



National Transportation Safety Board Aviation Accident Final Report

Location:	Atlantic Ocean, AO	Accident Number:	ERA18LA119
Date & Time:	03/31/2018, 1117 EDT	Registration:	N4ZQ
Aircraft:	AMES ANGIER M LNC2	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot did not receive an official weather briefing before beginning the instrument flight rules cross-country flight. While en route to the destination airport and as the airplane was descending, the pilot was advised of areas of moderate-to-heavy precipitation at the airplane's eleven-to-one-o'clock position. The pilot acknowledged this information, continued the airplane's descent, and maintained the airplane's heading. The pilot initiated a turn, and the controller asked the pilot if he was deviating to avoid the precipitation. The pilot replied that he was not deviating but that he could use a 10° turn to the left. No further communications were received from the pilot. A review of radar data for the flight revealed that the pilot made a 90° left turn and then flew straight for about 1 minute before radar contact was lost. A review of the airplane's radar track overlaid on weather radar plots surrounding the time of the accident revealed that the airplane flew into an area of moderate-to-heavy precipitation.

An Alert Notice (ALNOT) was issued, and airplane debris was located about 10 miles north of the airplane's last radar-observed location. Fragments of the wings, fuselage, and empennage were recovered, but no other parts of the airplane were located.

According to a witness statement and a review of weather data, the pilot likely entered instrument meteorological conditions just before the time of the accident and lost control of the airplane shortly after encountering the moderate-to-heavy precipitation in the area at the time. Even though the pilot was operating the airplane on an instrument flight rules flight plan, it is likely that he became spatially disoriented given that he turned the airplane 90° instead of the 10° requested. Because the pilot's logbook was not recovered, his recency and proficiency of instrument experience flight could not be determined.

Toxicology results showed a low concentration of ethanol in the pilot's muscle tissue; no other samples were provided for testing. Ethanol can be produced postmortem. The amount of ethanol detected, if ingested, would not be considered impairing. Thus, the identified ethanol did not contribute to the circumstances of this accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's spatial disorientation after entering instrument meteorological conditions and encountering moderate-to-heavy precipitation, which resulted in a loss of airplane control.

Findings

Personnel issues	Spatial disorientation - Copilot (Cause)
Environmental issues	Rain - Effect on operation (Cause)
	Low visibility - Effect on operation (Cause)

Factual Information

History of Flight

Enroute-cruise	Other weather encounter Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On March 31, 2018, about 1120 eastern daylight time, an experimental amateur-built Lancair LNC2, N4ZQ, was destroyed when it impacted the Atlantic Ocean off the coast of Stuart, Florida. The private pilot and the passenger were fatality injured. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. An instrument rules flight plan was filed, and instrument meteorological conditions (IMC) prevailed at the time of the accident. The flight originated from Stella Maris Airport (MYLS), Long Island, Bahamas, about 0940 and was destined for Treasure Coast International Airport (FPR), Fort Pierce, Florida.

According to Federal Aviation Administration (FAA) air traffic control (ATC) and radar data, a radar target identified as the accident airplane was at 8,000 ft mean sea level (msl) until 1111. At that time, the controller instructed the pilot to descend to 4,000 ft msl. At 1112:37, the controller stated that there were areas of "moderate to heavy precipitation eleven to one o'clock three miles area's one five miles in diameter." The pilot acknowledged with the airplane call sign. At 1113:34, the pilot reported the airplane's altitude as 5,100 ft msl (in response to the controller's query a few seconds earlier) and continued to descend the airplane to 4,000 ft msl along a 305° course. About 1115, the airplane began a left turn, and the controller asked if the pilot was deviating from the airplane's previously established course; the pilot responded at 1115:12, "negative, but we could use 10 degrees left." Two seconds later, the controller responded that the airplane should proceed direct to WADAS waypoint—the initial approach fix for the RNAV (GPS) RWY 32 approach into FPR—and the pilot acknowledged the instruction at 1116:05 (the last transmission from the airplane) and continued the turn. About 1116 the airplane completed a turn of about 90° before maintaining a course along a 210° heading. The airplane continued flying straight until 1117, when radar contact was lost. An Alert Notice (ALNOT) was issued for the airplane; the US Coast Guard located debris from the airplane about 10 miles north of its last radar-observed location.

