NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

April 14, 2016

Group Chairman's Factual Report

OPERATIONAL FACTORS

CEN16MA036

Table Of Contents

A. ACCIDENT

Location:	Akron, Ohio
Date:	November 10, 2015
Time:	1452 Eastern Standard Time[1]
Airplane:	Hawker 125, N237WR.

B. OPERATIONAL FACTORS GROUP[2]

Captain David Lawrence - Chairman
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490 L'Enfant Plaza East, SW
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[1] All times are Eastern Standard Time (EST) based on a 24-hour clock, unless otherwise noted. Times indicated with a "Z" are Greenwich Mean Times.
[2] Representatives from Textron and Execuflight were added to the Operations Group, but did not participate in the field investigation.

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Captain Donnie Shackleford
Hawker Captain
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C. SUMMARY

On November 10, 2015, about 1453 eastern standard time (EST) (1953Z), Execuflight flight 1526, a British Aerospace HS 125-700A, N237WR, departed controlled flight while on approach to landing at Akron Fulton International Airport (AKR) and impacted a 4-plex apartment building in Akron, Ohio. The Captain, First Officer, and seven passengers died; no ground injuries were reported. The airplane was destroyed by the crash and a post-crash fire. The airplane was registered to Rais Group International NC LLC and operated by Execuflight under the provisions of Title 14 *Code of Federal Regulations* (*CFR*) Part 135 as an on-demand charter flight. Instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed. The flight departed from Dayton-Wright Brothers Airport (MGY), Dayton, Ohio, about 1413 EST and was destined for AKR.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board (NTSB) investigators on the Operations Group traveled to Akron, Ohio on Wednesday, November 11, 2015. The group chairman was briefed by the Investigator in Charge (IIC) on the following day's plan. The Operations Group was formed with a party member from the FAA assigned. Following the field investigation, representatives from Execuflight and Textron Aviation were added to the Operations Group.[3]

On November 12, 2015 the NTSB investigators received an IIC briefing on the accident site and planned activities. Following the briefing, the Operations Group participated in an FAA recorded replay of the original Safety Review Team (SRT) call that contained ATC[4] radar plots of the accident aircraft. The Operations Group participated in on-scene activities, including documentation of cockpit panels and center console. The group also recovered various flight documents and binders to be sent to NTSB Headquarters in DC for further review. The group then traveled to AKR and met with the airport manager, and conducted a tour of the airport lighting, runway lights, runway light sensor, the PAPI[5] lights, and the ASOS[6] system.

[3] See Attachment 17 – Party Forms.
[4] Air Traffic Control
[5] Precision Approach Path Indicator. For additional information, see Section 15.2 Precision Approach Path Indicator (PAPI) of this Factual Report.
[6] Automated Service Observation System

The Operations Group then conducted interviews of the pilot and instructor conducting a training flight that landed previous to the accident flight, and traveled to the Akron-Canton Regional Airport (CAK), Akron, Ohio to participate in a review of the ATC radar and voice communications between ATC and the accident flight.

On November 13, 2015, the Operations Group traveled to the Summit County Medical Examiner's Office. The group documented the flight crew's personnel effects as recovered from the accident site. Due to the thermal damage of the contents, no evidence was recoverable to assist the Operations Group. Requests for statements were sent to various witnesses and requests were made for additional FAA documentation. The Operations Group then traveled to the Cleveland-Hopkins International Airport (CLE), Cleveland, Ohio and documented an exemplar Hawker HS-125 700A[7]. Field notes were completed and delivered to the IIC, and the on-scene portion of the Operation Group's investigation concluded on November 13, 2015.

From December 2, 2015 through December 3, 2015, the Operations Group conducted a series of interviews with Execuflight personnel. The interviews consisted of flight operations leadership, pilots, and sales personnel from Execuflight.

From January 19, 2016 through January 20, 2016, the Operations Group conducted a series of interviews and simulator work at the CAE Training Facility in Dallas, Texas. The group conducted interviews with CAE Training personnel who conducted training and evaluations of the accident crew.

On February 11, 2016, the Operations Group interviewed the FAA Principal Operations Inspector for Execuflight. From February 2016 to March 2016, additional information and data was collected from the FAA and Execuflight.

E. FACTUAL INFORMATION

1.0 History of Flight

The accident crew was operating a 2-day pairing, 14 CFR Part 135 on-demand charter with seven passengers onboard each leg. The first day of the pairing originated on November 9, 2015 at 0630 from the company's base of operations at Fort Lauderdale Executive Airport (FXE) in Fort Lauderdale, Florida, and consisted of flights from FXE to St. Paul Downtown Holman Field in St. Paul, Minnesota (STP), Quad City International Airport in Moline, Illinois, Spirit of St. Louis Airport (SUS) in St. Louis, Missouri, and Cincinnati Municipal Airport-Lunken Field (LUK) in Cincinnati, Ohio. The first day total flight time was scheduled for 6 hours and 11 minutes with a total duty time of 12 hours and 54 minutes, and the crew had a scheduled overnight rest in LUK of 15 hours and 6 minutes. The second day of the trip was planned for flights from LUK to Dayton-Wright Brothers Airport (MGY) in Dayton, Ohio, then to AKR, and finally a return to FXE. Total scheduled flight time for the second day of the trip was 3 hours and 6 minutes with a total duty time of 12 hours and 30 minutes.

[7] The aircraft was not affiliated with the accident operator.

On the day of the accident, the first flight of the day departed LUK about 1103 and arrived at MGY about 1133. While at MGY, the Captain filed an IFR flight plan for "Zipline"[8] flight 1526 (EFT1526) to AKR, planning a 34 minute flight at cruise altitude 17,000 feet above mean sea level (msl)[9], with a cruise speed of 382 knots and a departure time of 1330. While at MGY, the airplane was fueled with 410 gallons (2,788 pounds) of Jet A fuel at 1145, and the First Officer (FO) signed for the fuel on his company issued credit card at 1148.[10] According to the fueling service at MGY, the accident pilots requested that both wing tanks be "topped off" and filled to their capacity.[11]

The Captain sent a "doors closed" text message at MGY from his cell phone at 1349 to company management, and the crew then contacted the local Flight Service Station (FSS) to obtain their IFR release to AKR at 1354.[12] ATC issued EFT1526 an IFR clearance to AKR with a hold for release awaiting another inbound IFR aircraft into MGY.[13] At 1404, EFT1526 advised ATC they were number one for departure from MGY, and at 1409, EFT1526 was given its release to depart from MGY with a climb to 3,000 feet and direct to the Appleton VOR (APE). EFT1526 departed runway 20 at MGY and about 1414 contacted ATC in a climb to 3,000 feet and direct to APE.

At 1416, ATC cleared EFT1526 to climb to 17,000 feet, and two minutes later cleared EFT1526 to the Akron airport via direct to the HUUVR intersection and then direct to the airport. A review of cockpit voice recorder (CVR) audio content was consistent with the FO acting as the pilot flying (PF) and the Captain acting as the pilot monitoring (PM).[14] About 1427, the FO first mentioned the approach briefing, and asked the captain to brief the approach.

At 1429, ATC cleared EFT1526 to cross the HUUVR intersection at 9,000 feet, and the flight then contacted the Cleveland ARTCC[15] at 1432 while descending through 14,000 feet to 9,000 feet. About 1433, the FO discussed the localizer (LOC) approach, followed by a discussion about the initial altitude and minimums, and missed approach. About 1436, the FO discussed the overcast height relative to the ground. According to radar data, at 1436 EFT1526 was recorded with a calibrated airspeed[16] of 298 knots at 9,000 feet. [17]

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[8] "Zipline" was the call sign ATC used for Execuflight flights.

[9] All altitudes in this report are above mean sea level or msl unless otherwise noted

[10] The Execuflight General Operations Manual, Page J-1, stated, in part: *The Pilot in Command will be responsible for determining the amount of fuel that will be needed for the scheduled flight.*

[11] See Section 10.2 Takeoff Fuel, of this Factual Report.

