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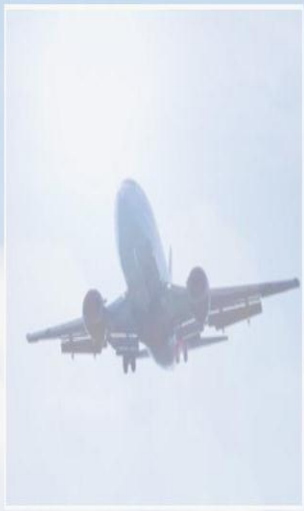


BAID

Bahamas
Accident
Investigation
Department

NASSAU, N. P., BAHAMAS

AIRCRAFT ACCIDENT REPORT

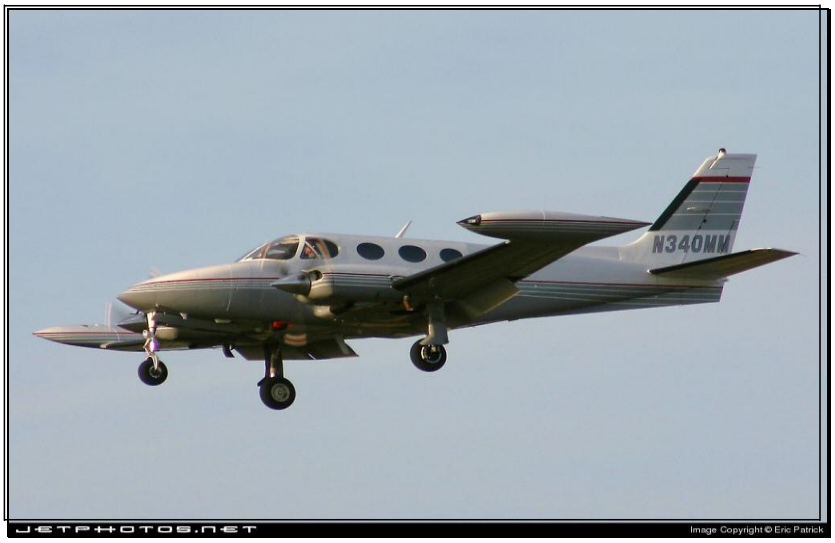
FUEL EXHAUSTION, LOSS OF CONTROL AND IMPACT WITH TERRAIN
AQUA SUN INVESTMENTS INC.

CESSNA 340A
N340MM
FREEPORT GRAND, BAHAMA
BAHAMAS

AUGUST 18, 2014

BAHAMAS
CIVIL AVIATION AUTHORITY
ACCIDENT INVESTIGATION DEPARTMENT
P. O. BOX AP-59244
BLAKE
NASSAU N. P., BAHAMAS

AIRCRAFT ACCIDENT REPORT



CESSNA 340A
N340MM
FUEL EXHAUSTION, LOSS OF CONTROL AND IMPACT WITH TERRAIN
FREEPORT, GRAND BAHAMA,
BAHAMAS

AUGUST 18, 2014

Abstract: This report outlines the circumstances involving the accident of Aqua Sun Investments Inc., aircraft N340MM, a Cessna 340A aircraft that crashed while on a left base approach to runway 06 at the Grand Bahama International Airport (MYGF) on August 18, 2014 at approximately 10:02am local time (1402UTC). This crash resulted in four (4) fatalities. The pilot advised ATC that he was "out of fuel" and crashed a short time later.

BAHAMAS
CIVIL AVIATION AUTHORITY
ACCIDENT INVESTIGATION DEPARTMENT

The Bahamas Accident Investigation Department (BAID) is the accident investigation unit of the **Civil Aviation Authority** (BCAA).

The BAID'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 BAID does not investigate for the purpose of apportioning blame or to provide a means for determining liability.

The BAID performs its functions in accordance with the provisions of the *Bahamas Civil Aviation (Safety) (Amendment) Regulations (CASAR) 2014, Schedule 19, International Civil Aviation Organization (ICAO) Annex 13* and, where applicable, relevant international agreements.

The Bahamas Accident Investigation Department is mandated by the Ministry of Transportation and Aviation to investigate air transportation 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 BAID makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations and safety alerts. When the BAID issues a safety recommendation, the person, organization or agency must provide a written response within 90 days. That response must indicate whether the person, organization or agency accepts the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

Official Copies of accident reports can be obtained by contacting:

Mr. Ivan Cleare
Director (Acting)
Bahamas Civil Aviation Authority
JL Center, Blake Road
P. O. Box N975
Nassau N. P., Bahamas
(242) 397-4700

Unofficial copies of the reports can be viewed on the BAID website at www.aaipu-bcaa.com

BAHAMAS
CIVIL AVIATION AUTHORITY
ACCIDENT INVESTIGATION DEPARTMENT

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ABBREVIATIONS AND TERMINOLOGY

When the following terms are used in this report, they have the following meanings:

