Aviation Investigation Final Report

Location:	Watkins, Colorado	**Accident Number:**	CEN14FA265
Date & Time:	May 31, 2014, 00:21 Local	**Registration:**	N6275G
Aircraft:	Cessna 150	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane departed on the local night flight in instrument flight rules conditions with 7 miles visibility and overcast clouds at 300 ft above ground level (agl). Radar data showed that the airplane departed the runway, made one flight around the traffic pattern, and landed 6 minutes later. The airplane departed again to the west, did not remain in the traffic pattern, and reached an altitude of 740 ft agl. The airplane made a left turn, which tightened as the airplane descended about 1,900 ft per minute. The airplane impacted a field and bounced one time before it came to rest upright.

An onboard recording device (GoPro) was found near the wreckage and the files were recovered. Based on the available information, it is likely that the GoPro files were recorded on May 30 and May 31, 2014, with the final GoPro file recorded during the 6-minute flight in the traffic pattern. The accident flight was not recorded. The GoPro recordings revealed that the pilot and various passengers were taking self-photographs with their cell phones and, during the night flight, using the camera's flash function during the takeoff roll, initial climb, and flight in the traffic pattern.

A postaccident examination of the airplane did not reveal any preimpact anomalies that would have precluded normal operation. Based on the wreckage distribution, which was consistent with a high-speed impact, and the degraded visual reference conditions, it is likely that the pilot experienced spatial disorientation and lost control of the airplane. The evidence is consistent with an aerodynamic stall and subsequent spin into terrain. Based on the evidence of cell phone use during low-altitude maneuvering, including the flight immediately before the accident flight, it is likely that cell phone use during the accident flight distracted the pilot and contributed to the development of spatial disorientation and subsequent loss of control. A review of the pilot's logbooks did not show that he met the currency requirements for flight in instrument meteorological conditions or night flight with passengers.

Probable Cause and Findings

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

The pilot's loss of control and subsequent aerodynamic stall due to spatial disorientation in night instrument meteorological conditions. Contributing to the accident was the pilot's distraction due to his cell phone use while maneuvering at low-altitude.

Findings

Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	(general) - Not attained/maintained
Personnel issues	Use of equip/system - Pilot
Personnel issues	Attention - Pilot
Personnel issues	Decision making/judgment - Pilot
Environmental issues	Dark - Effect on personnel
Environmental issues	Low ceiling - Effect on personnel
Environmental issues	Low ceiling - Decision related to condition

Factual Information

History of Flight

Maneuvering-low-alt flying	Aerodynamic stall/spin (Defining event)
Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On May 31, 2014, at 0022 mountain daylight time, a Cessna 150K airplane, N6275G, impacted terrain 2 miles west of the Front Range Airport (FTG), near Watkins, Colorado. The instrument rated pilot and one passenger were fatally injured. The airplane sustained substantial damage. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Night instrument meteorological conditions (IMC) prevailed for the flight, which did not operate on a flight plan. The local flight originated from FTG at 0018.

The airplane was reported missing about 0330. Front Range Airport personnel located the wreckage about 0730 in a wheat field about 2 miles west-northwest of the airport. There were no witnesses to the accident. The pilot was not in contact with Air Traffic Control (ATC), but the flight path was captured on radar. The airplane impacted the field with the left wing first, bounced one time and came to rest upright. An onboard image recorder (GoPro) was found in the wreckage and its data card was reviewed by the National Transportation Safety Board (NTSB) Vehicle Recorders Laboratory. The video revealed that the camera recorded the events prior to the accident; however, the accident sequence was not recorded.

PERSONNEL INFORMATION

The pilot, age 29, held a commercial pilot certificate with ratings for single engine land, multi-engine land and instrument airplane. The pilot also held a ground instructor certificate. The pilot was issued an unrestricted first class medical certificate on August 29, 2013.

