KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

PRELIMINARY

KNKT.24.03.08.04

Aircraft Accident Investigation Report

PT Smart Cakrawala Aviation

Pilatus PC-6/B2-H4; PK-SNE

Mountainous Area Near Binuang, North Kalimantan

Republic of Indonesia

8 March 2024

2024

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 Law (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

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

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Jakarta, 6 May 2024
KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AIP	:	Aeronautical Information Publication, issued by Indonesia DGCA
ALA	:	Aerodrome for Light Aircraft
AOC	:	Air Operator Certificate
ATC	:	Air Traffic Control
ATS	:	Air Traffic Service
BASARNAS	:	Badan SAR Nasional (Indonesia National Search and Rescue Agency)
BMKG	:	*Badan Meteorologi Klimatologi dan Geofisika* (Bureau of Meteorology, Climatology and Geophysics of Indonesia)
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CPL	:	Commercial Pilot License
CVDR	:	Cockpit Voice and Data Recorder
DGCA	:	Directorate General of Civil Aviation
DME	:	Distance-measuring equipment
ELT	:	Emergency Locator Transmitter
EOB	:	Engineer on Board
ETA	:	Estimated Time of Arrival
FOO	:	Flight Operation Officer
HF	:	High Frequency
IMC	:	Instrument Meteorological Conditions
kg	:	kilograms
KNKT	:	*Komite Nasional Keselamatan Transportasi*. An Independent Investigation Authority of Indonesia, also known as the National Transportation Safety Committee/NTSC)
LT	:	Local Time
Lbs	:	Pound-Mass or Pound. Lbs has been derived from a Roman word Libra; it is represented by ‘lb’ or ‘lbs’. Pound is a Latin word meaning ‘a pound by weight’. One pound is equal to 0.45359237 kg
LUT	:	Local User Terminal. It is a Cospas-Sarsat ground station to catch satellite downlink signals from the Emergency Locator Transmitter (ELT) with a frequency of 406 MHz.
MFD	:	Multi-Function Display
MHz	:	Megahertz
NM	:	Nautical Mile
OM	:	Operation Manual
ONC	:	Operation Navigation Chart
P/N	:	Part Number

PIC	:	Pilot in Command
S/N	:	Serial Number
SD	:	Secure Digital
TAWS	:	Terrain Awareness Warning System
TIBA	:	Traffic Information Broadcast by Aircraft
UTC	:	Universal Time Coordinate
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VOR	:	VHF omnidirectional range

SYNOPSIS

On 8 March 2024, a Pilatus PC-6/B2-H4 aircraft, registered PK-SNE, was being operated by PT Smart Cakrawala Aviation (Smart Aviation) on a cargo flight from Tarakan (WAQQ) to Binuang (WAQG). The flight was conducted on single pilot operation.

Based on the filed flight plan the flight would follow Visual Flight Rules (VFR), the cruising altitude would be 8,500 feet, the flight route would be directed from Tarakan to Binuang, and the fuel endurance would be sufficient for three-hour flight.

During the flight preparation, the pilot received pictures that depicted the weather over Binuang was cloudy.

At 0825 LT, in daylight conditions, the aircraft departed Tarakan. On board of the aircraft were a pilot, an aircraft engineer of Smart Aviation, and cargo with a total weight of 583 kg.

At 0854 LT, the pilot reported to the approach controller that the aircraft was over Malinau at an altitude of 8,500 feet. The approach controller then instructed PK-SNE to monitor radio communication at a frequency of 122.9 MHz. This communication was the last recorded transmission from the PK-SNE at the approach controller radio frequency.

The flight was monitored by the Flight Operation Officer (FOO) at Tarakan and Malinau using a flight following system. At 0900 LT, PK-SNE transmitted the last position report in the flight following system, which indicated that the aircraft was about 12 NM northeast of Malinau or about 35 NM southeast of Binuang.

About 1000 LT, the Malinau FOO, who had been aware that the PK-SNE did not transmit its position report in the flight following, then contacted the Binuang resident. The Binuang resident advised the Malinau FOO that the aircraft had not landed at Binuang. The Malinau FOO then contacted Malinau air traffic control, and the Tarakan FOO contacted Tarakan air traffic control. Both air traffic controllers then contacted the PK-SNE pilot several times and asked the air traffic services unit near Binuang of the PK-SNE. All attempts to locate the PK-SNE aircraft were unsuccessful, and search and rescue activities were activated.

On 9 March 2024, the aircraft was found on the ridge of the mountain at the coordinates of 3°43’29.60”N and 115°56’24.04”E, with an elevation of about 4,800 ft, 5 NM southeast of Binuang on a bearing of 305°.

At the time of issuing this Preliminary Report, KNKT had not been informed of any safety actions taken by involved parties resulting from this occurrence. The KNKT issued safety recommendations to address the safety issues identified in this report.

The investigation involved the participation of the Swiss Transportation Safety Board (STSB) of the Switzerland as the State of Design and Manufacture, the Transportation Safety Board (TSB) of the Canada as the State of Manufacture, and Bureau d’Enquêtes et d’Analyses pour la sécurité de l’aviation civile (BEA) as the State providing assistance. All agencies have appointed their accredited representatives and advisers to assist in this investigation in accordance with the provisions in ICAO Annex 13.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 8 March 2024, a Pilatus PC-6/B2-H4 aircraft, registered PK-SNE, was being operated by PT Smart Cakrawala Aviation (Smart Aviation) on a cargo and passenger flight in North Kalimantan Area, Indonesia. The flights of the day scheduled for the aircraft were Tarakan[1] – Binuang[2] – Malinau[3] – Datah Dian Airstrip (WALO) – Malinau. The flights were conducted on single pilot operation.

Based on the filed flight plan for the first flight of the day, the flight from Tarakan to Binuang would follow Visual Flight Rules (VFR), the cruising altitude would be 8,500 feet, the flight route would be directed from Tarakan to Binuang, and the fuel endurance would be sufficient for three-hour flight.

Prior to conducting the flight duty, the pilot underwent a medical examination of body temperature and blood pressure, which revealed no health problem.

During the flight preparation, the Flight Operation Officer of Smart Aviation at Tarakan (Tarakan FOO) asked the weather condition at Binuang to a Binuang resident who was hired by Smart Aviation to provide ground handling service at Binuang. The communication between them was conducted via a mobile messaging application.

