



Aviation Investigation Factual Report

Location:	Tehachapi, California	Accident Number:	WPR14TA149
Date & Time:	March 27, 2014, 01:47 Local	Registration:	N497E
Aircraft:	Bell OH-58A	Aircraft Damage:	Substantial
Defining Event:	VFR encounter with IMC	Injuries:	3 None
Flight Conducted Under:	Public aircraft		

On March 27, 2014, at 0147 Pacific daylight time, a Bell OH-58A, N497E, collided with a highway near Tehachapi, California, after encountering instrument meteorological conditions (IMC). The helicopter was registered to, and operated by, the Kern County Sheriff's Department as a public aircraft flight. The commercial pilot, tactical flight officer (TFO), single passenger, and a dog from the Sheriff's K-9 division were not injured. The helicopter sustained substantial damage during the accident sequence. The cross-country flight departed Meadows Field Airport, Bakersfield, California, at 0121, with a planned destination of General William J Fox Airfield, Lancaster, California. Marginal visual meteorological conditions prevailed at the accident site, and a company flight plan had been filed.

The purpose of the flight was to transport the dog to an urgent care facility in Lancaster, after it was shot while on duty about 3 hours prior to the accident. According to the K9 Unit Supervisor, the local veterinarian could not perform treatment due to the nature of the dog's injuries.

The pilot stated that he arrived at the Air Support Unit (ASU) headquarters in Bakersfield about 0100, and was briefed on both the mission and en route weather by the current on-duty command pilot (who was coming to the end of his shift). The accident pilot confirmed that visual meteorological conditions (VMC) prevailed at both the departure and arrival airports. He was aware that a weather front was moving through the area, and that he would most likely encounter instrument meteorological conditions (IMC) while en route. He planned to use Tehachapi airport, about 45 miles east of Bakersfield, as an alternate landing site should conditions deteriorate.

At 0120, they loaded the dog into the rear left footwell, along with the K-9 Division Chief who was seated in the rear right seat. The departure was uneventful, but as they approached Tehachapi they encountered light rain, strong winds, and low clouds. Both the pilot and the TFO were wearing Night Vision Goggles (NVG's) throughout the flight.

The pilot decided to proceed, and wanted to see if Sand Canyon, east of Tehachapi, was passable. However, once they got beyond the lights of the city, he lost visual reference after flying into what he thought was clouds. He reported flying about 500 feet above ground level (agl) at that time, and was concerned that returning might cause them to collide with wind turbines and other obstacles in the area. He elected to slow the helicopter and initiate a gradual descent with the hope of exiting the clouds. During the descent he realized that the windshield had fogged up, and he turned on the demister. A short time later a highway came into view and the helicopter struck the ground.

The TFO reported similar observations stating that as soon as they launched, cloud cover started to descend into the area, and he could see clouds in the mountain passes ahead. They maintained visual contact along the route but as they approached Tehachapi, the area became further enveloped in clouds. The cloud deck at their location was about 600 feet agl and he could neither see a break nor an exit route. Looking ahead towards the northeast he observed the cement plant at Monolith, and a break in the clouds beyond near Highway 58. He communicated this to the pilot, and as they flew past the cement plant, his forward vision became completely obscured. He could still see out of the side window, so assumed the windshield had fogged up (it often did during rain because of a leak). The pilot then turned

on the demister, and the TFO perceived that the helicopter was now performing gradual S-turns over the highway. He did not get the sense that they were descending, and he continued to look out of the right window, telling the pilot that they were clear of obstructions. He continued to move his head back and forth observing the front and side windows; however, the front windshield was still obscured. A few seconds later he looked out of the right window, and although he could not sense movement, they appeared to be rapidly descending. They transitioned over the eastbound lanes of the highway, and he immediately called for the pilot to pull up, however, a few seconds later the helicopter struck the ground.

The helicopter struck the surface of the westbound lane of Highway 58, bounced back into the air, and rotated about 180 degrees. The pilot maintained a low hover and could now see the lights of Tehachapi ahead. The helicopter appeared to be handling normally, and was not vibrating or making any unusual sounds, so he elected to return to Tehachapi Airport, 5 miles to the west. Before landing he asked the TFO to open the door to observe the skids; they appeared intact. The TFO attempted to utilize the Forward Looking Infrared Camera (FLIR) mounted on the nose, and rear-mounted "Nightsun" searchlight to assist with the landing, but they were both inoperative. The helicopter then landed uneventfully.

Subsequent examination revealed that the helicopter sustained substantial damage to the belly structure, with the skids having been spread about 2 feet beyond their normal stance. The FLIR and searchlight were both disabled, and sustained crush damage to their lower cowlings, and the tailskid appeared to have struck the ground.