ATS	Air Traffic Services	ICAO	International Civil Aviation Organization
ATC	Air Traffic Control		
BAID	Bahamas Accident Investigation Department	MET	Meteorological Office / Department
BCAA	Bahamas Civil Aviation Authority	METAR	Weather Report furnished by Meteorological Department
CASR	Bahamas Civil Aviation (Safety) Regulations	MYGF	Grand Bahama Int'l Airport
		NM or nm	Nautical Miles
CFIT	Controlled Flight into Terrain	NTSB	National Transportation Safety Board
C of A	Certificate of Airworthiness		
C of R	Certificate of Registration	NVM	Non Volatile Memory
CVR	Cockpit Voice Recorder	SMOH	Since Major Overhaul
DCA	Director of Civil Aviation	USA	United States of America
EST	Eastern Standard Time (-4 hours to convert from UTC)	VFR	Visual Flight Rules
		UTC / Z	Universal Coordinated Time / Zulu time
FAA	Federal Aviation Administration		

DEFINITIONS

When the following terms are used in this report, they have the following meanings as per BASR 2013 and ICAO Annex 13;

Accident - An occurrence associated with the operation of an aircraft which takes place between the times any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

a) a person is fatally or seriously injured as a result of:
— being in the aircraft, or
— direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
— direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:
— adversely affects the structural strength, performance or flight characteristics of the aircraft, and
— would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or
c) the aircraft is missing or is completely inaccessible.

Note 1.— For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.

Note 2.— An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Accredited representative - A person designated by a State, on the basis of his or her qualifications, for the purpose of participating in an investigation conducted by another State.

Adviser - A person appointed by a State, on the basis of his or her qualifications, for the purpose of assisting its accredited representative in an investigation.

Aircraft - Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Causes - Actions, omissions, events, conditions, or a combination thereof, which led to the accident or incident.

CFIT - Controlled Flight into Terrain occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown into terrain, water, or an obstacle. The pilots are generally unaware of the danger until it is too late.

Fatal injury - means any injury which results in death within 30 days of the accident.

Investigation - A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

Investigator-in-charge - A person charged, on the basis of his or her qualifications, with the responsibility for the organization, conduct and control of an investigation.
Note.— Nothing in the above definition is intended to preclude the functions of an investigator-in-charge being assigned to a commission or other body.

Maximum mass - Maximum certificated take-off mass.

Operator - A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Preliminary Report. The communication used for the prompt dissemination of data obtained during the early stages of the investigation.

Safety Recommendation. A proposal of the accident investigation authority of the State conducting the investigation, based on information derived from the investigation, made with the intention of preventing accidents or incidents.

State of Design - The State having jurisdiction over the organization responsible for the type design.

State of Manufacture - The State having jurisdiction over the organization responsible for the final assembly of the aircraft.

State of Occurrence - The State in the territory of which an accident or incident occurs.

State of the Operator - The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

State of Registry - The State on whose register the aircraft is entered.

Note: - In the case of the registration of aircraft of an International operating agency on other than a national basis, the States constituting the agency are jointly and severally bound to assume the obligations which, under the Chicago Convention, attach to a State of Registry. See, in this regard, the Council Resolution of 14 December 1967 on Nationality and Registration of Aircraft Operated by International Operating Agencies which can be found in Policy and Guidance Material on the Economic Regulation of International.

FOREWARD

July 29, 2015

Mr. Ivan L. Cleare
Director (Acting)
Bahamas Civil Aviation Authority
P.O. Box N-975
Nassau, N.P., Bahamas

Sir

On behalf of the Bahamas Accident Investigation Department (BAID) the following report is being submitted outlining the circumstances of the fatal accident involving N340MM, a Cessna 340A aircraft, registered in the United States of America (USA) to Aqua Sun Investment Inc., Ormond Beach, Florida. This accident occurred on August 18, 2014 at approximately 10:02am EST, (1402UTC) in waters located five (5) miles northwest of Grand Bahama International Airport (MYGF), Grand Bahama, Bahamas. The aircraft was on a left base for landing to runway 06. The pilot reported to ATC that he was "out of fuel" and crashed a short time later.

This report is submitted pursuant to Part XII, Regulation 80, and Schedule 19 of the Bahamas Civil Aviation (Safety)(Amendment) Regulation (BASR 2013) and in accordance with Annex 13 to the Convention on International Civil Aviation Organization (ICAO). In accordance with referenced regulations and annex, the fundamental purpose of such investigation is to determine the circumstances and causes of these events, with a view to the preservation of life and the avoidance of similar occurrences in the future. It is not the purpose of such investigations to apportion blame or liability.

This report contains facts which have been determined up to the time of publication. Information is published to inform the aviation industry and the public of the circumstances surrounding this accident. The contents of this report may be subjected to alterations or corrections if additional factual information becomes available.

