Aviation Investigation Final Report

Location:	Borinquen, Puerto Rico	**Accident Number:**	ANC06LA078
Date & Time:	June 23, 2006, 13:12 Local	**Registration:**	N75JF
Aircraft:	Piper PA-23-250	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airline transport certificated pilot purchased the twin engine airplane about two days before the flight. He indicated that the airplane had a fuel capacity of 192 gallons, and had an endurance of 7.5 to 8 hours. He departed on a Title 14, CFR Part 91 cross-country flight for an airport that was about 908 miles away. The airplane was equipped with auxiliary wingtip fuel tanks, and the pilot said the airplane consumed about 23 gallons of fuel per hour. Five hours and 12 minutes after takeoff, after consuming an estimated 122 gallons, the pilot said that the main fuel tanks were dry, and he was trying to draw fuel from the auxiliary tanks without success. He said the fuel gauges for the auxiliary tanks were indicating 1/4 full, but both engines were surging. He stated that there still should have been about 50 gallons of fuel in the airplane's wingtip tanks, and he tried every fuel tank and cross-feed combination, but the engines lost power, and he ditched the airplane about 829 miles from his departure point. The airplane sank in deep water, and was not recovered.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Fuel starvation/exhaustion for an undetermined reason during cruise flight, which resulted in a complete loss of engine power to both engines and a ditching in the ocean.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: CRUISE

Findings
1. ALL ENGINES
2. (C) FLUID,FUEL - STARVATION/EXHAUSTION
3. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: DITCHING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. TERRAIN CONDITION - WATER

Factual Information

On June 23, 2006, about 1312 eastern daylight time, a wheel-equipped, twin engine Piper PA-23-250 airplane, N75JF, was destroyed when it ditched and sank in the Atlantic Ocean, about 31 miles northwest of Borinquen, Puerto Rico. The airplane was being operated as a visual flight rules (VFR) cross-country personal flight under Title 14, CFR Part 91, when the accident occurred. The airplane was operated by the pilot. The airline transport certificated pilot, the sole occupant, received minor injuries. The flight originated at the Ft. Lauderdale Executive Airport, Ft. Lauderdale, Florida, about 0800, for St. Thomas, U.S. Virgin Islands, via Grand Turk Island, with a planned fuel stop at the Fernando Luis Ribas Dominicci Airport, San Juan, Puerto Rico, located about 64 miles west of St. Thomas. Visual meteorological conditions prevailed. A proposed VFR flight plan was filed for the flight, but was not opened.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), on June 29, the pilot reported that he purchased the airplane about two days before the flight. He indicated that the airplane has a fuel capacity of 192 gallons, with a usable capacity of 188 gallons, and has an endurance of 7.5 to 8 hours. The pilot said he flew the airplane to Ft. Lauderdale, where some radio maintenance was performed, and he ordered the fuel tanks filled. He departed for Puerto Rico, and climbed to a cruise altitude of 9,500 feet, with an indicated ground speed of 171 knots. Five hours and 12 minutes after takeoff, the pilot said that the main fuel tanks were dry, and he was trying to draw fuel from the auxiliary tanks without success. He said the fuel gauges for the auxiliary tanks were indicating 1/4 full, but both engines were surging. The engines lost power, and the pilot ditched the airplane, which sank within 90 seconds of water impact. The pilot was rescued by the U.S. Coast Guard about 1407. The pilot said that there still should have been about 50 gallons of fuel in the airplane's wingtip tanks when he ditched.

The distance from Ft. Lauderdale to the Fernando Luis Ribas Dominicci Airport, San Juan, via Grand Turk Island, is about 908 nautical miles. The distance from Ft. Lauderdale to the accident location, via Grand Turk Island, is about 829 nautical miles.

The airplane sank in deep water, and was not recovered. The maintenance records for the airplane reportedly were aboard when it sank.

In the Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1) submitted by the pilot, the pilot indicated that he departed with the fuel selectors on the inboard tanks. He switched to the outboard tanks about 45 minutes after takeoff. He leaned the engines to about 20 inches of manifold pressure and 2,200 rpm, to burn about 11.5 gallons per hour, per engine, for a total of about 23 gallons per hour. He said his ground speed was 171 knots, which included a 20 knot tailwind. After four hours of flight, the left engine began to surge. He cross-fed the left engine from the right fuel tank, and it ran for about 15 minutes. He then switched to the

inboard fuel tanks and ran both engines for about 45 minutes, at which time they began to surge. He switched back to the outboard fuel tanks, turned on the engine boost pumps, and the engines ran for another 15 minutes before beginning to surge. The pilot said he had been talking with San Juan Approach Control, and declared an emergency when he was about 50 miles from the northwest tip of San Juan Island. The engines continued to surge for another 20 miles while the pilot tried every fuel tank and cross-feed combination. About 31 miles from San Juan, both engines lost power, and the pilot reported that he was ditching in the ocean. The pilot reported that he had accrued about 18,650 hours of total aeronautical experience, and about 2,500 hours in the accident airplane make and model.

