Aircraft Accident Investigation Authority of the Bahamas

Aviation Short Investigation Final Report

Loss of Control – Inflight (LOC-I)

Piper PA-32R-301, N9253M

Near the Exuma Cays, Bahamas
9th June 2023

AAIA Aviation Occurrence Investigation

Report Number #OCC – 2023/0023

Final Report

24th May 2024

Released in accordance with Section 25 and Section 1.445 of the *Aircraft Accident Investigation Authority Act 2021 and Regulations, 2019 respectively*.

Publishing information

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About the AAIA

The Aircraft Accident Investigation Authority (AAIA) is the independent accident investigation agency under the Bahamas' Ministry of Energy & Transport (MOET) charged with the responsibility of investigating all aviation accidents and serious incidents in the Bahamas.

The AAIA's function is to promote and improve safety and public confidence in the aviation industry through excellence in:

- Independent investigation of aviation accidents and other safety occurrences
- Safety data recording, analysis and research
- Fostering safety awareness, knowledge and action.

The AAIA does not investigate for the purpose of apportioning blame or to provide a means for determining liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the AAIA endeavors to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

The AAIA performs its functions in accordance with the provisions of the Aircraft Accident Investigation Authority Act 2019 and Regulations 2021, International Civil Aviation Organization (ICAO) Annex 13 and, where applicable, relevant international agreements.

The Aircraft Accident Investigation Authority is mandated by the Ministry of Energy & Transport to investigate aviation accidents and incidents, determine probable causes of accidents and incidents, issue safety recommendations, study transportation safety issues and evaluate the safety effectiveness of agencies and stakeholders involved in air transportation. The objective of a safety investigation is to identify and reduce safety-related risk. AAIA investigations determine and communicate the safety factors related to the transport safety matter being investigated.

The AAIA makes public its findings and recommendations through accident reports, safety studies, special investigation reports, safety recommendations and safety alerts. When the AAIA issues a safety recommendation, the person, organization or agency is required to provide a written response without delay. The response shall indicate whether the person, organization or agency accepts the recommendation, any reasons for not accepting part or all of the recommendation(s), and details of any proposed safety action(s) resulting from the recommendation(s) issued.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.

AIRCRAFT ACCIDENT

INVESTIGATION AUTHORITY

Registered Owner:	Blue Eagle Air LLC
Manufacturer:	Piper
Aircraft Type:	PA-32R-301
Nationality:	United States
Registration:	N9253M
Place of Accident:	43 NM North West of Stella Maris Airport (MYLS), Long Island, Bahamas
Date and Time:	9th June, 2023, 11:03 am EDT (1503) UTC
Notification:	Civil Aviation Authority Bahamas (CAA-B) National Transportation Safety Board (NTSB) United States
Investigating Authority:	Aircraft Accident Investigation Authority, Ministry of Energy & Transport
Investigator in Charge:	Jaime Nixon
Releasing Authority:	Aircraft Accident Investigation Authority
Final Report Publication:	24th May 2024

History of Flight

On Friday 9th June 2023 at 11:49 am EDT (1549 UTC[1]), the Aircraft Accident Investigation Authority (AAIA) received notification of an occurrence involving a Piper PA-32R-301 aircraft with United States registration N9253M. The aircraft was reported to have lost radar contact with Miami Air Route Traffic Control Center[2] (ARTCC) Georgetown Radar at a position of approximately 43 NM north west of the Stella Marris Airport (MYLS), Stella Maris, Long Island, Bahamas at coordinates 23 59 39.6N 075 55 11.7W at approximately 11:03 am EDT (1503 UTC).

The aircraft, which departed the North Palm Beach County Airport (F45), West Palm Beach, FL, USA on an Instrument Flight Rules (IFR) flight plan at approximately 8:43 am EDT, was enroute to the Stella Maris Airport (MYLS), with a final destination of Rum Cay, Bahamas with the pilot as the sole person on board the aircraft.

At 8:46 am (1246 UTC), Palm Beach TRACON[3] issued the following clearance to N9253M, "from North Palm Beach County Airport, FL (F45) to the Stella Maris Airport, Bahamas (MYLS) via radar vectors direct, maintain 2,000 feet expect 9,000 feet 10 minutes after departure, frequency 128.3 squawk 0030, hold for release". The pilot in command read back the correct clearance.

The pilot remained in contact with the Palm Beach facility until 9:09 am when he was handed over to Miami Air Route Traffic Control Center (ZMA) Freeport Low Position on frequency 133.4 MHz at an altitude of 6,000 feet. After establishing contact with Miami Center, N9253M was given instructions to climb to 9,000 feet, which the pilot complied.

At 9:14 am, the pilot in command of N9253M requested to deviate from route of flight due to weather. Miami Center approved the request and also cleared the aircraft direct to its destination when able.

At 9:30 am, Miami Center Freeport Low instructed N9253M to contact Miami Center Bimini High Position on frequency 125.6 MHz. The pilot in command acknowledged and complied while at an altitude of 9,000 feet.

At 9:47 am, N9253M was instructed to contact Miami Center Nassau Low Radar on frequency 125.7 MHz, which the pilot complied. Nassau Low Radar Position issued the local altimeter setting to the aircraft and afterwards, the pilot in command stated that he may need to deviate from his route of flight due to weather. Miami Center approved the request and the aircraft deviated to the left of its course.

At 9:59 am, N9253M was instructed to contact Nassau Approach Control on frequency 121.0 MHz. The pilot in command acknowledged and complied.

Radar contact was established with Nassau Approach control at 10:01 am, and the aircraft remained in contact with Nassau Approach until instructed to contact Miami Center Georgetown Radar, and the pilot acknowledged and complied, with contact made at 10:30 am while at an altitude of 9,000 feet.

