Aviation Investigation Final Report

Location:	Oshkosh, Wisconsin	**Accident Number:**	CEN10FA443
Date & Time:	July 27, 2010, 18:16 Local	**Registration:**	N6JR
Aircraft:	Hawker Beechcraft 390	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation		

Analysis

The accident occurred during the Experimental Aircraft Association's Airventure 2010 fly-in convention. Because of the high density of aircraft operations during the fly-in, the Federal Aviation Administration implemented special air traffic control procedures to accommodate traffic demand and maximize runway capacity. Arriving aircraft were issued landing instructions and clearances by a tower controller using a specified tower radio frequency. Departing aircraft were handled by another team of controllers operating on a separate radio frequency that was associated with a mobile operations unit located near the runway.

Air traffic control data indicated that the accident airplane established contact with the tower controller and entered a left traffic pattern for runway 18R. As the accident airplane was turning from downwind to base leg, the controller handling departures cleared a Piper Cub for an immediate takeoff and angled departure (a procedure used by slower aircraft to clear the runway immediately after liftoff by turning across the runway edge). The accident pilot was not monitoring the departure frequency, and, therefore, he did not hear the radio transmissions indicating that the departing Piper Cub was going to offset to the left of the runway after liftoff. The accident pilot reported that, while on base leg, he became concerned that his descent path to the runway would conflict with the Piper Cub that was on takeoff roll. He stated that he overshot the runway centerline during his turn from base to final, and, when he completed the turn, his airplane was offset to the right of the runway. The pilot stated that, at this point, he decided not to land because of a perceived conflict with the departing Piper Cub that was ahead and to the left of his position. The pilot reported that he initiated a go-around, increasing engine power slightly, but not to takeoff power, as he looked for additional traffic to avoid. He estimated that he advanced the throttle levers "probably a third of the way to the stop," and, as he looked for traffic, the stall warning stick-shaker and stick-pusher systems activated almost simultaneously as the right wing stalled. The airplane subsequently collided with terrain in a nose down, right wing low attitude.

A postaccident review of available air traffic control communications, amateur video of the accident sequence, controller and witness statements, and position data recovered from the accident airplane indicated that the Piper Cub was already airborne, had turned left, and was clear of runway 18R when

the accident airplane turned from base to final.

The postaccident examination did not reveal any preimpact mechanical malfunctions or failures that would have precluded normal operation of the airplane. The airplane flight manual states that, in the event of a go-around, the pilot should first advance engine thrust to takeoff power and then establish Vref (reference landing approach speed). The pilot's decision not to select takeoff power during the go-around directly contributed to the development of the aerodynamic stall at a low altitude.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision not to advance the engines to takeoff power during the go-around, as stipulated by the airplane flight manual, which resulted in an aerodynamic stall at a low altitude.

Findings

Aircraft	Powerplant parameters - Incorrect use/operation
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Use of policy/procedure - Flight crew
Environmental issues	Traffic congestion - Effect on operation

Factual Information

History of Flight

Approach-VFR go-around	Loss of control in flight (Defining event)
Approach-VFR go-around	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On July 27, 2010, about 1816 central daylight time, a Hawker Beechcraft model 390 (Premier IA) business jet, N6JR, collided with terrain while maneuvering to land on runway 18R at Wittman Regional Airport (OSH), Oshkosh, Wisconsin. The airline transport pilot and passenger sustained serious injuries. The airplane sustained substantial damage. The airplane was registered to and operated by Roush Fenway Racing, LLC, as a business flight under 14 Code of Federal Regulations Part 91. Day visual meteorological conditions prevailed at the time of the accident. The cross-country flight departed Willow Run Airport (YIP), Ypsilanti, Michigan, at 1729, with OSH as the intended destination.

