



# Aviation Investigation Final Report

<b>Location:</b>	Granger, Texas	<b>Accident Number:</b>	WPR18FA232
<b>Date &amp; Time:</b>	August 21, 2018, 12:18 Local	<b>Registration:</b>	N530FU
<b>Aircraft:</b>	Hughes 369	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of visual reference	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

## Analysis

The flight instructor was providing emergency procedure refresher training, as part of a contract between the US Army and a private contractor, to special operations pilots with the Jordanian Air Force. The accident was intended to be an introductory orientation flight for the pilot receiving instruction of the airports areas where the training would be occurring.

Radar data indicated that the helicopter traveled east from the departure airport and climbed to an altitude of about 500 ft above ground level (agl). Afterward, the helicopter began to descend, and flew at altitudes that varied between 0 and 120 ft agl at a groundspeed of about 90 knots. A witness saw the helicopter rapidly approaching his location and reported that the helicopter was flying low in a nose-down attitude.

A short time later, the helicopter struck and severed a steel wire power distribution line, and continued to fly until the helicopter impacted the ground about 950 ft beyond the impact point with the line. Most of the severed power line was continuous to the main wreckage location, having likely trailed or been attached to the helicopter after impact. According to the radar data, and impact trajectory, the 36-ft-tall power line support poles would have been hidden from the pilots' view by a stand of trees as the helicopter approached the area.

Postaccident examination revealed no anomalies with the airframe or engine that would have precluded normal operation of the helicopter. The wreckage location, which was well beyond the impact point with the power line, was consistent with the helicopter operating at a high forward speed and likely a high engine power.

The flight instructor was highly experienced in the accident helicopter make and model and had an extensive military career flying attack missions in helicopters. These missions included navigation and aerial gunnery, which would have required low-level flight close to terrain. Likewise, the pilot receiving instruction flew similar attack missions in helicopters with the Jordanian military. Therefore, it is likely that the flight instructor decided to intentionally deviate from the training syllabus and perform, or allow

the pilot receiving instruction to perform, a high-speed, nap-of-the-earth flight for personal reasons, possibly to simulate their working environment, make the flight more interesting or engaging, push limits, or impress each other.

The flight instructor had used the sedating antihistamine cetirizine at some time before the accident flight. Although the levels of the drug were well below the therapeutic range, it is not possible to determine if he could have been impaired by the sedating effects during the accident sequence.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of both pilots to see and avoid a power line while maneuvering at low altitude. Contributing to the accident was the flight instructor's decision to not follow the training syllabus and allow the low-level high-speed flight.

### Findings

<b>Personnel issues</b>	Task monitoring/vigilance - Pilot
<b>Personnel issues</b>	Task monitoring/vigilance - Instructor/check pilot
<b>Environmental issues</b>	Wire - Awareness of condition
<b>Environmental issues</b>	Wire - Effect on operation
<b>Personnel issues</b>	Decision making/judgment - Instructor/check pilot

# Factual Information

## History of Flight

<b>Maneuvering-low-alt flying</b>	Loss of visual reference (Defining event)
<b>Maneuvering</b>	Controlled flight into terr/obj (CFIT)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On August 21, 2018, about 1218 central daylight time, a Hughes Helicopters 369FF, N530FU, was destroyed when it was involved in an accident near Granger, Texas. The flight instructor and the pilot receiving instruction sustained fatal injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

Brunner Aerospace had been contracted by the US Army Security Assistance Training Management Organization (SATMO), to provide "MD530F Emergency Refresher Training (Enhanced)" for special operations pilots who flew the MD-530F with the Jordanian Air Force. The accident flight was one such training flight.

The flight originated from Georgetown Municipal Airport (GTU), Georgetown, Texas, about 1208 and was destined for Draughon-Miller Central Texas Regional Airport (TPL), Temple, Texas. About 1207, the flight instructor made a radio call to the GTU tower and reported his intention to depart to the northeast. The tower controller acknowledged the flight instructor's transmission and cleared the helicopter for departure.

