



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

KNKT.18.06.24.04

Aircraft Accident Investigation Report

PT. Spirit Avia Sentosa (FlyingSAS)

Cessna 208B, PK-FSL

**About 3.6 Nm from NBR VOR/DME on bearing of 105°,
Nabire, Papua**

Republic of Indonesia

18 June 2018

2018

This Preliminary Report was produced 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 initial investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation Organization, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

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

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Jakarta, July 2018

**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AIP	:	Aeronautical Information Publication
ALA	:	Aerodrome for Light Aircraft
AOC	:	Airline Operator Certificate
ARP	:	Aerodrome Reference Point
ATC	:	Air Traffic Control
ATZ	:	Aerodrome Traffic Zone
BMKG	:	<i>Badan Meteorologi Klimatologi Geofisika</i> / Meteorological Climatological and Geophysics Agency
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CASR	:	Civil Aviation Safety Regulation
CB	:	Cumulonimbus
DGCA	:	Directorate General of Civil Aviation
DME	:	Distance Measuring Equipment
ETA	:	Estimate Time Arrival
FOO	:	Flight Operation Officer
GPS	:	Global Positioning System
ICAO	:	International Civil Aviation Organization
KNKT	:	Komite Nasional Keselamatan Transportasi
LT	:	Local Time
MHz	:	Megahertz
NDB	:	Non-Directional Beacon
Nm	:	Nautical Mile
OM	:	Operation Manual
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
SIC	:	Second in Command
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VOR	:	VHF Omnidirectional Range

SYNOPSIS

On 18 June 2018, Pilot in Command (PIC) and Second in Command (SIC) of PT. Spirit Avia Sentosa (FlyingSAS) was conducting unscheduled passenger flights. The flights of the day planned for the pilots were from Douw Aturure Airport (WABI), Nabire to Sugapa Airstrip (WAYB), Bilorai and return for three times. The PIC acted as Pilot Flying (PF) and the SIC acted as Pilot Monitoring (PM) on all these flights.

The third flight from Nabire to Bilorai, the pilot used Cessna 208B aircraft registered PK-FSL and landed safely in Bilorai. Prior to the departure to Nabire, there was no report or record of aircraft system malfunction and the aircraft was operated within the approved weight and balance envelope. On board the aircraft were two pilots and 11 passengers.

The aircraft departed from Bilorai to Nabire on daylight condition and cruised at altitude of 10,500 feet. The aircraft was flying in an out through clouds when approaching Nabire.

Over checkpoint BRAVO, the pilot made initial contact with Nabire Tower controller (controller) and advised that the aircraft was descending and passed altitude of 6,600 feet. During descent after checkpoint BRAVO, the pilot noticed development of cloud along the route and decided to avoid the clouds by deviating the aircraft track to the right of the GPS route.

The aircraft was flying in and out through clouds when approaching Nabire. At about 4.5 Nm from NBR VOR/DME, the flight monitoring system of the FlyingSAS recorded the aircraft altitude was 2,000 feet.

The PM noticed yellow on the aircraft GPS which mean the terrain was between 1,000 feet and 100 feet below the aircraft altitude and advised the PF. The PF decided to disengage the auto pilot, reduced the rate of descend and continue to get visual reference on ground.

The PM noticed an “X” symbol on the GPS which indicated a potential impact point and advised the PF. The PF was continuing the descent and then the second “X” appeared on the GPS. A few second later, the PF noticed terrain ahead and pulled the aircraft. The left side of the aircraft impacted tree.

At about 2 Nm, the pilot advised the controller of the aircraft position and requested to make landing approach using runway 16. The controller approved the pilot request.

The rest of the flight was uneventful and the aircraft landed safely using runway 16 at Nabire.

No one injured in this occurrence and the aircraft was substantially damaged.

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

At the time of issuing this preliminary report, the KNKT had been informed safety action taken by the FlyingSAS resulting from this occurrence. The KNKT acknowledged the safety actions taken by the FlyingSAS, there still remain safety issues that need to be considered. Therefore, the KNKT issues the following safety recommendations addressed to the FlyingSAS, AirNav Indonesia and Directorate General of Civil Aviation.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 18 June 2018, a Pilot in Command (PIC) and Second in Command (SIC) of PT. Spirit Avia Sentosa (FlyingSAS) was conducting unscheduled passenger flights. The flights of the day scheduled for the pilots were from Douw Aturure Airport (WABI), Nabire¹ to Sugapa Airstrip (WAYB), Bilorai² and return for three times. The PIC acted as Pilot Flying (PF) and the SIC acted as Pilot Monitoring (PM) on all these flights.

The first flight from Nabire to Bilorai departed at about 0100 UTC (1000 LT³) after delayed about 30 minutes from the estimated time departure. In this flight the pilots used a Cessna 208B aircraft registered PK-FSL. While returning to Nabire, the pilot followed the top on the list of stored flight plan route on Global Positioning System (GPS) of the PK-FSL aircraft which was from Bilorai – checkpoint ECHO⁴ – checkpoint BRAVO⁵ – NBR VOR/DME⁶ – Nabire.

The second flight from Nabire to Bilorai, the aircraft changed to another Cessna 208B registered PK-FSP. The aircraft departed and landed safely in Bilorai. At this time, the returned flight to Nabire, the pilot followed the top on the list of flight plan route stored on GPS of the PK-FSP aircraft which was from Bilorai – checkpoint ECHO – checkpoint BRAVO – checkpoint TOPO⁷ – NBR VOR/DME – Nabire.

The third flight from Nabire to Bilorai, the pilot used the PK-FSL aircraft again and landed safely in Bilorai. The pilot planned the flight return to Nabire as the first flight. The route was consistent with the filed flight plan signed by the PIC.

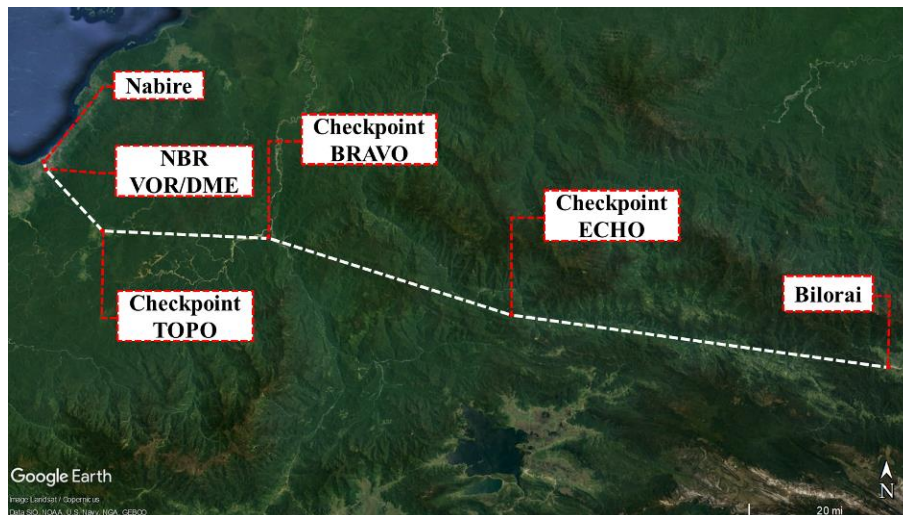


Figure 1: The flight plan route Bilorai to Nabire via checkpoint TOPO

- 1 Douw Aturure Airport (WABI), Nabire will be named as Nabire for the purpose of this report.
- 2 Sugapa Airstrip (WAYB), Bilorai will be named as Bilorai for the purpose of this report.
- 3 The 24-hours clock in Local Time (LT) is used in this report to describe time as specific events occurred. Local time is UTC+9 hours.
- 4 Checkpoint ECHO is located at about 41 Nm from Bilorai on bearing 278°.
- 5 Checkpoint BRAVO is located at about 26 Nm from Nabire on bearing 26°.
- 6 NBR is VHF Omnidirectional Range located at 0.9 Nm from Nabire on bearing 164°.
- 7 Checkpoint TOPO is located at about 10 Nm from Nabire on bearing 139°.

