

## **Impact of ATS Flight Plan Rejection on Air Traffic Services at AirNav Indonesia Palembang**

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### **Abstract**

*The increase in air traffic volume at AirNav Indonesia Palembang Branch, along with the expansion of service sectors, has led to a significant rise in the number of flight plans processed by the ATS System. This condition increases the potential occurrence of flight plan rejected events, which may affect the quality of air traffic services. This study aims to analyze the impact of flight plan rejected by the ATS System on air traffic services at AirNav Indonesia Palembang Branch. A quantitative research method was employed, with data collected through questionnaires, observations, and documentation studies. The research population consisted of 56 Air Traffic Controllers (ATC), all of whom were included as research samples. Data analysis was conducted using validity tests, reliability tests, descriptive statistics, normality tests, correlation analysis, and simple linear regression. The results indicate that the level of flight plan rejected occurrences falls into the moderate category and has a measurable effect on air traffic services, particularly in terms of ATC workload, guidance efficiency, and service effectiveness. The study concludes that flight plan rejected by the ATS System has a significant influence on the quality of air traffic services, highlighting the need for improved accuracy in flight plan submission and the development of more effective operational procedures to minimize such occurrences.*

**Keywords:** *flight plan rejected, ATS System, air traffic services, AirNav Indonesia Palembang, Air Traffic Controller*

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## **INTRODUCTION**

In the air transportation ecosystem, air navigation services play a fundamental role in ensuring flight safety, operational efficiency, and the orderly flow of air traffic. These services are essential for maintaining separation between aircraft, managing airspace capacity, and supporting the continuity of flight operations under varying traffic and weather conditions. As the sole national provider of air navigation services, AirNav Indonesia bears full responsibility for managing flight operations not only within Indonesia's sovereign airspace but also in certain delegated airspace sectors of neighboring countries. This responsibility requires a high level of reliability, accuracy, and system integration in all operational processes. Consequently, AirNav Indonesia is required to continuously modernize its systems, infrastructure, and operational procedures to accommodate the rapid growth of air traffic while maintaining international safety standards (Dwinanda & Dewi, 2021).

In line with this responsibility, the Palembang Branch of AirNav Indonesia has implemented a policy of service sector centralization aimed at improving efficiency and optimizing resource utilization. Initially, this centralization covered the Pangkal Pinang Terminal Maneuvering Area (TMA), and in 2021 it expanded to include Jambi Control Zone (CTR), Bengkulu CTR, and Tanjung Pandan CTR. This expansion significantly increased the scope of air traffic services handled by the Palembang Branch, leading to a substantial rise in aircraft movements and the volume of flight plan data processed daily. As a result, the operational workload of Air Traffic Controllers (ATC) has intensified, requiring higher levels of concentration, coordination, and system reliability (AIM Indonesia, 2021). In 2024, total aircraft movements reached 22,425 operations, highlighting the growing demand for a robust, efficient, and error-resistant air traffic service system to ensure safety and operational continuity.

The increase in traffic volume has a direct impact on air traffic services and the performance of the ATS System, particularly in the management and processing of flight plan data. As traffic density increases, the number of flight plans submitted to the system also rises, thereby increasing the likelihood of errors in data entry and system incompatibility. Flight plans are critical operational documents containing essential information such as routes, flight levels, departure times, aircraft types, and other operational parameters. These data must be accurately submitted and validated before the Estimated Off-Block Time (EOBT) to support effective air traffic management. Any inaccuracies, inconsistencies, or non-compliance with system requirements may result in flight plan rejection, which can disrupt the flow of air traffic operations (Fathurrozy et al., 2022; Rachmanto, 2023).

Flight plan rejection requires corrective actions by Flight Data Officers (FDO) or ATC personnel to revise and resubmit the data before clearance can be issued. This process may delay clearance delivery, increase controller workload, and reduce the efficiency of automated system functions, particularly during peak traffic periods. In high-density traffic situations, such conditions may introduce operational risks and place additional pressure on controllers' decision-making processes. Inefficient handling of rejected flight plans can ultimately degrade the quality of air traffic services and affect overall system performance (Fitrianingsih et al., 2021; Zhong et al., 2025). Therefore, understanding the operational implications of flight plan rejection is crucial for improving service effectiveness and maintaining safety standards at AirNav Indonesia Palembang Branch.

Based on the background described above, the research questions of this study are formulated as follows:

1. How does flight plan rejection occur at AirNav Indonesia Palembang Branch?
2. How is the performance of air traffic services at AirNav Indonesia Palembang Branch?
3. What is the impact of flight plan rejection by the ATS System on air traffic services at AirNav Indonesia Palembang Branch?

