Hageland Aviation Services, Inc.

Submission to the

National Transportation Safety Board

for the

Investigation of Hageland Aviation Flight 3153 Accident near Togiak, Alaska, October 2, 2016

September 25, 2017

Adam Ricciardi
Director of Safety Assurance
Party Coordinator
Hageland Aviation Services,
Inc.

Table of Contents

Executive Summary

On October 2, 2016, Hageland Flight 3153 impacted terrain approximately 12 miles northwest of Togiak, Alaska, while en route from Quinhagak, Alaska, to Togiak. It appears from a review of the wreckage that the airplane, a turbine-powered Cessna 208B Grand Caravan, was in a steep climb at the time of impact. What transpired before the steep climb, however, remains unknown.

The only available position information regarding the flight path of the accident aircraft from Quinhagak to Togiak was provided by the aircraft's Spidertracks system, which relays data once every six minutes. The last position information was recorded four minutes prior to the accident. Accordingly, the path of the accident flight over the final four minutes is speculative.

The functioning of the aircraft's Terrain Alerting and Warning System (TAWS) during the flight is also indeterminable. The system is designed to alert the pilot when the aircraft is under 700 feet above ground level (agl). Since there is no available data regarding the aircraft's altitude agl in the last few minutes of the flight, it is not known when the flight crew might have received alerts from the TAWS unit.

Although the timing of any alerts that might have been provided by the TAWS is not known, a simulation done by Honeywell found that the accident crew did not receive TAWS cautions or warnings for a 30 second period in the last 1-2 minutes of the flight. The same Honeywell simulation, based on a speculative flight path, indicates that a TAWS warning would have been provided in the final moments of the flight. The aircraft's steep climb is consistent with a proper response by the flight crew to a TAWS warning, but whether such a warning was provided cannot be verified. Regarding the unit itself, it was badly damaged in the accident and could not be tested.

It further appears that the flight crew encountered conditions of decreased visibility. Images from weather cameras, while aimed in other directions, suggest that at the time of the accident, there were clouds in the area where the accident occurred. About half an hour after the accident, the pilots sent by Hageland to look for the accident aircraft saw clouds obscuring the accident location.

It is not known, however, why the accident aircraft encountered such conditions. Another Hageland flight from Quinhagak to Togiak, that left Quinhagak just a few minutes behind the accident flight, selected a route along lower terrain, out of the clouds, and around the mountains where the accident occurred. That flight crew did not have any difficulty remaining in good visual meteorological conditions (VMC).

Although aspects of the flight crew's performance remain unclear, what is clear is that Hageland exercised appropriate operational control over the flight. Hageland's system of operational control is an industry leading model, and has been recognized by the FAA as the most sophisticated and robust among Alaska Part 135 operators. Based on the NTSB's investigation, it is clear the system worked as intended.

Per the company's required risk assessment process, the pilot in command of the accident flight and an operational control agent each risk assessed the flight and spoke via telephone prior to the release of the flight. The risk assessment includes numerous factors that might affect the flight, including weather conditions. On the day of the accident, the weather throughout the morning, from the time the aircraft was released to the time of the accident, was VMC, and supported day visual flight rules (VFR) operations. Both the accident flight, and the other Hageland flight that was flying the same city-pair route between Quinhagak and Togiak, were released as VFR flights.

The only area of potential concern with regard to the weather was the possibility of rain near Quinhagak. The operational control agent and the pilot in command discussed whether the operation should be conducted under instrument flight rules (IFR) or VFR, and agreed the weather was VMC, and that the flight should be flown under VFR, which would also reduce icing concerns. After the flight was released, the weather conditions in Quinhagak actually improved.

The accident flight crew was trained to avoid IMC weather while flying under VFR. Hageland pilots received ground training, flight training and simulator training on avoiding controlled flight into terrain. The pilot in command had received simulator training specifically on recognition of deteriorating weather and the need to immediately escape such conditions. The flight crew also received training on the use of visual cues to judge in-flight visibility, and on CRM techniques to avoid and resolve issues arising during flight.

The accident flight crew also received training on the aircraft equipment that provides information, cautions and warnings regarding terrain conflicts. This training includes the functioning of the TAWS system, as well as the Garmin moving maps that depict the terrain and provide visual warnings of terrain. After finishing their training, Hageland pilots also receive 50 hours of flying with a pilot experienced and knowledgeable regarding the terrain and weather patterns of the area in which they will be flying.

This comprehensive training is part of Hageland's culture of safety that emphasizes the importance of good decision-making. Since January 1, 2016, Hageland has cancelled 3,564 flights due to weather. If operating VFR and inflight conditions deteriorate below that required for VMC flight, the company demands that the flight crew follow the safest course of action as they have been trained. Since January 1, 2016, 607 flights have turned back or diverted.

Hageland proactively addresses the challenges of flying in Alaska. This is evidenced by the company's system of operational control, its comprehensive training for avoidance of controlled flight into terrain, and its continuing commitment to identify and mitigate risk. Hageland utilizes all resources at its disposal, including the FAA, the Medallion Foundation, and outside consultants. Hageland has a total company commitment to safe operations.

1. Factual Information

1.1 History of Flight

On October 2, 2016, about 1157 Alaska daylight time[1], a turbine-powered Cessna 208B Grand Caravan airplane, N208SD, sustained substantial damage after impacting steep, mountainous terrain. Ops, p. 4. The accident occurred at approximately 2,300 feet msl, near the top of a mountain ridge, about 12 miles northwest of Togiak, Alaska. Id.[2] The airplane was being operated as Flight 3153 by Hageland Aviation Services, Inc. ("Hageland") as a scheduled commuter flight under the provisions of 14 CFR Part 135. Id. Hageland is based in Anchorage, Alaska, and is the largest Part 135 operator in the state. Id.; Hickerson, p. 99.[3]

All three people on board (two commercial pilots and one passenger) sustained fatal injuries. Ops, p. 4. Visual meteorological conditions (VMC) prevailed at the Togiak Airport, and company flight monitoring procedures were in effect. Id. Flight 3153, which was operated under visual flight rules (VFR), departed Quinhagak Airport (KWN), in Quinhagak, Alaska, at 1133, and was destined for Togiak Airport (TOG), in Togiak, Alaska. Id.

On the day of the accident, the flight crew was scheduled to complete five legs under Flight Number 3153: Bethel (BET) to TOG; TOG to KWN; KWN-TOG; TOG-KWN; and KWN-BET. HP, p. 2.[4] The accident flight crew departed BET for TOG at approximately 0927, arriving at 1029. Id. After loading cargo, the crew departed TOG at 1044 for KWN, arriving at 1125. Id. The flight flew at an altitude of about 4,500 feet msl en route from TOG to KWN. Id.

The crew was on the ground in Quinhagak for about eight minutes to load and unload cargo and board a passenger. HP, p. 2. Then they departed KWN at 1133 for the 60 mile return flight to TOG, flying at an altitude of approximately 1,000 feet msl (500-700 feet agl). Id.; IIC, p. 15.[5] As stated above, the accident occurred at approximately 1157. Ops, p. 4.

A second Hageland flight, also operated under VFR, departed KWN for TOG within minutes of the accident flight. HP, p. 2. About ten minutes into the flight, the pilot-in-command (PIC) of the second flight determined that a more westerly route over lower terrain was more favorable given the then-existing conditions. Id.

The Hageland General Operations Manual (GOM), consistent with Part 135 regulations, prescribes that day VFR flights be flown at an altitude no lower than 500 AGL. Ops, p. 24. The

---

[1] All times herein are Alaska Daylight Time and presented in 24 hour "military time" format.

[2] References to the Operational Factors Specialist's Factual Report will be denoted as "Ops," followed by the page number(s). Attachments to the report will be designated "Ops Att.," followed by the attachment number.

[3] References to the public hearing transcript will include the name of the witness/source and page number(s).

[4] References to the Human Performance Factual Report will be denoted as "HP," followed by the page number(s).

[5] References to the Investigator-in-Charge presentation at the August 17, 2017 Public Hearing will be labeled "IIC," followed by the transcript page number.

GOM also provides that flight plan routes shall be along the shortest safe route, or as assigned by air traffic control (ATC). Id.

According to the Director of Operations (DO) for Hageland, he received a notification from the Air Force Rescue Coordination Center (AFRCC) at approximately 1214, advising that the AFRCC had received a signal from a 406 megahertz (MHz) Emergency Locator Transmitter (ELT). Ops, p. 5. The signal activated at approximately 1208 and was registered to N208SD. Id.

After accessing the aircraft location data provided by an on-board flight tracking system, the DO discovered the aircraft had been stationary for approximately 20 minutes. Ops, pp. 5-6. He then contacted the Hageland Operational Control Center (OCC) in Palmer, Alaska, to verify the information, and contacted the crew of the second airplane to initiate a search for the accident aircraft. HP, p. 2. The crew departed TOG at 1236 to search for the accident flight. Id.; see Ex. A, attached. Due to clouds obscuring the mountain from which the ELT signal was emitting, they were unable to locate the wreckage. Id.

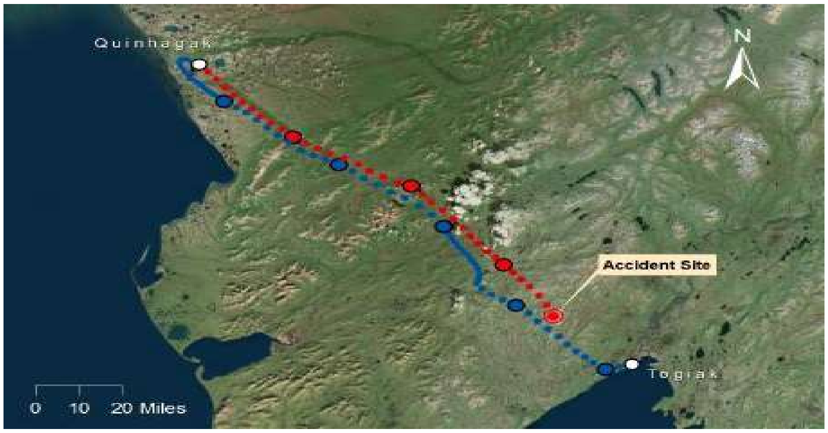
At 1326, the Alaska State Troopers were notified by AFRCC personnel of the ELT signal. Ops, p. 6. Shortly before 1430, a state trooper helicopter was dispatched from Dillingham, Alaska, about 67 miles east of Togiak, to the coordinates associated with the signal. Id. The poor weather conditions that had developed by that time, however, kept the searchers from locating the accident airplane until about 1630. Id. The state troopers were able to access the scene on foot shortly after 1730, and subsequently confirmed there were no survivors. Id.

The airplane was equipped with a satellite tracking device that reported the aircraft position, altitude, heading and groundspeed in 6-minute intervals. Ops, p. 6. For the flight path between KWN and TOG, three Spidertracks data points were recorded. Ops Att. 20, p. 2. The first was at 676 feet msl. Id. The second was at approximately 1,000 feet msl. Id.

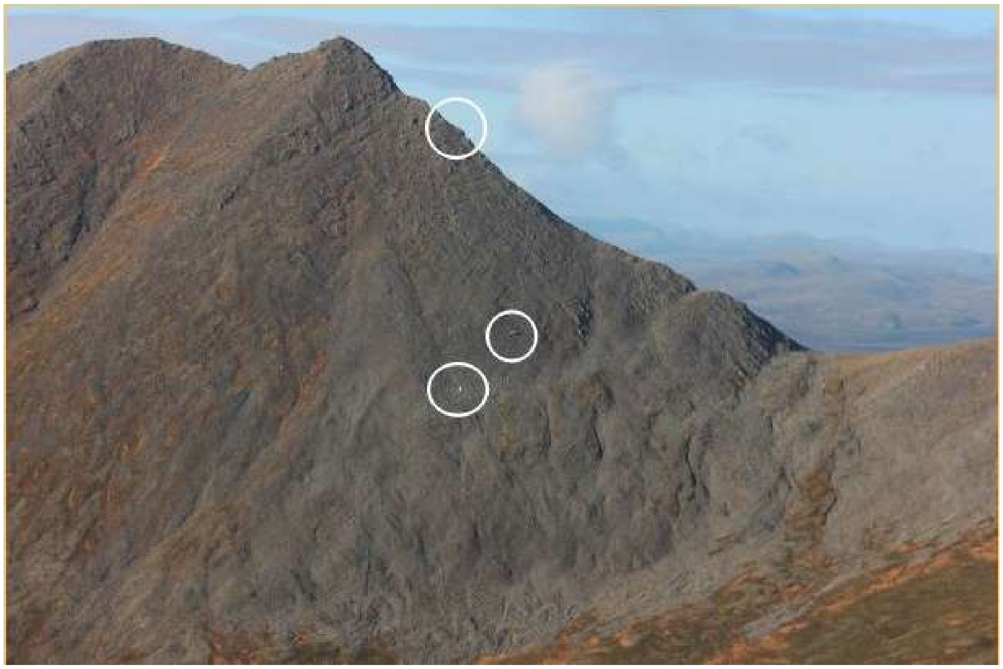
The third and last information from Spidertracks was transmitted about four minutes before the accident, at 1153. Ops Att. 20, p. 2. At that time, the airplane location was about 19 nautical miles northwest of the Togiak Airport, at an altitude of 1,043 feet MSL, traveling at 144 knots groundspeed on a heading of 140 degrees. Id. As discussed above, the accident occurred when the aircraft impacted terrain at an elevation of approximately 2,300 feet msl, about 12 miles northwest of Togiak, at 1157. Ops, p. 4.

The below image depicts two separate routes flown on the day of the accident. IIC, p. 15. The data was derived from on-board flight tracking systems. Id. The track displayed in red is the accident flight. Id. This track is based only on the data points provided by Spidertracks because the aircraft's ADS-B was inoperative pending maintenance. IIC, p. 16; Ops, p. 11. The Spidertracks data points were each six minutes apart, with the last data point four minutes before the accident. Id. The exact path of the aircraft between these data points is unknown; the red line represents the flight path if the aircraft had flown on a direct line between the Spidertracks data points.

The track displayed in blue is from another airplane about five minutes behind the accident flight. IIC, p. 15. Unlike the track of the accident aircraft, this track is known with precision because the second aircraft had an operative ADS-B. As the below image shows, the second airplane was slightly west of the estimated track of the accident flight, and deviated around the mountain where the accident occurred. Id.



The picture below was taken the day after the accident. IIC, p. 16. It shows the accident location, as viewed from a helicopter that was positioned southeast of the accident site. Id. The white circle shows the location of the initial impact on the opposite side of the ridge, about 200 feet below the estimated 2,500 foot peak. Id. Investigation of the wreckage indicated the airplane was in a steep climb at the time of impact. Id. The point of impact was so close to the top of the ridge that the aircraft wreckage came to rest on the other side of the ridge, in the areas inside the two lower circles shown below. Id.



1.2 Meteorological Information

The last hourly report of TOG weather available to the pilot prior to his 1133 departure from KWN was time-stamped 1056, and reported the conditions at TOG as wind calm, visibility 10 statute miles, sky overcast at 1,600 feet agl, temperature 7° C, dew point 6° C, and altimeter setting 29.86 inHg. Ops, p. 12. At a distance of 12 miles, this was the closest weather reporting facility to the accident site. Id.

While en route to TOG, the airport weather at 1139 was reported as wind calm, visibility nine statute miles, light rain, scattered clouds at 1,400 feet agl, sky overcast at 4,400 feet agl, temperature 8° C, dew point 6° C, and altimeter setting 29.87 inHg. Ops, p. 12. It is not known if the flight crew received this report on the radio while en route to TOG. Id. At 1156, a METAR from TOG reported wind calm, visibility seven statute miles, light rain, scattered clouds at 3,900 feet agl, sky overcast at 4,700 feet agl, temperature 7° C, dew point 6° C, and altimeter setting of 29.88 inHg. Id.

Weather cameras at TOG provided views of the terrain and sky at various angles looking out from the airport. Ops, p. 13. Prior to the flight's departure from Bethel earlier that day, the operational control agent (OCA) assigned to the flight reported he had checked the weather cameras at the flight's destinations, and they indicated the flight could be flown under VFR. Id.

The weather camera pointing west from TOG captured an image at 1156, one minute before the accident occurred. IIC, p. 16. Based on the accident flight's Spidertracks data points, it is likely that the aircraft was on approach to TOG from the right side of the image in the area where the mountains are located. Id. In the photo, low clouds partially obscure the top of a 1,300-foot mountain located seven miles west of the airport. Ops, p. 13.