[12] See Attachment 18 – Flight Following Texts.

[13] For detailed ATC information, see Air Traffic Control Group Chairman's Factual Report.

[14] N237WR was equipped with a CVR but was not equipped with a flight data recorder (FDR). For additional information on CVR recorded communications, see Vehicle Recorders Group Chairman's Factual Report.

[15] Air Route Traffic Control Center.

[16] According to the Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25A), indicated airspeed (IAS) is the direct instrument reading obtained from the airspeed indicator, uncorrected for variations in atmospheric density, installation error, or instrument error. Manufacturers use this airspeed as the basis for determining aircraft performance. Calibrated airspeed (CAS) is the IAS corrected for installation error and instrument error. In the cruising and higher airspeed ranges, IAS and CAS are approximately the same. For additional information on the radar data, see Performance Group Chairman's Factual Report.

[17] 14 CFR 91.117 restricts operation of an aircraft below 10,000 feet mean sea level (msl) to 250 knots indicated

At 1438, EFT1526 checked on with Akron (CAK) approach control, level at 9,000 feet over HUUVR, and was then issued a heading of 065 degrees and told to expect the localizer (LOC) 25 approach at AKR. ATC also asked EFT1526 to advise when they had the weather at AKR. About that time, the crew also had a further discussion of the cloud base and minimums.

About 1438, cockpit audio indicated that the crew received the 1938Z weather at AKR from the airport's automated weather station showing a ceiling of 600 feet above ground level (agl) broken and a visibility of 1 ½ miles with mist, and a wind of 240 degrees at 08 knots. About 1440, the captain mentioned that they had the visibility.

At 1444, EFT1526 was issued a speed reduction of 200 knots and a descent to 4,000 feet, followed by another speed reduction to 170 knots at 1446, with a heading of 360 degrees and a descent to 3,000 feet.

An instrument student and instructor were flying a training flight in a single engine airplane on the localizer 25 approach at AKR ahead of EFT1526, and at 1446, ATC advised EFT1526 that there was another inbound aircraft to AKR that was slower than they were flying. At 1447, ATC issued EFT1526 a 280 degree heading and instructed to join the localizer course for runway 25.

About 1448, the FO made a mention about drag, and at 1449, when EFT1526 was about 4 miles from the final approach fix (FAF) for the localizer 25 approach at AKR, ATC advised that the previous inbound aircraft had cancelled their IFR flight plan, and cleared EFT1526 for the localizer approach. EFT1526 acknowledged the clearance and advised that they were established on the localizer. About that time, cockpit audio also recorded the sounds similar to the landing gear being extended.

According to the preceding training flight pilots, upon landing at AKR and taxiing clear of the runway, they contacted EFT1526 on the local UNICOM[18] frequency and advised that they "broke out at minimums" on the approach. According to interviews with the student and instructor, EFT1526 acknowledged receipt of the report.

About 1449, the Captain made mention of a high pitch and a concern about a recurrence of decreasing speed, and the FO mentioned the planned approach speed. At 1450, ATC advised EFT1526 to change to the local airport advisory frequency and to report cancelling IFR either on the ground or in the air, and about the same time, the Captain had a discussion with the FO about not wanting to stall the airplane. The last ATC transmission from EFT1526 occurred about 1450 when they advised ATC they were changing to the advisory frequency.

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airspeed.

[18] Universal Communication system, which is a local designated air to ground communication frequency. The AKR UNICOM was not monitored by any Air Traffic Control facilities, and at the time of the accident, AKR did not record any UNICOM transmissions. The airport also did not have surveillance video that captured the accident flight.

Full flaps were requested by the FO about 1451, and about a minute later the FO called out a descent to minimums. About 1452, the Captain made mention of diving 2,000 feet per minute, followed by the cockpit sounds of the windshield wipers and the Captain mentioning the ground.

About 1452, the Captain made a call out to level off, followed by the sounds similar to a stick shaker and a ground proximity warning system (GPWS) aural alert.

Multiple witnesses observed the airplane descending in a left banked turn as it impacted the apartment building about 2 miles from the AKR airport. Both pilots and all seven passengers received fatal injuries.

2.0 Flight Crew Information

The flight crew consisted of a Captain acting as Pilot in Command (PIC) and a FO acting as Second in Command (SIC). The Captain occupied the left seat in the cockpit, and the FO occupied the right seat. There were no jumpseaters onboard the airplane, and there were seven passengers onboard. The flight crew was operating a 2-day charter for Execuflight. A review of records provided by Execuflight indicated both pilots had flown with each other on 3 other occasions prior to the accident pairing within the previous 90 days for a total of about 32.5 flight hours. According to Execuflight records, neither crew had experience operating into or out of AKR. The Captain had flown 166.5 hours since employed at Execuflight, and the FO had flown 82 hours since employed at Execuflight.

The Execuflight General Operations Manual (GOM), En Route Qualification Procedures FAR 135.23(n),[19] page N-1, dated July 7, 2002, stated the following, in part:

> *Each Company Pilot in Command who has not flown over a route and/or not an airport within the preceding 90 days shall, before beginning the flight, become familiar with all available information required for the safe operation of that flight., Including [sic] the airport facilities directory, approach plates (if applicable), airport NOTAMS[20], charts and other pertinent information relevant to the flight.*

The same section of the Execuflight GOM, page N-2, stated the following:

> *Any pilot who has not flown over a route and into an airport within the preceding 90 days, will, before beginning a flight over that route and/or into that airport:*
>
> *1. Study the route on the low altitude VFR[21] or IFR charts as appropriate, noting MEA's, MOCA's, routing, ATC frequency allocations, changes to NAVAIDS, and any other pertinent information.*

[19] Title 14 CFR 135.23(n) stated that each required manual must include enroute qualification procedures for pilots, when applicable.
[20] Notice to Airmen.
[21] Visual Flight Rules

2. Study the current Airport Facilities Directory, noting runway lengths and orientations, available instrument approaches, weather observation capability, tower hours of operations, and any other pertinent information.

2.1 The Captain

The Captain was 40 years old and resided in Miami, Florida. His date of hire with Execuflight was June 22, 2015, and he was based at FXE as a Hawker 700A Captain.

Prior to Execuflight, he was employed as a Hawker 800 Part 91 captain by Heralpin USA from May 1, 2014 until April 30, 2015 when his employment was terminated.[22] Previously he was a pilot for Helicol-Avianca from April 2011 until April 2014 in Bogota, Colombia, and an FO with Avianca Cargo from January 2010 until April 2011 in Rionegro, Colombia.

He held an airline transport pilot (ATP) certificate for multiengine land airplane, with a type rating for the HS-125. He held a first class medical certificate with no limitations.

The Captain was current and qualified under Execuflight and FAA requirements. A review of FAA records found no incidents or accidents. A review of the FAA PTRS[23] and Enforcement Information System (EIS) records found one letter of correction[24] issued to the Captain with a recommendation for remedial training for violation of 14 CFR Part 91.123(b).[25] A search of records at the National Driver Registry (NDR) found no history of driver's license revocation or suspension.

2.1.1 The Captain's Pilot Certification Record

Private Pilot – Airplane Single Engine Land certificate issued March 22, 2003.

Private Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued November 9, 2004.

Notice of Disapproval – Commercial Pilot Single Engine Land was issued on May 10, 2005.[26]

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[22] For additional details on the Captain's previous employment, see Section 2.8.1 Captain PRIA Background check, of this Factual Report.

[23] The Program Tracking and Reporting Subsystem (PTRS) was 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 the current data on airmen, air agencies, air operators, and many other facets of the air transportation system. Source: FAA.

[24] The captain was the subject of a June 21, 2014 violation of 14 CFR 91.123(b) for operating an aircraft contrary to an ATC instruction. A letter of correction was issued by the FAA with a recommendation for remedial training, and the status was considered closed by the FAA on December 24, 2014.

[25] CFR Part 91.123(b) states that "Except in an emergency, no person may operate an aircraft contrary to an ATC instruction in an area in which air traffic control is exercised."