The helicopter was equipped with an AeroComputers Digital Mapping System. The system recorded the helicopters GPS track at approximately 1-second intervals. The data for the accident flight revealed a track that closely matched the crew's statements. The helicopter maintained a southeast track for the majority of the flight, generally following Highway 58. The projected flight track beyond the accident site would have taken the helicopter through a pass which was flanked immediately to the north and south by wind turbine-covered peaks, at elevations ranging between 1,000 and 2,000 ft above the highway.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	Age:	60
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Helicopter	Toxicology Performed:	No
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	September 24, 2013
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	October 11, 2012
Flight Time:	16110 hours (Total, all aircraft), 6193 hours (Total, this make and model), 15909 hours (Pilot In Command, all aircraft), 48 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

The pilot was the chief flight instructor for the ASU. He stated that he had been flying fixed wing aircraft since 1975, and helicopters since 1980. His flight experience was primarily within the fields of electronic news gathering, emergency medical service, and law enforcement. He held an airline transport pilot certificate with ratings for helicopter-rotorcraft, along with a commercial certificate with ratings for airplane single engine land, multiengine land, and instrument airplane. He also held a flight instructor certificate with ratings for helicopter. He reported a total flight experience in all aircraft of 16,110 hours, with 6,193 in the accident make and model. He had flown for 14 hours during the preceding 30 days, three of which were in the accident make and model.

The pilot held a second-class medical certificate issued on September 24, 2014. It had no limitations or waivers.

The TFO did not hold a pilots certificate.

The pilot submitted a sleep and activity log for the 72-hour period leading up to the accident. Each day he went to sleep at 2130, and woke at 0530. Although he was on duty from 0800 to 1600 on both prior days, he did not fly on the day before the accident. He was awakened by a phone call from the ASU at 0015 on the day of the accident, and reported for duty at 0100.

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	Registration:	N497E
Model/Series:	OH-58A	Aircraft Category:	Helicopter
Year of Manufacture:	1978	Amateur Built:	
Airworthiness Certificate:	Restricted (Special)	Serial Number:	69-16375
Landing Gear Type:	N/A; Skid	Seats:	4
Date/Type of Last Inspection:	March 17, 2014 100 hour	Certified Max Gross Wt.:	3200 lbs
Time Since Last Inspection:	36 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	8036 Hrs at time of accident	Engine Manufacturer:	Rolls Royce
ELT:	C126 installed, not activated	Engine Model/Series:	250 C20B
Registered Owner:	KERN COUNTY SHERIFFS DEPARTMENT	Rated Power:	420 Horsepower
Operator:	KERN COUNTY SHERIFFS DEPARTMENT	Operating Certificate(s) Held:	None

The helicopter was manufactured by Bell Helicopters in October 1970 and delivered to the United States Army at the end of that month. After being retired from military service, it was purchased by the Kern County Sheriff's Department in June 1997. According to the Sheriff's Department, the helicopter had accrued 8,036 hours of total flight time on the date of the accident.

The helicopter was maintained utilizing the manufacturer's inspection program, the last inspection of which occurred on March 17, 2014, 36 flight hours prior to the accident.

The helicopter was not equipped with instruments certified for instrument flight rules; it was equipped with a radar altimeter.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Night
Observation Facility, Elevation:	KTSP, 4001 ft msl	Distance from Accident Site:	5 Nautical Miles
Observation Time:	08:35 Local	Direction from Accident Site:	287°
Lowest Cloud Condition:	Scattered / 400 ft AGL	Visibility	7 miles
Lowest Ceiling:	Broken / 800 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	13 knots / 19 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.93 inches Hg	Temperature/Dew Point:	4°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	BAKERSFIELD, CA (BFL)	Type of Flight Plan Filed:	Company VFR
Destination:	LANCASTER, CA (WJF)	Type of Clearance:	None
Departure Time:	01:21 Local	Type of Airspace:	Class G

The closest weather reporting station was located at Tehachapi. Five minutes before departure it reported wind from 300 degrees at 15 knots with gusts to 22 knots, 7 miles visibility, broken ceiling at 500 ft agl, overcast skies at 1,300 ft agl, temperature 4 degrees C, dew point temperature 4 degrees C, altimeter 29.93 inHg.

At 0135, the visibility remained the same, with scattered clouds at 400 ft agl, broken ceiling at 800 ft agl, and overcast skies at 1,700 ft agl.

Next Generation Radar (NEXRAD) LEVEL-II data imagery for the period 1245 to 0158 revealed rain showers forming and moving eastward into the mountainous terrain east of Bakersfield.

An area forecast, issued about 6 hours prior to the accident, indicated rain showers and ceilings near 3,000 ft for Bakersfield, along with isolated showers for the mountains and 20 knots wind, gusting to 30 knots. An AIRMET was also issued about that time indicating mountain obscuration and turbulence.

Airport Information

Airport:	TEHACHAPI MUNI TSP	Runway Surface Type:	
Airport Elevation:	4001 ft msl	Runway Surface Condition:	Wet
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Precautionary landing

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None	Latitude, Longitude:	35.110553,-118.339164(est)

Organizational and Management Information

The ASU was comprised of six pilots and three TFO's. Depending on availability, the pilots would also perform the duties of a TFO. The unit also drew on the resources of a group of search and rescue (SAR) volunteers. Two of the pilots were instrument rated. Depending on the day of the week, the ASU shared aviation related SAR responsibilities with the Kern County Fire Department. With the fire department providing support Monday through Wednesday, and the ASU covering the remaining four days.

