Aviation Investigation Final Report

Location:	Presque Isle, Maine	**Accident Number:**	ERA18LA033
Date & Time:	November 22, 2017, 18:45 Local	**Registration:**	N421RX
Aircraft:	Cessna 421	**Aircraft Damage:**	Substantial
Defining Event:	Fire/smoke (non-impact)	**Injuries:**	2 Minor, 2 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Air Medical (Medical emergency)		

Analysis

After takeoff, the commercial pilot saw flames coming from the left engine nacelle area. He retarded the throttle and turned off the fuel boost pump; however, the fire continued. He then feathered the propeller, shut down the engine, and maneuvered the airplane below the clouds to remain in the local traffic pattern. He attempted to keep the runway environment in sight while drifting in and out of clouds. He was unable to align the airplane for landing on the departure runway, so he attempted to land on another runway. When he realized that the airspeed was decreasing and that the airplane would not reach the runway, he landed it on an adjacent grass field. After touchdown, the landing gear separated, and the airplane came to a stop. The airframe sustained substantial damage to the wings and lower fuselage.

Examination of the left engine revealed evidence of a fuel leak where the fuel mixture control shaft inserted into the fuel injector body, which likely resulted in fuel leaking onto the hot turbocharger in flight and the in-flight fire. A review of recent maintenance records did not reveal any entries regarding maintenance or repair of the fuel injection system.

The pilot reported clouds as low as 500 ft with rain, snow, and reduced visibility at the time of the accident, which likely reduced his ability to see the runway and maneuver the airplane to land on it.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The in-flight leakage of fuel from the fuel injection system's mixture shaft onto the hot turbocharger, which resulted in an in-flight fire, and the pilot's inability to see the runway due to reduced visibility conditions and conduct a successful landing.

Findings

Aircraft	Fuel controlling system - Damaged/degraded
Environmental issues	Low ceiling - Contributed to outcome

Factual Information

History of Flight

Initial climb	Fire/smoke (non-impact) (Defining event)
Approach-VFR pattern final	Off-field or emergency landing
Initial climb	Attempted remediation/recovery
Landing	Part(s) separation from AC

On November 22, 2017, about 1845 eastern standard time, a Cessna 421C, N421RX, was substantially damaged during a forced landing shortly after takeoff from Northern Maine Regional Airport (PQI), Presque Isle, Maine. The commercial pilot was not injured; two crewmembers, and one passenger sustained minor injuries. The airplane was operated by Fresh Air LLC under the provisions of Title 14 *Code of Federal Regulations* part 135 as an air medical flight. Day, instrument meteorological conditions prevailed, and an instrument flight rules flight plan was filed. The flight originated at PQI about 1840 and was destined for Bangor International Airport (BGR), Bangor, Maine.

The pilot reported that the preflight inspection of the airplane and ground operations were uneventful. After taking off on runway 19, the pilot retracted the landing gear and turned off the landing lights. He then observed flames coming from the left engine nacelle. He immediately retarded the throttle and turned off the fuel boost pump; however, the fire persisted. He feathered the propeller, shut down the engine, and maneuvered the airplane below the clouds to remain in the traffic pattern at PQI. He attempted to keep the runway environment in sight while drifting in and out of clouds. He was unable to align the airplane for a landing on runway 19, so he attempted to land on runway 10. The pilot realized the airspeed was dropping and the airplane would not reach runway 10, so he landed in an adjacent field. After touchdown, the landing gear broke away and the airplane came to a stop in the grass.

The PQI reported weather at 1848 included, overcast clouds at 1,400 ft and broken clouds at 800 ft, with 5 statute miles visibility in light snow and mist. The pilot reported that the clouds were at 500 ft with rain and snow at the time of the accident.

An inspector with the Federal Aviation Administration responded to the accident site and examined the wreckage. The airplane came to rest in an upright position. The landing gear were separated, and structural damage to the wings and lower fuselage was evident. Initial examination of the left engine revealed soot on the nacelle louver vents and some localized white discoloration near the turbocharger area.

Subsequent examination of the engine revealed soot and a darkening of the area below and behind the fuel injector system near the turbocharger. The top engine cowling, which exhibited paint bubbling and discoloration from exposure to intense heat, was placed over the top of the engine and the damage was consistent with the area above the fuel injector system.

The fuel system was then pressurized with 40psi of air and the sound of escaping air was heard in and around the mixture control arm of the fuel injector system. A mixture of water/soap was sprayed on the

area where air was heard, and bubbles were immediately observed. Other areas of the engine were also sprayed with the water/soap mixture and no other signs of leaks were observed. The area where the leak was observed was consistent with fuel dripping and being blown onto the hot turbocharger in flight.

The fuel injector system was removed, and blue staining was observed in and around the mixture arm. A pressure check of the exhaust system was also conducted. No leaks were observed at any welds or joints.

A review of the engine logbook entries did not reveal evidence of any recent maintenance or repair on the fuel injection system. An annual inspection was completed on June 2, 2017 and a 100-hr inspection was completed on September 13, 2017.

Pilot Information

Certificate:	Commercial	**Age:**	52,Male
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:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	December 1, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 28, 2017
Flight Time:	4482 hours (Total, all aircraft), 3620 hours (Total, this make and model), 3973 hours (Pilot In Command, all aircraft), 73 hours (Last 90 days, all aircraft), 29 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N421RX
Model/Series:	421 C	**Aircraft Category:**	Airplane
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	421C0264
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 2, 2017 100 hour	**Certified Max Gross Wt.:**	7500 lbs
Time Since Last Inspection:	18 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	7473 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	GTSIO-520-L
Registered Owner:	FRESH AIR LLC	**Rated Power:**	375 Horsepower
Operator:	FRESH AIR LLC	**Operating Certificate(s) Held:**	On-demand air taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PQI,533 ft msl	**Distance from Accident Site:**	
Observation Time:	18:47 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	5 miles
Lowest Ceiling:	Broken / 800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.81 inches Hg	**Temperature/Dew Point:**	1°C / 1°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Presque Isle, ME (PQI)	**Type of Flight Plan Filed:**	IFR
Destination:	Bangor, ME (BGR)	**Type of Clearance:**	IFR
Departure Time:	18:25 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	Northern Maine Regional PQI	**Runway Surface Type:**	
Airport Elevation:	533 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	2 Minor, 1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor, 2 None	**Latitude, Longitude:**	46.688888,-68.044723(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Mark Auclair; FAA/FSDO; Portland, ME
Original Publish Date:	July 23, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96398