# National Transportation Safety Board
# Aviation Accident Final Report

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| **Location:** | Derby, KS | **Accident Number:** | CEN14FA009 |
| **Date & Time:** | 10/18/2013, 1017 CDT | **Registration:** | N610ED |
| **Aircraft:** | CESSNA 500 | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | Loss of control in flight | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General Aviation - Business | | |

## Analysis

After climbing to and leveling at 15,000 feet, the airplane departed controlled flight, descended rapidly in a nose-down vertical dive, and impacted terrain; an explosion and postaccident fire occurred. Evidence at the accident site revealed that most of the wreckage was located in or near a single impact crater; however, the outer portion of the left wing impacted the ground about 1/2 mile from the main wreckage.

Following the previous flight, the pilot reported to a maintenance person in another state that he had several malfunctioning flight instruments, including the autopilot, the horizontal situation indicator, and the artificial horizon gyros. The pilot, who was not a mechanic, had maintenance personnel replace the right side artificial horizon gyro but did not have any other maintenance performed at that time. The pilot was approved under an FAA exemption to operate the airplane as a single pilot; however, the exemption required that all equipment must be operational, including a fully functioning autopilot, flight director, and gyroscopic flight instruments. Despite the malfunctioning instruments, the pilot chose to take off and fly in instrument meteorological conditions.

At the time of the loss of control, the airplane had just entered an area with supercooled large water droplets and severe icing, which would have affected the airplane's flying characteristics. At the same time, the air traffic controller provided the pilot with a radio frequency change, a change in assigned altitude, and a slight routing change. It is likely that these instructions increased the pilot's workload as the airplane began to rapidly accumulate structural icing. Because of the malfunctioning instruments, it is likely that the pilot became disoriented while attempting to maneuver and maintain control of the airplane as the ice accumulated, which led to a loss of control.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The airplane's encounter with severe icing conditions, which resulted in structural icing, and the pilot's increased workload and subsequent disorientation while maneuvering in instrument

flight rules (IFR) conditions with malfunctioning flight instruments, which led to the subsequent loss of airplane control. Contributing to the accident was the pilot's decision to takeoff in IFR conditions and fly a single-pilot operation without a functioning autopilot and with malfunctioning flight instruments.

## Findings

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| **Aircraft** | Performance/control parameters - Capability exceeded (Cause)<br>Instrument panel - Malfunction (Cause) |
| **Personnel issues** | Aircraft control - Pilot (Cause)<br>Spatial disorientation - Pilot (Cause)<br>Task overload - Pilot (Cause)<br>Decision making/judgment - Pilot (Factor) |
| **Environmental issues** | Conducive to structural icing - Contributed to outcome (Cause)<br>Ceiling/visibility/precip - Effect on operation (Cause) |

## Factual Information

HISTORY OF FLIGHT

On October 18, 2013, at 1017 central daylight time, N610ED, a Cessna 500, Citation, multi-engine turbojet airplane, collided with terrain during an uncontrolled descent near Derby, Kansas. The pilot and passenger were fatally injured, and the airplane was destroyed. The airplane was registered to and operated by Dufresne, Inc.; Murrieta, California. Day visual meteorological conditions (VMC) prevailed on the surface; however, instrument meteorological conditions (IMC) likely prevailed at altitude at the time of the accident. An instrument flight rules flight plan had been filed for the 14 Code of Federal Regulations Part 91 business flight. The airplane departed Wichita Mid-Continent Airport (ICT), Wichita, Kansas, at 1007 and was destined for New Braunfels Regional Airport (BAZ), New Braunfels, Texas.

During climb to cruise, after leveling at 15,000 feet, the airplane departed controlled flight, descended rapidly and impacted terrain. Several witnesses described seeing the airplane below the clouds in a nose-down vertical dive and trailing either white smoke or black smoke. One of the witnesses reported the nose-down airplane was "spinning very fast". Many of the witnesses reported an immediate explosion with a fireball about 500 feet high followed by a column of black smoke. Evidence at the accident scene showed evidence of a postimpact fire with most of the wreckage located in or near a single impact crater. Several witnesses reported that after they heard or saw the explosion and fire they saw airborne debris tumbling and falling to the ground about one half mile west from the main wreckage.

