KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

PRELIMINARY

KNKT.22.06.07.04

Aircraft Accident Investigation Report

PT. ASI Pudjiastuti (Susi Air)

PC-6/B2-H4; PK-BVM

About 2 Nm North of Duma Airstrip, Papua

Republic of Indonesia

23 June 2022

2022

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

The report is based upon the investigation carried out 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).

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

Readers are advised that the KNKT investigates for the sole purpose of enhancing aviation safety. Consequently, the KNKT reports are confined to matters of safety significance and may be misleading if used for any other purpose.

As the KNKT believes that safety information is of greatest value if it is passed on for the use of others, readers are encouraged to copy or reprint for further distribution, acknowledging the KNKT as the source.

When the KNKT makes recommendations as a result of its investigations or research, safety is its primary consideration.

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

Readers should note that the information in KNKT reports, and recommendations is provided to promote aviation safety. In no case is it intended to imply blame or liability.

Jakarta, 26 August 2022

KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

TABLE OF CONTENTS

TABLE OF FIGURES

ABBREVIATIONS AND DEFINITIONS

ACL	:	Authorization, Condition and Limitations
AIP	:	Aeronautical Information Publication
AOC	:	Air Operator Certificate
ARB	:	Area Reference Booklet
ARO	:	Air Traffic Services Reporting Office
BMKG	:	Badan Meteorologi Klimatologi dan Geofisika
BNPP	:	Badan Nasional Pencarian dan Pertolongan
CASR	:	Civil Aviation Safety Regulation
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CPL	:	Commercial Pilot License
DAAO	:	Directorate of Airworthiness and Aircraft Operation
DGCA	:	Directorate General of Civil Aviation
ELT	:	Emergency Locator Transmitter
ETA	:	Estimate Time of Arrival
GPS	:	Global Positioning System
ICAO	:	International Civil Aviation Organization
LT	:	Local Time
MFD	:	Multi-Function Display
NTSB	:	National Transportation Safety Board
OM-A	:	Operations Manual Part A
OM-C	:	Operation Manual Part C
SD	:	Secure Digital
TIBA	:	Traffic Information Broadcast
TSB	:	Transportation Safety Board of Canada
STSB	:	Swiss Transportation Safety Investigation Board
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency

SYNOPSIS

On 23 June 2022, a Pilatus PC-6/B2-H4 aircraft, registered PK-BVM was being operated by PT ASI Pudjiastuti Air (Susi Air), on an unscheduled passenger flight. The aircraft was operated in single pilot operation and the flight plans of the flight filed at the Air Traffic Services Reporting Office (ARO) stated that the flight would be conducted in accordance with Visual Flight Rules (VFR).

At 2034 UTC (0534 LT), on a dawn condition about 25 minutes before sunrise, the aircraft departed Timika with intended destination of Duma. On board the aircraft was one pilot and six passengers. The flight was approved by the Timika air traffic controller (the controller) to climb to altitude of 8,000 feet and to fly on Radial 330° of TMK VOR/DME.

During the flight, the pilot advised the air traffic controller that the ETA at Duma was 2049 UTC (0549 LT). The pilot also requested to fly at cruising altitude of 4,500 feet to the controller and was approved.

At 0544 LT, when the aircraft position was about 15 Nm from TMK VOR/DME, the pilot reported to the controller that the aircraft was entering Duma valley.

Based on the flight following system installed in the aircraft, at 0552 LT, the data recorded that the aircraft was about 1 Nm southwest of Duma (on bearing 238° from Duma) with altitude about 4,500 feet.

Local people who were waiting the aircraft at Duma witnessed the aircraft was flying about the same level of the airstrip elevation from Timika direction to the North direction without any indication that the aircraft would turn to land to the airstrip.

The local people in the near village witnessed the aircraft was flying low and impacted to a tree with height about 30 meters, then crashed. The aircraft was found about 3 Nm, North direction of Duma on elevation about 5,400 feet.

The investigation involved participation of the Swiss Transportation Safety Investigation Board (STSB) as the State of Aircraft Design and Manufacture; Transportation Safety Board of Canada (TSB) as the State of Engine Design and Manufacture; National Transportation Safety Board (NTSB) of United States of America as the State providing assistance. The agency has appointed accredited representatives to assist the investigation in accordance with the provisions in International Civil Aviation Organization (ICAO) Annex 13.

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

The investigation is continuing, 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 FACTUAL INFORMATION

1.1 History of the Flight

On 23 June 2022, a Pilatus PC-6/B2-H4 aircraft, registered PK-BVM was being operated by PT ASI Pudjiastuti Air (Susi Air), on a unscheduled passenger flight. The aircraft was operated in single pilot operation. The flight planned of the day for the aircraft and the pilot were from Timika[1] – Duma[2] – Timika – Kilmit[3] – Timika – Paro[4] – Timika – Jila[5] – Timika. The flight plans of those flights were filed at the Air Traffic Services Reporting Office (ARO) and stated that the flight would be conducted in accordance with Visual Flight Rules (VFR).

At 2034 UTC (0534 LT[6]), on a dawn condition about 25 minutes before sunrise, the aircraft departed Timika with intended destination of Duma. On board the aircraft was one pilot and six passengers. The flight was approved by the Timika air traffic controller (the controller) to climb to altitude of 8,000 feet and to fly on Radial 330° of TMK VOR/DME.

After the aircraft was airborne, the controller instructed the pilot to report when the aircraft position was at 25 Nm from TMK VOR/DME and requested the estimate time of arrival (ETA) at Duma. The pilot read back the instruction and advised the controller that the ETA at Duma was 2049 UTC (0549 LT).

At 0540 LT, the pilot requested a clearance to fly at cruising altitude of 4,500 feet to the controller and was approved.

