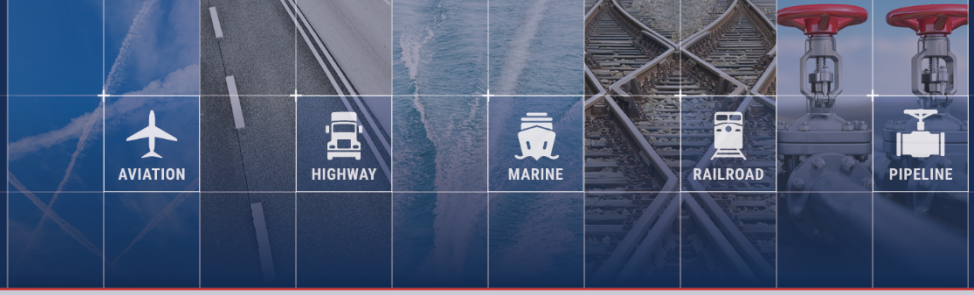

Aviation Investigation Final Report

Location:	Pahokee, Florida	**Accident Number:**	ERA13FA071
Date & Time:	December 1, 2012, 13:19 Local	**Registration:**	N118GG
Aircraft:	GREEN GARY E THORP T-18	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Family members reported the airplane overdue for arrival, so an alert notice was issued. The local authorities located the airplane the following day. Air traffic control records indicate that, during the accident flight, the pilot was operating under visual flight rules while receiving radar traffic advisory service from an air traffic controller. The air traffic controller noticed a potential conflict with a Boeing 757 and acted to maintain traffic separation by instructing the 757 pilot to maintain 8,000 feet, asking the accident pilot to maintain at or below 7,500 feet, and providing a wake turbulence cautionary advisory. The accident airplane was at 7,800 feet at the time, and the pilot advised that he was descending to comply with the controller's instructions. When the two aircraft were separated horizontally by about 1 to 2 miles, the accident pilot reported the 757 in sight. Radar data indicated that the accident airplane passed directly beneath the Boeing 757, within 500 feet of vertical separation, traveling in roughly the opposite direction. Although the geometry and the timing of the airplane's passing each other suggest the possibility of a wake turbulence encounter, the accident pilot made no comment about encountering turbulence. Although radar data showed the accident airplane turning left as if to get out from under the 757's flight track, it then turned back to the right and continued climbing on a northwesterly heading for about 2 1/2 minutes until reaching 8,300 feet. The airplane then turned right and descended to 7,200 feet before it was lost from radar. During the descent, the wings separated from the airplane due to overstress in a positive direction. The reason for the descent and in-flight overstress of the airplane could not be determined. The two aircraft were operating in class E airspace, and Federal Aviation Administration directives do not require 1,000-feet separation for aircraft in this airspace.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The descent and overstress of the airplane during the descent, which resulted in the in-flight breakup of the airplane.

Findings

Personnel issues	(general) - Pilot
Aircraft	(general) - Attain/maintain not possible
Aircraft	Spar (on wing) - Capability exceeded

Factual Information

History of Flight

Enroute-descent	Unknown or undetermined (Defining event)
Enroute-descent	Part(s) separation from AC
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On December 1, 2012, about 1319 eastern standard time, an experimental amateur built Thorp T-18, N118GG, registered to and operated by the pilot, was destroyed when it broke up in flight over Pahokee, Florida. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. The airline transport pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed. The flight departed Pompano Beach Airpark (PMP), Pompano Beach, Florida, at 1259.

According to family members, the pilot was enroute to Lakeland Linder Regional Airport (LAL), Lakeland, Florida. The pilot was overdue on his arrival, and an alert notice was issued. During the search, an emergency distress signal was received from the airplane's emergency locator transmitter, and the local authorities located the airplane the following day at 0610.

According to information obtained from the West Palm Beach Air Traffic Control Tower (ATCT), at 1313, the pilot contacted Palm Beach Approach on frequency 124.6 at 6,500 feet msl and on a course heading of approximately 335 degrees. Palm Beach Approach issued the pilot the current altimeter setting for Palm Beach. The pilot was then issued a traffic advisory at 6,500 feet msl, and the pilot advised that he was climbing to 8,500 feet msl.
At 1315, Palm Beach Approach instructed the pilot to maintain 7,500 feet msl and advised of traffic at his 12 o'clock, 5 miles southeast-bound. The airplane was identified as a Boeing 757, and a wake turbulence caution alert was issued to the pilot. Radar data showed the Boeing 757 was at an altitude of 8,000 feet msl and a course heading of 144 degrees. The pilot advised that he was descending back down.
At 1316, the pilot reported the traffic in sight; radar data showed that, at the time, the horizontal separation between the two airplanes was 1 to 2 miles. Radar data also showed that the two aircraft passed within 300 to 500 feet of vertical separation.

At 1317, the pilot asked to climb to 8,500 feet msl and was cleared by Palm Beach Approach to proceed as requested. Review of radar data showed that the pilot's airplane turned to the right and continued along his flight path adjacent to the flight path of the Boeing 757. Radar data revealed that, approximately 3 minutes after the separation event, the pilot's airplane climbed to an altitude 8,300 feet msl before descending to 7,200 feet msl and being lost from radar. The Boeing 757 had passed the point the accident airplane was lost from radar about 5 minutes before and at an altitude of 9,900 feet.

PERSONNEL INFORMATION

The pilot, age 80, held an airline transport pilot certificate for airplane single-engine land, multi-engine land, and rotorcraft-helicopter issued May 27, 2008, and a third-class airman medical certificate issued August 31, 2011, with limitations for corrective lenses. The pilot's logbook was not recovered for review. According to the Federal Aviation Administration (FAA) records, the pilot reported 30,000 total flights hours and with 28 flight hours in the 6 months that preceded the issuance of his airman medical certificate.