A review of the pilot's logbooks revealed that he had accumulated about 726 total flight hours, 38 hours in the last 30 days and 4.5 hours in the 24 hours preceding the accident flight. He had 27.1 hours in night conditions and 0.5 hours in simulated IMC in the last 60 days. He accumulated a total of 99 hours in simulated IMC and 14.7 hours in actual IMC. The logbooks did not reveal whether or not he had completed the flight currency requirements to operate in IMC or to carry passengers at night (see ADDITIONAL INFORMATION - 14 CFR Part 61.57 (c) *Instrument experience*; 14 CFR Part 61.57 (b) *Night takeoff and landing experience*).

AIRCRAFT INFORMATION

The Cessna 150K, serial number 15071775, was a single engine, two seat, high wing, fixed gear, utility category airplane, which was manufactured in 1970. The airplane was powered by a 100-horsepower Continental Motors, Inc. O-200-A engine, which drove a two bladed metal McCauley propeller. The

most recent annual inspection was completed on March 4, 2014 at a total aircraft time of 7,030.6 hours and was determined to be in airworthy condition.

METEOROLOGICAL INFORMATION

On May 30, 2014, at 2359, a special surface weather observation from the Denver International Airport (DEN), which was located 5 miles northwest of the accident site, reported: wind calm, 2 ½ miles visibility, mist, ceiling overcast at 300 feet, temperature 55° Fahrenheit (F), dew point 54° F, and altimeter setting 30.19 inches of mercury.

On May 31, 2014 at 0027, another special surface weather observation was issued for DEN: wind from 160 degrees at 3 knots, 6 miles visibility, mist, scattered clouds at 200 feet, broken clouds at 500 feet, temperature 55 degrees F, dew point 54 degrees F, and altimeter setting 30.19 inches of mercury.

FLIGHT RECORDER INFORMATION

The undamaged GoPro camera was found in the wreckage and the data card was reviewed by the National Transportation Safety Board (NTSB) Vehicle Recorders Laboratory. The video recordings revealed that the camera was mounted in the airplane above the instrument panel. The GoPro was in front of the pilot, faced toward the rear of the airplane and captured the front seat occupants as well as a view out of the left and right windows and portions of the rear window. The time and date stamps on the recordings were unreliable, but the files appear to be from the day prior and the day of the accident. The GoPro recorded the events prior to the accident; however, the accident sequence was not recorded. The data card contained 7 total video files which are summarized below.

RADAR INFORMATION

Radar data which recorded flight track information for the accident flight revealed that the airplane departed FTG at 0004, made one flight around the traffic pattern and landed on runway 26 at 0010. During the flight, the airplane reached an altitude of about 900 above ground level (agl). At 0018:56 the airplane again departed runway 26 and began to drift to the left of the runway centerline. At 0020:06 the airplane turned right to the northwest, ascended at 300 feet per minute and reached an altitude of about 640 feet agl. The airplane began a left turn and reached an altitude of about 740 feet agl. At 0021:24, the left turn tightened and the airplane descended about 1,900 feet per minute. The last radar point was recorded at 0021:43, about 140 feet agl. The main wreckage was located inside the radar points which completed the descending left turn.

During the flights, the airplane's distance from the runway varied between 0.44 miles and 1.66 miles away.

WRECKAGE AND IMPACT INFORMATION

On June 1, 2014, the NTSB investigator-in-charge, a Federal Aviation Administration (FAA) inspector, and investigators from Cessna Aircraft and Continental Motors, examined the wreckage.

The accident site was located in a wheat field about 2 miles west-northwest of the departure end of runway 26 at FTG, at an elevation of 5,423 feet mean sea level.

The airplane impacted with the left wing first followed by the left main landing gear, the propeller, and then the right wing on a heading of 195 degrees. Pieces of red glass, consistent with a fragmented position light lens, were found on the outboard section of the initial left wing impact point. Pieces of green glass, also consistent with a fragmented position light lens, were found near the outboard section of the right wing impact point. There was a propeller slash mark in the ground near the center impact crater. A second impact area was observed 26 yards away on a heading of 250 degrees. The main wreckage was found on the 250 degree heading about 16 yards away where it came to rest. The nose of the airplane was positioned on a heading on 205 degrees. Airplane debris was found in the wreckage path from the initial impact point to the main wreckage.

