National Transportation Safety Board

Office of Aviation Safety

Washington, DC

October 31, 2010

Survival Factors Group Chairman's Factual Report of Investigation

A.	**Accident**	**:**	**ANC10MA068**
	Location	:	10 miles northeast of Aleknagik, Alaska
	Date	:	August 9, 2010
	Time	:	~ 1442 ADT [1]
	Airplane	:	DeHavilland DHC-3T, N455A
	Operator	:	GCI Communications Corporation.

[1] All times are reported in Alaska Daylight Time unless otherwise noted.

B. Survival Factors Group

Chairman	:	Mark H. George National Transportation Safety Board Washington, DC
Member	:	Leonard E. Wallner Alaska State Troopers Anchorage, AK

C. Summary

On August 9, 2010, about 1442 Alaska Daylight Time, a single engine, turbine-powered, amphibious, float-equipped de Havilland DHC-3T airplane, N455A, impacted mountainous tree-covered terrain, about 10 miles northeast of Aleknagik, Alaska. Of the nine people aboard, the airline transport pilot and four passengers died at the scene, and four passengers sustained serious injuries. The airplane sustained substantial damage. The flight was operated by GCI Communications Corporation (GCI), Anchorage, Alaska, under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91. The flight originated at a GCI-owned remote fishing lodge on the southwest shoreline of Lake Nerka about 1427 and was en route to a remote sport fishing camp on the banks of the Nushagak River, about 52 miles southeast of the GCI lodge. At the time of the accident, marginal visual meteorological conditions were reported at the Dillingham Airport, about 18 miles south of the accident site. No flight plan was filed.

D. Details of the Investigation

1.0 Airplane Configuration

The airplane was configured with 9 passenger seats and 2 pilot seats. (Figure 1). There was a floor-level passenger door on the left side of the cabin and a floor-level passenger exit on the right side of the cabin. On the accident flight, the pilot occupied seat 1, and a passenger was in seat 2.

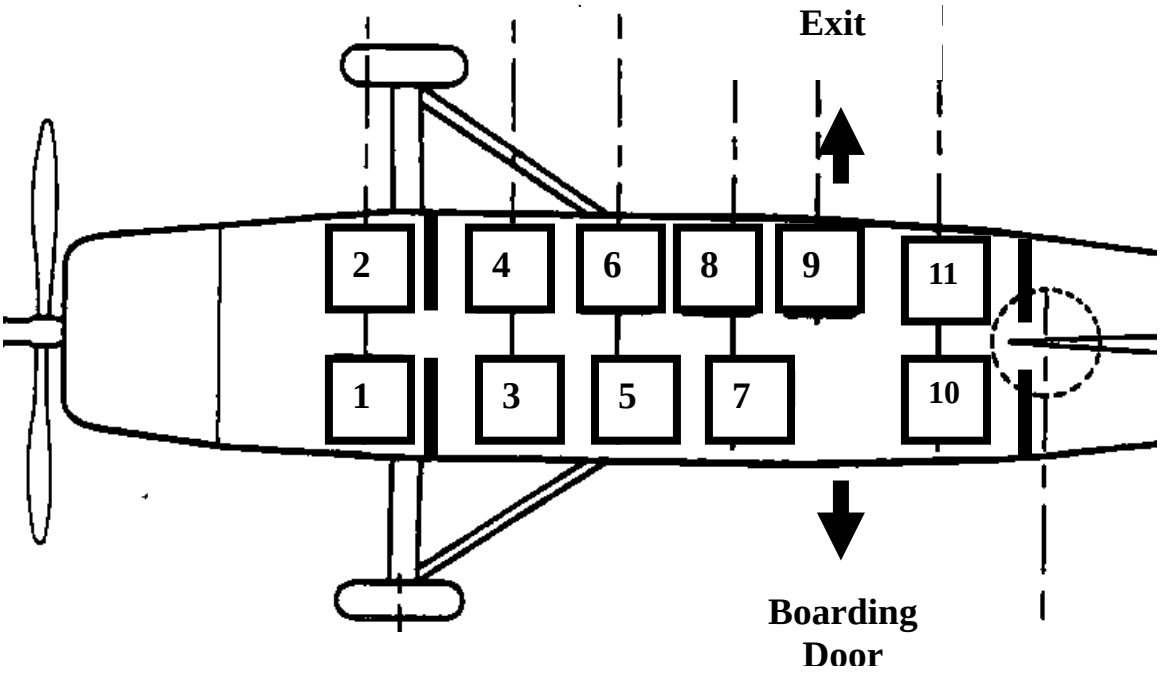

Figure 1. DHC-3 cabin configuration

2.0 Description of Site

Refer to the Airworthiness Group Chairman's Field Report for a description of the accident site.

3.0 Airplane Documentation

Refer to the Airworthiness Group Chairman's Field Report for airplane documentation.

3.1 Crashworthiness Certification

The DHC-3 Otter airplane was first type certificated in Canada on November 7, 1952, and was issued US Type Certificate No. 815 under Civil Air Regulation (CAR) 10[2] and CAR 3 (as amended to November 1, 1949) in 1955. CAR 3.386 *Protection*, specified:

> The ultimate accelerations to which occupants are assumed to be subjected shall be as follows:

[2] CAR Part 10 permits the Administrator of Civil Aeronautics to issue certificates and approvals upon certification of a foreign government with which the United States has a reciprocal agreement that the aircraft, product, etc., meets the standards prescribed in the Civil Air Regulations for aircraft, products, built in the United States or other standards which give the same level of airworthiness.

	Normal, Utility	Acrobatic
Upward	3.0g	4.5g
Forward	9.0g	9.0g
Sideward	1.5g	1.5g
Downward	3.0g[3]	3.0g

CAR 3.390 *Seats and Berths*, specified:

> *(a) Passenger Seats and Berths*: All seats and berths and supporting structure shall be designed for a passenger weight of 170 pounds (190 pounds with parachute for the acrobatic and utility categories) and the maximum load factors corresponding to all specified flight and ground load conditions including the emergency conditions of CAR 3.386.
>
> *(b)Pilot seats:* Pilot seats shall be designed for the reactions resulting from the application of the pilot forces to the primary flight controls as specified in CAR 3.231.

According to AEROC (airworthiness) documents provided by Viking Air Limited[4] the DHC-3 pilot and passenger seats were demonstrated to meet the airworthiness requirements of CAR 3 in January of 1954.

