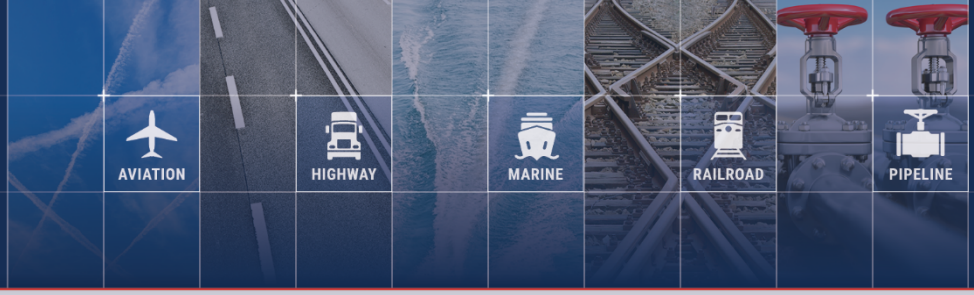

Aviation Investigation Factual Report

Location:	Eastland, Texas	**Accident Number:**	CEN12FA670
Date & Time:	September 30, 2012, 09:32 Local	**Registration:**	N144CF
Aircraft:	AGUSTA SPA A109E	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	3 Serious
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled - Air Medical (Medical emergency)		

Factual Information

HISTORY OF FLIGHT

On September 30, 2012, approximately 0932 central daylight time, an Augusta 109E Emergency Medical Service (EMS) helicopter, N144CF, registered to Wells Fargo Bank NW NA Trustee, Salt Lake City, Utah, crashed after an uneventful 26 minute cross-country flight. The crash occurred while the helicopter was being maneuvered to avoid local weather prior to setting up for an instrument approach to the Eastland Airport, Eastland, Texas. All three occupants, the airline transport rated pilot, flight nurse, and a flight paramedic, sustained serious injuries. The flight was being operated by CareFlite of Grand Prairie, Texas, and was conducted under the provisions of 14 CFR Part 91 as a repositioning flight to pick up a patient. The helicopter departed the CareFlite base located at Granbury Airport (GDJ), Granbury, Texas, at 0906. Its intended destination was the Eastland Airport (ETN), Eastland, Texas. Visual meteorological conditions prevailed along the route of flight from Granbury to Eastland, however, marginal visual meteorological conditions or instrument conditions were reported in the vicinity of the accident site. A company VFR flight plan was activated upon departure from Granbury and an IFR flight plan was placed on file with ATC, but was not activated.

According to first responders to the accident site, the helicopter impacted the ground in an open field, approximately 4.4 miles south of Eastland Airport. Emergency responders transported the occupants to a nearby hospital. The helicopter was transported to a secure facility for detailed examination.

Flight Nurse was located in the rear cabin, Aft-facing seat which is located on the right side of the aircraft. The Flight Paramedic was seated in the Co-Pilots seat. All three crew members' observations/recollections of the flight/event are as follows:

Flight Paramedic

According to the Paramedic, the crew received a call from CareFlite dispatch and the pilot accepted the mission. The pilot checked the weather and asked the CareFlite communications center to put an IFR flight plan on file and requested that the helicopter be topped off with fuel prior to departure. After preflight, the helicopter took off and began the flight in visual meteorological conditions (VMC). As we approached Eastland, visibility toward the north appeared to be decreasing. The pilot made the decision to continue the flight under IFR and stated to the Paramedic and Flight Nurse that he would slow down the helicopter's airspeed and follow a roadway below while he set up the autopilot to fly an instrument approach to the airport.

The Paramedic felt the airspeed decrease and the pilot handed him a book with the approach plate for Eastland. The Paramedic held the book open to reference as needed. The Paramedic then became a little concerned with the situation. He looked back over his left shoulder at the weather conditions and made a statement to the pilot that he did not like the situation that we were getting into. The Paramedic then watched the navigational instruments and tried to remain calm. He noticed the pilot activate and deactivate different autopilot settings. During this time, the Paramedic noticed that the airspeed was

continually decreasing as the altitude increased and at this point the helicopter was in complete IMC. The paramedic then noticed some fluctuation in the artificial horizon but it didn't seem too severe. He then felt a vibration, similar to that of an aircraft accelerating. He looked at the altimeter and it was spinning extremely fast and told the pilot that he felt as if the helicopter was in a steep dive. He stated that the pilot did not reply. The Paramedic then looked at the artificial horizon on the pilot side and observed that it was in an extremely askew orientation.