All major components of the airplane were found at the accident site. The right wing separated from the fuselage at the wing root and was on top of the left wing. The left wing was folded under the fuselage and was inverted. All flight controls remained attached to their respective mounts. A 1 foot section of the outboard end of the left aileron was detached and was near the initial impact point. The flaps were retracted. The elevators, rudder, and ailerons moved freely through their respective ranges of travel. The left aileron control cable was continuous from the yoke to the respective bell crank. The right aileron actuation cable separated in tension overload at the right wing root. The aileron carry through cable was separated in tension overload at the right wing root. The elevator and rudder cables were continuous from the control yoke and the rudder pedals to the respective control surfaces. The elevator trim setting was near neutral. The trim wheel chain was off the trim wheel in the cockpit. The fuel tanks contained several gallons of fuel. Neither fuel tank was breached during the accident sequence. The fuel caps were in place and the chain lanyards were attached to the caps. The fuel selector valve was in an intermediate position between OFF and ON. The fuel strainer bowl was fractured and the screen contained minimal debris. The right main landing gear remained attached to the airframe. The left main landing gear and the nose landing gear separated and exhibited impact damage. The pitot tube was intact and remained attached to the left wing. The left seat separated from the seat rails and was outside the fuselage. The right seat remained attached to the seat rails. The lap belts remained latched and separated from the fuselage. The only seat belt that remained attached to the fuselage was the right seats outboard belt section. The aft fuselage separated from the forward fuselage at the aft cabin area. The tail cone was bent and twisted to the left. The emergency locator transmitter (ELT) was found in the armed position and remained attached to the antenna. No reports of ELT transmissions were reported. The tachometer read 7,062.85 hours.

The crankshaft displayed cracks consistent with impact damage. A hand tool was used to rotate the propeller flange. Continuity was established between the crankshaft, camshaft and associated drive train components. The top spark plugs were removed and all four cylinders produced compression and suction when the crankshaft was rotated by hand. All four cylinders were examined using a borescope and each displayed normal operating signatures. The bottom spark plugs were removed and each displayed normal operating signatures. Both magnetos were actuated when the crankshaft was rotated by hand and all of the terminals produced a spark. The oil sump was impact damaged and breached. The oil filter was removed from the engine and cut open – no metal contaminants were found inside. The carburetor broke free from the intake system and sustained impact damage. The mixture control arm broke free from the carburetor and the throttle control cable rod ends broke free from the rest of the control cable. The throttle moved freely when actuated by hand. The carburetor was disassembled. The fuel inlet screen was free of contaminants and all internal components displayed normal operating signatures. The vacuum pump broke free from the engine and a portion of the crank case remained attached to it. The vacuum pump drive shaft was intact. The shaft was rotated and exhibited some

resistance, but was able to be rotated by hand and pumped residual oil. The vacuum pump was disassembled and revealed normal operating signatures.

The propeller remained attached to the propeller flange. The first blade was mostly straight with minor twisting deformation. The second blade, which was bent aft and under the wreckage, displayed twisting deformation and the cambered side displayed polishing.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot at the Adams County Coroner's Office, Brighton, Colorado, on June 2, 2014. The cause of death was multiple fractures and internal injuries due to blunt trauma and the manner of death was listed as an accident. The FAA Civil Aerospace Medical Institute completed a Final Forensic Toxicology Fatal Accident Report, which was negative and no tested for drugs were detected.

ADDITIONAL INFORMATION

14 CFR Part 91.155 – Basic VFR Weather Minimums

The regulation states, " Except as provided in paragraph (b) of this section and Sec. 91.157,no person may operate an aircraft under VFR when the flight visibility is less, or at a distance from clouds that is less, that that prescribed for the corresponding altitude and class of airspace."

(b) *Class G Airspace.* Notwithstanding the provisions of paragraph (a) of this section, the following operations may be conducted in Class G airspace below 1,200 feet above the surface:
(2) *Airplane, powered parachute, or weight-shift-control aircraft..* If the visibility is less than 3 statute miles but not less than 1 statute mile during night hours and you are operating in an airport traffic pattern within one-half mile of the runway, you may operate an airplane, powered parachute, or weight-shift-control aircraft clear of clouds.