[26] Areas for reexamination included: Sections II. Preflight Procedures, III. Airport and Seaplane Base Operations, IV. Takeoffs, Landings and Go-arounds, IX. Emergency Operations, V. Performance Maneuvers, VI. Ground Reference Maneuver, VII. Navigation, VIII. Slow Flight and Stalls, X. High Altitude Operations, XI. Postflight

Commercial Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued May 15, 2005.

Commercial Pilot – Airplane Single and MultiEngine Land, Instrument Airplane certificate issued July 11, 2005.

Commercial Pilot – Airplane Single and MultiEngine Land, Instrument Airplane, HS-125 SIC Privileges Only certificate issued October 16, 2009.[27]

Airline Transport Pilot – Airplane MultiEngine Land HS-125, Commercial Privileges Airplane Single Engine Land, HS-125 SIC Privileges Only certificate issued September 28, 2011.

Airline Transport Pilot – Airplane MultiEngine Land HS-125, Commercial Privileges Airplane Single Engine Land certificate issued June 17, 2014.

2.1.2 The Captain's Pilot Certificates and Ratings Held at Time of the Accident

Airline Transport Pilot (issued June 17, 2014)
Airplane MultiEngine Land
HS-125[28]
Commercial Privileges Airplane Single engine Land – English Proficient

Medical Certificate – First Class (issued June 23, 2015)
Limitations: None

Colombian Certificates[29]

Air Transport Pilot (PTL) issued on 15/February/2012 – Ratings: Pilot HS125 / Pilot BE1900
Commercial Pilot (PCA), issued on 24/August/2006 – Ratings: Pilot in single and multiengine piston aircrafts until 5700Kgs. – Copilot DHC-8/ B757 / B767 / HS125 / BE1900

The Colombian pilot possessed a current medical certificate from Colombia CAA issued on 14 January 2015, valid to 14 January 2016.

Procedures. Source: FAA.

[27] The captain received his HS-125 SIC type rating training on the Hawker 800XP at FlightSafety International in Wilmington, DE. An "English Proficient" was added to his Commercial Pilot certificate on September 22, 2011.

[28] The HS-125-700A was a variant to the HS-125 series aircraft. An HS-125 type rating included the Hawker 700 and Hawker 800 series aircraft. For additional information, see FAA Order 8900.1, Figure 5-88 "Pilot Certification Aircraft Type Designations – Airplane."

[29] Information provided by the GRIAA – Aircraft Accident Investigation Group, Civil Aviation Authority – Colombia CAA.

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

Date of Initial Type Rating on HS-125	October 16, 2009
Date of Hire with Execuflight	June 22, 2015
14 CFR 135.293 Oral[31]	June 26, 2015
14 CFR 135.293(b) Simulator check[32]	June 1, 2015
14 CFR 135.297 Instrument Proficiency check[33]	June 1, 2015
Execuflight Indoctrination Completed	June 25, 2015
14 CFR 135.299 PIC Line Check	August 6, 2015

2.1.4 The Captain's Flight Times[34]

The Captain's flight times, based on Execuflight and FAA records:

Total pilot flying time	6,170
Total Pilot-In-Command (PIC) time	3,414
Total HS-125 flying time	1,020
Total HS-125 PIC time	670
Total flying time last 24 hours [35]	3.6
Total flying time last 7 days	9.6
Total flying time last 30 days	43.2
Total flying time last 90 days	118.1
Total flying time from initial hire	166.5

2.2 The First Officer (FO)[36]

The FO was 50 years old and resided in Boyton Beach, Florida. His date of hire with Execuflight was June 1, 2015.[37] Prior to Execuflight he was unemployed since February 27, 2015. He was previously employed by Sky King (AerSale, Inc. was the parent company of Sky King) as an FO on the B-737 from September 16, 2014 to February 27, 2015 when his

[30] Information provided to the NTSB by Execuflight and CAE Simuflite. The Captain's simulator and instrument competency checks were conducted at CAE Simuflite. The Captain's 135.293 check was conducted by the FAA POI at FXE. See Attachment 5 – Captain Training Records.

[31] 14 CFR 135.293 required pilots to pass a written or oral test every 12 calendar months covering topics such as regulations, airplane systems, weight and balance, and weather.

[32] 14 CFR 135.293 required pilots to pass a competency check every 12 calendar months to determine the pilot's competence in practical skills and techniques.

[33] 14 CFR 135.297 required a pilot operating as a PIC to pass an instrument proficiency check every 6 months.

[34] The flight times are approximate based on information provided by the Execuflight "Pilot Annual Resume," company flight logs, FAA 8500-8 medical applications, and a review of past FAA Form 8710-1's where flight times were listed for certificate/rating applications. No logbook was recovered for verification of exact flight time.

[35] This time includes only the flight time from 1545 on November 9, 2015 until the time of the accident.

[36] The terms "First Officer" and "second in command" are used interchangeably. The role corresponds to 14 CFR 135.245 "Second in command qualifications."

[37] The FO's employment contract with Execuflight was entered on May 19, 2015 and was effective for the two year period commencing June 1, 2015. Source: Execuflight.

employment was terminated.[38] Prior to Sky King, he was an FO for Chauff Air (Inversiones Polair) since 2012 flying ferry and Part 91 flights, and with Personal Jet Inc. from August 1, 2007 until May 30, 2011 as a charter FO on the Hawker and Learjet. In his resume provided to Sky King, he also listed employment with Panther Aviation as a Lear Part 135 FO form 1999 to 2000, banner towing from 1998 to 1999, assistant mechanic from 1994 to 1998, and aerial photography from 1991 to 1994. His resume also stated that he was in the Italian Air Force from 1987 to 1991.

He held an airline transport pilot certificate for multiengine land airplane with type ratings for the HS-125, B-737, and Lear Jet (SIC).[39] He held a first class medical certificate with no limitations.

The FO was current and qualified under Execuflight and FAA requirements. A review of the FAA PTRS and EIS records found no prior incidents, accident or enforcement actions. A search of records at the National Driver Registry (NDR) found no history of driver's license revocation or suspension.

2.2.1 The FO's Certification Record[40]

Private Pilot – Airplane Single Engine Land certificate issued June 25, 1990.[41]

Private Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued January 13, 1991.

Commercial Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued April 15, 1991.

Commercial Pilot – Airplane Single and MultiEngine Land, Instrument Airplane certificate issued June 18, 1991.

Airline Transport Pilot – Airplane MultiEngine Land, Commercial Privileges Airplane Single Engine Land, HS-125[42] certificate issued November 20, 2007.[43]

[38] For additional information, see Section 2.8.2 FO's PRIA Background Check of this Factual Report.
[39] 14 CFR 135.245 Second in command qualifications, required a second in command hold at least a commercial pilot certificate with appropriate category and class ratings and an instrument rating.
[40] Source: FAA.
[41] The FO's Private Pilot certificate was issued on the basis of his Italian pilot license #24566. Restrictions included Night Flying prohibited, and not valid for agricultural aircraft operations.
[42] According FAA records, the FO received his ATP certificate and HS-125 type rating from CAE Simuflite in Dallas, Texas on November 20, 2007. According to the CAE Simuflite Manager of Regulatory Affairs, records dating back to 2007 and were initially archived under the CAE Simuflite's WEB-REG system, which was replaced by Gemini. The FO's 2007 training records were purged with the move to the Gemini Systems. (Source: Email from CAE Simuflite received Wednesday, February 10, 2016 5:09 PM).
[43] The FO's ATP certificate was subject to Pilot in Command limitations for the HS-125 (25 hour S.O.E.). The limitation was removed on October 29, 2008. A November 14, 2007 letter to the FAA from the Chief Pilot of Personal Jet Charter, Inc. (5401 East Perimeter Road, Ft. Lauderdale, Florida 33309) stated "Please be advised that [the FO] is a full time employee with Personal Jet Charter, Inc." Source: FAA.

