Aviation Investigation Final Report

Location:	Redwood Valley, California	**Accident Number:**	LAX04FA076
Date & Time:	December 23, 2003, 19:32 Local	**Registration:**	N25RX
Aircraft:	Agusta A109A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

Following an encounter with night instrument meteorological conditions, the emergency medical services (EMS) helicopter collided with rising hilly terrain while attempting to reverse course in a narrow mountain valley near Redwood Valley, California. The purpose of the flight was to pickup a patient at a rural hospital in a mountainous area for transport to a larger medical facility. When weather conditions would not permit reaching the rural hospital, common practice for the operator's flight crews was to fly to an intermediate airport with an instrument approach where the helicopter could meet ground transport of the patient and continue the evacuation. Prior to departure from home base, the pilot received a weather briefing from DUATS, which indicated that areas along the route of flight would experience light rain showers, as well as cloud layers that ranged from 1,500 feet above ground level (agl) to 6,000 feet agl ,and visibilities between 3 to 5 statute miles (sm). The pilot filed an instrument flight rules flight plan from his home base to the intermediate airport. An employee of another EMS operator based at the intermediate airport said that there was rain and reduced visibilities at the airport, and that she told the accident medical crew by radio that they should come inside and wait for the ambulance to get to the airport because of the weather. Once the accident helicopter arrived at the intermediate airport, the helicopter was not shut down, the flight nurses got out and got back in, and helicopter departed the airport. Communications between a fire department dispatcher and the accident medical crew indicated that the accident flight was attempting to fly to the fire department's helipad located between the intermediate airport and the hospital. Recorded company communications indicated that a few minutes after the conversation with the fire department dispatcher, the accident flight was diverting back to the intermediate airport. There were no further communications with the accident crew. Witnesses in the area of the accident site all reported heavy rain and wind and poor visibilities due to a heavy fog in the area. Another witness about 2 miles south of the accident site reported hearing the helicopter flying very low over her house, just above the 100-foot tall treetops, about 12 minutes before the accident. The charge nurse at the rural hospital indicated that the weather was poor, and she had indicated to the

operator's dispatch that the rural hospital would transport the patient to the intermediate airport. The accident area was located in a narrow valley with mountain peak elevations ranging up to 2,000 feet on either side of a major highway that ran in a north/south direction. The airframe and engines were inspected with no preimpact mechanical anomalies noted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper in-flight planning and decision to continue flight under visual flight rules into deteriorating weather conditions, which resulted in an inadvertent in-flight encounter with instrument meteorological conditions and a collision with rising terrain while attempting to reverse course.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CRUISE

Findings
1. LIGHT CONDITION - DARK NIGHT
2. WEATHER CONDITION - CLOUDS
3. WEATHER CONDITION - RAIN
4. WEATHER CONDITION - OBSCURATION
5. (C) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
6. (C) VFR FLIGHT INTO IMC - CONTINUED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: MANEUVERING - TURN TO REVERSE DIRECTION

Findings
7. TERRAIN CONDITION - MOUNTAINOUS/HILLY

Factual Information

HISTORY OF FLIGHT

On December 23, 2003, about 1932 Pacific standard time, an Agusta A109A, N25RX, collided with mountainous terrain near Redwood Valley, California. Mediplane Inc., doing business as (d.b.a.) REACH (Redwood Empire Air Care Helicopter), was operating the helicopter under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as an emergency medical services (EMS) positioning flight. The airline transport pilot (ATP) and two flight nurses were killed, and the helicopter was destroyed by post impact fire. Night visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed for a portion of the flight.

According to REACH personnel, the flight departed Charles M. Schulz Sonoma County Airport (STS), Santa Rosa, California, about 1900 to pickup a critically injured patient at a rural hospital in Willits, California, and transport him to Santa Rosa Memorial Hospital, Santa Rosa. REACH personnel noted that, in accordance with the common procedure used when weather prevented flying direct to Willits, the accident pilot elected to file an IFR flight plan from STS to Ukiah Municipal Airport (UKI), Ukiah, California, which is an intermediate airport with an instrument approach, and meet a ground ambulance with the patient at UKI. The accident helicopter landed at UKI about 1922, ending the IFR portion of the flight.

