Aviation Investigation Final Report

Location:	New Smyrna Beach, Florida	**Accident Number:**	ERA15FA099
Date & Time:	January 13, 2015, 20:58 Local	**Registration:**	N757ZM
Aircraft:	Cessna 152	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot was in the process of purchasing a block of flight time with the intent of building time toward an additional rating. According to the operator, the pilot did not complete the mandatory checkout. However, she possessed the keys to the airplane since she had flown the previous day with an instructor, but he did not approve her for solo flight because he believed she required additional practice landing the airplane with an instructor onboard. On the day of the accident, she flew an undetermined number of local, solo flights without the knowledge of the operator. The accident flight was initiated at night, presumably with the intent of operating in the local airport traffic pattern. About 7 minutes into the flight, the pilot likely encountered instrument meteorological conditions (IMC) and requested assistance from air traffic control.

An air traffic controller attempted to provide the pilot with radar vectors to a nearby airport; however, the pilot was unable to visually acquire that airport. The controller then observed the airplane on radar at 600 ft and descending and directed the pilot to climb and turn. A short time later, radar and radio contact were lost; the airplane had crashed. The level of damage and fragmentation of the wreckage was consistent with ground impact at a high velocity. The flight was conducted on a dark, moonless night, under an overcast ceiling, and the final portion of the flight was over the ocean. These factors would have reduced the pilot's ability to perceive the natural horizon and increased her risk of spatial disorientation.

Although the pilot held an instrument rating and had recently completed an instrument proficiency check, on the night of the accident, she did not demonstrate the skills necessary to control an airplane in IMC. She also did not display the ability to adequately communicate her situation to the controller, nor did she seem to understand or comply with the assistance offered to her. Review of autopsy results and postaccident toxicological testing showed no evidence of any physiologically induced incapacitation or other impairment.

During the sequence of events leading up to the accident, the pilot communicated with two air traffic

controllers. The pilot described that she was operating in conditions that limited her ability to navigate and potentially affected her ability to control the airplane under visual flight rules (VFR). Although the actions of the controllers did not directly contribute to the pilot's loss of control while attempting to fly under VFR in IMC, the controllers did not act in accordance with Federal Aviation Administration (FAA) guidance that dictates how to assist pilots experiencing this type of emergency. Specifically, the controllers did not ascertain if the pilot was qualified and capable of IFR flight nor did they attempt to locate and direct the pilot toward the nearest areas reporting visual meteorological conditions. Further, a controller assisting the accident controller had the opportunity to solicit a pilot report from another pilot in a nearby airplane to ascertain if that airplane was operating above the reported IMC but did not do so. During postaccident interviews, the air traffic controllers indicated that they had not received FAA-required evidence-based simulation training on emergencies and described the computer-based emergency training that they received as poor quality.

Probable Cause and Findings

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

The pilot's failure to maintain control of the airplane while operating under visual flight rules (VFR) in night, instrument meteorological conditions, likely due to spatial disorientation. Contributing to the outcome was the radar controller's failure to follow published guidance for providing assistance to VFR pilots having difficulty flying in instrument conditions.

Findings

Aircraft	(general) - Not attained/maintained
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Environmental issues	Below VFR minima - Effect on operation
Environmental issues	Dark - Effect on operation
Personnel issues	Lack of action - ATC personnel
Personnel issues	Use of policy/procedure - ATC personnel
Organizational issues	Emergency proc training - ATC

Factual Information

History of Flight

Approach	VFR encounter with IMC
Approach	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On January 13, 2015, about 2058 eastern standard time, a Cessna 152, N757ZM, collided with a public beach at New Smyrna Beach, Florida. The commercial pilot was fatally injured and the airplane was substantially damaged by impact forces. The airplane was registered to a private company and was operated by the pilot under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91 as a personal flight. Night, instrument meteorological conditions (IMC) prevailed for the flight, and no flight plan was filed. The local flight originated from Massey Ranch Airpark (X50), Edgewater, Florida, about 2040.