Class G distance from cloud night minimums were listed as: 3 statute miles visibility, 500 feet below, 1,000 feet above, and 2,000 feet horizontal.

14 CFR Part 61.57 – Recent flight experience: Pilot in command

(b) *Night takeoff and landing experience.* (1) Except as provided in paragraph (e) of this section, no person may act as pilot in command of an aircraft carrying passengers during the period beginning 1 hour after sunset and ending 1 hour before sunrise, unless within the preceding 90 days that person has made at least three takeoffs and three landings to a full stop during the period beginning 1 hour after sunset and ending 1 hour before sunrise, and—

(i) That person acted as sole manipulator of the flight controls; and

(ii) The required takeoffs and landings were performed in an aircraft of the same category, class, and type (if a type rating is required).

(c) *Instrument experience.* Except as provided in paragraph (e) of this section, a person may act as pilot in command under IFR or weather conditions less than the minimums prescribed for VFR only if:

(1) *Use of an airplane, powered-lift, helicopter, or airship for maintaining instrument experience.* Within the 6 calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in an airplane, powered-lift, helicopter, or airship, as appropriate, for the instrument rating privileges to be maintained in actual weather conditions, or under simulated conditions using a view-limiting device that involves having performed the following—

(i) Six instrument approaches.

(ii) Holding procedures and tasks.

(iii) Intercepting and tracking courses through the use of navigational electronic systems.

TETS AND RESEARCH

Onboard Image Recorder (GoPro) Summary

GOPR0016.MP4 – Daylight

Pilot and Passenger #1 adjust and fasten their seat belts. The pilot made some keyboard entries to his cell phone and reached to the back compartment of the airplane to grab a notepad. Recording ends.

GOPR0017.MP4 – Daylight

Taxiing with Passenger #1 from the previous file. The airplane taxied toward an unknown runway via multiple taxiways. The pilot made radio calls and at times, adjustments to devices in the vicinity of the instrument panel. The pilot and Passenger #1 spoke in a language other than English. The pilot appeared to perform an engine run-up during the taxi. Later, the ATC controller asked the pilot if he wanted to do a run-up. The pilot's response is muffled by the engine noise on the audio track and his actions are consistent with the pilot indicating that he said he had already completed it. The video recording ends before the pilot reaches the runway.

GOPR0018.MP4 –Daylight

Video starts at takeoff roll. The passenger is still Passenger #1 from the previous video files. The airplane took off and it appeared that the pilot flew a large right pattern for the active runway. The pilot took a few self-photographs using the cell phone, on base near final and possibly also on final. The pilot's cell phone screen is seen in camera mode. Passenger #1 was also taking self-photographs and forward facing photographs with his own cell phone for about the last two minutes of video. The pilot made an uneventful landing. Passenger #1 appeared to begin recording a short video. The pilot cleared the runway and received taxi instructions from ATC and the video ends.

GOPR0019.MP4 – Daylight

The video began near the hangar area. A new passenger (Passenger #2) is seen in the cockpit with the pilot. The pilot did not appear to do a pre-takeoff check in the time captured by the video recording. The pilot taxied to the runway and is cleared for takeoff. The pilot made an uneventful takeoff. Passenger #2 follows the pilot's flight control manipulations on the control yoke for the duration of the flight but it appeared that Passenger #2 was not actively manipulating the controls. The pilot made some slight

negative-G control movements and Passenger #2 was entertained. The pilot took some self-photographs on what appears to be the downwind leg. The pilot made an uneventful landing, taxied back to the hangar area and picks up a new passenger (Passenger #3) without shutting down the engine. Passenger #3 fastened their seatbelt and put on a headset. Passenger #3 used his cell phone to take multiple self-photographs during taxi. The pilot listened to the tail end of the airport's automatic weather recording "Information Lima" and then made an input to a device near the instrument panel. The pilot appeared to make some keyboard entries on his cell phone during taxi. The use of a checklist or pre-flight check was not seen in the recording. The airplane took off while Passenger #3 appeared to be recording a video using his cell phone. The pilot moved Passenger #3's cell phone out of his line of sight at one point. Later, the pilot can be seen taking self-photographs during the climb out portion of the flight. Passenger #3 is using his cell phone to take more self-photographs during the flight. The video segmented to new chapter recording (next file, GP010019.MP4) as the airplane turned to crosswind leg.