At 0544 LT, when the aircraft position was about 15 Nm from TMK VOR/DME, the pilot reported to the controller that the aircraft was entering Duma valley. The controller acknowledged the pilot report and instructed the pilot to monitor Traffic Information Broadcast by Aircraft (TIBA) radio frequency. This was the last communication of the pilot to the controller.

Based on the flight following system installed in the aircraft, at 0552 LT, the data recorded that the aircraft was about 1 Nm southwest of Duma (on bearing 238° from Duma) with altitude about 4,500 feet.

Local people who were waiting the aircraft at Duma witnessed the aircraft was flying about the same level of the airstrip elevation from Timika direction to the North direction without any indication that the aircraft would turn to land to the airstrip.

At 0600 LT, head quarter of *Badan Nasional Pencarian dan Pertolongan* (National Search and Rescue Agency of Indonesia) in Jakarta, received Emergency Locator Transmitter (ELT) signal of the PK-BVM aircraft. The activation of the ELT signal was forwarded to the National Search and Rescue Agency at Timika office.

[1] Timika in this report is referred to Mozes Kilangin Airport, Timika (WAYY), Papua.
[2] Duma in this report is referred to Duma Airstrip (WABE), Papua.
[3] Kilmit in this report is referred to Kilmit Airstrip (WAYF), Papua.
[4] Paro in this report is referred to Paro Airstrip (WAYQ), Papua.
[5] Jila in this report is referred to Jila Airstrip (WAYJ), Papua.
[6] The 24-hours clock in Local Time (LT) is used in this report to describe the local time as specific events occurred. Local time is Universal Time Coordinated (UTC)+8 hours. The date for the UTC time is 22 June 2022.

At 0609 LT, the flight following system recorded an "inactive" status of the aircraft, which means that the system did not receive any data from the aircraft for a pre-determined period of time.

The Susi Air Operations Control personnel asked one of Susi Air pilot that was flying with PK-BVZ on a flight from Ilaga[7] to Nabire[8] to fly over Duma. About 0900 LT, PK-BVZ pilot advised to the controller that the PK-BVM crashed about 3 Nm North direction of Duma.

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	0	0	0	0
Serious	1	5	6	0
Minor	0	1	1	Not applicable
None	0	0	0	Not applicable
TOTAL	1	6	7	0

The injured flight crew is South African while the other passengers are Indonesian.

1.3 Damage to Aircraft

The aircraft was substantially damaged.

1.4 Other Damage

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

1.5 Personnel Information

The pilot is South African who held valid Commercial Pilot License (CPL) and qualified as single engine land aircraft pilot. The pilot also held valid First-Class medical certificate without any medical limitation.

The pilot had total flying hour of 1,986.7 hours, included 624.8 hours on PC-6/B2-H4 aircraft. At the day of the occurrence, the pilot had flown about 30 minutes prior to the occurrence.

Based on the pilot license, the last proficiency check for the pilot was conducted on 25 February 2022.

On 2 until 7 May 2022, the pilot conducted route familiarization on Timika area supervised by an experienced captain pilot prior to be released to fly on that area. During the route familiarization, the pilot flew from Timika to Duma on 5 May 2022, and this was the first flight of the pilot to Duma.

After being released to fly on Timika area, the pilot had flown from Timika to Duma for five times, including the accident flight. The last flight of the pilot to Duma prior to the occurrence was on 16 June 2022.

[7] Ilaga airport located about 50 Nm from Timika on radial 053° or about 45 Nm from Duma on radial 085°.
[8] Nabire is Douw Aturure Airport located on the north coastline about 110 Nm from Timika on radial 310°

After the accident, the pilot was unable to recall the whole accident flight sequence. The pilot only recalled that after the aircraft taking off from Timika, the pilot requested a clearance to fly at cruising altitude of 4,500 feet to the controller. The next pilot recollection was the evacuation process from the aircraft.

1.6 Aircraft Information

1.6.1 General

The PC-6/B2-H4 aircraft with serial number of 975, was manufactured by Pilatus Aircraft Limited, a Switzerland aircraft manufacturer in 2010. The aircraft registered PK-BVM and had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

The aircraft had total hour since new of 5,224.7 hours and total cycles since new 9,915 cycles. The engine installed on the aircraft was PT6A-27, manufactured by Pratt & Whitney, Canada with serial number of PCE-PG0421. The total time of the engine since new was 4,946.5 hours.

Prior to the departure, the pilot conducted preflight check of the aircraft included checking the maintenance record. There was no record or report of aircraft system nor engine malfunction.

1.6.2 Global Positioning System

The aircraft was equipped with Garmin G950 Global Positioning System (GPS), which has capability of flight navigation and flight data logging. The logging data capable to record several parameters including time, coordinate, GPS altitude, indicated airspeed, vertical speed, ground speed, pitch attitude angle and roll attitude angle. All these recorded parameters are stored on a Secure Digital (SD) data card which inserts into the top card slot of the Multi-Function Display (MFD). The navigation data stores on a SD card which inserts into the bottom card slot of the MFD.

At the accident site, the investigation found the SD data card inserted into the bottom card slot of the MFD which contained navigation data and did not find the SD card of the flight data logging for the accident flight.

1.7 Meteorological Information

Meteorological information provider was not available at Duma, and pilot relied on their visual observation or other pilot observation report.

Passengers on board the aircraft during the accident flight recalled that the weather along the flight was clear including at the area around Duma. Local people from a village near the accident site also described the weather during the accident was clear.

