NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

February 1, 2017

Group Chairmen's Factual Report

OPERATIONAL FACTORS/HUMAN PERFORMANCE

ANC15MA041

A. ACCIDENT

Operator:	Promech Air
Location:	Ketchikan, Alaska
Date:	June 25, 2015
Time:	1215 Alaska daylight time[1]
Airplane:	de Havilland DHC-3 (Otter), N270PA

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C. SUMMARY

On June 25, 2015, about 1215 Alaska daylight time, a single-engine, turbine-powered, float-equipped de Havilland DHC-3 (Otter) airplane, N270PA, sustained substantial damage when it impacted mountainous tree-covered terrain, about 24 miles northeast of Ketchikan, Alaska. The airplane was being operated under the provisions of 14 Code of Federal Regulations (CFR) Part 135, as an on-demand visual flight rules (VFR) sightseeing flight when the accident occurred. The airplane was owned by Pantechnicon Aviation, of Minden, Nevada, and operated by Promech Air, Inc., of Ketchikan. The commercial pilot and eight passengers were fatally injured. Marginal visual meteorological conditions were reported in the area at the time of the accident. The flight departed a floating dock located in Rudyerd Bay about 44 miles northeast of Ketchikan about 1200 for a tour through Misty Fjords National Monument Wilderness. A company VFR flight plan was in effect. At the time of the accident, the flight was returning to the operator's base at the Ketchikan Harbor Seaplane Base, Ketchikan.

D. DETAILS OF THE INVESTIGATION

An NTSB operations investigator arrived on-scene about 1600 on June 26, 2015. An organizational meeting was held that evening and joint operations/human performance group

[1] All times are Alaska daylight time (AKD) based on a 24-hour clock, unless otherwise noted.

was formed with representatives from NTSB, FAA, and Promech participating. The operations investigator led the group's activities on scene while the human performance investigator participated remotely by telephone. The group conducted interviews and reviewed documents at the operator's base in Ketchikan, Alaska and concluded its initial on-scene activities on July 1. The group reconvened in Ketchikan on October 1, 2015, toured Promech facilities, reviewed Promech controlled flight into terrain (CFIT) avoidance training equipment and materials, and conducted additional interviews with local tour operators. After that, the group conducted interviews with FAA personnel at the Juneau FSDO from October 5-6. The operations group chairman conducted additional interviews with former Promech pilots and passengers between October 2015 and March 2016.

D. FACTUAL INFORMATION

1.0 History of Flight

The accident airplane was the third of four Promech airplanes to take off from Rudyerd Bay bound for Ketchikan after boarding passengers from a floating dock. The first two Promech airplanes (DHC-3s) took off about 1200. The accident airplane took off about 1207. The fourth Promech airplane, a slower DHC-2, took off immediately afterward. Corrected Chelton IDU data indicate that the accident airplane exited the entrance to Rudyerd Bay about 700 feet msl and proceeded southwest over Behm Canal while climbing to about 1,100 feet msl. Upon reaching Eddystone Rock, the airplane changed course from a southwesterly to a westerly heading and proceeded toward Ella Bay, crossing the western shore of Behm Canal about 1,300 feet msl. The airplane continued through the Ella Narrows area (a low-lying valley about 100-300 feet in elevation flanked by 2,000 to 2,500 foot mountains). Partway through Ella Narrows, the airplane descended rapidly from about 1,300 to 1,100 feet msl before gradually climbing again.

After reaching the northeast end of Ella Lake about 1,200 feet msl, the pilot turned southwest, and flew over the lake (surface elevation 250 feet) while climbing to about 1,300 feet msl. At 2015:48, after reaching the approximate center of the lake about 1,400 feet msl, the airplane turned west toward the shoreline. The airplane then climbed to 1,464 feet msl while crossing a 900-foot ridge on the lake's western shoreline. After crossing this ridge about 2016:03, the airplane continued on a relatively constant heading between 1,400 and 1,500 feet msl for about 30 seconds until it impacted a rock face on the northeast side of a 1,900-foot mountain. About two seconds before impact, the airplane's pitch increased and the airplane rapidly climbed to about 1,600 feet msl, where it collided with terrain (see Figure 1).

1.1 Tour Routes

Promech pilots normally used two major routes to fly between Rudyerd Bay and Ketchikan (See Figure 2). Pilots flying the "short route" normally exited Rudyerd Bay at Point Louise, crossed Behm Canal, proceeded overland through Ella Narrows, then flew southwest across Ella Lake, transited Gokachin Lakes, crossed Thorne Arm and Carrol Inlet, rounded Mountain Point, and proceeded up Tongass Narrows to Ketchikan. Common variations on this route involved flying through one of two other areas of low terrain south of Ella Lake. One of these areas was known as "Muskeg" and the other was known as "Sea Level." Another route, known as the "long route," also exited Rudyerd Bay at Point Louise but continued south down Behm Canal around

Point Alava before heading northwest up Tongass Narrows to Ketchikan. The long route was generally preferred in poor weather because it allowed pilots to fly lower and remain over water. The long route took about 5 minutes longer than the short route.

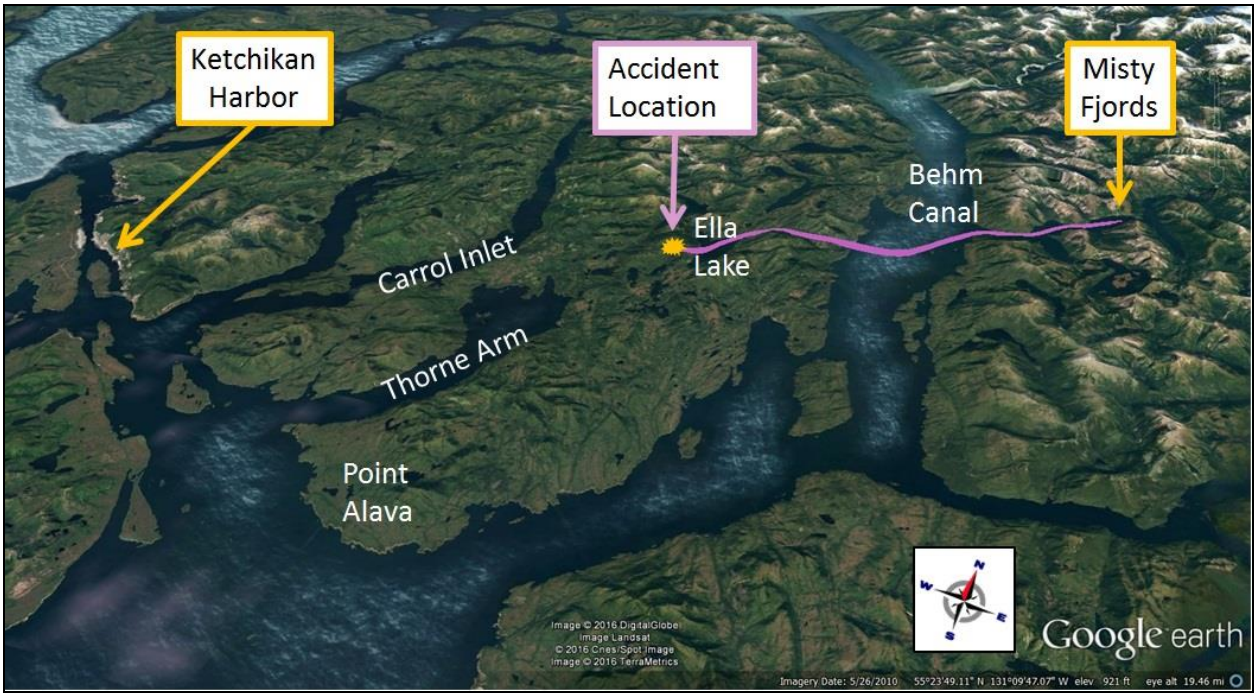

Figure 1. Accident flight path and wreckage location.

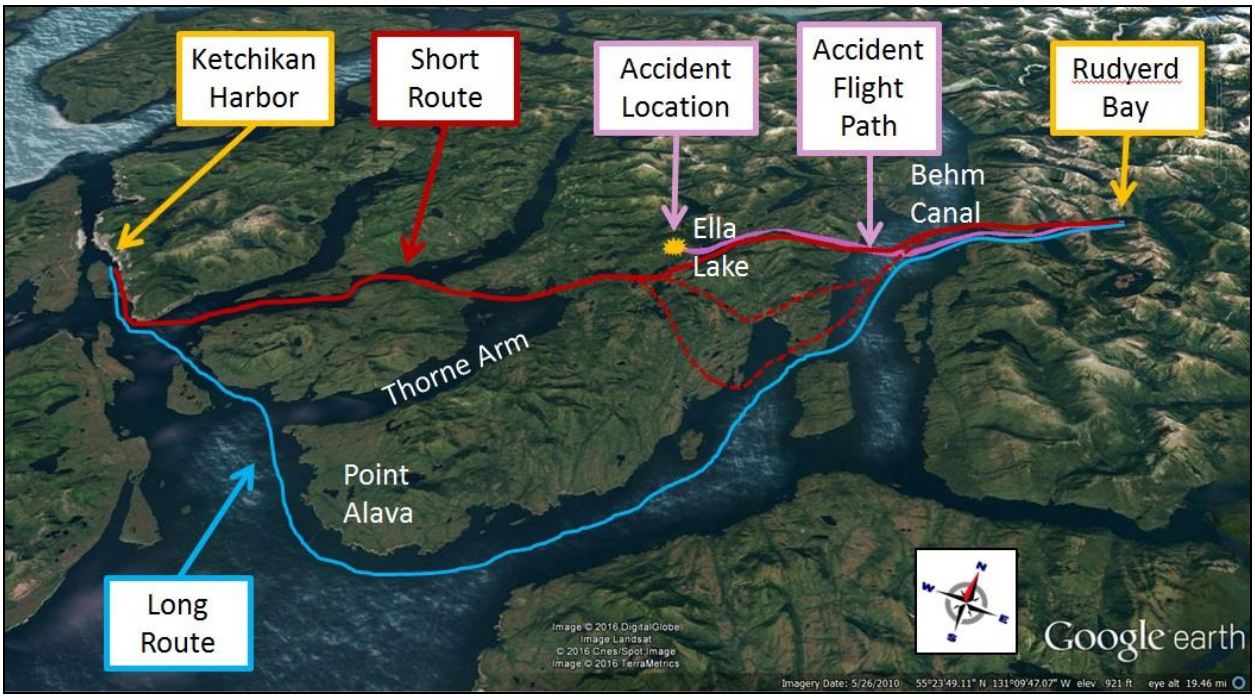

Figure 2. Promech's two major routes between Ketchikan and Misty Fjords: The "short route" (in red) and the "long route" (in blue).