In accordance with these research questions, the objectives of this study are to analyze the impact of flight plan rejection by the ATS System on air traffic services at AirNav Indonesia Palembang Branch and to examine the condition of air traffic services in relation to flight plan rejection incidents. Through this analysis, the study is expected to provide insights that can support operational improvements and enhance the effectiveness of air traffic services in handling increasing traffic demands.

## RESEARCH METHODS

This study employed a quantitative research design to examine the impact of *flight plan rejected* by the Air Traffic Services (ATS) System on air traffic services at AirNav Indonesia Palembang Branch. The quantitative approach was selected because it allows the researcher to measure relationships between variables objectively through numerical data and statistical analysis. This approach is particularly appropriate for operational aviation studies, where service performance, workload, and system reliability can be systematically quantified and analyzed (Pradana, 2019). The research design focuses on identifying patterns, tendencies, and the magnitude of influence between the independent and dependent variables based on empirical data.

### Research Subjects and Location

The research was conducted at Perum LPPNPI (AirNav Indonesia) Palembang Branch, an air navigation service provider responsible for managing multiple air traffic service sectors, including Palembang TMA, Pangkal Pinang TMA, Jambi CTR, Bengkulu CTR, and Tanjung Pandan CTR. The research subjects consisted of 56 Air Traffic Controllers (ATC) who are

directly involved in flight plan processing and daily air traffic service operations. These personnel were selected because of their operational roles and direct interaction with the ATS System, particularly in handling flight plan data and managing air traffic flow.

### **Population and Sampling Technique**

The research population comprised all ATC personnel at AirNav Indonesia Palembang Branch who are actively involved in flight plan management and air traffic services. According to Sugiyono (2019), a population refers to a group of individuals or objects that share specific characteristics relevant to a study. In this research, the total population consisted of 56 ATC personnel. A non-probability sampling technique using total sampling (census) was applied, whereby all members of the population were included as research respondents. This technique was chosen to ensure comprehensive representation and to minimize sampling bias, allowing the findings to accurately reflect the actual operational conditions at the research site (Sugiyono, 2019).

### **Research Variables and Operational Definitions**

The study involved two main variables. The independent variable (X) was *flight plan rejected by the ATS System*, defined as the rejection of submitted flight plans due to administrative errors, data inconsistencies, or technical non-compliance with system and regulatory requirements (ICAO, 2016). The dependent variable (Y) was *air traffic services*, defined as the overall performance of air traffic services as perceived by ATC personnel, including service smoothness, workload management, coordination effectiveness, communication quality, and operational efficiency.

To ensure measurability and consistency, operational definitions were applied. The *flight plan rejected* variable was measured based on ATC perceptions of rejection frequency, correction processes, and operational impact. Air traffic services were measured through indicators related to safety, coordination, service continuity, communication responsiveness, and workload conditions following flight plan rejection incidents.

### **Data Collection Techniques and Instruments**

Data were collected using multiple techniques to enhance data validity and triangulation. First, a documentation study was conducted by reviewing ATS operational data, Standard Operating Procedures (SOPs), Aeronautical Information Publications (AIP), and records of flight plan rejected incidents. Second, direct observation was carried out to obtain real-time insights into operational conditions, system usage, and the handling of rejected flight plans during daily operations. Third, questionnaires were distributed to ATC personnel using a Likert scale to capture structured perceptions regarding both research variables. The Likert scale was chosen because it effectively measures attitudes and perceptions in quantitative research (Sugiyono, 2019; Pradana, 2019).

### **Data Analysis Techniques and Statistical Model**

Data analysis was conducted using well-established quantitative analysis procedures. The questionnaire data were first subjected to validity and reliability testing to ensure that the research instruments accurately and consistently measured the intended variables. Descriptive statistical analysis was then applied to present an overview of the data distribution and respondent characteristics. Prior to inferential analysis, normality testing was performed to assess data distribution suitability. Furthermore, correlation analysis was used to examine the relationship between *flight plan rejected* and air traffic services, while simple linear regression analysis was employed to assess the influence of the independent variable on the dependent variable. These statistical methods were applied without excessive presentation of formulas, in accordance with best practices in quantitative research reporting (Sugiyono, 2019).

## RESULTS AND DISCUSSION

This study analyzes the impact of *flight plan rejected* by the ATS System on air traffic services at AirNav Indonesia Palembang Branch based on questionnaire responses from 56 Air Traffic Controllers (ATC), supported by operational documentation and observations.

### Flight Plan Rejected by the ATS System

The assessment of the *flight plan rejected* variable was conducted using ten questionnaire items measured on a Likert scale. The analysis shows that the total score obtained reached 1,900 out of a maximum possible score of 2,800, representing 67.86% of the maximum value. This result places the level of *flight plan rejected* in the moderate category, indicating that rejection events occur with considerable frequency in daily operations.

