

CIVIL AERONAUTICS BOARD

# ACCIDENT INVESTIGATION REPORT

Adopted: August 7, 1952

Released: August 11, 1952

GENERAL AIRWAYS, INC., - MT. CRILLON, ALASKA, JANUARY 12, 1952

## The Accident

A Douglas DC-3C, N 41748, owned and operated by General Airways, Inc., an irregular air carrier, crashed at the 9,000-foot elevation, mean sea level, on the southeast slope of Mt. Crillon, Alaska, on January 12, 1952, at some time after 1147<sup>1</sup>/<sub>2</sub> when it last gave its position. Impact occurred about 30 miles to the right (northeast) of course. N 41748, operating as Flight 785, was a cargo flight and the two pilots, the only occupants, were killed. The aircraft was demolished upon impact.

## History of the Flight

Flight 785 departed Portland, Oregon, at 0200, January 12, 1952, destined for Merrill Field, Anchorage, Alaska, with a cargo of produce consisting mainly of crated eggs. The crew consisted of Captain Burton L. McGuire, Chief Pilot of General Airways, Inc., and First Officer George A. Simpson. The flight proceeded uneventfully and landed at Annette, Alaska, at 0709, at this point having completed almost one-half of the trip.

At Annette, 507 gallons of 91 octane gasoline were added, resulting in a total fuel load of 650 gallons. The fueling report of the Standard Oil station at Annette reflected that the oil supply for each engine was 24 gallons. No cargo was removed from or added to the aircraft; the cargo weight upon departure was 6,177 pounds. The weight and balance manifest indicated a takeoff gross weight of 26,894 pounds, and the load was properly distributed with respect to the center of gravity. The maximum certificated takeoff gross weight for the aircraft was 26,900 pounds.

The flight delayed at Annette for two hours and twenty-two minutes, awaiting improvement of weather conditions at Anchorage. Both pilots were thoroughly briefed on weather conditions by U. S. Weather Bureau personnel, and the pilots reviewed pertinent weather information several times. The aircraft was placed in a hangar to prevent ice formation due to freezing drizzle. A solid overcast was forecast over the route from Annette to Anchorage with temperature at flight level lowering from -10°C. at Annette to -12°C. between Sitka and Cape Spencer, and -14°C. at Yakutat. Winds at the 10,000-foot level<sup>2</sup> were forecast as approximately 230° and 45 knots to

<sup>1</sup>/ All times referred to herein are Pacific Standard and based on the 24-hour clock.

<sup>2</sup>/ Forecast data nearest to flight level.

Sitka, and 200° and 65 knots north of Sitka. Stable air was predicted, with little or no turbulence except over high, rough terrain where mechanically induced turbulence was expected due to the effect of strong winds. Light icing at flight level was forecast. The freezing drizzle changed to snow at about 0905, and the pilots made preparations to continue the flight.

A new flight plan was filed at Annette, and Flight 785 was authorized by Air Route Traffic Control to proceed under Instrument Flight Rules (IFR), direct from Annette to Sitka (off airway) and thence to Anchorage via Amber Airway No. 1.<sup>3/</sup> The flight was to maintain at least 500 feet on top of the clouds while in the control area, join Amber 1 at Sitka at 9,000 feet, and maintain 9,000 feet. The alternate airport was Kenai, near Anchorage. Flight 785 departed Annette at 0931.

The flight reported to Annette radio at 0940 that it estimated over Sitka at 1050. At 1111, Flight 785 advised Sitka radio that it was meeting strong head winds and estimated over Sitka in five or ten minutes. At 1116, the pilot reported by Sitka at 1113, 9,000 feet, and estimating Cape Spencer intersection<sup>4/</sup> at 1156. Flight 785 reported by Cape Spencer intersection at 1147, 9,000 feet, estimating over Yakutat at 1245. This was the last radio contact with N 41748.

### Investigation

The Yakutat radio, at 1414, issued an emergency warning, thus alerting all stations along the route that N 41748 was unreported and presumed missing. Search activities were immediately instituted by 10th Air Rescue, U. S. Air Force.