The final stage of the accident was not observed by any witnesses; however radar data from a Federal Aviation Administration (FAA) air route surveillance radar about 30 miles northeast of GTU revealed a target departing the GTU airport environment about 1209 and traveling east while climbing to a mode C transponder-reported altitude of 1,100 ft (about 500 ft above ground level [agl]). About that time, the instructor requested a frequency change with the tower, and 4 minutes after departure (9 miles east of Georgetown), the target began to descend. One minute later, the target had reached an altitude of about 50 ft agl. The target continued traveling east at a groundspeed of about 90 knots and at altitudes that varied between 0 and 120 ft agl over unpopulated areas.

A witness, who was at his residence 2 miles southwest of the town of Granger, stated that although helicopters are a normal sight in the area, between 1200 and 1300 on the day of the accident his attention was drawn to the unusually loud sound of a helicopter. When the witness looked north, he observed a black helicopter rapidly approach his house from the northwest, flying low over a field, about 30 to 40 ft agl, in a nose-down attitude. The witness became concerned that the helicopter might collide with his house, and reported that just as the helicopter approached to within about 200 ft, it began to rapidly climb up and over the power lines that bordered his street. He then looked to the south and anticipated that he would see the helicopter, but it was out of his view behind a stand of trees.

The radar data revealed that, about 1215:26, the target, while at 25 ft agl, had traveled left to right directly in front of the witness's house, coming within 700 ft. The target then began to climb and reached

125 ft agl as it passed beyond the witness' house while proceeding southeast. The last recorded target, which was 1 mile west of the accident site, was captured at 1217:14 at an altitude of 58 ft agl. The helicopter wreckage was located in a cotton field about 4 miles east of the witness' residence, and 1.5 miles west of Granger Lake. (as shown in figure 1).



Figure 1. Radar track (as indicated by red line) and wreckage location. (Background image courtesy of Google Earth).

A student pilot and a flight instructor in a fixed-wing airplane who were returning to GTU reported that, between 1215 and 1220, they both heard a series of expletives being transmitted over the GTU frequency in a manner that, according to the instructor, sounded "desperate." The student pilot stated that the transmissions lasted about 2 seconds, and the flight instructor stated that the transmissions happened just before he made his first call to GTU tower. The student pilot stated that he and the flight instructor were flying over Granger Lake (1.5 miles from the accident site) at the time. No such transmissions were heard on the GTU tower audio recordings.

### Flight instructor Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	58,Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Helicopter	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	May 12, 2018
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	January 26, 2017
<b>Flight Time:</b>	(Estimated) 7000 hours (Total, all aircraft), 700 hours (Total, this make and model)		

## Pilot Information

<b>Certificate:</b>	Foreign	<b>Age:</b>	27,Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	None None	<b>Last FAA Medical Exam:</b>	
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 2000 hours (Total, all aircraft), 1000 hours (Total, this make and model)		

### Flight Instructor

The flight instructor had held operational and instructional pilot positions within multiple US Army regiments, including time as an attack helicopter pilot with the 160th Special Operations Aviation Regiment (SOAR). During that time, his flight duties included long-range navigation and precision aerial gunnery in the AH-6J "Little Bird" attack helicopter, which had a similar design as the accident helicopter and was based on Boeing's MH-6 "Little Bird" and MD Helicopters' 369-series helicopters.

After retirement from the US Army and before his employment with Brunner Aerospace, the flight instructor held positions as a pilot, an instructor, and a manager at various aviation-related companies operating in Iraq and Afghanistan.

The flight instructor was in his second year working for Brunner Aerospace as an instructor. He resided in Alabama and stayed in a hotel in Texas while he provided training.

