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OPTIMIZING AIR TRAFFIC CONTROLLER (ATC) COMMUNICATION TOOLS TO IMPROVE AVIATION SAFETY

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Abstrak: Komunikasi merupakan elemen krusial dalam menjamin keselamatan dan efisiensi operasi lalu lintas udara. Penelitian ini bertujuan untuk mengevaluasi dan mengoptimalkan penggunaan alat komunikasi Direct Speech yang digunakan oleh Pengatur Lalu Lintas Udara (ATC) di Perum LPPNPI Cabang Sorong, Bandara Domine Eduard Osok. Alat komunikasi ini masih mengandalkan sistem telepon konvensional untuk berkoordinasi dengan unit terkait seperti APP, Ujung Control, Menara Rendani, Jayapura Info, dan unit internal seperti ARO dan teknik. Tantangan teknis yang sering dihadapi antara lain audio terputus-putus, pemutusan tiba-tiba, dan panggilan yang tumpang tindih yang mengganggu konsentrasi ATC, terutama pada kondisi puncak lalu lintas udara. Penelitian ini menggunakan pendekatan deskriptif kualitatif, dengan pengumpulan data dilakukan melalui observasi, wawancara, dan kuesioner yang disebarkan kepada 16 personel ATC. Hasil penelitian menunjukkan bahwa tantangan utama berasal dari keterbatasan sistem komunikasi Direct Speech, yang disebabkan oleh peralatan yang sudah tua dan kurangnya perawatan rutin oleh unit teknis. Hasil kuesioner menunjukkan bahwa mayoritas responden (81% hingga 94%) setuju bahwa alat komunikasi yang ada saat ini memerlukan perbaikan dan peningkatan untuk mendukung layanan yang lebih optimal. Masalah seperti panggilan yang tumpang tindih dan gangguan audio dapat meningkatkan risiko miskomunikasi, yang berpotensi membahayakan keselamatan penerbangan. Berdasarkan temuan ini, direkomendasikan peningkatan infrastruktur komunikasi melalui penerapan Sistem Kontrol Komunikasi Suara (VCCS). Komunikasi merupakan elemen krusial dalam menjamin keselamatan dan efisiensi operasi lalu lintas udara. Penelitian ini bertujuan untuk mengevaluasi dan mengoptimalkan penggunaan alat komunikasi Direct Speech yang digunakan oleh Pengatur Lalu Lintas Udara (ATC) di Perum LPPNPI Cabang Sorong, Bandara Domine Eduard Osok. Alat komunikasi ini masih mengandalkan sistem telepon konvensional untuk berkoordinasi dengan unit terkait seperti APP, Ujung Control, Menara Rendani, Jayapura Info, dan unit internal seperti ARO dan teknik. Tantangan teknis yang sering dihadapi antara lain audio terputus-putus, pemutusan tiba-tiba, dan panggilan yang tumpang tindih yang mengganggu konsentrasi ATC, terutama pada kondisi puncak lalu

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Kata Kunci: Alat Komunikasi, Pengatur Lalu Lintas Udara, Pelayanan Lalu Lintas Udara, Di Wilayah Cabang Sorong Perum Lppnpi.

Abstract: *Communication is a crucial element in ensuring the safety and efficiency of air traffic operations. This study aims to evaluate and optimize the use of Direct Speech communication tools employed by Air Traffic Controllers (ATC) at the Sorong Branch Area of Perum LPPNPI, Domine Eduard Osok Airport. These communication tools still rely on conventional telephone systems to coordinate with relevant units such as APP, Ujung Control, Rendani Tower, Jayapura Info, and internal units like ARO and engineering. Technical challenges often encountered include intermittent audio, sudden disconnections, and overlapping calls that disrupt ATC concentration, particularly during peak air traffic conditions. The research employs a qualitative descriptive approach, with data collection carried out through observations, interviews, and questionnaires distributed to 16 ATC personnel. The results show that the primary challenges stem from the limitations of the Direct Speech communication system, attributed to the aging equipment and a lack of regular maintenance by the technical unit. The questionnaire results reveal that the majority of respondents (81% to 94%) agree that the current communication tools require improvements and upgrades to support more optimal services. Issues such as overlapping calls and audio disruptions can increase the risk of miscommunication, which has the potential to compromise flight safety. Based on the findings, it is recommended that communication infrastructure be upgraded through the implementation of the Voice Communication Control System (VCCS). This system is considered more modern, efficient, and capable of reducing the communication barriers*

