



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Newkirk, New Mexico	Accident Number:	CEN14FA369
Date & Time:	July 17, 2014, 01:42 Local	Registration:	N507CF
Aircraft:	AGUSTA SPA A109E	Aircraft Damage:	Destroyed
Defining Event:	Loss of control in flight	Injuries:	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

After the commercial pilot received an emergency medical services helicopter flight request, he quickly (in about 20 seconds) assessed the weather conditions and accepted the flight. No records were found indicating that the pilot obtained an official weather briefing before departing on the flight, and the investigation could not determine which weather resources the pilot used to assess the weather. About 8 minutes later, the pilot called the company's operations center to report that the flight was departing; this was the last communication received from the pilot. The helicopter was operating in an area that was known by company pilots, including the accident pilot, to have the potential for low visibility, even though there were no airport weather reporting facilities or Doppler radar coverage in the area.

A review of GPS data showed that, while en route to pick up the patient, the helicopter performed a slight descending 360° turn before continuing toward the hospital. Weather overlays with the GPS track indicated that the helicopter made the 360° turn about the same time that an outflow boundary wave, which could have increased the potential for windshear and strong updrafts and downdrafts and reduced ceilings and visibility. Following the 360° turn, the helicopter proceeded toward the destination. About 14 minutes later, the helicopter turned right and began flying toward a major highway. It is likely that, due to the reduced visibility in the area, the pilot was flying toward the highway to follow the lights toward the city. The helicopter then turned further right and began to climb. As the helicopter entered another outflow boundary wave, it turned left. The left turn tightened, and the helicopter began to rapidly descend into terrain. The helicopter impacted a mesa in a near-level attitude.

A review of a company communication recording showed that, about 17 minutes after the estimated accident time, the operations center attempted to contact the flight crew and was unsuccessful. The company sent three company helicopters to the accident helicopter's last known position; one helicopter pilot flew near the helicopter's site but was unable to see anything, and the two other pilots could not proceed close to the accident site due to clouds and low visibility. The wreckage was subsequently located by local law enforcement. A postaccident examination of the helicopter and engine did not reveal any anomalies that would have prevented normal operation.

Due to mid- and low-level cloud cover, it is likely that no lunar or celestial lighting was available for amplification by the pilot's night vision goggles (NVG). Since the helicopter was not equipped with an infrared spotlight, only cultural light would have been available for NVG amplification. However, the helicopter was operating in a remote, sparsely populated area with minimal cultural light. Although the pilot's recurrent training included recovery procedures from inadvertent entry into instrument meteorological conditions (IMC), and his training records showed that he satisfactorily completed this item on his most recent training flight about 8 months before the accident, the circumstances of the accident are consistent with the pilot's inadvertent visual flight into IMC, which resulted in a loss of helicopter control.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadvertent visual flight into instrument meteorological conditions, which resulted in a loss of helicopter control.

Findings	
Aircraft	(general) - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Environmental issues	Dark - Effect on operation
Environmental issues	Clouds - Effect on operation
Environmental issues	Clouds - Awareness of condition

Factual Information

History of Flight

Enroute-cruise	VFR encounter with IMC
Enroute-cruise	Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On July 17, 2014, at 0142 mountain daylight time, an Agusta A109E helicopter, N507CF, collided with a mesa near Newkirk, New Mexico. The commercial pilot, flight nurse, and paramedic were fatally injured. A postimpact fire ensued and the helicopter was destroyed. The helicopter was registered to and operated by TriState CareFlight LLC under the provisions of 14 Code of Federal Regulations Part 91 as a positioning flight. Night visual meteorological conditions existed for the helicopter's departure and a company visual flight rules flight plan was filed. The flight originated from the Santa Fe Municipal Airport (SAF), Santa Fe, New Mexico, at 0051 and was en route to a hospital in Tucumcari, New Mexico.

The helicopter was the subject of an alert notice and was found by a local resident. The helicopter wreckage came to rest on the north side of a mesa about 150 ft above the surrounding terrain. A postimpact fire consumed a majority of the fuselage. All main airframe and engine components were accounted for at the accident site.