### Pilot Receiving Instruction

The pilot receiving instruction was a first lieutenant in the Jordanian Air Force Special Operations Command, for which he flew an MD530F helicopter that was designed and configured similarly to the accident helicopter. Brunner Aerospace indicated that the Jordanian pilots attend the training course each year and that the accident flight occurred during the pilot's second year attending the training.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Hughes	<b>Registration:</b>	N530FU
<b>Model/Series:</b>	369 FF	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	1984	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal; Restricted (Special)	<b>Serial Number:</b>	0005F
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	August 13, 2018 100 hour	<b>Certified Max Gross Wt.:</b>	3100 lbs
<b>Time Since Last Inspection:</b>	10 Hrs	<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	17399.2 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Rolls Royce
<b>ELT:</b>	C126 installed, activated, aided in locating accident	<b>Engine Model/Series:</b>	250-C30
<b>Registered Owner:</b>	Air 1 Sandpoint Helicopters Inc	<b>Rated Power:</b>	650 Horsepower
<b>Operator:</b>	Brunner Aerospace	<b>Operating Certificate(s) Held:</b>	Rotorcraft external load (133), On-demand air taxi (135), Agricultural aircraft (137)
<b>Operator Does Business As:</b>	Utility Aviation, Inc	<b>Operator Designator Code:</b>	UA7L

The accident helicopter was one of two 369FF helicopters that Brunner Aerospace operated as part of the flight training program. Avionics equipment installed on the accident helicopter included a Garmin 430 GPS/Nav/Comm and a radar altimeter. The doors had been removed for training. No discrepancies were noted on any of the helicopter's flight logs between the last inspection and the accident.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KGTU, 787 ft msl	<b>Distance from Accident Site:</b>	14 Nautical Miles
<b>Observation Time:</b>	16:56 Local	<b>Direction from Accident Site:</b>	267°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.13 inches Hg	<b>Temperature/Dew Point:</b>	33°C / 22°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Georgetown, TX (GTU )	<b>Type of Flight Plan Filed:</b>	Company VFR
<b>Destination:</b>	Temple, TX (TPL )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	12:08 Local	<b>Type of Airspace:</b>	Class E

According to the National Oceanic and Atmospheric Administration, the altitude of the sun when viewed from the accident site at 1218 would have been 64.6&deg;, with an azimuth (east of north) of 133&deg;.

## Airport Information

<b>Airport:</b>	Georgetown Muni GTU	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	789 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	30.69,-97.400558



The first identified points of ground contact consisted of five matching 2-ft-long excavations that were equally spaced throughout a length of about 40 ft and were on a magnetic heading of 100°. The excavations contained fragments of yellow paint, which matched the paint color on the tips of the five main rotor blades. The cotton plants adjacent to the excavations had been sheared on a 45° plane relative to the ground. The debris field, which consisted of landing skid fragments, pieces of windscreen, cabin contents, and sections of a main rotor blade, continued for 100 ft on a heading of 080° directly to the main cabin.

The cabin came to rest on its left side on a heading of about 280°. Most of the cabin was consumed by fire. The tailcone and tail rotor assembly had separated and were located about 20 ft east of the cabin.

The debris field was bordered to the west by a series of 36-ft-tall power distribution poles, which were oriented north-south and spaced about 450 ft apart. The tops of the poles were spanned by an overhead power line made of steel stranded wire, and an "underbuild" line 4 ft below. The overhead line in the northwest corner of the field, which was about 950 ft from the main wreckage, was severed about midspan (as shown in figure 2), and a red belly-mounted strobe light lens was located 100 ft to the east. The severed point of the line was located in between two stands of trees.