AIRCRAFT INFORMATION

The two-seat, low-wing, tailwheel airplane, serial number 949, was manufactured in 1980. It was powered by a Lycoming model O-360 that was built by the pilot/owner. The engine was equipped with an Aymar-Demuth two-bladed wooded propeller. Review of copies of maintenance logbook records showed an annual inspection was completed March 15, 2012, at a recorded airframe total time of 2,561.7 hours and an engine time of 1,715.6 hours.

METEOROLOGICAL INFORMATION

The recorded weather at the Okeechobee County Airport, Okeechobee, Florida (OBE) which is located about 28 miles south of the accident site at an elevation of 33 feet, revealed at 1315, conditions were wind 040 degrees at 9 knots, gusting 16 knots, visibility of 10 miles, cloud conditions scattered at 4,900 feet above ground level, temperature 23 degrees Celsius (C); dew point 14 degrees C; altimeter 30.20 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted a sugarcane field about 2 miles southeast of Palm Beach County Glades Airport (PHK), Pahokee Florida. The fuselage of the airplane came to rest inverted, in a flat attitude, on a course of 315 degrees. The propeller remained attached to the engine, and the engine remained attached to the firewall and main landing gear, and was located approximately 200 yards east of the main wreckage. Fragmented parts from both outboard wings were also located near the engine. The instrument panel was not located at the wreckage site.
Examination of the fuselage revealed that the flight control stick was connected to the aileron and elevator control tubes. The rudder and tailwheel control cables were connected at the rudder and tailwheel attachment point. The rudder pedals were not located, and the cables showed signs of overstress failure. The fuselage and empennage were buckled. Examination of the wings revealed that the left and right wings were separated at the spar attachment joint. The vertical stabilizer was partially separated from the empennage.

Examination of the engine revealed it sustained impact damage and remained attached to the firewall and landing gear assembly. The impact damage was concentrated on the upper and lower side of the engine. The starter motor remained attached, and the alternator remained attached but was impact-damaged. All push rods were impact-damaged and bent. The engine was equipped with an Electroair direct ignition system and an E-Mag electronic magneto. The magneto mounting area was capped off. Both systems were impact-damaged. The vacuum pump was broken away from its mount and not recovered. All of the ignition leads exhibited varying degrees of impact-related damage. The spark plugs were removed and examined. The plugs were automotive NGK plugs and were fitted with cylinder

sleeves. The upper and lower spark plugs exhibited gray color on the electrodes and combustion deposits. The cylinder combustion chambers were examined and were free of debris and exhibited normal amounts of combustion deposits. All fuel injection lines were impact-damaged and broken. The fuel sump was broken, and the fuel sump screen was free of debris. The crankshaft was rotated, and compression and crankshaft continuity were established on of the four cylinders during the rotation of the crankshaft. Valve train continuity was established on cylinders Nos. 2 and 4. The push tubes for cylinder Nos.1 and 4 were bent, and valve movement could not be established. The lifters for cylinders Nos.1 and 4 were observed moving when the crankshaft was rotated. The oil sump screen was clear and free from debris. Examination of the engine and its components did not reveal any preimpact mechanical malfunctions or failures that would have precluded normal operation.

Examination of the propeller revealed that the propeller blades were constructed of wood. One blade remained attached to the propeller hub, and the other was broken away at the propeller hub root. The remaining blade exhibited small fractures and broken pieces of wood throughout the blade span.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot on December 2, 2012, by the Office of the District Medical Examiner District 15, West Palm Beach, Florida.

The FAA's Civil Aerospace Medical Institute performed forensic toxicology on specimens from the pilot with negative results for alcohol. Losartan and Metoprolol were detected in the muscle and blood cavity.

TEST AND RESEARCH

The inboard sections of the left and right wing main spars were sent into the NTSB Materials Laboratory for examination. The parts received were attached to the respective adjacent outboard sections of the wing carry-though structure. The upper and lower spar caps of the carry-through structure were fractured just inboard of the doublers attached to the forward face of the structure. Close examination of the spar fractures uncovered features indicative of overstress fractures with no indications of preexisting cracking or corrosion. On both sides of the carry-through, the lower spar caps displayed tensile fractures with gradual bends. The upper spar caps showed compression buckling with overstress fractures in the highly deformed center of the buckles. The deformation associated with the fractures and surround areas was consistent with tip up bending of both wings.

Pilot Information

Certificate:	Airline transport; Flight engineer	**Age:**	80
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	August 31, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 30000 hours (Total, all aircraft), 100 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	GREEN GARY E	**Registration:**	N118GG
Model/Series:	THORP T-18	**Aircraft Category:**	Airplane
Year of Manufacture:	1980	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	949
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	February 24, 2011 Annual	**Certified Max Gross Wt.:**	902 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2498 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	C91 installed, activated, aided in locating accident	**Engine Model/Series:**	O&VO-360 SER
Registered Owner:	David E Flatter	**Rated Power:**	180 Horsepower
Operator:	David E Flatter	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PHK,16 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	13:15 Local	**Direction from Accident Site:**	235°
Lowest Cloud Condition:	Scattered / 4900 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 8000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / 16 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	40°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.2 inches Hg	**Temperature/Dew Point:**	23°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pompano Beach, FL (PMP)	**Type of Flight Plan Filed:**	None
Destination:	Lakeland, FL (LAL)	**Type of Clearance:**	None
Departure Time:	12:59 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	26.771944,-80.668891

Administrative Information

Investigator In Charge (IIC):	Alleyne, Eric
Additional Participating Persons:	Edmundo Rolon; FAA/FSDO; Miramar, FL
Original Publish Date:	May 8, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=85719