The *Badan Meteorologi Klimatologi dan Geofisika*/BMKG (Bureau of Meteorology, Climatology and Geophysics of Indonesia) provided satellite weather image at 2030 UTC (0530 LT) and 2100 UTC (0600 LT). The satellite images did not indicate any development of clouds surrounding the flight route including the accident site (see figure 1).

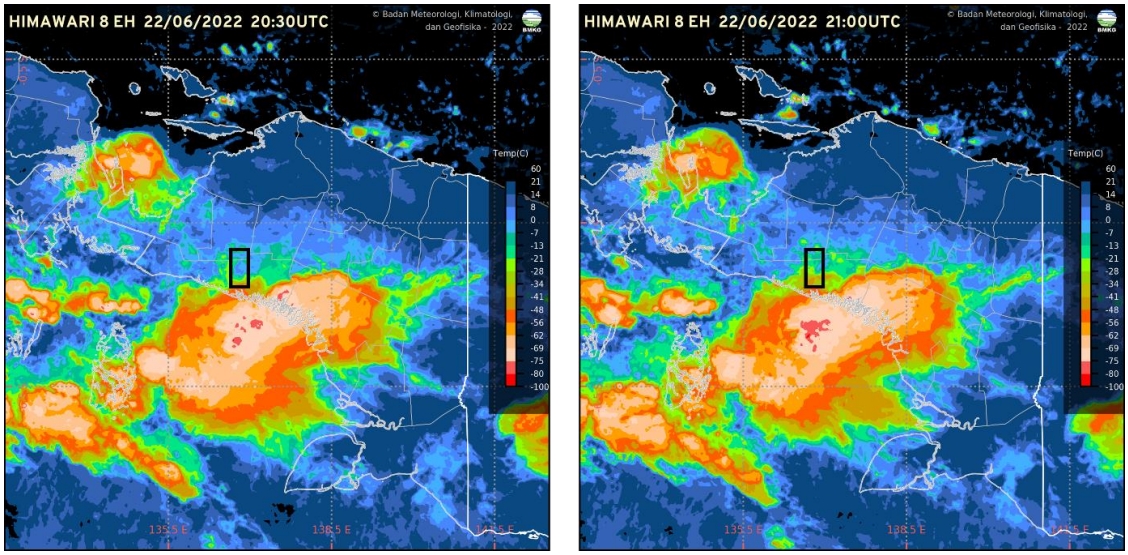

Figure 1: The satellite image of area near flight route and accident site (inside the black square, annotated by KNKT)

The superimposed of the aircraft flight following data to the weather radar image at 2052 UTC (0552 LT)[9] provided by the BMKG, indicated that the radar intensity level along the flight route, last recorded position and the accident site, at the height of about 1,400 meters (4,500 feet) was more than 25 dBz[10]. This means that the area did not indicate any significant development of clouds and the estimated visibility was more than 10 km[11].

[9] This time was the last recorded of the aircraft position in the flight following system.

[10] Decibel relative to Z. It is a logarithmic dimensionless technical unit used in radar, mostly in weather radar, to compare the equivalent reflectivity factor (Z) of a remote object (in mm6 per m3) to the return of a droplet of rain with a diameter of 1 mm (1 mm6 per m3).

[11] The visibility was calculated based on the value of the reflectivity compared with the table of international visibility for weather conditions and precipitation for rain conditions described in the article Sharma and Kaur (2012). The article can be found in the following link: https://www.researchgate.net/publication/258652491_Degradation_Measures_in_Free_Space_Optical_Communication_FSO_and_its_Mitigation_Techniques_-_A_Review

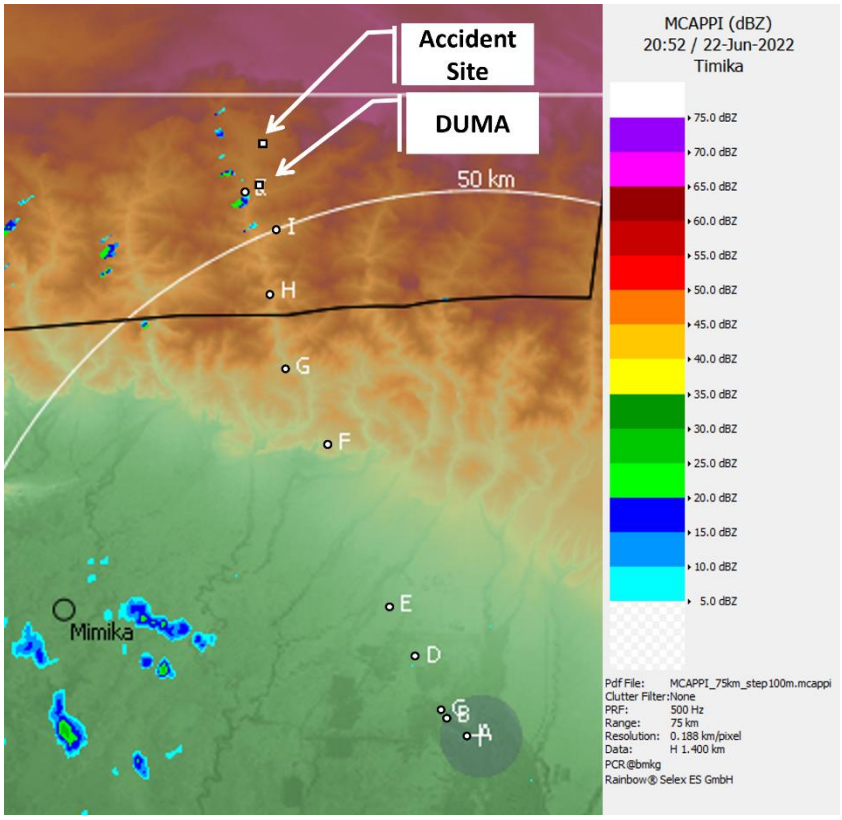

Figure 2: The superimposed flight following data (dot with alphabet notation) with BMKG weather radar image at 2052 UTC (0552 LT)

1.8 Aids to Navigation

No ground-based navigation aids were available at Duma.

