KOMITE NASIONAL KESELAMATAN TRANSPORTASI
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Aircraft Accident Investigation Report

PT Marta Buana Abadi (Dimonim Air)

Cessna C208; PK-HVG

Yabi Airstrip, Papua

Republic of Indonesia

9 May 2023

2026

This Final Report is published by the Komite Nasional Keselamatan Transportasi (KNKT), located on the 3rd floor of the Transportation Building, Jalan Medan Merdeka Timur No. 5, Jakarta 10110, Indonesia.

The report is the result of an investigation conducted by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Act (UU No. 1/2009), and Government Regulation (PP No. 62/2013).

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Jakarta, 30 March 2026

KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

ACL	:	Authorization, Condition and Limitations
AIP	:	Aeronautical Information Publication
AltB	:	Barometric Altitude
AMSL	:	Above Mean Sea Level
AOC	:	Air Operator Certificate
ATC	:	Air Traffic Controller
BMKG	:	*Badan Meterorologi, Klimatologi, dan Geofisika* / Meteorological, Climatological, and Geophysical Agency
CG	:	Center of gravity
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
DAAO	:	Directorate of Airworthiness and Aircraft Operation
DGCA	:	Directorate General of Civil Aviation
FAA	:	Federal Aviation Administration
FDR	:	Flight Data Recorder
Fpm	:	Feet per Minute
GndSpd	:	Ground Speed
GPS	:	Global Positioning System
HDG	:	Heading
IAS	:	Indicated Airspeed
ICAO	:	International Civil Aviation Organization
KNKT	:	*Komite Nasional Keselamatan Transportasi* also known as National Transportation Safety Committee (NTSC) is the Indonesia government agency responsible to conduct transport safety investigation in accordance with the standards and recommended practices of ICAO Annex 13
lbs	:	Pounds
LT	:	Local Time
MFD	:	Primary Flight Display
NM	:	Nautical Mile
NormAc	:	Normal Acceleration
OM-A	:	Operation Manual Part A
OM-C	:	Operation Manual Part C

PF	:	Pilot Flying
PFD	:	Multi-Function Display
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
SD	:	Secure Digital
SIC	:	Second in Command
SSB	:	Single-sideband
TDZ	:	Touchdown Zone
TQ	:	Engine Torque
TRK	:	Aircraft Track
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VSpd	:	Vertical Speed

SYNOPSIS

On 9 May 2023, a Cessna C208 aircraft registered PK-HVG, operated by PT Marta Buana Abadi (Dimonim Air), was conducting an unscheduled cargo flight from Nop Goliat Dekai Airport (WAVD), Dekai, to Yabi Airstrip.

At 0740 LT, the aircraft departed Dekai under Visual Flight Rules (VFR). The flight was operated by two pilots, with the Pilot in Command (PIC) acting as Pilot Flying (PF) and the Second in Command (SIC) serving as Pilot Monitoring (PM).

At approximately 0800 LT, the aircraft landed at Yabi Airstrip, touching down about 100 meters from the beginning of the runway. The aircraft continued rolling along the upsloping runway and subsequently veered to the right. The pilot applied full braking and left rudder input in an attempt to realign the aircraft with the runway centerline. Despite these corrective inputs, the aircraft could not be maintained on the runway and exited to the right side.

The pilot reduced engine power and shut off the fuel by closing the fuel valve. The aircraft collided with a large rock, resulting in the separation of the propeller from the engine power drive. The aircraft came to rest approximately 330 meters from the beginning of the runway.

No injuries were reported. The aircraft sustained substantial damage: the propeller separated and the blades were bent, the nose landing gear collapsed and folded rearward causing damage to the forward cargo door, and the engine, cowling, and exhaust system were deformed.

Based on factual information gathered during the investigation, no indications of aircraft system malfunction or pilot medical issues were identified prior to the occurrence. Weather conditions were reported as calm winds and clear visibility of 10 kilometers. Therefore, the analysis did not address aircraft systems, medical factors, or weather conditions. Instead, the analysis highlighted safety issues related to aircraft handling techniques and operational guidance.

The investigation identified the following contributing factors:

- visual illusion, where the upsloping runway made the runway surface appear higher than its actual elevation, likely resulting in mis-assessment of height during the approach and leading to an improper flare, contributing to a nose-low attitude at initial touchdown.
- nose-low attitude landing, which contributed to structural failure of the nose landing gear while the aircraft was veering to the right, resulting in a runway excursion.

At the time of issuing this investigation report, the KNKT had not been informed of any safety actions taken as a result of this occurrence. Therefore, the KNKT issued safety recommendations to the aircraft operator to address the safety issues identified in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 9 May 2023, a Cessna C208 aircraft, registered PK-HVG, was conducting an unscheduled cargo flight in the Papua area. The planned flight schedule for the day comprised the sectors of Wamena[1] – Dekai[2] – Yabi[3] – Dekai – Wamena.

At 2139 UTC[4] (0639 LT), the aircraft departed Wamena Airport and arrived in Dekai at 0704 LT. Following landing, the pilot supervised the cargo loading and conducted a walk-around inspection prior to the next departure. No signs of airframe damage or system malfunction were observed during this inspection.

According to an aircraft operator's officer at Yabi, light rain had occurred the previous night. On the morning of the occurrence, the weather conditions were reported to be clear and were communicated to the pilot.

The aircraft departed Dekai for Yabi at 0740 LT. The flight was operated by two pilots under Visual Flight Rules (VFR). On board the aircraft were two pilots, the Pilot in Command (PIC) acted as Pilot Flying (PF), while the Second in Command (SIC) served as Pilot Monitoring (PM).

At 0758 LT, the aircraft arrived over Yabi. According to pilot observation, visibility was approximately 10 km, and wind conditions were calm. To assess the runway condition, the pilot performed a flyover of the runway before commencing the approach. After confirming that the runway was suitable for landing, the pilot entered the K-point[5] in landing configuration, with flaps fully extended and maintaining a speed of approximately 80 knots. The aircraft subsequently advanced to the Abort-point[6]. As the wind speed was calm, the pilot decided to continue the landing.

At 0800 LT, the aircraft landed at Yabi, touching down approximately 100 meters from the beginning of the runway. The pilot reported hearing an impact sound after touchdown. The aircraft continued rolling along the upslope runway, and then veered to the right. The pilot applied full braking and left rudder inputs in an attempt to realign with the center of the runway. Despite the pilot's corrective inputs, the aircraft could not be maintained and subsequently exited the runway. The pilot reduced engine power and shut off the fuel by closing the fuel valve. The aircraft collided with a large rock, resulting in the separation of the propeller from the engine power drive. The aircraft came to a stop approximately 330 meters from the beginning of the runway.

1.2 Injuries to Persons

There were no injuries to persons as a result of this occurrence.

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[1] Wamena in this report refers to Wamena Airport (WAVV), Wamena.

[2] Dekai in this report refers to Nop Goliat Dekai Airport (WAVD), Dekai, which was located at coordinates of 4° 51' 10.95"S; 139° 29' 6.65"E.

[3] Yabi in this report refers to Yabi Airstrip, which was located at the coordinates of 04° 20.44'S; 139° 20.42'E or about 32 Nm on radial 344° outbound from Dekai.

[4] The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the time as specific events occurred. Local Time (LT) is UTC+9 hours.

[5] Based on the Yabi airstrip chart, the K-point was situated at an altitude of 7,500 feet over Balinggama point (see Figure 2).

[6] The Abort point is a position for the pilot to decide whether to proceed with the landing or to abort. The point was located approximately 2 km away from Yabi airstrip (see Figure 2).

1.3 Damage to Aircraft

The aircraft was substantially damaged. The propeller separated from the engine power drive, and all blades were bent. The nose landing gear collapsed and folded rearward, causing damage to the forward cargo door. The engine, cowling, and exhaust system were also deformed.