[1] UTC (Coordinated Universal time) - a single time standard for global aviation based upon the time at 0 degrees East/West (the Greenwich Meridian)
[2] Air Route Traffic Control Centers (ARTCC) - Centers are established primarily to provide air traffic service to aircraft operating on IFR flight plans within controlled airspace, and principally during the en route phase of flight.
[3] TRACON (Terminal radar approach control) - are U.S. Federal Aviation Administration (FAA) facilities that house air traffic controllers who guide aircraft approaching and departing airports

Miami Center Georgetown Radar provided the local altimeter setting as well as Significant Meteorological Information (SIGMET[4]) to N9253M. At 10:54 am, N9253M informed Miami Center Georgetown Radar that they were in Instrument Meteorological Conditions[5] (IMC).

At 10:56 am, the pilot in command of the aircraft advised Miami Center that he was having difficulty maintaining altitude while flying through IMC. Miami Center then asked N9253M if it was stalling. The pilot in command responded but the transmission was unreadable.

A Cessna Citation V jet that was in the vicinity of N9253M informed Miami Center Georgetown Radar that they believed the aircraft was behind them and it was a “rough ride”, referring to the weather, and that it was "rapidly intensifying”.

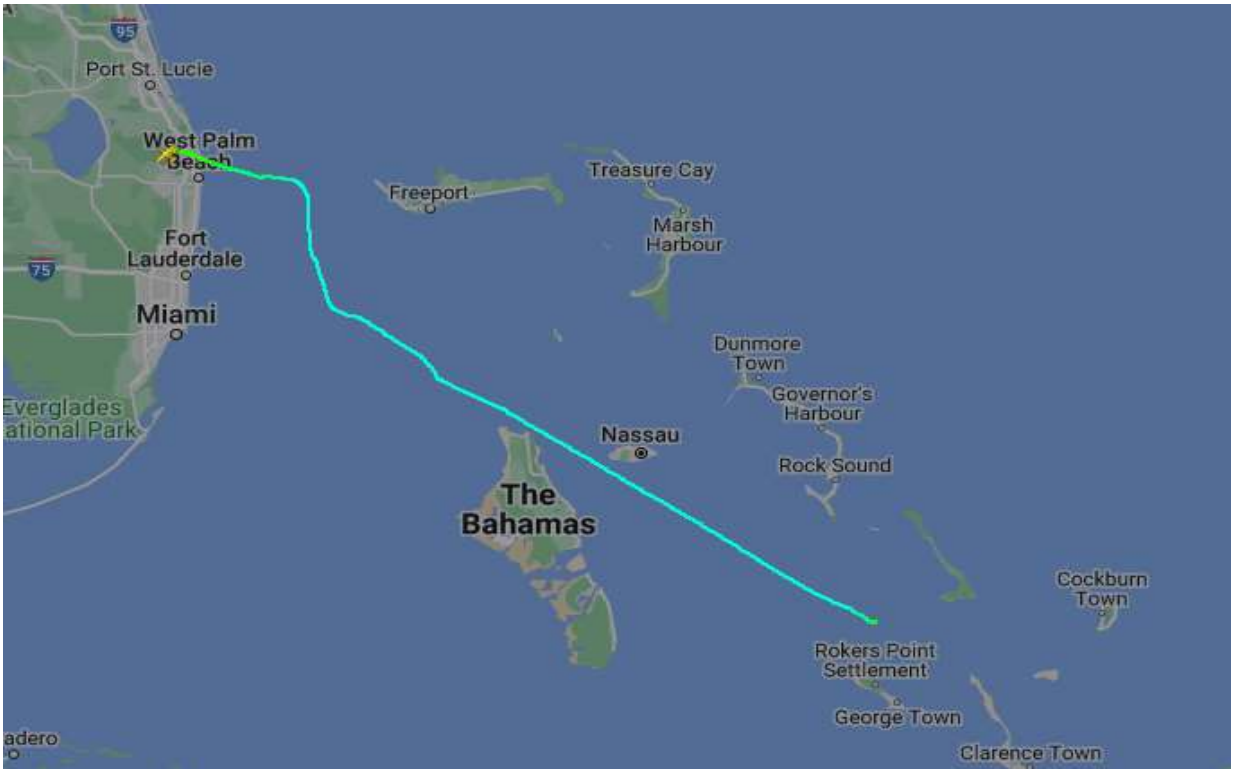


Fig.1: N9253M Route of Flight

At 10:57 am, Miami Center Georgetown Radar broadcasted for N9253M, but did not get a response. Miami Center then requested assistance from an Envoy Air regional jet (ENY4235) in the vicinity to look out for N9253M. Coordinates were given to ENY4235 by Miami Center and they acknowledged and confirmed that they would assist.

Additionally, Miami Center requested ENY4235 to do a relay transmission on the frequency for N9253M. At 10:59 am Envoy Air acknowledged and complied.

[4] SIGMET - Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations

[5] Instrument Meteorological Conditions (IMC) - are meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions (VMC)

At 11:00 am, Miami Center advised ENY4235 that there may be a downdraft in the area and asked if they received a response to their relay transmission for N9253M. ENY4235 advised that they did not receive a response.

At 11:01 am, Miami Center provided updated coordinates for N9253M to ENY4235, which was acknowledged. Envoy Air then advised that the rain was becoming more intense and that they were in IMC conditions, but they would remain on alert for the aircraft.

At 11:03 am, ENY4235 broadcasted for N9253M on frequency. Miami Center additionally broadcasted on guard frequency[6] (121.5 MHz). At this time, the last reported altitude observed on radar by Miami Center for N9253M was 2,900 feet at coordinates 23 59 39.6N 075 55 11.7W.

At 11:04 am, ENY4235 advised Miami Center that it did not receive a response to its relay broadcast for N9253M on frequency. Miami Center then began to initiate emergency protocols for distressed aircraft, including making contact with relevant air traffic personnel and external agencies.

Shortly after, Nassau Approach Control received notification from Miami Center indicating that radar contact was lost with N9253M. It was also relayed that prior to radar contact being lost, the aircraft reported some difficulty maintaining its assigned altitude due to inclement weather.

Nassau Approach Control then initiated local emergency response protocols and notified the Royal Bahamas Police Force (RBPF), Royal Bahamas Defense Force (RBDF), US Coast Guard, and the Bahamas Air Sea Rescue Association (BASRA).

