ANALYSIS OF THE FULFILLMENT OF AVIATION SECURITY FACILITIES IN THE OPERATION OF THE REGIONAL GOVERNMENT VIP BUILDING AT EL TARI KUPANG AIRPORT

Gracyel Abhellya Christine[1], Yuyun Suprapto[2], Fatmawati[3]

[1,2,3] *Politeknik Penerbangan Surabaya, Jemur Andayani I No.73, Surabaya City, East Java, Indonesia 60236*
[*]*Corresponding author. Email:* [1,*] *abhellya83@gmail.com*

ABSTRACT

Aviation security is a crucial aspect of airport operations. The condition of the El Tari Kupang Airport RegionalGovernment VIP building, which has direct access to the apron area, and the lack of aviation security facilities can pose risks to aviation safety and security. This research used a quantitative approach with a cross-sectional study design. The research method employed the Gap Analysis Checklist and the Analytical Hierarchy Process (AHP). The AHP method was used to determine the priority of mandatory security facilities, while the gap analysis method was used to measure the level of compliance of existing facilities with Regulation KM 39 of 2024. The results of the research indicate that the level of compliance is still low. Of all the indicators regulated, only four aspects meet the standards, namely Hand Held Metal Detectors (HHMD), warning systems to mobile phones or management rooms, manual cabin baggage inspection tables, and communication devices with security unit management. Meanwhile, the AHP analysis identified the security facilities that should be available in the regionalgovernment VIP building based on the order of eigenvector values: CCTV in the inspection area (0.1569), security facility testing equipment (0.1420), a multi-view cabin X-ray machine with active TIP functionality (0.1363), Walk Through Metal Detector (WTMD) (0.1327), and Hand Held Metal Detector (HHMD) (0.1087). This situation poses a serious potential risk to aviation safety. Although the probability of the risk occurring is relatively low, the impact is very high, so immediate mitigation efforts are needed through the improvement of facilities and security procedures in the regionalgovernment VIP building.

Keywords: *Aviation security facilities, El Tari Kupang airport, Analytical Hierarchy Process, Gap Analysis, Safety risk.*

1. INTRODUCTION

An airport is an area located on land and/or waters with certain boundaries, which is used as a location for aircraft to land and take off, as well as a place for passenger boarding and disembarkation activities, the process of loading and unloading goods, and moving between and within modes of transportation[1]. El Tari Kupang Airport is one of the main air transportation infrastructures, especially in the East Nusa Tenggara Province (NTT) area which plays a role in supporting connectivity and community mobility in the eastern region of Indonesia and is under the management of PT Angkasa Pura Indonesia which serves domestic routes around the East Nusa Tenggara region and connects major cities such as Jakarta, Surabaya, Bali, and Makassar. El-Tari Kupang Airport is used as a special access for the departure of important officials in the NTT region so that in the airport area a VIP building facility was built by the Regional Government in 2012 and managed by the NTT Provincial Government. This Regional Government VIP Building is located on the west side of El-Tari Kupang Airport and has direct access to the air side area, namely the airport apron and is in the same security area as El-Tari Airport so that it is an area vulnerable to the threat of crime, so all facilities in it including the Regional Government VIP building must be equipped with an adequate security system.

El Tari Airport Statistics (2023) recorded an average of 35 visits by VIP officials per month. With the frequency of use quite often by the NTT Regional Government, the operation of the VIP building of the Regional Government is required to meet aviation security standards (*aviation security threats*) to prevent threats that can cause special dangers in flight operations.

Aviation security is a condition that ensures flight protection from unlawful actions through the synergy of the use of human resources, facilities, and procedures [2][3]. A sense of security is a fundamental aspect that must be realized by an airport not only depending on the number and quality of personnel but also determined by the completeness of flight security facilities [4]. Each airport requires a variety of flight security facilities tailored to the security system determined by the number of departing passengers each year. El Tari Airport was recorded to have the highest number of departing domestic passengers in 2023, reaching 568,674 people. Therefore, El Tari Kupang Airport implements Security System E (number of passengers 500,000-1,000,000 people/year). Ministerial Decree No. 39 of 2024 concerning the National Aviation Security Program has regulated the fulfillment of the security system with category E must have a security inspection line equipped with security facilities and supporting facilities.

In accordance with the explanation above, the author can formulate and arrange the formulation of the problem as follows:

1. What are the flight security facilities that should be available in the VIP building of the El Tari Kupang Airport Government based on KM 39 of 2024?
2. What is the level of suitability of security facilities in the VIP building of the El Tari Kupang Airport Government based on KM 39 of 2024?
3. What are the impacts of the incompatibility of flight security facilities at the VIP building of the El Tari Kupang Airport Government?