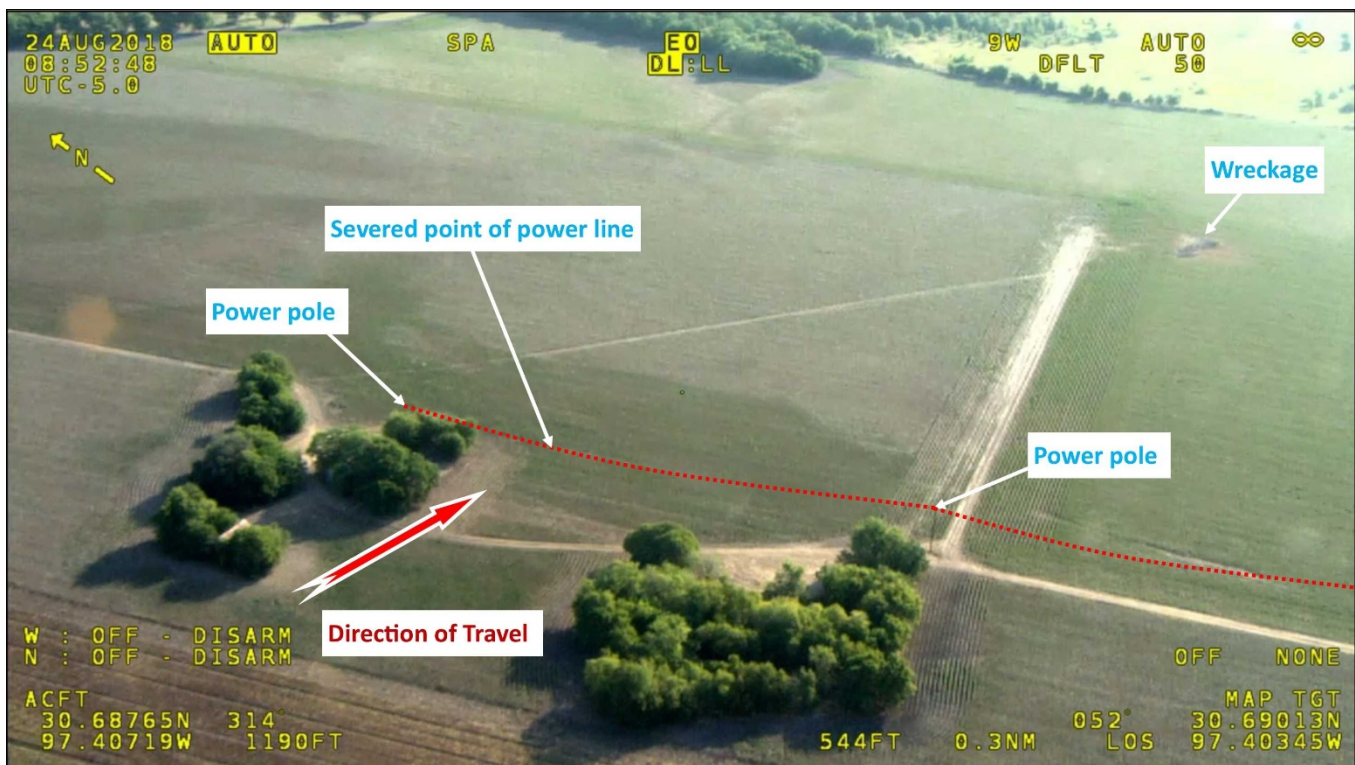


Figure 2. Wreckage and power line locations. (Background image source: Texas Department of Public Safety.)

The other end of the overhead line, which was about 1,300 ft in length, had been pulled away from the three poles to the south and was continuous to the main wreckage (as shown in figure 3). The poles



exhibited recent ground disruption at their bases and were bent toward the main wreckage site. When facing east at the altitude and direction of travel of the radar targets, the two poles that held the severed line were obscured by trees.

