



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

KNKT.16.12.45.04

Aircraft Accident Investigation Report

PT. ASI Pudjiastuti Aviation

Pilatus Porter PC-6, PK-BVM

Ilaga Airport

Republic of Indonesia

31 December 2016



2017

This preliminary investigation report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the initial investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation Organization, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

The preliminary report consists of factual information collected until the preliminary report published. This report will not include analysis and conclusion.

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However, the KNKT fully recognizes that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

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ABBREVIATIONS AND DEFINITIONS

AFIS	:	Aerodrome Flight Information Service
AIP	:	Aerodrome Information Publication
ATC	:	Air Traffic Control
AOC	:	Aircraft Operator Certificate
ATPL	:	Airline Transport Pilot License
BMKG	:	<i>Badan Meteorologi Klimatologi dan Geofisika</i> (Bureau of Meteorology, Climatology and Geophysics)
CPL	:	Commercial Pilot Licence
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
DGCA	:	Directorate General of Civil Aviation
FISO	:	Flight Information Service Officer
IFR	:	Instrument Flight Rules
kg	:	Kilogram
km	:	Kilometer
KNKT	:	<i>Komite Nasional Keselamatan Transportasi</i>
LT	:	Local Time
Nm	:	Nautical Mile
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules

INTRODUCTION

SYNOPSIS

On 31 December 2016, a Pilatus Porter PC6 aircraft registered PK-BVM was being operated as unscheduled cargo flight from Mozes Kilangin International Airport (WAYY), Timika to Ilaga Aiport (WAYL), Papua. The pilot was the only person on board and the flight carried 853 kg of cargo.

At 0656 LT (2156 UTC), the aircraft departed Timika and turned left to intercept radial 060 TMK VOR. At approximately 17 Nm from TMK, the aircraft turned right and intercepted radial 080 TMK VOR then climbed to 13,000 feet. At approximately 10 Nm south of Jila, the aircraft turned right directing to Ilaga Cut. When the aircraft position at abeam Jila, the aircraft altitude was 13,500 feet, and then when the aircraft was overhead Ilaga Cut, the pilot turned the aircraft to the right to Ilaga Pass.

When the aircraft was overhead Ilaga pass, the aircraft started to descend and the pilot contacted to Ilaga Flight Information Services Officer (FISO). The Ilaga FISO informed the pilot that the wind was calm, ground fog on left base and final runway 25, visibility was 3 up to 4 km and advised the pilot to join left downwind for runway 25.

When the aircraft position on the left downwind, the pilot selected full flaps and informed Ilaga FISO that the aircraft was on the left downwind, it was acknowledged by Ilaga FISO and advised the pilot to report when the aircraft position on final. The aircraft turned to left base leg at altitude of 9,000 feet. At approximately 3 Nm from runway threshold, the pilot informed to Ilaga FISO that the aircraft was on final and the Ilaga FISO informed the pilot that the runway was clear.

The aircraft touched down with three wheels at approximately 100 meters from the beginning runway 25. The pilot felt that the aircraft was slightly on the left of runway centerline, and then the pilot recovered the aircraft by applying right rudder pedal and brake moderately. The aircraft yawed to the right and the pilot recovered by applying full left rudder pedal and full brake. The aircraft continued travelled to the right and veered out of the runway. The right-wing tip hit the slope at the edge of the runway shoulder which was higher than the runway elevation. The aircraft heading changed at approximately 45° and stopped at approximately 20 meters right of the runway pavement.

No one injured in this occurrence. The aircraft was substantially damaged with the right wing broken, tail section bent and the propellers tip bent.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 31 December 2016, a Pilatus Porter PC6 aircraft registered PK-BVM was being operated as unscheduled cargo flight from Mozes Kilangin International Airport (WAYY), Timika¹ to Ilaga Aiport (WAYL), Papua². The pilot was the only person on board and the flight carried 853 kg of cargo.