Prior to the accident flight, the pilot, who was a Japanese citizen, contacted Flight Time Building LLC to purchase a block of flight time in a Cessna 152. According to the company's website, the company sold "blocks" of flight time to licensed pilots, with 50 hours being the minimum-sized block. The company normally dispatched an airplane to the pilot upon completion of a ground and flight "checkout." According to the owner of Flight Time Building, on the day prior to the accident, the pilot flew a local flight with an instructor, followed by a cross country flight with a safety pilot, who was an instructor-in-training. The owner reported that the pilot was not "signed off" for solo flight after the flights on January 12. The flight instructor stated that he needed to see "improved landings" before he could approve her for solo flight.

On the day of the accident, she flew an undetermined number of local, solo flights without the knowledge of Flight Time Building personnel. She possessed the keys to the accident airplane since she had flown it on the previous day with the safety pilot. She refueled the airplane at her own expense and initiated the accident flight, which was a local, night flight in the traffic pattern at X50.

At 2042:03, a radar target correlated to be the accident airplane was about 1 nautical mile (nm) south of X50. Radar data indicated the aircraft was in a left, 360-degree turn.

At 2047:22, the accident pilot pilot transmitted on the emergency frequency, 121.5 MHz, "hello," followed by two more transmissions of the her saying "hello." This coincided with radar data that depicted the accident aircraft emitting a transponder code of, or "squawking," 7700 (emergency) about 3.5 nm south of X50, or about 8.4 nm south of New Smyrna Beach airport (EVB).

At 2047:42, the pilot stated "uh I don't know where I am I want to land." At 2047:52, the Daytona Beach (DAB) Radar South controller transmitted, "The aircraft that doesn't know where they are at; are they at 1,700 feet squawking emergency and 1200?" At 2048:21, the pilot transmitted "I want to land."

The EVB local controller heard the pilot asking for assistance on 121.5 MHz. Because the aircraft was

close to EVB, he was able to establish communications. Between 2048 and 2053, the EVB local controller provided assistance to the pilot. The pilot advised the EVB air traffic controller that she could see the ground but could not maintain visual flight conditions. When the EVB local controller turned the pilot toward EVB, the pilot reported that she could see the airport, but a short time later said she could no longer see it. The EVB local controller then attempted to transfer communications to DAB approach control on 125.35 MHz.

At 2053:52, the EVB local controller advised DAB ATC that the aircraft was proceeding towards DAB, and that EVB would have the lights set on high intensity if they needed the airport. The DAB Radar South controller replied, "thanks, we are going to try it." At 2054:35, the pilot of N757ZM transmitted "hello" on the emergency frequency 121.5, and at 2054:41 continued, "on 125.25 no ah contact." The pilot had been instructed by EVB to contact DAB on 125.35 MHz. The DAB Radar South controller responded on 121.5 by asking the pilot if she could hear DAB.

At 2054:49, the pilot again transmitted that she was unable to reach anybody on 125.25. The DAB air traffic controller replied "ok just stay on this frequency you are all right, maintain your present altitude." The EVB local controller informed the DAB air traffic controller that the pilot could not hear DAB on 125.35. DAB advised the EVB local controller that the pilot was on the wrong frequency, and that the DAB controller would assist the pilot on the emergency frequency.

At 2055:15, the pilot transmitted "hello." The DAB air traffic controller established communications with the pilot on 121.5 and asked the pilot if she could hear DAB; the pilot responded, "I can hear you."

At 2055:22, the DAB controller instructed the pilot to "remain calm and to maintain present altitude." The DAB controller told the pilot to continue the right turn northbound towards EVB, and that the airport would be off the right side. The DAB controller added that EVB would have all the runway lights turned on to high and instructed the pilot to advise when she saw the lights.

At 2055:40, the pilot transmitted on 121.5 that she was heading 100 degrees, and asked the DAB air traffic controller what heading she needed to fly. The DAB air traffic controller told the pilot that if she were able, to turn left heading 360 and that EVB would be at the pilot's 12 o'clock position and one and a half nautical miles. After an unintelligible transmission from the pilot, the DAB controller told the pilot she was not required to read back any further transmissions, and to make the turn. The DAB controller instructed the pilot to advise when she saw the lights at EVB. The pilot verified the heading and asked if she needed a left turn, heading 300. The DAB air traffic controller instructed the pilot to continue a left turn, heading 360 and reiterated the EVB position relative to the aircraft. The pilot acknowledged the turn.