Prior to the departure to Nabire, there was no report or record of aircraft system malfunction and the aircraft was operated within the approved weight and balance envelope. On board the aircraft were two pilots and 11 passengers.

At about 1415 LT on daylight condition, the aircraft departed from Bilorai to Nabire and cruised at altitude of 10,500 feet. At about 20 Nm from checkpoint BRAVO which was about 40 Nm from NBR VOR/DME, the pilot started to descend the aircraft with rate of descend about 500 fpm. The pilot noticed development of cloud along the route and decided to avoid the clouds by deviating the aircraft track to the right of the GPS route.

The aircraft flew on the class G airspace and when flew on Nabire aerodrome traffic zone (area with radius of 10 Nm centered at ZR NDB⁸) the airspace was class C airspace.

At 1442 LT, the pilot made initial contact with Nabire tower controller (controller) and advised that the aircraft was in bound to Nabire from Bilorai with ETA of 0552 UTC and the aircraft position was over point BRAVO, descending and passed altitude of 6,600 feet. The controller acknowledged the pilot message and issued clearance to fly to NBR VOR/DME expecting to land on runway 34 with additional information of the latest wind condition and QNH. The controller then instructed the pilot to report when the aircraft position on 10 Nm from NBR VOR/DME.

When descending passed altitude of 4,000 feet, the aircraft was flying through clouds and when passing altitude of 3,500 feet the flight was returned to VMC.

At 1449 LT, the pilot advised the controller that the aircraft position was 10 Nm from NBR VOR/DME and passed 3,300 feet. The controller instructed the pilot to continue approach and report when the aircraft was on final runway 34.

At about 5 Nm from NBR VOR/DME, when passed 2,500 feet the aircraft was flying through clouds again. The PF continued the descent and looked outside attempting to get visual reference on ground. At 1451 LT, about 4.5 Nm from NBR VOR/DME, the flight monitoring system of the Flying SAS⁹ recorded the aircraft altitude was 2,000 feet.

The PM noticed yellow area on the aircraft GPS which mean the terrain on the area was between 1,000 feet and 100 feet below the aircraft altitude and informed to the PF. The PF decided to disengage the auto pilot, reduced the rate of descend and continued to get visual reference on ground.

The PM then noticed an “X” symbol on the GPS which indicated that the area of the symbol was a potential impact point and informed the PF. The PF was continuing the descent. Thereafter the second “X” symbol appeared on the GPS and the PM informed to the PF. A few second later, the PF noticed terrain in front of the aircraft and pulled the control column to climb aircraft. The left side of the aircraft impacted top of tree.

⁸ ZR is Non-Directional Beacon located on 0.3 Nm from Nabire on bearing of 12°.

⁹ The Flying SAS utilize flight monitoring system developed by Spider Tracks Limited with type/model of Spider 7. The detail information of the flight following system is in subchapter 1.17.1.

The aircraft climbed and then maintained at altitude of 3,000 feet.

At 1452 LT, the controller called the pilot and asked the aircraft position. The pilot responded that the aircraft was about 2 nm from NDB VOR/DME and the pilot requested to make landing approach using runway 16. The controller acknowledged the aircraft position and approved the pilot request.

The rest of the flight was uneventful and the aircraft landed safely using runway 16 at Nabire.

The pilot did not perform any briefings during all flights and the pilot did not advise the controller that the aircraft impacted tree during the landing approach to the controller. After landed, the pilot advised the flight engineer that the aircraft impacted tree and the left wing was damaged.

1.2 Injuries to Persons

No one injured in this occurrence.

1.3 Damage to Aircraft

The aircraft was substantially damaged. The left wing tip was damaged and several dent found on the left wing and on the left horizontal stabilizer.



Figure 2: The damage on the left wing tip

1.4 Other Damage

No other damage to property and/or the environment were found in this occurrence.

1.5 Personnel Information

1.5.1 Pilot in Command

Gender	: Male
Age	: 31 years old
Nationality	: United States of America
Date of joining company	: 15 March 2017
License	: Commercial Pilot License
Date of issue	: 27 July 2016
Aircraft type rating	: Single Engine Land

Instrument rating validity : 28 May 2019
Medical certificate : First Class
 Last of medical : 22 February 2018
 Validity : 22 August 2018
 Medical limitation : Holder shall wear corrective lenses
Last proficiency check : 14 May 2018

Flying experience

Total hours : 1,772 hours 27 minutes
Total on type : 1,772 hours 27 minutes
Last 90 days : 169 hours 19 minutes
Last 60 days : 124 hours 24 minutes
Last 24 hours : 4 hours 41 minutes
This flight : 4 hours 41 minutes

The PIC is a qualified company flight instructor in the FlyingSAS.

1.5.2 Second in Command

Gender : Male
Age : 25 years old
Nationality : Indonesia
Date of joining company : 15 January 2018
License : Commercial Pilot License
 Date of issue : 8 November 2015
 Aircraft type rating : Single Engine Land
Instrument rating validity : 31 May 2019
Medical certificate : First class
 Last of medical : 29 March 2018
 Validity : 29 September 2018
 Medical limitation : None
Last proficiency check : 14 May 2018

Flying experience

Total hours : 936 hours 16 minutes
Total on type : 738 hours 3 minutes
Last 90 days : 112 hours 31 minutes
Last 60 days : 36 hours 24 minutes
Last 24 hours : 4 hours 41 minutes

This flight : 4 hours 41 minutes

1.5.3 Air Traffic Controller

The controller was Indonesian 27 year old, qualified Nabire tower control rating with valid air traffic control license and third class medical certificate without any limitation. The controller also had valid level 4 of ICAO Language Proficiency and was performing duty as Nabire tower controller since 27 December 2017.

1.6 Aircraft Information

1.6.1 General

Registration Mark : PK-FSL
Manufacturer : Cessna Aircraft Company
Country of Manufacturer : United States of America
Type/Model : Cessna 208B
Serial Number : 208B1254
Year of Manufacture : 2007
Certificate of Airworthiness
Issued : 22 December 2017
Validity : 21 December 2018
Category : Normal
Limitations : None
Certificate of Registration
Number : 3898
Issued : 22 December 2016
Validity : 21 December 2019
Time Since New : 11,276 hours 51 minutes
Cycles Since New : 15,519 cycles

1.6.2 Engines

Manufacturer : Pratt & Whitney Canada
Type/Model : PT6A-114A
Serial Number : PCE-PC0787
▪ Time Since New : 15,313 hours 3 minutes
▪ Cycles Since New : 28,348

1.6.3 Propellers

Manufacturer : McCauley Propeller
Type/Model : McCauley 3GFR34C703-B
Serial Number : 080486
Time Since New : 7,599 hours 15 minutes

1.6.4 Global Positioning System

The aircraft was fitted with Global Positioning System (GPS) Garmin GNS 430 and Garmin GNS 530. Both GPS provides pilot a navigation data and communication capability including terrain information. The FlyingSAS utilized the GNS 430 for terrain information while the GNS 530 for navigation purposes.

