Aviation Investigation Final Report

Location:	Snow Hill, North Carolina	**Accident Number:**	NYC08LA176
Date & Time:	May 8, 2008, 13:10 Local	**Registration:**	N101BX
Aircraft:	Desalvatore Al Lancair IV-P	**Aircraft Damage:**	Destroyed
Defining Event:	Structural icing	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot departed under visual flight rules for a 1,016 nautical-mile cross-country flight in the single engine, high performance, amateur-built airplane. About 2.5 hours into the flight, the pilot requested and was given, and instrument flight rules (IFR) clearance, and subsequently descended from 17,500 feet to 17,000 feet. About 4 minutes later, the pilot queried air traffic control (ATC) regarding the weather conditions ahead, and was advised of another airplane reporting light rime icing between 15,000 and 12,000 feet. Another aircraft further ahead did not report any ice at 11,000 feet. About 12 minutes after requesting the IFR clearance, the pilot requested to descend due to icing conditions. ATC cleared the airplane to descend to 15,000 feet, and advised that if further descent was required the airplane would have to be vectored around climbing traffic. The accident airplane was lost from radar shortly thereafter. The conflicting, climbing traffic pointed out by ATC was a business jet, and the crew, which observed the accident airplane on their collision avoidance system, reported no icing while flying at 14,000 feet. Review of weather radar data and satellite imagery revealed the presence of relatively colder convective cloud tops as the airplane progressed along its flight path, and implied positive vertical velocities and weak embedded high-altitude convection in the area. Level 1 weather radar returns and recorded temperatures aloft of -3 to -7 degrees Celsius indicated that super-cooled large water droplets were most likely present in the area. The accident airplane most likely encountered moderate to severe clear or mixed icing while descending out of 17,000 feet. A review of flight service station data revealed the pilot did not contact any flight service stations or utilize the Direct User Access Terminal System (DUATS) to obtain a weather briefing, or file a flight plan, prior to commencing the flight, nor did the pilot contact any flight service stations while en route.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An inadvertent encounter with icing conditions, resulting in a loss of aircraft control. Contributing to the accident was the pilot's inadequate preflight and in-flight decision making.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Aircraft control - Pilot
Environmental issues	Conducive to structural icing - Effect on equipment
Aircraft	(general) - Not attained/maintained

Factual Information

History of Flight

Enroute-cruise	Structural icing (Defining event)
Enroute-descent	Loss of control in flight

HISTORY OF FLIGHT

On May 8, 2008, at 1310 eastern daylight time, an amateur-built Lancair IV-P, N101BX, was destroyed when it impacted terrain following an uncontrolled descent in Snow Hill, North Carolina. The certificated commercial pilot and the passenger were fatally injured. Visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed and activated for the flight. The flight originated at Page Field (FMY), Fort Myers, Florida, and was destined for Hartford-Brainard Airport (HFD), Hartford, Connecticut. The personal flight was conducted under 14 Code of Federal Regulations Part 91.

According to information provided by Federal Aviation Administration (FAA) Air Traffic Control (ATC) facilities, the pilot departed FMY under visual flight rules about 1030. While en route, the pilot contacted ATC and requested visual flight rules flight following services.

At 1254, the pilot requested, and was given, an IFR clearance. Review of radar data revealed that about this time the airplane descended from 17,500 feet to 17,000 feet. About 4 minutes later, the pilot queried ATC and asked if there were any "ride reports in the teens." The controller replied that an aircraft had reported light rime icing between 15,000 and 12,000 feet, located about 20 miles ahead of the accident airplane's position. The controller also advised that another aircraft about 60 miles ahead at 11,000 feet, reported the ride was "smooth." After receiving the report the pilot replied to ATC that the temperature aloft was 17 degrees Fahrenheit (F), and made an unintelligible comment about icing.

At 1306, the pilot contacted ATC and requested to descend due to icing. The controller then advised the pilot to standby, and 30 seconds later cleared the pilot to descend to 15,000 feet. The controller then asked the pilot for the type of icing and the temperature, to which the pilot replied "light and trace" icing and a temperature of 18 degrees F. During this exchange the airplane's reported altitude began to vary, initially descending from 17,100 feet to 16,700 feet, before it climbed to 17,300 feet. Shortly after receiving the clearance, the airplane began to descend.

At 1306, ATC advised the pilot that if he needed to descend further, he would have to be vectored to the east, due to a Beech 400 that was behind him and climbing. The pilot acknowledged, and no further transmissions were received. The final radar target was observed shortly after that transmission at 15,000 feet, about 2 miles southwest of the

accident site.

