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NATIONAL TRANSPORTATION SAFETY COMMITTEE

Aircraft Accident Investigation Report

AMA (Association of Mission Aviation)
PK – RCZ
Pilatus Porter PC-6
En-route Taive II – NduNdu, PAPUA
Republic of Indonesia

9 August 2008

NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
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This Report was produced by the National Transportation Safety Committee (NTSC), Karya Building 7th Floor Ministry of Transportation, Jalan Medan Merdeka Barat No. 8 JKT 10110, Indonesia.

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TABLE OF CONTENT

TABLE OF FIGURES

GLOSSARY OF ABBREVIATIONS

AD	Airworthiness Directive
AFM	Airplane Flight Manual
AGL	Above Ground Level
ALAR	Approach-and-landing Accident Reduction
AMSL	Above Mean Sea Level
AOC	Air Operator Certificate
ATC	Air Traffic Control
ATPL	Air Transport Pilot License
ATS	Air Traffic Service
ATSB	Australian Transport Safety Bureau
Avsec	Aviation Security
BMG	Badan Meterologi dan Geofisika
BOM	Basic Operation Manual
°C	Degrees Celsius
CAMP	Continuous Airworthiness Maintenance Program
CASO	Civil Aviation Safety Officer
CASR	Civil Aviation Safety Regulation
CPL	Commercial Pilot License
COM	Company Operation Manual
CRM	Cockpit Recourses Management
CSN	Cycles Since New
CVR	Cockpit Voice Recorder
DFDAU	Digital Flight Data Acquisition Unit
DGCA	Directorate General of Civil Aviation
DME	Distance Measuring Equipment
EEPROM	Electrically Erasable Programmable Read Only Memory
EFIS	Electronic Flight Instrument System
EGT	Exhaust Gas Temperature
EIS	Engine Indicating System
FL	Flight Level
F/O	First officer or Copilot
FDR	Flight Data Recorder
FOQA	Flight Operation Quality Assurance
GPWS	Ground Proximity Warning System
hPa	Hectopascals
ICAO	International Civil Aviation Organization

IFR	Instrument Flight Rules
IIC	Investigator in Charge
ILS	Instrument Landing System
Kg	Kilogram(s)
Km	Kilometer(s)
Kt	Knots (NM/hour)
Mm	Millimeter(s)
MTOW	Maximum Take-off Weight
NM	Nautical mile(s)
KNKT / NTSC	Komite Nasional Keselamatan Transportasi / National Transportation Safety Committee
PIC	Pilot in Command
QFE	Height above aerodrome elevation (or runway threshold elevation) based on local station pressure
QNH	Altitude above mean sea level based on local station pressure
RESA	Runway End Safety Area
RPM	Revolution Per Minute
SCT	Scattered
S/N	Serial Number
SSCVR	Solid State Cockpit Voice Recorder
SSFDR	Solid State Flight Data Recorder
TS/RA	Thunderstorm and rain
TAF	Terminal Aerodrome Forecast
TSN	Time Since New
TT/TD	Ambient Temperature/Dew Point
TTIS	Total Time in Service
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

SYNOPSIS

On the Saturday 9 August 2008, a Pilatus Porter PC-6 B2-H4 aircraft, registered PK-RCZ, operated by AMA (Association of Mission Aviation) departed from Taive II for NduNdu, Papua, The flight was to be operated in accordance with the visual flight rules (VFR), remaining clear of cloud and navigating visually.

The aircraft did not arrive at NduNdu and pilots of search aircraft reported hearing PK-RCZ's emergency locator transmitter (ELT) signal, but were unable to reach the crash site due to the weather conditions.

At 2020 (0520 local time on Sunday 10 August), the aircraft wreckage was found at an elevation of 6,400 feet at the coordinates 03° 26' 08" S, 138° 21' 58" E, in the area of NduNdu Pass, on the aircraft's planned track. The crash site was about 200 feet to the left (east) of the southerly track across the Pass, on the slope of an 11,000 foot mountain. The coordinates and elevation of the lowest point in the NduNdu Pass were 03° 26' 26" S, 138° 21' 22" E and 5,700 feet.

The pilot, the sole occupant, was fatally injured.

The investigation determined that PK-RCZ departed from Taipe II for NduNdu in accordance with the visual flight rules. However, the weather in the NduNdu Pass area was reported to have been cloudy.