Marine and aerial assets were dispatched to the last known area in search of the aircraft.

Search and rescue efforts continued into Saturday 10th June, 2023. The Royal Bahamas Defense Force vessel, HMBS Bahamas, located and recovered a life jacket and aircraft seat at coordinates 24 05.97N 075 50.40W, later identified as coming from the missing aircraft.

Search and recovery efforts were conducted until 12th June, 2023, when at that time weather conditions did not allow efforts to continue. Additionally, a bilge pump[7] was located and recovered, confirmed to have come from the missing aircraft, based on post-accident investigation and interviews.

Up to the time of writing this report, the pilot in command of the aircraft has not been found and there were no additional aircraft parts or components located.

[6] Guard Frequency -a frequency used on the aircraft band reserved for emergency communications for aircraft in distress

[7] Bilge pump -a key piece of equipment found on boats to remove water that collects in the bilge, which is the bottom of the inside of a boat's hull

Fig.2: Stock photo of aircraft

Investigation Findings

Pilot Experience

Pilot

The pilot in command of N9253M was 66 years of age at the time of the accident. He possessed a Private Pilot's license issued by the United States Federal Aviation Administration (FAA) on the 16th July, 2013 with an Airplane Single Land and Instrument rating.

At the time of the accident, the pilot had accumulated approximately 1,627 hours of total flight time.

He held a Third Class medical certificate issued 12th September, 2022 with the limitation "must wear corrective lens for distant vision and have glasses for near vision".

The Aircraft

The Piper PA-32R-301 Saratoga is a renowned single-engine aircraft with a rich history. Introduced by Piper Aircraft in 1980, it is the descendant of the esteemed Piper Cherokee Six and Lance models. This aircraft has earned a reputation among pilots for its impressive capabilities and versatility across various missions, such as personal travel, business trips, and flight training.

The airplane is an all metal, low wing, single engine airplane equipped with tricycle landing gear.

This airplane is certified in the normal category. In the normal category all aerobatic maneuvers including spins are prohibited. The airplane is approved for day and night VFR/IFR operations when equipped in accordance with F.A.R. 91 or F.A.R 135.

The aircraft is powered by a Lycoming IO-540-K1G5D engine and is rated at 300 horsepower. It is a six cylinder, normally aspirated, direct drive, air cooled, horizontally opposed, fuel injected engine.

The standard fuel capacity of the airplane is 107 gallons. The inboard tank is attached to the wing structure with screws and nut plates. The outboard tank consists of a bladder fuel cell that is interconnected with the inboard tank.

The aircraft serial number was 32R-8513010. This aircraft engine serial number was L-227202-48A. The most recent annual inspection listed engine time Since Major Over Haul (SMOH) at 1482.0 hours on 17th February, 2023. The propeller was manufactured by McCauley, propeller model B3D36C433-C, Serial Number 130752. The last annual inspection propeller Service Time was 490.0 hours on 17th February, 2023. The last annual inspection listed airframe Total Time at 4056.0 hours recorded on 17th February, 2023.

The AAIA received documentation of the aircraft maintenance records, Airframe Annual Sign Off, Engine Annual Sign Off, Propeller Annual Sign Off and a compliance list for the Airworthiness Directives (AD's) from the maintenance provider. Review of records provided revealed compliance with the manufacturers' maintenance manual and Title 14 US Code of Federal Regulations Part 91.409 (a) 1 (Annual Inspections).

Weather

Conditions at Accident Site	**Condition of Light**
Instrument Meteorological Conditions	Day
Observation Facility	**Observation Time**
MYCB (New Bight Airport, Cat Island, Bahamas)	1500
Distance From Accident Site	**Temperature/ Dewpoint**
45 NM	23°C/23°C
Lowest Cloud Condition	**Wind**
FEW008	160/04 KTS (Varying between 130° to 190°)
Altimeter Setting	**Visibility**
29.99 in. HG	2 Statute Miles

Weather information was provided by the Bahamas Meteorological Department via a comprehensive weather package that included the Bahamas Area Forecast, METAR[8] information, satellite imagery, and surface analysis charts.

Additionally, a Meteorology Specialist Analysis Report was provided by the National Transportation Safety Board (NTSB) in support of the investigation into this occurrence.

On Tuesday 6th June 2023, the Bahamas Meteorological Department issued a Special Weather Statement covering the period of Wednesday 7th June to Saturday 10th June, 2023.

[8] METAR -is a format for reporting weather information.

THE BAHAMAS DEPARTMENT OF METEOROLOGY
Forecast Office Section
P.O. Box N-8330
Telephone No. 377-7178
Fax No. 377-5275
Nassau, Bahamas

SPECIAL WEATHER STATEMENT
Issued by The Bahamas Department of Meteorology
at 9:00 PM Tuesday, 6th June, 2023

Inclement and wet-weather pattern is expected for the Central and Southeast Bahamas from Wednesday, 7th June through Saturday, 10th June 2023.

Deep layered troughing across the area is expected to bring a very warm and moist airmass over the islands beginning on Wednesday. The feature will generate unsettled weather conditions with heavy showers and thunderstorms, mainly across the Central Bahamas. Excessive rainfall is forecast for Thursday and Friday in particular. There is a moderate risk of flooding in low-lying and flood-prone areas.

Portions of the Central Bahama, namely Exuma, Cat Island, Long Island, San Salvador and Rum Cay should expect maximum rainfall accumulations 4 to 6 inches over a 3 day period, and isolated maxima of up to 8 to10 inches over the next 5 days. Residents should remain vigilant and ready to take the necessary action to protect their property due to the impending conditions. Motorists should maneuver with extreme caution due to ponding on roads during and after heavy and prolonged rainfall events.

Please continue to monitor updates issued by The Bahamas Department of Meteorology concerning this weather event.

