



# National Transportation Safety Board

## Aviation Accident Factual Report

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<b>Location:</b>	Colonia, New Jersey	<b>Accident Number:</b>	ERA20FA020
<b>Date &amp; Time:</b>	October 29, 2019, 10:58 Local	<b>Registration:</b>	N959MJ
<b>Aircraft:</b>	Cessna 414	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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On October 29, 2019, at 1058 eastern daylight time, a Cessna 414A airplane, N959MJ, was destroyed when it was involved in an accident in Colonia, New Jersey. The commercial pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

The pilot's spouse reported that he planned to depart Leesburg Executive Airport (JYO), Leesburg, Virginia, about 0900 local; however, he delayed his departure due to the weather at his destination, Linden Airport (LDJ), Linden, New Jersey. She reported that the pilot was scheduled to give a lecture in Queens, New York, in the afternoon.

Review of radar and flight plan data provided by the Federal Aviation Administration (FAA) revealed that the airplane departed JYO at 0950 on an instrument flight rules (IFR) flight plan and proceeded on course to LDJ. At 1053:20, the airplane's radar altitude was 2,000 ft mean sea level (msl) and its position was over the DAPVY GPS waypoint, which was the first waypoint associated with the GPS-A circling instrument approach procedure to LDJ. The airplane then turned to a northeast heading, which was consistent with the final approach course for the GPS-A approach.

For the next 2 1/2 minutes, the airplane descended along the final approach course and crossed the final approach fix (GEZSY) about 1,200 ft msl (radar altitude). During the descent from DAPVY to GEZSY, the airplane's groundspeed varied from about 110 knots, to 140 knots, and then to 100 knots. The airplane continued to descend after GEZSY and crossed the subsequent waypoint of 3 nautical miles (nm) from BAUTZ about 700 ft msl. From GEZSY to 3nm to BAUTZ the groundspeed varied from about 100 knots, to 115 knots, and to 85 knots.

The airplane subsequently descended to 600 ft msl, maintained course, and remained at 600 ft for about 1 minute. During this time, groundspeed varied and increased from about 80 knots to 90 knots before decreasing to 65 knots. At 1058:02, the airplane's flight track turned left off

course and the airplane rapidly descended. The final radar return, at 1058:07, was less than 1/10 mile from the accident site and showed the airplane at 200 ft msl headed northwest.

Figure 1 shows the automatic dependent surveillance-broadcast (ADS-B) data for the final 5 minutes of the flight. The data presented are calculated groundspeed and geometric altitude, which is the height of the airplane above the earth ellipsoid calculated by GPS (the airplane's ADS-B signal did not report barometric altitude). The yellow bars denote the position of the aforementioned GPS approach waypoints.