Regards

Delvin R. Major
Investigator in Charge
Bahamas Civil Aviation Authority
Accident Investigation Department
JL Center, Blake Road
Nassau, N. P., Bahamas

BAHAMAS
CIVIL AVIATION AUTHORITY
ACCIDENT INVESTIGATION DEPARTMENT

EXECUTIVE SUMMARY

On August 18th 2014 at approximately 10:02am EST, (1402Z) UTC, a Cessna 340A aircraft, registration N340MM, registered to and operated by Aqua Sun Investments Inc., crashed in shallow waters approximately 5 nautical miles northwest of Grand Bahama International Airport (MYGF), on the 300 degree radial, while on a left base for a landing on runway 06.

The aircraft was on an instrument flight rules (IFR) flight plan from Ormond Beach Municipal Airport (KOMN), Ormond Beach, Florida to (MYGF). Freeport Approach Control (ATC) was notified by Miami Center sometime after 9:00am (1300Z) UTC that N340MM was inbound on an (IFR) flight plan. Upon contact with the aircraft, ATC apprised the pilot of the weather conditions, re-cleared the pilot to Freeport VOR and told him the approach that could be expected. After acknowledgement by the pilot, ATC cleared the pilot to the approach altitude of two thousand feet for the RNAV-GPS runway 06 approach. At this time the aircraft control was handed over to Freeport Control Tower who instructed the pilot to join the left base for runway 06 and to report 5 miles from the airport.

During his communications with Freeport Control Tower the pilot reported that he was "out of fuel" and that he would be "dead sticking it in." In a later communication the pilot stated that he "was going to be in the water five miles from the airport." Following this communication the Control Tower made several attempts to reestablish communication with the aircraft with no success.

Freeport Control Tower made request of aircraft departing and inbound to assist in locating N340MM, by over flying the vicinity in which the pilot last reported, for visual confirmation of the missing Cessna 340A. It was at this time that an inbound aircraft reported seeing the aircraft down at 5 miles on the 300 radial off the ZFP VOR. Visual meteorological conditions prevailed at the time of the accident.

The official notification of the accident was made to the Bahamas Accident Investigation Department (BAID) of the Civil Aviation Authority at Lynden Pindling International Airport, Nassau, N. P., Bahamas shortly after the accident occurred. The investigation commenced immediately at 10:07 local time (1407Z) UTC upon notification of the IIC. The investigation was conducted by Inspector Delvin R. Major (Investigator-in-Charge) of the Bahamas Accident Investigation Department (BAID), Flight Standards Inspectorate (FSI), Airworthiness Inspectors, Operations Inspectors, Human Factors and other administrative personnel. Valuable assistance was also received from the National Transportation Safety Board (NTSB), the Federal Aviation Administration (FAA) and Manufacturers of the aircraft and engine components, Royal Bahamas Defense Force (RBDF), Royal Bahamas Police Force (RBPF), Bahamas Air Sea Rescue Association (BASRA) and other local first responders.

The pilot's incorrect fuel calculations resulting in fuel exhaustion to both engines has been determined as a major contributing factor in the accident.

BAHAMAS
CIVIL AVIATION AUTHORITY
ACCIDENT INVESTIGATION DEPARTMENT

TITLE

Registered Owner:	Aqua Sun Investment Inc.
Operator:	Aqua Sun Investment Inc.
Manufacturer:	Cessna Aircraft Company
Aircraft Type:	Cessna Model 340A
Nationality:	United States of America
Registration:	N340MM
Place of Accident:	In shallow waters approx., five (5) miles northwest on a left base to runway 06, at Grand Bahama International Airport (MYGF), Bahamas
Date and Time:	August 18, 2014 at 10:02am local Time, (1402UTC)
Notification:	DCA, NTSB, ICAO, FAA, Cessna Aircraft Company and Continental Motors
Investigating Authority:	Bahamas Civil Aviation Authority Accident Investigation Department
Investigator in Charge:	Delvin R. Major
Accredited Representatives:	Mr. Paul Cox – NTSB
Technical Advisors:	Mr. Ernest Hall – Cessna Aircraft Company. Mr. Mike Council – Continental Motors Inc. Mr. James Jelinski – FAA
Releasing Authority:	Bahamas Civil Aviation Authority
Date of Final Report Publication:	July 29, 2015

1.0 FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

On 18 August, 2014 at 10:02am local time (1402Z) UTC a fixed wing, twin-engine, Cessna 340A aircraft, United States registration N340MM, serial number 340A0635, crashed into waters while on a left base to runway 06 at Grand Bahama International Airport (MYGF) Freeport, Grand Bahama, Bahamas.

The aircraft departed Ormond Beach Municipal Airport (KOMN) at 8:51am local time (1251Z) for Grand Bahama International Airport (MYGF) on an Instrument Flight Rules (IFR) flight plan with the pilot and three passengers aboard.

Sometime after 9:00am (1300Z) an IFR inbound flight plan on N340MM was received by Freeport Approach Control from Miami Center. Upon initial contact with Freeport Approach Control the pilot was given weather advisory, re-cleared to Freeport VOR and told to maintain four thousand feet and report at JAKEL intersection. He was also advised to expect an RNAV runway six approach.