Kaylinda Ward-Forbes, CMO
Bahamas Department of Meteorology

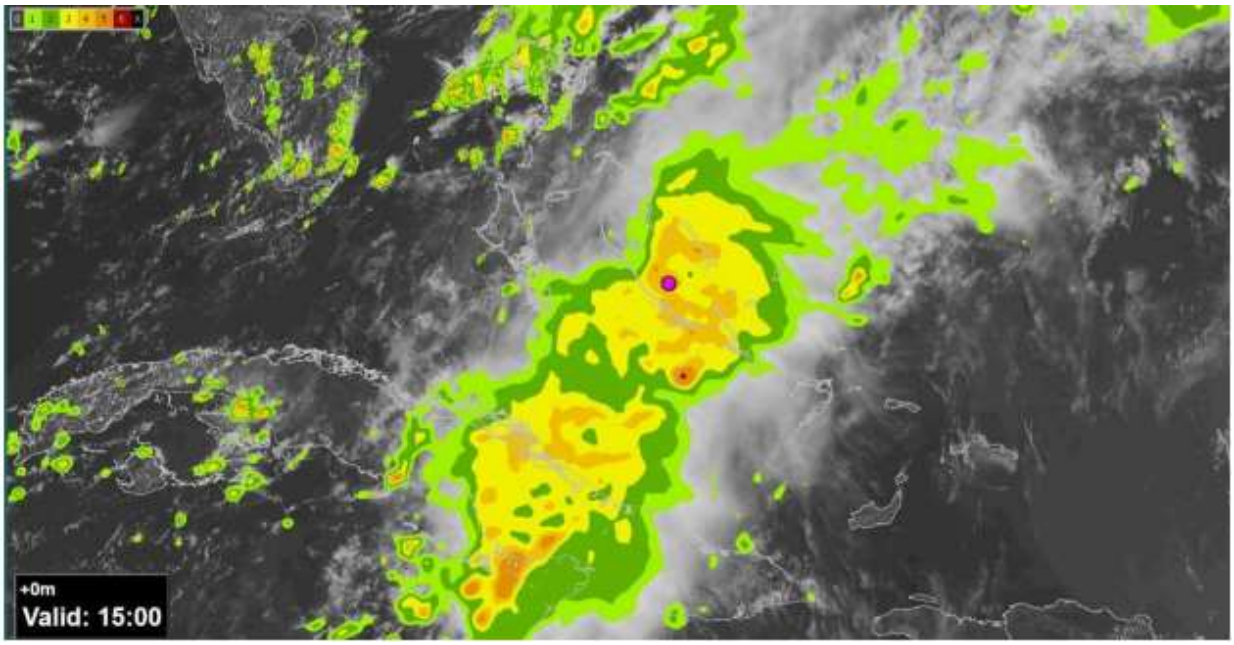


Fig.3: Merged OPC[9] Precipitation Image at 11:00 am (NTSB Specialist Report) Purple dot last known position of N9253M

At 7:15 am on Friday 9th June 2023, the National Weather Service (NWS) Aviation Weather Center (AWC) issued Significant Meteorological Information (SIGMET) Information Kilo 6 (pink polygon in figure below) that was active for the last known location of the aircraft until 11:15 am. The issued SIGMET advised of frequent thunderstorms in the Central Bahamas with expectation of intensification up to the end of the validity period.

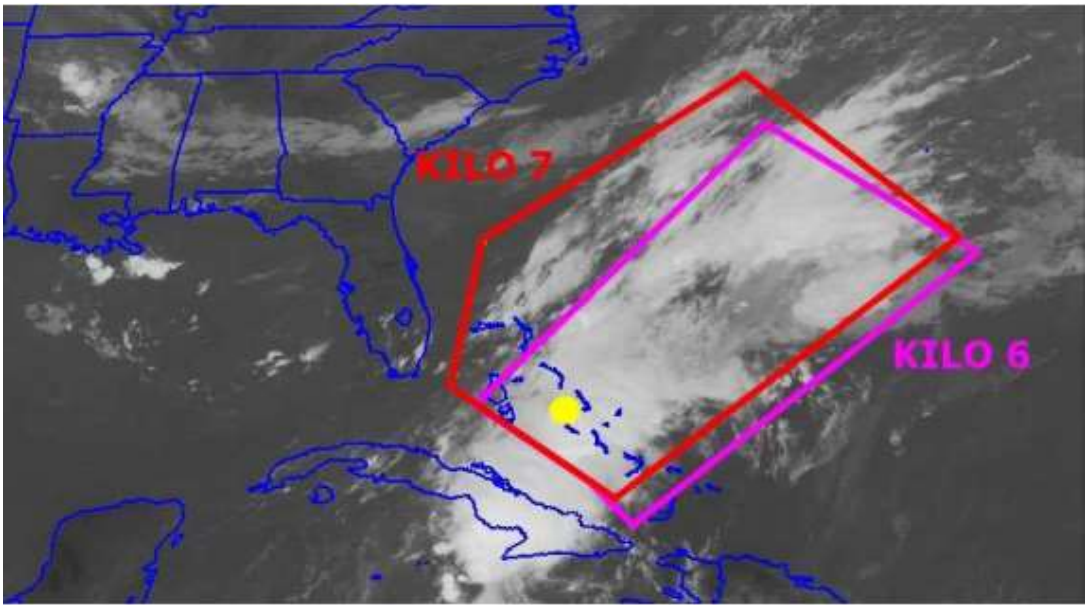
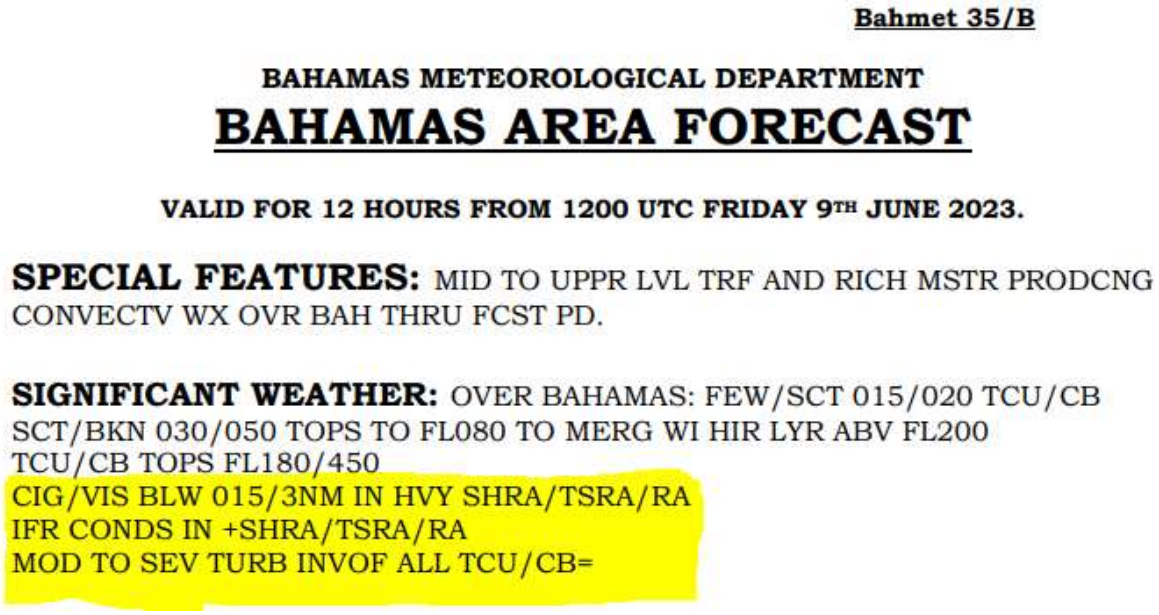


