Aviation Investigation Final Report

Location:	Tyonek, Alaska	**Accident Number:**	ANC17FA049
Date & Time:	August 23, 2017, 22:45 Local	**Registration:**	N1905A
Aircraft:	Piper PA-18AS	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The noninstrument-rated private pilot had spent the previous 4 days and nights conducting a solo sheep hunting trip and was returning home when the accident occurred. Before departing the remote, mountain airstrip, the pilot contacted a Federal Aviation Administration (FAA) Flight Service Station (FSS) on his satellite phone for a weather briefing and asked whether visual flight rules (VFR) flight was recommended for his route that night.

The flight service specialist (FS-S) provided the pilot with the terminal area forecast for the destination airport; information from the current Area Forecast, which indicated cloud ceilings around 5,000 ft mean sea level (msl), marginal VFR conditions, and rain; and a pilot report from a nearby mountain pass, which advised that VFR was not recommended. The pilot asked several times about a specific mountain pass, and although the FS-S described the conditions at that pass based on FAA weather camera images and expressed pessimism about the prospect of the pilot attempting VFR flight, she did not provide the pilot with the information contained in the Area Forecast for the pass, which indicated instrument flight rules conditions, rain, and mist, as well as isolated moderate turbulence in the area below 6,000 ft msl. The FS-S also did not provide weather radar information, which showed the intended route of flight under an extensive area of precipitation, including areas of moderate or greater intensity. Despite the pessimism of the FS-S on the prospect of the pilot attempting a VFR flight to his intended destination that night, had the FS-S provided the current forecast information for the specific pass and the regional turbulence found in the Area Forecast, as well as a description of the current weather radar depiction for his intended route of flight, the pilot would have had a more accurate picture of the weather over the route of flight.

Data obtained from an onboard GPS unit for the last several minutes of flight showed the airplane conduct two descending, spiraling turns. The airplane continued to descend before the data terminated. The airspeed during the last several minutes of the flight ranged from 49 knots to 82 knots.

The pilot departed on the flight about 10 minutes before sunset. Twilight conditions during much of the flight would have provided the pilot with some illumination from which to see; however, cloud cover would have decreased the amount of illumination during this period, as would the end of civil twilight, which occurred about an hour after takeoff. Thus, dark night conditions would have existed for at least the last 14 minutes of the flight, as the flight proceeded over a remote area devoid of cultural lighting. The dark night conditions, lack of available ground lighting, and possible instrument meteorological conditions present at the time were conducive to the development of spatial disorientation, and the airplane's flight track is consistent with the known effects of spatial disorientation. Whether the pilot may have been experiencing fatigue before and/or during the flight given his hunting activities of the previous 4 days, it could not be determined based on the available information.

Based on the available radar weather and airplane track data, it is likely that the airplane flew into or came very close to an area of moderate or greater precipitation just before the accident; however, the extent to which the weather contributed to the pilot's spatial disorientation could not be determined.

The pilot chose to depart at a time that would have required him to operate in dark night conditions with a lack of cultural lighting, eliminating his reference to a visual horizon and requiring reliance on the airplane's flight instruments for attitude control. The dark night conditions would also have precluded the detection and avoidance of weather.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:
The noninstrument-rated pilot's decision to initiate a visual flight rules flight into dark night, marginal visual flight rules to instrument flight rules conditions, which resulted in a loss of control due to spatial disorientation.

Findings

Environmental issues	Dark - Decision related to condition
Environmental issues	Dark - Effect on operation
Environmental issues	Below VFR minima - Effect on operation
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Enroute	VFR encounter with IMC
Enroute	Loss of visual reference
Enroute	Loss of control in flight (Defining event)
Enroute	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On August 23, 2017, about 2245 Alaska daylight time (AKDT), a wheel-equipped Piper PA-18AS-125 airplane, N1905A, impacted remote, tree-covered terrain about 31 miles northwest of Tyonek, Alaska. The private pilot sustained fatal injuries and the airplane was destroyed. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 visual flight rules (VFR) personal flight. Night instrument meteorological conditions were present along the airplane's route of flight at the time of the accident and no flight plan was filed. The flight originated from a remote airstrip near Telaquana Lake, located in the Lake Clark National Park and Preserve, about 2130, and was destined for Merrill Field (MRI), Anchorage, Alaska.

The pilot's wife reported that the pilot was returning from a solo Dall sheep hunting trip in the Alaska Range. The pilot departed from MRI on August 19 about 1630 and arrived at the remote airstrip about 1930. She reported that the length of the hunting trip was open-ended with no set return date.

The pilot placed three separate phone calls via satellite phone to the Federal Aviation Administration (FAA) Kenai Flight Service Station (FSS), Kenai, Alaska, on the night of the accident requesting weather information for his route of flight. The Kenai FSS is located at the Kenai Municipal Airport (PAEN), Kenai. Each call was dropped due to interruptions of satellite coverage. The same flight service specialist (FS-S) spoke with the pilot on all three occasions. The public docket contains the transcripts for each phone call.

The first phone call was at 1950 and lasted about 1 minute. The pilot reported that he was south of Merrill Pass and requested an outlook briefing for flight via Merrill Pass to Anchorage for the night of the accident and for the following day. He asked, "whether or not it's going to remain VFR from Merrill Pass back into Anchorage tonight and into tomorrow." The FS-S provided the terminal forecast for Anchorage before the call was dropped.

The second phone call, at 1956, lasted about 3 minutes. The pilot reported that he was near Merrill Pass on the west side and requested a "quick weather brief" asking if VFR flight from Merrill Pass or Telaquana Pass to Anchorage would be recommended for that night. The FS-S provided the Merrill Pass forecast, which called for marginal VFR (MVFR) conditions, the area forecast (FA), and the Anchorage terminal forecast before the call was dropped.

About 2100, the pilot contacted his wife via a satellite phone and asked her to retrieve weather information for a flight to MRI. She instructed the pilot to call her back in about 5 minutes; however, the pilot never called back.

The third and final phone call to the FSS was at 2108 and lasted about 10 minutes. The pilot asked if VFR flight across the Alaska Range or in the Merrill Pass area was recommended that night. The FS-S responded by saying, "…I don't have anything that's giving me a good report…" and provided the pilot with information from the current FA, which included the current airman's meteorological information (AIRMET) and regional ceiling, visibility, precipitation information, and information from a pilot report (PIREP) advising that VFR was not recommended on the east side of Lake Clark Pass (about 34 miles southwest of the accident site).

The pilot again asked about conditions at Merrill Pass, to which the FS-S responded with a comprehensive description of what she was seeing from the FAA Merrill Pass "low" weather camera. The FS-S indicated the FAA Merrill Pass "high" weather camera was out of service. Following a request from the pilot, she also provided a comprehensive description of what she was seeing on the FAA Beluga weather camera. Despite being asked several times about Merrill Pass, the FS-S did not provide the pilot with the forecast for instrument flight rules (IFR) ceilings, rain, and mist that was indicated for the pass in the current FA.