The aircraft was fitted with GPS Garmin G950 which can provide navigation data. The GPS allows the pilot to create, edit and store up several flight plans with and waypoints on each flight plan. The GPS can use direct point-to-point navigation to provide guidance from a certain point or position to another point on the flight plan.

The Susi Air developed Area Reference Booklet (ARB) for internal use which included a route guidance to fly on certain route. The ARB for Papua did not include guidance for Timika to Duma flight.

Based on the best practice among pilots within the company, pilots would use a stored GPS flight plan as reference to navigate the aircraft to Duma. The GPS flight plan for Timika to Duma consisted of several GPS waypoints points as illustrated in the figure 3. The location of Duma was included as a waypoint in the aircraft GPS (noted as DUM) and had not been included as an aerodrome in the navigation database. All the coordinate used in the GPS flight plan for Timika to Duma was not included in any company documents.

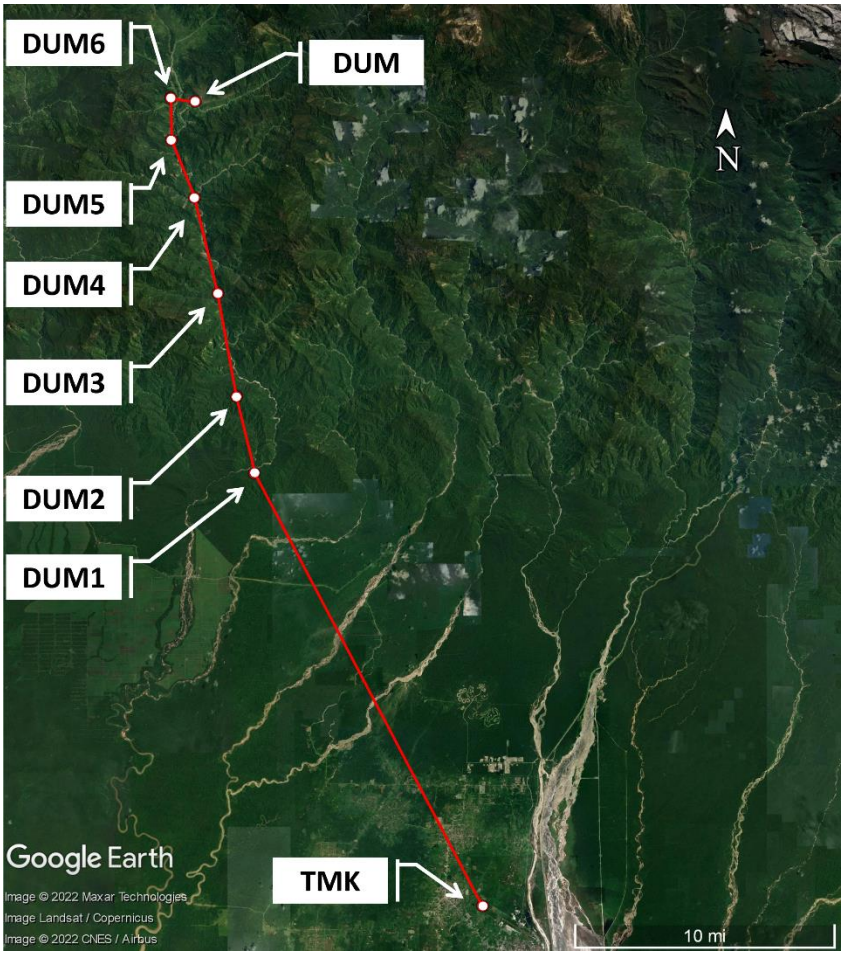

Figure 3: The GPS flight plan of Timika to Duma flight

1.9 Communications

All communications between Timika air traffic controller and the pilot were recorded by ground based automatic voice recording equipment.

The aircraft was equipped with three very high frequency (VHF) radio communication systems. The pilot used the VHF radios for routine communication with air traffic control and when broadcasting message in the Traffic Information Broadcast by Aircraft (TIBA) frequency. At the day of the accident, the VHF radios were serviceable.

1.10 Aerodrome Information

Duma was located on mountainous area on coordinate 04°04.41’ S 136°42.73’ E with elevation of 4,400 feet. The runway surface was grass with designation number of 08 – 26, the runway dimension was 320 meters length and 25 meters width.

Figure 4: The surrounding area of the airstrip as seen from the final area of Runway 08

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 aviation regulations.

1.12 Wreckage and Impact Information

The aircraft was found about 3 Nm, North direction of Duma on coordinate 4° 2'26.08" S 136°42'56.76" E. The elevation of the accident site was about 5,400 feet.