The investigation determined that it is likely that the pilot continued flying towards the Pass towards the NduNdu aerodrome in instrument meteorological conditions (IMC). The aircraft impacted the mountain slope to the east of the Pass while cruising. The impact was severe and the accident was not survivable.

1 FACTUAL DATA

1.1 HISTORY OF THE FLIGHT

On the Saturday 9 August 2008, a Pilatus Porter PC-6 B2-H4 aircraft, registered PK-RCZ, operated by AMA (Association of Mission Aviation) on a charter flight from Wamena[1], Papua, to Taive II[2], Papua departed at 1000 UTC[3]. The aircraft was to pick up a medical patient from Taive II.

Figure 1: Pilatus Porter PC-6, registered PK-RCZ

After landing and unloading cargo at Taive II, the aircraft departed from Taive II for NduNdu[4], Papua, at 1106 with an estimated time of arrival of 1113. The flight was to be operated in accordance with the visual flight rules (VFR), remaining clear of cloud and navigating visually.

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[1] Wamena Airport, Wamena, Papua is referred as 'Wamena' in this report.

[2] Taive II Airstrip, Papua is referred as 'Taive II' in this report.

[3] The 24-hour clock in Coordinated Universal Time (UTC) is used in this report to describe the local time as specific events occurred. Local time in the area of the accident, Eastern Indonesia Standard Time (Waktu Indonesia Timur (WIT)) is UTC +9 hours.

[4] NduNdu Airstrip, Papua is referred as 'NduNdu' in this report.

When the aircraft had not arrived by 1213, the Wamena authorities decided to search for the aircraft. Three operators assisted the search; Association of Mission Aviation (AMA), Mission Aviation Fellowship (MAF), and Yajasi. They all reported hearing PK-RCZ's emergency locator transmitter (ELT) signal, but were unable to reach the crash site due to the weather conditions.

At 2020 (0520 local time on Sunday 10 August), the aircraft wreckage was found at an elevation of 6,400 feet at the coordinates 03° 26' 08" S, 138° 21' 58" E, in the area of NduNdu Pass, on the aircraft's planned track. The crash site was about 200 feet to the left (east) of the southerly track across the Pass, on the slope of an 11,000 foot mountain. The coordinates and elevation of the lowest point in the NduNdu Pass were 03° 26' 26" S, 138° 21' 22" E and 5,700 feet.

The pilot, the sole occupant, was fatally injured.

1.2 INJURIES TO PERSONS

Table 1: Injuries to persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	1	-	1	-
Serious	-	-	-	-
Minor	-	-	-	Not applicable
Nil Injuries	-	-	-	Not applicable
TOTAL	1	-	1	-

The pilot was a citizen of the United States of America.

1.3 DAMAGE TO AIRCRAFT

The aircraft was destroyed by the impact forces.

1.4 OTHER DAMAGE

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

1.5 PERSONEL INFROMATION

1.5.1 Pilot in Command

Age	: 46 years
Gender	: Male
Type of licence	: Airline Transport Pilot License
Valid to	: 31 August 2009
Rating	: C185, PC6 B2/H4
Total flying time	: 4,624 hours 7 minutes
Total on this type	: 2,275 hours
Total last 90 days	: 154 hours 48 minutes
Total on type last 90 days	: 154 hours 48 minutes
Total on type last 7 days	: 19 hours 54 minutes
Total on the type last 24 hours	: 2 hours
Last recurrent training	: 27 June 2008
Last proficiency check	: 27 June 2008
Route and aerodrome recency	: See note below*.
Medical class	: Class one
Last medical examination	: 14 March 2008
Valid to	: 14 September 2008
Medical limitation	: Must wear corrective lenses

*The company reported that the pilot "flew the route between Taive II for NduNdu on an almost weekly basis. He was VERY familiar with that particular area. His last dual check in the NduNdu/Taive area was July 2007."

The investigation was unable to determine if the pilot was wearing the prescribed corrective lenses at the time of the accident.