At 0015 UTC (0815 LT[4]), the Binuang resident provided pictures that depicted the weather condition over the aerodrome to the Tarakan FOO. About four minutes later, the Tarakan FOO received another picture from the Binuang resident. Those pictures depicted that the weather was cloudy (see Figures 2 and 3 in Subchapter 1.7). The Tarakan FOO then forwarded the pictures to the pilot.

At 0825 LT, in daylight conditions, the aircraft departed Tarakan with the destination of Binuang. On board of the aircraft were a pilot, an aircraft engineer of Smart Aviation, and cargo with a total weight of 583 kg.

After departure, the air traffic controller of the Tarakan control tower unit (tower controller) instructed the PK-SNE to contact the air traffic controller (ATC) on Tarakan approach control unit (approach controller) and was readback by the PIC.

The pilot made initial contact with the approach controller and was instructed to report the estimated time of arrival (ETA) at Binuang. As the flight would fly over Malinau and then be directed to Binuang, the pilot reported that the ETA over Malinau would be 0855 UTC and the ETA at Binuang would be 0920 LT. The approach controller acknowledged the PIC report and instructed the PK-SNE to report when the aircraft reached cruising altitude.

At 0838 LT, the pilot reported to the approach controller that the aircraft reached the cruising altitude of 8,500 feet at the position about 22 NM on radial 280 of TRK

[1] Tarakan in this report is referred to as Juwata International Airport (WAQQ), Tarakan.
[2] Binuang in this report is referred to as Binuang Airstrip (WAQG), Binuang.
[3] Malinau in this report is referred to as Robert Atty Bessing Airport (WAQM), Malinau.
[4] The 24-hour 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.

VOR/DME[5]. The approach controller acknowledged the report and instructed PK-SNE to report when flying over Malinau.

At 0854 LT, the pilot reported to the approach controller that the aircraft was over Malinau at an altitude of 8,500 feet. The approach controller then instructed PK-SNE to monitor radio communication at a frequency of 122.9 MHz. The 122.9 MHz radio frequency was the common frequency to be used among pilots to communicate, as the aircraft would fly outside the jurisdiction of the approach controller to provide air traffic control service. This communication was the last recorded transmission from the PK-SNE at the approach controller radio frequency.

The flight was monitored by the Flight Operation Officer (FOO) at Tarakan and Malinau using a flight following system. At 0900 LT, PK-SNE transmitted the last position report in the flight following system, which indicated that the aircraft was about 12 NM northwest of Malinau or about 35 NM southeast of Binuang.

At 0906 LT, the flight data logging of the aircraft Global Positioning System (GPS) recorded the aircraft leaving barometric altitude of 8,500 feet.

At 0912 LT, the flight data logging of the aircraft GPS recorded the aircraft descending and passing barometric altitude of 5,000 feet. At this time, the vertical speed was recorded at -700 feet per minute (aircraft descending) which then the rate of descent gradually reduced.

At 0913 LT, the flight data logging of the aircraft GPS recorded the aircraft at barometric altitude of 4,200 feet with a vertical speed of -120 feet per minute (aircraft descending). The aircraft heading recorded 290°, the pitch angle was 2.2°, and the roll angle was 9.9°. This was the last data from the flight data logging of the aircraft GPS.

About 1000 LT, the Malinau FOO, who had been aware that the PK-SNE did not transmit its position report in the flight following, then contacted the Binuang resident. The Binuang resident advised the Malinau FOO that the aircraft had not landed at Binuang. The Malinau FOO then contacted Malinau air traffic control, and the Tarakan FOO contacted Tarakan air traffic control. Both air traffic controllers then contacted the PK-SNE several times and asked the Air Traffic Services unit near Binuang of the PK-SNE. All attempts to locate the PK-SNE aircraft were unsuccessful, and search and rescue activities were activated.

On 9 March 2024, the aircraft was found on the ridge of the mountain at the coordinates of 3°43’29.60”N and 115°56’24.04”E, with an elevation of about 4,800 ft, 5 NM southeast of Binuang on a bearing of 305°.

[5] TRK VOR/DME is the name of a radio beacon that combines a VHF omnidirectional range (VOR) with distance-measuring equipment (DME) which is located at Tarakan.

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	1	1	-
Serious	1	-	1	-
Minor	-	-	-	-
None	-	-	-	-
TOTAL	1	1	2	-

All the occupants were Indonesian.

1.3 Damage to Aircraft

The aircraft was destroyed.

1.4 Other Damage

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

1.5 Personnel Information

1.5.1 Pilot Information

The pilot was an Indonesian who held a valid Commercial Pilot License (CPL) and was qualified as a single-engine land aircraft pilot. The pilot also held a valid Class I medical certificate with no limitation. The last proficiency check for the pilot was conducted on 6 August 2023.

The pilot had a total flying hour of 3,348 hours 11 minutes, including 1,832 hours 16 minutes as Pilot in Command, 847 hours 12 minutes at Kalimantan Area. Among the pilot total flying hours the 328 hours 50 minutes was on Pilatus Porter PC-6 aircraft. On the last 24-hours prior to the day of the occurrence, the pilot had flown for 5 hours and 5 minutes, and in the occurrence flight, the pilot had flown for approximately 40 minutes.

1.6 Aircraft Information

1.6.1 General

The Pilatus PC-6/B2-H4, with serial number of 1017, was manufactured by Pilatus Aircraft Company, a Switzerland aircraft company, in 2017. The aircraft was registered as PK-SNE and had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

At the day of the occurrence, the aircraft was airworthy when dispatched for the flight and operated within the weight and balance envelope. During the flight, there was no record or report of an aircraft system malfunction.

The aircraft had total hours since new of 1,072 hours 42 minutes and total cycles since new of 1,404 cycles. The engine installed on the aircraft was PT6A-27, manufactured by Pratt & Whitney Canada with serial number of PCE-PG0568. The total time and cycle since new of the engine were exactly the same with the aircraft, respectively.

1.6.2 Global Positioning System

The aircraft was equipped with Garmin G950 Global Positioning System (GPS), which has the capability of flight navigation and flight data logging. The logging data can 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.