PERSONNEL INFORMATION

The pilot, age 49, held a Federal Aviation Administration (FAA) commercial pilot certificate with ratings for airplane single engine and multiengine land, and instrument airplane. His private pilot certificate in airplane single engine land was initially issued on March 6, 2000, his private pilot rating in airplane multiengine land was issued on May 17, 2000, and his rating in instrument airplane was issued on January 7, 2006. On January 20, 2006, he was issued a commercial pilot certificate in airplane multi-engine land, and on February 6, 2006, he was issued a restricted type rating for CE-500 with a limitation "SIC privileges only". On December 13, 2008, he was issued an unrestricted type rating for CE-500.

The pilot also held an FAA second-class medical certificate, issued on July 3, 2012, with a restriction "must have available glasses for near vision".

A review of the pilot's three logbooks showed entries beginning on January 21, 1999, with the last entry in logbook number three on October 11, 2013. The logbooks showed that his total pilot experience was then 2,605 hours, with about 2,366 hours in multi-engine airplanes, and a total of 239 hours of instrument flying experience. He had logged at total of 1,172 hours of pilot experience in Cessna 500 and 550 airplanes which included 658 hours of second-in-command experience.

The pilot completed a satisfactory CE-500 pilot proficiency check on October 4, 2012. One month later on November 10, 2012, he completed a satisfactory proficiency check for a single pilot exemption in CE-500 airplanes. Pilot logbook entries showed that since November 17, 2012, he had flown about 206 hours in CE-500 airplanes with all of that experience logged as a "single pilot", and without another pilot crewmember in the cockpit.

## AIRCRAFT INFORMATION

The Cessna 500, Citation, serial number (s/n) 500-0241, was a multi-engine business turbojet airplane. The transport category airplane was originally issued a standard airworthiness certificate on June 12, 1975. It was powered by two Pratt & Whitney Canada JT-15D-1A turbofan engines, s/n 76522 and s/n 76209, each capable of producing 2,200 pounds of thrust. At the time of the accident the airplane was maintained on an approved aircraft inspection program (AAIP) and its most recent airframe inspection was completed on September 24, 2012, at an airplane total time of 7,560.9 hours. On that date the left and right engines had then accumulated a total of 7,212.8 hours and 10,435.2 hours, respectively.

Based on a postaccident review of invoices, correspondence, pilot logbook entries, and other documents, the total flight time from September 24, 2012, to the accident date was estimated as an additional 249 hours.

The airplane's type-certificate data sheet (TCDS) showed a maximum takeoff weight limitation of 11,500 pounds and showed the airplane was certified with seats for two pilots and a maximum of seven passengers. The limitations in the TCDS also required a minimum crew of a pilot and co-pilot for all flights.

The airplane could be operated with only one pilot if the pilot had been approved under an FAA exemption which included completion of an FAA approved single-pilot training program. That exemption for single pilot operation also stated that all required equipment must be operational including a fully functioning autopilot, flight director, and gyroscopic flight instruments.

An aviation maintenance person in another state reported that the pilot had telephoned him on the day before the accident. The pilot stated that he had just arrived at ICT and on his inbound flight he had several failure flags on the horizontal situation indicator (HSI) and artificial horizon (AH) gyro instruments, and that the right side (co-pilot side) AH gyro was "sideways". The pilot also stated that several times on the same inbound flight to ICT he had uncommanded drops in N1, N2, and ITT readings on one engine and those repeated changes in the engine power setting required re-trimming the aircraft.

Maintenance records and interviews with maintenance persons at ICT showed that the pilot got their assistance to replace the co-pilot's AH gyro instrument. However, the pilot did not mention to them the problems with the malfunctioning autopilot, the malfunctioning pilot's flight instruments, or the malfunctioning engine. No evidence could be found that the pilot ever attempted to fix those problems.

FAA registry documents show that the airplane was purchased by the current owner on March 14, 2005, and that since 1975 the airplane had been registered to 16 different owners.

