National Transportation Safety Board
Aviation Accident Final Report

Location:	Whittier, AK	**Accident Number:**	ANC08FA025
Date & Time:	12/03/2007, 1718 AST	**Registration:**	N141LG
Aircraft:	Eurocopter Deutschland BK117C1	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	4 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled - Air Medical (Unspecified)		

Analysis

The commercial helicopter pilot was on a visual flight rules (VFR) 14 Code of Federal Regulations Part 135 EMS (emergency medical service) patient transfer flight from a remote medical clinic in Alaska to a hospital in Anchorage when it collided with the ocean during instrument meteorological conditions. The flight entailed flying over and near ocean waters and mountainous terrain during dusk and night conditions without lighted ground references (such as buildings and street lights) due to the uninhabited topography. With the pilot and patient were a paramedic and a nurse. While crossing over a portion of ocean approaching rising terrain, the helicopter likely encountered low ceilings and snow squalls. With the pilot unable to discern either the shore or the ocean, it is probable he flew the helicopter under control into the ocean. Pieces of the helicopter and the body of the nurse were recovered several days after the accident. The rest of the helicopter and its occupants are presumed to have sunk in the ocean. There were no distress calls received from the pilot, and no history of any significant mechanical issues with the helicopter.

The accident flight was the pilot's first flight from this clinic, and this was his first winter season flying in Alaska. He had expressed his concern to a mechanic prior to the flight about flying over the accident route and water at night, and also told the nurse to bring his night vision goggles (NVGs) to assist him in seeing terrain. The pilot also had NVGs. It is unknown what weather information the pilot had when he elected to accept the flight. He had access to a company computer, and he and other company pilots routinely did their preflight weather planning using it. There is no record that he received any preflight weather briefing from the FAA, nor contacted them for weather information prior to his departure from the clinic, or sought weather updates while en route. It was night VFR when the pilot departed the clinic, but the weather had deteriorated near the accident site in close proximity to his departure time. The nearest reporting station was about 5 miles from the accident site. About 23 minutes before the accident, it was reporting instrument meteorological conditions with snow and low ceilings.

Aerial search efforts had to be delayed due to the poor weather. Neither the operator nor the hospital provided en route weather updates, or primary dispatch services. The hospital's

procedure was to call the assigned EMS pilot to request a flight, and the pilot made the decision to either accept or reject the flight. Company procedures required that the pilot complete a risk assessment form prior to taking a flight. There was no risk assessment form found for the accident flight, and company management could not locate other risk assessment forms for previous EMS flights. An exemplar risk assessment form was completed by the NTSB investigator-in-charge using information that the pilot could reasonably expect to have known prior to accepting the flight. That information equated to a "Moderate" risk level, and required company management's concurrence to authorize the flight. Company management was not notified. The pilot was required to phone the hospital communications center at 10-minute intervals via satellite phone while en route, and when he did not call at the required time, a search was initiated.

The operator's main base was in Anchorage, and the EMS facility was in another Alaska town. The operator had not been assigned a principal operations inspector (POI) to oversee their operations until about 2 months prior to the accident. The POI had not inspected or visited the remote EMS location. Prior to the POI's assignment, the operator did not have a POI assigned for the preceding 22 months, but instead relied on various points of contact (POC) within the local FAA Flight Standards District Office to provide oversight. Investigation disclosed no evidence that any POC had visited the EMS facility. The operator also did not adhere to the proper procedures in training the accident pilot in the use of the NVGs. These discrepancies were not discovered by the FAA until after the accident. NTSB/SIR-06/01 recommended that the FAA require EMS operators to use formalized dispatch and flight-following procedures that include up-to-date weather information and assistance in flight risk assessment decisions. With a formalized dispatch and flight following process, it is probable the helicopter would have been turned around/canceled prior to entering instrument meteorological conditions (IMC), or due to the noncritical nature of the patient, the patient could have waited until an airplane was available that was capable of flying in IMC.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision to continue VFR flight into night instrument meteorological conditions. Contributing to the accident were the operator's failure to adhere to an FAA-approved and mandated safety risk management program, the FAA's failure to provide sufficient oversight of the operator to ensure they were in compliance with the risk management program, the pilot's lack of experience in night winter operations in Alaska, and the operator's lack of an EMS dispatch and flight following system.