The GNS 430 have TERRAIN page which could display terrain information based on database of Terrain Data cards inserted on the GPS. The terrain information is visualized to pilot on the TERRAIN page of the display. The TERRAIN feature on this GPS is not intended to be used as a primary reference for terrain avoidance and does not relieve the pilot from the responsibility of being aware of surroundings during flight. The TERRAIN feature is only to be used as an aid for situational awareness of terrain avoidance and is not certified for use in applications requiring a certified terrain awareness system.

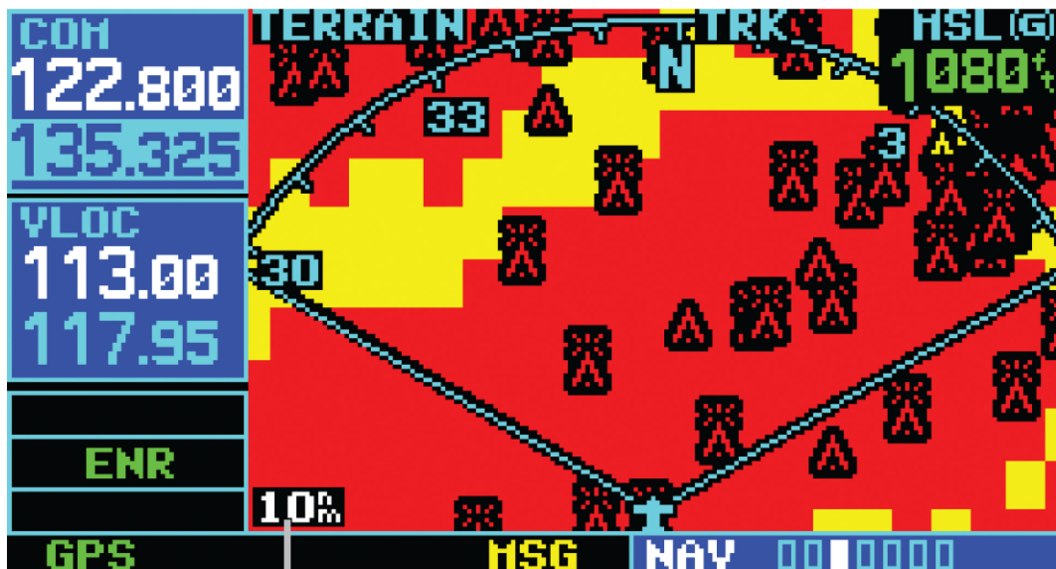


Figure 3: The TERRAIN page display

The terrain information is visualized into color and symbols to represent obstacle and potential impact points. Red terrain color means the terrain/obstacle is above or within 100 feet below the aircraft altitude, yellow terrain color means the terrain/obstacle is between 100 and 1,000 feet below the aircraft altitude and black terrain color means the terrain/obstacle is more than 1000 feet below the aircraft altitude. The symbols used on the TERRAIN page are as follows:

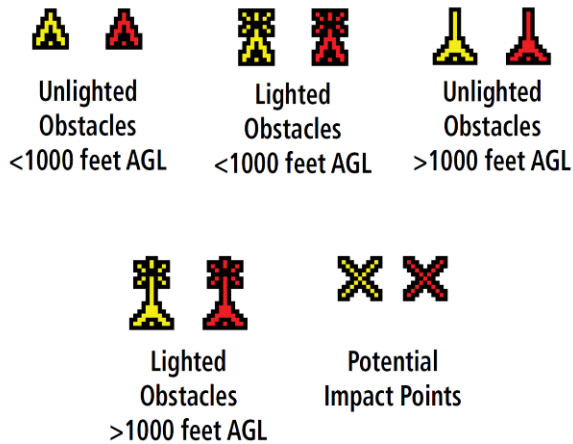


Figure 4: The TERRAIN symbols

The GNS 530 have similar capabilities with GNS 430 to provide pilot navigation data and communication capability however, this GPS does not have terrain alert feature.

The GNS 530 can use direct point-to-point navigation to provide guidance for pilot from departure point to the destination point. The GNS 530 allows pilot to create, edit and activate up to 20 flight plans with up to 31 waypoints in each flight.

1.7 Meteorological Information

Prior to the departure, pilot was provided a meteorological report over Nabire at 1400 LT by the Flight Operation Officer (FOO). The report was surface wind 310° with velocity of 5 knots, horizontal visibility 7 km, cloud¹⁰ FEW CB 1,600 feet, temperature 26°C and dew point 23°C, QNH 1,009.9 mb/in Hg and QFE 1,009.2 mb/in Hg.

The following satellite images were provided by *Badan Meteorologi Klimatologi dan Geofisika* (BMKG – Bureau of Meteorology, Climatology and Geophysics) at 0540 UTC (1440 LT) and 0550 UTC (1450 LT). The images indicated significant development of clouds which potentially become Cumulonimbus.

¹⁰ Cloud amount is assessed in total which is the estimated total apparent area of the sky covered with cloud. The international unit for reporting cloud amount for Few (FEW) is when the clouds cover 1/8 up to 2/8 area of the sky.