Despite being asked directly for turbulence information for the Cook Inlet and Matanuska-Susitna Valley area, the FS-S did not provide the pilot with the forecast for isolated moderate turbulence below 6,000 ft above mean sea level (msl) for the region found in the current FA. Additionally, the FS-S did not provide the pilot with the current Kenai weather radar information.

The pilot indicated that he was not in a hurry to get home, and then asked about conditions the next day. The FS-S provided a synoptic summary of frontal systems and expected precipitation and wind and indicated that she was, "…not seeing anything too much for the passes." The pilot requested forecast information valid for 24-48 hours from that time. The FS-S stated "…that occluded front basically right now still over Kodiak Island there pushing into uh Cook Inlet/Susitna Valley definitely got your rain looking at that low coming right over by four o'clock in the afternoon tomorrow right over us. I'm showing IFR conditions right in your area where you're coming from so that's around four o'clock in the afternoon now tomorrow okay that occluded front is going to be right over the top of us into Prince William Sound there's going to be isolated areas where it's going to be in the clear but they're talking about the drying of those winds the Turnagain Arm winds there drying out that moisture at the same time you got those winds cause you got turbulence going to be in the forecast there…"

The pilot asked, "So it's going to get worse is what you're saying?" to which the FS-S responded, "yeah basically…" The FS-S then stated, "…I didn't know how else to relay that to you I just cannot tell you yeah go ahead and try to come home through Merrill Pass it's not looking too good especially what they said about the Alaskan range through the Aleutian areas there so I would not chance that." The pilot then indicated his intent to, "probably go tonight" and started to file a VFR flight plan, but the call was lost before the flight plan was completed.

About 2220, the pilot's wife received a text message from the pilot stating that he was flying over Kenibuna Lake and that he should be home around 2300. She did not receive any further communications from the pilot. She reported that he was not rushed to return home nor was there any sort of emergency that required him to depart when he did.

Upon departing from the airstrip and heading to the northeast, the route of flight was over mountainous terrain. Continuing east, the route was overwater as the airplane crossed Kenibuna Lake and Chakachamna Lake. Once past the mountainous terrain and continuing to the east, the area consisted mainly of hills before reaching the Cook Inlet and the Matanuska-Susitna Valley. An overview of the route of flight, along with the remote airstrip the pilot departed from, the accident site, and the destination airport is shown in figure 1. Figure 2 shows the last portion of the flight.

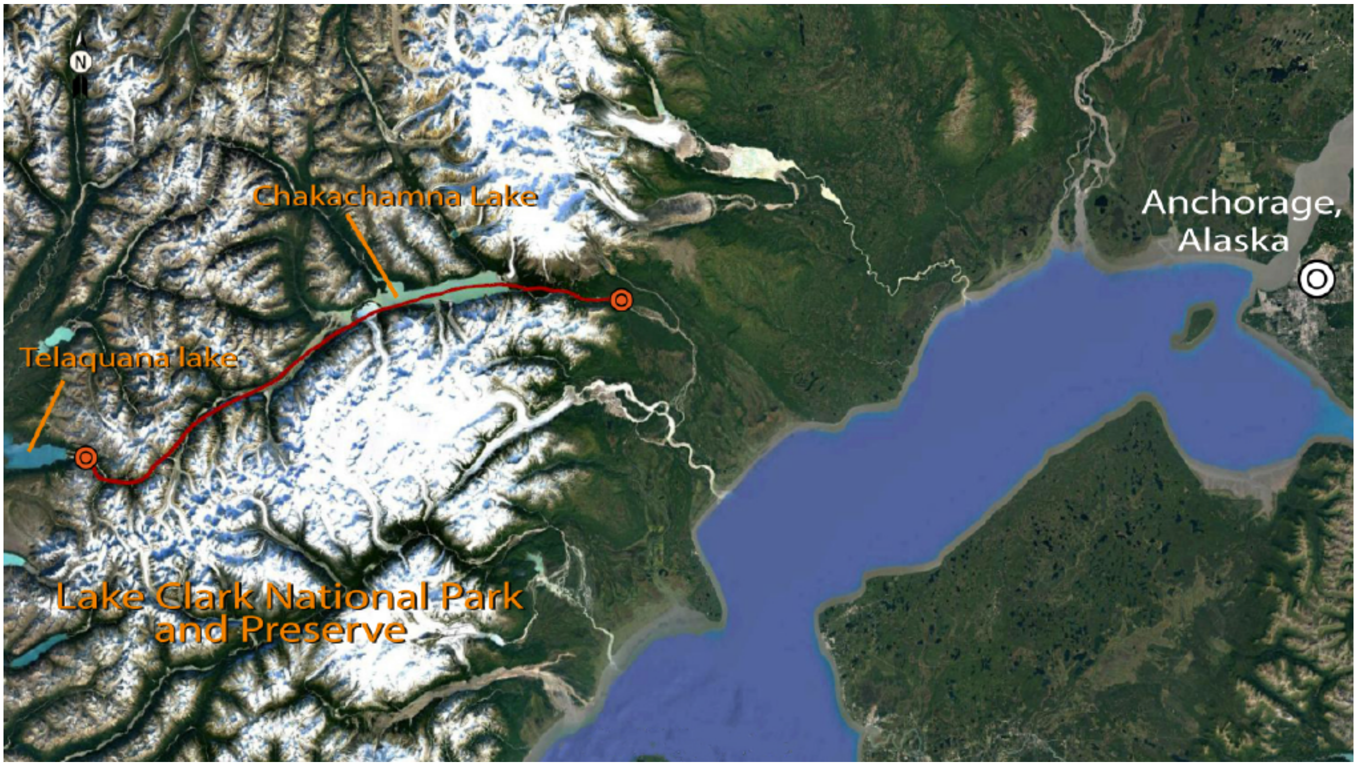

Figure 1 – Map of the route of flight, obtained from the onboard GPS unit (courtesy of the NTSB).