The subject airplane (Otter N455A), serial number 206, was manufactured by DeHavilland Aircraft of Canada and was delivered to the original customer (India Supply Mission) on August 11, 1957.

4.0 Medical and Pathological

4.1 Injury Table

Injuries	Flight Crew	Flight Attendants	Passengers	Other	Total
Fatal	1	0	4	0	5
Serious	0	0	4	0	4
Minor	0	0	0	0	0
None	0	0	0	0	0
Total	1	0	8	0	9

[3] Actual downward loads tested at certification were 6.6g.

[4] Viking Air Limited is the current type certificate holder for the DHC-3.

4.2 Injuries

See Attachment 1 for injury information.

4.3 Fatalities

The following autopsy data was provided by the Alaska State Medical Examiner's Office. Note: passenger numbers do not correspond to seat numbers.

	Final Pathologic Diagnosis	**Cause of Death**
Pilot (62 year-old male)	1. Blunt force injury of head and neck: A. Cutaneous lacerations, abrasions, and contusions; B. Fracture of 4th cervical vertebrae. 2. Blunt force injury of trunk: A. Multiple bilateral rib fractures and sternum fracture; B. Pericardial hemorrhage, epicardial hemorrhage, and hemorrhage surrounding left anterior descending coronary artery; C. Liver laceration; D. Crushing pelvic fractures with crush injury of all pelvic structures and vessels. 3. Blunt force injury to extremities: A. Cutaneous contusion, abrasions, and lacerations; B. Open fracture of left tibia and fibula, and right tibia.	Blunt force injuries of the head, neck, trunk, and extremities.

	Final Pathologic Diagnosis	Cause of Death
Passenger 5 (16 year-old female)	Multiple blunt force injuries: 1. Head: A. Multiple skull fractures; B. Multifocal arcas of subgaleal hemorrhage; C. Crush injury, with extensive pulpification of anterior cerebral cortex; D. Diffuse subarachnoid hemorrhage ; E. Large gasping laceration of right side of face; F. Multiple abrasions, lacerations, and bruises of the face. 2. Extremities: A. Fracture of left humerus and femur; B. Multiple abraded bruises, abrasions, and bruises of upper and lower extremities. 3. Torso: A. Multiple pleural contusions; B. Right hemothorax; C. Mediastinal hemorrhage; D. Abraded bruise of left upper chest.	Multiple blunt force injuries.
Passenger 6 (48 year-old female)	Multiple blunt force injuries: 1. Torso: A. Transection of descending aorta; B. Extensive periaortic and mediastinal hemorrhage; C. Fracture of second thoracic vertebra; D. Multiple rib fractures, flail chest, with multiple areas of pleural perforation E. Hemothorax, bilateral; F. Collapse of left lung; G. Multiple contusions of right lung; H. Abraded bruises of left upper chest and lower abdomen; I. Bruise of right upper back 2. Head and Neck: A. Fractures of fourth and sixth cervical vertebrae; B. Scattered lacerations and abrasions of face; 3. Extremities: A. Fractures of left distal tibia and fibula; B. Multiple bruises and abrasions of upper and lower extremities.	Multiple blunt force injuries.

	Final Pathologic Diagnosis	Cause of Death
Passenger 7 (86 year-old male)	1. Blunt force injury of head: A. Large avulsive laceration with open complex skull fractures; B. Partial avulsion and multiple lacerations of cerebrum. 2. Blunt force injury of trunk: A. Cutaneous contusions and abrasions; B. Multiple bilateral rib fractures, sternum fracture, and vertebral fractures; C. Hemothorax; D. Aortic laceration; E. Pericardial laceration and hemorrhage; F. Pelvic fractures. 3. Blunt force injury of extremities: A. Cutaneous abrasions and contusions; B. Fractures of left metacarpal, left hip, right tibia and fibula.	Multiple blunt force injuries of the head, neck, and extremities.
Passenger 8 (56 year-old male)	1. Blunt force head trauma: A. Focal facial and scalp abrasions and upper right forehead laceration; B. Focal subgaleal hemorrhages; 2. Blunt force chest trauma: A. Fracture of upper third sternum and multiple bilateral posterior, lateral, and anterior rib fractures; B. Transected thoracic aorta (centered approximately 2 ½ inches distal from the origin of the subclavian artery) 1. Large retroaortic and mediastinal hematoma; 2. Bilateral hemothoraces. 3. Bilateral pulmonary contusions and right pulmonary puncture wounds; 4. Blunt force abdominal trauma; A. Hemoperitoneum; B. Multiply-lacerated spleen. 5. Multiple pelvic fractures with hemorrhage; 6. Dislocated right knee and right ankle; 7. Additional multiple cutaneous abrasions, contusions, and lacerations.	Multiple blunt force trauma.

5.0 Interviews

Initial passenger interviews were conducted on the dates indicated. In November 2010, each passenger was asked to review a draft summary of his interview for accuracy, and suggest necessary changes. Two passengers suggested no changes, and one passenger suggested minor clarification changes which were incorporated into the summaries. The fourth passenger included substantive changes to his original interview. The new text appears in italics in the interview summary, and the deleted text appears in Footnote 4.

5.1 Passengers

Passenger # 1
Interview #1 conducted on August 13, 2010 at Providence Alaska Medical Center, Anchorage, AK.
Conducted by Mark George, NTSB; Elias Kontanis, NTSB; Mike Richards, NTSB; and Leonard Wallner, Alaska State Troopers.
Interview #2 conducted on August 16, 2010 by telephone.
Conducted by Mark George, NTSB; Tom Little, NTSB; and Malcolm Brenner, NTSB.

Passenger #1 was a 19 year old male. He remembered that it had been raining all day but had let up before the trip to the fish camp. The weather had been worse the day before and so turbulent that he got "nauseous." He sat in the copilot's seat and had his lap belt on – no shoulder harness. He had sat in the copilot's seat on one other occasion. He said that Passenger #4 was seated in the seat behind the pilot, and Passenger #2 was seated behind Passenger #4.

The pilot gave the passengers life preservers and told them where the airplane exits were. They departed about 3:00 in the afternoon. He had made the trip to the fish camp five times before and on this trip, the pilot went a different direction during takeoff. The pilot said it was to avoid "wind and weather." They took off over the lake, then after about 10 minutes, turned right and flew over land. The visibility was "fine." It was cloudy above with light turbulence. They did not fly into clouds, they kept below them. He noticed water "running across" the outside of the windshield. There were lighted displays at the top of the airplane "dash." He went to sleep 10 -15 minutes into the flight.