1.2 Communications During the Accident Flight

Promech pilots used local advisory frequencies to communicate with each other while enroute, and they could locate each other on a traffic information display inside the cockpit of each airplane. Eddystone Rock, in the center of Behm Canal, was the location where pilots normally changed from one advisory frequency to another. This was also the location where, on this particular flight, the pilots decided which route they were going to take back to Ketchikan. Because the airplanes flew over Eddystone Rock in a staggered fashion they did not all participate in the same conversation.

The first Promech flight (a DHC-3) reached Eddystone Rock and switched over to the new frequency. He observed a DHC-2 operated by Seawind Aviation flying slightly ahead of him. He had not flown the short route yet on that particular day, but he knew the pilot of the DHC-2 had recently done so. He told investigators that he radioed the DHC-2 pilot to ask about the weather conditions in Ella Lake and the other pilot told him that the conditions were good. Based on this report, his own observations of the weather in Ella Bay (which he saw to be generally improving), and his visual assessment of the conditions in Ella Narrows, he decided to return via the short route. Two photos from a passenger on this Promech flight provide some indication of the conditions in Ella Narrows at that time (see figure 3 below).

Figure 3. Photo of the entrance to Ella Narrows taken by a passenger on the first Promech airplane.

In a post-accident interview, the pilot operating the Seawind Aviation DHC-2 (who had over 12,000 hours of Alaska flying experience) said he told the first Promech pilot that the weather looked good around Ella Bay, that there were a couple of clouds but no ragged bottoms. He felt it was more scenic to go that way so he decided to fly the short route.

The second Promech pilot to depart Rudyerd Bay told investigators he recalled hearing fragments of the conversation between the two pilots ahead of him, specifically the words "scattered layers" and "ragged." He told investigators he was not happy with what he heard about the conditions and he could see low clouds hanging in Ella Narrows. He told investigators he had been forced to turn around in Ella Lake earlier in the day due to poor weather conditions and he wanted to avoid having to do it again. He decided to fly the long route but did not broadcast his intentions.

Upon reaching Eddystone Rock, the accident pilot changed course and proceeded into Ella Narrows, following the other two airplanes that were already taking the short route.

The fourth Promech pilot told investigators that he had intended to fly the long route back to Ketchikan until he overheard some fragments of communication between the accident pilot and the other pilots ahead of him. He then asked the accident pilot about the conditions in Ella Lake. The accident pilot was unable to provide any detailed information because he had not traveled far enough through Ella Narrows to see Ella Lake yet, however, the fourth Promech pilot decided that Ella Narrows looked good and he would also return via the short route. He could see the accident airplane about three miles ahead of him on his in-cockpit traffic display at that time.

Photos taken by a weather camera installation located in the middle of Behm Canal between the entrance to Rudyerd Bay and Ella Bay showed no significant clouds and good visibility looking south down Behm Canal (figure 4). Looking west toward Ella Narrows, the cameras showed a scattered cloud layer near the ground with tops about 700 feet MSL, a higher overcast layer with bases about 1,300 to 1,500 feet MSL, and scattered clouds hanging down some hillsides. The most distant visible landmarks inside Ella narrows are about 1.5 nautical miles from the shoreline (figure 5).

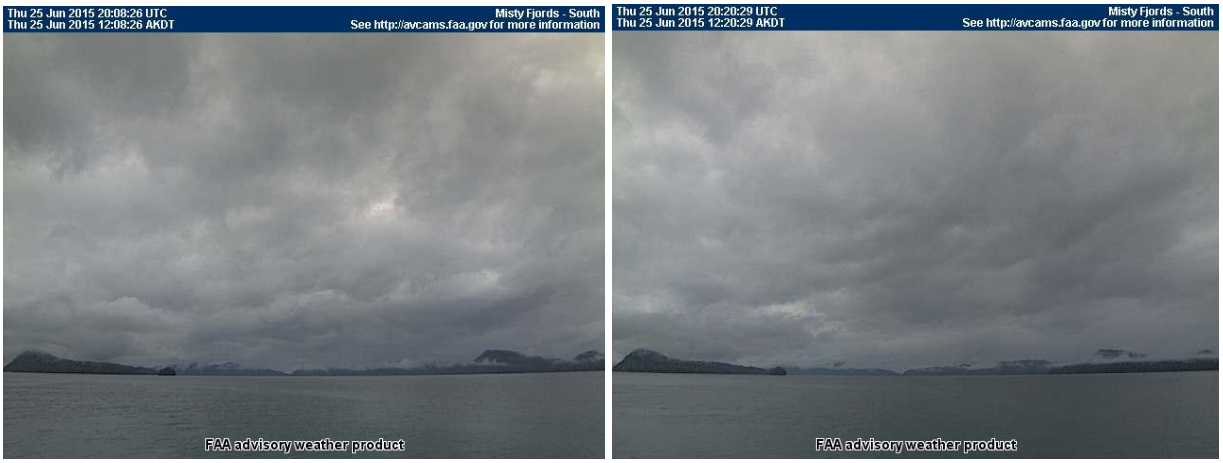

Figure 4. Weather camera view looking south down Behm Canal at 1208 and 1220.

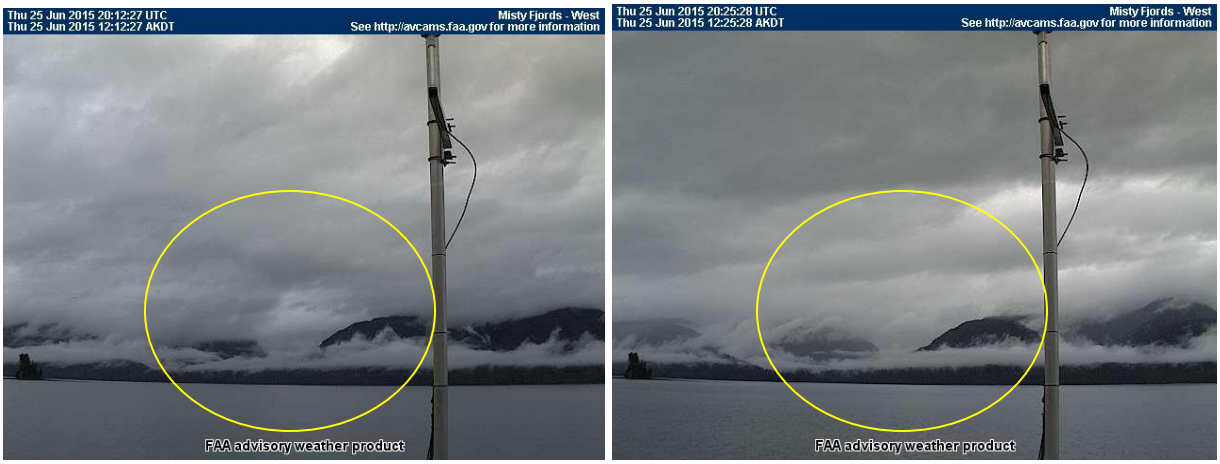

Figure 5. Weather camera view looking west toward Ella Narrows (highlighted by the yellow circle) at 1212 and 1225.

1.3 Weather in Ella Lake

The first Promech pilot told investigators that when he reached Ella Lake (several minutes before the accident airplane), there was a cloud ceiling above the lake about 1,600-1,700 feet msl, with a slightly lower ceiling (1,400-1,600 feet msl) over the south end of the lake. He reported that there were no "jagged edges" or "hanger" clouds coming down from the cloud ceiling. He recalled encountering misty rain and flying near the clouds but said his visibility was never obscured. He recalled being able to see Thorne Arm (located 5 nautical miles from the south end of Ella Lake) while he was still flying over Ella Lake.

Conditions encountered by the first Promech pilot about ½ nautical mile south of Ella Lake were documented in two passenger photos obtained by investigators (one of which is shown in figure 6). These photos show a southwesterly view (see figure 7). The most distant visible landmarks are about 1.5 nautical miles away. These photos indicate that the first Promech airplane transited the area south of Ella Lake about 900 to 1,000 feet msl over terrain that is at least 600 feet in elevation. The southeastern face of a large mountain is visible in the photo. It is completely obscured by clouds above about 1,000 feet msl, with scattered clouds hanging down the mountainsides to lower elevations. This is the same mountain that was subsequently impacted by the accident airplane about 1.3 nautical miles north of the area shown in this photo. The Seawind Aviation DCH-2 referenced in the previous section of this report is visible in the upper right-hand corner of this photo.