## METEOROLOGICAL INFORMATION

ICT was located 13 miles northwest from the accident site at an elevation of 1,333 feet mean sea level (msl). At 0953 the surface weather observation site at ICT reported wind from 010 degrees at 10 knots, 10 miles visibility, light rain, a broken ceiling at 4,400 feet above ground level (agl), overcast skies at 6,500 feet agl, temperature of 7 degrees Celsius (C), dew point temperature of 3 degrees C, and an altimeter setting of 30.15 inches of Mercury.

McConnell Air Force Base (IAB) was located 6 miles north-northwest of the accident site, at an elevation of 1,371 feet msl. At 0958 the surface weather observation site at IAB reported wind from 020 degrees at 10 knots, 10 miles visibility, light rain, few clouds at 900 feet agl, temperature of 6 degrees C, dew point temperature of 4 degrees C, and an altimeter setting of 30.15 inches of Mercury.

The observations from IAB and ICT indicated light rain at the surface at the time of the accident with cloud ceilings lowering over time. Pilot reports in the area indicated light to moderate icing conditions above 6,000 feet msl at the accident time.

AIRMETs Sierra and Zulu issued at 0945 (1445 UCT), and valid at the accident time, forecasted IFR conditions for the accident site with ceilings below 1,000 feet and visibilities below 3 miles with precipitation and mist, and moderate icing conditions between the freezing level and FL180.

Current Icing Potential (CIP) is produced by the NWS' Aviation Weather Center and is intended to be supplemental to other icing advisories (e.g. AIRMETs and SIGMETs). The CIP indicated a 40 to 80 percent probability of icing at the accident altitude around the time of the accident. The high likelihood of icing indicated by CIP matched the weather environment described in the upper air sounding, weather radar, and PIREP sections.

In addition to the CIP showing that icing was likely at 13,000, 14,000 and 15,000 feet at 1000, the CIP also characterized the icing as moderate to heavy around the accident site. Similar icing probabilities and severity were also indicated by CIP above 10,000 feet msl near the accident site around the accident time.

Pilot reports (PIREPs) indicated a large area of light to moderate icing conditions throughout the atmosphere around the accident site. One report of moderate icing came from a large Boeing KC-135E as it was taking off from IAB, and this report along with the ice pellet and snow reports indicate that more severe icing was possible at the flight altitude of the accident flight around the accident time.

The closest NWS WSR-88D with dual-polarization weather radar data was at ICT. That radar showed values of dual-pol data at the accident site which indicated it was likely that the precipitation in and around the accident site at the accident time was a mix between ice crystals, dry snow, and supercooled liquid water. Of note, just to the northeast of ICT and near the accident flight track there was an increase of dBZ values between 1015 and 1020 with dBZ values going from around 15 dBZ at 1015 (1515 UCT) to near 35 dBZ at 1020 There was no or very little change in the Zdr or CC values, likely indicating that there was a large increase in hydrometeors (ice crystals, dry snow, and supercooled liquid water) during the time between 1015 and 1020 CDT around and to the northwest of accident site.

The freezing level was located at 7,231 feet msl. The precipitable water value was 0.64 inches.

The 1000 CDT NAM sounding indicated several layers of conditional instability which supported mid-level clouds from 7,000 feet through 19,000 feet. The 1000 CDT sounding was also close to saturation between -4 degrees C and -20 degrees C, between 9,000 and 19,000 feet msl, which would have likely supported the growth of snow crystals and super cooled liquid water droplets. The icing analysis from RAOB indicated high probability of clear, mixed, and rime icing conditions from 9,000 to at least 18,000 feet. With the soundings remaining between 0 degrees C and -12 degrees C for such a long extent as 9,000 feet, Supercooled Large Drop (SLD) icing would also be likely.

The Area Forecast, valid at the accident time, forecasted an overcast ceiling at 5,000 feet with the tops of the clouds to 25,000 feet msl.

It was unknown what weather information the pilot had, since there was no record he had received preflight weather information from an official source.

COMMUNICATIONS AND RADAR

Following is a timeline of selected communications between the pilot of N610ED and FAA Air Traffic Control (ATC). A summary of the FAA ATC radar contacts is included.

1007 N610ED departed ICT to the north on runway 1R and had normal radio contacts with the departure controller until climbing to 15,000 feet.