When he woke up, he was lying between the pilot and copilot's seat. The copilot's seat was slanted toward the right. He saw that the pilot was not alive. Passenger #3 came to the front of the airplane and they both tried to use the radio to call for help but couldn't figure out how. This passenger eventually got to the ground outside the airplane. Passenger #1 heard Passenger #4 and another passenger further aft in the airplane. A couple of hours went by, and then he heard helicopters. A man named "Bob" climbed down the hill. About 30 - 40 minutes later, it was "pretty dark," and a female doctor arrived. "Somebody" put a tarp over him. At least two other rescuers were there also. He never saw Bob again. The doctor said they would have to wait until the next morning for the Coast Guard to rescue them.

He thought that the pilot was a "really good" pilot and a nice guy. His landings were very smooth. When he sat up front, the pilot pointed out lakes, mountain ranges, and good places to fish. Passenger #1 asked what the altitude was, and the pilot pointed that out. He heard the pilot call "someone" when they were about to take off and say, "Otter 455 alpha." On the accident flight, the pilot was in a friendly mood and alert. The pilot was not doing paperwork or reading anything while he was flying. The pilot was around the lodge while he was there, but he didn't talk to him a lot.

Passenger # 2
Interview conducted on August 13, 2010 at Providence Alaska Medical Center, Anchorage, AK. Conducted by Mark George, NTSB; Elias Kontanis, NTSB; Mike Richards, NTSB, and Leonard Wallner, Alaska State Troopers. The passenger's wife and a personal friend were also present.

Passenger # 2 was a 53 year-old male, and had never met the accident pilot before on previous trips to the lodge, although he had flown with him earlier in the week. He characterized the pilot as a serious, intense man, and was very concerned about, and aware of, weather. Passenger # 2 did not know if the pilot checked the weather before the flight on the Internet or by telephone, but the pilot left the room for a while, and when he came back, he seemed to have "more information" about the weather. Passenger #2 recalled flying to the fish camp from the lodge previously on August 7th.

The weather was bad the morning of the accident, so there was not going to be a trip to the fish camp. Passenger #2 and Passenger #8 fished on the river in front of the lodge. By about noon they had caught one rainbow trout each, so they went in for lunch. "Someone" said that the weather had cleared enough to fly to the fish camp. Passenger #2 thought that the accident pilot checked weather prior to their departure, but he was not certain. No one on the aircraft expressed any concern about the weather immediately prior to take-off or during the accident flight. The airplane took off in the same direction as during previous flights – in an approximate 10 o'clock orientation from the dock.

The adults usually offered the younger guys the copilot seat. Passenger # 1 sat in the copilot seat on the accident flight. Passenger #2 sat in the seat immediately behind the pilot. Passenger #2 thought that Passengers #3 and #4 sat behind him on the left side, but did not remember which seats they were in. He thought that Passenger # 8 was seated in the aft section of the airplane because there was more room towards the back and Passenger # 8 was a large man.

Prior to the first flight of the trip, the pilot had briefed the passengers on the location and use of the emergency exits. Life vests were handed out prior to every trip and all passengers donned the vests. Passenger #2 did not recall how far along they were in the flight when the accident occurred but believes they were 15 minutes into a 45-55 minute flight. Passenger #2 was wearing a headset, but he did not participate in any conversation that took place during the flight. He said he was "deep in his own thoughts." *He periodically looked out the window next to him, trying to catch a glimpse of wildlife*

on the ground. Once airborne, he could not see the ground, and could only see white-out conditions outside the airplane. He did not know if the airplane had climbed into clouds initially or if it had entered clouds at some point along the way. He did not recall condensation on the windows that inhibited his view, but he could not see anything but white through his window.[5] The flight was not turbulent, but was not particularly smooth. He sensed no indication of a problem with the flight prior to impact; There was no maneuvering, change in aircraft attitude, change in engine noise, discussion of a problem, expletives, or excited utterances prior to impact.

Upon impact, the aircraft stopped abruptly, and he did not feel the aircraft skid. Passenger #2 indicated that his head and upper torso moved down and to the right. During the flight, Passenger #2 wore his lap-belt snugly, but not tight across his waist. His seat was not equipped with a shoulder harness. His seatbelt remained buckled after the impact, and he unbuckled it himself in order to get into a more comfortable position. Passenger #2 thought that his seat separated from the aircraft, since, after the accident, he was on top of Passenger # 4.

After the airplane stopped, Passenger # 8 was lying flat in the aisle with his head against the forward bulkhead separating the cockpit from the cabin. Passenger # 1 was in front of him in the cockpit area, could not move, and did not say much after the accident. Passenger #2 was lying on top of Passenger # 4 and had to crawl over Passenger # 4 to reach the cabin floor. Passenger #2 then slid on his back to the rear of the airplane. When he came to rest, his neck was against the rear bulkhead. Passenger # 7 was covered in rubble and Passenger #2 did not see the two women passengers.

Passenger #2's neck hurt, he could not turn over, or get up; he felt he had no strength. At that time, he did not think that he was going to die, but he thought he may be paralyzed. Passenger #3 was the only ambulatory passenger, and he attempted to help Passenger #2 turn around to a more comfortable position. Passenger # 3 also helped Passengers # 1 and # 4. All of the survivors were in a lot of pain. Passenger # 3 could not open the boarding door on the left side of the airplane because it was crumpled. The right rear door could be opened; however, there was a substantial drop-off. Passenger # 3 got out of the airplane through an open space in the vicinity of the left boarding door. Passenger # 3 returned to the cabin and lay down next to Passenger #2.

As it started to get dark, Passenger #2 heard aircraft in the distance and thought they must be looking for the crashed airplane. When they heard the airplanes, Passenger # 3 began to wave his arm through a space in the left rear door. Approximately 1-2 hours elapsed from the time the aircraft arrived overhead to the time the aircraft landed on the top of the hill and the rescue team hiked to the accident site.

[5] As a result of the November 2010 review of his interview summary, Passenger #2 added the text in italics, and deleted the following text from his initial interview: "During the flight, the cabin was cool, and condensation formed on the inside of his window, so he could not see well through the window. He did not have any indication of weather."

