



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI  
REPUBLIC OF INDONESIA**

# **PRELIMINARY**

**KNKT.16.09.27.04**

**Aircraft Accident Investigation Report**

**PT. Trigana Air Service**

**Boeing 737-300F; PK-YSY**

**Wamena Airport, Papua**

**Republic of Indonesia**

**13 September 2016**



**2016**

This preliminary investigation report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3<sup>rd</sup> 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

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ATC	:	Air Traffic Control
ATPL	:	Airline Transport Pilot License
ATS	:	Air Traffic Services
BMKG	:	<i>Badan Meteorologi Klimatologi dan Geofisika</i> (Bureau of Meteorology, Climatology and Geophysics)
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
EGPWS	:	Enhanced Ground Proximity Warning System
FL	:	Flight Level
FOO	:	Flight Operation Officer
g	:	Gravitational Force
kg	:	Kilogram
km	:	Kilometer
KNKT	:	<i>Komite Nasional Keselamatan Transportasi</i>
Nm	:	Nautical Mile
PBN	:	Performance Based Navigation
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
RNAV	:	Area Navigation
SIC	:	Second in Command
UTC	:	Universal Time Coordinated
VASI	:	Visual Approach Slope Indicator
VFR	:	Visual Flight Rules
VMC	:	Visual Meteorological Condition

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# INTRODUCTION

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## SYNOPSIS

On 13 September 2016, a Boeing 737-300 Freighter, registered PK-YSY was being operated by PT. Trigana Air Service on a scheduled cargo flight from Sentani Airport, Jayapura (WAJJ) to Wamena Airport, Wamena (WAVV), Papua, Indonesia. On board the aircraft were two pilots and one Flight Operation Officer (FOO) as a loadmaster. The aircraft carried 14,913 kg of cargo.

The aircraft cruised at altitude 18,000 feet and prior to descend, the pilot observed the weather within the criteria of Visual Meteorological Condition (VMC). The pilots able to identify the other Trigana flight from Sentani to Wamena in front of them.

The aircraft make orbit in point X which located at 8 Nm from runway 15 and land on sequence number three, after another aircraft which was on downwind runway 15.

At approximately 7,000 feet altitude, the pilot received landing clearance from the Wamena Tower controller. At this position, the pilot could not identify visual checkpoint then decided to reduce the rate of descend and continued the approach.

At approximately 5,700 feet altitude at about 2 Nm from runway threshold the pilot was able to see the runway and increased the rate of descend. The aircraft touched down with vertical acceleration recorded on the flight data recorder was 3.25 g.

The aircraft had substantially damage with both of main landings gear collapsed. The left main landing gear detached and found on runway. The aircraft stopped at approximately 1,890 meters from the beginning of the runway 15. No one injured on this occurrence.

At the time of issuing this preliminary investigation report, the Trigana Air Services has issued safety actions resulting from this occurrence. The Komite Nasional Keselamatan Transportasi (KNKT) considered that the safety actions issued by the aircraft operator were relevant to improve safety.

The investigation is continuing and will include information of the following:

- Relevant aircraft operator manuals and procedures,
- Crew training,
- Recorder information,
- Organization information,
- Human factors.

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.

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# 1 FACTUAL INFORMATION

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## 1.1 History of the Flight

On 13 September 2016, a Boeing 737-300 Freighter, registered PK-YSY was being operated by PT. Trigana Air Service on a scheduled cargo flight from Sentani Airport, Jayapura (WAJJ) to Wamena Airport<sup>1</sup>, Wamena (WAVV), Papua, Indonesia.

At approximately 2130 UTC<sup>2</sup>, during the flight preparation, the pilot received weather information which was stated that on the right base runway 15, on the area known as mount Pikei, low cloud was observed with the cloud base was increasing from 200 to 1000 feet and the visibility was 3 km.

At 2145 UTC, the aircraft departed Sentani Airport and cruised at altitude 18,000 feet. On board the aircraft were two pilots and one Flight Operation Officer (FOO) as a loadmaster. The aircraft carried 14,913 kg of cargo. The Pilot in Command (PIC) acted as Pilot Flying (PF) while the Second in Command (SIC) acted as Pilot Monitoring (PM). There was no reported or recorded aircraft system abnormality during the flight until the time of occurrence.

