



National Transportation Safety Board Aviation Accident Final Report

Location:	ELIM, AK	Accident Number:	ANC95FA016
Date & Time:	12/10/1994, 1900 AST	Registration:	N1238K
Aircraft:	CESSNA 402C	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	5 Fatal

Flight Conducted Under: Part 135: Air Taxi & Commuter - Scheduled

Analysis

THE AIRPLANE WAS ON A FLIGHT AT NIGHT FROM NOME TO KOYUK, AK, WHEN IT CRASHED INTO A MOUNTAIN AT THE 2725 FOOT LEVEL. THE ACCIDENT SITE WAS DIRECTLY ON A COURSE LINE BETWEEN THE NOME AND KOYUK AIRPORTS. THE CEILING AT NOME WAS 3500 OVERCAST AT THE TIME OF DEPARTURE. ACCORDING TO RESCUE PERSONNEL, WEATHER AT THE ACCIDENT AREA WAS: INDEFINABLE CEILING AND POOR VISIBILITY WITH HEAVY SNOW AND BLOWING SNOW. THE PILOT HAD A HAND HELD GPS ON BOARD THAT HE HAD BARROWED FROM ANOTHER PILOT. BUT THE DATABASE COULD NOT BE RETRIEVED FROM THE GPS. ACCORDING TO THE OWNER OF THE GPS, HE AND THE ACCIDENT PILOT PROGRAMMED DIFFERENT WAYPOINTS. THE PILOT DID NOT FILE A VFR OR AN IFR FLIGHT PLAN WITH THE FAA.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: VFR FLIGHT BY THE PILOT INTO INSTRUMENT METEOROLOGICAL CONDITIONS (IMC), AND HIS FAILURE TO MAINTAIN SUFFICIENT ALTITUDE OR CLEARANCE FROM MOUNTAINOUS TERRAIN. FACTORS RELATED TO THE ACCIDENT WERE: DARKNESS AND THE ADVERSE WEATHER CONDITIONS.

Findings

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

Findings

1. (F) LIGHT CONDITION - DARK NIGHT
2. (F) WEATHER CONDITION - LOW CEILING
3. (F) WEATHER CONDITION - SNOW
4. (C) VFR FLIGHT INTO IMC - CONTINUED - PILOT IN COMMAND

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

Findings

5. TERRAIN CONDITION - MOUNTAINOUS/HILLY
6. (C) ALTITUDE/CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On December 10, 1994, at 1900 Alaska standard time, a retractable gear, wheel equipped Cessna 402C, N1238K, registered to and operated by Ryan Air Service of Anchorage, Alaska, crashed into a mountain located approximately 12 miles northwest of Elim, Alaska. The scheduled air taxi flight, operating under 14 CFR Part 135 as Ryan Air Flight 2402, departed Nome, Alaska, on a route that would have taken the flight to Koyuk, Shaktoolik, and a return to Nome. The flight did not reach the first destination. A Federal Aviation Administration (FAA) flight plan was not filed but a company flight plan was in effect. Instrument meteorological conditions prevailed at the accident site. The airline transport certificated pilot and the four passengers were fatally injured and the airplane was destroyed by impact forces.

INJURIES TO PERSONS

The pilot and the four passengers received fatal injuries. All were ejected from the airplane.

DAMAGE TO AIRCRAFT

All the major components of the airplane were located at the wreckage site or along the wreckage path. The airplane fuselage was the largest piece and was resting upside down. The forward section, the nose and cockpit area, were curled rearward into the cabin of the airplane. The empennage remained attached to the fuselage. The vertical fin and rudder were resting on the ground and had numerous bends and dents. The horizontal stabilizer and elevators remained attached in their proximate correct locations and they were dented.

The left wing was attached to the fuselage only by control cables and was right side up. It was positioned in front of the main wreckage with the wing root near the nose of the airplane. The left engine had separated from the engine nacelle and was resting on the ground in front of the airplane approximately 25 feet up hill. The right wing root and engine nacelle remained attached to the fuselage and was inverted. The right engine separated from the engine nacelle but was connected by the engine control cables and electrical wiring harnesses. The outboard portion of the right wing was separated and located to the left and along the wreckage path.

Both propellers were separated from the engines and were located 205 feet from the wreckage along the wreckage path. The main landing gear remained attached to their proximate correct locations and were both retracted. The nose gear and surrounding structure was separated and the nose gear was extended but not locked down.

PERSONNEL INFORMATION

PILOT

The 51 year old pilot was the holder of an airline transport pilot certificate with type ratings in the DC-3, the EMB-110, and DH-4 airplanes. He held commercial privileges for airplane single engine land and sea.

According to company records, the pilot had satisfactorily completed his 14 CFR Part 135.298 a and b checkride earlier that day.