According to a pilot who was flying another airplane from MYLS to FPR, the accident pilot topped off the airplane with fuel before takeoff. Both pilots planned to fly at an altitude of 8,000 ft msl, and the accident pilot departed about 45 minutes after the pilot of the other airplane. The accident pilot and the other pilot spoke twice during the flights about both airplanes' airspeed and the distance from FPR.

When the other pilot was about 50 miles from a filed waypoint, he noted a buildup of precipitation near the waypoint and requested to divert. He deviated to the south of the weather, and the airplane entered IMC when it was west and south of the waypoint. The airplane remained in IMC until it was descending to land. The airplane broke out of the clouds at an altitude of about 1,500 ft msl, and the pilot performed a visual landing at FPR.

Pilot Information

Certificate:	Private	Age:	71, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Unknown
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last FAA Medical Exam:	01/30/2017
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1325 hours (Total, all aircraft)		

According to FAA airmen records, the accident pilot held a private pilot certificate with ratings for airplane single-engine land and instrument airplane. His most recent FAA third-class medical certificate was issued on January 30, 2017. At that time, he reported 1,325 total hours of flight experience, of which 56 hours were accumulated during the previous 6 months. The pilot's logbooks were not available for review. In July 2014, the pilot reported his flight time to the Lancair Owners and Builders Organization (LOBO) as 1,100 total hours of flight experience, including 100 hours of total instrument flight time, 73 hours of which was actual instrument flight time. According to LOBO's records, the pilot's instrument flight time had not changed since he began reporting it to LOBO in 2014.

Aircraft and Owner/Operator Information

Aircraft Make:	AMES ANGIER M	Registration:	N4ZQ
Model/Series:	LNC2 NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:	2012	Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	AMES1
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	350 Hours	Engine Manufacturer:	Lycoming
ELT:		Engine Model/Series:	IO-360-B-1F
Registered Owner:	On file	Rated Power:	180 hp
Operator:	On file	Operating Certificate(s) Held:	None

According to FAA airworthiness records, the pilot built the airplane in 2012. It was equipped with a Lycoming IO-360-B-1F 180-hp engine. According to LOBO records, the airplane had accumulated about 350 hours of flight time. The airplane's maintenance logbooks were not located.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	FPR, 23 ft msl	Distance from Accident Site:	32 Nautical Miles
Observation Time:	1131 EDT	Direction from Accident Site:	288°
Lowest Cloud Condition:	Few / 2400 ft agl	Visibility	10 Miles
Lowest Ceiling:	Overcast / 3000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	40°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.16 inches Hg	Temperature/Dew Point:	24° C / 19° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Stella Maris, FN (MYLS)	Type of Flight Plan Filed:	IFR
Destination:	FORT PIERCE, FL (FPR)	Type of Clearance:	IFR
Departure Time:	0940 EDT	Type of Airspace:	

The closest National Weather Service Weather Surveillance Radar–1988, Doppler (WSR-88D) to the accident site was the Melbourne, Florida, radar, which was 65 miles north-northwest of the accident site and 72 miles north-northwest of the last radar target. Reflectivity values between 30 and 45 dBZ were located in the area of the airplane's last radar observed position, between 1115 and 1121; these values corresponded to moderate-to-heavy precipitation (see figure 1). The reflectivity bands were moving from northeast to southwest between 1100 and 1135. There were no lightning strikes near the accident location about the time of the accident.

