



National Transportation Safety Board Aviation Accident Data Summary

Location:	Apache Junction, AZ	Accident Number:	WPR12MA046
Date & Time:	11/23/2011, 1831 MST	Registration:	N690SM
Aircraft:	ROCKWELL 690	Injuries:	6 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Ponderosa Aviation, Inc. (PAI) purchased the airplane and relocated it from Indiana to PAI's base at Safford Regional Airport (SAD), Safford, Arizona, about 1 week before the accident. PAI's president conducted the relocation flight under a Federal Aviation Administration (FAA) ferry permit due to an unaccomplished required 150-hour inspection on the airplane. The airplane's arrival at SAD terminated the ferry permit, and no inspections were accomplished to render the airplane airworthy after its relocation. Although other airworthy airplanes were available, PAI's director of maintenance (DOM) (the accident pilot) and the director of operations (DO), who were co-owners of PAI along with the president, decided to use the nonairworthy airplane to conduct a personal flight from SAD to Falcon Field (FFZ), Mesa, Arizona, about 110 miles away. All available evidence indicates that the DOM was aware of the airplane's airworthiness status and that this was the first time he flew in the accident airplane. The DO flew the leg from SAD to FFZ under visual flight rules (VFR) in night visual meteorological conditions (VMC). After arriving at FFZ and in preparation for the flight back to SAD, the DOM moved to the left front seat to act as the pilot flying.

The airplane departed FFZ about 12 minutes after it arrived. The return flight was also conducted under VFR in night VMC. There was no moon, and the direction of flight was toward sparsely lit terrain. After takeoff, the air traffic control (ATC) tower controller instructed the pilot to maintain runway heading until advised due to an inbound aircraft. About 2 minutes later, the controller cleared the airplane for its requested right turn and then began a position relief briefing for the incoming controller. No subsequent communications to or from the airplane occurred, nor were any required. Radar data indicated that the airplane turned onto a course directly towards SAD and climbed to and leveled at an altitude of 4,500 feet. About 4 minutes after the right turn, while continuing on the same heading and ground track, the airplane impacted a mountain in a wings-level attitude at an elevation of about 4,500 feet.

Although the airplane was technically not airworthy due to the unaccomplished inspection, the investigation did not reveal any preimpact airframe, avionics, engine, or propeller discrepancies that would have precluded normal operation. Airplane performance derived from radar tracking data did not suggest any mechanical abnormalities or problems.

FFZ, which has an elevation of 1,394 feet mean sea level (msl), is situated about 15 miles west-northwest of the impact mountain. The mountain is surrounded by sparsely lit terrain and rises to a maximum charted elevation of 5,057 feet msl. The investigation was unable to determine whether, or to what degree, the pilot conducted any preflight route and altitude planning. If such planning had been properly accomplished, it would have accounted for the mountain and provided for terrain clearance. The pilot had flown the round trip flight from SAD to FFZ several times and, most recently, had flown a trip from SAD to FFZ in night VMC 2 days before the accident. Thus, the pilot was familiar with the route and the surrounding terrain. According to the pilot's brother (PAI's president), the pilot typically used an iPad for navigation and flew using the ForeFlight software app with the "moving map" function. The software could display FAA VFR aeronautical charts (including FAA-published terrain depictions) and overlay airplane track and position data on the chart depiction.

Although iPad remnants were found in the wreckage, the investigation was unable to determine whether the pilot adhered to his normal practice of using an iPad for the flight or, if so, what its relevant display settings (such as scale or terrain depiction) were. Had the pilot been using the ForeFlight app as he normally did, he could have been able to determine that the airplane would not clear the mountain on the given flight track.

According to the pilot's brother, the pilot typically departed an airport, identified the track needed to fly directly to his destination, and turned the airplane on that track. Radar tracking data from the accident flight indicated that the airplane began its turn on course to SAD about 2 miles northeast of FFZ. Comparison of the direct line track data from FFZ to SAD with the track starting about 2 miles northeast of FFZ direct to SAD revealed that while the direct line track from FFZ to SAD passed about 3 miles south of the impact mountain, the direct track from the point 2 miles northeast of FFZ to SAD overlaid the impact mountain location. Thus, the pilot likely set on a direct course for SAD even though the delayed right turn from FFZ put the airplane on a track that intersected the mountain. The pilot did not adjust his flight track to compensate for the delayed right turn to ensure clearance from the mountain.

In addition, a sector of the Phoenix Sky Harbor (PHX) Class B airspace with a 5,000-foot floor was adjacent to the mountain range, which reduced the vertical options available to the pilot if he elected to remain clear of that airspace. The pilot's decision to remain below the overlying Class B airspace placed the airplane at an altitude below the maximum elevation of the mountain. The pilot did not request VFR flight following or minimum safe altitude warning (MSAW) services. Had he requested VFR flight following services, he likely would have received safety alerts from ATC as defined in FAA Order 7110.65. Had he requested the MSAW in particular, he likely would have received an advisory that his aircraft was in unsafe proximity to terrain. Further, the investigation was unable to determine why the pilot did not request clearance to climb into the Class B airspace or fly a more southerly route that would have provided adequate terrain clearance. On the previous night VMC flight from FFZ to SAD, the pilot stayed below the Class B airspace but turned toward SAD right after departure. In response to issues raised by this accident, the FAA conducted a Performance Data Analysis Report System (PDARS) study to determine the legitimacy of a claim that it was difficult for VFR aircraft to be granted clearance to enter Class B airspace. The PDARS study revealed that on the day of the accident, 341 VFR aircraft were provided services by Phoenix TRACON. The PDARS study, however, was unable to document how many aircraft were actually within the Class B airspace itself or how many had been refused services; the study only documented how many had been provided services. In response to a January 20, 2012, FAA internal memo formally restating the claim that it was difficult for VFR aircraft to obtain clearance into the PHX Class B airspace, the FAA conducted a comprehensive audit of the PHX Class B airspace that spanned four different time periods and was spread among several sectors during peak traffic periods to provide the most accurate picture. Of 619 requests for VFR aircraft to enter Class B airspace, 598 (96.61%) were granted. While data was not available to refute or substantiate any claims from previous years regarding difficulty obtaining clearance into the PHX Class B airspace, this data clearly indicated that difficulty obtaining clearance into the PHX Class B airspace did not exist during the four time periods in which the audit took place in the months after the accident.

