File No 1-0009

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

ADOPTED April 14, 1964 **RELEASED.** April 21, 1964

NORTHWEST AIRLINES, INC.
DOUGLAS DC-7C, N 290, ANNETTE ISLAND, ALASKA
JUNE 3, 1963

SYNOPSIS

A Northwest Airlines, Inc., Douglas DC-7C, N 290 MATS charter Flight 293, crashed in the north Pacific Ocean approximately 116 nautical miles west-southwest of Annette Island, Alaska, at approximately 1816 G.m.t., June 3, 1963.

The flight departed McChord AFB, Washington, for Elmendorf AFB, Alaska, carrying 95 passengers and a crew of 6. The passenger list included military personnel, dependents, Department of Defense employees, and a Red Cross employee. All occupants of the aircraft were lost at sea and the aircraft was destroyed.

The aircraft had been airborne approximately 2 hours and 35 minutes when radio contact was lost. No difficulties were reported by the crew prior to this time. The wreckage was sighted by a Royal Canadian Air Force aircraft at 0322 G.m.t., June 4, 1963, at 54°21'N - 134°39'W but no survivors were observed. Approximately 1,500 pounds of floating aircraft wreckage was recovered.

Because of a lack of evidence the Board is unable to determine the probable cause of this accident.

Investigation

A Northwest Airlines, Inc., Douglas DC-7C, N 290, crashed at sea at an estimated position of 54°14'N - 134°41'W at approximately 1816[1/] June 3, 1963. The flight was operating as Northwest Airlines Flight 293, a Military Air Transport Service (MATS) charter flight from McChord Air Force Base (AFB) Washington, to Elmendorf AFB Alaska, transporting military personnel, dependents, Department of Defense civilian employees, and a Red Cross employee.

N 290 was ferried from Minneapolis, Minnesota, to McChord AFB, Washington, by a Northwest Airlines crew on June 3, 1963. The aircraft arrived at McChord AFB at approximately 1300. The captain stated that all systems were operating normally and no discrepancies were entered in the aircraft logbook. There were no carry-over maintenance items entered in the log on its arrival at McChord. The aircraft had just completed a scheduled maintenance inspection (No. 2 check) on June 2, 1963. This inspection is accomplished at 200-hour intervals.

The Northwest Airlines dispatcher at Seattle-Tacoma (SEA-TAC) Airport stated that he studied the U.S. Weather Bureau prognostic charts, as well as teletyped

1/ All times herein are Greenwich mean time based on the 24-hour clock.

information which included area forecasts, regional forecasts, terminal forecasts, and weather reports pertinent to the proposed flight. Copies of these documents along with a NOTAM[2] summary were attached to the flight plan provided to the captain.

The weather forecasts available to the captain and the dispatcher indicated the following: An occluded front just east of Annette with occasional moderate turbulence expected near the front to an altitude of 22,000 feet and light to moderate icing expected west of the front (also scattered rain showers). Cloudiness of varied types and heights was depicted along the route with bases of the lowest indicated at 1,000-2,000 feet and tops going up to as high as 18,000 - 22,000 feet. Higher clouds were forecast over the northern end of the route.

The dispatcher stated that the 14,000-foot cruising altitude was selected because it ". . . allowed the flight to be between layers or on top most of the time. No other altitude offered any better forecast (weather) conditions. This altitude allows the aircraft to operate in low blower power[3] configuration with lower cabin pressurization for passenger comfort. Most DC-7 crews prefer low blower operation as a more efficient operation."

The crew reported to SEA-TAC at approximately 1315 and the captain and the dispatcher discussed the forecast weather and the flight plan. After this briefing session the captain completed his flight plan and signed the flight release as did the dispatcher. The flight crew proceeded to McChord AFB and reported to Military Air Transport Service (MATS) operations. Here they received another weather briefing at 1534 from the USAF weather forecaster and were furnished with a Horizontal Weather Depiction Chart which included U.S. Weather Bureau, USAF, and Canadian Department of Transport weather data.

This forecast was essentially congruent with the earlier forecast. It indicated that the crew could expect light rime icing at 14,000 feet along the route from Port Hardy to Sandspit, B. C., and light to moderate rime icing from Sandspit to Domestic Yakutat[4], a point about 440 nautical miles northwest of Sandspit. The forecast also indicates light to moderate turbulence just north of Domestic Sitka during frontal penetration.