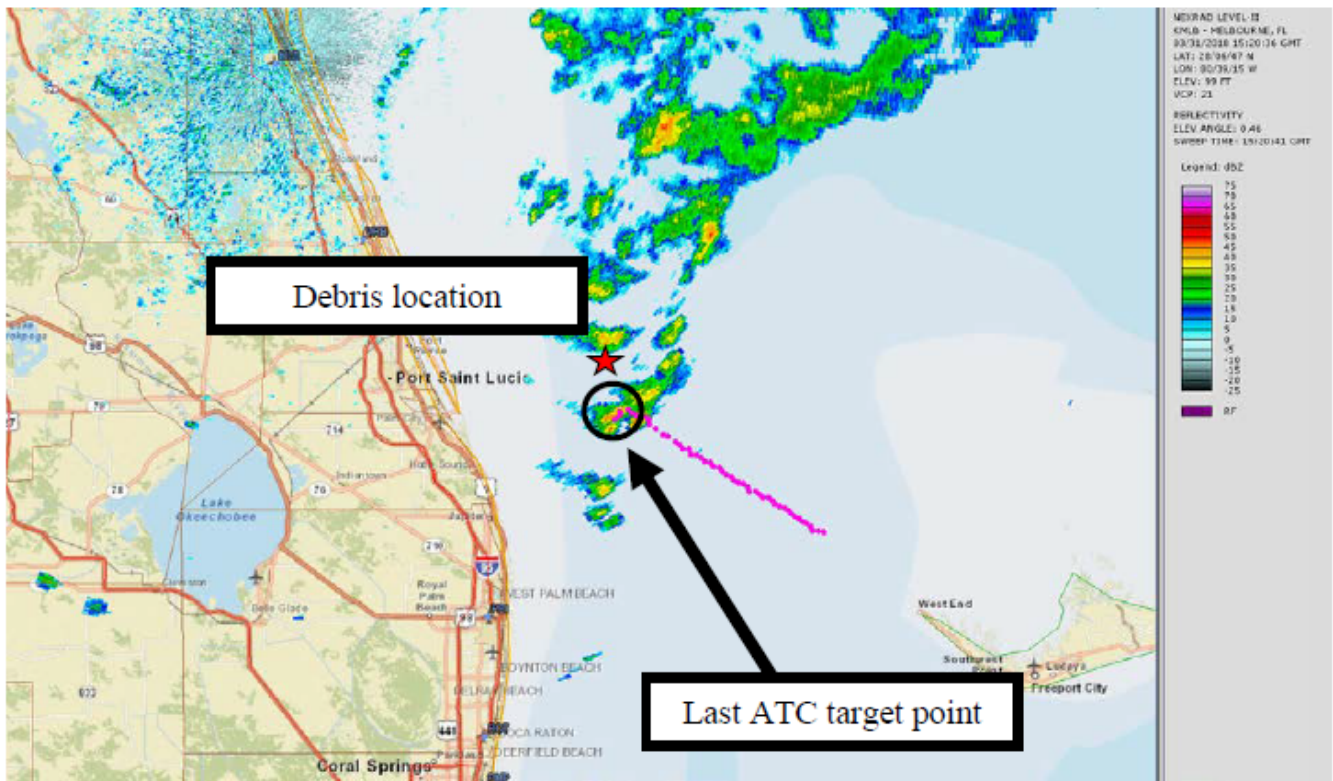


Figure 1 - Melbourne, Florida, WSR-88D composite reflectivity image at 1121 with the airplane's ATC radar-derived flight track points in pink, the last ATC target point marked with black circle, and the debris location indicated with a red star.

Visible and infrared imagery from the Geostationary Operational Environmental Satellite No. 16 (GOES-16) indicated abundant cloud cover above the accident site at the accident time with the low-level cloud cover moving from northeast to southwest and the mid- and high-level cloud cover moving from southwest to northeast. The lower brightness temperature bands (indicating higher cloud tops) were oriented southwest to northeast and were located around the accident site and in areas across Florida.

A High-Resolution Rapid Refresh model sounding was created for the accident site for 1100 with station elevation at sea level. The sounding indicated the possibility of clouds between 1,500 ft and 4,500 ft.