Findings

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

Findings
1. WEATHER CONDITION - SNOW
2. WEATHER CONDITION - OBSCURATION
3. (C) FLIGHT INTO ADVERSE WEATHER - CONTINUED - PILOT IN COMMAND
4. (F) PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND
5. (F) PROCEDURE INADEQUATE - COMPANY/OPERATOR MANAGEMENT
6. (F) INADEQUATE SURVEILLANCE OF OPERATION - FAA(ORGANIZATION)
7. (F) DISPATCH PROCEDURES - INADEQUATE - COMPANY/OPERATOR MANAGEMENT
8. (F) LACK OF TOTAL EXPERIENCE IN TYPE OPERATION - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: CRUISE

Findings
9. (C) ALTITUDE/CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On December 3, 2007, about 1718 Alaska standard time, a Eurocopter BK117C1 helicopter, N141LG, is presumed to have sustained substantial damage during impact with ocean waters, about 3 miles east of Whittier, Alaska. The helicopter was operated by Evergreen Alaska Helicopters, Inc., under contract to Providence Hospital, Anchorage, Alaska, under their Lifeguard Program, as a visual flight rules (VFR) patient transport flight under 14 CFR Part 135. Of the four persons aboard, the commercial pilot, paramedic, nurse, and patient, only the body of the nurse was recovered. The remaining three were not located, and are presumed to have also died. Instrument meteorological conditions prevailed in the area of the accident, and company VFR flight following procedures were in effect. The accident flight departed Cordova, Alaska, about 1640.

The helicopter was based in Soldotna, Alaska, and flew to Cordova to pickup the patient about 1340. After boarding the patient, the helicopter departed for Anchorage about 1640. During the flight from Cordova to Anchorage, the pilot communicated with the hospital's communications center at 10-minute intervals via satellite telephone. During the communications he gave the helicopter's position and estimated time of arrival in Anchorage. The helicopter was reported missing when the pilot failed to make a required position report, and attempts to communicate with him failed.

On the evening of December 3, the Alaska Rescue Coordination Center (ARCC) initiated a search for the missing helicopter. Initially, search efforts were restricted to watercraft due to weather in the search area. The following day both aircraft and watercraft carried on the search, as well as ground searchers on land. On December 8, the body of the nurse and some wreckage were found floating in Passage Canal near Whittier. On December 10, the active search for the helicopter and its three missing occupants was terminated.

The flight from Cordova to Anchorage required flying over/near the ocean waters of Prince William Sound. Prince William Sound is an isolated area with no roads, few small towns/villages, and essentially no land or water-based lights. For patient transfers from Cordova to Anchorage, Providence hospital routinely used airplanes operating under instrument flight rules as the preferred transportation method. The use of the helicopter was the last option. Helicopter flights operate under visual flight rules only.

The VFR flight in a helicopter from Cordova to Anchorage typically would follow the north and east boundary of Prince William Sound to avoid extended flight over water.

The accident flight departed Cordova about 1640, and official sunset was 1548. Federal Air Regulation Part 135.205(a) states: No person may operate a helicopter under VFR unless that person has visual surface reference, or at night, visual surface light reference, sufficient to safely control the helicopter.

DAMAGE TO AIRCRAFT

To date, the only pieces of helicopter wreckage recovered are fragmented pieces of the main rotor blades, and the aft left cabin door. Two flight helmets belonging to the flight nurse and the pilot were found floating in the surf. Night vision goggles were attached to the helmets via

lanyards. The NVG switches were found in the "ON" position.

PERSONNEL INFORMATION

No personal flight records for the pilot were discovered for examination, and the following information was taken from operator and FAA records.

The pilot held a commercial pilot's certificate, with ratings for airplane single-engine land, helicopter, and instrument helicopter. An FAA second class medical certificate was issued to the pilot on January 29, 2007, with the limitation that he must wear corrective lenses. The pilot was hired by Evergreen Helicopters on April 16, 2007. At the time of the accident he had about 2,678 hours of flying experience. Of those hours, about 2,398 were in helicopters, and about 120 hours were in the same make and model as the accident helicopter. The pilot had 65 hours of night flying experience, 78 hours of simulated instrument flight, and 18 hours of actual instrument flight time. He accumulated about 70 hours of Alaska time working for another operator during the summer in Southeast Alaska, and 109 hours with the current operator for a total of 179 hours of Alaska time. He had not previously flown during the winter months in Alaska.