The crew of the Beech 400 was in contact with ATC, and was flying in the area of the accident airplane. Both the captain and first officer provided similar written statements recounting what they heard and observed. The crew was initially cleared to climb to 15,000 feet, but was later told to stop their climb at 14,000 feet because a Lancair, the accident airplane, was descending from 17,000 feet to 15,000 feet due to icing. Upon reaching 14,000 feet, the crew observed a target on their Traffic alert and Collision Avoidance System (TCAS) that was about 1,000 feet above them in altitude, and at their 12 o'clock position at a distance about 7 to 8 miles. The next update of the TCAS showed the traffic at the same altitude, still at the 12 o'clock position at a distance about 5 to 6 miles. The crew questioned ATC if this was the traffic that they had previously been alerted to, which was answered in the affirmative.

The next time the crew looked at the TCAS, the traffic was 2,000 feet below, at the 2 to 3 o'clock position and a distance of 4 miles. The crew did not observe any further TCAS updates of the traffic, and shortly thereafter the crew briefly heard the sound of an emergency locator transmitter in the background of the controller's transmission.

The crew additionally reported that they were in instrument meteorological conditions at the time of the event, and that while flying at 14,000 feet there was no icing present. They were not sure of the outside air temperature, but remembered that the ram air temperature was over 10 degrees Celsius (C).

Two witnesses riding in a truck, about 100 yards from the accident site, stated that they observed a "glimpse of something" as it impacted the ground. One of the witnesses stated that he saw the airplane's tail about 4 to 5 feet in the air before it "slammed" to the ground.

Another witness stated that he heard a loud whirring noise, "like a bearing going bad," that started and stopped twice. The whirring noise then stopped, just before he heard a loud "explosion" that shook the ground. He looked in the direction of the noise and saw a small amount of smoke. He then proceeded to the accident site and saw thick white smoke coming from underneath the instrument panel. He and three other individuals attempted to help the occupants out of the wreckage, but by that time the fire had become too hot and they had to back away. When asked about the appearance of the airplane prior to the fire, the witness described that it was mostly intact with the exception of the cabin, which was "gone."

METEOROLOGICAL INFORMATION

The airplane's flight track was superimposed onto high-resolution visible satellite imagery, which revealed that about the time the pilot requested an IFR clearance, the airplane was flying in visual meteorological conditions; however, dense overcast clouds were located along and upwind of the airplane's proposed route of flight. Visible satellite images for 1302, and 1325, revealed overcast clouds in the vicinity of the accident airplane. The clouds just west of the airplane's position at 1302, and just east of the airplane's position at 1325, had a "lumpy"

appearance consistent with the presence of convective clouds.

Examination of color-enhanced infrared satellite data revealed convective cloud tops in the vicinity and northeast of the airplane's position, about 1254, were above the airplane's flight altitude. The infrared satellite image for 1302, showed cloud tops near 30,000 feet, and progressively colder cloud tops as the airplane proceeded along its flight path. The 1315, infrared satellite image indicated cloud tops above 30,000 feet for the airplane's final minute of flight.

Examination of weather radar data indicated that the accident airplane entered an area of "level 1" radar echoes about the time the pilot reported icing to ATC, and around the airplane's altitude. The radar data also showed widespread level 1 echoes along the airplane's flight track, below its altitude.

Upper air data for the period encompassing the accident flight indicated that the temperature at 17,000 feet was -7 degrees C, and the temperature at 15,000 feet was -4 degrees C. A pilot report, at 1225, near Kingston, North Carolina, reported that the temperature at 15,000 feet was -3 degrees C.

The weather conditions reported at Goldsboro-Wayne Municipal Airport (GWW), Goldsboro, North Carolina, located about 9 nautical miles west of the accident site, at 1320, included winds from 210 degrees at 5 knots, 7 statute miles visibility in light rain, scattered clouds at 600, 1,700, and 7,000 feet, temperature 21 degrees C, dew point 18 degrees C, and altimeter setting of 29.93 inches of mercury.

An airmen's meteorological information (AIRMET) for icing and freezing level valid during the period of the accident flight, beginning at 1045, advised that the freezing level across an area of the final portion of the accident flight was 12,000 feet. No other forecasts or advisories showed any significant weather along the proposed route of flight.

A review of flight service station data revealed the pilot did not contact any flight service stations or utilize the Direct User Access Terminal System (DUATS) to obtain a weather briefing, or file a flight plan, prior to commencing the flight, nor did the pilot contact any flight service stations while en route.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with ratings for airplane single and multi-engine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single engine and instrument airplane.

The pilot's personal logbooks were not located; however, a review of flight experience information submitted to the pilot's insurance carrier revealed that as of September 20, 2007, he had accumulated 1,350 total hours of flight experience, 75 hours of which were logged in

the previous 12 months. Additionally, the pilot reported that he possessed 800 hours of experience in airplanes equipped with retractable landing gear, 20 hours of flight experience in multi-engine airplanes, and no previous experience in the accident airplane make and model.

AIRCRAFT INFORMATION

According to FAA aircraft registration information, the accident airplane was built in 2003. Maintenance records for the airplane were not recovered.