frequently encountered. Additionally, regular evaluation and maintenance of existing communication equipment are essential to ensure operational reliability. By optimizing communication tools, it is expected that inter-unit coordination will become more effective, ATC performance will improve, and air traffic services will be safer, more efficient, and more professional. These steps are critical to supporting aviation safety in the Sorong Branch area of Perum LPPNPI and its surrounding regions.
Keywords: *Communication Tools, Air Traffic Controller, Air Traffic Services, At The Sorong Branch Area Of Perum Lppnpi.*

INTRODUCTION

The development in the aviation world is showing rapid progress every day. Due to this, the readiness of an airport in handling potential safety and security disturbances of operating aircraft must meet the standards that have been set.

Domine Eduard Osok (DEO) Sorong Airport has a fairly dense air traffic flow. With the existing conditions, a high level of safety and smoothness is required for an Air Traffic Controller (ATC) in order to provide air traffic services with a focus on safety and security, in accordance with the established standard procedures.

Along with the development of traffic, the need for supporting communication equipment is also increasing, requiring more complex communication tools to improve the efficiency of air traffic guidance services. However, the reality is that the communication equipment for coordination between related units is still not ideal.

Before delving deeper into coordination in aviation or more specifically in the ATC world, it is important to understand that coordination, as explained in DOC.9426, states: Coordination is the craftsmanship of communicating with another with a view to coming to an agreed arrangement to a common issue. Without coordination, planning has no meaning. This means that without coordination, planning has no meaning. Thus, the need for equipment that is easy to use is essential so that information can be quickly and accurately conveyed to the unit being contacted to achieve a goal. Meanwhile, in the tower room (combined with APP), At the Sorong Branch area of Perum LPPNPI still uses Direct Speech in the form of conventional telephones.

Direct Speech (DS) is a direct telephone facility used for coordination between airports via VSAT (satellite). To prevent miscommunication, Direct Speech (DS) used for coordination between Air Traffic Controller (ATC) personnel at one airport and another airport is also recorded by the Recorder Framework. With this tool, it is possible for us to communicate directly without having to use an operator. ATC can contact you directly by pressing a special number to get an exit line. Then ATC will directly connect to the destination adjacent unit. Direct Speech is a switch to manage incoming and outgoing telephone communications efficiently and effectively between one unit and another.

Based on the main discussion to be presented, this focuses on the utilization of communication facilities, specifically Direct Speech, which serves as the main tool for coordination between Air Traffic Services (ATS) units at Domine Eduard Osok Sorong Airport. Coordination tools between Air Traffic Controller (ATC) and adjacent units in the tower building include: five conventional telephones used for communication with the APP unit, Ujung Control, Rendani Tower, Jayapura Information, and units within the scope Sorong Branch Area of Perum LPPNPI such as Air Traffic Service Reporting Office (ARO), Technical, and Cleaning Service. Additionally, Convenient Talky (HT), a communication device resembling a mobile phone, like a walkie-talkie, is used to coordinate with units such as PKPPK, Apron Movement Control (AMC), the runway unit, and patrols.

Telephones are conventionally used for voice communications, however many telephones are used for data communications (webmaster, 2015). Basically, a telephone set consists of a sound sending device (microphone) and a sound receiving device (speaker). In order for the telephone and central telephone to be connected, signaling is required.

PABX, which stands for Private Automatic Branch Exchange, is a telephone connection system that operates without going through an operator. With this system, callers can make direct telephone calls to the intended telephone number, namely by pressing a special number to get an outgoing line, then pressing the number the destination phone. (Rizki Sari Dewi, 2020).

The five conventional telephones are located on the right side of the control work area, in front of the assistant. The issue that arises is that the phone sounds overlap at the same time, which disrupts the concentration of Air Traffic Controller (ATC) personnel while working.

RESEARCH METHOD

This research design uses the application of a descriptive qualitative approach, which employs methods such as observation, interviews, and questionnaires. Sugiyono (2017) states that Case study is a type of qualitative research that deeply examines individuals, groups, institutions, and their circumstances over a certain period of time. The goal of a case study is to discover meaning, investigate processes, and obtain a deep and comprehensive understanding of an individual, group, or specific situation. Case study data is obtained through interviews, observations, and studying various documents related to the researched topic.