The weather camera pointing north from TOG captured an image at 1159, in which the top of a 400-foot mountain 3.5 miles from the airport was clearly visible, but another 550-foot mountain 12 miles away was only faintly visible. Ops, p. 13. The accident flight was arriving from the northwest, and no weather camera captured images from that direction. Id.

1.3 Use of Two Pilot Flight Crew

The accident flight crew consisted of a PIC and second-in-command (SIC). Ops, p. 6. Since the flight was operated under VFR, and the aircraft was type-certificated for a single pilot, only one pilot was required. Id. Having a second pilot permits the operator to utilize the pilots for a maximum of 10 hours of flight time, versus an eight hour maximum for operations with a single pilot. Id. Also, Hageland uses SICs to assist with loading and unloading and to perform other duties. Id.

1.4 PIC Background, Qualifications and Certificates

The PIC was 43 years old and resided in Montana. Ops, p. 7. He had been employed by Hageland since November 2, 2015. Id. Prior to being hired by Hageland, the PIC had been employed as a pilot at Flight Alaska, dba Yute Air, from August 26, 2011, through August 26, 2013. Id. At Yute Air, he had been PIC on the C-172 and C-207 aircraft, and had served as a flight instructor on the C-207 and as a check airman on the C-172. Id.

According to Hageland's records, at the time the PIC was hired, he had a total of 5,800 hours, including 4,000 hours in the Cessna 207 aircraft, and 100 hours in the C-208B aircraft. Ops, p. 7. He had 4,300 hours as a PIC flying in Alaska. Id. In January 2016, he completed the necessary training and checks, and was assigned as a PIC in the C-208B. Id.

In July 2016, the PIC successfully completed a proficiency check in the C-208B. Ops, p. 7. His training and checking records at Hageland and Yute Air did not reveal any problems or concerns. Id. He completed the following training and proficiency checks while at Hageland:

• Completion of initial ground training	November 6, 2015
• Completion of initial flight training	November 10, 2015
• Completion of initial 208 flight training	December 15, 2015
• Completion of recurrent training	February 4, 2016
• 14 CFR 135.293(a) Oral Check[6]	July 7, 2016
• 14 CFR 135.293(b) Competency Check[7]	July 7, 2016
• 14 CFR 135.297 Instrument Proficiency Check[8]	July 7, 2016
• 14 CFR 135.299 PIC Line Check[9]	July 7, 2016

Ops, pp. 8-9; see Ex. B, attached.

Pilots who flew with the PIC said he had good crew resource management (CRM) and there were no concerns about his decision making or judgment. HP, p. 8. A co-pilot who had flown with him the day before the accident did not note anything unusual or noteworthy in the pilot's behavior. Ops, p. 7. The co-pilot stated that it had been a normal day, and the pilot seemed happy. Id.

---

[6] Title 14 CFR 135.293(a) required pilots to pass a written or oral test every 12 calendar months covering topics such as regulations, airplane systems, weigh and balance, and weather.

[7] Title 14 CFR 135.293(b) required pilots to pass a competency check every 12 calendar months to determine the pilot's competence in practical skills and techniques.

[8] Title 14 CFR 135.297 required a pilot operating as a PIC to pass an instrument proficiency check every 6 months.

[9] Title 14 CFR 135.299 requires a pilot operating as a PIC to pass a flight check every 12 calendar months in one of the types of aircraft which that pilot was to fly.

The PIC's wife said the PIC had not experienced any major changes in his financial situation, health or personal life that would have affected his performance on the day of the accident. HP, p. 8. He did not have any specific concerns about working at Hageland or flying the C-208. Id.

The PIC's most recent second class medical certificate, issued by the FAA, was dated July 22, 2016, with no limitations. HP, p. 8. He had no issues with his vision or hearing and listed no medications. Id. His wife described him as "very healthy" and said he took over-the-counter vitamins, but did not take any medications. Id. Although his wife said he would drink a beer in the evening, she was not aware of him having any alcoholic beverages in the days before the accident. Id. He fell asleep quickly and had no problems sleeping. Id. When not working, he would go to sleep about 2300 and wake up about 0900. Id.

FAA records show the following certificates were issued to the PIC:

- Private Pilot – Airplane Single Engine Land certificate issued June 23, 1996.
- Private Pilot – Airplane Single Engine Land; Instrument Airplane certificate issued July 21, 1997.
- Commercial Pilot – Airplane Single Engine Land; Instrument Airplane certificate issued September 2, 1997.
- Commercial Pilot – Airplane Single and Multi-Engine Land; Instrument Airplane certificate issued August 7, 2009.
- Flight Instructor – Airplane Single Engine certificate issued May 22, 2008.
- Flight Instructor – Airplane Single Engine; Instrument Airplane certificate issued March 13, 2009.
- Flight Instructor – Airplane Single- and Multi-Engine; Instrument Airplane certificate issued February 14, 2011, and renewed March 12, 2013, and January 28, 2015.

Ops, p. 8.

1.5 SIC Background, Qualifications and Certificates

The SIC, who was acting as the pilot monitoring, was 29 years old and based in Bethel, Alaska. HP, p. 4. He had been employed by Hageland since July 18, 2016. Ops, p. 9. Prior to being hired at Hageland, he was enrolled in a flight training program at the University of Alaska at Anchorage. Id. He completed the required flight test and gained a commercial pilot certificate on May 4, 2016. Id.

When the SIC was hired by Hageland, he had a total of 189 hours, including 139 hours in PIC flight time. Ops, p. 9. On September 3, 2016, after completing all necessary training and checks, he was assigned as an SIC in the C-208B. Id. A pilot who flew with the SIC shortly before the accident said he was smart and experienced, and he did not have any concerns about flying with him. HP, p. 4.

The SIC lived with his girlfriend in Anchorage, Alaska. HP, p. 4. His girlfriend said he had not experienced any major changes, good or bad, to his financial situation, health, or personal life, that would have affected his performance on the day of the accident. Id.

The SIC's most recent second class medical certificate, issued by the FAA, was dated July 13, 2016, with no limitations. HP, p. 4. He had no issues with his vision or hearing, and listed no medications. Id. His girlfriend described him as "very healthy," and he was a "very active person." Id.

The SIC had been issued the following certificates:

- Private Pilot – Airplane Single Engine Land certificate issued March 10, 2015.

- Private Pilot – Airplane Single Engine Land; Instrument Airplane certificate issued February 25, 2016.

- Commercial Pilot – Airplane Single Engine Land; Instrument Airplane certificate issued May 4, 2016.

Ops, pp. 9-10.

The SIC completed the following training and proficiency checks after he was hired by Hageland on July 18, 2016:

• Completion of initial ground training	July 25, 2016
• Completion of initial flight training	September 2, 2016
• 14 CFR 135.293(a) Oral check	September 3, 2016
• 14 CFR 135.293(b) Competency check	September 3, 2016

Ops, p. 10.

1.6 Flight Crew Scheduling and Flight Times

Pilots at Hageland typically worked 15 days on duty followed by 15 days off. Ops, p. 7. When on duty, they would normally have a 14-hour duty day. Id. The amount of flight time each pilot would accrue during this duty period varied. Id.

On the day of the accident, the PIC was on his second of fifteen days of scheduled duty for October 2016. Ops, pp. 7-8. The PIC had 15 days off duty from September 16-30, 2016. Id.

In the two months preceding the accident, the PIC had flown the C-208B for 193.2 hours. Ops, p. 7. The PIC's flight times, as evidenced by Hageland's records, were as follows:

Total pilot flying time	6,465 hours
Total PIC time	6,165 hours
Total C-208B flying time	765 hours
Total flying time last 7 days	4.3 hours
Total flying time last 30 days	95.4 hours
Total flying time last 90 days	256.9 hours
Total flying time last 12 months	836 hours

Ops, p. 9.

The PIC had flown the KWN to TOG route on 10 previous occasions, including three times in the three months preceding the accident. See Hageland's September 22, 2017 data response. He had flown the reverse route, from TOG to KWN, 16 times, including six times in the three months preceding the accident. Id.

On the day of the accident flight, the SIC was on his third of fifteen scheduled days of duty following fourteen days off. Ops, p. 9. The accident SIC's flight times, based on Hageland's records and the pilot's logbook, were:

Total pilot flying time	273.6 hours
Total PIC time	138.7 hours
Total SIC time	80.0 hours
Total flying time in C-208	84.2 hours
Total flying time last 24 hours	4.7 hours
Total flying time last 7 days	4.7 hours
Total flying time last 30 days	83.2 hours
Total flying time last 90 days	84.2 hours

Ops, p. 10.

Hageland pilots typically report at 0730 for their duty day. Ops, p. 7. On Sundays, however, flights do not typically start until after 1100. Id. If bypass mail needs to be carried, however, such flights might leave earlier in the morning. Id. The accident flight crew was flying a bypass mail flight on the morning of the accident, and had volunteered for the assignment. Burdick, p. 91.

Each station holds a morning meeting if three or more pilots are working. HP, p. 14. During the meeting, the station Lead Pilot briefs the pilots on the following:

- Pilot and aircraft status
- Current weather reports and forecasts
- NOTAMs and ADS-B NOTAMs
- Any abnormal operational issues affecting flight operations, such as station staffing, refueling, potential for icing conditions and deice preparations, etc.; and
- Flight assignment plan, including any needed discussion regarding
    - Nature of the flight loads
    - Anticipated non-scheduled flights, e.g., extra sections, charters, reposition flights
    - IFR vs. VFR flights; and
    - Civil twilight hours and flights affected by Day vs. Night flight rules

HP, p. 14; Ops, p. 7.

On the day of the accident, a morning pilot meeting was not held because Hageland operates fewer flights on Sundays and the pilots arrive at the base at different times. Ops, p. 7.

1.7 General Aircraft Information

The aircraft was a Cessna 208B Grand Caravan, Registration N208SD, and serial number 208B0491. Ops, p. 10. It was powered by a Pratt and Whitney PT6A-114A (engine model number 52032) turbo-prop engine. Id. The airplane was manufactured in 1995, and the last airworthiness certificate was issued on March 2, 2009. Id. The airplane was registered to Icecap LLC Trustee in Anchorage, Alaska. Id.

The airplane had two pilot seats, and with a two pilot flight crew, the cabin could be configured with a maximum of nine passenger seats. See 14 CFR 135.113. When the airplane was operated with a single pilot, a passenger could occupy the right-hand pilot seat, for a total allowable capability of one pilot and nine passengers. Ops, p. 11. Fewer passenger seats were sometimes installed to allow for more space for cargo in the main cabin of the airplane. Id. The accident aircraft was configured with two passenger seats, one behind each of the pilot seats. Id.

1.8 Aircraft Maintenance

At the beginning of the accident flight, the airplane had accumulated 20,562 hours total time, and a Hobbs/Tach (engine) time of 1,566 hours. Ops, p. 10. The next inspection was due at an airplane total time of 20,600 hours. Id.

The airplane had an FAA-approved Minimum Equipment List (MEL), under which maintenance of certain equipment, not essential for safe operation, and not specifically required by regulation or an airworthiness directive, can be deferred while the aircraft continues to operate. Ops, p. 11. The ADS-B system on the accident aircraft was not functioning, and repair of the item had been deferred per the company's MEL. Id. Hageland had affixed a sticker listing the deferred item on the aircraft flight log and maintenance record container that was recovered from the accident site. Id.

1.9 Terrain Awareness Warning Systems (TAWS)

A. TAWS Function

In accordance with 14 CFR 135.154(a)(2), the accident airplane was equipped with a TAWS, the Honeywell KGP 560 EGPWS. Ops, p. 21. TAWS is a generic term; the term EGPWS refers specifically to the Honeywell TAWS unit installed in the accident aircraft. Id. at 11. This system uses an internal GPS receiver and terrain database to determine if the airplane is in a position where conflicts with terrain or obstacles are a possibility. Id. at 21. If the system determines a conflict could occur, it provides a caution or warning to the pilot. Id.

For the en route phase of flight, the TAWS system uses a "look-ahead" feature to look at the predicted flight path of the airplane for the next minute, and alerts the pilot if it determines the flight would come into conflict with terrain or obstacles. Ops, p. 21. Specifically, the system provides aural and visual cautions and warnings if the aircraft descends below 700 feet agl and is not within five miles of an airport. Id. For day VFR operations such as the accident flight, the flight may operate as low as 500 feet agl. Id.

The EGPWS produces both aural and visual alerts. Ops, 21. The visual alert would be the illumination of either a red (warning) or yellow (caution) TERR light on the unit's control panel. Id.

A pilot receiving an aural alert other than "pull up," such as "caution terrain," should initiate corrective action to remove the cause of the warning. Honeywell KGP 560 Flight Manual Supplement, p. 9. A pilot receiving an aural warning of "pull up" should level the wings, add maximum power, adjust pitch attitude to ensure terrain clearance, and climb at best angle of climb speed until terrain clearance is assured. Id. at 8.

B. TAWS Inhibition

The aural and visual terrain warnings and cautions that the EGPWS produces may be inhibited. Ops, p. 21. A latching push-button on the control panel would inhibit these alerts when pushed in. Id. The button would remain pushed in, and the cautions and warnings inhibited, until the pilot pushed the button again and it moved out to the uninhibited position. Id.

When the system's warnings and cautions are inhibited, a light next to the button illuminates the message TERR INHB. Ops, p. 21. This informs the pilot that terrain warnings and cautions are not provided. Id. The light is very bright and conspicuous and directly in the pilot's line of sight. Witt, p. 56; Burdick, p. 67.

Under Hageland policy, the TAWS system could be inhibited in VMC if the pilot was confident that there were no terrain concerns. HP, p. 13. In IMC, the TAWS could not be inhibited, and the pilot was to comply with the TAWS alert and perform the appropriate escape maneuver. Id.

Hageland policy allows pilots to inhibit the TAWS aural and visual cautions and warnings if they occur while the pilot is in VMC. Ops, p. 22. Before inhibiting the system, the pilot has to first visually verify that the aircraft is not in danger of terrain conflicts. Id. Hageland enforces compliance through use of line checks and observations. Witt, pp. 39-40.

A post-accident examination of the inhibit switch on the control unit found the switch to be in the out, non-inhibited position. Ops, p. 21. It is not known if this was the position of the switch prior to impact, or if forces from the aircraft's impact with terrain caused the switch to move from the in, or inhibited position, to the out position. Id.

C. TAWS Testing

The flight manual supplement for this system states that its "procedures are for guidance only in identifying acceptable operating procedures." Honeywell KGP 560 Flight Manual Supplement, p. 4. This guidance includes the statement "Perform a system self test on the ground prior to every flight to verify proper operation of the KGP 560 GA-EGPWS." Id.

The Hageland Operations Training Manual ("OTM"), section Cessna 208 Flight Training, Flight Module 2: C-208 Normal Procedures and section Simulator Training – C-208 Flight Training-Pre-Flight, Module 5: C-208 Pre-Flight and Equipment Difference listed elements to be discussed "to familiarize the trainee with the interior and preflight inspection of a C-208 aircraft." HP, p. 13. Under subsection (e) Cockpit Orientation, line item (7) stated "TAWS/GPWS test." Id.

Hageland flights contain multiple legs, and the system is tested prior to the first flight segment of the day. Witt, p. 61. Some of Hageland's flight segments are as short as three minutes. Id. Hageland's testing prior to the first flight segment of the day is consistent with industry standards and is appropriately tailored to Hageland's operations. Id.

D. Honeywell Simulation

Honeywell created a potential flight path for the accident aircraft using Spidertracks data points that showed the accident aircraft's position and altitude at six minute intervals between KWN and TOG. Ops, p. 21. In order to complete the flight path, and lacking any data as to the actual flight path between the Spidertracks data points, Honeywell assumed that the aircraft flew in a straight line between those data points. Id. Once the flight path was created, Honeywell's simulation looked to see how the TAWS might have functioned during the flight.[10] Id.

If the flight proceeded in a straight line between the four data points that were each six minutes apart, then the aircraft would have been between 500-800 feet agl throughout the flight, and the TAWS unit, if uninhibited, would have provided cautions and warnings throughout most of the flight. Ops, pp. 21-22; Ops Att. 20, p. 3. At a point 46 seconds prior to impact, the simulation showed the TAWS unit providing terrain cautions through an aural alert of "caution terrain." Id. At a point 36 seconds prior to impact, the simulation showed the TAWS unit providing terrain warnings using an aural alert of "pull up, pull up." Id.; Ops Att. 20, p. 3.

Honeywell's simulation, however, also showed that there was a period of TAWS silence, lasting about 30 seconds, before the "caution terrain" and "pull up pull up" alerts were received. Ops Att. 20, p. 3. As stated above, although the TAWS was found to be in the uninhibited position, it is not known whether it changed position as a result of impact forces, or if it had moved from an inhibited position during the flight and, if so, when. Ops, p. 21.