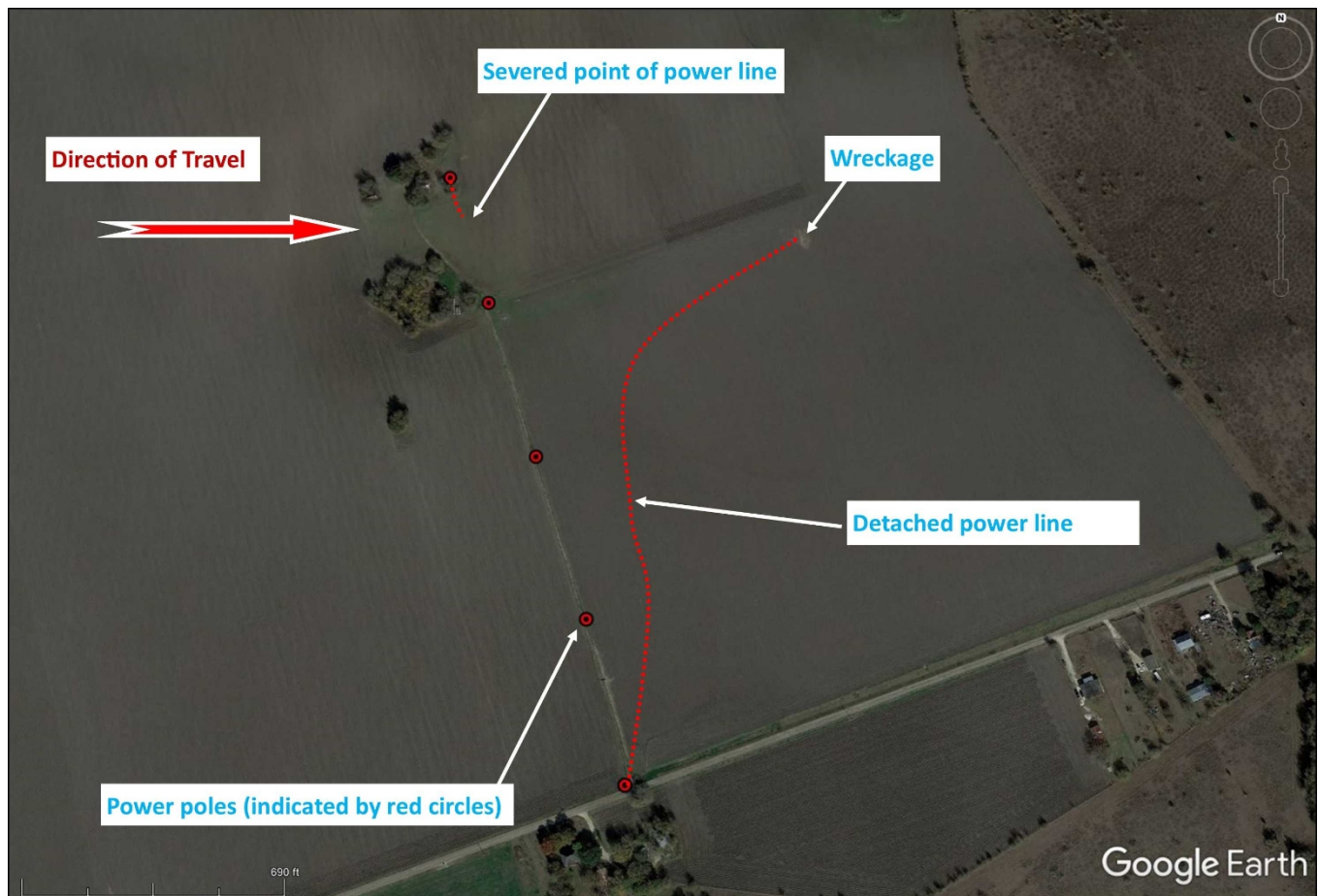


Figure 3. Detached power line leading to wreckage.

Although the helicopter was painted black with silver lettering, layers of red paint were observed under the paint of various skin and fairing components, indicating that the helicopter was previously painted red. Red-colored transfer marks were observed on the 75-ft-long section of the southern portion of the overhead line that led from the separation point.

There was no evidence of a bird strike to any of the airframe structure, and no bird remnants were found on the ground in the area between the final radar target and the severed power line.

Examination of the airframe showed evidence of stranded wire contact to both of the forward and the left rear landing gear struts and one of the main rotor blades.

All main and tail rotor blades were located near the main wreckage. Four of the five main rotor blades remained attached to the hub assembly; all blades exhibited spiral and aft curl damage with chordwise abrasion and damage to their leading edge surfaces. The tailrotor drive shaft exhibited rotational signatures at the point where the tail rotor assembly had separated from the tailboom. Similar rotational signatures and damage were observed at multiple locations throughout the drivetrain of the main transmission.

All engine ancillary lines were intact at their respective fittings. The engine was disassembled, and N1 and N2 drive continuity was established with no evidence of internal thermal damage or failure.

Drive train continuity throughout the gearbox was confirmed, and all gears were intact and remained coated in oil with no evidence of catastrophic failure.

## **Medical and Pathological Information**

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### **Instructor**

The Office of the Chief Medical Examiner, Tarrant County, Texas, performed an autopsy on the flight instructor. The cause of death was thermal trauma, and no significant natural disease was identified.