1.6 AIRCRAFT INFORMATION

1.6.1 General

Aircraft manufacturer	: Pilatus Aircraft Ltd
Model	: Pilatus Porter PC-6/B2-H4
Serial number	: 903
Year of manufacture	: 1993
Nationality and registration mark	: Indonesia, PK-RCZ
Country of manufacture	: United State of America
Name of the owner	: Association of Mission Aviation (AMA)

Name of the operator	: AMA
Certificate of Airworthiness	: Standard
Date issued	: 27 September 2007
Valid to	: 26 September 2008
Certificate of Registration	
Date issued	: 22 March 2006
Valid to	: 21 March 2009
Total flying hours since manufacture	: 6,321 hours 12 minutes
Total flying hours last overhaul	: 718 hours 54 minutes
Total flying hours since last inspection	: 18 hours 18 minutes

1.6.2 Engine

Manufacturer	: Pratt & Whitney Canada
Engine type	: Turbo Propeller Free Turbine
Model	: PT6-27
Serial Number	: PCE-42755
Total Time Since New	: 8,270 hours 42 minutes
Total Time Since Overhaul	: 2,352 hours 6 minutes

1.6.3 Propeller

Manufacturer	: Hatzell Propeller
Propeller type	: Variable Pitch Prop
Model	: HC-B3TN-3D/T10178CNR
Serial Number	: BUA-21040
Total Time Since New	: 4,321 hours 6 minutes
Total Time Since Overhaul	: 1,319 hours 12 minutes
Time Between Overhaul	: 3,000 hours

1.6.4 Aircraft maintenance

The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures. The maintenance schedule had been completed in accordance with the approved Company Aircraft Maintenance Program (CAMP). The last 100 hourly inspection was completed on 1 August 2008. The aircraft was certified as being airworthy when dispatched for the flight.

1.6.5 Weight and Balance

Weight and balance was not a factor in this accident.

1.7 METEOROLOGICAL INFORMATION

The people living in the area reported that the departure weather was "good". The weather at NduNdu, the destination, was also reported by the local people as "good". The people on the ground in Taive II reported that the weather at the NduNdu pass was cloudy. However, pilots operating in the area an hour before the accident and about two hours after the accident reported that the general weather in whole area was "pretty good".

1.8 AIDS TO NAVIGATION

Ground-based navigation aids, onboard navigation aids, and aerodrome visual ground aids and their serviceability were not a factor in this occurrence.

1.9 COMMUNICATIONS

There was no air traffic control service coverage for the area of the flight. The operator maintained its own flight following service and the pilot cantacted the "company flight following" on departure from Taive II. Communication was good, but that was the last contact. There were no other aircraft in area at the time of the accident.

1.10 AERODROME INFORMATION

Not relevant to this accident.

1.11 FLIGHT RECORDERS

The aircraft was not fitted with a flight data recorder or cockpit voice recorder. Neither recorder was required by current Indonesian regulations.

1.12 WRECKAGE AND IMPACT INFORMATION

Figure 2: Wreckage PK-RCZ in NduNdu Pass at 6400 feet

Figure 3: Outboard section of the right wing and tail section separated from the aircraft

Figure 4: Right door of PK-RCZ

Figure 5: Inboard section of the right wing

Figure 6: Left wing and pilot's seat

Figure 7: Engine

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

Medical and pathological were conducted on the visum et repertum from Wamena hospital no: 352/117/VR/2008. The cause of death was reported as due to extreme trauma.

1.14 FIRE

There was no evidence of fire in flight or after the aircraft impacted terrain. There were no dangerous goods on board.

1.15 SURVIVAL ASPECTS

The accident was not survivable.

1.16 TESTS AND RESEARCH

No tests or research were required to be conducted as a result of this accident.

1.17 ORGANIZATIONAL AND MANAGEMENT INFORMATION

1.17.1 Association of Mission Aviation (AMA)

Aircraft Owner : Association of Mission Aviation (AMA)

Aircraft Operator : Association of Mission Aviation (AMA)
Sentani Airport, Papua

Aircraft Operator Certificate number: SKEP/16/II/2000

1.18 ADDITIONAL INFORMATION

The PK-RCZ flight program on 9 August 2008 was:

- Wamena – Taive II – Dou – Taiyai – Wamena
- Wamena – Taive II – NduNdu – Wamena
- The operator reported that the pilot “added the extra flight to NduNdu himself as a favor to the local people. This is not unusual in our operation and we try and help out when we have the time and fuel to add something into the schedule”.

The aircraft was carrying 60 kilograms of cargo from Taive II to NduNdu. The accident occurred during the sector between Taive II and NduNdu.