For night vision goggle (NVG) training he had flown three flights for 5.0 hours total flight time. The flights included inadvertent IMC procedures, and unusual attitude recovery. The NVG training was begun on August 20, and completed on August 22, 2007. According to the FAA, the pilot did not complete the NVG training as prescribed by the vendor/trainer, which according to the trainer, required five separate flights for a total of at least 5 hours of flight time, and therefore the pilot was not qualified to use NVG. The FAA had not assigned a Principal Operations Inspector (POI) to the operator at the time of the NVG training, and did not cancel the pilot's NVG usage, as the discrepancy was not discovered until after the accident. According to the operator, they understood that the pilot required 5 hours of NVG flight, not specifically five flights, and therefore they believed the pilot was trained to qualification.

Route training was provided to the pilot during his local area familiarization flights, however Cordova was not included in that familiarization training. No evidence was discovered showing that the pilot had ever flown to or from Cordova.

The pilot completed and passed a Federal Air Regulation Part 135.293/299 Airman Competency Check ride on May 8, 2007, given by a company check airman. The check ride included instrument navigation and communications procedures, use of the auto pilot, inadvertent IMC procedures, and unusual attitude recovery. The accident pilot held an instrument rotorcraft certificate, but was not required to be IFR current.

According to the check pilot, the accident pilot was a capable pilot, and current in all of his required pilot tasks and training.

The pilot's weather training consisted of completing the operator's interactive computer module, which was completed on May 5, 2007.

The operator's pilot training manual contains a section titled, "Special Subjects Training - For Additional Pilot Authorizations." Additional training subjects include underwater evacuation and ditching; however, the training was not required for the EMS helicopter position and was not provided to the accident pilot or crew.

The medical flight crews received formal training from the operator, in the operation of some helicopter systems, principally communications, patient care relative to flight, airspace

surveillance, NVG usage, and emergency procedures. Essentially, medical flight crewmembers who had flown with the accident pilot, felt he was conscientious, professional, and a good pilot. One crewmember said on one occasion, he and the pilot got into severe turbulence, and after the flight the pilot was visibly shaken, as was he. Another crewmember said he was concerned about the number of days in a row the pilots worked 12 hour shifts, and wrote a letter to his supervisor because he was concerned that the accident pilot was making mistakes due to fatigue. The letter was forwarded to the operator, and the pilots were give additional days off.

OPERATOR INFORMATION

Evergreen International is a multinational aviation company supporting hundreds of aircraft worldwide. At the time of the accident, Evergreen Alaska Helicopters, Inc., a subsidiary of Evergreen International, supported numerous helicopter operations throughout Alaska, including two dedicated EMS helicopters, both of which were contracted to Lifeguard, Providence Hospital.

The accident helicopter was stationed at Providence Hospital, Soldotna, Alaska, and designated for day/night VFR operations only.

At the time of the accident, operational control of flight operations was specified in the company's FAA-approved Operations Specifications. The specifications stated in part, "...operational control is named management personnel to include Chief Pilot, Director of Maintenance, Chief Inspector, and Director of Operations." Under paragraph 7(a), the operations specification stated in part, "...prior to the certificate holder conducting any flight operation under Part 135, the certificate holder must provide information to the designated pilot in command that indicates which flight or series of flights will be conducted under Part 135, that indicates which Part 91 flights will be conducted by the certificate holder, and that the certificate holder is accountable and responsible for the safe operations of these flights or series of flights." According to the operator, all flights for Providence Hospital were conducted under Part 135.

According to the company operations manual Chapter 10, page 4, Pilot in Command: "The Director of Operations and the Pilot in Command are jointly responsible for the initiating, continuation, diversion, and termination of a flight in compliance with Regulations and Evergreen's Operations Specifications."

The crew for the helicopter at Soldotna was a single pilot, and usually two medical crewmembers. The pilot has numerous tools to conduct flight operations, including computer access to weather data, and company operations specifications and procedures.

Pilots received an annual Part 135 check ride, and annual safety training. The company did make a helicopter and fuel available for pilots who wanted to stay instrument current. The instrument training/currency was voluntary. No evidence was presented showing that the accident pilot was instrument current.