GP010019.MP4, Continuation of GP010019.MP4 – Daylight

Passenger #3 continued to use his cell phone to take self-photographs and what appeared to be a video recording. The pilot can be seen making keyboard entries to his cell phone during portions of the flight. The pilot conducts some mild and slight negative-G manipulations of the control yoke. The airplane landed uneventfully and the pilot taxied back to the hangar area, Passenger #3 continued to use his cell phone to take self-photographs. The pilot's associates and previous passengers walked to the airplane to greet Passenger #3. The group used their cell phones to take photos. Passenger #4 entered the cockpit and the video recording ended.

GOPR0020.MP4 - Daylight

The recording began as the pilot and Passenger #4 appeared to be back taxiing to a runway. The pilot was cleared for takeoff on Runway 08 and instructed to make right closed traffic. The pilot performed an uneventful takeoff. During the climb out phase, the pilot was seen making keyboard entries to his cell phone and additional keyboard entries on a portion of flight consistent with the downwind leg. During that time, the pilot made three distinct and separate interactions with his cell phone. The pilot performed some small wing rocks during the downwind leg. Passenger #4 is seen taking self-photographs and videos throughout the landing portion of the flight. The pilot taxied back to the hangar area and shut down the engine on the ramp. A language other than English is heard. The video file ended.

GOPR0021.MP4 – Night

Video recording began at the hangar area. A new passenger, Passenger #5 was in the cockpit with the pilot. The pilot's associates were seen standing near the hangar behind the airplane. A sound similar to the pilot pumping the airplane's fuel primer is heard. The pilot started the engine. The following ATIS recording was heard through the GoPro's internal microphone:

Denver Front Range Airport automated weather observation zero-six-zero-five (0605) Zulu: weather – wind calm, visibility [seven], ceiling three-hundred (300) overcast, temperature one-four (14) Celsius dew point one-three (13) altimeter three-zero-two-zero (30.20).

The pilot taxied to a runway. It appeared that the pilot conducted an engine run-up during the taxi. The pilot was seen checking for freedom of control movement in the control yoke during taxi. The pilot began the takeoff roll and departed the runway. During the climb out portion of flight, the pilot uses his

cell phone to take a self-photograph. The camera's flash was activated and illuminated the cockpit area. The pilot's cell phone appeared to be on a user screen consistent with a camera application. The pilot landed and can be seen using his cell phone during the landing rollout. The recording appeared to have ended normally.

Pilot Information

Certificate:	Commercial	**Age:**	29
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	August 29, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	726 hours (Total, all aircraft), 38 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N6275G
Model/Series:	150	**Aircraft Category:**	Airplane
Year of Manufacture:	1970	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	15071775
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	March 4, 2014 Annual	**Certified Max Gross Wt.:**	1600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	7030.6 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors Inc
ELT:		**Engine Model/Series:**	O-200 A
Registered Owner:	Amritpal Singh	**Rated Power:**	100 Horsepower
Operator:	Amritpal Singh	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KDEN,5431 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	23:58 Local	**Direction from Accident Site:**	303°
Lowest Cloud Condition:		**Visibility**	6 miles
Lowest Ceiling:	Overcast / 500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	40°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.21 inches Hg	**Temperature/Dew Point:**	13°C / 13°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Watkins, CO (FTG)	**Type of Flight Plan Filed:**	None
Destination:	Watkins, CO (FTG)	**Type of Clearance:**	None
Departure Time:	00:18 Local	**Type of Airspace:**	Class B;Class G

Airport Information

Airport:	FRONT RANGE FTG	**Runway Surface Type:**	Asphalt
Airport Elevation:	5512 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	08	**IFR Approach:**	Unknown
Runway Length/Width:	8000 ft / 100 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	39.800556,-104.594444

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Brian Neal; Federal Aviaion Administration; Denver, CO Jan Smith; Cessna Aircraft; Wichita, KS Kurt Gibson; Continental Motors; Mobile, AL
Original Publish Date:	January 27, 2015
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=89319