At this point the pilot frantically stated that we were about to crash. Seconds later, the helicopter broke through the clouds pointing straight down at the ground. The Paramedic recalled seeing the pilot using the collective to attempt to pull up. The next thing he recalled was moments after the helicopter came to rest, he was still was still in his seat, the flight nurse had exited the helicopter, and the pilot was turned sideways and appeared to be standing in front of him inside the helicopter as it rested on its side. He recalled that at least one engine was still running. The Paramedic then saw the pilot turn both engine switches to the 'OFF" position. At this point, a bystander helped the pilot exit the helicopter through the pilot door and helped me exit through the window just above the co-pilot door.

Flight Nurse

The Flight Nurse had been with CareFlite for 16 years and had was familiar and trained in the company's IFR program for flight crewmembers. According to the Flight Nurse, the crew was initially notified that the flights destination was to be directly to the Eastland Hospital. The flight destination was then changed to the Eastland Airport due to the pilot having stated he did not have weather reporting available in Eastland prior to the flight, and in case of the need for IFR flight into Eastland Municipal Airport. She stated that the pilot had filed an IFR flight plan as a back-up.

While preparing to go out to the aircraft, the Flight Nurse discussed the flight with the Flight Paramedic. The paramedic was not a permanent crewmember at the CareFlite base in Granbury, TX, but was called in to work from a different base. During their conversation, the Flight Nurse mentioned to the Flight Paramedic that she was concerned over the pilot's limited IFR experience in that particular helicopter (the Agusta 109). She understood that the pilot was one of the last pilots in the company to go through the certification of the IFR program. It was stated that as medical crewmembers that they would need to support the pilot in the event that the weather deteriorated and the flight plan would require IFR.

During the crew duties before take-off the Flight Nurse remembered that the pilot mentioned that he had programmed the flight data into the aircraft in the event that an IFR approach was necessary going into Eastland. She stated that takeoff and departure was normal. The Flight Nurse was speaking with Eastland EMS on the progress of the flight and stated that they had an ETA of approximately 4-5 mins to the airport. Over the intercom, the Flight Nurse heard the Flight Paramedic state that, "I'm not comfortable with this." At that time, the Flight Nurse turned to the right to look forward into the cockpit and the helicopter was in the clouds – totally "Whited Out." The Flight Nurse replied to the Paramedic, "Oh, I'm not either." She said that prior to the aircraft entering into the clouds the flight was normal, doing just fine and no issues. It seemed to be a direct route.

The Flight Nurse asked the pilot if there was anything that they could do to help and the pilot did not reply. She noted that the IFR Approach plates were out and that the Paramedic was assisting the pilot with them. She also noted that the pilot did not communicate much and said that there was no communication from the pilot on the possibility of entering the clouds. She said that the helicopter had

been climbing and the altimeter instrument was reading approximately 4,500 feet. Pilot did state that "we should be fine here." The Flight Nurse heard the pilot make an attempt to contact the tower.

Flight Nurse observed the pilot push a button up front on the panel. Almost immediately the aircraft seemed to go out of control, rolling to the left and right, and seemed to be pitching up and down at times. She stated that the upset was very scary and disorienting to her, and that she could not tell whether the aircraft was going up or down from her seat. The helicopter seemed to be out of control. The helicopter seemed to be not responding to the pilot's inputs and was descending at a rapid rate. She said that she could not tell if the pilot was hand-flying the aircraft or not and remembered hearing the Paramedic state, "We are in a nose dive, Pull Up, Pull Up." The Flight Nurse also repeated, "Pull Up, Pull Up."