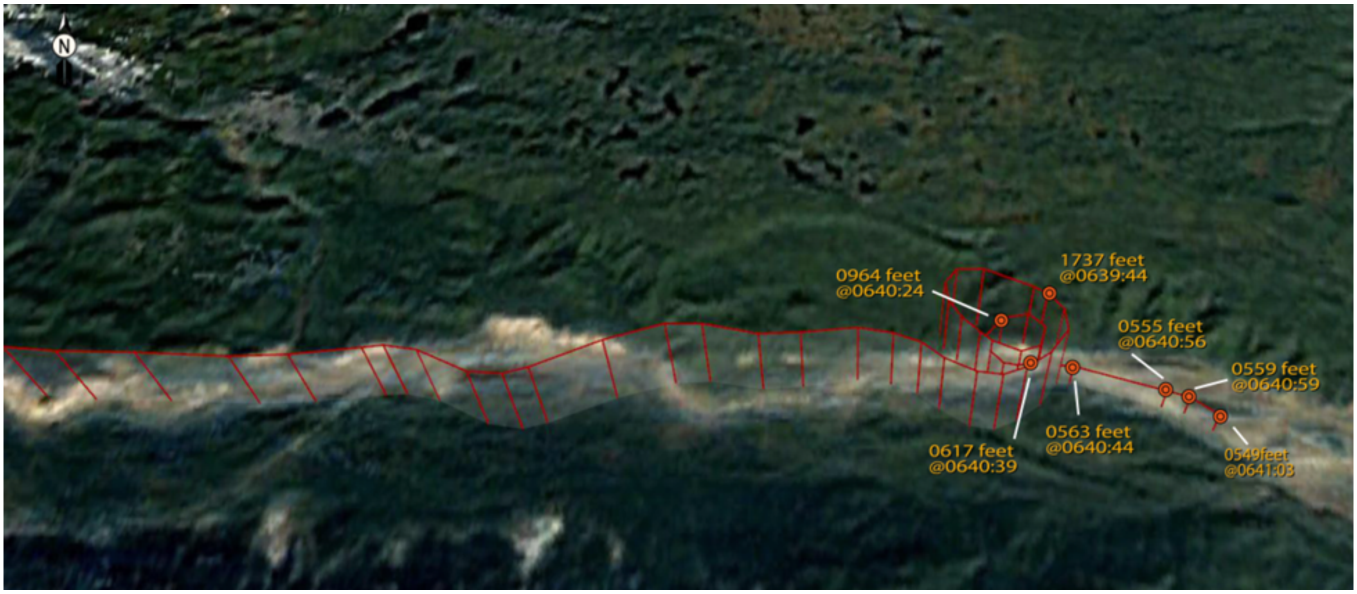

Figure 2 – Map of the last portion of the route of flight, obtained from the onboard GPS unit (courtesy of the NTSB).

Merrill Pass, which is depicted on a VFR sectional map, is shown in figure 3.

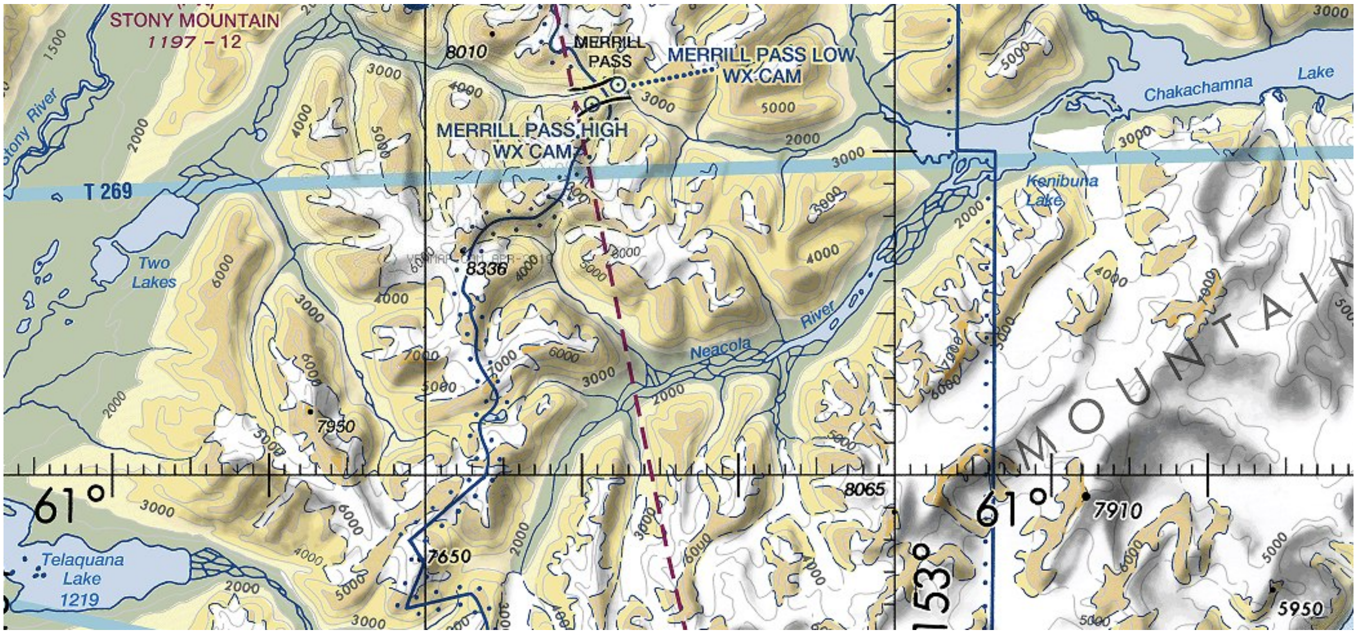

Figure 3 – Map showing the location of Merrill Pass (courtesy of vfrmap.com).

About 2245, the U.S. Air Force Alaska Rescue Coordination Center at Joint Base Elmendorf-Richardson, Alaska, received a 406 MHz emergency locator transmitter (ELT) signal from the airplane. The wreckage was located the next morning in remote, tree-covered terrain about 1/4 mile south of the Chakachatna River as shown in figure 4.

Figure 4 – Aerial view of the wreckage (courtesy of the NTSB).

PERSONNEL INFORMATION

The pilot's wife reported that he was a conservative and safe pilot who was cognizant of the dangers of flying in Alaska, particularly with bad weather in the mountains. She stated that he always carried a satellite phone when he flew and would always call for a weather briefing.

In addition, she stated that the pilot had no issues with alcohol, drugs, fatigue, or stress. She further reported that the pilot was a fit, healthy person and lived an active lifestyle.

The pilot did not hold an instrument rating. A review of the pilot's logbook, as of the last entry on July 20, 2017, showed no actual instrument flight experience, 23 hours of simulated instrument experience, and 66.1 hours of night experience.

FS-S

The FS-S was based at the Kenai FSS in Kenai. Her air traffic control experience began in the U.S. Navy where she served as an air traffic controller (ATC) from 1990 to 1994. Between 1998 and 1999, she was training as a control tower operator with the FAA. From 2000 to 2005, she worked as a FS-S with the FAA. From 2005 until 2006, she worked as a certified professional controller at an FAA approach control center. She worked outside of aviation from 2007 until August 2016 when she was rehired by the FAA as a FS-S and began working in Kenai.

The FS-S had completed all required training for her duties. She possessed a second-class FAA medical certificate and her last ATC physical examination was conducted in October 2016.

AIRCRAFT INFORMATION

The airplane was not equipped for instrument flight and did not have an onboard weather system. An examination of the airplane's maintenance records revealed no evidence of uncorrected mechanical discrepancies with the airframe and engine.

