Aviation Investigation Final Report

Location:	Pawtucket, Rhode Island	**Accident Number:**	NYC08LA207
Date & Time:	June 6, 2008, 17:45 Local	**Registration:**	N27199
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:	Ground collision	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A Piper PA-30 was on an instrument flight rules (IFR) flight plan in instrument meteorological conditions and was cleared for an instrument approach. As the Piper approached the missed approach point, the pilot visually acquired the airport, and notified the air traffic controller to cancel his IFR flight plan. According to the Piper pilot, after the controller acknowledged the cancellation request, the pilot retuned his radio to the Common Traffic Advisory Frequency (CTAF) and announced his intention for landing. Due to the wind direction, the Piper pilot elected to circle and land on Runway 15, which was in the opposite direction of his approach. The pilot of a Beech A36, who was ready to depart from Runway 5 of the same airport, and who was also on an IFR flight plan, requested permission to take off but was told to "hold for release" by the controller. However, the controller did not explicitly inform the Beech pilot of the reason for the delay. Less than a minute later, the controller released the Beech. The two airplanes collided near the intersection of the two runways. Both pilots reported that they were not aware of the other airplane until immediately prior to the collision. Several witnesses heard the Beech pilot announce his intentions multiple times, but did not hear the Piper pilot's transmissions. The investigation also revealed that the two controllers were both aware of the proximity of the two airplanes, but neither one communicated that information to either of the pilots. A review of the recorded communications also revealed that the approach controller had a brief personal conversation with another controller just prior to the accident. The lack of received position or intent transmissions from the Piper, and the controllers' failure to inform the pilots of the proximity of the two airplanes, deprived the pilots of information that was critical to the pilots' situational awareness, and which could have enabled one or both pilots to prevent this accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Both pilots' failure to see and avoid the other airplane. Contributing to the accident was the air traffic controllers failure to notify either pilot of the potential conflict.

Findings

Personnel issues	Lack of action - ATC personnel
Personnel issues	Monitoring other aircraft - Pilot
Personnel issues	Monitoring other aircraft - Pilot of other aircraft
Personnel issues	Lack of communication - ATC personnel
Environmental issues	(general) - Effect on operation

Factual Information

History of Flight

Takeoff	Ground collision (Defining event)
Takeoff	Runway excursion

HISTORY OF FLIGHT

On June 6, 2008, about 1745 eastern daylight time, a Beech A36, N27199, and a Piper PA-30, N7660Y, were substantially damaged during a runway collision at North Central State Airport (SFZ), Pawtucket, Rhode Island. The certificated private pilot and passenger of the Beech were not injured, and the certificated commercial pilot of the Piper sustained minor injuries. Instrument meteorological conditions (IMC) prevailed at the time of the accident. The Beech was operating on an instrument flight rules (IFR) flight plan, and was departing SFZ for Morristown Municipal Airport (MMU), Morristown, New Jersey. The Piper was operating on an IFR flight plan from Nantucket Memorial Airport (ACK), Nantucket, Massachusetts, to SFZ. Both personal flights were conducted under the provisions of 14 Code of Federal Regulations (CFR) Part 91.

According to Federal Aviation Administration (FAA) air traffic control (ATC) transcripts, at 1718:56 the Piper pilot initially checked in on the radio frequency for Providence (PVD) Approach, reported that he was at four thousand feet, and requested the global positioning system (GPS) "Alpha" approach to SFZ. About 11 minutes later, the Beech pilot initially contacted PVD clearance delivery, and PVD clearance delivery responded. The Beech pilot then requested and was given his clearance, and at 1732:59, PVD clearance delivery responded with "november one nine nine and uh acknowledge holding for release please." At 1733:03 the Beech pilot acknowledged "yes holding for release ma'am."