After the weather briefing the captain completed a military aircraft clearance form, requesting an IFR flight clearance to Elmendorf AFB, Alaska, at 14,000 feet, via Airways Victor 287, Victor 4, Amber 1, control area 1310, and Victor 440 Airway to Anchorage, Alaska, thence direct to Elmendorf AFB. The estimated time for the flight was 5:26 hours and the fuel on board was sufficient for 7:45 hours of flight.

The weight and balance form showed that the aircraft had a gross takeoff weight of 123,171 pounds and a takeoff center of gravity (c.g.) of 29.8 percent

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2/ NOTAMS are Notices of Airmen which are published as required to provide information of temporary outages or changes in airports, navigational aids, etc.

3/ Low blower is a term that refers to the engine driven supercharger operating in its low RPM Gear condition.

4/ Domestic Yakutat is a geographical fix 57°53'N - 141°44'W. Its location is determined by the intersection of bearings from VOR and radio range stations at Yakutat and Middleton Island, Alaska.

mean aerodynamic chord (MAC). The weight included 23,000 pounds of fuel, 95 passengers and 4,103 pounds of baggage and a crew of six. No cargo was loaded on the aircraft. The maximum allowable takeoff gross weight was 127,558 pounds and the c.g. range was 17.2 percent to 32.5 percent MAC. A weight sheet was delivered by the company agent to the crew in the cockpit approximately 15 minutes before departure. At that time the captain, first officer, and engineer were observed to be in their proper seats. This witness, as well as others who had contact with the crew, stated the crew appeared to be in good spirits and health prior to takeoff.

A Northwest Airlines maintenance crew chief performed a preflight inspection on the aircraft at McChord following its arrival from Minneapolis. He stated that he used the company checklist in conducting this inspection and that he discovered no discrepancies. No maintenance was required or performed on the aircraft. The aircraft was serviced with 2,021 gallons of 115-145 octane gasoline from an Air Force refueling unit and with 38 gallons of oil from a Northwest Airlines servicing vehicle kept at McChord for that purpose. After the sumps were drained the total amount of fuel (23,000 pounds) was verified by metering, dip stick, and fuel gages. During the preflight inspection the crew chief verified that the emergency equipment was aboard the aircraft. This equipment included 32 children's life vests stowed in the aft section of the fuselage; 106 adult life vests stowed in the seat backs and under seats; 7 crew life vests stowed in the cockpit and the aft section of the fuselage; five 20-man life rafts stowed near the aft main door; one 10-man life raft stowed in the cockpit; 4 exposure suits stowed in the cockpit; 1 bag of winter clothing; and 1 emergency radio transmitter stowed in the cockpit.

Another inspection of the aircraft and survival equipment was conducted by an Air Force maintenance man as required by MATS Manual 35-11. He used an Air Force checklist to guide him on this inspection and discovered no discrepancies.

The passenger baggage was loaded aboard the aircraft by civilian employees of the Air Force. The lower fuselage baggage compartments were examined before loading and there was nothing unusual noted in the compartments or the baggage as it was loaded.

The passengers were briefed in the terminal by pamphlets and signs, and they were requested not to carry any flammable or explosive items aboard the aircraft. There was no examination of their belongings or baggage.

The aircraft departed the terminal at approximately 1520, 10 minutes ahead of schedule, and was airborne at 1532. Witnesses who observed the takeoff reported that it appeared normal in all respects and the crew did not report any problems or malfunctions. The aircraft climbed, under radar control, to its assigned altitude and reported reaching 14,000 feet at 1552.

The crew reported over all compulsory reporting points at their flight planned times. At 1807 the crew reported that they had been over Domestic Annette[5/] at 1806, 14,000 feet, estimating Domestic Sitka at 1837, and requested a clearance to climb to 18,000 feet. No reason for the requested change in altitude was given.

5/ Domestic Annette is a geographic fix at 54°14'N - 130°40'W. It is located at the intersection of an ADF bearing of 208° magnetic from Annette Island low frequency range and the 286° magnetic bearing from the Sandspit low frequency range. A supplemental aid to its location is a relative radar bearing of 058° to Forrester Island, Alaska, at a distance of 32 nautical miles.