METEOROLOGICAL INFORMATION

An Automated Weather Observing System was located at PAEN and was located about 44 miles southeast of the accident location at an elevation of about 100 ft msl. Automated reports from PAEN during the times surrounding the accident time are as follows:

[2053 AKDT] METAR PAEN 240453Z AUTO 00000KT 10SM OVC060 12/12 A2958 RMK AO2 RAE34 SLP017 P0001 T01220122 TSNO=

[2153 AKDT] METAR PAEN 240553Z AUTO 00000KT 10SM -RA FEW050 OVC060 12/12 A2958 RMK AO2 RAB0458 SLP017 P0000 60009 T01220117 10133 20122 56008 TSNO=

[2253 AKDT] METAR PAEN 240653Z AUTO 00000KT 5SM -RA BR SCT050 OVC060 12/12 A2957 RMK AO2 SLP016 P0004 T01170117 TSNO=

[2353 AKDT] METAR PAEN 240753Z AUTO 26003KT 5SM -RA BR SCT049 OVC055 12/12 A2957 RMK AO2 SLP015 P0006 T01170117 TSNO=

At 2253, PAEN reported a calm wind, visibility of 5 miles, light rain, mist, scattered clouds at 5,000 ft above ground level (agl), ceiling overcast at 6,000 ft agl, temperature of 12° Celsius (C) and a dew point temperature of 12°C, altimeter setting of 29.57 inches of mercury; remarks included: station with a precipitation discriminator, 0.04 inches of precipitation since 2153 AKDT, no thunderstorm information.

An AIRMET advisory SIERRA for "mountains occasionally obscured in clouds/precipitation" was issued at 2010 and was active for the accident site at the accident time.

An Area Forecast that included the forecast for the accident location was issued by the National Weather Service (NWS) Alaska Aviation Weather Unit (AAWU) at 2010. The Area Forecast included the AIRMET information, and for the region (excluding the following Alaska/Aleutian Range region) forecasted few clouds at 1,500 ft msl, scattered clouds at 2,500 ft msl, broken to overcast clouds at 4,500 ft msl, with clouds tops to 15,000 ft msl and clouds layered about that to flight level 260, with light rain, occasional broken clouds at 2,500 ft msl with light rain and mist. Along the Alaska and Aleutian Ranges, it forecasted occasional broken clouds at 1,500 ft msl and visibilities 3-5 statute miles and light rain and mist, and isolated ceilings below 1,000 ft agl with visibilities below 3 statute miles with moderate rain and mist. For Merrill Pass, the Area Forecast forecasted IFR ceilings with moderate rain and mist. For the region, the Area Forecast forecasted isolated moderate turbulence below 6,000 ft msl and isolated moderate icing between 8,000-15,000 ft msl with the freezing level at 6,000 ft msl.

Various graphics were issued by the AAWU applicable to the accident time. The graphics identified IFR or MVFR conditions (as shown in figure 5), isolated moderate icing between 8,000 to 15,000 ft msl, isolated moderate turbulence below 6,000 ft msl, and light or moderate precipitation (as shown in figure 6) at the accident location, at or near the accident time.

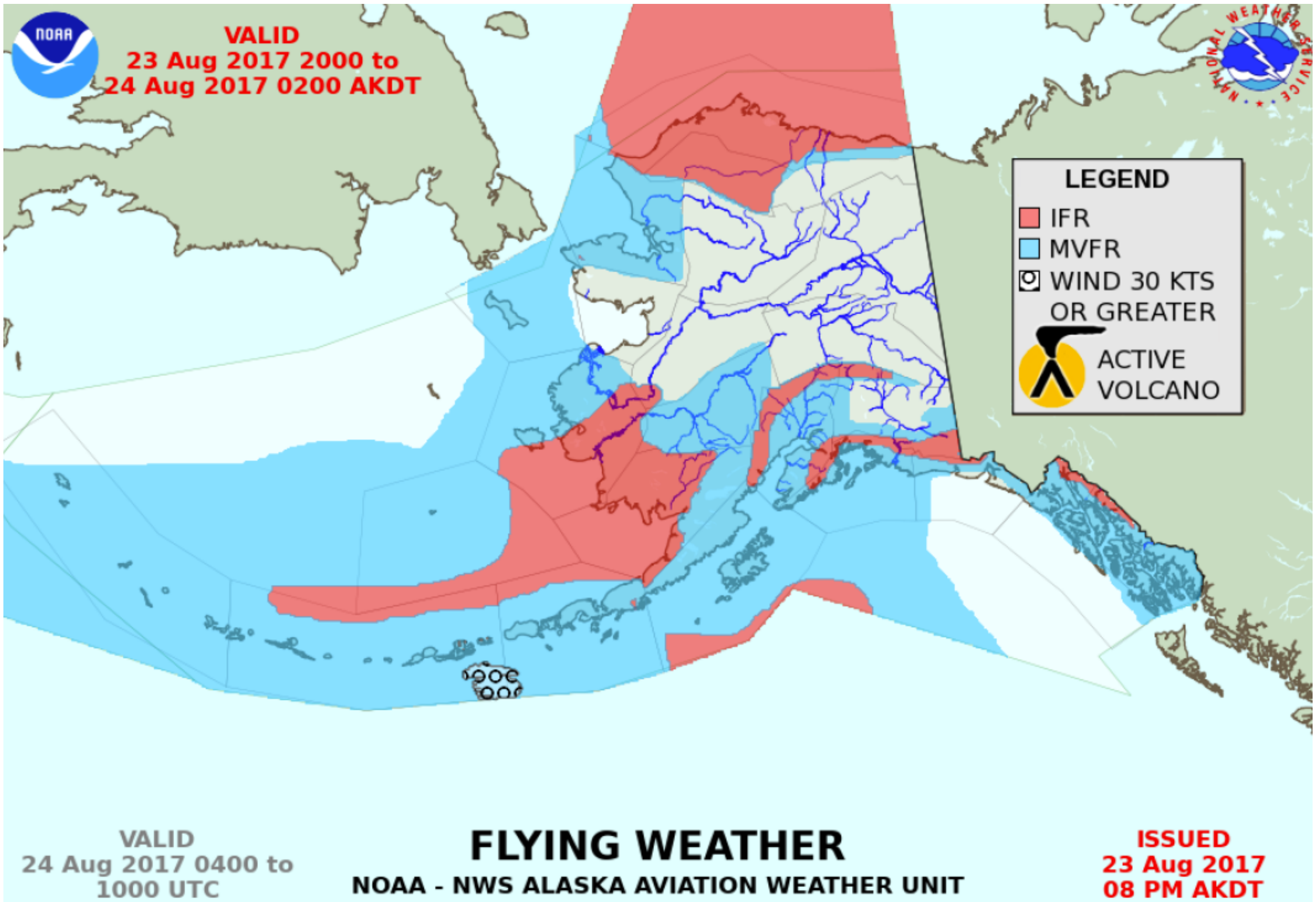

Figure 5 – Flying weather graphic issued at 2000 and valid between 2000 on August 23, 2017, and 0200 on August 24, 2017 (courtesy of the AAWU).