Pilot Information

Certificate:	Commercial; Flight instructor	Age:	46
Airplane Rating(s):	None	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):	Helicopter; Instrument helicopter	Toxicology Performed:	Yes
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	September 17, 2013
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	November 26, 2013
Flight Time:	6167 hours (Total, all aircraft), 208 hours (Total, this make and model), 28.1 hours (Last 90 days, all aircraft), 9.8 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

The pilot, age 46, held a commercial pilot certificate for helicopter and instrument helicopter. He also held a flight instructor certificate for helicopter and instrument helicopter. On September 17, 2013, the pilot was issued a second class medical certificate with the limitation that he must wear corrective lenses.

The pilot was hired by TriState CareFlight (TSCF) on September 10, 2009. During his employment with TSFC, he began flying Agusta 119 helicopters, before being transferred to Eurocopter AS350

helicopters. On December 13, 2012, he was assigned the duties of pilot in command of Agusta A109 helicopters. Using data from TSCF and the pilot's annual resume, it was estimated that he accumulated about 6,167 total hours, with 208 hours in Agusta A109 helicopters, over 410 hours of night time, 75 hours of simulated instrument conditions, and 0 hours of actual instrument conditions. The pilot had been operating out of the Santa Fe base for over a year and a half and had been flying in the mountainous desert environment of Arizona, Nevada, and New Mexico since his hire in 2009. He had flown numerous flights in the Santa Fe and Tucumcari areas prior to the accident.

The most recent check flight for the pilot was accomplished on December 16, 2013. It was a combined 14 CFR Part 135.293 and 135.299 check flight. The flight lasted 1.2 hours, was flown completely under night vision goggle (NVG) use, and some of the maneuvers flown and evaluated included: normal operations, emergency operations, unusual attitude recovery, inadvertent instrument flight rules (IFR) procedures, and NVG failure in flight. Astrological conditions for that training flight would have included clear skies with a bright moon at 100% disk illumination.

The pilot was qualified to fly using NVGs. At the time of the accident he had accrued at least 162 hours of flight assisted by NVGs. His last recurrent NVG training flight was on December 16, 2013, with ground training accomplished that day. The pilot inspected and tested his NVGs on July 16 and reported no discrepancies on the company's NVG Sign-Off Sheet. In the 90 days prior to the accident, he had flown 8.3 hours of NVG time:

Date Hours

April 23, 2014 0.4

April 25 2.4

April 27 1

May 22 2.6

May 26 1

May 27 0.2

June 18 1.1

June 19 0.6

July 16 0.8

The pilot normally worked a schedule that consisted of 7 days on-call and 7 days off-call. Prior to the accident, the pilot had been on-call for 15 days. From July 2 to July 8, the pilot was on-call between 0700 until 1900. The pilot was then given 24 hours off and then on July 9, was on-call between 1900 until 0700. The accident occurred on the pilot's eighth consecutive shift. Prior to the accident flight he had previously flown 0.6 hours on that same shift.

Aircraft and Owner/Operator Information

Aircraft Make:	AGUSTA SPA	Registration:	N507CF
Model/Series:	A109E E	Aircraft Category:	Helicopter
Year of Manufacture:	2000	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	11067
Landing Gear Type:	Tricycle	Seats:	
Date/Type of Last Inspection:	July 4, 2014 AAIP	Certified Max Gross Wt.:	6283 lbs
Time Since Last Inspection:	16 Hrs	Engines:	2 Turbo shaft
Airframe Total Time:	3703 Hrs at time of accident	Engine Manufacturer:	P&W CANADA
ELT:	C126 installed, not activated	Engine Model/Series:	PW206C
Registered Owner:	TRISTATE CAREFLIGHT LLC	Rated Power:	549 Horsepower
Operator:	TRISTATE CAREFLIGHT LLC	Operating Certificate(s) Held:	On-demand air taxi (135)
Operator Does Business As:	TRISTATE CAREFLIGHT LLC	Operator Designator Code:	IFJA

The Agusta A109E helicopter was manufactured in 2000 and had been modified for helicopter air ambulance (HAA) flight operations. It was powered by twin Pratt & Whitney Canada PW206C turbo shaft engines each rated at 549 horsepower. The helicopter was certified for instrument flight rules operations. The last inspection, completed on July 4, 2014, was an approved aircraft inspection program which combined the 25 hour, 50 hour, and 150 hour inspections. After that date, the helicopter flew 17.3 hours with 2 discrepancies. On July 7, the accident pilot reported weak wheel brakes which were replaced that day. On July 11, the accident pilot reported a transmission oil chip light illumination. After the flight, maintenance cleaned "slight fuzz" from the chip detectors and returned the helicopter to service.