1.6.3 Flight Following System

The Smart Aviation utilized flight following system manufactured by Spider Tracks Limited, New Zealand, and the aircraft was equipped with type/model Spider 6. Smart Aviation subscribed to the flight following system for two-minute interval data reporting. The reporting parameters in the flight following system contained several data including time, coordinates, GPS aircraft altitude, ground speed, and bearing.

The Spider Tracks installed in the aircraft utilized a keypad with three different functions (Figure 1).

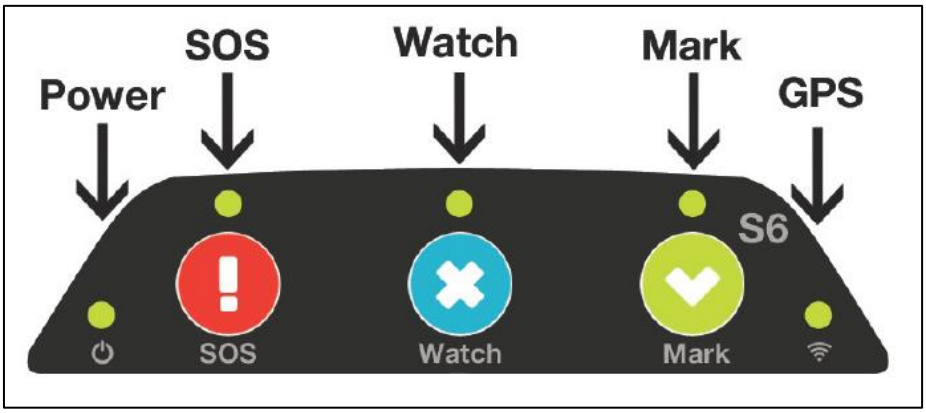


Figure 1: Spider 6 keypad

Spidertracks provides two tracking capabilities, which are passive (NORMAL mode) and active (WATCH mode). Both modes will send positional information and flight data to the monitoring system in real time, depending on the interval time subscription.

Under the NORMAL mode, the Spidertracks would report positional information and flight events in real time. However, if the aircraft encounters an emergency situation in flight, ground personnel will be alerted when the SOS button is pressed by the pilot.

The WATCH mode could be activated either manually or automatically (by speed trigger). In either case, the watch button must be pressed to disable the watch system. There is no auto-off system for the WATCH mode. In both modes, the pilot could send SOS signal by pressing the SOS button. While in WATCH mode, the SOS signal could be sent automatically to the system when the aircraft was unable to send flight data for a period of ten minutes.

The downloaded data from the flight following system did not indicate either the SOS signal was transmitted or WATCH mode was active during the accident flight.

1.7 Meteorological Information

Aviation meteorological station was not available at Binuang. The Smart Aviation relied on the visual observation of the Binuang resident and satellite images provided by the *Badan Meteorologi Klimatologi dan Geofisika* (BMKG – Bureau of Meteorology, Climatology, and Geophysics) before deciding to conduct the flight to Binuang.

Prior to departure, Binuang resident provided pictures that depicted the weather conditions over the airstrip to the Tarakan FOO and forwarded it to the PIC. The weather at the time of the occurrence was cloudy, as shown in the following figures.

Figure 2: Weather condition on Binuang (view looking to the south)

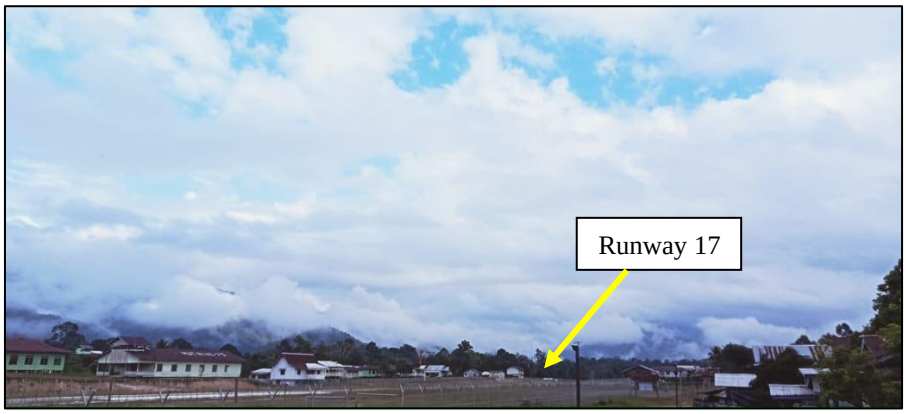


Figure 3: Weather condition on Binuang (view looking to the north)

Based on the satellite images provided by BMKG as shown on the following figures, at 0900 LT and 0930 LT, it was shown that there were stratocumulus clouds, cumulus clouds, and middle clouds around the accident site (red-highlighted).

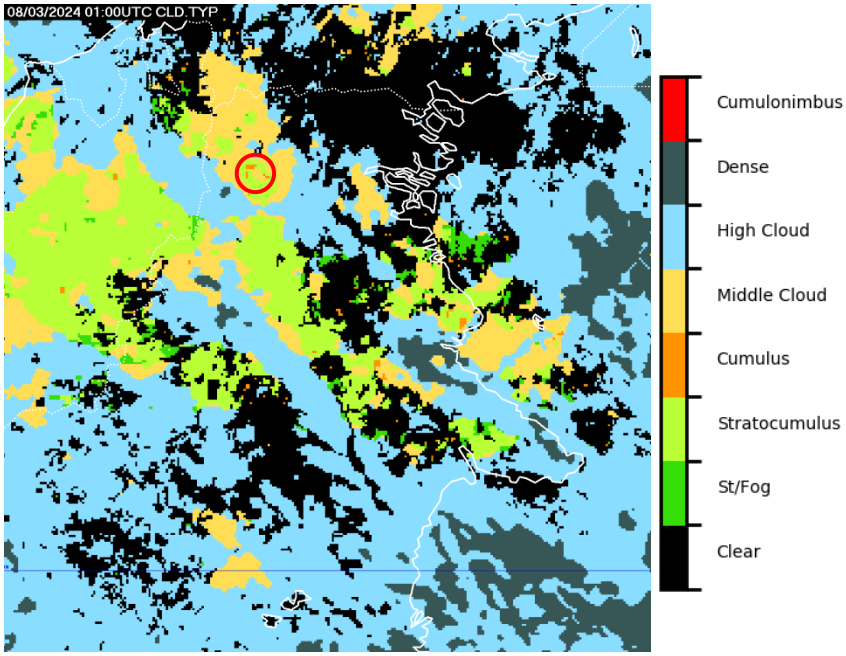


Figure 4: The satellite images to show the cloud type at 0100 UTC (0900 LT)

