NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 12, 2013

Group Chairman's Factual Report

OPERATIONAL FACTORS

ERA13MA139

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A. ACCIDENT

Aircraft: N777VG (Serial # RB-208)
Location: Thomson, Georgia
Date: February 20, 2013 (2006 EST[1])
Type: Hawker Beechcraft Premier IA Model 390

[1] All times are eastern standard time (EST) unless otherwise noted.

B. OPERATIONAL FACTORS GROUP

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C. SUMMARY

On February 20, 2013, at 2006 eastern standard time, a Beechcraft 390 Premier IA[4], N777VG, was destroyed following a collision with a utility pole, trees, and terrain following a go-around at Thomson-McDuffie Regional Airport (HQU), Thomson, Georgia. The airline transport-rated pilot and co-pilot were seriously injured, and five passengers were fatally injured. The airplane was registered to the Pavilion Group LLC and was operated by the pilot under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as a business flight. Night visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed. The flight originated at John C. Tune Airport (JWN), Nashville, Tennessee, about 1827 central standard time (1927 eastern standard time).

D. DETAILS OF THE INVESTIGATION

On February 21, 2013, the Operations (Ops) Safety Investigator traveled via FAA airplane at 0815 EST and arrived in Augusta, GA at 0930 EST and traveled via car from Augusta to Thomson, GA accident site and attended an organizational meeting with Investigator in Charge (IIC), FAA, and parties to the investigation. An Operations Group (the Group) was formed with party members from the FAA and Beechcraft.[5] The Group toured the accident site and documented wreckage with the NTSB team. The Group obtained medical contact information for both pilots and established contact with Beechcraft requesting additional airplane information. The Group conducted HQU personnel interviews, obtained copies of a security camera video of the accident airplane during landing and reviewed the landing runway. Historical fueling records for N777VG at HQU were also retained.

[2] Captain Peter Gracey, Beechcraft Test Pilot, provided additional support to the Ops Group.
[3] Formerly Hawker Beechcraft Corporation.
[4] Throughout this Factual Report, Premier and Premier IA are used interchangeably.
[5] The Ops Group Beechcraft representative joined the group during the following day (February 22, 2013).

The Group also interviewed EMS[6] personnel at the accident site, and then drove to the Georgia Regents Medical Center[7] where both pilots were transported. The Group spoke with attending physicians for both pilots and briefly spoke with the co-pilot.

PTRS[8] data and pilot blue ribbon packages were requested from the FAA. The Group documented runway lighting configuration in same light conditions as the time of the accident, and reviewed accident security video and copies of light testing results.

On February 22, 2013, the Group conducted a walk around of an exemplar Premier 1A aircraft and documented the cockpit with the Beechcraft Senior Sales Demonstration Pilot. FlightSafety training records and TCE[9] instructor names through Beechcraft were requested, in addition to a request for simulator time. The Group returned to the accident site to document the cockpit.

The Group traveled to the Evans, GA offices of The Vein Guys/Pavilion Group and interviewed the office manager, and traveled to Georgia Regents Medical Center in Augusta with the NTSB TDA[10] representative to speak with family members of both crew members.

The Group obtained electronic copies of fueling records from JWN where the accident flight originated, and phone interviewed an aircraft mechanic at HQU airport. Electronic copies of the Premier operating manuals were obtained and reviewed.

On February 23, 2013, the Group received copies of the Premier Pilot Operating Manual (POM) and FAA Approved Airplane Flight Manual (AFM), completed the Field Notes for the on-scene investigation, and Group members were released. The OPS Group Chairman returned to Washington, DC on February 24, 2013.

From March 4, 2013 through March 7, 2013 the Group reconvened in Greenwood, South Carolina to conduct interviews of both surviving pilots. The Group also conducted a tour of the Executive Shuttle offices and hanger space at Greenwood County Airport (GRD).

From April 18, 2013 through April 19, 2013 the Group conducted a tour of the FlightSafety (FSI) training facilities in Wichita, Kansas, followed by interviews with several FSI Training Center Evaluators (TCE) and senior staff on the Premier program at FSI. The Group also conducted an examination of an exemplar Premier 390 on the ramp at the Beech Factory Airport (KBEC), documenting aural and visual alerts in the cockpit. The Group also received complete copies of the captain's FlightSafety training records.

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[6] Emergency Medical Service.

[7] The Georgia Regents Medical Center is located at 1120 15th Street, Augusta, Georgia 30912.

[8] Program Tracking and Reporting Subsystem. According to the FAA, PTRS "is a comprehensive information management and analysis system used in many Flight Standards Service (AFS) job functions. It provides the means for the collection, storage, retrieval, and analysis of data resulting from the many different job functions performed by Aviation Safety Inspectors (ASIs) in the field, the regions, and headquarters. This system provides managers and inspectors with current data on airmen, air agencies, air operators, and many other facets of the air transportation system" (source: http://fsims.faa.gov/wdocs/other/ptrs_procedures_manual.htm#_Toc206484687).

[9] Training Center Evaluator.

[10] Transportation Disaster Assistance.

On May 12, 2013 The Group conducted telephone interviews of the FlightSafety FAA Principal Operations Inspector (POI) and Training Center Program Manager (TCPM).

On June 17, 2013 the Group conducted re-interviews of both pilots following their review of the cockpit voice recorder (CVR).

On July 16, 2013, the Group traveled to the FlightSafety Greater Philadelphia/Wilmington Learning Center in Wilmington, Delaware and conducted interviews of FlightSafety instructors and evaluators. The Group also conducted simulator testing in the FlightSafety Premier 390 simulator.[11]

E. FACTUAL INFORMATION

1.0 History of Flight

On February 20, 2013, The Pavilion Group, a subsidiary of The Vein Guys®, hired Executive Shuttle to provide pilot services for the Pavilion Group's Premier IA (N777VG) on a roundtrip flight from Thomson-McDuffie Regional Airport (HQU), Thomson, Georgia to John C. Tune Airport (JWN), Nashville, Tennessee. The flights were flown by two pilots from Executive Shuttle; the captain was the owner of Executive Shuttle, and the co-pilot was a pilot for Executive Shuttle. According to interviews, although the airplane was certified for single-pilot operations, the captain told NTSB Staff that he "usually always" asked for a co-pilot on the early morning legs.[12] There were 5 passengers onboard each of the two flights, and the accident occurred on the return flight from JWN to HQU.

On the morning of the accident, the captain and co-pilot left their respective homes in Greenwood, SC and Due West, SC at approximately 0230 for an hour drive to HQU where the accident airplane was based. The five passengers were all employees of the Vein Guys®, including the doctor who founded The Vein Guys®. N777VG departed HQU at approximately 0406 and arrived into JWN at approximately 0459.[13] Both pilots stated in interviews that the flight to JWN was uneventful with good weather. The pilots stated in interviews that they spent their time at the JWN terminal (run by Corporate Flight Management) sleeping in the crew break room, doing paperwork and working on the computer. They left for a late lunch around 1500 and returned to the airport around 1630.

According to security camera footage from the terminal in JWN, N777VG was towed to the front of the terminal at approximately 1620. Security camera footage showed a car pulling onto the ramp at approximately 1913, both pilots walking toward the airplane, and at 1918, the five Vein Group employees are seen walking toward N777VG while one pilot appeared to be conducting a walk-around of the airplane. N777VG was seen taxing away from the terminal at about 1923,

[11] For additional information, see Attachment 21– Simulator Notes.
[12] In interviews, the captain stated he used the FAA Flight Risk Assessment Tool to calculate a risk value for early morning flights. For additional information, see Information for Operators (InFO) 07015 "Flight Risk Assessment Tool" (dated July 3, 2007, and Attachment 1 – Interview Summaries.
[13] Nashville, TN is in the central time zone. Times shown here are EST for consistency with departure/arrival times in Thomson, GA (EST).

and departed JWN a few minutes later. The captain was the pilot flying, and night VFR conditions prevailed for the flight.

At 1927, N777VG contacted departure control (DRW) climbing through 3,500 feet and requested an IFR clearance to HQU. At 1930, N777VG contacted Memphis ARTCC[14] (ZME) climbing through 14,000 feet, and at 1933 was given a clearance to climb and maintain a cruising altitude of 27,000. According to interviews, both pilots stated the weather along the route was good, and the co-pilot stated that they had a "70+" knot tailwind on the flight from JWM to HQU.

At 1948, N777VG contacted Atlanta ARTCC level at 27,000 feet, and was given a descent clearance to 24,000 feet. At 1953, N777VG was given a further descent clearance to 11,000 along with the Athens, GA altimeter setting. At about the same time, the co-pilot tuned the Thomson-McDuffie Regional Airport AWOS[15] (frequency 120.62) to receive the most current weather at the airport. The AWOS weather current at that time for Thomson-McDuffie Regional Airport weather was reported at 1935 (0035Z) for calm winds, temperature 9°C, 10 statute mile visibility, scattered clouds at 12,000 feet and an altimeter setting of 30.13. The captain then set up the flight management guidance system for a visual approach to runway 10 at Thomson-McDuffie Regional Airport with a 3.4 degree path descent to the runway from a five mile final, and the co-pilot tuned his radios to the ILS[16] for runway 10. Runway 10 at Thomson-McDuffie Regional Airport was 5,503 feet long, and 5,208 feet was available for landing due to a displaced threshold.[17] The airport elevation was 501 feet msl.[18]

At 1956, N777VG advised Atlanta ARTCC they were descending through 18,500 feet, and two minutes later N777VG cancelled their IFR flight plan with Atlanta ARTCC. N777VG was then asked to contact Augusta Approach control, and at 2000 N777VG called Augusta approach and advised them that they were descending out of 8,400 and had Thomson-McDuffie Regional Airport in sight. The crew asked the controller if there was any traffic in the area, and after Augusta approach advised that there was none, N777VG elected to remain on the frequency for flight following until 2002 when N777VG called Augusta approach and requested Augusta approach cancel their flight following so they could switch to the local advisory frequency. There was no traffic reported between the aircraft and the airport, and at 2003, ATC[19] radar services were terminated with N777VG.

[14] Air Route Traffic Control Center.
[15] AWOS – Automated Weather Observing System is equipped with meteorological instruments to observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to twelve thousand feet, and altimeter setting.
[16] Instrument Landing System.
[17] According to the Aeronautical Information Manual (AIM), page 2-3-4, a displaced threshold is a threshold located at a point on the runway other than the designated beginning of the runway. Displacement of a threshold reduces the length of runway available for landings. The portion of runway behind a displaced threshold is available for takeoffs in either direction, and landings from the opposite direction.
[18] Mean sea level.
[19] Air Traffic Control.

At about that time, N777VG began to conduct an "S" turn[20] along the final approach path to the runway. About a minute later, the Enhanced Ground Proximity Warning System[21] (EGPWS) aural alert announced that the airplane was 1,000 feet above the ground and the captain lowered the landing gear. According to recorded data, after lowering the landing gear, the ANTI SKID FAIL annunciator light illuminated in the cockpit. The flight continued on the approach and, according to EGPWS data, the airplane touched down on runway 10 at about 2005. About 7 seconds after touching down, witnesses saw and heard the airplane execute a go-around. The airplane lifted off toward the end of the runway and climbed to an altitude of about 63 feet. At 2006, the airplane impacted a utility pole, trees, and terrain about a quarter mile east of the airport. The airplane was destroyed, and all passengers were fatally injured. Both pilots survived with serious injuries.

2.0 Flight Crew Information

The accident flight crew consisted of a captain and a co-pilot. The captain held a single pilot type rating for the accident airplane.[22] The co-pilot was not type rated on the accident airplane. The captain told NTSB Staff that he would "usually always" ask for a co-pilot on early morning departures to mitigate the risks of early morning flights since he was new to the airplane. According to the FAA, a co-pilot was not a required pilot for operations on an airplane certified for single-pilot operations conducted under 14 CFR Part 91.[23]

2.1 The Captain

The Captain was 56 years old and held an Airline Transport Pilot (ATP) license with a single pilot type rating on the Premier (390S)[24]. He was the Director of Operations for Sky's the Limit (Part 135 certificate #S2LA514W), doing business as Executive Shuttle, a 14 CFR Part 135 operator based in Greenwood, South Carolina. He was hired by the Pavilion Group to provide private pilot services for their Premier and operate it under the provisions of 14 CFR Part 91.[25]

The captain resided in Greenwood, South Carolina. For flights on the Premier, he would drive approximately one hour from his home to Thomson, Georgia where the accident airplane was based.

A previous co-pilot who flew with the accident captain stated the captain was experienced, professional and had good flying skills. Both co-pilots used by the accident captain (including

[20] "S" turns are an inflight manuever used by a pilot for spacing purposes. According to the FAA Aeronautical Information Manual, Section 4-3-5, "On occasion it may be necessary for pilots to maneuver their aircraft to maintain spacing with the traffic they have been sequenced to follow. The controller can anticipate minor maneuvering such as shallow "S" turns."

[21] According to the Spec Sheet for the accident airplane (RB-208), the airplane was equipped with a Honeywell Mark V EGPWS. See Attachment 16 – R**B**-208 Spec Sheet.

[22] For more information, Section 5.0 "Single Pilot Operations" of this Factual Report.

[23] See Attachment 22 - FAA Responses.

[24] The "390S" type rating designation on the captain's certificate indicated a single pilot type rating for the Premier 390.

[25] For additional information, see Section 13 Organizational and Management Information of this Factual Report.

the accident co-pilot) stated that they did not have a specific role on their flights with the accident captain when flying the Premier.