After the pilot's acknowledgement of the information he later acknowledged his position crossing JAKEL. Freeport Approach then instructed the aircraft to descend to two thousand feet and cleared him direct to JENIB intersection for the RNAV runway six (6) approach. After descending to two thousand feet the pilot indicated to Freeport Approach that he had the field in sight and was able to make a visual approach. Freeport Approach re-cleared the aircraft for a visual approach and instructed the pilot to contact Freeport Control Tower on frequency 118.5.

At 9:57am (1357Z) N340MM established contact with Freeport Tower and was cleared for the visual approach to runway six; he was told to join the left base and report at five (5) DME.

At 10:01am (1401Z) the pilot reported being out of fuel and his intention was to dead stick the aircraft into the airport from seven miles out at an altitude of one thousand five hundred feet.

A minute later the pilot radioed ATC to indicate they "were going down and expected to be in the water about five miles north of the airport." Freeport Tower tried to get confirmation of the last transmission but was unable to. Several more calls went out from Freeport Tower to N340MM but communication was never reestablished.

Freeport Control Tower then made request of aircrafts departing and arriving to assist in locating the lost aircraft by over flying the vicinity of the last reported position to see if visual contact could be made. An inbound aircraft reported seeing an aircraft down five miles from the airport on the 300 degree radial of the ZFP VOR. Calls were made to all the relevant agencies and search and rescue initiated.

The aircraft was located at GPS coordinates 26° 35.708'N and 078° 47. 431 W. The aircraft received substantial damage as a result of the impact and crash sequence. There were no survivors.

1.2 INJURIES TO PERSONS

Injuries	Crew	Passengers	Others	Total
Fatal	1	3		4
Serious				
Minor/None				

1.3 DAMAGE TO AIRCRAFT

The aircraft sustained substantial damage due to the impact sequence and subsequent partial water submersion. The nose and baggage compartment area of the aircraft was crushed and buckled aft to the front pressure bulkhead displacing the windshield and upper fuselage.

The left wing out board of the left engine nacelle was displaced upward and the leading edge deformed toward the wing front spar. About mid-position of the left wing outboard to the wing tip was partially missing. The right wing remained attached but received damage mainly to the wingtip.

The cockpit was buckled aftward to about fuselage station 152.75. There was also an aftward buckle on the left side of the cockpit from the bottom of the airplane toward the top and creases and tearing were also observed in the cabin fuselage.

The aft fuselage was partially separated at about fuselage station 252.00 and at fuselage station 363.00.

The empennage was buckled along its length and partially separated about the vertical and horizontal stabilizer attachments. The cockpit and cabin seating were displaced by the impact forces and subsequent physical damage to the aircraft.

The left engine was separated from the left wing nacelle and was displaced a few feet forward of the left wing. A portion of the left propeller hub assembly remained attached to the left engine crankshaft flange while all three blades separated from the propeller hub and were found 15 to 20 feet in front of the airplane.

The right engine became partially detached at the nacelle. The right engine propeller was separated from the right engine crankshaft flange and one blade was separated from the hub assembly.

1.4 OTHER DAMAGE

Other than damage sustained by the aircraft and subsequent recovery efforts, no other damage were reported whether to person, structure or environment.

1.5 PERSONNEL INFORMATION

The pilot of the aircraft was a forty seven (47) year old male of Ormond Beach Florida, he was a Canadian citizen. He was the holder of a valid FAA private pilot license with Airplane Single Engine Land, Airplane Single Engine Sea, Airplane Multi Engine Land, Airplane Multi Engine Sea and Instrument Airplane privileges with no limitations which was issued on 03 March, 2007. The pilot was also the holder of a United States third class medical certificate issued March, 2013.

The pilot total flying hours as a pilot or total flying hours in the aircraft type involved in the accident was not ascertained. The hours flown by the pilot in the last 24 hours, 7 days or 90 days prior to the accident is unknown.

1.6 AIRCRAFT INFORMATION

1.6.1 General

N340MM, was a fixed wing multi-engine six place pressurized cabin Cessna 340A aircraft which was manufactured in 1979 by Cessna Aircraft Company and designated serial number 340A0635.

The aircraft was fitted with two (2) reciprocating direct drive engines, model number TSIO 520-NB, manufactured by Teledyne Continental Motors, with two McCauley model number 3AF32C515 constant speed, variable pitch propellers. The aircraft was listed in the normal category, standard classification.

The aircraft was issued an Airworthiness Certificate on January 12, 1979. At the time of the accident the aircraft had a total time of 5572.8 hours.

1.6.2 Aircraft Description

The Cessna 340A is a twin engine, all metal, low wing airplane, with retractable, tricycle landing gear. The fuselage is of semi-monocoque construction: the wing, tailplane and fin are of conventional aluminum construction. The cabin pressurization system is the same as that found in the Cessna 400 twin series aircrafts. The aircraft was configured with two forward seats for pilot and co-pilot and four passenger seats aft of the pilot and co-pilot seats, in club configuration.