At 2056:57, the DAB air traffic controller told the pilot to land any runway at EVB if she saw the runway lights. At 2057:06, the pilot stated she was at 600 feet and the DAB air traffic controller instructed the pilot to maintain her altitude until she saw the airport. The pilot replied that she was in the clouds. The DAB controller told the pilot, "okay don't worry, don't worry, don't worry, don't worry ma'am, just calm down, calm down; make a left turn." The DAB air traffic controller then instructed the pilot to make a left turn to climb because she had been in a descent. The DAB air traffic controller advised the pilot it was okay to be in the clouds but that she needed to climb.

At 2057:48, the DAB controller asked the pilot if she was climbing, and told her that she needed to maintain at least 1,000 feet. The pilot acknowledged the climb to 1,000 feet, followed by an unintelligible transmission. The DAB air traffic controller reiterated the climb to 1,000 feet and for the pilot to advise DAB when she was comfortable. There were no further transmissions from the pilot.

A short time later, radar and radio contact was lost and the airplane crashed onto New Smyrna Beach, in shallow water. Radar data indicated a descending, right turn prior to impact. The altitude of the last observed radar target was 500 feet above mean sea level. Emergency responders arrived at the accident site shortly thereafter in an attempt to provide assistance.

Pilot Information

Certificate:	Commercial	**Age:**	38
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
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:**	August 18, 2014
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	November 19, 2014
Flight Time:	416 hours (Total, all aircraft)		

The pilot, age 38, held a commercial pilot certificate with ratings for airplane single engine land, airplane multi-engine land, and instrument airplane. She was issued a Federal Aviation Administration (FAA) third-class medical certificate on August 18, 2014, with a restriction to wear corrective lenses.

Pilot records recovered from the wreckage indicated that the pilot had logged about 416 total hours of flight experience as of January 7, 2015. She had logged about 1.3 hours of night time and about 6.1 hours of actual instrument time prior to the accident flight. Logbook entries showed that she completed a 14 CFR Part 61.55 flight review and a 14 CFR 61.57(d) instrument proficiency check (IPC), in a Cessna 152, at Torrance, California on November 19, 2014. The flight review and IPC were performed with different flight instructors. Her pilot logbook indicated she flew about 2.4 hours on June 30, 2014, in a Beech BE-58 and did not log another flight prior to her flight review and IPC of November 19, 2014.

FAA inspectors interviewed the flight instructors who performed the flight review and IPC. Both flight instructors reported that the accident pilot showed no weaknesses, handled the radios during the flight, was familiar with the local area, and was a "good pilot."

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N757ZM
Model/Series:	152	**Aircraft Category:**	Airplane
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	15280134
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	October 27, 2014 Annual	**Certified Max Gross Wt.:**	1676 lbs
Time Since Last Inspection:	23 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	12000 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed	**Engine Model/Series:**	O-235-L2C
Registered Owner:	On file	**Rated Power:**	118 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The airplane was a Cessna model 152 that was manufactured in 1977. The high-wing, fixed tricycle landing gear airplane was powered by a Lycoming O-235-L2C engine, rated at 110 horsepower at 2,550 rpm and was equipped with a Sensenich 72CK56-0-54 metal, fixed-pitch propeller.

According to the maintenance logbooks provided by the owner, the most recent annual inspection of the airframe and engine was completed on October 27, 2014, at 502.1 hours tachometer time. The observed tachometer time at the time of the accident was 525.8 hours. The aircraft total time was not recorded in on the logbook entries, and the owner estimated that the total time of the airframe was about 12,000 hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	EVB,10 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	20:55 Local	**Direction from Accident Site:**	290°
Lowest Cloud Condition:		**Visibility**	8 miles
Lowest Ceiling:	Overcast / 500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	17°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Edgewater, FL (X50)	**Type of Flight Plan Filed:**	None
Destination:	Edgewater, FL (X50)	**Type of Clearance:**	None
Departure Time:	20:40 Local	**Type of Airspace:**	

The National Weather Service (NWS) Surface Analysis Charts for 1900 and 2200 on January 13, 2015 depicted a cold front moving across central into southern Florida with cold air stratus clouds behind the front. Numerous station models behind the front depicted visibilities restricted in mist or fog, with temperature-dew point spreads of less than 5° F, and in the vicinity of the accident site less than 3° F.