Airline Transport Pilot – Airplane MultiEngine Land, Commercial Privileges Airplane Single Engine Land; HS-125, LR-Jet, English Proficient, LR-Jet SIC Privileges Only certificate issued April 11, 2013.

Airline Transport Pilot – Airplane MultiEngine Land, Commercial Privileges Airplane Single Engine Land; HS-125, LR-Jet, B-737, English Proficient; LR-Jet SIC Privileges Only; B-737 Circ. Apch VMC Only certificate issued October 23, 2014.[44]

2.2.2 The FO's Certificates and Ratings Held at Time of the Accident

Airline Transport Pilot (issued October 23, 2014)
Airplane Multiengine Land
HS-125, LR Jet, B-737
Commercial Privileges Airplane Single Engine Land
Limitations: English Proficient, LR-Jet SIC privileges only, B-737 Circ. Apch VMC Only

Medical Certificate – First Class (issued September 3, 2015)
Limitations: None

2.2.3 The FO's Training and Proficiency Checks Completed[45]

Date of Initial Type Rating on HS-125	November 20, 2007
Date of Hire with Execuflight	June 1, 2015
14 CFR 135.293(b) Simulator check	June 22, 2015
14 CFR 135.297 Instrument Proficiency check	June 22, 2015
Execuflight Indoctrination Complete	July 1, 2015
14 CFR 135.293 Oral	July 23, 2015

2.2.4 The FO's Flight Times[46]

The FO's flight times, based on Execuflight and FAA records:

Total pilot flying time	4,382
Total Pilot-In-Command (PIC) time	3,200
Total HS-125 flying time	482[47]

[44] According to Sky King, the FO received his B-737 type rating at Pan Am Academy in Florida as a new hire with Sky King (AerSale, Inc.).
[45] Information provided to the NTSB by Execuflight and CAE Simuflite. The FO's simulator and instrument competency checks were conducted at CAE Simuflite. The FO's 135.293 check was conducted by the POI at FXE. See Attachment 6 – First Officer Training Records.
[46] The flight times are approximate based on information provided by the Execuflight "Pilot Annual Resume," company flight logs, FAA 8500-8 medical applications, and a review of past FAA Form 8710-1's where flight times were listed for certificate/rating applications. No logbook was recovered for verification of exact flight time.
[47] Total Hawker time assumes the FO accumulated 400 hours of total Hawker SIC time during the 2011 to 2014 time frame when his total time increased from 3,900 hours to pre-Execuflight employment in 2015 of 4,300 hours, plus 82 hours while at Execuflight.

Total flying time last 24 hours [48]	3.6
Total flying time last 7 days	21.3
Total flying time last 30 days	38.4
Total flying time last 90 days	77.9

2.3 Crew Responsibilities

2.3.1 Captain

According to the Execuflight GOM, page A-4, the Captain, as Pilot in Command, had the following responsibilities:

> *The Pilot in Command reports directly to the Chief Pilot and is responsible for the safe and efficient conduct of each flight assignment.*
> *His specific duties are as follows:*
>
> *a. Determines that he is adequately rested and in proper dress.*
>
> *b. Plans flight assignments and obtains information regarding purpose of the flight, weather, operating procedures and special instructions.*
>
> *c. Prepares or supervises preparation of flight plans, considering such factors as altitude, terrain, weather, range, weight, cruise control data, airport facilities and navigational aids. The PIC signs the Aircraft Log as only after he/she determines that the flight can be initiated, conducted, or terminated safely and in accordance with EXECUFLIGHT's operations specifications, manuals, and regulations.*
>
> *d. Insures proper Trip Kit is aboard and is responsible to return the Trip Kit to the Chief Pilot upon trip termination.*
>
> *e. Insures that required airworthiness inspections have been accomplished and any previous discrepancies have been corrected or properly deferred (as applicable).*
>
> *f. Inspects or supervises preflight inspection of the aircraft for mechanical and structural integrity, plus proper operation of communications and navigational equipment.*
>
> *g. Supervises loading, distributing, and security of cargo and passengers. He assures that carry-on baggage is placed in cargo area. Determines that weight and balance are within prescribed limits, prepares company load manifests and assures that a copy of each -manifest is delivered to the Chief Pilot for filing.*
>
> *h. Insures provisions for passenger comfort and any special emergency equipment such as life vests are aboard (when required).*
>
> *i. Files and closes flight plans.*
>
> *j. Operates aircraft at favorable altitudes taking into account turbulence, oxygen requirements and comfort of the passengers during the flight.*
>
> *k. Insures the preparation of flight logs, reporting of mechanical irregularities, discrepancies and proper recording of maintenance by*

[48] This time includes only the flight time from 1545 on November 9, 2015 until the time of the accident.

maintenance personnel, when any maintenance is performed away from the principle operations base.

l. He will make all operational determinations for Part 135 flights that are in accordance with the EXECUFLIGHT's written policies, procedures and standards. He may delegate functions to other personnel, but retains responsibility.

m. He must be highly knowledgeable of the Company Operations Manuals, FAA Regulations, NTSB Procedures, Operations Specifications, Flight Manuals, and other instructions pertinent to his duties.

n. He will assure that a copy of any required report submitted to the FAA is also submitted to the Director of Operations.

o. He will assure that cargo doors are secured so that inadvertent opening in flight is avoided. He will also assure that all cargo and exterior lockers that have warning lights or horns are checked to be sure they are operating properly.

p. He shall assign a crewmember or passenger prior to takeoff to assist any person who may need the assistance of another person during a possible emergency evacuation of the company aircraft.

q. The Pilot in Command shall conduct the briefing of all passengers prior to each takeoff; he may delegate this duty to a crewmember but retains responsibility.

r. Each Pilot in Command of a company aircraft shall be listed in Chapter 1, Page 2 of the Company Operations Manual, "Operational Control" authorization page. Only those listed therein will assume operational control over company flights.

s. Additionally, the Pilot in Command shall perform those duties stipulated throughout this General Operations Manual as "THE PILOT IN COMMAND SHALL".

t. The Pilot in Command and all crewmembers shall be watchful of any passenger who might be using an electronic device on board company aircraft. An electronic game, radio, or calculator could cause possible interference with navigational and communications equipment.

u. Checklists: All company pilots will use checklists provided by the aircraft manufacturer.

v. The Pilot in Command has the authority to conduct or terminate a flight for the company. He will conduct all flights in a safe and professional manner. At no time (except as provided in Para 1 .6) will he relinquish such authority to any other person. It will be the responsibility of the Pilot in Command to brief all crew members (as applicable) before each flight as to the nature of the flight.

2.3.2 Second in Command

According to the Execuflight GOM, page A-8, the FO (as second in command) had the following responsibilities:

The Second in Command is administratively responsible to the Chief Pilot and functionally responsible to the Pilot in Command of the flight to which he is assigned.

In the event of an accident or incident whereby the Pilot in Command becomes incapacitated or deceased the Second in Command shall assume the duties and responsibilities of the Pilot in Command.

The Second in Command shall perform those duties stipulated throughout this General Operations Manual and specific responsibilities designated to the SIC by the Pilot in Command.

The Second in Command may delegate duties to others only when acting under instructions from the Pilot in Command or in the event the Pilot in Command becomes incapacitated.

He must be highly knowledgeable of the Company Operations Manual, FAA Regulations, NTSB Procedures, Operations Specifications, Aircraft Flight Manual and all other instructions pertinent to his duty position.

2.4 Second in Command Flying

Based on recorded information, the FO was the pilot flying on the approach. The NTSB interviewed multiple Execuflight pilots and management pilots, and were told that, in practice, Execuflight captains would typically operate as PF on all revenue legs with passengers, and the FOs would fly the "empty" legs that did not have revenue passengers onboard.