Fig.4: SIGMET Advisories (NTSB Specialist Report) Yellow dot denotes last known location of N9253M

[9] Offshore prediction capability (OPC) – provides lightning, satellite and numerical weather prediction model data to create radar like weather mosaics for use by Air Traffic Control



Bahmet 35/B

BAHAMAS METEOROLOGICAL DEPARTMENT

BAHAMAS AREA FORECAST

VALID FOR 12 HOURS FROM 1200 UTC FRIDAY 9TH JUNE 2023.

SPECIAL FEATURES: MID TO UPPR LVL TRF AND RICH MSTR PRODCNG CONVECTV WX OVR BAH THRU FCST PD.

SIGNIFICANT WEATHER: OVER BAHAMAS: FEW/SCT 015/020 TCU/CB SCT/BKN 030/050 TOPS TO FL080 TO MERG WI HIR LYR ABV FL200 TCU/CB TOPS FL180/450
CIG/VIS BLW 015/3NM IN HVY SHRA/TSRA/RA
IFR CONDS IN +SHRA/TSRA/RA
MOD TO SEV TURB INVOF ALL TCU/CB=

Fig.5: Top portion of Area Forecast

Additionally, the highlighted portion of the Significant Weather section of the Bahamas Area Forecast indicated Instrument Meteorological Conditions with heavy rain showers and thunderstorms with moderate to severe levels of turbulence in the vicinity of towering cumulus and cumulonimbus clouds.

The visible thunderstorm cloud is only a portion of a turbulent system whose updrafts and downdrafts often extend far beyond the visible storm cloud. Severe turbulence can be expected up to 20 miles from severe thunderstorms. This distance decreases to about 10 miles in less severe storms.

Turbulence beneath a thunderstorm should not be minimized. This is especially true when the relative humidity is low in any layer between the surface and 15,000 feet. Then the lower altitudes may be characterized by strong out flowing winds and severe turbulence.

Wreckage and Impact Information

The last known location of the aircraft was identified at coordinates 23 59 39.6N 075 55 11.7W, the point at which N9253M lost radar contact with Miami Center at an approximate distance of some 43 nautical miles from Stella Maris Airport (MYLS).

