



# Aviation Investigation Final Report

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<b>Location:</b>	Kent Island, Maryland	<b>Accident Number:</b>	ERA19FA163
<b>Date &amp; Time:</b>	May 4, 2019, 12:11 Local	<b>Registration:</b>	N572MD
<b>Aircraft:</b>	Guimbal Cabri	<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 - Personal		

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## Analysis

The non-instrument-rated pilot and passenger intended to fly the helicopter, which was not equipped for instrument flight, in order to photograph the passenger's family member fishing, despite a forecast of instrument meteorological conditions. The helicopter flew for about 11 minutes, making several left and right turns in the vicinity of where the family member was fishing at an altitude of about 175 ft. The passenger was texting the family member, and at one point asked "Can you see us? We are hitting the wall that we can't fly through." The family member responded, "not really," and the passenger sent one last text message stating, "Give me one more [GPS] pin to try." After the last message, the helicopter began to fly south over water and away from land and any natural horizon.

The wreckage was located in the water about 1.5 miles from the shoreline. Examination of the wreckage revealed no evidence of any preimpact mechanical anomaly. Analyses of weather information, witness statements, and photographs taken by the passenger were consistent with conditions of limited visibility and a lack of a visible horizon. In these limited visibility conditions, especially when flying away from shore, the pilot's workload would have increased as he divided his attention between maintaining control of the helicopter and an adequate altitude above the water using poor visual cues and positioning of the helicopter laterally while looking for the fishing vessel. These conditions were conducive to the both the development of spatial disorientation and loss of control, or an inadvertent descent into the water (due to distraction or a visual illusion). The ability of the pilot to detect any loss of control or a trajectory towards the water was significantly reduced as a result of the extremely low altitude in which the flight over water was conducted, the low visibility, the lack of instruments on board to allow for instrument flight, and his lack of instrument training and experience.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The noninstrument-rated pilot's continued visual flight into instrument meteorological conditions, which resulted in an inadvertent descent into the water. Contributing to the

accident was the pilot's decision to conduct the flight at a low altitude without sufficient cues to aid in the perception of attitude and altitude.

## Findings

<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Environmental issues</b>	Below VFR minima - Decision related to condition
<b>Aircraft</b>	Altitude - Not attained/maintained
<b>Personnel issues</b>	Aircraft control - Pilot
<b>Personnel issues</b>	Total instrument experience - Pilot
<b>Aircraft</b>	Lateral/bank control - Not attained/maintained

## Factual Information

### History of Flight

<b>Maneuvering</b>	VFR encounter with IMC
<b>Maneuvering</b>	Loss of visual reference (Defining event)
<b>Maneuvering</b>	Collision with terr/obj (non-CFIT)

On May 4, 2019, about 1211 eastern daylight time, a Guimbal Cabri G2 helicopter, N572MD, was destroyed when it was involved in an accident near Kent Island, Maryland. The pilot and passenger were fatally injured. The helicopter was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

According to a family member of the passenger, the flight was planned so that the passenger could take photographs of that family member's fishing trip in the Chesapeake Bay. The passenger texted the family member at 0829 stating "looks like we are going to be flying. Where are you guys fishing? Not sure how well my cell works when up." The family member responded with the location at 0841. Then, at 1036 the passenger stated "OK, no problem. The closer you stayed at Poplar Island the better chance we might have [of] finding you with this low ceiling there's flight restrictions."

The pilot called flight services at 1102 to file a special flight rules area (SFRA) flight plan for a local flight originating from Tipton Airport (FME), Fort Meade, Maryland. During the phone call, the flight briefer noted that instrument meteorological conditions (IMC) prevailed for the intended flight and that he could not recommend a visual flight rules flight. Furthermore, he stated that AIRMET Sierra was issued for instrument flight rule (IFR) conditions and was currently active and ending between 1700 and 2000. The briefer asked the pilot if he needed a standard weather briefing and the pilot responded that he did not need any other information.

At 1145, the passenger texted the family member that the helicopter was en route. At 1151, the family member sent the passenger the GPS location and the passenger responded at 1202, "Rats. You guys are too far west... flight rules." At 1203 the family member sent another GPS location to the passenger and the passenger responded at 1208, "Can you see us? We are hitting the wall that we can't fly through." The family member responded, "not really" and the passenger sent one last text message at 1208 stating, "Give me one more pin to try." There were no further communications with the passenger.