According to Nazir (2014:43), the descriptive method is a method used to research the status of a group of people, an object, a condition, a system of thought, or a class of events at the present time. The purpose of descriptive research is to provide a systematic, factual, and accurate description, depiction, or representation of the facts, characteristics, and relationships between the phenomena being studied.

Sugiyono (2007) states that research variables are attributes or characteristics or values of people, objects, or activities that have a certain variation that the researcher has determined to study and draw conclusions from. In this study, the variables are divided into two types: dependent and independent variables. The independent variable is the variable that causes changes or the emergence of the dependent variable. The independent variable in this research is the communication tool in the form of Direct Speech, while the dependent variable is coordination between adjacent units in Sorong Branch Area of Perum LPPNPI.

In this research, data collection techniques were carried out by:

1. Observation

   Observation is by making direct observations of matters related to research.

2. Interview

   Interviews were conducted via telephone directly with several Sorong ATC personnel to obtain data regarding the description of equipment utilization direct speech communication in Sorong.

3. Questionnaire

   The questionnaire was carried out via Google Form which was then distributed to Sorong ATC personnel.

In this research, the data analysis technique used is descriptive qualitative. This technique is research data taken from several sources and then analyzed based on applicable standards and regulations. For the questionnaire, data was tabulated using the Ms. Excel application to produce percentage values for the questionnaire data.

RESULT AND DISCUSSION

Based on the results of observations at The Sorong Branch Area of Perum LPPNPI, Domine Eduard Osok Sorong Airport, the aviation communication equipment at Domine Eduard Osok Sorong Airport needs to be improved to achieve safe, efficient, and smooth air traffic services. This aims to understand Air Traffic Services that are safe, efficient, and smooth in terms of optimizing Flight Safety Communication.

During the On the Job Training (OJT) conducted by cadets at Domine Eduard Osok Sorong Airport, problems were found in the utilization of communication between units. Therefore, optimization of communication equipment utilization for Air Traffic Controllers (ATC) is required. The communication equipment at the Tower of Domine Eduard Osok Sorong Airport still uses conventional telephones, commonly referred to as Direct Speech. Direct Speech is a communication tool used for coordination with adjacent units, such as Manokwari, Jayapura Information, and Ujung Pandang ACC. Meanwhile, PABX is used for communication with units around the airport, such as the meteorological unit, technical unit, Air Traffic Service Reporting Office (ARO) unit, and other related management units. Mobile phones are used for reinforcement and coordination with other airports, such as Bintuni, Teminabuan, Waisai, Werur, kaimana, Fak-Fak, Manokwari.

When the author served as an assistant, there was an incident where the Direct Speech lines for Manokwari, Jayapura Data, and Ujung Pandang Control were ringing simultaneously. This caused the assistant to be unable to determine which communication tool should be prioritized.

In addition to conducting research through observation, this study was also carried out using a questionnaire with a Likert scale instrument on 16 Air Traffic Controller (ATC) personnel in Sorong Branch Area of Perum LPPNPI. The questionnaire was distributed on June 3, 2021, containing five statements that would later be responded to by the respondents. Each respondent could only provide one response to each question via a Google Form web browser, then mark the column that they considered most appropriate. There were five alternative answers used: SS (Strongly Agree) with a score of 5, S (Agree) with a score of 4, RR (Neutral), TS (Disagree) with a score of 2, and STS (Strongly Disagree) with a score of 1. The results of this survey are as follows:

Below is the data from the measurement of the optimization of Flight Safety communication that has been conducted by the author at the Tower, Sorong Branch Area of Perum LPPNPI:

Table 1. Search Data Result

ANSWER CODE	X1		X2		X3		X4		X5	
	f	%	f	%	f	%	f	%	f	%
SS	10	63%	8	50%	13	81%	9	56%	15	94%
S	5	31%	5	31%	3	19%	7	45%	1	65%
RR	1	6%	3	19%	0	0%	0	0%	0	0%
TS	0	0%	0	0%	0	0%	0	0%	0	0%
STS	0	0%	0	0%	0	0%	0	0%	0	0%

a. **For item X1**, the statement "The damage to the Direct Speech communication tool generally occurs because the tool is already quite old." Out of 16 respondents, 10 people (63%) strongly agreed, 5 people (31%) agreed, and 1 person (6%) was neutral, while no one disagreed or strongly disagreed (0%). From this result, it can be concluded that the damage to Direct Speech is caused by the tool being old.
b. **For item X2**, the statement "The damage to the Direct Speech communication tool generally occurs because regular checks by the technical unit on Direct Speech are

infrequent." Out of 16 respondents, 8 people (50%) strongly agreed, 5 people (31%) agreed, and 3 people (19%) were neutral, while no one disagreed or strongly disagreed (0%). From this result, it can be concluded that the technical unit rarely conducts checks on the Direct Speech communication tool.