The pilot was flying to OSH to attend the Experimental Aircraft Association's Airventure 2010 fly-in convention. During the fly-in convention, a parallel taxiway east of runway 18 was used for takeoff and landings and was identified as runway 18L. The main runway, normally identified as runway 18, was denoted runway 18R and had a displaced threshold of 1,300 feet, leaving 6,700 feet of runway surface available for takeoffs and landings. During the fly-in convention, arriving aircraft were issued landing instructions and clearances by an air traffic control tower controller (tower controller) using a specified tower radio frequency. Departing aircraft were handled by another team of controllers operating on a separate radio frequency that was associated with a mobile operations/communications workstation (MOOCOW) located near the runway.

Air traffic control (ATC) data indicated that the accident airplane entered the Oshkosh area under visual flight rules. The pilot reported being on the Turbine/Warbird Arrival, a published arrival procedure used by jets and other high-performance aircraft during the fly-in convention. At 1811:18, the tower controller asked the pilot which runway he would like to use for landing. The pilot replied, "Uh, 18 or 27 would be okay." The tower controller told the pilot to expect a left base to runway 18R and to report over Warbird Island (a geographic reference point used for the approach procedure).

At 1813:31, the pilot reported being over Warbird Island. The tower controller cleared the pilot to land on runway 18R and to make his base turn abeam the control tower. The pilot read back the landing clearance correctly. At 1815:23, the tower controller told the pilot to turn northbound, onto a left downwind for the runway.

At 1815:54, the controller handling departing aircraft told the pilot of a yellow Piper Cub to taxi in position and hold on runway 18R. The pilot of the yellow Piper Cub acknowledged and requested an "... angled departure to stay clear of faster traffic." An angled-departure is a procedure used by slower aircraft to clear the runway immediately after liftoff by turning across the runway edge. At 1816:10, the controller handling departures transmitted, "Cub uh 18R cleared for takeoff as requested ... cleared for immediate takeoff." (A postaccident review of the cockpit voice recorder [CVR] indicated that the

accident pilot was not monitoring the departure frequency, and therefore did not hear the radio transmissions made to the departing yellow Piper Cub.) Position data obtained from the accident airplane's enhanced ground proximity warning system (EGPWS) was synchronized with ATC communications. The synchronized data indicated that the accident airplane was turning to base leg when the yellow Piper Cub was cleared for immediate takeoff.

At 1816:19, the accident pilot transmitted to the tower controller, "Is ... is 6JR gonna be okay with this?" The tower controller responded, "Affirmative," to which the accident pilot replied, "I don't think so." The EGPWS position data indicated the accident airplane was still turning onto a base leg.

At 1816:21, the controller handling departures transmitted, "Cub as soon as you're airborne offset off the runway," and at 1816:33, told the pilot of the yellow Piper Cub to, "... turn left off the runway, traffic short final behind you." At 1816:36, the controller handling departures continued, "Thank you sir, doing a good job." A review of an amateur video synchronized with ATC voice recordings and the EGPWS data indicated that the accident airplane was turning from base to final when the controller transmitted the "good job" comment to the pilot of the yellow Piper Cub. The final segments of the accident flight were below available radar coverage; as a result, radar track data could not be used to establish separation between the accident airplane and the departing yellow Piper Cub.

At 1816:35, the CVR recorded the EGPWS announcing "bank angle" five times until 1816:40. During the same time period, the CVR recorded a rapid increase in engine sound. At 1816:40, the accident pilot transmitted "Going around" as the engine sound peaked. Review of the synchronized amateur video showed that the accident airplane had pitched up at that time. Beginning at 1816:41, the CVR recorded a decrease in engine sound over a period of 6 seconds. During the same time period, the EGPWS announced "bank angle" two additional times.

At 1816:46, the tower controller acknowledged the go-around stating, "Alright premier jet uh use caution for the uh traffic ahead on the upwind and uh..." During this controller transmission, the CVR recorded an incremental increase of engine sound over 6 seconds until 1816:54. At 1816:54 the EGPWS announced "bank angle" two more times. The engine sound remained steady until the CVR recorded a sound similar to impact at 1816:57. A continuous high-pitched tone was recorded by the CVR immediately before impact. The airplane was equipped with a stall warning horn.