2. METHODS

2.1. Research Design

This study uses a qualitative approach with a cross-sectional study research design, which is a research design that observes variables at a certain time to describe the conditions or phenomena that are occurring [5]. This approach is used because it is in line with the purpose of the research, which is to find out the extent of the fulfillment of aviation security facilities in the operation of the VIP building of the El Tari Kupang Airport Government in accordance with KM 39 of 2024. This research is descriptive with the intention of describing the level of conformity of existing security facilities with the standards that have been set and identifying potential impacts that arise due to these nonconformities.

2.2. Research Variables

The variable in this study is the fulfillment of aviation security facilities in the VIP building of the El Tari Kupang Airport Government which is measured based on the indicators listed in KM 39 of 2024 concerning the National Aviation Security Program.

Table 1. Operational Definition

Variable	Indicator	Opertaional Definition	Measuring Instruments	Measurement Results	Scale
Fulfillment Aviation Security Facilities in accordance with the Decree of the Minister of Transportation of the Republic of Indonesia Number KM 39 Year 2024 on the National Aviation Security Program	Multiview cabin x-ray machine with active TIP function	Availability of x-ray machines used to scan passengers' luggage with the TIP feature active	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Walk Through Metal Detector (WTMD)	Availability of a goal-shaped metal detector used during the inspection	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Hand Held Metal Detector (HHMD)	Availability of handheld metal detectors used during inspections	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Plastic tray	Availability of plastic containers to place passenger luggage when passing through x-ray machines	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Prohibited item box	Availability of transparent boxes to store prohibited and confiscated items	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Table and roller inlet before x-ray machine	Availability of examination aids at the beginning of the x-ray machine examination	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Table and outlet roller after x-ray machine	Availability of examination aids at the end of the x-ray machine examination	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Special examination room	Availability of a dedicated room for follow-up checks on passengers or goods	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Partitions at least two meters high in the PSCP area	Availability of visual/physical barriers to maintain privacy and security during check-in	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Security information media (banner/poster)	Availability of visual information about aviation safety	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	CCTV in the inspection area	Availability of surveillance cameras covering all security screening areas	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Safety facility test kit	Availability of tools to ensure the functioning of security facilities	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Alert system to mobile phone/leaderroom	Availability of an automatic alarm or notification system connected to the monitoring device	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Cabin baggage manual inspection table	Availability of a dedicated desk for manual checks of luggage	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Communication tools with security unit leaders	Availability of direct communication tools for coordination between security officers	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal
	Cabinet/computer for storage of logbooks and documents	Availability of a place to store important documents related to security processes	Questionnaire/ Checklist Sheet	1. Score 1 (Appropriate) 2. Score 0 (Inappropriate)	Nominal

2.3. Population, Sample and Research Object

2.3.1. Population and Sampel

The population in this study is 8 (eight) respondents who have an understanding of aviation security facilities in the operation of the Regional Government VIP building

at El Tari Kupang Airport consists of 1 person Departement Head Unit Airport Security (code R.1), 3 person *Supervisor Unit Airport Security* (code R.2) and 4 person of Chief (code R3). The sampling technique used in this study is non-probability sampling with a purposive sampling approach, is a sample determination technique with certain considerations or criteria that are relevant to the research purpose [6]. The sample criteria in this study are as follows of 3 (three) people who have a direct role in the management of aviation security facilities at the Regional Government VIP building at El Tari Kupang Airport in 2024. First, 1 Depertement Head of the Airport Security unit who has knowledge and responsibility related to flight security facilities at the airport. Second, 1 Supervisor who is directly involved in the management of aviation security facilities in the VIP building of the Regional Government. Third, 1 staff who participate in the implementation of policies and procedures related to aviation security facilities in the VIP building of the Regional Government.

2.3.2 Research Object

The object of research in this study is the flight security facility in the VIP building of the Regional Government at El Tari Kupang Airport with a focus on compliance aspects in accordance with KM 39 of 2024 consists of : multiview cabin x-ray machine with active TIP function, Walk Through Metal Detector (WTMD), Hand Held Metal Detector (HHMD), plastic tray, prohibited item box, table and roller inlet before x-ray machine, table and outlet roller after x-ray machine, special examination room, partitions at least two meters high in the PSCP area, security information media (banner/poster), CCTV in the inspection area, safety facility test kit, alert system to mobile phone/leaderroom, cabin baggage manual inspection table, communication tools with security unit leaders and cabinet/computer for storage of logbooks and documents.