A review of FAA records found no prior accident, incident reports, and one enforcement action. The captain was cited by the FAA for violations of 14 CFR 91.139(c) and Section 99.7 for a flight in the DC ADIZ[26] in a Piper PA31-T (N376WS) on September 15, 2005. The proposed suspension of his ATP was waived on July 5, 2007 because the captain filed a NASA report through the Aviation Safety Reporting System (ASRS) program.[27]

2.1.1 The Captain's Pilot Certification Record

FAA records of the captain indicated the following:

Private Pilot – Airplane Single Engine Land certificate issued November 29, 1981.
Private Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued September 29, 1985.
Private Pilot – Airplane Single and Multi-Engine Land Instrument Airplane certificate issued January 19, 1986.
Commercial Pilot – Airplane Single Engine Land Instrument Airplane, Private Pilot Privileges – Airplane Multi-Engine Land certificate issued August 8, 1987.
Airline Transport Pilot – Airplane Multi-Engine Land, Commercial Privileges Airplane Single Engine Land certificate issued October 5, 1987.
Flight Instructor –Airplane - Single Engine (expires February 28, 1990) certificate issued February 16, 1988.
Flight Instructor –Airplane - Single and Multi-Engine Land (expires July 31, 1990) certificate issued July 5, 1988.
Flight Instructor –Airplane - Single and Multi-Engine Land Instrument Airplane (expires July 31, 1990) certificate issued July 5, 1988.

Renewals: July 6, 1990; July 29, 1992; July 27, 1994; July 28, 1996; July 1, 1998; July 28, 2000; October 28, 2001; October 24, 2003; September 15, 2005; September 24, 2007[28]; October 26, 2009; October 2, 2011.

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[26] Air Defense Identification Zone..According to the FAA Aeronautical Information Manual, section 5-6-1, all aircraft entering domestic U.S. airspace from points outside must provide for identification prior to entry. To facilitate early aircraft identification of all aircraft in the vicinity of U.S. and international airspace boundaries, Air Defense Identification Zones (ADIZ) have been established.

[27] The ASRS collects, analyzes, and responds to voluntarily submitted aviation safety incident reports in order to lessen the likelihood of aviation accidents (see http://asrs.arc.nasa.gov/overview/summary.html). For additional information, see Attachment 2 - Flight Crew Records.

[28] The captain's Temporary Airman Certificate (Form 8060-4) was dated September 24, 2007, and Section XII (Ratings and Limitations) stated that the certificate expired October 30, 2009. 14 CFR 61.197 (b) states, in part: The expiration month of a renewed flight instructor certificate shall be 24 calendar months from - (1) The month the renewal requirements of paragraph (a) of this section are accomplished; or (2) The month of expiration of the current flight instructor certificate provided - (i) The renewal requirements of paragraph (a) of this section are accomplished within the 3 calendar months preceding the expiration month of the current flight instructor certificate, and (ii) If the renewal is accomplished under paragraph (a)(2)(iii) of this section, the approved flight instructor refresher course must be completed within the 3 calendar months preceding the expiration month of the current flight instructor certificate.

Airline Transport Pilot – Airplane Multi-Engine Land N-265, Commercial Privileges Airplane Single Engine Land certificate issued September 21, 1989.
Airline Transport Pilot – Airplane Multi-Engine Land N-265, B-737, Commercial Privileges Airplane Single Engine Land certificate issued August 8, 1991.
Airline Transport Pilot – Airplane Multi-Engine Land N-265, B-737, CE-525S, Commercial Privileges Airplane Single Engine Land certificate issued May 9, 2004.
Airline Transport Pilot – Airplane Multi-Engine Land N-265, B-737, CE-525S, CE-500, Commercial Privileges Airplane Single Engine Land certificate issued June 11, 2005.
Airline Transport Pilot – Airplane Multi-Engine Land N-265, B-737, CE-525S, CE-500, BE-300 Commercial Privileges Airplane Single Engine Land certificate issued September 7, 2008.
Airline Transport Pilot – Airplane Multi-Engine Land N-265, B-737, CE-525S, CE-500, BE-300, RA-390S, Commercial Privileges Airplane Single Engine Land certificate issued June 22, 2012.

2.1.2 The Captain's Certificates and Ratings Held at Time of the Accident[29]

AIRLINE TRANSPORT PILOT (issued June 22, 2012)
AIRPLANE MULTI-ENGINE LAND
N-265, B-737, CE-525S, CE-500, BE-300, RA-390S
COMMERCIAL PRIVILEGES AIRPLANE SINGLE ENGINE LAND

FLIGHT INSTRUCTOR (issued October 2, 2011)
AIRPLANE SINGLE AND MULTI-ENGINE
INSTRUMENT AIRPLANE

MEDICAL CERTIFICATE SECOND CLASS (issued October 29, 2012)
Limitations: Holder shall possess glasses for near/intermediate vision.

2.1.3 The Captain's Training and Proficiency Checks Completed[30]

According to interviews and training records, the captain attended the FlightSafety Premier I Series (RA-390) 14 CFR Part 61.157 Initial Training Course at the FlightSafety Wichita Learning Center in Wichita, Kansas from June 7, 2012 through June 22, 2012. The ground instruction, conducted from June 7, 2012 through June 14, 2012, consisted of 58 hours of ground training and 11.5 hours of briefing/debriefing. The captain also attended flight simulator training from June 15, 2012 through June 21, 2013, which consisted of 15 hours of simulator training. He was type rated on the Premier on June 22, 2012 following a 2.2 hour simulator session and a 2.5 hour oral/written examination.

The captain also attended the FlightSafety Premier 14 CFR 61.58 Recurrent PIC[31] Course at the FlightSafety Greater Philadelphia/Wilmington Learning Center in Wilmington, Delaware from

[29] Source: FAA
[30] See Attachment 4 – Captain Training Records.
[31] Pilot in Command.

January 3, 2013 through January 5, 2013. The ground instruction consisted of 12 hours of training and 4.5 hours of briefing/debriefing. The simulator portion of the training, conducted during the same 3 days, consisted of 7 hours of simulator time.

2.1.4 The Captain's Flight Times[32]

The captain's flight times provided to the NTSB:

Total pilot flying time	13,319
Total Pilot-In-Command (PIC) time	12,609
Total Premier time	198
Total Premier PIC time	198
Total flying time last 24 hours	2
Total flying time last 30 days	41
Total flying time last 90 days	146

2.1.5 The Captain's 72-Hour History

See Human Performance Group Chairman's Factual Report.

2.2 The Co-Pilot

The co-pilot was 40 years old and held an Airline Transport Pilot license. He was not type rated in the Premier. He resided in the Due West, South Carolina, and would drive approximately one hour from his home to Thomson, Georgia where the accident airplane was based. He was employed by, and flew charters for Executive Shuttle, owned by the accident captain. He would accompany the accident captain on the Premier flights at the request of the captain, and estimated that he had about 45 flight hours in the Premier.

A review of FAA records found no prior accident, incident or enforcement actions.

2.2.1 The Co-Pilot's Certification Record

FAA records of the co-pilot indicated the following:

Private Pilot – Airplane Single Engine Land certificate issued November 19, 1998.
Private Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued July 22, 2004.
Commercial Pilot – Airplane Single Land Instrument Airplane certificate issued June 17, 2005.
Notice of Disapproval of Application for Flight Instructor certificate issued August 31, 2006.
(First Failure) Items for reexamination: Entire oral and flight.
Notice of Disapproval of Application for Flight Instructor certificate issued January 10, 2007.

[32] Flight times were provided to the NTSB by the captain through his legal counsel.

(Second Failure) Items for reexamination: Areas of Operation III Task C; Task B, D, E not tested; Area of Operation V through XIV not tested. [33]

Notice of Disapproval of Application for Flight Instructor certificate issued May 18, 2007.

(Third Failure) Items for reexamination: Areas of Operation II through XIV.[34]

Flight Instructor –Airplane Single Engine Land (expires May 31, 2010) certificate issued May 26, 2008.

Flight Instructor – Airplane Single Engine Instrument Airplane (expires May 31, 2010) certificate issued May 26, 2008.

Commercial Pilot – Airplane Single and Multi-engine Land Instrument Airplane certificate issued July 14, 2008.

Flight Instructor –Airplane Single Engine and Multi-engine Instrument Airplane (expires October 31, 2010) certificate issued October 7, 2008.
Renewed: October 20, 2010; October 14, 2012.

Airline Transport Pilot – Airplane Multi-Engine Land, Commercial Privileges Airplane Single Engine Land certificate issued February 7, 2011.

2.2.2 The Co-Pilot's Certificates and Ratings Held at Time of the Accident

AIRLINE TRANSPORT PILOT (issued September 19, 2012)[35]
AIRPLANE MULTI-ENGINE LAND
COMMERCIAL PRIVILEGES AIRPLANE SINGLE ENGINE LAND

FLIGHT INSTRUCTOR (issued October 14, 2012)
AIRPLANE SINGLE AND MULTI-ENGINE
INSTRUMENT AIRPLANE

MEDICAL CERTIFICATE SECOND CLASS (issued February 12, 2013)

2.2.3 The Co-Pilot's Training and Proficiency Checks Completed

The co-pilot on the accident flight was not type rated on the Premier, nor received simulator training on the Premier. According to the interviews and the co-pilot's logbook, he received a 14 CFR 61.55 logbook endorsement from the accident captain, dated October 10, 2012, that stated the following:

> *"In accordance with FAR 61.55, I have determined that Jeremy Hayden, 2588660, has demonstrated the skill and knowledge required for the safe operation of the RA-390 Beechcraft Premier, relevant to the duties and responsibilities of a second in command."*[36]

[33] According to the FAA FAA-S-8081-6D, Flight Instructor Airplane Practical Test Standards, Area of Operations Task C included "Operations of Systems."

[34] According to the FAA FAA-S-8081-6D, Flight Instructor Airplane Practical Test Standards, the only Area of Operation the co-pilot was not required to demonstrate for re-examination following his third failure was Area of Operation I, "Fundamentals of Instructing."

[35] Revised date of the co-pilot's ATP was for the reissuance of a replacement to a lost certificate.

[36] See Attachment 2 - Flight Crew Records.

2.2.4 The Co-Pilot's Flight Times[37]

The accident co-pilot's flight times provided to the NTSB:

Total pilot flying time	2,932
Total PIC time	2,613
Total flying time in the Premier	45
Total Premier SIC[38] time	45
Total flying time last 24 hours	2
Total flying time last 30 days	27
Total flying time last 90 days	120

2.2.5 The Co-Pilot's 72-Hour History

See Human Performance Group Chairman's Factual Report.

3.0 Medical and Pathological Information

See Human Performance Group Chairman's Factual Report.

4.0 Aircraft Information[39]

The accident airplane was a Hawker Beechcraft Premier IA Model 390[40], certified in accordance with 14 CFR Part 23 (Normal Category) and 14 CFR Part 36[41], and was a metal and carbon fiber composite, low wing airplane powered by two Williams-Rolls Royce FJ44-2A turbofan engines mounted on the aft fuselage and rated at 2300 lbs. thrust.

The airplane's interior was divided into two sections: cockpit and cabin. The cockpit contained the pilot and copilot seats, instrument and control panels, and other equipment. The cabin contained 6 passenger seats, a toilet, baggage area, a passenger door, emergency escape door, and equipment for passenger convenience such as coat rack, card table etc.

[37] Flight times were provided to the NTSB by the co-pilot through his legal counsel.
[38] Second in command.
[39] Source: Hawker Beechcraft Premier I/IA Model 390 POM.
[40] The FAA type certificate for the Premier I was first issued March 23, 2001. The Premier IA had a new cabin interior and upgraded systems, and was type certified on September 22, 2005.
[41] 14 CFR Part 23 prescribed airworthiness standards for the issue of type certificates, and changes to those certificates, for airplanes in the normal, utility, acrobatic, and commuter categories. 14 CFR Part 36 prescribed noise standards for the issue of type certificates, and changes to those certificates, and standard airworthiness certificates, for subsonic transport category large airplanes, and for subsonic jet airplanes regardless of category.

Photo 1: Accident Airplane (prior to N777VG registration)

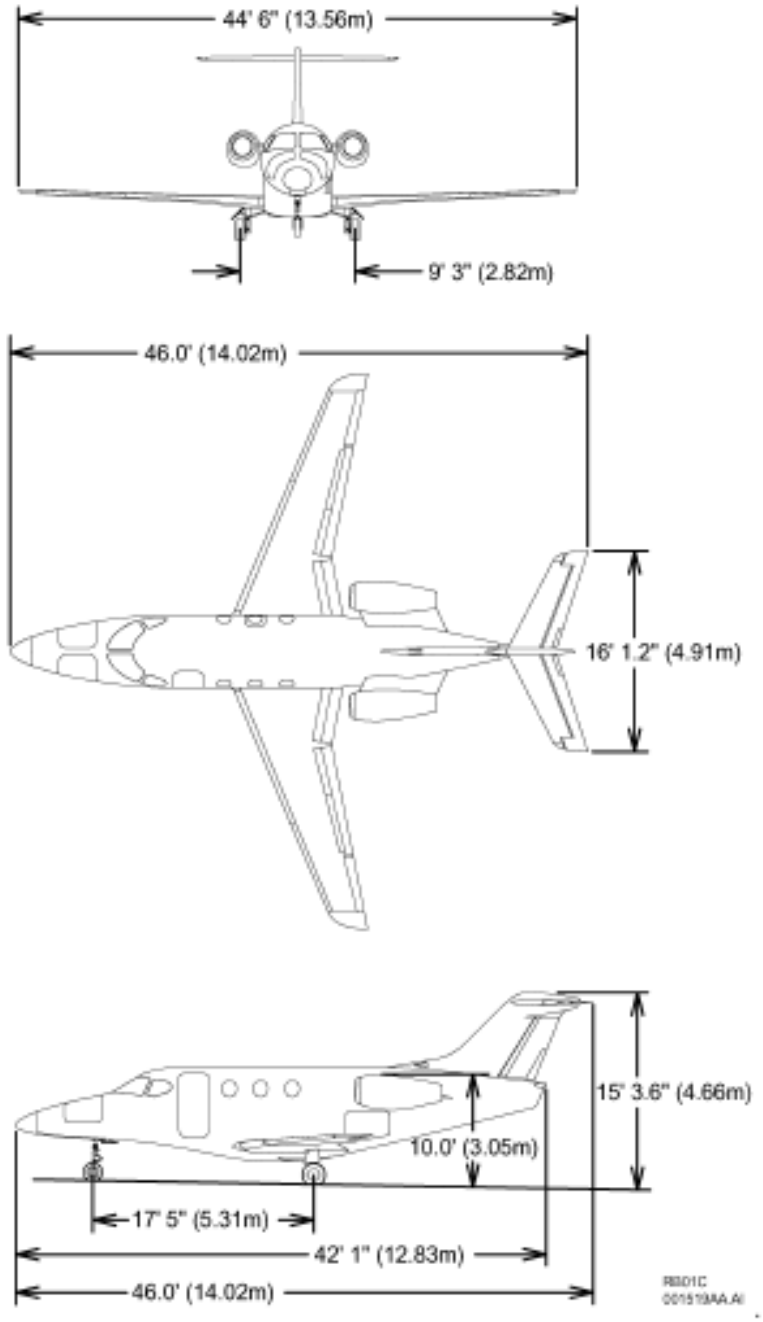


Photo 2: Premier Model 390 General Dimensions[42]

4.1 Structure

The fuselage was a monocoque design made of composite material reinforced by internal aluminum alloy and composite structures. Secondary structures and aerodynamic fairings completed the fuselage.[43] Aluminum alloy was used for the wing and other selected structure.