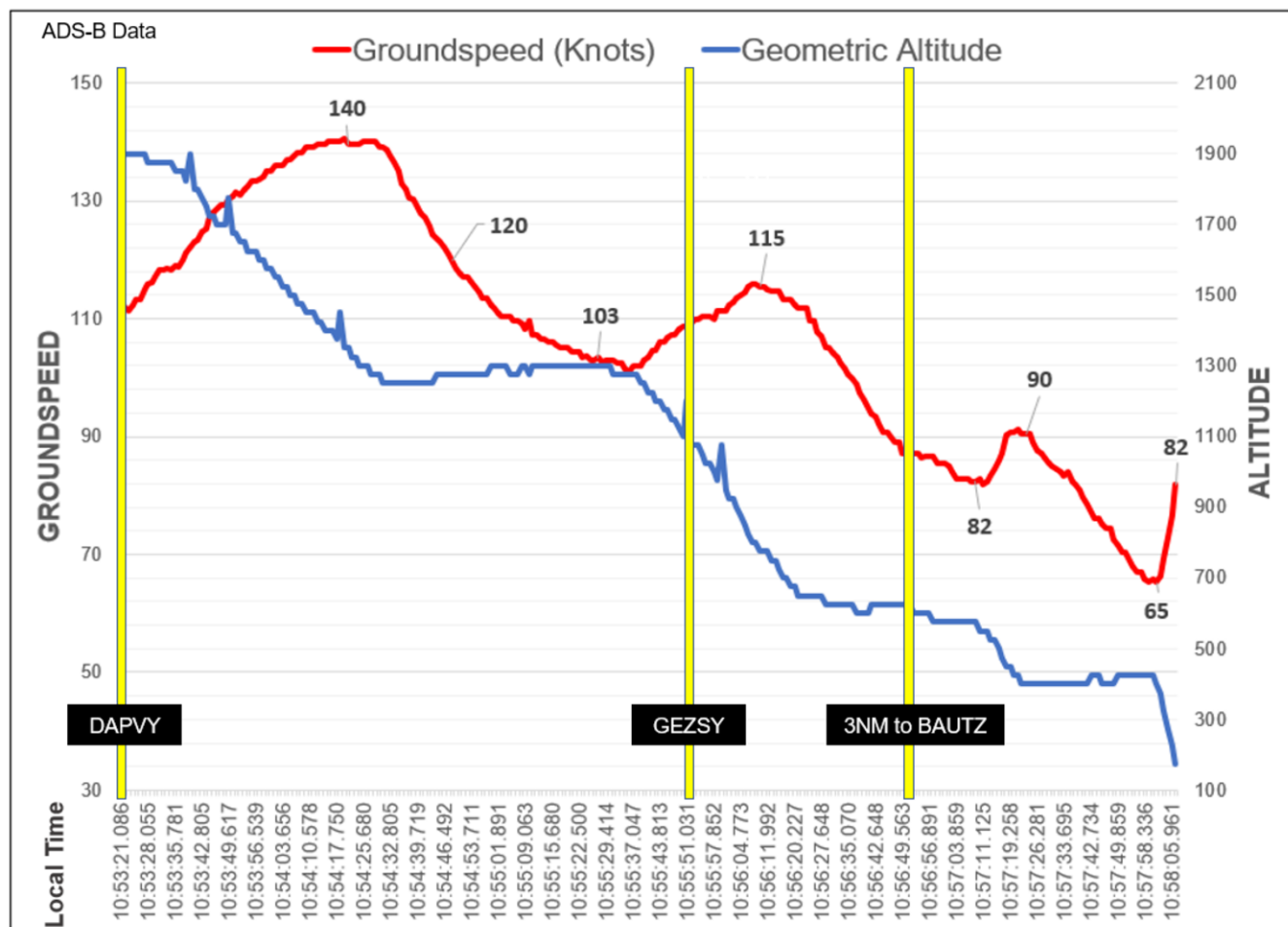


Figure 1: ADS-B data from the final 5 minutes of the flight.

Review of air traffic control communications provided by the FAA revealed that the pilot was communicating with New York Approach during the arrival into the LDJ area.

About 1050, the controller provided the pilot with a recently received pilot report (PIREP) for cloud bases at 500 ft overcast at nearby Newark Liberty International Airport (EWR). The pilot acknowledged and subsequently informed the controller that LDJ was reporting bases at 700 ft. The controller then informed the pilot that the automated report at EWR was reporting an 800 ft broken ceiling.

At 1051:50 the pilot was cleared for the GPS-A nonprecision circling instrument approach procedure to LDJ. At 1056:56, the controller stated to the pilot, “say flight conditions.” The pilot immediately responded, “say again oh we’re still IFR.” At 1058:06 the controller again asked the pilot to say the flight conditions; however, there was no response. At 1058:12, the controller stated to the pilot, “check altitude immediately;” however, there was no response from the pilot. This was the only altitude warning the controller provided to the pilot. The controller attempted to reach the pilot again multiple times, but there was no response.

Figure 2 provides an overview of the flight track, ATC and pilot communications during the final minutes of the flight, the missed approach point (BAUTZ), and LDJ. The solid red line denotes the flight track, and the dotted yellow lines and blue lines reflect the possible courses to be flown during the approach.