According to interviews, the former Director of Operations considered the practice a "safety proposal" in place at Execuflight, and the co-pilot would fly the empty legs "pending his experience level" until they built up the confidence to fly the revenue legs, and added "there was no way would I allow a First Officer that's just out of school with just refresh [sic] type rating go out there and fly in a full-blown IFR approach, down to minimums, you know, on his first couple of weeks, even without passengers." He considered each co-pilot's ability on a "one-on-one basis." The President of the company said FOs flying revenue legs was considered on a "case-by-case" basis. For instrument approaches, the Chief Pilot said it was "captain's discretion" to decide if the FO was competent to fly an instrument approach.[49]

A review of Execuflight documentation did not find a formal policy delineating PF/PM roles based on whether or not there were passengers onboard, but the Execuflight GOM, page R-12 contained the following limitations on co-pilot flying when complying with the Destination Airport Analysis Program (DAAP)[50] requirements:

Pilot Operating Limitations

Crew pairing.

[49] See Attachment 2 – FXE Interview Transcripts.
[50] See Section 10.6 Destination Airport Analysis Program.

Either the pilot in command or the second in command must have at least 75 hours of flight time in that aircraft make or model and, if a type rating is required, for that type aircraft, either as pilot in command or second in command.

Pilot Operating Limitations

If the second in command of a fixed-wing aircraft has fewer than 100 hours of flight time as second in command flying in the aircraft make and model and, if a type rating is required, in the type aircraft being flown, and the pilot in command is not an appropriately qualified check pilot, the pilot in command shall make all takeoffs and landings in any of the following situations:

Landings at the destination airport when a Destination Airport Analysis is required by §135.385(f); and

In any of the following conditions:

(A) The prevailing visibility for the airport is at or below ¾ mile.
(B) The runway visual range for the runway to be used is at or below 4,000 feet.
(C) The runway to be used has water, snow, slush, ice, or similar contamination that may adversely affect aircraft performance.
(D) The braking action on the runway to be used is reported to be less than "good."
(E) The crosswind component for the runway to be used is in excess of 15 knots.
(F) Windshear is reported in the vicinity of the airport.
(G) Any other condition in which the pilot in command determines it to be prudent to exercise the pilot in command's authority.

2.5 Crew Pairing

Execuflight sales representatives (also called "dispatchers" at Execuflight)[51] booked charter flights for Execuflight and would then create a "Trip Kit" for the sequence of flights for the charter. According to the Execuflight GOM, page A-11 (dated May 21, 2014), a Trip Kit was a multi-layered file folder that was issued electronically for each trip, and contained flight plans, weight and balance, performance information, trip itinerary, customer information, ground handling information, crew hotel and rental car information if applicable, and a pouch to hold all trip receipts. This kit was to be returned to the Chief Pilot by the PIC for processing at the end of each trip.[52]

The Captain and FO began the 2-day trip on November 9, 2014 with a scheduled departure of 0630 from FXE to St. Paul Downtown Holman Field (STP). According to the flight following text messages from the Captain, the flight actually departed FXE about 0650, and arrived at STP about 1029. The accident crew then continued the pairing, departing STP about 1150 and arrived Quad City International Airport (MLI), Moline Illinois about 1252 (again, based on the

[51] The dispatchers were sales agents and did not perform the duties of an FAA licensed dispatcher. See Section 5.0 Flight Locating, for further information on Execuflight "dispatchers."
[52] For detailed information on the accident Trip Kit, see Attachment 11 – Trip Kit.

Captain's text messages). They then departed from MLI about 1549 and arrived at Spirit of St. Louis Airport (SUS), Chesterfield, Missouri about 1645. They then departed from SUS about 1838 and arrived at Cincinnati Municipal Airport – Lunken Field (LUK), Cincinnati, Ohio about 1955.

On November 10, 2015, the crew departed LUK about 1103 and arrived at MGY about 1133. According to Execuflight records, the crew had 2 hours and 16 minutes on the ground in MGY prior departing MGY on the accident flight about 1349.

2.6 Crew Overnight

According to the accident trip kit, the flight crew was scheduled to have 15 hours and 6 minutes free of duty on the LUK overnight.[53] The flight crew arrived into LUK about 1955 on November 9, 2015, and overnighted at the Marriott Cincinnati RiverCenter Hotel in Covington, Kentucky.[54]

14 CFR 135.267(b): Flight time limitations and rest requirements: Unscheduled one- and two-pilot crews, stated the following:

> *(b) Except as provided in paragraph (c) of this section, during any 24 consecutive hours the total flight time of the assigned flight when added to any other commercial flying by that flight crewmember may not exceed—*
>
> *(1) 8 hours for a flight crew consisting of one pilot; or*
>
> *(2) 10 hours for a flight crew consisting of two pilots qualified under this part for the operation being conducted.*
>
> And:
>
> *(d) Each assignment under paragraph (b) of this section must provide for at least 10 consecutive hours of rest during the 24-hour period that precedes the planned completion time of the assignment.*

These duty time limitations were also in the Execuflight GOM, Flight Time/Duty Time/Rest Limits, page R-11.

Hotel receipts indicated that the FO's credit card was billed for his and the Captain's hotel rooms. Restaurant receipts indicated that both pilots ate dinner at the hotel restaurant that evening, and received their final, separate bills at 2138. Only one alcoholic beverage was consumed between the two pilots. At 2210, one pilot ordered additional food off the room service menu. There was no alcohol indicated on that receipt. The last card swipe activity recorded for either hotel room on the evening of November 9, 2015 was at 2222. Cell phone

[53] There were no flight records provided that indicated either accident pilot operated a flight for Execuflight on November 8, 2015 (the day preceding the accident trip).

[54] Internet searches indicated that the Marriott RiverCenter and Lunken Airport are about 7 miles and a 15 minute drive apart.

records for both pilots were received and provided to an NTSB Human Performance investigator for further analysis.

The crew departed LUK about 1103, and received 15 hours and 8 minutes free of duty in LUK.

2.7 Pilot Hiring

Both accident pilots had been hired by Execuflight in June 2015. According to the Execuflight GOM, Company Organization, Section 1-1 President, page A-2, the President was responsible for recruiting and terminating all company personnel; however, he may delegate the responsibility to other persons with management responsibilities. The GOM also stated that the Director of Operations had specific duties to include conducting "personnel interviews and recommends personnel actions to the President."

The Execuflight President told the NTSB that he hired both accident pilots. The former Director of Operations was asked if he was involved, at any point in time, in the hiring of either of the accident two pilots, and he stated "no." According to the Execuflight Chief Pilot, "the hiring was done by the owner."[55]

2.8 Pilot Records Improvement Act (PRIA)

The "Pilot Records Improvement Act of 1996" (PRIA), required that a hiring air carrier under 14 14 CFR Parts 121 and 135, or a hiring air operator under 14 CFR Part 125, request, receive, and evaluate certain information concerning a pilot/applicant's training, experience, qualification, and safety background, before allowing that individual to begin service as a pilot with their company. According to the FAA, the previous employer was required to provide the following:[56]

> *1. Records pertaining to the individual, found in – 49 U.S.C. Section 44703 (h) (1) (B) (i)*
>
> *2. Records pertaining to the individual's performance as a pilot, found in – 49 U.S.C. Section 44703 (h) (1) (B) (ii)*
>
> *(This includes disciplinary actions; however, these actions must be related directly to the individual's performance as a pilot, and not other types of employment related actions)*

Companies were authorized to use 3rd party "Designated Agents" to conduct the background checks of pilot applicants. The Designated Agent (DA) for Execuflight hired to conduct the PRIA background checks for both accident pilots was Results, Inc. in Sunrise, Florida. Guidance for PRIA was found in FAA Advisory Circular 120-68F, Pilot Records Improvement Act of 1996, dated May 31, 2012, and included the following:

> *USING A DA TO RESPOND TO PRIA REQUESTS. You may contract with a DA to process PRIA requests and furnish records to hiring employers and pilots/applicants. Although you may delegate this work to a DA, you are ultimately responsible for fulfilling*

[55] See Attachment 2 – FXE Interview Transcripts.
[56] Source: http://www.faa.gov/pilots/lic_cert/pria/guidance/.

the requirements. Also, note that since a DA cannot retain PRIA records in a records system of its own you are responsible for maintaining PRIA records. The release of the documents must specify exactly who is to receive the documents, and a blanket release to provide the documents to a category of parties is prohibited under 49 CFR §§ 40.321(b) and 40.351(d) of the drug and alcohol testing regulations. A guidance document titled PRIA Instructions for the Designated Agent is available on the PRIA Web site (http://www.faa.gov/pilots/lic_cert/pria).