After passing point MALIO, the aircraft started to descend. The pilot observed the weather within the criteria of Visual Meteorological Condition (VMC). The pilots able to identify the other Trigana flight from Sentani to Wamena in front of them.

While passing flight level (FL) 135 (altitude 13,500 feet) at approximately over PASS VALLEY, the Wamena Tower controller instructed the pilot to report position over JIWIKA.

When aircraft position over point JIWIKA, the Wamena Tower controller instructed the pilot to make orbit in point X, which located at 8 Nm from runway 15 and to land on sequence number three, after another aircraft which was on downwind runway 15.

At altitude approximately 7,000 feet, the pilot received landing clearance from the Wamena Tower controller. At this position, the pilot could not identify visual checkpoint mount Pikei and attempted to identify the other check point which was a church on the right base runway 15. The pilot noticed that the aircraft position was on right side of runway centerline.

The PF decided to reduce the rate of descend and continued the approach. The PM informed to the PF that runway was not insight and advised to go around.

At altitude approximately 5,700 feet at about 2 Nm from runway threshold the PF was able to see the runway and increased the rate of descend. The pilot noticed that the Enhanced Ground Proximity Warning System (EGPWS) aural warning "SINK RATE" active and the PF reduced the rate of descent. While the aircraft passing threshold, the pilot felt the aircraft sunk and touched down at approximately 125 meter from the beginning runway 15.

The Flight Data Recorder recorded the vertical acceleration was 3.25 g on

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<sup>1</sup> Wamena Airport (WAWW) Papua, Indonesia will be named Wamena for the purpose of this report.

<sup>2</sup> 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.

touchdown at about 2230 UTC.

Both of main landings gear collapsed. The left main landing gear detached and found on runway. The engine and lower fuselage contacted to the runway surface. The aircraft veer to the right and stopped at approximately 1,890 meters from the beginning of the runway 15.

No one was injured on this occurrence and the aircraft had substantially damage.



**Figure 1: The aircraft final position**

## 1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor/None	2	1	3	-
<b>TOTAL</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>-</b>

## 1.3 Damage to Aircraft

The aircraft substantially damaged, the detail damaged were as follows:

- Both of main landing gears collapsed;
- Left main landing gear assembly detached;
- Right main landing gear assembly broken
- Tire number 2 blown out;
- Both inner flaps broken;
- Left engine cowling were detached;
- Leading edge of right horizontal stabilizer dent;
- Lower skin of right horizontal stabilizer perforated;
- Aft lower fuselage scratched;

- Left wing to fuselage fairing torn



**Figure 2: Damages to aircraft**

## **1.4 Other Damage**

There was no other damage to property and/or the environment.

## **1.5 Personnel Information**

### **1.5.1 Pilot in Command**

Gender	: Male
Age	: 59 years
Nationality	: Indonesian
Marital status	: Married
Date of joining company	: 1 March 2013
License	: ATPL
Date of issue	: 9 March 1983

Aircraft type rating	: Boeing 737-300/400/500
Instrument rating validity	: 31 March 2017
Medical certificate	: First Class
Last of medical	: 1 June 2016
Validity	: 31 December 2016
Medical limitation	: Holder shall possess glasses that correct for near vision
Last line check	: 23 April 2016
Last proficiency check	: 10 March 2016

**Flying experience**

Total hours	: 23,823 hours 5 minutes
Total on type	: 9,627 hours 35 minutes
Last 90 days	: 262 hours 25 minutes
Last 60 days	: 196 hours 55 minutes
Last 24 hours	: 2 hours 27 minutes
This flight	: 46 minutes