The records show the pilot was current and qualified to operate the airplane for this particular flight.

OPERATIONS AGENT

According to the Nome station manager, the company operations agents are hired to monitor the flight's progress and to accomplish the paperwork task. He stated they do not have a formal training program for the operations agents. Their primary duties are to answer the telephones, collect and distribute tickets, coordinate with passengers, assist pilots in obtaining weather information from other village operations agents, weigh baggage, and assist the pilot in making a weather decision. The station manager stated that the operations agent at any of the villages, including Nome, has the full authority to stop any flight if they believe it to be unsafe for any reason. Examination of the company's policy and procedures showed no formal procedure. The station manager stated that if any pilot were to go against what the operations agent decided or attempted to intimidate the operations agent, the pilot would be fired immediately.

The operations agents are not required by regulations to have a dispatcher's license nor a pilot certificate.

STATION MANAGER

The Nome station manager is responsible for all the daily operations of the company at the Nome facility. He is a certificated private pilot. He does have an airframe and powerplant mechanic's certificate and functioned primarily as a mechanic until he was promoted to station manager. There is no formal company training program for station managers. He stated that he was not in the facility for the launching of the accident flight, Ryan Air Flight 2402. He said the operations agent is normally "responsible" to be present for the departure and arrival. He stated that the operations agents will leave the office during the flight to accomplish other tasks and will usually return before the flight.

CHIEF PILOT

The chief pilot for the company is not based in Nome. His primary duty station is Anchorage. He travels to the outlying facilities to monitor and perform necessary training and checkrides. He was not at the Nome station on the day of the accident.

AIRCRAFT INFORMATION

N1238K, a Cessna 402C airplane, had a total of 10,722 hours accrued on the airframe. The airplane was operating on an approved inspection program and had operated 34 hours since its last inspection.

An FAA Principal Avionics Inspector examined the maintenance records for N1238K and found that the original Cessna directional gyro, slaving accessory, flux detector, and navigation indicator was removed and replaced with King compass system which consisted of a horizontal situation indicator, remote directional gyro, autopilot adapter, VOR/LOC converter, and a flux detector. The inspector also found that the pilot's altimeter was removed and a encoding altimeter was installed.

According to the records, a FAA Form 337, major repair and alteration was completed and signed by an airframe and powerplant mechanic who also holds and Inspection Authorization.

According to 14 CFR Part 91.411, it states, in part, "that no person may operate an airplane in controlled airspace under IFR (instrument flight rules) unless within the preceding 24 calendar months, each static pressure system, each altimeter instrument, and each automatic

pressure altitude reporting system has been tested and inspected and found to comply with appendix E of part 43 of this chapter."

It further states, "except for the use of the system drain and alternate static pressure valves, following any opening and closing of the static pressure system, that the system has been tested and inspected and found to comply with paragraph (a), appendices E and F, part 43 of this chapter.... The tests required by paragraph (a) of this section must be conducted by the manufacturer of the airplane or a certificated repair station...."

METEOROLOGICAL INFORMATION

At the time of the accident the destination village of Koyuk did not have a weather observation facility.

The nearest weather reporting facility to the accident site is Nome, Alaska, located 76.5 miles on the 238 degree magnetic bearing from the accident site. The reported observation at Nome, taken at 1752 was measured 3500 broken, 4300 overcast, visibility 7 miles with light snow, temperature 26 degrees fahrenheit, dewpoint 19 degrees fahrenheit, wind from 050 degrees at 19 knots, altimeter setting 29.34 inches of mercury.

According to the station manager, the pilot should have been looking for a minimum ceiling of 500 feet above the ground and 2 miles of visibility at his destination before launching. The weather source used at Koyuk was the village agent who was not a trained weather observer. He stated the village agents have been looking at the weather for years and he felt they were able to determine a 500 foot ceiling and a 2 mile visibility.

According to the Terminal Forecast for Nome, taken on the 10th of December and valid from 2200 UTC to 2200 UTC, the weather was expected to be 8000 scattered, ceiling 10000 broken, occasional visibilities of 5 miles with blowing snow, wind gusts to 25 knots. AT 0200 UTC it was forecast to be 1500 scattered, ceiling 4000 overcast, visibility 4 miles with light snow with occasional conditions of partial obscuration, ceiling 800 broken, visibility 1 1/2 mile with light snow and blowing snow.

According to the Alaska State Troopers, who responded to the accident by snow machine and foot, the weather at the accident site was ceiling indefinable, visibility very poor, heavy snow fall, blowing snow. The Troopers were not able to see the main airplane wreckage from the observed initial impact point, a distance of 205 feet.