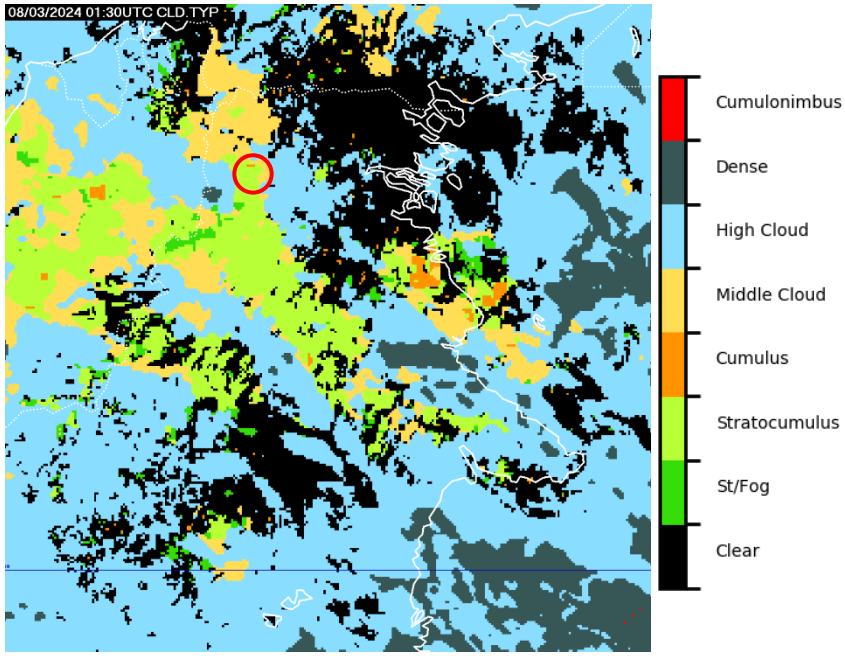
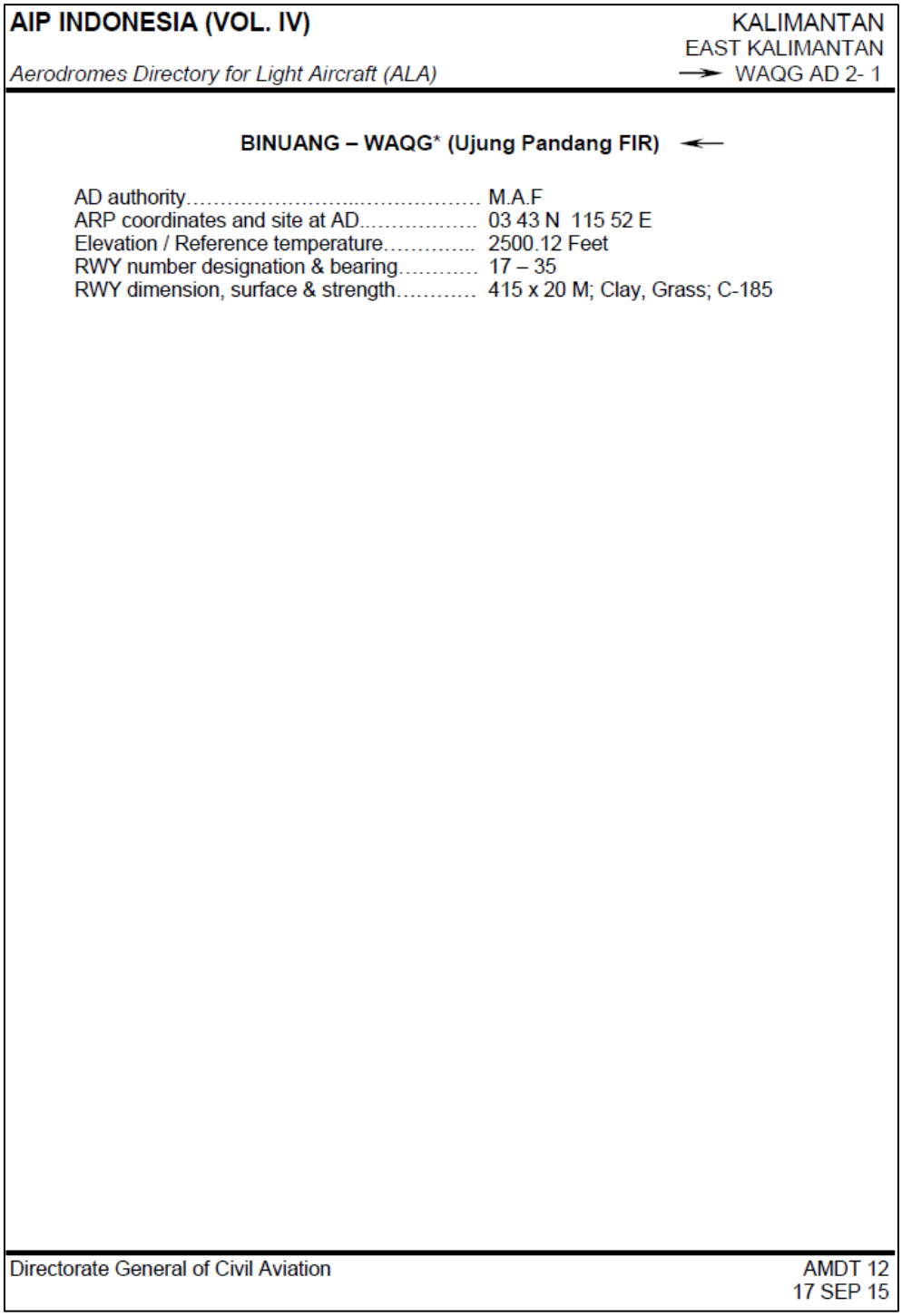