1.4 Other Damage

There was no other damage to property or the environment.

1.5 Personnel Information

1.5.1 Pilot in Command (PIC)

The pilot was a 36-year-old Indonesian national who held a valid Commercial Pilot License (CPL) and was qualified to operate Single Engine Land aircraft. The pilot also held a valid first-class medical certificate without any limitations.

The pilot had a total flight time of 1,733.2 hours, including approximately 400 hours on the Cessna C208B aircraft type. The pilot had flown for 20 minutes prior to the occurrence. The last proficiency check was conducted on 18 December 2022.

The pilot had operated to Yabi approximately 30 times in total. Of these, 14 flights, including the occurrence flight, were conducted as PIC, while the remaining flights were conducted with an instructor as part of check flights.

1.5.2 Second in Command (SIC)

The pilot was a 34-year-old Indonesian national who held a valid Commercial Pilot License (CPL) and was qualified as a Single Engine Land pilot. The pilot also held a valid first-class medical certificate without any limitations.

The pilot had a total flight time of 997.4 hours, including 78.4 hours on the Cessna Co2B aircraft type. The pilot had flown for 20 minutes prior to the occurrence. The last proficiency check was conducted on 19 December 2022.

1.6 Aircraft Information

1.6.1 General

The Cessna C208 aircraft, bearing serial number 20800558, was manufactured by Cessna Aircraft Company in 2014. The aircraft was registered as PK-HVG and held a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). The total time since new was 1,862 hours, and the total cycles since new was 3,330 cycles.

The aircraft was powered by a single Pratt & Whitney Canada PT6A-114A turboprop engine, serial number PCE-PC2101. The total engine time since new was 1,862 hours, with 3,332 cycles.

The propeller installed on the aircraft was a McCauley 3GFR34C703B, three-bladed, serial number 130998. The total time since new was 1,862 hours, and the total cycles since new was 3,330 cycles.

Prior to departure, the pilot conducted a preflight and walk-around inspection. There was no indication of any aircraft system or engine malfunction.

1.6.2 Cessna C208 Landing Gear System

The Cessna C208 is equipped with a tricycle-type landing gear consisting of a steerable nosewheel and two main wheels, as shown in Figure 1. Shock absorption for the main landing gear is provided by tubular spring-steel struts (drag link spring), while the nose gear uses an oil-filled shock strut.

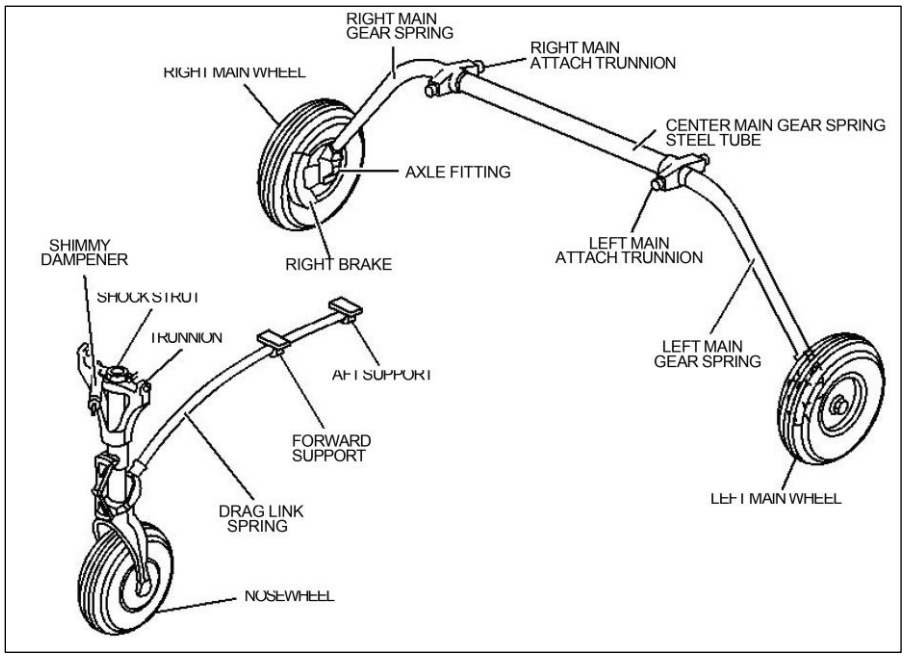


Figure 1: Typical Cessna C208 landing gear system

The nose gear shock strut trunnion is attached to the lower forward engine mount via two pivot lugs. The drag link spring is mounted to the upper portion of the wheel fork and connected to the lower fuselage using two tandem bearing blocks. This configuration allows for the easy removal of the complete nose gear assembly when replacement is required.

Vertical loads encountered during landing and taxiing are absorbed by both the drag link spring and the nose gear shock strut. Minor loads, such as those experienced during taxiing, are primarily absorbed by the drag link spring. As the magnitude or rate of load application increases, such as during landing, a larger proportion of the load is absorbed by the shock strut.

1.6.3 Weight and Balance

According to the weight and balance sheet, the aircraft carried approximately 1,633 lbs of cargo and 650 lbs of fuel. The estimated takeoff weight of the aircraft was 7,799 lbs, which was within the maximum allowable takeoff weight of 8,750 lbs. The estimated landing weight was 7,451 lbs, also within the maximum allowable landing weight of 8,500 lbs.

The estimated center of gravity (CG) at takeoff was 194 inches, and at landing was 193.5 inches. The allowable CG range was between 180 and 204 inches aft of the datum. Based on this data, the aircraft was operated within the approved weight and balance envelope.

1.7 Meteorological Information

Aviation meteorological services were not available in Yabi, and operations relied on the pilot's visual observations. Weather information was obtained from an aircraft operator's officer at Yabi via radio communication. On the night before the occurrence, light rain was reported in Yabi. However, on the day of the occurrence, according to the pilot, the weather was clear, with visibility of 10 kilometers and calm winds.

The Garmin G1000 flight data logging indicated that during the landing approach, the wind direction was 310°. At touchdown, the wind direction was 026°.

1.8 Aids to Navigation

The Yabi airstrip did not have any ground-based navigation aids. For navigation, the aircraft was equipped with a Garmin G1000 system, which displays Global Positioning System (GPS) navigation data on its Primary Flight Display (PFD) and Multi-Function Display (MFD). The GPS system enables direct point-to-point navigation, providing guidance between locations based on the flight plan.

Dimonim Air has developed an internal Operations Manual Part C (OM-C) that provides information on areas, routes, and aerodromes in Papua. The document includes details on airports, terrain, routes, and other relevant information considered useful for flight operations in these regions. The latest revision of the document, Revision No. 4, dated 17 September 2021, did not include information on Yabi or route guidance for flights between Dekai and Yabi.

The investigation did not find any aeronautical information for Yabi in the Indonesia Aeronautical Information Publication (AIP). During the occurrence flight, the pilot used an airport chart published by another aircraft operator, as shown in the following figure.