AIDS TO NAVIGATION

NOME

The departure airport is equipped with three navigational aids. Two are Nondirectional beacons (NDB), and one is a combination very high frequency omni range and tactical air navigation system (VORTAC).

The Gold NDB, equipped with distance measuring equipment (DME), is located on the Nome airport and does not serve any airway route structure or approach.

The Fort Davis NDB, not equipped with a DME, is located 3.6 nautical miles east of the Nome airport. The NDB serves in the airway route structure and is used in the NDB Runway 27 approach at Nome.

The Nome VORTAC is located 5.3 nautical miles east of the Nome airport. The VORTAC

serves in the airway route structure and is used for the VOR Runway 27 approach, the VOR/DME Runway 9 approach and the HI-VOR/DME or TACAN Runway 27 approach into Nome.

The Nome airport is equipped with an Instrument Landing System (ILS). The airport has a published ILS approach to Runway 27 and a Localizer/DME Backcourse approach to Runway 9.

KOYUK

The Koyuk airport, the intended destination, is equipped with an NDB and DME. The NDB/DME is located on the Koyuk airport. The beacon does not serve any airway route structure system nor is it used in an approach to Koyuk. According to the Alaska Supplement, the NDB/DME is unusable from 240 degrees to 270 degrees beyond 15 miles and below 5000 feet above mean sea level (msl), and between 270 degrees and 360 degrees beyond 9 miles and below 10000 feet msl.

According to the Nome visual flight rules (VFR) sectional chart, the closest navigational aid to the accident site is Moses Point, Alaska. Moses Point is equipped with a VOR/DME and the Norton Bay NDB, both located on the Moses Point airport. Both facilities serve in the airway route structure system and have a published VOR and NDB Airway respectively between Moses Point and Nome, and Norton Bay and Fort Davis. According to the Low Altitude Instrument Flight Rules enroute chart, the minimum obstruction clearance altitude for either airway, V-452 or G-7, is 4200 feet msl.

According to the Station Manager the pilot had a Global Positioning System (GPS), on board the airplane. He stated that each of the pilots had their own handheld GPS. He stated the company did not purchase the GPS units but was aware that the pilots possessed the units. He stated they do not have a training program for the use of the GPS.

Examination of some of the GPS units in the company showed that each of the units was marked with an individual's name. The pilot of the accident airplane had left his GPS in another airplane and was using another company pilot's GPS. According to that pilot, each of the pilots would program in different waypoints based on their likes or dislikes. This pilot stated that he programmed his waypoints for Koyuk approximately 2 miles off the end of the extended centerline of the runway. He stated the pilot of the accident airplane liked to program in the center of the airport as a waypoint.

The station manager stated, they do not have any method to standardize the waypoints that the pilots program.

WRECKAGE AND IMPACT INFORMATION

The accident site is located at geographic coordinates 64 degrees, 48.5 minutes north and 162 degrees, 34 minutes west, the western face of Mt. Arathlatuluk, at the 2723 foot level. It is located directly on a course line plotted from the Nome airport to the Koyuk airport. The magnetic heading of this course line is 060 degrees.

The observed initial impact point was located below the main wreckage at the 2675 foot level. The observed initial impact point was determined by the location of the left propeller and the green navigation light, the two most distant objects from the main wreckage. The horizontal distance between the left propeller and the green navigation light was measured to be 39 feet. The actual measurement of this distance on the airplane was 31.045 feet. The

wreckage path continued upslope on a magnetic course of 061 degrees. The angle of incline of the slope along the wreckage path was 12 degrees. The main wreckage was located 205 feet upslope from the observed initial impact point. The main wreckage was resting inverted on a magnetic heading of 078 degrees.

Examination of the airplane wreckage showed that control continuity existed between the rudder, elevators, and associated trim tabs to the main spar area. Continuity could not be established further forward in the wreckage due to the damage. Aileron control continuity was not established due to the separation of the right wing and aileron and the damage to the left wing. The breaks in the cables were visually examined and showed signs of necking and unwinding.

The elevator trim rod was extended 1.5 inches. The rudder trim rod was extended 2.25 inches, and the aileron trim rod was extended 1.5 inches. The flap drive mechanism showed 5.5 links of drive chain from the end, on the number 1 sprocket.

According to Cessna Aircraft, the elevator neutral trim position should show 1.53 inches of trim rod, the rudder neutral position should show 2.24 inches of trim rod, and the aileron trim rod has maximum travel of 1.45 inches. The wings were separated from the fuselage and there was no aileron trim control continuity. The flap drive chain, when the flaps are completely retracted, would show only 3.5 links of drive chain from the end on the number 1 sprocket. For each link exposed beyond the 3.5 links, the flaps would be extended 3 degrees. According to Cessna Aircraft, this information shows that the airplane had 6 degrees of flap selected during flight.