1010:08 Radar showed N610ED was at an altitude of 7,000 feet

1010:36 Radar showed N610ED was at an altitude of 8,000 feet and began a turn to the right

1010:59 Radar showed N610ED was at an altitude of 8,900 feet

1011:27 Radar showed N610ED was at an altitude of 10,000 feet

Radar data showed N610ED was on a meandering course of about 165 degrees beginning about 1012 until 1014:41

1012:08 Radar showed N610ED was at an altitude of 11,000 feet

1012:50 Radar showed N610ED was at an altitude of 12,000 feet

1013:26 Radar showed N610ED was at an altitude of 13,000 feet

1013:55 Radar showed N610ED was at an altitude of 14,000 feet

1014:41 Radar showed N610ED was at an altitude of 14,600 feet and beginning a turn to the right

1014:49 N610ED reported to the controller that he was "... leveling at one five thousand"

1014:54 The controller cleared N610ED to "... climb and maintain flight level two three zero cleared direct millsap"

1015:00 N610ED responded "... millsap direct uh zero echo delta"

No further communications were received from N610ED

A direct course to the Millsap VORTAC was then about 184 degrees at a distance of about 295 nautical miles. Radar data showed N610ED continued its right turn to a course of about 240 degrees and climbed to 15, 200. It then entered a left turn to a course of about 170 degrees and began a meandering descent to 14,600, followed by a climb to 15,200 feet.

1016:19 Radar showed N610ED was at an altitude of 15,200 feet when it began a descending left turn to a course of about 090 degrees

1016:51 The last radar contact showed N610ED was at an altitude of 10,100 feet

Radar contact was then lost. The controller repeatedly attempted to contact N610ED over the next 15 minutes; however, no further radio transmissions were received.

FLIGHT RECORDERS

The airplane was not equipped with a flight data recorder (FDR) or cockpit voice recorder (CVR), and neither was required by the FAA.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in a bean field about 13 miles southeast from ICT and about 6 miles south southeast from IAB.

Ground scars and other evidence at the scene showed the airplane impacted terrain in a near vertical nose-down attitude creating a crater approximately 15 feet deep and 30 feet wide. The elevation of the main impact crater was estimated as 1,320 feet msl. The wreckage was extensively fragmented. Portions of the terrain surface and some wreckage components on the surface showed evidence of a postimpact fire.

Most of the airplane, including the landing gear, engines, and the other heavier portions of the wreckage were buried in the impact crater. Dirt was ejected from the crater mostly toward the southeast with the center line of that debris path oriented to about 125 degrees. Small fragmented pieces of wreckage were found within 50 to 100 feet from the south through northeast. Other small pieces of wreckage were found within about 300 feet to the east through southeast.

The outer portion of the left wing had separated and came to rest in a harvested corn field about 3,100 feet west at 264 degrees from the main wreckage. The left aileron had separated and came to rest in a harvested corn field about 1,950 feet west at 276 degrees from the main wreckage. The left aileron and the portion of the left wing were photo documented and transported to the location where the main wreckage was being laid out.

As the crater was excavated and the wreckage parts were recovered from the crater they were laid out at the scene. The fragmented and frequently obliterated wreckage parts observed included: both wings, both ailerons, the elevator, the rudder, the tail surfaces, the radome, the fuselage, the nose gear, the left and right landing gear, and both engines. During the wreckage lay-out at the accident scene, all major components of the airplane were accounted for.

The left engine s/n could not be determined at the scene. Its installed position was determined by its location in the impact crater and the fan trim servo located with opposite engine. The fan case, outer bypass duct, intermediate case and accessory gearbox were obliterated. Only separate portions of housings were recovered. The low pressure fan hub had separated from the engine and was recovered separately. All blades were sheared at their roots. The high pressure impeller was separated from the engine, and the impeller shroud was recovered separately. The gas generator case and engine tail cone were deformed by impact.

The right engine s/n could not be determined at the scene. Its installed position was determined its location in the impact crater and the fan trim servo located with engine. The fan case, outer bypass duct, intermediate case and accessory gearbox were obliterated. Fractured portions of housings were recovered. The low pressure fan hub fractured from main engine and was recovered separately. All blades were sheared at their roots. The high pressure impeller was separated from the engine, and the impeller shroud was recovered separately. The gas generator case and engine tail cone were deformed by impact. The separated high pressure turbine was recovered separately. All blades were sheared at their roots.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed on the pilot and the passenger by the Regional Forensic Science

Center - Sedgwick County, Kansas; in Wichita, Kansas.