He did not know how many people showed up, but Dr. Dani Bowman and some EMTs were there. Dr. Bowman and two men attempted to reposition Passenger #2. Passenger #4's legs were trapped, and several rescuers provided aid to him. Dr. Bowman administered Demerol to Passenger #4 and Passenger #2. It helped. Passenger #2 was told that the Coast Guard (CG) helicopter was not able to come, so they would have to spend the night at the accident site.

At daylight, the Coast Guard arrived at the accident site. They used the "jaws of life" to open the fuselage and remove the survivors. The CG rescuers applied a neck brace on Passenger #2 and place him onto a backboard. Passenger #2 was the first or second survivor to be removed from the wreckage and was the first loaded onto the helicopter. Passenger #2 kept his eyes closed during loading onto the helicopter due to the intense rotor-wash. He did not remember who was loaded next to him.

Passenger #2 was transported to a hospital in Dillingham, where he received "excellent" medical attention. He was then loaded onto a C-130 and transported to Anchorage.

Passenger #3
Interview conducted on September 16, 2010, at the passenger's residence in Darnestown, MD.
Conducted by Mark George, NTSB, and Elias Kontanis, NTSB. Passenger #3's mother and grandparents were also present during the interview.

Passenger #3 was a 13 year-old male. He had traveled to Alaska once a year for the past 4-5 years. He had flown in the accident airplane approximately 15 times, but had never flown with the accident pilot prior to this trip. On this trip, he had flown with the accident pilot on five flights; from Dillingham to the lodge, and then, back and forth from the lodge to the fish camp on the Nushagak River. On all trips to and from the fish camp, the pilot took the same route. Passenger # 3 noted that the accident pilot would circle the landing zone at the Nushagak River before landing, presumably looking for bears or moose. He also noted that the accident pilot's landings on water were "very smooth."

The accident pilot ate dinner with the group on a regular basis at the lodge, and seemed "nice." He did not seem "weird," or anything. Passenger # 3 only saw the pilot during meals and during flight operations, although, before the accident flight, he saw the pilot on the dock. During flights, the accident pilot would often joke over the intercom. He did not notice anything unusual about the pilot on the day of the accident.

The weather was "foggy" on the morning of the accident flight, and at about 1130-1200 local time, the party decided to not fly to the Nushagak River. However, "about an hour later" the weather cleared. At approximately 1345-1400 local time, Passenger # 3 and his father were asked if they wanted to go fishing at the fish camp. They got dressed and went to the aircraft.

At the time of departure the weather was “nice,” with no rain, and the visibility was clear enough to see the mountains, although there was “a little fog and mist around the mountains.” The takeoff was normal. The accident pilot did not provide a safety briefing before the accident flight or on the previous two flights. Other pilots he had flown with had mentioned the presence of a first aid kit and a survival kit located in the aft section of the airplane.

During the flight, Passenger # 3 could see approximately “50 yards” forward. “Some” fog was present beneath the aircraft, but he could still see water. He did not think the airplane flew into any clouds while taking off, but he did notice “clouds, fog, and condensation on the windows” early in the flight. There was minor turbulence, but no rain. He was not wearing a headset.

At the time of the accident, Passenger #3 was not wearing his seatbelt and stated that it was “common practice” to not wear a seatbelt when taking-off and landing on water. He had been told on a different trip, by a different pilot, “not to wear a seatbelt when taking off from water, so you could get out, if you needed to.” The accident pilot did not specifically tell the passengers this, but he assumed it still applied based on his past experience flying in Alaska.

Passenger #3 occupied the second seat aft (not counting the pilot’s seat) on the left side of the airplane. Either Passenger #2 or Passenger #4 occupied the seat immediately behind the pilot. The seat behind Passenger #3 (third passenger seat aft, left side) was empty, and either Passenger #2 or Passenger #4 sat in the seat behind the empty seat, and placed his legs on the empty folded-down empty third passenger seat. Passenger #1 was seated to the right of the pilot, in the co-pilot’s seat. Passenger # 5 occupied the seat to the right of Passenger #3, and Passenger #8 sat in the furthest aft seat row, but Passenger #3 did not remember if he was on the left or right side.

Passenger #3 fell asleep approximately 3-4 minutes after departure. He did not remember the accident, but believed that during the impact he was thrown forward, through the opening into the cockpit. When he regained consciousness, he was next to Passenger #1, who was “shaking him awake.” Passenger # 1 asked him if he could stand and walk and he found he was able to do so, although his left leg was injured and “largely unusable.” Passenger #3 climbed over wreckage and exited the front, left side of the cockpit. He climbed down vegetation to the ground, then walked down a slope towards the rear of the airplane. It was raining and everything was “slippery.” Both rear boarding doors had been thrown open and were “up in the air.” He climbed back into the airplane from the left door, and saw Passenger #2 sitting against the aft bulkhead in the rear of the cabin. He saw a bag containing life vests, and additional life vests were scattered on the floor. He found the survival kit in the aft section of the wreckage, which contained dried food, a hatchet, and a knife. Other survivors told him there was a flare in the survival kit, but he could not find it. He did not want to take the food out of the bag, for fear of attracting bears.

Passenger #3 walked forward in the fuselage, upslope towards the front of the airplane. He had difficulty moving through the fuselage due to the slope, so he stabilized himself using a seat that was still attached to the right side of the fuselage, as well as other parts of the airplane. He went the entire length of the airplane, but did not reenter the cockpit. He removed debris from Passenger #4's legs to help free them, by moving items to the side or throwing them out of a broken window. Passenger #3 then went aft to Passenger #2 and sat beside him for "a few hours." He did not leave the airplane, because he did not think he could get back inside, due to the slope.

After a few hours, Passenger #3 heard an aircraft flying overhead. He tried to "flag it down" by leaning out of the left rear exit and waving his arms. He saw the airplane but did not recognize it. Shortly, a 55-60 year-old heavy-set male with a beard appeared near the crash site, and told the survivors that he would get help. This man did not approach the aircraft wreckage. About 30 minutes later, another aircraft (possibly the same one as before) flew over, and it was followed by Mr. Ronald Duncan's airplane. Passenger # 3 did not see the aircraft land, but he assumed that they did so on the other side of the mountain. Dr. Bowman arrived at the crash site about 10-20 minutes after he saw Mr. Duncan's airplane. Dr. Bowman had a satellite telephone, but was unable to receive a strong signal at the accident site. She said she would hike towards the top of the mountain to call the Alaska Air National Guard for support. Upon her return, Dr. Bowman climbed into the wreckage and told the survivors that the weather was preventing the rescue helicopters from reaching the accident site, so they would have to wait until morning for rescue.