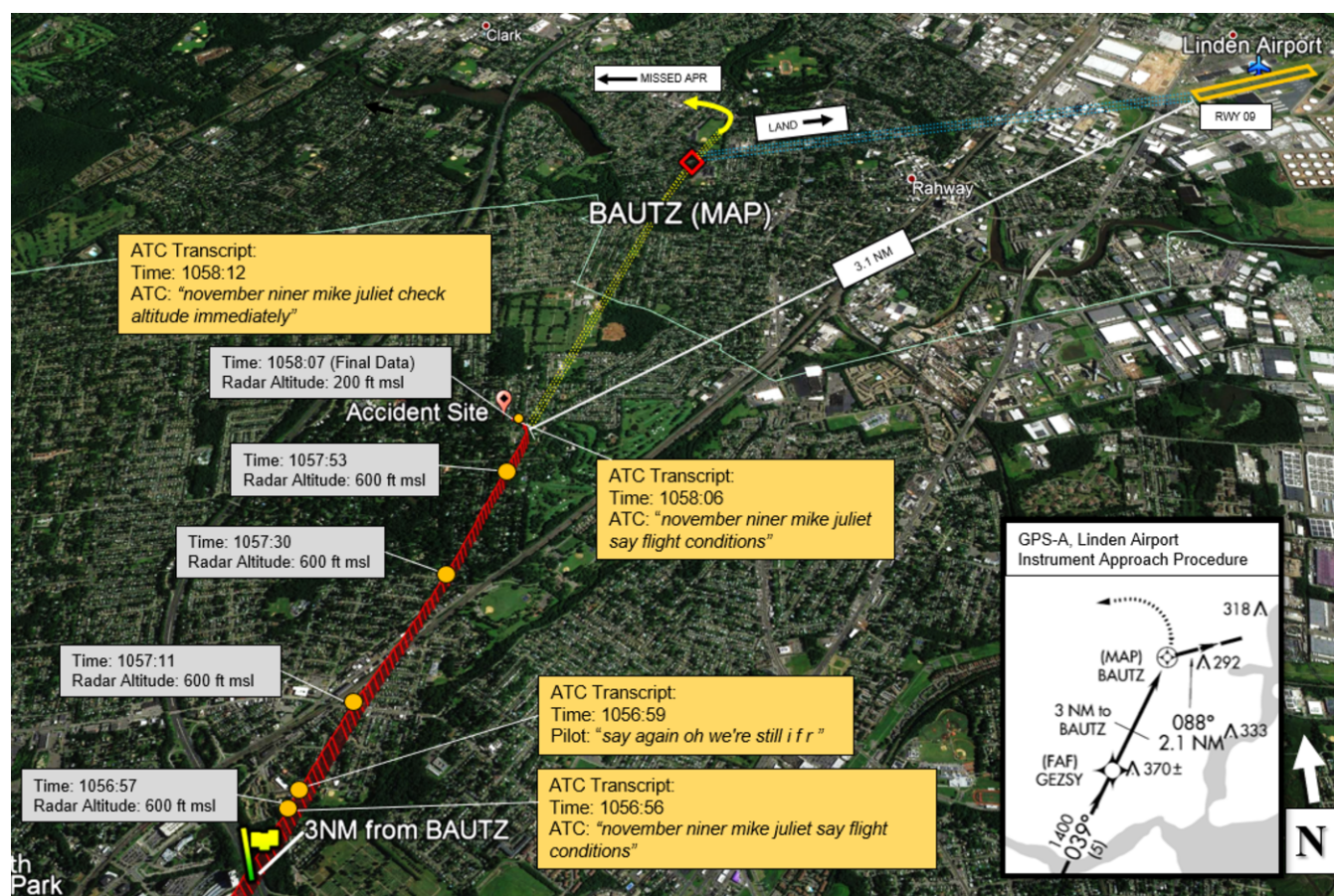


Figure 2: Overview of the flight track and radar data with excerpts of the ATC transcript.

Two home surveillance cameras captured the final portions of the flight. The first video, taken about .20 nautical mile south of the accident site, showed the airplane in a shallow left bank as it entered the camera view, and subsequently the airplane entered a rapid descending left turn and exited the camera view.