Forensic toxicology was not performed.

TESTS AND RESEARCH

Main Wreckage and Engines

The wreckage was moved to another location and examined. The major components of the airplane were again laid out and confirmed that all major components of the airplane were accounted for. The fragmented parts of the engines were removed and examined separately.

The left engine fan case, outer bypass duct, intermediate case, and accessory gearbox were obliterated. Fractured portions of the housings were recovered. The low pressure fan hub was

fractured from the main engine and located separately. All of the fan blades were sheared at their

roots. The high pressure impeller was fractured from the main engine, and the impeller shroud was recovered separately. The gas generator case was severely deformed by impact. The tail cone was deformed, preventing access to the low pressure turbines. The severe impact damage precluded a formal disassembly. The gas generator and turbine support cases were sectioned as practicable for access. Strong circumferential rubbing and deformation were displayed by the low pressure fan, high pressure compressor and shroud, high pressure turbine stator, shroud, and

turbine, second stage low pressure turbine stator, shroud and turbine, and the 3rd stage low pressure turbine stator, shroud and turbine, due to their making contact with their adjacent components under impact loads and engine structural housing deformation.

The left engine low compressor case was obliterated, with only fragments recovered. The low compressor inlet case was obliterated, with only fragments recovered. The intermediate case was obliterated, with only fragments recovered. The accessory gearbox was obliterated, with only fragments recovered. The oil to fuel heater, fuel control unit pneumatic section, high pressure fuel pump, and the flow divider were recovered separately, with impact damage. The outer bypass duct displayed severe impact deformation. The gas generator case displayed severe impact deformation. The inner bypass duct displayed severe impact deformation. The exhaust duct displayed severe impact deformation. The automatic fuel shut off valve (N2 over speed shut off valve) was in the normal un-triggered position.

The right engine fan case, outer bypass duct, intermediate case and accessory gearbox were obliterated. Fractured portions of the housings only were recovered. The low pressure fan hub was fractured from the main engine and was located separately. All of the fan blades were sheared at their roots. The high pressure impeller was partially fractured from main engine, and the impeller shroud was recovered separately. The gas generator case was severely deformed and torn by impact. The high pressure turbine was recovered separately. All of the blades were sheared at their roots. The tail cone was deformed preventing access to the low pressure turbines. The severe impact damage precluded formal disassembly. The gas generator and turbine support cases were sectioned as practicable for access. Strong circumferential rubbing and deformation were displayed by the low pressure fan, high pressure compressor and shroud, high pressure turbine stator, shroud, and turbine, second stage low pressure turbine stator, shroud and turbine, and the 3rd stage low pressure turbine stator, shroud and turbine, due to their making contact with their adjacent components under impact loads and engine structural housing deformation.

The right engine low compressor case was obliterated, with only fragments recovered. The low compressor inlet case was obliterated, with only fragments recovered. The intermediate case was obliterated, with only fragments recovered. The accessory gearbox was obliterated, with only fragments recovered. The oil to fuel heater, fuel control unit pneumatic section, high pressure fuel pump, and the flow divider were recovered separately, with impact damage. The outer bypass duct displayed severe impact deformation. The gas generator case displayed severe impact deformation. The inner bypass duct displayed severe impact deformation. The exhaust duct displayed severe impact deformation. The automatic fuel shut off valve (N2 over speed shut off valve) was in the normal un-triggered position.

Both the left and right engines displayed similar contact signatures to their internal components characteristic of the engines producing similar power in the time of impact, likely in a middle to high power range.

Follow-up Examination of the Left Wing

A portion of the separated left outboard wing which included the fracture location at the inboard end was examined with federal oversight at the Cessna Material and Process Engineering Lab in Wichita, Kansas. The purpose of the examination was to identify and characterize the fractures of the various structural elements of the left outboard wing structure, as well as documenting several areas of repairs of the structure near the separation location.