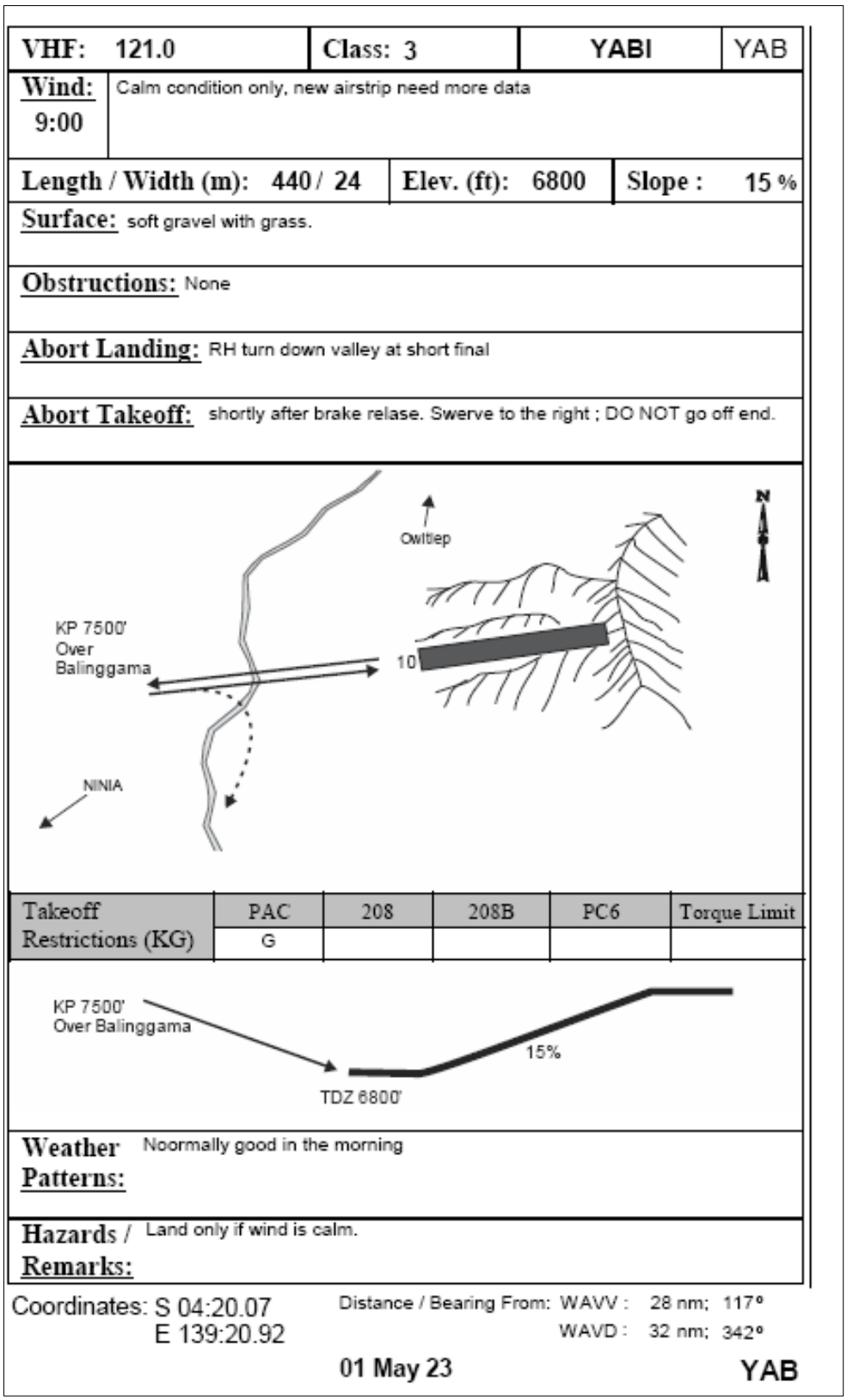


Figure 2: Yabi airstrip chart (abort point shown by the dashed line)

1.9 Communications

The aircraft was equipped with Single-sideband (SSB) radio and Very High Frequency (VHF) for aircraft communication. There was no air-to-ground communication recorded at Yabi.

1.10 Aerodrome Information

The investigation collected aerodrome data from several sources and determined that Yabi is located at coordinates 04°20.44'S and 139°20.042'E, at an elevation of 7,100 feet above mean sea level (AMSL). The airstrip is designated as Runway 08/26, with a total length of 550 meters and a surface composed of soft gravel and grass. The airstrip features a touchdown zone (TDZ) slope of approximately 13% (about 7°)[7] and an average slope of about 20% (about 11°).

1.11 Flight Recorders

The aircraft was not equipped with a Flight Data Recorder (FDR) or a Cockpit Voice Recorder (CVR), as neither was required under the applicable Indonesian aviation regulations.

The aircraft was equipped with a Garmin G1000 system, which has the capability to record flight data. The flight data logging function automatically recorded flight and engine parameters onto a Secure Digital (SD) card inserted into the top slot of the MFD.

The SD card containing the flight data from the PK-HVG aircraft was transported to the KNKT recorder facility for processing. The SD card contained 44 flight data logging files and recorded 57 parameters. The occurrence flight had a duration of 23 minutes and 24 seconds. The relevant data related to the occurrence were visualized in Figure 3 and Figure 4.

[7] The slope which was presented in percent (%) can be reverted to a degrees unit by simple arctan(slope) equation. The arctan(13%) or arctan(0.13) = 7.4°.