2.4. Data Collection Techniques and Research Instrument

2.4.1. Primary Data

The primary data in this study is the result of filling out a checklist sheet that focuses on aviation security facilities at the VIP building of the El Tari Kupang Airport Regional Government, which includes various equipment and facilities in accordance with KM 39 of 2024. This checklist sheet will identify the implementation of existing security facilities at El Tari Kupang Airport, including X-ray machines, metal detectors, CCTV, and other supporting facilities. Primary data will also include direct assessments from managers and related staff regarding the fulfillment of existing facilities in the regionalgovernment's VIP building at El Tari Kupang Airport. In this study, a checklist sheet was made by the researcher by referring to the literature consisting of several questions by providing a check list (√) on the available answer columns regarding the implementation of flight security facilities in the VIP building of the Kupang Airport Regional Government. checklist gap analysis to find out the existing condition of aviation security facilities in the Regional Government VIP building. Each indicator if "Appropriate" will be given a scale of (1), and if "Not Appropriate" then given a scale of (0).

2.4.2. Secondary Data

Data collection was carried out through tracing documents in the Regional Government VIP building at El Tari Kupang Airport, as well as information that can support the analysis of the implementation of security facilities in the Regional Government VIP building at El Tari Kupang Airport, including:

1. Policies, procedures, and regulations governing the management of aviation security facilities at El Tari Kupang Airport, in accordance with Ministerial Decree Number 39 of 2024.
2. Data on facilities in the Regional Government VIP building, which includes the types and conditions of available security facilities.
3. Documents containing safety procedures implemented at El Tari Kupang Airport, especially those related to passenger security checks at the Regional Government VIP building.

2.5. Data Analysis Techniques

The data analysis techniques used in this study are quantitative descriptive, using the Analytical Hierarchy Process (AHP) and Gap Analysis Checklist methods which aim to describe the level of conformity between the implementation of flight security facilities in the VIP building of the El Tari Kupang Airport Government and the provisions listed in KM 39 of 2024 concerning the National Aviation Security Program.

2.5.1. Analytical Hierarchy Process (AHP)

This method is used to help decision-making effectively in dealing with complex problems [7]. This approach is carried out by simplifying and accelerating the decision-making process, namely by breaking down the problem into several components, arranging the components or variables in the form of a hierarchy, and then providing a numerical assessment based on subjective considerations about the level of importance of each variable, where the variable with the highest priority then influences the outcome of the decision in the situation the most. AHP (Analytic Hierarchy Process) has the basic principles of the method, namely decomposition, comparative judgement, synthesis of priority and consistency

1. Decomposition is defining the problem and determining the desired solution. In this study,

problems and determining solutions are described in the form of a hierarchy and grouped into two parts, namely goals and criteria.

Table 2. Intensity of Interests [7]

Intensity Interests	Description
1	Both elements are equally important
3	One element is slightly more important than the other
5	One element is more important than the other
7	One element is clearly more absolute important than the other
9	One element is absolutely more important than the other
2,4,6,8	Values between two adjacent values of considerations

2. The second step is Comparative Judgment, which is compiling a paired comparison matrix. This matrix is filled with numbers that represent the relative level of importance between the elements. This process is carried out by comparing each element of the criteria and alternatives in pairs. The values in the matrix were obtained from questionnaires that had been answered by respondents.

3. In the third stage, is the synthesis of priority, carried out by processing a normalized comparison matrix. At this stage, an Eigen Vector (Priority Factor) value will be obtained which describes the priority level of each criterion.

4. The fourth step is consistency, which aims to check the accuracy of the eigenvector values generated at the synthesis of priority stage. At this stage, a number of calculations are carried out to ensure the consistency of the data obtained
   a) Determine the maximum lamda (λ) by multiplying the paired comparison matrix by the weight vector.
   b) Hierarchical consistency test, by calculating the consistency index (Consistency Index = CI) with the formula :

$$CI = \frac{\lambda \text{ maksimum} - n}{n - 1}$$

   Formula description
   N : the number of rows or columns of paired comparison matrices.
   c) Determining the Random Index (RI_n)
   The random index value (RI_n) can be seen in the table 3.

Table 3. Random Index (Ri_n) [7]

N	Ri_n
1	0
2	0
3	0.52
4	0.89
5	1.11
6	1.25
7	1.35
8	1.40
9	1.40
10	1.45
11	1.49
12	1.54
13	1.56
14	1.58
15	1.59

   d) Calculate Consistency Rasio (CR)

$$CR = \frac{CI}{RI}$$

Formula description:
RI : random values obtained from the RandomConsistency Index table on a given n.
Criteria :
- CI = 0, the hierarchy is consistent
- CR < 0.1, hierarchy is quite consistent
- CR > 0.1, hierarchy is very inconsistent

In this study, the AHP (Analytic Hierarchy Process) analysis method is used to determine priorities in the improvement and fulfillment of security facilities, taking into account the level of importance, urgency, and its influence on aviation safety.