Figure 5: The satellite images to show the cloud type at 0130 UTC (0930 LT)

1.8 Aids to Navigation

A ground navigation aid was not available at Binuang. The aircraft GPS allows pilots to create, edit, and store several flight plans with 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 Binuang Airstrip was listed on the Aeronautical Information Publication (AIP) Volume IV – Aerodrome for Light Aircraft (ALA) which was issued by the Directorate General of Civil Aviation (DGCA) Indonesia. The information about Binuang on the AIP is as follows:



AIP INDONESIA (VOL. IV)

KALIMANTAN
EAST KALIMANTAN
WAQG AD 2- 1

Aerodromes Directory for Light Aircraft (ALA)

BINUANG – WAQG* (Ujung Pandang FIR)

AD authority	M.A.F
ARP coordinates and site at AD	03 43 N 115 52 E
Elevation / Reference temperature	2500.12 Feet
RWY number designation & bearing	17 – 35
RWY dimension, surface & strength	415 x 20 M; Clay, Grass; C-185

Directorate General of Civil Aviation

AMDT 12
17 SEP 15

Figure 6: Binuang information on AIP

The AIP Volume I Subchapter ENR 6-1J provided VFR routes for North and East Kalimantan. The route for a flight from Tarakan to Binuang was not included. The

following figure is an illustration of the VFR route from Tarakan to Long Bawan based on the AIP with the location of Binuang.

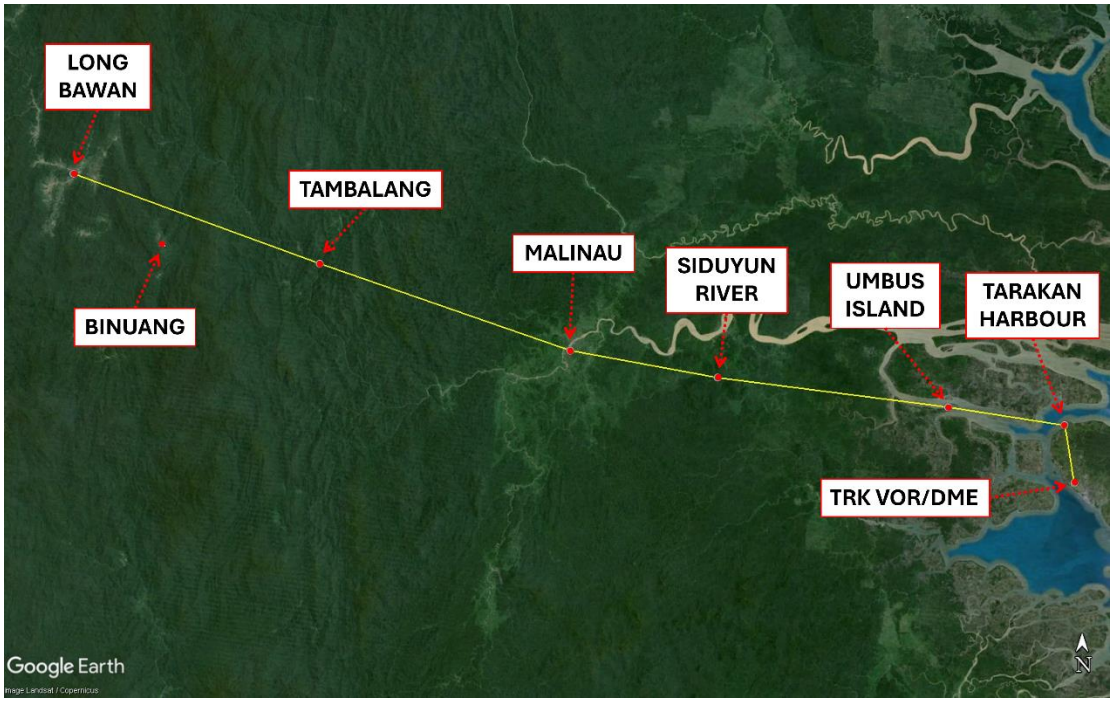


Figure 7: Illustration of the VFR route from Tarakan to Long Bawan

Smart Aviation Operation Manual Part C (OM-C) provided area, routes and aerodromes information that can be used for internal use. The OM-C provided information limited to aerodrome information of Binuang and route information of Malinau to Binuang (see the following figures).

smartaviation			**BINUANG - BIN - WAQG**			WAQM: R284 47NM WAQQ: R285 106NM	
			N03° 46.36' E115° 51.37'			WIND TIME N/A	
Length	Width	TDZE	TDZ Slope	AVG Slope	Keypoint	Sun Hazard	Radio
600	30	2500	0%	0%	3000	N/A	122.9

Smart Cakrawala internal use only. No guarantee is made as to the accuracy of the information presented here.

Aborted Landing
Rwy35: Abort straight ahead before touchdown.
Rwy17: Abort straight ahead at touchdown.

Aborted take off
Continue straight ahead.

Take Off Restrictions

PC-6	NIL
C208B	TBD

Refer to performance section in the POH for TO and LDG distances required

Surface:	Asphalt. surface not that even, small undulations
Obstacles:	Antenna West of airport
Weather:	Usually open before Long Bawan
Hazards:	Dogs on runway strong wind shear possible when westerly winds are present
Remarks:	Rwy 17 touch down area has a slight upslope.

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Figure 8: The Binuang Airstrip information

smartaviation	**Malinau to Binuang**	Flight time: 0.5 Total distance: 47NM GPS Flight plan 1

ROUTING				
WAQM N03° 34.62' E116° 37.05'	WAQG N03° 46.36' E115° 51.37'			

Reporting points - Nil

RADIO INFORMATION
Stations: Malinau TWR: 119.35
Nav Aids: TRK: 116.6
Area Frequencies: 122.9

MALINAU TO BINUANG			BINUANG TO MALINAU	
ALTITUDES				
Recommended altitudes: 8500ft 10500ft IFR	VNAV: Visual descent		Recommended altitudes: 7500ft 11500ft IFR	VNAV: 1000ft 3NM before WAQM @500 FPM
CLIMB PROCEDURES				
Visual only			Visual only	
ENROUTE PROCEDURES				
Emergency: Long Paday			Emergency: Long Paday	
DESCENT/ARRIVAL PROCEDURES				
Visual only			Visual only	

