



vol. 17 / 2023



## **The 7th International Conference on Science Technology**

organized by  
Faculty of Social Science and  
Law Universitas Negeri Manado and  
Consortium of International Conference  
on Science and Technology

# **The Innovation Breakthrough in Digital and Disruptive Era**



## Analysis of New Loleo Airport Facilities in Tidore City Islands

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**Abstract.** The construction of a new airport in Loleo Tidore Islands City acts as a transportation network node and supports economic growth and local government activities in North Maluku, that this airport is projected for the connectivity of the IWIP Industrial Estate and the capital of North Maluku Province (Sofifi City). The data collection methods used in this study include observation and literature study. The analyzed facilities consist of airside facilities consisting of a runway, taxiway, and apron. While the land-side facilities to be analysed consist of facilities in public zones, technical zones, and supporting zones. Other facilities that will be analysed also in this study consist of flight navigation facilities, visual landing aids, communication and information facilities, PKP-PK facilities, and PLLU facilities. The results of the analysis of total land requirements for the construction of new airport facilities in Loleo City Tidore Islands phase 1 amounted to 200 Ha and phase 2 amounted to 200 Ha so the total land needed was 400 Ha. The annual passenger movement of Phase I amounted to 569,443 passengers in Phase II amounted to 1,175,839 passengers, the plan the length of the runway Phase I along 1600 m served the largest aircraft ATR 72-600, and phase II 2500 m served the largest aircraft, namely Boeing 737-900 ER, and the farthest route of phase I development was Loleo - Ambon and the farthest route of phase II development was Loleo - Jakarta.

**Keywords.** Facilities, Airport, Loleo Airport

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## 1 Introduction

Transportation development is one aspect that is necessary in the framework of regional development. One indicator of the development of a region is the economic development that increases every year. This increase will also increase the movement of people and goods. The smooth movement needs to be supported in terms of effectiveness to reach North Maluku Province.

The construction of a new airport in Loleo Tidore Islands City acts as a transportation network node and supports economic growth and local government activities in North Maluku, that this airport is projected for the connectivity of the IWIP Industrial Estate and the capital of North Maluku Province (Sofifi City).

According to the plan of the North Maluku provincial government, this airport will be built in Loleo Hamlet, Akelamo Village, Central Oba District, Tidore Island City. The geographical coordinates of the airport are located at 00 33' 54.8644" North Latitude, 1270 32' 23.9766" East Longitude. In addition, to carry out operations, services, management, business, and development activities, this airport will be built in two stages, the first phase will be to build the main airport facilities with a planned land area of 200 Ha, and in the second phase for the construction of commercial areas with a land area of 200 Ha, so that the total land area of this airport is 400 Ha.

The planned Passenger Service Demand Forecast at the new Loleo Airport in Tidore Islands City is 1,175,839 annual passenger movements, annual aircraft traffic of 12,045 movements, and the number of aircraft during peak hours as many as 3 aircraft for Boeing 737 – 900 ER aircraft types.

The purpose of this study was to analyze the needs of airport facilities in Loleo City Tidore Islands, the facilities analyzed consisted of airside facilities consisting of runway, taxiway, and apron. While the land-side facilities to be analyzed consist of facilities in public zones, technical zones, and supporting zones. Then other facilities that will be analyzed also in this study consist of flight navigation facilities, visual landing aids, communication and information facilities, ARFF facilities, and ATC facilities.

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## 2 Literature Review

### 2.1 Airport Facilities

Airport facilities are all facilities used for airport and aviation operational purposes consisting of airport infrastructure and equipment and utilities [1].

### 2.2 Landside Facilities

The landside is the airport area that is not directly related to flight operations [1]. At the airport there are land-side facilities consisting of:

- Passenger and cargo terminal buildings, aviation traffic control towers, aviation operational buildings, aircraft rescue and fire fighting buildings, generator/main power house buildings, administration/office buildings and hangars;
- Access road;
- Motor vehicle parking lots;
- Land-side markings and signs.

### 2.3 Airside Facilities

The air side is part of the airport and all its supporting facilities which are non-public areas where every person, goods, and vehicle that will enter it must go through security checks and/or have special permits [1]. Airside facilities consist of:

- Runway
- Runway strip, runway end safety area (RESA), slipway, clearway;
- Taxiway;
- Parking runway (apron);
- Airside markings and signs

### 2.4 Loleo New Airport

An airport is an area on land and/or waters with certain boundaries that are used as a place for aircraft to land and take off, get on and off passengers, load and unload goods, and places for intra and intermodal transportation transfers, which are equipped with aviation safety and security facilities, as well as basic facilities and other supporting facilities [2].