1.10 Navigational Equipment

The airplane was equipped with a Garmin 430W and a King KLN 89B GPS navigational system. Ops, p. 22. Both systems allow the pilot to set a variety of paths to follow to the destination airport, and are capable of providing guidance for GPS approaches. Id.

1.11 Multi-Function Display

The airplane was equipped with a multi-function display, a Garmin GMX 200. Ops, p. 22. This unit provides the pilot a choice of displays showing the aircraft's position relative to the planned flight path, navigational aids, airports, and the terrain surrounding the aircraft. Id.

The Garmin GMX 200 does not give aural or visual warnings or cautions regarding terrain conflicts but, through two different modes of terrain display, provides color-coded depictions of terrain near the aircraft. Ops, p. 22. One mode, called the sectional mode, shows absolute (non-relative) terrain, similar to the depiction of terrain on an aviation sectional map. Id.

The second mode, the terrain awareness mode, shows a color-coded view of terrain based on terrain elevation relative to the airplane's altitude. Ops, p. 22. Terrain that is between 100 and 1,000 feet below the airplane's current altitude is displayed in yellow. Id. Terrain that is from 100 feet below the airplane's current altitude and up is displayed in red. Id. The map will flash red if the aircraft is near terrain.

---

[10] The TAWS unit was destroyed in the accident, so it could not be tested.

The depiction of terrain could also be turned off. Ops, p. 22. It is not known what, if any, terrain depiction the pilot had selected on this unit during the accident flight. Id.

1.12 CFIT–Avoidance Training

A. Hageland's CFIT-A Pilot Training

Controlled flight into terrain (CFIT) refers to accidents in which there is no indication of loss of control, such as a mechanical malfunction, yet the pilot inadvertently flew the aircraft under control into terrain. Witt, pp. 19-20. CFIT-A refers to avoidance of CFIT. Witt, p. 20. A CFIT-A training program is not required by the federal aviation regulations. Id. Hageland, however, provides extensive CFIT-A training in both initial and recurrent training. HP, p. 8.

CFIT-A is embedded in Hageland's operations even before an applicant is hired. Witt, p. 20. Pilot candidates are interviewed on their decision making, judgment and risk tolerance. Id. About ten percent of pilots who reach the interview stage are not hired because of Hageland's evaluation of these three key aspects. Id. at 35. If the candidate is found suitable and is hired, he or she must complete an online course on CFIT-A, as well as a 7-day ground school curriculum that includes embedded training on CFIT-A and crew resource management (CRM). Id. at 20.

The ground training provides definitions, background, procedures and strategies for dealing with potential CFIT scenarios. Ops, p. 18. The simulator training allows pilots to practice these procedures by recognizing and responding to these potential CFIT scenarios. Id.

Hageland's CFIT-A FAA-approved ground training was listed as module 7 in the Airman General Subjects section of its OTM. Ops, p. 18. This ground training module was an element of both initial and recurrent pilot training. Id. The training listed in the OTM was mandatory because the manual was an approved FAA document which governed Hageland training. Id. The company also used a PowerPoint presentation on CFIT avoidance that was provided to pilots during ground training. Id. This was presented as computer-based training (CBT), which pilots may accomplish outside of a formal classroom setting. Id. The presentation was based on materials published by the Flight Safety Foundation and widely used in the industry, but not specifically tailored to low-altitude VFR flying in mountainous terrain. Witt, p. 36; Ops, p. 19.

According to the Hageland CFIT-A Manual, ground training in CFIT avoidance was to be recorded in the standard ground school records for pilots. Ops, p. 19. The records for the accident PIC indicate he completed the ground training in January 2016 during his annual recurrent training. Id. The records for the SIC indicate he completed the ground training during his initial training in July 2016. Id. The training records of both pilots indicated they completed this training on-line, using the CBT method. Id.

During ground school, the CEO, President, Director of Operations and Chief Pilot speak to the new hires and explain the importance of good decision making, as well as the expectation of the company with regard to cancelling flights, turning around and going back, or diverting to an alternate. Witt, p. 20. The ground school also includes a "lessons learned" powerpoint that focuses on safety. Id. at 35.

Ground school concludes with a discussion of the systems in the Grand Caravan that assist with CFIT-A. Witt, p. 35. This includes the EGPWS, one or two Garmin GPS devices, and a radar altimeter. Id. at 35-36. The GMX 200 has terrain landmark features that can be used to judge distance from terrain. Burdick, p. 32.

Pilots are taught the use of the TAWS, including the functions, alert levels, and capabilities, in Cessna 208 ground school. Witt, p. 43. The training the pilots receive on TAWS involves hands-on operation and observation of the unit inside the aircraft, including its visual and aural functions. Id. at 68. The Honeywell EGPWS manual is used as courseware in the Cessna 208 and Beech 1900 ground school. Id. at 38.

Hageland evaluates its pilots' knowledge of the TAWS in a test at the conclusion of Cessna 208 ground school. Witt, pp. 43-44. Use of the TAWS is also evaluated during flight training. Id. at 44. Recency and proficiency checks also address this item. Id.

Training for TAWS (terrain awareness warning systems) was referenced in several areas of the Hageland OTM. HP, p. 12. Specifically, Hageland OTM, "Airman General Subjects Module #7 – CFIT Avoidance", referenced the TAWS, as did the OTM, Aircraft Ground Module #10 – Airplane Systems and Procedures, which stated in part:

> Warning Systems. Aural, visual, and tactile warning systems, including the character and degree of urgency related to each signal, warning and caution annunciator systems, including ground proximity warning system (GPWS) and Terrain Warning System (TAWS) as installed.

HP, pp. 12-13.

After seven days of ground school, all pilots receive simulator training that includes CFIT-A scenarios and CRM instruction. Witt, p. 20. The simulator training is also provided in recurrent pilot training. Ops, p. 18. The simulator training incorporates many scenarios, including flat light conditions, whiteout conditions, and inadvertent flight into IMC, as well as real-life scenarios, such as navigation and communication shortcomings in the system and ATC errors. Witt, p. 21. One technique the simulator instructor will use is to slowly degrade visibility during a VFR flight until the conditions are no longer VMC, and the pilot must then either perform a turnback or climb to pick up an approach to a local nearby airport. Burdick, p. 37.

Hageland provided this instruction in a C208 simulator at the University of Alaska-Anchorage. HP, p. 9. TAWS policy is also taught and discussed outside of the simulator. Witt, p. 21.

The Hageland CFIT Avoidance Training Manual, revision 1, section "General," stated, in part:

> **TRAINING OBJECTIVE**
>
> It is recognized that in a great many CFIT accidents, systemic factors made by the flight crew resulted in the final link of the accident chain of events. Therefore, at the conclusion of the CFIT accident prevention training, the individual involved will be able to successfully demonstrate their knowledge of the CFIT causal factors, policies, and procedures by correctly answering 80 percent of the questions on written tests. Oral tests in lieu of written tests may be conducted when approved by the Director of Training. At the completion of the simulator/FTD check, the pilot will meet or exceed the minimums as set forth by the appropriate Practical Test Standards (PTS).

HP, p. 9.

> **TRAINING SYLLABUS**
>
> At a minimum, the simulator/FTD proficiency checks will cover the following:
>
> 1. Simulated VFR flight into IMC, flat light and white out conditions, and associated escape maneuvers.
> 2. Use of autopilot, if installed.
> 3. Standard rate turns (level, climbing and descending).
> 4. Instrument approaches appropriate to the aircraft and area of operation.
> 5. Multitasking (flying, tuning radios, communicating with ATC, etc.)

HP, p. 9.

Additional information regarding CFIT avoidance training included in ground school was included in the Hageland OTM. HP, p. 9.

Hageland pilots received training per the company's Operations Training Manual (OTM). Ops, p. 18. The training listed in the OTM was required by the FARs (except for the CFIT-A ground training discussed below), and the manual is reviewed and approved by the FAA. Id. This training included both ground and flight training. Id.

Hageland used their CFIT-A Training Manual to provide guidance to instructors for CFIT-A training. Ops, p. 18. This manual contained both ground and simulator training syllabuses. Id. The effectiveness of the policies, procedures, and content of the manual are audited by the Hageland Director of Training each year. Id. Senior management also reviewed and endorsed the CFIT-A program annually. Id. The Director of Training will then make any necessary changes to the manual in accordance with this audit and review. Id.

The training concludes with a session on conflict resolution to test the CRM concepts taught in the program. Witt, p. 20. Pilots then receive flight training, including additional training in the aircraft for CFIT-A. Id. at 35. Further, for PIC candidates, Hageland utilizes a safety pilot program, which ensures all pilots have a company-designated safety pilot in the right seat until the new PIC has a minimum of 50 hours in type. Id. at 20-21.

The safety pilot program continues the CFIT avoidance training in the local area in which the pilot will be flying. Witt, p. 21. The safety pilot program focuses on local terrain features, weather patterns, and the area's ATC environment. Burdick, p. 31. Pilots learn to estimate visibility distances through references to local terrain features; in-flight visibility determinations are also taught in ground school. Id. The CFIT-A and related training discussed above sometimes takes two months to complete. Witt, p. 21.

Hageland is a member of the Medallion Foundation. Witt, p. 21. Hageland received its CFIT Star in 2005 and passed Medallion's annual CFIT audit last year. Id. As part of its Medallion CFIT Star compliance, Hageland completes audits each year on its CFIT avoidance program. Id. The president and DO are included in the annual CFIT program reviews. Id.

Hageland continues to work to reduce CFIT risk. Witt, p. 21. Hageland has committed to install FOQA-type equipment on its entire fleet. Id. at 21-22. The equipment needed for three out of its four fleet types does not exist, so Hageland's avionics engineers are inventing it. Id. at 22. Currently, approximately 10 percent of Hageland's flights are reviewed after completion to ensure regulatory compliance and adherence to company standards. Id. The FOQA-type equipment installation will expand and enhance the compliance mechanism. Id.

The CFIT-A simulator training which Hageland conducted was based on the syllabus contained in the company's CFIT-A Manual. Ops, p. 19. The syllabus contained elements to teach the recognition of deteriorating visibility, flat light, and white-out conditions. Id. Actions required for pilots entering these conditions were practiced. Id. The training was conducted during initial flight training for pilots, and yearly during annual recurrent training, and according to the Hageland CFIT-A Manual, the training could be conducted in a simulator or flight training device. Id. For Hageland pilots assigned to the C-208B airplane, initial CFIT-A training was included in their simulator flight training using a simulator operated by the University of Alaska at Anchorage. Id. Hageland provided company instructors for the training. Id.

The accident PIC last received the training during his recurrent training in January 2016. Ops, p. 19. The records of the simulator training for the accident SIC could not be located. Id. Per the Hageland CFIT-A Manual, Hageland does not assign a pilot to flying duty until the pilot has completed the CFIT accident avoidance training program. Id. at 20.

1.13 Aids to Navigation

There were no ground-based navigational aids between the departure airport and the arrival airport. Ops, p. 13. There was a non-directional beacon (NDB) located at the destination airport with the identifier of TOG. Id. It is not known if the pilot was using the signal from the NDB for navigation. Id. The aircraft was also equipped with GPS as a navigational aid. Id.

1.14 Airport Information

TOG had an AWOS weather reporting system. Ops, p. 13. This automated system provided weather data including altimeter setting, wind, temperature, dew point, density altitude, visibility, ceiling, and precipitation information. Id. The AWOS weather information was transmitted over VHF radio to allow inbound aircraft to gain awareness of the conditions at the airport. Id. There were also FAA weather cameras and a non-directional beacon (NDB) navigational aid located at the airport. Id. The airport elevation was 18 feet above sea level. Id. There were two GPS and two NDB approaches available at the airport. Id.

1.15 Hageland Organizational and Management Information

Hageland began Alaska operations in September 1981 with one Cessna 180. Ops, p. 13. In 1982, Hageland added the C-207. Id. Throughout the 1980s, the company added more aircraft, pilots and routes, including operations in the Aniak, McGrath and Unalakleet regions. Id. In the 1990s, Hageland continued to expand, by obtaining a certificate to transport mail, in addition to building hangars in Bethel, St. Mary's and Kotzebue, with new bases eventually in Barrow and Nome. Id.

At the end of the 20th century, Hageland added the Cessna 208 to its fleet. Ops, p. 14. The airline continued its steady growth through the first decade of the 21st century, and introduced the Beech 1900C to its fleet. Id. In 2014, Hageland built a state of the art OCC in Palmer, Alaska. Hickerson, pp. 99-100.

1.16 Safety Programs and Enhancements

Hageland's safety program is geared to achieving the highest level of safety possible while meeting or exceeding FAR and Medallion Foundation standards. Greene, pp. 167-68. The company's safety program elements include, but are not limited to: its safety manual, operation manuals, maintenance manuals, safety education and training, incident and accident reporting program, incident and accident investigation, and safety committees. Ex. 14N, p. 1.4.

Hageland relays safety information through channels such as its safety manual, safety bulletin boards, safety bulletins, safety newsletters, safety alerts, safety reporting program, and safety meetings. Ex. 14N, p. 1.4. Flight crews can report safety issues through Hageland's Aviation Safety Action Program, Hageland's Aviation Safety Reporting System (WBAT), the NASA Aviation Safety Reporting System, and the safety hotline. Id. at p. 6.1-6.6.

Any Hageland employee who identifies the need for a change can submit a Safety Report or initiate a Safety Risk Assessment in WBAT. Ex. 14N, p. 7.3. Hageland also has an Internal Evaluation Program which conducts annual evaluations in the areas of flight operations, inspection, safety, training, maintenance, and stations and facilities. Id.

As noted above, Hageland is also a member of the Medallion Foundation. Hageland achieved the following certifications from Medallion:

CFIT-A	Medallion Star awarded on June 25, 2005
Safety	Medallion Star awarded on February 19, 2009
Operational Control	Medallion Star awarded on April 7, 2014
Maintenance and Ground Service	Medallion Star awarded on January 20, 2015
Internal Evaluation Program	Medallion Star awarded on August 14, 2015

The Medallion Shield was awarded on June 28, 2016.

After the accident, Hageland made additional safety enhancements. In 2014, Hageland started its industry-leading operational control center. Greene, p. 168. On May 19, 2017, as part of Hageland's emphasis on safety and continuous improvement, Hageland formally committed to enter into the FAA's voluntary SMS program. Id. In conjunction with this effort, Hageland is developing and executing a 16-month action plan that will culminate in IATA ISSA certification. Id.

In early January of this year, Hageland developed a seven-point CFIT mitigation plan in consultation with the FAA. Greene, p. 168. The seven points are:

- Install FOQA equipment in Hageland's fleet
- Perform a daily review of flight data from Flight Data Acquisition Systems (FDAS)
- Convert Hageland's General Operations Manual (GOM), Operations Training Manual (OTM), and General Maintenance Manual (GMM) into electronic format
- Undertake a safety risk analysis of VFR routes and associated operational risks
- Complete an IFR route study and make increased use of IFR
- Elevate flights with an inoperative GPS to a Level 3 risk, so flights with inoperative GPS now require management review and approval
- Develop a Professional Pilot Advancement Program

See Hageland Safety Initiatives and Programs Presentation, p. 3.

Hageland is committed to installing FOQA-type equipment in its entire fleet. Greene, p. 169. Apart from its Beech 1900s, there is currently no off-the-shelf solution for FOQA equipment for the majority of Hageland's fleet. Id. Hageland is currently working in partnership with the FAA on its engineering study to identify solutions to this issue. Id. Once developed, data from these systems will be fed into a Flight Safety Department which will be housed within the existing Safety Department. This will further enable Hageland to review compliance with company procedures through data analysis, similar to a Part 121 operation. Id.

In order to review the FDAS data, Hageland has committed to creating a department tasked with monitoring daily flights, reviewing flight release procedures, and verifying operational performance through data acquisition and compliance monitoring. Greene, p. 168. Currently, Hageland's entire fleet is outfitted with GPS tracking systems, and the OCC reviews flight data daily for inconsistencies or abnormalities. Id. at 168-69. This data review lets the pilots know that flights can be monitored to ensure compliance with filed flight plans and company procedures. Id. at 169.

Hageland has put in place policies that promote IFR operation to the maximum extent that is safe and supported by available infrastructure. Greene, p. 170. In November 2016, Hageland conducted an extensive IFR study which identified significant infrastructure challenges with IFR operations in rural Alaska. Id. at 169. As a result, Hageland recognizes that to support the rural communities of Alaska, it must maintain its ability to operate when IFR flight is not possible. Id. at 170. Accordingly, VFR routes are being risk-assessed and established where warranted. Id. at 169.