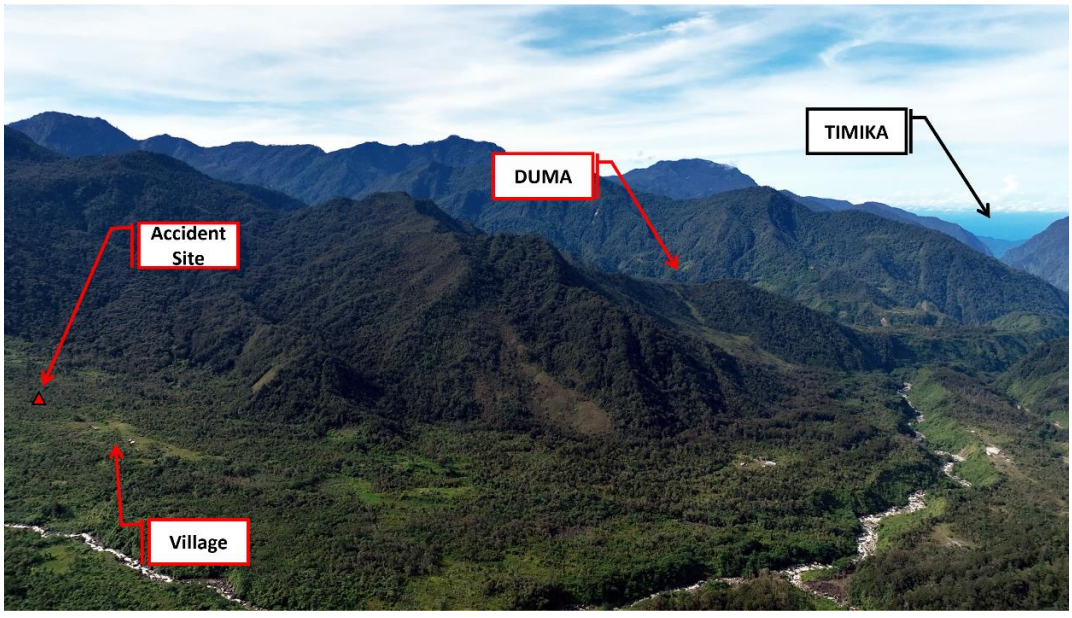

Figure 5: The accident site location

The accident site was close to a village which located about 500 meters in Southwest direction. Local people witnessed the aircraft was flying low in Northeast direction and impacted a tree with height about 30 meters (named as Tree 1 in this report).

The impacted Tree 1 was the highest tree in that area. An impact mark also found on a tree about 125 meters on 054° direction from the impacted Tree 1. This second impact mark named as Tree 2 in this report. The third impact mark was found on a tree (named as Tree 3) which located on 031° direction and 121 meters from the Tree 2. The aircraft was found on 32 meters on 318° direction from Tree 3 (see figure 6 and 7).