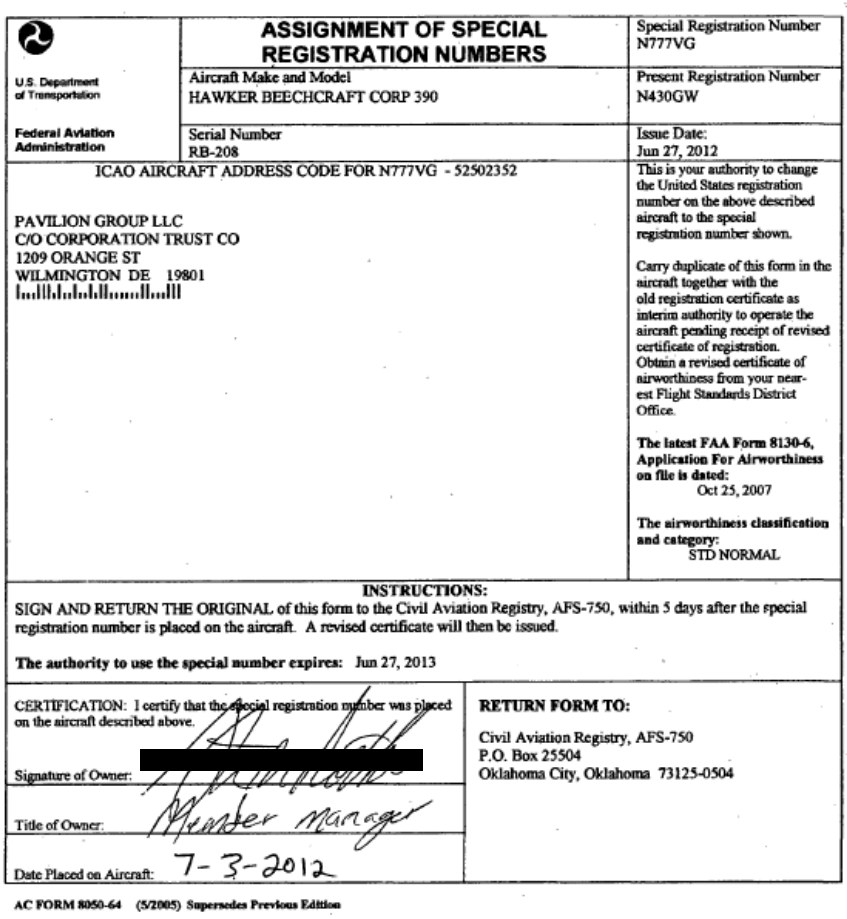
[42] Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section 1 General, page 1-9 through 1- 13.
[43] Source: Premier Maintenance Manual 53-00-00-001.

The wing was a semimonocoque wet-wing design having spars, ribs, stringers, and upper and lower skin panels.[44] A circular cabin section was utilized with a dropped aisle in the passenger cabin to provide additional headroom. Composite structure consisting of graphite plies and honeycomb core was used for the vertical stabilizer skin and horizontal stabilizer structure. The horizontal stabilizer assembly included the horizontal stabilizer, leading edge, and access panels. The horizontal stabilizer was a semimonocoque design made up of spars, ribs, and skins. It was centered on the top of the vertical stabilizer. The vertical stabilizer was a semimonocoque design made up of an aluminum forward and aft spar with bonded stringers, ribs and aluminum skins. The forward and aft spars of the vertical stabilizer attach to the forward and aft canted bulkheads of the aft fuselage. The vertical stabilizer included the leading edge, internal structure, outer skins, access panels, aerodynamic fairings, caps, and dorsal inlet.[45]

4.2 Registration[46]

The accident airplane (Serial #RB-208) was built in 2007 and was originally registered as N208BP. It was sold to J.A.B Leasing in Odessa, Texas on December 12, 2007[47], and re-registered as N430GW on February 6, 2008. The airplane was sold to the Pavilion Group, LLC on June 15, 2012[48] and re-registered as N777VG on June 27, 2012.

[44] Source: Premier Maintenance Manual 57-00-00-001.
[45] Source: Premier Maintenance Manual 55-10-00-001 and 55-30-00-01.
[46] For additional information, see Attachment 5 – Aircraft Registration.
[47] The sale was brokered by Kiernan F. Mannion (DBA KFM Aviation) in Atlanta, Georgia.
[48] The sale was brokered by Piedmont Aircraft Company, LLC in Winston-Salem, North Carolina.



U.S. Department of Transportation
Federal Aviation Administration

ASSIGNMENT OF SPECIAL REGISTRATION NUMBERS

Special Registration Number: N777VG

Aircraft Make and Model: HAWKER BEECHCRAFT CORP 390

Present Registration Number: N430GW

Serial Number: RB-208

Issue Date: Jun 27, 2012

ICAO AIRCRAFT ADDRESS CODE FOR N777VG - 52502352

PAVILION GROUP LLC
C/O CORPORATION TRUST CO
1209 ORANGE ST
WILMINGTON DE 19801

This is your authority to change the United States registration number on the above described aircraft to the special registration number shown.

Carry duplicate of this form in the aircraft together with the old registration certificate as interim authority to operate the aircraft pending receipt of revised certificate of registration. Obtain a revised certificate of airworthiness from your nearest Flight Standards District Office.

The latest FAA Form 8130-6, Application For Airworthiness on file is dated: Oct 25, 2007

The airworthiness classification and category: STD NORMAL

INSTRUCTIONS:

SIGN AND RETURN THE ORIGINAL of this form to the Civil Aviation Registry, AFS-750, within 5 days after the special registration number is placed on the aircraft. A revised certificate will then be issued.

The authority to use the special number expires: Jun 27, 2013

CERTIFICATION: I certify that the special registration number was placed on the aircraft described above.

Signature of Owner: [redacted]

Title of Owner: Member Manager

Date Placed on Aircraft: 7-3-2012

RETURN FORM TO:

Civil Aviation Registry, AFS-750
P.O. Box 25504
Oklahoma City, Oklahoma 73125-0504

AC FORM 8050-64 (5/2005) Supersedes Previous Edition

Photo 3: Accident Airplane Registration

4.3 Cockpit[49]

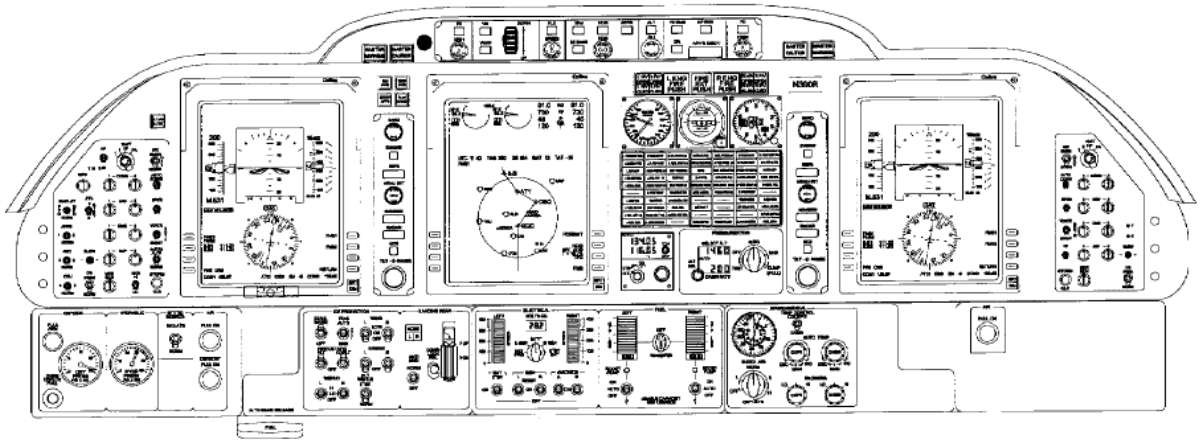
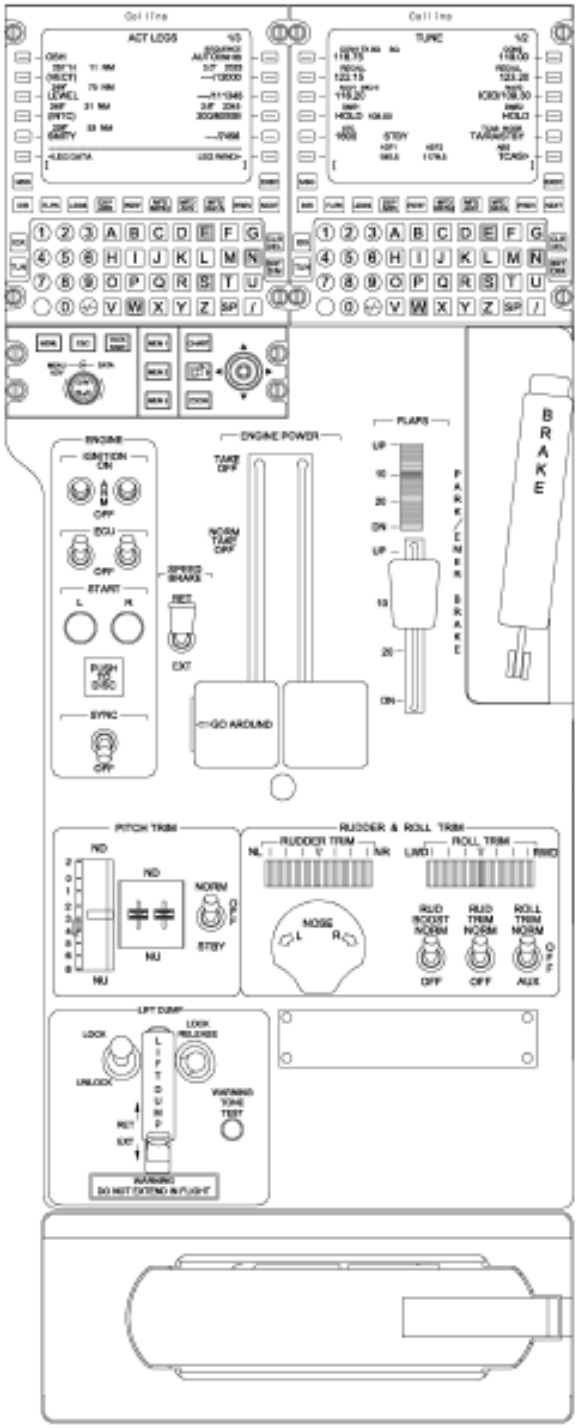


Photo 4: Premier forward cockpit instrument panel.[50]

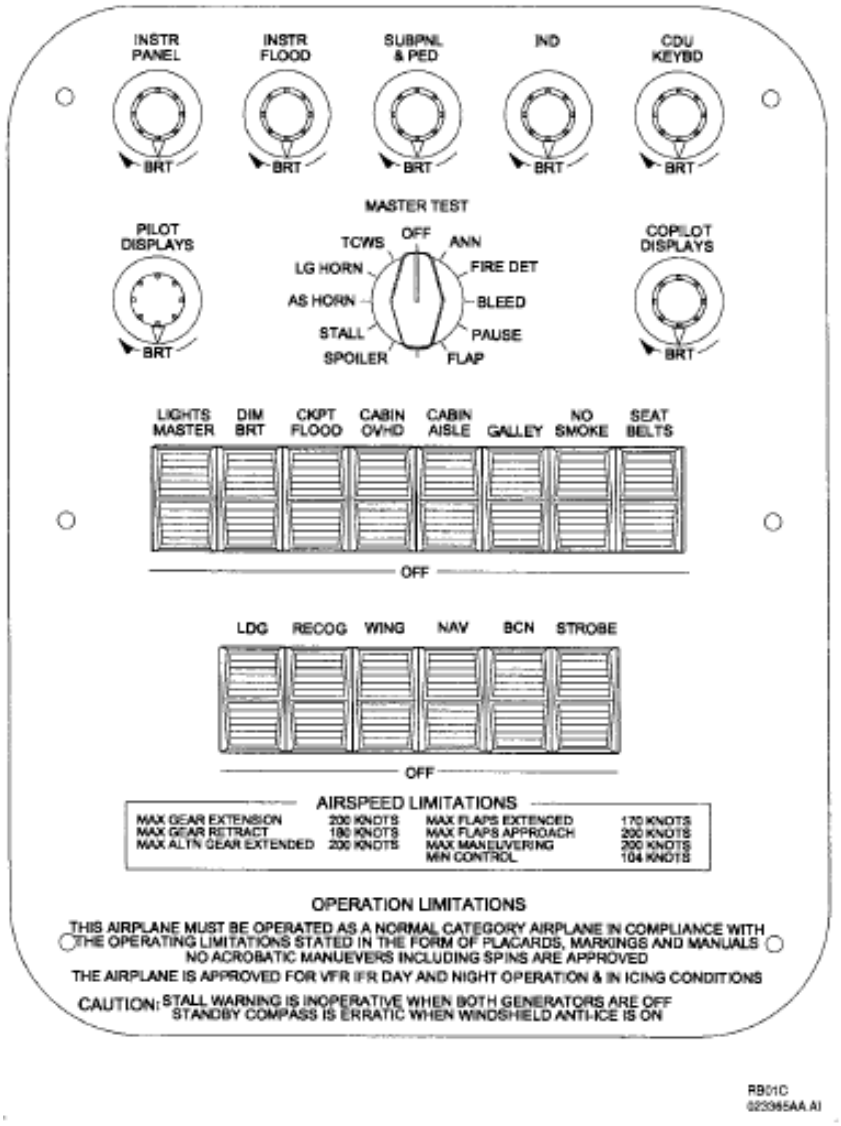
[49] Hawker Beechcraft Premier I/IA Model 390 POM, Section 1 General, page 1-9 through 1- 15.
[50] According to the RB-208 Spec sheet, the accident airplane had a Collins Pro Line 21 3-tube EFIS (electronic flight instrument system). See Attachment 16 – RB-208 Spec Sheet.