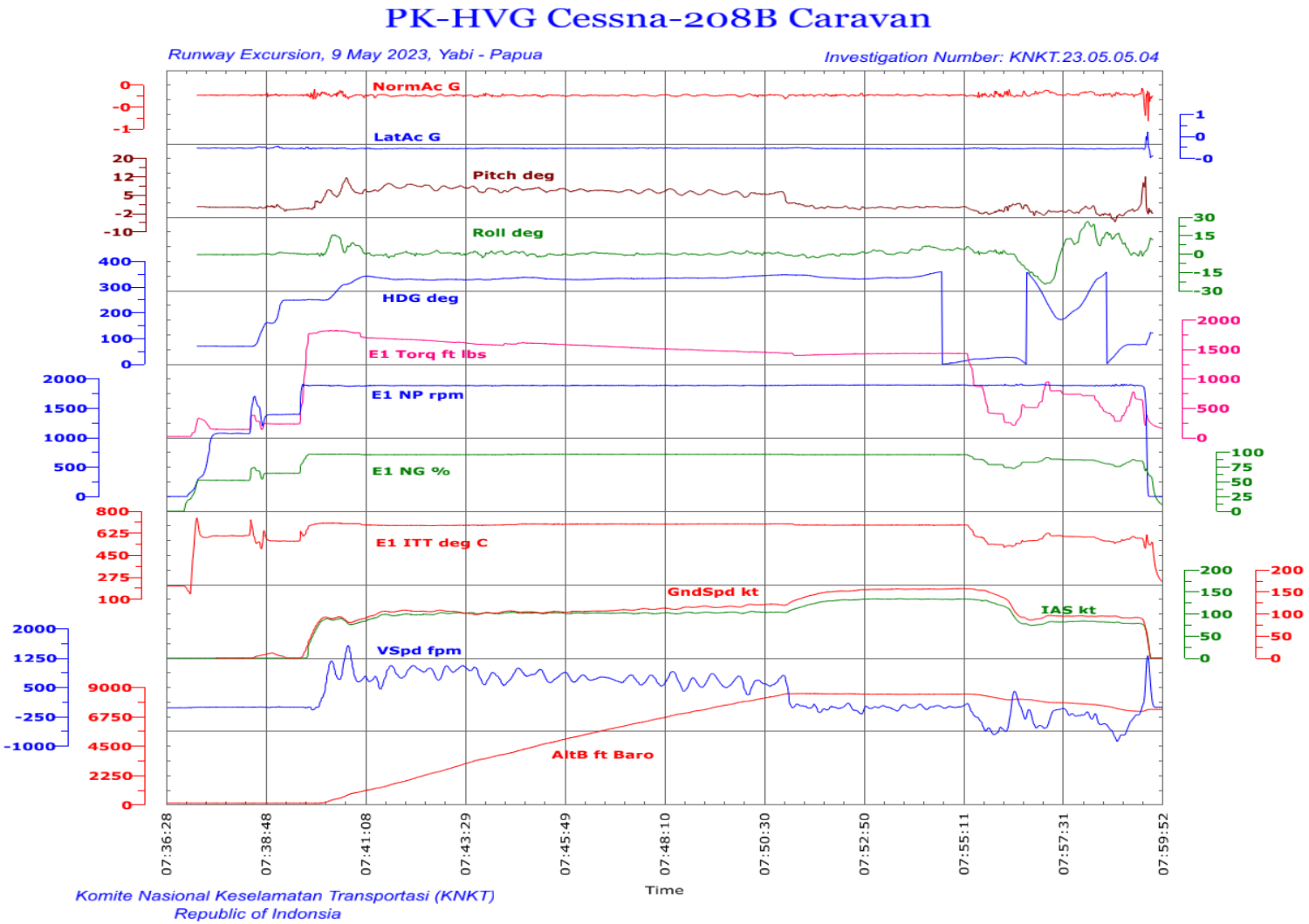


Figure 3: Aircraft full flight plot

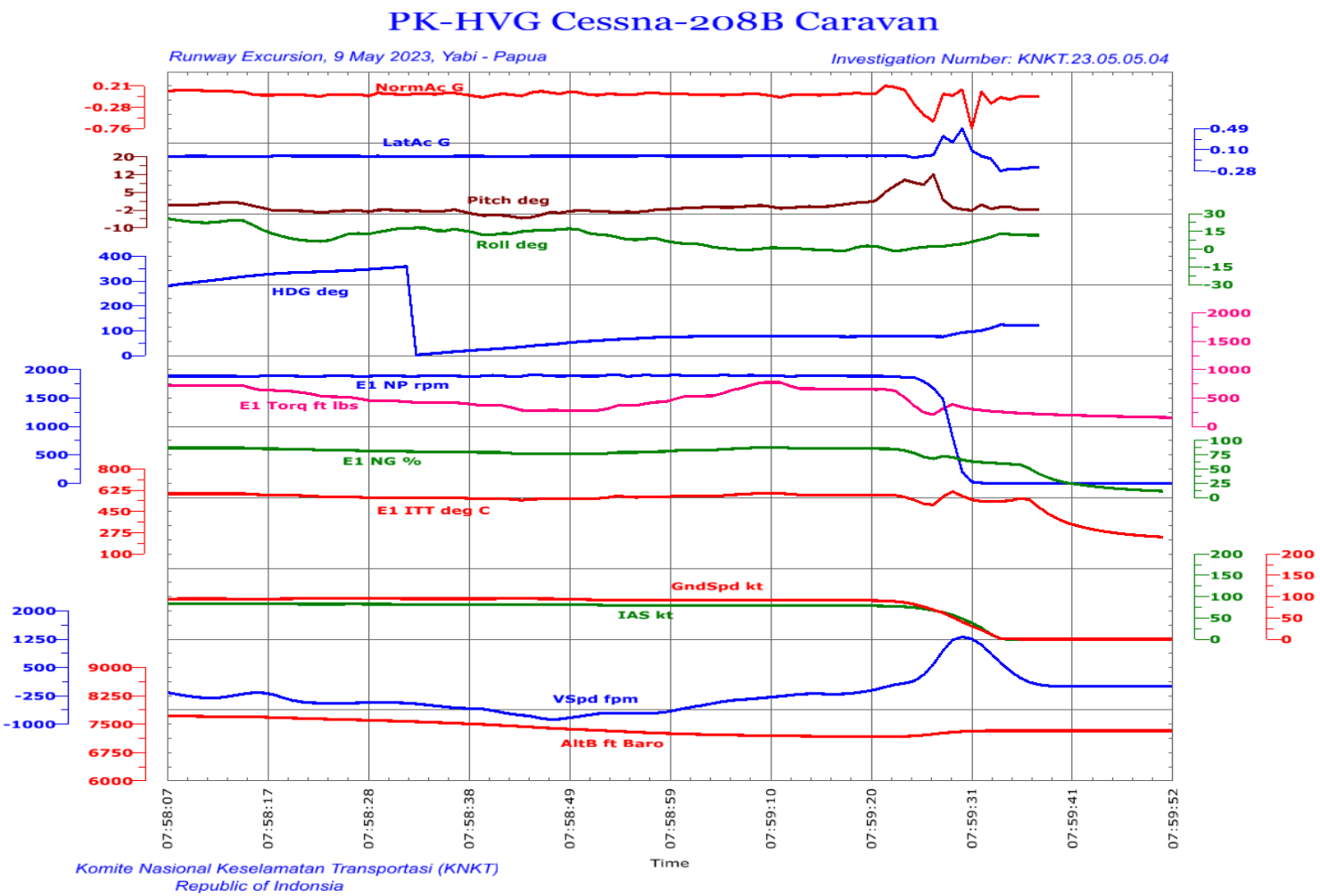


Figure 4: Aircraft landing plot

The significant events of the flight are summarized as follows:

1. At 22:50:51 UTC (7:50:51 LT), the barometric altitude (AltB) recorded the aircraft reached 9,000 feet, and maintained approximately this altitude.
2. At 7:55:37 LT, the AltB was decrerasing from 9,000 feet.
3. At 7:58:19 LT, the AltB was 493 feet and continued decreasing. The Indicated Airspeed (IAS) was 82 knots, and the vertical speed (VSpd) was -292 feet per minute (fpm).
4. From this point until touchdown, the aircraft track (TRK) showed that it remained aligned with the center of the runway. The vertical speed was less than 1,000 fpm, and the engine torque (TQ) remained above the minimum power required for approach.
5. At 7:58:37 LT, the coordinates indicated that the aircraft flew over the Balinggama airstrip. The IAS was 81 knots, and the VSpd was -560 fpm.
6. At 7:59:22 LT, the AltB was 7,100 feet, the normal acceleration (NormAc) was recorded as 0.21 g, the IAS was 78 knots, with the ground speed (GndSpd) was 89 knots. The aircraft altitude as recorded by the AltB parameter was 7,177 feet, the pitch angle was recorded 5.17°, the VSpd was -15 fpm, the roll angle was 0°, the heading (HDG) was 078°, and the engine torque (TQ) was 650 ft lbs.
7. At 7:59:23 LT, the pitch angle was 7.84°, the NormAc was 0.18 g, the VSpd was 48 fpm, and the GndSpd was 88 knots.
8. At 7:59:24 LT, the pitch angle was 10.21°, the NormAc was 0.12 g, the VSpd was 84 fpm, and the GndSpd was 86 knots.
9. At 7:59:25 LT, the pitch angle was 9.05°, the NormAc was -0.21 g, the VSpd was 142 fpm, and the GndSpd was 82 knots.
10. At 7:59:26 LT, the pitch angle was 8.26°, the NormAc was -0.45 g, the VSpd was 312 fpm, and the GndSpd was 76 knots.
11. At 7:59:27 LT, the pitch angle increased to 12.61° and one second later decreased to 1.8°. At that time, the NormAc was -0.6 g, the VSpd was 587 fpm, and the GndSpd was 68 knots. The aircraft roll was recorded at 2.44°, and the aircraft started to veer to the right.
12. At 7:59:30 LT, the IAS was at 48 knots, the VSpd was 1,310 fpm, the pitch angle was -2.14°, the roll angle was 4°, and the NormAc was 0.13 g. The HDG was 093°.
13. At 7:59:35 LT, the ground speed was 0 knots, the pitch angle was -1.14°, and the roll angle was 12°.

1.12 Wreckage and Impact Information

The touchdown mark was found about 100 meters from the beginning of the runway. Approximately 130 meters further, a mark indicating the nose wheel pothole was identified.