The wreckage was located the next day (January 13) by the crew of a 10th Air Rescue aircraft on a mountainside about 30 miles from the center of Amber Airway No. 1, on a bearing of 36 degrees true and 46 miles from Cape Spencer intersection. Flight conditions were hazardous, owing to very severe turbulence and winds of extremely high velocity, but seven low passes were made over the wreckage and two photographs obtained. Positive identification of the aircraft was made by Corp. Paul Nielsen, U.S.A.F., a former employee of General Airways. The name "General" in large lettering on the left wing panel and a red paint streak along the length of the fuselage were plainly visible. The cockpit was crushed. The right wing and engine were torn off and lay some distance behind the major portion of the wreckage. The right side of the fuselage had burst open, with cargo and wreckage scattered over a distance of two wing spans. The tail section seemed entirely intact. The fuselage lay in a direction generally opposite to the intended course of the flight. From observation of the wreckage it was evident that neither occupant could have survived the crash owing to the severity of impact.

The crew of a CAA aircraft which flew over the crash site on January 14 could not locate the wreckage, it having been buried by an avalanche or snow storm after the 10th Air Rescue aircraft flew over the scene.

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<sup>3/</sup> See Attachment.

<sup>4/</sup> Cape Spencer intersection is formed by the intersection of the north-west leg of the Sitka radio range, southwest leg of the Gustavus radio range, and the southeast leg of the Yakutat radio range.

Mt. Crillon has perpetual snows. The crash site is not accessible to helicopter or to conventional aircraft because of the high altitude and unavailable landing area, nor to land parties because of glacial crevasses and avalanches.

Investigation disclosed that the only other aircraft in the vicinity at the time Flight 785 reported by Cape Spencer intersection (1147) was Pan American Flight 915, proceeding south, which reported over Gustavus at 1141 at 11,000 feet. Gustavus is 60 miles northeast of Cape Spencer intersection. Over Point Hugh intersection, 120 miles southeast of Cape Spencer intersection, the Pan American flight logged "light rime ice, temperature  $-4^{\circ}\text{C}.$ , wind 60 knots,  $250^{\circ}$ ." Between Point Hugh and Petersburg (about 75 miles east of Sitka) it was necessary to hold a heading  $14^{\circ}$  to the right of course for drift correction. Turbulence encountered by Pan American Flight 915 was light and intermittent. Radio reception was normal, and no unusual static conditions were noted.

Investigation of weather conditions over the route between Annette and Mt. Crillon revealed that Flight 785 was in instrument weather throughout, with relatively light turbulence except that induced by strong winds flowing over the high, rugged terrain in the area of the crash. Aircraft icing would have been relatively light, if any. The latest forecast wind for the 10,000-foot level, given to the crew, was 65 knots from 200 degrees in the area between Sitka and Yakutat, and an earlier forecast was for wind of 50 knots from 270 degrees. Post analysis indicated that wind at flight level in the vicinity of Cape Spencer intersection was approximately 80 knots from 210 degrees.

Monitoring reports of the Sitka, Gustavus, and Yakutat radio ranges reflected that the on-course signals were in correct alignment and the transmitters operated satisfactorily in all respects during the pertinent period. In addition, the Yakutat and Sitka radio ranges were flight checked by the CAA on January 14 and 15, respectively. On-course signals were in correct alignment and operation of these stations was found normal in all respects. It was ascertained that no difficulty should have been experienced by the flight in obtaining good signals from the Yakutat radio range station, located 112 miles from the accident site.

None of the communications stations along the route received any radio contacts from Flight 785 in which the pilot asked for assistance in fixing position.

For some time prior to this accident, consideration of a probable hazardous situation between the Sitka and Yakutat radio ranges had been under study by the CAA, as there had been several accidents in the area over a period of years. At the time of the accident, the Sitka station transmitted on 323 kilocycles, the Yakutat station on 332 kilocycles. On a northbound flight, once a pilot had established the proper heading to maintain course on the northwest leg of Sitka (N signal on right side of on-course signal), he might re-tune the range receiver to Gustavus in order to establish the position of Cape Spencer intersection, which lies about half-way between Sitka and Yakutat. Then, after passing the intersection and while changing frequency to receive Yakutat (A signal on right side of

on-course signal), the pilot might inadvertently again tune in Sitka due to the small separation in frequencies (9 kilocycles) or the possibility of transposing the last two figures of the Sitka and Yakutat frequencies. Thus a pilot, failing to identify the range station, could get off course to the right while correcting for an N signal from Sitka, not an N from Yakutat. The terrain rises steeply north of Cape Spencer intersection and while the same error could be made on a southbound flight, the possibility of striking a mountain would be greater while northbound.