The examination found that the left wing had separated from the aircraft at approximately WS 161 to 171.5, with torn and crumpled wing skin and deformation and fracture of internal structural components (stringers and spar assemblies). The microscopic examination of features of 23 different fracture surfaces associated with the wing structure between WS 161 and 208 were all indicative of ductile overload fracture.

The examination also showed that the wing exhibited repairs at several locations between WS 161 and WS 208, consisting of spliced-in forward portions of ribs at WS 171.5 and WS 192 and a replacement lower aux spar cap between WS 177.5 and WS 199.5. The repairs showed that many of the rivets were improperly installed, there were several double drilled fastener holes, unapproved materials were used, and internal parts did not have protective primer applied. In addition, the application of fuel tank sealant was excessive and sloppy in the internal areas of the wing structure.

The examination of the wreckage revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation.

ADDITIONAL INFORMATION

According to the FAA Instrument Flying Handbook FAA-H-8083-15B; Chapter 10 on page 10-24: "The very nature of flight in instrument meteorological conditions (IMC) means operating in visible moisture such as clouds. At the right temperatures, this moisture can freeze on the aircraft, causing increased weight, degraded performance, and unpredictable aerodynamic characteristics. Understanding avoidance and early recognition followed by prompt action are the keys to avoiding this potentially hazardous situation ... Structural icing is a condition that can only get worse. Therefore, during an inadvertent icing encounter, it is important the pilot act to prevent additional ice accumulation. Regardless of the level of anti-ice or deice protection offered by the aircraft, the first course of action should be to leave the area of visible moisture. This might mean descending to an altitude below the cloud bases, climbing to an altitude that is above the cloud tops, or turning to a different course. If this is not possible, then the pilot must move to an altitude where the temperature is above freezing. Pilots should report icing conditions to ATC and request new routing or altitude if icing will be a hazard."

Chapter 11 on page 11-2: Inadvertent Icing Encounter "Because icing is unpredictable in nature, pilots may find themselves in icing conditions even though they have done everything practicable to avoid it ... The effects of ice on aircraft are cumulative—thrust is reduced, drag increases, lift lessens, and weight increases. The results are an increase in stall speed and a deterioration of aircraft performance. In extreme cases, two to three inches of ice can form on the leading edge of the airfoil in less than 5 minutes. It takes only 1/2 inch of ice to reduce the lifting power of some aircraft by 50 percent and increases the frictional drag by an equal percentage. A pilot can expect icing when flying in visible precipitation, such as rain or cloud droplets, and the temperature is between +02 and –10° Celsius. When icing is detected, a pilot should ... leave the area of precipitation or go to an altitude where the temperature is above freezing ... Proper preflight action includes obtaining (weather) information".

Chapter 5 on page 5-25: "An autopilot is a mechanical means to control an aircraft using electrical, hydraulic, or digital systems (and) can control three axes of the aircraft: roll, pitch, and yaw ... The autopilot should be utilized to reduce workload, which affords the pilot more time to monitor the flight (and) decreases the chances of entry into an unusual attitude ... "

Chapter 7 on page 7-36 "When operating in IMC and in a partial panel configuration, the pilot should avoid abrupt changes to the control yoke. Reacting abruptly to altitude changes can lead to large pitch changes and thus a larger divergence from the initial altitude ... overcontrolling causes the pilot to move from a nose-high attitude to a nose-low attitude and ... small changes to pitch are required to insure prompt corrective actions are taken to return the aircraft to its original altitude with less confusion ... during instrument flight with limited instrumentation, it is imperative that only small and precise control inputs are made. Once a needle movement is indicated denoting a deviation in altitude, the pilot needs to make small control inputs to stop the deviation. Rapid control movements only compound the deviation by causing an oscillation effect. This type of oscillation can quickly cause the pilot to become disoriented and begin to fixate on the altitude. Fixation on the altimeter can lead to a loss of directional control as well as airspeed control".