The Flight Nurse stated that there was serious tension due to the "G" forces during the descent. There seemed to be pressure on her lungs and chest. When the aircraft came to rest, the Flight Nurse stated that it took time for her to gain her breath and thought that she may have a possible collapsed lung. The Flight Nurse was also concerned with her back hurting and thought that her back was broken. At this time she tried to stand up in the cabin of the aircraft and cleared herself from the medical equipment and debris that was everywhere in the cabin. She tried to contact the pilot and paramedic up front and did not receive a reply. Within seconds, a gentleman arrived at the accident scene. The Flight Nurse dialed the CareFlite communications center on her personal cell phone and notified them of the accident.

All 3 flight crewmembers were prepared for ground transportation by first responders and loaded into ambulances. While the Flight Nurse was at Fort Worth Harris Methodist Hospital the crew was visited by many other CareFlite crewmembers. Many crewmembers stated that the accident aircraft had a similar event with the training pilot. They stated it was some sort of an upset event, included a steep nose-dive but he was able to pull out of the dive. He was not IFR. It was also stated that maintenance could not duplicate some of the reported issues/concerns. The Flight Nurse stated that she had flown with the accident pilot for the past 2 years, but never IFR with him – only the other pilots at the base. Also, the Flight Nurse stated that the flights were usually started under IFR and then the complete route would be flown and not changed over to IFR enroute.

Pilot

The pilot stated that at his request, CareFlite Dispatch had filed an IFR Flight plan for the flight to Eastland. He said that all was normal on the flight until approximately 10 miles from Eastland. Initial cruise altitude was 2,500 feet MSL. The weather had deteriorated to high overcast, mid-level scattered to broken with some rain showers and reduced visibility. As a precaution, the pilot began a climb, initiated using auto-pilot VSI Mode to an altitude of approximately 4,000 feet. The climb was necessary to communicate with Fort Worth (FTW) Approach. The pilot then communicated with FTW Approach to activate flight his IFR flight plan that was previously on file. Fort Worth Approach replied to standby. He then engaged auto-pilot (AP) Altitude hold. He said that everything was normal before initiating the AP. After engaging the AP the aircraft abruptly pitched down 90 degrees and began spinning simultaneously with the airspeed increasing. The pilot scanned the instruments and identified a disagreement between the Pilot and Co-Pilot ADI. He then turned the AP off and moved his scan to the Back-up Vertical Reference Gyro (Back-up ADI). The pilot then attempted an unusual attitude recovery and tried to stop the spinning and rotation of the helicopter. He initiated back pressure on cyclic control

and scanned the instruments to verify that the helicopter was still descending. He said that the attitude was leveled and the VSI and altimeter were moving rapidly.

He eased up on cyclic back pressure because he did not want to overstress the rotor system and entered the clouds below and used the instruments. The helicopter came out of the bottom of the cloud base very close to the ground in VMC. He said that he did not feel that he was flying against non-pilot initiated control inputs during the recovery sequence. The pilot saw power lines and he attempted an emergency landing. The helicopter touched down in a level attitude, bounced several times and skidded to a stop.

After the landing, the pilot was dazed ad had no memory of losing consciousness. He turned off both Power Management Systems switches and engines continued to operate. Both throttles were bent over on the overhead control panel. The pilot then turned off both fuel shutoff valves.

PERSONNEL INFORMATION

The pilot was hired by CareFlight on January 28, 2009. At the time of hire, had over 7,000 hours of total helicopter flight time with over 6,000 hours as Pilot-In-Command (PIC) in helicopters. Prior to his employment with CareFlight, the pilot had many years of flight experience as an Electronic News Gathering (ENG) helicopter pilot within the Dallas/Fort Worth metro area. The pilot was assigned the position of pilot-in-command of the A109E aircraft**.**

The pilot held an Airline Transport Certificate with Rotorcraft-Helicopter and Instrument ratings and a Flight Instructor Certificate with Rotorcraft-Helicopter and Instrument ratings. His valid FAA Second Class Medical Certificate was issued on 08/09/12.

Initial Training

The pilot's initial 14 CFR Part 135.293 and 135.299 check ride was administered on March 31, 2009 with satisfactory results in the A109E aircraft. The company check airman administered the check ride. On January 20, 2012, the pilot completed additional training and a Part 135.293, 135.297, and a 135.299 check ride was completed to act as VFR and IFR pilot in command.