At 0656 LT (2156 UTC³), the aircraft departed Timika and turned left to intercept radial 060 TMK VOR⁴. At approximately 17 Nm from TMK, the aircraft turned right and intercepted radial 080 TMK VOR then climbed to 13,000 feet. At approximately 10 Nm south of Jila, the aircraft turned right directing to Ilaga Cut. When the aircraft position at abeam Jila, the aircraft altitude was 13,500 feet, and then when the aircraft was overhead Ilaga Cut, the pilot turned the aircraft to the right to Ilaga Pass.

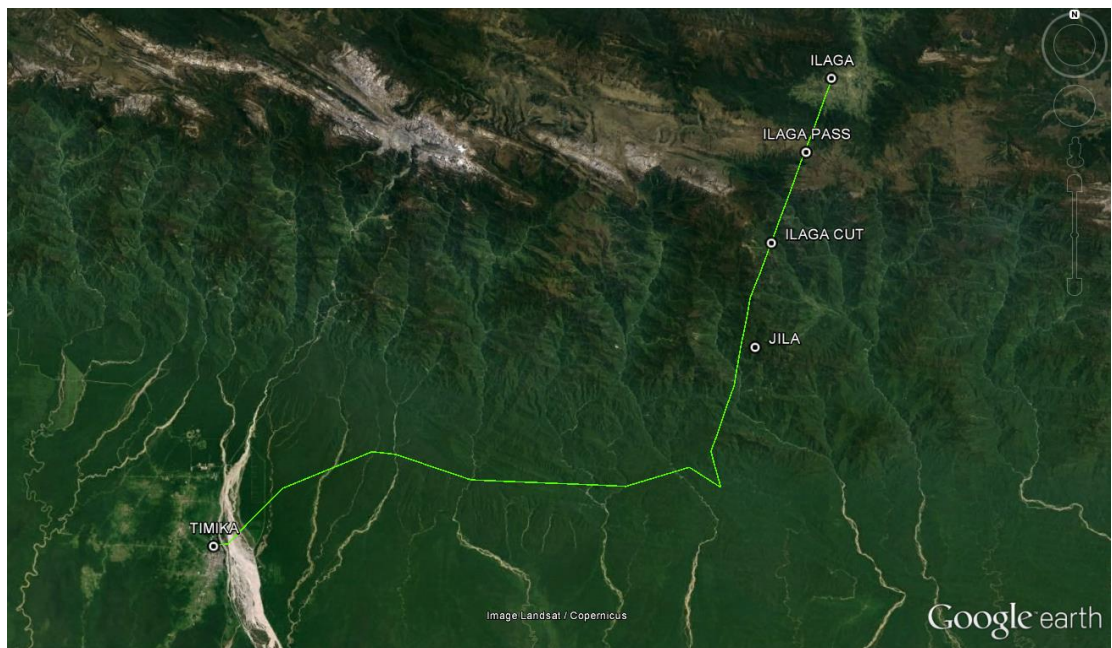


Figure 1: The illustration of the flight path based on flight following

When the aircraft was overhead Ilaga pass, the aircraft started to descend and the pilot contacted to Ilaga Flight Information Services Officer (FISO). The Ilaga FISO informed the pilot that the wind was calm, ground fog on left base and final runway 25, visibility was 3 up to 4 km and advised the pilot to join left downwind for runway 25.

When the aircraft position on the left downwind, the pilot selected full flaps and informed Ilaga FISO that the aircraft was on the left downwind, it was acknowledged by Ilaga FISO and advised the pilot to report when the aircraft position on final. The

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- 1 Mozes Kilangin International Airport (WAYY), Timika will be named as Timika for the purpose of this report.
 - 2 Ilaga Aiport (WAYL), Papua will be named as Ilaga for the purpose of this report.
 - 3 The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occurred. Local time is UTC+9 hours.
 - 4 TMK VOR is the Very High Frequency Omni Range (VOR) of Timika with identification of TMK. VOR is a ground base navigation system.

aircraft turned to left base leg at altitude of 9,000 feet. At approximately 3 Nm from runway threshold, the pilot informed to Ilaga FISO that the aircraft was on final and the Ilaga FISO informed the pilot that the runway was clear.