According to Federal Aviation Administration radar data, the helicopter flew over Kent Island and made several left and right turns over the southern tip of the island then flew about 2 miles south of the island. The helicopter maneuvered in that area beginning at 1200 until radar contact was lost at 1211. The radar track indicated that the helicopter was flying about 175 ft above the water for the final 10 minutes of the flight. Figure 1 depicts the helicopter's radar-observed flight path for the accident flight in red. The yellow arrows trace the helicopter's flight path as it initially transitioned from flying over land to water. The white arrows trace the helicopter's flight path as it continued to maneuver over the water, and the pink arrows trace the final portion of the flight until radar contact was lost. The number 1 point depicts where the wreckage of the helicopter was located in the water.



Figure 1 - The red line depicts the helicopter's radar-observed flight path for the 10 minutes before the accident. Note: The time displayed at the beginning of the radar plot is in universal coordinated time.

Several witnesses reported seeing the helicopter flying around the southern point of Kent Island for several minutes before the accident occurred. One witness stated that the weather was "cloudy and the fog was heavy." Another witness reported that the helicopter was "flying very low to the water in dense fog."

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	38, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	July 6, 2017
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	April 21, 2018
<b>Flight Time:</b>	103.5 hours (Total, all aircraft), 103.5 hours (Total, this make and model), 14.8 hours (Last 90 days, all aircraft), 14.3 hours (Last 30 days, all aircraft)		

The pilot did not hold an instrument rating, nor did he record any instrument flight time or simulated instrument flight time in his logbook.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Guimbal	<b>Registration:</b>	N572MD
<b>Model/Series:</b>	Cabri G2	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	2017	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	1189
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	April 1, 2019 Annual	<b>Certified Max Gross Wt.:</b>	1540 lbs
<b>Time Since Last Inspection:</b>	46 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	645.5 Hrs at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	O-360-J2A
<b>Registered Owner:</b>	Jsc Investment Group Llc	<b>Rated Power:</b>	180 Horsepower
<b>Operator:</b>	Monumental Helicopters	<b>Operating Certificate(s) Held:</b>	None

There was a placard on the instrument panel of the helicopter that stated, "This rotorcraft is approved for night and day VFR operation." Additionally, according to general limitations in the helicopter's flight manual, the helicopter was limited to day and night VFR operations only.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	W29,17 ft msl	<b>Distance from Accident Site:</b>	8 Nautical Miles
<b>Observation Time:</b>	11:00 Local	<b>Direction from Accident Site:</b>	20°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	3 miles
<b>Lowest Ceiling:</b>	Overcast / 400 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	350°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.87 inches Hg	<b>Temperature/Dew Point:</b>	18°C / 18°C
<b>Precipitation and Obscuration:</b>	Moderate - None - Mist		
<b>Departure Point:</b>	Fort Meade(Odenton), MD (FME )	<b>Type of Flight Plan Filed:</b>	VFR
<b>Destination:</b>	Fort Meade(Odenton), MD (FME )	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	11:30 Local	<b>Type of Airspace:</b>	Class G

The National Weather Service issued an update at 1045 for AIRMET Sierra, which indicated IFR conditions for the area surrounding the accident location and advised of ceilings below 1,000 ft, visibility below 3 statute miles, precipitation, mist, and fog.

One photograph taken by the passenger while on the accident flight showed the visibility over the water was less than 3 miles. In another photograph, it was difficult to differentiate between the water and the sky.



Figure 2 - Photograph that passenger took on accident flight.

It could not be determined if the pilot reviewed any other weather information beyond that provided when he filed his flight plan before the flight.

### Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	38.815834,-76.383056

The helicopter impacted the Chesapeake Bay about 1.5 miles from the shoreline of Kent Island and was recovered from a depth of about 63 ft. All major components of the helicopter were recovered, and an oil and fuel sheen was noted on the water by first responders. Flight control continuity was confirmed

from the flight controls to the main rotor and tail rotor through multiple overstress fractures. Continuity was confirmed from the throttle to the engine through all push-pull tubes. The windscreen, doors, and forward section of the fuselage were fragmented. The instrument console remained attached to the main wreckage through cables and wires. Both seats were impact-separated in the forward direction but remained attached to the fuselage by their seatbelts.

All main rotor blades remained attached to the rotor head but were removed to facilitate recovery. The yellow rotor blade exhibited impact damage and was fragmented. The lead/lag damper was not extended. The green rotor blade was impact damaged and the outboard portion of the blade was partially separated. The lead/lag damper was extended about 0.5 cm. The red rotor blade was impact damaged and sections of the trailing edge were splayed open. The red lead/lag damper was extended about 4 cm.