Figure 6. Southwest-looking photo taken about 1/3rd nautical mile southwest of Ella Lake and 1.3 nautical miles southeast of the accident location by a passenger on the first Promech airplane.

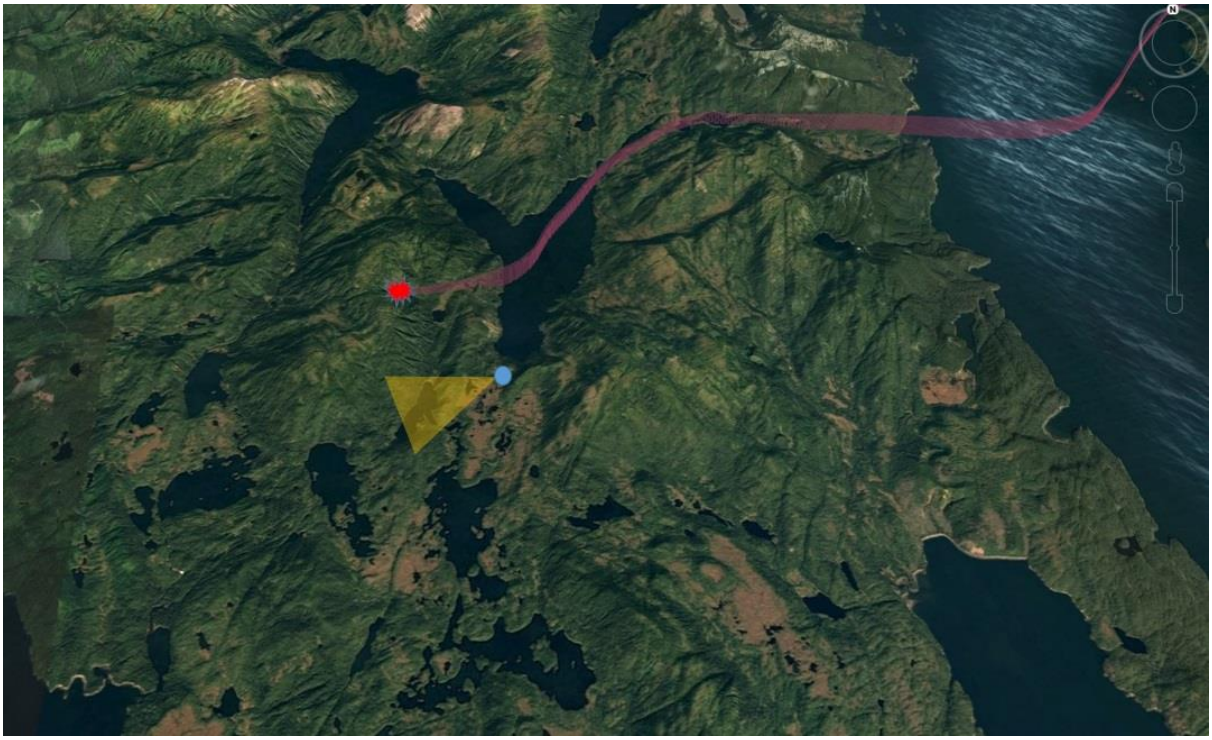

Figure 7. Approximate vantage point (blue circle) and field of view (yellow triangle) of the photos shown in Figures 5 and 6, relative to the accident flight path (pink) and accident location (red).

Photographic and video evidence of weather conditions encountered five or ten minutes later over Ella Lake by the accident flight is documented in the Personal Electronic Devices and Cameras group chairman's factual report.

The fourth Promech pilot (who was ferrying an empty DHC-2) told investigators that when he reached Ella Lake there was a scattered cloud layer at about 1,200-1,300 feet msl. He said it did not constitute a ceiling, but there were multiple cloud layers above that. He said that there was some rain restricting visibility over the lake, but visibility was "at least 2 miles." When shown the accident location on a map, the fourth Promech pilot said that it was raining in the accident location, and the visibility in that area looked like it was less than two miles. He also stated that mountaintops were obscured in that area. He reported encountering rain and moderate turbulence over the southern half of the lake and he said visibility deteriorated to 1 or 2 miles as he transited terrain south of the lake. He recalled seeing low-hanging "wisps" of cloud near the surface in that area. He told investigators he did not feel comfortable turning west after crossing the south shore of Ella Lake until he had continued south for 2 or 3 miles over lower terrain. He recalled that when he reached Thorne Arm, however, the conditions improved dramatically.

2.0 Earlier Promech Tours Flown on the Day of the Accident

2.1 The Pilot's First Tour

The accident flight was the return leg of the third tour operated by Promech on the day of the accident. The first tour, which was scheduled to depart at 0800 involved three airplanes, a Beaver and two Otters (including the accident pilot). ADS-B data revealed that they departed Ketchikan Harbor between 0756 and 0800. The accident pilot was the first to leave, and he flew the short route. He rounded Mountain point about 600 feet msl and climbed to 2,900 feet by the time he reached Gokachin Lakes. He transited Gokachin Lakes about two miles south of Ella Lake and proceeded northeast over Behm Canal to Rudyerd Bay at 3,000 feet msl. Passenger photos from this flight, one taken near the entrance to Carroll Inlet and the other taken in the vicinity of Gokachin Lakes are shown in figures 8 and 9.

The other two Promech pilots on the 0800 tour flew the long route outbound. ADS-B data indicate that they climbed to 600-700 feet msl by Mountain Point but then descended as low as 200 feet msl near Bold Island. Next, they rounded Point Alava about 500-600 feet and then climbed to 2,000 feet msl while flying north up Behm Canal.

According to the flight scheduler, the accident pilot radioed that the weather was good with isolated rain showers while outbound along the short route, while the pilots that flew the long route said the conditions were "not great", but above minimums.

Figure 8. Passenger photo showing a southern view from the vicinity of Gokachin Lakes.

Figure 9. Passenger photo showing an eastern view from the entrance to Carroll Inlet.

All three pilots attempted to return from the first tour via the short route. ADS-B data indicate that the accident pilot exited Rudyerd Bay about 0844. He crossed Behm Canal about 1,000 feet msl, transited Ella Narrows and Ella Lake about 2,000 feet, and then descended to about 700 feet while crossing Thorne Arm. Upon reaching Carroll Inlet, he initiated a climbing right turn to 1,500 feet msl and returned to Thorne Arm. Upon reaching Thorne Arm, he performed a, descending near-360 degree turn to 500 feet msl, and then flew southwest down Thorne Arm to Ravillagigedo

Channel, where he rejoined the long route. He flew the rest of the way back to Ketchikan via the long route at altitudes varying between 600 and 800 feet msl, landing at 0915.

The other two airplanes exited Rudyerd Bay about 0858. They crossed Behm Canal between 2,000 and 2,500 feet msl, passed through Ella Narrows, and were flying at 2,500 to 3,000 feet by the time they reached Ella Lake. They flew west across the north end of Ella Lake to Mirror Lake where they reversed course. Then they returned to the north end of Ella Lake and flew south along Ella Lake about 2,400 feet msl. Both airplanes crossed the western shore of the lake in the vicinity of the accident location and proceeded southwest while descending to about 2,000 feet msl. One of these pilots told investigators that it looked as if someone had "hung a sheet" over the southern end of the lake. Both airplanes reversed course. One flew back east toward Behm Canal via the Sea Level route and rejoined the long route back to Ketchikan. The other flew north over the middle of Ella Lake and then crossed back over to Behm canal between peaks located east of Ella Lake. ADS-B data indicate that both pilots descended to 900 feet msl by the time they reached Point Alava, and as low as 450 feet msl near Bold Island, and they landed in Ketchikan at 0925 and 0934. As the next tour was scheduled to depart at 0930.

Only two other airplanes flew into Misty Fjords area between 0800 and 0900 that morning. One belonged to a single pilot owner-operator who provided commercial air tours under the name Family Air Tours. The other was a King Air registered to Dynamic Aviation.

2.2 The Pilot's Second Tour

The second tour was scheduled to depart at 0930. The accident pilot departed at 0940. He was the fourth of six Promech airplanes (3 DHC-2s and 3 DHC-3s) that departed between 0934 and 0947. All of the Promech airplanes flew the long route to Rudyerd Bay. Five of the six airplanes descended below 500 feet msl over the water between Bold Island and Point Alava (the accident pilot descended to 325 feet and the others to altitudes as low as 250 feet). The company president, operating a DHC-2, maintained a minimum altitude of 625 feet msl while transiting that area. On the way to Point Alava, some of the Promech airplanes passed a DHC-2 operated by Taquan Air's director of operations who was performing a weather check. As a result of this flight, the director of operations from Taquan determined that the weather conditions between Ketchikan and Point Alava were not adequate for Taquan to operate tours.

All six Promech airplanes returned via the long route and all six descended below 500 feet msl over the water between Point Alava and Bold Island, with the accident pilot flying as low as 375 feet and the company president flying as low as 250 feet. The pilot of a Promech DHC-2 flew as low as 225 feet above the water. He told investigators that it was his first flight of the day and that when he arrived for work that morning he expressed concern to Promech's president that the weather conditions were not good enough and the president told him "That's just Alaska weather," so they went ahead and flew the tour. The DHC-2 pilot described the weather conditions during this tour as "Shitty," and he recalled feeling relieved when he learned while inbound that he would not have to fly his next tour because there were not enough paying passengers. The six Promech airplanes landed in Ketchikan between 1053 and 1103, with the accident pilot landing last.