RB01B
895016AAJ

TYPICAL CENTER PEDESTAL
(RB-102, RB-135 AND AFTER)

Photo 5: Premier center pedestal panel.



OVERHEAD SWITCH PANEL
(RB-46, RB-51, RB-60, RB-61, RB-66, RB-70 AND AFTER; AND PRIOR SERIALS MODIFIED BY RAYTHEON KIT P/N 390-3203-1, -3, -5, -7, OR -13)

Photo 6: Premier cockpit overhead switch panel.

5.0 Single Pilot Operations

The Premier was certified by the FAA for single pilot operations per Type Certificate Number A00010WI, approved March 23, 2001 (revised March 26, 2007).[51]

[51] See Attachment 19 – Premier Type Certificate.

According to the Hawker Beechcraft Premier I/IA Model 390 AFM, Section 2 – Limitations, page 2-47, the following components were required when the airplane was operated with a crew of one pilot per applicable operating rules:

1. Operable FCS-3000 Autopilot.[52]
2. Operable FMS-3000 Flight Management System for IFR operation.[53]
3. Headset with boom microphone (must be worn).
4. FAA Approved Abbreviated Pilot Checklist P/N 390-590001-0051.[54]
5. Provisions for storage and retention of navigation charts, accessible to the pilot from the pilot's station.

6.0 Weight and Balance

The following weight and balance was derived from records obtained from Beechcraft, interviews with both pilots, and sources as noted in the footnotes. Limitations were obtained from Hawker Beechcraft Premier I/IA Model 390 FAA Approved Airplane Flight Manual (AFM), reissue date March 31, 2005, revision date January 31, 2013. Fuel burns were estimated based on ATC records of flight times and cruise altitude and based on the performance tables found in the Hawker Beechcraft Premier I/IA Model 390 POM, Section IV – Flight Planning Data.

WEIGHT & BALANCE / PERFORMANCE	
Basic Operating Weight[55]	8371.4
Pilot Weights[56]	480
Passenger Weight[57]	799
Baggage/Cargo Weight	0
Zero Fuel Weight	9650.4
Maximum Zero Fuel Weight	10000
Fuel Weight[58] (takeoff)[59]	2056
Ramp Weight	11706.4

[52] According to the RB-208 Spec Sheet, the accident airplane had a Collins FGC-3000 IFCS autopilot/flight director installed.
[53] According to the RB-208 Spec Sheet, the accident airplane had a Collins FMS-3000 with GPS installed.
[54] The FAA Approved Abbreviated Checklist used by FlightSafety was P/N 390-590001-0051C (Reissue C—April 2008.)
[55] See Attachment 6 – Weight and Balance. The basic operating weight (BOW) listed here was from the airplane delivery weight and balance dated October 11, 2007. Staff was unable to locate a more recent weight and balance.
[56] Weight for the captain (240 lbs.) was taken from his 2nd class medical certificate, dated October 29, 2012. Weight for the co-pilot (240 lbs.) was taken from his 2nd class medical certificate, dated February 12, 2013.
[57] Passenger weights were based upon final GBI-Atlanta autopsy findings. For more information, see Survival Factors Group Chairman's Factual Report.
[58] Fuel records from Corporate Flight Management, Inc. at JWM Airport indicated 1156 lbs. (170 gallons) were added to N777VG on February 20, 2013 (6.8lbs/gallon). Total fuel load after refueling at KJWM was estimated from the fuel the captain said he had for landing (900 lbs) plus the fuel he added at JWM (1156 lbs.) for a total fuel weight of 2056 lbs. on departure from JWM. See Attachment 6 – Weight and Balance, and Attachment 1 – Interview Summaries.
[59] Total usable fuel capacity was 547.8 gallons (3670 lbs) gravity fill, and 537gallons (3598 lbs.) single-point fill. Source: Hawker Beechcraft Premier I/IA Model 390 FAA Approved AFM, page 2-11.

	Maximum Ramp Weight	12591
	Taxi Fuel Burn (estimated)	100
	Actual Takeoff Weight	11606.4
	Maximum Takeoff Weight	12500
	Estimated Climb Burn (10 minutes @ 240 kts., ISA)	291
	Estimated Cruise Burn (20 minutes, ISA)	485
	Estimated Descent Burn	120
	Estimated Approach Burn	200
	Estimated Landing Weight	10510.4
	Maximum Landing Weight	11600
	Landing Stab Trim[60]	3.6°
	TO Green Band Stab Trim Range	3.27° to 4.27° (+/-0.12°)
	Landing Flap Setting	Full (DN)
	Vref[61] (Captain/co-pilot)	112/111
	Vac[62] (Captain/co-pilot)	125/123

7.0 Performance

See Aircraft Performance Group Chairman's Factual Report.

8.0 Meteorological Information[63]

The National Weather Service (NWS) Surface Analysis for 1900 EST on February 20, 2013 depicted a trough of low pressure extending east-to-west over northern Georgia, South Carolina, and into southern North Carolina immediately north of the accident site. The chart depicted a weak pressure gradient with resulting winds of 5 knots or less over the region, with no significant weather reported, and the NWS regional radar mosaic depicted no meteorological echoes over the region.

Thomson – McDuffie County Airport (HQU), Augusta, GA, elevation 422 feet, variation 4° W. Airport was equipped with an Automated Weather Observation System (AWOS) and issued observations every 20-minutes. The following conditions were reported the following the time of the accident:

> Thomson- McDuffie County Airport weather at 1955 EST (0055Z) automated, wind calm, visibility unrestricted at 10 statute miles, sky clear, temperature 9° Celsius (C),

[60] For more information on stab trim setting and TO green band range, see Systems Group Chairman's Factual Report.
[61] Reference airspeed for landing and landing climb - The landing approach airspeed (KIAS) or climb speed. VREF is based on 1.23 Vsro (reference stall speed landing configuration) for the flaps DN configuration.
[62] According to the Premier I/IA Model 390 AFM, Vac Speed is approach climb airspeed - the airspeed (KIAS) for the approach climb configuration. According to the Premier Balked Landing checklist, the target speed for a Balked Landing (go around) was Vref.
[63] Source: Don Eick, NTSB. For detailed weather information, see Attachment 26 – Weather.

dew point -4° C, altimeter 30.12 inches of mercury. Remarks: automated observation system, temperature 9.3° C, dew point -4.4° C.

Thomson-McDuffie County Airport weather at 2015 EST (0115Z) automated, wind from 240° true at 6 knots, visibility unrestricted at 10 statute miles, sky clear, temperature 11° C, dew point -3° C, altimeter 30.15 inches of mercury. Remarks: automated observation system, temperature 10.6° C, dew point -3.5° C.[64]

The NWS did not issue a terminal aerodrome forecast (TAF) for the destination airport. The Area Forecast expected light wind, scattered to broken high cirrus clouds, with visibility unrestricted. The NWS also had an AIRMET[65] current for moderate turbulence below 8,000 feet over the area.

9.0 Air Traffic Control

Air Traffic Control (ATC) services were provided by the Atlanta Air Route Traffic Control Center (ARTCC) and the Augusta, Georgia Terminal Radar Approach Control Facility (TRACON). For additional information, see Attachment 7 – ATC Information.

10.0 Aids to Navigation

See Survival Factors Group Chairman's Factual Report.

11.0 Communications

There were no known communication difficulties.

12.0 Airport Information[66]

The accident airplane was based at Thomson-McDuffie County Airport (HQU). HQU was a public airport located 4 miles north of Thomson, Georgia (zip code 30824) at 33° 31.78'N and 082° 31.02'W (magnetic variation 04W). The airport elevation was 501 feet msl,[67] and had a lighted wind indicator with a segmented circle.[68]

---

[64] At 2015 EST the wind component for runway 10 was about a 5 knot tailwind and about a 3 knot crosswind.

[65] An AIRMET (AIRman's METeorological Information) advises of weather that maybe hazardous, other than convective activity, to single engine, other light aircraft, and Visual Flight Rule (VFR) pilots. Source: National Weather Service, http://www.crh.noaa.gov/lot/aviation/airmet_info.php.

[66] Source: http://www.airnav.com/airport/KHQU and interviews. For additional airport information, see Survival Factors Group Chairman's Factual Report.

[67] Mean sea level.

[68] According to FAA Advisory Circular (AC) 150/5340-5C, Segmented Circle Airport Marker System, the segmented circle performs two functions; it aids the pilot in locating obscure airports and it provides a centralized location for such indicators and signal devices as may be required on a particular airport, such as a wind direction indicator, landing direction indicator, landing strip indicator, traffic pattern indicator, right-turn indicators, and closed field signals.

According to FAA records, the airport was owned by Thomson City and McDuffie County.[69] The airport did not have a control tower (uncontrolled), requiring pilots to communicate their positions and intentions on a CTAF (common traffic advisory frequency).[70] The airport had a fixed-base operator (FBO)[71], Spirit Aviation, which provided various aircraft services at the airport, and was attended daily from 0800-1700 local time.[72]

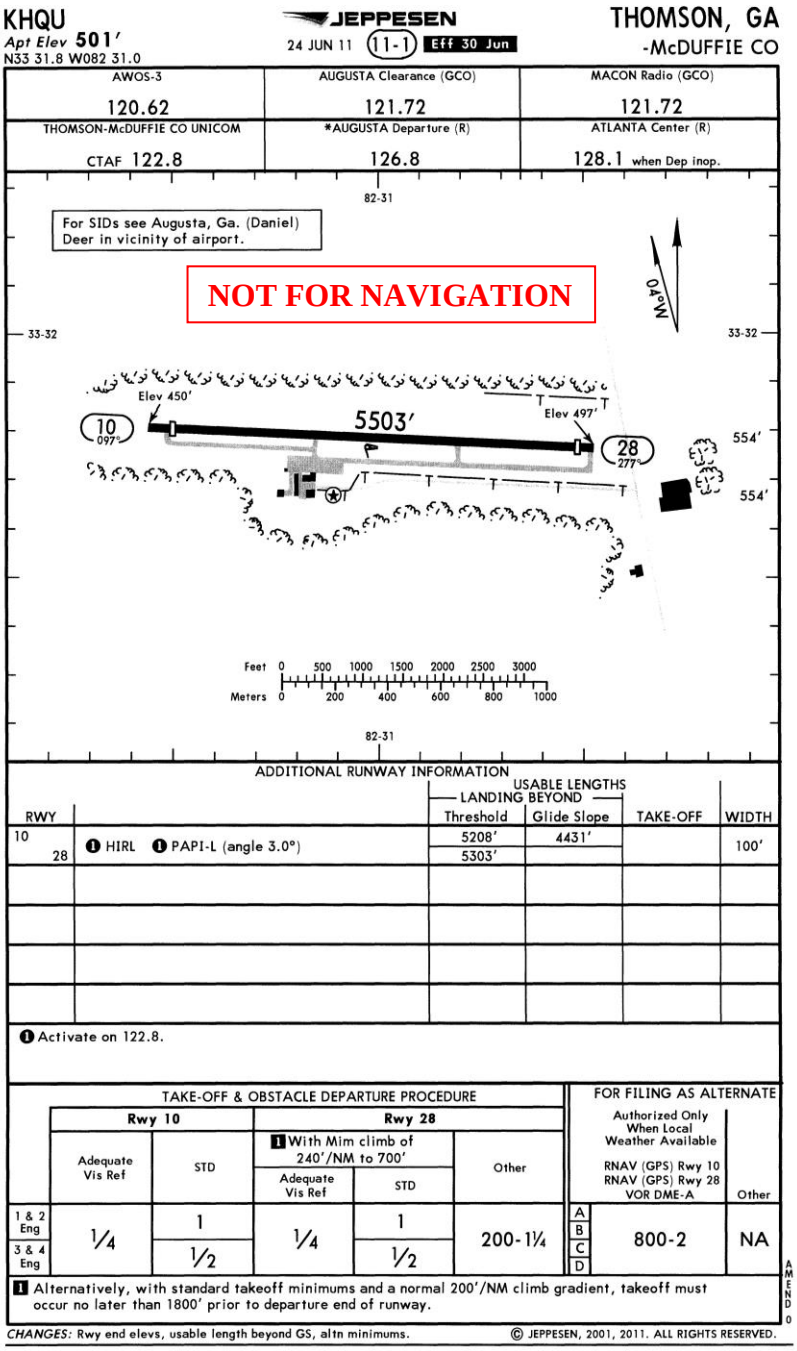
There were 25 total airplanes based at HQU[73]: 23 were single engine airplanes, one was a jet airplane, and one was an ultralight. The airport averaged 52 operations each day. 53% of these operations were local general aviation, and 47% were transient general aviation.