Hageland has implemented and continues to refine a Professional Pilot Continuing Education Program. Greene, p. 170. The company has enlisted the support of professional organizations, like Doss, USC, and Convergent Performance, to provide training and support on human factors, leadership, professionalism, SMS and CRM. Id. Hageland is committed to developing its pilots and understands the importance this development plays in a successful company and safety culture. Id.

1.17 Operational Control

A. Definition

As defined by the FAA and Hageland's General Operations Manual, operational control is:

> the exercise of authority over initiating, conducting, or terminating a flight. Its purpose is to ensure safe, consistent management of flight operations according to identifiable policies and procedures.

Ops, p. 14.

B. Hageland's Operational Control Center

Hageland has created an industry leading system of operational control unique among Part 135 operators in Alaska. Hickerson, p. 99. Hageland's system of operational control protects operational control decisions from any outside pressures or interference. Id. at 99-

100. Hageland accomplished this goal by building an Operational Control Center ("OCC") in Palmer, Alaska, in early 2014. Id.

The OCC is separated, both physically and functionally, from company management and Hageland's bases of operation. Hickerson, p. 100. Hageland removed operational control authority from station personnel and allowed them to focus on the business and customer service functions at its outlying stations. Id. This eliminated any business pressures from the safe and legal conduct of all flight operations. Id.

The OCC does not face internal pressure to release flights. Hickerson, p. 100. It does not have any role in the business or customer service functions of the company; its sole concern is safety. Id. Further, the OCC eliminates the pressures on line pilots that were felt when operational control was held at the station level. Witt, p. 72. In the interest of furthering its safety function, the OCC has continuously evolved over the last three years to provide a 121-type dispatch process and state-of-the-art flight locating and monitoring capabilities. Hickerson, p. 100.

Currently, Hageland releases approximately 55,000 flights per year through the OCC. Hickerson, p. 100. The OCC is staffed with seven operational control agents ("OCAs"), one supervisor, and an operational control manager. Id. Six have completed 121 dispatcher training or maintain a current pilot license. Id.

C. The Two-Tiered Operational Control Concept

According to Volume 3, Chapter 25, Section 5, paragraph 3-2029 of FAA Order 8900.1, [11] there were two tiers to the operational control concept, defined below:

1) The First Tier. All first-tier actions must be taken by the certificate holder's direct employees.

    a) The first tier is the assignment of flightcrew member(s) and aircraft for revenue service under the operating certificate. The assignment of crew and release of aircraft to revenue service is the responsibility of the certificate holder, and must be made by the management of the certificate holder 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 (or in OpSpec A006, A039 or A040, if applicable), and be under management supervision.

---

[11] FAA Order 8900.1 provides flight standards policy and guidance documents regarding aviation safety for FAA Aviation Safety Inspectors (ASIs).

b) Management supervision means, for example, 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.

2) The Second Tier. All second-tier action may be taken either by the certificate holder's direct employees or by the certificate holder's agents. The second tier of operational control is more tactical. 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 (EMS)). 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 methods of maintaining and distributing this list to all affected parties must be described in OpSpec A008 or in the GOM.

3) 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.

<u>Ops</u>, pp. 14-15.

D. Hageland's First Tier of Operational Control

As stated in Hageland's GOM and its FAA-issued Operations Specifications A008, operational control is exercised by the Hageland Director of Operations ("DO") and individuals designated by the DO. <u>Ops</u>, p. 15. Although the authority of operational control can be delegated, the DO retains responsibility. <u>Id</u>. These designated individuals include all PICs and all OCAs, and the GOM lists the name of each. <u>Id</u>. The Chief Pilot maintains a list of all PICs who are qualified to exercise operational control. <u>Id</u>.

All OCAs work from the OCC located in Palmer, Alaska. Ops, p. 15. An OCA is assigned for each flight, and the OCA and the PIC together have operational control over the flight.[12] Id.

The Hageland GOM stated the following in part:

> OCAs report directly to the OCM or DO. The OCA has operational control and meets the requirements to fulfill his or her duties per [14 CFR Part 119.69(d.)] as defined in [FAR 135.77]. The OCA shall successfully complete OCA training and maintain qualification and shall inform the OCM or DO before any required qualification expires. The OCA obtains, understands and acts on information according to the procedures found in the operational control chapter of this manual. With safe conduct as the first consideration, the OCA releases flights to operate according to the operational control chapter of this manual.

Ops, pp. 15-16.

Hageland trains, tests and evaluates each OCA to assure they meet Hageland's standards. Hickerson, p. 100. The primary focus of the OCC is to guarantee that operations are conducted in a safe, legal manner, and in accordance with best practices. Id.

As set forth in Hageland's OTM, OCAs received eight hours of initial and annual recurrent training. Ops, p. 20. Initial training was followed by a period of on-the-job (OJT) training. Id. This period was 16 hours for personnel who were already Hageland employees, and 40 hours for OCAs who were new-hires. Id.

The training covered the following topics:

- reading and understanding aviation weather and NOTAMs;
- using Flight Master software and other available resources for flight planning;
- utilizing flight following and company databases for airport runway information and village contacts;
- understanding the risk assessment process and conducting risk assessments;
- employing company resources to confirm aircraft are airworthy and pilots are current and legal to fly; and
- communicating effectively over the phone with pilots, station and village agent personnel regarding flight operations.

---

[12] At Hageland, a flight can consist of multiple legs, as aircraft stop at various airports prior to arrival at their final destination.

Ops, p. 20.

An annual competency review of these OJT functions was required following annual classroom training. Ops, p. 20. Completion of a written test with a score of at least 80% was also required. Id.

The GOM stated:

> The OCA and PIC are jointly responsible for preflight planning, flight delay and release of a flight in compliance with FAR (Federal Aviation Regulations), the Ops Specs, and the procedures of this manual.

Ops, p. 14.

E. Hageland's Second Tier of Operational Control

The Hageland GOM in effect at the time of the accident stated that a flight risk assessment must be completed prior to every flight and the risk value must be agreed upon by both the pilot and OCA. IIC, p. 14. It also stated that the OCA and PIC are jointly responsible for preflight planning, flight delay and release of a flight, in compliance with regulations, operations specifications and company procedures. Id.

All flights are risked through a company-designed risk matrix that includes factors as airport conditions, weather, and NOTAMs. Hickerson, p. 100. The pilot and the OCA will concur on an appropriate risk number and, depending on the level of risk, might also need the concurrence of a company-designated manager for approval of the flight. Id.

The OCA considers the elements of risk for the flight and, together with the PIC, determines the risk assessment (RA) number for that flight. Ops, p. 16. The RA number is determined by completing a Hageland Safe Flight Categories form.[13] Id. After considering various potential hazards for the flight using this form, the PIC arrives at an RA number between one and four. Id. Level 1 is the lowest risk, and Level 4 is the highest. Id.

After the PIC conducts the risk assessment, the PIC consults with the OCA for the flight, and verifies that the OCA concurs with the RA number. Ops, p. 16. An RA of one or two would allow the flight to proceed if the flight has the approval of both the PIC and OCA. Id. This "two to go, one to say 'No'" concept means that if the approval of either the PIC or OCA is not received, the flight will be delayed or canceled. Tanner, p. 127.

If the RA is a level 3 risk, then a third person, a designated management official named in the GOM, also has to agree and provide consent for the flight. Ops, p. 16. If consent is not

---

[13] See Docket Ex. 2F.

provided, the flight will be canceled, or delayed to a time of lower risk. An RA of four would delay or cancel the flight. Id.

The risk assessment that is conducted by the PIC and OCA and, if needed, management, is comprehensive and based on a published set of factors. See HP, pp. 10-11. The Hageland General Operations Manual (GOM), revision 6, chapter 2 "Operational Control", section 4 "Flight Release Procedures and Standards," subsection D "Risk Assessment, stated, in part:

> This risk assessment is meant to give an overall value to the amount of risk a certain flight may encounter and the associated operational control given to each individual flight. The risk assessment (RA) categories are broken down into four specific categories with RA1 being the lowest risk and RA4 being the highest risk. When conducting a risk assessment for your flight, start by noting each hazard factor that applies to your flight. The hazard factors are explained below for further definition. Once you have all of the factors that apply to your flight, note the highest RA value for any of the hazards that you have circled, don't overlook hazard letter "R." If your highest hazard falls under RA value 1 or 2, your flight can be released by the Operational Control Agent (OCA) in Palmer. If you find that your RA value is 3, you will need approval from the OCA and from a Designated RA3 Company Manager. If you find yourself with a RA value of 4, your flight is deemed too risky, save yourself the phone call and inform the departure control agent at your base that the flight will need to be canceled or delayed until the risk is lowered.
>
> Once you have determined what your RA value is and the associated hazards are, be sure to review this information with the OCA upon your phone call for release. An example phone call may go something like this: "Flight 232 going out to Savoonga. I've got a RA 3 – Lima." This would indicate that the proposed flight is a RA3 due to the surface winds being above 30kts and would require approval from a Designated RA 3 Company Manager. The OCA will record your RA and all applicable hazard letters for your flight in FlightMaster and you will only need to verify that it is printed on your manifest along with the time of release.
>
> Remember, this is a risk assessment for conditions prior to accepting a flight. Once you have been released it is up to you to make good decisions that abide by the GOM and the FAR's. If you find that conditions have changed and may put you into a higher risk category, it is up to you as the PIC to decide whether to continue the flight or take other actions with safety in mind.
>
> Category 1 – Common Hazards
>
> a. Day

- VMC conditions for the entire route.
- AWOS fully functional – Must have official reported weather.
- Surface winds from any direction below 15 knots.
- No runway contamination reported or expected.
- No DMI – Any deferred items go under RA2.
- No company imposed pilot restrictions.

Category 2 – Caution

b. Night – Any portion to be conducted at night.
c. IMC – Any portion of your flight where you expect IMC conditions and will obviously be IFR.
d. No AWOS – This would indicate that there is not any official weather from an approved FAA source on the field.
e. Known Icing – Any known icing along your route.
f. X-Wind Component exceeding 15 knots.
g. Runway Conditions Contaminated – Any reported contamination.
h. Any DMI – Any deferred item even if it does not affect your flight.
i. Company Imposed Restrictions – If you are on restrictions you are automatically a RA2.
j. Haven't landed at the airport in the last 30 days – Look back at calendar, not days worked.
k. Surface winds from any direction 15-29 knots.

Category 3 – Requires Approval from a Designated RA3 Company Manager

l. Special VFR – If you are departing on a Special or expect to get one at your arrival.
m. Surface winds from any direction above 30 knots.
n. Wind over the manufacturer's max demonstrated crosswind.
o. Published runway not including any overrun that is less than 1800 feet.
p. Braking Action reported poor or less.
q. Special Airport – Haven't landed at the airport in 30 days.
r. Special Approaches – Haven't used approach in the last 30 days.
s. Part 91 flights – All part 91 flights regardless of their nature and Check Rides.
t. 5 or more hazards from Ca. 2 – Be sure to reference Category 2, if you have 5 or more hazards from Category 2 you will be elevated to RA3.

Category 4 – Flights are Prohibited

u. Any limitations or restrictions – All flights that may exceed any company, FAA, or manufacturer's limitations or restrictions fall under this category.

v. Human Factors – Self-Assessment using the “IMSAFE” checklist.

See HP, pp. 10-11.

After this risk assessment process is complete, the OCA enters the RA in the flight manifest remarks section and confirms with the PIC, via a telephone conversation, their agreement that the flight can safely begin. Ops, p. 16.

Once the flights have departed, the OCC will monitor the progress of the flight. Ops, p. 17. All Hageland aircraft are equipped with ADS-B and Spidertracks (or similar system) to provide the company with flight monitoring capability. Hickerson, p. 101. Where the infrastructure does not support ADS-B capabilities, Hageland has been able to supplement Spidertracks for the flight locating and monitoring functions. Id.

Since a flight might consist of multiple short legs (as with the accident flight), a single risk assessment value, agreed upon prior to the flight’s departure, could cover several hours of flying in mountainous terrain with rapidly changing weather conditions. See Ops, p. 16. A similar situation is faced by carriers that fly a single, multi-hour flight segment. Hageland’s system takes a conservative approach by applying the risk value of the highest risk flight segment to the entire flight. Under this approach, if one flight segment has a risk value of 3, all the segments of the flight would require management approval.

Also, OCAs monitor the weather and status of flight after release and, if conditions deteriorate, the OCA can communicate with the flight crew during the flight, either directly or through the departure control agent (DCA). Id. The DCAs at a plane’s base sometimes monitor weather on their computer and by telephone with village agents. Id. If there is a weather change that could impact a flight in progress, the DCA contacts the pilot via VHF radio. Id.

According to Hageland’s GOM:

> The OCA or Departure Control Agent shall inform the flight crew promptly with information critical to the safety of the flight or with any operational information that may assist the flight crew.
>
> The OCA shall delay or cancel the flight if, in his opinion or in the opinion of the PIC, the flight cannot operate or continue to operate safely as planned or released.

Ops, p. 16.

Any Hageland pilot who observes worsening weather can discuss the situation directly or indirectly with the OCA, discontinue the flight and remain at one of the airports serviced by the flight, or fly to an alternate airport. Hageland pilots have company issued cell phones and can obtain updated weather information by contacting the OCC, FAA flight service stations, or AWOS stations as needed.[14] Burdick, p. 90; McClure, p. 32.

If a pilot is unable to reach the OCC by radio, they can call the DCA at the pilot's base and request updated weather. Ops, p. 16. If the DCA cannot reach the aircraft on the radio, he or she may call another Hageland aircraft in flight, or an airport that the flight is near, and ask them to relay the information. Id. Here, the weather forecast with respect to the forecasted rain near Quinhagak actually improved, instead of worsening. Id. at 17. The OCC did not attempt to pass any additional information to the accident flight after its initial departure from Bethel base. Id. at 16.

The OCC has been instrumental in providing Hageland the foundation for a strong operational control model. Hickerson, p. 101. Verification of an airworthy aircraft, a trained and qualified pilot, and safe, legal weather are the backbone of the OCC. Id. The model fits Hageland's organization and provides assurance that all flights are operated in a safe, legal manner, and in accordance with best practices. Id.

F. Operational Control Regarding Accident Flight

For the accident flight, the OCA assigned to the flight described the release procedure as normal. Ops, p. 17. He checked the National Weather Service's Alaska Aviation Weather Unit website to view the area forecast, METARs, TAFs, and the FAA weather cameras located at KWN and TOG. Id. There was some rain and clouds in the vicinity of KWN, the second stop for the accident flight and the departure airport for the accident leg. Id. The OCA and PIC spoke and they agreed the weather was VFR at the departure and arrival airports, and the area forecast was good. Id.

According to the flight manifest generated by the OCA, the RA value for the flight was two. Ops, p. 17. The factor that prevented the RA from being a 1A, the lowest risk, was that the aircraft had an inoperative ADS-B. See Ex. 2E. In an interview, the OCA noted that the weather actually improved after the flight was released, and therefore no adverse changed conditions existed that would cause him to contact the flight crew during the flight. Ops, p. 17.

The OCA had a discussion with the PIC regarding the OCA's risk assessment, and the OCA inquired as to whether the PIC wished to proceed under an instrument flight rules (IFR) flight plan because of the rain near Quinhagak. Ops, p. 17. The pilot and the OCA agreed that the weather at KWN was in VFR conditions, and that operating the flight under VFR would be legal according to company policy and FAA regulations. Id. Also, there were forecasted icing

---

[14] Lack of cell phone reception, however, prevents pilots from contacting certain flight service stations. Burdick, p. 81.

conditions for the area, making VFR operation preferable. See Meteorology Factual Report, p. 31. After a discussion, the PIC and OCA agreed the flight should go VFR.[15] Id.

G. Role of Departure Control Agents

Under Hageland's system, departure control agents work at the individual bases and review passenger and mail loads and other revenue considerations. Olin interview transcript, p. 18. The departure control agents are solely responsible for revenue considerations, and do not play a role in assigning pilots to bases, scheduling aircraft for bases, conducting safety risk assessments, or releasing flights. Olin, pp. 122-126; Gillespie, p. 132.

Hageland's GOM makes clear that the departure control agents report to the base manager and are responsible for business-only functions such as manifesting and load planning assistance. Ops, p. 17. As such, departure control agents are not listed in Hageland's GOM or Operations Specifications as being authorized to conduct operational control, and they do not receive operational control training. Id.

The departure control agent proposes flights to the OCC by entering a pilot(s), aircraft, and the planned destinations into a computer program. Ops, p. 17. As discussed above, the OCC will review the pilot currency and qualifications, the aircraft maintenance and airworthiness status, NOTAMs, weather sources, and other factors that might affect operations during the proposed flight. Based on this review, the OCA will accept, reject or modify what the DCA has proposed, including the proposed pilot(s), aircraft, and destinations.

