engineer:
1. The ATC informs that UJ16 is freeze. UJ or Ujung is a term they use to name the position where they control the aircraft. The engineer in the Automation division does not use UJ to named Air Traffic Controller’s position, but they use CWP (Control Work Position). If the engineer who receives the information is not careful or doesn't listen well, it will have a bad impact. More details can be seen in the following picture.
From the figure above, known that UJ and CWP totally different. The system only can execute the CWP, not UJ. From the information that UJ16 was frozen, if the system freezes, the engineer may restart the device (in this case, UJ16). If not, listen carefully. The engineer would restart CWP16, which is CWP16 is UJ07, and that position isn’t normal condition. Worse, if that position being used by Air Traffic Controller controlling the aircraft traffic, the system in that position will be shut down, and if the system suddenly shutdown, the Air Traffic Controller couldn’t see the targets from the radars, it can have an impact on the disruption of flight schedules.

2. If there is a change in the dataset’s system, it will be conducted restart system in the whole position. In the restart, the system needs coordination between the Air Traffic Controller and the engineer, where Air Traffic Controller as user and engineer as executor of the system. Before the restart system starts, the procedure or SOP (Standard Operating Procedure) will be shared with both the Air Traffic Controller and engineer. Coordination is carried out using a walkie-talkie. Each step is carried out with a predetermined time so that both engineer and ATC must understand various terms contained in the procedure in order to the implementation doesn’t exceed the allotted time. While the system is restarting, the NOTAM (Notice to Airmen) was issued that some equipment is not serviceable during the restart system.

Here are some parts of the restart system that contain the terms [2]:

Table 1. Steps of restart system (not all steps).

| Step Number | PIC        | Who      | Action                                                                 | Time Allocation |
|-------------|------------|----------|----------------------------------------------------------------------|-----------------|
| A.0         | MED + ENG  |          | Ensure Service LAN on OPS platform in normal condition                 | Start | Finish |
| A.1         | MED + ENG  |          | Generate all dataset on DBM platform (offline platform)               | Start | Finish |
| A.2         | MOD        |          | Notify all adjacent ATSU(s) regarding the estimated time of system shutdown, especially ATSU which has | Start | Finish |
system correlation with MAATS (i.e., AIDC)

A.3  DOD  ENG  Distribute new dataset on operational
A.4  MKD + FDO  MKD + FDO  Record all valid NOTAM
A.5  MKD + FDO  Record all active adjacent ATSU’s radio frequencies and all information in bulletin 1, 2 & 3 fields
A.6  MKD + FDO  Create Testing FPL
A.7  MOD  Record all airspace activity (i.e., military exercise) in Ujung Pandang FIR, if any
A.8  MOD  Inform the estimated time of system restart to Briefing Office (ATS reporting office) and Comm. Centre & Tower/ADC
A.9  MED + ENG  Make Sure Strip Printer Server is OK and Print checklist to be checked

| Step Number | PIC | Who       | Action                                                                 | Time Allocation |
|-------------|-----|-----------|------------------------------------------------------------------------|-----------------|
| B.1         | MOD + ATCo | MOD + ATCo | Broadcast to all CPDLC Flights about the time of disconnecting CPDLC service same as T-time (unplug isolated consoles time) | 25 mnt          |
| B.2         | MOD + ATCo | MOD + ATCo | Check CPDLC histories, send NDA and address forwarding manually to southbound (CPDLC) traffic if needed |                |
| B.3         | DOD + MOD + ATCo | DOD + MOD + ATCo | Manual end of service for all (southbound and northbound) CPDLC flights |                |
| B.4         | MED | MED       | Inform that technical preparation for system restart is ready         | 2 mnt           |
| B.5         | ATCo | ATCo      | Advice MOD about traffic condition for deciding the rime to isolate CWP | 2 mnt           |
| B.6         | MOD | MOD       | Define the time to isolate HMI, and inform that to MKD and MED         | 1 mnt           |
| B.7         | MOD | MOD       | Define which node is isolate node                                    | 5 mnt           |
| B.8         | MOD | MOD       | Re-sectorise isolated console                                        | 4 mnt           |

From procedure above found some terms used in coordination between ATC and engineer, such as Platform, Console, Generate, AIDC, NOTAM, Isolated Consoles, Bound (Boundary), CWP, ADC, CPDLC, and re-sectorise. In technical terms for ATC and engineer, The meaning for these terms are:

Platform: Platform is a combination of software with a programming language used to run an application.