The fenestron remained attached to the tailboom. Chordwise scratching was noted on the fenestron housing. All fenestron vanes were bent the opposite direction of travel. The tail rotor rotated freely when the tail rotor drive shaft was rotated by hand. The tail rotor drive shaft was bent and separated from the transmission. Continuity was confirmed from the anti-torque pedals to the tail rotor.

The engine remained attached to the helicopter through two of the three engine mounts and was removed from the airframe for further examination. Crankshaft continuity was confirmed by rotating the scroll assembly by hand. The scroll assembly exhibited impact damage along about one-third of the circumference. Thumb compression and suction were noted on the Nos. 2, 3, and 4 cylinders. The No. 1 cylinder was removed since it exhibited weak compression and was examined. When water was placed in the cylinder, most of the water leaked through the exhaust valve seat and a minor amount of water leaked through the intake valve seat.

The carburetor was removed from the engine. Fuel and water were noted in the bowl. The carburetor floats exhibited hydraulic deformation. The accelerator pump operated when the throttle arm was moved by hand. The carburetor fuel inlet screen was removed, and no debris was noted. The carburetor gasket was removed, and no tears were noted. The carburetor heat door was in the closed position. The assembly was impact damaged and pushed up onto the carburetor. The automatic carburetor door was tested using a 12V battery. When the wires were connected to the battery, the door operated and moved to an open position. The wires were then moved to the opposite poles of the battery and the carburetor door moved to the closed position.

The oil suction screen was removed, and no debris was noted. The oil filter was removed, disassembled, and no debris was noted in the filter. The engine driven fuel pump was removed from the engine and it operated when moved by hand. The helicopter was equipped with an electronic and single-conventional magneto ignition system. The conventional magneto was removed from the engine and produced spark on all towers when rotated.

## **Medical and Pathological Information**

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The Office of the Chief Medical Examiner, Baltimore, Maryland, performed the autopsy on the pilot. The autopsy report indicated the cause of death was multiple injuries.



Toxicology testing of the pilot was performed at the FAA Forensic Sciences Laboratory. Fluid and tissue specimens tested negative for ethanol and other drugs.

## **Additional Information**

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### Flight School Aircraft Use Agreement

According to the operator's aircraft use agreement, pilots renting the helicopter were required to fly in VFR weather with a 3,000-ft ceiling and 6 miles visibility when flying without a flight instructor.

## **Preventing Similar Accidents**

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### Reduced Visual References Require Vigilance (SA-020)

#### **The Problem**

About two-thirds of general aviation accidents that occur in reduced visibility weather conditions are fatal. The accidents can involve pilot spatial disorientation or controlled flight into terrain. Even in visual weather conditions, flights at night over areas with limited ground lighting (which provides few visual ground references) can be challenging.

#### **What can you do?**

- Obtain an official preflight weather briefing, and use all appropriate sources of weather information to make timely in-flight decisions. Other weather sources and in-cockpit weather equipment can supplement official information.
- Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself about your skill limitations. Plan ahead with cancellation or diversion alternatives. Brief passengers about the alternatives before the flight.
- Seek training to ensure that you are proficient and fully understand the features and limitations of the equipment in your aircraft, particularly how to use all features of the avionics, autopilot systems, and weather information resources.

- Don't allow a situation to become dangerous before deciding to act. Be honest with air traffic controllers about your situation, and explain it to them if you need help.
- Remember that, when flying at night, even visual weather conditions can be challenging. Remote areas with limited ground lighting provide limited visual references cues for pilots, which can be disorienting or render rising terrain visually imperceptible. When planning a night VFR flight, use topographic references to familiarize yourself with surrounding terrain. Consider following instrument procedures if you are instrument rated or avoiding areas with limited ground lighting (such as remote or mountainous areas) if you are not.
- Manage distractions: Many accidents result when a pilot is distracted momentarily from the primary task of flying.

See <https://www.nts.gov/Advocacy/safety-alerts/Documents/SA-020.pdf> for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Kemner, Heidi
<b>Additional Participating Persons:</b>	Bentley Hunte; FAA/FSDO; Baltimore, MD David Harsanyi; Lycoming Engines; Williamsport, PA
<b>Original Publish Date:</b>	December 3, 2020
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 2</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=99374">https://data.ntsb.gov/Docket?ProjectID=99374</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](#).