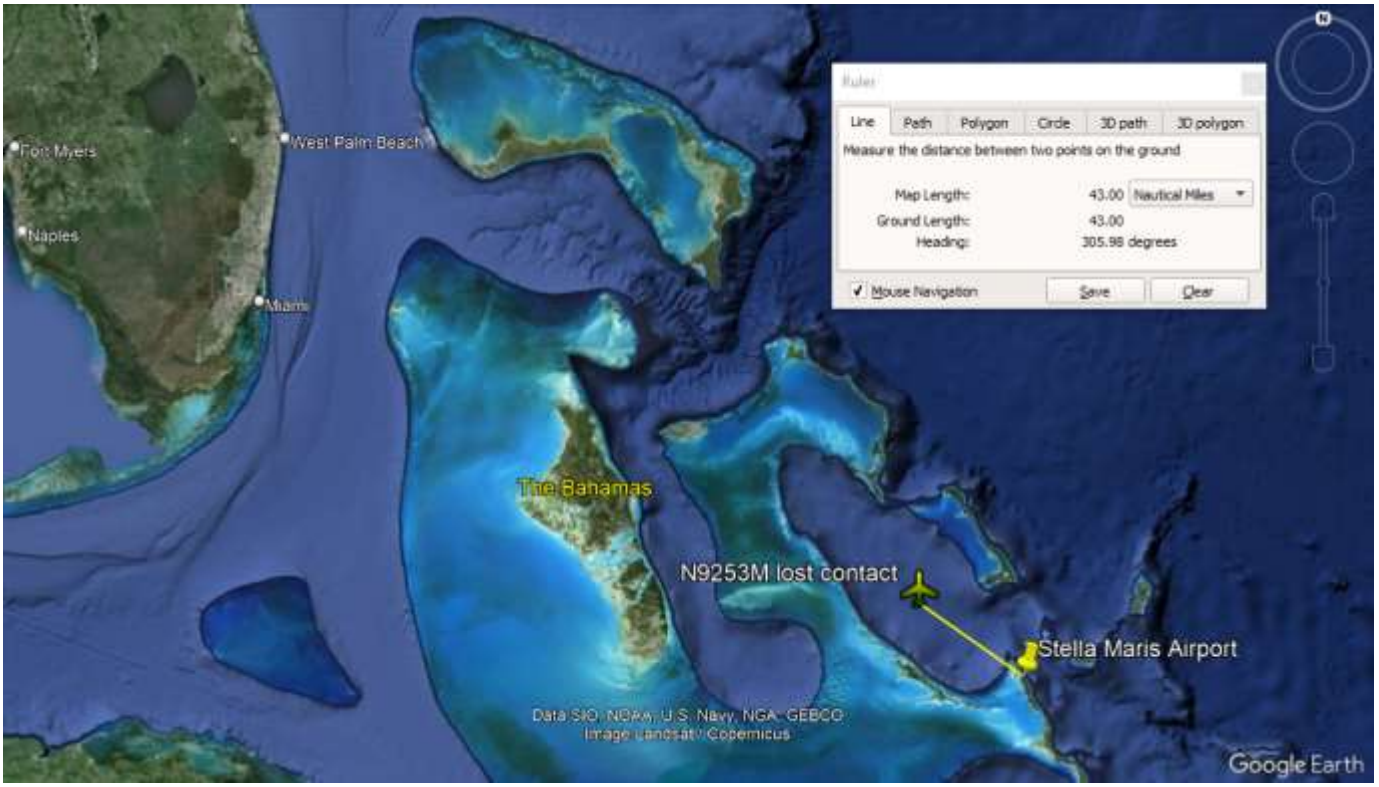


Fig.6: Last known position of N9253M in relation to destination Stella Maris Airport (MYLS)

The aircraft was never located. During search and rescue, three (3) items (aircraft seat, life vest, bilge pump) were recovered, which investigations later revealed were from N9253M.

Fig. 7: Photos of aircraft seat and bilge pump found during search and rescue for N9253M

Search and Rescue

Nassau air traffic control made initial contact with the Operations Control Center (OCC) of the Royal Bahamas Defense Force (RBDF) at 11:20 am, a short while after Miami Center had lost radar contact with N9253M. Additionally, information was also relayed to the United States Coast Guard.

Subsequently, RBDF OCC coordinated with the Search and Rescue Group (SAR) to inform marine assets on patrol of the missing aircraft, providing them with last known coordinates and requisite instructions to provide assistance.

Shortly after 12 noon, United States Coast Guard and US Customs launched the following aerial assets to assist in search:

US Coast Guard MH-60 (helicopter)
US Coast Guard HC-144 (Fixed Wing Aircraft)
US Customs and Border Protection Black Hawk (helicopter)

By 12:30 pm, RBDF OCC had been notified that checks at airports near the last known location of N9253M (including Stella Maris Airport, New Bight Airport, Deadman's Cay Airport, Staniel Cay Airport, Black Point Airport, Norman's Cay Airport and Arthur's Town Airport) all yielded negative sighting of the aircraft.

Upon arrival at the last known location of the aircraft, United States Coast Guard aerial assets observed what appeared to be bubbles of fuel rising to the surface as well as an "oil sheen" in the general area.

The RBDF vessel HMBS Bahamas, by this time, was already enroute to the scene to aid in search and rescue efforts.

Aerial search continued until 8:30 pm that night, with surface assets of the RBDF to continue.

On 10th June, 2023, HMBS Bahamas while conducting searches, retrieved an aircraft seat and life vest at coordinates 24 05.97N 075 50.40W, approximately 5 NM north east from the point of lost radar contact with N9253M. These items were later identified as belonging to N9253M.

Later that evening, the HMBS Bahamas also located a bilge pump at coordinates 24 04.43N 075 21.37W, approximately 30 NM east of the last point of radar contact with the aircraft. Post-accident investigations revealed that the bilge pump was loaded onto the aircraft prior to the accident flight.

RBDF vessel HMBS Kamalamee joined the HMBS Bahamas in search for N9253M, but by end of the day, their efforts did not yield any results.

The following day on 11th June, 2023, HMBS Kamalamee continued its search efforts, but again, yielded no results. Search efforts continued until Monday 12th June, 2023, when weather conditions disrupted the ability to continue.

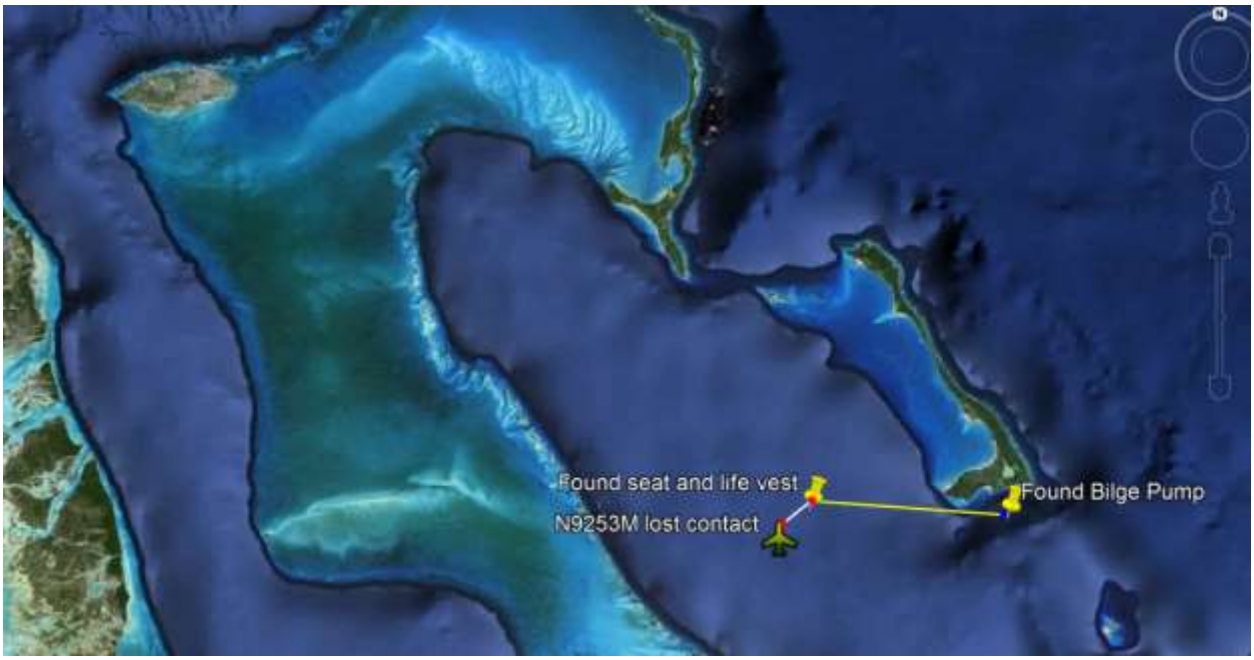


Fig.8: Location of found aircraft seat and life vest and bilge pump in relation to last known location of N9253M