A review of available EGPWS position data depicted the accident airplane turning from downwind in a continuous left turn to final for runway 18R. During the final portion of the turn, the recorded bank angles were between 32 and 43 degrees left-wing-down (LWD). The airplane overshot the runway during that turn. The EGPWS data also showed that the airplane descended from 185 feet to 37 feet above the ground (radar altitude) during the turn to final. After the overshoot, the airplane momentarily leveled its wings before entering a climb for about 6 seconds. The airplane climbed from 37 feet to 117 feet above the ground, as it entered a left bank (reaching 30 degrees LWD). The airplane then entered a descending right turn, at an increasingly higher angle-of-attack and rate-of-descent. The maximum bank angle was 44 degrees right-wing-down during the 5 seconds before impact. The angle-of-attack was between 11 and 16 degrees and the maximum descent rate was 1,972 feet per minute during the same time period.

The accident airplane's flight path depicted on the amateur video was consistent with the available

EGPWS data. During the final descent the airplane's pitch appeared to increase until the airplane entered a right bank and struck the grass area west of the runway in a nose down, right wing low attitude. The video showed a yellow Piper Cub appearing after the accident airplane had overshot the final approach. At that time, the wing profile of the yellow Piper Cub was consistent with a southeasterly heading, away from runway 18R.

The pilot was interviewed on August 30, 2010, by an Operational Factors investigator with the National Transportation Safety Board (NTSB). The pilot reported that he had departed YIP on an instrument flight rules (IFR) flight plan to Milwaukee, Wisconsin; however, he canceled the flight plan while en route and continued to OSH under visual flight rules. He stated that he flew the Turbine/Warbird Arrival and that the tower controller told him to expect runway 18R. He noted that he was not given an option of available runways. While on base and during his turn to final, he identified two airplanes operating from runway 18R. One of the airplanes was already airborne and approaching the departure end of the runway. The other airplane, a yellow Piper Cub, was on takeoff roll. The accident pilot reported that while on base leg, he became concerned that his descent path to the runway would conflict the Piper Cub that was on takeoff roll. He stated that he overshot the runway during his turn from base to final, and when he completed the turn the accident airplane was right of the runway. The pilot stated that at this point he decided not to land because of a perceived conflict with the departing Piper Cub (which was flying ahead and to the left of the accident airplane). He recalled seeing the yellow Piper Cub over the runway 18R centerline. The pilot reported that he initiated a go-around, increasing engine power slightly, but not to takeoff power, as he looked for additional traffic to avoid. He estimated that he advanced the throttle levers "probably a third of the way to the stop" and, as he looked for traffic, the stall warning stick-shaker and stick-pusher systems activated almost simultaneously as the right wing stalled. He did not recall hearing a stall warning horn sound. He stated that there were no preimpact mechanical malfunctions or failures that would have precluded normal operation of the airplane.

The air traffic controllers working the final portion of the accident flight were interviewed on July 28, 2010, by a NTSB Air Traffic Control Investigator. The MOOCOW aircraft spotter/coordinator stated that he was made aware of an inbound Premier IA jet via notification by the control tower supervisor over an FM radio link used for coordination between the control tower and the MOOCOW. The control tower supervisor made two status calls; one as the Premier IA jet was on downwind, and another when it turned onto left base. The aircraft spotter/coordinator stated that in response to the first status call he directed the aircraft communicator (for departing aircraft) to clear the yellow Piper Cub for an immediate takeoff and to sidestep off the runway after liftoff. At that time, the Premier IA jet was in a turn from downwind to base. The aircraft spotter/coordinator reported that the yellow Piper Cub was airborne and clear of the runway before the Premier IA jet turned inbound onto final. The other MOOCOW controllers gave similar statements about the flight path of the Premier IA jet and remarked that it appeared to be going around before it impacted terrain. The tower controller responsible for communicating with arriving aircraft reported that when the accident pilot announced "Going around" the yellow Piper Cub was already airborne and offset from the runway.