According to the Execuflight President, he delegated the review of PRIA records to the Chief Pilot.

On December 4, 2015, Execuflight provided the NTSB the PRIA records for both accident pilots that was labeled "Complete PRIA Check." On February 8, 2016, the NTSB sent the PRIA records electronically to Results, Inc. for review, and Results, Inc. indicated that the records provided to the NTSB were "incomplete" and lacked the additional documentation required by PRIA.[57] The NTSB further requested Execuflight provide all documentation that resulted from the PRIA background checks on both accident pilots,[58] and on February 16, 2016, the NTSB received the previous employment documentation on the FO from Execuflight.[59]

2.8.1 Captain PRIA Background check

The Captain's PRIA documentation provided by Execuflight did not include detailed employment, training or flight time records from any of his previous employers.[60] A review of documentation provided to the NTSB by Heralpin USA, Inc. (the Captain's most previous employer) showed that the Captain was employed as a Hawker 800A PIC from May 2014 to April 2015, and most recently received a 14 CFR 61.58(d)(1) proficiency check on the HS-125 on June 17, 2014. He was scheduled for recurrent training on the HS-125 on April 20, 2015 at CAE Simuflite, but did not attend the training. According to Heralpin USA, Inc. records, the Captain received an employment termination notice on April 30, 2015 which stated the following:

You're employment with Heralpin USA will be officially terminated on April 30, 2015. You have been terminated for the following reasons:

Failure to present you're self [sic] for Hawker 800A Recurrent Training on April 20, 2015 at CAE Simuflite.[61]

According to the Execuflight President, he was aware that the Captain left his previous employer over an "adminstrative issue" and the separation was "voluntary." He further stated that he relied on the PRIA background check, the Captain's interview, and recommendations from other

[57] Email received by the President and Designated Agent, Results, Inc. on Monday, February 08, 2016 2:14 PM.
[58] Email sent to Execuflight Chief Pilot on Monday, February 08, 2016 2:48 PM.
[59] Email received from Execuflight Chief Pilot on Tuesday, February 16, 2016 5:59 AM.
[60] A request for the Captain's employment records, training records, and 8060 forms as required by 49 U.S. Code § 44703 and 14 CFR 135.337 was sent to the Execuflight Chief Pilot on Monday, February 08, 2016 2:48 PM.
[61] See Attachment 8 - Captain Previous Employer.

pilots when hiring the Captain. Execuflight did not contact the previous employer (Heralpin, USA) for additional background information on the Captain.

2.8.2 FO's PRIA Background check.

A review of records provided by Execuflight and AerSale, Inc. (the FO's previous employer) indicated that the FO was employed as a B-737-400 FO from September 16, 2014 to February 27, 2015.

The Execuflight President stated he hired the FO based on a recommendation and an opportunity to fly with the FO. He further stated the following:

> *I'm not too familiar because the PRIA generally comes in and it's given to, the G [chief] pilot is one that gets it. He's the one that requests it. He does all the due diligence in that respect. And you know I am not, I was not familiar with anything that, there were like alarms that I needed him to come and talk to me. But I didn't again, really home in on him as I was hiring him as a second in command. And I didn't get in deep into his file.*[62]

A review of additional records obtained by the NTSB from the FO's previous employer, Sky King (AerSale, Inc.),[63] and were not a part of the Execuflight's "Complete PRIA Check" information originally provided to the NTSB, included a letter from a Sky King B737 check airman that detailed the FO's training difficulties experienced during B737 ground school and simulator training for Sky King.[64]

Details from the Sky King check airman letter regarding the FO's training included the following:

> Ground School
> - Fell behind in training
> - Struggled with memory items
> - Struggled with weight and balance problems.
>
> Simulator training
> - struggled with the correct use of the normal and non-normal checklists
> - did not know memory items, call outs, profiles or flows
> - continued to struggle with weight and balance problems.

[62] See Attachment 2 – FXE Interviews Transcripts.

[63] The FO's previous employer, Sky King (AerSale, Inc.), was sent formal requests from the NTSB for training, certification and employment flight time records on November 24, 2015, November 30, 2015, January 29, 2016 (twice), and February 2, 2016 in support of the accident investigation. A subpoena was issued by the NTSB on February 5, 2016 to AerSale, Inc. for the FO's records. AerSale, Inc. sent the FO's employment records to the NTSB on February 5, 2016. The FO's flight time records were sent to the NTSB via email on Friday, February 12, 2016 3:53 PM.

[64] For the complete Sky King check airman letter, see Attachment 9 - FO Previous Employer.

According to Sky King records, because of the FO's "lack of acceptable progression," he was given the opportunity to fly as a jumpseat observer for 7 days at over 16 hours observation experience. On February 27, 2015, his employment with Sky King was terminated due to "unsatisfactory work performance."

The Execuflight Chief Pilot was aware that the FO was "terminated involuntary" from Sky King;[65] however, the Sky King check airman who wrote the letter detailing the FO's training difficulties was never contacted or called by Execuflight to evaluate the FO's lack of training progression at the airline, or to discuss the training issues he identified to the Sky King management about the FO.[66] Execuflight was in possession of the FO's Sky King employment records, including the Sky King check airman letter detailing the FO's lack of training progression.

The FO's previous employer was a supplemental Part 121 operator. CFR 121.683(a) Crewmember and dispatcher record, stated the following:

(a) Each certificate holder shall—

> *(1) Maintain current records of each crewmember and each aircraft dispatcher (domestic and flag operations only) that show whether the crewmember or aircraft dispatcher complies with the applicable sections of this chapter, including, but not limited to, proficiency and route checks, airplane and route qualifications, training, any required physical examinations, flight, duty, and rest time records; and*
>
> *(2) Record each action taken concerning the release from employment or physical or professional disqualification of any flight crewmember or aircraft dispatcher (domestic and flag operations only) and keep the record for at least six months thereafter.*

49 U.S. Code §44703 "Airman Certificates" stated that an air carrier shall request and receive the records pertaining to "the training, qualifications, proficiency, or professional competence of the individual , including comments and evaluations made by a check airman designated in accordance with section 121.411 , 125.295, or 135.337 of such title".

In a response to an NTSB request for a legal definition of "professional competency," on March 29, 2016 the FAA responded as follows:

> *Competence is defined as "the quality of being competent; adequacy; possession of required skill, knowledge, qualification, or capacity." As this term is used in PRIA and as it relates to the federal aviation regulations applicable to the aircraft pilot profession, the competency of a pilot to serve as a flight crewmember is dependent upon the sufficiency of the individual's knowledge, skills, judgment and flight experience. In addition, the competency of a pilot is dependent upon the individual's demonstration of compliance with the applicable operating standards. The plain meaning of professional competence, as this term is used in PRIA, is thus, an extension of the requirement to*

[65] Source: Email received from Execuflight Chief Pilot Tuesday, February 16, 2016 5:59 AM.
[66] See Attachment 10 - Sky King Check Airman Interview.

furnish records related to pilot training, qualifications and performance on checking and other testing events.[67]

The FAA further responded that "determining whether a specific scenario would constitute a lack of 'professional competence' should be left to the discretion of an air carrier or other operator."

3.0 General Operations Manual

Execuflight policy and procedures were outlined in the Execuflight General Operations Manual (GOM), Revision 53, dated May 21, 2014. One copy of the manual was required to be maintained in current form at the principal operations base, and an electronic copy of the manual was issued to all flight crewmembers, maintenance personnel, and ground operations personnel, who were required to keep their manual copy up to date with the changes and additions furnished to them. All Execuflight pilots, ground, and maintenance personnel were required to use the manual in the conduct of all operations. As required by FAR 135.293(a) (1), all pilots were required to be tested at least annually on their knowledge of the GOM.