Figure 8: Wreckage of PK-RCZ on the slope above NduNdu Pass

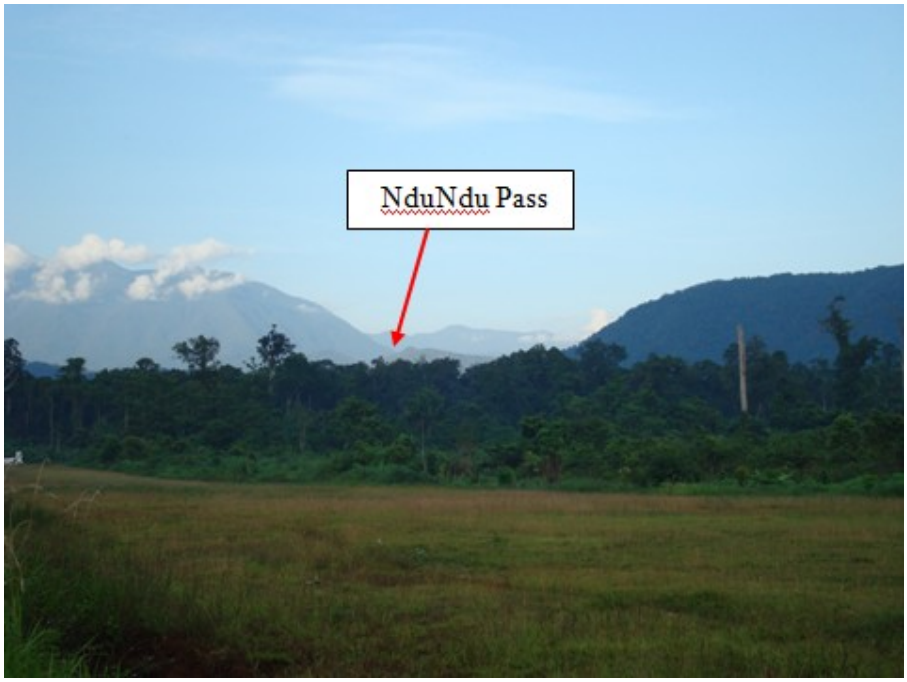

Figure 9: NduNdu Pass viewed from Taive II airstrip

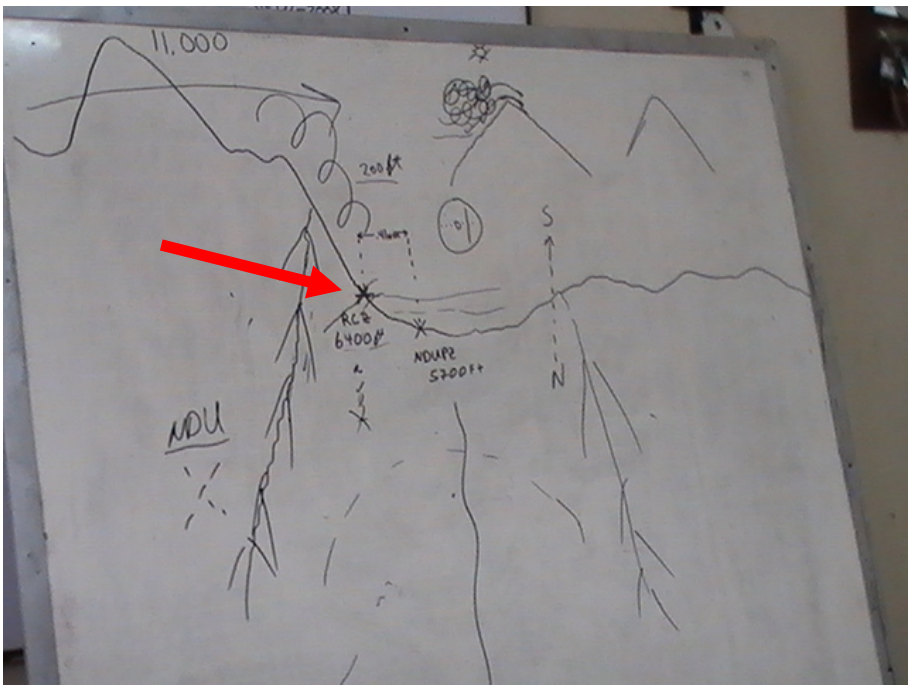

Figure 10: Sketch of the location of the accident site

Early on Sunday morning, 10 August, the Helimission helicopter lowered a crew member to check for survivors. The crew member reported that the pilot had been fatally injured. They did not have the capacity to winch the pilot out, and the crew member returned with the helicopter to Wamena. Another helicopter from PT. Freeport Indonesia was scheduled to be on site to evacuate the pilot on Sunday, 10 August, but at approximately 11:00 am the offer of assistance was cancelled and that helicopter was no longer available.