Historical Recurrent Training

Recurrent training flights in the A109E were completed on January 6, 2012 and the pilot passed a Part 135.297 check ride on July 10, 2012.

Transition Training

The pilot received several company IFR training flights starting November 22, 2011 thru January 6, 2012. He completed a Part 135.297 check ride on January 20, 2012.

Current Qualification

On January 20, 2012 a recurrent check ride in the A109E was completed. The check ride was administered by a company check airman.

Flight and Duty Time

On September 30, 2012, the day of the accident, the pilot had not flown. He arrived on duty at 0645 and planned to log off duty time of 1900, according to the duty log. The estimated duty period for the day would have been 12.25 hours. The previous day (09/29/12), the pilot's duty time was logged from 0645 to 1900, a duty period of 12.25 hours. He logged 0 hours of flight time on this day. The following flight times were listed on the company Pilot Duty Record: (The flight times below do not include the approximate flight time of 0.4 hours accumulated on the accident date.)

September 13.4 hours

August: 15.9 hours

Calendar quarter: 50.1 hours

Last two consecutive quarters: 116.1 hours

Calendar year 2012 total: 176.3 hours.

According to the pilot's Pilot in Command Qualifications form, which was completed by the pilot in January 2009, he had logged over 7,600 hours of flight time.

Flight time last 90 days in A109: 50.1 hours

Flight time last 30 days in A109:13.4 hours

Flight time last 24 hours in A109:0 hours

According to the records kept by the operator, the pilot is appropriately rated and medically qualified. The pilot is qualified to act as pilot-in-command of the A109E aircraft in 14 CFR Part 135 operations. The airman is current in qualification and, according to company records, adheres to the appropriate flight and duty time limitations. The pilot's most recent Part 135.299 check ride occurred on January 20, 2012, with satisfactory results.

Pilot 72 Hour History (Information Provided by the Chief Pilot)

The pilot was off duty on September 26, 2012.

The pilot worked September 27, 2012. He logged in at 0645 am and logged off at 1900, with no flights.

The pilot worked September 28, 2012. He logged in at 0645 am and logged off at 1900, with no flights.

The pilot worked September 29, 2012. He logged in at 0645 am and logged off at 1900, with no flights.

The pilot worked September 30, 2012. He logged in at 0645 am. He received is company flight release at 0659 which was valid until 2045. He received a radio call from Comm. Center at 0853 for a weather check for a scene flight to Eastland, TX. He said the weather was good and that he would top off the fuel and be ready to go. The Comm. Center dispatched him at 0855 and he was enroute at 0907. There were no out of the ordinary issues for any of the last days the pilot was on duty.

AIRCRAFT INFORMATION

The Augusta A109E helicopter, serial number 11144, had 5,404.4 hours of total airframe time (ACTT) and 26,736 landings. The last airframe inspection was a 50-hour/30-day inspection performed in accordance with the current CareFlite AAIP on September 27, 2012, at 5,400.6 hours airframe time. The number 1 engine, a Pratt & Whitney 206C, serial number PCE-BC-0389 had 4266.7 total time and 784.4 time since overhaul. The number 2 engine, a Pratt & Whitney 206C, serial number PCE-BC-0388 had 4033.0 total time and 535.6 time since overhaul.

Recently Logged Maintenance/Mechanical History

September 10, 2012. Pilot reported the # 2 Stability Augmentation System (SAS) kicked off-line in flight. The reporting pilot reset the #2 SAS without further issues. A CareFlight maintenenace technician inspected and cleaned the vertical gyro connectors and found no defects and performed an operational check with no defects also. (5368.3 ACTT)

September 11, 2012. A 25-hour main rotor damper inspection was performed with no defects noted.

