Aviation Investigation Final Report

Location:	Belfast, Maine	**Accident Number:**	NYC08FA155
Date & Time:	April 6, 2008, 17:56 Local	**Registration:**	N601RH
Aircraft:	SIAI-Marchetti SF-260	**Aircraft Damage:**	Substantial
Defining Event:	Loss of visual reference	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Just after departure from the airport, the airplane was observed by several witnesses performing a "lazy barrel roll" over a bay. After the first "barrel roll" the airplane was observed starting to perform a climb toward an overcast cloud layer. One eyewitness observed the airplane begin a second maneuver and as it was "still upside down," the nose of the airplane pointed down to the water and disappeared from view. Another eyewitness had turned his back when he assumed the airplane was going into the overcast cloud layer; however, he and several other witnesses heard the "loudest bang" that sounded similar to an engine "back fire." Due to the depths of the water and the size of the debris area, the airplane was not recovered; however, the wreckage was video-taped on the bottom of the bay. Deformation of the wing spars indicated positive high g-loading just prior to impact. The Federal Aviation Administration Advisory Circular 60-4A states in part, "Surface references and the natural horizon may at times become obscured, although visibility may be above visual flight rule minimums. Lack of natural horizon or surface reference is common on overwater flights…" Witness accounts of the accident suggest the pilot became disoriented while performing the aerobatic maneuvers over the water and in proximity to the clouds.

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 due to spatial disorientation during an aerobatic maneuver.

Findings

Environmental issues	Water - Contributed to outcome
Aircraft	(general) - Not attained/maintained
Personnel issues	Spatial disorientation - Pilot

Factual Information

History of Flight

Maneuvering-aerobatics	Loss of visual reference (Defining event)
Maneuvering-aerobatics	Loss of control in flight

HISTORY OF FLIGHT

On April 6, 2008, about 1755 eastern daylight time, an SIAI-Marchetti, SF-260, N601RH, was substantially damaged when it impacted the water of Penobscot Bay, while maneuvering near Belfast Municipal Airport (BST), Belfast, Maine. The certificated commercial pilot was killed. The local personal flight was conducted under 14 Code of Federal Regulation Part 91, and no flight plan was filed. Visual meteorological conditions prevailed at the time of the accident.

A witness observed the airplane performing a "lazy barrel roll;" while the airplane was "still upside down," it was observed to pitch down towards the water and "disappear." Another witness observed the airplane starting a "lazy climb" as thought it was going to go into the clouds. The witness then heard "the loudest bang" and could not reacquire the airplane. One witness reported that it sounded similar to an engine "back fire," but considerably "louder than a back fire." The depth of the water was approximately 60 feet and the airplane was not recovered. The landing gear and some seat cushions were recovered.

The diver who recovered the body of the pilot reported that "everything forward of the rear seat was shredded." He further stated that the only item resembling an airplane was the tailcone section.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate, with ratings for airplane single-engine land, airplane multi-engine land, and instrument airplane. He also held a private pilot certificate, with a rating for airplane single-engine sea. His most recent Federal Aviation Administration (FAA) second-class medical certificate was issued on April 1, 2008. According to the accident pilot's last medical application form, he accumulated 3,600 total hours of flight experience, and flew 30 hours in the previous 6 months.

AIRCRAFT INFORMATION

The airplane was manufactured in Italy in 1971 and was registered in the United States on January 3, 1985. The airplane was powered by a Lycoming O-540-E4A5 engine, serial number L-12386-40. The most recent annual inspection on both the airframe and engine was completed on January 18, 2008. At that time both logbooks recorded a tachometer time of

1,637.2 total hours and the engine logbook recorded a time since major overhaul of 940 hours. The most recent entry in the airframe logbook, dated March 24, 2008, revealed an eddy current inspection was accomplished on the lower bolt holes of the left and right forward spar roots, spar connection plates, and the center area on the lower spar connection plates, and no defects were noted.

METEORLOGICAL INFORMATION

The 1755 recorded weather conditions at the Knox County Regional Airport (RKD), Rockland, Maine, located approximately 21 miles south of the accident site, included an overcast ceiling at 3,200 feet and visibility 10 miles.