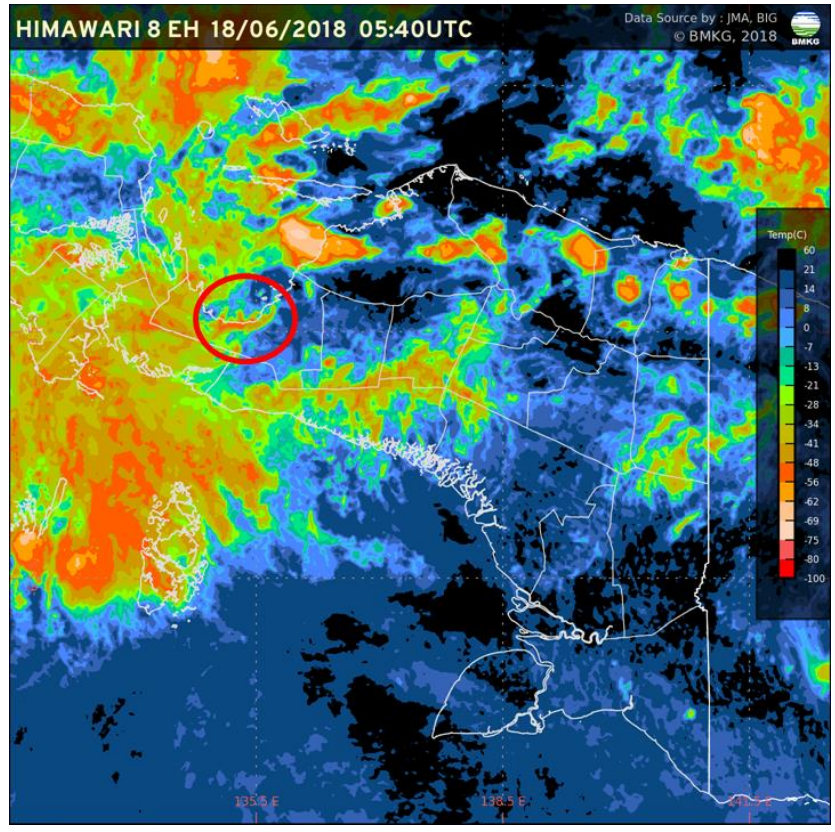


Figure 5: The satellite image of the occurrence site (red circle) at 0540 UTC

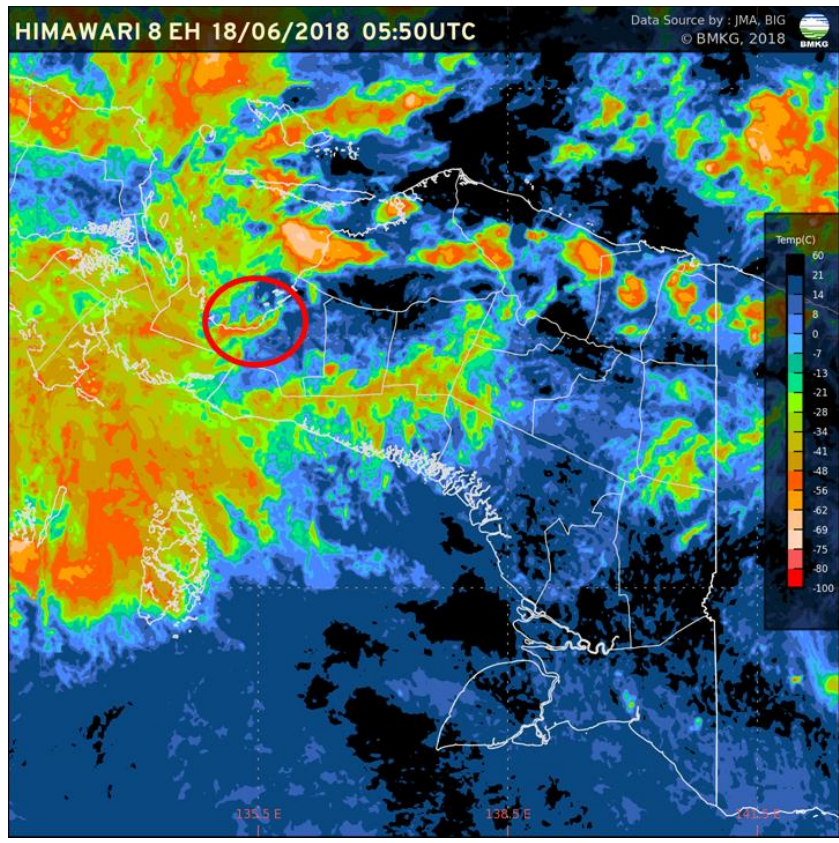


Figure 6: The satellite image of the occurrence site (red circle) at 0550 UTC

1.8 Aids to Navigation

According to the Aeronautical Information Publication (AIP) Volume IV (Aerodrome for Light Aircraft/ALA), Nabire equipped with Non-Directional Beacon (NDB) identified as ZR and VHF Omnidirectional Range (VOR)/Distance Measuring Equipment (DME) identified as NBR. The navigation equipment was serviceable during the occurrence.

The location of the NBR VOR/DME on the airport information was on coordinate $03^{\circ}23'38.1''$ S; $135^{\circ}30'08''$ E which was about 1.6 Nm from aerodrome reference point (ARP) of Nabire on bearing 169° . Meanwhile, the coordinate of NBR VOR/DME on the instrument approach chart was on $03^{\circ}22'30.00''$ S; $135^{\circ}29'47.00''$ E, which was about 0.43 Nm from Nabire ARP on bearing 185° .

The FlyingSAS GPS stored different position of the NBR VOR/DME which was on coordinate $03^{\circ}22'55.05''$ S; $135^{\circ}30'04.04''$ E. Referred to this coordinate, the NBR VOR/DME was about 0.9 Nm from Nabire ARP on bearing 164° .

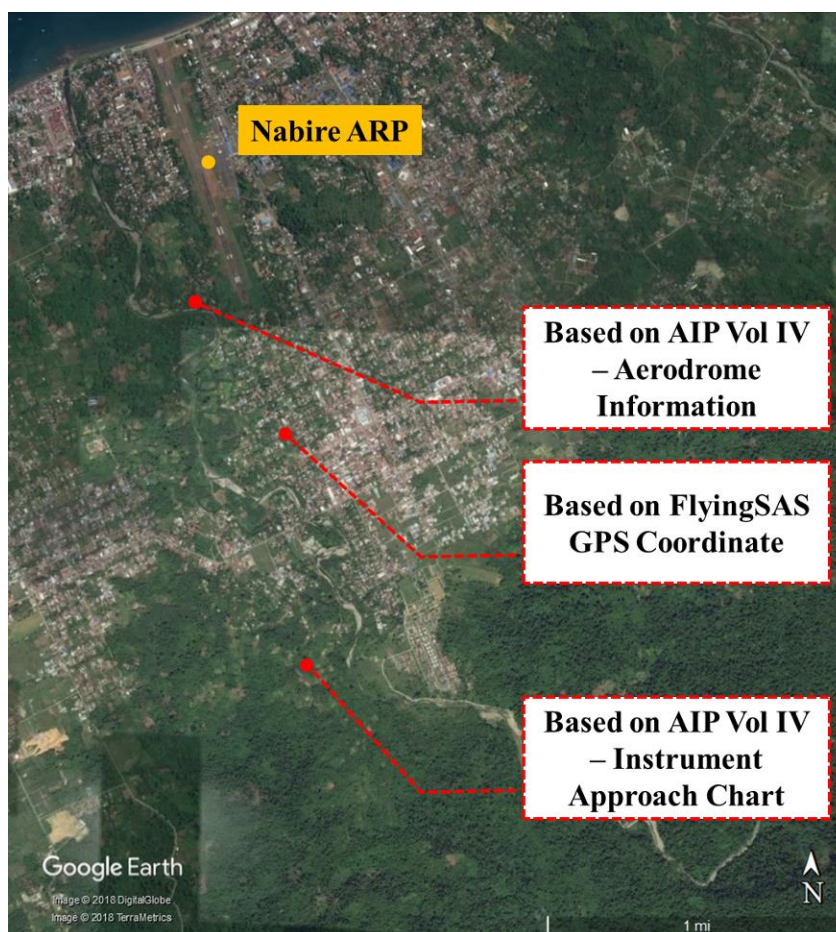


Figure 7: The NBR VOR/DME locations

The AIP Volume IV did not include approach guidance for Nabire. The FlyingSAS issued Route and Airport Instruction of Nabire and Visual Flight Rules (VFR) Chart for route Nabire – Sugapa (Bilorai) and return. These guidance was contained in the FlyingSAS Operation Manual (OM) – Part C and was used for internal use.

The Route and Airport Instruction for arrival to Nabire described:

Aircraft inbound from West or North area is expected to contact Nabire Tower 60 Nm from Nabire. When clear of descend aircraft will be given clearance to 2500 feet and call at 10 Nm. If runway 16 in use then will be directed to intercept final runway 16. If runway 34 in use then will be directed to join left downwind runway 34. Aircraft inbound from East area must contact Nabire Tower when approaching Point B check point. After leaving Point B, aircraft shall tracking to Topo area then follow Nabire Tower instruction to call at 10 Nm. If runway 34 in use aircraft will be directed to join final runway 34. If runway 16 in use the aircraft will be directed to join right downwind runway 16. When using runway 34 aircraft will be making a high approach.