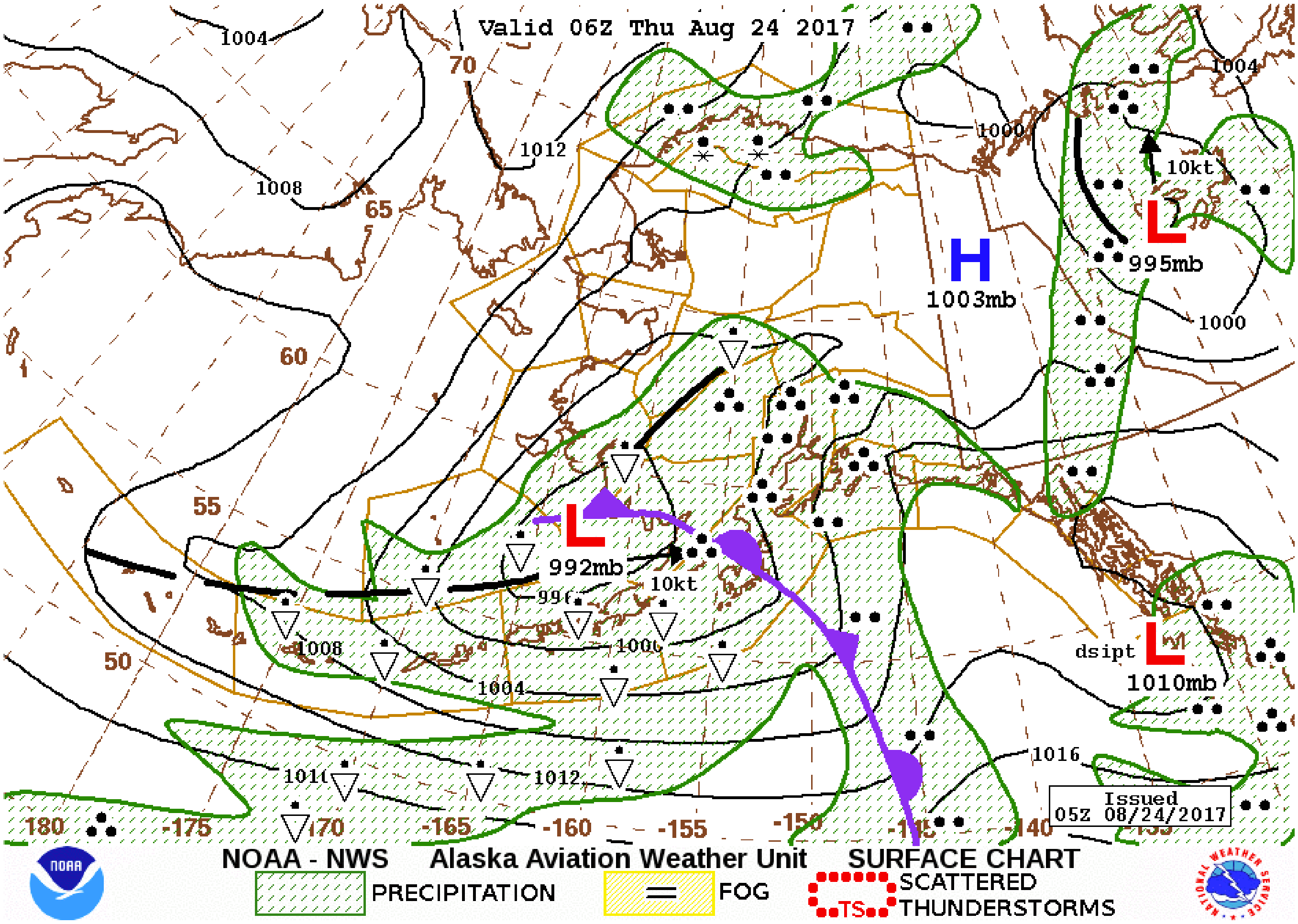

Figure 6 – Surface Chart issued at 2100 and valid for 2200 (courtesy of the AAWU).

WSR-88D Level-II weather radar imagery was obtained from near Kenai (PAHG). PAHG was located approximately 34 miles southeast of the accident site at an elevation of about 242 ft msl. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the PAHG 1.4° tilt would have "seen" altitudes above the accident location of between about 4,300 and 7,800 ft msl. The PAHG imagery surrounding the accident period identified reflectivity features consistent with light to extreme intensities of precipitation in the region and adjacent to the accident site as shown in figure 7.