MEDICAL AND PATHOLOGICAL INFORMATION

The autopsy and toxicological test were completed by the Alaska Department of Health and Social Services, Office of the Medical Examiner, Deputy Chief Medical Examiner, 5500 East Tudor Road, Anchorage, Alaska, 99507.

The toxicological examination, conducted by a laboratory contracted by the State Medical Examiner, showed negative for alcohol, amphetamines, barbituates, cocaine metabolites, opiates and TMC (marijuana). The results showed a 2.9% blood carbon monoxide level.

TEST AND RESEARCH

According to pilots, who have operated airplanes of this category and class in snow and icing conditions, a common practice is to extend the flaps approximately 3 to 5 degrees so that the ice will not collect on the underside of the wing, behind the deice boot.

A GPS unit, model Garmin 55, serial number 25659040, was recovered from the accident site. The case had a Marc Gardner's name tag glued to the side. The unit was sent to FAA Flight Standards District Office in Kansas City Missouri for testing at the Garmin factory. Test results showed that the Garmin GPS unit was damaged and it would not produce any information. Internal examination of the unit showed that the memory chip was cracked and the CPU would not "boot up."

ADDITIONAL INFORMATION

There are no IFR routes established between Nome and Koyuk. There are no GPS routes authorized for IFR operations between Nome and Koyuk.

The pilot did not file an IFR flight plan and according to the station manager, the pilot

normally files a flight plan each flight. He stated the pilot usually gives the flight plan to the station agent who calls the information into the Flight Service Station (FSS). The station manager stated that this flight should have been conducted under VFR.

According to 14 CFR Part 135.203(a)(2), titled "VFR: Minimum altitudes. Except when necessary for takeoff and landing, no person may operate under VFR- (a)An airplane- (2) At night, at an altitude less than 1000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown or, in designated mountainous terrain, less than 2000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown."

According to the Alaska Supplement the area in which the Nome to Koyuk route is located, is classified as mountainous terrain. Examination of a VFR Sectional chart showed that the highest obstacle within 5 miles of the intended route to be flown was a 3314 foot high mountain. The next highest obstacle within 5 miles of the route is Mt. Arathlatuluk with a height of 2995 feet. The accident site is less than 1 mile from the peak. The minimum flight altitude for the intended route of flight, Nome direct Koyuk, should have been 5314 feet.

According to the chief pilot, the Ryan Air Board of Directors would send people as passengers to monitor the flights.

The pilots would not know who or when this would occur. He stated that on one occasion, while a member of the Board of Directors was on board, the airplane flew through a cloud while on a VFR flight and without an IFR clearance. The Board of Directors issued a warning to all pilots which stated that if any other pilots were found flying through clouds without a clearance, that pilot would be "fired." The chief pilot stated that this flight, the accident flight, was a "no brainer" for this pilot because he was experienced. He further stated that he wondered if the Board of Director's edict was forcing everyone to fly low.

During the interview with the chief pilot, he stated he sometimes did not understand what the Board of Directors wanted. He then said "I know what they want; the Board of Directors wants a scheduled service that flies by the FAR's."

Pilot Information

Certificate:	Airline Transport	Age:	51, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	07/13/1994
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	15804 hours (Total, all aircraft), 828 hours (Total, this make and model), 15004 hours (Pilot In Command, all aircraft), 164 hours (Last 90 days, all aircraft), 97 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	Registration:	N1238K
Model/Series:	402C 402C	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	402C1019
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	12/02/1994, AAIP	Certified Max Gross Wt.:	7190 lbs
Time Since Last Inspection:	34 Hours	Engines:	2 Reciprocating
Airframe Total Time:	10722 Hours	Engine Manufacturer:	CONTINENTAL
ELT:	Installed, activated, aided in locating accident	Engine Model/Series:	TSIO-520-VB
Registered Owner:	RYAN AIR SERVICE	Rated Power:	325 hp
Operator:	RYAN AIR SERVICE	Operating Certificate(s) Held:	Commuter Air Carrier (135); On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	UATA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	OME, 37 ft msl	Distance from Accident Site:	77 Nautical Miles
Observation Time:	1752 AST	Direction from Accident Site:	238°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	0 Miles
Lowest Ceiling:	Unknown / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	19 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	50°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	-3° C / -7° C
Precipitation and Obscuration:			
Departure Point:	NOME, AK (OME)	Type of Flight Plan Filed:	VFR
Destination:	KOYUK, AK (KKA)	Type of Clearance:	None
Departure Time:	1827 AST	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	4 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	5 Fatal	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	GEORGE KOBELNYK	Report Date:	10/16/1995
Additional Participating Persons:	PHIL B EVANS; FAIRBANKS, AK		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).