At 1735:44, PVD approach transmitted the Piper's approach clearance, which was acknowledged by the pilot. One minute later, PVD approach issued the following instruction "twin comanche six zero yankee report cancellation of ifr in the air on this frequency or on the ground on one two four point three five change to advisory frequency approved," and at 1736:55 the Piper pilot responded with "sixty yank thank you sir." At 1737:43 the Beech pilot transmitted the following to PVD clearance delivery: "providence uh bonanza two seven one nine nine now we're holding next runway five uh ready to go [just need a release]." At 1737:57, PVD clearance responded "calling clearance was that november two seven one nine nine," and the Beech pilot responded "uh yes ma'am we're holding at runway five for departure uh one nine nine." A few seconds later, clearance delivery told the Beech pilot "november one nine nine hold for release i'll get back to you in approximately five minutes," and the Beech pilot responded with "one nine nine." Clearance delivery at 1738:11 "november one nine nine verify holding for release please," And 3 seconds later the Beech pilot responded "we're holding for

release ma'am on nine nine."

At 1741:49, the Piper pilot cancelled his IFR flight plan, and then followed with another transmission that he had the airport in sight. Nine seconds later, PVD approach responded with "understand uh cancelling ifr november six zero yankee roger and uh squawk vfr frequency change approved good night." Four seconds after that, the Piper pilot acknowledged the instruction, and that was the last recorded transmission from the Piper.

Approximately one minute after the Piper pilot cancelled his IFR flight plan radar clearance delivery released the Beech for departure, with a clearance void time of five minutes. After his departure clearance was received, the Beech pilot switched his radio to the common traffic advisory frequency (CTAF), and broadcast his position and intentions twice. These broadcasts were confirmed by several witnesses located near a communication radio in a building on the airport. The Beech pilot then began his takeoff roll. About the same time, but unbeknownst to the Beech pilot, the Piper landed on runway 15.

According to the Piper pilot, as he approached the intersection of runway 5/23, at a speed of approximately 40 knots, he heard a noise outside the airplane, and saw the Beech on its takeoff roll on runway 5. According to the Beech pilot, as the airplane approached its rotation speed of 75 knots, the pilot and passenger saw the Piper approaching them from their left. The Beech pilot pulled back on the yoke in an attempt to fly over the Piper, but the airplanes collided with one another.

After the collision, which occurred when the Beech was airborne about 6 feet above the ground, the airplane descended back to the ground, veered off the runway, and came to a stop in the grass off the side of the runway. The Piper came to rest facing the opposite direction of travel, approximately 200 feet south of the runway 5 centerline, and approximately 20 feet off the pavement of runway 15.

Both pilots reported that neither one of them was aware that another airplane was operating at the airport until seconds prior to the collision.

PERSONNEL INFORMATION

Beech Pilot

The pilot, age 54, 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 December 13, 2007. At the time of the accident, the pilot reported a total flight experience of 1,640 hours, including 1,000 hours as pilot in command in the accident airplane make and model, and 450 hours in instrument meteorological conditions. In the 90 days preceding the accident, the pilot logged 11 total hours of flight experience, and 3 hours of flight experience in IMC.

Piper Pilot

The pilot, age 45, held a commercial pilot certificate, with ratings for airplane single-engine land and instrument airplane, and private pilot privileges for airplane multi-engine land. At the time of the accident, the pilot reported a total flight experience of 3,215 hours, including 2,000 hours as pilot in command in the accident airplane make and model, and 418 hours of flight time in instrument meteorological conditions. In the 90 days preceding the accident, the pilot logged 62 total hours of flight experience and 7 hours of flight experience in IMC.

AIRCRAFT INFORMATION

Beech N27199

The Beech was a six seat, low wing, retractable-gear airplane, and was manufactured in 1986. It was powered by a Teledyne Continental Motors IO-550-B, 310-horsepower engine, and equipped with a McCauley controllable-pitch propeller. The airplane's most recent annual inspection was completed on October 2, 2007, and at the time of the accident the airplane had accumulated 2,662 total hours. The airplane was not equipped with a traffic alerting system.

Piper N7660Y

The Piper Comanche was a four seat, low wing, retractable-gear airplane, and was manufactured in 1965. It was powered by two Lycoming IO-320-B1A, 160-horsepower engines, equipped with Hartzell controllable pitch propellers. The most recent annual inspection was completed on April 1, 2008 and the airplane had accumulated 5,278.4 hours of total flight time at the time of inspection. The airplane was equipped with a Garmin GPS430W system which was installed in the airplane May 18, 2007. The airplane was not equipped with a traffic alerting system.