**1.5.2 Second in Command**

Gender	: Male
Age	: 22 years
Nationality	: Indonesian
Marital status	: Single
Date of joining company	: 2 February 2015
License	: CPL
Date of issue	: 18 October 2014
Aircraft type rating	: Boeing 737-300/400/500
Instrument rating validity	: 30 June 2015
Medical certificate	: First Class
Last of medical	: 2 May 2016
Validity	: 30 November 2016
Medical limitation	: None
Last line check	: 3 March 2016
Last proficiency check	: 24 June 2016
<b>Flying experience</b>	
Total hours	: 650 hours 51 minutes

Total on type : 480 hours 51 minutes  
Last 90 days : 248 hours 17 minutes  
Last 60 days : 144 hours 26 minutes  
Last 24 hours : 2 hours 20 minutes  
This flight : 46 minutes

## **1.6 Aircraft Information**

### **1.6.1 General**

Registration Mark : PK-YSY  
Manufacturer : Boeing Company  
Country of Manufacturer : United State of America  
Type/Model : Boeing 737-300F  
Serial Number : 23597  
Year of Manufacture : 1986  
Certificate of Airworthiness  
Issued : 2 October 2015  
Validity : 1 October 2016  
Category : Transport  
Limitations : None  
Certificate of Registration  
Number : 2972  
Issued : 26 September 2015  
Validity : 25 September 2016  
Time Since New : 59,420 hours 57 minutes  
Cycles Since New : 48,637 cycles  
Last Major Check : 10 October 2014  
Last Minor Check : 4 September 2016

### **1.6.2 Engines**

Manufacturer : General Electric  
Type/Model : CFM 56-3  
Serial Number-1 engine : 720864  
▪ Time Since New : 68,808 hours 56 minutes

- Cycles Since New : 48,842 cycles
- Serial Number-2 engine : 722296
- Time Since New : 42,197 hours 19 minutes
  - Cycles Since New : 29,807 cycles

## 1.7 Meteorological Information

Weather reports of Wamena Airport, issued on 13 September 2016, were as follows:

	2130 UTC	2200 UTC	2230 UTC
Wind	110 / 2 knot	350 / 3 knot	010 / 3 knot
Visibility	3 km	2 km	3 km
Weather	BR (MIST <sup>3</sup> )	BR (MIST)	BR (MIST)
Cloud <sup>4</sup>	BKN 200 feet	BKN 400 feet	BKN 100 feet
TT/TD	16 / 16	16 / 16	16 / 16
QNH (mb/in Hg)	1,009/29.79	1,010/29.82	1,010/29.82
QFE (mb/in Hg)	837/24.71	837/24.71	837/24.71

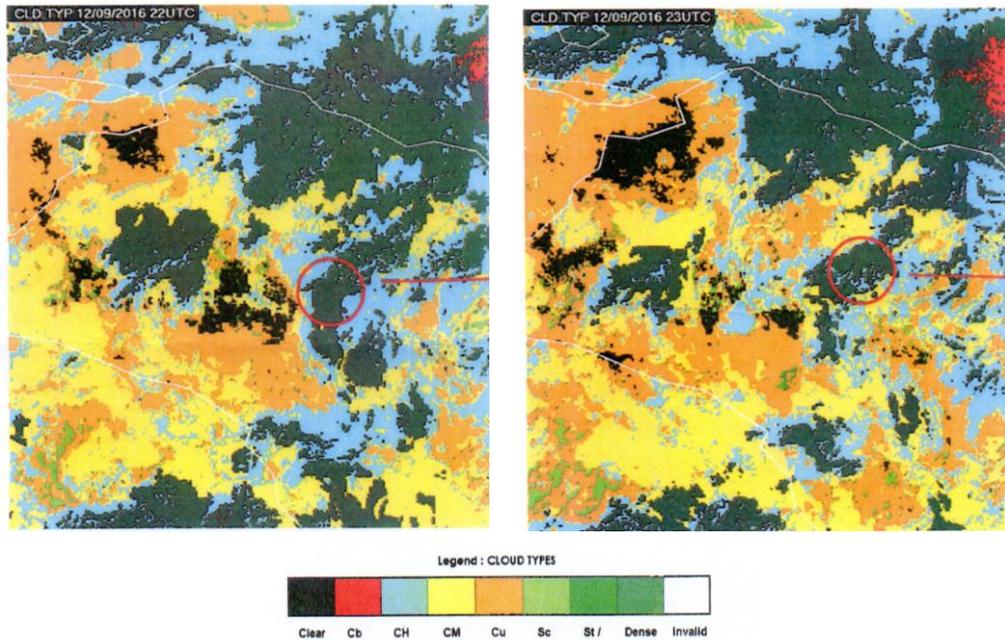
According to the observation of meteorological personnel, the weather surrounding the Wamena Airport at 2200 UTC was haze and the visibility was 2,000 meters

