



# **Aviation Investigation Final Report**

Location:	Bethel, Alaska	Accident Number:	ANC22LA007
Date & Time:	November 20, 2021, 17:55 Local	Registration:	N9794M
Aircraft:	Cessna 207A	Aircraft Damage:	Substantial
Defining Event:	Fire/smoke (non-impact)	Injuries:	6 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Scheduled		

### Analysis

The pilot was conducting a scheduled air taxi flight with five passengers onboard. Shortly after departure, the pilot began to smell an electrical burn odor, and he elected to return to the airport. About 1 minute later, the electrical burn smell intensified, which was followed by visible smoke in the cockpit, and the pilot declared an emergency to the tower. After landing and all the passengers had safely departed the airplane, heavy smoke filled the cockpit and passenger compartment, and the pilot saw a candle-like flame just behind the pilot and co-pilot seats, just beneath the floorboards of the airplane. Moments later, the airplane was engulfed in flames.

Postaccident examination of the airframe revealed the origin of the fire to be centered behind the pilot's row of seats, where a wire harness was found improperly installed on top of the aft fuel line from the left tank. Examination of the wire harness found a range of thermal and electrical damage consistent with chafing from the fuel line. It is likely that the installation of the wire harness permitted contact with the fuel line, which resulted in chafing, arcing, and the subsequent fire.

### **Probable Cause and Findings**

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

The improper installation of an avionics wire harness over a fuel line, which resulted in chafing of the wire harness, arcing, and a subsequent fire.

#### Findings

Aircraft Aircraft Misc wiring - Not serviced/maintained Electrical pwr sys wiring - Fatigue/wear/corrosion

## **Factual Information**

**History of Flight** 

Enroute-cruise

Fire/smoke (non-impact) (Defining event)

On November 20, 2021, about 1755 Alaska standard time, a Cessna 207 airplane, N9794M, sustained substantial damage when it was involved in an accident near Bethel, Alaska. The pilot and five passengers were not injured. The airplane was operated by Yute Commuter Service as a Title 14 *Code of Federal Regulations* Part 135 scheduled passenger flight.

The purpose of the flight was to transport five passengers and cargo to Kwethluk, Alaska, which is located about 12 miles east of Bethel. The pilot reported that shortly after departure, he noticed that the red emergency locator transmitter (ELT) light on the instrument-panel-mounted remote switch had illuminated. The pilot then asked the Bethel tower operator if they were hearing an ELT signal, and the tower operator responded that no signal was being received. Moments later, the pilot began to smell an electrical burn smell and elected to return to Bethel.

The pilot said that about 1 minute later, the electrical burn smell intensified, which was followed by visible smoke in the cockpit, and he then declared an emergency to the Bethel tower. The pilot then turned off the airplane's master electrical switch, and subsequently opened his side window for ventilation and smoke removal. He said he briefly turned the master switch back on to again declare an emergency with Bethel tower, and to inform the tower operator that he was planning to land on runway 1L.

The pilot said that during the landing roll, he realized that the nosewheel steering system and brake system were both inoperative. After the airplane rolled to a stop on the left side of runway 1L, he ordered all the passengers to evacuate the airplane.

The pilot reported that after all the passengers had safely departed the airplane, heavy smoke filled the cockpit and passenger compartment, and he saw a candle-like flame behind the pilot and co-pilot seats, just beneath the floorboards of the airplane. Moments after all the passengers and pilot had exited the airplane, it was immediately engulfed in flames. See figure 1.



Figure 1 Photo of accident airplane while still on Runway 1L.

Examination of the maintenance records showed that on January 27, 2011, the Capstone system, phase 1, was installed on the accident airplane under Federal Aviation Administration (FAA) Supplemental Type Certificate (STC) number STC2154AK. The Capstone Program is a voluntary safety demonstration involving the installation, at FAA expense, of avionics suites in approximately 200 aircraft operated in western Alaska. The avionics suites, manufactured by UPS Aviation Technologies, consist of an MX-20 multifunction display (MFD), a GX-60 GPS nav/com, a Universal Access Transceiver (UAT), and an installation kit with all necessary cables, antennas, and mounting hardware, and an instruction book.

