



# Aviation Investigation Final Report

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<b>Location:</b>	Pompano Beach, Florida	<b>Accident Number:</b>	ERA23FA352
<b>Date &amp; Time:</b>	August 28, 2023, 08:44 Local	<b>Registration:</b>	N109BC
<b>Aircraft:</b>	Eurocopter EC135	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Fire/smoke (non-impact)	<b>Injuries:</b>	2 Fatal, 1 Serious, 1 Minor
<b>Flight Conducted Under:</b>	Part 135: Air taxi & commuter - Non-scheduled - Air Medical (Medical emergency)		

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## Analysis

The helicopter was dispatched to pick up a victim from an automobile accident. Electronic devices onboard the helicopter recorded that about 67 seconds after liftoff, the No. 1 electronic engine control unit reported a simultaneous double N1 and double N2 failure. While this failure would have been expected to result in a “FADEC FAIL” cockpit caution, the pilot did not recall seeing or hearing any cockpit caution or warning indications. This condition would also have frozen the fuel control unit to the fuel flow at the time of the failure until the end of the flight, which was 123 l/h, consistent with a climb power setting. The reason for the failure could not be determined.

About 90 seconds after liftoff, at 300 to 400 ft above ground level, the pilot heard a “bang” from the rear of the helicopter and noticed that the turbine outlet temperature (TOT) was rising on the No. 1 engine, but still within limits. He set the No.1 engine throttle to idle, declared an emergency to air traffic control, and reversed direction to return to the airport. Unbeknownst to the pilot, due to the FADEC FAIL condition, setting the engine throttle to idle would have had no effect on fuel flow, but rather the engine twist grip would need to be manipulated to manually control fuel flow to that engine. Despite this condition, fuel flow maintained at that level would not be expected to result in an overtemperature condition in the engine.

The pilot next scanned the cockpit instrument panel and noticed that the No.1 engine fire button had illuminated. He stated that he pressed the button to activate the fire suppression system; however, the TOT continued to rise near 1,000° C (maximum limit 895°C) on the No. 1 engine. The pilot subsequently heard a second “bang” (about 90 seconds after the first “bang”) and was unable to control the helicopter. It spun and descended into an apartment building.

Review of witness video revealed an in-flight fire near the area of the No. 1 engine exhaust and the air conditioner condenser fans. The tailboom partially separated in flight and the helicopter descended in a right spin. Examination of the No. 1 engine revealed that five turbine blades had fractured consistent with overheating fatigue from temperatures in excess of 1,295° C. There was no evidence of fire within the No. 1 engine compartment prior to ground impact; however, exhaust gases in excess of 1,000° C could have been a factor in the initiation of the inflight airframe fire outside of the No. 1 engine compartment. Specifically, a fiberglass air conditioner housing and composite tailboom fuselage were located near the No.1 engine exhaust. While the composite fuselage offered more fire resistance than the fiberglass housing, neither were certified to withstand temperatures in excess of 1,000° C.

While the No. 1 engine fire warning light could provide indications of fires within the engine compartment, this fire was outside the engine compartment. As such, the pilot had no caution and warning indicators of an inflight fire that may have forced a land immediately action, therefore, his decision to return to the airport was reasonable, rather than risk an off-airport emergency landing to a confined area with one engine inoperative.

The No. 1 emergency fuel shutoff valve was in the open position. In the cockpit, the No. 1 engine fire button's breakable safety wire was found unbroken and the button did not exhibit inward deformation. Although the pilot stated that he pressed the fire button, he likely did not. Additionally, the fire suppression system was for inside the engine compartment and would not have extinguished a fire outside of the engine compartment, but pressing the button would have closed the fuel shutoff valve for the No. 1 engine.

In summary, the accident was the result of an inflight fire in the vicinity aft of the helicopter's No. 1 engine exhaust, near the air conditioner condenser fans, and the origin of the fire was likely the result of the engine overheating. The only plausible explanations the investigation could determine for only the No. 1 engine to overheat were foreign object debris, blockage of the No. 1 engine air inlet, or hot gas or combustible fluid ingestion. Because the wreckage was subjected to a postimpact fire, the source of the overtemperature could not be determined.

