



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

May 15, 2018

Radar Study

AIR TRAFFIC CONTROL

ANC17FA004

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A. ACCIDENT

Location: Port Alsworth, Alaska
Date: October 28, 2016
Time: 1828 AKD
0228 UTC
Airplane: N5308F, Fairchild Pilatus PC-6 Porter

B. AIR TRAFFIC CONTROL INVESTIGATOR

Andy Olvis
Group Chairman
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C. DETAILS OF THE INVESTIGATION

A request to review available ATC data pertaining to the subject accident was made by the investigator in charge and assigned to an air traffic control investigator. Federal Aviation Administration (FAA) radar data was obtained; however, there were no FAA radio communications available for review. A complete review of available radar data was conducted.

D. SUMMARY

On October 28, 2016, about 1828 Alaska daylight time, a turbine-powered tailwheel-equipped Fairchild Pilatus Porter PC-6, N5308F, sustained substantial damage after impacting mountainous terrain about 57 miles north-northeast of Port Alsworth, Alaska, in the Neacola Mountains of Lake Clark National Park and Preserve. The airplane was being operated as a visual flight rules (VFR) cross-country personal flight under the provisions of Title 14 *Code of Federal Regulations (CFR)* Part 91. The commercial rated pilot, the sole occupant, sustained fatal injuries. Visual meteorological conditions prevailed at the departure and destination, with areas of reduced visibility and lower cloud ceilings along the route of flight. No flight plan had been filed. The flight departed Lake Hood Seaplane Base, Anchorage, Alaska, at 1711, destined for a private airstrip near Port Alsworth.

E. RADAR DATA

In general, two types of radar are used to provide radar position and track information for aircraft cruising at high altitudes between airport terminal airspaces, and, for those operating at low altitude and speeds within terminal airspaces. Air Route Surveillance Radars (ARSRs) are long range (250 nautical mile) radars used to track aircraft cruising between terminal airspaces. ARSR antennas rotate at 5 to 6 RPM, resulting in a radar return every 10 to 12 seconds; there is no weather data associated with the radar return. Airport Surveillance Radars (ASRs) are short range (60 nautical mile) radars used to provide air traffic control services in terminal areas. ASR antennas rotate at 13 to 14 RPM, resulting in a radar return every 4.6 to 5 seconds.

A radar detects the position of an object by broadcasting an electronic signal that is reflected by the object and returned to the radar antenna. These reflected signals are called *primary*

returns. Knowing the speed of the radar signal, the time interval between when the signal was broadcast and when it was returned, the distance or range from the radar antenna to the reflecting object can be determined. Knowing the direction that the radar antenna was pointing when the signal was broadcast, the direction (bearing, or azimuth) from the radar to the object can be determined. Range and azimuth from the radar sensor to the reflected object define the object's position.

To improve the consistency and reliability of radar returns, aircraft are equipped with transponders that sense beacon interrogator signals broadcast from radar sites, and in turn broadcast a response signal. Even if the radar site is unable to sense a weak reflected primary return, it will sense the response signal broadcast by the transponder and be able to determine the aircraft position. The response signal can also contain additional information, such as the identifying "beacon code" for the aircraft, and the aircraft's pressure altitude (also called "Mode C" altitude). Transponder signals received by the radar site are called secondary returns.

EnRoute Radar Intelligent Tool (ERIT) radar data for this report was obtained from the FAA Anchorage Air Route Traffic Control Center (ZAN ARTCC) and utilized both ARSR and ASR radar sensors. The ERIT data contained all the available ZAN radar sensors. The initial departure and enroute segments of the accident flight were captured by the Anchorage (ANC) ASR-11 (ANX) airport surveillance radar, the middle segment was captured by the Kenai ARSR-3 long range radar, and the accident sequence was captured by the Sparrevohn ARSR FPS-117 long range radar sensor. The ZAN ERIT radar data used to compile this report was useable and of good quality.

F. FACTUAL INFORMATION

The accident aircraft was first detected at 0112:11 UTC by the ANX radar sensor about 0.72 nautical miles (NM) north of the departure end of runway 32 at Lake Hood Seaplane Base (see figure 1). The first radar target reported a Mode C pressure altitude of 400', and the aircraft transponder beacon code was 1200. The aircraft climbed straight ahead to an altitude of 1,000' for about 3.6 NM before starting a left turn. There were no reported communications with the Lake Hood control tower.

The accident aircraft flew westbound along the coastline climbing to an altitude of about 5,600'. It remained at about 5,600' for nearly 25.10 NM before descending down to 4,600'. The accident aircraft stayed at 4,600' for about 8.22 NM before again beginning a climb. The accident aircraft flew southwest along the coast line while climbing, it reached a maximum altitude of about 14,700'. The accident aircraft made a series of "s" turns while at or near 14,500' and began tracking to the west (see figure 2).

At about 0210:32 and at 13,200', the accident aircraft turned to the northwest and began a descent. The aircraft continued northwest for about 25.5 NM descending to 7,600' (see figure 3).

The last radar target was 0226:55 at 61.06245 north latitude and 153.41196 west longitude at a mode C reported altitude of 7,600'. The reported accident site was located at 61.094722 north latitude and 153.446944 west longitude (see figure 4). The radar data showed the last target was about 2.1 NM southeast of the accident site.

G. LIST OF ATTACHMENTS

Attachment 1 are graphics made from the radar data.

Submitted by:

Andy Olvis
Senior Air Traffic Investigator

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