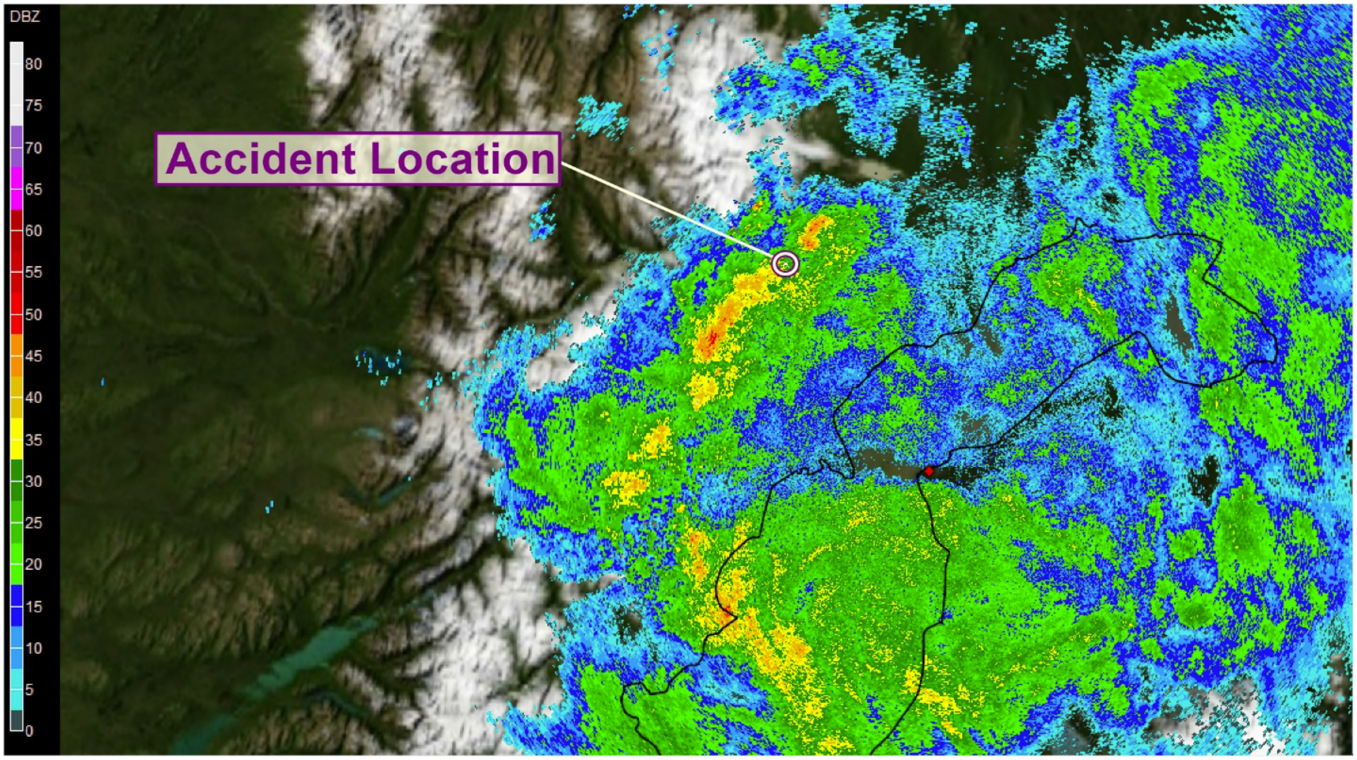

Figure 7 – PAHG 1.4° Level-II reflectivity product from a sweep initiated at 2245:47 (courtesy of the NTSB).

WSR-88D Level-III composite weather radar imagery from PAHG for the times surrounding the third Kenai FSS telephone weather briefing was obtained. This composite imagery identified an extensive area of reflectivity surrounding the accident location and extending east through the Anchorage area as shown in figure 8.

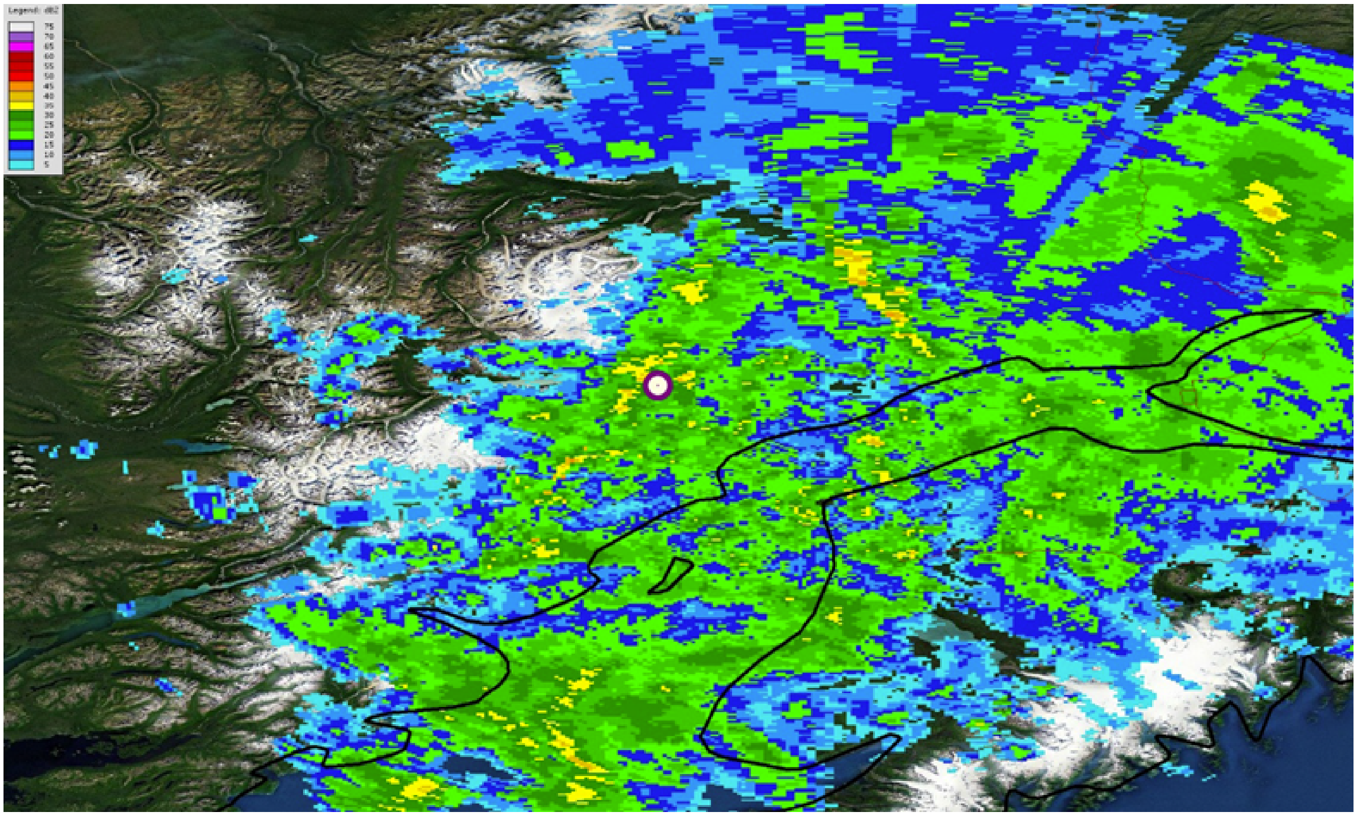

Figure 8 – PAHG Level-III composite reflective image, from a volume scan initiated at 2056 (courtesy of the NTSB). The white dot denotes the accident location.

Astronomical Conditions

The astronomical data obtained from the U.S. Naval Observatory for the accident site, indicated that sunset was 2141, end of civil twilight was 2231, moonrise was 0918, and moonset was 2226. The phase of the moon was listed as waxing crescent with 5 percent of the moon's visible disk illuminated.

WRECKAGE AND IMPACT INFORMATION

On August 24, the NTSB IIC and the Alaska State Troopers (AST) traveled to the accident site via helicopter. The wreckage was located at the base of a 100-foot-tall cottonwood tree at an elevation of about 455 ft msl as shown in figure 9.

Figure 9 – View of the empennage and the right wing (courtesy of the NTSB).

All portions of the airplane were accounted for at the wreckage site. The fuselage, both wings, and the cockpit were severely damaged with extensive deformation. Flight control continuity could not be established onsite due to extensive impact damage. The engine and propeller were buried underneath the airframe. Various hunting and camping gear were scattered throughout the wreckage.

The wreckage was recovered and transported to a secure facility in Wasilla, Alaska, for further examination. During the examination, no preimpact mechanical malfunctions or failures with the airframe and engine were noted. The total estimated weight of the cargo recovered from the wreckage was about 178 lbs.

MEDICAL AND PATHOLOGICAL INFORMATION

The Alaska State Medical Examiner, Anchorage, Alaska, conducted an autopsy of the pilot. The cause of death was attributed to multiple blunt force injuries.

The FAA's Bioaeronautical Research Sciences Laboratory, Oklahoma City, Oklahoma, performed toxicology tests on specimens from the pilot; testing was negative for ethanol and drugs. Carbon monoxide and cyanide tests were not performed.