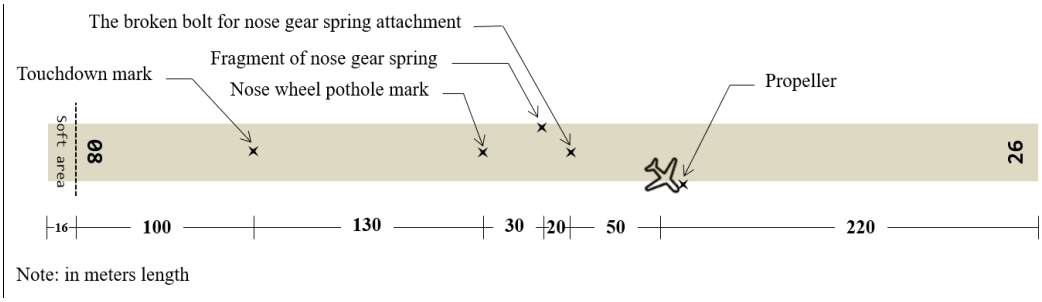


Figure 5: Impact sequence and wreckage trail

A fragment of the nose landing gear spring (drag link spring) was discovered about 260 meters from the beginning of the runway, with the broken bolt used for the nose gear spring attachment found approximately 20 meters beyond that point.

Figure 6: The fragment of the nose landing gear spring (drag link spring) and the broken bolt used for the nose gear spring attachment

The nose landing gear spring (drag link spring) showed evidence of widening in the fork end compared to the normal size, as shown in Figure 7.

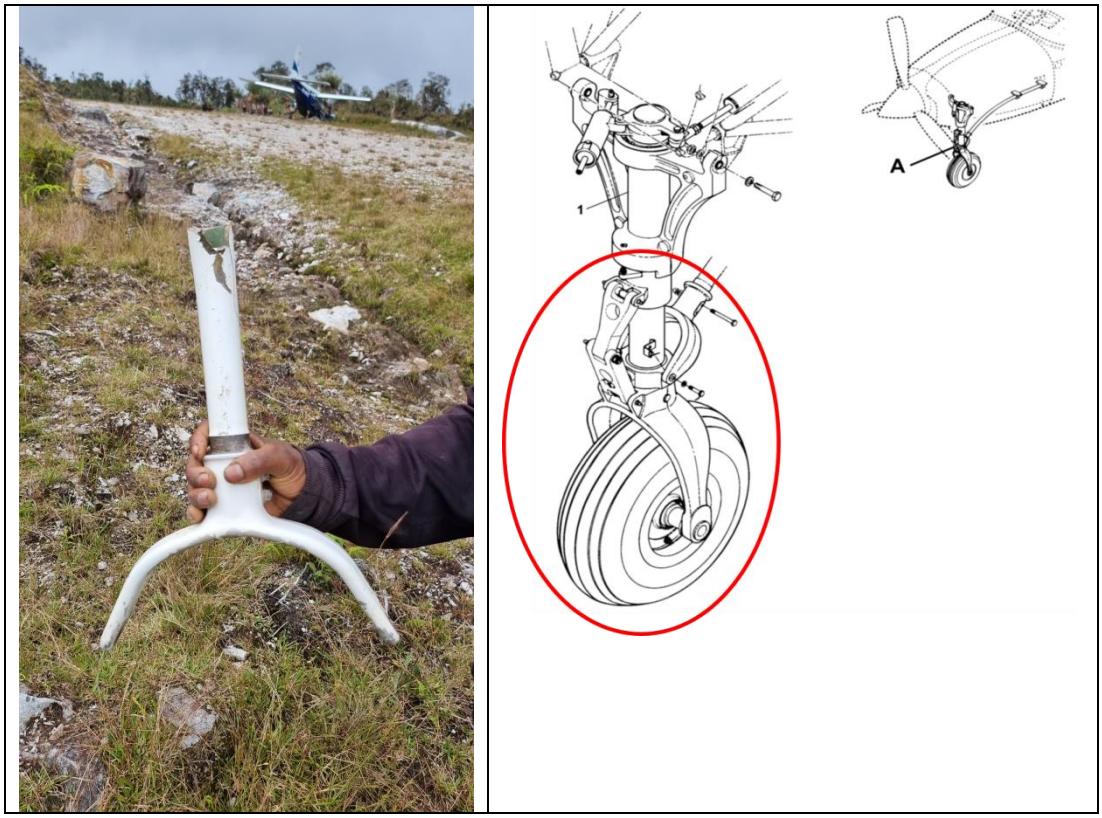


Figure 7: The widening of the nose gear spring (drag link spring) fork end

The propeller, which had detached from the engine power drive, was located approximately 0.5 meters to the left of the aircraft's nose, as shown in Figure 8. The investigation team did not find any propeller scratches on the runway.

Figure 8: The detached propeller was adjacent to the aircraft

The aircraft was resting on the right side of the runway, while the nose landing gear was collapsed.

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence, nor were any required.

1.14 Fire

There was no evidence of in-flight or post-impact fire.

1.15 Tests and Research

1.15.1 Aircraft Landing Profile

The G1000 Garmin system did not record any data of a successful landing at Yabi. To assist the analysis, the investigation reviewed data from the Balinggama airstrip, which shares similar characteristics with Yabi.

Balinggama Airstrip is located at coordinates 04°20.85'S and 139°19.34'E, approximately 1 NM from Yabi on a bearing of 245°. The airstrip has an elevation of about 7,000 feet Above Mean Sea Level (AMSL) and a slope of approximately 15°. The relative locations of Balinggama and Yabi are shown in Figure 9.

Figure 9: Balinggama and Yabi

The investigation utilized the Google Earth map combined with the ArcGIS[8] data elevation model to determine the location of the aircraft touchdown point. The elevation data, which were retrieved from the ArcGIS, were combined with the latitude and longitude that were recorded in the Garmin G1000 flight data logging, and then the data were plotted on Google Earth.

[8] ArcGIS is a comprehensive Geographic Information System (GIS) software platform developed by a company named Esri. The software has the capability to determine the data elevation model of such location if it processed.

The location of the touchdown point was estimated at the point where the Garmin G1000 flight data logging recorded NormAc parameter (as a g-force representation) greater than +0.1 g[9] when the aircraft was on the runway area.

The investigation examined Garmin G1000 flight data logging files of aircraft that had successfully landed at Balinggama Airstrip to analyze the landing profiles. The investigation estimated the Balinggama slope based on the elevation data model from the ArcGIS and found the slope was approximately 14.5% or about 7° up slope.

The first dataset indicated that the aircraft touched down with NormAc of 0.23 g, the pitch angle was 11.06°, the roll angle was 0°, the IAS was 75 knots, and the VSpd was 170 fpm. The aircraft landed uneventfully.

The second dataset showed that the aircraft touched down with NormAc of 0.27 g, the pitch angle was 12.05°, the roll angle was 1°, the IAS was 77 knots, and the VSpd was -150.64 fpm. The aircraft also landed uneventfully.

Both landing profiles indicated that the pilot maintained a relatively high pitch attitude to accommodate the runway up slope, with an IAS between 75 and 77 knots. Despite variations in pitch, the recorded normal accelerations were similar, ranging between 0.23 g and 0.27 g.

1.15.2 Aircraft Landing Roll

The Garmin G1000 flight data logging of the accident flight, recorded that during touchdown the NormAc was 0.21 g, the ground speed (GndSpd) was 89 knots and the pitch of the aircraft was 5.17°.

As the aircraft travels with a groundspeed of 89 knots, and converting the knots into meters per second of 0.514 meters per second, then the distance traveled from the previous point was approximately 46 meters (89 knots × 0.514 meters per second = 45.7 meters).

At 7:59:23 LT, the aircraft experienced a g-force of 0.18 g, and the VSpd was 48 feet per minute, the pitch angle was 7.84°, with the GndSpd being 88 knots. At this point, the ArcGIS elevation model showed the elevation of 7,623 feet, or a gain of about 28 feet from the previous point.