The Domestic Annette position report is the last known transmission from Flight 293. A Canadian radio operator at Sandspit, British Columbia, acknowledged this transmission and advised Flight 293 that 18,000 feet was occupied by Pacific Northern Airlines (PNA) Flight 5 estimating Domestic Annette at 1806. The crew of Flight 293 did not akcnowledge this transmission.

At 1809 the Sandspit operator attempted to contact Flight 293 and give it a clearance to 16,000 feet. The Sandspit operator then asked the PNA 5 crew to attempt to contact 293 but all further attempts to contact Flight 293 were futile.

The PNA 5 flight was over Domestic Annette at 1806 at 18,000 feet on the same route of flight as Flight 293. The PNA captain testified that he was intermittently in clouds and noted light icing in the vicinity of Domestic Annette. He said that his original cruising altitude was 16,000 feet but that between Port Hardy and Sandspit he requested a change to 18,000 feet to get out of an area of light icing. He did encounter light turbulence along the route, and occasional heavy precipitation static in the vicinity of Domestic Annette that blocked out communications on his high frequency radio.

At 1916 an alert notice[6/] was issued by Anchorage Air Route Traffic Control Center. The communication search carried out in response to this alert did not locate the aircraft. The estimated time of arrival of the aircraft at Anchorage was 2058 and fuel exhaustion was estimated at 2317. At 1935 the Northwest Airlines dispatcher at Anchorage declared an emergency and a sea and air search was initiate Aircraft from the United States Air Force, United States Coast Guard, and the Royal Canadian Air Force were assigned to conduct en route and area search based on the last reported position and flight plan of Flight 293. A Japanese surface vessel, the Hosei Maru, was requested to assist in the search and proceeded to the search area.

At 0322, June 4, 1963, an RCAF aircraft sighted floating debris at a position determined by radar and Loran fixes to be 54°21'N - 134°39'W. This location is approximately 35 nautical miles west of Domestic Annette and 17 nautical miles left of the centerline of control area 1310 between Domestic Annette and Domestic Sitka. (See Attachment.) The debris sighted consisted of uninflated life rafts, and other items later identified as clothing, aircraft components, and personal belongings. No survivors were sighted.

The Hosei Maru was the first surface vessel to arrive on the scene and initiated a search for survivors. Small boats were launched and recovered documents and personal baggage identified as property of a passenger on Flight 293. All material recovered by the Japanese was turned over to USCG vessels when they arrived at the wreckage area. The Coast Guard continued the search and recovered an estimated 1,500 pounds of aircraft wreckage and a small amount of human tissue, but no individual identification could be made. All recovered material was transferred to Annette Island, Alaska, for examination.

At the request of the Board, the U.S. Navy Oceanographic Office computed a probable impact point based on drift induced by general water circulation and wind conditions. They determined the position of the wreckage shortly after 1806

6/ An alert notice is to be issued by FAA agencies when communication cannot be established with an aircraft within 30 minutes after it fails to report over a specified reporting point or a compulsory reporting point while on an IFR flight.

to be approximately 54°14'N - 134°41'W. Based on this estimated impact area, reported winds, and currents, it was determined that the wreckage would have drifted in a northeasterly direction at .94 knots to the point where it was discovered. The water depth in this area is in excess of 8,000 feet. The Coast Guard reported water temperatures of 50.5°F - 51.8°F at the surface during their search of the area.

Search activities were called off at 0400, June 7, 1963. Periodic sweeps by aircraft since that time have discovered no further material.

The recovered survival equipment consisted of three 20-man life rafts; four crew immersion suits; a parachute bag of winter clothing for crew use; and fourteen adult and one children's size life jackets. In addition, the following aircraft components were recovered: the top section of the divider wall between the two aft lavatories; a small portion of exterior aircraft skin from the aft fuselage area; the seat pan and cushion from the extra observer's seat; one-half of a pilot's seat cushion; approximately 60 passenger seat back cushions; and approximately 45 passenger seat cushions. Additionally, miscellaneous items including blankets, clothing, pillows, three passenger seat belts, wood fragments, pieces of carpet, and pieces of interior decoration were recovered.

The seat back cushions, in many instances, contained the aluminum seat back frames. These frames were extremely deformed and most were broken into several pieces. The impact forces collapsed many of the frames downward and sideward giving them the apperance of "M's" with one or both of the vertical legs of the "M" bent or broken. The seat and back cushions retained their shape and the covers exhibited vertical tearing of the seat covers and foam cushions. There were no fragments of foreign material driven into the cushions although fragments of wood and other material were adhering to the fibers inside the seat covers and inside the cushion airspaces. A number of the seat back covers, with the life vest storage compartments still zipped shut, were salvaged with the life vests in their intact plastic containers.