At the time of the accident, the company operations manual stated that when inadvertent IFR was encountered, the pilot’s primary responsibility was to maintain attitude control (level the helicopter), heading control (turn to avoid known obstacles), add climb power, and attain climb airspeed. The pilot should then climb to the area’s minimum safe altitude, make no turns greater than a standard rate turn, and contact ATC/FSS.

Aviation Flight Risk Evaluation Program

The operator had a flight risk evaluation program with an associated form to be completed by the pilot and filed at the main office in Anchorage. There was no continuity among the pilots interviewed as to when and how the form was filled out. Some pilots filled the form out as a daily risk evaluation, while others filled it out for each flight. The remaining Soldotna-based pilot said he left the completed forms with other paperwork destined for the main office, but did not know what became of them. The chief pilot at the main office was not able to locate the completed forms, and no form for the accident flight was presented.

The risk evaluation program used a point system divided among categories, such as administrative, equipment, crew, weather, and environment. Selected elements are given a point value, and the total point value is assigned a risk factor, such as low, caution, medium, and high, etc. There is a required action associated with each risk factor. For instance, low requires pilot concurrence, caution requires the pilot to take steps to lower/reduce the risk, and medium requires management concurrence with the pilot to initiate the flight. Using the operator's form, and the conditions present for the accident flight that the pilot knew, or should have known at the time of evaluation prior to the flight, the point value reached the medium risk level. A medium risk level flight required concurrence from operator management to proceed. The pilot did not contact his management for concurrence.

Weather Minimums

The pilot was operating in Class G airspace, and the Part 135 VFR visibility requirements for night cross-country flight during Helicopter Emergency Medical Services (HEMS) flights in Class G airspace using NVG were 1,000 feet and 3 miles. At the time of the accident, these minimums were included in the company operations specifications.

AIRCRAFT INFORMATION

The helicopter was a 2003 model year, Eurocopter GMBH BK117C1, twin-engine turbine helicopter. According to the operator's records, at the time of the accident the helicopter had about 11,021 hours of flight time. It was maintained under an Approved Airworthiness Inspection Program (AAIP), and the last inspection was completed November 19, 2007. The helicopter was equipped for instrument flight. An examination of the airframe and engine log books revealed no known mechanical anomalies.

The helicopter was configured as an air ambulance. Among other equipment, it contained communications equipment, seating for the medical crew, stretchers for patients, medical monitors, medical equipment, and on-board oxygen.

The helicopter was certified for day/night VFR flight by one pilot. It had standard instrumentation for instrument flight, and was certified for single-pilot instrument operations. The helicopter was not equipped with emergency pop-out floats, and none were required by the FAR.

METEOROLOGICAL INFORMATION

VFR conditions prevailed along the route of flight from Soldotna to Cordova, and at the time of departure from Cordova, but instrument flight rules (IFR) conditions developed in Whittier after the helicopter departed Cordova. FAA weather cameras at Whittier/Portage Pass, pointed south toward Prince William Sound, showed rapidly deteriorating weather in the area of Whittier, and Portage Pass, just before sunset at 1548 Alaska standard time. After sunset the weather cameras were unusable.

The weather reporting stations along/near the route of flight from Cordova to Anchorage, principally Whittier and Portage were automated stations. Automated stations can be accessed via computer, by telephone, or aircraft radio. When accessed by telephone or aircraft radio they provide current weather conditions being sensed at the time of the contact. In addition, the FAA maintained a series of weather cameras in select areas accessible through the Internet and Flight Service Stations. Telephone and computer records showed that the pilot used the telephone to contact the automated reporting sites, as well as Internet resources to gather information about the weather conditions along the route of flight prior to leaving Soldotna. He did not contact an FAA flight service station for a complete weather briefing. No records were discovered showing that the pilot accessed any weather sites after departing Soldotna.

The closest weather reporting station to the accident site was the automated weather station at Whittier, about 5 miles west of the suspected accident location. The 1655 AST observation, about 23 minutes prior to the estimated time of the accident, reported 1 mile visibility in light snow and mist, ceiling obscured, vertical visibility 300 feet, wind from 120 degrees at 6 knots, temperature and dew point 22 degrees F, altimeter setting 29.46 inches of HG.