After landing at UKI, the helicopter crewmembers were notified by California Department of Forestry (CDF) Howard's Forest dispatch (located between Ukiah and Willits) that the ground ambulance was still 40 minutes from UKI. According to the CDR dispatch log, the flight nurse radioed that the pilot was "checking the weather to see if we can attempt to get in there [Willits]." According to REACH personnel, the flight nurses are responsible for all non-emergency in-flight communications with other agencies, including REACH dispatch.

Shortly after landing at UKI, the helicopter departed about 1925 under visual flight rules (VFR) and proceeded north toward a CDF helipad just south of Willits to attempt to pickup the patient there. About 1928, the medical crewmembers on the helicopter indicated that they wanted the ground ambulance to continue to UKI and that they would advise if they were able to land at the CDF helipad. About 1930, the flight nurse told CDF dispatch that the flight was returning to UKI. No further transmissions were received from the flight nurse.

About 1933, CDF dispatch received the first 911 call from a witness who reported seeing something going down off of highway 101 and then observing a fire. About 1942, a California Highway Patrol officer on a routine patrol reported a fire and explosions on a hillside adjacent to highway 101 at milepost marker 39 and indicated that he thought that it was possibly a downed aircraft. The wreckage was located at 39 degrees 16.715 minutes north latitude by

123 degrees 16.878 minutes west longitude at an elevation of about 1,190 feet mean sea level (msl).

Residents and rescue personnel in the area of the accident stated that there were high winds and rain at the time of the accident. Emergency response personnel who arrived on scene noted that it was raining and that visibility was poor due to heavy fog. A dispatcher at CDF Howard's Forest noted that it was "pouring down rain" and was "very windy," with no fog present.

A witness located about 2 miles south of the accident along highway 101 reported that she heard the accident helicopter fly over her residence about 1920. She indicated that the helicopter was "flying real low," sounded very loud, and that the lights were on. She reported that she initially thought that the helicopter engine was having problems because it was so loud. However, when the helicopter initiated a climb and flew off, she stated that the engine sounded normal. The witness also indicated that she did not think the helicopter would clear the trees in the area because it was flying so low. The National Transportation Safety Board investigator-in-charge (IIC) estimated the treetops in the area of the witness' residence to be about 100 feet tall.

A flight nurse from CalStar, an EMS operator based out of UKI, spoke to a REACH flight nurse on board the accident flight when it was about 20 minutes from UKI. The CalStar flight nurse told the REACH crew to come inside to warm up and wait for the ground ambulance to arrive at UKI with the patient. The CalStar flight nurse reported that once the accident helicopter arrived at UKI, the pilot did not shut it down. The CalStar flight nurse stated that the REACH flight nurses got out of the helicopter, then got back in, and it took off. CalStar pilots checked weather throughout the day for the UKI area, and indicated that the weather was forecasted to be "very windy and rainy."

The charge nurse at Howard Memorial Hospital, where the patient was being transported from, reported that the emergency room doctor at Santa Rosa Memorial Hospital arranged the patient transport. She stated that she had not been outside that day but knew that the weather was bad. The charge nurse further reported that once in contact with REACH, she told them three times that the hospital had enough staff and would be able to transport the patient to UKI to meet the helicopter.

PERSONNEL INFORMATION

A review of the pilot's Federal Aviation Administration (FAA) airman certification records disclosed that the pilot held an ATP certificate with ratings for airplane multiengine land and rotorcraft helicopter, as well as commercial privileges for airplane single engine land. The pilot was type rated for the Sikorsky SK-58 (VFR only) and SK-62.

Review of the pilot's medical information revealed that the most recent first-class medical certificate was issued on October 28, 2003. The medical contained no limitations.

According to REACH's written statement, the pilot had an estimated total flight time of 14,143.0 hours, with 12,858 hours of total flight time in rotorcraft. REACH indicated that the pilot had accumulated 1,382.9 hours of night total time, 484.7 total hours of actual instrument flight, and 417.8 total hours of simulated instrument flight. He had an estimated 1,670.3 hours in the accident helicopter make and model. He logged 69.8 hours in the last 90 days, with 35.3 hours of night flight and 12.5 hours of actual instrument flight. In the last 30 days, he logged 27.0 hours, of which 9.1 hours were night flight and 11.4 hours were actual instrument flight. In the last 24 hours, the pilot had accumulated 2.1 hours, with 1.6 hours of actual instrument flight and no night flights.