According to ADS-B data, several other operators appeared to operate tours during this period, including Island Wings, Mountain Air Service, Carlin Air, and Seawind Aviation. The owner and operator of Island Wings told investigators that after flying this tour she decided to cancel her next tour.

2.3 The Pilot's Third Tour

Four Promech airplanes (3 DHC-3s and 1 DHC-2) departed together on the next tour, which was scheduled to depart at 1100. These airplanes took off between 1118 and 1120, with the accident pilot taking off at 1120. All four airplanes took the long route. As the planes were departing, the company president made a radio transmission to them. He told investigators that the content of this transmission was "Hey guys, don't forget about your 1230 all aboard." According to the company president, as the group of airplanes was headed for Point Alava, one of the DHC-3 pilots (the accident pilot's close friend) transmitted that the weather was looking "wide open" and the short route would be preferred on the way back. One other operator, Seawind aviation, also departed on a tour around this time (1052 takeoff time).

3.0 Pilot Information

The pilot age 64, was a resident of Sagle, Idaho. He was renting a room in a house in Ketchikan with two other Promech pilots and one of their wives during a period of summer employment. His wife said that he had been in a good mood recently and that he was generally a positive person. She said he was very excited to be working as a float plane pilot in Alaska.

The pilot's wife said that the pilot planned to move into his own apartment when he got off work the day of the accident. She said that his living arrangements had been a bit crowded and he had experienced a bit of a personality clash with one of his roommates and that roommate's wife. His wife and one of his roommates said that the pilot was feeling relaxed about the situation because he had found his own apartment and he preferred to live alone. His roommates said the pilot had few personal belongings so the move would entail only a few boxes.

The pilot's primary occupation had been as a restaurant business owner. However, he had also been a pilot for more than 20 years, and flown for various operators in the state of Alaska. He had about 500 total hours in DHC-2 airplanes and 1,200 hours flying in Alaska, but the job with Promech was his first job flying in Southeast Alaska. His date of hire with Promech was April 27, 2015. He was initially hired to fly air tours in Promech's float-equipped DeHavilland DHC-2 airplanes.

After successfully completing company DHC-2 training on May 1, 2015, he flew his first Promech air tour on May 3, 2015. Soon after, he was selected to upgrade to Promech's float-equipped DeHavilland DHC-3T Otter airplanes. He completed training in the Otter on June 6, 2015, and flew his first air tour in the Otter on June 10, 2015.

The pilot's wife stated that the pilot was a morning person who typically went to sleep at 2200 and woke at 0500 when off duty for an extended period of time. She said he experienced no difficulty falling asleep at night or remaining awake during the day. She said that the pilot snored

but had never been diagnosed with any sleep disorders. She said he liked to get at least 8 hours of sleep per night. Another DHC-3 pilot who became the pilot's close friend in Ketchikan said that the pilot typically went to bed early, woke early, and did not report difficulty sleeping.

A check of the National Driver Registry revealed no evidence of driver's license suspension or revocation for the pilot.

3.1 Pilot's recent activities

The pilot's last day off was Saturday, June 20, 2015, five days before the accident. Table 1 summarizes the pilot's daily flight time and number of trips for several days before the accident (for additional information on the pilot's recent activities see the Personal Electronic Devices and Cameras group chairman's factual report).

Table 1.
Summary of the pilot's flying activity in the days before the accident.

Date	Flight Hours	Misty Fjords Tours	Waterfall Resort Turns	Total Trips
Sunday, June 21	4.6	3	1	4
Monday, June 22	5.5	5		5
Tuesday, June 23	5.5	5		5
Wednesday, June 24	3.5	2	1	3
Thursday, June 25	2.2	2		2

Note: Flight hours for June 21-24 were obtained from the pilot's personal logbook. Flight hours for June 25 were estimated. Company personnel stated that Misty Fjords tours averaged 1.1 hours of flight time, and Waterfall turns averaged .6 hours of flight time each way. Flight hours and trips on June 25 do not include the accident flight.

On Monday, June 22, the pilot's first use of his smart phone occurred at 0426.[2] Company flight and duty time records indicated that the pilot worked from 0700 to 1600 and operated 5 flights for a total of 5.5 flight hours. The pilot's last use of his smart phone occurred at 2038.

On Tuesday, June 23, the pilot's first use of his smart phone occurred at 0348. Company flight and duty time records indicated that the pilot worked from 0730 to 1630 and operated 5 flights for a total of 5.5 flight hours. His colleagues reported routine interactions with him between flights that day. The pilot's last use of his smart phone occurred at 2112.

On Wednesday, June 24, the pilot's first use of his smart phone occurred at 0449. Company flight and duty time records indicated that the pilot worked from 0700 to 1700, and operated three

[2] See the Personal Electronic Devices and Cameras group chairman's factual report for what kinds of activities constituted "use."

flights for a total of 3.5 flight hours. His colleagues reported routine interactions with him between flights that day. The pilot sent a text message at 1617 indicating that he was back from his last flight. Two other Promech pilots and the flight scheduler ate dinner at a restaurant with the pilot around 1900 or 2000. They recalled that he was in a good mood.

The pilot sent a text message to his wife at 2038 stating, "I move in tomorrow, so I'm selebrating tonite." He told his colleagues that he planned to pay the owner of his new apartment the next evening. About 2200, the pilot sent text messages to a colleague and his wife saying he had arrived home and was going to bed. The pilot's last use of his smart phone was at 2229.

On the day of the accident, the pilot's first use of his smart phone occurred at 0700. He was scheduled to begin work at 0700, although none of his coworkers could recall seeing him arrive. His first tour was scheduled to depart at 0800 and he was scheduled to operate additional tours departing at 0930, 1100 and 1230. Interviews indicate that he operated the 0800, 0930, and 1100 tour, and the accident occurred during his return flight from the 1100 tour.

Table 2.
Pilot's activity data summary.

Date	First Activity	First Activity Source	Last Activity	Last Activity Source	Previous Night's Sleep Opportunity
June 22	0426	Smart phone	2038	Smart phone	
June 23	0348	Smart phone	2112	Smart phone	7:10
June 24	0449	Smart phone	2229	Smart phone	7:37
June 25	0700*	Smart phone			8:31

Note: * The pilot was scheduled to start work at 0700 on June 25 and his first flight was at 0800. His coworkers recalled that he operated the 0800 flight, but none of them could recall when he actually arrived for work that day.

Table 3.
Pilot's flight schedule on the day of the accident.

Flight Type	Scheduled Departure Time	Scheduled Arrival Time	Scheduled Flight Time	Scheduled Turnaround Time
Misty Fjords Tour	0800	0906	1:06	0:24
Misty Fjords Tour	0930	1036	1:06	0:24
Misty Fjords Tour	1100*	*	*	
Misty Fjords Tour	1230			

Note: * Denotes the accident flight.

The flight scheduler recalled seeing the pilot arrive and preflight his airplane sometime before his first flight of the day which was scheduled to depart at 0800. The pilot's last use of his smart phone occurred at 0743.

3.2 Pilot's Certification

The pilot was certificated under Federal Aviation Administration (FAA) certification requirements. He held the following certificates.

Commercial Pilot Certificate issued April 3, 2013

Airplane single-engine land and sea
Instrument Airplane
(No type ratings)

Last Part 135.293 PIC check ride accomplished satisfactorily on May 1, 2015

The pilot's flight experience, shown below, was estimated from logbook data, interview data and company records.

Flight Times:

Total flying time (logbook):	4,070 hours
Flight time in the DHC-3T Otter (logbook):	About 40 hours
Total flying time last 24 hours (company records):	5.7 hours
Total flying time last 30 days (company records):	90 hours
Total flying time last 90 days (company records):	62 hours
Total flying time Promech (company records):	152 hours

A review of FAA accident/incident and enforcement records indicated no history of certificate actions.

3.3 Pilot's Past Performance

Several Promech pilots were asked to describe the pilot's past performance, judgment and decision making. The director of operations said he had provided training to the pilot and had no issues with his performance. His most recent opportunity to observe the pilot's proficiency was during a return flight from Waterfall Lodge on June 6, 2015. They were not carrying any passengers, so he briefed a full engine shutdown and dead-stick landing maneuver. After the director of operations shut down the engine, the pilot did a "stellar job" of feathering the propeller, pushing the nose over, and pumping in landing flaps. The director of operations observed that he was "smooth, competent and proficient" during the maneuver. Promech's assistant chief pilot said he had observed the pilot's past performance in the DHC-2 and described him as one of the company's more skilled pilots. He said the pilot had adequate skills for the kind of flying the company did around Ketchikan.

A third Promech pilot who flew the DHC-3 and was a close friend of the accident pilot, said he once rode along on a 15-minute weather check flight with the pilot and felt he was competent and relaxed, not lazy, uptight, or nervous. Although it was a short flight, he thought the pilot handled operating in the marginal weather conditions very well and that his performance was exemplary compared to the other pilots. A fourth Promech pilot who flew the DHC-2 and was directly behind the pilot during the accident tour said he had ridden along during one of the pilot's DHC-2 training flights. He recalled that the pilot was "smooth and conscientious." A fifth Promech pilot who flew the DHC-3 (the pilot who chose the long route back during the accident tour) said he had never flown with the pilot but he said others at the company regarded him as a good pilot.