September 13, 2012. The # 1 engine went into manual mode during shutdown. System was troubleshot in accordance with the current Pratt & Whitney maintenance manual, with no defects noted. A CareFlight maintenance technician then swapped the # 1 & # 2 Engine Electronic Control Units (EECs), for troubleshooting. Operational checks were performed with no defects noted. The aircraft was reconfigured from EMS to dual pilot configuration and then back to EMS configuration (5376.4 ACTT)

September 16, 2012. Upon engine run-up, the transmission chip light illuminated. Both transmission chip detectors were inspected and a small amount of "fuzz" was detected on the upper chip detector. The "fuzz" was classified as normal wear and no follow up action was required in accordance with the current A109E Maintenance Manual. The detector was cleaned and a ground run was performed with no defects noted. (5379.8 ACTT)

September 17, 2012. The cabin TDFM 7000 radio was inoperative and replaced. (5380.0 ACTT)

September 18, 2012. The # 2 inverter kicked off- line. The # 2 voltage sensing relay was replaced. Operational check was performed with no defects noted. (5382.5 ACTT)

September 19, 2012.The upper tail rotor pitch link was replaced due to a worn bearing. The tail rotor idler link bolts were replaced. Operational check flight was performed with no defects noted. (5384.5ACTT)

September 20, 2012. The # 1 & # 2 engine oil was serviced. A 25-hour main rotor damper inspection was performed with no defects noted. The helicopter was reconfigured from EMS to dual pilot configuration and then back to EMS configuration after pilot training was performed. AD 2007-26-52R1 was performed on the main rotor blade tips caps. Forward searchlight was inoperative and bulb was replaced. The #1 inverter indication stayed illuminated on the EDU with the switch in "ON" position. The K7212 relay was replaced and no further defects were noted. A 12-month ELT inspection was performed. GNS 430 and KMD 850 data cards were replaced with the current data cards. (5387.2ACTT)

September 27, 2012. A 50-hour/30-day inspection was performed. The aircraft was reconfigured from EMS to dual pilot configuration and then back to EMS configuration after pilot training was performed.

Tail rotor idler link was replaced for worn bearings. Tail rotor control tube aft bolt was replaced due to corrosion. A 12-month engine inspection was completed on the # 2 engine.(5400.6 ACTT)

September 27, 2012. A CFR Parts 135.293, 135.297, 135.299 check ride was completed. The auto pilot performed as required for 2 ILS approaches, 1 VOR approach, 1 GPS approach and various tasks enroute.

Flight Control Anomaly History

Since October 13, 2011, there were 4 occurrences reported by CareFlight pilots whereby the helicopter (N144CF) experienced un-commanded flight control inputs:

October 13, 2011. The helicopter made an un-commanded left roll during cruise flight. Numerous items in the flight control system were replaced during troubleshooting. An additional discrepancy appeared during these troubleshooting steps. The discrepancy was the flight director would exceed the 22-degree bank limit in a left turn. Replacement of the co-pilots HIS control panel and the #2 gyro corrected these discrepancies and the helicopter was returned to service.

December 29, 2011. The helicopter began un-commanded left and right oscillations during cruise flight at 140 knots airspeed. Replacement of the # 2 Heli-pilot corrected this discrepancy and the helicopter was returned to service.

April 3, 2012. The helicopter's #2 SAS disengaged in flight. Replacement of the #2 vertical gyro corrected this discrepancy and the helicopter was returned to service.

April 13, 2012. The helicopter had an un-commanded SAS channel #2 pitch malfunction. System was troubleshot with no defects noted. After a successful check flight, the helicopter was returned to service.

April 15, 2012. The helicopter had un-commanded bump and the #2 SAS was intermittent in flight. Replacement of the #2 vertical gyro corrected this discrepancy and the helicopter was returned to service.

METEOROLOGICAL INFORMATION

Eastland Airport did not have weather reporting facilities. The area of the accident, near Eastland Municipal Airport was approximately 18 miles south of Breckenridge (KBDK) and the following reports provide an estimate of the weather for Eastland at the time of the accident.

0755: METAR KBKD 301255Z AUTO 34009KT 7SM OVC006 19/18 A2993 RMK AO2

0815: METAR KBKD 301315Z AUTO 34008KT 7SM OVC006 19/18 A2994 RMK AO2

A02 Remark (RMK) means that the site is automated and has a precipitation sensor.

2-D and 3-D weather radar images (included in the supporting docket of this report) show that the helicopter was passing through light to moderate rain showers just prior to the accident. The weather radar also showed bands of clouds and a south-southwestward movement of an area of light to moderate rainfall. The weather radar images were consistent with the statements from the Flight Paramedic and

Flight Nurse as the helicopter encountered marginal VMC conditions and entering clouds just before the accident.