METEROLOGICAL INFORMATION

The 1735 recorded weather at SFZ reported calm winds, visibility 10 miles, an overcast cloud layer 600 feet above ground level (agl), temperature 14 degrees C, dew point 11 degrees C, and an altimeter setting of 30.13 inches of mercury.

A review of recorded weather observation at airports within a 30 mile radius of SFZ around the time of the accident showed the winds were out of the south and southwest and varied between 6 and 10 knots, and an overcast ceiling of between 500 and 900 feet agl.

AIDS TO NAVIAGATION

The published instrument approach procedure (IAP) for the very high omni-direction range (VOR)/GPS A approach to SFZ indicated that the minimum altitude at the final approach fix (FAF) was 1,900 feet mean sea level (msl), and the minimum descent altitude (MDA) for the

approach was 980 feet msl, or 539 feet agl. This approach was not specific to any runway at SFZ. Air traffic control radar tracking data indicated that the Piper was at or below the MDA for approximately 42 seconds prior to the pilot notifying Providence ATC to cancel his IFR flight plan. The lowest altitude recorded prior to the pilots cancelation was 700 feet msl, or approximately 259 feet agl, this altitude was recorded for 14 seconds. The final radar return from the Piper which included altitude information was received at 1742:16, and the indicated an altitude was 500 feet msl, or approximately 59 feet agl. The final radar return from the Piper was received at 1742:32. This was approximately 30 seconds prior to the time when ATC released the Beech.

AIRPORT INFORMATION

The airport was not equipped with an air traffic control tower. Communications between airplanes at SFZ were accomplished using the CTAF. The airport was served by two crossing runways, designated as 05/23 and 15/33. Runway 05/23 was 5,000 feet long and 100 feet wide.

The airspace in the proximity of SFZ was categorized as class G airspace. The vertical limit of this airspace extended to 700 feet agl, where the airspace changed to class E. Class G airspace was uncontrolled airspace that required aircraft operating under visual flight rules (VFR) to have 1 mile flight visibility, and to remain clear of clouds. Class E airspace was controlled airspace whose floor could be at the surface, 700 feet agl, or 1,200 feet agl, and required aircraft operating under VFR to have 3 miles flight visibility and to maintain specific minimum distances from the clouds.

The departure area for Runway 5 and the touchdown zone for runway 15 were separated by trees that varied in height from approximately 13 to 55 feet. The locations and heights of some of these trees were such that it impeded the ability of the pilots to see one another from their respective runways.

Charted communication frequencies for aircraft operating in the vicinity of SFZ included CTAF, clearance delivery, departure, and approach. All except for the CTAF were monitored by ATC personnel located at a facility approximately 13 nautical miles south of SFZ. Departure and approach control were charted as the same communication frequency.

WRECKAGE AND IMPACT INFORMATION

The Piper sustained damage to its nose section, and the upper crown portion of the cabin had collapsed downward. There was no fire, and the pilot extricated himself from the wreckage. Witness marks indicated that the airplane skidded sideways prior to stopping. A portion of the Beech's fuel bladder was attached to the left propeller of the Piper.

The Beech's outboard left wing and aileron separated from the airplane, spilled fuel on the runway, and came to rest near the runway intersection. The left horizontal stabilizer also

separated from the airplane, and the right main gear collapsed. The cockpit and engine compartment incurred minor damage. The runway bore several witness marks consistent with tire skidding and a fuel fire.

ADDITIONAL INFORMATION

Chapter 1, "Collision Avoidance," of the FAA Airplane Flying Handbook (FAA-H-8083-3A) provided the following guidance to pilots: "All pilots must be alert to the potential for midair collision and near midair collisions. The general operating and flight rules in 14 CFR Part 91 set forth the concept of "See and Avoid." This concept requires that vigilance shall be maintained at all times, by each person operating an aircraft regardless of whether the operation is conducted under instrument flight rules (IFR) or visual flight rules (VFR). Pilots should also keep in mind their responsibility for continuously maintaining a vigilant lookout regardless of the type of aircraft being flown and the purpose of the flight."