The departure control agent who was on duty at the Bethel station on October 2, 2016, saw both pilots, spoke to the PIC about the weather, and did not notice anything unusual about either pilot. Ops, p. 7.

1.18 Flight Crew Duties

The Hageland GOM, revision 6, chapter 1 "Duties & Responsibilities – Personnel," section 14, states that the PIC:

1. Reports directly to the Chief Pilot and assigned base Lead Pilot.
2. Ensures safe operation of flight assignments in accordance with the Ops Specs, Company procedures, and all applicable regulations.
3. Prior to originating a flight, or a series of flights, ensures the aircraft is equipped with all required systems and components for its assigned operations.
4. Is responsible for the safety of the passengers, crewmembers, cargo, and aircraft when executing a flight assignment.

---

[15] Operating IFR from KWN to TOG is also difficult given the poor communications infrastructure. Gillespie, pp. 63-64; Burdick, p. 89. The approach clearance might not be received until radio communication with the Bethel area ATC has already been lost. Id. In that situation, the pilot has to fly to the beacon at TOG, enter the hold, and hope that the Kenai Flight Service Station's remote communications outlet is working so an approach can be received. Id.

5. Has authority and responsibility for managing any additional crewmembers assigned to the PIC during duty time, including allocation of duties with respect to operation of the aircraft.
6. Promotes fundamental CRM [crew resource management] when working with other Pilots and station personnel.
7. Is jointly responsible with the OCA [operational control agent] for preflight planning, flight delay and flight release for any flight assignment in compliance with the operational control procedures in this manual.
8. Shall suspend or modify the continuation of a flight assignment to the extent necessary to avoid any conditions that are hazardous to flight.
9. Is responsible for maintaining currency with certification and flight experience (e.g. medical certificates, check rides, recency of experience of experience [sic], etc.).
10. Shall ensure every day's flight and duty time is entered into Monthly Summary prior to the end of the day.
11. Shall ensure every day's flight and duty time is entered into FlightLogger prior to the end of the day.
12. Shall keep all manuals and other documents assigned to him in current status.
13. Plan an active role in the WBAT system.

HP, pp. 5-6.

The Hageland GOM, revision 6, chapter 1 "Duties & Responsibilities – Personnel," section 15, stated that the SIC:

1. Reports directly to the assigned PIC during flight operations and otherwise reports to the Chief Pilot and base Lead Pilot.
2. Assumes all duties delegated by the PIC or specified by Company policies.
3. Immediately informs the PIC of any observed illegal or suspected unsafe conditions.
4. In the event the PIC becomes incapacitated during the flight, the SIC will assume command and fulfill all of the responsibilities and duties of the PIC.
5. Shall ensure every day's flight and duty time is recorded in the Monthly Summary and is entered in FlightLogger.
6. Shall keep all manuals and other documents assigned to him in current status.
7. Play an active role in the WBAT systems.

HP, p. 6.

The Hageland GOM, revision 6, chapter 1 "Duties & Responsibilities – Personnel" section 21, stated that Safety Pilots:

1. Report to the Director of Training.
2. Provide familiarization for the recognition, avoidance, and operational considerations of terrain features in the terrain features in the geographic region where the flight is conducted.

3. Provide familiarization of local weather patterns for the area of operation.
4. Provide familiarization of local route structures and operational considerations including unique ATC procedures.
5. Promote safety and good judgement in aeronautical decision making.

HP, pp. 6-7

The Hageland GOM, revision 6, chapter 3 "Pilot Policies", section 3 "Pilot Responsibilities during Duty Time" stated, in part, that Hageland pilots will:

1. Report for duty at the beginning of the duty day and remain on duty or available for work until the Lead pilot [sic] (LP) or departure control agent (DCA) releases you or your duty day ends. On days where reduced flights are allowed, report for duty time is one hour before scheduled departure time or as assigned by the Lead Pilot or DCA.
5. Obtain current weather and aeronautical information for each flight segment.
8. Participate in the 2-party decision (Operational Control Center and PIC) for flight release according to the operational control procedures of this manual.
12. Operate the aircraft in a safe manner while on the ground and in the air.
15. Participate in the policies and procedures of the Company safety program and comply with the submission requirements for hazard reports and irregularity reports as follows here. Submit a WBAT report: (a) whenever directly involved in a safety-related event, (b) whenever company equipment is damaged and you know something about it, (c) anytime you are concerned about a hazard.
16. While ASAP [aviation safety action program] is voluntary, Hageland strongly encourages eligible employees to complete them. Whether a certificate issue may or not be present, a Safety Assurance Report to the Company safety department is expected.

HP, p. 7.

1.19 CRM Training

Hageland pilots receive crew resource management (CRM) training in compliance with FAR 135.330. HP, p. 9. The training is provided in every ground school. Burdick, p. 30. It covers, among other things, situational awareness, judgment, aeronautical decision making, communicating and managing disagreements in a two person flight crew, and the effects of fatigue and stress. Id. Hageland reinforces with its pilot group the importance of staying inside the box, and that they are expected to exercise sound judgment and good decision-making. Witt, p. 50.

CRM is taught during ground training, flight training, and in the simulator. Witt, p. 51. Simulator training focuses on CRM concepts for both PIC and SIC candidates. Id. Any pilot who might operate as part of a two person crew undergoes simulator training for two person crews. Id.

According to the Hageland OTM, Airman General Subjects Module #9 "Crew Resource Management (CRM)," the objective of CRM training was to "enhance company pilots' awareness and understanding of CRM concepts with the ultimate goal of promoting safe and efficient company operations." HP, pp. 9-10. CRM training elements included: purpose of CRM, pilot in command authority, communication, building and maintaining a flight team, workload and time management and situational awareness, the effects of fatigue and stress, and aeronautical decision making and risk management. Id. at 10.

1.20 FAA Oversight

FAA oversight of Alaska air carriers is extensive. During a six month period in 2016, Hageland was inspected 117 times, equating to an average of one inspection every business day. Abbott, p. 173. The few findings reported to Hageland were immediately resolved. Id.

The FAA assisted Hageland with establishing its OCC in 2014. The FAA concluded that Hageland's system of operational control is very effective. Abbott, pp. 215-216. In fact, the FAA has noted that it is superior to other Part 135 Alaska air carriers. Id.

The Alaska Region Flight Standards District Office has found that Hageland has a real commitment to conduct safe operations. Wease, pp. 220-221. The commitment comes from its management down to its pilots. Id. There has been a notable improvement over the past several years. Id. at 241.

2. Analysis

2.1 The Decision to Operate under Visual Flight Rules was Appropriate for the Available Infrastructure and Weather Conditions

The weather for the accident flight was VMC. The last hourly report of TOG weather available to the pilot prior to his 1133 departure from KWN reported visibility of 10 statute miles with an overcast sky at 1,600 feet. As the flight approached TOG, the airport weather at 1139 was reported as visibility nine statute miles, light rain, scattered clouds at 1,400 feet agl, and sky overcast at 4,400 feet agl. It is unknown if the flight crew received this report but, even if they had, it would have indicated that VFR flight was still appropriate.

One minute before the accident, a METAR from TOG reported wind calm, visibility seven statute miles, light rain, scattered clouds at 3,900 feet agl, and sky overcast at 4,700 feet agl. The company flight that departed KWN to TOG just minutes behind the accident flight was also a VFR flight. As discussed herein, VFR flight was actually more suitable for the city-pair route, as the difficulty in obtaining an IFR approach into TOG can result in the need to circle or divert. Further, the possibility of icing also made VFR flight preferable.

2.2 Flight Risk was Properly Assessed

The company flight that departed KWN to TOG just minutes behind the accident flight was a level 1A risk, the lowest risk level. The conditions were VMC for the entire route, AWOS was fully functional, the wind was calm, no runway contamination was reported or expected, and there were no company imposed pilot restrictions. The accident flight also would have been assessed a Level 1A risk, except the aircraft had an inoperative ADS-B, making it a Level 2H risk. This risk level was conservative for the intended operation, and the inoperative ADS-B was not a factor in the accident.

2.3 Hageland's Culture and Operational Control Model Did Not Contribute to the Accident

Hageland's system of operational control eliminates pressure on the pilot to accept or complete flights. Also, Hageland stresses to its pilots that any doubts must be resolved in favor of safety. The data support that the pilot group understands the message. Since January 1, 2016, Hageland has had 607 flights turn back or divert due to unforecasted weather, and 3,564 flights that were cancelled due to weather issues. Further, there are no financial pressures on pilots to accept or continue flights, because pilot pay is based on duty period, not the number of flights completed.

Regarding the accident flight, there is no indication the pilots were under any outside pressures that would have led them to select a flight path over elevated terrain in lower visibility rather than fly around the mountains in clearer skies. In fact, the other flight that had left KWN for TOG a few minutes behind the accident flight had selected a more circuitous route, demonstrating that Hageland pilots are not under pressure to accept risk.

2.4 Hageland's CFIT-A Training Did Not Contribute to the Accident

Hageland's CFIT-A training includes instruction on the TAWS and the numerous terrain displays and directional aids available to Hageland pilots flying the Grand Caravan. If the TAWS was active and functioning in the 1-2 minutes preceding the accident (which is not known), the flight crew would have received TAWS cautions and warnings. If they received the cautions and warnings, and if they had followed Hageland's training, they would have executed a safe climb above the terrain. In fact, the wreckage is consistent with the aircraft having been in a steep climb at the time of impact.

Even if the TAWS was not active at the time of the accident, the terrain displays on the aircraft's console would have alerted them to the looming terrain hazards. Also, the PIC had flown the route previously, and would have flown the route previously with a safety pilot to gain familiarity with the area, so the layout of the terrain and distances to various terrain features would have been familiar to him.

Most importantly, the flight crew would have received Hageland's comprehensive training on judgment and avoidance/mitigation of risk, including in ground school discussions, CRM modules, two person crew simulator sessions, and lead pilot briefings, among other sources. The PIC also received CFIT-A training in the simulator, and was trained on recognizing and reacting to deteriorating visibility.

2.5 Class C Certification for TAWS Reduces Risk

Honeywell's simulation showed that reducing the required terrain clearance height to 250 feet agl to match Class C certification requirements significantly reduced the number of TAWS alerts received along the estimated accident flight path. This Class C technology is readily available, but Part 135 operators cannot take advantage of it due to regulatory restrictions.

3. Conclusions

3.1 Findings

1. The flight crew was properly certificated and qualified in accordance with federal regulations and company requirements.

2. No evidence was found indicating that either pilot was fatigued, had any adverse medical conditions, or had used alcohol or drugs.

3. The accident aircraft inadvertently encountered conditions of decreased visibility in the mountains northwest of Togiak.

4. For single-engine airplanes operated under 14 CFR Part 135 that frequently operate at altitudes below their respective terrain awareness and warning system class design alerting threshold, the nuisance alerts and associated increase in the use of the inhibit mode prevents the system from effectively providing the intended protection.

5. The terrain displays in the accident aircraft provide pilots with useful terrain information for position reference and for use in navigation during visual flight.

6. Hageland did not apply any revenue, scheduling or other commercial pressures on the accident flight crew.

7. There is no evidence that Hageland management fostered a company culture that tacitly endorsed operating in weather conditions that were below applicable Federal Aviation Administration minimums.

8. The controlled flight into terrain avoidance training that Hageland provided the accident flight crew was appropriate.

9. Hageland exercised a sufficient and appropriate level of operational control over the accident flight.

10. All Title 14 Code of Federal Regulations Part 135 operators could benefit from best practices guidance on operational control and the establishment of an operational control model similar to Hageland's.

11. A Safety Management System ("SMS") can benefit all 14 CFR Part 135 operators because it requires the operator to incorporate formal system safety methods into internal oversight programs.

3.2 Probable Cause

The probable cause of the accident was the flight crew's failure to adequately adjust the flightpath of the accident aircraft in a timely manner so as to avoid rising terrain for unknown reasons.

3.3 Contributing Cause

The accident aircraft inadvertently encountered conditions of deteriorating visibility in an area of elevated terrain.

4. Safety Recommendations

As a result of this accident, Hageland believes the NTSB should issue the following recommendations to the Federal Aviation Administration:

1. Conduct a study of the IFR infrastructure in Alaska and develop a prioritization plan and budget for building an IFR infrastructure in Alaska to a standard equivalent to that currently existing in the US.

2. Review whether the FAA should establish an exemption process to allow Alaska Part 135 operators using aircraft configured with 6 to 9 passenger seats to petition for an exemption from the requirements of 14 CFR 135.154 that would allow the operators to utilize TAWS units meeting the requirements for Class C equipment in Technical Standard Order C151.

3. Issue guidance to certificate holding district offices for the issuance of operations specifications under 14 CFR 135.213(b) that would allow IFR operations into airports that lack an approved weather reporting service, where weather observations from nearby airports can be obtained, and if such operations would provide a greater level of safety than operations under VFR.

4. Require all Part 135 operators to (1) develop and implement flight operational quality assurance programs that collect objective flight data, (2) analyze these data and implement corrective actions to identified systems safety issues, and (3) share the de-identified aggregate data generated through these analyses with other interested parties in the aviation industry through appropriate means.

5. Require all Part 135 operators to implement a safety management system program that includes sound risk management practices and incorporates formal system safety methods into their internal oversight programs.

6. Require Part 135 operators with more than nine aircraft to implement a system of operational control using an operational control center and procedures that ensure that the decision to release a flight is not subject to operational/revenue pressures.

Ravn

Charter Flight Log

Log#: 301660

Aircraft: 1296Y Type: C208 Date: 10/02/16

Captain: Oas, Samuel

First Officer: Burdick, Natoshia

Flight #	Station		Departure		Arrival		Leg Length		Pax	Fuel Added	
	From	To	Out	Off	On	In	Block	Flight		Gallons	Station
1153	BET	TOG	0935	0937	1030	1032	0:57	0:53	0		
1153	TOG	KWN	1050	1052	1127	1129	0:39	0:35	0		
1153	KWN	TOG	1132	1134	1208	1210	0:38	0:34	0		
1153	TOG	BET	1236	1238	1456	1458	2:22	2:18	0		
							4:36	4:20			
Minutes to tenths: 0 to 2 = .0 3 to 8 = .1 9 to 14 = .2 15 to 20 = .3 21 to 26 = .4 27 to 32 = .5 33 to 38 = .6 39 to 44 = .7 45 to 50 = 0.8 51 to 56 = .9 57 to 60 = 1.0						Total	4.6	4.3			

Alyeska Cost Code

HAGELAND
AVIATION SERVICES

Certificate

Recurrent General Subjects and Ground Training

Conducted: January 28-29, 2016

Pilot: Cline, Timothy S.

Subjects Including, But Not Limited To:

General Subject [135.329(a)]	**NA**	**Instructors:**
Company History and Profile		CBT
Crew Duties		CBT
Regulations		Gregory Crane
Company Certificate and Ops Specifications		Luke Hickerson
Company Ops Manual		Luke Hickerson
Flight Locating		CBT
Weight & balance		CBT/Victor Olsen
Weather		CBT
ATC		CBT
Nav, Pubs, e-Media, IAP		CBT
Normal and General Emergency Comm		CBT
Visual Descent Below MDA / DH		CBT
Severe Weather Recognition [135.(b)(6)(i)]		CBT
Severe Weather Escape		CBT
Thunderstorms		CBT
Ground Ice: HOT, De-Ice, Comm		CBT
Contaminations Recognition, Cold Weather Preflight		CBT
ADS-B		CBT
Aircraft Perf. And Airport Analysis		CBT
KLN 89b, 90b, Garmin 530/430		CBT
Special Subjects		
HazMat		CBT
ADM / CFIT		CBT
Special Airport and Special IAP		CBT
CRM		CBT
12-5 GSC Training (B1900 only)	✓	
12-5 ISC Training (B1900 only)	✓	
Extended Overwater	✓	
Emergency Subjects [135.331] [135.331(a)(b)&(c)]		
(b)(1) Emergency Assignments		Victor Olsen
(b)(2) Emergency Equipment (AC Specific)		Victor Olsen
(b)(2)(ii) First Aid Equipment	✓	
(b)(2)(iii) Portable Fire Extinguisher (Flight Training Drills)		Gregory Crane
(b)(3) Emergency Situations		Victor Olsen
(b)(3)(i) Rapid Decompress (B1900 only)	✓	
(b)(3)(ii) Fire / Smoke / Electric (AC Specific)		Victor Olsen
(b)(3)(iv) Passenger / Crew Illness or Injury		Victor Olsen
(b)(3)(v) Hijack / Security		Victor Olsen
(b)(4) Previous Incident / Accident		Victor Olsen
(c) Emergency Drills [H6 Form F-05]	✓	

I certify that all the required ground training has been completed satisfactorily in accordance with the Hageland Aviation Services approved training program.