1.6.3 Engines

The Cessna 340A is powered by two Teledyne Continental Motors model TSIO-520-NB engines which are turbo charged, fuel injected, direct drive, air-cooled and horizontally opposed with six cylinders and a displacement of 520 cubic inches.

The engines are normally rated at 310 horsepower, however, the engines fitted to N340MM had the RAM Aircraft LP STC installed increasing the horsepower output from 310 to 335 horsepower at 38 inches manifold pressure. The serial numbers of the engines were 503200 left and 519010 right. Each engine is provided with an oil pump, fuel pump, vacuum pump, propeller governor, tachometer generator, starter and alternator.

Each engine had, at the time of the accident, accumulated total times of 1207.2 hours since major overhaul.

1.6.4 Propellers

Propellers installed on the Left and Right engines of N340MM, were manufactured by McCauley Accessory Division Cessna Aircraft Company model number 3AF32C515 serial numbers 960534 and 960645 respectively.

The types of propellers were all metal, three-bladed, constant speed, full feathering, single acting, non-reversible, hydraulically actuated, governor regulated propellers. Each propeller utilizes oil pressure which opposes the force of springs and counterweights to obtain correct pitch for engine load.

Each propeller had, at the time of the accident, accumulated total times of 1207.2 hours since major overhaul.

1.6.5 Flight Controls systems

The flight control system consists of the ailerons, elevators and rudder and their respective trim systems. All of these systems are constructed of aluminum and are statically balanced. These primary flight controls gives the aircraft movement about its roll, vertical and yaw axis.

The pilot has control authority of the ailerons and elevators by the yoke (control wheel) in the cockpit through a series of cables, pulleys, bell cranks and rods linking the yoke to the flight control. Deflection of the rudder is achieved by movement of the rudder pedals, this movement transmitted to the rudder by cables pulleys and bell crank.

The trim tab for the aileron is attached to the left wing aileron and the trim tab for the elevator is attached to the right elevator.

1.6.6 Aircraft Fuel System

The Cessna 340A fuel system consist of two tip tanks, which are the main tanks on this airplane, they each hold 100 gallons of useable fuel.

Then there are the auxiliary tanks located in the wings inboard of the tip tanks, these feed directly to the engines.

N340MM was also fitted with a wing locker tank in the left wing locker from which fuel is transferred to the main tanks. The main tanks alone are used for take-off and landing.

1.6.7 Maintenance History of the Aircraft

N340MM was maintained by Rams Aviation located at 770 Airport Road #13, Ormond Beach Florida.

A review of the aircraft technical logbooks indicate consistency in the accomplishment of the required 100 hour/Annual inspections, the last of which was completed on 10-02-13 at Hobbs time 3203.5 hours.

The accumulated time on both engines and both propellers at that time was 1196.3 hours (SMOH) since major overhaul, and the aircraft total time was 5561.9 hours.

Records indicted applicable Airworthiness Directives were also complied with at the time of the last inspection. The records also indicated ATC Transponder test required by FAR 91.413 was performed by Avionics Installations Inc. of Port Orange Florida on 04-23-10, and Altimeter/Altitude Reporting/Static System test required by FAR 91.411 was performed by Volusia Aviation Inc. on 12-14-12.

Since the completion of the last 100 hr/Annual inspection and prior to the accident, maintenance records show that the battery was replaced on 08-05-14 at 3211.6 hours (Hobbs) and on 08-13-14 at 3213.2 hours (Hobbs) the #4 cylinder on the right engine and the left fuel selector were replaced.

1.7 METEOROLOGICAL INFORMATION

Weather observations are transmitted in coordinated universal time/Zulu time (UTC/Z). Eastern Daylight Time is 4 hours behind UTC/Z time.

Bahamas Meteorological Department at the Grand Bahama International Airport issued the Bahamas Area Forecast which originated at 1421 UTC; dated August 18, 2014 valid for 12 hours.

A tropical wave was expected to move through the Bahamas with some unsettling weather. The weather in the immediate area of Freeport at the time of the accident was reported as VFR with winds of 130 degrees at 3 knots.

1.8 AIDS TO NAVIGATION

No discrepancies with navigational aids were known or reported.

1.9 COMMUNICATIONS

No difficulties with internal or external communications were known or reported. BAID was able to obtain a written transcript and an audio recording of communications between N340MM and Freeport Approach and Control Tower.

1.10 AERODROME INFORMATION

Grand Bahama International Airport (IATA: FPO, ICAO: MYGF), has an elevation of 7 feet above mean sea level (MSL). The coordinates are 26˚ 33’ 31.27 N and 078 ˚ 41’ 43.99 W.

The airport is served by runways 06/24 which is oriented northeast and southwest. 06/24 is 10,979 feet long and 150 feet wide. The runway is a paved surface and constructed of asphalt.