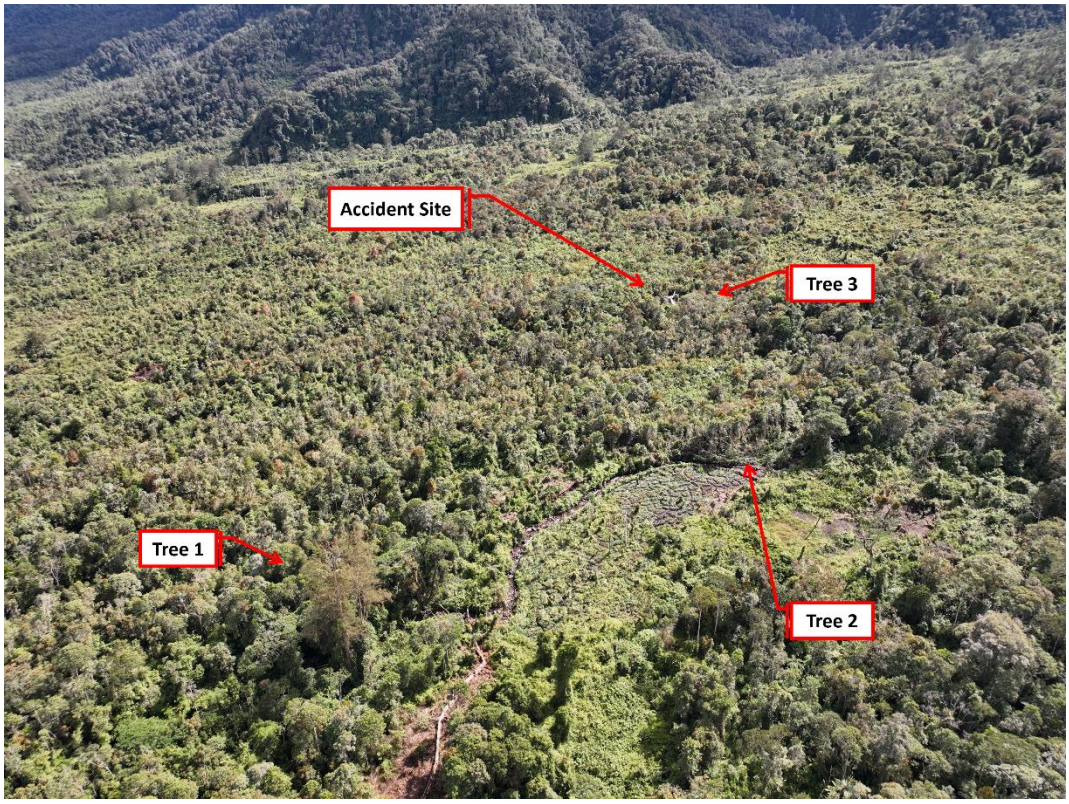

Figure 6: The impacted trees

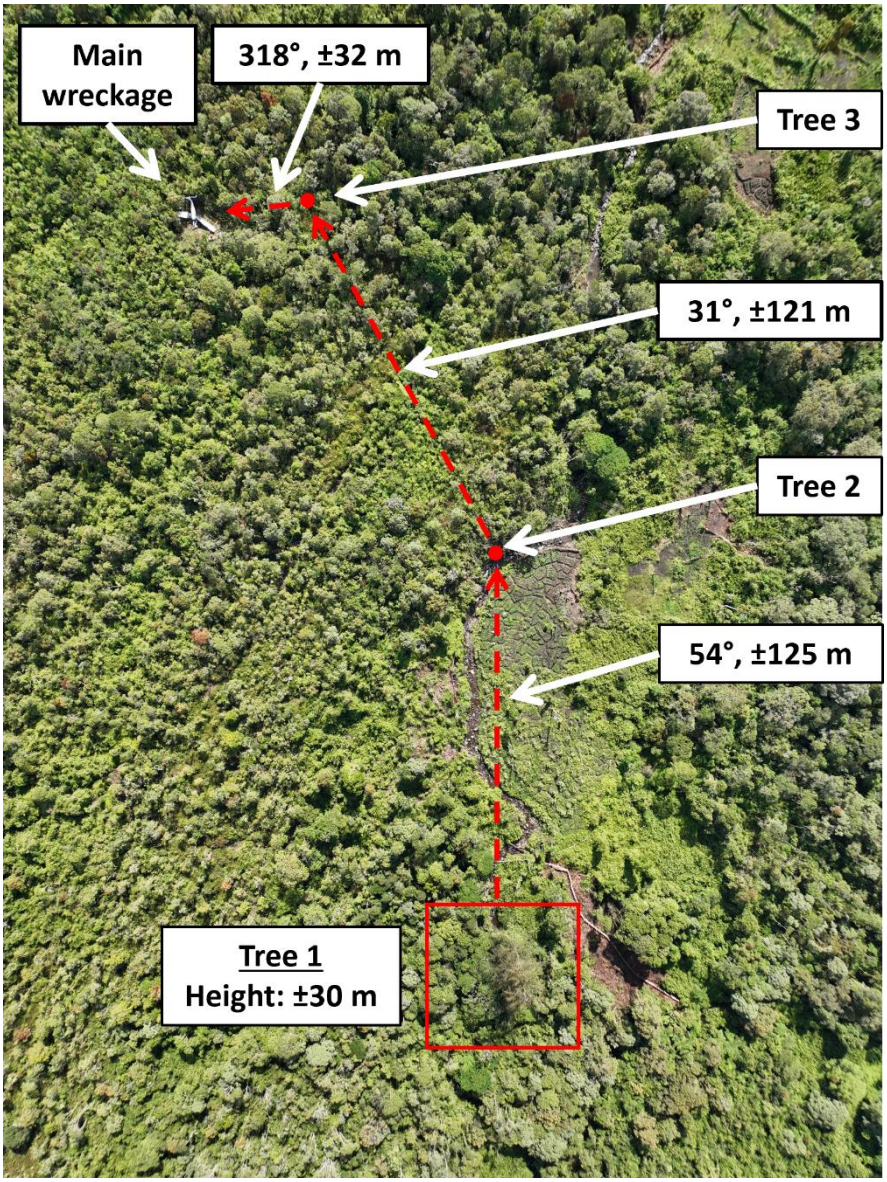

Figure 7: Detailed of the accident site location

The wreckage examination[12] identified several information as follows:

- Marks of fuel spills were found at the accident site.
- Main wreckage was on a heading of 220 degrees.
- Nose section was broken.
- The propeller blades were found damaged, the blade angle was in feather position, and the Propeller Control Lever was in MAX FINE position.
- The Idle Control Lever was in low idle position.
- The Power Lever was close to reverse position.
- Left wind shield was broken.

[12] The wreckage examination was conducted three days after the accident. On the day of the accident the pilot was evacuated from the cockpit by local people which may disturbed the cockpit condition and there was no documentation of the actual cockpit condition prior the evacuation.

- Left and right wings were detached from its wing root, and the leading edge of both wings were damaged.

Figure 8: The wreckage condition from above

Figure 9: The damaged nose section of the aircraft

Figure 10: The damaged wings

1.13 Medical and Pathological Information

Medical and pathological information were not available at the time of the issuance of this report. Should any medical and/or pathological information be obtained during this investigation that is relevance to this investigation, it will be included in the final report.

1.14 Fire

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

1.15 Survival Aspects

At 0600 LT, head quarter of *Badan Nasional Pencarian dan Pertolongan* (National Search and Rescue Agency of Indonesia) in Jakarta, received Emergency Locator Transmitter (ELT) signal of the PK-BVM aircraft. The activation of the ELT signal was forwarded to the National Search and Rescue Agency at Timika office.

After the aircraft crashed, some local people went to the crash site and evacuated the occupants to their village. Considering that there was no communication means available, some local people waited at the accident site assuming that there would be an aircraft searching the accident aircraft.

At 0609 LT, the flight following system of the aircraft recorded an "inactive" status. About 30 minutes later, the Susi Air Operations Control personnel contacted the Susi Air Base Coordinator at Timika asking the status of the PK-BVM flight and was suspected that the aircraft encountered a bad weather condition.

About 0650 LT, the Susi Air Operations Control personnel contacted the Timika air traffic controller (the controller) and was advised that the last communication with PK-BVM pilot was about 0544 LT, when the aircraft entered Duma valley. The controller then contacted the Indonesia Air Force staff in Timika asking whether the air force has personnel at Duma and advised the uncertainty condition of the PK-BVM flight. The controller also asked several representatives from aerodrome near Duma whether PK-BVM diverted to their aerodrome and asked other pilot who flew near Duma to contact the aircraft.

About 0703 LT, the aircraft operator Operations Control personnel called the aircraft using the flight following system several times, and no response. The aircraft operator Operations Control personnel contacted again the controller and no update for the PK-BVM flight.

About 0754 LT, the National Search and Rescue Agency advised the Susi Air Operations Control personnel that they received PK-BVM ELT signal. Thereafter, one of Susi Air aircraft which would conduct flight from Ilaga to Nabire was instructed to fly over Duma searching for the PK-BVM aircraft.