The helicopter was equipped with a Garmin GNS-530 GPS/NAV/COM, a SkyConnect Transceiver, and a panel mounted Garmin GPSmap 396. The cockpit was modified for NVG use via a supplemental type certificate. In addition, the helicopter was equipped with an enhanced ground proximity warning system, auto flight system, and radar altimeter.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Unknown	Condition of Light:	Night
Observation Facility, Elevation:	KTCC, 4039 ft msl	Distance from Accident Site:	32 Nautical Miles
Observation Time:	01:35 Local	Direction from Accident Site:	83°
Lowest Cloud Condition:	Thin Overcast / 1500 ft AGL	Visibility	10 miles
Lowest Ceiling:	Overcast / 1500 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	18 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	50°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.03 inches Hg	Temperature/Dew Point:	19°C / 13°C
Precipitation and Obscuration:			
Departure Point:	SANTA FE, NM (SAF)	Type of Flight Plan Filed:	Company VFR
Destination:	Tucumcari, NM	Type of Clearance:	VFR
Departure Time:	00:51 Local	Type of Airspace:	Class G

A weather study was conducted for the accident flight by an NTSB Senior Meteorologist. A review of the National Weather Service Surface Analysis Chart for 0000 mountain daylight time (MDT) found a fairly active surface environment with a surface trough located over the accident site at 0000 MDT. In addition, a stationary front was located south of the accident site and three areas of low pressure were located to the distant northwest, south, and southeast of the accident site. Potential existed for clouds and precipitation due to numerous lifting mechanisms around the accident site to include combined surface, low-level, and mid-level troughs. At 1845 on July 16, the Storm Prediction Center predicted a 15% chance of damaging thunderstorm wind or gusts of 50 knots within the vicinity of the accident site until 0600 on July 17.

A review of aviation weather reporting facilities in the vicinity of the accident flight, revealed that the helicopter likely had a southerly wind component until flying south to southeast of Las Vegas, New Mexico at which point the wind would have shifted to out of the northeast. In addition, cloud ceiling would have lowered as the flight proceeded towards Tucumcari. An upper air sounding indicated the potential for cloud formations between 5,000 and 8,000 ft mean sea level (msl), with the possibility of rain showers and thunderstorms. Additionally, the sounding indicated the strongest wind speeds possible with a microburst or outflow boundary would have been between 45 to 53 mph. A potential for low-level wind shear was identified between 5,000 and 6,000 ft msl with clear air turbulence from the surface to 10,000 ft msl.

The closest Doppler radar site was located at Cannon Air Force Base (FDX), located 43 miles southeast of the accident site. Scans initiated between 2124 MDT on July 16 through 0235 MDT on July 17, revealed two distinct features before, during, and after the accident time. First, an outflow boundary moved from east to west across New Mexico from 2124 MDT to 0030 MDT. As the outflow boundary moved from east to west, the surface wind direction switched from southerly to northeasterly, concurrent with the aviation weather reporting facilities. Next, another outflow boundary and wave pattern was

detected on the 0235 scan but due to Doppler beam angle and distance to the accident site was likely masked on the earlier scan. Backwards trajectory analysis was completed to map the progression of the outflow boundaries. Mapping estimated that the first outflow boundary and associated convective activity would have been over the accident site at the accident time. This would have increased the potential for increased wind shear, strong updrafts and downdrafts, reduced ceilings, and reduced visibility.

Airmen's Meteorological Information (AIRMET) Sierra, issued at 2045 MDT on July 16 and valid at the accident time for the accident site and route of flight, forecasted instrument meteorological conditions for the accident site with ceilings below 1,000 ft and visibility below 3 miles with precipitation and mist.

The terminal aerodrome forecast (TAF) for Tucumcari, located 32 miles east of the accident site, issued at 2334 MDT on July 16 forecasted wind from 030 degrees at 11 knots, prevailing visibility 6 miles, rain showers in the vicinity, few clouds at 2,000 ft agl and a broken ceiling at 8,000 ft agl.