1.10.1 Aircraft Rescue and Firefighting

Grand Bahama International Airport (MYGF) is privately operated and maintains a category 7 RFF facility on the airfield for all alerts on airport property.

The station houses three (3) crash trucks, one (1) Oshkosh T-3000 truck with a capacity of 3000 gallons of water and 420 gallons of foam concentrate and two (2) Oshkosh T-1500 with a capacity of 1500 gallons of water and 210 gallons of foam concentrate. One truck has a capacity of 500 pounds of dry chemical and the other has 700 pounds.

1.10.2 Air Traffic Control

The Grand Bahama control zone is designated as Class D airspace extending upward from the surface but not including 3000 feet AMSL within a 15NM radius of Grand Bahama International Airport while the control tower is in operation.

During the hours that the control tower is not in operation the airspace becomes Class E airspace extending upward from 700 feet AGL within 15NM radius of the Grand Bahama International Airport, Bahamas.

N340MM was handled by two (2) air traffic controllers: The approach controller and the tower controller were all certified Air Traffic Control Officers. The Air traffic Control notified all relevant search and rescue, law enforcement agencies as well as the regulatory authority.

1.11 FLIGHT RECORDERS

N340MM was not fitted with a flight recorder as none was required by regulations for this type of aircraft.

1.12 WRECKAGE AND IMPACT INFO

1.12.1 General Wreckage Description

N340MM sustained substantial damage. The examination of the wreckage revealed that all major components (Ailerons, flaps, elevators and rudder) of the airplane were accounted for. The following was observed:

Nose structure: Nose/baggage compartment was buckled aft to the front pressure bulk head.

Wings: The right wing remained attached to the fuselage.

The left wing remained attached to the fuselage. About mid position on the left wing outboard to the wing tip was partially separated. The left wing, outbound of the left engine nacelle, was displaced upward and the leading edge was hydraulically deformed upward toward the wing front spar.

The aft fuselage was partially separated. The empennage, consisting of the vertical and both horizontal stabilizer remained attached to the aft fuselage.

The cockpit was buckled aftward. The aftward buckle was observed on the left side of the cockpit from the bottom of the airplane toward the top.

The cabin fuselage was intact with creases and tearing.

The bottoms of both wings were submerged in water during the onsite investigation.

The nose landing gear was observed submerged in water under the nose section of the airplane.

The left main landing gear was observed in the retracted position and attached to the left wing. The position of the right main landing gear was undetermined.

All the lap belts, the two point restraints, were observed with cut signatures consistent with first responders extricating the occupants from the seats.

The attitude indicator was impact damaged and read inverted 20° nose down left wing 30° low.

The following information was noted on cockpit instruments or gauges after the accident:

Fuel Tank Gauges

- Left Main fuel tank……Zero
- Right Main fuel tank…..Zero
- Left Auxiliary fuel gauge…..Zero
- Right Auxiliary fuel gauge…Zero

Fuel Selector Handle

- Left……Cross-feed
- Right…..Left

Fuel Selector Valve

- Left…..Off
- Right…Left

Fuel Boost Pump

- Left…..Low
- Right…Undetermined

Electrical Switch Positions

- Master battery…...Off
- Left Alternator…..Off
- Right Alternator…Off
- Avionics……....Off

Lighting Switch Position

- Navigation…….On
- Rotating Beacon……On
- Strobe…….ON

Position of the left and right magnetos of both right and left engines could not be determined.

Both Cowl Flaps and Alternate Air of both left and right engines were found in the closed position.

1.12.2 Engines

Both engines were Teledyne Continental Motors TSIO-520-NB.

Right Engine:

The right engine remained attached to the airframe in a nose down position. Only the top half of the engine remained out of the water with the lower half submerged. The engine appeared intact with no breach or damage to the upper crankcases. The three bladed McCauley propeller was impact damaged and detached from the engine. The engine crankshaft flange remained intact. Two blades remained attached to the propeller hub with the third blade detached and the propeller hub shattered. Only impact damage was noted to the blades with crushing damage to the spinner. No significant cordwise gouging, twisting or bending was evident with the exception of trailing damage to one of the blades which remained attached to the propeller hub.

The right and left magnetos remained intact and undamaged. The ignition harness appears undamaged.

The top sparkplugs remained intact and appeared undamaged.

The fuel manifold, fuel lines and GAMI fuel injectors remained in place in each of the cylinders. No damage was noted to these components. The upper deck pressure components remained in place and appeared undamaged.

The engine driven fuel pump remained intact and in place with no apparent damage.

The original engine data plate was installed over another larger plate which indicated that RAM Aircraft Engines modified the original engine increasing horsepower from 310 to 335 @ 2700 RPM. All six cylinders remained in place and intact with no apparent impact damage. Each rocker box cover exhibited a placard indicating GAMI fuel injectors were installed.