The NWS Weather Depiction Chart for 2000 depicted an extensive area of IMC extending from the accident site and across most of all of central and northern Florida, Georgia, South Carolina, portions of southern and eastern North Carolina, and portions of Tennessee, Alabama, Mississippi, and Louisiana. A second area of IMC was also identified over southern Florida ahead of the front in the vicinity of West Palm Beach with marginal visual meteorological conditions extending through most of central and into southern Florida. The closest visual meteorological conditions with ceilings above 3,000 feet and visibility greater than 5 miles were over southwestern Florida, and extreme south Florida. The chart indicated that fog and low ceilings were not a localized event over the New Smyrna Beach area, but extended over most of the area.

The National Center for Atmospheric Research regional radar mosaic for 2100 depicted no significant weather echoes associated with rain showers or thunderstorms in the vicinity of the accident site during the period.

The NWS 12-hour Low-Level Significant Weather Prognostic Chart valid for 0100 and available for briefing prior to the accident depicted the cold front moving across southern Florida with an extensive area of IMC expected over most of all of Florida, Georgia, South Carolina, Alabama, and into sections of Mississippi, and Tennessee. The chart depicted no significant turbulence outside of convective activity was expected, and depicted the freezing level near 12,000 feet over the region.

No weather reporting capability was present at X50. A review of the observations surrounding the area indicated that at the time the accident airplane departed from X50, IMC were already being reported

surrounding the area at EVB, DAB, and to the south at the NASA Shuttle Landing Facility (TTS), Titusville, Florida.

EVB was located approximately 5 nm north of the departure airport at an elevation of 10 feet, and less than 3 miles west of the accident site. The airport had an Automated Weather Observation System. The weather conditions reported at 2055, or about 3 minutes prior the accident, included wind from 350° at 8 knots, visibility 8 statute miles, ceiling overcast at 500 feet, temperature 17° Celsius (C), dew point 16° C, altimeter 30.14 inches of mercury (Hg).

The next closest weather reporting station was DAB, located approximately 14 nm northwest of the departure airport at an elevation of 34 feet. The airport had a control tower and a federally installed and maintained Automated Surface Observation System (ASOS). The weather conditions reported at 2053, or about 5 minutes prior the accident, included wind from 020° at 9 knots, visibility 10 statute miles, ceiling overcast at 700 feet, temperature 18° C, dew point 16° C, and altimeter 30.14 inches of Hg.

The DAB special weather report at 2131 included wind from 360° at 11 knots gusting to 17 knots, visibility 1 statute mile, ceiling overcast at 400 feet, temperature 16° C, dew point 15° C, and altimeter 30.15 inches of Hg.

The DAB special weather report at 2146 included wind from 360° at 8 knots, visibility ½ statute mile in fog, ceiling overcast at 300 feet, temperature 16° C, dew point 15° C, and altimeter 30.15 inches of mercury. Remarks: automated observation system, tower visibility 1-mile, temperature 15.6° C, dew point 15.0° C.

Orlando Sanford International Airport (SFB), Orlando, Florida, was located 20 nm southwest of the departure airport at an elevation of 55 feet, and was equipped with an ASOS. The weather conditions reported at SFB, at 2100, included wind from 360° at 9 knots, visibility 10 statute miles, ceiling broken at 1,000 feet, overcast at 3,900 feet, temperature 19° C, dew point 17° C, altimeter 30.14 inches of Hg.

On the day of the accident, sunset occurred about 1745 and evening civil twilight occurred about 1811. Moonrise occurred at 0029, and moonset occurred at 1212.