Another helicopter transited the Whittier/Portage Pass portion of the route about 2 hours prior to the accident helicopter. The pilot of that helicopter described weather conditions as waves of snow squalls and near zero visibility. He said during daylight hours he was able to see snow squalls ahead and behind, and had to land his helicopter several time to wait out the squalls.

No pilot reports appropriate to the area and time of the accident were found.

COMMUNICATIONS

The EMS dispatch center is located at Providence Hospital, and staffed by hospital employees. There were no employees of the helicopter operator involved in the dispatch operation. The dispatchers processed requests for transportation, but did not make any decisions relative to the transport. Dispatchers are given a list of aircraft available for transport from each facility. The list has an order of preference i.e. first choice, second choice, etc. Dispatchers do not make decisions on the appropriateness of particular aircraft based on distance, weather, time of day, or criticality of the patient. Once a third choice aircraft is dispatched, in this instance the helicopter, no further steps are taken to reassign a more appropriate aircraft, or divert a more appropriate aircraft if one becomes available.

The flight dispatch process consisted of the pilot being asked by the hospital's communications center personnel if he/she could make a flight between two locations, and the pilot completing the operator's flight risk form. Once the flight is requested, the pilot is responsible for gathering and interpreting weather information and determining its relevance to the flight. The pilot then notifies the communications center whether he/she will accept the flight request.

During the last satellite telephone communication between the hospital dispatch center and the pilot, the pilot said that they were about 25 miles east of Whittier, and estimated their arrival in 27 minutes. When the helicopter did not check-in 10 minutes later, a communications search began.

The operator, Evergreen, does not actively participate in flight following, or the en route communications process, and participation is not required by CFR Part 135.

WRECKAGE AND IMPACT INFORMATION

The impact area was believed to be the ocean waters of Prince William Sound in the area of

Passage Canal near Whittier. The largest piece of wreckage recovered was the intact, aft left cabin sliding door. The door's latch was found in the closed position. The emergency door release was in place. The emergency window release was in place. The center portion of the plexi-glass door window was broken out. The door was a sliding type, and the door sliders/rollers were intact.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the nurse under the authority of the Alaska State Medical Examiner, 4500 South Boniface Parkway, Anchorage, Alaska, on December 5, 2007. The examination revealed the cause of his death was salt water drowning. He had minimal, non-life threatening traumatic injuries.

SURVIVAL ASPECTS

The helicopter's missions could include flight over/near fresh/salt water at night. The helicopter was not equipped with emergency pop-out floats, a self-deploying emergency beacon, or a raft. The crew was not required to wear flotation devices, or survival suits. Saltwater temperatures in Alaska typically range from 33-43 degrees F. The flight crew's training did not include underwater egress training. The nurse, the only individual recovered from the water, was voluntarily wearing a float coat. The crew was required to wear helmets, and the nurse's and the pilot's helmets were recovered from the water. The helmets were fitted with a dense foam layer for comfort/fit, which provided buoyancy to the helmets. Neither helmet had discernible impact damage.

ADDITIONAL INFORMATION

Basic Operation - Patient Transfer Flight

Unlike most of the 48 contiguous states, most clinics and hospital facilities are not connected by roads, or the distances are so great, that "routine" patient transfers are frequently accomplished by aircraft.

When a patient's medical caregiver determines that they can no longer provide an appropriate level of care for the patient, a facility with the appropriate level of care is notified, and the decision to transport is made by the sending and receiving caregivers. The transport may, or may not, be critical. At Providence Hospital, prior to the accident flight, a generic request for transfer was sent to the hospital's communications center. In this case, predetermined by policy, the first and second choice for patient transport from Cordova, were airplanes, and the helicopter was the third choice, due to the crossing of Prince William Sound. Prior to requesting the helicopter, the communications center noted that the airplanes had accepted other assignments.

Providence Hospital contracted with one operator for airplane flights, and a different operator for helicopter flights. There was no interface between the two operators, and the communications center did not reroute an airplane when one became available. Providence Hospital communications center did not have a central point of contact with aviation expertise, to either assess the need for transport in relation to resources available, or to facilitate a collaborative process with the aviation transport providers about the appropriate use of aviation assets. The helicopter pilot accepted the flight, knowing that he would have to cross Prince William Sound after dark. EMS pilots are not told the criticality or nature of a patient,

because it might impair their judgment with respect to making the flight. After the helicopter took off from Soldotna, one of the airplane missions was canceled. Because there was no active oversight of the operation as a whole, the airplane was not diverted to Cordova, and the helicopter continued.