The aircraft touched down with three wheels at approximately 100 meters from the beginning runway 25. The pilot felt that the aircraft was slightly on the left of runway centerline, and then the pilot recovered the aircraft by applying right rudder pedal and brake moderately. The aircraft yawed to the right and the pilot recovered by applying full left rudder pedal and full brake. The aircraft continued travelled to the right and veered out of the runway. The right-wing tip hit the slope at the edge of the runway shoulder which was higher than the runway elevation. The aircraft heading changed at approximately 45° and stopped at approximately 20 meters right of the runway pavement.

No one injured in this occurrence. The aircraft was substantially damaged with the right wing broken, tail section bent and the propellers tip bent.



Figure 2: The aircraft last position

1.2 Personnel Information

The pilot was 35 years old, male Australian citizen, held valid medical certificate and held valid Kenya Commercial Pilot License (CPL) which has been validated by Indonesia Directorate General of Civil Aviation (DGCA).

The pilot had experience with total flying hour of 5,341 hours, including 99.5 hours on type. The rest of the flying experienced was in Cessna 208B Caravan aircraft including several times flying to Ilaga.

1.3 Aircraft Information

The aircraft was manufactured in Switzerland by Pilatus Aircraft Company with serial number 975 and the type/model was Pilatus Porter PC-6/B2-H4. The aircraft registered PK-BVM and had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

The total flight hour of the aircraft was 4,799.4 hours and the total cycle was 9,148

cycles.

The aircraft was not equipped with flight recorder and nor it was required by current Indonesia regulation for this type of aircraft.

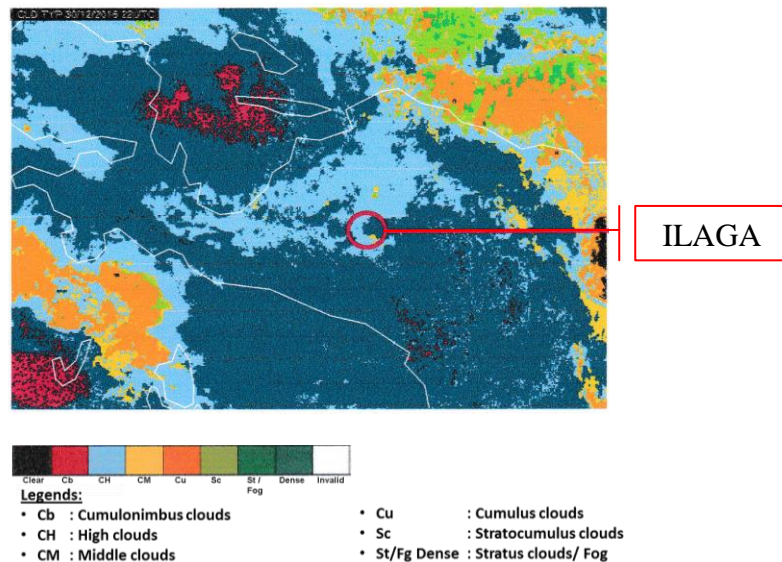
The engine was manufactured in Canada by Pratt & Whitney Canada. The type/model was PT6A-27 with serial number PCE-PC0427. The total hour of the engine was 4,798.4 hours and the total cycle was 9,148 cycles

1.4 Meteorological Information

The weather information of Ilaga was based on Ilaga FISO observation and the determination of wind velocity utilized a wind shock which located near the beginning runway 25. There was no meteorological station or meteorological instrument to provide weather information.

The weather during approach until the aircraft landed was reported cloudy, the wind condition was calm and the visibility was about 3 up to 4 kilometers.

The following satellite images were provided by *Badan Meteorologi Klimatologi dan Geofisika* (BMKG – Bureau of Meteorology, Climatology and Geophysics) at 2200 UTC and 2300 UTC (figure 3 and 4). The images indicated a development of middle, and Cumulus clouds⁸ around Ilaga during the occurrence flight.