[redacted]

Chief Pilot or Director or Operations

2/4/2016

Date

Form F-10 Rev. 2 05/29/12

HAGELAND
AVIATION SERVICES

Certificate

Initial General Subjects and Ground Training

Conducted: November 2-3, 2015

Pilot: Cline, Timothy S.

Subjects Including, But Not Limited To:

General Subject [135.329(a)]	**NA**	**Instructors:**
Company History and Profile		CBT
Crew Duties		CBT
Regulations		Gregory Crane
Company Certificate and Ops Specifications		Luke Hickerson
Company Ops Manual		Luke Hickerson
Flight Locating		CBT
Weight & balance		CBT/Victor Olsen
Weather		CBT
ATC		CBT
Nav, Pubs, e-Media, IAP		CBT
Normal and General Emergency Comm		CBT
Visual Descent Below MDA / DH		CBT
Severe Weather Recognition [135.(b)(6)(i)]		CBT
Severe Weather Escape		CBT
Thunderstorms		CBT
Ground Ice: HOT, De-Ice, Comm		CBT
Contaminations Recognition, Cold Weather Preflight		CBT
ADS-B		CBT
Aircraft Perf. And Airport Analysis		CBT
KLN 89b, 90b, Garmin 530/430		CBT
Special Subjects		
HazMat		CBT
ADM / CFIT		CBT
Special Airport and Special IAP		CBT
CRM		CBT
12-5 GSC Training (B1900 only)	✓	
12-5 ISC Training (B1900 only)	✓	
Extended Overwater	✓	
Emergency Subjects [135.331] [135.331(a)(b)&(c)]		
(b)(1) Emergency Assignments		Victor Olsen
(b)(2) Emergency Equipment (AC Specific)		Victor Olsen
(b)(2)(ii) First Aid Equipment	✓	
(b)(2)(iii) Portable Fire Extinguisher (Flight Training Drills)		Gregory Crane
(b)(3) Emergency Situations		Victor Olsen
(b)(3)(i) Rapid Decompress (B1900 only)	✓	
(b)(3)(ii) Fire / Smoke / Electric (AC Specific)		Victor Olsen
(b)(3)(iv) Passenger / Crew Illness or Injury		Victor Olsen
(b)(3)(v) Hijack / Security		Victor Olsen
(b)(4) Previous Incident / Accident		Victor Olsen
(c) Emergency Drills [H6 Form F-05]	✓	

I certify that all the required ground training has been completed satisfactorily in accordance with the Hageland Aviation Services approved training program.

[redacted]

Chief Pilot or Director or Operations

11/6/2015

Date

HAGELAND
AVIATION SERVICES

Certificate

Recurrent C207 Ground Training

Conducted: January 30, 2016

Pilot: Cline, Timothy S.

Subjects Including, But Not Limited To:

	NA	Instructor(s):
A/C Performance		Victor L. Olsen
Weight & Balance		Victor L. Olsen
Engine and Propellers		Victor L. Olsen
Components and Systems		Victor L. Olsen
Communication		Victor L. Olsen
Contamination		Victor L. Olsen
Winter Pre-flight Inspection		Victor L. Olsen
Limitations		Victor L. Olsen
Fuel Consumption		Victor L. Olsen
Flight Planning		Victor L. Olsen
Normal and Emergency Procedures		Victor L. Olsen
POH		Victor L. Olsen
General Operational Subjects		Victor L. Olsen
Seat Removal & Installation		Victor L. Olsen

I certify that all the required ground training has been completed satisfactorily in accordance with the Hageland Aviation Services approved training program.

[redacted]
Chief Pilot or Director of Operations

February 2, 2016
Date

HAGELAND
AVIATION SERVICES

Certificate

Initial C207 Ground Training

Conducted: November 4, 2015

Pilot: Cline, Timothy S.

Subjects Including, But Not Limited To:

	NA	**Instructor(s):**
A/C Performance		Victor L. Olsen
Weight & Balance		Victor L. Olsen
Engine and Propellers		Victor L. Olsen
Components and Systems		Victor L. Olsen
Communication		Victor L. Olsen
Contamination		Victor L. Olsen
Winter Pre-flight Inspection		Victor L. Olsen
Limitations		Victor L. Olsen
Fuel Consumption		Victor L. Olsen
Flight Planning		Victor L. Olsen
Normal and Emergency Procedures		Victor L. Olsen
POH		Victor L. Olsen
General Operational Subjects		Victor L. Olsen
Seat Removal & Installation		Victor L. Olsen

I certify that all the required ground training has been completed satisfactorily in accordance with the Hageland Aviation Services approved training program.

[redacted]

Chief Pilot or Director of Operations

November 6, 2015

Date

Form F-04 Rev. 1 01/28/11

HAGELAND
AVIATION SERVICES

Proficiency Check

Ref 135.293; 135.297
135.299 & 135.340

Pilots Name: Cline, TIM

Signature: [redacted]

Certificate #: [redacted] ○ ATP ☒ Commercial

Date: 12NOV2015

Location: BET Base: BET

Aircraft Type: C207A

Date of Birth: [redacted] Medical Class: 2ND Medical Exam Date: 30JUL2015

Flight Log #: 277117

Name of Check Airman: EVATT, CLINTON

Signature: [redacted]

Seat Flown: ☒ Left ○ Right ○ Both

Aircraft N #: N5277J

Flight Time: 0.7

Flight Maneuvers Grade: S = Satisfactory, U = Unsatisfactory, W = Waived

Pre Flight	
1. Equipment Examination ○ Oral ○ Written	/
2. Preflight Inspection	S
3. Starting Procedures	S
4. Taxi	S
5. Powerplant Checks	S
Takeoffs	
6. Normal	S
7. Crosswind	/
8. Short Field (SE Only)	/
9. Soft Field (SE Only)	/
10. Instrument ○ (Lower Than Standard)	/
11. Rejected	/
12. With Simulated Power Plant Failure (ME Only)	/
Inflight Maneuvers	
13. Steep Turns	/
14. Slow Flight	/
15. Stall Series	/
16. Unusual Attitude	/
17. Powerplant Failure	/
18. Maneuvering With Partial Panel Under The Hood	/
Landings	
19. Normal	S
20. Crosswind	/
21. Short Field (SE Only)	/
22. Soft Field (SE Only)	/
23. From an ILS	/
24. From a Circling Approach	/
25. Rejected	/
26. With Simulated Powerplant Failure (ME Only)	/
Emergency	
27. Normal and Abnormal Procedures	/
28. Emergencies	/
29. System Malfunction	/
30. No Flap Procedures	/
31. Emergency Descent	/
32. Emergency Landings (SE Only)	/
Instrument Procedures	
33. Area Departure	S
34. Holding	/
35. Area Arrivial	S
36. Approaches	/
a. ILS ○ Normal ○ Coupled ○ Single Engine	/
b. GPS ○ WAAS ○ Normal ○ Coupled ○ SE	/
c. VOR	/
d. ○ Localizer ○ Back Course	/
e. NDB	/
Instrument Procedures cont.	
37. Circling Approaches	/
38. Missed Approaches	/
39. Auto Pilot	/
General	
40. Check List Procedures	S
41. Judgement	S
42. Communications	S
43. Navagation	S
44. Crew Coordination	S
45. Other:	/

○ Knowledge 135.293 a	Expires
○ Competency 135.293 b	Expires
○ IFR Proficiency 135.297	Expires
○ Auto Pilot	Expires
☒ Line Checks 135.299	Expires NOV 2016
○ Observation 135.340	Expires

Approved For:

☒ Single Pilot ○ IFR ○ Lower/Standard TO

Comments:

Base Month: NOVEMBER

Completed in: ○ Early Grace ☒ Base Month ○ Late Grace

135.299: MLL-BET

Results of Check:

☒ Initial ☒ PIC ☒ Approved

○ SIC ○ Disapproved

Region: ________ District Office: ________

Inspector Name: ________

Inspector Signature: ________

FAA Use Only

Check Airman Performance: ○ Approved ○ Disapproved

HAGELAND
AVIATION SERVICES

Proficiency Check

Ref 135.293; 135.297
135.299 & 135.340

Pilots Name: CLINE, TIM
Signature: [redacted]
Certificate #: [redacted]
○ ATP ☒ Commercial
Date: 11NOV2015
Location: BET
Base: BET
Aircraft Type: C207A
Date of Birth: [redacted]
Medical Class: 2ND
Medical Exam Date: 30JUL2015
Flight Log #: 277115
Name of Check Airman: EVATT, CLINTON
Signature: [redacted]
Seat Flown: ☒ Left ○ Right ○ Both
Aircraft N #: N5277J
Flight Time: 1.1

Flight Maneuvers Grade: S = Satisfactory, U = Unsatisfactory, W = Waived

Pre Flight

1. Equipment Examination ☒ Oral ○ Written	S
2. Preflight Inspection	S
3. Starting Procedures	S
4. Taxi	S
5. Powerplant Checks	S

Takeoffs

6. Normal	S
7. Crosswind	S
8. Short Field (SE Only)	S
9. Soft Field (SE Only)	S
10. Instrument ○ (Lower Than Standard)	/
11. Rejected	S
12. With Simulated Power Plant Failure (ME Only)	/

Inflight Maneuvers

13. Steep Turns	S
14. Slow Flight	S
15. Stall Series	S
16. Unusual Attitude	S
17. Powerplant Failure	S
18. Maneuvering With Partial Panel Under The Hood	S

Landings

19. Normal	S
20. Crosswind	S
21. Short Field (SE Only)	S
22. Soft Field (SE Only)	S
23. From an ILS	/
24. From a Circling Approach	/
25. Rejected	S
26. With Simulated Powerplant Failure (ME Only)	/

Emergency

27. Normal and Abnormal Procedures	S
28. Emergencies	S
29. System Malfunction	S
30. No Flap Procedures	S
31. Emergency Descent	S
32. Emergency Landings (SE Only)	S

Instrument Procedures

33. Area Departure	S
34. Holding	~~S~~
35. Area Arrivial	S
36. Approaches	S
a. ILS ○ Normal ○ Coupled ○ Single Engine	/
b. GPS ○ WAAS ☒ Normal ○ Coupled ○ SE	S
c. VOR	/
d. ○ Localizer ○ Back Course	/
e. NDB	/

Instrument Procedures cont.

37. Circling Approaches	/
38. Missed Approaches	/
39. Auto Pilot	/

General

40. Check List Procedures	S
41. Judgement	S
42. Communications	S
43. Navagation	S
44. Crew Coordination	S
45. Other:	/

☒ Knowledge 135.293 a	Expires	NOV 2016
☒ Competency 135.293 b	Expires	NOV 2016
○ IFR Proficiency 135.297	Expires	
○ Auto Pilot	Expires	
○ Line Checks 135.299	Expires	
○ Observation 135.340	Expires	

Approved For:

☒ Single Pilot ○ IFR ○ Lower/Standard TO

Comments:

Base Month: NOVEMBER

Completed in: ○ Early Grace ☒ Base Month ○ Late Grace

135.299:

Results of Check:

☒ Initial ☒ PIC ☒ Approved
○ SIC ○ Disapproved

Region: ______ District Office: ______

Inspector Name: ______

Inspector Signature: ______

FAA Use Only

Check Airman Performance: ○ Approved ○ Disapproved

HAGELAND
AVIATION SERVICES

Record and Certificate of Flight Training and Aircraft Drills

Form F-05

Trainee: TIM CLINE

Aircraft: ● C207 ○ C208 ○ PA31 ○ F406 ○ B1900

Type of Training: (Select All Applicable) ● PIC ○ SIC ○ Instructor

● Initial ○ Transition ○ Upgrade ○ Differences

○ Recurrent ○ Requalification ○ Simulator

If Flight Training is waived show it here: ○ Flight Training Waived

Flight Training Sessions

(List date and flight time for each session)

1. 09NOV2015 0.8 2. 10NOV2015 0.7 3. 10NOV2015 0.7 4. 5.

(List total landings for each session)

1. 5 2. 3 3. 4 4. 5.

Instructor Comments

(Required)

1. Good pilot. Excellent job [redacted] Instructor Signature
2. Very smooth on the controls [redacted] Instructor Signature
3. Ready for checkride [redacted] Instructor Signature
4. Instructor Signature
5. Instructor Signature

○ I certify that the airman has failed to satisfactorily complete the required flight training in accordance with the Hageland Aviation approved training program and is recommended for:

○ Additional Training ○ Removal from Training

● I certify that all of the required flight training has been completed satisfactorily in accordance with the Hageland Aviation Services approved pilot training program and that the airman is recommended for a check ride.

Name of Instructor: C EVATT

Signature of Instructor: [redacted] Date: 10NOV2015

Signature of Trainee: [redacted] Date: 10/10/15

Form F-05 Rev. 7 07/24/2015

Trainee: TIM CLINE

Date all training completed: 10NOV2015

Aircraft: C207

Ground Operations	Session Number 1	2	3	4	5
Preflight Inspection	S	/			
Performance Planning	S	/			
Weight and Balance	S	/			
Securing Cargo	S	/			
Preflight Limitations	S	/			
Cockpit Management	S	/			
Starting	S	/			
Pretaxi Procedures	S	/			
Taxi	S	/			
Pre-takeoff checks	S	/			
Checklist Procedures	S	/			
Takeoffs					
Normal & Crosswind	S	S			
Short & Soft Field	S	S			
Rejected	S	S			
Engine Failure	S	S			
Lower Than Standard T/O	/	/			
Instrument	/	/			
Climb					
Climb (Normal)	S	S			
Climb (One Engine Inop)	/	/			
Inflight					
Steep Turns	S	/			
Stalls (App / Dept.)	S	/			
Slow Flight	S	/			
Unusual Attitudes	S	/			
Normal & Emer. Decent	S	/			
Instrument Procedures	S	/			
Holding	/	/			
Airframe Icing / PCC	S	/			
Auto Pilot	/	/			
Hazard / Collision Avoidance	S	/			
Wind Shear	S	/			
Engine Shut Down	/	/			
Air Start	/	/			
Instrument Procedures / Approaches					
ILS / DME Approach	/	/			
ILS With Engine Inop	/	/			
NDB Approach	/	/			
NDB / DME Approach	/	/			
GPS / Capstone	S	S			
VOR Approach	/	/			
VOR / DME Approach	/	/			
LOC Approach	/	/			
LOC/ DME Approach	/	/			
LOC / BC Approach	/	/			
DME ARC	/	/			
Non P A w/ Engine Out	/	/			
Circling Approach	/	/			
S.E. Circling Approach	/	S			
Visual Approach	/	/			
Contact Approach	/	/			
Area Departure	S	S			
Area Arrival	S	S			
Partial Panel	S				
Rejected with Engine INOP	/	/			

Landings	Session Number 1	2	3	4	5
Landings					
Short & Soft	S	S			
Normal & Crosswind	S	S			
From ILS	/	/			
W / Flap Malfunction	S	/			
From SE ILS	/	/			
From Circling Approach	/	S			
After Landing Procedure	S	S			
Parking & Securing	S	S			
Normal System Ops.					
Vacuum System	S	/			
Fuel & Oil System	S	/			
Electrical System	S	/			
Battery Check	/	/			
Hydraulic System	/	/			
Pneumatic System	/	/			
Anti-ice System	S	/			
Flight Controls	S	/			
Communication Systems	S	/			
Navigation Systems	S	/			
Warning Systems	/	/			
Heating / Cooling Systems	/	/			
Ground / De-Ice Demo	/	/			
Brake System	S	/			
Malfunction & Emergency					
Engine Fire In Flight	/	/	S		
Engine Fire On Ground	/	/	S		
Engine Failure In Flight	/	/	S		
Prop Over Speed	/	/	/		
Prop Under Speed	/	/	/		
SE Go Round	/	/	/		
Oil System	/	/	S		
Fuel System	/	/	S		
Generators / Alternators	/	/	S		
Excessive Load or Current	/	/	S		
Inverter Inop	/	/	/		
Unscheduled Trim	/	/	S		
Trim Inop.	/	/	S		
Go Round (Trim Inop.)	/	/	S		
L Gear Emergency Ext.	/	/	/		
Engine Over Heat	/	/	S		
Bag. Comp. & Doors	/	/	S		
Annunciator Failure	/	/	/		
Bleed Air Failure	/	/	/		
Cross Feed	/	/	/		
Circuit Breakers	/	/	S		
Cabin Door Warning	/	/	/		
Magnetos	/	/	S		
Flap System Failure	/	S	S		

Drills [135.331(c)]	Instructor's Last Name & Date	
Evacuation & Exits	EVATT	09NOV2015
Deice	EVATT	09NOV2015
Seat Removal/Installation	EVATT	09NOV2015
91002 seats	EVATT	09NOV2015

HAGELAND
AVIATION SERVICES

Operating Experience
(Ref 135.244)
Form F-07

Pilot Name: Timothy S. Cline

Aircraft: 207

Date	Route	Flight Time	Takeoff Landing	Check Airman
11/11/15	BET-WTL-EEK-BET	1.4	3	Eva H
11/12/15	BET-WTL-BET	1.0	2	Eva H
11/12/15	BET-NME-TNK-BET	2.2	3	Eva H
11/12/15	BET-RSH-MLL	1.1	2	Eva H
	Total	5.7	10	

Remarks:

O.E. reduced per 135.244(b)(4)

I certify that the above named pilot has satisfactorily completed the operating experience in accordance with 14 CFR Part 135.244 in the above aircraft

[redacted]

Check Airman

12NOV2015

Date

Note: Check Airman, verify a 135.299 Line Check is completed at the conclusion of Operating Experience.