Hospital administration said that the safe conduct of a patient transfer flight was the responsibility of the helicopter operator.

Interviews - Helicopter Operator

Interviews were conducted with five of the operator's other pilots. One experienced pilot said he would not have accepted a transport over Prince William Sound at night, due to lack of ground reference lights, and lack of available weather information. Other than the operator's check pilot, none of the pilots had flown with the accident pilot.

A company mechanic stationed in Soldotna, who saw the pilot preparing for the flight to Cordova, said the pilot was apprehensive about flying over Prince William Sound after dark from Cordova to Anchorage, and the pilot advised the rest of the crew to make sure they took their night vision goggles.

Research

Federal Air Regulation Part 135.183 states: No person may operate a land aircraft carrying passengers over water unless; (a) it is operated at an altitude that allows it to reach land in the case of an engine failure; (b) it is necessary for takeoff or landing; (c) it is a multi-engine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative, at least 50 feet per minute, at an altitude of 1,000 feet above the surface; or (d) it is a helicopter equipped with helicopter flotation devices.

HEMS Flight and Duty Time

The HEMS program was developed by the FAA to acquaint their inspectors with special characteristics associated with EMS helicopter operations. According to the operator, their helicopter was operated under 14 CFR Part 135, and not under the HEMS guidelines.

Title 14, CFR Part 135.271, in part, describes the applicability of flight crewmembers assigned to HEMS flights, and specifies flight time and duty time limitations. Flight crewmembers may not accept an assignment for flight time if that crewmember's total time in all commercial flight will exceed 500 hours in any calendar quarter, 800 hours in any two consecutive calendar quarters, and 1,400 hours in any calendar year. A pilot must have 10 consecutive hours of rest immediately preceding reporting to the hospital for duty. Crewmember’s flight time during any 24 consecutive hours is limited to 8 hours unless an emergency evacuation operation is prolonged. Each crewmember who exceeds the 8 hour daily flight time limit, must be relieved of the HEMS assignment immediately upon completion of the emergency evacuation operation, and must be given a rest period of at least 12 consecutive hours for an assignment of less than 48 hours, and at least 16 consecutive hours for an assignment of more than 48 hours.

Each flight crewmember must receive at least 8 hours of rest during any 24 consecutive hour period of a HEMS assignment. A flight crewmember must be relieved of the HEMS assignment if he cannot receive at least 8 consecutive hours of rest during any 24 consecutive hour period

of a HEMS assignment. A HEMS assignment may not exceed 72 consecutive hours at the hospital. The operator may not assign any other duties to the flight crewmember during a HEMS assignment. The operator must provide at least 13 rest periods of at least 24 consecutive hours in each calendar quarter.

CFR Part 135.273 defines duty period and rest time limitations, and defines a calendar day as beginning at midnight and ends 24 hours later at the next midnight. Duty period means the period of time between reporting for an assignment involving flight time, and release from that assignment. Rest period means the period free of all responsibility for work or duty.

Essentially, there were two pilots assigned to the accident helicopter to cover 24 hours a day, 7 days a week, with intermittent relief by other company pilots. The operator had told Providence Hospital that additional pilots were qualified and available for pilot relief, but interviews with the other pilots revealed that although qualified in the accident helicopter, they were employed flying other helicopters for the operator fulltime, and were not typically available for routine pilot relief.

The pilots maintained their own shift logs, and the operator was not able to find the accident pilot's shift log for the month of November. They said he had not turned it in prior to the accident flight. The operator suspected that the shift logs were in the helicopter, and not recovered. A review of the accident pilot's shift logs from April 2007 through October 2007 showed that days on and off varied widely. As an example, during June and July the pilot worked 14 days on, had 14 days off, worked 29 days on, had one day off, then worked another 12 days on. According to payroll records, the day of the accident was the pilot's twentieth shift, and he had nine more shifts until his days off. Under CFR Part 135.267(f), the certificate holder must provide each flight crewmember at least 13 rest periods of at least 24 consecutive hours each in each calendar quarter. The operator's scheduling method met the minimum requirement for rest periods during a calendar quarter as required by the regulation. The operator did have two additional pilots in training, and was planning to assign them to the Soldotna helicopter.