A sixth Promech pilot who had participated as another student in multiple DHC-2 training flights with the pilot felt that the pilot's instrument flying proficiency was marginal. He said that the pilot required multiple attempts to successfully complete the company's inadvertent instrument meteorological conditions (IMC)/CFIT maneuver training in the DHC-2 because he tended to turn more than 180 degrees, and fly toward terrain. He felt the pilot was not ready to upgrade to the DHC-3. A seventh Promech pilot who flew the DHC-2 (and was the pilot's roommate with whom he had experienced a personality conflict) said that the pilot seemed to admire one of the DHC-3 pilots and sought to emulate him but did not have the same skills.

3.4 Pilot's Past Judgment and Decision Making

The director of operations said the pilot had previously demonstrated good judgment. Less than a week after upgrading to the DHC-3, the pilot was heading out on a tour with a group of other Promech airplanes when he turned around just east of Ketchikan. He came back to Ketchikan Harbor while the rest of the group continued. After returning to the office, the pilot told the director of operations and President that it was raining and he had felt uncomfortable with the visibility. He apologized and said he would get the job done, but according to the managers, he was told he had done a good job – exactly what they wanted. Company managers said that the pilot's cautious decision making was a major reason they had upgraded him to the DHC-3. Other Promech pilots also reported this incident, and a DHC-2 pilot said the weather conditions on the day of this incident were similar to those on the day of the accident.

The Promech pilot who followed the pilot into the Ella Lake area in a DHC-2 during the accident flight said the pilot was conscientious and looked out for others. He said he regarded him as a humble mentor. He said there was nothing about the pilot that made him seem like an "accident waiting to happen." The pilot's close friend who operated the DHC-3 said the pilot was well liked and had a steady, non-emotional disposition.

A Promech DHC-2 pilot said he once saw the pilot disappear into what appeared to be an area of IMC in the Ella Lake area. He said he radioed the pilot to ask about the conditions and the accident pilot told him they were fine. The DHC-2 pilot said the pilot seemed to think he was invincible or more skilled than he actually was. He said he warned management that the pilot had flown into questionable weather conditions, but managers dismissed his concerns. Another Promech pilot who flew the DHC-2, the roommate with whom the pilot had had a falling out, described another incident involving the pilot that had concerned him. He said that early in the

2015 season he was flying back out of the Ella Lake area when he encountered the pilot coming the other way. He told the pilot the area was closed due to weather and he should proceed to Point Alava, but the pilot disregarded his report and continued into Ella Lake. After trying unsuccessfully to get through Ella Lake, the pilot backtracked to Point Alava but ended up running low on fuel and returning to Ketchikan before reaching Misty Fjords.

These two DHC-2 pilots also described a third incident that concerned them. They said that on one occasion they radioed the pilot to warn him about an area of severe downdrafts they had encountered in Rudyerd Bay but the pilot chose to heed the advice of his close friend the DHC-3 pilot who radioed that he had been through the area recently and it was "fine." The DHC-2 pilots said that when the pilot attempted to fly through the area in question, he encountered a downdraft and his floats struck trees. An entry in the pilot's logbook from that day, June 14, 2015, read, "Misty Trip, Thought I was dead." Company records showed the pilot flew two trips to the Misty Fjords that day. Investigators contacted some of the passengers who had been on those flights. They did not recall anything out of the ordinary about the flights except that they had been turbulent. Promech managers said they were not informed about this incident until after the accident occurred.

Section 3.6 of the PM AIR, LLC GOM stated:

The Incident / Accident Report provides a means for employees to report an incident or a mechanical malfunction as described in paragraph 3.10 E. It is mandatory for any employee that is involved in an incident and/or aircraft/vehicle accident, to complete a PM AIR, LLC Incident / Accident Report Form.

4.0 Medical and Pathological Information

The pilot held a current FAA second class medical certificate dated March 23, 2015, with the limitation "Must wear corrective lenses." FAA medical records indicated that his corrected distant, intermediate and near vision was 20/20. He reported taking no medications and having no significant medical conditions or recent medical procedures.

Biological specimens from the pilot's body were forwarded to the FAA's Civil Aerospace Medical Institute for toxicological testing. These specimens tested negative for carbon monoxide, ethanol and a range of legal and illegal drugs.[3]

A post mortem examination of the pilot was conducted under the authority of the State of Alaska Medical Examiner, Anchorage, Alaska, on June 27, 2015. The cause of death for the pilot was listed as "multiple blunt force injuries." In addition to injuries sustained in the accident, the autopsy documented "focal myocardial fibrosis" and "mild, 10-20% atherosclerotic narrowing focally present in the three main coronary arteries." For additional information on pathological findings documented in the autopsy, see the NTSB medical officer's factual report.

[3] Immunoassay and chromatography were used to screen for the following drugs: amphetamine, opiates, marihuana, cocaine, phencyclidine, benzodiazepines, barbiturates, antidepressants, antihistamines.

5.0 Aircraft Information

The deHavilland DHC-3 Otter is a single engine, propeller driven, single pilot, high wing, short take-off and landing (STOL) airplane originally designed in the early 1950's. The original airplane was powered by a single reciprocating radial engine but can be converted to turbine engine power by Supplemental Type Certificate (STC). The accident airplane was powered by a Pratt & Whitney PT6A turboprop engine in accordance with Vazar, Inc. STC SA 3777NM and equipped with Edo 7490 amphibious floats in accordance with A.M. Luton STC SA 4375NM. The airplane is 45 feet, 10 inches long, 12 feet, 6.6 inches high at the tail and has a wing span of 58 feet. The airplane is equipped with a cruciform tail and either conventional landing gear or floats. The type certificate for the airplane is currently owned and maintained by Viking Air Limited, Sidney, British Columbia, Canada.

6.0 Terrain Awareness and Warning System

The accident airplane was equipped with two Chelton Flight Systems FlightLogic EFIS Integrated Display Units (IDU). The IDU units are identical part numbers and are configured to operate as primary flight displays (PFD) or multi-function displays (MFD). Using sensors, including solid state Air Data and Attitude Heading Reference System (ADAHRS), the PFD displays aircraft parameter data including altitude, airspeed, attitude, vertical speed, and heading. The MFD displays navigational information by way of a moving map. Additionally, the units in this accident included a terrain awareness and warning system (TAWS) that provides color-coded warnings of terrain on the MFD and, when enabled, aural alerts. As part of the TAWS system, the PFD is capable of providing a profile view of terrain ahead of the aircraft ("synthetic vision").

The FlightLogic EFIS IDU features integrated Class C TAWS or, optionally, Class A or B TAWS or Class A or B Helicopter TAWS (HTAWS). The IDU provides TSO-C151b TAWS functionality. Depending upon aircraft configuration settings and external sensors/switches, the system is configurable as a Class A, B or C TAWS or a Class A or B HTAWS.[4]

The accident airplane TAWS functionality was set to Class B specifications as required by 14 CFR 135.154 and Technical Standard Order (TSO) – C151. 14 CFR 135.154 (b) (2) states, "No person may operate a turbine-powered airplane configured with 6 to 9 passenger seats, excluding any pilot seat, after March 29, 2005, unless that airplane is equipped with an approved terrain awareness and warning system that meets as a minimum the requirements for Class B equipment in Technical Standard Order (TSO)-C151."

Functions provided by the Class B TAWS are:

1. Terrain Display: Display of terrain and obstacles on the PFD and MFD.
2. Forward Looking Terrain Awareness ("FLTA"): A warning function that uses a terrain database and an obstruction database to alert the pilot to hazardous terrain or obstructions in front of the aircraft.

[4] Reference: Chelton FlightLogic Operators Manual Section 9-12

3. Premature Descent Alert ("PDA"): A warning function that alerts the pilot when descending well below a normal approach glidepath on the final approach segment of an instrument approach procedure.
4. Excessive Rate of Descent (GPWS Mode 1): A warning function that alerts the pilot when the rate of descent is hazardously high as compared to height above terrain (i.e., descending into terrain).
5. Sink Rate after Takeoff or Missed Approach (GPWS Mode 3): A warning function that alerts the pilot when a sink rate is detected immediately after takeoff or initiation of a missed approach.

A TAWS Inhibit Switch is used for manual inhibiting of TAWS alerting functions. The TAWS Inhibit Switch is of the latching type and gives an obvious indication of actuation (i.e., toggle / rocker or pushbutton with indicator light). The TAWS Inhibit Switch is connected directly to the EFIS IDU. The TAWS Inhibit Switch is activated when manual inhibiting of TAWS alerting functions is desired. The TAWS inhibit switch on the accident airplane was found in the "inhibit" mode at the accident site.

Figure 10. Photo of TAWS inhibit switch as found at accident site.

7.0 Meteorological Information

The NWS Alaska Surface Analysis Chart for 1300 AKDT (2100Z) on June 25, 2015 depicted a low pressure system off the coast at 1008-hPa with a dissipating occluded front. A large area of rain showers was associated with the system and was influencing southeast Alaska with increased clouds and moisture during the period.

The NWS Area Forecast valid during the period warned of mountain obscuration conditions over the region. The general forecast was for scattered clouds to occasional broken clouds at 2,500 feet and visibility 3 to 5 miles in light rain and mist, with isolated ceilings below 1,000 feet. The outlook expected MVFR conditions due to low ceilings and visibility in rain to prevail across the region.