The accident airplane approached and landed on runway 10 at HQU. The asphalt runway was 5,503 feet long and 100 feet wide, with a 295 foot displaced threshold and an elevation of 448 mean sea level. The available length of runway for landing on runway 10 was 5,208 feet. Runway 10 had a .9% upslope gradient to the east.[74]

[69] The address of record is Thomson City and McDuffie County Courthouse, Thomson, GA 30824.
[70] According to the Airman's Information Manual, page 4-1-2, "A CTAF is a frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF may be a UNICOM, MULTICOM, FSS, or tower frequency and is identified in appropriate aeronautical publications . . . Pilots of inbound traffic should monitor and communicate as appropriate on the designated CTAF from 10 miles to landing. Pilots of departing aircraft should monitor/communicate on the appropriate frequency from start-up, during taxi, and until 10 miles from the airport unless the CFRs or local procedures require otherwise."
[71] According to FAA AC 150/5190-7, Minimum Standards for Commercial Aeronautical Activities, a fixed-base operator (FBO) "is a commercial business granted the right by the airport sponsor to operate on an airport and provide aeronautical services such as fueling, hangaring, tie-down and parking, aircraft rental, aircraft maintenance, flight instruction, etc."
[72] For additional airport information, see Survival Factors Group Chairman's Factual Report.
[73] Source: FAA Form 5010, as of December 31, 2011. See FAA AC 150/5200-35A, Submitting the Airport Master Record in Order to Activate a New Airport, http://www.gcr1.com/5010web/airport.cfm?Site=HQU&AptSecNum=0.
[74] Source: FAA Airport Facility Directory, see http://aeronav.faa.gov/pdfs/se_202_17OCT2013.pdf .

12.1 Charts[75]

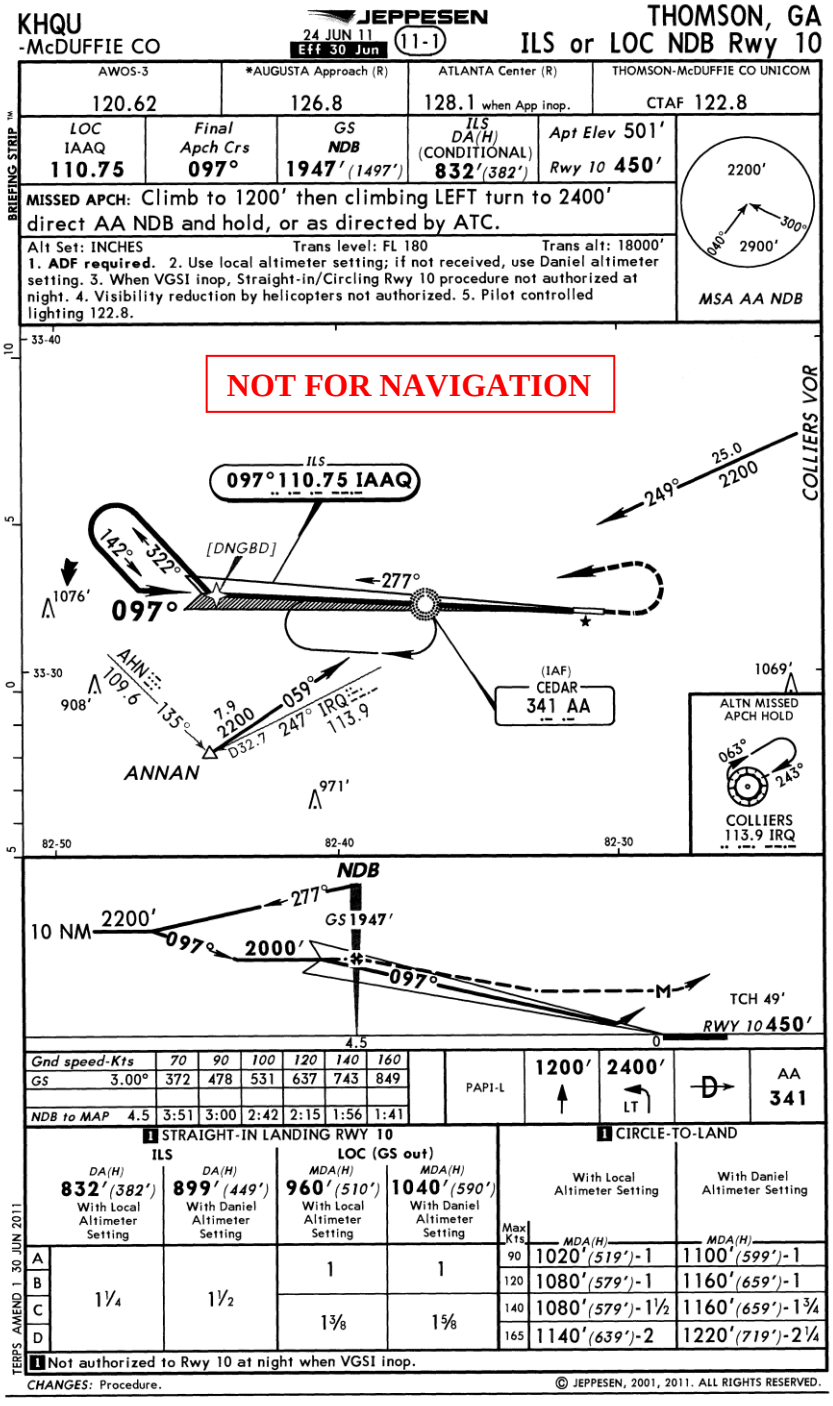
12.1.1 Airport Chart



[76]

[75] For additional approach charts, see Attachment 9 – Charts.
[76] Source: Jeppesen.

12.1.2 ILS Runway 10 Approach Chart



[77]

[77] Source: Jeppesen.

12.2 Airport Lighting

12.2.1 Runway and Taxiway Light Intensities

According to interviews, the co-pilot stated that he turned the runway lights to low as the airplane approached the runway at HQU. On February 21, 2013, Safety Board staff documented the airport lighting, including runway and taxiway light intensities at the same time as the accident flight the previous evening. The image shown in Photo 9 below showed what appeared to be the accident airplane at the approximately arrival time at HQU on February 20, 2013.[78]

NTSB staff documented the airport lighting via the same security camera images at the approximate time of the accident from the previous evening in generally identical weather conditions. Investigators used a hand-held transmitter to key the runway lights using the CTAF frequency (122.8) to initiate airport runway and taxiway lighting to intensities of low, medium and high, and documented each setting to compare to the security camera images from the evening of the accident.

Photo 7: View looking down runway 10 during daylight (2/21/2013).[79]

[78] For further information, see Aircraft Performance Group Chairman Factual Report.
[79] Photo taken by the Ops Group Chairman on February 21, 2013.

Photo 8: Screen shot of security camera video of accident airplane (2/20/2013 at 20:06:01 EST)

Photo 9: Screen shot video the following night (2/21/2013), runway lights on low intensity.

Photo 10: Screen shot video the following night (2/21/2013), runway lights on medium intensity.

Photo 11: Screen shot video the following night (2/21/2013), runway lights on high intensity.

13.0 Organizational and Management Information

According to its website,[80] The Vein Guys® was a group of four doctors[81] that operated several vein care centers in the United States, offering treatment of varicose veins, spider veins, leg pain and leg veins. They had offices located in Augusta, Georgia; Atlanta, Georgia; Nashville, Tennessee; and Raleigh, North Carolina.[82] According to interviews, the Pavilion Group was a subsidiary established by the owners of The Vein Guys® to handle all business activities associated with the ownership and operation of its private airplane, which it used to shuttle doctors and staff between their offices in Georgia, Tennessee, and North Carolina. The doctors with The Vein Guys® also used the airplane for private flights to vacation destinations.

The Pavilion Group hired Executive Shuttle (owned by the accident captain) to provide pilot services for their airplane and operated under the provisions of 14 CFR Part 91. According to billing records, the Pavilion Group paid the captain $400/day for pilot services on the Premier, and for flights where the captain scheduled a co-pilot, $200/day was paid to the co-pilot. According to the accident captain, the Pavilion Group also paid for the captain's initial and recurrent Premier ground and simulator training at FlightSafety.

[80] Source: http://www.veinguys.com/practice.php.
[81] The co-founder of The Vein Guys® was a passenger on the accident flight.
[82] Following the accident, The Vein Guys® closed their Raleigh, North Carolina office.

According to FAA records, Executive Shuttle was an authorized DBA[83] for Sky's the Limit, a 14 CFR Part 135 certificate holder (Certificate #S2LA).[84] The captain stated in interviews that there was no signed contract between Executive Shuttle and the Pavilion Group (or The Vein Guys®) for pilot services on the Pavilion Group's airplane, and all Premier flights Executive Shuttle operated for the Pavilion Group were conducted under 14 CFR Part 91 flight rules.

Previous to owning the accident airplane, the Pavilion Group owned a King Air 300 (N401BL), and utilized the services of Executive Shuttle pilots to fly their airplane out of Daniel Field Airport (DNL) in Augusta, Georgia. The Pavilion Group sold the King Air to a company in Brazil, and on June 27, 2012 the Pavilion Group purchased the accident airplane (N777VG) and continued to use the pilot services of Executive Shuttle. According to an email sent to the NTSB,[85] the accident captain advised the co-founding doctor of The Vein Guys® that the DNL airport would not accommodate the Premier due to the limited runway length.[86] The doctor informed the captain that he was building a new residence closer to Thomson, Georgia, and already had a vacation home on Lake Oconee (west of Thomson) and the doctor choose HQU to base the Premier.

14.0 Relevant Procedures

The Premier IA FAA Approved Airplane Flight Manual (AFM), P/N 390-590001-0003, was dated March 31, 2005, and contained the normal, abnormal, and emergency procedures for the Premier IA. It also contained the limitations, weight and balance, and performance information for the airplane. The most recent revision was P/N 390-590001-0003C8, and was dated January 31, 2013. According to the Premier IA AFM, it was required to be carried in the airplane at all times per 14 CFR 23.1581,[87] and kept within reach of the pilot during all flight operations.[88] The AFM included the material required to be furnished to the pilot by 14 CFR Part 23.

According to the Hawker Beechcraft Premier I/IA Model 390 AFM, Section 2 – Limitations, page 2-47, single-pilot operations on the Premier required the use of an FAA Approved Abbreviated Pilot Checklist P/N 390-590001-0051. At the time of the accident, the most current version of the FAA Approved Abbreviated Pilot Checklist for the Premier was P/N 390-590001-

[83] "Doing business as." For additional information, see FAA Kirsch-McBreenKopko - (2011) Legal Interpretation.

[84] Sky's the Limit had 3 airplanes on its certificate: one BE58-58 (N62624), one BE90-C90A (N643EA), and one CE-335-335 (N2706A). The accident airplane (N777VG) was not on the Sky's the Limit 14 CFR Part 135 certificate. See Attachment 18 – Sky's the Limit Records.

[85] Email received by the captain's legal counsel on Tuesday June 18, 2013 at 4:31pm . See Attachment 1 – Interview Summaries.

[86] DNL's longest runway length was 4,002 feet.

[87] 14 CFR 23.1581 states that an Airplane Flight Manual must be furnished with each airplane, and it must contain the following: (1) Information required by §§ 23.1583 through 23.1589, (2) Other information that is necessary for safe operation because of design, operating, or handling characteristics, (3) Further information necessary to comply with the relevant operating rules.

[88] 14 CFR 91.9(b) states that no person may operate a U.S.-registered civil aircraft - (1) for which an Airplane or Rotorcraft Flight Manual is required by § 21.5 of this chapter unless there is available in the aircraft a current, approved Airplane or Rotorcraft Flight Manual or the manual provided for in § 121.141, and (2) For which an Airplane or Rotorcraft Flight Manual is not required by § 21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.

0051C, Revision 2 dated November 2010.[89] According to interviews with FlightSafety instructors, pilots on the Premier were taught to use the abbreviated checklist for a system failure. The accident captain also stated he was taught to use the abbreviated checklist for a systems failure. For failures that had an associated performance penalty, Premier pilots were taught to go to a "brown tab" in the checklist to determine the appropriate performance penalty.[90]

Beechcraft also published a Pilot's Operating Manual that included general airplane and systems information on the Premier. At the time of the accident, the most current version of the Hawker Beechcraft Premier I/IA Model 390 POM was P/N 390-590001-0005A6, dated April 5, 2007. The Hawker Beechcraft Premier I/IA Model 390 POM title page included the following statement:

> *This Pilot's Operating Manual is incomplete without a current FAA Approved Airplane Flight Manual, P/N 390-590001-0003. If any inconsistencies exist between the Pilot's Operating Manual and the FAA Approved Flight Manual, the FAA Approved Airplane Fight Manual shall be the governing authority.*

15.0 Landing at HQU

15.1 Anti-skid System Failure[91]

The Premier did not have reverse thrust, and the wheel braking system was the primary means of stopping the airplane on the runway after landing. The main landing gear wheels were equipped with full powered brakes operated by toe action on the rudder pedals. The major components were the anti-skid control unit (ACU), the power brake/anti-skid control valve, and the wheel speed transducers. Emergency braking was accomplished through the emergency/parking brake system. The PARK/EMER BRAKE lever was located on the upper right side pedestal.

The airplane was equipped with an electrically controlled anti-skid system. The system modulates brake pressure to maintain the wheels on the threshold of a skid. The anti-skid system functions when wheel speeds are above approximately 15 knots. According to the Hawker Beechcraft Premier I/IA Model 390 POM, page 3-36, use of the anti-skid system offered protection from skids and could provide consistently shorter landing rolls for all runway conditions.