⁸ The altitude ranges of middle clouds in the tropical area are between altitudes of 6,500 up to 25,000 feet and the high clouds are between altitude of 20,000 up to 60,000 feet (International Cloud Atlas Volume I: Manual on The Observation of Clouds and Other Meteors, that can be found in <http://wmo-cloudatlas.org/index.php/en/>)

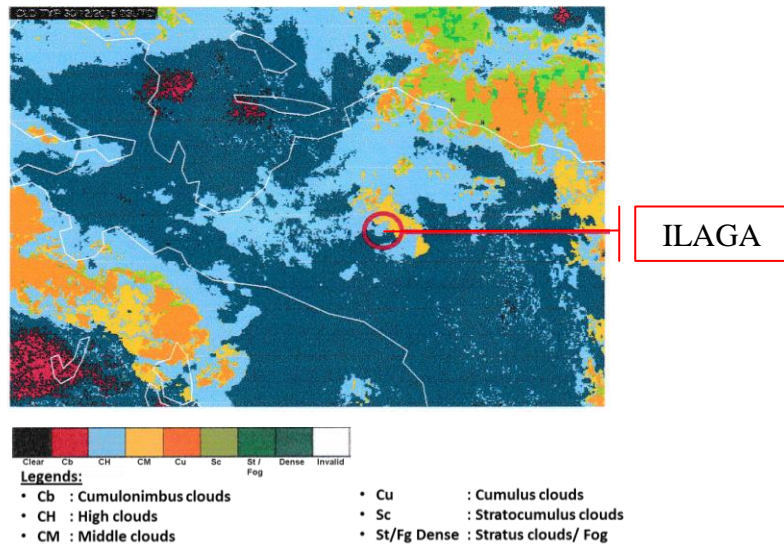


Figure 4: Satellite image at 2300 UTC

1.5 Aerodrome Information

Ilaga Airport was situated on a valley and surrounded by mountains up to 12,000 feet. The airport operating hour was from 2100 to 0300 UTC. The weather phenomena dominates by cumulus cloud formation on the top of the mountainous area especially after 1100 LT (0200 UTC). The air navigation services provided by Airnav Indonesia by Aerodrome Flight Information Services (AFIS). The aircraft movements were 30 up to 40 flights per day and mostly incoming and outgoing from or to Timika.

The flight to Ilaga shall only be conducted under Visual Flight Rules (VFR). Normally the flight route from Timika conducts via U Pass then proceed to Ilaga Pass or Jila Pass then join holding pattern for descend and approach to runway 25. The selection of Ilaga Pass or Jila Pass depends on the weather condition. There was no direct VFR route from Timika to Ilaga based on the VFR route which was published on Aeronautical Information Publication (AIP) Indonesia Amendment 31 dated 5 April 2012. (the detail of the route is available on the appendices of this report).

According to the AIP Indonesia volume IV amendment 12, dated 17 September 2015 published by Indonesia DGCA, the Ilaga airport was located in Aminggaru village, Papua. The airport elevation was 7,975 feet. The runway was asphalt surface with dimension of 600 meters length and 18 meters width and has upslope 4 % longitudinal and 1.5 % transverse. The elevation of threshold runway 25 was 7,903.70 feet and the elevation of threshold runway 07 was 7,985.06 feet.

The aircraft operator has developed Susi Air Airstrip Booklet dated September 2014 which contained visual guide for Ilaga which stated that the airport elevation was 7500 feet at touchdown zone runway 25 and the elevation of runway 07 was 7,580 feet. The runway surface was sealed which has 2 % down slope and followed by 7% up slope longitudinal toward runway 07.

The figure below shows the information of Ilaga Airport including the operator visual guidance.