On January 26, 2006, the NTSB published Special Investigation Report - Emergency Medical Services Operations (NTSB/SIR-06/01). The report profiled 55 EMS aircraft accidents that occurred between January 2002, and January 2005. During the accident study, the NTSB identified commonalities, and as a result, the NTSB issued six findings, and made four recommendations to the FAA.

The first recommendation (A-06-12) dealt with Part 135 operations and positioning flights, and does not relate to this accident.

The second recommendation (A-06-13) would require all EMS operators to develop and implement a flight risk evaluation program. The operator in this accident did have such a program in place, however, interviews with pilots and top management personnel revealed that the program was not well understood, and not monitored. As noted, no risk evaluation form was discovered for the accident flight, but the accident flight would have qualified in the medium risk category, which required concurrence at a higher level than the pilot. No concurrence was requested.

The third recommendation (A-06-14) would require EMS operators to use formalized dispatch and flight-following procedures that include up-to-date weather information and assistance in

flight risk assessment decisions. The hospital communications center provided rudimentary satellite telephone flight-following, but had no responsibility for providing flight risk information or weather to the pilot. After normal business hours, the operator provided an off-duty supervisor for flight concurrence via telephone. The operator does not actively monitor flights. The automated weather stations at Whittier Airport (PAWR) and Portage Glacier (PATO) provided real-time weather data after the helicopter departed Cordova that the pilot or dispatcher could have accessed via telephone or radio during the flight. According to the automated stations, the weather along the route of flight had deteriorated, and was below the VFR weather minimums required by the operator's Operations Specification (OPSPEC) of 3 miles visibility and 1,000 foot ceiling with the use of night vision goggles.

The fourth recommendation (A-06-15) would require EMS operators to install terrain awareness and warning systems (TAWS) in their aircraft. The accident helicopter was equipped with a Enhanced Ground Proximity Warning System.

FAA Operations

Typically the FAA assigns a Principal Operations Inspector (POI) to each operator. The POI may be assigned to as many as 40 individual operators, depending on the size and complexity of each operator. Evergreen was assigned a POI in October of 2007. Prior to that, Evergreen did not have an assigned POI for 22 months. During that time, in lieu of a POI, Evergreen was given FAA points of contact (POC).

Annually, a POI is given a list of required inspection items for each operator, and oversees operational changes for the operator. Additionally, the POI may engage in other surveillance or inspections as necessary.

In the absence of a POI, the required inspection items are accomplished by the POC, or other FAA personnel as assigned. According to the FAA, all of Evergreen's required inspections were completed. Other surveillance or inspections may not be accomplished in the absence of a POI.

The POI assigned to Evergreen in October was sent to Panama to certify airplanes, which were going to be put on Evergreen Alaska's certificate. He said he was in Panama at the time of the accident, and that prior to leaving for Panama, he had not made any inspections of Evergreen.

FAA Notice N8000.293: Helicopter Emergency Medical Services (HEMS) Operations was issued with the intent to provide guidance for POIs in specialties regarding the HEMS operators that they supervise. According to the current POI assigned to the operator, the HEMS process was considered a subset of the required inspection process, but in the absence of a POI, only the required inspections were completed.

The NTSB IIC requested FAA Program Tracking and Reporting Subsystem (PTRS) records for the operator. The FAA provided 21 records covering the fiscal year from October 2007 through October 2008, of which 10 applied to helicopters. Four of the helicopter records were required inspection items. Of the four PTRS records, one was a review of the operator's operations manual, one was a pilot ramp check, one was an approval of a training program revision, and the final record was a review of the operator's dispatch flight-following procedures. According to an FAA supervisor, an inspection of the Soldotna base would not have been a required inspection item, and during the 22 months without a POI, only required inspections were performed. Also, the POI assigned in October 2007, did not visit or inspect the Soldotna EMS base.

OTHER INFORMATION

The weather conditions that existed at the accident site during the time of the accident were estimated to be: 1 mile visibility in light snow and mist, ceiling obscured, vertical visibility 300 feet, wind from 120 degrees at 6 knots. Dark night conditions prevailed. The helicopter was equipped with an Enhanced Ground Proximity Warning System (EGPWS). The pilot was using a night vision goggles (NVG) during the flight. A radar altimeter was installed on the helicopter. The accident flight was not being tracked by an automated flight following program, and did not receive flight dispatch services prior to the initiation of the flight. A formal flight risk assessment form was supposed to be completed prior to the flight. No completed form was discovered.