Review of the pilot duty records for the day of the accident showed that the pilot was scheduled from 0800 to 2000 hours. The accident flight was dispatched about 1841. He was 1 hour 20 minutes from the end of a normal 12-hour duty day, and 3 hours 20 minutes from the FAA regulation of a maximum 14-hour duty day.

The accident pilot's training records from REACH indicated that he had completed a company IFR training module on December 7, 2003. The "Instructor Comments" section of his evaluation indicated that he was ready for his Part 135 checkride. On December 15, 2003, the accident pilot completed the 14 CFR Section 135.293/.297 and Section 135.299 checkride for an airman competency/proficiency check.

AIRCRAFT INFORMATION

The helicopter was an Agusta A109A, serial number 7220. The helicopter was on an FAA approved airworthiness inspection program (AAIP), and, at the last inspection, had accumulated a total airframe time of 3,847.5 hours. The AAIP 25- and 150-hour inspections were completed on November 24-26, 2003. The helicopter had accumulated 17.3 hours since the last inspection.

The helicopter was powered by two Rolls-Royce/Allison Model 250-C20B engines. Engine No. 1 (serial number [S/N] CAE 832876) had a total of 3,599.6 hours, and engine No. 2 (S/N CAE 832148) had a total time of 6,525.5 hours at the time of the accident. At the last 150-hour inspection, completed on November 24-26, 2003, engine No. 1 had a total time of 3,582.4 hours, and engine No. 2 had a total time of 6,508.3 hours. Examination of the maintenance and flight department records revealed no unresolved maintenance discrepancies against the helicopter before departing for the accident flight.

According to REACH personnel, the helicopter was refueled at Chico Municipal Airport the day of the accident with 57 gallons of Jet A fuel. A daily preventative maintenance check was performed on the mobile refueler on the day of the accident, and no discrepancies were noted. A monthly check of the mobile refueler was completed on December 1, 2003.

METEOROLOGICAL INFORMATION

The closest official weather observation station was at UKI, located 10 nautical miles (nm) south of the accident site. The elevation of the weather observation station is 625 feet msl. A meteorological aerodrome report (METAR) for UKI issued at 1756 reported a broken cloud layer at 1,500 feet above ground level (agl); an overcast cloud layer at 2,400 feet agl; visibility 10 statute miles (sm); winds from 130 degrees at 9 knots; temperature 52 degrees Fahrenheit; dew point 50 degrees Fahrenheit; and an altimeter setting of 29.78 inches of mercury.

A special METAR was issued about 1826 reported a scattered cloud layer at 2,500 feet agl; an overcast cloud layer at 3,300 feet agl; visibility 10 sm; winds from 120 degrees at 9 knots; temperature 52 degrees Fahrenheit; dew point 50 degrees Fahrenheit; and an altimeter setting of 29.77 inches of mercury. The remarks section reported that rain began about 1800 and ended about 1810.

The METAR about1856 indicated a few clouds at 2,500 feet agl; a broken cloud layer at 3,200 feet agl; and an overcast cloud layer at 4,600 feet agl; visibility 9 sm; winds from 140 degrees at 10 knots; temperature 52 degrees Fahrenheit; dew point 48 degrees Fahrenheit; and an altimeter setting of 29.78 inches of mercury. The remarks section reported rain beginning about 1800, ending about 1810, and beginning again about 1855.

The METAR issued about 1956 indicated a few clouds at 2,500 feet agl; a broken cloud layer at 3,200 feet agl; an overcast cloud layer at 4,600 feet agl; visibility 9 sm; winds from 140 degrees at 8 knots; temperature 52 degrees Fahrenheit; dew point 50 degrees Fahrenheit; and an altimeter setting of 29.29 inches of mercury. There were no entries in the remarks section.

UKI also recorded unofficial weather observations in 5-minute intervals. About 1925, sky conditions were reported as few clouds at 2,700 feet agl; a broken cloud layer at 3,900 feet agl, and an overcast cloud layer at 6,500 feet agl; visibility 10 sm; light rain present, and winds from 130 degrees at 8 knots. The observation also recorded a pressure altitude of 760 feet and relative humidity as 96 percent, with a density altitude of 400 feet.

About 1930, about 2 minutes before the accident, the sky condition was reported as few clouds at 2,700 feet, a broken cloud layer at 4,700 feet, and an overcast cloud layer at 6,500 feet.