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Figure 9: Route information of Malinau to Binuang

Smart Aviation provided the Operation Navigation Chart (ONC) of the Northern Kalimantan Area (Indonesia, Malaysia, and Brunei) on board the aircraft and at the Tarakan flight operation office. The ONC was published by INDOAVIS, an Indonesian aeronautical information provider, with a scale of 1:1.000,000. The cropped ONC, which showed the Binuang, was as follow:

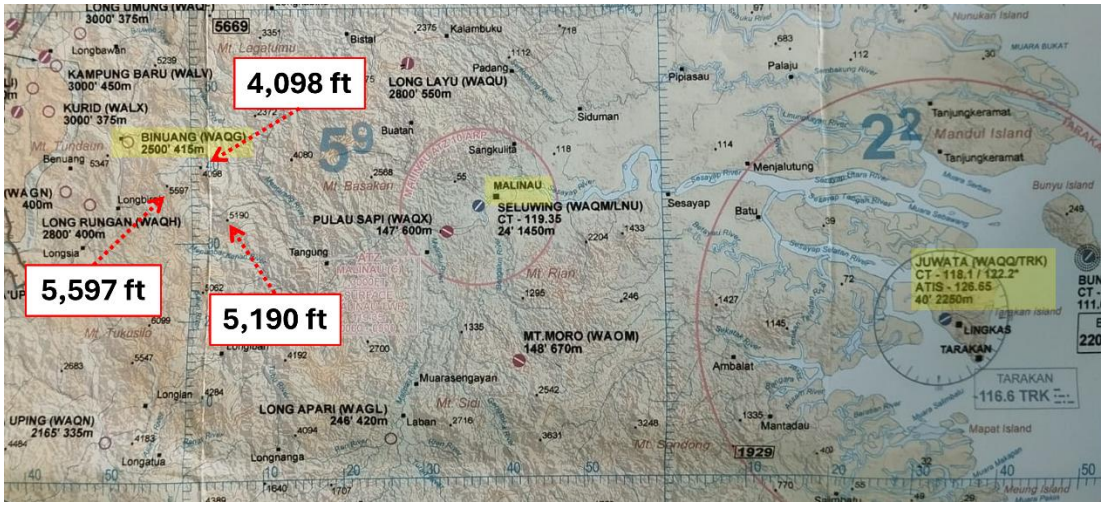

Figure 10: Cropped INDOAVIS ONC annotated and highlighted by KNKT

1.9 Communications

The pilot used the VHF radios for routine communication with air traffic control (ATC) and to broadcast information in the uncontrolled airspace. At the day of occurrence, the VHF radios were serviceable.

1.10 Aerodrome Information

Airport Name	:	Binuang
Airport Identification	:	WAQG
Airport Operator	:	Local government of Nunukan Regency
Coordinate	:	03°43’ N; 115°52’ E
Elevation	:	2,500 feet
Runway Direction	:	17 – 35
Runway Length	:	415 meters
Runway Width	:	20 meters
Surface	:	Asphalt

The airstrip situated on a valley surrounded by mountainous area with the highest terrain up to 5,500 feet at approximately on 5 NM at southeast from the airport.

1.11 Flight Recorders

The aircraft was equipped with Data Recorder and Managing Unit of APIBOX i2A-SAS manufactured by iAero with part number (P/N) iDRMU-001 EPA and serial number (S/N) 20210050. The APIBOX has the capability to record voice and several flight data.

The aircraft was also equipped with Garmin G950 GPS, which has the capability of flight data logging. The Garmin G950 was able to store several pieces of data on a Secure Digital (SD) data card.

The APIBOX unit, and SD card of Garmin G950 GPS were recovered from the accident site and transported to the KNKT recorder facility for the data downloading process. Until the issuance of this report, the APIBOX data had not been successfully downloaded.

The data om the recovered SD data card had been downloaded and the recorded file of the accident flight recorded 56 minutes 46 seconds of aircraft movement, with 60 parameters.

1.12 Wreckage and Impact Information

The aircraft wreckage was found at about 5.0 NM southeast of Binuang on a bearing of 305° with an elevation of about 4,500 feet at the ridge of a mountain with tropical rain forest.

The wreckage distribution of the accident was shown on below image.

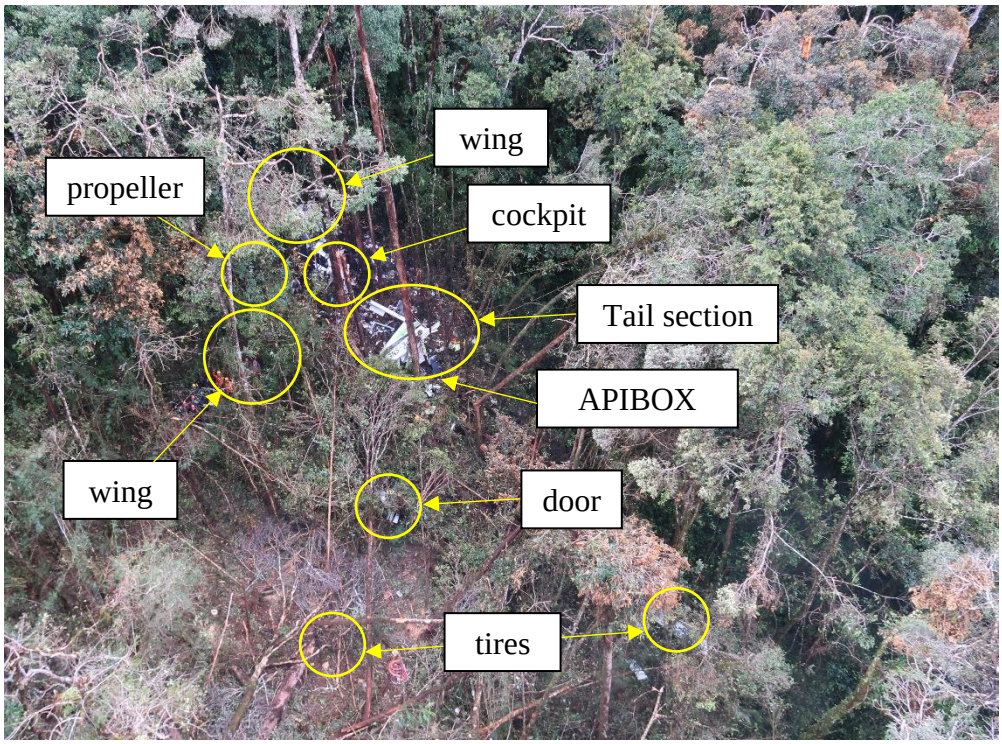

Figure 11: Wreckage Distribution

1.13 Medical and Pathological Information

Should any medical or pathological information be available, it will be included in the final report.