Approximately 45 minutes later, "two or three" EMTs showed up (US Coast Guard, he thought). They wore black jumpsuits with insignia badges and helmets. They cut off Passenger #3's waders, and provided him and the other survivors with "space" blankets. They did not administer any medication to him. Passenger #3 spent the night with Dr. Bowman under the airplane's left wing, a few yards from the main fuselage. The EMTs also spent the night at the scene but did not sleep.

A US Coast Guard helicopter arrived at the accident site the following day, before noon. "Three or four" rescue personnel were lowered from the helicopter and prepared the survivors for extrication from the scene. They cleared trees on a relatively flat area down slope from the accident site. Passengers # 2 and # 4 were moved to the cleared area using stretchers, and were then hoisted onto a helicopter, which departed shortly thereafter. Passenger # 1 was also transported to the clearing using a stretcher, and Passenger # 3 walked to the clearing with the help of two rescue personnel. Approximately one minute after the first helicopter departed; another helicopter arrived on-scene. Passengers #1 and #3, along with two rescue personnel, were hoisted onto the helicopter using a basket and a stretcher.

The helicopter transported them to an airport, where they were loaded onto an ambulance that transported them to a military airplane for a flight to Anchorage. Passengers #1 and # 3 were on one airplane, and Passengers #2 and # 4 were on another airplane.

Passenger #4
Interview conducted on September 16, 2010, at the HealthSouth Rehabilitation Hospital in Aldie, VA.
Conducted by Mark George, NTSB, and Elias Kontanis, NTSB. Passenger #4's spouse was also present during the interview.

Passenger #4 was a 54 year-old male. He had traveled to Alaska once a year for the past 30 years. He had a lot of experience flying as a passenger on general aviation aircraft in Alaska and had experienced flight in marginal weather conditions. On the day of the accident, the weather was overcast with rain falling intermittently throughout the morning until approximately 1300 local time. These conditions were similar to those experienced the previous two days at the lodge, and were not remarkable and did not seem particularly "risky" based on his prior experiences flying in Alaska. He had read the NTSB Preliminary Report and believed the departure time and weather conditions indicated in the report were "accurate."

Passenger #4 arrived at the lodge on Friday, August 6, 2010. This was his first trip to the Agulawok Lodge, but he had visited other lodges in the vicinity. He had never met or flown with the accident pilot before this trip. The accident pilot flew him to the lodge on Friday, and stayed at the lodge the entire trip. Prior to the first flight of the trip, the accident pilot briefed passengers on how to operate the life vest and checked to determine if they were donning the vests properly. He never mentioned a satellite phone or a survival kit during the initial or subsequent safety briefings. There had been one trip made by another pilot, but the accident pilot had been with him.

Passenger #4 spent the few days prior to the accident getting to know the pilot, and had dinner with him on one occasion. He characterized the pilot as a "seasoned veteran" that was prudent, cautious, very quiet, and business-like, but not humorless. Passenger #4 had heard that the pilot's son-in-law was fatally injured in a recent C-17 accident, but the accident pilot never mentioned it. He did not perceive a change in the pilot's personality during the trip. The only time the accident pilot became "animated" was during a conversation comparing ConocoPhillips and Alaska Airlines flight operations.

Passenger #4 flew in the right front [copilot] seat on one trip and characterized the pilot as being "attentive to his instruments." He utilized a checklist during the flight, but Passenger #4 did not remember if the accident pilot referred to a map during the flight. It appeared that the accident pilot had "flown the routes so many times that he had memorized them." Passenger #4 flew with the accident pilot from the Agulowak Lodge to the same location on the Nushagak River on Saturday, August 7th and Sunday, August 8th, but did not know if the route was the same as on the accident flight. All flights were made below the ceiling; however the accident pilot entered clouds for a few seconds on rare occasions.

The lodge guests had lunch at approximately 1300 local time on the day of the accident. They ate salmon, and no alcohol was served. At lunch, they discussed the option to fish at the Nushagak River or remain at the lodge. There was no pressure placed upon the pilot to make the flight to the Nushagak River, or to depart by a certain time – the decision was rather casual. It was clear to everyone that the final decision would be made by the pilot. There was a room at the main lodge where the accident pilot checked weather during the trip, but Passenger #4 did not know if he checked weather before the accident flight. The flight departed between 1500-1530 hours local time, with a ceiling estimated at 1000 feet.

Prior to departure, the pilot provided a safety briefing over the intercom and visually verified that the passengers had buckled their seatbelts and donned their life vests. Passenger #4 wore his headset with the volume turned down throughout the flight. He sat in the fourth row seat on the left side of the airplane (third passenger seat behind the pilot). There was an empty seat in front of him, Passenger #3 occupied the left seat immediately behind the pilot, and Passenger #1 sat in the right front [copilot] seat. Passenger #5 sat in the seat immediately behind the copilot seat, and Passenger #6 was seated immediately behind Passenger #5. Passenger #7 sat in the seat behind Passenger #6. Passengers #2 and #8 sat in the rear-most seats, but he did not remember who sat on the left or right. Passenger #4 wore a seatbelt throughout the flight, and believed that everyone else also wore their seatbelts.

During the 10-15 minute flight, the weather was not remarkable or notable in any way. The pilot remained below the cloud ceiling flying along the tree line, following streams, and executing several turns to avoid terrain; it was "characteristic" Alaska flying. The pilot made a left turn, going up a hill, and immediately impacted terrain. The turn was not unusual in bank angle, and Passenger #4 did not hear any change in the engine sound before impact. Also, he did not perceive any change in pitch attitude of the airplane or any unusual maneuvering prior to impact.

Passenger #4's first memory after the impact was that he had fractured several teeth. Prior to impact, he had been seated with his legs extended into the aisle. When the airplane came to rest, he was on the cabin floor, approximately 10-15 feet behind the cockpit, with Passenger #8 laying on his right leg, and Passenger #2 on top of him. Passenger #2 moved to the rear of the airplane, which allowed Passenger #4 to assume a kneeling position. The entire time he spent in the airplane, he alternated between kneeling and sitting positions, but could not free himself due to miscellaneous objects strewn about the cabin during the accident. His seat had separated from its attachments to the airframe, but the seatbelt remained fastened. He released the belt buckle, and it took "some effort." He did not see many seats that had remained attached to the airframe and noted that the seat directly in front of him was also destroyed. He saw that Passenger #1 was "suspended in his seat" and was not able to free himself.