WRECKAGE AND IMPACT INFORMATION

The main wreckage came to rest at GPS coordinates; N32.33567 W098.8256. The helicopter was lying on its left side with a 495-foot long dirt rut/trail and debris field leading up to its final location. The initial impact point was about 1-foot wide and widened to about 3-feet wide and was about 10 to 15 feet long. The ground damage was consistent with the tail rotor guard and tail rotor blade coming into contact with the ground. Then there was a spot of undamaged ground for approximately 10 feet. After the undamaged area, there were three noticeable ruts that measured across about 3 feet, also consistent with tail rotor strikes. It appeared to be caused by the tail rotor blade, tail rotor guard and tail rotor gearbox cowling. The next ground impact marks where consistent with two definitive imprints which matched the aircrafts aft wheels when they are in the retracted position.

The ground damage then narrowed again with no discernible imprints for about 40 feet. A few lower aircraft cowlings and a piece of one of the tail rotor blade was found. From this point forward, there were approximately six ruts perpendicular to the main damage path. Each rut was anywhere from 6 feet long to 15 feet long. All of these ruts had different depths throughout the length of the rut. This damage appeared to be caused by the main rotor blades coming in contact with the ground. Also, at this point the debris became much heavier with the majority being on the left side of main impact path. There were a couple of main rotor blade pieces on the right, but the left side had blade pieces all over up to the tip caps being located over 100 feet away. The length along the main impact path that has the 6 ruts crossing it was about 6 feet.

After the blade impact marks on the ground, the path has no more discernible marks until its final resting place. The path direction did alter at this point to the right about 35-40 degrees. The main impact path does show evidence that the aircraft was on its belly and slowly rotated to the left approximately 70 degrees. From the blade strike area to the end was approximately 250 feet. Just short of the final location, there was a large rut which appeared to be where the right hand stub wing dug into the ground. Just past this rut, about 6 feet, there was another rut which appeared to be consistent with contact of the main rotor head cover. The helicopter rested on its left side with its tailboom detached.

After the on scene inspection, the helicopter was transported to a secure facility for detailed examination.

Main Fuselage

The fuselage had extensive damage with the nose of the helicopter separated and deformed from right to left. The nose, pilots side wind screen, center post, upper pilot side green house, and pitot tubes were deformed right to left and appeared consistent with main rotor blade contact. The landing gear was observed in the up position. The pilot in command seat was not attached to the seat rails, and was observed outside the aircraft, the composite structure seat structure was broken and deformed consistent with a vertical impact. The seat pan exhibited impact/contact marks. The co-pilots seat was observed attached and secured to the metal seat frame. The seat exhibited downward deformation consistent with a vertical impact, no damage to the seat pan was observed.

The underbelly damage was observed with extensive upward deformation and evidence of sliding. A significant amount of dirt and debris was on the belly structure. The upper forward cowlings were observed off of the aircraft. The aft transmission and engine cowlings exhibited moderate damage that appeared impact related. The transmission was observed leaning forward and to the left from its normal mounting position. The transmission support structure anti-torque mounts on the left side main beams were observed broken in what appeared impact related damage. All but the upper aft right transmission support arms were observed broken, but secured/attached to the transmission and fuselage attach points.

No pre-impact anomalies were noted with fuselage and/or transmission support structure.

Tail Boom

The tail boom was observed separated from the fuselage at the fuselage attach point with the forward portion and aft sections of the boom moderately deformed. The horizontal stabilizer was not attached to the tail boom. The stinger had separated from its attachment points.

The tail rotor gearbox was observed securely attached to the tail boom and the tail rotor blades exhibited extensive impact damage. The inboard non-rotating lower rigid connecting link was observed deformed inward toward the output shaft.

No pre-impact anomalies were noted with the tail boom structure or tail rotor assembly.

Flight Controls

The flight control continuity was established from the cyclic and collective cockpit controls to the star mixing lever on the fuselage upper deck. All control links going from the star mixing lever aft to the flight control servos were observed separated approximately midway on the control rods. The fractures appeared consistent with overload. The anti-torque pedals were manually exercised and continuity from the pedals to the fracture point at the tail boom separation point was established.