The weather observed by *Badan Meteorologi Klimatologi dan Geofisika* (BMKG – Bureau of Meteorology, Climatology and Geophysics) on the day of the accident at 2100 UTC and 2300 UTC on Wamena area was haze.

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<sup>3</sup> BR (mist): reported when visibility is at least 1,000 meters but not more than 5,000 meters

<sup>4</sup> Cloud amount is assessed in total which is the estimated total apparent area of the sky covered with cloud. The international unit for reporting cloud amount for Broken (BKN) is when the clouds cover more than half (5/8 up to 7/8) area of the sky.



**Figure 3: Satellite weather images at the accident site (red circle)**

## 1.8 Aids to Navigation

Wamena Airport is equipped with a Non-Directional Beacon (NDB) which was serviceable at the time of occurrence.

Wamena Airport has navigation aid such as Visual Approach Slope Indicator (VASI) lights and several runway lights were unserviceable.

The operator also provided visual guidance for pilots as shown in the figure below.

# WAMENA

## WMX / WAJW

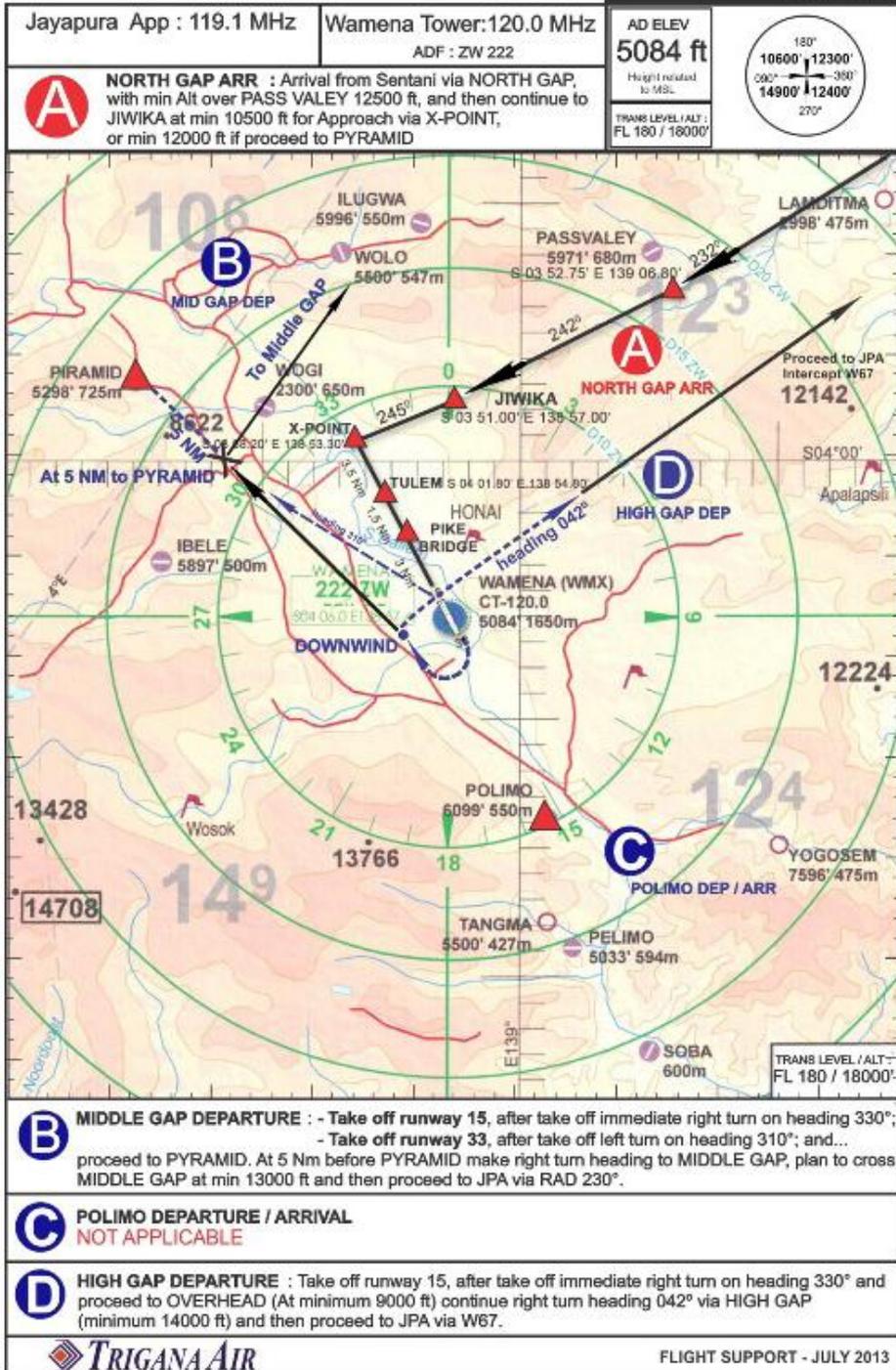
1-1

Effective date : 03 July 2013

# Visual Guidance

## TERMINAL AREA CHART

Boeing 737-300



# WAMENA

WMX / WAJW

2-1

Effective date : 03 July 2013

## Visual Guidance

Approach Rwy 15

Boeing 737-300

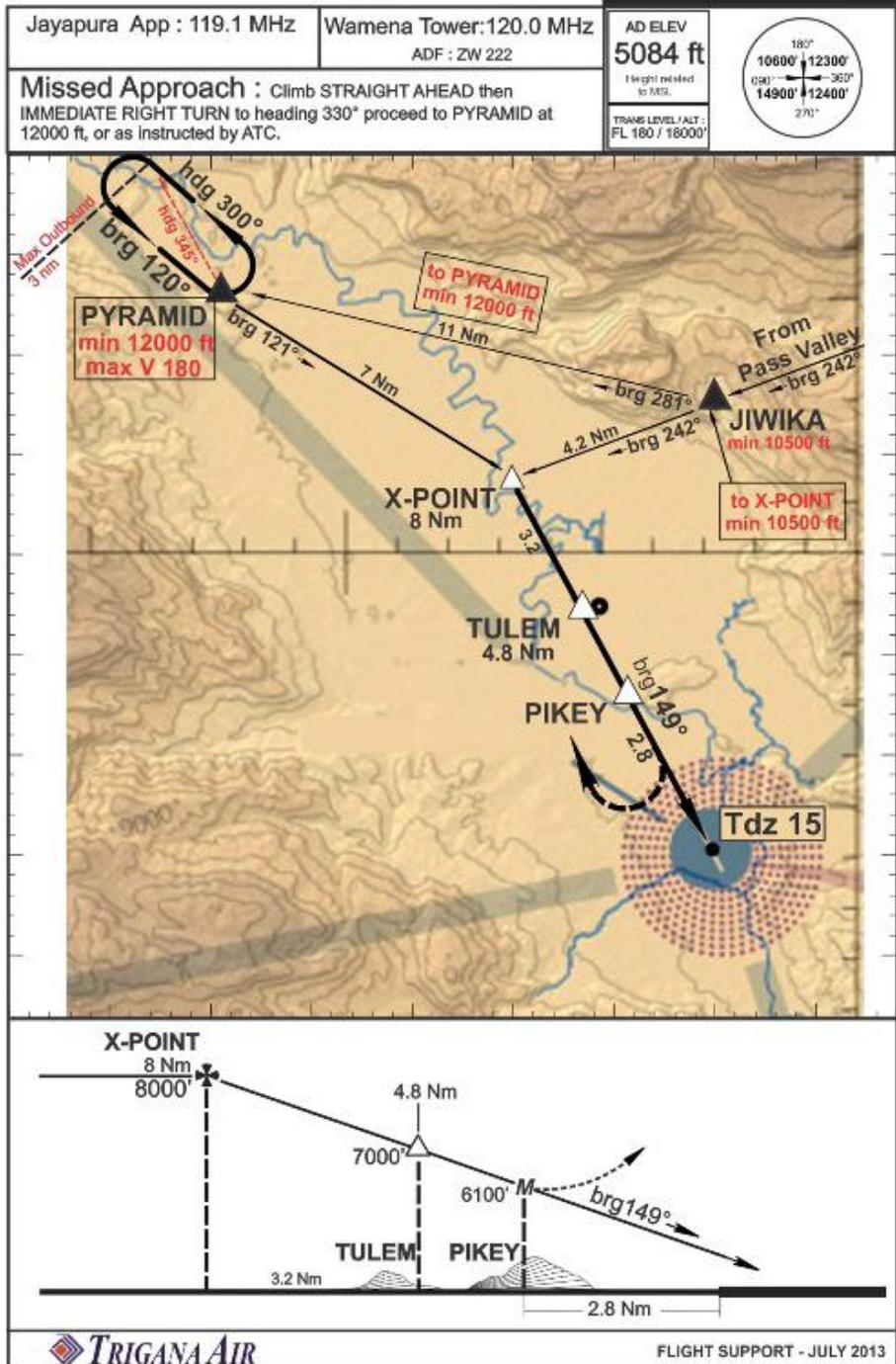


Figure 4: Operator Visual approach chart

### 1.9 Communications

All communications between Air Traffic Services (ATS) and the crew were normal as recorded on ground based automatic voice recording equipment and Cockpit Voice Recorder (CVR) for the duration of the flight. The quality of the recorded transmissions was good.

## 1.10 Aerodrome Information

Airport Name : Wamena  
 Airport identification : WAVV/WMX  
 Airport operator : Directorate General Civil Aviation  
 Coordinate : 04° 05' 89" S; 138° 57' 17" E  
 Elevation : 5,084 feet  
 Runway direction : 15 – 33  
 Runway length : 2,175 meters  
 Runway width : 30 meters  
 Surface : Asphalt

Further information of aerodrome will be included in the final report.

## 1.11 Flight Recorders

### 1.11.1 Flight Data Recorder

The aircraft was equipped with a Fairchild F1000 Flight Data Recorder (FDR) with part number S703-1000-00 and serial number 00343. Following the accident, the recorder was transported to KNKT recorder facility for data downloading process. The FDR recorded 20 parameters which was containing 52 flights including the occurrence flight.