1.14 Fire

Should any information about the fire be available, it will be included in the final report.

1.15 Survival Aspects

About 1000 LT, the Malinau FOO was aware that the PK-SNE did not transmit position report in the flight following system. The Malinau FOO then contacted the Binuang resident and was advised that the aircraft had not landed at Binuang.

The Malinau FOO then asked the Malinau air traffic controller to contact the PK-SNE pilot. The Malinau FOO also asked the Tarakan FOO to contact Tarakan air traffic controller asking about the PK-SNE flight. The Malinau and Tarakan air traffic controller then contacted the PK-SNE pilot several times, asked the aircraft pilot that was flying near Binuang, and asked the nearby ATS provider. Smart Aviation also searched for the PK-SNE using their aircraft, which flew near Binuang. All attempts to locate the PK-SNE aircraft were unsuccessful.

At 1155 LT, Tarakan air traffic control advised the *Badan Pencarian dan Pertolongan Nasional* (Indonesian Search and Rescue Agency). The search and rescue team was assembled immediately, assisted by the local police, the air force, the army, and local residents near Binuang. The Indonesian Search and Rescue Agency was also notified by the Australian and Singaporean Search and Rescue Agency that they received Emergency Locator Transmitter (ELT) signal transmitted from PK-SNE aircraft.

Smart Aviation then searched the PK-SNE aircraft again using PK-SNG aircraft in an area near the ELT coordinates provided by the Australian and Singaporean Search and Rescue Agency. At about 1600 LT, the PK-SNG pilot detected signals from an ELT. A helicopter from the Indonesian Army also departed from Tarakan to conduct an aerial search using the provided coordinates. The PK-SNG and army helicopter pilots were unable to locate the PK-SNE aircraft due to cloudy conditions. The search and rescue process was postponed on that day due to the weather and visibility, which made it no longer possible to perform the search and rescue. The PK-SNG and the Indonesian Army helicopter returned to Malinau.

On 9 March 2024, the search and rescue activities were continued. The Indonesian Army and local residents conducted a ground search to the area of the ELT coordinate captured by the PK-SNG aircraft. At 1115 LT, the Indonesian Army helicopter departed from Malinau to the ELT captured coordinates and was unable to find the PK-SNE aircraft. It then returned to Malinau.

At 1558 UTC, PK-SND aircraft operated by Smart Aviation departed from Malinau to the ELT captured coordinates. The PK-SND pilot sighted smoke near one of the identified ELT coordinates and had visual on the PK-SNE wreckage. The PK-SND then returned to Malinau and the pilot reported the PK-SNE wreckage coordinates to the Indonesian Search and Rescue Agency. The rescue team believed that there was survivor as the PK-SND pilot saw fire near the wreckage. The search and rescue team then, using an Indonesian Army helicopter, dropped the logistics to the area in order to provide food for the survivor. The search and rescue activities were postponed and continued the following day due to weather and visibility issues.

On 10 March 2024, the Indonesian Army helicopter departed from Malinau and about 1100 LT, dropped the search and rescue team at the accident site. One Indonesian Air Force helicopter departed from Tarakan to assist in the rescue of the survivor. About 1600 LT, the Indonesian Air Force helicopter was able to rescue the survivor and

returned to Tarakan. The PIC was seriously injured, and the engineer was fatally injured. The PIC was then evacuated to the hospital in Tarakan for further treatment.

Detailed information on the survival aspects of the pilot will be included in the final report.

1.16 Tests and Research

Test and research information were not available at the time of the issuance of this preliminary report. Should any test or research information be obtained during this investigation that is relevant 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 Smart Cakrawala Aviation (Smart Aviation), which held a valid operator certificate with an Air Operator Certificate (AOC) number of 135–062.

The Smart Aviation developed Operation Manuals (OM)s which contain policies and procedures approved by the Directorate General of Civil Aviation (DGCA).

1.17.1.1 Route and Terrain Information

Smart Aviation Operation Manual Part A (OM-A) Subchapter 10.7 described:

Smart Cakrawala Aviation 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.

…

All Smart Cakrawala Aviation pilots must be familiar with the area, route and airports that Smart Cakrawala Aviation 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

The OM-A Subchapter 3.4.2 described:

Valid Navigational charts of required area, en-route, destination, and alternate shall be carried onboard the aircraft.

The OM-C did not provide information about the route for Tarakan to Binuang flight or any terrain information along the route to Binuang. The available information related to a flight to Binuang was limited to aerodrome information of Binuang, and the route guide for flight from Malinau or Nunukan to Binuang and return (see Subchapter 1.8).

Considering that the flight from Tarakan to Binuang would fly over Malinau, the common practice among pilots was to use information in the route guide of Malinau to Binuang as guidance for the flight from Tarakan to Binuang.

The OM-C Subchapter 1.5 described:

Whenever a PT. Smart Cakrawala Aviation approved VFR standard route has not been established between the departure and destination aerodromes each pilot may fly via the most direct route or on a route of the pilots choosing provided proper terrain and obstacle clearance is maintained, the minimum VFR operating minimums appropriate to the airspace are maintained, the minimum enroute altitudes as laid down in PT. Smart Cakrawala Aviation OM part A chapter 8.2 are met and, adequate areas which would permit a safe forced landing should the engine fail are maintained.

The OM-A Subchapter 8.2 did not contain the minimum enroute altitude, the correct subchapter reference was the Subchapter 8.3. The OM-A Subchapter 8.3.1 describes minimum flight altitudes for day VFR operations as follow:

The PIC shall not operate any aircraft under VFR during the day at an altitude less than 1,000 feet above the surface or less than 1,000 feet from any mountain, hill, or other obstruction to flight.