The second video, which was positioned about .20 nautical mile north of the accident site, captured about the final 4 seconds of the flight. The airplane entered the camera view in a

descending steep left turn near the treetops, continued to roll to the left, and subsequently descended out of view. The sound of an impact was recorded about 1 second after the airplane exited the camera view. Both cameras showed the airplane flying below an overcast cloud ceiling.

Two additional home surveillance cameras captured the audio of the final portions of the flight. Both audio recordings revealed that the engines were running until an impact was heard, and the sound of the engines increased in the few seconds prior to the impact. About 10 seconds after the sound of impact, a loud explosion was recorded.

A witness, who was in his car about 200 ft from the accident site, reported that he heard a loud noise coming from behind him that kept getting louder. He slowed his vehicle, looked out his left window, and saw the accident airplane in a 45° left bank about 80 ft above the ground, flying west. He did not observe the landing gear extended. He subsequently witnessed the airplane strike a tree and then a house. He reported that the engines were “extremely loud.”

A second witness, located about 1/2 mile south of the accident site, reported that while outside of his home, he saw the airplane descend through an overcast cloud layer. He added that the engines were “running fine, no stuttering.” He noted that the landing gear were down and that the airplane was “lumbering along with the nose up” in level flight several hundred feet above the trees. The airplane subsequently exited his view, and he heard a loud impact about 10 seconds later.

### Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	74, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Glider	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	April 3, 2019
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	January 17, 2019
<b>Flight Time:</b>	(Estimated) 7173 hours (Total, all aircraft), 1384 hours (Total, this make and model)		

Fragments of the pilot's logbook were recovered in the wreckage; however, the majority of its contents were illegible. On the application for the pilot's most recent medical certificate, dated April 3, 2019, he reported 7,173 total hours of flight experience, including 66 hours in the previous 6 months. On an aircraft insurance application from January 2019, the pilot reported a total of 2,284 multiengine airplane flight hours, including 1,384 flight hours in the accident airplane.



According to the pilot's spouse, he had flown into the destination airport "hundreds of times," as he was accustomed to commuting to the New York City area on a regular basis.

#### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N959MJ
<b>Model/Series:</b>	414 A	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1980	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	414A0471
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	October 18, 2019 Annual	<b>Certified Max Gross Wt.:</b>	7087 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	7712 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	TSIO-520-NB
<b>Registered Owner:</b>		<b>Rated Power:</b>	335 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

According to FAA airworthiness records, the six-seat, multiengine, low-wing airplane was manufactured in 1980. It was powered by two Continental TSIO-520-NB, 335-horsepower engines, which had been modified with the RAM Aircraft conversion. The airplane was also equipped with RAM Aircraft winglets and vortex generators.

According to the RAM winglets, vortex generator airplane flight manual supplement, the aerodynamic stall speeds varied with weight, bank angle, and the configuration of the landing gear and wing flaps. Figure 3 shows the range of stall speeds that could be expected. For example, at weight between 6,750 lbs - 5,200 lbs, 20° bank, flaps 15°, and landing gear down, the stall speed would vary from 76 to 67 knots indicated airspeed. The supplement stated that the maximum altitude loss during a conventional stall was approximately 550 ft.

## STALL SPEEDS

### CONDITIONS:

Throttles - ZERO THRUST at  $1.1V_{s1}$

### NOTE:

Maximum altitude loss during a conventional stall is approximately 550 ft.

WEIGHT lbs	CONFIGURATION		ANGLE OF BANK							
			0°		20°		40°		60°	
	FLAPS	GEAR	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
7087	0°	Up	71	71	73	73	82	81	103	100
	15°	Down	75	71	78	73	85	81	103	100
	45°	Down	72	66	73	68	79	75	94	93
6750	0°	Up	69	69	71	71	80	79	101	98
	15°	Down	74	69	76	71	84	79	101	98
	45°	Down	70	64	72	66	77	73	93	91
6200	0°	Up	66	66	68	68	75	75	96	93
	15°	Down	70	66	72	68	80	75	97	93
	45°	Down	69	62	70	64	76	71	90	88
5700	0°	Up	64	64	66	66	73	73	94	91
	15°	Down	68	64	70	66	78	73	95	91
	45°	Down	66	59	68	61	73	67	86	83
5200	0°	Up	61	61	63	63	70	70	88	86
	15°	Down	65	61	67	63	75	70	91	86
	45°	Down	65	57	66	59	71	65	83	81