A review of maintenance records for the aircraft indicated that mechanical or radio discrepancies based on pilot reports had been corrected prior to departure of Flight 785 from Portland on January 12 and the aircraft was airworthy. N 41748 was equipped with an automatic direction finder, a high and low frequency receiver, a manual direction finder unit, and a marker beacon receiver. The maintenance history for N 41748 revealed numerous reports of radio discrepancies, a condition not uncommon in cold weather operations. A weak tube in the ADF unit was replaced following a discrepancy report made on January 11 by the pilot of the preceding flight from Alaska to Portland. The pilots of Flight 785 reported no malfunction of this or other radio units at any time en route or during the stop at Amette. In the matter of mechanical discrepancies, the pilots' directional gyroscope was replaced on January 11 with a newly overhauled unit. The directional gyroscope of the automatic pilot had also been reported malfunctioning. The Superintendent of Maintenance for General Airways stated that Captain McGuire was acquainted with the malfunctioning of this unit of the automatic pilot before departing Portland. He further advised that no aircraft of General Airways is ever released for flight unless all radio equipment functions properly, and the aircraft is airworthy.

General Airways employs six maintenance mechanics at Portland, all A & E certificated by the CAA, and a radio service mechanic. The company maintains a radio test shop at Portland. Its shops and the work performed on aircraft are periodically inspected by CAA maintenance agents. Any necessary repairs during the time an aircraft is on a trip are made at CAA-approved repair stations. The Superintendent of Maintenance stated that aircraft operated by General Airways are given a No. 1, 2, or 3 check, as applicable, upon return from any trip. The last No. 3 (heavy) check on this aircraft was completed on December 28, 1951.

The President of General Airways advised that the company owns and operates three DC-3 aircraft. He further advised that Captain McGuire and First Officer Simpson had, in accordance with company policy, flown together for approximately six months, mostly between Portland and Anchorage. Captain McGuire possessed an airline transport pilot rating, while Mr. Simpson possessed a commercial pilot and instrument rating, and had successfully completed the written portion of an examination for an airline transport pilot rating. The ten other pilots currently employed by General Airways all possess an airline transport pilot rating. Although the Chief Pilot is a designated CAA examiner, all pilots are periodically given route and proficiency checks by CAA Aviation Safety Agents. All General Airways pilots are given a written examination each 60 days, an oral test each month, and participate in a general pilots' meeting once each month.

Company training of pilot personnel also includes route checks by the Chief Pilot, instrument proficiency checks, and examinations on the equipment being flown. In the training of pilots by the company, they are instructed to use the range receiver as the primary radio navigational aid, and utilize the ADF as a secondary aid.

The company, the aircraft and the crew were properly certificated.

### Analysis

The track of Flight 785 between Annette and the impact site could not be ascertained, for it was evident that the flight was off course when the pilot reported "by" both Sitka and Cape Spencer intersection. Since the wreckage is inaccessible, it was also impossible to determine what radio equipment was in use, and the frequency or frequencies to which the receivers were tuned.

It appears that there was no malfunctioning of any component part of the aircraft or radio equipment, since no discrepancies were reported by the pilot between Annette and Cape Spencer intersection. Also, several radio contacts were made en route with the pilot reporting that the flight was at its assigned cruising altitude of 9,000 feet; N 41748 crashed at that altitude. Thus the possibilities of power loss, structural icing, radio failure, or crew incapacitation are remote in light of the routine manner in which the flight progressed.

Pan American Flight 915 was in the area and although somewhat to the east and southeast, reported radio reception normal. Also, as a result of monitoring and flight checks, it was found that all pertinent radio range stations operated normally, with the on-course signals in correct alignment. Thus it can be assumed that Flight 785 in all probability experienced satisfactory radio reception.

Flight 785 could have been off course to the right, due to wind effect from the left. The wind in the vicinity of Cape Spencer intersection was of higher velocity than forecast and had veered about 10 degrees from the forecast direction. Although weather must be considered a factor in this accident, the pilot could and should have established the proper heading to maintain course on the radio range between Sitka and Cape Spencer, and thence toward Yakutat. There was no radical change in wind direction or velocity between Cape Spencer intersection and Mt. Crillon. It was observed that the estimated times of arrival over Sitka and Cape Spencer intersection are at considerable variance with the actual times reported abeam those points.

Both pilots knew the route, knew of the high terrain after passing Cape Spencer, and had flown together for several months. So there is no question of lack of route familiarization or teamwork between the pilots.