The two-foot by one-foot portion of white painted aircraft exterior skin was found entangled in the lanyards of one of the life rafts. It was identified as coming from the top portion of the fuselage on the right side near one of the aft life raft storage areas.

The recovered survival equipment showed no signs of attempted use. Three complete seat belt units were recovered, buckled, and examination showed the belt webbing was compressed under the belt cam.

Recovered clothing had received various degrees of damage ranging from none to severe shredding and tearing. A large amount of this clothing was buttoned but not torn. None of the recovered clothing showed any signs of tissue or human remains but some of it did have wood chips, splinters, and scraps of decorative cabin interior adhering to it. These scraps had not penetrated the material. A few personal effects such as rubber shoes (thongs), shoe brushes, and some portions of carpeting and plywood scraps showed indication of blackening and possible charring. Laboratory examination of these items showed that the burning had occurred on one side only. No evidence of an in-flight fire or explosion was found.

Inquiries indicated that there were no known missile firings in the area of the accident and no aircraft other than the PNA 5 flight was known to be in the area at the time of the accident.

The crew of Flight 293 were line crew members regularly employed by Northwest Airlines who were selected on the basis of seniority and aircraft qualifications. All crew members were certificated, qualified and experienced in the operation of the DC-7 aircraft over the route from McChord AFB to Elmendorf AFB. Training records indicated that the flight crew and cabin attendants were currently qualified in emergency procedures and search and rescue training.

All aircraft maintenance records reviewed indicated that the aircraft and powerplants were maintained in accordance with FAA approved Northwest Airlines directives and procedures. The records did not reveal the existence of any unairworthy items or conditions on the aircraft's departure from McChord AFB.

The history of the installed propellers showed that they had been maintained in accordance with existing FAA approved procedures and directives.

A review of the historical records of the superchargers and power recovery turbines revealed no outstanding discrepancies and indicated that they had been maintained in accordance with pertinent directives and procedures.

Flight 293 was operating under the provisions of a contract between Northwest Airlines, Inc., and the United States Air Force as represented by the Military Air Transport Service (MATS). This contract required that the carrier operate all flights under the Civil Air Regulations that apply to scheduled air carrier operation within the United States, or those engaged in over-water flight, whichever was appropriate. The contract also required Northwest Airlines to maintain this aircraft in accordance with the Civil Air Regulations that pertained to the maintenance of Northwest aircraft engaged in scheduled passenger service. The contract was let by negotiation after MATS had solicited bids and investigated the operation of the companies who submitted bids. The contract was originally let for one year as of July 1, 1961, with an option for two yearly renewals. A MATS representative testified that MATS was satisfied with Northwest's performance and the option to renew had been exercised by the Air Force for the second time, effective July 1, 1963.

Record checks were performed by the Federal Bureau of Investigation, United States Air Force, United States Army, and the United States Coast Guard of the personnel aboard the aircraft. These checks revealed no significant information.

Laboratory analysis of fuel samples taken from the truck that serviced N 290 showed that the fuel met the specifications for aviation fuel.

Analysis

Available aircraft records and witness testimony indicate that the aircraft was airworthy and that there were no outstanding discrepancies at the time of departure from McChord Air Force Base. The crew was qualified, certificated, properly briefed, and prepared for the flight. The preflight activities of the crew, dispatcher, and maintenance personnel were satisfactory and the record indicates that all required actions were performed. The aircraft was properly equipped for this flight and the gross weight and c.g. were within limits.

The flight was normal and without reported incident until after the crew transmitted the Domestic Annette position report and requested a change in altitude. The requested change of altitude could have been motivated by either a desire to get out of an area of turbulence and icing or for passenger convenience during the serving of meals. The meals ordinarily would have been ready to be

served about 2-1/2 hours after takeoff. It is also noted that the flight, from Port Hardy north, was conducted in conditions favorable to icing.

The failure of the crew of Flight 293 to acknowledge the Sandspit radio operator's transmission advising that the 18,000-foot level was occupied by PNA 5 may indicate the time that the emergency occurred. Whatever the emergency was it must have either been of such a nature as to require the concentration of all the cockpit crew and/or caused a loss of airborne communications.