WRECKAGE AND IMPACT INFORMATION

The airplane was located by flex of paint and an oil slick on top of the water. The Maine State Police (MSP) dive team dove down at that location and located the wreckage scattered in an area of approximately 80 feet in diameter. The divers attached a rope to the tail section and raised it to the surface of the water to extract the pilot. Upon removal of the body the State Police untied the tail and allowed it to settle to the bay floor.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the Chief Medical Examiner of Maine performed an autopsy on the pilot on April 8, 2008. The cause of death was multiple blunt force injuries.

Toxicological testing was performed post mortem at the FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The tests were negative for carbon monoxide, cyanide, ethanol, and drugs.

TEST AND RESEARCH

An FAA Air Traffic Control (ATC) radar track of an airplane with a transponder beacon code of 1200 was located. This radar recording was from the Bangor, Maine FAA ATC facility, located approximately 28 nautical miles to the northeast of the accident site; the radar recording was recorded in approximate 5-second sweeps. The target was seen climbing out of BST at 1753.06, at an altitude of 500 feet above mean sea level (msl). The target was departing on a northwest ground track and making a right turn at 1753.12, at altitude of 600 feet msl. The target was then on a ground track of 151 degrees magnetic at an altitude of 1,200 feet msl, ascending to the highest altitude recorded for the flight of 1,900 feet msl. The last radar target observed was at 1754.57, with a ground track of 169 degrees magnetic, a ground speed of 150 knots, and was located at 44 degrees 24.0244 minutes north latitude and 068 degrees 57.4267 minutes west longitude. This was in close proximity to the wreckage site.

On July 22, 2008, in joint effort with the Federal Bureau of Investigation (FBI) Emergency

Response Team (ERT) and MSP, a dive was accomplished to videotape the wreckage on site. The aircraft wreckage was found utilizing GPS and sonar. The tail of the airplane was located 1/2 mile from the main wreckage site. The MSP reported to the National Transportation Safety Board investigator that while raising the tail of the aircraft to the surface, in order to recover the pilot, the current allowed the boat to drift down current and once finished, they released the tail, which accounts for the tail of the airplane not in the same location as the main wreckage. The tail of the airplane was originally co-located with the rest of the airplane. On July 22, 2008 the tail section was videotaped by the FBI ERT on the bay floor. The tail section exhibited signs of tensile overload along the horizontal stabilizer in a positive (upward) direction. On July 23 and 24, 2008, the main wreckage was videotaped by the FBI ERT as well as the MSP dive team. The wings spars were located and exhibited signs of tensile overload in the positive (upward) direction.

ADDITIONAL RESEARCH

The FAA's Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25) states in part, "…under normal flight conditions, when there is a visual reference to the horizon and ground, the sensory system in the inner ear helps to identify the pitch, roll, and yaw movements of the airplane. When visual contact with the horizon is lost, the vestibular system becomes unreliable. Without visual references outside the airplane, there are many situations where combinations of normal motions and forces can create convincing illusions that are difficult to overcome."

The Handbook further states in part, "A sloping cloud formation, an obscured horizon …can provide inaccurate visual information, or false horizon, for aligning the aircraft correctly with the actual horizon. The disoriented pilot may place the aircraft in a dangerous attitude."

The FAA's Advisory Circular 60-4A states in part, "The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references 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 overwater 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."

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Pilot Information

Certificate:	Commercial	**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Unknown
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	SIAI-Marchetti	**Registration:**	N601RH
Model/Series:	SF-260	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Aerobatic; Utility	**Serial Number:**	2-50
Landing Gear Type:	Retractable - Tricycle	**Seats:**	3
Date/Type of Last Inspection:	January 18, 2008 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1
Airframe Total Time:	1637 Hrs as of last inspection	**Engine Manufacturer:**	
ELT:		**Engine Model/Series:**	
Registered Owner:	Ace Aviation Inc	**Rated Power:**	
Operator:	Ace Aviation Inc	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	
Observation Facility, Elevation:	RKD	**Distance from Accident Site:**	
Observation Time:	17:55 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 3200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.45 inches Hg	**Temperature/Dew Point:**	6°C / 1°C
Precipitation and Obscuration:			
Departure Point:	Belfast, ME (BST)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	
Departure Time:	17:50 Local	**Type of Airspace:**	

Airport Information

Airport:	Belfast Municipal Airport BST	**Runway Surface Type:**	
Airport Elevation:	198 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:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	44.396389,-68.961944

Administrative Information

Investigator In Charge (IIC):	Etcher, Shawn
Additional Participating Persons:	David Pepple; FAA/FSDO; Portland, ME
Original Publish Date:	October 19, 2009
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=67760