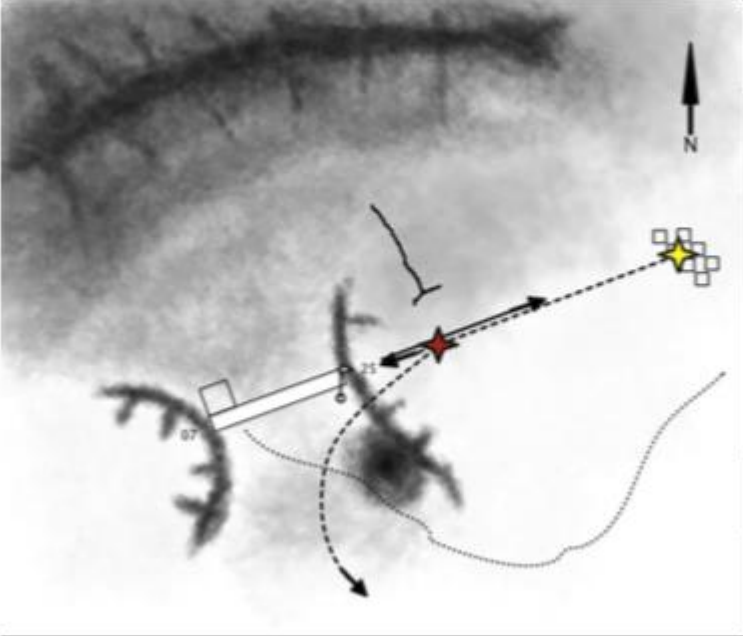
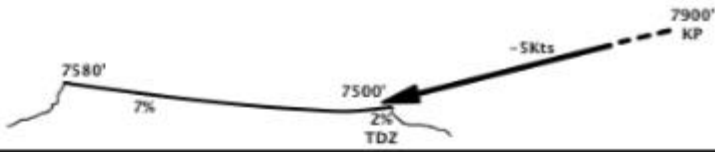
Wind: 1000	ILAGA	2E	ILA
Radio: 122.0			
		Elev(ft): 7500ft at TDZ	
		Length: 608m Width: 13m	
		Slope: 2% at TDZ then 7%	
		Surface: Sealed	
		Max LDW: Full Max TOW: 7650	
		Max GS: 95-97 @ 80Kts Vref	
			
Terrain: Situated in a large valley. Terrain to North and South.			
Weather: Generally closed in the morning until around 8 then open for the rest of the day until afternoon. Winds picking up around 9.			
Aborted Landing: Abeam dirt path at 200m final. Left turn around to the right of the small hill. Aborted Take-off: 50-100m into takeoff roll. Large centreline marking. Swerve right into ditch. DO NOT GO OFF END.			
Threats: Busy strip, many operators. Parking area degrading and rough. Be aware of departing aircraft with prop wash etc. Radio operator cloggin freq.			
Notes:			Landing: 25 Takeoff: 07

Figure 5: The operator airstrip booklet

ILLAGA I – WAYL* (Ujung Pandang FIR) ←

AD authority.....	D.G.C.A
ARP coordinates and site at AD.....	03° 58' 37.65" S 137° 37' 12.59" E
Elevation / Reference temperature.....	7975 ft msl / 23° C
Address	Desa Aminggaru, Kab. Puncak Illaga
Telephone	Nil
Facsimile	Nil
E-mail	bandar udara_illaga@yahoo.com ←
Hour of service.....	2100 - 0300
Apron dimension, surface & strength.....	54 x 50 m; Asphalt ←
Apron slope.....	1.5 %
TWY Dimension, Surface, Streight	Nil
Marking	RWY Designation, THR, RWY CL Marking
RWY number designation & bearing.....	07 – 25 (079° - 259°) ←
RWY dimension, surface & strength.....	600 x 18 m; Asphalt; DHC-6 Twin Otter
Strip Dimension	628 x 57 m
THR Coordinates	RWY 07 : 03° 58' 37.17" S 137° 37' 10.38" E RWY 25 : 03° 58' 33.69" S 137° 37' 29.53" E
THR Elevation	RWY 07 : 7985.06 ft RWY 25 : 7903.70 ft
RWY slope.....	Longitudinal : 4 % Transverse : 1.5 %
SWY Dimension	Nil
CWY Dimension	Nil
Declared Distances	RWY TORA TODA ASDA LDA 07 600 600 600 600 25 600 600 600 600
Strip dimension & surface.....	SSB : Primary 6811.2 (channel 5), 6886 (channel 3), 5763 (channel 1), 5836 (channel 6)
ATS communication facilities.....	
Additional information.....	- High mountain - Obstacle within take off RWY 07 and Approach RWY 25, 12% hill