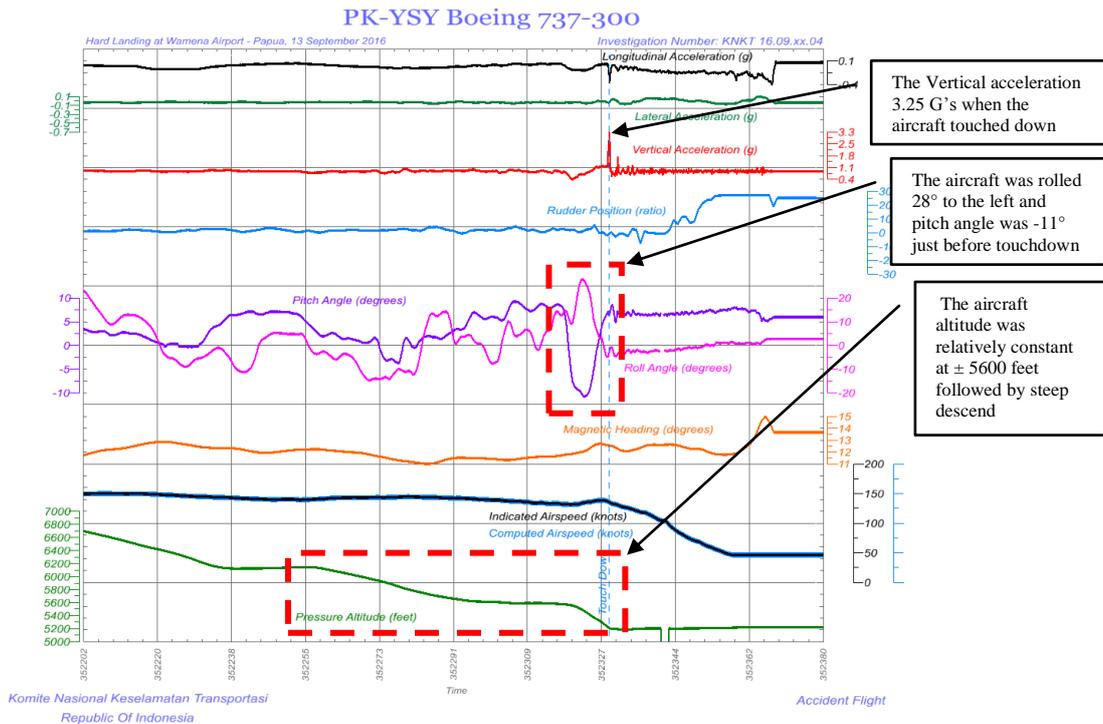


Figure 5: Several FDR parameters on approach and landing

### 1.11.2 Cockpit Voice Recorder

The aircraft was fitted with a L3 Communication Cockpit Voice Recorder (CVR) with part number 2100-1020-00 and serial number 000103498. The CVR recorded 2 hours of good quality recording.

The information of the CVR recorded data will be included in the final report.

## **1.12 Wreckage and Impact Information**

After touchdown, both main landing gears collapsed and the left main landing gear detached and found on the runway. The aircraft travelled with the engine cowling and lower fuselage contacted to the runway surface until the aircraft stopped at approximately 1,890 meters from the beginning of the runway 15.



**Figure 6. the left main landing gear found on the left side of the white paint scratch mark**

The investigation found the tire marks of left main landing gear on the runway at approximately 125 meters from the runway threshold, followed by the tire mark of the right main landing gear. Following these marks, a white paint between two purple paint scratch marks that changed to metal scratch marks found along the aircraft trajectory.

## **1.13 Medical and Pathological Information**

No medical or pathological investigations were conducted as a result of this occurrence.

## **1.14 Fire**

There was no evidence of fire.

## **1.15 Survival Aspects**

The flight crew and load master safely evacuated from the aircraft using escape rope.

## **1.16 Tests and Research**

Any test or research information will be included in the final report.

## **1.17 Organizational and Management Information**

### **1.17.1 PT. Trigana Air Service**

Aircraft Owner and Operator : PT. Trigana Air Service

Address : Komplek Puri Sentra Niaga. Jl. Wiraloka Blok D

60-61 Kalimalang, Jakarta 13620.

Certificate Number : AOC 121 - 006

PT. Trigana Air Services serves domestic routes for both passenger and cargo flight, the operator operates 13 aircraft consist of three ATR 42-300, two ATR 72-212, three DHC6-300, four Boeing B737-300 and one B737-400.

The operator conducted cargo flight from Jayapura to Wamena with average four flights per day utilizing Boeing 737-300F aircraft.

Further information will be included in the final report.

### **1.18 Additional Information**

The investigation is continuing and will include information of the following:

- Relevant aircraft operator manuals and procedures,
- Crew training,
- Recorder information,
- Organization information,
- Human factors.

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.