The DAB North Controller, who assisted the accident controller, solicited pilot reports (PIREPS) for the DAB local area earlier in her shift, but could not recall their specific content. During the accident sequence, she had been working a Cirrus SR22, whose pilot requested the RNAV runway 29 approach into EVB. The SR22 was at 3,000 feet holding at RISRE, about 10 NM east of EVB and near the accident aircraft, but she did not solicit a PIREP from the pilot or ask about cloud tops.

Airport Information

Airport:	New Smyrna Beach Muni EVB	**Runway Surface Type:**	
Airport Elevation:	10 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	Unknown
Total Injuries:	1 Fatal	**Latitude, Longitude:**	29.039722,-80.895278(est)

The wreckage was located in shallow water at approximate coordinates 29 02 22.68N, 080 53 52.69W. The wreckage was pulled onto the beach by local authorities after coordination with the NTSB investigator-in-charge to prevent further damage and loss of parts.

The left and right wings separated from the fuselage during the impact sequence. The outboard 4 feet of the left wing was separated from the remainder of the wing. The right wing exhibited diagonal and aft crush deformation, beginning 2 feet from the wing root to the aft spar at the wing tip. Aileron control cable continuity was established through multiple recovery cuts and fractures consistent with overstress. A majority of the left aileron was not located. The wing flap actuator was found in the retracted (flaps up) position.

The fuselage was separated into multiple sections, including a section consisting of the engine firewall and instrument panel, the landing gear and cabin floor, and an 8-foot section of aft fuselage. The right main landing gear was not recovered. The nose landing gear was separated and located with the main wreckage.

The empennage separated aft of station 173. The horizontal and vertical stabilizers remained attached. The outboard half of the right horizontal stabilizer leading edge was crushed in an up and aft direction. Rudder and elevator control cable continuity was established through multiple recovery cuts and fractures consistent with overstress.

Both wing fuel tanks were breached during the impact sequence and no residual fuel of found. The fuel selector handle was found in the "on" position and the unit operated normally in the "on" and "off" positions when forced air was introduced into the selector valve. Sand was found in the fuel strainer bowl and screen. The odor of fuel was observed in the strainer bowl.

The propeller separated from the crankshaft flange and was found partially buried in sand at the location of the main wreckage. The blades exhibited twisting deformation, leading edge gouges, and surface polishing.

The engine was separated from the firewall. The carburetor, carburetor air box, and alternator were missing and were not located. All engine components were subjected to salt water and sand immersion. The carburetor flange was fractured from impact and was still attached to the oil sump. The carburetor data plate was lodged into the induction tube at the oil sump.

The valve covers, magnetos, vacuum pump, and exhaust were removed by investigators. Mechanical internal continuity was established by rotating the rear accessory gears at the vacuum pump drive with a mechanical device. All valve action was confirmed through 720 degrees of crankshaft rotation and thumb suction and compression was observed at all cylinders. A digital video boresope examination of the interior of the cylinders and the piston surfaces revealed normal operating signatures. The magnetos were turned with a hand drill and by hand rotation; no spark could be produced. The spark plug electrodes were normal in appearance except for salt water, oil, and sand contamination.

The inspection of the engine did not reveal any abnormalities that would have prevented normal operation or production of rated horsepower.

Communications

Paragraphs 10-2-8 and 10-2-9 of FAA order 7110.65 address how air traffic controllers should provide radar assistance to aircraft operating under visual flight rules (VFR) in weather difficulty, including techniques that should be used to the extent possible when providing assistance. They state [in part]:

10−2−8. RADAR ASSISTANCE TO VFR AIRCRAFT IN WEATHER DIFFICULTY

a. If a VFR aircraft requests radar assistance when it encounters or is about to encounter IFR weather conditions, ask the pilot if he/she is qualified for and capable of conducting IFR flight.

b. If the pilot states he/she is qualified for and capable of IFR flight, request him/her to file an IFR flight plan and then issue clearance to destination airport, as appropriate.

c. If the pilot states he/she is not qualified for or not capable of conducting IFR flight, or if he/she refuses to file an IFR flight plan, take whichever of the following actions is appropriate:

1. Inform the pilot of airports where VFR conditions are reported, provide other available pertinent weather information, and ask if he/she will elect to conduct VFR flight to such an airport.