The moonless night decreased the already low visual conspicuity of the mountain. The airplane was equipped with very high frequency omnirange and GPS navigation units, a radar altimeter, and an Avidyne EX-500 multifunction display. Had the pilot conducted the flight under instrument flight rules (IFR), the resultant handling by ATC would have helped ensure terrain clearance.

The airplane was not equipped with a terrain awareness and warning system (TAWS). Six years earlier, the accident airplane seating configuration was changed to reduce passenger seat provisions from six to five by removing a seat belt from the aft divan, which was originally configured with seat belts for three people. This modification rendered the airplane exempt from the TAWS requirement;

however, this modification was not approved by the FAA or documented via a supplemental type certificate or FAA Form 337 (Major Repair and Modification). Per the requirements of 14 Code of Federal Regulations 91.223, TAWS is not required for airplanes with fewer than six passenger seats. In this accident, onboard TAWS equipment could have provided a timely alert to help the pilot avoid the mountain.

Based on the steady flight track; the dark night conditions; the minimal ground-based lighting; and the absence of preimpact airplane, engine, or propeller anomalies that would have affected the flight, the airplane was likely under the control of the pilot and was inadvertently flown into the mountain. This controlled flight into terrain (CFIT) accident was likely due to the pilot's complacency (because of his familiarity with the flight route and because he selected a direct route, as he had previously done, even though he turned toward the destination later than he normally did) and lack of situational awareness. In January 2008, the National Transportation Safety Board issued a safety alert titled "Controlled Flight Into Terrain in Visual Conditions: Nighttime Visual Flight Operations Are Resulting in Avoidable Accidents." The safety alert stated that recent investigations identified several accidents that involved CFIT by pilots operating under VFR at night in remote areas, that the pilots appeared unaware that the aircraft were in danger, and that increased altitude awareness and better preflight planning likely would have prevented the accidents. The safety alert suggested that pilots could avoid becoming involved in a similar accident by accomplishing several actions, including proper preflight planning, obtaining flight route terrain familiarization via sectional charts or other topographic references, maintaining awareness of visual limitations for operations in remote areas, following IFR practices until well above surrounding terrain, advising ATC and taking action to reach a safe altitude, and employing a GPS-based terrain awareness unit.

Member Sumwalt filed a concurring statement that can be found in the public docket for this accident. Member Weener joined the statement.

Flight Events

Enroute - Controlled flight into terr/obj (CFIT)

Probable Cause

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain a safe ground track and altitude combination for the moonless night visual flight rules flight, which resulted in controlled flight into terrain. Contributing to the accident were the pilot's complacency and lack of situational awareness and his failure to use air traffic control visual flight rules flight following or minimum safe altitude warning services. Also contributing to the accident was the airplane's lack of onboard terrain awareness and warning system equipment. Member Sumwalt filed a concurring statement that can be found in the public docket for this accident. Member Weener joined the statement.

Findings

Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Altitude-Not attained/maintained - C

Aircraft-Aircraft systems-Navigation system-Ground proximity system-Not specified - F

Personnel issues-Task performance-Planning/preparation-Flight planning/navigation-Pilot - C

Personnel issues-Psychological-Personality/attitude-Complacency-Pilot - F

Personnel issues-Psychological-Perception/orientation/illusion-Situational awareness-Pilot - F

Personnel issues-Task performance-Use of equip/info-Use of available resources-Pilot - F

Environmental issues-Conditions/weather/phenomena-Light condition-Dark-Contributed to outcome

Environmental issues-Physical environment-Terrain-Mountainous/hilly terrain-Contributed to outcome

Pilot Information

Certificate:	Commercial	Age:	31
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Instrument Rating(s):	Airplane
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	(Estimated) 2500 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROCKWELL	Registration:	N690SM
Model/Series:	690 A	Engines:	2 Turbo Prop
Operator:	Ponderosa Aviation	Engine Manufacturer:	Airresearch/Honeywell
Operating Certificate(s) Held:	On-demand Air Taxi (135)	Engine Model/Series:	TPE-331
Flight Conducted Under:	Part 91: General Aviation - Personal		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	FFZ, 1349 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:	None	Wind Speed/Gusts, Direction:	5 knots / , 350°
Temperature:	23°C	Visibility	40 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Mesa, AZ (FFZ)	Destination:	Safford, AZ (SAD)

Airport Information

Airport:	Falcon Field (FFZ)	Runway Surface Type:	
Runway Used:	N/A	Runway Surface Condition:	
Runway Length/Width:			

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	5 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	
Latitude, Longitude:	33.439167, -111.450556		

Administrative Information

Investigator In Charge (IIC):	Michael C Huhn	Adopted Date:	12/03/2013
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=82380		

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