### **1.19 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.

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## 2 FINDINGS<sup>5</sup>

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According to factual information gathered during the investigation, the findings were listed as follows:

- The aircraft was airworthy prior to the occurrence and was operated within the weight and balance envelope. There was no report or record of the aircraft system abnormality during the flight from take-off until the time of the occurrence.
- All crew had valid licenses and medical certificates.
- Fifteen minutes before departure, the pilot received weather information of Wamena which was stated that on the right base runway 15, low cloud was observed with the cloud base was increasing from 200 to 1000 feet and the visibility was 3 km.
- The visibility of Wamena airport reported by BMKG at the time of the occurrence was 3 km.
- At altitude approximately 7,000 feet, the pilot received landing clearance from the Wamena tower controller, at this position, the pilot could not identify visual checkpoint. The PF reduced the rate of descend and continued the approach. The PM advised to go around.
- At altitude approximately 5,700 feet at about 2 Nm from runway threshold the PF was able to see the runway and increased the rate of descend. The Enhanced Ground Proximity Warning System (EGPWS) aural warning “SINK RATE” active and the PF reduced the rate of descent.
- While the aircraft passing threshold, the aircraft sunk and touched down at approximately 125 meter from the beginning runway 15. The FDR recorded the vertical acceleration was 3.25 g on touchdown.
- Both of main landings gear collapsed. The left main landing gear detached and found on runway. The engine and lower fuselage contacted to the runway surface. The aircraft veer to the right and stopped at approximately 1,890 meters from the beginning of the runway 15.

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<sup>5</sup> 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.

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## **3 SAFETY ACTION**

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At the time of issuing this preliminary report, the Komite Nasional Keselamatan Transportasi had been informed of safety actions resulting from this occurrence.

### **3.1 PT. Trigana Air Service**

After the occurrence, the management issued Notice to Pilot Number 12/OPS-NPB/IX/2016 were as follow:

- Before flying to Wamena, the pilot should update Wamena weather information including minimum visibility 5 Km and Ceiling 1,000 feet Above Ground Level (AGL).
- Reemphasize Go-Around when the stabilized approach criteria does not achieve.

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## **4 SAFETY RECOMMENDATIONS**

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Komite Nasional Keselamatan Transportasi (KNKT) considered that the safety actions issued by the aircraft operator were relevant to improve safety. In this preliminary report, KNKT consider not to issue safety recommendation.

## 5 APPENDICES

### 5.1 Notice to Pilot

 <b>NOTICE TO PILOT</b>	
<b>N O M O R</b>	<b>: 12 / OPS-NPB / IX / 2016</b>
<b>EFFECTIVE DATE</b>	<b>: 13 SEPTEMBER 2016</b>
<b>ATTENTION</b>	<b>: ALL PILOT BOEING 737 CL</b>
<b>SUBJECT</b>	<b>: INCIDENT PK-YSY AT WMX</b>
<b>CC</b>	<b>: - OPERATION DIRECTOR - OPERATION MANAGER - SAFETY DIRECTOR - SAFETY MANAGER - FLOPS</b>
<p>Mengacu kepada kejadian Serious Incident PK-YSY di Bandara Wamena pada hari Selasa, tanggal 13 sep 2016, saat mendarat yang mengakibatkan kerusakan pada pesawat dan kerugian terhadap perusahaan. Dengan ini diingatkan kembali kepada rekan-rekan pilot B737 CL Trigana Air agar tidak melakukan kesalahan yang sama.</p> <p>Di instruksikan kepada seluruh Pilot B737-CL :</p> <ol style="list-style-type: none"><li>1. Pilot yang akan terbang ke Wamena harus Update Weather wamena ( Minimum Visibility 5 km dan Minimum Ceiling 1000 ft AGL )</li><li>2. Apabila terjadi Unstabilized Approach jangan ragu-ragu melakukan <b>Go-Around. Ref FCTM 5.4 ( Stabilized Approach )</b></li></ol> <p>Demikian Notice to Pilot ini dibuat agar dapat dilaksanakan sebaik mungkin, terima kasih atas perhatian dan kerjasamanya.</p> <p style="text-align: center;"><b>SELAMAT BERTUGAS DAN <i>SAFE FLIGHT</i></b></p>	
<b>ISSUED BY</b> CHIEF <del>PILOT</del> B 737 CL	<b>ACKNOWLEDGE BY</b> OPERATION MANAGER

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