According to recorded data, on the final approach to HQU the ANTI SKID FAIL annunciator and master caution illuminated in the cockpit on the accident flight when the landing gear was lowered. The master warning/caution system was provided to monitor the operating status of various airplane systems.[92] The ANTI SKID FAIL annunciator would illuminate if a

[89] The FAA Approved Abbreviated Pilot Checklist for the Premier was copyrighted in 2009 by Hawker Beechcraft Corporation/FlightSafety International, Inc.
[90] The "brown tab" was the performance section of the FAA Approved Abbreviated Pilot Checklist.
[91] Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-36.
[92] The system consisted of an annunciator panel, located on the center instrument panel, two MASTER CAUTION push-type switches located on the glare shield, on either side of the flight guidance panel, and two MASTER WARNING push-type switches located immediately outboard of the two MASTER CAUTION switches. The appropriate red MASTER WARNING or amber MASTER CAUTION switches would flash whenever a warning or

malfunction existed in the system when the ANTI SKID switch was in the NORM position. [93] The ANTI SKID FAIL annunciator was an amber annunciator, and according to the Hawker Beechcraft Premier I/IA Model 390 POM, illumination of an amber annunciator identified a caution malfunction which required corrective action, but not necessarily immediate actions.[94]

Photo 12: Premier 390 annunciator panel[95]

15.2 Raytheon Safety Communique[96]

In June 2004, Raytheon Aircraft Company[97] issued a Safety Communique to all owners and operators, Raytheon Aviation Centers, chief pilots, Directors of Operations, Directors of

caution annunciator illuminated. This flashing light could be extinguished by depressing the switch, which would arm the system for any subsequent failure detection.

[93] Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-40.

[94] According to the Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, the annunciator panel had a 70 annunciator capability. Illuminated red annunciators identified warning malfunctions which required immediate corrective action by the flight crew. Illuminated amber annunciators identified caution malfunctions which required corrective action, but not necessarily immediate actions. Illuminated green annunciators were advisory in nature and did not necessarily require any corrective action. Illuminated white annunciators denoted a system status. Illuminated blue annunciators denoted status of systems not involved in actual operation of the airplane. Once illuminated, these annunciators would remain illuminated until the malfunction was corrected (red or amber annunciators) or the status changed (green, white or blue annunciators).

[95] Photo taken April 18, 2013 of Premier 390 exemplar (N145JF) at FlightSafety in Wichita, KS by the Ops Group Chairman.

[96] For additional information, see Attachment 17 –Beechcraft Safety Communique.

[97] A note contained within the Communiques stated the following: "Raytheon Aircraft Company, which has been renamed Hawker Beechcraft Corporation, is now owned by Hawker Beechcraft, Inc. Neither Hawker Beechcraft, Inc., nor Hawker Beechcraft Corporation are affiliated any longer with Raytheon Company. Any Raytheon marks contained in this document are owned by Raytheon Company and are employed pursuant to a limited license granted by Raytheon Company."

Maintenance, all Raytheon Aircraft authorized service centers, and international distributors and dealers entitled "Landing Performance Awareness." The communique contained the following guidance:

> *If the airplane is landing in an abnormal configuration due to a system failure, the normal landing distance should be determined from the appropriate landing distance graph accounting for all the given variables, then increased by the factor identified in the abnormal or emergency procedure.*

According to the FlightSafety Premier instructor who provided recurrent simulator training to the accident captain, FlightSafety provided the communique to all Premier students during both initial and recurrent training, and the information contained in the Communique was incorporated in the Premier POM.

15.3 Anti-Skid Failure Procedure

Pilots receiving training at FlightSafety on the Premier were taught to utilize the FAA Approved Abbreviated Pilot Checklist to handle systems malfunctions. A failure of the anti-skid system was included in Abnormal Procedures section of the FAA Approved Abbreviated Pilot Checklist. Upon receiving the annunciator for an anti-skid failure, the pilots were taught to access the abbreviated checklist and follow the instructions provided in the checklist. The checklist procedure for a failure of the anti-skid system stated the following: [98]

1. *Anti-skid . . . . . OFF*
2. *Landing . . . . . FLAPS UP OR 10*
3. *See FLAPS UP, 10 or 20 APPROACH AND LANDING Procedures; Tab3, page A-8.*
4. *Apply brakes steadily, gradually increasing force to avoid skidding tires.*

NOTE

Landing Distance will increase approximately:

FLAPS UP – 130%

FLAPS 10 – 89%

According to the checklist, the pilot would place the anti-skid switch to OFF, [99] and plan for a flaps 10 or flaps UP landing by referencing the FLAPS UP, 10 or 20 APPROACH AND LANDING Procedures; Tab 3, page A-8, which stated the following:

1. *Crew Briefing .....COMPLETE*
2. *TCAS .....AS REQUIRED*
3. *Fuel Management .....CHECK*

[98] Hawker Beechcraft Premier I/IA FAA Approved Abbreviated Pilot Checklist — Model 390, Abnormal Procedures, page A-30.

[99] The two-position toggle switch was located on the pilot's right subpanel adjacent to the landing gear control handle. With the ANTI SKID switch in the NORM position, power was supplied to the system. The anti-skid system may be shut off by moving the ANTI SKID switch to OFF. Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-40.

4. VREF, VAC, N1 Ref and Landing Distance.....CONFIRM/SET FOR LANDING FLAP SETTING
5. Cabin Signs.....NO SMOKE/SEAT BELTS
6. Seats.....POSITION FOR LANDING
7. Engine Sync .....OFF
8. Ignitions .....ON
9. Landing Lights .....ON
10. Recognition Lights .....AS DESIRED
11. EGPWS FLAP OVRD.....SELECT
12. Landing Gear.....DN
13. Lift Dump .....UNLOCK, HANDLE ILLUMINATED, J-HOOK CLEAR
14. Flaps .....SET FOR LANDING
15. Speed Brakes .....,,,,,RETRACT

WARNING: Failure to retract speed brakes prior to landing may result in roll spoiler, speed brake and lift dump failures when lift dump is extended after touchdown. Full or partial lift dump effectiveness may be lost.

16. Autopilot……DISENGAGE
17. Airspeed ……(Flaps UP) Vref+20 KIAS
(Flaps 10) Vref+10 KIAS
(Flaps 20) Vref+5 KIAS
18. Yaw Damp ……OFF
19. Thrust …….. IDLE
20. Brakes (After Touchdown) …….. APPLY
21. Pitch Attitude …….. NOSE WHEEL ON GROUND
22. Lift Dump …….. EXTEND

NOTE: Landing Distance will increase approximately:
Flaps UP – 60%
Flaps 10 – 34%
Flaps 20 – 16%

The Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-96 (Landing Distance Determination) stated the following:

If the airplane is landing in an abnormal configuration due to a systems failure, the normal landing distance should be determined from the appropriate landing distance graph accounting for all given variables, then increased by the factor identified in the abnormal or emergency procedure.

According to the Anti-skid Failure checklist, the pilot was required to account for the loss of the anti-skid system by applying a performance penalty to the normal landing distance, depending on the landing flap configuration the pilot selected (flaps 10 or flaps UP), and determine the required landing distance with the anti-skid inoperative (step 4 of the FLAPS UP, 10 or 20 APPROACH AND LANDING Procedures). According to the Premier POM and Beechcraft

Safety Communique for a system failure, the normal landing distance should be determined from the appropriate landing distance graph accounting for all the given variables, then increased by the factor identified in the abnormal or emergency procedure.

To determine the normal landing distance, the Premier pilots were taught to refer to the performance section of the FAA Approved Abbreviated Pilot Checklist. Depending on the selected flaps for landing (flaps 10 or flaps UP for an anti-skid inoperative), the pilot must then apply the performance penalty (89% or 130% respectively) to the normal planned landing distance to determine if the runway of intended landing was long enough to land on with the anti-skid failed.[100]

For example, with the anti-skid system failed, Premier pilots were taught to land either with flaps 10 or flaps UP. The pilot would first determine the normal landing distance by referencing FAA Approved Abbreviated Pilot Checklist, Performance section, page 57 "Landing Distance - Feet – (Unfactored) – Dry" chart for the aircraft weight (10,510.4 lbs), temperature (9°C), and field elevation (using 501 feet for the HQU field elevation). Using the 10°C column and interpolating between 11,000 pound and 10,000 pound landing weight charts (3141 feet and 3002 feet respectively), the normal landing distance could be estimated as 3,072 feet. The pilot would then apply the performance penalty to this landing distance. In this example, if the pilot elected to land with flaps UP and the anti-skid inoperative, the 130% performance penalty would be 3,994 feet. This would equate to a required landing distance of 7,066. Subsequently, if the pilot elected to land flaps 10, the 89% performance penalty would be 2,734 feet. This would equate to a required landing distance of 5,806. The pilot would then have to compare the required landing distances and the available landing distances for the runway of intended landing to determine if the airplane could land or require a divert to a longer runway. In this example, HQU runway 10's available runway length for landing was 5,208 feet, which did not meet the flaps up or flaps 10 performance penalty requirements. [101]

On June 17, 2013, both pilots listened to the cockpit voice recorder (CVR) for the accident flight, and according to interviews following that review of the CVR, neither pilot recalled seeing the ANTI SKID FAIL annunciator light illuminated on the approach. According to interviews with both pilot's and recorded information, the ANTI SKID FAIL abnormal checklist as outlined in the FAA Approved Abbreviated Pilot Checklist for the Premier was not conducted by the accident crew prior to landing at HVQ. Further, the captain stated that he did not think they needed the anti-skid system on the landing at HVQ, and said the performance penalty would only apply if you were "trying to make your numbers" in the book made by the test pilots by applying maximum braking.[102]

15.4 Landing Configuration for Anti-skid Failure

The Premier was equipped with two single slotted Fowler-type flaps on each wing. The flap panels were electronically/electrically controlled, monitored, and actuated in a closed loop

[100] See Section 15.3 "Raytheon Safety Communique" of this report and Attachment 17 –Beechcraft Safety Communique

[101] For additional information, see the Aircraft Performance Group Chairman's Factual Report.

[102] See Attachment 1 – Interview Summaries.

positioning system. Flap movement was provided by the Flap Control Unit (FCU) and motor driven actuators, one on each end of each flap, in response to movement of the flap control lever located on the center pedestal. The flap control lever had four positions: UP, 10, 20, and DN. The FCU commanded the motor driven actuators to move the flaps to the desired position. The normal flap position for landing was DN. According to the Premier abnormal checklist, the required flap configuration for a landing with the anti-skid failed was flaps 10 or flaps UP. Preliminary recorded information indicated that the flaps on the accident airplane were extended to the DN position (full) on landing. The Hawker Beechcraft Premier AFM Anti-Skid Fail procedure had the following note:

> *Use of flaps 20 or DN for landing, with anti-skid failed, is prohibited.*[103]

Beechcraft was asked by NTSB Staff the reason for requiring a flaps 10 or flaps UP configuration when landing with the anti-skid system inoperative, and received the following response:[104]

> *If the Antiskid is failed and the pilot lands with Flaps Down and subsequently has a failure of the Lift Dump to deploy, there is not sufficient weight on the main wheels at landing speeds so the pilot can reliably modulate the power brakes at the low brake pressures needed to prevent excessive skidding. The pilot may blow the tires in this scenario. This is not an issue with Lift Dump deployed.*
>
> *Even though the Lift Dump is indicated to be working the AFM procedures direct the pilot away from the ANTISKID fail and Flaps Down configuration (higher probability for blown tires) and accept the longer landing distance and more reliable power braking associated with the Flaps 10 (or UP) configuration. The pilot must therefore choose a sufficiently long runway to land when an ANTISKID failure is annunciated in flight.*

16.0 Training for Systems Failures

For systems failures, Premier pilots could reference an electronic checklist[105] or a written checklist (FAA Approved Abbreviated Pilot Checklist). According to interviews, the captain stated that FlightSafety taught him to use the written checklist for systems failures since it was so difficult to navigate out of the electronic checklist. The simulator instructor who provided initial training to the captain stated in an interview that he would expect the pilot to use the written checklist for a systems failure, determine the proper flap setting for landing, and then apply the performance penalty for the landing, adding that the anti-skid failure checklist emphasized that the landing must be made with only flaps 10 or UP.

[103] Source: Hawker Beechcraft Premier I/1A Model 390 AFM, Section 3A – Abnormal Procedures, A-33.
[104] Per email response received Tuesday June 25, 2013 at 3:33 PM from the Beechcraft Premier 390 Test Pilot to the NTSB Ops Group Chairman.
[105] The Collins Pro Line 21 installed on the Premier had a Maintenance Diagnostic Computer (MDC) that provided checklist functions including normal, abnormal and emergency checklists that could be displayed on the Multi-Functional Display (MFD)

According to a review of the captain's FlightSafety training records, on June 12, 2012 (day 5 of Premier initial ground school) the captain received instruction on the landing gear and brakes, and on January 5, 2013 he received recurrent ground instruction on landing gear and brakes.

The captain stated in interviews that he had training on system failures that required the use of the checklist and was taught that when an annunciator light came on, "you would put the airplane on auto-pilot and then get the checklist."[106] Training records indicated that the captain received multiple abnormal training events during initial and recurrent simulator training at FlightSafety requiring the use of the FAA Approved Abbreviated Pilot Checklist. The captain stated he did not specifically remember receiving an anti-skid light during the accident flight or conducting required procedures for that light while in training at FlightSafety. He did not recall if there was a procedure in the checklist specifically addressing an anti-skid failure. However, a review of the captain's FlightSafety training records indicated that on January 4, 2013 he received training on an anti-skid failure during recurrent simulator training.

According to a FlightSafety Premier simulator instructor, the anti-skid system was "very important.[107] If you lost the anti-skid system, the performance penalty was similar to loss of the hydraulics."[108] According to the Hawker Beechcraft Premier I/IA FAA Approved Abbreviated Pilot Checklist, Abnormal Procedures, page A-28, a total hydraulic failure required a landing be accomplished with a flaps UP configuration and the pilot to calculate a performance penalty for landing with the flaps UP.[109] A review of the captain's training records indicated that on June 20, 2012 the captain received initial Premier simulator training on a hydraulic failure, and on January 4, 2013 the captain received recurrent Premier simulator training on a hydraulic failure.