According to the FAA "Aeronautical Information Manual"; section 8-1-5, Illusions Leading to Spatial Disorientation: "Various complex motions and forces and certain visual scenes encountered in flight can create illusions of motion and position. Spatial disorientation from these illusions can be prevented only by visual reference to reliable, fixed points on the ground or to flight instruments ...A rapid acceleration ... can create the illusion of being in a nose up attitude. The disoriented pilot will push the aircraft into a nose low, or dive attitude. A rapid deceleration by a quick reduction of the throttles can have the opposite effect, with the disoriented pilot pulling the aircraft into a nose up, or stall attitude .. An abrupt change from climb to straight and level flight can create the illusion of tumbling backwards. The disoriented pilot will push the aircraft abruptly into a nose low attitude, possibly intensifying this illusion".

## History of Flight

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| **Enroute-climb to cruise** | Unknown or undetermined<br>Structural icing<br>Loss of control in flight (Defining event) |
| **Uncontrolled descent** | Aircraft structural failure<br>Part(s) separation from AC<br>Collision with terr/obj (non-CFIT) |
| **Post-impact** | Explosion (post-impact)<br>Fire/smoke (post-impact) |

## Pilot Information

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| **Certificate:** | Commercial | **Age:** | 49 |
| **Airplane Rating(s):** | Multi-engine Land; Single-engine Land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 2 With Waivers/Limitations | **Last FAA Medical Exam:** | 07/03/2013 |
| **Occupational Pilot:** | Yes | **Last Flight Review or Equivalent:** | 11/10/2012 |
| **Flight Time:** | 2605 hours (Total, all aircraft), 1172 hours (Total, this make and model), 47 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | CESSNA | **Registration:** | N610ED |
| **Model/Series:** | 500 CITATION | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | No |
| **Airworthiness Certificate:** | Transport | **Serial Number:** | 5000241 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 8 |
| **Date/Type of Last Inspection:** | 09/24/2012, Continuous Airworthiness | **Certified Max Gross Wt.:** | 11500 lbs |
| **Time Since Last Inspection:** | 249 Hours | **Engines:** | 2 Turbo Fan |
| **Airframe Total Time:** | 7560 Hours as of last inspection | **Engine Manufacturer:** | PWC |
| **ELT:** | C126 installed, not activated | **Engine Model/Series:** | JT15D-1A |
| **Registered Owner:** | DUFRESNE INC | **Rated Power:** | 2200 lbs |
| **Operator:** | DUFRESNE INC | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual Conditions | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | KIAB, 1371 ft msl | **Distance from Accident Site:** | 6 Nautical Miles |
| **Observation Time:** | 0958 CDT | **Direction from Accident Site:** | 337° |
| **Lowest Cloud Condition:** | Few / 900 ft agl | **Visibility** | 10 Miles |
| **Lowest Ceiling:** | None | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 10 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 20° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.15 inches Hg | **Temperature/Dew Point:** | 6°C / 4°C |
| **Precipitation and Obscuration:** | Light - Rain | | |
| **Departure Point:** | Wichita, KS (ICT) | **Type of Flight Plan Filed:** | IFR |
| **Destination:** | New Braunfels, TX (BAZ) | **Type of Clearance:** | IFR |
| **Departure Time:** | 1007 CDT | **Type of Airspace:** | |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Fatal | **Aircraft Damage:** | Destroyed |
| **Passenger Injuries:** | 1 Fatal | **Aircraft Fire:** | On-Ground |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | On-Ground |
| **Total Injuries:** | 2 Fatal | **Latitude, Longitude:** | 37.522500, -97.217500 (est) |

## Administrative Information

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| **Investigator In Charge (IIC):** | Thomas Latson | **Report Date:** | 11/19/2015 |
| **Additional Participating Persons:** | Matthew Rigsby; FAA AVP-100; Washington, DC<br>Ricardo J Asensio; Cessna Aircraft Company; Wichita, KS<br>Thomas Berthe; Pratt and Whitney Canada; Longueil, QC<br>David McNair; Transportation Safety Board of Canada; Gatineau, QC<br>Bobby D Warren; FAA Wichita FSDO; Wichita, KS<br>Richard Terrell; FAA Wichita FSDO; Wichita, KS | | |
| **Publish Date:** | 11/19/2015 | | |
| **Note:** | The NTSB traveled to the scene of this accident. | | |
| **Investigation Docket:** | http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=88235 | | |