2. If the action in subparagraph 1 above is not feasible or the pilot declines to conduct VFR flight to another airport, provide radar assistance if the pilot:

(a) Declares an emergency.
(b) Refuses to declare an emergency and you have determined the exact nature of the radar services the pilot desires.

3. If the aircraft has already encountered IFR conditions, inform the pilot of the appropriate terrain/obstacle clearance minimum altitude. If the aircraft is below appropriate terrain/obstacle clearance minimum altitude and sufficiently accurate position information has been received or radar identification is established, furnish a heading or radial on which to climb to reach appropriate terrain/obstacle clearance minimum altitude.

10−2−9. RADAR ASSISTANCE TECHNIQUES

Use the following techniques to the extent possible when you provide radar assistance to a pilot not qualified to operate in IFR conditions:

a. Avoid radio frequency changes except when necessary to provide a clear communications channel.
b. Make turns while the aircraft is in VFR conditions so it will be in a position to fly a straight course while in IFR conditions.
c. Have pilot lower gear and slow aircraft to approach speed while in VFR conditions.
d. Avoid requiring a climb or descent while in a turn if in IFR conditions.
e. Avoid abrupt maneuvers.
f. Vector aircraft to VFR conditions.
g. The following must be accomplished on a Mode C equipped VFR aircraft which is in emergency but no longer requires the assignment of Code 7700:

1. TERMINAL. Assign a beacon code that will permit terminal minimum safe altitude warning (MSAW) alarm processing.

Medical and Pathological Information

A postmortem examination of the pilot was performed at the offices of the District 7 Medical Examiner, Daytona Beach, Florida, on January 14, 2015. The autopsy report noted the cause of death as "Multiple Blunt Traumatic Injuries" and the manner of death was "Accident."

Forensic toxicology testing of the pilot was performed on specimens of the pilot by the FAA Bioaeronautical Sciences Research Laboratory (CAMI), Oklahoma City, Oklahoma. The CAMI toxicology report indicated negative for carbon monoxide, ethanol, and drugs. Testing for cyanide was not performed.

Additional Information

FAA Guidance to Pilots

In April 2003, the FAA published Advisory Circular 61-134, General Aviation Controlled Flight into Terrain Awareness. The circular stated in part:

"Operating in marginal VFR /IMC conditions is more commonly known as scud running. According to

National Transportation Safety Board (NTSB) and FAA data, one of the leading causes of GA accidents is continued VFR flight into IMC. As defined in 14 CFR part 91, ceiling, cloud, or visibility conditions less than that specified for VFR or Special VFR is IMC and IFR [instrument flight rules] applies. However, some pilots, including some with instrument ratings, continue to fly VFR in conditions less than that specified for VFR. The result is often a CFIT [controlled flight into terrain] accident when the pilot tries to continue flying or maneuvering beneath a lowering ceiling and hits an obstacle or terrain or impacts water. The accident may or may not be a result of a loss of control before the aircraft impacts the obstacle or surface. The importance of complete weather information, understanding the significance of the weather information, and being able to correlate the pilot's skills and training, aircraft capabilities, and operating environment with an accurate forecast cannot be emphasized enough."

According to FAA Advisory Circular AC 60-4A, "Pilot's Spatial Disorientation," tests conducted with qualified instrument pilots indicated that it can take as long as 35 seconds to establish full control by instruments after a loss of visual reference of the earth's surface. AC 60-4A further states that surface references and the natural horizon may become obscured even though visibility may be above VFR minimums and that an inability to perceive the natural horizon or surface references is common during flights over water, at night, in sparsely populated areas, and in low-visibility conditions.

According to the FAA Airplane Flying Handbook (FAA-H-8083-3), "Night flying is very different from day flying and demands more attention of the pilot. The most noticeable difference is the limited availability of outside visual references. Therefore, flight instruments should be used to a greater degree.… Generally, at night it is difficult to see clouds and restrictions to visibility, particularly on dark nights or under overcast. The pilot flying under VFR must exercise caution to avoid flying into clouds or a layer of fog." The handbook described some hazards associated with flying in airplanes under VFR when visual references, such as the ground or horizon, are obscured. "The vestibular sense (motion sensing by the inner ear) in particular tends to confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in the attitude of the airplane, nor can they accurately sense attitude changes that 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."