Chapter 2 of the Instrument Flying Handbook (FAA-H-8261-1A) stated that "Meteorological conditions permitting, you are required to use "see and avoid" techniques to avoid traffic, terrain, and other obstacles…"

The Instrument Flying Handbook also contained the following guidance: "Since separation cannot be provided by ATC between IFR and VFR traffic when operating in areas where there is no radar coverage, pilots are expected to make radio announcements on the CTAF. These announcements allow other aircraft operating in the vicinity to plan their departures and arrivals with a minimum of conflicts. In addition, it is very important for crews to maintain a listening watch on the CTAF to increase their awareness of the current traffic situation. Flights inbound on an instrument approach to a field without a control tower should make several self-announced radio calls during the approach:
• Initial call within 5-10 minutes of the aircraft’s arrival at the IAF. This call should give the aircraft's location as well as the crew's approach intentions.
• FAF inbound, stating intended landing runway and maneuvering direction if circling.
• Short final, giving traffic on the surface notification of imminent landing."

The handbook also stated that "When operating on an IFR flight plan at an airport without a functioning control tower, pilots must initiate cancellation of the IFR flight plan with ATC… if a frequency is not available on the ground, the pilot has the option to cancel IFR while in flight if VFR conditions can be maintained…until landing."

The Instrument Flying Handbook described situational awareness as "the accurate perception of operational and environmental factors that affect the flight. It is a logical analysis based upon the machine, external support, environment, and the pilot. It is knowing what is going on."

The research paper "Theoretical Underpinnings of Situation Awareness: A Critical Review," further simplified the definition of situational awareness as "knowing what is going on around you." It stated that a "pilot does not need to know everything, but does need to know a great

deal of information related to the goal of safely flying the aircraft."

FAA ATC CONTROLLER'S GUIDANCE

FAA Order 7110.65R, Air Traffic Control

Chapter 1, Introduction, stated that "this order prescribes air traffic control procedures and phraseology for use by persons providing air traffic control services. Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations that are not covered by it."

Chapter 2, General Control, stated that "The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic." Section 2-1-2 provided the following guidance on controllers' prioritization of aircraft: "Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment shall be used in prioritizing all other provisions of this order based on the requirements of the situation at hand." The section provided the following guidance regarding traffic advisories "Unless an aircraft is operating within Class A airspace or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when, in your judgment, their proximity may diminish to less than the applicable separation minima. Where no separation minima applies, such as for VFR aircraft outside of Class B/Class C airspace, or a TRSA, issue traffic advisories to those aircraft on your frequency when in your judgment their proximity warrants it. Provide this service as follows:
To aircraft that are not radar identified:
1. Distance and direction from fix.
2. Direction in which traffic is proceeding.
3. If known, type of aircraft and altitude.
4. ETA over the fix the aircraft is approaching, if appropriate."

Departure Guidance

Section 4-3-4b stated "Hold for release instructions shall be used when necessary to inform a pilot or a controller that a departure clearance is not valid until additional instructions are received." It also stated "When issuing hold for release instructions, include departure delay information."

Approach Guidance

Section 5-9-5a stated "The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a letter of agreement/facility directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course."

Radar Service Guidance

Section 7-6-1a explicitly stated that "Basic radar services for VFR aircraft shall include:
1. Safety alerts.
2. Traffic advisories.
3. Limited radar vectoring when requested by the pilot.
4. Sequencing at locations where procedures have been established for this purpose and/or when covered by a LOA."

In a written statement, one of the air traffic controllers stated that after he acknowledged the cancellation of N7660Y and informed the pilot of the frequency change he then "advised the DR [Departure Radar] controller that N7660Y canceled IFR." In a review of ATCT Tracon Layout Chart, the Radar Clearance Delivery controller was seated immediately behind the approach controller. No recordings of the conversations between the controllers were provided to the National Transportation Safety Board; the only recordings or transcripts provided were the communications between the individual controller and the aircraft in which they communicated with.