2.5.2. Gap Analysis

Gap analysis compares two types of data to identify and find out the differences. Gap analysis is used to compare a set of requirements. Gap analysis is structured in one area, topic, or category so that it becomes efficient in determining the sector or field that needs improvement[8]. In this study, gap analysis is used to determine the level of conformity in the fulfillment of aviation security facilities in accordance with KM 39 of 2024 where there are 16 indicators of aviation security facilities that must be fulfilled.

In each item of this checklist sheet, there are 16 flight safety facilities based on KM 39 of 2024, with a choice of answers. The answer choice score uses a nominal scale. At this scale, there is no hierarchical relationship or comparison, just a grouping based on the same thing. In table 4 the Score GAP Analysis that explains the nominal scale in the data analysis of this study

Table 4. Score Gap Analysis

Score	Understanding
1	If the flight security facilities available in the regional government's VIP building are in accordance with the KM 39 of 2024 regulatory standards.
0	If the flight security facilities available in the regional government's VIP building are not in accordance with the standards of KM 39 of 2024 regulations.

To find out the percentage of conformity level, the results of grouping based on a nominal scale, an analysis was carried out using the formula :

$$\text{Compatibility Level} = \frac{\text{Number of indicator fulfilled}}{\text{Total indicator}} \text{ x } 100\%$$

The percentage of conformity level obtained in the analysis based on the size of the percentage gap obtained is based on the following table 4.

Table 4. Range Gap Analysis [9]

Rentang Presentase Kesesuaian (%)	Kategori
75 - 100	Height (as standard)
50 - 74	Medium (Need significant improvement)
< 50	Low (Not up to standard)

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Responden Charcteristics

The respondents in this study were 3 (three) people, all of whom came from the Department of ARFF and Security at El Tari Kupang Airport. The three respondents have strategic positions in the field of aviation security, namely two people who serve as Airport Security Chief Assistants, namely Yossa Galuh Darhantian and Anak Agung Gede Agung Baskara Kepakisan, and one person as Airport Security Department Head, namely Hery Deny Marjono. The background of the positions and departments of these three respondents shows that they have the relevant competence and authority to provide an assessment of the fulfillment of aviation security facilities, especially in the operation of the Regional Government VIP Building.

3.1.2. Result of Analytical Hierarchy Process (AHP)

The decision hierarchy in AHP for this study consists of three main levels, namely: (1) Main objectives: evaluating the fulfillment of aviation security facilities in the Regional Government VIP Building; (2) Criteria: indicators of safety facilities in accordance with aviation regulations; and (3) Alternative: the real condition of the existing facilities based on the results of observation and assessment of respondents. This hierarchy is the basis for analysis and decision-making in the context of meeting safety standards at the research site.

1. Decomposition

At this stage, the problem is that the fulfillment of aviation security facilities in the operation of the Regional Government VIP building at El Tari Airport has not been optimal in the form of a decision hierarchy consisting of the main parts of objectives and criteria. The goal is to ensure that the necessary security facilities are met, functioning properly and in accordance with applicable regulatory standards..

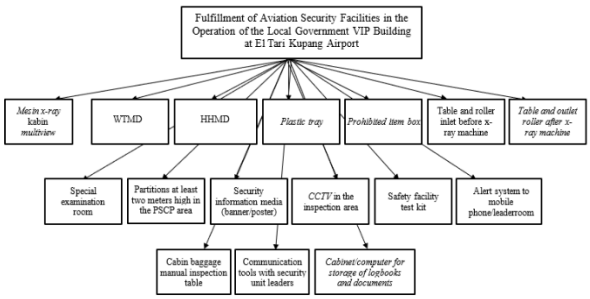

Figure 1 Decision Hierarchy AHP

2. Comparative Judgement

After the criteria in decision-making are determined according to figure 1, each of these criteria will be compared in pairs (comparative judgement) to assess priority or weight (synthesis of priority) based on the level of urgency and its contribution to the aviation safety system. Paired comparison matrices are filled using numbers to present the relative importance of an element to another element. The numbers entered in the paired comparison matrix were obtained from questionnaires that had been filled out by the respondents. In this study, the researcher used a sample of 3 (three) respondents who played a direct role in the management and supervision of aviation security facilities in the VIP Building of the Kupang Airport Regional Government. The respondents

consisted of one Manager and two staff from the ARFF & Security Department, who had responsibility for flight safety operations. Each comparison is assessed using a fundamental scale that reflects how dominant one element is over another in meeting the set goals or criteria. The results of this comparative judgement are compiled in the form of a paired comparison matrix, which will then be used to calculate the priority weight of each element Based on the questionnaire data that has been scored and collected, then calculated and summarized in the form of a paired comparison table using the help of software in the form of Microsoft Exel so that the assessed listed.