HAGELAND
AVIATION SERVICES

Certificate

Recurrent C208 Ground Training

Conducted: January 27, 2016

Pilot: Cline, Timothy S.

Subjects Including, But Not Limited To:

	NA	Instructor(s):
A/C Performance		Victor L. Olsen
Weight & Balance		Victor L. Olsen
Engine and Propellers		Victor L. Olsen
Components and Systems		Victor L. Olsen
Communication		Victor L. Olsen
Contamination		Victor L. Olsen
Winter Pre-flight Inspection		Victor L. Olsen
Limitations		Victor L. Olsen
Fuel Consumption		Victor L. Olsen
Flight Planning		Victor L. Olsen
Normal and Emergency Procedures		Victor L. Olsen
POH		Victor L. Olsen
General Operational Subjects		Victor L. Olsen
Seat Removal & Installation		Victor L. Olsen

I certify that all the required ground training has been completed satisfactorily in accordance with the Hageland Aviation Services approved training program.

[redacted]
Chief Pilot or Director of Operations

February 2, 2016
Date

HAGELAND
AVIATION SERVICES

Certificate

Initial C208 Ground Training

Conducted: November 5-6, 2015

Pilot: Cline, Timothy S.

Subjects Including, But Not Limited To:

	NA	Instructor(s):
A/C Performance		Victor L. Olsen
Weight & Balance		Victor L. Olsen
Engine and Propellers		Victor L. Olsen
Components and Systems		Victor L. Olsen
Communication		Victor L. Olsen
Contamination		Victor L. Olsen
Winter Pre-flight Inspection		Victor L. Olsen
Limitations		Victor L. Olsen
Fuel Consumption		Victor L. Olsen
Flight Planning		Victor L. Olsen
Normal and Emergency Procedures		Victor L. Olsen
POH		Victor L. Olsen
General Operational Subjects		Victor L. Olsen
Seat Removal & Installation		Victor L. Olsen

I certify that all the required ground training has been completed satisfactorily in accordance with the Hageland Aviation Services approved training program.

[redacted]
Chief Pilot or Director of Operations

November 6, 2015
Date

Form F-04 Rev. 1 01/28/11

HAGELAND AVIATION SERVICES

Proficiency Check

Ref 135.293; 135.297
135.299 & 135.340

Pilots Name: **Cline, Timothy S.** Signature: [redacted]	Certificate #: [redacted] ○ ATP ● Commercial	Date: **Jul 7, 2016**	
	Location: **BET** Base: **BET**	Aircraft Type: **C208B**	
Date of Birth [redacted] Medical Class: **2**	Medical Exam Date: **Jul 24, 2015**	Flight Log #: **277727**	
Name of Check Airman: **Coon, William R.** Signature: [redacted]	Seat Flown: ● Left ○ Right ○ Both	Aircraft N #: **N92JJ**	Flight Time: **1.8**

Flight Maneuvers Grade: S = Satisfactory, U = Unsatisfactory, W = Waived

Pre Flight	
1. Equipment Examination ● Oral ○ Written	S
2. Preflight Inspection	S
3. Starting Procedures	S
4. Taxi	S
5. Powerplant Checks	S
Takeoffs	
6. Normal	S
7. Crosswind	S
8. Short Field (SE Only)	S
9. Soft Field (SE Only)	S
10. Instrument ● (Lower Than Standard)	S
11. Rejected	S
12. With Simulated Power Plant Failure (ME Only)	----
Inflight Maneuvers	
13. Steep Turns	S
14. Slow Flight	S
15. Stall Series	S
16. Unusual Attitude	S
17. Powerplant Failure	S
18. Maneuvering With Partial Panel Under The Hood	S
Landings	
19. Normal	S
20. Crosswind	S
21. Short Field (SE Only)	S
22. Soft Field (SE Only)	S
23. From an ILS	S
24. From a Circling Approach	S
25. Rejected	S
26. With Simulated Powerplant Failure (ME Only)	----
Emergency	
27. Normal and Abnormal Procedures	S
28. Emergencies	S
29. System Malfunction	S
30. No Flap Procedures	S
31. Emergency Descent	S
32. Emergency Landings (SE Only)	S
Instrument Procedures	
33. Area Departure	S
34. Holding	S
35. Area Arrival	S
36. Approaches	S
a. ILS ● Normal ● Coupled ○ Single Engine	S
b. GPS ● WAAS ○ Normal ● Coupled ○ SE	S
c. VOR	----
d. ○ Localizer ○ Back Course	----
e. NDB	----

Instrument Procedures cont.	
37. Circling Approaches	S
38. Missed Approaches	S
39. Auto Pilot	S
General	
40. Check List Procedures	S
41. Judgement	S
42. Communications	S
43. Navigation	S
44. Crew Coordination	S
45. Other:	----

● Knowledge 135.293 a	Expires	**7/2017**
● Competency 135.293 b	Expires	**7/2017**
● IFR Proficiency 135.297	Expires	~~**12/2016**~~ 01/2017
● Auto Pilot	Expires	**7/2017**
● Line Checks 135.299	Expires	**7/2017**
○ Observation 135.340	Expires	

Approved For:

● Single Pilot ● IFR ● Lower/Standard TO

Base Month: July

Completed in: ○ Early Grace ● Base Month ○ Late Grace

135.299: PABE PFKW PABE

Comments: Good flight

Results of Check:

○ Initial ● PIC ● Approved

○ SIC ○ Disapproved

Region: ________ District Office: ________

Inspector Name: ________

Inspector Signature: ________

FAA Use Only

Check Airman Performance: ○ Approved ○ Disapproved

HAGELAND
AVIATION SERVICES

Proficiency Check
Ref 135.293; 135.297
135.299 & 135.340

Pilots Name: TIM CLINE
Signature: [redacted]
Certificate #: [redacted] ○ ATP ☒ Commercial
Date: 3JAN2016
Location: BET Base: BET
Aircraft Type: C208B
Date of Birth: [redacted] Medical Class: 2ND Medical Exam Date: 30JULY2015
Flight Log #: 254083
Name of Check Airman: CLINTON EVATT
Signature: [redacted]
Seat Flown: ☒ Left ○ Right ○ Both
Aircraft N #: N407GV
Flight Time: 1.1

Flight Maneuvers Grade: S = Satisfactory, U = Unsatisfactory, W = Waived

Pre Flight	
1. Equipment Examination ○ Oral ○ Written	
2. Preflight Inspection	S
3. Starting Procedures	S
4. Taxi	S
5. Powerplant Checks	S
Takeoffs	
6. Normal	S
7. Crosswind	S
8. Short Field (SE Only)	
9. Soft Field (SE Only)	
10. Instrument ○ (Lower Than Standard)	
11. Rejected	
12. With Simulated Power Plant Failure (ME Only)	
Inflight Maneuvers	
13. Steep Turns	
14. Slow Flight	
15. Stall Series	
16. Unusual Attitude	
17. Powerplant Failure	
18. Maneuvering With Partial Panel Under The Hood	
Landings	
19. Normal	S
20. Crosswind	S
21. Short Field (SE Only)	
22. Soft Field (SE Only)	
23. From an ILS	
24. From a Circling Approach	
25. Rejected	
26. With Simulated Powerplant Failure (ME Only)	
Emergency	
27. Normal and Abnormal Procedures	
28. Emergencies	
29. System Malfunction	
30. No Flap Procedures	
31. Emergency Descent	
32. Emergency Landings (SE Only)	
Instrument Procedures	
33. Area Departure	S
34. Holding	
35. Area Arrival	S
36. Approaches	
a. ILS ○ Normal ○ Coupled ○ Single Engine	
b. GPS ○ WAAS ○ Normal ○ Coupled ○ SE	
c. VOR	
d. ○ Localizer ○ Back Course	
e. NDB	

Instrument Procedures cont.	
37. Circling Approaches	
38. Missed Approaches	
39. Auto Pilot	S
General	
40. Check List Procedures	S
41. Judgement	S
42. Communications	S
43. Navagation	S
44. Crew Coordination	S
45. Other:	

○ Knowledge 135.293 a Expires
○ Competency 135.293 b Expires
○ IFR Proficiency 135.297 Expires
○ Auto Pilot Expires
☒ Line Checks 135.299 Expires JAN2017
○ Observation 135.340 Expires

Approved For:
☒ Single Pilot ☒ IFR ☒ Lower/Standard TO

Comments:
Base Month: JAN
Completed in: ○ Early Grace ☒ Base Month ○ Late Grace
135.299: MYU - BET

Results of Check:
○ Initial ☒ PIC ☒ Approved
○ SIC ○ Disapproved

Region: District Office:
Inspector Name:
Inspector Signature:

FAA Use Only
Check Airman Performance: ○ Approved ○ Disapproved

HAGELAND AVIATION SERVICES

Proficiency Check

Ref 135.293; 135.297
135.299 & 135.340

Pilots Name: TIM CLINE
Signature: [redacted]
Certificate #: [redacted] ○ ATP ● Commercial
Date: 2JAN2016
Location: BET Base: BET
Aircraft Type: C208B
Date of Birth: [redacted] Medical Class: 2ND Medical Exam Date: 30JULY2017
Flight Log #: 254081
Name of Check Airman: Clinton Evatt
Signature: [redacted]
Seat Flown: ● Left ○ Right ○ Both
Aircraft N #: N407GV
Flight Time: 1.7

Flight Maneuvers Grade: S = Satisfactory, U = Unsatisfactory, W = Waived

Pre Flight	
1. Equipment Examination ● Oral ○ Written	S
2. Preflight Inspection	S
3. Starting Procedures	S
4. Taxi	S
5. Powerplant Checks	S
Takeoffs	
6. Normal	S
7. Crosswind	S
8. Short Field (SE Only)	S
9. Soft Field (SE Only)	S
10. Instrument ● (Lower Than Standard)	S
11. Rejected	S
12. With Simulated Power Plant Failure (ME Only)	/
Inflight Maneuvers	
13. Steep Turns	S
14. Slow Flight	S
15. Stall Series	S
16. Unusual Attitude	S
17. Powerplant Failure	S
18. Maneuvering With Partial Panel Under The Hood	S
Landings	
19. Normal	S
20. Crosswind	S
21. Short Field (SE Only)	S
22. Soft Field (SE Only)	S
23. From an ILS	S
24. From a Circling Approach	S
25. Rejected	S
26. With Simulated Powerplant Failure (ME Only)	/
Emergency	
27. Normal and Abnormal Procedures	S
28. Emergencies	S
29. System Malfunction	S
30. No Flap Procedures	S
31. Emergency Descent	S
32. Emergency Landings (SE Only)	S
Instrument Procedures	
33. Area Departure	S
34. Holding	S
35. Area Arrival	S
36. Approaches	S
a. ILS ● Normal ● Coupled ○ Single Engine	S
b. GPS ● WAAS ● Normal ○ Coupled ○ SE	S
c. VOR	S
d. ○ Localizer ○ Back Course	/
e. NDB	/
Instrument Procedures cont.	
37. Circling Approaches	S
38. Missed Approaches	S
39. Auto Pilot	S
General	
40. Check List Procedures	S
41. Judgement	S
42. Communications	S
43. Navagation	S
44. Crew Coordination	S
45. Other:	

● Knowledge 135.293 a Expires JAN2017
● Competency 135.293 b Expires JAN 2017
● IFR Proficiency 135.297 Expires JULY 2016
● Auto Pilot Expires JAN 2017
○ Line Checks 135.299 Expires
○ Observation 135.340 Expires

Approved For:

● Single Pilot ● IFR ● Lower/Standard TO

Comments:

Base Month: JAN

Completed in: ○ Early Grace ● Base Month ○ Late Grace

135.299:

Results of Check:

● Initial ● PIC ● Approved
○ SIC ○ Disapproved

Region: District Office:

Inspector Name:

Inspector Signature:

FAA Use Only

Check Airman Performance: ○ Approved ○ Disapproved

HAGELAND
AVIATION SERVICES

Record and Certificate of Flight Training and Aircraft Drills
Form F-05

Trainee: Cline, Tim

Aircraft: ○ C207 ○ C208 ○ PA31 ○ F406 ○ B1900

Type of Training: (Select All Applicable) ☒ PIC ○ SIC ○ Instructor
☒ Initial ○ Transition ☒ Upgrade ○ Differences
○ Recurrent ○ Requalification ○ Simulator

If Flight Training is waived show it here: ○ Flight Training Waived

Flight Training Sessions
(List date and flight time for each session)

1. 9DEC2015 (1.2) 2. 10DEC2015 (1.2) 3. 11DEC2015 (2.4) 4. 12DEC2015 (0.8) 5. 16 DEC 2015 (1.6)

(List total landings for each session)

1. 3 2. 1 3. 2 4. 1 5. 3

Instructor Comments
(Required)

1. Adjusting well. [redacted] Instructor Signature
2. Smooth, smooth pilot. [redacted] Instructor Signature
3. GOOD IFR Procedures [redacted] Instructor Signature
4. Emergency procedures [redacted] Instructor Signature
5. ILS's and finishing touches [redacted] Instructor Signature

○ I certify that the airman has failed to satisfactorily complete the required flight training in accordance with the Hageland Aviation approved training program and is recommended for:

○ Additional Training ○ Removal from Training

☑ I certify that all of the required flight training has been completed satisfactorily in accordance with the Hageland Aviation Services approved pilot training program and that the airman is recommended for a check ride.