Figure 6: Ilaga Aerodrome Information Publication

1.6 Organizational and Management Information

1.6.1 Aircraft Operator

The aircraft was owned and operated by PT. Asi Pudjiastuti Aviation (Susi Air) which had a valid Aircraft Operator Certificate (AOC) number 135-028.

The Susi Air operated 50 aircraft including nine Pilatus Porter PC-6 aircraft, operated in several bases such as Sumatera, Java, Kalimantan and Papua.

The detail of aircraft operator information including the company policies and

procedures will be included in the final report.

1.6.2 Air Navigation Services Provider

The air navigation service in Ilaga was provided by *Lembaga Penyelenggara Navigasi Penerbangan Indonesia* (AirNav Indonesia) and the airspace over Ilaga was class F airspace⁹. The total Flight Information Services Officer was 3 personnel including the chief which also performed as a key person management.

1.7 Additional Information

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1.8 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the KNKT approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

⁹ Class F airspace means Instrument Flight Rules (IFR) and Visual Flight Rules flights were permitted, and all IFR flights would receive an air traffic advisory service and all flight would receive flight information service if requested (CASR Part 170: Air Traffic Rules).

2 FINDINGS¹⁰

According to factual information during the investigation, the Komite Nasional Keselamatan Transportasi identified initial findings as follows:

- The pilots held valid licenses and medical certificates.
- The aircraft had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
- The pilot had experience with total flying hour of 5,341 hours, including 99.5 hours on type. The rest of the flying experienced was mostly in Cessna 208 B Caravan aircraft.
- The airport information between AIP Indonesia and Susi Air Airstrip Booklet have different information of Ilaga Airport related to the airport elevation and runway slope.
- There was no direct VFR route from Timika to Ilaga based on the VFR route which was published on Aeronautical Information Publication (AIP) Indonesia Amendment 31 dated 5 April 2012.
- There was no meteorological station or meteorological instrument at Ilaga. The weather information was based on Ilaga FISO observation. The determination of wind velocity utilized a wind shock which located near the beginning runway 25.
- The witness stated that aircraft touched down runway 25 at about 100 meters from beginning runway. The aircraft yawed to the right continued travelled to the right out of the runway and the right-wing tip hit the slope outside the runway shoulder which was higher than the runway elevation. The aircraft heading changed at approximately 45° and stopped at approximately 20 meters out from runway surface pavement.
- No one injured in this serious incident and the aircraft had substantially damage.

¹⁰ Findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal, or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

3 SAFETY ACTION

At the time of issuing this preliminary report, the Komite Nasional Keselamatan Transportasi had not been informed of any safety actions resulting from this occurrence.

4 SAFETY RECOMMENDATIONS

The Komite Nasional Keselamatan Transportasi (KNKT) recorded eight occurrences within two years in Ilaga including six occurrences in the period of seven months between May to December 2016. Based on this data, KNKT conducted special observations to the aircraft operation in Ilaga including environmental, communication and navigation. Based on this observation, KNKT identified several safety issues and proposed recommendations in order to improve the safety of the aircraft operation to the Ministry of Transportation, DGCA, BMKG, AirNav Indonesia and Aircraft Operators. The recommendation is stated on KNKT letter number KTU/1/24 KNKT 2017. The summary of the safety issues and recommendation were as follows:

No	Safety issues	Recommendation
1	KNKT occurrence database showed that the runway excursion was the most frequent events occurred in Ilaga with the existing runway dimension was 600 meters length and 18 meters width and significant down slope beyond the runway.	KNKT recommend to the DGCA to review the runway length and consider to extend the runway and provide the runway end safety area at the end of runway 25 to minimize aircraft overrun and damaged to the aircraft in the case of overrun occurred.
2	Approach to Ilaga only be able to conduct with visual reference, the runway $\pm 6\%$ <i>up slope</i> may affect the pilot visual illusion when the pilot tends to fly below glide.	KNKT recommend to the DGCA to review the installation navigation aid such as PAPI or VASI to prevent the visual illusion.
3	The airport operating hours was limited due to the weather phenomenon. The apron capacity was limited by the number of unserviceable aircraft occupied the apron. These conditions affects the incoming flight should hold (wait) until the aircraft on ground completes disembarkation or loading/unloading process and departs. This results in the rush handling of the aircraft on ground.	KNKT recommend to the DGCA to consider to expand the apron dimension to increase the capacity to be able to accommodate more aircraft.
4	There was no meteorological station or qualified weather observer in Ilaga. The weather information was based on Ilaga FISO observation.	Considering the number of flight per day and the availability of meteorological station, KNKT recommends to the BMKG to consider the installation of meteorology observation instrument in Ilaga.

5	There was no standard route guidance for arrival and departure from Ilaga. The aircraft operators developed their own visual route guidance which may be different to the other operator. It might increase the potential of mid-air collision considering the number of traffic and limited of air navigation service.	KNKT recommend to the DGCA and AirNav Indonesia to establish the standard departure and arrival route guidance to Ilaga and to review the possibility of upgrading the air traffic services to aerodrome control area (ADC).
6	The demand of logistic in Ilaga was around 20,000 kg per day which was transported with several aircraft types with capacity around 1,000 kg per flight. It would take around 20 flights per day.	Considering of the limited operational hours in Ilaga, KNKT recommend to the aircraft operator to consider the used of bigger capacity aircraft type to reduce the frequency of flight to Ilaga.
7	The event of aircraft return to base (RTB) was about eight flights per month and mostly due to visibility below minimum and other weather conditions.	KNKT recommend to the aircraft operators to support the pilot decision and not to apportion blame for pilot conducts RTB or diversion.
8	Most of the aircraft operators classified the airport or airstrip in mountainous area of Papua according to the level of complication and classified the pilot qualification and training before released as pilot on the mountainous area.	KNKT recommend to the DGCA to review the aircraft operator SOP.
9	<i>EGPWS terrain database</i> for mountainous area in Papua was only available in low resolution terrain database. It might be caused the EGPWS warning active while the aircraft approaching in mountainous area.	KNKT recommend to the aircraft operator to emphasize the EGPWS provider to provide the high resolution terrain database in the mountainous area of Papua.
10	Accommodation facility for duty personnel in Ilaga was limited.	KNKT recommend to the DGCA and Airnav Indonesia to review the facility to support the performance of duty personnel.

In addition, there still remain safety issues that need to be considered. The KNKT issued safety recommendations addressed to:

4.1 PT. ASI Pudjiastuti Aviation

- **04.O-2016-45.1**

The pilot had experience with total flying hour of 5,341 hours, including 99.5 hours on Pilatus Porter PC-6. The rest of the flying experienced was in Cessna 208B Caravan aircraft including several times flying to Ilaga. KNKT recommends to review the pilot qualification and requirements to fly to an airport with special circumstances such as Ilaga.