No evidence was found to suggest that the accident airplane was equipped with any anti- or de-icing system.

WRECKAGE AND IMPACT INFORMATION

The airplane was examined at the accident scene by Federal Aviation Administration (FAA) inspectors. According to the inspectors, the entirety of the wreckage was accounted for at the scene, with the exception of one winglet, which was found on the roof of a house about 4,000 feet from the main wreckage. The majority of the wreckage was consumed by a post impact fire. Control continuity was traced from the cockpit area to all of the flight control surfaces.

The engine was transported to a recovery facility, where it was further examined by a National Transportation Safety Board investigator and a representative of the engine manufacturer.

The engine was intact, with all of the accessories attached, with the exception of the fuel pump. Two of the four propeller blades were separated from the propeller hub, one blade was broken in half, while the fourth blade was not damaged. The aft portion of the engine was fire damaged, and the oil sump was crushed upward into the camshaft. Borescope examination of all cylinders revealed that the piston heads and cylinder domes did not exhibit any abnormal combustion deposits. Rotation of the crankshaft at the propeller confirmed continuity throughout the drivetrain and the valvetrain, and compression was confirmed on all cylinders. Both turbochargers were fire and impact damaged, and neither of their driveshafts was free to rotate.

The top six spark plugs were removed, and examination revealed that they exhibited light gray deposits in the electrode areas. The fuel pump was separated from the rear of the engine, and was coated with soot. The drive coupling was intact, but the drive shaft was not free to rotate. Further disassembly revealed that the interior was dry and heat discolored, with no internal mechanical damage observed. Disassembly and examination of the fuel manifold revealed that the fuel screen was absent of debris or fuel. The oil filter was fire and impacted damaged. Examination of the paper element revealed that it was charred, but no metal particles were observed.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the North Carolina Department of Health and Human Services, Office of the Chief Medical Examiner, Chapel Hill, North Carolina. The autopsy report noted the cause of death as "multiple extreme injuries."

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on the pilot.

ADDITIONAL INFORMATION

FAA Advisory Circular AC 00-6A, Aviation Weather, described some of the conditions and cloud types that could be conducive to the formation of aircraft structural icing. According to the advisory circular, "Basically, all clouds at subfreezing temperatures have icing potential. However, drop size, drop distribution, and aerodynamic effects of the aircraft influence ice formation. Ice may not form even though the potential exists. The condition most favorable for very hazardous icing is the presence of many large, supercooled water drops. Conversely, an equal or lesser number of smaller droplets favors a slower rate of icing."

The advisory circular later stated, "The upward currents in cumuliform clouds are favorable for the formation and support of many large water drops. The size of raindrops and rainfall intensity normally experienced from showers and thunderstorms confirm this. When an aircraft enters the heavy water concentrations found in cumuliform clouds, the large drops break and spread rapidly over the leading edge of the airfoil forming a film of water. If temperatures are freezing or colder, the water freezes quickly to form a solid sheet of clear ice. Pilots usually avoid cumuliform clouds when possible. Consequently, icing reports from such clouds are rare and do not indicate the frequency with which it can occur."

The advisory circular closes, "Icing is where you find it. As with turbulence, icing may be local in extent and transient in character. Forecasters can identify regions in which icing is possible. However, they cannot define the precise small pockets in which it occurs. You should plan your flight to avoid those areas where icing probably will be heavier than your aircraft can handle. And you must be prepared to avoid or to escape the hazard when encountered en route."

Some specific points numerated by the advisory circular were:
"2. If your aircraft is not equipped with de-icing or anti-icing equipment, avoid areas of icing. Water (clouds or precipitation) must be visible and outside air temperature must be near 0 degrees C or colder for structural ice to form."

"10. Avoid cumuliform clouds if at all possible. Clear ice may be encountered anywhere above the freezing level. Most rapid accumulations are usually at temperatures from 0 degrees C to -15 degrees C."

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	56,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):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	August 21, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 21, 2006
Flight Time:	1350 hours (Total, all aircraft), 25 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Desalvatore Al	**Registration:**	N101BX
Model/Series:	Lancair IV-P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	LIV-421
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	3200 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-550
Registered Owner:	Higher Power FL, LLC	**Rated Power:**	350 Horsepower
Operator:	Higher Power FL, LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GWW,134 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	13:20 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Scattered / 600 ft AGL	**Visibility**	7 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	21°C / 18°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	Ft. Myers, FL (FMY)	**Type of Flight Plan Filed:**	IFR
Destination:	Hartford, CT (HFD)	**Type of Clearance:**	IFR
Departure Time:	10:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	35.428333,-77.807502

Administrative Information

Investigator In Charge (IIC):	Diaz, Dennis
Additional Participating Persons:	Duane R Burns; FAA/FSDO; Greensboro, NC John T Kent; Teledyne-Continental Motors; Mobile, AL
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Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=67963