Execuflight also furnished the FAA South Florida Flight Standards District Office (FSDO) with a copy of the GOM, and the Director of Operations was required to furnish the FAA with all changes and additions to the GOM. The GOM was also carried onboard each Execuflight airplane, and the Execuflight Chief Pilot was responsible for keeping the manual current.

4.0 Operational Control

Flights operating under the provisions of 14 CFR Part 135, such as the accident flight, were required to comply with 14 CFR Part 135.77 "Responsibility of Operational Control" which stated the following:

"Each certificate holder is responsible for operational control and shall list, in the manual required by §135.21, the name and title of each person authorized by it to exercise operational control."

Operational control was outlined in the Execuflight Operations Specifications (OpSpecs) A008,[68] which stated the following:

The system of operational control for Part 135 operations must ensure that each pilot is knowledgeable that the failure of a pilot to adhere to the certificate holder's directions and instructions, or compliance with directions or instructions from an aircraft owner (other than the certificate holder), or any other outside private person or private entity, that are contrary to the certificates holder's direction or instructions, while operating

[67] See FAA legal interpretation by legal interpretation from Mark Bury, Assistant Chief Counsel for Regulations, AGC-200, to Jason Lorenzon on September 12, 2014

[68] For more information on 14 CFR Part 135 Operational Control, see FAA INFO (Information for Operators) 08005 Part 135 Operational Control Questions and Answers (Q&A's), dated February 11, 2008.

aircraft under these operations specifications, may be contrary to Parts 119 and/or 135, and therefore may be subject to legal enforcement action by the FAA.

(c) These requirements do not apply to the following:

(i) Air Traffic Control instructions, clearances, Notices to Airmen (NOTAMs) received from FAA or cognizant Air Traffic Control authorities.
(ii) Aeronautical safety of flight information received by the pilot, and,
(iii) Operation under the emergency authority of the PIC in accordance with Section 91.3(b), and/or Section 135.19(b).

According to the Execuflight GOM, Section A- 11 (Rev 53) dated May 21, 2014, the following individuals, by authority of the company President, had been designated to exercise operational control for Execuflight:

Title	**Phase of Flight**
General Manager / Director of Operations	ALL
Chief Pilot	Operational
Director of Maintenance	Maintenance
Limited Operational control is hereby granted to by the Director of Operations	
President	Operational

5.0 Flight Locating

The CFRs and Execuflight OpSpecs A008 did not require 14 CFR Part 135 operators to have Part 121 or Part 121-like dispatchers. Execuflight utilized the services of employee "dispatchers;" however, according to interviews, their function was primarily as sales agents tasked with arranging Execuflight charters, and they had no traditional dispatch function. Execuflight pilots were responsible for the pre-flight planning and filing of their flight plans, obtaining and evaluating required weather, and calculating the airplane's weight and balance.

Execuflight used text messaging as a flight following function to satisfy OpSpecs A008. Pilots would text their "doors closed" (DC) times to indicate an impending departure, and a "doors open" (DO) time to indicate an arrival. According to interviews, these text messages were received by Execuflight personnel to monitor a flight's progress, including the company President, Director of Operations, the Chief Pilot, and the sales representative. Copies of the text messages sent by the accident crew for their 2-day trip were provided by Execuflight to the NTSB.[69]

[69] See Attachment 18 – Flight Following Texts.

6.0 Execuflight Pilot Training

Both accident pilots were new-hires to Execuflight. The Captain was hired on June 22, 2015, and the FO was hired on June 1, 2015. New Execuflight pilots received in-house initial training for 32 hours over 4 days at FXE. The ground school training included basic company indoctrination, hazardous material, security and general emergency training. The Captain attended basic indoctrination training at the company from June 22, 2015 to June 25, 2015, and the FO attended basic indoctrination training at the company from June 24, 2015 to July 1, 2015.

Execuflight Hawker pilots conducted Hawker 700A initial and recurrent simulator training at the CAE Simuflite training facility in Dallas, Texas. Both accident pilots were enrolled in the Execuflight initial new-hire simulator training program.

According to CAE Simuflite records, the Captain received 48 hours of Hawker 700A ground school training beginning May 19, 2015. The Captain then attended simulator training from May 26, 2015 to June 1, 2015 with another Part 135 pilot from a different operator, and received a total of 24.3 hours of Hawker 700A simulator training (12.3 hours as pilot flying, and 12.0 hours as pilot monitoring) over the course of 7 simulator sessions (including the check ride).[70] According to CAE Simuflight Hawker 700A instructors, Execuflight Hawker pilots utilized Execuflight Hawker checklists and procedures when conducting simulator training. He also received 8 hours of ground school differences training on the Hawker 800 on June 2, 2015. During the course of his simulator training, he conducted 13 ILS[71] approaches, 15 non-precision approaches, 4 circling approaches and 3 visual approaches. According to interviews with CAE Simuflite instructors, most approaches, including non-precision approaches, were conducted at either JFK or LGA airports since those airports were approved in the simulator for checking purposes. A Part 135 "Briefing Sheet" given to CAE instructors prior to training, to familiarize the instructors on specific training requirements for an operator, indicated that Execuflight pilots conducted non-precision approach procedures without vertical guidance, to include VOR/DME/LOC approaches.

The FO attended simulator training prior to basic indoctrination, and according to CAE Simuflite received 48 hours of Hawker 700A ground school training beginning June 9, 2015. The FO then attended simulator training from June 16, 2015 to June 22, 2015, and trained in the simulator by himself from the left seat with CAE instructors used as seat support in the right seat.[72] The FO received a total of 22.6 hours of simulator training (20.3 hours as pilot flying, and 2.3 hours as pilot monitoring) over the course of 7 simulator sessions (including the check ride). There were no documents provided by CAE Simuflite indicating the FO received Hawker 800 differences training. During the course of his simulator training, he conducted 16 ILS approaches, 19 non-precision approaches, 6 circle approaches, and 2 visual approaches.

Execuflight was authorized to use the CAE Simuflite training center in Dallas, Texas per OpSpecs A031 Contract Training as part of its approved training program. Execuflight was

[70] This included 5 simulator training sessions, 1 practice check ride, and the final check ride. According to CAE Simuflite instructors, 2-pilot simulator training sessions were scheduled for 4 hours, and a single pilot training session (with seat support) was 3 hours.
[71] Instrument Landing System.
[72] The FO received takeoff and landing training from the right seat during his second simulator training session.

required to ensure that all contract training met company and regulatory requirements, and the contract training had adequate facilities and equipment, competent personnel, and organizational structure to support the training of Execuflight pilots, and the instruction and evaluation of its pilots were conducted in accordance with its operations specifications. As part of that assurance, Execuflight was required to conduct initial and recurring audits of each training agreement to include an evaluation that the contract training met the requirements of OpSpecs A031. The Execuflight OpSpecs A031 "Contract Training" stated, in part:

> *The certificate hold conduct initial and recurring audits of each training agreement and organization listed in Table 1 of this operations specification. Each audit must include an evaluation of at least the items listed in subparagraphs b through h above. The first audit is due within 60 days of the commencement of training or checking operations, and subsequent audits must be conducted by the certificate holder at least once every 24 calendar months. The date of the most recent audit must be recorded on Table 1. Each audit with evaluation must be presented to the certificate holder's POI[73] for review and acceptance not later than the last business day of the month following the due month for such audits.*

According to OpSpecs A031, page 2, Table 1 indicated that the most recent audit date for the HS-125-700A[74] was September 2014, and the most recent date for the Beech Hawker-800XP was November 2012. In an interview with the NTSB, the Execuflight POI said he was unaware of the out-of-date audit for the -800XP training agreement.

A review of Execuflight Pass/Fail records showed that for the two CAE Simuflite Hawker check airmen authorized to conduct check rides (135.293(a)(2) & (3), 135.293(b), and 135.297 checks) for Execuflight, there were nine Execuflight Hawker pilot check rides conducted in 2015, and 6 conducted in 2014, and each indicated "Pass" for the results. Execuflight maintained copies of the FAA Pass/Fail records for two years.