The new Loleo airport in Tidore Islands City in its development plan by the North Maluku Provincial government, acts as a node in the transportation network by its hierarchy, as a gateway to economic activities, and as a place where transportation mode transfer activities need to be well-planned facilities and infrastructure. This airport is also projected for the connectivity of the IWIP Industrial Estate and the capital city of North Maluku Province (Sofifi City). In addition, this airport also plays a role in the development of archipelago insight and supporting government activities both central and regional [3].

This airport will be built in Loleo Hamlet, Akelamo Village, Central Oba District, Tidore Island City, North Maluku Province. In the planning, the estimated demand for passenger service needs to be planned at the new Loleo Airport in Tidore Islands City is 1,175,839 annual passenger movements, annual aircraft

traffic of 12,045 movements, and the number of aircraft during peak hours as many as 3 aircraft for Boeing 737-900 ER aircraft types. From this review, the availability of this airport facility needs to be analyzed comprehensively and specifically following national and international regulations [3], [4] [5].

### 3 Method

The data collection method used in this study includes observation or observation carried out intentionally and systematically. In this observation, researchers make direct observations and are being used as a source of research data. The data collected from direct observations are airport location determination data and planned land area data. In addition to observation, researchers also use literature studies in the form of airport theory, national regulations, and international regulations. The regulations used as references in this study are:

- Annex 14 on aerodromes;
- CASR 139 on aerodromes;
- Law Number 1 of 2009 concerning Aviation;
- Regulation of the Minister of Transportation Number KM 10 of 2009, concerning Telecommunication and Radio Navigation Flight Service Providers;
- Regulation of the Minister of Transportation Number PM 39 of 2019 concerning the National Airport Order;
- Directorate General of Civil Aviation Regulation No KP 14 of 2015 concerning Technical and Operating Standards of Civil Aviation Safety Regulations Bagia 139 (Manual Of Standard CASR Part 139) Volume IV of aircraft rescue and fire fighting Services (PKP-PK);
- Regulation of the Director General of Civil Aviation No 326 of 2019 concerning Technical and Operational Standards of Civil Aviation Safety Regulations-Part 139;
- Decree SKEP/77/VI/2005, concerning Technical Requirements for Operation of Airport Engineering Facilities;
- Regional Regulation of RTRW North Maluku Province;
- Regional regulations RTRW Tidore city Islands.

The analyzed facilities consist of airside facilities consisting of runway, taxiway, and apron. While the landside facilities that will be analyzed consist of facilities in public zones, technical zones, and supporting zones. Then other facilities that will be analyzed also in this study consist of flight navigation facilities, visual landing aids, communication and information facilities, aircraft rescue and firefighting facilities, and air traffic service facilities.

### 4 Result and Discussion

#### 4.1 Estimated Number of Loleo Airport Passengers

The plan to build and develop new airport facilities in Loleo City, Tidore Islands to meet the needs of flight operations and airport services is carried out mainly based on the development of air freight traffic. Based on the results of the analysis of the forecast number of passengers at the new airport in Loleo as shown in table 1 below [6], [4], [5].

**Table 1.** Results obtained based on data calculations

No	Description	Phase I	Phase II
1	Passenger Movement		
	Annual	569.443	1.175.839
	Daily	1560	3221
	Rush Hour	456	588
2	Aircraft Movement		
	Annual	10.585	12.045
	Daily	29	33
	Rush Hour	8	6
3	Number of Rush Hour Aircraft	4	3
4	Largest Aircraft	ATR 72 - 600	BOEING 737 - 900 ER
5	Farthest Route	Ambon	Jakarta

Source: Author's Analysis

#### 4.2 Analysis of Landside Facilities

From the estimated number of passengers as described in Table 1, further analysis was carried out for the new airport facilities in Loleo as explained in the following table [6], [7], [1].

**Table 2.** Plan of landside facilities Loleo Airport

No	Description	Phase I	Phase II
A	Public zones		
1	Passenger Terminal Building	6,400 m <sup>2</sup>	8,400 m <sup>2</sup>
2	Parking Area	16,000 m <sup>2</sup>	16,000 m <sup>2</sup>
3	Canteen and Public Toilet	49 m <sup>2</sup>	90 m <sup>2</sup>
B	Technical Zone		
4	Administration Building	1.120 m <sup>2</sup>	1.120 m <sup>2</sup>
5	Operations Office	200 m <sup>2</sup>	200 m <sup>2</sup>
6	ARFF Building	300 m <sup>2</sup>	900 m <sup>2</sup>
7	Clinic Building	98 m <sup>2</sup>	98 m <sup>2</sup>
8	Power supply building	175 m <sup>2</sup>	175 m <sup>2</sup>
9	Pump House	136 m <sup>2</sup>	136 m <sup>2</sup>
10	Workshop	245 m <sup>2</sup>	245 m <sup>2</sup>
11	Airport maintenance building	60 m <sup>2</sup>	60 m <sup>2</sup>