About 0900 LT, PK-BVZ pilot found local people raised flag to show the location of the PK-BVM aircraft. The PK-BVZ pilot then advised the controller that the aircraft crashed about 3 Nm North direction of Duma. The rescue mission initiated, in coordination between National Search and Rescue Agency, air force and the aircraft operator.

An air force helicopter (Eurocopter EC725/Airbus Helicopters H225M) was utilized to conduct the evacuation, and at 1116 LT, the helicopter departed from Timika. The helicopter landed at an open area near the local people village. All injured occupants then evacuated to Timika.

At 1203 LT, the helicopter landed at Timika and all injured occupants transported to the nearest hospital for further treatment.

1.16 Tests and Research

Test and research information were not available at the time of the issuance of this report. Should any test and research information be obtained during this investigation that is relevance to this investigation, it will be included in the final report.

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

The aircraft was operated by PT. ASI Pudjiastuti Aviation (Susi Air) which had valid Air Operator Certificate (AOC) number 135-028. The Susi Air is authorized to conduct air transportation carrying passenger and cargo in scheduled and non-scheduled operation within and outside Indonesia for aircraft operations under Civil Aviation Safety Regulation (CASR) Part 135.

The Susi Air developed operation manuals (OM)s which contains Susi Air policies and procedures that had been approved by the Directorate General of Civil Aviation (DGCA).

1.17.1.1 Aeronautical Information Provided to Pilot

According to the Authorization, Condition and Limitations (ACL) issued by the DGCA, described that the Susi Air was approved to use several airport aeronautical data sources including the Aeronautical Information Publication (AIP) and company area reference booklet.

The Operation Manual Part C (OM-C) which provides area, route and aerodrome information described that the Susi Air primarily uses Area Reference Booklets (ARB) issued by the company. The ARB provides the pilot with information of the local areas of flight, including reference to common routes, flight altitudes, airport and runway details and any other relevant information deemed useful or suitable for the flight operations. The ARB issued by the aircraft operator did not provide any information for flight to Duma.

1.17.1.2 Area, Route and Aerodrome Analysis

The Operations Manual Part A (OM-A) chapter 14.17 required Susi Air to conduct an analysis prior to starting operation on any route or to any aerodrome. The procedure was as follows:

> *Prior to starting operations on any route or to any airport, a thorough analysis must be completed and DGCA approval obtained. The analysis includes, but is not limited to:*
>
> - *Determination of Minimum Safe Altitude (all phases of flight)/terrain clearance;*
> - *Check that sufficient nav-aids are available along for navigating the aircraft along the route and to any airport to be used (including alternates) with the required degree of accuracy;*
> - *Check that sufficient communication two-way air/ground radio communication system is available to ensure reliable and rapid communications over the entire route between the aircraft and the appropriate air traffic control units;*
> - *Runway infrastructure (width, length, declared distances, pavement strength, lightning);*
> - *Analysis of airport infrastructure (nav-aids, ATC, Rescue & Fire Fighting, lightning, type of instrument approach) and of available servicing and maintenance facilities;*
> - *Check for any airport particular operating conditions (curfew, prior permission required, etc.);*
> - *Determination of Aerodrome Operating Minima;*
> - *Determination of the airport category (A/B/C);*
> - *Performance analysis for takeoff, en-route, landing, including critical engine inoperative operations and depressurization over critical areas, etc.*

Until the day of the accident, Susi Air had conducted flight operation to Duma for more than five years. The investigation had not received any document indicating a thorough analysis for the flight operation prior to starting the flight operation to Duma.

1.17.2 Civil Aviation Authority

Civil aviation in Indonesia is regulated and oversighted by Directorate General of Civil Aviation (DGCA) under the Ministry of Transportation.

The DGCA has several directorates including the Directorate of Airworthiness and Aircraft Operation (DAAO) that responsible in formulating regulations including supervision of aircraft operation.

1.18 Additional Information

The investigation involved the participation of the following States:

- Swiss Transportation Safety Investigation Board (STSB) as the State of Aircraft Design and Manufacture.
- Transportation Safety Board of Canada (TSB) as the State of Engine Design and Manufacture.
- National Transportation Safety Board of United States of America as the State providing assistance.

The agency has appointed accredited representatives to assist the investigation in accordance with the provisions in International Civil Aviation Organization (ICAO) Annex 13.

The investigation is continuing, 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.

2 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 pilot held valid Commercial Pilot License (CPL) and qualified as a single engine land aircraft pilot. The pilot also held valid first-class medical certificates without medical limitation.
2. On 5 May 2022, during the route familiarization on Timika area, the pilot flew from Timika to Duma supervised by an experienced captain pilot, and this was the first flight of the pilot to Duma.
3. After being released to fly on Timika area, the pilot had flown from Timika to Duma for five times, including the accident flight. The last flight of the pilot to Duma prior to the occurrence was on 16 June 2022.
4. The aircraft had valid Certificate of Airworthiness (C of A) and a valid Certificate of Registration (C of R).
5. Prior to the departure, the pilot conducted preflight check of the aircraft included checking the maintenance record. There was no record or report of aircraft system nor engine malfunction.
6. The aircraft departed from Timika on a dawn condition about 25 minutes before sunrise. About six minutes after the departure, the pilot requested a clearance to fly at cruising altitude of 4,500 feet to the Timika air traffic controller and was approved.
7. Based on the flight following system installed in the aircraft, at 0552 LT, the data recorded that the aircraft was about 1 Nm southwest of Duma (on bearing 238° from Duma) with altitude about 4,500 feet.
8. Local people who were waiting the aircraft at Duma witnessed the aircraft was flying about the same level of the airstrip elevation from Timika direction up to the North direction without any indication that the aircraft would turn to land to the airstrip.
9. At 0609 LT, the flight following system recorded an “inactive” status of the aircraft, which means that the system did not receive any data from the aircraft for a pre-determined period of time.
10. Duma was located on mountainous area and no ground-based navigation aids were available.
11. Passengers on board the aircraft during the accident flight recalled that the weather along the flight was clear including at the area around Duma. Local people from a village near the accident site also described the weather during the accident was clear.