About 1935, the sky condition was reported as few clouds at 2,800 feet, a broken cloud layer at 4,900 feet, and an overcast cloud layer at 6,500 feet. The pressure altitude increased to 750 feet.

Pilot reports (PIREPS) obtained for the Northern California and Oregon coastal areas ranged from 75 nm to more than 190 nm from the accident site in different geographical locations and were not pertinent to the accident area.

An aviation area forecast (FA) issued by the Aviation Weather Center, Kansas City, Missouri,

for the northern California Pacific Coast (FA6) about 1245, indicated that the cloud layers along the coastal sections were scattered to broken from 2,500 to 3,500 feet, overcast conditions at 7,000 feet, with tops at 25,000 feet. Visibilities were occasionally 3 to 5 sm with light rain and mist. After 1800, the forecast called for a broken ceiling at 3,000 feet and southerly winds gusting to 25 knots. The FA6 forecast for the Sacramento Valley indicated cloud layers that were scattered to broken from 1,000 feet, broken at 3,000 feet, and layered to 25,000 feet. Visibilities were occasionally from 3 to 5 sm with light rain showers and mist. After 1600, the forecast called for an overcast ceiling at 3,000 feet with occasional light rain.

The FA6 issued at 1945 for northern California indicated cloud layers along the coastal sections that were broken to overcast to 6,000 feet, overcast at 12,000 feet, and layered to 20,000 feet. Visibilities were occasionally from 3 to 5 sm with rain.

The Terminal Aerodrome Forecasts (TAFs) valid for December 23, 2003, at UKI from about 1600 through the accident time indicated visibilities greater than 6 sm, light rain showers, a scattered cloud layer at 1,500 feet, and an overcast cloud layer at 2,500 feet. The wind was forecast from 120 degrees at 10 knots.

The amended TAF issued for December 23 about 1917 for UKI indicated visibilities greater than 6 sm, light rain showers and a scattered cloud layer at 2,500 feet, and an overcast cloud layer at 3,000 feet. The wind was forecast from 140 degrees at 10 knots.

AIRMET SIERRA Update 5 was issued on December 23 and valid from 1245 until 1900 for IFR conditions and mountain obscuration for Northern California. Airmet TANGO (turbulence) for occasional moderate turbulence issued for the same time period encompassed California and coastal waters.

AIRMET SIERRA was issued on December 23 about 1845 and valid until 0100 on December 24 for IFR conditions and mountain obscuration for northern California. AIRMET TANGO for occasional moderate turbulence below 18,000 feet issued for the same time period encompassed California and coastal waters.

According to the National Transportation Safety Board senior meteorologist, a strong frontal system off the Pacific Northwest coastline was prevalent during the accident time. In advance of the frontal system along the Northern California area, moderate to strong southerly low-level winds existed, along with high relative humidity, rainfall, and an upslope flow in the accident area. All of these conditions combined to form patchy mountain obscuration and IFR conditions throughout Northern California.

The accident pilot received and reviewed a Direct User Access Terminal Service (DUATS) weather report, which contained the same information provided by the Safety Board senior meteorologist.

WRECKAGE AND IMPACT INFORMATION

The accident site is located 0.25-mile west of highway 101 near Reeves Canyon Road. Highway 101 is a north/south interstate highway situated in a corridor between the cities of Ukiah and Willits. The terrain has sharp contrasts between the valley floors and mountain peaks with elevations ranging up to 2,000 feet. The helicopter came to rest on the side of a 1,190-foot mountain in a ravine on a 60-degree upslope with uneven, stepped terrain. The helicopter came to rest about 150 feet below the mountain's ridgeline. The debris path was along a magnetic bearing of 165 degrees.

The east-facing slope of the ravine contained part of a rock outcropping. Near the bottom of the rock outcropping were two distinct witness marks. A 20-foot-tall tree on the west side of the ravine had broken branches near the top facing toward the east.

An Agusta representative identified the witness marks (pieces of main rotor blades, and indentations) on the rock outcropping as main rotor blades strikes. He estimated that the helicopter airspeed was about 89 knots at the time of the accident based on the distance between the main rotor blade strikes.

The forward portion of the right side of the helicopter collided with a lower steppe of the mountain face. The upper portion of the cockpit area was sheared off and came to rest about 5 feet south of the main wreckage area. All four of the main rotor blades remained connected to the main rotor hub and exhibited chordwise buckling along the entire span of the blades. Both engines remained attached to their mounting points, which remained connected to the engine transmission deck. The transmission also remained connected to the transmission deck.