12	Meteorological office	105 m <sup>2</sup>	105 m <sup>2</sup>
13	Meteorological park	450 m <sup>2</sup>	450 m <sup>2</sup>
14	Combustion area Garbage and Waste incineration area	200 m <sup>2</sup>	300 m <sup>2</sup>
15	Employee canteen	57 m <sup>2</sup>	57 m <sup>2</sup>
16	GSE Parking	100 m <sup>2</sup>	100 m <sup>2</sup>
17	Security office	90 m <sup>2</sup>	90 m <sup>2</sup>
18	Watchtower	-	123 m <sup>2</sup>
C	Supporting zone		
19	Employee housing	840 m <sup>2</sup>	1.380 m <sup>2</sup>
20	DPPU area	5.000 m <sup>2</sup>	5.000 m <sup>2</sup>
21	Cargo terminal area	1.350 m <sup>2</sup>	2.100 m <sup>2</sup>
22	Airborne agency area	300 m <sup>2</sup>	300 m <sup>2</sup>
23	Facilities of worship	5.00 m <sup>2</sup>	5.00 m <sup>2</sup>
24	Waste management area	150 m <sup>2</sup>	300 m <sup>2</sup>
25	Catering Building	100 m <sup>2</sup>	150 m <sup>2</sup>
D	Flight navigation	PBN, VOR / DME	PBN, VOR / DME, ILS
E	<i>Visual aids</i>		
26	TH17	Marking / PAPI / WDI / Runway Light / Approach Light	Marking / PAPI / WDI / Runway Light / Approach Light
	TH35	Marking / PAPI / WDI / Runway Light / Approach Light	Marking / PAPI / WDI / Runway Light / Approach Light
F	Communication and information facilities	VHF A/G(AMS, AFS) & HF-SSB	VHF A/G (AMS, AFS) / HF-SSB / ATIS / VSCS / Recorder / TTY / ATN / VSAT / DS
G	ARFF	V	VII
H	ATC Facilities	AFIS	ADC

Source: Author's Analysis

### 4.3 Analysis of Airside Facilities

Airside facilities at the airport are planned to be built and developed at the new Loleo Airport as listed in Table 3 below [6], [7], [1], [8], [9], [8], [2].

**Table 3.** Plan of airside facilities of Loleo Airport

No	Description	Phase I	Phase II
A	Runway facilities		
1	Airport Reference Code	3C	4C
2	Runway Classification	Non Precision Instruments	Precision Instruments
3	Runway Direction	17 - 35	17 - 35
4	Critical Aircraft	Sejenis ATR 72 – 500/600	Boeing 737-900 ER
5	Runway	1,600 x 30 m <sup>2</sup>	2,500 x 45 m <sup>2</sup>
6	Runway Strip	1,720 x 280 m <sup>2</sup>	2,620 x 280 m <sup>2</sup>
7	<i>Runway and safety area (RESA)</i>		
	TH 17	90 x 60 m <sup>2</sup>	90 x 90 m <sup>2</sup>
	TH 35	90 x 60 m <sup>2</sup>	90 x 90 m <sup>2</sup>
8	Turn area		
	TH 17	1125	1125
	TH 35	1125	1125
9	Take off run available (TORA)		
	TH 17	1,600 m	2,500 m
	TH 35	1,600 m	2,500 m
10	Take off distance available (TODA)		
	TH 17	1,600 m	2,500 m
	TH 35	1,600 m	2,500 m
11	Landing distance available (LDA)		
	TH 17	1,600 m	2,500 m
	TH 35	1,600 m	2,500 m
12	Accelerate stop distance available (ASDA)		
	TH 17	1,600 m	2,500 m
	TH 35	1,600 m	2,500 m
B	Taxiway facilities		
13	Exit taxiway	1 buah	2 buah
14	Dimension	170 x 23 m <sup>2</sup>	170 x 23 m <sup>2</sup>
C	Apron facilities		
15	ATR 72-600	4 pesawat	1 pesawat
16	B 737-900 ER	-	2 pesawat
17	Backup	1 pesawat	2 (1 ATR 72-600, 1 B737-900) pesawat
18	Total	5 pesawat	5 pesawat
19	Apron area	185 x 65 m <sup>2</sup>	185 x 90 m <sup>2</sup>

Source: Author's Analysis

## 5 Conclusion

From the results of the analysis of the facilities of the new Loleo Airport in Tidore Islands City, several things can be concluded as follows.

- The total land requirement for the construction of new Loleo Airport facilities in Tidore Islands City phase 1 is 200 Ha and phase 2 is 200 Ha so that the total land needed is 400 Ha.
- The annual passenger movement of Phase I amounted to 569,443 passengers in Phase II amounted to 1,175,839 passengers, the plan The length of the runway Phase I along 1600 m served the largest aircraft ATR 72-600, and phase II 2500 m served the largest aircraft, namely Boeing 737-900 ER, and the farthest route of phase I development was Loleo - Ambon and the farthest route of phase II development was Loleo - Jakarta.

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