3. Synthesis of Priority

From the results of the comparison matrix, then look for the eigenvector or average value (local priority) of each paired comparison matrix. The synthesis of priorities makes it possible to see the overall contribution of each alternative to the main goal to be achieved. The final result is in the form of the global priority value or final weight of each alternative, which is the basis for decision-making. Based on the results of the synthesis of priority, the value of the Vector Eigen (Priority Factor) can be determined which shows that the priority level in each criterion. After obtaining the priority weight or eigenvector of each indicator, then the Vector Eigen is presented from the highest priority to the lowest priority.

Table 5. Sequence Level of Vector Eigen

No	Criteria	Vector Eigen (Priority Factor)
11	CCTV in the inspection area	0.1569
12	Safety facility test kit	0.1420
1	Multiview cabin x-ray machine with active TIP function	0.1363
2	*Walk Through Metal Detector* (WTMD)	0.1327
3	*Hand Held Metal Detector* (HHMD)	0.1087
8	Special security checkroom	0.0412
10	Security information media (banner/poster)	0.0346
7	Table and outlet roller after x-ray machine	0.0333
9	Partitions at least two meters high in the PSCP area	0.0329
14	Cabin baggage manual inspection table	0.0323
4	*Plastic tray*	0.0311
13	Alert system to mobile phone/leaderroom	0.0287
15	Communication tools with security unit leaders	0.0255
6	Table and roller inlet before x-ray machine	0.0249
16	Cabinet/computer for storage of logbooks and documents	0.0248
5	*Prohibited item box*	0.0140

4. Consistency

Consistency is the process of determining the correctness of the Vector Eigen value obtained from the synthesis of priority process that has been made beforehand. From the calculation of the Vector Eigen value, the maximum lamda (λ) is 22,587.

$$\begin{bmatrix} 1.000 & 1.587 & 2.000 & 4.642 & 5.000 & 4.000 & 4.000 & 3.000 & 5.000 & 9.000 & 2.289 & 3.000 & 5.000 & 5.646 & 5.000 & 4.000 \\ 0.630 & 1.000 & 6.000 & 4.000 & 5.000 & 6.000 & 6.000 & 7.000 & 5.313 & 6.000 & 1.000 & 1.000 & 4.000 & 4.000 & 7.000 & 7.000 \\ 0.500 & 0.167 & 1.000 & 7.000 & 4.000 & 4.000 & 3.000 & 6.000 & 6.649 & 7.000 & 1.000 & 4.000 & 6.000 & 1.000 & 6.000 & 6.000 \\ 0.215 & 0.250 & 0.143 & 1.000 & 3.000 & 3.000 & 3.000 & 0.275 & 0.275 & 4.000 & 0.111 & 0.111 & 0.333 & 0.500 & 5.000 & 0.333 \\ 0.200 & 0.200 & 0.250 & 0.333 & 1.000 & 0.250 & 0.250 & 0.125 & 0.143 & 0.167 & 0.111 & 0.111 & 0.200 & 0.191 & 0.500 & 3.000 \\ 0.250 & 0.167 & 0.250 & 0.333 & 4.000 & 1.000 & 1.000 & 1.000 & 0.500 & 0.500 & 0.111 & 0.111 & 0.250 & 0.500 & 4.000 & 3.000 \\ 0.250 & 0.167 & 0.333 & 0.333 & 4.000 & 1.000 & 1.000 & 0.333 & 1.000 & 0.275 & 0.116 & 0.116 & 5.000 & 5.000 & 1.000 & 3.000 \\ 0.333 & 0.143 & 0.167 & 3.634 & 8.000 & 1.000 & 3.000 & 1.000 & 0.250 & 0.333 & 0.111 & 0.111 & 4.000 & 6.000 & 2.000 & 0.250 \\ 0.200 & 0.188 & 0.150 & 3.634 & 7.000 & 2.000 & 1.000 & 4.000 & 1.000 & 3.000 & 0.111 & 0.111 & 0.500 & 0.500 & 0.143 & 1.000 \\ 0.111 & 0.167 & 0.143 & 0.250 & 6.000 & 2.000 & 3.634 & 3.000 & 0.333 & 1.000 & 0.111 & 0.111 & 4.000 & 2.000 & 0.333 & 3.000 \\ 0.437 & 1.000 & 1.000 & 9.000 & 9.000 & 9.000 & 8.653 & 9.000 & 9.000 & 9.000 & 1.000 & 2.080 & 9.000 & 9.000 & 9.000 & 9.000 \\ 0.333 & 1.000 & 0.250 & 9.000 & 9.000 & 9.000 & 8.653 & 9.000 & 9.000 & 9.000 & 0.481 & 1.000 & 9.000 & 9.000 & 9.000 & 9.000 \\ 0.200 & 0.250 & 0.167 & 3.000 & 5.000 & 4.000 & 0.200 & 0.250 & 2.000 & 0.250 & 0.111 & 0.111 & 1.000 & 0.500 & 3.000 & 0.333 \\ 0.177 & 0.250 & 1.000 & 2.000 & 5.241 & 2.000 & 0.200 & 0.167 & 2.000 & 0.500 & 0.111 & 0.111 & 2.000 & 1.000 & 3.000 & 1.587 \\ 0.200 & 0.143 & 0.167 & 0.200 & 2.000 & 0.250 & 1.000 & 0.500 & 7.000 & 3.000 & 0.111 & 0.111 & 0.333 & 0.333 & 1.000 & 1.000 \\ 0.250 & 0.143 & 0.167 & 3.000 & 0.333 & 0.333 & 0.333 & 4.000 & 1.000 & 0.333 & 0.111 & 0.111 & 3.000 & 0.630 & 1.000 & 1.000 \end{bmatrix} \text{X} \begin{bmatrix} 0.136 \\ 0.133 \\ 0.109 \\ 0.031 \\ 0.014 \\ 0.025 \\ 0.033 \\ 0.041 \\ 0.033 \\ 0.035 \\ 0.157 \\ 0.142 \\ 0.029 \\ 0.032 \\ 0.026 \\ 0.025 \end{bmatrix} = \begin{bmatrix} 22.587 \end{bmatrix}$$