The tail section remained at the first identified point of contact (FIPC) just below where the main wreckage came to rest. Portions of tail rotor blades were near the rock outcropping, and the tail rotor assembly was embedded into the side of the mountain.

MEDICAL AND PATHOLOGICAL INFORMATION

The County of Mendocino Office of the Sheriff-Coroner completed an autopsy on the pilot on December 26, 2003. The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing of specimens from the pilot. The results of analysis of the specimens were negative for carbon monoxide, cyanide, and tested drugs. The report contained the following positive results for the VOLATILES section: 25 (mg/dL, mg/hg) ethanol detected in muscle; 29 (mg/dL, mg/hg) ethanol detected in kidney, 12 (mg/dL, mg/hg) acetaldehyde detected in kidney. This section of the report indicates a cutoff of 10 mg/dL for volatile concentrations.

TESTS AND RESEARCH

A followup airframe and engine inspection was conducted on December 28, 2003, in

Sacramento, California.

Airframe Examination

Investigators examined the airframe's flight controls and anti-torque pedal linkages. All of the breaks were angular and granular in appearance. The main landing gear actuator and the nose landing gear actuator, as identified by the manufacturer, were in a position that correlated with a retracted position. The portion of the tail rotor drive shaft located between the No. 1 and No. 2 engines had melted in its normal position. No discrepancies with the airframe were noted.

Engine Inspection

No visually obvious mechanical malfunctions were noted during the engine inspection. Both engines sustained rearward crushing of the compressor front support structures, as well as fire damage from the postimpact fire.

Visual examination of the No. 1 engine compressor revealed the compressor blades from the first two stages of the compressor rotor had sheared near their respective roots. According to the manufacturer's representative, the stator vanes from the first two stages of the compressor case halves were folded back nearly flat against the case halves in the direction of rotation of the compressor rotor. Dents were evident on the upper aft portions of the outer combustion case. The right exhaust stack sustained damage with white paint transfer marks that matched the paint from the cowling.

The fuel nozzle screens for the No. 1 engine had nominal carbon deposits, which the manufacturer's representative considered to be a normal amount. The nozzle screen remained intact with no visible obstructions or contaminants. The drive shaft for the accessory gearbox to the combining transmission fractured about 6 inches forward of the flex coupling. The accessory gearbox's two magnetic chip detector plugs were free of metal particles.

Before disassembly, an unsuccessful attempt was made to rotate the gas producer and power turbine drive trains. Once the engine was disassembled, it was noted that the gas producer turbine rotor tie bolt had fractured forward of the threads and had a flat appearance. The manufacturer attributed the tie bolt damage to the engine being under power. According to the manufacturer's representative, all of the bearings had been properly installed, and oil wetted and did not exhibit evidence absent of thermal distress or visible damage. There was no obvious mechanical failure of the No. 1 engine that would have precluded it from producing power.

Visual examination of the No. 2 engine showed that the first stage of the compressor rotor had uniform rotational damage along the outermost 1/2 inch of the blades' leading edges in the opposite direction of rotation. The left exhaust stack also exhibited white paint transfer that matched the paint of the engine cowling. The drive shaft for the accessory gearbox to the

combining transmission had factures similar to that of the No. 1 engine. However, the No. 2 drive shaft sheared aft of the flex coupling and forward of the splined adapter. No metal particles were found on either of the accessory gearbox's two magnetic chip detector plugs.

Prior to disassembly, the drive shaft was manually rotated with considerable resistance. Once removed from the accessory gearbox, the turbine and compressor sections would not rotate. However, the N1 gear train in the accessory box turned freely with no binding once the compressor and turbine sections were removed. The manufacturer attributed the drive shaft damage to the engine being under power. According to the manufacturer's representative, all of the bearings had been properly installed and oil wetted, and, with no thermal distress or visible damage were evident. There was no obvious mechanical failure of the No. 2 engine that would have precluded it from producing power.

ADDITIONAL INFORMATION

The wreckage was released to the owner's representative.