Several witnesses recalled seeing the yellow Piper Cub offset from runway 18R when the accident occurred. One witness reported that the Piper Cub performed a short-field takeoff and offset after liftoff. The same witness reported that the Piper Cub was between runways 18R and 18L as the Premier jet was turning base to final.

Pilot Information

Certificate:	Airline transport	**Age:**	68,Male
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:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 17, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	December 9, 2009
Flight Time:	9095 hours (Total, all aircraft), 1406 hours (Total, this make and model), 8464 hours (Pilot In Command, all aircraft), 62 hours (Last 90 days, all aircraft), 17 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

According to Federal Aviation Administration (FAA) records, the accident pilot, age 68, held an airline transport pilot certificate, issued on May 4, 2007, with airplane single and multi-engine land ratings. The pilot was type-rated in the Cessna 525 (Citation) and the Hawker Beechcraft model 390 (Premier). He also had FAA authorization to fly North American P-51 (Mustang) with an experimental classification. His last aviation medical examination was completed on January 17, 2010, when he was issued a second-class medical certificate with a restriction for corrective lenses.

The pilot reported having accumulated 9,095 hours total flight time, of which 8,464 hours were as pilot-in-command. He had accumulated 2,165 hours in single-engine airplanes, 6,930 hours in multi-engine airplanes, 1,641 hours at night, and 857 hours in actual instrument conditions. He had flown approximately 1,425 hours in the accident airplane make/model. The pilot had flown 62 hours during last 90 days, 17 hours during in the 30 days, and 1.5 hours during the previous 24 hours.

The pilot's most recent flight review was completed in the accident airplane on December 9, 2009.

Aircraft and Owner/Operator Information

Aircraft Make:	Hawker Beechcraft	**Registration:**	N6JR
Model/Series:	390	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	RB-161
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	February 16, 2010 AAIP	**Certified Max Gross Wt.:**	12500 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:	1265 Hrs at time of accident	**Engine Manufacturer:**	Williams International
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	FJ44-2A
Registered Owner:	Roush Fenway Racing, LLC.	**Rated Power:**	2300 Lbs thrust
Operator:	Roush Fenway Racing, LLC.	**Operating Certificate(s) Held:**	None

The accident airplane was a 2006 Hawker Beechcraft model 390 (Premier IA) business jet, serial number (s/n) RB-161. Two Williams International model FJ44-2A turbofan engines powered the airplane. The airplane had a certified maximum takeoff weight of 12,500 pounds. The airplane was equipped for operation under instrument flight rules and in known icing-conditions.

The accident airplane was issued a standard airworthiness certificate on September 20, 2006. Roush Fenway Racing, LLC, purchased the airplane on June 22, 2007. The current FAA registration certificate was issued on July 18, 2007. As of July 25, 2010, the airframe and both engines had accumulated a total service time of 1,264.8 hours and 930 takeoff-and-landing cycles. The airplane was maintained under the provisions of a manufacturer inspection program. The last inspection of the airplane was completed on February 16, 2010, at 1,163.1 hours (847 cycles). The static system, altimeter system, automatic pressure altitude reporting system, and transponder were also tested during that inspection. The last recorded maintenance was performed on July 17, 2010, when both main tires were replaced. A postaccident review of the maintenance records found no history of unresolved airworthiness issues.