**Table 1. Flight Plan Rejected Score Distribution**

Variable	Total Score	Maximum Score	Percentage (%)	Category
Flight Plan Rejected	1,900	2,800	67.86	Moderate

Operationally, this condition reflects the increased traffic volume and sector expansion handled by AirNav Indonesia Palembang Branch. Errors related to route structure, aircraft type, and Estimated Off-Block Time (EOBT) remain dominant contributors to flight plan rejection, consistent with previous findings emphasizing the importance of data accuracy in flight plan processing (Fathurrozy et al., 2022; Rachmanto, 2023).

### Air Traffic Services Performance

Air traffic services performance was also evaluated using ten questionnaire items. The results show a total score of 1,810 out of 2,800, equivalent to 64.64%, which places the service performance within the moderate category. This indicates that air traffic services remain generally effective, although operational constraints are evident, particularly during high traffic periods.

**Table 2. Air Traffic Services Score Distribution**

Variable	Total Score	Maximum Score	Percentage (%)	Category
Air Traffic Services	1,810	2,800	64.64	Moderate

Field observations indicate that rejected flight plans require corrective actions by ATC or Flight Data Officers (FDO), which may affect service smoothness and response time. Similar operational challenges have been highlighted by Fitrianiingsih et al. (2021), who noted that delayed flight plan correction can disrupt coordination among ATS units.

### Relationship Between Flight Plan Rejected and Air Traffic Services

The comparative analysis demonstrates that the occurrence of *flight plan rejected* is closely associated with air traffic service performance. As traffic volume increases, the likelihood of flight plan input errors also rises, which in turn affects workload distribution and operational efficiency. This relationship is illustrated by the comparison of both research variables.

Figure 1. Comparison of Flight Plan Rejected and Air Traffic Services

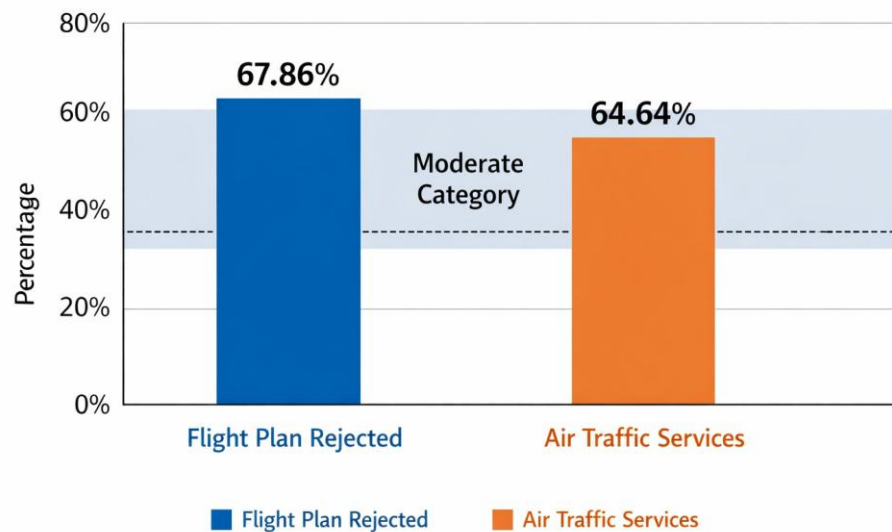


Figure 1. Comparison of Flight Plan Rejected and Air Traffic Services

Figure 1 illustrates the percentage comparison between the *flight plan rejected* variable and *air traffic services* variable. The results show that both variables fall within the moderate category, with flight plan rejection exhibiting a slightly higher percentage. This condition indicates that frequent flight plan rejection contributes to increased operational complexity and reduced system automation effectiveness, particularly under high traffic conditions.

From an operational perspective, rejected flight plans temporarily reduce the benefits of ATS automation, requiring additional manual coordination. In dense traffic situations, this may affect controller workload and decision-making processes, as also noted by Zhong et al. (2025). Therefore, improving flight plan submission accuracy and strengthening standardized procedures aligned with ATS System requirements are essential to support safe, orderly, and efficient air traffic services.

## CONCLUSION

Based on the results and discussion, this study concludes that *flight plan rejected* by the ATS System has a noticeable influence on the performance of air traffic services at AirNav Indonesia Palembang Branch. The findings show that the level of flight plan rejection falls within the moderate category and is closely associated with air traffic service performance, which is also categorized as moderate. Frequent flight plan rejection increases operational complexity by requiring additional corrective actions, reducing the effectiveness of system automation, and adding to the workload of Air Traffic Controllers, particularly during periods of high traffic density. These conditions may affect service smoothness, response time, and overall operational efficiency. Therefore, improving the accuracy of flight plan submission and strengthening standardized operational procedures aligned with ATS System requirements are essential measures to enhance air traffic service quality and support safe, orderly, and efficient air traffic operations.

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