Regarding a theory that the pilot of N 41748 became confused owing to the Sitka-Yakutat situation discussed in the previous section, the possibility that such an error had been made was considered. However, in view

of the relatively large angle involved and the 43-mile distance from Cape Spencer intersection, the possibility is considered remote, since such a large change in heading for that number of miles would be highly improbable, even though the aircraft might have been to the right of course when the pilot reported "by Cape Spencer intersection." It is noted that as a result of its studies, the CAA, subsequent to this accident, changed the transmitting frequency of Yakutat to 385 kilocycles and the identification of Sitka to "SIT." No change in the identification of Yakutat or the transmitting frequency of Sitka was necessary. These changes were made only coincidentally, and not as a result of the crash of Flight 785.

Whether the deviation from course was intentional or unintentional is a matter of pure conjecture. The Board must conclude, however, that Flight 785 was not conducted in accordance with the flight plan, and improper navigation is strongly indicated. There is no reasonable explanation for the pilot's failure to have established the proper heading to follow the northwest on-course signal of Sitka, which would have placed the flight in a safe position, at sea, to continue on the southeast leg of Yakutat radio range.

### Findings

On the basis of all available evidence the Board finds that:

1. The company, the aircraft, and the crew were properly certificated.
2. The aircraft was airworthy upon departure from Annette, had sufficient fuel aboard for the remainder of the flight, and the load was distributed within allowable center of gravity limits.
3. The flight was proceeding from Annette to Anchorage in accordance with an IFR flight plan.
4. No malfunctions of any nature were reported by the crew after departure from Annette.
5. Radio range stations in the area operated normally and the on-course signals were within allowable tolerances.
6. One or more transmitters and receivers installed in N 41748 operated normally for at least two hours and sixteen minutes after the Annette departure.
7. The wind at flight level in the crash area was from about 210 degrees and 80 knots, whereas the latest forecast wind on which the pilots were briefed was 65 knots from 200 degrees for the 10,000-foot level.
8. The flight struck Mt. Crillon at an altitude of 9,000 feet MSL and about 30 miles northeast of its planned course.

Probable Cause

The Board, upon consideration of all available evidence, determines that the probable cause of this accident was deviation from the planned route due to improper navigation of the flight.

BY THE CIVIL AERONAUTICS BOARD:

/s/ DONALD W. NYROP

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

Oswald Ryan, Vice Chairman, did not participate in the adoption of this report.

# S U P P L E M E N T A L   D A T A

## Investigation and Hearing

The Civil Aeronautics Board was notified of this accident at 1430 on January 12, 1952, and an investigation was immediately initiated in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. In connection with the investigation depositions were taken at Portland, Oregon, in lieu of a public hearing.

## Air Carrier

General Airways, Inc., is an Oregon corporation, with its principal office at 10,000 NE 47th Avenue, Portland, Oregon. The company is principally engaged in the purchase and transportation of merchandise to Alaska, but also engages in nonscheduled carriage of persons and property between the continental United States and Alaska. It holds Letter of Registration No. 556, issued by the Civil Aeronautics Board, and operates under Air Carrier Operating Certificate 7-7, issued by the Civil Aeronautics Administration.

## Flight Personnel

Captain Burton L. McGuire, age 30, was employed by General Airways, Inc., in July 1947. He was the holder of a valid airman certificate with an airline transport rating for multi-engine land, and commercial pilot rating for single and multi-engine land, and multi-engine sea aircraft. Captain McGuire had a total of 5,366 flying hours, of which 3,866 were in DC-3 equipment, and 1,008 hours of instrument flying time. His last instrument check was accomplished on June 30, 1951, and his last en route check was made on December 5, 1951. Captain McGuire received a CAA physical examination on November 9, 1951.

First Officer George A. Simpson, age 26, was employed by General Airways, Inc., in May 1950. He was the holder of a valid airman certificate with commercial pilot, instrument, and flight instructor ratings. Mr. Simpson successfully completed the written examination for an airline transport pilot rating on May 3, 1949. He had a total of 3,575 flying hours, of which 606 were in DC-3 aircraft, and 148 were instrument. His last instrument and en route checks were accomplished on December 27, 1951, and his last CAA physical examination on November 23, 1951.

## The Aircraft

N 41748, a Douglas DC-3C, serial number 11827, was owned and operated by General Airways, Inc. It had a total of 8,546:20 flying hours and was currently certificated by the Civil Aeronautics Administration. It was equipped with two Pratt & Whitney R-1830-92 engines, and Hamilton Standard 23E50 propellers.