The closest official weather observation was from Ketchikan International Airport (PAKT) located 20 miles southwest of the accident site. Ketchikan reported MVFR conditions surrounding the period with rain and mist, and with ceiling heights between 1,200 to 1,800 feet agl. The temperature-dew point spread was reported at 2° C also inferring moist low-level conditions. The RVR values in the report also indicated temporary visibility restrictions to less than 1 mile in rain and mist prior to the accident and after 1700 AKDT, when IFR conditions prevailed.

Further south Metlakatla Seaplane Base (PAMM) also reported MVFR conditions prevailing with ceilings broken at 1,800 to 2,200 feet agl. While the AWOS equipment at the airport could not report weather type, rain was detected during the period. The temperature and dew point sensors were inoperative or missing. A review of the observations indicated in the beginning of July the temperature and dew point sensors were restored to operation; however, the system still does not have a precipitation discriminator.

Annette Island Airport (PANT) located 29 miles south-southwest of the accident site reported MVFR to IFR conditions surrounding the period with ceilings between 800 and 1,400 feet agl, and visibility restricted in moderate rain and mist.

The Misty Fjords FAA weather camera provided the closest observation of the conditions in the area of the accident through the western facing camera. The images depicted broken to overcast skies over the area with the higher ridges mainly obscured by clouds, a low layer of stratus extended over the coastal section at less than 100 feet with the valley opening to Ella Lake partly covered with low stratiform clouds. Immediately prior to the accident at 1134 and 1146 AKDT showed visibility decrease to 3 miles or less, improve, and then decrease again at 1252 and 1423 AKDT. The images to the south also photographed some higher terrain obscured by clouds and some rain showers, but at least provided a safe landing area in the water if the flight encountered IMC.

The Ketchikan weather camera facing to the northwest depicted visibility less than 2 miles with the higher terrain obscured by clouds, while the accident site was just off the camera viewing angle, the images were consistent depicting less than optimal conditions over the higher terrain for safe operations under visual meteorological conditions.

7.1 Post-Accident Evaluation of Weather Camera Information by Company Personnel

Reviewing the weather camera footage from the Misty Fjords camera looking up and down Behm Canal one to three hours before the accident flight, the assistant chief pilot said that he saw low scud with visible moisture moving along the hillsides. Visibility was good and the winds were about 10-15 knots. Conditions looked appropriate for flying. At times, rain and mist moved through, reducing the visibility to 3 or 4 miles in certain areas.

In a west-looking photo, taken at 1146 he said the weather did not look good at all. If he was in the lead, he would tell the other pilots that Ella was no good and he was heading for Muskeg. He said that he usually headed out quicker than the other guys for that reason.

Asked if the weather in the next west-looking photo, taken at 1212, looked more inviting, he said he would still fly toward Point Alva and pick up the other option. It was pretty definitive. Ella did not look like the right route. He said he saw a low band of obscuration across Ella Bay that he would not be able to get under and he would have to fly over a short narrow band of clouds through some "Swiss cheese" to get into Ella Narrows before he could get to the lake. He said there also appeared to be a broken layer at 1,800 to 2,200 feet and a high overcast layer above that. He said he was seeing obscuration in a narrow pass that he would not approach.

By the time of the west-looking photo at 1304 was taken, the lower band was gone. He could see into the "twist" and would be able to go in there without performing evasive maneuvers. It looked comfortable. Subsequent pictures looked "ugly" again, with low obscuration, glassy water, and flat, white light.

8.0 Organizational and Management Information

Promech Air was a 14 CFR Part 135 air carrier holding on-demand and commuter operations specifications. The company's main business lines were air tours and providing air transportation for the Waterfall Lodge. The company headquarters was located in Ketchikan, and a satellite air tour operation was located in Key West, Florida. The president, director of operations, assistant chief pilot, and director of maintenance were located in Ketchikan. The chief pilot was located in Key West.

From 2005 until October 2014 Promech provided air taxi service and scheduled service involving passenger flights and mail contracts. The company had been the biggest freight operator going into some communities in Southeast Alaska, such as Metlakatla, Hollis, Thorn Bay, and Craig. According to the company president, growth potential was poor, winter service was slower, and the US Post Office had decided to award the contract for service into Craig to a wheeled operator. Promech was losing $500,000 each winter so it was not making economic sense to continue scheduled service.

The president spoke with Wings Airways about how they were doing flying air tours exclusively, and it had made sense. Subsequently, Promech stopped providing scheduled service, although they were still authorized to do so. At the time of the accident their business involved tour contracts with the cruise lines and the Waterfall Resort and ad hoc charters, as requested. About 90% of their business consisted of air tours.

At the time of the accident, Promech was operating 9 airplanes in Ketchikan and employing between 30 and 40 people. Promech was also operating two airplanes at its Key West location.

According to Promech personnel, the accident flight was part of a package referred to as a "Cruise/Fly." One group of passengers would depart Ketchikan by boat to a shared dock in Rudyard Bay, which is about 40 miles west of Ketchikan. The second group of passengers would fly to the shared dock via airplane and meet the boat, where the groups would change places for the return to Ketchikan. The accident flight was the return portion for the trip.

The company's air carrier certificate was managed through the Juneau Flight Standards District Office. A standard Certificate Management Team, consisting of a Principal Operations Inspector, Principle Maintenance Inspector, and Principle Avionics Inspector, was assigned to provide the FAA oversight of Promech's operations. Additional surveillance was available through a geographic inspector based in Ketchikan.

8.1 Promech Management

8.1.1 President and CEO

The company president and CEO had been in his position with Promech since 2005. He had also served as the director of operations until 2015, when the current director of operations was hired. His day-to-day role in Ketchikan had been dialed back considerably as he had become more focused on accounting, buying parts, cruise line agreements, and maintaining relationships. He was doing "big picture stuff" rather than the day-to-day movement of airplanes. He was listed as the agent for service in the Promech operations specifications, but he was no longer listed as the director of operations. The president was in the office on the day of the accident and he operated an airplane during the second tour of the day.

8.1.2 Director of Operations

The director of operations (DO) was a Ketchikan native. He was hired in May 2013 directly into the position. He said that he was the person who was on the ops specs for operational control. He helped maintain pilot records and helped with pilot training. He also served as the interface between the pilots and the mechanics and assisted with general maintenance of the mooring docks and fuel systems. He described himself as a "jack of all trades". He also had flying duties and estimated that he flew the line 3 to 4 days per week.

8.1.3 Assistant Chief Pilot

The assistant chief pilot (ACP), also a Ketchikan native, was hired by Promech in November 2013 as a line pilot. In January 2015, he took on the role of ACP. His normal duties and responsibilities as ACP were flying the line, maintaining pilot records, assisting with training, mentoring, and providing moral support to employees. He said he was still learning his management position. He tried to mimic what he had seen other managers do over the last year of his employment. Recently, he had also become a company check airman. In addition, he worked with accounting to oversee how the pilots were paid. His favorite duty was serving as one of the company's primary Beaver and Otter pilots in the winter.

8.2 Promech Safety Management

Section 3.4 of the Promech GOM sets forth the policy and procedures for safety management. The sections stated:

> The Director of Operations promotes and encourages safety in all areas and ensures instructions pertinent to safety are properly observed. She/he monitors the education

and training of all flight and ground support personnel that are involved in flight operations.

The company did not employ a formal Safety Management System (SMS) or utilize a formal Flight Risk Assessment (FRA) process.

The DO said it would be possible to scale a SMS to their operation, however he believed that they accomplished the same things through their safety culture. He felt they did not have enough people on staff to manage a formal SMS and ensure that it was appropriate, useful, and effective. Given the size of the operation in Ketchikan and its centralized nature, however, he felt they could maintain a safety culture through the presence of the DO and the use of multiple communication methods.

The DO stated that the bulletin board in the dispatch area was loaded with useful information. They continually posted bulletins there about hazards to look out for and provided information that could help the operation and the pilot. With regard to flight risk assessment, the DO said he had worked with formal risk assessment forms in other jobs and he believed they were able to accomplish the same thing informally at Promech.

The company had an anonymous hazard reporting system that could be used to report operational hazards and general unsafe conditions. The DO stated that all the pilots were told where the hazard reporting forms were, and that they needed to report any slips or falls, bumped heads, or dropped cameras. He said that a number of things that came up had to do with things like missing bumper tires on the dock that could damage the airplanes. When asked specifically about non-punitive safety reporting for the pilots, the DO said that he would have to look through the GOM section to review the policy, but pilots could submit a form anonymously using the collection box and he would look in there from time to time and there was never anything in it. He thought everyone knew they could bring up anything they wanted. He liked to think it was a culture where they felt free to bring up anything that was bothering them.

The company president said that safety reports could be submitted anonymously in a box in the lunch room. Copies of the report form were located in the GOM and next to the box. Typically, pilots just walked in and told the managers if they had a concern, but they had the ability to do it either way. Asked whether they ever received written reports or mostly verbal reports, he said the DO might have received written reports, he did not know. Verbal reports were more likely.

The company did have an anonymous, in-house safety reporting system. Investigator review of these reports identified no reports pertaining to in-flight operational safety issues.

8.3 Promech CFIT Avoidance Training

Created in conjunction with the Medallion foundation, The PM AIR, LLC CFIT Avoidance Manual described the policies and procedures that PM AIR, LLC would use in relation to CFIT avoidance during all phases of flight. The manual stated that all POM AIR, LLC aircrews should adhere to the procedures in this manual. The manual stated that CFIT Avoidance training was

accomplished for all new hire pilots, all pilots receiving recurrent training, and any pilot who has gone out of currency. Training was accomplished through a combination of ground training and simulator training in an Approved Training Device (ATD). The CFIT training program was not part of the FAA approved training program.