Figure 3: Aerodynamic stall speed chart provided in the applicable airplane flight manual supplement

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	LDJ, 22 ft msl	Distance from Accident Site:	3 Nautical Miles
Observation Time:	11:15 Local	Direction from Accident Site:	240°
Lowest Cloud Condition:	700 ft AGL	Visibility	2 miles
Lowest Ceiling:	Overcast / 700 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	None / None
Wind Direction:		Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.32 inches Hg	Temperature/Dew Point:	14° C / 13° C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Leesburg, VA (JYO )	Type of Flight Plan Filed:	IFR
Destination:	Linden, NJ (LDJ )	Type of Clearance:	IFR
Departure Time:	09:50 Local	Type of Airspace:	Class E

A search of archived ForeFlight information indicated that the pilot requested weather information via ForeFlight Mobile at 1206 on October 28 with a planned departure of 0830 on October 29. The weather briefing information contained all the standard weather information valid at that time; however, most of the weather forecast information was only valid through 0500 on October 29.

The pilot obtained an additional weather briefing at 0920 the day of the accident via telephone from Leidos Flight Service. The pilot specifically requested the current conditions and outlook for LDJ and Teterboro Airport (TEB), which was the pilot's alternate airport. The briefer asked whether the pilot was aware of the AIRMETs for IFR conditions, and the pilot confirmed that he was aware. The briefer provided the pilot with current and forecast weather conditions at LDJ and TEB, which included visibilities between 5 and 10 statute miles with drizzle and mist and ceilings between 700 ft above ground level (agl) to 2,500 ft agl.

The pilot subsequently inquired when the weather was expected to improve in the Linden-Newark area. The briefer stated, "there may be a slight improvement, still remaining marginal." The pilot asked when the improved conditions were expected, and the briefer reported that, "it could be 1,400 broken through 1500 zulu [1100 local]."

The 1055 recorded weather observation at LDJ included an overcast ceiling at 700 ft agl, 10 statute miles visibility, and calm wind. At 1115, LDJ reported 2 miles visibility, mist, and an overcast ceiling at 700 ft agl.

The 1051 recorded weather observation at EWR, located about 8 miles northeast of the accident site, included a broken ceiling at 800 ft and 4 statute miles visibility with light drizzle

and mist. At 1135, EWR reported 2 statute miles visibility, light drizzle and mist, and broken ceiling varying between 500 ft to 900 ft agl.

A PIREP filed at 1048 from an Airbus A320 on final approach into runway 4R at EWR reported an overcast ceiling base of 500 ft mean sea level.

### Airport Information

<b>Airport:</b>	Linden LDJ	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	22 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>		<b>IFR Approach:</b>	Circling;Global positioning system
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

The pilot was performing the GPS-A nonprecision circling instrument approach procedure (IAP) to LDJ. Review of the IAP chart valid at the time of the accident found that the IAP utilized a series of step-down altitudes concluding with a minimum descent altitude of 620 ft msl (597 ft agl). The final approach course was not aligned with the runway. The missed approach point (MAP), BAUTZ, was about 2 nautical miles from runway 09. The accident site was located about 1.4 nautical miles southwest of BAUTZ.

According to the LDJ FAA Chart Supplement, the airport was nontower-controlled and runway 09 was equipped with runway end identifier lights (REIL) in addition to a visual approach slope indicator (VASI) on the right side of the runway.

According to a Linden Airport Operations lineman, for the entire time surrounding the accident, he had been continuously monitoring the airport's common traffic advisory frequency (CTAF). He reported that there were no radio calls from the accident airplane nor did he hear any "clicks" that would have indicated that a pilot was attempting to activate the airport lighting.

He reported that every morning, he checked the REILs, taxiway lights and runway lights via the pilot-controlled lighting frequency, and on the day of the accident, the lights functioned as expected.