The consistency of the hierarchy by calculating the Consistency Index (CI)

$$CI = \frac{22.597 - 16}{16 - 1} = 0.439$$

Calculating the consistency ratio (CR) with the RI value (random values obtained from the Random Consistency Index table at a given n, which is 1.56) :

$$CR = \frac{0.439}{1.56} = 0.281$$

From the results of the calculation, the Consistency Ratio (CR) value is 0.281 so that it can be said that the determination of the hierarchy is consistent with the justification [10]

3.1.3. Result of Gap Analysis

The assessment has been carried out by the respondents, namely 2 (two) people as Airport Security Chief Assistant and 1 (one) person as Airport Security Department Head. Each "Match" indicator is given a scale of (1) and the "Matchless" indicator is given a scale of (0). The results of the assessment in the table 6.

Tabel 6. Result of Checklist Gap Analysis

No.	Facility Indicator Flight Security	Respondents Respon (Score)
1	Multiview cabin x-ray machine with active TIP function	0
2	*Walk Through Metal Detector* (WTMD)	0
3	*Hand Held Metal Detector* (HHMD)	1
4	*Plastic tray*	0
5	*Prohibited item box*	0
6	Table and roller inlet before x-ray machine	0
7	Table and outlet roller after x-ray machine	0
8	Special security checkroom	0
9	Partitions at least two meters high in the PSCP area	0
10	Security information media (banner/poster)	0
11	CCTV in the inspection area	0
12	Safety facility test kit	0
13	Alert system to mobile phone/leaderroom	1
14	Cabin baggage manual inspection table	1
15	Communication tools with security unit leaders	1
16	Cabinet/computer for storage of logbooks and documents	0

The results of the gap analysis showed that out of 16 indicators of aviation security facilities, there were 4 indicators that were appropriate while 12 indicators were not suitable. The results are based on the percentage of the number of compatibility.

$$\textbf{Compatibility Level } = \frac{4}{6} \textbf{ x 100 \%= 25\%}$$

Gap analysis is based on actual conditions with established standards to determine which aspects are appropriate and which should be improved. Risk assessment was carried out on the non-compatibility of flight security facilities at the regional government's VIP building El Tari Kupang Airport based on Range Gap Analysis (Table 4.)