TESTS AND RESEARCH

The pilot's cell phone and a GPS device were extracted from the wreckage and submitted to the NTSB Vehicle Recorder Division, Washington, DC, for examination. The cell phone sustained severe impact damage. The data on the microSD card was not pertinent to the investigation.

The GPS unit, a Garmin Aera 660, sustained severe impact damage. Data was recovered from the device. This data included parameters such as date, time, longitude, latitude, airspeed, altitude, and track as recorded by the device. Graphical overlays, such as figure 1 and figure 2, using the recovered data and Google Earth Pro were generated for the accident flight route. Data obtained from an onboard GPS unit for the last several minutes of flight showed the airplane conduct two descending, spiraling turns. The airplane continued to descend before the data terminated. The airspeed during the last several minutes of the flight ranged from 49 knots to 82 knots.

Refer to the Vehicle Recorder Specialist Factual Report in the public docket for additional information.

ADDITIONAL INFORMATION

FSS Preflight Briefing

The FAA Aeronautical Information Manual (AIM), discusses briefings that the FSS can provide and states in part:

Flight Service Stations (FSS) are the primary source for obtaining preflight briefings and inflight weather information. Flight Service Specialists are qualified and certificated by the NWS as Pilot Weather Briefers. They are not authorized to make original forecasts, but are authorized to translate and interpret available forecasts and reports directly into terms describing the weather conditions which you can expect along your flight route and at your destination. Available aviation weather reports, forecasts and aviation weather charts are displayed at each FSS, for pilot use. Pilots should feel free to use these self briefing displays where available, or to ask for a briefing or assistance from the specialist on duty.

Three basic types of preflight briefings are available to serve your specific needs. These are: Standard Briefing, Abbreviated Briefing, and Outlook Briefing. You should specify to the briefer the type of briefing you want, along with your appropriate background information. This will enable the briefer to tailor the information to your intended flight.

The AIM discusses the various of aspects of a standard briefing which is provided to a pilot and states in part:

Adverse Conditions. Significant meteorological and/or aeronautical information that might influence the pilot to alter or cancel the proposed flight; for example, hazardous weather conditions, airport closures, air traffic delays, etc. Pilots should be especially alert for current or forecast weather that could reduce flight minimums below VFR or IFR conditions. Pilots should also be alert for any reported or forecast *icing if the aircraft is not certified for operating in icing conditions. Flying into areas of icing or weather below minimums could have disastrous results."*

VFR Flight Not Recommended. When VFR flight is proposed and sky conditions or visibilities are present or forecast, surface or aloft, that, in the briefer's judgment, would make flight under VFR doubtful, the briefer will describe the conditions, describe the affected locations, and use the phrase "VFR flight not recommended." This recommendation is advisory in nature. The final decision as to whether the flight can be conducted safely rests solely with the pilot. Upon receiving a "VFR flight not recommended" statement, the non−IFR rated pilot will need to make a "go or no go" decision. This decision should be based on weighing the current and forecast weather conditions against the pilot's experience and ratings. The aircraft's equipment, capabilities and limitations should also be considered. NOTE− Pilots flying into areas of minimal VFR weather could encounter unforecasted lowering conditions that place the aircraft outside the pilot's ratings and experience level. This could result in spatial disorientation and/or loss of control of the aircraft.

Area Forecast

The NWS AAWU publication, "A Pilot's Guide to Aviation Weather Services in Alaska," discusses area forecasts, including the mountain pass forecasts, and states in part:

FAs are routinely issued for the entire state of Alaska including coastal waters (to 100 miles offshore) except for the Aleutian Islands west of Attu. All Alaskan FAs are produced by the AAWU located at the Weather Service Forecast Office in Anchorage. The FA is a 12-hour forecast of expected large scale weather conditions. In addition, the FA includes an outlook in categorical terms for the 18-hour period following the valid time of the forecast. Since the FA primarily deals with widespread significant weather features, it may not include localized situations which affect aircraft operations. This is particularly true in areas where weather observations are sparse. The FA serves as a flight planning and pilot weather briefing aid for general aviation pilots, civil and military aviation operations, and FAA briefers. The FA is a product which includes a SYNOPSIS, all Flight Precautions (AIRman's METerological Information [AIRMETs]/SIGnificant METerological Information [SIGMETs]), IFR/VFR Clouds/Weather, designated mountain PASS forecasts, Icing, and Turbulence.

The designated PASS forecasts are permanently assigned to one of the sectors that the pass connects, i.e., ATIGUN and ANAKTUVUK passes are assigned to the North Slopes of the Brooks Range Sector. The Alaska Mountain PASS Forecast included in the FA are:

Northern Alaska: ATIGUN, ANAKTUVUK, MENTASTA, and ISABEL.

Southern Alaska: PORTAGE, LAKE CLARK, MERRILL, RAINY, WINDY, and TAHNETA.
Southeast Alaska: WHITE and CHILKOOT.

The PASS forecast will indicate whether the predominant conditions through the PASS are: VFR, MVFR, or IFR and if the ceiling or precipitation are the reason. The forecast will also indicate turbulence. For example: ATIGUN...IFR CIG BR PORTAGE...VFR TURB. The designator TURB is used when the turbulence is forecast to be moderate or greater through the pass.

Accident Climatic and Topographic Region

The NWS AAWU has published "A Pilot's Guide to Aviation Weather Services in Alaska." This document mentions that the state of Alaska can be divided into six climatic and topographic regions for aviation weather purposes. For the region the accident flight occurred, the document states in part:

Cook Inlet, Susitna Valley and the Copper River Basin are the home for a large number of Alaskans. This area encircles some of the highest mountains in North America. Summers are mild and winters are cool with moderate snowfall. Although winds are generally light to moderate, wind speeds reaching over 100 miles an hour occur infrequently. Frequent VFR weather conditions occur in the lowlands with frequent MVFR/IFR conditions in the adjacent mountain passes.

Weather Briefings

FAA Advisory Circular 00-45H Aviation Weather Services discusses weather briefings and states in part:

Prior to every flight, pilots should gather all information vital to the nature of the flight. This includes a weather briefing obtained by the pilot from an approved weather source, via the Internet, and/or from an FSS specialist.

The FSS' purpose is to serve the aviation community. Pilots should not hesitate to ask questions and discuss factors they do not fully understand. The briefing should be considered complete only when the pilot has a clear picture of what weather to expect. Pilots should also make a final weather check immediately before departure, when possible.

FS-S Checklists

FAA Order JO 7110.10Z Flight Services lists weather display products for a FS-S to use in their duties along with the required items for a pilot briefing (standard briefing, abbreviated briefing, and an outlook briefing). A review of FAA Order JO 7110.10Z found no mention of a current checklist for weather display products and the required items for a pilot briefing to be stationed at each FS-S position at an FSS.

Definition of Pertinent

A review of FAA Order JO 7110.10Z Flight Services found that "pertinent" means directly and significantly to the matter at hand. No further information was found in FAA Order JO 7110.10Z regarding the definition of "pertinent" with regards to weather data and pilot briefings for a FS-S in their duties.