Based on the pilot's calculations, at 171 knots, in 5 hours and 15 minutes, the airplane should travel about 900 miles. Based on the pilot's calculations of an engine consumption rate of 23 gallons per hour, in 5 hours and 15 minutes, the airplane would consume about 122 gallons.

Airplane Information

The airplane's original fuel system consisted of two inboard fuel tanks with a capacity of 36 gallons each, and two outboard tanks with a capacity of 36 gallons each, for a total of 144 gallons. The airplane was equipped with auxiliary wingtip fuel tanks with a capacity of 24 gallons each, providing a total fuel capacity of 192 gallons.

According to airworthiness information on-file at the Federal Aviation Administration (FAA), auxiliary wingtip fuel tanks, manufactured by Met-Co-Aire, Fullerton, California, were installed in the airplane on November 5, 2003, under Supplemental Type Certificate (STC) number SA1480WE. On April 26, 2004, a leaking section of the right wing outboard fuel tank feed line was replaced by inserting a line of the same size and material as original. The replacement line was run parallel and adjacent to the original line.

The maintenance manual for the Met-Co-Aire wingtip fuel tanks notes that the tanks are constructed of fiberglass and replace the original wingtips. They have a capacity of 24 gallons each, for a total of 48 gallons, of which 2 gallons is unusable. An outlet fuel line from the bottom of the tip tank is connected to a "T" fitting that is installed in the outlet fuel feed line from the outboard fuel tanks in each wing. A check valve is installed between the "T" fitting and the outlet fuel line from the bottom of the outboard main fuel tank, thus allowing fuel from the wingtip tanks to feed via gravity into the fuel system without flowing into the outboard tanks and over pressurizing them. Atmospheric venting for the wingtip tanks is by a vent hose installed between the outboard fuel tank filler well, and the top of the wingtip tanks. The fuel caps for the wingtip tanks are "non-vented." A finger screen is installed at the wingtip tank outlet fitting.

Section 1 - 1 of the flight manual supplement for the wingtip tanks notes that the combination of the wingtip tanks feeding fuel into the outlet fuel line from the outboard fuel tank, essentially increases the outboard fuel tank capacity to 60 gallons total for each side (24 gallons in the wingtip and 36 gallons in the outboard tank). When the outboard fuel tanks are selected on the

airplane's fuel selector, the outboard main tank and the wingtip tank are essentially selected together. The fuel quantity gauge in the cockpit for the outboard tank reads the combined capacity of the two tanks together, although the fuel quantity sensor is located only in the outboard main tank.

According to the flight manual supplement, the majority of the wingtip fuel will feed first (about 16 gallons). The pressure between the wingtip and outboard tank will then equalize, and the two tanks will feed simultaneously. Once the tanks begin to flow at the same time, the fuel gauge for the outboard tank will read FULL (30 gallons or more); 3/4 (23 gallons); 1/2 (17 gallons); and 1/4 (10 gallons).

Section 2 - 1 of the flight manual supplement notes that the wingtip tank should be fueled last. This is required as the wingtip tank will not feed the engine with the outboard tank empty, and the fuel gauge will not register the correct fuel readings unless the outboard tank is filled first. It is possible that as much as 8 gallons of fuel may migrate from a full outboard tank to an empty wingtip tank.

Section 4 - 1 of the flight manual supplement states, in part: "1) Be aware that the fuel caps on the tip tanks are "non-vented." Vent for the tip tanks is picked up at the outboard tank filler neck well. Do not use any fuel cap other than the non-vented cap approved by Met-Co-Aire.... As part of your preflight, verify that the gasket on the fuel cap is in a workable condition. If not, repair or replace before further flight. A poor seal at the cap can prevent fuel feed."

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	59,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	February 1, 2006
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 1, 2006
Flight Time:	18650 hours (Total, all aircraft), 2500 hours (Total, this make and model), 10000 hours (Pilot In Command, all aircraft), 200 hours (Last 90 days, all aircraft), 75 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N75JF
Model/Series:	PA-23-250	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	27-7554168
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	May 1, 2006 Annual	**Certified Max Gross Wt.:**	5200 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TIO-540
Registered Owner:	James W. Herron	**Rated Power:**	250 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TJBQ,237 ft msl	**Distance from Accident Site:**	33 Nautical Miles
Observation Time:	12:53 Local	**Direction from Accident Site:**	325°
Lowest Cloud Condition:	Few / 2000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	20°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	29°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ft. Lauderdale, FL (KFXE)	**Type of Flight Plan Filed:**	None
Destination:	(TIST)	**Type of Clearance:**	VFR
Departure Time:	08:00 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	18.221048,-66.590095(est)

Administrative Information

Investigator In Charge (IIC):	Erickson, Scott
Additional Participating Persons:	Julio Arizmendi; FAA San Juan,PR FSDO; San Juan, PR
Original Publish Date:	February 26, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=64013