The location of the impact area, the last known ground speed and the last reported position combine to indicate that the aircraft was airborne from five to nine minutes after its last radio transmission. Because of the inherent inaccuracies of Automatic Direction Findings (ADF) bearings due to instrument interpretation, atmospheric interference with radio signals, and the radio beam width at Domestic Annette, it is possible that a position error of as much as 10 nautical miles could have occurred when the crew believed they were over Domestic Annette.

Since a number of the adult life vests were recovered still incased in their plastic containers, with the zippers closed, it is believed that either there was insufficient time to alert the passengers to prepare for a water landing, or they were unable to take appropriate action due to unusual aircraft attitudes.

The fragmentation of the aircraft indicates that it struck the water at a high speed and the damage to the seat backs shows forces applied to the top of the seat indicating that the airplane fuselage struck the water nearly inverted. The concentration of the observed wreckage and the failure to find any floating wreckage outside that general area shows that the aircraft was probably intact at impact.

There was no available evidence to substantiate a fire or explosion in flight; however, fire after impact burned portions of items floating on the water.

Probable Cause

Because of a lack of evidence the Board is unable to determine the probable cause of this accident.

BY THE CIVIL AERONAUTICS BOARD:

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ CHAN GURNEY
Member

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

SUPPLEMENTAL DATA

Investigation

The Civil Aeronautics Board was notified of this accident on June 3, 1963. An investigation was immediately initiated in accordance with the provisions of Title VII of the Federal Aviation Act of 1958, as amended. Deposition proceedings were conducted at Minneapolis, Minnesota, on September 16-17, 1963, and Seattle, Washington, on September 19, 1963.

Air Carrier

Northwest Airlines, Inc., is a Minnesota corporation with its principal business office at Minneapolis, Minnesota. The corporation holds a certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Federal Aviation Agency.

The Aircraft

N 290, a Douglas DC-7C, was manufactured August 19, 1957, and delivered to Northwest Airlines, Inc., new. It had a total flying time of 17,418 hours. The last major inspection was completed 379 hours before the accident and the last line maintenance inspection was completed 7:30 hours before the accident. The aircraft was powered by four Wright R-3350 988TC18-EA4 engines, and four Hamilton Standard 34E60 propellers. The maintenance records indicated that the aircraft and its powerplants had been maintained in accordance with FAA approved procedures.

Flight Personnel

Captain Albert F. Olsen, age 54, held airline transport certificate No. 31110 issued February 27, 1956, with an airplane multiengine land rating. He held type ratings for DC-3, DC-4, DC-6-7, Boeing 377, and Lockheed Constellation. Captain Olsen had 15,465 hours flying time with 3,665 hours in this type of equipment. His total instrument time as of January 31, 1963, was 1,545 hours. He had seven days rest before commencing this flight. He had flown a total of 239 hours in this type equipment in the preceding 90 days. Captain Olsen checked out in this equipment on March 11, 1957. His last proficiency check in a DC-7 was February 9, 1963, and his last route check from Seattle to Anchorage was September 8, 1962. His ground training and air/sea rescue training was current. His last medical examination was accomplished February 12, 1962, and he received a Class I medical certificate with a limitation that "Holder shall possess corrective glasses for near vision while exercising the privileges of his airman certificate."