Pilot Report Collection

During the weather briefing, the pilot indicated that he was at Telequana Pass and reported, "it's clear as can be." There is no evidence that this PIREP was recorded and disseminated by the FS-S. FAA Order JO 7110.10Z, Flight Services, discusses the responsibility of FS-S with PIREPs and states:

FSS specialists must actively solicit PIREPs in conjunction with preflight and inflight communications with pilots and assure timely dissemination of the PIREP information. Each facility should make special *efforts to obtain PIREPs on departure and arrival weather conditions at airports within their flight plan area.*

For additional information on the importance of PIREPs, refer to NTSB Special Investigative Report 17/02, Improving Pilot Weather Report Submission and Dissemination to Benefit Safety in the National Airspace System and NTSB Safety Alert SA-064 Pilot Weather Reports (PIREPs): Pay It Forward.

Composite Radar Reflectivity Information

There was no explicit requirement in FAA Order JO 7110.10Z Flight Services that required an FS-S to issue radar reflectively information to pilots during a standard briefing. The order does not discuss the benefits of using "composite" weather radar imagery during weather briefings.

Alaska Mountainous Terrain Product

There is currently no FAA product that contains a standardized extent and location of commonly used mountain ranges and mountain passes in Alaska for aviation operations. These commonly used mountain ranges and mountain passes are routinely referenced in NWS forecast products, referenced in pilot weather briefings by FS-S, and also referenced in PIREPs.

Spatial Disorientation

The FAA Civil Aeromedical Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a "loss of proper bearings; state of mental confusion as to position, location, or movement relative to the position of the earth." This document lists flight factors contributing to spatial disorientation: changes in angular acceleration, flight in IFR conditions, low-level flight over water, frequent transfer from VFR to IFR conditions, and unperceived changes in aircraft attitude. This document concludes with, "anytime there is low or no visual cue coming from outside of the aircraft, you are a candidate for spatial disorientation."

The FAA's Airplane Flying Handbook, FAA-H-8083-3A, describes some hazards associated with flying when the ground or horizon are obscured. The handbook states, in part:

The vestibular sense (motion sensing by the inner ear) in particular tends to confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in the attitude of the airplane, nor can they accurately sense attitude changes that occur at a uniform rate over a period of time. On the other hand, false sensations are often generated; leading the pilot to believe the attitude of the airplane has changed when in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation.

Basic Flight Physiology by Richard Reinhart discusses spatial disorientation. This book discusses incapacitation resulting from spatial disorientation and states in part:

Spatial disorientation, as described here, becomes a serious source of disorientation, especially in instrument conditions. The physiologically impaired pilot (tired, hypoxic, using over the counter drugs, etc.) will lose his or her tolerance to suppressing input from peripheral vision. The pilot can quickly become incapacitated as a result of conflicting spatial senses.

Sheep Hunting and Fatigue

The Journal of Mountain Hunting has published an article, "So You Wanna Hunt Sheep?" by Dustin Roe. This article discusses the various demanding aspects of hunting for sheep in mountainous terrain and states in part:

Sheep hunting is without question of the most physically and mentally demanding hunting experiences available to the mountain hunter.

Mentally preparing for significant physical exertion, extreme fatigue, and emotional highs and lows will definitely increase your odds.

The American Hunter has published an article, "So You Want to Hunt Sheep..." by Tyler Freel. This article also discusses the various demanding aspects of hunting for sheep in mountainous terrain and states in part:

You first must accept that "comfortable" is a relative term. To put it mildly, you must be ready to endure various levels of discomfort and keep going. You will live entirely out of your backpack, sleeping on the ground, and often will be cold, wet, hungry and exhausted, all at the same time. You may have to spend hours hunkered under a rock to stay out of a driving rain or wake up to 12 inches of snow on your tent in mid-August. You might have to spend a night away from your tent and sleeping bag because a ram pins you down, and you may make several thousand-foot climbs only to have the ram you are after vanish into thin air. Some forms of hunting could be referred to as "casual," but not sheep hunting. It will push you beyond what you thought your limits were, and you will question whose bright idea it was to ever get involved in it.

Pilot Information

Certificate:	Private	**Age:**	35,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	November 18, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 9, 2017
Flight Time:	(Estimated) 1071 hours (Total, all aircraft), 606.2 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N1905A
Model/Series:	PA-18AS 125	**Aircraft Category:**	Airplane
Year of Manufacture:	1952	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18-1740
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	July 6, 2017 Annual	**Certified Max Gross Wt.:**	1499 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4608.6 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	O-320-A2B
Registered Owner:	On file	**Rated Power:**	160 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	PAEN,92 ft msl	**Distance from Accident Site:**	44 Nautical Miles
Observation Time:	06:53 Local	**Direction from Accident Site:**	148°
Lowest Cloud Condition:	Scattered / 5000 ft AGL	**Visibility**	5 miles
Lowest Ceiling:	Overcast / 6000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.56 inches Hg	**Temperature/Dew Point:**	12°C / 12°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Remote Airstrip, AK	**Type of Flight Plan Filed:**	None
Destination:	ANCHORAGE, AK (MRI)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	61.194442,-152.027496(est)

Preventing Similar Accidents

Reduced Visual References Require Vigilance (SA-020)

The Problem

About two-thirds of general aviation accidents that occur in reduced visibility weather conditions are fatal. The accidents can involve pilot spatial disorientation or controlled flight into terrain. Even in visual weather conditions, flights at night over areas with limited ground lighting (which provides few visual ground references) can be challenging.

What can you do?

- Obtain an official preflight weather briefing, and use all appropriate sources of weather information to make timely in-flight decisions. Other weather sources and in-cockpit weather equipment can supplement official information.
- Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself about your skill limitations. Plan ahead with cancellation or diversion alternatives. Brief passengers about the alternatives before the flight.
- Seek training to ensure that you are proficient and fully understand the features and limitations of the equipment in your aircraft, particularly how to use all features of the avionics, autopilot systems, and weather information resources.

- Don’t allow a situation to become dangerous before deciding to act. Be honest with air traffic controllers about your situation, and explain it to them if you need help.
- Remember that, when flying at night, even visual weather conditions can be challenging. Remote areas with limited ground lighting provide limited visual references cues for pilots, which can be disorienting or render rising terrain visually imperceptible. When planning a night VFR flight, use topographic references to familiarize yourself with surrounding terrain. Consider following instrument procedures if you are instrument rated or avoiding areas with limited ground lighting (such as remote or mountainous areas) if you are not.
- Manage distractions: Many accidents result when a pilot is distracted momentarily from the primary task of flying.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-020.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Paula Huckleberry; FAA Anchorge FSDO; Anchorage , AK Mark Platt; Lycoming Engines; Williamsport, PA Robert Martellotti ; Piper Aircraft; Vero Beach, FL
Original Publish Date:	November 6, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=95889