Review of the LDJ NOTAMs found that there were two active airport NOTAMs, both for the runway 09 VASI. The NOTAMs stated that the low and medium intensity light settings were "unusable."



## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	On-ground
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	40.590158,-74.310767

The main wreckage was located in the basement of a residence. The airplane sustained significant impact and thermal damage as a result of postcrash fire and the wreckage was intermingled with house debris and rubble. The initial impact point was identified by large broken tree branches about 40 ft east of the main wreckage; the wreckage path was oriented on a true heading of 278°. Multiple tree branches were cut at 45° angles and exhibited gray paint transfer consistent with propeller blade contact.

The largest piece of the airframe was the forward cabin area, which included the left side cockpit instrument panel. The majority of the right cockpit fuselage skin and the right cockpit instrument panel was consumed by fire.

Complete flight control cable continuity could not be established to the flight control surfaces, as a majority of the left and right wings and empennage were consumed by the postimpact fire and were not located in the house debris. Partial aileron and elevator flight control cable continuity was established by observing the cables moving in the lower forward floor assembly area when the left yoke was moved by hand.

The left and right wing flap tubes and bellcranks were observed. The right flap chain, when measured, was consistent with a flap setting of 15°. The left flap chain was not observed. Rudder cable continuity was not established. The left, right, and nose landing gear had separated from the fuselage; the landing gear position could not be determined based on observation of the landing gear actuators. The landing gear handle arm was twisted, and its position could not be determined.

The throttle, mixture, and propeller control levers were found full forward. The left and right fuel selector handles were found pointing straight forward in an intermediate position between main and crossfeed. The airspeed indicator was found indicating about 55 knots, the primary attitude indicator was found displaying a 120° left roll, and the pitch indicated a 5° nose up pitch attitude. When disassembled, the gyro moved freely within its housing and displayed small rotational scoring marks.

The altimeter was set to 30.31 inches of mercury and indicated 200 ft. The barometric setting was consistent with the LDJ weather observation. The primary heading indicator was found indicating a heading of 260°, the course was set to 010°, and the heading bug was found set to 050°. The altitude alerter was found set to 30,000 ft. The course deviation indicator was found

indicating that the airplane was left of course. The left and right engine ignition switches were found in the ON position.

The right engine had separated from the wing and was located in the basement of the house forward of the main wreckage. It sustained impact and thermal damage. The three-bladed propeller remained attached to the propeller hub and displayed chordwise scratching, torsional twisting, and s-bending. The crankshaft was rotated by hand through 360°; crankshaft continuity was established from the forward section of the engine to the accessory section. All cylinders displayed normal operating and combustion signatures and thumb compression.

The right engine magnetos turned freely by hand and spark was observed on all ignition terminals. No debris was noted in fuel nozzles or fuel manifold. The top spark plugs for each cylinder displayed normal operating combustion signatures. The right turbocharger exhibited thermal damage and the compressor housing and compressor wheel were not located. The vacuum pump attached to the right engine was removed and disassembled; the drive coupling remained intact.

The left engine had separated from the wing and was located under the fuselage. It sustained impact and thermal damage. The three-bladed propeller displayed chord-wise scratching and torsional twisting. The crankshaft was rotated by hand through 360° of motion; crankshaft continuity was established from the forward section of the engine to the accessory section.

All cylinders displayed normal operating and combustion signatures. Each cylinder, with the exception of the Nos. 4 and 6 cylinders, displayed thumb compression. The Nos. 4 and 6 cylinders contained fire debris on the valve seats, which prevented full closure of the valves.

The left engine magnetos sustained significant external and internal thermal damage; the ignition leads could not be tested. The top spark plugs for each cylinder displayed normal operating combustion signatures. The left turbocharger was intact, and the turbine wheel turned freely. The vacuum pump attached to the left engine was removed and disassembled; the drive coupling remained intact.