Two documents were recovered that related to the accident pilot's CFIT training. A completed, but not graded, CFIT written examination was located with the pilot's name, dated May 1, 2015. A Medallion Foundation simulator sign-in/training log was located that showed that accident pilot received 1.3 hours of simulator time on May 4, 2015, instructed by the Assistant Chief Pilot.

8.4 Promech Weather Minimums

At the time of the accident, the company utilized the basic FAR Part 135 weather minimums to release revenue flights. To release a revenue flight, a pilot would have been required by federal regulations to maintain a minimum of 500 feet altitude above ground level and maintain at least 2 miles flight visibility if the ceiling was below 1,000 feet or 1 mile visibility if the ceiling was above 1,000 feet during the entire flight.[5]

Section 4.12 of the PM Air, LLC General Operations Manual (GOM) states, "No PM AIR, LLC aircraft will be released for flight under visual flight rules unless the enroute ceiling and visibility as indicated by available weather forecasts or reports, or combination thereof, are and will remain at or above applicable weather minimums for VFR operation at the landing area(s)."

8.5 Promech Flight Scheduler Training

Promech had no formal training program for flight coordinators. The Promech GOM stated that flight schedulers should be trained and qualified; however, there were no formal methods of meeting those requirements. According to the flight coordinator on duty at the time of the accident, her training consisted of studying the company GOM and operations specifications, and on-the-job training. She was already familiar with the company having worked there prior to becoming a flight scheduler. She could not recall how long her initial training lasted, and she had not received any recurrent training during her employment.

8.6 Operations Specifications Paragraph A008, Operational Control

A 14 CFR Part 135 operator must have a system and/or procedures for the control of flight movements. The intent of operations specification paragraph A008 is to promote a mutual understanding between an operator and the FAA concerning the system and/or procedures used by that operator.

Operations Specifications Paragraph A008 (Operational Control)[6] was issued to Promech Air by the FAA on March 2, 2011, and stated in part:

[5] See 14 CFR Part 135.205.
[6] See attachment 8: Operations Specifications Paragraph A008

Refer to GOM Chapter 1, page 1-3, 1-4, Chapter 3, page 3-5, 3-6, 3-7, 3-8, 3-18,3-19, and Chapter 6.

PM AIR, LLC GOM Chapter 1, as referenced above, contained policies for Operational Control. PM AIR GOM Chapter 3, as referenced above, contained the procedures for conducting flight locating, and accident/incident reporting. Chapter 6 of the GOM provided guidelines and procedure for PM AIR, LLC employees when handling emergency situations.

8.6.1 PM AIR, LLC Operational Control Policies and Procedures

Section 1.4 of the PM Air, LLC GOM contained the relevant policies relating to operational control. The section stated:

> PM AIR, LLC at all times retains full responsibility of Operational Control of all company flights, both Part 135 and Part 91. This responsibility is not transferable, and cannot be superseded by any other contract or agreement. Pilots who fail to adhere to company procedures may be acting contrary to the FAR's and may be subject to enforcement action by the FAA. The only flights not conducted under the authority of PM AIR, LLC are pilot aircraft rental flights, which have been approved by the Director of Operations and coordinated with the Flight Schedulers.
>
> The following personnel have full Operational Control authority at PM AIR, LLC: With respect to control for all flights, maintenance, and business practices in accordance with FAR 135:
>
> President
> Chief Pilot
> Director of Operations
> Director of Maintenance
> Assistant Chief Pilot
>
> Operational Control responsibilities may be delegated to other trained and qualified personnel. The following personnel have limited Operational Control at PM AIR, LLC:
>
> Flight Schedulers—Flight Schedulers are authorized to initiate flights and terminate flights. Flight Schedulers shall be trained and qualified and a current list of Flight Schedulers shall be kept on a white board in the Dispatch Office.
>
> Pilots—Pilots are authorized to conduct and terminate flights. A current list of Pilots (with certificate numbers) shall be kept on a white board in the Dispatch Office.

8.6.2 Conduct and Termination of Flights

Section 1.4 of the Promech General Operations Manual stated the following in reference to the conduct and termination of Promech flights:

> Flights are conducted in joint agreement and coordination between the Pilot and Flight Scheduler. Both the Pilot and Flight Scheduler must agree that the flight can be conducted safely before a flight may be launched. During the flight both the Pilot and Flight Scheduler will monitor and reassess the conditions to ensure that the flight can continue safely. Either the Pilot or Flight Scheduler can terminate a flight when they are not confident that the flight can continue safely. The Pilot and Flight Scheduler will work together to decide whether the flight should divert to a new location, or return to where it took-off from, but ultimately the pilot has the final decision in this matter. It is worth repeating that it takes the concurrence of both the Pilot and Flight Scheduler to launch and continue a flight, but either may decide to terminate the flight.

When asked about the role of the flight schedulers with respect to operational control, the DO said their normal role was to provide weather information to the pilots. They obtained information from other operators. The DO would ask the flight scheduler if the other operators were out flying. If not, it was a "red flag." If they had already done a weather check they could see it on the flight tracking display and they would wait to hear. There had been times when the weather had been questionable and the DO had told the flight coordinator to have someone go check. According to the DO, flight coordinators had very limited operational control, almost none.

The DO was asked about a provision of Promech's GOM which stated that responsibility for operational control could be delegated to the flight scheduler and pilots cooperatively for initiating and canceling the flights. He said that if no managers were at the office, the pilot and flight scheduler could work together to decide whether to release a flight.

The DO was asked about a provision of Promech's GOM which stated that both pilot and flight scheduler had to agree to a flight before it departed, and asked how that factored into the decision making process. He said that it would be a joint effort between the scheduler and pilots looking at all of the available weather information, including the weather cameras. He said he thought there could be a time when the pilots might want to go and the flight coordinator might say "I'm not sending you," but normally it was hashed out between the pilots and flight coordinator. He said he did not think there would ever be a time when a flight coordinator would say not to go and the pilots would overrule that decision.

The DO was asked if he sampled the operational control delegates' performance of the operational control function. He said that he did, and gave the example, "Occasionally the pilots canceled a 0930 tour because they had gone out, turned around, and come back, and the managers would say "Good call." The pilots had exercised that decision making authority and those decisions had been appropriate."

The flight scheduler was asked if she reviewed the flights with the pilots before every flight, she said yes. When they were on their way back she would ask them if it was still good. They would sit down together and make the go / no-go decision. Asked whether she felt that the pilots respected her input and took it into consideration, she said yes. Asked whether they ever had

disagreements with her over such decisions, she said she did not think so. She never had any issues with pilots pushing back if she thought the weather was bad. She said she had limited operational control. Mainly she collected pertinent preflight weather data and passed it to the pilots. Ultimately, a manager decided whether they wanted the flight to go out. It was their call. She said, however, that she had partial control with the pilots as to whether a flight left or was canceled, and that the pilots had some control also.

Asked to summarize who had overall responsibility for operational control, she stated that the president of the company, the director of operations and the director of maintenance had full operational control. Asked whether they delegated operational control to the flight scheduler and the pilot jointly for each specific flight, she said yes.

The flight scheduler stated that the day of the accident she did not recall having any conversations with the accident pilot beyond normal greetings. Asked whether she could recall having any conversations with him about the weather that morning, she said she only recalled the weather report when he was outbound on the first round of flights. That was all she could remember coming from him.

8.7 Operational Control

8.7.1 FAA Order 8900.1 Two-Tiered Operational Control Concept

FAA Order 8900.1, Volume 3, Chapter 25, Section 5, 3-2029, H, states, in part:

> The first tier is described as the assignment of flight crewmembers, and aircraft for revenue service under the operating certificate, and must be made by management or management delegates. In order to be delegated the authority to make these decisions, the management delegates must be trained, found competent, and designated by the certificate holder, be listed in the GOM, and be under management supervision. Management supervision means, that the certificate holder tracks the actions of the management delegate or employee, samples the work of that employee (reviews a sample of the decisions made), and has the ability to enforce the certificate holder's standards through corrective actions such as retraining, requalification, or disciplinary actions such as disqualification, demotion, suspension, or termination. Because the certificate holder is responsible for the conduct of its employees or agents, it must have the ability to monitor and control their performance.
>
> The second tier is more tactical and may be taken either by the certificate holder's direct employees or by the certificate holder's agents. This involves the decisions made by personnel (such as the PIC) in the day-to-day conduct of operations. This may include the initiation of flights upon the PIC receiving a request from the customer directly (often the case in on-demand operations being conducted under a dedicated service contract, such as offshore operations or emergency medical service). This is acceptable if the PIC is authorized by the certificate holder to make those decisions on behalf of the certificate holder. To do so would require that the PIC be trained, found competent by the certificate holder, designated, be listed in the GOM (or in OpSpec A006, A039 or A040, if applicable), and be under management supervision. If maintaining a list of these personnel in the GOM is too cumbersome, a list of these personnel may be maintained at

the air carrier's principal base of operations and referenced in the GOM. The method of maintaining and distributing this list to all affected parties must be described in A008 or in the GOM.

The GOM (or other appropriate documentation) must contain guidance which describes the certificate holder's operational control system. The training program must provide the certificate holder's personnel with the knowledge and skills required to ensure that the operational control system is effective.