Smart Air provided the Operation Navigation Chart (ONC) of the Northern Kalimantan Area (Indonesia, Malaysia, and Brunei) on board the aircraft and at the Tarakan flight operation office. The ONC contained terrain information near Binuang (see figure 10 in Subchapter 1.8).

1.17.2 Civil Aviation Authority

Civil aviation in Indonesia is regulated and oversighted by DGCA under the Ministry of Transportation. According to the Authorization, Condition, and Limitation (ACL) issued by the Directorate General of Civil Aviation (DGCA), the Pilatus PC-6/B2-H4 aircraft of Smart Aviation was limited for a day VFR flight, and the aircraft configuration was approved for six passenger seats.

1.18 Additional Information

The investigation involved the participation of the Swiss Transportation Safety Board (STSB) of the Switzerland as the State of Design and Manufacture, the Transportation Safety Board (TSB) of the Canada as the State of Manufacture, and Bureau d'Enquêtes

et d'Analyses pour la sécurité de l'aviation civile (BEA) as the State providing assistance. All agencies have appointed their accredited representatives and advisers to assist in this investigation in accordance with the provisions in ICAO Annex 13.

The investigation is continuing. Should any further relevant safety issues emerge during 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. Pilot held valid licenses and medical certificates.
2. The aircraft had a valid Certificate of Airworthiness (C of A) and a valid Certificate of Registration (C of R).
3. The occurrence flight was the first flight of the day for the pilot and aircraft.
4. Based on the filed flight plan, the flight from Tarakan to Binuang would follow Visual Flight Rules (VFR), the cruising altitude would be 8,500 feet, the flight route would be directed from Tarakan to Binuang, and the fuel endurance would be sufficient for three-hour flight.
5. A ground navigation aid was not available at Binuang. The aircraft Global Positioning System (GPS) allows pilots to create, edit, and store several flight plans with 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.
6. Prior to conducting the flight duty, the pilot underwent a medical examination of body temperature and blood pressure, which revealed no health problem.
7. During the flight preparation, the pilot received pictures that depicted the weather condition over the destination aerodrome. Those pictures were taken by Binuang resident and depicted that the weather was cloudy.
8. At 0825 LT, in daylight conditions, the aircraft departed Tarakan with the destination of Binuang. On board of the aircraft were a pilot, an aircraft engineer of Smart Aviation, and cargo with a total weight of 583 kg.
9. The aircraft was airworthy when dispatched for the flight and operated within the weight and balance envelope. During the flight, there was no record or report of an aircraft system malfunction.
10. The last recorded transmission from the PK-SNE at the approach controller radio frequency was at 0854 LT, when the PIC reported that the aircraft was at an altitude of 8,500 feet. At that time the aircraft had flew over Malinau.
11. The flight was monitored by the Flight Operation Officer (FOO) at Tarakan and Malinau using a flight following system. At 0900 LT, PK-SNE transmitted the last position report in the flight following system, which indicated that the aircraft was about 12 NM northeast of Malinau.
12. The downloaded data from the flight following system did not indicate either the SOS signal was transmitted, or WATCH mode was active during the accident flight.

13. At 0906 LT, the flight data logging of the aircraft GPS recorded the aircraft leaving barometric altitude of 8,500 feet, and at 0912 LT, the aircraft descending and passing barometric altitude of 5,000 feet. At this time, the vertical speed was recorded at -700 feet per minute (aircraft descending) which then the rate of descent gradually reduced.
14. At 0913 LT, the flight data logging of the aircraft GPS recorded the aircraft at barometric altitude of 4,200 feet with a vertical speed of -120 feet per minute (aircraft descending). The aircraft heading recorded 290°, the pitch angle was 2.2°, and the roll angle was 9.9°. This was the last data from the flight data logging of the aircraft GPS.
15. Based on the satellite images provided by BMKG at 0900 LT and 0930 LT, it was shown that there were stratocumulus clouds, cumulus clouds, and middle clouds around the accident site.
16. The aircraft was found impacted into the ridge of the mountain with an elevation of about 4,500 feet on coordinates of 3° 43’ 29.60” N and 115° 56’ 24.04” E. The crash site location is about 5 NM southeast of Binuang on a bearing of 305°.
17. The Aeronautical Information Publication (AIP) Volume I Subchapter ENR 6-1J provided VFR routes for North and East Kalimantan. The route for a flight from Tarakan to Binuang was not included.
18. Smart Aviation Operation Manual Part A (OM-A) required pilots to be familiar with the area, route, and aerodrome, including terrain, prior to conducting the flight. The OM-A describes the area, route, and aerodrome information that can be found in the INDOAVIS Route Chart Manual, VFR Route Guidance, and Operations Manual Part C.
19. Smart Aviation Operation Manual Part C (OM-C) provided area, routes and aerodromes information that can be used for internal use. The OM-C provided information limited to aerodrome information of Binuang and route information of Malinau to Binuang.
20. The investigation is unable to find route guidance of a flight from Tarakan to Binuang provided by the aircraft operator.
21. Smart Aviation provided the Operation Navigation Chart (ONC) of the Northern Kalimantan Area (Indonesia, Malaysia, and Brunei) with a scale of 1:1.000,000 on board the aircraft and at the Tarakan flight operation office. The ONC indicated that, at the southeast of Binuang, there were several terrains with the highest heights of 5,597 feet, 5,190 feet, and 4,098 feet.

3 SAFETY ACTION

At the time of issuing this Preliminary Report, the KNKT had not been informed of any safety actions taken by involved parties 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 Smart Aviation

04.O-2024-08.01

Smart Aviation Operation Manual Part A (OM-A) required pilots to be familiar with the area, route, and aerodrome prior to conducting the flight. The OM-A describes the area, route, and aerodrome information that can be found in the INDOAVIS Route Chart Manual, VFR Route Guidance, and Operations Manual Part C.

The investigation was unable to find route guidance of a flight from Tarakan to Binuang provided by the aircraft operator. The absence of this guidance was not in accordance with the OM-A and was unable to ensure pilot having sufficient guidance to conduct flights from Tarakan to Binuang.

Therefore, KNKT recommends Smart Aviation to develop and implement route guidance to conduct flights from Tarakan to Binuang.

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