Name of Instructor: Aaron Wimmer

Signature of Instructor: [redacted] Date: 16 DEC 2015

Signature of Trainee: [redacted] Date: 16 DEC 2015

Trainee: Cline, Tim

Aircraft: C208B

Date all training completed: 16 DEC 2015

Ground Operations	Session Number				
	1	2	3	4	5
Preflight Inspection	S	S			
Performance Planning	S	S			
Weight and Balance	S	S			
Securing Cargo	S	S			
Preflight Limitations	S	S			
Cockpit Management	S	S			
Starting	S	S			
Pretaxi Procedures	S	S			
Taxi	S	S			
Pre-takeoff checks	S	S			
Checklist Procedures	S	S			
Takeoffs					
Normal & Crosswind	S	S	S	S	S
Short & Soft Field	S		S	S	S
Rejected					S
Engine Failure	S		S	S	S
Lower Than Standard T/O					S
Instrument					S
Climb					
Climb (Normal)	S	S	S		
Climb (One Engine Inop)					
Inflight					
Steep Turns	S	S			
Stalls (App / Dept.)		S	S	S	
Slow Flight	S				
Unusual Attitudes					S
Normal & Emer. Decent					S
Instrument Procedures		S	S		S
Holding					S
Airframe Icing / PCC	S	S	S		
Auto Pilot	S	S	S		S
Hazard / Collision Avoidance	S	S	S	S	
Wind Shear					
Engine Shut Down					
Air Start					
Instrument Procedures / Approaches					
ILS / DME Approach					S
ILS With Engine Inop					
NDB Approach					
NDB / DME Approach					
GPS / Capstone		S	S		
VOR Approach					
VOR / DME Approach			S		
LOC Approach					
LOC/ DME Approach					
LOC / BC Approach					
DME ARC					S
Non P A w/ Engine Out					
Circling Approach			S		S
S.E. Circling Approach					
Visual Approach					
Contact Approach					
Area Departure	S			S	S
Area Arrival	S			S	S
Partial Panel					
Rejected with Engine INOP					

Landings	Session Number				
	1	2	3	4	5
Landings					
Short & Soft	S		S		
Normal & Crosswind	S			S	
From ILS					
W / Flap Malfunction	S				
From SE ILS					
From Circling Approach			S		
After Landing Procedure	S	S	S	S	
Parking & Securing	S	S	S	S	
Normal System Ops.					
Vacuum System		S			
Fuel & Oil System		S			
Electrical System		S			
Battery Check					
Hydraulic System					
Pneumatic System					
Anti-Ice System		S			
Flight Controls	S				
Communication Systems	S				
Navigation Systems	S			S	
Warning Systems					
Heating / Cooling Systems					
Ground / De-Ice Demo	S				
Brake System	S				
Malfunction & Emergency					
Engine Fire In Flight					
Engine Fire On Ground					
Engine Failure In Flight				S	
Prop Over Speed					
Prop Under Speed					
SE Go Round					
Oil System	S				
Fuel System	S				
Generators / Alternators	S				
Excessive Load or Current					
Inverter Inop					
Unscheduled Trim					
Trim Inop.					
Go Round (Trim Inop.)					
L Gear Emergency Ext.					
Engine Over Heat					
Bag. Comp. & Doors	S				
Annunciator Failure					
Bleed Air Failure	S				
Cross Feed	S				
Circuit Breakers	S				
Cabin Door Warning	S				
Magnetos					
Flap System Failure	S				

Drills [135.331(c)]	Instructor's Last Name & Date
Evacuation & Exits	EVATT 10DEC2015
Deice	EVATT 10DEC2015
Seat Removal/Installation	EVATT 10DEC2015

Form F-05 Rev. 7 07/24/2015

HAGELAND
AVIATION SERVICES

Operating Experience
(Ref 135.244)
Form F-07

Pilot Name: Tim Cline

Aircraft: 207

Date	Route	Flight Time	Takeoff Landing	Check Airman
1/2/16	BET-SCM-BET	2.1	2	Jay Evatt
1/2/16	BET-SCM-VAK-BET	2.3	3	Evatt
1/3/16	BET-TOG-KWN-BET	2.6	3	Evatt
1/3/16	BET-SCM-VAK-BET	2.5	3	Evatt
1/3/16	BET-AYU	1.3	1	Evatt
	Total	10.8	12	

Remarks:

O.E complete per 135.244

I certify that the above named pilot has satisfactorily completed the operating experience in accordance with 14 CFR Part 135.244 in the above aircraft

[redacted]

Check Airman

03JAN2016

Date

Note: Check Airman, verify a 135.299 Line Check is completed at the conclusion of Operating Experience.

Form F-07 Rev. 3 07/21/2015

Hageland Aviation Services, Inc.

Response to the Submission of the

Medallion Foundation

for the

Investigation of Hageland Aviation Flight 3153 Accident near Togiak, Alaska, October 2, 2016

January 23, 2018

Adam Ricciardi
Director of Safety Assurance
Party Coordinator
Hageland Aviation Services,
Inc.

Executive Summary

The Medallion Foundation ("Medallion"), which is not a party to the investigation, does not direct its proposed findings toward the accident. Instead, Medallion appears to be attempting to address concerns raised by the Board about Medallion's effectiveness as a non-regulatory safety audit organization, and its use of FAA funding for its operations.

With respect to Medallion's proposed findings, Hageland notes that Medallion's claims are: 1) inconsistent with Medallion's organizational processes, which rely on formal audits to determine compliance; and 2) not relevant to this proceeding, because the investigation of the Flight 3153 accident has been directed towards determining the cause of this tragic event – not assessing conformity with Medallion's annual audits.

Medallion's participation in this matter has only been as a party to a one day public hearing where it faced questions about the purpose, funding, and effectiveness of the foundation, and it did not provide any testimony supporting its proposed findings. If Medallion had been a party to the investigation, any legitimate issues would have undoubtedly been heard, worked through and vetted in the normal group process with the input of all party group members. For these reasons, as well as the facts and analysis set forth below, Medallion's proposed findings should be rejected.

I. Management Support

Medallion writes that "The core of most failures is lack of management support." Medallion, p. 7. This statement has no basis in the facts presented and appears to have been included as a general unsubstantiated proposition, rather than anything directed at Hageland or the Flight 3153 investigation.

Nonetheless, since the statement was included in its submission with respect to the Flight 3153 accident, Hageland is compelled to note that safety and the company's safety program and philosophy were strongly supported before this accident, and even more so since that time. Indeed, the FAA itself recognized this fact at the hearing and noted that Hageland's proactive safety culture and industry-leading initiatives were the direct result of substantial management support, particularly in recent years. See generally, NTSB Public Hearing Transcript ("Public Hearing"), pp. 220-221; 241.

II. Release of Flights with RA2 Values

Medallion has proposed that the NTSB find that Hageland's "RA2 values do not have an appropriate release authorization." Medallion, p. 10. According to Medallion, this is because "the Operational Control Agent is not considered by Medallion to represent an operator's increasing level of management, as required." Id.

This proposed finding should be rejected for several reasons. First, there is no requirement under the federal aviation regulations for internal company assessed risk levels to be accompanied by an elevated level of managerial consent. In fact, neither Hageland's model of operational control nor its operational control center are required for Part 135 air carriers, and both have been praised by the FAA as being industry leading. "There are not really any other carriers in Alaska that have a system that's comparable to what Hageland has." Public Hearing, p. 215 (Testimony of Deke Abbott, Manager of FAA Polaris CMO). Second, even under Medallion's internal risk management system, Hageland's Level 1 and Level 2 risks could simply be combined into one risk level. The use of two lower risk levels rather than one, however, makes Hageland's system more, not less, safe.

More importantly, however, Medallion's allegation and proposed finding has nothing to do with the accident because the facts show the flight was properly released. In fact, another company flight that departed Quinhagak (KWN) to Togiak (TOG) just minutes behind the accident flight was only a level 1A risk, the lowest risk level. The accident flight also would have had a similar Level 1A risk, except the aircraft had an inoperative ADS-B, making it a Level 2H risk. Operational Factors Specialist Factual Report ("Ops"), p. 17, Ex. 2E.

For Medallion's proposed finding to be relevant to the accident, it would have to be shown that the Level 2 risk that was assigned was insufficiently conservative, which was not the case. Indeed, none of the Level 3 risk factors were present. In fact, none of the Level 2 risk factors were present, other than the inoperative ADSB. Instead, the conditions were VMC for the entire route, the AWOS for TOG was fully functional, the wind was calm, no runway contamination was reported or expected, and there were no company imposed pilot restrictions.

III. The Multisegment Flight

Medallion has proposed a finding that "Hageland Aviation Flight Risk Assessment did not take into account the multiple hazards and factors relevant to a flight or series of flights with multiple legs, weather trending and forecasts and terrain (environmental) factors." Medallion, p. 11. Medallion further stated that "Medallion requires a policy and associated procedures for a consolidated risk assessment covering multiple flights to the same destination(s)." Medallion, p. 10.

Here, the NTSB has already noted that Medallion's policies "do[] not define the term 'flight.'" Ops, p. 28. That aside, and regardless of how the term "flight" is defined, Medallion's point concerns the potential for changing weather:

> The Hageland Risk Assessment does not take into consideration a flight with multiple legs conducted over a period of time in which weather forecasts indicate a change, or that marginal weather may require inflight decision making that would take the flight into or through mountainous terrain.

Medallion, p. 10.

Medallion's proposed findings in this instance should also be rejected. First, Hageland's system of operational control takes into account multiple weather reporting sources and the potential for deteriorating weather. Second, the risk assessment that Hageland does for each flight strip (which is not required for Part 135 operations) includes an assessment of the risks for each and every flight segment. Finally, Hageland's operational control process captures the fact that more risk factors are present for a multi-segment flight than for a flight with only one segment. As the Manager of the FAA's Polaris CMO testified:

> [Hageland's pilots] can always get what they need and they do have people watching them. I think it's –I think the system they put in place is a powerful system.

Public Hearing, p. 216.

For the accident flight, the Operational Control Agent ("OCA") assigned to the flight described the release procedure as normal. Ops, p. 17. He checked the National Weather Service's Alaska Aviation Weather Unit website to view the area forecast, METARs, TAFs, and the FAA weather cameras located at KWN and TOG. Id. There was some rain and clouds in the vicinity of KWN, the second stop for the accident flight and the departure airport for the accident leg. Id. The OCA and the pilot-in-command ("PIC") spoke and they agreed the weather was VFR at the departure and arrival airports, and the area forecast was good. Id.

Once the flight had departed, Hageland policy required the PIC to obtain current weather and aeronautical information for each flight segment. Human Performance Factual Report ("HP"), p. 7. If the PIC had observed worsening weather, he could have discussed the situation directly or indirectly with the OCA, discontinued the flight and remained at one of the airports serviced by the flight, or he could have diverted to an alternate airport. Hageland pilots have company issued cell phones and can obtain updated weather information by contacting the Operational Control Center, FAA flight service stations, or AWOS stations as needed. Public Hearing, pp. 32, 90.

As an additional precaution with respect to changing weather conditions, OCAs monitor the weather and status of flight after release and, if conditions deteriorate, the OCA can communicate with the flight crew during the flight, either directly or through the departure control agent (DCA). Ops, p. 16. The DCAs at a plane's base sometimes monitor weather on their computer and by telephone with village agents. Id. If there is a weather change that could impact a flight in progress, the DCA contacts the pilot via VHF radio. Id.

Here, however, the weather conditions did not deteriorate. Visual meteorological conditions (VMC) prevailed at the Togiak Airport. Ops, p. 4. At 1156, a METAR from TOG reported wind calm, visibility seven statute miles, light rain, scattered clouds at 3,900 feet agl, sky overcast at 4,700 feet agl, temperature 7° C, dew point 6° C, and altimeter setting of 29.88 inHg. Id.

The OCA noted that the weather actually improved after the flight was released, and therefore no adverse changed conditions existed to cause him to contact the flight crew. Ops, p. 17. Both the accident flight, and the second Hageland flight that was flying the same city-pair route between Quinhagak and Togiak almost immediately thereafter, were released as VFR flights. The only area of potential concern with regard to the weather was the possibility of rain near Quinhagak. After the flight was released, the weather conditions in Quinhagak actually improved. Ops, p. 17.

Further, the accident flight crew had just flown the same route in the opposite direction. The accident flight crew departed BET for TOG at approximately 0927, arriving at 1029. HP, p. 2. After loading cargo, the crew departed TOG at 1044 for KWN, arriving at 1125. Id. The accident occurred about half an hour later, at approximately 1157. Ops, p. 4. Accordingly, not only did the weather updates not reflect worsening conditions, but the flight crew had actually observed the local weather conditions shortly before the accident.

In short, neither weather trending, nor the available weather reports, nor the system of operational control Hageland had in place had anything to do with this accident. The risk level was low, regardless of the fact the flight had multiple segments.

IV. CFIT-A Training Records

Medallion proposes the NTSB find that "Hageland Aviation did not ensure all pilots receive all CFIT-A training prior to being assigned a revenue flight or flight duties." Medallion, p. 11. This finding is also unsupported by the facts.

There is no showing that any Hageland pilot did not receive CFIT-A training. Hageland policy requires its pilots to undergo CFIT-A training, including simulator training, prior to begin flying with a safety pilot. Public Hearing, pp. 20-21. The records for the accident PIC indicate he completed the ground training in January 2016 during his annual recurrent training. Ops, p. 19. The records for the SIC show he completed the ground portion of his initial training in July 2016. Id.

The accident PIC last received CFIT-A training during his recurrent training in January 2016. Ops, p. 19. The records of the simulator training for the accident SIC could not be located. Id. The fact that the pilot's record of his simulator training is missing does not disprove that the training occurred.

In accordance with the Hageland CFIT-A Manual, Hageland does not assign a pilot to flying duty until the pilot has completed the CFIT accident avoidance training program. Ops, p. 20. As Medallion itself notes, Hageland audited its CFIT-A training records and did not identify any lapses in CFIT-A Training. Medallion, p. 11. Since Hageland's policy requires the training to be completed, and because no similar deficiencies have been found during this investigation or any prior audit, the most logical conclusion to draw is that a recordkeeping irregularity occurred.

Further, Medallion awarded Hageland its CFIT-A Star on June 25, 2005, and Hageland has maintained it continuously throughout all of Medallion's audits over the years. Medallion's audit points for the CFIT-A Star include the following:

> Training
>
> 30. There is a method to ensure new hire and returning seasonal pilots receive all CFIT-A training prior to being assigned revenue or flight duties.
>
> 32. All pilots must receive CFIT-A training annually.
>
> 34. All training associated with this program is documented. The training form must include a line signed off and dated by both the pilot receiving the ground and simulator training and the instructor providing the training certifying that the training has been completed in accordance with the Company's CFIT-A training program.
>
> 35. Training records include at least pilot name, subject, instructor name, date, and evaluation of performance.
>
> 36. Training records include a signature and date of birth the pilot receiving instruction and the instructor who performed the instruction. All training records must document date and quantity of simulator training time.
>
> 38. Completion of CFIT-A classroom training and at least one ATD or simulator training session is required each year for all pilots. ATD or simulator training must include all three CFIT-A scenarios.

In short, Medallion's own audits indicate that Hageland requires all of its pilots to undergo CFIT-A training, including simulator training, and that Hageland has robust processes in place to ensure that this occurs. In the face of this evidence, it is much more logical to infer that a lack of paperwork is just that – missing paperwork – than to speculate that lack of paperwork means that somehow, just for this one pilot, company-mandated training did not occur.

V. Estimating In-Flight Visibility

Medallion proposes a finding that "Hageland did not provide practice in estimating in-flight visibility during ATD/Simulator training." Medallion, p. 12. Medallion requires practice estimating in-flight visibility as a CFIT-A audit point. Medallion, p. 11.

As Medallion acknowledges, however, Hageland Simulator/FTD Training Flight Lesson 1 includes a discussion of visibility estimation. Medallion, p. 11. Also, in-flight visibility estimations are taught in ground school, and pilots learn to estimate visibility distances through reference to local terrain features as part of Hageland's safety pilot program. Public Hearing, p. 31.

More importantly, however, the known circumstances of the accident render it unlikely that a mistake at estimating distances was its cause. The wreckage indicated the aircraft was in a steep climb at the time of impact, and Hageland requires the flight to remain at least 500 feet above ground level, suggesting that this was not a simple matter of perceiving the ridge to be slightly farther away. Further, the flight crew had available to them the TAWS as well as the Multi-Function Display to provide terrain cues, and the pilot-in-command had flown the KWN to TOG route on 10 previous occasions, and had flown the reverse route 16 times, so he was very familiar with the local terrain. See Hageland's September 22, 2017 data response.

VI. Medallion's Findings are Contradicted by Its Own Processes

According to Medallion, its Stars and Shield are bestowed and periodically validated through detailed, multilayered processes. At the public hearing, Medallion testified that

> Our auditors work separately and independently from our program managers. The program manager assists the carrier to ensure requirements are maintained to our standards and the carrier requirements. If a carrier fails the audit, we require a timeline to fix or provide additional data.

Public Hearing, p. 177.

Medallion further testified "If they hold multiple Stars, we'll look at those multiple Stars… look at … what their program requires…" Public Hearing, p. 209. In other words, the program manager ensures carriers understand Medallion's standards, and the auditors check to make sure the airline has maintained them.

Regarding Hageland, Medallion was clear that it has been thorough in auditing Hageland. In the two years preceding the accident, Medallion's program manager "was over there quite a bit working with them, helping them get the programs in place, and we saw a huge change." Public Hearing, p. 207. Even before that, Hageland continuously maintained its CFIT-A and Safety Stars. In fact, at all relevant times, Hageland has maintained its Medallion Stars and Medallion Shield, which were first awarded on the following dates:

CFIT-A Star: June 25, 2005
Safety: February 19, 2009
Operational Control: April 7, 2014
Maintenance and Ground Service: January 20, 2015
Internal Evaluation Program: August 14, 2015
Shield: June 28, 2016

Medallion testified that after this accident, they “looked at [Hageland’s] programs.” Public Hearing, p. 207. After explaining that Medallion met with Hageland after the accident, Medallion further stated:

> “We’ve looked at their programs. We’ve looked at their programs pretty intensely and to date they still maintain their programs and have them in place.”

Id.

In other words, before the accident, Hageland obtained and maintained its Medallion credentials, then Hageland’s programs improved in the few years immediately preceding the accident and, after the accident, Medallion reviewed Hageland’s programs “intensely” and without identification of any shortcomings. Thus, in closing, if Medallion’s processes, credentials and audits are to mean anything, it is that Hageland has consistently met Medallion’s standards over the years, demonstrating a commitment to safety going well above and beyond regulatory requirements.