Tabel 7. Risk of Non-Conformity of Flight Security Facilities of the Regional Government VIP Building

No.	Threat Scenarios	Curent Security Measures (Summary)	Residual Risk (Summary)
1.a	Liquid bomb hidden on passenger's body	X-ray, WTMD, HHMD, ETD, random check, patrol, CCTV, coordination, training have not been carried out	Not all Avsec are trained, lack of liquid detector tools, **medium** risk
1.b	Metal bomb hidden in passenger's body	X-ray, WTMD, HHMD, ETD, random check, patrol, CCTV, coordination, training have not been carried out	**Low** risk, need for training and addition of CCTV
1.c	Laptop bomb infiltrated by insider (tenant)	Patrol, CCTV, random check, strict PSCP	Lack of consistency, limited CCTV, **low** risk
2.a	Ground Handling infiltrates explosives through GSE	Permit checks, CCTV, patrols	Lack of personnel & UVSS, **low** risk
2.b	Metal explosives in vehicles in drop zones	Patrols, CCTV, *random check, bollard*	Parking area is not equipped with CCTV, **low** risk
3	Bomb detonated through cargo	*X-ray single view*, ETD, patrol, permit check	Obsolete X-rays, limited CCTV access, **low** risk
4	MANPADS attack on aircraft	Perimeter patrol, CCTV, TNI/BINDA coordination	No vulnerable points yet, socialization & SOPs are not complete, **low** risk
5.a	Bomb in checked baggage	HBSCP, *profiling*, CCTV, patrol	Avsec is not all trained, **low** risk
5.b	Ground Handling infiltrates	Profiling, coordination,	Low safety culture, **low** risk

	bombs into luggage	inspection, safety culture	
6.a	Hackers hacked the airport system's website	Firewall, licensing, access control	No logbook, cyber security personnel, **low** risk
6.c	Phishing emails with fake links	Firewall, antispam, access restrictions	No socialization, **low** risk
7	Insider infiltrates SSCP/server space	ID check, CCTV, patrol, TNI coordination	CCTV operator only 1(one), **low** risk
8.a	Insider flies drones to aircraft engines	Patrol, CCTV, ATC & TNI coordination	Drone regulations are not clear, patrols have not reached KKOP, **medium** risk
8.b	Bomb-laden drone attack on terminal	Patrol, CCTV, ATC & TNI coordination	**Medium** Risk
9	Plane hijacking by unknown persons	Identity checks, CCTV, patrols security	No terrorist data held by Avsec, **low** risk
10.a	Terrorists attack with firearms	Patrol, CCTV, security coordination	CCTV operator only 1, **low** risk
10.b	Insider attacks with sharp weapons in check-in area	Patrol, CCTV, security coordination	**Low** risk
11	Biological attack (Nubikara) by passengers	X-ray inspection, ETD, WTMD, patrol	No Nubikara training yet, **medium** risk
12	Bomb in catering services	Vehicle inspection, CoC, seal, CCTV	ETD not yet available, no awareness for catering, **low** risk
13.a	Sabotage of power outages	Patrol, Supervision	The power house area does not have CCTV, **low** risk
13.b	Sabotage of CCTV by officers	Patrol, CCTV	There is no awareness for officer, **low** risk
14.a	Hoax phone bomb	Banners, coordination with intelligence	There has been no socialization of handling hoaxes, **low** risk
14.b	Cleaning service jokes about carrying bombs	SSCP Examination	Not all employees have been trained, **low** risk
15.a	Collusion of airport workers and outsiders smuggling dangerous goods	Permit checks, CCTV, background checks, awareness	Inconsistent inspections, CCTV not yet fully covered, **medium** risk
15.b	Intruders damage perimeter/ drainage fence	Patrol, CCTV, fence	CCTV is not optimal, plants exceed fences, **low** risk

3.2. Discussion

The analysis of the fulfillment of aviation security facilities in the operation of the Regional Government VIP Building at El Tari Kupang Airport, it is known that the CCTV in the inspection area has the highest priority value (priority factor 0.1569). This shows that the existence of CCTV is seen as the most vital element in supporting surveillance and early detection of potential security threats. In second and third place in a row are the test equipment of the security facility (priority factor 0.1420) and the multiview cabin x-ray machine with an active TIP function (priority factor 0.1363). These two devices are a key component in the dangerous goods detection process and support the effectiveness of security checks technically. Walk Through Metal Detector (WTMD) and Hand Held Metal Detector (HHMD) also occupy high priority positions, with values of 0.1327 and 0.1087, respectively. This shows the importance of detecting metal objects carried by passengers, both automatically and manually. Meanwhile, supporting facilities such as special examination rooms (priority factor 0.0412) and security information media such as banners or posters (priority factor 0.0346) occupy the middle position, indicating that while important, their role is complementary in supporting the main security system.