## Communications

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### Air Traffic Control Low Altitude Alerts

ATC services were provided by New York Terminal Radar Approach Control (TRACON) (N90) for the pilot's approach into LDJ. The N90 TRACON was equipped to issue a "Minimum Safe Altitude Warning (MSAW)". FAA Order 7110.65Y, Air Traffic Control, Pilot/Controller Glossary, provided the following definition for an MSAW:

*A function of the ARTS [Automated Radar Terminal System] III computer that aids the controller by alerting him/her when a tracked Mode C equipped aircraft is below or is predicted by the computer to go below a predetermined minimum safe altitude.*

At 1056:01, an MSAW low altitude (LA) alert visually and aurally activated at the approach controllers' position for the accident airplane. According to FAA radar data from the EWR ASR-9 antenna, the airplane's altitude indicated 1,000 ft msl. About 55 seconds later, the approach controller instructed the pilot to say flight conditions.

At 1058:06, a second LA alert activated for the airplane. According to radar data, the altitude indicated 200 ft. The approach controller instructed the pilot to "say flight conditions." The pilot did not respond. Five seconds later, the approach controller instructed the pilot to "check altitude immediately." There were no responses from the pilot.

### Safety Alert

FAA Order 7110.65Y, Air Traffic Control, paragraph 2-1-6, "Safety Alert," described the circumstances for a controller to issue a "safety alert." The paragraph stated in part:

*Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude that, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller.*

### NOTE-

*1. The issuance of a safety alert is a first priority...once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller must remain vigilant for such situations and issue a safety alert when the situation is recognized.*

*2. Recognition of situations of unsafe proximity may result from MSAW14/E-MSAW, automatic altitude readouts, Conflict/Mode C Intruder Alert, observations on a PAR scope, or pilot reports.*

*3. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, will be taken.*

*a. Terrain/Obstruction Alert. Immediately issue/ initiate an alert to an aircraft if you are aware the aircraft is at an altitude that, in your judgment, places it in unsafe proximity to terrain and/or obstructions. Issue the alert as follows:*

*PHRASEOLOGY- LOW ALTITUDE ALERT (call sign) CHECK YOUR ALTITUDE IMMEDIATELY.*

## **Medical and Pathological Information**

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According to the autopsy report from the County of Middlesex, North Brunswick, New Jersey, Medical Examiner, the pilot's cause of death was blunt impact trauma of the head, and the manner of death was accident.

The medical examiner listed the contributing causes of death as smoke inhalation and blunt impact trauma of torso; he reported soot in the pilot's upper and lower airways. The medical examiner discovered a cardiac monitoring device in the pilot's chest; according to the medical examiner, the readout by the manufacturer showed that the pilot had an abnormal rhythm several minutes after impact with the house; prior to the impact, there was a normal heart rhythm. With the exception of atherosclerosis in the aorta and a tumor on the left kidney, there was no other significant natural disease identified.

The FAA Forensic Sciences Laboratory toxicology testing detected the non-impairing medications irbesartan, famotidine, and tamsulosin, used to treat high blood pressure, acid reflux, and an enlarged prostate, respectively, in the pilot's cardiac blood and urine. They detected carboxyhemoglobin at 34% in cardiac blood. Toxicology testing performed for the County of Middlesex, Office of the Chief Medical Examiner, detected carboxyhemoglobin at 43% in cardiac blood.

Carbon monoxide (CO) is an odorless, colorless gas that is a byproduct of combustion, such as from an exhaust system or fire. Carboxyhemoglobin is formed when CO binds to hemoglobin, the protein in red blood cells that carries oxygen. The degree of carboxyhemoglobin formation is related to the concentration of CO and the duration of exposure. The binding of CO impairs oxygen transport and use, and results in symptoms of exposure that can be mild and vague to impairing and incapacitating. Carboxyhemoglobin levels above 5% in nonsmokers and above 10% in smokers would suggest exposure to carbon monoxide.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Gerhardt, Adam
<b>Additional Participating Persons:</b>	Richard Rohrig; FAA/ FSDO; Teterboro, NJ Peter Basile; Textron Aviation; Wichita, KS Phillip Grice; Continental Motors; Mobile, AL
<b>Report Date:</b>	December 1, 2021
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=100503">https://data.nts.gov/Docket?ProjectID=100503</a>