The oil filter remained attached to the oil filter adapter but the adapter was broken and detached from the oil pump. Safety wire remained attached from the oil filter (incorrectly) to the oil cooler cross brace. The provided security tab located on the oil filter adapter was not used for securing the oil filter as provided.

The turbo charger remained attached to the airframe with the intake plenum missing exposing the compressor vanes. The compressor blades indicated rotational damage.

The engine driven vacuum pump and cooling shroud remained attached without apparent damage.

The engine driven alternator was fully submerged, but appeared to be intact and remained attached.

The engine oil rod was removed and engine oil was noted on the oil rod.

The oil cooler remained attached and appeared undamaged.

Left Engine:

The left engine was separated from the left wing engine mount and was located approximately five feet forward of the main wreckage with control cables and hoses still attached. Only a small portion of the upper engine remained out of the water with the lower portion submerged. The engine appeared intact with no breach or damage to the upper crankcases.

The three blade McCauley propeller was impact damaged and detached from the engine. A torn section of the damaged spinner remained attached to the crankshaft flange with the remaining portion attached to the propeller hub. All three propeller blades released from the hub and were scattered forward of the fuselage.

The propeller hub was shattered into several pieces. Only impact damage was noted to the blades with crushing damage to the spinner. No significant cordwise gouging, twisting or bending was evident.

The right and left magnetos remained intact and undamaged. The ignition harness appears undamaged.

The top sparkplugs remained intact and appeared undamaged.

The fuel manifold, fuel lines and GAMI fuel injectors remained in place in each of the cylinders. No damage was noted to these components. The upper deck pressure components remained in place and appeared undamaged.

The engine driven fuel pump was submerged but impact damage was noted on the adjustment screw housing on the rear of the pump.

The original engine data plate was installed over another larger plate which indicated that RAM Aircraft Engines modified the original engine increasing horsepower from 310 to 335 @ 2700 RPM. All six cylinders remained in place and intact with no apparent impact damage except that the rocker box cover from cylinder 6 was broken and a large portion missing exposing the rocker arms and valve springs.

Each rocker box cover exhibited a placard indicating GAMI fuel injectors were installed with the exception noted on cylinder 6.

The oil filter remained attached to the oil filter adapter. Safety wire remained attached from the oil filter (incorrectly) to the oil cooler cross brace. The provided security tab located on the oil filter adapter was not used for securing the oil filter as provided.

The engine driven vacuum pump and cooling shroud remained attached without apparent damage.

The engine driven alternator was fully submerged, but appeared to be intact and remained attached.

The engine oil rod was removed and engine oil was noted on the oil rod.

The oil cooler remained attached and appeared undamaged.

1.12.3 Propellers

The left propeller assembly flange remained attached to the engine. All three propeller blades separated from the propeller hub and were found about 15 to 20 feet in front of the airplane. No significant cord-wise scratching, twisting and bending were noted on all three propeller blades. However, gouge marks, consistent with the impact sequence, were noted on some of the blades.

The right propeller assembly separated from the engine. One blade separated from the hub. The spinner remained attached to the propeller assembly and was crushed aftward. The right propeller assembly

was found against the airplane pressure bulkhead. No significant cord-wise scratching, twisting and bending were noted on all three propeller blades. However, gouge remarks, consistent with the impact sequence were noted on some of the blades.

1.13 MEDICAL AND PATHOLOGICAL

The body of the pilot and three (3) passengers were recovered the day of the accident and were transported to the Morgue of the Rand Memorial Hospital for autopsies to be performed.

Specimens of liver, blood, stomach contents, urine and vitreous humor of the pilot were obtained by pathologist from the Department of Pathology at the Rand Memorial Hospital in Freeport, Grand Bahama.

The diagnostic specimen for toxicology was sent in a Federal Aviation Administration Tox-Box Kit to the Bio-aeronautical Sciences Research Laboratory at the Civil Aerospace Medical Institute (CAMI) at the Federal Aviation Administration Mike Monroney Aeronautical Center (MMAC) 6500 South MacArthur Boulevard, Oklahoma City, Oklahoma 73169 for toxicological analysis.

The analysis was to determine if there were any pre-existing disease, alcohol, drugs or any toxic substance in the pilot, which may have caused or contributed to the cause of the accident.

The results of the analysis revealed no drugs, alcohol or carbon monoxide were detected in the samples of the pilot.

1.14 FIRE

Examination of the wreckage concluded no fire was involved pre or post crash.

1.15 SURVIVAL ASPECTS

The impact damage evident by the destruction of the aircraft indicated the tremendous force with which the aircraft contacted the terrain, subjecting the human occupants to severe impact forces and the resulting physical trauma caused by the destruction of the aircraft was virtually non-survivable. The pilot and all passengers remained within the confines of the aircraft.

Seat 1, 2, 4 and 6 were occupied. Seats 1 and 2 were equipped with 3-point restraint systems which were used by the occupants. Seats 4 and 6 were equipped with 2-point restraints which were also used by the occupants.