On February 7, 2006, the NTSB issued four safety recommendations to the FAA addressing EMS operations. They are as follows:

NTSB Recommendation No. A-06-12 - Require all EMS operators to comply with 14 CFR Part 135 operations specifications during the conduct of all flights with medical personnel onboard.

NTSB Recommendation No. A-06-13 - Require all EMS operators to develop and implement flight risk evaluation programs that include training all employees involved in the operation, procedures that support the systematic evaluation of flight risks, and consultation with others trained in EMS flight operations if the risks reach a predefined level.

NTSB Recommendation No. A-06-14 - Require EMS operators to use formalized dispatch and flight-following procedures that include up-to-date weather information and assistance in flight risk assessment decisions.

NTSB Recommendation No. A-06-15 - Require EMS operators to install terrain awareness and warning systems on their aircraft and to provide adequate training to ensure that flight crews are capable of using the systems to safely conduct EMS operations.

These four recommendations were also placed on the NTSB's "Most Wanted List of Safety Improvements" in October 2008.

Additionally, the NTSB stated in its January 2006 Special Investigation Report on EMS Operations that they were pleased that the FAA encouraged the use of night vision imaging systems in EMS operations, and that the NTSB would continue to monitor the applicability and usage of these devices in the EMS industry.

Also, on December 21, 2007, the NTSB issued two safety recommendations to the FAA regarding the use of radar altimeters in EMS night operations. They are as follows:

NTSB Recommendation No. A-07-111 - Require helicopter EMS operators to install radar altimeters in all helicopters used in HEMS night operations.

NTSB Recommendation No. A-07-112 - Ensure that the minimum equipment lists for helicopters used in helicopter EMS operations require that radar altimeters be operable during flights conducted at night.

Pilot Information

Certificate:	Commercial	**Age:**	42, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With Waivers/Limitations	**Last Medical Exam:**	01/01/2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	08/01/2007
Flight Time:	2678 hours (Total, all aircraft), 120 hours (Total, this make and model), 2439 hours (Pilot In Command, all aircraft), 49 hours (Last 90 days, all aircraft), 26 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Eurocopter Deutschland	**Registration:**	N141LG
Model/Series:	BK117C1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	7503
Landing Gear Type:	Skid	**Seats:**	6
Date/Type of Last Inspection:	11/01/2007, AAIP	**Certified Max Gross Wt.:**	7385 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo Shaft
Airframe Total Time:	11021 Hours	**Engine Manufacturer:**	Turbomeca
ELT:	Installed, not activated	**Engine Model/Series:**	Arriel 1E2
Registered Owner:	EVERGREEN HELICOPTERS OF ALASKA INC	**Rated Power:**	700 hp
Operator:	EVERGREEN HELICOPTERS OF ALASKA INC	**Air Carrier Operating Certificate:**	On-demand Air Taxi (135)
Operator Does Business As:	Evergreen Helicopters of Alaska, Inc.	**Operator Designator Code:**	EHAA

Meteorological Information and Flight Plan

Observation Facility, Elevation:	PAWR	**Observation Time:**	1655 AST
Distance from Accident Site:		**Condition of Light:**	Night
Direction from Accident Site:		**Conditions at Accident Site:**	Instrument Conditions
Lowest Cloud Condition:	Partial Obscuration / 300 ft agl	**Temperature/Dew Point:**	-6°C / -6°C
Lowest Ceiling:	Obscured / 300 ft agl	**Visibility**	1 Miles
Wind Speed/Gusts, Direction:	6 knots, 120°	**Visibility (RVR):**	
Altimeter Setting:	29.46 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	Moderate - Showers - Snow		
Departure Point:	Cordova, AK (CKU)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Anchorage, AK	**Type of Clearance:**	None
Departure Time:	1630 ADT	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	3 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal		

Administrative Information

Investigator In Charge (IIC):	Lawrence Lewis	**Adopted Date:**	01/15/2009
Additional Participating Persons:	Don Duncan; Anchorage FSDO-03; Anchorage, AK		
Publish Date:	11/17/2009		
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.