The phase of the Moon was waning gibbous with 65% of the Moon's visible disk illuminated. At the time of the accident there would have been no moon visible due to the mid- and low-level cloud cover that the accident flight was likely flying beneath.

Wreckage and Impact Information

Crew Injuries:	3 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Fatal	Latitude, Longitude:	35.113609,-104.256385

The helicopter came to rest midway between the peak and the surrounding terrain of a 300-foot high mesa, at a measured elevation of 4,654 ft msl. The wreckage was generally located in one area with fragments of main rotor blades and light debris scattered nearby. A postimpact fire consumed a majority of the wreckage. The main wreckage consisted of the main rotors, fuselage, tail boom, and tail rotors. Some of the exterior panels and medical equipment were found strewn in the area surrounding the wreckage.

All linkages between the swash plate and pitch change horns were found intact and cotter pinned. The tail rotor blades rotated when the tail rotor drive shaft was turned by hand. All linkages to the tail rotor blades were found intact and cotter pinned. On the boulder where the tail rotor had come to rest, machining was visible on the rock's surface consistent with tail rotor blade strikes. In addition, the top of a boulder closest to the nose of the helicopter wreckage displayed circular scuffing with a portion of a main rotor blade tip wedged into the rock.

The helicopter's airspeed indicator needle pointed at 190 knots. Of note, the helicopter's never exceed speed (Vne) is listed as 168 knots. The left side vertical speed indicator needle pointed between 2,500

and 3,000 ft per minute descent. All other gauges were destroyed or unreadable. The lower portion of the helicopter was partially buried in the dirt and gear positioning was consistent with the landing gear in the retracted position. The emergency locator beacon was impact and thermally damaged. A Garmin GPSmap 396 was found buried in the dirt and was sent to the NTSB laboratories in Washington, D.C. for a data download.

Due to the mesa's slope and thermal damaging of the surrounding rocks, the wreckage could not be fully examined on-site. A postaccident examination was conducted after the wreckage was transported to a storage facility. The examination revealed that portions of the flight controls displayed fracture signatures consistent with overload and/or thermal damage. No preimpact anomalies were detected with the flight controls. The engines were examined and did not display any preimpact anomalies.

Communications

TSCF used the SkyConnect satellite communication system to communicate between their California based operations center and the accident helicopter. At 0050:48, the pilot called the operations center to report that he had departed for Tucumcari. No further communications were made from the helicopter.

The helicopter was operating under a company visual flight rules flight plan and was not in communication with air traffic control.

Medical and Pathological Information

An autopsy was authorized and conducted on the pilot by the New Mexico Office of the Medical Investigator. The cause of death was the result of multiple injuries and the manner of death was ruled an accident.

Forensic toxicology was performed on specimens from the pilot by the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. Testing was negative for all tested drugs and substances.

Tests and Research

SkyConnect Data

The onboard SkyConnect system allowed for tracking of the company's helicopters at their operations

center. The data track began at 0052 with the helicopter on the company's helipad at SAF. The helicopter briefly taxied southwest on taxiway Charlie before it departed the airport. While en route, the system reported the helicopter's position about every 30 seconds. The helicopter tracked on a 100° heading at 9,500 ft msl (about 3,800 ft agl) and 160 knots groundspeed until about 25 miles southeast of Las Vegas, New Mexico. At 0120:13 the Garmin GPSmap 396's data began recording and provided better data resolution than the SkyConnect data. The two tracks followed very closely to each other with the Garmin data being captured about every 10-20 seconds. This report will focus primarily on the data provided by the Garmin.

Garmin GPSmap 396

The data from the panel mounted GPS was downloaded and found to retain the accident flight. Flight data began recording at 0120:13 when the helicopter was already en route to Tucumcari. The first complete data point from the accident flight occurred at 0120:26 as the helicopter tracked 106° at 9,237 ft msl with a groundspeed of 158 knots. At 0121, the helicopter began a slight descending left 360° turn. The helicopter descended as low as 1,225 ft agl before it resumed a course towards Tucumcari. The helicopter flew about 6,600 ft msl (about 1,200-1,800 ft agl) with a groundspeed of about 130 knots. At 0136:17, about 30 miles west from Tucumcari, the helicopter turned right and flew south-southeast. The helicopter descended to 6,000 ft msl and the groundspeed increased to 160 knots and then reduced to 140 knots. At 0140:09 the helicopter continued the right turn and flew south-southwest while climbing to 7,763 ft msl. At 0140:49, the helicopter turned left. As the helicopter passed through a 90 degree heading change, the helicopter began to descend. At 0141:21 the helicopter began a 940 ft per minute (fpm) descent, which increased until the last reporting point. The helicopter continued a left 360° turn that tightened as the turn progressed. The last reporting point occurred at 0141:47 with the helicopter at 4,840 ft msl (200 ft agl) and groundspeed of 93 knots. The estimated final descent rate was 14,760 fpm.