## **Probable Cause and Findings**

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

An inflight fire outside of the engine firewalls, likely from overheating of the No. 1 engine for undetermined reasons, which resulted in a partial tailboom separation.

## Findings

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**Not determined**

(general) - Unknown/Not determined

## Factual Information

### History of Flight

<b>Initial climb</b>	Fire/smoke (non-impact) (Defining event)
<b>Approach</b>	Part(s) separation from AC
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On August 28, 2023, about 0844 eastern daylight time, a Eurocopter (Airbus Helicopters) Deutschland GMBH EC135T1, N109BC, was destroyed when it was involved in an accident near Pompano Beach, Florida. The commercial pilot sustained minor injuries. One paramedic onboard and a resident of an apartment building were fatally injured, while a second paramedic onboard was seriously injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 135 air medical flight.

The pilot reported that the helicopter was dispatched to transport a patient from the scene of an automobile accident. About 90 seconds after liftoff and during initial climb, west of Pompano Beach Airpark (PMP), Pompano Beach, Florida, about 300 to 400 ft above ground level, the pilot heard a “bang” from the rear of the helicopter and noticed that the turbine outlet temperature (TOT) was rising on the No. 1 engine, but was still within limits. Prior to the “bang,” the pilot did not recall seeing or hearing any cockpit caution or warning indicators. He set the No.1 engine throttle to idle, declared an emergency to air traffic control, and reversed direction to return to the airport. He scanned the cockpit instrument panel and noticed that the No.1 engine fire button had illuminated. The pilot further stated that he pressed the button to activate the fire suppression system; however, the TOT continued to rise near 1,000° C on the No. 1 engine (maximum limit 895°C). The pilot subsequently heard a second “bang” and was unable to control the helicopter. It spun and descended into an apartment building.

Review of witness video revealed an in-flight fire near the area of the No. 1 engine exhaust, and air conditioner condensing fans. The inflight fire spread to the central area near the tail boom attach point. Subsequently, the tailboom partially separated inflight and the helicopter descended in an uncontrolled right spin.

## Pilot Information

<b>Certificate:</b>	Commercial; Private	<b>Age:</b>	37, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Helicopter; Instrument helicopter	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	December 15, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	June 9, 2023
<b>Flight Time:</b>	4035 hours (Total, all aircraft), 272 hours (Total, this make and model), 3750 hours (Pilot In Command, all aircraft), 16 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Cabin crew Information

<b>Certificate:</b>		<b>Age:</b>	50, Male
<b>Airplane Rating(s):</b>		<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>		<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>		<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>		<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>		<b>Last FAA Medical Exam:</b>	
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>			

## Cabin crew Information

<b>Certificate:</b>		<b>Age:</b>	29, Male
<b>Airplane Rating(s):</b>		<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>		<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>		<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>		<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>		<b>Last FAA Medical Exam:</b>	
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>			

The pilot held a commercial pilot certificate with ratings for rotorcraft helicopter and instrument helicopter. He also held a second-class medical certificate. The pilot reported 3,895 hours of total helicopter experience, of which 272 hours were in the same make and model as the accident helicopter. He had been flying for the operator for over four years.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Eurocopter	<b>Registration:</b>	N109BC
<b>Model/Series:</b>	EC135 T1	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	1999	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	0139
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	May 23, 2023 100 hour	<b>Certified Max Gross Wt.:</b>	6250 lbs
<b>Time Since Last Inspection:</b>	24 Hrs	<b>Engines:</b>	2 Turbo shaft
<b>Airframe Total Time:</b>	5557 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Turbomeca
<b>ELT:</b>	C126 installed, not activated	<b>Engine Model/Series:</b>	Arrius 2B1
<b>Registered Owner:</b>	BROWARD COUNTY SHERIFFS OFFICE	<b>Rated Power:</b>	670 Horsepower
<b>Operator:</b>	BROWARD COUNTY SHERIFFS OFFICE	<b>Operating Certificate(s) Held:</b>	On-demand air taxi (135)