Passenger #3 was the only ambulatory survivor and he went outside the airplane through the front of the wreckage. He walked around the wreckage, entered again through the left entry door. He also searched unsuccessfully in the back of the airplane for

an emergency beacon, transponder, or satellite telephone. Passenger #3 again exited the airplane through the left entry door, and was outside the wreckage when a reconnaissance aircraft flew overhead. Passenger #3 spent approximately 10-15 minutes outside each time he exited the wreckage.

Passenger #4 could hear aircraft, but could not see them. Approximately six hours after the accident, the first rescuer arrived. It was Dr. Bowman, and he heard her directing search and rescue personnel to the accident site. Dr. Bowman expressed concern that walking around on the wreckage might cause it to slide down the slope. Passenger #4 heard Dr. Bowman speaking with the survivors, but he did not know if she had established communications with others off-scene. She spoke with someone named "Bob," however, his voice sounded like he was some distance away.

Approximately 7-8 hours post-accident, additional rescuers arrived, including "two to four" EMTs that hiked in to spend the night with them. An Alaska Air National Guard EMT named "Susan" arrived and stayed with Passenger #4 until the rescue helicopters arrived. He did not receive medical attention, because in his opinion, there was not much that could be done for him on-scene. Other survivors may have received medical attention. Susan removed debris from around those in the wreckage. There were no more than two EMT's inside the wreckage at one time, due to concerns about the stability of the wreckage on the slope. Passenger #4 deliberately maintained consciousness from the time of the accident until the rescue helicopter lowered a basket to extricate him. At that time, he passed out.

5.2 Interviews

Dani Bowman
Interview conducted on August 12, 2010 at GCI, Anchorage, AK. Conducted by Mark George, NTSB; Tom Little, NTSB; Mike Richards, NTSB, Leonard Wallner, Alaska State Troopers, and Robin Broomfield, FAA. A GCI attorney was also present.

Dr. Bowman, a physician, and her husband, Ron Duncan, were at the Agulawok Lodge when the accident airplane departed. She estimated that the Otter departed about 1500 and that she and her husband departed in their red and white Renegade amphibian airplane, between 1530 and 1630, to "go look for some sunshine." Dr. Bowman said that the flight lasted for about an hour, and, although they did not know it at the time, they had actually been in the area of the crash site. She said that the visibility was good but they found nothing but rain and "low scuzz" so they returned to the lodge.

After they returned to the lodge, Mr. Chapados (GCI) remarked to her that "we may have a problem." This remark regarded a phone call to HRM fishing camp that revealed that the Otter had not arrived. She could not recall the time of the conversation with Mr. Chapados. She said that she then got a medical kit, sleeping bags, survival gear, a SAT phone, a radio, "…and we set out to find them." She and her husband departed the lodge in the Renegade, but she could not remember what time this was.

After taking off, they flew north and east searching for the Otter. Subsequently another pilot who was involved in the search came on the air (radio transmission) stating, "I got them." She didn't know who the other pilot was. She thought that it was less than 10 minutes from the time that she and her husband were in the air until the time the other pilot spotted the Otter. They got the coordinates from the other pilot. Her husband proceeded to the accident site and circled the area. She could see a passenger outside of the airplane, waving at them. She told her husband that she "needs to get on the ground."

Her husband contacted Tom Tucker (based in Dillingham), who had responded to the accident site in an R44 helicopter with a GCI technician, Bob Himschoot. Her husband arranged with Tucker to meet him at an alternate site, where Dr. Bowman, would transfer from the Renegade to the helicopter and be transported by Mr. Tucker to the accident site. After landing in the vicinity of the crash site, she was led to the wreckage site by Bob Himschoot. It was about 1,000 feet down the hill and it took between 40 and 45 minutes to reach the wreckage. The wreckage could only be approached from the left side. Her goal was to assess the injuries of the survivors, and provide any treatment she could. She thought that the fatally injured passengers had died on impact. All of the survivors were conscious. She had some medication that contained Demerol, which she provided to the two most seriously injured passengers.

Additional airplanes and helicopters arrived, bringing more help. Specifically, a husband and wife team of EMTs arrived at the wreckage site, along with a man named "Josh." She did not remember how they got there. It was a very long night. In order to make room for the injured passengers in the airplane, she spent the night under the wing of the airplane with the youngest passenger. She used a satellite phone to call the lodge, and gave "Greg" a list of fatalities and survivors. She also called the police department and hospital in Dillingham and asked for additional supplies. Bob Himschoot left the scene at some point; the EMTs and Josh stayed all night.

About 07:00 – 07:15 the next morning, the Coast Guard and Air National Guard parajumpers arrived by airplane and helicopter. Survivors and rescue personnel were loaded into the helicopter, at an area about 40 – 50 feet from the wreckage.

Jim May
Interview conducted by telephone on August 15, 2010 at GCI, Anchorage, AK. Conducted by Mark George, NTSB; Malcolm Brenner, NTSB; and Tom Little, NTSB.

Mr. May was a guest at the Agulawak Lodge at the time of the accident. He had flown to the lodge from Dillingham on Saturday morning. The pilot gassed up the airplane, and then flew the group to the lodge. Mr. May sat in the seat directly behind the pilot for the trip from Dillingham to the lodge. He wore a headset, and listened to the conversation between the pilot and the right-seater. It was a "get acquainted" conversation – not aviation related. He had never met the pilot prior to this trip. He described the pilot as cordial, but very business-like, not terribly personable, but was alert and paid attention to the business of flying. At no time, on any of the flights Mr. May was on, did the pilot "fly into weather." The pilot gave a safety briefing to the passengers

before every flight, and Mr. May especially remembered the briefing given to the passengers on very first flight. The pilot mentioned seatbelts, safety equipment – all the basics.