The ASU operated three fixed wing aircraft, and five helicopters, which included two Bell OH-58's, two McDonnell Douglas MD 500's, and one Bell UH-1. Most of the routine and scheduled maintenance was performed by mechanics in-house.

According to the operations manual, the ASU was managed by an officer-in-charge (OIC), with training scheduling, oversight, and planning performed by the chief flight instructor. According to the manual, a position of Safety Officer had been created to "Establish a safety manual, safety practices, and to provide recommendations for the OIC regarding safety items." However, the OIC revealed that a Safety Officer had not been assigned, and that the safety manual only contained broad safety objectives that were not specific to ASU operations.

There was no formal safety management system (SMS) in place beyond verbal and written discrepancy reports to the OIC and chief flight instructor. According to the pilot, there was no specific risk assessment procedure prior to flight, primarily because most flights are routine in nature.

Airborne Law Enforcement Association Standards

The Airborne Law Enforcement Association (ALEA) is a non-profit association comprised of local, state, and international public aircraft operators. The association's mission is to "promote and advance safe, effective and efficient aviation operations in public safety through voluntary compliance with Commission standards validated through the accreditation process."

The ALEA provide a series of guidelines and resources, which a public operator may choose to utilize as either an operations template, or towards accreditation. According to an ALEA representative, the

organization has over 3,000 members, and eight public operators have attained accreditation.

According to the OIC, although the ASU has not attained accreditation, all of the pilots are members, and typically two or three attend ALEA conferences annually.

Additional Information

Night Vision Goggles

All ASU pilots received training in the use of NVG's during the period from 2006 through 2009 by Aviation Specialties Unlimited of Boise, Idaho. All subsequent recurrent training was performed by both the accident pilot and the deputy flight instructor, who both then cross-train each other for currency. All pilots are required to maintain currency every 90 days.

The accident pilot did not recall any specific training which warned of the adverse effects of windshield fogging while using NVG's. He stated that the windshield demister was turned off at takeoff, and that this was required by checklist because it utilized engine bleed air.

According to representatives from Aviation Specialties Unlimited, windscreen condition and its effects on NVG performance are discussed during training. Additionally, the 2008 ground school student handout stated the following in the section entitled, "Indications of Restrictions to Visibility at Night":

"NOTE: Aviators may fail to detect a gradual increase in cloud coverage (fog, haze, or precipitation) and may inadvertently enter the clouds. Occasionally look under the goggles (unaided) and check for indications of deteriorating weather conditions."

The Part 135 Operations section of the most current student handout specifically states the following, "Inspect aircraft windscreen and windows for condition and cleanliness. Particular attention should be paid to ensure that the windscreen and windows do not have a layer of dust on the exterior or haze that can form on the interior of the windscreen. A light layer of dust or haze, just like light fog or mist, can significantly degrade visual acuity."

Radar Altimeter

The radar altimeter was an analog type, with a needle which triggered both an audible and visual warning when its altitude was reached. The pilot reported that the audible and visual alerts were turned off at the time of the accident.

He stated that his standard practice when flying the UH-1 helicopter on SAR missions is to set the altimeter to a pre-determined hoisting height, and that for the accident flight he would most likely have set it to trigger at 300 feet, thereby giving him ample opportunity to react. He conceded, however, that not setting it for this flight was an oversight, and that the urgency of the mission could have contributed to this. He further stated that complacency was a possible factor due to the excellent situational awareness typically provided by NVG's. He stated that setting the radar altimeter is not a checklist item

because it is mission specific, but that it should be added to the checklist, possibly in the form of "set radar altimeter trigger as needed." He further noted that some pilots prefer not to set or arm the radar altimeter due to the distracting beeping sound it creates.

Weather Minima

The ASU operations manual, Helicopter - Prohibited Operations section, stated that night mountain operations with ceiling or visibility less than 1,000 ft agl and 3 statute miles are strictly prohibited.

In the Operator/Owner Safety Recommendation section of the NTSB Form 6120.1

"PILOT/OPERATOR AIRCRAFT ACCIDENT/INCIDENT REPORT", the pilot stated that the accident could have been prevented by:

"Obtain[ing] a complete official weather briefing in person. Avoid flight operations in marginal weather conditions at night."

Administrative Information

Investigator In Charge (IIC): Simpson, Elliott

Additional Participating Persons: Frank Motter; Federal Aviation Administration; Van Nuys, CA
James Morrison; Kern County Sheriff, Bakersfield, CA

Report Date: December 8, 2015

Last Revision Date:

Investigation Class: [Class](#)

Note: The NTSB did not travel to the scene of this accident.

Investigation Docket: <https://data.nts.gov/Docket?ProjectID=88977>

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](#).