The yellow servo lower attach bolts were not observed attached to the lower attach point. The red and blue servos were securely attached to the transmission. And the lower control tubes were separated. The red and blue pitch control links were deformed and broken at the upper rod ends the damage appears consistent with overload. The yellow and blue servo control rods were broken. The yellow and white pitch links were observed securely attached.

The synchronization sensors under the pilot's seat were observed securely attached and did not exhibit damage. The transducers under the co-pilots seat were observed intact and securely attached. The hydraulic system integrity was confirmed and the accumulators were manually checked and the charge was verified.

No pre-impact mechanical anomalies were found with the flight control system.

Transmission

The main transmission was manually rotated with no anomalies noted. Drive system continuity was established throughout the main transmission, accessory gearbox, tail rotor output shaft, and two main input drive shafts. No pre-impact anomalies were observed with the transmission.

Main Rotor Hub and Main Rotor Blades

The main rotor damper rods had sheered at the rod ends from the blue, red, and white blades. The damper brackets sheared on the red, white, and yellow blades. The red and white upper elastomeric bearings were sheared. The white grip assembly blade was observed deformed downward. The drive scissors was observed intact. The blue, white, yellow and red blades all exhibited extensive impact damage. The composite after-body of each blade had separated from the spars. The four flapping limiters were observed sheered.

Engines

The #1 and #2 engine compressors and power turbines for both engines rotated freely and did not exhibited any sign of anomalies. The engines, and ECU's for each engine were removed for shipping and detailed examination at the manufacturers facility at an undetermined date. The #1 oil cooler blower assembly was significantly deformed and the drive belt was not attached the blower or the accessory drive gear. The #2 oil cooler blower assembly was attached and did not exhibit indications of pre-impact anomalies.

Drive System

The main input #1 and #2 driveshafts were both separated at the aft coupling/engine side. The input drive shafts exhibited rotational scoring in the area of firewall penetration. No indications of pre-impact anomalies were observed. The #1 tail rotor drive shaft was observed separated 13 inches from the forward attach point. The tail rotor drive shaft exhibited rotational scoring. The #2 tail rotor drive shaft was intact but bent slightly. The remaining #3 tail rotor drive shaft was observed securely attached to the separated tail boom and the tail rotor gearbox. The shaft was manually rotated turning the tail rotor gearbox and remaining portion of the tail rotor blades.

Auto Pilot System Flight Controls

The auto pilot system, gyros, and servo components were examined. No pre-impact anomalies were found, however the solid state components could not be tested for functionality due to damage.

ADDITIONAL INFORMATION

The wreckage was released to the owner's representative.

Pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	58
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Helicopter; Instrument airplane; Instrument helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	August 9, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 10, 2012
Flight Time:	(Estimated) 7600 hours (Total, all aircraft), 600 hours (Total, this make and model), 7000 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AGUSTA SPA	**Registration:**	N144CF
Model/Series:	A109E	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	11144
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	September 27, 2012 AAIP	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo shaft
Airframe Total Time:	5401 Hrs as of last inspection	**Engine Manufacturer:**	P&W CANADA
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	PW206C
Registered Owner:	WELLS FARGO BANK NORTHWEST NA TRUSTEE	**Rated Power:**	561 Horsepower
Operator:	CareFlite	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	CareFlite	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BDK,1321 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	09:35 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Unknown	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 1000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots / 19 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	19°C / 17°C
Precipitation and Obscuration:			
Departure Point:	Granbury, TX (GDJ)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Eastland, TX (ETN)	**Type of Clearance:**	None
Departure Time:	09:06 Local	**Type of Airspace:**	

Airport Information

Airport:	Easton ETN	**Runway Surface Type:**	
Airport Elevation:	1468 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	3 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Serious	**Latitude, Longitude:**	32.379173,-94.579872(est)

Administrative Information

Investigator In Charge (IIC):	Lemishko, Alexander
Additional Participating Persons:	Mark McDougle; FAA FSDO Lubbock; Lubbock, TX David Carr; CareFlite; Grandbury, TX
Report Date:	May 5, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85251