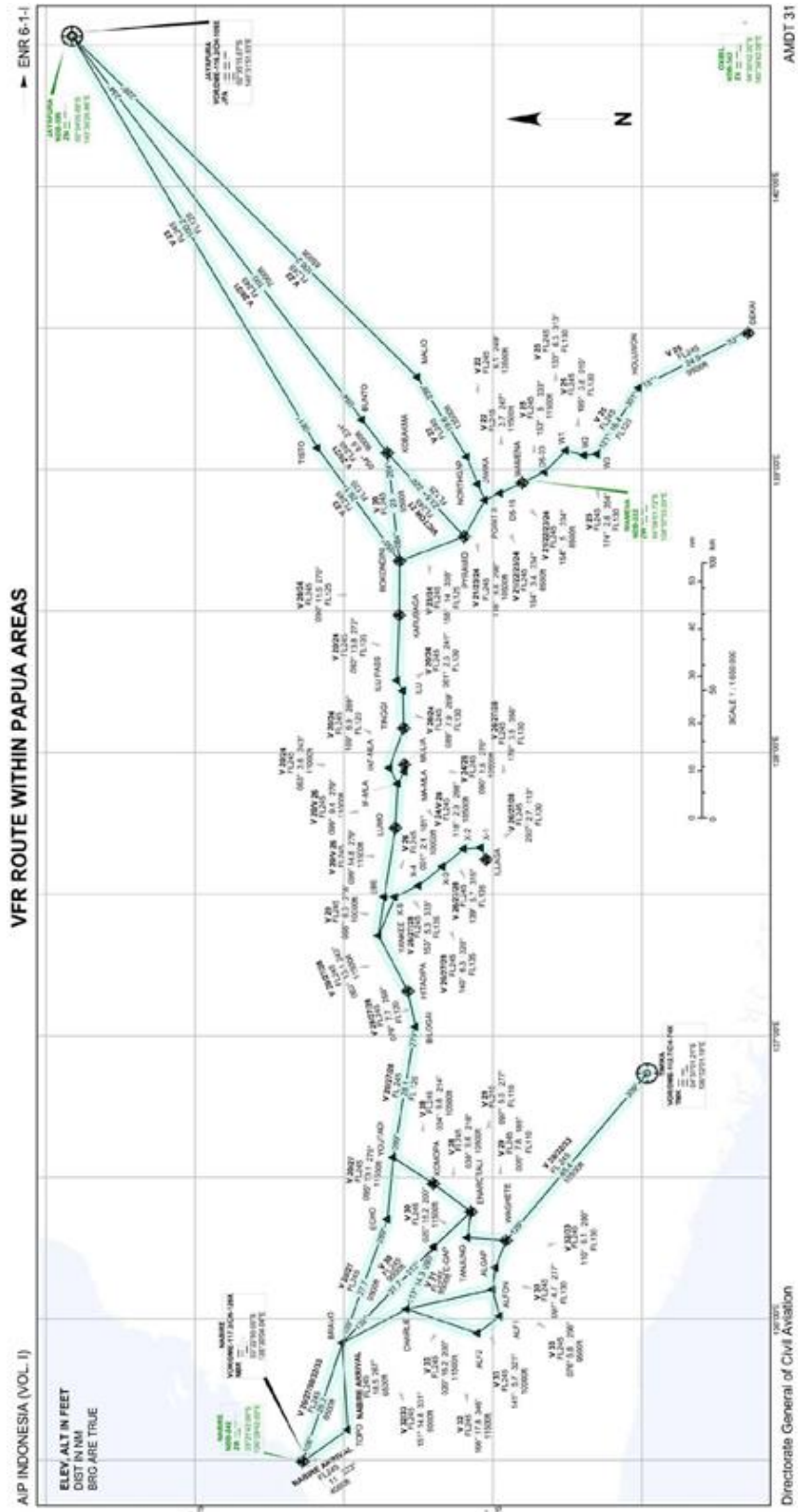
4.2 Directorate General Civil Aviation (DGCA)

- **04.R-2016-45.2**

There was no direct VFR route from Timika to Ilaga based on the VFR route which was published on Aeronautical Information Publication (AIP) Indonesia Amendment 31 dated 5 April 2012, KNKT recommends to review and update the VFR routes within area of Papua to include Timika - Ilaga.

5 APPENDICES

5.1 VFR route within Papua areas



KOMITE NASIONAL KESELAMATAN TRANSPORTASI REPUBLIK INDONESIA

Jl. Medan Merdeka Timur No.5 Jakarta 10110 INDONESIA

Phone : (021) 351 7606 / 384 7601 Fax : (021) 351 7606 Call Center : 0812 12 655 155

website 1 : <http://knkt.dephub.go.id/webknkt/> website 2 : <http://knkt.dephub.go.id/knkt/>

email : knkt@dephub.go.id