Pilot Information

Certificate:	Private	**Age:**	54,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	December 1, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 4, 2008
Flight Time:	1640 hours (Total, all aircraft), 1100 hours (Total, this make and model), 1492 hours (Pilot In Command, all aircraft), 11 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N27199
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	E-2321
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	October 1, 2007 Annual	**Certified Max Gross Wt.:**	3650 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2662 Hrs at time of accident	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-550-8
Registered Owner:	On file	**Rated Power:**	310 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SFZ,441 ft msl	**Distance from Accident Site:**	
Observation Time:	17:35 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Thin Overcast / 600 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 600 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	14°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pawtucket, NJ (SFZ)	**Type of Flight Plan Filed:**	IFR
Destination:	Morristown, NJ (MMU)	**Type of Clearance:**	IFR
Departure Time:	17:44 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	North Central Airport SFZ	**Runway Surface Type:**	Asphalt
Airport Elevation:	441 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	05	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	41.92139,-71.495834

Administrative Information

Investigator In Charge (IIC):	Etcher, Shawn
Additional Participating Persons:	Ronald J Williams; FAA/FSDO; Boston, MA
Original Publish Date:	March 3, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=68183

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.

Aviation Investigation Final Report

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Date & Time:	June 6, 2008, 17:45 Local	**Registration:**	N7660Y
Aircraft:	Piper PA-30	**Aircraft Damage:**	Substantial
Defining Event:	Ground collision	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A Piper PA-30 was on an instrument flight rules (IFR) flight plan in instrument meteorological conditions and was cleared for an instrument approach. As the Piper approached the missed approach point, the pilot visually acquired the airport, and notified the air traffic controller to cancel his IFR flight plan. According to the Piper pilot, after the controller acknowledged the cancellation request, the pilot retuned his radio to the Common Traffic Advisory Frequency (CTAF) and announced his intention for landing. Due to the wind direction, the Piper pilot elected to circle and land on Runway 15, which was in the opposite direction of his approach. The pilot of a Beech A36, who was ready to depart from Runway 5 of the same airport, and who was also on an IFR flight plan, requested permission to take off but was told to "hold for release" by the controller. However, the controller did not explicitly inform the Beech pilot of the reason for the delay. Less than a minute later, the controller released the Beech. The two airplanes collided near the intersection of the two runways. Both pilots reported that they were not aware of the other airplane until immediately prior to the collision. Several witnesses heard the Beech pilot announce his intentions multiple times, but did not hear the Piper pilot's transmissions. The investigation also revealed that the two controllers were both aware of the proximity of the two airplanes, but neither one communicated that information to either of the pilots. A review of the recorded communications also revealed that the approach controller had a brief personal conversation with another controller just prior to the accident. The lack of received position or intent transmissions from the Piper, and the controllers' failure to inform the pilots of the proximity of the two airplanes, deprived the pilots of information that was critical to the pilots' situational awareness, and which could have enabled one or both pilots to prevent this accident.

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Findings

Personnel issues	Lack of action - ATC personnel
Environmental issues	(general) - Effect on operation
Personnel issues	Monitoring other aircraft - Pilot
Personnel issues	Monitoring other aircraft - Pilot of other aircraft
Personnel issues	Lack of communication - ATC personnel

Factual Information

History of Flight

Landing-landing roll	Ground collision

HISTORY OF FLIGHT

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METEROLOGICAL INFORMATION

The 1735 recorded weather at SFZ reported calm winds, visibility 10 miles, an overcast cloud layer 600 feet above ground level (agl), temperature 14 degrees C, dew point 11 degrees C, and an altimeter setting of 30.13 inches of mercury.

A review of recorded weather observation at airports within a 30 mile radius of SFZ around the time of the accident showed the winds were out of the south and southwest and varied between 6 and 10 knots, and an overcast ceiling of between 500 and 900 feet agl.

AIDS TO NAVIAGATION

The published instrument approach procedure (IAP) for the very high omni-direction range (VOR)/GPS A approach to SFZ indicated that the minimum altitude at the final approach fix (FAF) was 1,900 feet mean sea level (msl), and the minimum descent altitude (MDA) for the approach was 980 feet msl, or 539 feet agl. This approach was not specific to any runway at

SFZ. Air traffic control radar tracking data indicated that the Piper was at or below the MDA for approximately 42 seconds prior to the pilot notifying Providence ATC to cancel his IFR flight plan. The lowest altitude recorded prior to the pilots cancelation was 700 feet msl, or approximately 259 feet agl, this altitude was recorded for 14 seconds. The final radar return from the Piper which included altitude information was received at 1742:16, and the indicated an altitude was 500 feet msl, or approximately 59 feet agl. The final radar return from the Piper was received at 1742:32. This was approximately 30 seconds prior to the time when ATC released the Beech.