Toxicology testing performed at the FAA Forensic Sciences Laboratory for the flight instructor detected tamsulosin, celecoxib, and cetirizine (0.043 µg/ml) in the pilot's specimens. Tamsulosin is used to treat an enlarged prostate, and celecoxib is a prescription anti-inflammatory medication. Neither is considered to be impairing. Cetirizine is an over-the-counter sedating antihistamine intended to treat allergy symptoms. The usual therapeutic range is 0.190 to 1.450 µg/ml. Although this drug can undergo postmortem redistribution, that would likely mean that the antemortem level was lower than the tested level. No carbon monoxide or ethanol was detected.

The cause of death for the pilot receiving instruction was thermal trauma, and toxicology testing performed at the FAA Forensic Sciences Laboratory identified no carbon monoxide, ethanol, or for screened drugs.

## **Organizational and Management Information**

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As part of the SATMO contract, Brunner Aerospace provided helicopters, flight instruction, and training materials along with the weapons and ammunition required to complete the live weapons portion of the training. The SATMO contract training program was managed by the accident flight instructor and the Brunner Aerospace chief operating officer (COO), both of whom also provided the flight and ground training.

The syllabus, which was created by Brunner Aerospace and approved by the Department of Defense, comprised both ground and flight training. According to the COO, the most current syllabus was co-managed by the accident flight instructor and based on the US Army 160th SOAR Flight Training Guide. The operational areas documented in the syllabus included the immediate airspace surrounding TPL, GTU, and Taylor (T74) airports, along with a target practice range about 50 miles east of Georgetown, near the town of Cameron.

Five pilots were trained at a time during a 14-day period, for a total of 25 pilots per year. This was the fourth year Brunner Aerospace had been providing the service.

The contract required the training to include standard flight emergency procedures, such as autorotations, run-on landings, and simulated system failures, along with live weapon target practice directly from the cockpit (which was usually performed on the last day of training).

All training was performed either within the airport environment or over the designated firing range. The syllabus did not make specific recommendations or have prohibitions regarding transition altitudes between airports; the COO stated that transition altitudes between airports typically ranged between 200 and 500 ft agl at speeds of up to 90 knots. The COO further stated that no formal transition routes had been established between airports because the syllabus did not call for any low-level flight outside of the runway or target practice environment. The COO stated that while he often flew low-level hog eradication flights (unrelated to the SATMO contract), and had experience with the local low-level terrain features, the accident pilot, who lived in Alabama, did not have such local familiarity.

The COO stated that some of the Jordanian pilots often wanted to fly low-level, high-speed maneuvers outside of the airport environment. He assumed that this was based on their day-to-day flying routine, which included low and fast training and combat missions. The COO considered flying low-level, nap-of-the-earth, "gun runs", or similar operations during training to be serious transgressions, and he stated that he was not aware of the accident pilot being involved in such transgressions while with Brunner Aerospace.

The accident, which occurred on the second day of the training course, was intended to be a local orientation flight lasting 1.1 hours. Although the orientation flight usually took place on the first sortie of training with each pilot, due to inclement weather and a miscommunication with the Jordanian team, the flights on the first day were delayed, and the decision was made to perform the orientation flight on sortie two on the second day. The first training flight for the pilot receiving instruction was on the morning of the accident between 0730 and 0915. The training flight consisted primarily of autorotation practice at TPL and was conducted with the accident instructor and in the accident helicopter.

Neither the SATMO contract nor the Brunner Aerospace syllabus included any provisions or training requirements for low-level, nap-of-the-earth flights. The COO stated that he was not aware of the accident pilot being involved in such operations during instructional flights while with the company.

## Administrative Information

**Investigator In Charge (IIC):** Simpson, Elliott

**Additional Participating Persons:** Jeffrey W Burns; Federal Aviation Administration FSDO; San Antonio, TX  
John Hobby; The Boeing Company; Mesa, AZ  
Joan Gregoire; MD Helicopters; Mesa, AZ

**Original Publish Date:** August 11, 2020

**Last Revision Date:**

**Investigation Class:** [Class](#)

**Note:** The NTSB traveled to the scene of this accident.

**Investigation Docket:** <https://data.nts.gov/Docket?ProjectID=98120>

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](#).