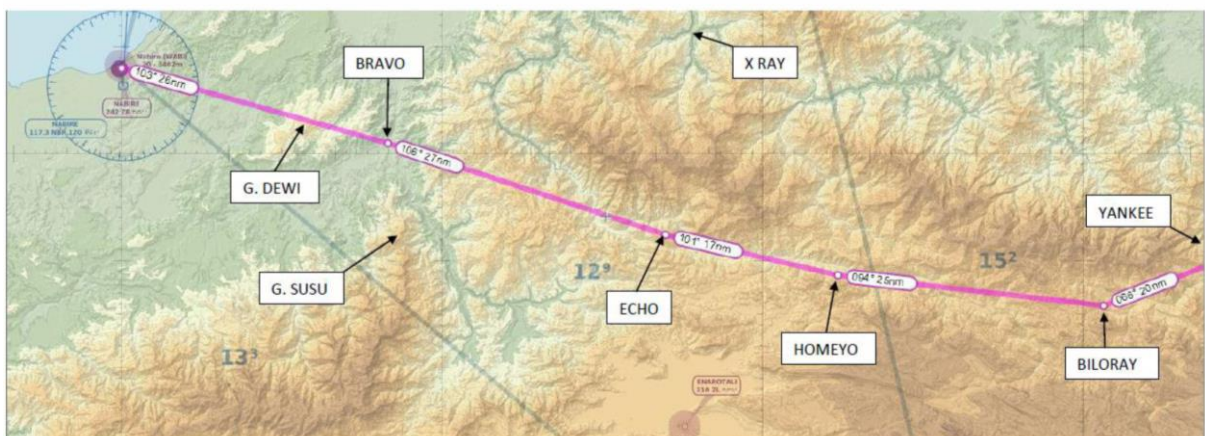


Figure 8: The VFR chart of Nabire – Sugapa

1.9 Communications

The communication between the pilot and the controller on Nabire radio frequency (122.3 MHz) was recorded by ground based automatic voice recording equipment and the recorder was serviceable.

1.10 Aerodrome Information

The Douw Aturure airport (WABI), Nabire was operated by Directorate General of Civil Aviation. The airport had a runway with direction of 16 – 34 (156° – 336°). The runway dimension was 1,399 meters length and 29 meters width.

The airport situated on a coastline with airport elevation was 40 feet and the aerodrome reference point was on coordinate $03^{\circ}22'04.53''$ S; $135^{\circ}29'49.55''$ E. The east direction of the airport was mountainous area and within range of 5 Nm from the ARP, the highest terrain was up to 1,800 feet.

1.11 Flight Recorders

The aircraft was not equipped with flight recorder and it was not required by current Indonesia regulation for this type of aircraft. However, the investigation utilizes recorded data from the flight following system of the aircraft.

1.12 Wreckage and Impact Information

Evidence of impact marks were found on the left side of the aircraft which were on the main landing gear strut, wing strut fairing, wing and horizontal stabilizer.



Figure 9: The impact marks on the aircraft (inside the red dot line)

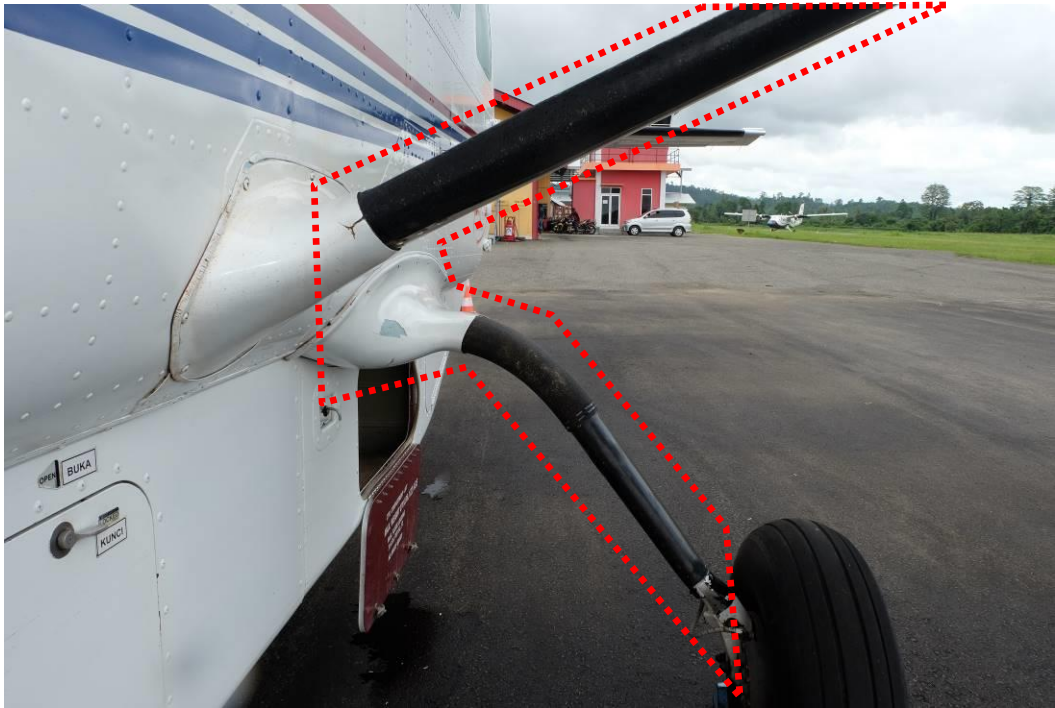


Figure 10: The impact marks on left hand main landing gear strut and wing strut fairing (inside the red dot line)



Figure 11: The wood impact marks on left wing



Figure 12: The dent and impact marks on left horizontal stabilizer

1.13 Medical and Pathological Information

Should any medical or pathological investigations will be included in the final report.

1.14 Fire

There was no evidence of fire after the aircraft hit the tree.

1.15 Survival Aspects

No injury to person in this occurrence and not relevant to this investigation

1.16 Tests and Research

Should any test and research information will be included in the final report.

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

Aircraft Owner	: Pacific Air Holdings, dba Delta Wing Equipment, LLC
Address	: 2202 Airport Drive Shawnee, Oklahoma, 74804, United States of America
Aircraft Operator	: PT. Spirit Avia Sentosa (FlyingSAS)
Address	: Jalan Protokol Halim Perdanakusuma No. 8, Jakarta Timur, 13620, Republic of Indonesia

The PT. Spirit Avia Sentosa (FlyingSAS) had valid Aircraft Operator Certificate (AOC) number 135-058 which authorized to conduct air transportation carrying passengers and cargo in non-scheduled operation within and outside Indonesia for aircraft operations under Civil Aviation Safety Regulation (CASR) Part 135.

The Flying SAS operated four Cessna 208B aircraft including the accident aircraft to serve on Papua area.

Operation Manual – Part A

The FlyingSAS Operation Manual (OM) – Part A subchapter 8.5.1 described a basic Visual Flight Rules (VFR) weather minimum which was referred to the Civil Aviation Safety Regulation (CASR) Part 91 – General Operating and Flight Rules. The requirement was not allowed any pilot to operate an aircraft under VFR on airspace class C and G when the flight visibility is less, or at a distance from clouds that is less, than that prescribed for the corresponding altitude and class of airspace in the following table:

Airspace	Flight Visibility	Distance from Clouds
Class C	<ul style="list-style-type: none"> • 8 km above 10.000 feet • 5 km below 10.000 feet 	<ul style="list-style-type: none"> • 1,000 feet above • 1,000 feet above • 1,500 meters horizontal
Class G	<ul style="list-style-type: none"> • 8 km above 10.000 feet • 5 km below 10.000 feet. • The higher of: 3000 feet AMSL 5 km, or 1000 feet AGL in sight 	<ul style="list-style-type: none"> • 1,000 feet above • 1,000 feet above • 1,500 meters horizontal • Clear of clouds

The subchapter 10.7 described departure and approach briefing requirement. All pilots must perform a departure and approach briefing at specified phase of flight. The departure including takeoff briefing will be given before starting engine or before starting checklist reading, while the approach briefing will be given including in the descent briefing at a convenient time before descent is start. The PIC is responsible for performing the briefing or delegates to the SIC when acting as Pilot Flying.