c. **For item X3**, the statement "When air traffic is heavy, Direct Speech often rings simultaneously and disrupts the ATC's concentration." Out of 16 respondents, 13 people (81%) strongly agreed, and 3 people (19%) agreed, while no one was neutral (0%), disagreed, or strongly disagreed. From this result, it can be concluded that the simultaneous ringing of Direct Speech during heavy traffic significantly disrupts the concentration of Air Traffic Controller (ATC).
d. **For item X4**, the statement "There is often an intermittent sound when coordinating with adjacent units using Direct Speech." Out of 16 respondents, 9 people (56%) strongly agreed, 7 people (44%) agreed, and no one was neutral (0%), disagreed, or strongly disagreed. From this result, it can be concluded that intermittent sound disruptions occur frequently when coordinating with adjacent units using Direct Speech.
e. **For item X5**, the statement "There is a need for an improvement in the ATC automation system for the Direct Speech communication tool at Sorong Branch Area of Perum LPPNPI." Out of 16 respondents, 15 people (94%) strongly agreed, and 1 person (6%) agreed, while no one was neutral (0%), disagreed, or strongly disagreed. From this result, it can be concluded that there is a strong need for an improvement in the Air Traffic Controller (ATC) automation system for Direct Speech communication tools.

The respondents were given a questionnaire by the author to evaluate the impact of optimizing Flight Safety communication tools, which was then assessed using a Likert scale for each statement. The questionnaire data from participants were processed using Likert scale calculations to draw conclusions based on the majority perspective.

Discussion

The definition of air traffic services is in Annex 11 Air Traffic Services Thirteenth Edition is a term that has various meanings, namely Flight Information Services, Alerting Services, Air Traffic Services and Air Traffic Control Services (services provided by ACC, APP, and TWR) (Air Traffic Services, 2012 pp. 1-3). The five objectives of the air traffic services shall be to:

1. Prevent collision between aircraft;
2. Prevent collision between aircraft on the maneuvering area an obstruction on that area;
3. Expedite and maintain an orderly flow af air traffic;
4. Provide advice and information useful for the safe and efficient conduct of flights;
5. Notify appropriate organization regarding aircraft in need of search and rescue aid, and assist such organizations as required.

The units tasked and responsible for providing Air Traffic Services, Flight Information Services and Alerting Services to Controlled Flights in Control Airspace are called Air Traffic Control Units (ATC Units). The ATC unit consists of the Area Control Center, Approach Control Office and Aerodrome Control Tower.

In accordance with Advisory Circular (AC) 170-02 Manual of ATS Operational Procedures (2009) (Manual of ATS Operational Procedure, 2009) Chapter 4 regarding units responsible for providing air traffic control services (ATC Service) as follows:

- Area Control Services must be provided by the Area Control Center or unit that provides Approach Control Services in the Control Zone (CTR) or Control Area (CTA) within certain limits, especially for the provision of Approach Control Services if Area Control is not established.
- Approach Control Service must be provided by the Aerodrome Control Tower or Area Control Center if it is necessary or very necessary to combine these units under the responsibility of one unit (combined unit) whose function is to provide Approach Control Service and Area Control Service or Approach Control Office if necessary to establish a separate unit.
- Aerodrome Control Service must be provided by the Aerodrome Control Tower.

Doc.9426, Air Traffic Service Planning Manual reads “Co-ordination is the art of communicating with another with a view of reaching an agreed solution to a common problem. Without co-ordination, planning has no meaning”. What this means is that without coordination, planning is meaningless, so equipment is needed that is easy to use so that the information to be coordinated can be quickly and precisely conveyed to the unit that will be contacted to achieve a goal.