Console: Console is another term of CWP (Control Work Position), a set of equipment and position used by ATC to guide aircraft from one place to their destination.

Generate: Generate is a program carried out in order to produce instructions or code’s program according to the needs of the system, activate the program that has been configured by the engineer, and providing information when there is an error.

AIDC: AIDC (ATS Interfacility Data Communications) is an application that supports information exchanges between ATC application processes within an automated ATS system located at different ATSUs. This application supports the
Notification, Coordination, and the transfer of Communication and Control functions between these ATSUs [3].

**NOTAM:**

NOTAM (*Notice to Airmen*) is notification distributed by telecommunications equipment containing information regarding the determination, conditions, or changes in each aeronautical facility, service, procedure, or hazardous condition, and important to be known by air navigation personnel.

**Isolated Console:** Console or CWP which not included in the process of restarting the system simultaneously so that the ATC still controls aircraft traffic using a radar monitor. The isolated console will be restarted after all CWP (not isolated console) already restarted.

**Boundary/ FIR:** Boundary is Line that marks the airspace limits or the limit on air space, which is the responsibility of a country's authority in providing air navigation safety services called ATS (*Air Traffic Services*). Air navigation services will be provided in the FIR, consisting of all important information and warning services.

**ADC:** ADC (*Aerodrome Control Tower*) guiding aircraft limited by the Air Traffic Controller’s visibility from the tower.

**CPDLC:** CPDLC (*Control Pilot Data Link Communications*) is communication between Pilot and Air Traffic Controller by text [4].

**Re-Sectorise:** Rearrange sectors in the system according to each control area.

The terms must be understood to all personnel involved in the restart system process in order to the implementation of the restart system that could be implemented quickly and on time without extending the NOTAM (*Notice to Airmen*), and the other equipment can normally operate.

2.2. **Discussion**

Coordination is balance activities in work between organizations or other parties to reach the common goal. Besides that, the terminology is the understanding of a term and explains it so as not to misunderstand the true meaning. According to Annex 10 [1] vol 2, Communication procedures including those with PANS status said that “Definitions of terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have independent status but is an essential part of each Standard and Recommended practice in which the term is used since a change in the meaning of the term would affect the specification.”

Another example of the term used by ATC is “one shoot” for the ADS (Automatic Dependent Surveillance) System. For the newcomers or new engineers may don’t understand about that term, as we know that the word “shoot” in our daily life means a kind of blow, but it has a different meaning in ATC’s words. “one shoot” is a term used by ATC for asking the pilot to send their aircraft position by ADS system. If there is the problem about ADS system, the ATC will call the engineer and tell that one shoot was failed, and the engineer would be confused about what the meaning of the complaint is, the engineer can’t ask more to the ATC because they were busy of controlling the aircraft and can’t be bothered. Because the engineer confuses about the term, so engineer must open the manual book or documents about the ADS system first, and it takes a longer time to fix the problem, and so the impact is reducing the availability of the aircraft service.

Having personal notes about terms that have been obtained is very important to be used as learning both for ATC and engineer as a way to develop abilities and knowledge in their respective fields. This can be very helpful in overcoming problems or avoiding misunderstood in coordination and communication and can provide the best air traffic services. According to some example of coordination between ATC and engineer, known that understanding technical terms is very important in aviation’s world because if not understood, can be caused problems in aviation’s world. Some
problems that can be caused by misunderstanding in coordination between ATC and engineer are aircraft crash, the delay time of flight’s schedules, lost aircraft data, etc.

3. Conclusion
Misunderstanding can be avoided by good coordination, especially in understanding the terms that are often used. The ATC or Engineer does not act carelessly before he really understands the meaning of the terms received. The recipient of the information can ask the informer again about the purpose of the term given, remembering that both parties work in different units and have a great responsibility in the safety of the aviation world.

The way to get good coordination and avoiding miscoordination is to make the list of terms often used by ATC and engineers about terms they often find relating to the system. The list or dictionary of the term that will be made then shared to all Air Traffic Controller and engineer in Makassar Air Traffic Service Center. Besides that, both of the Air Traffic Controller and the engineer can increase knowledge of the terms about equipment or terms related to the world of aviation by reading a lot of documents about aviation and equipment manual books. Good coordination and communication will provide the best services in the aviation world.

References

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[4] Thales 2014 Topsky-ATC System/Segment Specification. Air Traffic Management, MATSC_SSS_Rev001 (Melbourne: Thales).