Flight Following

The FlyingSAS utilizes flight following system provided by Spider Tracks Limited with type/model Spider 7 which manufactured in New Zealand. The tracking and flight data from the aircraft transmitted to the Spidertracks website and monitored by Flying SAS officer in Jakarta.

The aircraft operator subscribed the Spidertracks flight following system for 2 minutes interval data reporting for each fleet, including the PK-FSL and PK-FSP aircraft. The reporting parameters in the tracking system contained several data including time, coordinate, aircraft altitude, speed and bearing. The tracking system begins to send position report when the device is powered in open area.

The investigation downloaded the reporting Spidertracks data of the three flights from Bilorai to Nabire during the day of the occurrence.

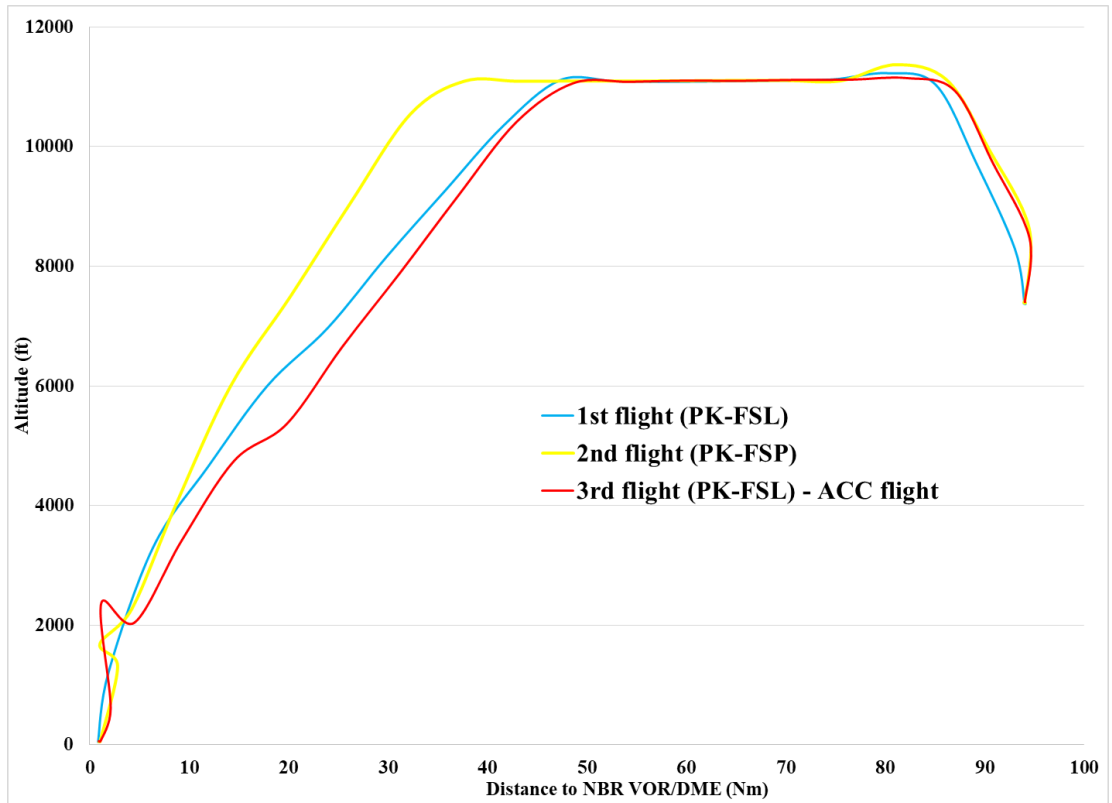


Figure 13: The altitude profile of the Bilorai – Nabire flights on 18 June 2018

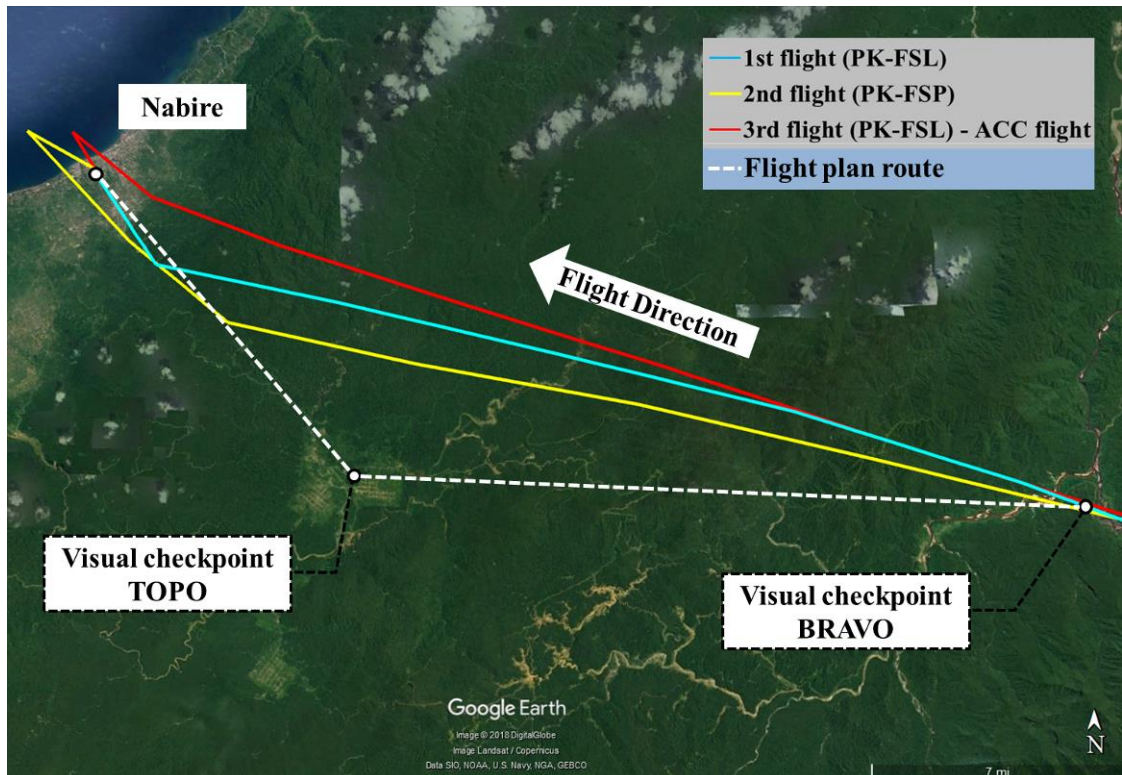


Figure 14: The flight profile of the Bilorai – Nabire flights on 18 June 2018

1.17.2 Air Traffic Service Provider

The Air traffic control (ATC) services in Nabire were provided by Perum LPPNPI (AirNav Indonesia) branch office Nabire on the aerodrome traffic zone (ATZ) which was within radius of 10 Nm centered at ZR NDB. The ATC services provided in Nabire was aerodrome control service. The airspace classification on the Nabire ATZ was class C airspace.

1.17.3 Aeronautical Information Publication Indonesia

The Aeronautical Information Publication Indonesia Volume IV (AIP Vol. IV) contained aerodrome directory for light aircraft including the VOR/DME information in Nabire. The AIP Vol. IV was published by the Directorate General of Civil Aviation (DGCA).