Impact of Optimizing Flight Safety Communication Tools

The author has researched several risks and disruptions that may occur due to issues with the Adjacent Units, based on their findings, including:

1. Coordination Disruptions: Several challenges in coordination arising from the use of conventional telephones in Air Traffic Controller (ATC) services.
2. Flight Information and Coordination Services: Ineffective communication, where the connection may suddenly drop or one party can only receive or send, necessitating repeated calls.

The author recommends several initiatives to ensure that Air Traffic Controllers (ATC) at the Sorong Branch Area of Perum LPPNPI can work comfortably without being disturbed by miscommunications and other disruptions in Flight Safety Communication services:

Implementing Direct Speech (DS) Communication Tools to facilitate connection between relevant units and to replace conventional telephones for communication purposes:

1. Reducing the likelihood of misunderstandings or poor coordination, which could lead to disconnections. The use of DS Direct Speech can reduce the chances of miscommunication among personnel.
2. Steps to minimize sudden disconnections, intermittent sound, or one-sided communication by optimizing the replacement of conventional telephones

In line with Civil Aviation Safety Regulation (CASR) Part 139 Aerodrome, Subpart H, 139.177 Communication number 4, which states: “The equipment must not interfere

with communication equipment used by the air traffic service at the aerodrome." Which means the equipment must not interfere with communications equipment used by air traffic services at the airport. In this case, there are too many coordination tools with adjacent APP units. The location of the coordination device in the form of a telephone is quite close to the fixed transceiver speaker and the position of the controller. So it disturbs the controller's concentration when on mic. Also CASR Part 170 Aeronauical Fixed Services, subpart 170.052 point C.(i).(a) states that, "Communications by Direct Speech alone, or in combination with data link communications, whereby for the purpose of transfer of control using radar or ADS-B, the 51 communications can be established instantly and for other purposes the communications can normally be established within fifteen seconds." What this means is that communication using Direct Speech or combined with data link communications can be used for instant and effective transfer of control within 15 seconds.

Annex 11 Chapter 6 explains the procedures for the use of Direct Speech, stating that: "Appropriate procedures for direct-speech communication should be developed to permit immediate connections to be made for very urgent calls concerning the safety of aircraft, and the interruption, if necessary, of less urgent calls in progress at the time." This means that direct voice communication procedures must be developed to allow immediate communication concerning urgent aircraft safety issues, with the possibility of interrupting less urgent calls if necessary. Furthermore, Annex 11 Air Traffic Services Chapter 6 also states: "Indication by time of the speed with which the communication should be established is provided as a guide to communication services, particularly to determine the types of communication channels required, e.g., that 'instantaneous' refers to communications that provide immediate access between controllers; 'fifteen seconds' to accept switchboard operation, and 'five minutes' to mean methods involving retransmission." This means that coordination should be done based on the time required for communication, and specifically determining the type of communication channels needed, allowing for effective direct access to communication. Fifteen seconds is designated for switchboard operations, and five minutes is specified for retransmission methods.

Annex 6 Chapter 11 also states about Procedure for Direct Speech Communications that, “Appropriate procedures for Direct Speech communications should be developed to permit immediate connections to be made for very urgent calls concerning the safety of aircraft, and the interruption, if necessary, of less urgent calls in progress at the time .” What this means is that appropriate procedures for Direct Speech must be developed for emergency situations with consideration of the safety of aircraft operating at that time.

According to sources, Direct Speech at Domine Eduard Osok Airport Sorong has been in place since its establishment in 2015. The role of communication at Sorong Airport is currently very important, where communication serves as any tool or medium that facilitates the exchange of data or communication with other Air Traffic Controller or units. Common issues faced include communication equipment experiencing reception disruptions, missing dial tones, sudden interruptions during conversations, audio fading in and out, and significant disturbances in information transfer that may affect flight information exchange.

With the frequent movement of aircraft during takeoff, landing, and overflying, coordination must be carried out quickly and accurately. Often, the Direct Speech communication with the Jayapura Info unit experiences disruptions or even fails, leading to suboptimal coordination. Disruptions such as suboptimal Direct Speech or even errors can result in a Breakdown of Coordination (BOC), which, if prolonged, may escalate into a Breakdown of Separation (BOS). This can increase the workload of an on-duty controller and may become a hazard due to potential miscommunication or misunderstanding when delivering information or coordinating via Direct Speech.