All lap belts were observed with cut signatures consistent with extrication efforts. Seats 1, 2, and 6 which were occupied were all forward facing seats. Seat 4 was a rear facing seat. The aircraft was configured in the club configuration.

1.15.1 First Aid

BASRA, RBDF and RBPF were mobilized to the site where the accident occurred.

The aircraft wreckage site was declared a "biohazard" area, and access to the site was restricted to essential personnel only. The monitoring of the site and access control was provided by the Royal Bahamas Police Force.

The procedures imposed for working in this type of environment required the BAID investigative team, including party members, to wear personal protective gear and or take special safety precautions while working on site and during post recovery teardown and analysis.

1.16 TESTS AND RESEARCH

Left and Right Engine Analysis were conducted in the United States at Continental Motors Inc. Factory in Mobile Alabama from February 10th to 12th 2015 with Bahamas Civil Aviation oversight.

1.16.1 Engine Analysis

The actual times on both left and right engine since date of manufacture could not be determined however, since major overhaul both engines had accumulated 1,207.3 hours according to information contained in engine logbook excerpts.

An annual inspection was completed on October 2, 2013 at 10.9 hours on the hobbs meter.

The report summary from the engine analysis of both left and right engines have determined that there were no anomalies which would have prevented either engine from producing rated horsepower.

2.0 ANALYSIS

2.1 OVERVIEW

Weather conditions were not a contributing factor in this accident.

Air Traffic Control services were provided in accordance with established criteria and was not a factor in the cause of this accident.

The pilot was properly certificated and qualified for the flight.

The aircraft was maintained in accordance with maintenance procedures and FAA guidelines.

It appeared from communication logs that the controller did not fully understand what the pilot was saying as she was still giving him instructions to land despite the pilot advising that he was out of fuel.

Readings from fuel gauges post-accident confirmed the absence of fuel in any of the fuel tanks.

Additionally, first responders on the accident scene reported no smell or visual observance of any fuel at the crash scene.

Based on switch position in the aircraft it appeared the pilot was preparing the aircraft for ditching as switches such as Master Battery, Left and Right Alternator and Avionics switches were all found in the "OFF" position.

Fuel selector valve for the Left fuel tank system was found in the "OFF" position, while the Right fuel tank selector valve was found selected to the "Left tank."

Fuel selector handle for the Left fuel tank was found in the "Cross-feed" position while the Right fuel selector handle was found to the Left tank position.

Based on the position of the fuel selector position it appears the pilot was searching all tanks, trying to find fuel from any tank that would possibly have remaining fuel.

It could not be determined where in the process this searching for fuel began.

It appears that the pilot was distracted trying to find fuel, and in his search, allowed the aircraft to stall and roll inverted, nose over, down and to the left. The extensive damage to the left wing and the nose confirms this condition. Additionally, the attitude indicator was found with readings of inverted 20 degrees nose down, left wing 30 degrees low.

Upon initial transmission to Freeport Tower, N340MM reported "7 miles out and out of fuel" and the fact that they were "dead-sticking" it in.

At the time of that transmission N340MM reported an altitude of 1,500 feet.

It appears ATC did not comprehend the situation reported by N340MM, as they only understood him to say he was seven miles at which time they requested his altitude, which he replied "one thousand five hundred, zero mike mike doesn't look we're gonna..…..." At this point ATC issued landing instructions behind a departing aircraft which 340MM acknowledged and confirmed his landing instructions.

At no point did N340MM declare an emergency. He advised ATC that "we are going to be in the water about ah five miles north of the air….." This was the last transmission made to ATC.

It appeared that this last transmission was what alerted ATC to the predicament of the aircraft as they requested him to repeat his last transmission. However, subsequent calls to N340MM went unanswered.

3.0 CONCLUSIONS

3.1 FINDINGS

- Weather was not a factor in this accident.
- ATC was not a factor in this investigation.
- The pilot was properly certificated and qualified for the flight.
- The aircraft was properly certificated in accordance with the existing regulations.
- The aircraft was properly maintained in accordance with applicable regulations.
- The pilot advised ATC that he was out of fuel
- The pilot did not declare an emergency or made it known to ATC the urgency of his predicament.
- The aircraft was stalled and became inverted and crashed nose first to the left. The extensive damages occurring to the left wing and nose of the aircraft confirm this.
- ATC did not fully realize the predicament the pilot was in.
- Engine Analysis performed by Continental Motors determined that there were no anomalies which would have prevented the engines ability to produce rated horsepower.

3.2 PROBABLE CAUSE

The probable cause of this accident has been determined as a lack of situational awareness resulting in a stalled condition and loss of control while attempting to remedy a fuel exhaustion condition at a very low altitude.

3.3 CONTRIBUTING FACTORS

- The pilot's incorrect fuel calculations which resulted in fuel exhaustion to both engines.
- Stalled aircraft
- Loss of situational awareness

4.0 RECOMMENDATIONS

The BAID makes no recommendations in this accident.