AIRPORT INFORMATION

The airport was not equipped with an air traffic control tower. Communications between airplanes at SFZ were accomplished using the CTAF. The airport was served by two crossing runways, designated as 05/23 and 15/33. Runway 05/23 was 5,000 feet long and 100 feet wide.

The airspace in the proximity of SFZ was categorized as class G airspace. The vertical limit of this airspace extended to 700 feet agl, where the airspace changed to class E. Class G airspace was uncontrolled airspace that required aircraft operating under visual flight rules (VFR) to have 1 mile flight visibility, and to remain clear of clouds. Class E airspace was controlled airspace whose floor could be at the surface, 700 feet agl, or 1,200 feet agl, and required aircraft operating under VFR to have 3 miles flight visibility and to maintain specific minimum distances from the clouds.

The departure area for Runway 5 and the touchdown zone for runway 15 were separated by trees that varied in height from approximately 13 to 55 feet. The locations and heights of some of these trees were such that it impeded the ability of the pilots to see one another from their respective runways.

Charted communication frequencies for aircraft operating in the vicinity of SFZ included CTAF, clearance delivery, departure, and approach. All except for the CTAF were monitored by ATC personnel located at a facility approximately 13 nautical miles south of SFZ. Departure and approach control were charted as the same communication frequency.

WRECKAGE AND IMPACT INFORMATION

The Piper sustained damage to its nose section, and the upper crown portion of the cabin had collapsed downward. There was no fire, and the pilot extricated himself from the wreckage. Witness marks indicated that the airplane skidded sideways prior to stopping. A portion of the Beech's fuel bladder was attached to the left propeller of the Piper.

The Beech's outboard left wing and aileron separated from the airplane, spilled fuel on the runway, and came to rest near the runway intersection. The left horizontal stabilizer also separated from the airplane, and the right main gear collapsed. The cockpit and engine

compartment incurred minor damage. The runway bore several witness marks consistent with tire skidding and a fuel fire.

ADDITIONAL INFORMATION

Chapter 1, "Collision Avoidance," of the FAA Airplane Flying Handbook (FAA-H-8083-3A) provided the following guidance to pilots: "All pilots must be alert to the potential for midair collision and near midair collisions. The general operating and flight rules in 14 CFR Part 91 set forth the concept of "See and Avoid." This concept requires that vigilance shall be maintained at all times, by each person operating an aircraft regardless of whether the operation is conducted under instrument flight rules (IFR) or visual flight rules (VFR). Pilots should also keep in mind their responsibility for continuously maintaining a vigilant lookout regardless of the type of aircraft being flown and the purpose of the flight."

Chapter 2 of the Instrument Flying Handbook (FAA-H-8261-1A) stated that "Meteorological conditions permitting, you are required to use "see and avoid" techniques to avoid traffic, terrain, and other obstacles…"

The Instrument Flying Handbook also contained the following guidance: "Since separation cannot be provided by ATC between IFR and VFR traffic when operating in areas where there is no radar coverage, pilots are expected to make radio announcements on the CTAF. These announcements allow other aircraft operating in the vicinity to plan their departures and arrivals with a minimum of conflicts. In addition, it is very important for crews to maintain a listening watch on the CTAF to increase their awareness of the current traffic situation. Flights inbound on an instrument approach to a field without a control tower should make several self-announced radio calls during the approach:
• Initial call within 5-10 minutes of the aircraft’s arrival at the IAF. This call should give the aircraft's location as well as the crew's approach intentions.
• FAF inbound, stating intended landing runway and maneuvering direction if circling.
• Short final, giving traffic on the surface notification of imminent landing."

The handbook also stated that "When operating on an IFR flight plan at an airport without a functioning control tower, pilots must initiate cancellation of the IFR flight plan with ATC… if a frequency is not available on the ground, the pilot has the option to cancel IFR while in flight if VFR conditions can be maintained…until landing."