After arriving at the lodge on Saturday, Mr. May noted that the pilot had been in the computer room and came out to have lunch with the group. Although, Mr. May had no conversation with the pilot, he noted that he seemed fine – very alert. After lunch, the group flew to the fish camp. Mr. May again sat in the seat behind the pilot. He could see the GPS at the top of the instrument panel, and it was "on." The weather was the same as it had been the day before – "about a thousand feet underneath the clouds." Mr. May was wearing a headset and he heard the pilot call FSS prior to takeoff. He did not remember who sat in the copilot seat, however, during the flight, he did not hear much conversation from the pilot. The landing was "very smooth." While they fished, the pilot flew away.

On the return flight to the lodge, Mr. May sat in the copilot seat. The pilot flew at a higher altitude and took a more direct route than the previous trip. The pilot explained that it was "because the weather was better." On the flight, Mr. May and the pilot "chatted airline stuff." The pilot was not a "huge fan" of airline management, although he said he liked the president of Alaska Airlines. Mr. May remembered hearing the pilot make a radio call to Dillingham FSS. He also remembered that the GPS displays were "on." He thought that the GPS had "terrain features" on it. The pilot's flying was "perfectly in control, and smooth," and the pilot's mood was "straightforward and alert," and "very businesslike. " The pilot was wearing glasses, and he was very attentive to flying the airplane. He did not "do any paperwork" while flying. The landing was "greased."

On Monday morning, it was raining, so they couldn't fly to the fish camp. Mr. May went fly fishing with a guide from the lodge. The fishing was OK – not great. Mr. May had no contact with the pilot that morning. The group had lunch at about 01:00 PM. About 01:30 – 02:00 PM, the pilot mentioned that the weather had improved, so they were going to the fish camp, and asked Mr. May if he wanted to go. He declined, and said he intended to fly fish there at the lodge.

After Mr. May returned to the lodge later in the afternoon, someone mentioned that "we may have lost a plane." Mr. May noticed that the red plane was not there. Ron Duncan and his wife loaded their airplane and flew off to try to locate the missing airplane. He stayed at the lodge got paperwork together, and worked to locate the airplane using the telephone.

6.0 Search and Rescue (SAR)

The accident flight originated from a GCI-owned fishing lodge on the southwest shoreline of Lake Nerka, about 1430. The flight was en route to a remote sport fishing camp about 20 miles east-southeast of Dillingham, Alaska. No flight plan was filed.

About 1815, GCI's onsite lodge manager contacted the fishing camp to inquire about the airplane's proposed return time, and was told by fishing camp personnel that the

airplane had not arrived. The lodge manager initiated a phone and radio search for the airplane. Unable to locate the airplane, lodge management personnel initiated an aerial search near the pilot's anticipated route. Additional search airplanes and helicopters in the area voluntarily joined the search for the missing airplane. The airplane was officially reported overdue to the FAA Flight Service Station (FSS) in Dillingham at 1859.

According to FSS records, at about 1935, an airborne volunteer search aircraft located the wreckage near the anticipated flight route, about 900 foot mean sea level (msl) in the Muklung Hills, in steep, heavily wooded terrain, about 19 miles southeast of the GCI lodge. According to interviews with volunteer rescuers, no ELT signal was detected while monitoring 121.5 MHz radio channel.

Volunteer search members reached the accident site by helicopter and confirmed that the pilot and four passengers died at the scene, and four passengers sustained serious injuries. In all, one GCI employee, one medical doctor, and three emergency medical technicians (EMTs) were able to reach the accident site on the night of the accident. Two additional EMTs were transported to the area by helicopter, but were not able to find the wreckage, and were transported back to Dillingham.

The Alaska Department of Public Safety (DPS) and the Alaska Rescue Coordination Center (RCC) was notified of the accident by the Dillingham FSS at about 1950. The RCC dispatched a Blackhawk helicopter with pararescuemen (PJs), and a C-130 airplane to the accident site. In addition, the Coast Guard dispatched a Jayhawk helicopter and C-130 airplane to the accident site. Poor weather and night conditions prevented military pararescue personnel from reaching the accident site until the next morning.

Entries in the following table are excerpts from an event log provided by the State of Alaska Department of Public Safety (DPS), the Alaska Rescue Coordination Center, and the Dillingham FSS. See Attachments 2 and 3 for additional details.

Date	Time	Event
8-9-2010	1859	ALNOT notification via Dillingham FSS
8-9-2010	~1935	Airborne volunteer searchers report coordinates of accident site to Dillingham FSS
8-9-2010	1945	11AF Rescue Coordination Center request Alaska Air National Guard (AKANG) rescue assets.
8-9-2010	1950	DPS notified of airplane crash by Dillingham FSS. Site coordinates and aircraft registration were provided by FSS. ELT not activated. FSS notified RCC in Anchorage, Alaska State Troopers (AST), and Dillingham Airport manager. Tucker Aviation enroute to site with helo and paramedic on board. Three possible survivors, 2 serious, and a number deceased.
8-9-2010	2000	AKANG accepts mission tasking. 11 AF RCC upgrade to mission: 10M0088 (210, 211, and 212 RQS).

Date	Time	Event
8-9-2010	2030	RCC Anchorage advises that a C-130 with PJs and Blackhawk with PJs enroute. ETA 1 hour, 45 minutes.
8-9-2010	2050	Bob Egli reports Egli Aviation helo is enroute with 2 additional paramedics to crash site.
8-9-2010	2115	Events coordinator at Agulawak Retreat provides manifest listing those on board downed GCI aircraft.
8-9-2010	2130	CGI contact at Agulawak Retreat advises that next-of-kin for pilot and two passengers have already been notified.
8-9-2010	2146	Larry Lewis, NTSB Regional Operations contacted AST via telephone, responding on 8/10/2010.
8-9-2010	2152	Patty Tucker, Tucker Aviation, reports that husband Tom Tucker flew R44 and medic to crash site. Helo departed at approximately 1930 hours. Landed on ridge 400 feet above crash site, No satellite phone. Bob Himshoot also taken to crash site.
8-9-2010	2207	RCC advised Blackhawk made fuel stop at Homer.
8-9-2010	2210	Greg Chapados reports by telephone that Dr. Bowman taken to scene.
8-9-2010	2234	Norman Heyano, Dillingham Airport manager, local coordinator for rescue contacted via telephone. He reports 5 medics and one doctor on scene. 0/0 weather. Foot search in progress.
8-9-2010	2240	Updated ETA of AKANG assets is midnight.
8-10-2010	0016	AFR 2104 (C-130) overhead subject area. AFR 467 (HH-60) is approximately 30 minutes out but needs to shoot the approach at Dillingham.
8-10-2010	0034	AFR 467 lands at Dillingham Airport.
8-10-2010	0101	Weather is 200 feet and 2 statute miles at Dillingham Airport. AFR 2104 is overhead downed aircraft between 10,000' to 11,000' unable to get eyes on objective due to weather. Updated Plan Established: AFR 467 placed in modified crew rest allowing crewmembers rest until weather improves. AFR 2104 returned to base. Day alert crews will be alerted at earliest available (0700); return to Dillingham with a crew rested HH-60, HC-130 and pararescuemen compliment. RCC request US Coast Guard (USCG) assets to assist/start making their way to subject area/Dillingham.
8-10-2010	0108	1021 from Elias Kontanis, NTSB requesting info. Advised that a crash team is enroute from Washington, DC.
8-10-2010	0120	11AF RCC request USCG assets out of USCG Kodiak Air Station via Juneau RCC.
8-10-2010	0326	Robert Parrish, State Medical Examiner's office called requesting information on SAR.