A National Transportation Safety Board (NTSB) postaccident examination of the airplane wreckage revealed the origin of the fire to be centered behind the pilot's row of seats, where a wire harness, which was discovered to be part of the Capstone Program equipment, was found improperly installed on top of the aft fuel line from the left fuel tank. The fuel line exhibited chafing and thermal damage. Following removal of the fuel line, a small pinhole was detected in the fuel line utilizing a flashlight. NTSB Materials Laboratory examination of the wire harness found a range of thermal and electrical damage, from thermal discoloration and sooting to beading and welding in areas on individual conductors. The damage was consistent with the wire being energized at the time the damage occurred.

During the on-scene NTSB examination of the accident airplane wreckage, a second Cessna 207, which was purchased at the same time as the accident airplane, was examined in the operator's hangar. The NTSB IIC, along with the entire investigative team, discovered that the same Capstone wire harness condition found in the accident airplane existed in the second Cessna 207 in the same location.

As a result of the NTSB investigation, the FAA issued a notification letter to alert registered aircraft owners and operators of the need to inspect the area inside inspection panels from the rear door frame forward under the pilots and passengers' floorboards at the next maintenance function, 100 hour, or Annual inspections. FAA database records indicate there is over 200 aircraft that had the CAPSTONE phase 1 equipment installation under STC2154AK and therefore need to be inspected.

Certificate:	Commercial; Flight instructor	Age:	28,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):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	January 21, 2021
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	March 30, 2021
Flight Time:	1480 hours (Total, all aircraft), 659 hours (Total, this make and model), 1128 hours (Pilot In Command, all aircraft), 293 hours (Last 90 days, all aircraft), 128 hours (Last 30 days, all aircraft).		

7 hours (Last 24 hours, all aircraft)

#### **Pilot Information**

### Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N9794M
Model/Series:	207A	Aircraft Category:	Airplane
Year of Manufacture:	1981	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	20700730
Landing Gear Type:	Tricycle	Seats:	6
Date/Type of Last Inspection:	November 13, 2021 100 hour	Certified Max Gross Wt.:	3800 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	15727.9 Hrs at time of accident	Engine Manufacturer:	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	IO-520-R
Registered Owner:	YR-AIRCRAFT LEASING LLC	Rated Power:	300 Horsepower
Operator:	Paklook Air Inc	Operating Certificate(s) Held:	Commuter air carrier (135)
Operator Does Business As:	Yute Commuter Service	Operator Designator Code:	T72A

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Dusk
<b>Observation Facility, Elevation:</b>	PABE,102 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	17:53 Local	Direction from Accident Site:	33°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	16 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	10°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	29.92 inches Hg	Temperature/Dew Point:	-18°C / -22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Bethel, AK	Type of Flight Plan Filed:	Company VFR
Destination:	Bethel, AK	Type of Clearance:	VFR
Departure Time:		Type of Airspace:	Class E

#### **Airport Information**

Airport:	BETHEL BET	Runway Surface Type:	Asphalt
Airport Elevation:	128 ft msl	<b>Runway Surface Condition:</b>	Dry
Runway Used:	1L	IFR Approach:	None
Runway Length/Width:	6400 ft / 150 ft	VFR Approach/Landing:	Forced landing

#### Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	5 None	Aircraft Fire:	Both in-flight and on-ground
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	6 None	Latitude, Longitude:	60.779217,-161.8368

#### **Administrative Information**

Investigator In Charge (IIC):	Ward, Mark		
Additional Participating Persons:	Erik Wilson; Federal Aviation Administration ; Anchorage , AK Jennifer Barclay; Textron Aviation (Cessna) ; Wichita, KS		
Original Publish Date:	September 20, 2023	Investigation Class:	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=104287		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available <u>here</u>.