The Instrument Flying Handbook described situational awareness as "the accurate perception of operational and environmental factors that affect the flight. It is a logical analysis based upon the machine, external support, environment, and the pilot. It is knowing what is going on."

The research paper "Theoretical Underpinnings of Situation Awareness: A Critical Review," further simplified the definition of situational awareness as "knowing what is going on around you." It stated that a "pilot does not need to know everything, but does need to know a great deal of information related to the goal of safely flying the aircraft."

FAA ATC CONTROLLER'S GUIDANCE

FAA Order 7110.65R, Air Traffic Control

Chapter 1, Introduction, stated that "this order prescribes air traffic control procedures and phraseology for use by persons providing air traffic control services. Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations that are not covered by it."

Chapter 2, General Control, stated that "The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic." Section 2-1-2 provided the following guidance on controllers' prioritization of aircraft: "Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment shall be used in prioritizing all other provisions of this order based on the requirements of the situation at hand." The section provided the following guidance regarding traffic advisories "Unless an aircraft is operating within Class A airspace or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when, in your judgment, their proximity may diminish to less than the applicable separation minima. Where no separation minima applies, such as for VFR aircraft outside of Class B/Class C airspace, or a TRSA, issue traffic advisories to those aircraft on your frequency when in your judgment their proximity warrants it. Provide this service as follows:
To aircraft that are not radar identified:
1. Distance and direction from fix.
2. Direction in which traffic is proceeding.
3. If known, type of aircraft and altitude.
4. ETA over the fix the aircraft is approaching, if appropriate."

Departure Guidance

Section 4-3-4b stated "Hold for release instructions shall be used when necessary to inform a pilot or a controller that a departure clearance is not valid until additional instructions are received." It also stated "When issuing hold for release instructions, include departure delay information."

Approach Guidance

Section 5-9-5a stated "The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a letter of agreement/facility directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course."

Radar Service Guidance

Section 7-6-1a explicitly stated that "Basic radar services for VFR aircraft shall include:
1. Safety alerts.
2. Traffic advisories.
3. Limited radar vectoring when requested by the pilot.
4. Sequencing at locations where procedures have been established for this purpose and/or when covered by a LOA."

In a written statement, one of the air traffic controllers stated that after he acknowledged the cancellation of N7660Y and informed the pilot of the frequency change he then "advised the DR [Departure Radar] controller that N7660Y canceled IFR." In a review of ATCT Tracon Layout Chart, the Radar Clearance Delivery controller was seated immediately behind the approach controller. No recordings of the conversations between the controllers were provided to the National Transportation Safety Board; the only recordings or transcripts provided were the communications between the individual controller and the aircraft in which they communicated with.

Pilot Information

Certificate:	Commercial; Private	**Age:**	45,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	September 29, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	June 1, 2007
Flight Time:	3215 hours (Total, all aircraft), 2965 hours (Total, this make and model), 2250 hours (Pilot In Command, all aircraft), 62 hours (Last 90 days, all aircraft), 34 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N7660Y
Model/Series:	PA-30	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30-738
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 1, 2008 Annual	**Certified Max Gross Wt.:**	3725 lbs
Time Since Last Inspection:	50 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	5278 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, not activated	**Engine Model/Series:**	IO320B1A
Registered Owner:	On file	**Rated Power:**	160 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SFZ,441 ft msl	**Distance from Accident Site:**	
Observation Time:	17:35 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Thin Overcast / 600 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 600 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	14°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Nantucket, MA (ACK)	**Type of Flight Plan Filed:**	IFR
Destination:	Pawtucket, NJ (SFZ)	**Type of Clearance:**	IFR
Departure Time:	17:10 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	North Central Airport SFZ	**Runway Surface Type:**	Asphalt
Airport Elevation:	441 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	05	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	41.92139,-71.495834

Administrative Information

Investigator In Charge (IIC):	Etcher, Shawn
Additional Participating Persons:	Ronald J Williams; FAA/FSDO; Boston, MA
Original Publish Date:	March 3, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=68183

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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