On Monday morning, 11 August, an Indonesian Army helicopter dropped personnel at the accident site. Shortly after they arrived at the site, the weather conditions in the area deteriorated, and the helicopter returned to base. On Tuesday morning, 12 August, the Army helicopter returned and was able to evacuate the fatally injured pilot to Taive II where it was transferred to an AMA aircraft and flown to Wamena.

1.18.1 Flight Operation

The pilot was required to operate under visual flight rules (VFR) procedures for the flight from Taive II to NduNdu. This necessitated flying clear of cloud and navigating along the route and through the Pass by visual reference. Investigators were unable to conclusively determine the circumstances leading to the accident. However, the accident site was to the left of the track required to safely fly through NduNdu Pass at 6,400 feet.

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

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

2 ANALYSIS

PK-RCZ departed from Taipe II for NduNdu in accordance with the visual flight rules. However, the weather in the NduNdu Pass area was reported to have been cloudy.

The accident site was to the east of the NduNdu Pass at 6,400 feet. The investigation determined that it is likely that the pilot continued flying towards the Pass towards the NduNdu aerodrome in instrument meteorological conditions (IMC). The aircraft impacted the mountain slope to the east of the Pass while cruising. The impact was severe and the accident was not survivable.

3 CONCLUSIONS

3.1 FINDINGS

- The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.
- The aircraft was certified as being airworthy when dispatched for the flight.
- There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.
- The pilot was licensed and qualified for the flight in accordance with existing regulations.
- NduNdu Pass, on the aircraft's track, was obscured by cloud.
- The pilot continued the flight into cloud and did not initiate action to maintain visual flight conditions.
- The flight was not conducted in conformance with the operator's VFR operational procedures.
- The aircraft impacted terrain was destroyed by impact forces.
- The accident was not survivable.

3.2 CAUSES

The pilot continued the flight into cloud and did not initiate action to maintain visual flight conditions.

The sector of the flight across the mountain pass was not conducted in conformance with the visual flight rules, and the pilot was did ensure that the aircraft remained clear of the terrain.

4 SAFETY RECOMMENDATIONS

4.1 SAFETY ACTIONS

At the time of finalising the Draft Final Report into this accident, the National Transportation Safety Committee had not been informed of any safety action taken.

4.2 RECOMMENDATIONS

Although the evidence in this accident indicated that the pilot was experienced in the area of the accident, the National Transportation Safety Committee reiterates recommendation 4.2.1 issued with Aircraft Accident Investigation Report KNKT.09.04.13.04, also issued as recommendation 4.2.1 in this report.

4.2.1 Recommendation to Directorate General of Civil Aviation (DGCA)

The National Transportation Safety Committee recommends that the Directorate General of Civil Aviation review the training and checking requirements for pilots operating in remote and mountainous regions such as Papua.

- Particular attention should be given to visual flight operations in mountainous and unpredictable weather conditions. This should include intensive route and aerodrome familiarization in locations, and over routes, where aids such as EGPWS[5], TAWS[6], GPS[7], and Radio Altimeter[8] are not effective, are not practical, or are not available.

The following definitions were taken from The Cambridge Aerospace Dictionary.

[5] EGPWS – Enhanced ground proximity warning system. Provides predictive terrain-hazard warnings. Uses aircraft flight data to calculate envelope along projected flight path and compare this with internal terrain data base. Potential conflict gives aural warning and also displays terrain map showing clearance ahead.

[6] TAWS – Terrain awareness and warning system. Provides predictive terrain-hazard warnings. See EGPWS.

[7] GPS – Global positioning system. Worldwide system in which users derive their location by interrogating four satellites from a total net of 24.

[8] Radio altimeter – Instrument giving a readout of height above ground level by time varying frequency and measuring the difference in frequency of received waves, this being proportional to time and hence to height.