At 7:59:24 LT, the Garmin G1000 flight data logging recorded the NormAc of 0.12 g, the aircraft pitch was 10.21°, the VSpd was 84 fpm, and the GndSpd was 86 knots. The ArcGIS data elevation model showed the elevation of 7,639 feet, or a gain of about 16 feet from the previous point. The aircraft traveled about 45 meters from the previous point. Up to this point, the aircraft experienced a decrease in g-force while traveling on the runway.

At 7:59:25 LT, the Garmin G1000 flight data logging recorded the NormAc as -0.21 g, meaning that the aircraft experienced an upward force, with the aircraft pitch at 9.05° and the GndSpd was 82 knots (the aircraft traveled 44 meters from the previous

[9] The NormAc parameter (as a g-force representation) that is recorded in Garmin G1000 flight data logging has both positive and negative signs. Observing the available data of Garmin G1000 flight data logging showed that the positive sign means that the force direction is downward by the evidence of decreasing of the vertical speed and altitude. As stated in Newton's third law, where the action is the same as the reaction, Garmin G1000 flight data logging represented the downward force direction with the positive value as a reaction of the downward force action, see https://www.strapdownassociates.com/Accels%20Measure.pdf.

point). Adding the distance from the touchdown point to this point, where the aircraft experienced the upward g-force of -0.21 g, resulted in 136 meters, which was relatively consistent with the finding of the investigation team, where the nose wheel pothole was discovered (see Figure 5).

At 7:59:26 LT, the Garmin G1000 flight data logging recorded the NormAc was -0.45 g, meaning that the aircraft experienced an upward force, with the aircraft pitch was 8.26°, the VSpd was 312 fpm, and the GndSpd was 76 knots (the aircraft traveled 42 meters from the previous point).

At 7:59:27 LT, the Garmin G1000 flight data logging recorded the NormAc was -0.6 g, meaning that the aircraft experienced an upward force, with the aircraft pitch at 12.61°, and the GndSpd was 68 knots. At this time the aircraft was traveling 34 meters from the previous point. The aircraft roll was recorded at 2.44°, and the aircraft started to veer to the right. Between this point and the previous point, the investigation team discovered a fragment of the nose landing gear spring (drag link spring) and the broken bolt of the nose gear spring attachment.

At 7:59:35 LT, the ground speed was 0 knots, the pitch angle was -1.14°, and the roll angle was 12°, consistent with the aircraft resting at the right of the runway with the attitude of nose down and tilted to the right.

1.16 Organizational and Management Information

1.16.1 Aircraft Operator

PT Marta Buana Abadi, also known as Dimonim Air, holds a valid Air Operator Certificate (AOC) number 135-049. The certificate authorizes the operation of Cessna C208B aircraft, including the registered PK-HVG, to conduct on-demand aircraft air services within and outside Indonesia in accordance with the Civil Aviation Safety Regulation (CASR) Part 135.

According to the Authorization, Condition and Limitations (ACL) issued by the DGCA, Dimonim Air is required and approved to obtain, maintain, and distribute current aeronautical data, such as Jeppesen Aeronautical Data and Aeronautical Information Publication (AIP), for the airports it operates.

The procedure for aeronautical data dissemination is described in the Operation Manual Part A (OM-A) Subchapter 3.3.5.1, which is quoted below:

> ***3.3.5.1 Airport Aeronautical Data***
>
> *The company will maintains subscription service with the Jeppesen Company for aeronautical enroute and approach charts.*
>
> *Aeronautical Information Publication (AIP) charts will be used to supplement the charts.*
>
> ***Aeronautical Information Publication (AIP) Standard:***
>
> *The Company shall ensure that aeronautical data and aeronautical information publication meets the standard requirements in terms of accuracy, resolution and integrity of appropriate quality to ensure flight operation safety*

Chart publications shall produce in accordance with Annex 4 to the Convention on International Civil Aviation and the Aeronautical Chart Manual (ICAO Doc 8697).

Available Information:

The aeronautical chart shall include at least:

a. Route Manual

b. Airport Chart

c. Airways Chart

d. ATC Procedures

The OM-C provides essential information on airports, terrain, routes, and weather within the operator's areas of operation.

1.16.2 Familiarization Areas, Routes, and Aerodrome

Dimonim Air has developed procedures for route and airport qualifications, as described in OM-A Chapter 5.3, quoted as follows:

Dimonim Air aircrafts will be operated into mountainous areas with many remote airstrips without navigation facilities. This will require more skill and awareness from the Pilot.

Therefore some of procedures for route and airport qualifications required are:

a. All flight crew shall be experienced with, and have an adequate knowledge of the routes to be flown and airports to be used.

b. All flight crew will be thoroughly briefed regarding route and airports before leaving base, by making full use of all available information.

c. It is the responsibility of the individual pilot to ensure that he is qualified to fly a particular route, or use a particular airstrip I airport. He must be thoroughly knowledgeable of all aspects of the operation, and be able to comply with all applicable regulations and local procedures for the route to be flown.

The PIC must have current and pertinent knowledge of route to tine satisfaction of the Chief Pilot. This includes:

a. Seasonal meteorological conditions;

b. Communication and navigational facilities including airport visrual aids;

c. Kinds of terrain and obstruction;

d. Minimum safe flight levels;

e. En-route and terminal area arrival and departure procedures, holding procedures and authorized instrument approach procedures for the airport involved;

f. Congested area and physical layout of each airport in terminal area involved.

In addition, procedures for familiarization with areas, routes, and aerodromes are described in OM-A Chapter 10.7, quoted as follows:

All Dimonim Air pilots must be familiar with the area, route and airports that Dimonim Air aircraft planning to fly and to land.

Before being assigned as Commander or as pilot to whom the conduct of the flight is delegated, the pilot shall obtain adequate knowledge of the route to be flown. This shall include knowledge of:

a. the terrain and minimum safe altitudes

b. the seasonal meteorological conditions

c. the meteorological, communication, air traffic facilities and service procedures

d. the search and rescue procedures

e. the navigational facilities associated with the route along which the flight will be conducted

This knowledge is achieved by self-study of the applicable parts of the AFM.

Before a flight to any aerodrome, all pilots shall obtain adequate knowledge of the aerodromes which are used, including the procedures applicable to flight paths over heavily populated areas and areas of high traffic intensity, obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures and applicable aerodrome operating minima.

For complete explanation on area, route, and airport familiarization refer to:

a. AIP

b. Jeppesen Airways Manual

c. VFR Route Guidance

d. Operations Manual Part C

1.16.3 Stabilized Approach Procedures

Dimonim Air has developed the stabilized approach procedures for its routes, as described in OM-A Chapter 10.8, quoted as follows:

A stabilized approach is one of the key features of a safe approach and landing in public transport operations. A stabilized approach is characterized by a constant-angle, constant-rate descent approach profile.

If at any time during an approach there is doubt that any element of the stable approach can be achieved or maintained, the approach should be discontinued.

All Dimonim Air flights must be stabilized by 500 feet above airport elevation in visual meteorological conditions (VMC).

An approach is stabilized when all of the following criteria are maintained:

a. The aircraft is on the correct flight path;

b. Only small changes in heading/ pitch are required to maintain the correct flight path;

c. The aircraft speed is not more than VREF+20 knots indicated airspeed and not less than VREF;

d. The aircraft is in the correct landing configuration;

e. Sink rate is no greater than 1,000 feet per minute; if an approach requires a sink rate greater than 1,000 feet per minute, a special briefing should be conducted;

f. Power setting is appropriate for the aircraft configuration and is not below the minimum power for approach as defined by the aircraft operating manual;

g. All briefing and checklists have been conducted;

h. Specific types of approaches are stabilized if they also full fi ll the following: instrument landing system (ILS) approaches must be flown within one dot of the glide slope and localizer; during a circling approach, wings should be level on final when the aircraft reaches 300 feet above airport elevation;

i. Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing.