Chapter 3, "Aircraft And Procedural Operations," Section 8 in REACH's FAA-approved Operations Manual stated the following regarding weather briefings (reference 14 CFR 135.213):

Flight crewmembers are required to obtain a weather briefing prior to all flight operations...If flight operations are conducted from an airport where weather information is unavailable either in person or by telephone, the Pilot in Command may in VFR weather conditions depart the airport and once airborne, receive a weather briefing as outline[d] in Paragraph A from the nearest Flight Service Station on flight weather information frequencies.

Section 10, titled "Flight Plans and Flight Locating (14 CFR 135.23, .79)," states, in part, that all cross-country flights in company aircraft will operate with a flight plan. Section 35, titled "Minimums and Limitations (14 CFR 135.203, 205, 207)," stated that, at night, the minimum altitude "will be at least 500 feet." The REACH manual also indicated that company weather minimums are as follows:

Cross-country - night
Ceiling: 1,000 feet agl
Visibility: 3 sm

Mountainous terrain - night
Ceiling: 2,000 feet agl
Visibility: 5 sm

REACH defined mountainous terrain as "any terrain greater than 4,500' msl."

Chapter 3, "Emergency Operations And Procedures," Section 39, titled "Termination Short of Destination (FAR 135.69a)," stated:

If it is necessary to deviate from the airport of intended destination due to weather…on any flight, the Pilot in Command will call the company office as soon as possible, giving complete details concerning the deviation.

The FAA-approved REACH Operations Specifications manual indicates that the accident helicopter (Agusta A109A) can be operated as a single-pilot IFR aircraft with the installation of an autopilot (Sperry SHZ-109-1, -2). The accident helicopter was equipped with the Sperry SHZ-109-2 autopilot.

Chapter 3, Section 24 of the manual requires that a load manifest be prepared in duplicate for all multiengine aircraft before each takeoff. It also stipulates that a copy of the completed manifest (REACH form M2000A) should always be carried with the aircraft to its destination. The second copy should kept on file at the operations base for at least 30 days.

The REACH Standard Operating Procedures (SOP) manual stated the following in a section titled "Shift Change - Weather Briefing:"

It is the pilot's responsibility to obtain a current and forecasted weather brief[ing] at the beginning of each shift. A weather briefing will take place between the pilot and a REACH communications specialist. The briefing will include concerns, alternate rendezvous points and/or landing zones. The following items must be communicated during the briefing:

- Current weather information
- Forecasted weather information
- If IFR, alternate rendezvous airports, landing zones, and specific concerns
- Altitude restrictions secondary to weather

When weather conditions both current and/or forecasted requires the use of IFR, then discussion regarding routing, potential rendezvous airports and/or landing zones shall be determined. Upon receiving a request to transport or respond to a scene call in IFR conditions, the pilot must be contacted immediately. The pilot shall determine whether or not he is able to fly in the current weather conditions. If the pilot declines the flight due to weather, the communication specialist must then follow the declined flight algorithm and policy.

According to REACH, there was no indication that the pilot communicated the weather conditions in the Ukiah/Willits area to a communications specialist prior to departure on the accident flight. REACH personnel also indicated that doing so is not required for a VFR flight and that the policy is intended only to facilitate ground transportation planning between the pilot/crew and communication specialist.

The REACH SOP manual also indicates that if a flight has to deviate from its original destination, the pilot must communicate the circumstances to the dispatch office by the most expeditious means available and provide the following information:

- New destination
- Reason for new destination
- What help will be required to facilitate transporting the patient to the original destination

The pilot is then responsible for communicating the flight status change to the medical crew and dispatch.

The REACH Policy manual acknowledges the difficulties and challenges of conducting EMS missions and highlights night and inclement weather. The company's policy states that the pilot is ultimately responsible for the safe operation of the aircraft and that the company's mission can be performed safely through proper training, teamwork, and good communication in the actions and decisions made by the pilot and medical crew. The policy emphasizes that medical crewmembers are not just passengers and that they are the "pilot's eyes for the left, right and rear area around the aircraft during flight." The policy emphasizes that the flight regime demands that all of the crewmembers participate in all phases of flight and that complacency could result in serious injury or death. The policy states that the crewmembers must actively participate in all of the flight segments. The policy further states that the overall goal of crew coordination efforts is to reduce "uncertainty by pre-planning a margin of error for unexpected events."