A search of two official weather briefing sources: Leidos, the Automated Flight Service Station

provider for weather briefings, and the Direct User Access Terminal Service (DUATS). The search determined that the accident pilot did not request a weather briefing through Leidos or DUATS before the flight.

A search of archived data from ForeFlight revealed that the accident pilot requested a weather briefing at 0903 on March 30, 2018, the day before the accident. The briefing contained standard weather information that was valid for March 30 at 0900. The only weather data that would also be valid for 0900 on March 31 was the winds aloft forecast. The accident pilot did not request a weather briefing or weather information via ForeFlight on March 31. It is unknown if the accident pilot checked or received additional weather information before or during the accident flight.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	Unknown
Ground Injuries:	N/A	Aircraft Explosion:	Unknown
Total Injuries:	2 Fatal	Latitude, Longitude:	27.334167, -79.800833 (est)

The airplane debris located by the US Coast Guard included separated sections of the vertical stabilizer, rudder, fuselage, and wings. No other parts of the airplane were recovered.

Medical And Pathological Information

The St. Lucie County Medical Examiner, Fort Pierce, Florida, performed an autopsy of the pilot. The autopsy report indicated that the pilot died as a result of multiple injuries.

Toxicology testing performed at the FAA Forensic Sciences Laboratory identified ethanol (10 mg/dl, mg/hg) in the pilot's muscle tissue. No tested drugs were identified in the pilot's muscle tissue.

Additional Information

Airplane Flying Handbook

The handbook provided the following information about an airplane's attitude and spatial disorientation:

The pilot must believe what the flight instruments show about the airplane's attitude regardless of what the natural senses tell. The vestibular sense (motion sensing by the inner ear) can and will confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in airplane attitude, nor can they accurately send the attitude changes which occur at a uniform rate over a period of time. On the other hand, false sensations are often generated, leading the pilot to believe the attitude of the airplane has changed when, in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation.

FAA Advisory Circular 60-4A, Pilot's Spatial Disorientation

The advisory circular stated the following:

The attitude of an aircraft is generally determined by reference to the natural horizon or other visual reference with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight, supported by other senses, allows the pilot to maintain orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of orientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is 'up.'...Surface references and the natural horizon may at times become obscured, although visibility may be above flight rule minimums. Lack of natural horizon or such reference is common on over water flights, at night, and especially at night in extremely sparsely populated areas, or in low visibility conditions.... The disoriented pilot may place the aircraft in a dangerous attitude... therefore, the use of flight instruments is essential to maintain proper attitude when encountering any of the elements which may result in spatial disorientation.

Preventing Similar Accidents

Reduced Visual References Require Vigilance

About two-thirds of general aviation accidents that occur in reduced visibility weather conditions are fatal. The accidents can involve pilot spatial disorientation or controlled flight into terrain.

Preflight weather briefings are critical to safe flight. In-flight weather information can also help pilots make decisions, as can in-cockpit weather equipment that supplements official information. In-cockpit equipment requires an understanding of the features and limitations.

We often see pilots who decide to turn back after they have already encountered weather, at which point, it is too late. Pilots shouldn't allow a situation to become dangerous before deciding to act. Additionally, air traffic controllers are there to help; be honest with them about your situation and ask for help.

Even when flying at night, visual weather conditions can also be challenging. Remote areas with limited ground lighting provide limited visual reference cues for pilots, which can be disorienting or render rising terrain visually imperceptible. Topographic references can help pilots become more familiar with the terrain. The use of instruments, if pilots are proficient, can also help pilots navigate these challenging areas.

See http://www.nts.gov/safety/safety-alerts/documents/SA_020.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Heidi Kemner	Report Date:	04/20/2020
Additional Participating Persons:	Julie-Ann Nydegger; FAA/FSDO; Miramar, FL		
Publish Date:	04/20/2020		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=96957		

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