The helicopter was manufactured in 1999 and powered by two Turbomeca Arrius 2B1, 670-turboshaft-horsepower engines. It was maintained under a manufacturer's approved inspection program. Its most recent 100-hour inspection was completed on May 23, 2023. At that time, the airframe had accrued 5,557.1 total hours. The engines had accrued 5,327.2 hours since new (2,251.3 hours since overhaul in 2016). The helicopter was operated about 24 hours from the time of the most recent inspection until the accident. An air conditioner was installed on the helicopter under supplemental type certificate on August 1, 2023, about 16 flight hours prior to the accident flight.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	PMP,15 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	08:53 Local	<b>Direction from Accident Site:</b>	60°
<b>Lowest Cloud Condition:</b>	Few / 2400 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 7000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	7 knots / None	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	190°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.81 inches Hg	<b>Temperature/Dew Point:</b>	31°C / 24°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Pompano Beach, FL	<b>Type of Flight Plan Filed:</b>	Company VFR
<b>Destination:</b>	Pompano Beach, FL	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class D

## Airport Information

<b>Airport:</b>	Pompano Beach Airpark PMP	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	19 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	6	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	4001 ft / 150 ft	<b>VFR Approach/Landing:</b>	Straight-in

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal, 1 Serious, 1 Minor	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	In-flight
<b>Ground Injuries:</b>	1 Fatal	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal, 1 Serious, 1 Minor	<b>Latitude, Longitude:</b>	26.240252,-80.122249

The wreckage came to rest on its left side, facing south, through the roof of a one-story apartment building. A postcrash fire consumed a majority of the airframe. The tailboom was located about 30 ft south of the main wreckage and its fenestron (tailrotor) remained intact. All four main rotor blades separated near the blade root, consistent with impact damage. Both engines and their respective electronic engine control units (EECUs) were retained for further

examination and data download. Additionally, the No. 1 engine fuel shutoff valve assembly was also retained for further examination.

The No. 1 engine was further examined at the manufacturer's facility. The examination revealed that five turbine blades had fractured below the blade platform. Metallurgical examination of the separated turbine blades revealed their inner walls exhibited dissolution of material precipitates (microstructural transformation) consistent with an overheating condition beyond 1,295° C and fatigue cracking due to excessive temperatures. There was no evidence of fire inside the No. 1 engine; however, the exhaust gases in excess of 1,000° C were consistent with an ignition source. Specifically, a fiberglass air conditioner housing and composite tailboom fuselage were located near the No.1 engine exhaust. While the composite fuselage offered more fire resistance than the fiberglass housing, neither were certified to withstand temperatures in excess of 1,000° C. (For more information, see the Airworthiness Group Chair's Factual Report, Powerplants Group Chair's Factual report, and Materials Laboratory Report in the public docket for this investigation.)

Review of data downloaded from the No. 1 engine EECU revealed a simultaneous double N1 and double N2 failure recorded about 67 seconds after liftoff, and about 25 seconds before the pilot heard the first "bang." This failure would result in a "FADEC FAIL" cockpit caution and would freeze the fuel control unit (FCU) at the fuel flow at the time of the failure, which was 123 l/h. Postaccident examination and testing of the FCU resolver revealed that it remained in a 123 l/h position. The reason for the failure could not be determined. Consequently, setting the engine throttle to idle will have no effect on fuel flow, but rather the engine twist grip must be manipulated to manually control fuel flow to that engine.

Computed Tomography scanning of the No. 1 emergency fuel shutoff valve revealed that it was in the open position. Examination of the cockpit revealed that the No. 1 and No. 2 engine fire buttons' breakable safety wire were found unbroken and the the buttons did not exhibit inward deformation. Examination of the No. 1 engine air inlet did not reveal any blockages; however, that area had been subject to a postcrash fire.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Gretz, Robert
<b>Additional Participating Persons:</b>	Ricardo Queiroz; FAA/FSDO; Miramar, FL Seth Buttner; Airbus Helicopters; Grand Prairie, TX Bryan Larimore; Safran Helicopter Engines; Grand Prairie, TX Paul-Etienne Jactat; Safran Helicopter Engines David Keenan; FAA AVP-100; Washington, DC Don Lambert; Metro Aviation; Shreveport, LA
<b>Original Publish Date:</b>	September 11, 2025
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=192950">https://data.nts.gov/Docket?ProjectID=192950</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).