An approach that becomes un-stabilized below 500 feet above airport elevation in VMC requires an IMMEDIATE GO-AROUND.

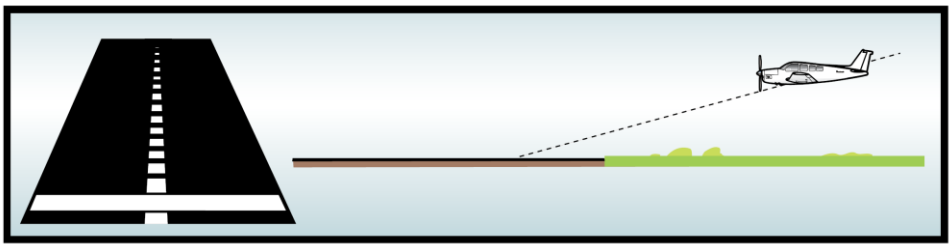
1.17 Additional Information

The investigation reviewed the Spatial Disorientation Visual Illusion published by the Federal Aviation Administration (FAA), described as follows:

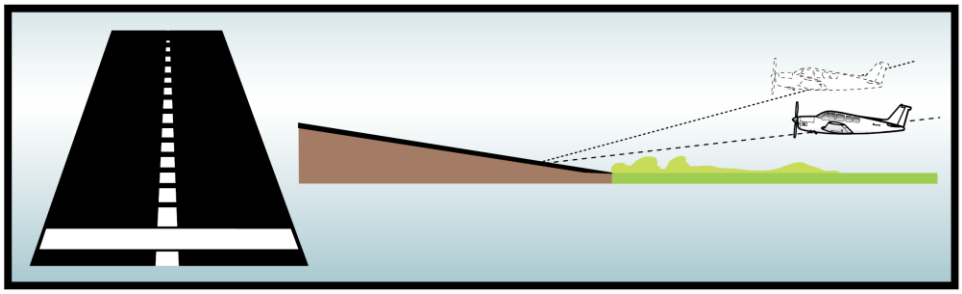
Visual Illusions

Visual illusions are familiar to most of us. As children, we learned that railroad tracks—contrary to what our eyes showed us—don't come to a point at the horizon. Even under conditions of good visibility, you can experience visual illusions including:

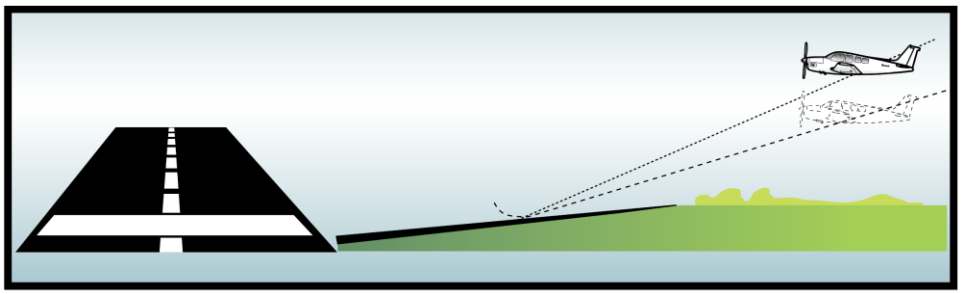
***Aerial Perspective Illusions** may make you change (increase or decrease) the slope of your final approach. They are caused by runways with different widths, upsloping or downsloping runways, and upsloping or downsloping final approach terrain. Pilots learn to recognize a normal final approach by developing and recalling a mental image of the expected relationship between the length and the width of an average runway, such as that exemplified in Figure 2.*



A final approach over a flat terrain with an upsloping runway may produce the visual illusion of a high-altitude final approach. If you believe this illusion, you may respond by pitching the aircraft nose down to decrease the altitude, which, if performed too close to the ground, may result in an accident (Figure 3).



A final approach over a flat terrain with a downsloping runway may produce the visual illusion of a low-altitude final approach. If you believe this illusion, you may respond by pitching the aircraft nose up to increase the altitude, which may result in a low-altitude stall or missed approach (Figure 4).



Further in the document, it describeds methods to prevent spatial disorientation, detailed as follows:

How to Prevent Spatial Disorientation

- *Take the opportunity to personally experience sensory illusions in a Barany chair, a Vertigon, a GYRO, or a Virtual Reality Spatial Disorientation Demonstrator (VRSDD). By experiencing sensory illusions first-hand (on the ground), pilots are better prepared to recognize a sensory illusion when it happens during flight and to take immediate and appropriate action. The Aerospace Medical Education Division of the FAA Civil Aerospace Medical Institute offers spatial disorientation demonstrations with the GYRO and the VRSDD in Oklahoma City and at all of the major airshows in the continental U.S.*
- *Obtain training and maintain your proficiency in aircraft control by*

reference to instruments.

- *When flying at night or in reduced visibility, use and rely on your flight instruments.*
- *Study and become familiar with unique geographical conditions where flight is intended.*
- *Do not attempt visual flight when there is a possibility of being trapped in deteriorating weather.*
- *If you experience a visual illusion during flight (most pilots do at one time or another), have confidence in your instruments and ignore all conflicting signals your body gives you. Accidents usually happen as a result of a pilot's indecision to rely on the instruments.*
- *If you are one of two pilots in an aircraft and you begin to experience a visual illusion, transfer control of the aircraft to the other pilot, since pilots seldom experience visual illusions at the same time.*
- *By being knowledgeable, relying on experience, and trusting your instruments, you will be contributing to keeping the skies safe for everyone.*

1.18 Useful or Effective Investigation Techniques

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

2 ANALYSIS

Based on the factual information gathered during the investigation, no issues related to aircraft system malfunction or the health of the pilots were reported prior to the occurrence. The wind was calm, and the weather was clear with a visibility of ten kilometers, as confirmed by both pilots. Therefore, the analysis will not address aircraft systems, medical concerns, or weather conditions. The analysis highlighted safety issues related to the aircraft handling and operational guidance and operational guidance.

2.1 Aircraft Handling During Landing

The Yabi airstrip, located in a mountainous region, has a short runway length of 550 meters, a steep 13% (7°) upslope gradient at the touchdown zone, and an average of 20% (11°). Compared to a typical flat runway, landing at such airstrip requires adjustments to approach angle, speed, descent rate, proper flare-out pitch attitude, and consideration of visual illusion to ensure a safe landing.

In this occurrence, Garmin G1000 flight data logging showed that after passing 500 feet above aerodrome elevation, the aircraft maintained a stabilized approach.

The initial touchdown was identified where the flight data logging showed a normal acceleration greater than 0.1 g. The Garmin G1000 flight data logging indicated that the initial point of touchdown occurred when the NormAc was 0.21 g.

The pitch angle at touchdown was 5.17°, while the runway slope was approximately 7° (corresponding to a 13% upslope). This indicates that the aircraft's pitch angle was lower than the runway slope surface, resulting in a nose-low attitude at the initial touchdown. In this situation, the nose landing gear system structure, including the nose landing gear spring (drag link spring), might have been deformed. The fragment of the nose landing gear spring (drag link spring), with the widening of its fork end, showed that the nose landing gear spring (drag link spring) ewas subjected to a high load as a result of the nose-low attitude at the initial touchdown.

Following the touchdown, NormAc was recorded at 0.18 g and decreased to 0.12 g. At that period the vertical speed (VSpd) reduced from 48 feet per minute (fpm) to 84 fpm. These data indicated that the aircraft bounced. The pilot might have not realized the bounce, as the runway upslope condition may have restored the aircraft's attitude.