Several facilities such as prohibited item boxes (priority factor 0.0140), logbook storage cabinets/computers (priority factor 0.0248), and inlet roller tables (priority factor 0.0249) occupy low priority. This does not mean that such facilities are not important, but their existence is considered not to be the secret of key devices such as CCTV and x-ray machines in the

security system. Therefore, in the context of the development of security facilities in the Regional Government VIP Building, the management needs to focus initial investment on the five main elements with the highest priority. The fulfillment of other facilities can be carried out in stages according to budget availability and operational urgency. This analysis shows that a priority-based approach allows for more effective and efficient planning, especially in resource constraints in public service sectors such as airports.

This research has the advantage of combining two quantitative approaches, namely Gap Analysis and Analytical Hierarchy Process (AHP), whereby the results of this research can provide a factual picture of the security facilities in the regional government VIP building, but also produce practical and risk-based recommendations.

4. CONCLUSION

After conducting the research related to the title and issues outlined in the previous chapters, the following conclusions can be drawn: that the security facilities in the VIP building of the El Tari Kupang Airport Government have not fully complied with the provisions of KM 39 of 2024. Of the 16 indicators required, only 4 facilities are compliant with the standards, while essential facilities such as comprehensive CCTV, liquid detection, and body scanners are still not available. So an initial step with fulfillment is needed. These nonconformities pose significant risks to aviation safety, including potential IED threats, intrusions, and cyberattacks, requiring immediate mitigation measures to ensure operational security in VIP areas. So that in the operation of the VIP building, it is necessary to fulfill flight security facilities in the form of CCTV, security facility test kits, multiview cabin x-ray machines, Walk Through Metal Detector, and Hand Held Metal Detector

AUTHORS' CONTRIBUTIONS

The sole author was responsible for designing the study, conducting the fieldwork, analysing the data and writing the manuscript. They completed all stages of the research process independently.

CKNOWLEDGMENTS

The author would like to thank Politeknik Penerbangan Surabaya, Angkasa Pura I management at El Tari Airport, and all participants who contributed to this research. Special thanks to the supervisors and academic staff for their guidance.

REFERENCES

[1] Kementerian Perhubungan, *Undang-Undang No 1 Tahun 2009*. 2009. [Online]. Available: https://peraturan.bpk.go.id/Details/54656/uu-no-1-tahun-2009

[2] Kementrian Perhubungan Republik Indonesia, Peraturan Menteri Perhubungan Republik Indonesia Nomor Pm 9 Tahun 2024 Tentang Keamanan Penerbangan Nasional. 2024, Pp. 1–21.

[3] S. Artileriawan, L. D. Kusumayati, A. Musadek, and Lady Silk Moonlight, "Analisa Keamanan Penerbangan Untuk Pengamanan Kargo Di Terminal Kargo Bandara Mutiara Sis Al-Jufri Palu," *Penerbangan*, pp. 1–7, 2022, [Online]. Available:https://ejournal.poltekbangsby.ac.id/index.php/SNITP/article/view/1251

[4] N. Erni Novayanti Putri, P. Budiartha, and P. Mantara Putra, "Pengaturan Hukum Badan Usaha Bandar Udara Terhadap Penumpang dan Barang Bawaan," *J. Analog. Huk.*, vol. 5, no. 1, pp. 28–33, 2023.

[5] M. Saunders, P. Lewis, and A. Thornhill, *Research Methods for Business Students*. 2007. [Online].Available:Https://www.researchgate.net/publication/330760964_Research_Methods_for_Business_Students_Chapter_4_Understanding_research_philosophy_and_approaches_to_theory_development

[6] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. 2022.

[7] Thomas L. Saaty and Kevin P. Kearns, *Decision-making with the AHP: Why is the principal eigenvector necessary*, *European Journal of Operational Research*, no. July. 2012. doi: 10.1016/b978-0-08-032599-6.50008-8.

[8] I. Yusri, M. F. Muchaddats, A. Krisna, S. Power, O. Indonesia, And S. Culture, "Safety Culture Terhadap Implementasi Safety Management System Di Unit Perawatan Pesawat Udara," Vol. 3, No. 3, 2024, [Online]. Available: Https://Ejournal3.Undip.Ac.Id/Index.Php/Ieoj/Article/View/16498/15896

[9] Y. Syahrullah, A. Yanti, T. P. Adhiana, and R. A. Imran, "GAP Analysis of Higher Education Quality Assurance System Implementation Against Educational Organization Management Standards ISO 21001:2018," *Oper. Excell. J. Appl. Ind. Eng.*, vol. 14, no. 1, p. 67, 2022, doi: 10.22441/oe.2022.v14.i1.044.

[10] V. A. P. Salomon and L. F. A. M. Gomes, "Consistency Improvement in the Analytic Hierarchy Process," *Mathematics*, vol. 12, no. 6, pp. 1–13, 2024, doi: 10.3390/math12060828.