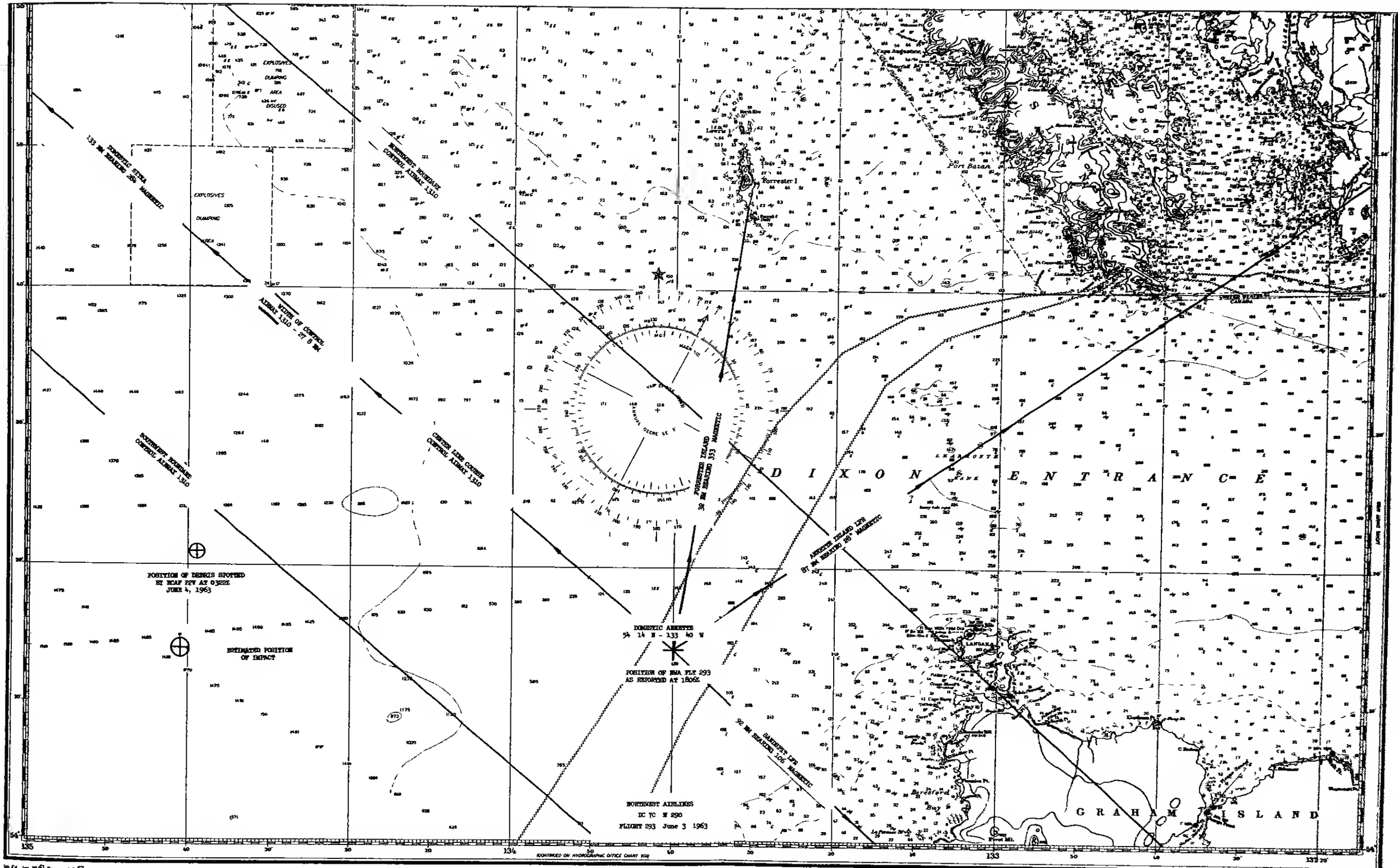
First Officer Donald R. Wenger, age 41, held airline transport pilot certificate No. 63364-41 issued November 13, 1961, with an airplane multiengine land rating and type ratings in DC-3, DC-4, DC-6-7, commercial privileges, airplane single engine land, and a flight engineer's certificate No. 1495593 issued May 5, 1961.

First Officer Wenger checked out in this type of equipment on March 13, 1957, as a copilot and December 1, 1962, as a captain. He had a total of 11,489 hours flying time with 635 hours in this type. He had his last proficiency check as a

captain, DC-7, December 23, 1962. His ground training and air/sea rescue training was current. He received a first-class medical certificate March 15, 1963, with no limitations.

Flight Engineer Kenneth A. Larson, age 47, held flight engineer certificate No. 1148275 issued November 9, 1953, and mechanic certificate No. 356044 with ratings for aircraft and aircraft engines issued January 13, 1949. He had a total flying time of 7,700 hours with 1,431 hours in this type of equipment. He checked out in this type of equipment March 20, 1957, and had his last proficiency check March 26, 1963. His ground training and air/sea rescue training were current. He received a Class II medical certificate October 8, 1962, with the following limitations: "Holder shall wear corrective glasses and shall have available a second pair of corrective glasses while exercising the privileges of his airman certificate."

The cabin attendants, Steward Donald K. Schaap, and Stewardesses Joan V. Morris and Patricia L. Moran, were properly trained for their duties.



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