Weather overlays with GPS flight track

Due to weather radar beam angles and distance to the accident site from the weather radar sites, the radar beam likely missed the outflow boundary around the accident time. Using known weather information, modelling of the outflow boundary waves was performed. Weather associated with these outflow boundary waves would be consistent with increased wind shear, strong updrafts and downdrafts, reduced ceilings, and reduced visibility.

When the helicopter flew east-southeast and performed a slight descending 360° turn at 0121, it was directly near the estimated location of an outflow boundary wave. The boundary wave was the second wave that moved through the area from the north-northwest to the south-southeast. The helicopter accelerated past the second boundary wave and continued to the east-southeast. At 0136, when the helicopter maneuvered to the south-southeast it was between the first and second boundary wave. At 0141, the helicopter likely flew into the first boundary wave about the time it began the left turn and descent toward the terrain.

Agusta Engineering Data

Engineers from Augusta Helicopters assessed the Garmin GPS data to evaluate the ability of a helicopter to perform the final spiraling left 360° turn. They found that the helicopter remained within the

structural design limits and estimated the helicopter bank angles continued to increase during the turn almost reaching 70° of bank and loaded near 2.7 Gs. The helicopter would have been flying a high speed, high load factor descending turn, with its main rotor system approaching or having reached its aerodynamic limit.

Organizational and Management Information

TriState CareFlight LLC Operations

The helicopter was operated by TriState CareFlight LLC. The helicopter was tasked in accordance with the company's standard operating procedure. Telephone recordings were provided which revealed information about the flight.

At 0018, a hospital in Tucumcari, New Mexico, telephoned TSCF's operations center to request a patient transfer from the hospital to another hospital in Albuquerque, New Mexico. The helicopter stationed at Tucumcari had been recently tasked with another flight, so the operations center contacted the pilot of the closest helicopter which had landed in Amarillo, Texas to refuel. The pilot declined the flight due to thunderstorms between Amarillo and Tucumcari. At 0042, TSCF's operation center contacted the accident pilot at Santa Fe, New Mexico and provided the flight request details. After being given the route of flight, the pilot assessed the weather for about 20 seconds before accepting the flight. It is unclear what weather resources the pilot may have consulted prior to the accident flight. At 0050, the pilot called the operations center and informed them that he was departing for the flight. That was the last transmission made from the accident crew.

When the helicopter stopped tracking, the operations center received a notification that the helicopter's progress had stopped. At 0200, the operations center attempted to contact the accident crew via satellite communications and cellphones and was unsuccessful. At 0209, the operations center contacted the on-call supervisor and informed him that a helicopter was dispatched to Tucumcari and was overdue. At 0215, a teleconference was held with multiple supervisors from the company attempting to locate and contact the accident crew. They contacted local law enforcement and asked for officers to respond to the last known location. At 0234, TSCF called the local flight service station and asked to begin search and rescue procedures for the helicopter and its crew. TSCF tasked several company helicopters to fly to the last known coordinates of the accident helicopter to see if they could locate the helicopter or contact the crew on the radios. Three helicopters flew towards the accident site and two of the helicopters were unable to proceed due to low visibility. One helicopter flew near the helicopter's site but was unable to see anything, could not reach the crew on the radio, and did not hear an emergency locator transmitter beacon. At 0322, TSCF was informed that the local land owner's ranch hand spotted a fire on the property near the last coordinates and responded to investigate. At 0355, New Mexico State Police confirmed that the wreckage of a helicopter had been located.