According to interviews, the captain said he did not think they needed the anti-skid system on the landing at Thomson, and did not remember what the checklist items were for an anti-skid system failure and would have to refer to the checklist. He further stated that if he had an anti-skid failure, he should go to the checklist. The captain did not remember getting the anti-skid annunciator light on the accident flight, and said he had never had it before.

17.0 Balked Landing/Go Around[110]

According to recorded data and witness interviews/statements, the accident flight executed a go-around after landing at Thomson, GA. The captain had no recollection of the event during interviews, while the co-pilot stated they conducted a go-around after the airplane had touched down. Premier procedures defined a discontinued landing approach as a "balked landing."

[106] See Attachment 1 – Interview Summaries.
[107] According to a FlightSafety Premier instructor, FlightSafety did not encourage land and hold short (LAHSO) on the Premier since it did not have thrust reversers. A review of the captain's training record indicated that he did not receive training on LAHSO operations on the Premier.
[108] See Attachment 1 – Interview Summaries.
[109] According to the FLAPS UP, 10, OR 20 APPROACH AND LANDING checklist, the performance penalty for landing with the flaps up was 60%. The Anti-skid Fail checklist for the Premier provided the pilot with the option of a flaps up or flaps 10 landing (see Section 15.2, "Anti-Skid Failure Procedure" of this Facutal report). For a flaps up landing, the anti-skid fail performance penalty was 130%.
[110] The following information was derived from a series of FAA responses to NTSB inquires, and interviews. For additional information, see Attachment 22 – FAA Responses, and Attachment 1 – Interview Summaries.

According to the Airplane Flying Handbook (FAA-H-8083, page G-2), a balked landing was synonymous with a go-around. Per the FAA Pilot/Controller Glossary, a go-around was a situation when a pilot abandons his/her approach to land. The term go-around was further explained in the FAA Airplane Flying Handbook (page 8-11) stating that a go-around may be warranted whenever landing conditions are not satisfactory, such as unmet air traffic control requirements, unexpected appearance of hazards on the runway, wind shear, wake turbulence, mechanical failure, and/or an unstabilized approach. According to the FAA, a go-around allowed a pilot to discontinue a landing approach and make another approach under more favorable conditions. A go-around was a normal maneuver which was emphasized and practiced early on in the student pilot training and is required to be demonstrated during practical tests.

According to the FAA Aeronautical Information Manual (AIM, page PCG T-4), a touchdown was the point at which an aircraft first made contact with the landing surfaces. The Airplane Flying Handbook (FAA-H-8083-3A), page 8-7 explained that the landing process was not over until the airplane decelerated to a normal taxi speed or comes to a complete stop. The Airplane Flying Handbook did not explicitly indicate that a go-around/balked landing could be initiated after first contact with the landing surface. However, according to the FAA, it was expected that a pilot may execute a balked landing/go-around if he/she determined that, after first contact with the landing surface, positive control had not been maintained or if continuing the landing process may expose the aircraft to unsafe conditions such as an unexpected appearance of hazards on the runway.

According to the Hawker Beechcraft Premier I/IA FAA Approved Abbreviated Pilot Checklist, Normal Procedures, page N-12, the Balked Landing checklist stated the following:

1. Thrust.....TAKEOFF
2. Climb Airspeed.....VREF
When positive climb is established:
3. Flaps.....10
4. Landing Gear.....UP
5. Yaw Damp .....ON
6. Flaps.....UP
7. Lift Dump.....LOCK, HANDLE EXTINGUISHED
8. Landing Light.....OFF

FlightSafety Premier instructors and evaluators in Wichita, KS and Wilmington, DE, during interviews with Staff, stated that a balked landing was considered an airborne maneuver typically taught to be performed at an altitude of 50 feet on the approach, and Premier pilots were not taught to execute a balked landing in the Premier following touchdown on the runway. The FlightSafety instructors and evaluators also stated that they discouraged students from executing a balked landing after touchdown. NTSB Staff reviewed Hawker Beechcraft Premier manuals and FlightSafety training guidance for the Premier, and could not find language prohibiting a balked landing procedure after touchdown.[111]

[111] It is Beechcraft's position that a balked landing is an in air maneuver initiated at or prior to the 50-foot point on the approach. The Model 390 was certified to meet this requirement, and according to Beechcraft the use of the term Balked Landing in the AFM meets the requirements of 14 CFR 23.1585 (a)(5).

The captain told investigators he did not recall if anyone at FlightSafety told him not to conduct a go-around or balked landing after touching down during his training. The captain also stated that the only balked landings he conducted in training were while airborne. When asked by investigators if he recalled anyone at FlightSafety telling him not to conduct a go-around or balked landing after touching down, the captain said "no," and he did not recall anyone telling him that during his training. The captain further stated that a balked landing was something that occurred in the air, and on the ground it was called a "touch and go." The captain did not remember ever doing a touch and go in the simulator, and had never done one in the actual airplane.[112]

18.0 Relevant Systems[113]

The following information was obtained from Hawker Beechcraft Corporation Pilot Operating Manual, Premier I/IA Model 390, Section III – Systems Description, issued May 23, 2001, and revised April 5, 2007.

18.1 Wheel Brake System[114]

The accident airplane was equipped with a brake control system that contained a hydraulically actuated brake control valve. That system consisted of rudder pedal master cylinders, volume compensators, a pressure reducing valve, power brake/anti-skid control valve, brake accumulator and pressure gauge. The system operated at a reduced hydraulic pressure of 1450 PSI. The brake control system could supply a maximum of 1500 PSI to each brake assembly.

18.1.1 Power Brake System[115]

Normal power braking was available at all times whether the anti-skid system was activated or not. When the anti-skid system was turned off (or inoperative), the power brake system operated in the power brake mode, allowing hydraulic pressure from the power brake/anti-skid control valve to be applied to the brakes relative to the pressure that was applied to the rudder/brake pedals. The power brake system could provide sufficient brake pressure to the brakes to stop wheel rotation under most runway conditions, aircraft configurations and speed.

According to the Hawker Beechcraft Premier I/IA Model 390 POM, the pilot must be careful when applying brakes without the assistance of anti-skid so as not to skid the tires. Excessive skidding would likely result in tire failure. The Hawker Beechcraft Premier I/IA Model 390 POM, page 3-36, provided the following note:

> *The power brake system is used with or without the anti-skid system.*

[112] See Attachment 1 – Interview Summaries.
[113] For more detailed systems information, see Systems Group Chairman's Factual Report.
[114] Source Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-36.
[115] Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-36.

18.1.2 Parking/Emergency Brake[116]

The emergency brake system can be operated by lifting and releasing the PARK/EMER BRAKE lever. The lever is connected to the emergency brake valve. Lifting the PARK/EMERG BRAKE lever opened the emergency brake valve, releasing hydraulic pressure stored in the emergency hydraulic accumulator. The released pressure is applied to the shuttle valve in the brake assembly, applying the airplane's brakes. When the PARK/EMERG BRAKE lever was released, the emergency brake valve closed, cutting off the hydraulic supply from the emergency hydraulic accumulator, and opened the hydraulic return to the brakes, releasing brake pressure.

18.2 Speed Brake and Lift Dump System[117]

The outboard and middle spoilers were used as a speed brake as well as for roll control when airborne and, along with the inboard spoilers, for lift dump on the ground. The speed brake function is electrically controlled by the SPEED BRAKE switch located on the center pedestal. The Lift Dump function is electrically controlled by the Lift Dump Handle located in the center pedestal extension. The spoilers were hydraulically operated.

18.2.1 Normal Operation – Speed Brake – Lift Dump[118]

According to interviews, the captain stated his own procedure was to touch down at 1000 feet, and get the nose down by about 1500 feet down the runway. He would then get the lift dump out immediately and start applying the brakes. According to interviews, neither pilot could recall if the lift dump was commanded to extend after landing at Thomson, GA.

The Lift Dump function is controlled by the LIFT DUMP handle located on the center pedestal extension. The LIFT DUMP handle is mechanically protected from an inadvertent selection by means of a lever locked safety switch, placarded LOCK/UNLOCK, located adjacent to the LIFT DUMP handle on the center pedestal extension.

[116]Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-40.
[117] Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-57.
[118] Source: Hawker Beechcraft Premier I/IA Model 390 POM, Section III – Systems Description, page 3-57.

Photo 13: Lift dump handle in the locked position (arrow points to mechanical LOCK RELEASE button)[119]

Photo 14: Lift dump handle in the unlocked position (arrow points to mechanical LOCK RELEASE button)[120]

The process of selecting the LOCK/UNLOCK safety switch to UNLOCK illuminated the LIFT DUMP handle and energized a solenoid which removed a gate from the LIFT DUMP handle

[119] Photo taken April 18, 2013 of Premier 390 simulator at FlightSafety in Wichita, KS by the Ops Group Chairman.
[120] Photo taken April 18, 2013 of Premier 390 simulator at FlightSafety in Wichita, KS by the Ops Group Chairman.

allowing the LIFT DUMP handle to be raised out of its detent and transitioned aft to the deploy position.

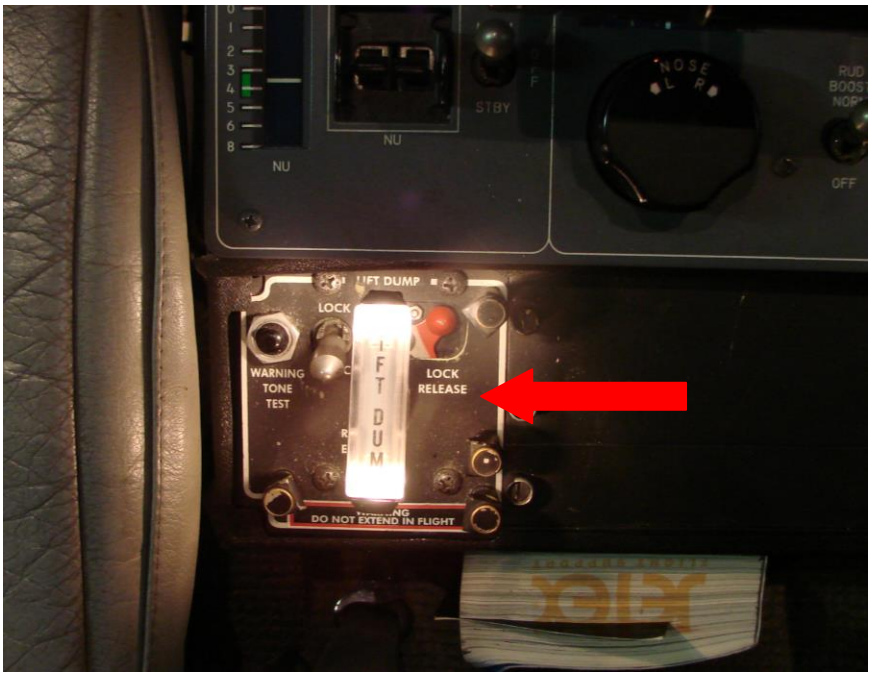


Photo 15: Lift Dump Handle (illuminated in the "unlocked" position). The handle is in the "up" unextended position.[121]

In the event that the solenoid failed a mechanical LOCK RELEASE button was provided which manually performed the function of the LOCK/UNLOCK safety switch. When the LIFT DUMP handle is placed in the EXT position, the Spoiler Control Unit (SCU) activates the LIFT DUMP function and extended the outboard, middle and inboard spoilers accordingly. Command of LIFT DUMP would override mixed roll spoiler and speed brake commands.

By design, a failure of the Lift Dump spoilers following an extension of the LIFT DUMP handle would be identified by an amber caution annunciator labeled LIFT DUMP FAIL together with an associated flashing of the amber MASTER CAUTION switch and a unique 430 Hz and 1,000 Hz continuous alternating siren. The logic for the this siren is weight-on-wheels (WOW), and would only be heard in the cockpit when the airplane was on the ground. On July 17, 2013, investigators conducted simulator testing in the Premier 390 simulator at the FlightSafety Training Center in Wilmington, Delaware.[122] During flights in the simulator, the lift dump handle was extended while airborne, and there was no continuous alternating siren heard while the lift dump was extended in flight.

According to Beechcraft, the LIFT DUMP FAIL alternating siren also had a higher priority than the Takeoff Configuration aural warning. A simultaneous failure of the lift dump system on the

[121] Photo taken February 22, 2013 of exemplar Premier at HQU airport by the Ops Group Chairman. According to Beechcraft, this picture is of a kited lift dump handle and not a production representative lift dump handle which was installed on RB-208

[122] See Attachment 21 – Simulator Notes

ground during a takeoff with an Takeoff Configuration Warning would result in the lift dump fail alternating siren being heard in the cockpit. NTSB Staff could find no evidence that the LIFT DUMP FAIL annunciator illuminated or the associated alternating siren sounded during the accident flight.

18.2.2 Lift Dump Use in Flight[123]

Placards were included to remind the flight crew and occupants of operating limitations and safety device limitations. The cockpit placards illustrated typical placards pertinent to operations and safety of flight.

On the pedestal immediately aft of LIFT DUMP handle the following placard was required to be installed:

WARNING
DO NOT EXTEND IN FLIGHT

Photo 16: Lift dump required placard[124]

In addition, the Hawker Beechcraft Premier I/IA Model 390 AFM, Section 2 – Limitations (All Operations), page 2-18, stated:

Do not extend lift dump in flight

[123] Hawker Beechcraft Premier I/IA Model 390 AFM, Section 2 – Limitations, page 2-21.
[124] Photo taken April 18, 2013 of Premier 390 simulator at FlightSafety in Wichita, KS by the Ops Group Chairman. This picture is of a lift dump handle with no power on the aircraft. During operation with the lift dump UNLOCKED the lift dump handle would be illuminated. See Section 18.2.1. "Normal Operation – Speed Brake – Lift Dump" of this Factual Report.