Human Factors

Investigations revealed that in the 24 hours preceding the accident, there was no indication of any serious health concerns for the pilot, other than what was described as some “back pain” but no medication was being used or was prescribed. The pilot was described as being in “good spirits” and adequately rested.

The pilot was a second home owner in The Bahamas, on the island of Rum Cay, for over 15 years and would have had experience flying this particular route, having to first stop at a Port of Entry Airport like Stella Marris (MYLS) for the purpose of Customs and Immigration, before flying on to Rum Cay.

There was no indication that there was a concern about the weather, as the pilot was making the trip to Rum Cay along with a friend and fellow second home owner, who piloted another aircraft.

It was determined that there was an apparent familiarity, based on the pilot’s experience flying in Florida and The Bahamas, with the occurrence of thunderstorms during that time of year. The extent to which this familiarity may have created a false sense of security which contributed to the decision to conduct the flight could not be determined.

Analysis

Post-accident, an extensive review was conducted of the maintenance documentation that was provided by the maintenance service provider for N9253M. Review of the documentation received revealed that the aircraft was maintained in accordance with the manufacturers' maintenance manual and Title 14 US Code of Federal Regulations Part 91.409 (a) 1 (Annual Inspections).

Additionally, there was no evidence received or any notification obtained of a defect or malfunction with the aircraft airframe or its engine prior to the accident flight.

Based on the issuance of a Special Weather Statement by the Bahamas Meteorological Department on the 6th June, 2023 concerning heavy rainfall and thunderstorms for the Central Bahamas from 7th – 10th June, 2023 and also, the issuance at 7:15 am on 9th June, 2023 of a SIGMET, special attention was placed on aspects related to weather which would have had the potential to pose a serious hazard.

During the accident flight, it was noted that on two (2) occasions, N9253M made a request with Miami Center to deviate from route of flight to avoid inclement weather.

In and around the period that N9253M indicated with Miami Center that it was having difficulty maintaining altitude (10:56 am), a Cessna Citation V and an Envoy Air regional jet (ENY4235) operating in the vicinity, also indicated to Miami Center that they were experiencing severe weather conditions.

At 11:03 am, Miami Center received last radar contact with N9253M at a position of coordinates 23 59 39.6N 075 55 11.7W at an altitude of 2,900 feet approximately some 43 NM north west of the Stella Maris Airport (MYLS), Stella Maris, Long Island, Bahamas.

In support of this investigation, a request was made to the National Transportation Safety Board (NTSB) to provide a Meteorological Specialist Report. The NTSB Specialist Analysis Report identified that satellite imagery displayed deep convection around the last known location of the aircraft (around coordinates 23 59 39.6N 075 55 11.7W). Lightning in that area also confirmed the presence of thunderstorm activity. This activity was characterized as having associated heavy to extreme levels of precipitation.

The NTSB Specialist Report concluded that the meteorological environment in the area of the last known location of N9253M was characterized by convective hazards that included instrument meteorological conditions, extreme turbulence, lightning, and icing at higher altitudes.

In consideration of the preponderance of evidence received relative to the prevailing hazardous weather conditions that existed at the time of the occurrence, and also the transmissions of the pilot in command of N9253M and other airman operating in the vicinity, it seems apparent that severe and turbulent weather conditions associated with convective thunderstorm activity may have contributed to a loss of control in-flight (LOC-I) event taking place from which the pilot could not recover.

Findings

These findings should not be read as apportioning blame or liability to any particular organization or individual.

1. The aircraft was certified, registered and equipped in accordance with applicable United States Aviation Regulations and approved procedures.

2. The maintenance records provided indicated that the aircraft was maintained in accordance with existing United States Aviation Regulations and approved procedures.

3. The maintenance records provided indicated that the most recent annual inspection conducted on the aircraft was at an airframe total time (TT) of 4,056 hours and engine total time since major overhaul (SMOH) 1482 hours completed on 17th February, 2023.

4. There was no evidence of any defect or malfunction in the aircraft, prior to the accident flight, which may have contributed to the accident.

5. The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR); neither was required by regulations.

6. There was no evidence of airframe failure or engine malfunction prior to the accident.

7. The pilot in command possessed a Private Pilot License with Single Engine and Instrument ratings issued by the United States Federal Aviation Administration (FAA) on 16th July, 2013.

8. The pilot in command of the aircraft held a valid Third Class Medical issued 12th September, 2022 with limitation must wear corrective lens for distant vision and have glasses for near vision.

9. The Bahamas Meteorological Department issued a Special Weather Statement for the Central and Southeastern Bahamas on 6th June, 2023 to be in effect during the period of Wednesday 7th – Saturday 10th June, 2023 indicating heavy showers with excessive rainfall and thunderstorms.

10. On 9th June, 2023, at 7:15 am, the National Weather Service (NWS) Aviation Weather Center (AWC) issued Significant Meteorological Information (SIGMET) Information Kilo 6 which was applicable to areas within the Central Bahamas and warned of frequent thunderstorms expected to intensify during a period up to 11:15 am that day.

11. During the course of the accident flight, the airman was provided with weather information on several occasions, including SIGMET information.

12. During the accident flight, the pilot in command made request on two (2) occasions with Miami Center to deviate from his route of flight due to weather.