Operations Specifications

In reference to the accident flight, the following specifications would have been valid for the flight: The Agusta 109 helicopters were authorized to perform visual flight rules (VFR) flight en route and

could operate both day and night. Flights at night in designated mountainous terrain must have a minimum ceiling of 1,000 ft. Night "local" flights needed 3 miles visibility and "cross country" flights needed 5 miles visibility. Local flying areas are those areas in which the pilot has demonstrated a level of familiarity which allows the use of lower VFR operating minima. Prior to conducting VFR operations, the pilot must determine the minimum safe altitudes along the planned en route phase of flight to include the minimum safe cruise altitude. The pilot must clear all terrain and obstacles for the route of flight by at least 500 ft for night operations. All night or NVG en route cruise operations require a minimum altitude of 500 ft agl. Prior to each flight, the pilot assesses the risk for the flight through the completion of a risk assessment form. Only the risk assessment form for the previous flight was located. The form for the accident flight was likely onboard the helicopter and was destroyed in the accident.

Additional Information

Low Visibility Area

The helicopter was operating in an area that was known by company pilots to have the potential for low visibility. This area extended from Moriarty, New Mexico, to Amarillo, Texas, and from Wagon Mound, New Mexico, to Fort Sumner, New Mexico. TSCF personnel reported that this area could develop low visibility even when the surrounding aviation weather stations reported clear weather. A photo of the map at the Santa Fe base is provided in the docket associated with this report.

ITT Night Vision & Imaging Aviator Night Vision Imaging System (ANVIS) 9 F4949

The operator utilized a Generation III ANVIS 9 system for their aircrews. According to company personnel, the pilot and one additional crew member were to utilize the ANVIS 9 during NVG operations. Marketing documents stated that the ANVIS 9 had a 40 degree nominal field of view. The F4949 intensified light 2,000 to 3,500 times.

Meteorological modelling of the accident area estimated that due to mid and low-level cloud cover, the helicopter likely operated without the aid of lunar or celestial light sources. The helicopter was not equipped with infrared spotlight, nor was it required to be. The helicopter was equipped with a regular spotlight which would not have been compatible with the NVGs and was likely not used.

The pilot and one of the crew members would have utilized the NVGs during the flight. Damage to the NVGs precluded the determination of whether the NVGs were in the down position during the accident.

United States Army Field Manual (FM) 3-04.203, Fundamentals of Flight, May 2007

The Army has incorporated NVGs into their flying programs for decades, making their knowledge base larger than most organizations. While not required reading for civilian pilots, FM 3-04.203 was constructed to educate pilots of the principles surrounding aviation for them to be better prepared to react to unexpected conditions. Chapter three titled "Rotor-Wing Environmental Flight," section 62 states "...when moon illumination is low or during the new-moon cycle, the desert presents a formidable challenge to night flying. It is probably the most difficult environment in which to interpret terrain relief

and elevation, especially while using [night vision devices]. Unaided night flight and operations are far more difficult and not recommended." In chapter four, titled "Rotary-Wing Night Flight," several passages described the hazards and risks of night flight with night vision systems. Key points were that the NVGs had a tendency to distort depth perception and distance estimation with the quality of depth perception being dependent on ambient light, terrain surface conditions, the ability of the NVG device, and the pilot's experience flying in those conditions. "...adverse weather is difficult to detect at night. Often the decrease in visual acuity and a gradual loss of horizon are very subtle. As meteorological conditions deteriorate, aviators must decrease airspeed to reduce risk of flying into inadvertent [instrument meteorological conditions]." The "NVG's field of view significantly reduces peripheral vision as compared with unaided flight. Crewmembers must use a continual scanning pattern to compensate for the loss." "Maneuvers requiring large bank angles or rapid attitude changes tend to induce spatial disorientation. An aviator should avoid making drastic changes in attitude/bank angles and use proper scanning and viewing techniques."

Administrative Information

Investigator In Charge (IIC):	Aguilera, Jason
Additional Participating Persons:	Patrick Hempen; FAA; Washington, DC Scott Tyrell; FAA Rotorcraft Directorate; Fort Worth, TX Matt Rielly; TriState CareFlight; Bullhead City, AZ Sid Essex; TriState CareFlight; Bullhead City, AZ Earl Chapman; Transportation Safety Board of Canada ; Gatineau Alessandro Cometa; Agenzia Nazionale per la Sicurezza del Volo; Roma
Original Publish Date:	June 27, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=89676

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](#).