Air Traffic Controller Training

As part of the investigation into this accident, air traffic controllers were asked about their preparedness to provide assistance to a pilot in an emergency situation. FAA air traffic controllers were required to undergo proficiency training that "maintains and upgrades the knowledge and skills necessary to apply air traffic procedures in a safe and efficient manner." This training included recurrent training and refresher training. Chapter 1 paragraph 5, (a) and (b), of FAA JO 3120.4N, Air Traffic Technical Training, addressed the requirements of recurrent and refresher training and stated [in part]:

JO 3120.4N Air Traffic Technical Training

a. Recurrent Training. Recurrent training is collaboratively-developed national safety training delivered via electronic means, instructor-led presentations, or any combination thereof. Recurrent training is intended to increase air traffic controller proficiency, enhance awareness of human factors affecting aviation, and promote behaviors essential for the identification, mitigation, and/or management of risk.

Topics are derived from data collected through internal and external safety reporting systems and stakeholder input. Recurrent training is conducted via an 8-hour block of training, two rounds delivered yearly. Each round is comprised of approximately 4 hours of training selected from the topics listed below, and 4 hours of training on relevant and timely safety topics, such as but not limited to: Human Factors, Safety Culture, Threat and Error Management, Crew Resource Management, Event Recovery, and learning that promotes the maturity of the Safety Management System. Recurrent training requirements are identified annually NLT October 1st to be delivered the following calendar year. Recurrent training on the following items need not be duplicated in local refresher training:

(1) Safety alerts and traffic advisories, to include Minimum Safe Altitude Warning (MSAW) procedures and the relationship between charted minimum altitudes and underlying topography.
(2) Weather and other conditions that affect flight (e.g., icing, thunderstorms, windshear, and VFR aircraft that encounter instrument flight rules (IFR) conditions).
(3) Bird activity information and dissemination.
(4) Wake turbulence information and application.
(5) Line up and wait (LUAW).
(6) Runway Safety.
(7) Recovery in ATC Operations.
(8) Fatigue awareness.

b. Refresher Training. Each facility must maintain, in writing, an annual (calendar year) refresher training plan. Annual refresher training contains two elements: nationally and/or facility-developed curriculum and simulation training. Facilities are encouraged to review their quality control data (e.g., Quality Control Monitoring, Service Reviews, and Compliance Verification and data available in the Partnership for Safety Portal) to identify additional topics for annual refresher training in order to meet each facility's changing needs. The following topics must be included unless designated by the TA as not applicable.

(1) Unusual situations, lost aircraft orientation, aviation security procedures (including interceptor procedures and communications), hijacking, and other topics identified by the TA. (Training on emergency situations should be based on real-life incidents and aircraft accidents, stressing a lessons-learned approach.)

(15) Facilities with simulation capabilities such as AT Coach, ETG, TTG, DYSIM, TSS,TTL, SIMFAST, O21 lab, etc., must complete locally identified, evidence-based simulation training on the topics identified in paragraph 5.b., Refresher Training, deemed appropriate by the TA, as follows:
(a) A minimum of one hour of evidence-based simulation training in calendar year 2014.
(b) A minimum of two hours of evidence-based simulation training in calendar year

Appendix (J) of the JO 3120.4N Air Traffic Technical Training identified the definitions and state [in part]:

Appendix J. Definitions

17. Evidence-based Training: Training based on an analysis of safety data.

All of the air traffic controllers indicated the recurrent training required by the FAA was lacking, and they couldn't remember any substance of the topics. All of the recurrent training they could remember was via computer-based instruction or by slide-based presentation. Both of the air traffic controllers on duty the night of the accident could not recall any refresher training utilizing the simulator as required, and the supervisor indicated most controllers viewed the training as an annoyance.

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Laura Burns; FAA/FSDO; Orlando, FL Brian Weber; Textron Aircraft; Wichita, KS Judson Rupert; Lycoming; Williamsport, PA
Original Publish Date:	April 14, 2016
Last Revision Date:	July 8, 2024
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90598