1.18 Additional Information

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1.19 Useful or Effective Investigation Techniques

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

2 FINDINGS¹¹

According to factual information during the investigation, the KNKT identified initial findings as follows:

1. The pilots and controller held valid license and medical certificate.
2. The aircraft had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
3. Prior to departure, there was no report or record of aircraft system malfunction. The aircraft was operated within the approved weight and balance envelope.
4. Prior to the occurrence flight, the pilots had flown for 5 flight sectors. The pilot used PK-FSL aircraft for the first, second, fifth and the occurrence flight while the rest flight used PK-FSP aircraft.
5. The stored GPS flight plan route on the PK-FSL aircraft used by the pilot when flew from Bilorai to Nabire was different with the stored GPS flight plan route used by the pilot on PK-FSP aircraft and different with the route information published by FlyingSAS.
6. The OM – Part C described route information for arrival to Nabire was to track TOPO area after leaving checkpoint BRAVO, however in the VFR chart for route Nabire – Sugapa (Bilorai) and return did not describe TOPO area.
7. The aircraft operator utilizes flight following system and subscribed for 2 minutes interval data reporting for each fleet.
8. The aircraft departed from Bilorai to Nabire on daylight condition and cruised at altitude of 10,500 feet.
9. Over checkpoint BRAVO, the pilot made initial contact with Nabire tower controller (controller) and advised that the aircraft was descending and passed altitude of 6,600 feet.
10. During descent after checkpoint BRAVO, the pilot noticed development of cloud along the route and decided to avoid the clouds by deviating the aircraft track to the right of the GPS route.
11. The aircraft was flying through clouds when passed altitude of 4,000 feet and when passed altitude of 3,500 feet the flight was in VMC again. At about 5 Nm from NBR VOR/DME, while passing altitude of 2,500 feet the aircraft flew through clouds again.
12. At about 4.5 Nm from NBR VOR/DME, the flight monitoring system of the FlyingSAS recorded the aircraft altitude was 2,000 feet.

¹¹ 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.

13. The PM noticed yellow on the aircraft GPS which mean the terrain was between 1,000 feet and 100 feet below the aircraft altitude and advised the PF. The PF decided to disengage the auto pilot, reduced the rate of descend and continue to get visual reference on ground.
14. The PM noticed an “X” symbol on the GPS which indicated a potential impact points and advised the PF. The PF was continuing the descent and then the second “X” appeared on the GPS. A few second later, the PF noticed terrain ahead and pulled the aircraft. The left side of the aircraft impacted tree.
15. At about 2 Nm, the pilot advised the controller of the aircraft position and requested to make landing approach using runway 16. The controller approved the pilot request.
16. The pilots did not perform any briefings during all flights and the pilot did not advise the controller that the aircraft had impacted the tree during the landing approach to the controller.
17. The aircraft was substantially damaged. The left wing tip was damaged and several dent found on the left wing and on the left horizontal stabilizer. Impact marks were found on the left side of the aircraft which were on the main landing gear strut, wing strut fairing, wing and horizontal stabilizer.
18. The airport situated on a coastline with airport elevation was 40 feet. The east direction of the airport was mountainous area and within range of 5 Nm from the ARP, the highest terrain was up to 1,800 feet.
19. The AIP Volume IV did not include approach guidance for Nabire. FlyingSAS issued Route and Airport Instruction of Nabire and Visual Flight Rules (VFR) Chart for route Nabire – Sugapa (Bilorai) and return. This guidance was contained in the FlyingSAS Operation Manual (OM) – Part C and was used for internal purpose.
20. The AIP Volume IV for Nabire contained different coordinates of the NBR VOR/DME location. The location of the NBR VOR/DME on the airport information was about 1.6 Nm from aerodrome reference point (ARP) of Nabire on bearing 169° meanwhile, the coordinate of NBR VOR/DME on the instrument approach chart was about 0.43 Nm from Nabire ARP on bearing 185°.

3 SAFETY ACTION

At the time of issuing this report, the KNKT had been informed any safety actions resulting from this occurrence taken by the FlyingSAS.

On 20 June 2018, the FlyingSAS issued Operation Notice with subject of VFR Stabilized Approach Checklist for Mountainous Flying. The detail notice can be found on the appendices and the highlight of the notice was as follows:

- Instructed all pilots to perform descend, approach and landing process in accordance with the VFR stabilized approach criteria for mountainous area.
- Reminded all pilots to follow the VFR stabilized approach checklist for mountainous flying.

On 26 June 2018, the FlyingSAS issued Operation Notice with subject of Crew Cockpit Resource Management (CRM) and Confidence Level. The detail notice can be found on the appendices and the highlight of the notice was as follows:

- Instructed all pilots to improve the CRM level during approach and landing by following certain guidance.
- Reminded all pilots to avoid over confidence to continue an approach and landing which could lead to an incident or accident.

4 SAFETY RECOMMENDATIONS

The KNKT acknowledged the safety actions taken by the FlyingSAS, there still remain safety issues that need to be considered. Therefore, the KNKT issues the following safety recommendations addressed to related parties.

4.1 FlyingSAS

04.O-2018-24.1

The stored GPS flight plan route on PK-FSP aircraft and the Route Information published by FlyingSAS on OM – Part C contained checkpoint TOPO for route Bilorai to Nabire while the stored GPS flight plan route on the PK-FSL aircraft and VFR Route Chart published on OM – Part C was not containing checkpoint TOPO.

KNKT recommends the FlyingSAS to ensure the route guidance for pilot contains same information.

4.2 AirNav Indonesia

04.A-2018-24.2

The AIP Volume IV of Nabire published by the DGCA contained different coordinate of the NBR VOR/DME location.

KNKT recommends the AirNav Indonesia to provide correct information of the NBR VOR/DME location to the DGCA and also review the possibility of other incorrect coordinate of navigation aid prior to publish in the AIP.

4.3 Directorate General of Civil Aviation

- **04.R-2018-24.3**

In 2017, KNKT issued safety recommendation number 04.R-2015-17.6 which was recommend the Directorate General of Civil Aviation (DGCA) to publish the visual route guidance for airport without instrument approach procedure and responded that the DGCA offered aircraft operator to submit draft visual guidance to DGCA and AirNav Indonesia for further discussion.

During this occurrence, the AIP Volume IV did not include approach guidance for Nabire. The FlyingSAS issued route information of Nabire and Visual Flight Rules (VFR) chart for route Nabire – Sugapa (Bilorai) and return, this guidance was used for internal purpose.

KNKT recommends the DGCA to ensure that the safety recommendation number 04.R-2015-17.6 which published in 2017 is performed for all Indonesian airports without instrument approach procedure.


- **04.R-2018-24.4**

The AIP Volume IV of Nabire published by the DGCA contained different coordinate of the NBR VOR/DME location.

KNKT recommends the DGCA to determine the correct coordinate of NBR VOR/DME and also review the possibility of other incorrect coordinate of navigation aid in the AIP.