The airplane flight manual provides procedures for a balked landing (go-around) under the Normal Procedures section. The listed procedure requires pilots to first advance engine thrust to takeoff power and establish Vref (reference landing approach speed). After a positive climb is established the pilot should select flaps 10-degrees, landing gear UP, and yaw damp ON. The final checklist items were to select flaps UP, ensure the lift dump handle was LOCKED, and turn the landing light OFF.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OSH,808 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	18:15 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	9 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots / 16 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.88 inches Hg	**Temperature/Dew Point:**	29°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ypsilanti, MI (YIP)	**Type of Flight Plan Filed:**	VFR/IFR
Destination:	Oshkosh, WI (OSH)	**Type of Clearance:**	VFR
Departure Time:	17:29 Local	**Type of Airspace:**	Class D

At 1815, the Wittman Regional Airport (OSH) automated weather observation system reported the following weather conditions: wind from 200 degrees true at 11 knots, gusting to 16 knots; visibility 9 miles; sky clear below 12,000 feet; temperature 29 degrees Celsius; dew point 23 degrees Celsius; altimeter 29.89 inches-of-mercury.

The weather observation station also recorded the following 1-minute wind data:
At 1815, wind from 196 degrees at 11 knots; peak wind from 205 degrees at 14 knots
At 1816, wind from 198 degrees at 10 knots; peak wind from 211 degrees at 13 knots
At 1817, wind from 197 degrees at 9 knots; peak wind from 201 degrees at 11 knots
At 1818, wind from 196 degrees at 9 knots; peak wind from 214 degrees at 14 knots

Airport Information

Airport:	Wittman Regional Airport OSH	**Runway Surface Type:**	Concrete
Airport Elevation:	808 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	18R	**IFR Approach:**	None
Runway Length/Width:	6700 ft / 150 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	43.975276,-88.558052

The initial point-of-impact (POI) was about 4,300 feet north of the departure end of runway 18R, in a grass drainage ditch between taxiway P and a temporary taxiway used during the fly-in convention. Recovered debris found at the POI was associated with the right wingtip. The wreckage debris path was about 250 feet long, orientated on a 215-degree magnetic heading. The main wreckage consisted of the fuselage, both wings, and empennage. The fuselage was fractured immediately forward of the engines. The wing remained partially attached to the fuselage. All flight control surfaces remained attached to their respective hinges. The wing flaps were found fully extended. The landing gear was extended. The wreckage debris path and accident site were surveyed before the airplane was eventually recovered to a secured area for further examination. No preimpact malfunctions or anomalies were noted during the on-scene examinations of the airframe structure, flight control systems, or two turbofan engines.

Injuries to Persons

The pilot and passenger were assisted out of the aircraft and transported to the hospital for treatment of their serious, but non-life-threatening injuries. There were no ground injuries.

Flight recorders

The cockpit voice recorder (CVR), manufactured by L-3 Communications, s/n 352608, was removed from the accident aircraft and sent to the NTSB's laboratory in Washington, D.C., for readout and evaluation. The CVR had not sustained any heat or appreciable impact damage. The CVR contained 30-minutes of digital audio that was stored in solid-state memory modules. The extracted recording consisted of four channels of audio information. Two of the channels were assigned to the captain and first officer audio panels. One channel was assigned the cockpit area microphone. The remaining fourth channel did not contain audio, nor was it required by law to do so.

The accident airplane was not equipped with a flight data recorder; however, the airplane was equipped with an enhanced ground proximity warning system (EGPWS) that recorded numerous flight parameters after a warning message was issued. The accident flight triggered several recorded warnings while the accident airplane maneuvered toward the runway; as a result, the EGPWS recorded 52 seconds of flight parameter data before impact. The EGPWS also continued to record various parameters for an additional 10 seconds after impact.

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Jan Gerstner; FAA - Milwaukee FSDO; Milwaukee, WI Christine Soucy; FAA - Accident Investigation and Prevention; Washington, DC Mike Gibbons; Hawker Beechcraft - Air Safety Investigation; Wichita, KS Robert Ramey; Hawker Beechcraft - Air Safety Investigation; Wichita, KS
Original Publish Date:	June 12, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=76778

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