Date	Time	Event
8-10-2010	0341	RCC Anchorage advises Blackhawk in Dillingham and on crew rest. Advises C-130 unable to drop PJs due to weather and Blackhawk unable to get to scene due to weather. RCC Anchorage also advises that Coast Guard C-130 dispatched with second Blackhawk crew for continued ops, and that there are 5 deceased, 4 survivors, 2 in critical condition, unknown identities, at the crash site.
8-10-2010	0516	Robert Parrish advises he is responding to the scene in the AM hours.
8-10-2010	0550	USCGR 6013 (H-60) is on the ground at Dillingham Airport and refueling. USCGR 1709 (C-130) is on scene orbiting the subject area.
8-10-2010	0630	AFR 467 is airborne enroute to objective area.
8-10-2010	0715	467 is on scene and pararescuemen are on the ground.
8-10-2010	0731	USCGR 1709 in communication with AFR 467 which has two pararescuemen packaging up two survivors.

6.1 Emergency Locator Transmitter

The accident airplane was equipped with an emergency locator transmitter (ELT),[6] a device intended to assist search and rescue personnel in detection and location of an aircraft in distress. An ELT is activated automatically by crash forces, and then transmits radio signals that are received and forwarded to rescue organizations. Depending on the model, an ELT transmits a distress beacon on 121.5 MHz, 406 MHz, or both simultaneously. The 406 MHz models emit a radio signal that can be received by COSPAS-SARSAT[7] satellites in Earth's orbit, and then relayed to Rescue Coordination Centers. The 121.5 MHz models emit a distress signal that can be detected by airplanes or air traffic control facilities through radios tuned to receive the signal.

Following the accident, the National Oceanic and Space Administration (NOAA) was contacted to determine if the ELT had been detected. According to a NOAA SARSAT Operations Support Officer, no signal had been detected during the time frame of the accident. Similarly, the pilot of one of the privately owned aircraft that participated in the initial search for the accident was monitoring 121.5 MHz frequency during the search, and no signal was detected. The pilot stated that other search pilots were monitoring the frequency and none detected a signal.

During the passenger rescue, an Air National Guard pararescueman (PJ) found the ELT detached from its mounting bracket, lying on the floor in the aft section of the airplane. Both the antenna and power cable had separated from the unit. The PJ believed the ELT was transmitting because he could hear a tone over his radio headset when he

[6] Per 14CFR Part 91.207.

[7] An international program established in 1988, designed to provide accurate, timely and reliable distress alert and location data to help Search and Rescue (SAR) authorities assist persons in distress

keyed his microphone. He switched the ELT from "on" to the "arm" position and removed it from the airplane.

The ELT on the accident airplane was an Artex ME406 which was a two-piece unit consisting of a mounting tray affixed to the aircraft, and an ELT module that "nested" in the tray. The module was secured to the tray by a webbed strap with a "hook and loop" (Velcro) fastener (Photograph 1).

Airplane logbook records indicated that the ELT was installed on March 1, 2008, and had "tested serviceable" per the Artex ME406 installation manual. According to 14 CFR Part 91.207 *Emergency Locator Transmitters*, ELTs are required to be inspected every 12 months, and the inspections must include checking for "proper installation." Records indicate that annual inspections for the airplane were conducted in April of 2009 and May of 2010, however, specific references to the ELT were not included in the records.

ELT Certification

The ME406 ELT was granted Technical Standard Order (TSO) authorization by the FAA on July 11, 2005, having met the performance standards prescribed by FAA TSOs C91a and C126. These TSOs incorporate additional requirements which are specified in Radio Technical Commission for Aeronautics (RTCA) documents DO-204A, DO-160F, DO-178B, DO-183, and DO-254. Among the performance standards required for TSO approval of an ELT, is a crash safety test designed to ensure that the ELT will not break loose from its mounts under impact conditions. RTCA DO-204A outlines the crash safety test that prospective ELT designs must pass. This test subjects the ELT to a half-sine wave acceleration impulse of 100g in three axes and both directions for each axis, for a duration of 23 milliseconds (+/- 2.0 ms). The ME406 ELT passed the crash safety test during the certification process.

Post-accident examinations

The ELT unit was examined at Artex facilities in Prescott, AZ on August 25, 2010. Artex personnel found no physical damage to the ELT tray or module. Electrical exams of the ELT module were conducted, and it was determined that the 121.5 MHz and 406 MHz beacons and the G-switch operated normally. Artex personnel also examined a photograph of the ELT tray mounted in the accident airplane (Photograph 2), and noted that the Velcro retention strap "appeared to be slid toward the aft section of the tray, out of its molded groove." They noted that under normal installation practices, the retention strap should not be physically able to be placed in this position. Other than photographs, Safety Board investigators did not examine the mounting tray prior to its removal from the wreckage, therefore, it is not known if the retention strap was actually incorrectly positioned following the accident. Details of the examination are in Attachment 6.

Photograph 1. Artex ME406 ELT in mounting tray, secured by Velcro strap.

Photograph 2. ELT tray mounted on sidewall of accident airplane.

7.0 Attachments

1. Passenger Injury Table
2. Alaska Department of Public Safety chronology of events
3. Alaska Rescue Coordination Center summary report
4. Sam Egli statement
5. Dani Bowman statement
6. Artex ELT Post-Accident Analysis Report