5 APPENDICES

5.1 FlyingSAS Operation Notice

	OPERATIONS DEPARTEMENT	36/OD/ON/VI/2018
		20/JUNE/2018
	OPERATION NOTICE	Page 1/1

DATE OF EFFECTIVENESS :	20 JUNE 2018
DISTRIBUTION :	DX, DB, DD, DF, FX, FO, FS , OP
APPLICABILITY :	ALL PT. SAS PILOTS
PREPARED BY :	
VERIFIED BY :	
APPROVED BY :	
SUBJECT :	VFR STABILIZED APPROACH CHECKLIST FOR MOUNTAINOUS FLYING

1. THIS NOTICE TO PILOT WAS ISSUED BASED ON SERIOUS INCIDENT PK-FSL AT NABIRE ON 18 JUNE 2018.
2. TO ALL PT. SPIRIT AVIA SENTOSA PILOTS, MANAGEMENT INSTRUCTION TO ALL PILOTS TO PERFORM DESCEND, APPROACH AND LANDING PROCESS ACCORDING TO FLYINGSAS VFR STABILIZED APPROACH CHECKLIST FOR MOUNTAINOUS FLYING.
3. TO ALL PT. SPIRIT AVIA SENTOSA PILOTS, BELOW ARE PT. SPIRIT AVIA SENTOSA ALAR VFR STABILIZED APPROACH CHECKLIST FOR MOUNTAINOUS AREA:
 - a. Pilot must get or have the **LATEST WEATHER REPORT** for destination and en route. This weather report at the destination must be at the same value or above the VFR requirement.
 - b. Pilot must have **VISUAL (VFR) CHECKPOINT** the position of downwind, base leg, and final leg of the intended runway in use.
 - c. Pilot must fly the aircraft at the **VISUAL (VFR) CHECKPOINT** at the **CORRECT POSITION, CORRECT PATH, CORRECT SPEED, CORRECT AIRCRAFT CONFIGURATION, NO HIGH RATE OF DESCEND, AND ALL CHECKLIST HAS BEEN DONE CORRECTLY AND AS APPLICABLE.**
 - d. Pilot Flying must give the **DESCEND, APPROACH AND LANDING PROFILE BRIEFING** to the Pilot Monitoring before commencing descend.
 - e. If all of **POINT a THROUGH POINT d** above **CAN NOT BE ACHIEVED**, then Pilot Flying **MUST ABORT DESCEND, or CANCEL APPROACH, or GO AROUND or MISS APPROACH AND LANDING and MUST RETURN TO THE SAFE ALTITUDE CHECKPOINT.**
4. PLEASE ACTKNOWLEDGE, FOLLOW SUIT AND DO ALL THIS INSTRUCTION WITH FULL RESPONSIBILITY AND PROFFESIONALISM. THANK YOU FOR YOUR COOPERATIONS.

**** WE CAN SAVE COMPANY'S MONEY BY JUST SIMPLY FOLLOW COMPANY'S S O P ****



OPERATIONS DEPARTMENT

37/OD/ON/VI/2018


26/JUNE/2018

OPERATION NOTICE

Page 1/2

DATE OF EFFECTIVENESS :	26 TH JUNE 2018
DISTRIBUTION :	DX, DF, FX, FO, FS, OP
APPLICABILITY :	ALL PT. SAS PILOTS
PREPARED BY :	
VERIFIED BY :	
APPROVED BY :	
SUBJECT :	CREW CRM AND CONFIDENCE LEVEL

1. THIS NOTICE TO PILOT WAS ISSUED BASED ON ON SERIOUS INCIDENT PK-FSL AT NABIRE ON 18 JUNE 2018
2. TO ALL PT. SPIRIT AVIA SENTOSA PILOTS, MANAGEMENT INSTRUCTION TO ALL PILOTS TO IMPROVE THE CREW CRM LEVEL DURING APPROACH AND LANDING EXECUTION.
3. HOW TO IMPROVE THE CREW CRM LEVEL DURING APPROACH AND LANDING EXECUTION:
 - a. BEFORE DESCEND GIVE DESCEND AND APPROACH BRIEFING, SO BOTH PILOT SHOULD KNOW WHAT PERFORMANCE TO EXPECT FROM EACH OTHER WHEN CONDUCTING THE APPROACH UNTIL LANDING EXECUTION.
 - b. IF THERE IS A CHANGE FROM PREVIOUS BRIEFFED ACTION, AN UPDATE BRIEFFING MUST BE GIVEN.
 - c. BOTH PILOTS MUST PERFORM STANDARD CALL OUT DURING ALL PHASE.
 - d. THE APPROACH MUST BE CONDUCTED ACCORDING TO THE FLYINGSAS VFR STABILIZED APPROACH CHECKLIST FOR MOUNTAINOUS FLYING.
 - e. BOTH PILOT MUST CHECK AND CROSS CHECK EVERY DECISION MADE DURING ALL PHASE.
 - f. IF IN HIS/HER OPINION THE FIRST OFFICER / S I C / PILOT MONITORING DECIDE THAT THE MISS APPROACH OR GO AROUND MUST BE INNITATE THEN THE "MISS APPROACH OR GO AROUND" CALL MUST BE GIVEN.
 - g. THE CAPTAIN / P I C / PILOT FLYING MUST PERFORM THE MISS APPROACH OR GO AROUND INSTANTLY WITHOUT ANY HESITATE AFTER "MISS APPROACH OR GO AROUND" CALL BEING GIVEN.
4. TO ALL PT. SPIRIT AVIA SENTOSA PILOTS, MANAGEMENT INSTRUCTION TO ALL PILOTS NOT TO OVER CONFIDENCE TO CONTINUE AN APPROACH AND LANDING IF THERE IS/ARE AN INFORMATIONS/EVIDENCES THAT IF YOUR APPROACH IS CONTINUED WILL LEAD TO AND INCIDENT OR ACCIDENT.

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	OPERATION NOTICE	Page 2/2

5. "MISS APPROACH OR GO AROUND IS THE BEST OPTION THAN HAVING AND INCIDENT OR ACCIDENT. MISS APPROACH OR GO AROUND IS NON PUNITIVE ACTION".

"IT IS BETTER TO TRY AGAIN OR RTB THAN MAKE INCIDENT OR ACCIDENT TO YOUR AIRCRAFT"

CONSEQUENCES:

- AIRCRAFT HAD INCIDENT, AIRCRAFT GROUNDED, LOST REVENUE, AIRCRAFT LEASE STILL TO BE PAYED, LOST OF COMPANY MONEY.
- AIRCRAFT HAD ACCIDENT, AIRCRAFT TOTAL LOST, LOST REVENUE, AIRCRAFT LEASE STILL TO BE PAYED, LOST OF COMPANY MONEY, LOST EVERYTHING.
- IF THERE IS EVIDENCE BRAKING OF COMPANY'S S O P, POSSIBLY NO INSURANCE COVER TO BE RELEASE.
- PILOT GROUNDED, ADMINISTRATIF PUNISHMENT, RE-TRAINING, LOST TIME AND INCOME.
- SPAREPART MUST TO BE CHANGED, LOST OF TIME AND COMPANY MONEY.
- DGCA INQUIRY, INSPECTION, ASSESSMENT, RECOMMENDATION, AND CORRECTIVE ACTION, LOST OF COMPANY MONEY.
- KNKT INQUIRY, INSPECTION, ASSESSMENT, RECOMMENDATION, AND CORRECTIVE ACTION, LOST OF COMPANY MONEY.
- COMPANY IMAGE RUINED. OPERATION COULD BE SUSPENDED.
- COMPANY AOC COULD BE REVOKED OR SUSPENDED.
- JOB LOST FOR EVERYONE.

6. PLEASE ACKNOWLEDGE. FOLLOW SUIT AND DO ALL THIS INSTRUCTION WITH FULL RESPONSIBILITY AND PROFESIONALISM. THANK YOU FOR YOUR COOPERATIONS.

**** WE CAN SAVE COMPANY'S MONEY BY JUST SIMPLY FOLLOW COMPANY'S S O P ****

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