A negative g was recorded in the NormAc parameter (-0.21 g), indicating that the aircraft had experienced an upward force and suggesting that the aircraft may have contacted the ground, leading to a sudden upward direction. This sudden upward direction might have created a nose wheel pothole. The pothole that was discovered about 130 meters by the onsite investigation was consistence with the calculated distance traveled using the latitude and longitude of Garmin G1000 flight data logging, which was about 136 meters.

As the runway slope continued, negative g values of -0.45 g and followed by -0.6 g, may indicate that the aircraft experienced another upward force. The fragment of the nose landing gear spring (drag link spring) and a broken bolt were found within this distance, indicating that such a force damaged those components.

Subsequently, the aircraft veered to the right as indicated by the change in heading and a positive roll attitude, while eventually out of the runway and stopping after colliding with a rock. Considering there was no scratch on the runway, it might indicate that the nose landing gear was still intact during the veering to the right and broken after colliding with the large rock.

The upsloping runway might create a visual illusion that makes the runway appear higher than its actual elevation. This illusion likely resulted in a mis-assessment of height when approaching the upsloping runway. This misassessment may contribute to a nose low attitude at initial touchdown.

Compared with the landing profile in Balinggama Airstrip, where the pilot used a high pitch angle on an upslope runway condition. Even though the NormAc was recoded between 0.23 g and 0.27 g (which was considered a high g load), it did not lead to deformation of the landing gear system, as the combination of the high pitch attitude, low aircraft speed during landing, and the benefit of an upslope runway condition recovered the condition of the aircraft.

2.2 Operational Guidance

Dimonim Air Operation Manual Part A (OM – Part A) Chapter 5.3 and 10.7 described the requirement for a pilot to have adequate experience and knowledge of the aerodrome to be flown. The OM-A also stated that the information on the aerodrome to be flown was described in the AIP, Jeppesen Airway Manual, VFR Route Guidance, and Operation Manual Part C (OM-C). However, the mentioned documents did not provide information about Yabi.

The pilot relied on an aerodrome chart from another operator that was not part of the company's official documents. This chart contained incorrect information about Yabi, including aerodrome elevation and runway slope. The actual aerodrome elevation was higher than the information provided in the aerodrome chart. The touchdown zone slope was 13%, while the chart showed there was no slope at the touchdown zone. Incorrect airport information increases the risk of misjudgments and operational errors.

3 CONCLUSION

3.1 Findings

The 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.

In this occurrence, the KNKT identified several findings as follows:

1. The aircraft had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
2. Both PIC and SIC held valid Commercial Pilot License (CPL) and qualified as a single engine land aircraft pilot. The pilots also had valid first-class medical certificate without any medical limitation.
3. The mass and the center of gravity (c.g) of the aircraft were within the prescribed limits.
4. Before departure, the pilot performed walk around check, and there was no evidence of airframe failure or system malfunction prior to the occurrence.
5. The flight was the first flight of the day and conducted under Visual Flight Rules (VFR).
6. During the flight, the PIC acted as Pilot Flying (PF), and the SIC acted as Pilot Monitoring (PM).
7. Touch down mark was found 102 meters from the beginning of the runway, and the nose wheel pothole mark was identified at a distance of 234 meters. The aircraft came to a stop approximately 330 meters from the beginning of the runway, at the right side of the runway, after executing a right turn, colliding with a large rock which led to the disassembly of the propeller from the engine power drive.
8. The aircraft was substantially damaged, but there were no injuries to persons as a result of this occurrence.
9. There was no evidence of in-flight or post-impact fire.
10. The nose landing gear collapsed. A fragment of the nose landing gear spring was discovered 271 meters from the beginning of the runway, and the bolt used for the nose gear spring attachment was found 14 meters further along from that point. Scattered fragments of the reduction gear box were found along the trail as the aircraft made a right turn before stopped.
11. The aircraft's recorded vertical speed at touchdown spiked reaching 21 ft/s, exceeding typical landing gear design tolerances.
12. During the time of occurrence, the weather was clear with visibility of 10 km, and the wind was calm.

13. The satellite weather images at 0730 LT and 0830 LT around the accident area indicated the presence of high clouds, and it was dominated by clear clouds.
14. The aircraft was equipped with Global Positioning System (GPS), which has capability of flight navigation and flight data logging. The GPS logging data was stored on a Secure Digital (SD) data card, and it contained flight data logging for the accident flight.
15. The Dimonim Air developed Operation Manual Part C (OM-C) for internal use which provides area, route, and aerodrome information in Papua and Bali Area. However, the latest revision of this documentdid not provide information of Yabi and guidance for Dekai to Yabi flight.
16. Yabi airstrip is 440-meter runway, featuring a 15% upslope and a soft gravel-and-grass surface.
17. The Yabi aerodrome chart held by the pilot shown that the runway designation number was 10/28 and the touch down zone elevation at 6,800 feet. The KNKT investigation identified that the runway heading was on 08/26 direction and the touch down zone was at 7,300 feet.

3.2 Contributing Factors

Contributing factors is defined as actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident.

The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability. The presentation of the contributing factors is based on chronological order and does not show the degree of contribution.

The KNKT concluded that the contributing factors are

- Visual illusion, which made the runway appear higher than its actual elevation likely resulted in a mis-assessment of height when approaching the upsloping runway, resulting in improper flare-out attitude, and contributing to nose low attitude at initial touchdown.
- Nose-low attitude landing, which contributed to structural failure of the nose landing gear while the aircraft veered to the right, resulting in a runway excursion.

4 SAFETY ACTION

At the time of issuing this investigation report, the KNKT had not been informed of any safety actions resulting from this occurrence.

5 SAFETY RECOMMENDATIONS

The safety recommendation in this investigation report is made with the intention of preventing accidents or incidents and in no case has the purpose of creating a presumption of blame or liability for an accident or incident.

Note: The following safety recommendations are proposed safety recommendations which could be changed or deleted if the factual information is changed during the consultation process of the draft report.

5.1 Dimonim Air

On 28 August 2023, KNKT issued the following safety recommendations to Dimonim Air operator as follow:

- **04.O-2023-5.01**

  The Dimonim Air developed Operation Manual Part C (OM-C) for internal use which provides area, route, and aerodrome information in Papua and Bali Area. The document includes airport, terrain, weather, route details and any other relevant information deemed useful for the flight operation in the local area. However, the latest revision of this document did not provide information related to Yabi. In the other hand, Yabi aerodrome chart in the possession of the pilot indicated a runway designation number of 10/28 and the touch down zone elevation was 6,800 feet. During the KNKT investigation, it was discovered that the correct runway heading was in 08/26 direction and the touch down zone was at 7,300 feet.

  The absence of company document which provide correct information of the area, route and aerodrome poses a significant concern, as it hinders the assurance that pilots to have necessary information when conducting flight operations in specific areas.

  Therefore, KNKT recommends the Dimonim Air ensures the provision of adequate and precise references to pilots, including all relevant information regarding Yabi airstrip and guidance for Dekai to Yabi operation to enhance flight safety and operational efficiency.

At the time of issuing this report, no response to these safety recommendations was received. Therefore, KNKT encourage Dimonim Air to response KNKT safety recommendation number 04.O-2023-5.01.

- **04.O-2025-5.02**

  KNKT investigation identified that the aircraft was landing with insufficient pitch attitude relative to the steep runway slope. This condition resulting in a nose-low attitude at the moment of touchdown, likely led to the failure of the nose gear and subsequent runway excursion. The investigation did not find any guidance materials related to upslope landing technique. The absence of guidance materials may contributed to the improper handling.

  Therefore, KNKT recommends Dimonim Air ensure that the pilots are familiar with visual illusion during landing approach to improve situational awareness and ensure safer operations into remote and terrain-challenged locations.

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