The SOP manual's Operations Aviation, General section, titled "Rotor Wing New Pilot Hires - VFR Minimums," stated the following:

During the first 2 months of operation, the weather minimums are more stringent than the company minimums. In part, the weather minimums for NIGHT CROSS COUNTRY are ceiling 1,200 feet agl and visibility 4 statute miles (sm). The pilot is further restricted to daytime only rotations. Once the pilot has completed the required training, the subsequent year is spent operating with higher IFR weather minimums.

The SOP section titled "Preflight Planning/Performance Expectation" stated the following:

The pilot is required to receive a standard weather briefing, print it out, and have it available during flight. Weather information should be updated as necessary. One of the items for weather evaluation is whether or not the flight can be conducted under VFR or IFR conditions. If the flight does not meet the company's VFR limitations, then the pilot considers if an IFR flight can be made with in company limitations. Once the determination has been made that a VFR and IFR flight cannot be made, the pilot will evaluate if there are alternatives available that will allow the completion of the mission.

The SOP section titled "Safety, General Emergency Procedures" stated the following:

The Director of Safety publishes a document addressing emergency procedures, ground training, and drill scenarios each month. There were no procedures called out addressing

inadvertent IMC drills.

The SOP section, titled "Safety, Rotor Wing Helicopter Inadvertent IMC Procedures" stated the following:

During the pilot's initial new hire training, ground school, and flight training, recovery procedures for inadvertent IMC are addressed. Recurrent inadvertent IMC training is then conducted on a semi-annual basis, and is documented in the pilot's training records. When operating in IMC conditions, the pilot should prepare the cockpit for an IMC encounter by setting communication radios to the appropriate ATC/approach/center frequency and dispatch/other appropriate frequency, and navigation radios to the appropriate/closest VOR frequency and the next appropriate/closest VOR frequency. If there is an inadvertent IMC encounter, the pilot should follow the company's procedures of CONTROL: "wings level and pitch attitude neutral, then CLIMB: use climb power ([maximum] continuous torque or TOT [turbine outlet temperature], whichever occurs first), obtain Vy [best rate of climb] speed of 60 knots IAS [indicated airspeed] and then turn to a heading of least terrain. To minimize workload, use the autopilot for these functions. If unsure of terrain, consider a continuous 360-degree climbing turn; however, you may only perform this while coupled to autopilot.
THEN
COMMUNICATE: communicate situation with appropriate ATC [air traffic control] facility and request radar vectors and instrument approach to the nearest airport. Declaration of an emergency situation should be considered under these circumstances.

Regulations Addressing Destination Airport Weather Minimums

Concerning flight under IFR, 14 CFR 135.219 states the following:

No person may takeoff an aircraft under IFR or begin an IFR or over-the-top operation unless the latest weather reports or forecasts, or any combination of them, indicate that weather conditions at the estimated time of arrival at the next airport of intended landing will be at or above authorized IFR landing minimums.

Pilot Information

Certificate:	Airline transport	**Age:**	48,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	October 1, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	14143 hours (Total, all aircraft), 1670 hours (Total, this make and model), 14143 hours (Pilot In Command, all aircraft), 70 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Agusta	**Registration:**	N25RX
Model/Series:	A109A	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	7220
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	November 1, 2003 AAIP	**Certified Max Gross Wt.:**	2600 lbs
Time Since Last Inspection:	17.3 Hrs	**Engines:**	2 Turbo shaft
Airframe Total Time:	3847.5 Hrs at time of accident	**Engine Manufacturer:**	Rolls-Royce
ELT:	Installed	**Engine Model/Series:**	250-C20B
Registered Owner:	Reach Air Ambulance	**Rated Power:**	420 Horsepower
Operator:		**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	REACH	**Operator Designator Code:**	JBZA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	UKI,614 ft msl	**Distance from Accident Site:**	
Observation Time:	19:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 1500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.79 inches Hg	**Temperature/Dew Point:**	11°C / 10°C
Precipitation and Obscuration:	Light - None - Haze		
Departure Point:	UKIAH, CA (UKI)	**Type of Flight Plan Filed:**	IFR
Destination:	Willits, CA	**Type of Clearance:**	IFR
Departure Time:	19:25 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	39.287498,-123.277496

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Glenn Gathright; Federal Aviation Administration; Oakland, CA Rick Thorpe; Rolls-Royce Allison; Indianapolis, IN Vicky Spediacci; Reach Air Ambulance; Santa Rosa, CA Paolo Ferreri; Agusta Helicopters; Italy
Original Publish Date:	January 26, 2006
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=58539