12. The satellite weather images at 2030 UTC (0530 LT) and 2100 UTC (0600 LT) did not indicate any development of clouds surrounding the flight route including the accident site.
13. The weather radar image at 2052 UTC (0552 LT), indicated that the radar intensity level along the flight route, last recorded position and the accident site, at the height of about 1,400 meters (4,500 feet) did not indicate any significant development of clouds and the estimated visibility was more than 10 km.
14. Local people from a village near the accident site witnessed the aircraft was flying low in Northeast direction and impacted a tree with height about 30 meters.
15. The aircraft was found about 3 Nm, North direction of Duma on coordinate 4° 2'26.08" S 136°42'56.76" E. The elevation of the accident site was about 5,400 feet.
16. After the accident, the pilot was unable to recall the whole accident flight sequence. The pilot only recalled that after the aircraft taking off from Timika, the pilot requested a clearance to fly at cruising altitude of 4,500 feet to the controller. The next pilot recollection was the evacuation process from the aircraft.
17. The aircraft was equipped with Global Positioning System (GPS), which has capability of flight navigation and flight data logging.
18. The GPS logging data was stored on a Secure Digital (SD) data card which inserts into the top card slot of the Multi-Function Display (MFD). The navigation data stores on a SD card which inserts into the bottom card slot of the MFD.
19. The GPS allows the pilot to create, edit and store up several flight plans with and waypoints on each flight plan. The GPS can use direct point-to-point navigation to provide guidance from a certain point or position to another point on the flight plan.
20. At the accident site, the investigation found the SD card inserted into the bottom card slot of the MFD which contained navigation data. The SD card did not contain flight data logging for the accident flight.
21. The Susi Air Operation Manual Part C (OM-C) which provides area, route and aerodrome information described that the Susi Air primarily uses Area Reference Booklets (ARB) issued by the company. The ARB for Papua did not include guidance for Timika to Duma flight.
22. The Susi Air Operations Manual Part A (OM-A) required Susi Air to conduct an analysis prior to starting operation on any route or to any aerodrome had approval from the DGCA.
23. The investigation had not received any document indicating that prior to starting the flight operation to Duma, the thorough analysis for the flight operation had not been conducted.

24. Based on the best practice among pilots within the company, pilots would use a stored GPS flight plan as reference to navigate the aircraft to Duma. The location of Duma was included as a waypoint in the aircraft GPS (noted as DUM) and had not been included as an aerodrome in the navigation database. All the coordinate used in the GPS flight plan for Timika to Duma was not included in any company documents.

3 SAFETY ACTION

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

4 SAFETY RECOMMENDATIONS

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

4.1 Susi Air

- **04.O-2022-07.01**

  The aircraft was equipped with Global Positioning System (GPS), which has capability of flight data logging. The logging data can be used as Flight Data Analysis for the safety management system and support the investigation process to enhance safety. All these recorded parameters are stored on a Secure Digital (SD) data card which inserts into the top card slot of the Multi-Function Display (MFD).

  At the accident site, the investigation did not find the SD card of the flight data logging for the accident flight. The absence of the flight data logging reduced the availability data that can be used as Flight Data Analysis for the safety management system and to support the investigation process to enhance safety.

  Therefore, KNKT recommends the Susi Air to ensure the GPS that has capability of flight data logging is able to store the flight data that can be used for the purpose of enhancing safety.

- **04.O-2022-07.02**

  According to the Susi Air Operations Manual Part A (OM-A), before conducting flight operations on any route or to any airport, a thorough analysis must be completed and DGCA approval must be obtained. The investigation had not received any document indicating that prior to starting the flight operation to Duma, the thorough analysis for the flight operation had not been conducted.

  The absence of thorough analysis of Duma flight was not in accordance with the OM-A and the hazards of the flight operation might not be unable to be identified and mitigated.

  Therefore, KNKT recommends the Susi Air to implement the thorough analysis prior to starting operations on any route or to any aerodrome in accordance with the OM-A.

- **04.O-2022-07.03**

  The Operation Manual Part C (OM-C) which provides area, route and aerodrome information described that the Susi Air primarily uses Area Reference Booklets (ARB) issued by the company. The ARB provides the pilot with information of the local areas of flight, including reference to common routes, flight altitudes, airport and runway details and any other relevant information deemed useful or suitable for the flight operations. The ARB issued by the aircraft operator did not provide any information for flight to Duma.

  Based on the best practice among pilots within the company, in order to find Duma, pilots would use the stored GPS coordinate point as reference to navigate the aircraft. All the coordinate used in the GPS for Duma flight was not included in any company documents.

  The absence of company document which provide information of the area, route and aerodrome was unable to ensure pilot have adequate information to conduct flight operation on certain area.

  Therefore, KNKT recommends the Susi Air to ensure adequate information that can be used as reference, including relevant information for flight to Duma in the ARB is provided to the pilot.

KOMITE NASIONAL KESELAMATAN TRANSPORTASI REPUBLIK INDONESIA
Jl. Medan Merdeka Timur No.5 Jakarta 10110 INDONESIA
Phone : (021) 351 7606 / 384 7601 Fax : (021) 351 7606 Call Center : 0812 12 655 155
website 1 : http://knkt.dephub.go.id/webknkt/ website 2 : http://knkt.dephub.go.id/knkt/
email : knkt@dephub.go.id