An example of this is the Direct Speech communication to Ujung Control when requesting a squawk number for departure traffic. If there is a disruption or failure in communication, it will result in delays for departure traffic. Additionally, unexpected traffic often occurs in Sorong, requiring good coordination with adjacent units. At certain times, especially when there is traffic with high conflict potential, such as between Sorong, Manokwari, and Makassar, effective coordination becomes crucial. While Direct Speech is very helpful, it can also become a challenge due to the large volume of phone calls, sometimes leading to Air Traffic Controller (ATC) errors in answering or making calls.

This can cause delays in providing information, which could lead to a Breakdown of Separation.

Based on research data, it is stated that damage to direct speech communication equipment generally occurs due to the age of the equipment, which has been used by ATC for quite a long time in Sorong. Also, the lack of regular checking of direct speech by technicians causes damage to the communication equipment.

The problem that ATC often faces when using this tool when flight traffic is busy is that the direct speech often sounds simultaneously which is quite disturbing for ATC's concentration in controlling. Also, there are often disturbances in telephone reception such as not hearing the dial tone, suddenly being cut off while talking, lost sound-arise and/or can only listen. So, maintenance is required or significant improvements to be made to prevent damage to the equipment or communication network in Direct Speech.

Currently, Domine Eduard Osok Sorong Airport is overcoming interference with Direct Speech communication tools, by using cellphones to coordinate directly with adjacent units. However, sometimes the existing cellular network is not adequate because several adjacent units are located on several small islands and in the middle of the forest.

A good way to overcome problems with communication equipment is the need for evaluation and rechecking as well as good and routine maintenance of communication equipment for suitability as well as active coordination with flight technicians and adjustments to the Standard Operational Procedure (SOP) and Letter of Coordination Agreement (LOCA) or Memorandum of Understanding (MoU) between units.

As suggested by the informants, to prevent undesired issues or risks related to communication failures, it is necessary to conduct an evaluation and recheck the communication equipment for its feasibility or procure new communication tools, such as a Voice Communication Control System (VCCS). The VCCS is crucial because it provides automation in ATC performance during working hours, helping Air Traffic Controller (ATC) and reducing workload risks, while enhancing technology to improve the quality of Air Traffic Services.

The Voice Communication Control System (VCCS) controls and Connects various voice communications systems used for Air Traffic Management such as VHF TX/RX,

telephone, and other ATC communications. It also provides the internetwork chain & backbone for many interfaces that act as exchanges for all unified interface. VCCS works on various technology protocols customized information for each set of facilities. (aai.aero, 2021).

According to the Airman's Journal: Analysis of Telephone Damage to Voice Control Unit (VCU) at Perum LPPNPI Manado Branch Office (2021), definition of VCCS:

Voice Communication Control System (VCCS) is a piece of equipment which is designed to make it easier for users to communicate sound by integrating all users (clients) and facilities communication in one system and controlled using Control panel. The importance of VCCS in an airport is to facilitate ATC and the parts of the airport that are connected internally communicate.

It is also necessary to provide technology and automation in the ATC system such as the Voice Communication Control System (VCCS) to make it more effective in communicating between related units. VCCS is considered to help reduce the workload of assistance and does not interfere with the concentration of ATC who is on duty. VCCS makes it easier for ATC where the system uses a touch screen monitor which can also combine Direct Speech and PABX, apart from that, procurement of VCCS can also minimize the equipment in the Control Desk.

CONCLUSION AND SUGGESTIONS

It can be concluded that at The Sorong Branch Area of Perum LPPNPI, the use of Air Traffic Controller (ATC) communication tools in the form of direct speech has been successfully implemented in the management of air traffic services. However, there are some challenges that Air Traffic Controller (ATC) often face when using direct speech during air traffic control operations. For example, when making calls, sometimes the connection tone is not heard, the call unexpectedly drops during coordination with adjacent units, and there are issues with sound fading in and out and/or only being able to hear from one side. Additionally, during peak traffic times, direct speech often rings simultaneously, which can significantly disrupt the concentration of Air Traffic Controller (ATC) while on duty.

The author provides several suggestions to minimize the communication disruptions occurring at The Sorong Branch Area of Perum LPPNPI, and optimize information services as well as coordination by using aviation safety communication tools. This includes positioning direct speech as a replacement for conventional communication tools between units to make coordination for flight safety services more efficient and reduce miscommunication.

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