The POI, when asked how many people are authorized to exercise operational control, said the FAR 119 management personnel are authorized. Also the flight coordinators, but he thought they needed the okay from the 119 management. When asked who in the organization was authorized to exercise Tier 1 operational control as defined in FAA Order 8900.1, he said the Chief Pilot, Director of Operations, and anyone that they delegated the authority to.

8.7.2 FAA Order 8900.1 Summary of Operational Control

FAA Order 8900.1, Volume 3, Chapter 25, Section 5, 3-2029, K, states, in part:

Only approved persons may exercise operational control on the certificate holder's behalf.

The certificate holder must have adequate controls in place to ensure that officials in a position of authority over flights conducted under the certificate do so safely, and in compliance with the regulations, OpSpecs, GOM, as applicable, and accepted or approved procedures.

Management of operations should never be inattentive, distracted, or careless. Hands-off management is not a legitimate excuse for failing to maintain operational control.

8.7.3 FAA Order 8900.1 Operational Control Failures

FAA Order 8900.1, Volume 3, Chapter 25, Section 5, 3-2029, F, states, in part:

The level of severity of the failure in operational control will dictate the actions required by both the certificate holder and the FAA. Simple cases may require reinforcement or realignment of management structure or procedure. In such cases, administrative action may be acceptable. In more pronounced cases, civil penalty and/or certificate action may be appropriate.

The FAA has identified several failure modes of operational control, including at least the following basic conditions:

1) Loss of operational control within the air carrier—hands-off management results in inadequate controls over its own operations.

2) Loss of operational control within the air carrier—exercise of operational control by an unapproved person.

3) Loss or surrender of operational control externally; e.g., an air carrier's illegal renting/franchising-out the use of its air carrier certificate to one or more uncertificated entities.

8.7.4 Title 14 Code of Federal Regulations Part 119, Sec. 119.69

Title 14 CFR 119.69, Management personnel required for operations conducted under Part 135 states, in part:

> That anyone in a position to exercise control over operations conducted under the operating certificate must be qualified through training, experience, and expertise, and to the extent of their responsibilities, have a full understanding of the following material with respect to the certificate holder's operation; aviation safety standards and safe operating practices; 14 CFR Chapter I (Federal Aviation Regulations); the certificate holder's operations specifications; all appropriate maintenance and airworthiness requirements of this chapter (e.g., parts 1, 21, 23, 25, 43, 45, 47, 65, 91, and 135 of this chapter); and the manual required by Sec. 135.21 of this chapter; and discharge their duties to meet applicable legal requirements and to maintain safe operations.

The POI was asked how flight coordinators are qualified as required by FAR 119.69, he stated that he was not sure how the qualification was accomplished. He thought they would have to be watched and trained until they could perform the job adequately.

8.8 Medallion Foundation Training and Auditing

The Medallion Foundation Inc. is a federally funded, not-for-profit organization with an Internal Revenue Service (IRS) 501(c)(3) tax exemption status.

8.8.1 History

The Medallion Foundation Inc. was created in 2001 by the Alaska Air Carrier's Association with the goal of improving aviation safety in the state of Alaska, while also reducing the insurance rates for commercial air carriers. According to the Medallion history webpage, in 2002, the Medallion Foundation signed a grant agreement with the FAA "to launch a major statewide aviation safety program to establish safety standards that exceed regulatory requirements through the detection of safety trends or needs before actual accidents occur."

8.8.2 Shield Program

According to the Medallion Foundation Shield Program webpage, the purpose of the Shield Program was to create and maintain a higher level of safety through the use of system safety and safety management system principles. In order to obtain a Shield, an applicant would first need to earn a "star" in each of the following categories:

- CFIT Avoidance
- Operational Control
- Maintenance and Ground Service
- Safety
- Internal Evaluation

To earn a "star," an applicant organization must complete specific training classes, produce a required manual and undergo an external audit to determine if the company has incorporated the information into its corporate culture. Following the initial audit, annual independent audits were to be conducted.

According to the webpage, the benefits of being a Shield carrier "…include reduced insurance rates, cross promotional marketing of Shield carriers and recognition by [U.S. Department of Defense] DOD, [International Association of Oil and Gas Producers] OGP and the FAA as an operator who incorporates higher standards of safety than required by regulations."

8.8.3 Promech Medallion Star

Asked for more details about Promech's participation in the Medallion Foundation, the company president said they had the CFIT star and their safety star was in progress. They were trying to get another star this winter because they had worked really hard at cleaning up the office and the manuals. Asked if the safety star was like a SMS, he said yes. He thought it was changing because SMS was not a requirement but Medallion was working with Promech to get a SMS going. Asked if Promech had a formal written safety policy, he said yes. Asked if they had a formal safety officer, he said no. Asked if the company performed risk assessments, either in general or on a per-flight basis, he said they did not have a documented risk assessment process, they just performed general risk assessment. They had general manager's meetings, they brought the pilots in, and the spent a lot of time watching the operation. The operation had a lot of moving parts with the boats and the airplanes.

8.8.4 Promech's Medallion Audit History

Multiple request by the NTSB to both Promech and Medallion Foundation for additional information regarding Promech's external and internal Medallion audits were denied.

8.8.5 Medallion CFIT Avoidance Manual

Created in conjunction with the Medallion foundation, The PM AIR, LLC CFIT Avoidance Manual described the policies and procedures that PM AIR, LLC will use in relation to CFIT avoidance during all phases of flight. The manual stated that all POM AIR, LLC aircrews should adhere to the procedures in this manual.

These policies and procedures were not contained in the FAA-accepted GOM or the FAA-approved training program. There was no regulatory requirement for compliance with the Medallion program manuals.

9.0 FAA Oversight

9.1 Juneau Flight Standards District Office

The Principal Operations Inspector (POI) was assigned to the Promech certificate sometime between 2008 and 2009, and had been the POI since that time. The Promech certificate had the normal three inspectors making up the certificate management team (CMT). He said that he was responsible for around 20 certificates other than Promech.

Asked how much of his time he was able to dedicate to the Promech certificate, he said 2015 had been a challenge because the FSDO had only two qualified inspectors to do check rides, so he spent a lot of time doing those duties. He had finished most of the Promech work program before the accident happened. He said he had dedicated a lot of time to them prior to the accident. Review of FAA Program Tracking and Reporting System (PTRS) records showed that the POI completed nine "required" inspections of Promech in 2015 prior to the accident.

The POI said that he had been working with Promech for a long time and he believed that they were operating safely and they were not a higher risk operator. He noted that they had had a recent change in management personnel, but he was impressed with the new management so far, and they had been responsive. He described the relationship between Promech and the FAA as cooperative and responsive.

An Operational Control inspection was completed by the POI on April 6, 2015, and was closed with a satisfactory outcome. No comments were noted in the PTRS record.

Asked to describe how Promech performs operational control. Mr. Percy said that they had whiteboards of pilots and airplanes in the dispatch office. The chief pilot and director of operations ensured that everyone was current and qualified. They also utilized company flight plans.

Asked what persons are allowed to exercise Tier 1 operational control as defined in FAA order 8900, he said the Chief Pilot, Director of Operations, and anyone that they delegate the authority to. Asked how many people are authorized to exercise operational control, he said that the FAR 119 management personnel are authorized. He thought the flight coordinators were also authorized, but he thought they needed the okay from the 119 management. He said the last operational control inspection was performed on Promech sometime before the accident. He said that the inspection was satisfactory, and he was not sure if there were any other findings.

The POI had never observed flight scheduler training. The flight scheduler training was not in the crew member training program, and he was not sure if Promech had a written program for it. He had never looked at flight scheduler training records. He was not aware of any requirements to be a flight scheduler at Promech. Asked how flight schedulers were qualified as

required by FAR 119.69, he said he was not sure how the qualification was accomplished. He thought they would have to be watched and trained until they could perform the job adequately.

With regard to flight risk assessment, the POI said he thought Promech had one in development, but nothing had been completed before the accident. He said that since the accident, the FSDO had increased the number of enroute inspections on Promech. They had also had changes to their ops specs, created higher departure minimums, and removed approval for Special VFR operations. There was also a list of items on the risk mitigation plan that the company was supposed to implement before the start of the next tour season.

10.0 List of Appendices

The following appendices are available in the docket.

1. Interview summaries and transcripts
2. Photos taken by a passenger in the preceding Promech airplane
3. Photos taken by a passenger on the pilot's 0800 tour
4. Photos taken by a weather camera installation in Behm Canal
5. Data file containing ADS-B traffic information
6. Chelton replay
7. Pilot's training records
8. Pilot's recent logbook entries
9. Pilot's flight and duty schedule
10. Scheduler's flight log
11. Promech General Operating Manual (GOM) excerpts
12. Chelton User's Manual excerpts
13. Photo of Terrain Awareness Warning System (TAWS) inhibit switch
14. Photos of terrain surrounding the accident location
15. Safety reporting form from GOM
16. Promech Controlled Flight into Terrain (CFIT) Avoidance Manual excerpts
17. Medallion Foundation CFIT training sign-in log
18. Photos of Medallion Foundation training device
19. FAA Operations specifications paragraph A008 issued to Promech
20. Taquan Air weather minimums and flight risk assessment form
21. FAA Capstone Program Phase II Baseline Report, 2002
22. FAA Capstone Program Phase II Implementation and Impact Assessment, 2005
23. Initial written statements from Promech pilots