The Hawker Beechcraft Premier I/1A Model 390 AFM, Section 3A – Abnormal Procedures page A-25 included the following warning:

> *Extending lift dump in flight could result in loss of airplane control leading to airplane damage and injury to personnel. Continued safe flight with lift dump extended has not been demonstrated.*

18.3 Take-off Configuration Warning System[125]

According to recorded information, during the attempted balked landing (go-around) after landing, the Take-off Configuration Warning horn sounded while the airplane was on the ground. On July 17, 2013, NTSB Staff conducted simulated balked landings (go-arounds) after landing in the Premier 390 simulator at the FlightSafety Training Center in Wilmington, Delaware.[126] During each of the simulated balked landings (go-arounds) after touchdown, the Take-off Configuration Warning horn sounded until the airplane became airborne.

The Take-off Configuration Warning System was a non-complex system whose main components were five relays, three diodes, two throttle switch inputs, a master test switch input, a spoiler control unit, a pitch trim input, a flap control unit input, and an output to the audio system so that a 500 (+/- 50) Hz continuous aural warning would be annunciated to the cockpit.

The Take-off Configuration Warning System provides an automatic aural warning to the flight crew during the initial portion of take-off if the airplane was in a configuration that would not allow for a safe take-off. The aural warning would continue until the airplane's configuration was changed to allow for safe take-off, until action was taken by the pilot to abandon take-off roll, or until weight goes off wheels.

An aural warning in the cockpit would sound when a 28 VDC input signal is received due to an out of configuration input:

Spoiler input:
- Both roll/speed brake surfaces are greater than 1°.
- Either speed brake/lift dump lever sensors are in the extended range.
- Either lift dump surface has not retracted.

Flaps:
- Either flap position is greater than 22°.
- Flap fail signal has been inputted to the Take-off Configuration Warning System controller.

Pitch trim:

[125] Information on the Premier aural warning system provided to the NTSB by Beechcraft in a letter dated July 23, 2013.
[126] See Attachment 21 – Simulator Notes.

• Pitch trim actuator signal (one signal) is output when horizontal stabilizer angle is less than 3.18° ± 0.10° or greater than 4.39° ± 0.10° (leading edge down position), and either the right or left thrust lever is advanced past 80% N1 engine speed.

The take-off configuration accepts inputs from the right and left thrust levers, flap system, the pitch trim system and the spoiler system. Annunciation of an out of take-off configuration is accomplished by activating an aural warning tone. The take-off configuration warning system would be armed if the airplane has been on the ground with electrical power applied and either thrust lever set at 80% N1 or greater. Once armed, the aural warning tone would be activated if the flaps, pitch trim, or spoilers were not in approved take-off positions. Retarding the thrust levers or placing the appropriate surface in an approved take-off position would cause the configuration warning tone to silence. The logic for the system includes weight-on-wheels, and the warning horn would only be heard in the cockpit while the airplane was on the ground.

18.4 Flap System

The airplane was equipped with two single slotted Fowler-type flaps on each wing. The flap panels were electronically/electrically controlled, monitored, and actuated in a closed loop positioning system. Flap movement was provided by the Flap Control Unit (FCU) and motor driven actuators, one on each end of each flap, in response to movement of the flap control lever located on the center pedestal. The flap control lever had four positions: UP, 10, 20, and DN. The FCU commanded the motor driven actuators to move the flaps to the desired position. A position sensor on each actuator provided continuous position feedback to the FCU. Upon reaching the commanded position, electrical power was removed from the motors and passive magnetic motor braking prevented further flap movement until the flap control lever was repositioned. A sensor in the right wing box provided information to the flap position indicator on the center pedestal.

The normal flap setting for the Premier was 10 degrees for takeoff, however performance numbers were available for flaps zero, 10 and 20 degrees. NTSB Staff was able to demonstrate the operation of the flap system on an exemplar Premier at Thomson, GA on February 22, 2013. According to the Beechcraft Senior Sales Demonstration Pilot, go-around flaps were gated at the 10 degree flap position.

Photo 17: Flap Handle in the UP position (arrow)[127]

18.5 Go-Around Button

The accident airplane was installed with a Pro Line 21 avionics system. Included in the Pro Line 21 avionics system was a feature called a go-around switch. According to the Pro Line 21 Avionics System Pilot's Guide, page 8-16 (dated November 1, 1989), the go-around mode was selected by pressing the throttle mounted GA (go-around) switch. Selection was inhibited when Preselect Mode was active, and when Overspeed mode was active. Selection of the go-around mode disengaged the autopilot and activated both flight directors. The yaw damper remained engaged.[128]

The flight directors displayed a fixed 10° pitch-up and heading-hold command. In flight, the heading reference was reset to the current aircraft heading. On the ground, the heading reference was continuously reset to the current heading.

Engaging the autopilot cleared the go around mode. Selecting another lateral or vertical mode also cleared the go around mode. The SYNC switch operation cleared the go around mode and selected basic pitch and roll modes.

[127] Photo taken February 22, 2013 of exemplar Premier at HQU airport by the Ops Group Chairman.
[128] For further information, see Attachment 14 – Collins Pro Line 21 Pilot's Guide.

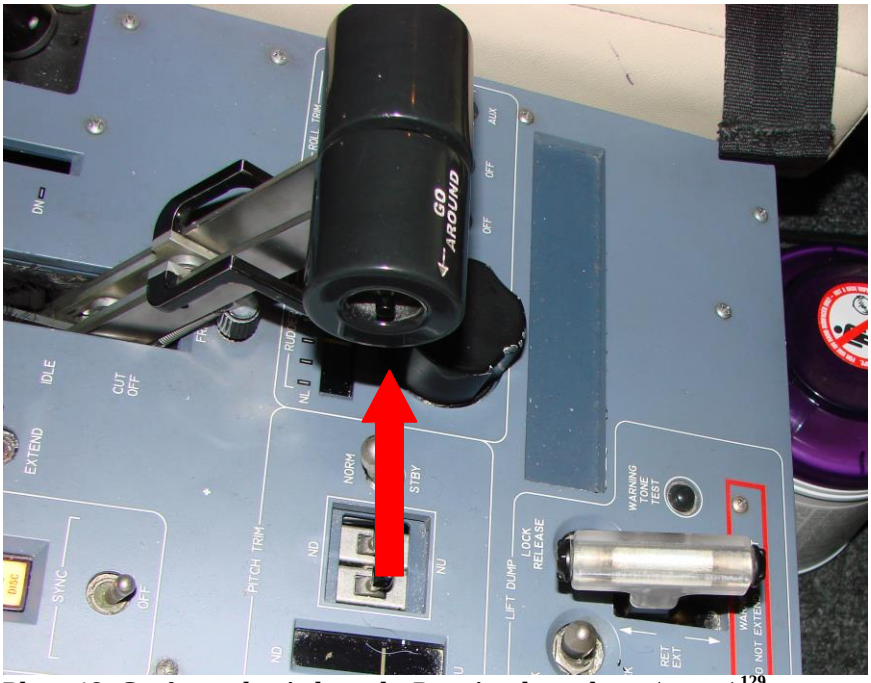


Photo 18: Go-Around switch on the Premier thrust lever (arrow)[129]

According to interviews with FlightSafety Premier instructors and evaluators, Premier pilots were taught a "power, pickle, pitch" technique for a balked landing, where the pilot would first apply power for the balked landing (power), then select the GA switch for pitch guidance (pickle) and then pitch the airplane up into the flight director command bars (pitch). This technique was not defined in the Premier POM or Hawker Beechcraft Premier I/IA FAA Approved Abbreviated Pilot Checklist or in training guidance provided by FlightSafety, and a review of the Premier Balked Landing Checklist indicated that use of the GA switch was not included in the balked landing procedure.[130]

The captain stated in interviews that he was taught to use the GA switch for balked landings, but had never had to use the GA switch during regular flight operations on the Premier. He did not remember if he used the GA switch during the accident flight.

19.0 FAA Oversight

As previously stated in this Factual, Executive Shuttle was an authorized DBA for Sky's the Limit, a 14 CFR Part 135 certificate holder (Certificate #S2LA). The captain told NTSB Staff that there was no signed contract between Executive Shuttle and the Pavilion Group (or The Vein Guys®) for pilot services on the Pavilion Group's airplane, and all flights Executive Shuttle operated for Pavilion on the Premier were conducted under 14 CFR Part 91 flight rules. A review of the Sky's the Limit Operations Specifications confirmed that the accident airplane (N777VG) was not on the Sky's the Limit 14 CFR Part 135 certificate.[131] There was no FAA

[129] Photo taken April 18, 2013 of Premier 390 simulator at FlightSafety in Wichita, KS by the Ops Group Chairman.
[130] See Section 17.0 "Balked Landing/Go Around" of this Factual report and Attachment 8 – Premier Checklists.
[131] See Attachment 13 - Sky's the Limit Information.

principal operations inspector (POI) required for oversight of the operation of N777VG under 14 CFR Part 91.

FlightSafety Training Centers operated under a single FAA 14 CFR Part 142 certificate, based in New York. The FlightSafety Premier training program had one FAA training center program manager (TCPM)[132] assigned to the oversight of the Premier training, and about 10 training center evaluators (TCEs) assigned to conduct Premier training and check rides for FlightSafety. Each TCE was observed by the TCPM conducting a check ride at least once each year. The certificate management office (CMO) also conducted a TCE course at FlightSafety every year where they went through all the changes in the training. The TCE course was 8 hours for the initial and 4 hours for the recurrent training, and according to the TCPM, they were conducted to keep the program standardized. The TCPM stated that she had not seen any issues with the FlightSafety Premier training during her oversight of the program. According to the Premier program TCPM, about 80-85% of the Premier training conducted at FlightSafety was for a single pilot type rating.

20.0 Aviation Safety Reporting System (ASRS) Reports

A search for "Premier" found 51 voluntary reports. Only one involved a stopping issue following landing.

ACN: 619634
Narrative:
THIS WAS A PART 91 REPOSITION FLT. ON APCH TO RWY 7, VGT TWR RPTED A VARIABLE WIND FROM THE S. MY TRACK AND LNDG INDICATED VERY LITTLE WIND AT ALL. ON TOUCHDOWN, BRAKES WERE APPLIED. NO BRAKES WERE SENSED BY ME AND MY PAX (IN THE FRONT R SEAT). I STAYED ON THE BRAKES COUNTING ON THE ANTI-SKID SYS TO WORK AS THIS IS THE ONLY WAY TO STOP THE ACFT. (NO PUMPING) WE WENT OFF THE END OF THE RWY INTO THE DESERT. MY CORRECTIVE ACTIONS? IS TO OPERATE TO PART 135 LNDG DISTANCES EVEN THOUGH WE ARE A PART 91 OPERATOR. AND BE PREPARED TO GO AROUND, IF I SENSE THE BRAKES HAVE FAILED.

Synopsis
A RAYTHEON PREMIER 1 LOOSES ITS BRAKES AT TOUCHDOWN RESULTING IN A RWY EXCURSION.

21.0 Previous Recommendations and Guidance

(A-11-18) Require manufacturers of newly certificated and in-service turbine-powered aircraft to incorporate in their Aircraft Flight Manuals a committed-to-stop point in the landing sequence

[132] According to FAA 8900.1 Vokume 6, Surveillance, Chapter 8, "Part 142 Surveillance," training center program managers (TCPM) have regulatory oversight responsibility for certificated 14 CFR, part 142 training centers and the task of determining if a certificated training center continues to meet the requirements of their initial certification as defined during the certification process.

(for example, in the case of the Hawker Beechcraft 125-800A airplane, once lift dump is deployed) beyond which a go-around should not be attempted.[133]

F. LIST OF ATTACHMENTS

Attachment 1 - Interview Summaries
Attachment 2 – Flight Crew Records
Attachment 3 – Premier Training Syllabus
Attachment 4 – Captain Training Records
Attachment 5 – Aircraft Registration
Attachment 6 – Weight and Balance
Attachment 7 – ATC Information
Attachment 8 – Premier Checklists
Attachment 9 - Charts
Attachment 10 - NOTAMS
Attachment 11 – Executive Shuttle Billing Records
Attachment 12 – Weather
Attachment 13 – Sky's the Limit Information
Attachment 14 – Collins Pro Line 21 Pilot's Guide
Attachment 15 – FlightSafety Documents
Attachment 16 – RB-208 Spec Sheet
Attachment 17 - Ratheon Safety Communique
Attachment 18 - Premier Type Certificate
Attachment 19 - Premier Landing and Technique
Attachment 20 - Simulator Notes
Attachment 21 – FAA Responses
Attachment 22 – Witness Statements
Attachment 23 – Party Forms

Submitted by:

Captain David Lawrence, NTSB
Operations Group Chairman

[133] On July 31, 2008, about 0945 central daylight time,1 East Coast Jets flight 81, a Hawker Beechcraft Corporation 125-800A airplane, N818MV, crashed while attempting to go around after landing on runway 30 at Owatonna Degner Regional Airport (OWA), Owatonna, Minnesota. The two pilots and six passengers were fatally injured and the airplane was destroyed by impact forces. The nonscheduled, domestic passenger flight was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 135. An instrument flight rules flight plan had been filed and activated; however, it was canceled before the landing. Visual meteorological conditions prevailed at the time of the accident. For more information, see Crash During Attempted Go-Around After Landing, East Coast Jets Flight 81, Hawker Beechcraft Corporation 125-800A, N818MV, Owatonna, Minnesota, July 31, 2008, Aircraft Accident Report NTSB/AAR-11/01 (Washington, DC: National Transportation Safety Board, 2011), available on the NTSB's website at <http://www.ntsb.gov/publictn/2011/AAR1101.pdf>