13. At 10:56 am, N9253M informed Miami Center Georgetown Radar that they were experiencing difficulties and were unable to maintain altitude.

14. A Cessna Citation V operating in the vicinity of N9253M informed Miami Center that they believed N9253M were behind them and they were having a “rough ride” and also that the

weather “was intensifying”.

15. At 11:03 am, Miami Center received last radar contact with N9253M at a position of coordinates 23 59 39.6N 075 55 11.7W at an altitude of 2,900 feet approximately some 43 NM north west of the Stella Maris Airport (MYLS), Stella Maris, Long Island, Bahamas.

16. Based on the National Transportation Safety Board (NTSB) Meteorology Specialist Analysis Report dated 21st September, 2023, the meteorological environment around the last known location of N9253M was characterized by convective hazards that included instrument meteorological conditions, extreme turbulence, lightning, and icing at higher altitudes.

17. Graphical and textual weather documentation gathered to cover the period of this occurrence for the aircraft route of flight through the Central Bahamas, identified the presence of hazardous convective weather that posed a potential danger to aircraft operating in the vicinity.

18. Based on weather information gathered and the transmissions of the pilot in command of N9253M and other airman operating in the vicinity, it seems apparent that a loss of control event may have taken place from which the pilot could not recover.

19. On 10th June, 2023, RBDF Vessel HMBS Bahamas, while conducting searches, retrieved an aircraft seat and life vest at coordinates 24 05.97N 075 50.40W, approximately 5 NM north east from the point of lost radar contact with N9253M. These items were later identified as belonging to N9253M.

20. Additionally, the HMBS Bahamas also located a bilge pump at coordinates 24 04.43N 075 21.37W, approximately 30 NM east of the last point of radar contact with the aircraft. Post-accident investigations revealed that the bilge pump was loaded onto the aircraft prior to accident flight.

21. At the time of release of this accident report, neither the pilot nor the aircraft has been located.

Probable Cause

The AAIA has determined the probable cause of this accident to be loss of control in-flight (LOC-I). Contributing factor to this occurrence include:

- The aircraft entering a meteorological environment characterized by the presence of convective hazards inclusive of thunderstorms associated with turbulence and heavy to extreme precipitation. It seems apparent that this environment produced hazards that led to a loss of control event taking place from which the pilot was unable to recover.

Safety Message

Whether or not the AAIA identifies safety issues in the course of an investigation, pilots and air operators should proactively initiate safety action in order to reduce their safety risk.

Due to the circumstances surrounding this occurrence as it relates to thunderstorms, the AAIA finds it necessary to attach the safety message below to aid and remind the aviation community of the hazards posed by thunderstorms and what steps can be taken to avoid situations that can result in injury and/or death.

As thunderstorms do pose a threat to the safe operation of aircraft, it is always wise to exercise caution when operating in and around the vicinity of thunderstorms. Turbulence, hail, rain, snow, lightning, sustained updrafts and downdrafts, icing conditions−can all be present in thunderstorms. While there is some evidence that maximum turbulence exists at the middle level of a thunderstorm, recent studies show little variation of turbulence intensity with altitude.

The Aeronautical Information Manual is one source that provides information useful for the operation of aircraft in such conditions. The following was taken from the Aeronautical Information Manual (effective 4/20/23) Chapter 7 Safety of Flight; Section 1 - Meteorology; 7-1-27. Thunderstorm Flying:

a. Thunderstorm Avoidance. Never regard any thunderstorm lightly, even when radar echoes are of light intensity. Avoiding thunderstorms is the best policy. Following are some Do's and Don'ts of thunderstorm avoidance:

1. Don't land or takeoff in the face of an approaching thunderstorm. A sudden gust front of low level turbulence could cause loss of control.

2. Don't attempt to fly under a thunderstorm even if you can see through to the other side. Turbulence and wind shear under the storm could be hazardous.

3. Don't attempt to fly under the anvil of a thunderstorm. There is a potential for severe and extreme clear air turbulence.

4. Don't fly without airborne radar into a cloud mass containing scattered embedded thunderstorms. Scattered thunderstorms not embedded usually can be visually circumnavigated.

5. Don't trust the visual appearance to be a reliable indicator of the turbulence inside a thunderstorm.

6. Don't assume that ATC will offer radar navigation guidance or deviations around thunderstorms.

7. Don't use data-linked weather next generation weather radar (NEXRAD) mosaic imagery as the sole means for negotiating a path through a thunderstorm area (tactical maneuvering).

8. Do remember that the data−linked NEXRAD mosaic imagery shows where the weather was, not where the weather is. The weather conditions depicted may be 15 to 20 minutes older than indicated on the display.

9. Do listen to chatter on the ATC frequency for Pilot Weather Reports (PIREP) and other aircraft requesting to deviate or divert.

10. Do ask ATC for radar navigation guidance or to approve deviations around thunderstorms, if needed.

11. Do use data-linked weather NEXRAD mosaic imagery (for example, Flight Information Service-Broadcast (FIS-B)) for route selection to avoid thunderstorms entirely (strategic maneuvering).

12. Do advise ATC, when switched to another controller, that you are deviating for thunderstorms before accepting to rejoin the original route.

13. Do ensure that after an authorized weather deviation, before accepting to rejoin the original route, that the route of flight is clear of thunderstorms.

14. Do avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of a large cumulonimbus.

15. Do circumnavigate the entire area if the area has 6/10 thunderstorm coverage.

16. Do remember that vivid and frequent lightning indicates the probability of a severe thunderstorm.

17. Do regard as extremely hazardous any thunderstorm with tops 35,000 feet or higher whether the top is visually sighted or determined by radar.

18. Do give a PIREP for the flight conditions.

19. Do divert and wait out the thunderstorms on the ground if unable to navigate around an area of thunderstorms.

20. Do contact Flight Service for assistance in avoiding thunderstorms. Flight Service specialists have NEXRAD mosaic radar imagery and NEXRAD single site radar with unique features such as base and composite reflectivity, echo tops, and VAD wind profiles.