6.1 Execuflight CRM Training

Title 14 CFR 135.330 Crew Resource Management Training, stated that each certificate holder must have an approved crew resource management training program that includes initial and recurrent training. The former Execuflight Director of Operations created a Crew Resource Management (CRM) manual dated March 7, 2013, approved by the FAA on March 22, 2013, and the Execuflight Chief Pilot provided in-house instruction on CRM to Execuflight pilots via lecture and PowerPoint presentation.

According to documentation provided by Execuflight, the Captain and FO completed CRM training on June 25, 2015 and July 1, 2015 respectively. Each pilot was trained by the Execuflight Chief Pilot and completion of the training was a 10 question test. Answers to the CRM test were provided in the CRM manual.

[73] Principal Operations Inspector.

[74] The training curriculum for both the HS-125-700 and-800XP included Initial/Recurrent/Upgrade/Transition/Re-qualification: FAR 135.343, .345, .351 and .347.

The Execuflight CRM manual, page iii (dated March 7, 2013) stated the following, in part:

> *Upon completion of the PowerPoint presentation each airmen [sic] will be required to take a written or Oral exam and must have a non-corrected passing grade of 80%. Any airmen who score is below 80% must review each missed question and have a corrected grade to 100%. Upon receiving a passing grade a completion certificate will be issued by the instructor pilot and it will be placed and kept in each airman training records until it is superseded by a newer certificate upon recurrent training.*

A review of the FO's Execuflight training records indicated that on July 1, 2015, he received an uncorrected grade of 80% on his CRM test, corrected to 100%, and was verified by investigators with the CRM manual answers. The Execuflight Chief Pilot initialed the test score results.

A review of the Captain's Execuflight training records indicated that on June 25, 2015, he received an uncorrected score of 100% on his CRM test. However, according to the correct answers provided in the CRM manual and reviewed by investigators, the Captain's test actually indicated only 4 correct answers (Questions 3, 6, 8 and 9).[75] The Execuflight Chief Pilot had initialed the test score results. According to Execuflight, the only set of test questions provided to the pilots were those in the CRM manual.[76]

According to interviews with CAE Simulator instructors, each crew member was evaluated during their training on their ability to utilize CRM.

7.0 Medical and Pathological Information

For medical and pathological information, see the Medical Factual Report for this accident.

[75] See Attachment 7 – CRM Training Results
[76] Source: Email received from Execuflight Chief Pilot, Tuesday, February 16, 2016 5:37 AM.

8.0 Aircraft Information

Photo 1: Photo of accident airplane, N237WR.

The accident airplane (Registration N237WR, Serial No. 257072) was a British Aerospace HS 125-700A. The airplane was built in 1979, registered to Rais Group International NC LLC, and held a transport category airworthiness certificate dated December 11, 1979. The airplane was configured with 2 pilot seats, an aft three-place couch, and 5 cabin seats.

The aircraft was certificated in the Transport Category (CFR Part 25) for the following types of operation when the appropriate instrument and equipment required by the airworthiness and/or operating regulations were installed, approved, and were in operating condition:[77]

Night flight
Instrument (IFR) flight
Flight in icing conditions

Copies of the Hawker 700A manufacturer's FAA Approved Airplane Flight Manual (AFM) were carried aboard each Execuflight Hawker 700A airplane, which were listed under the manufacturer's revision program.[78]

[77] Source: Hawker Beechcraft, Document No. HS.1.9 Flight Manual, Hawker Siddeley H.S. 125 Series 700A, Section 2 "Limitation" page 18 "Miscellaneous Limitations."

[78] According to the FAA Aircraft Weight and Balance Handbook (FAA-H-8083-1A), the Airplane Flight Manual (AFM) was an FAA-approved document, prepared by the holder of a Type Certificate for an aircraft that specifies the operating limitations and contains the required markings and placards and other information applicable to the

The HS-125-700A was authorized by Execuflight Operations Specifications A003 to conduct 14 CFR 119.21(a)(5) on-demand passenger and cargo operations under IFR/VFR and day/night conditions.[79]

9.0 Load Manifest

Title 14 CFR 135.63(c) Operating Requirements, stated the following:

> *For multiengine aircraft, each certificate holder is responsible for the preparation and accuracy of a load manifest in duplicate containing information concerning the loading of the aircraft. The manifest must be prepared before each takeoff and must include:*
>
> *(1) The number of passengers;*
> *(2) The total weight of the loaded aircraft;*
> *(3) The maximum allowable takeoff weight for that flight;*
> *(4) The center of gravity limits;*
> *(5) The center of gravity of the loaded aircraft, except that the actual center of gravity need not be computed if the aircraft is loaded according to a loading schedule or other approved method that ensures that the center of gravity of the loaded aircraft is within approved limits. In those cases, an entry shall be made on the manifest indicating that the center of gravity is within limits according to a loading schedule or other approved method;*
> *(6) The registration number of the aircraft or flight number;*
> *(7) The origin and destination; and*
> *(8) Identification of crew members and their crew position assignments.*

According to the Execuflight GOM, Section 2-2 Load Manifest, page B-1, the Turbine Daily Record Sheet/Manifest form used by Execuflight pilots "complies with FAR Part 135.63," and the form must be electronically prepared before each takeoff. The Pilot in Command was required to carry on board either in paper or electronic format one copy of the completed Turbine Daily Record Sheet/Manifest onboard the aircraft to the destination, and a duplicate copy was required to be emailed or uploaded to the Chief Pilot and to the aircraft account for future storage prior to any departure. Further, the pilot could not depart until a confirmation was received from the Execuflight electronic system that the uploaded or email had been received by the Chief Pilot and or Aircraft account. An NTSB review of the aircraft email account did not show any emails from N237WR since October 28, 2015. According to Execuflight, the load manifest information provided to the NTSB originated from the printer in the Execuflight Chief Pilot's office.

The Execuflight GOM, Section 2-5 Turbine Daily Record Sheet, page B-2, stated the following:

> *The form which is incorporated into ExecuFlight FLIGHT Log Ops form 19 / M102 must be prepared by the flight crew prior to departure and shall include at least the following items:*

---

regulations under which the aircraft was certificated.
[79] Source: Execuflight Inc. certificate EXFA391K Operations Specifications A003-1, Amendment No. 13.

1. *The number of passengers.*
2. *The total weight of the loaded aircraft.*
3. *The maximum allowable takeoff weight for that flight.*
4. *The center of gravity limits.*
5. *The center of gravity of the loaded aircraft.*
6. *The registration number of the aircraft.*
7. *The origin and destination.*
8. *Identification of crewmembers and their crew position assignments.*

Portions of the accident aircraft logbook (Ops Form 19/M102) were recovered on scene. A review of the last page of logbook entries indicated completed entries for the LUK to MGY leg on November 10, 2015. There were no entries in the logbook for the MGY to AKR leg on the day of the accident.

Photo 2: Last logbook page recovered from the accident site showing LUK to MGY leg.

10.0 Weight and Balance

Title 14 CFR 135.385(a) Large transport category airplanes: Turbine engine powered: Landing limitations: Destination airports, stated the following:

> *No person operating a turbine engine powered large transport category airplane may take off that airplane at a weight that (allowing for normal consumption of fuel and oil in flight to the destination or alternate airport) the weight of the airplane on arrival would exceed the landing weight in the Airplane Flight Manual for the elevation of the*

destination or alternate airport and the ambient temperature anticipated at the time of landing.

Weight and balance guidance and procedures for Execuflight pilots were found in the Execuflight GOM and the OpSpecs. Execuflight pilots primarily computed their aircraft weight and balance by means of a software program that was accessed through the company's computer system. The Execuflight GOM, Weight and Balance, Section 2-1(f), page B-1, stated the following:

> *The Pilot in Command will compute the aircraft weight and C.G[80]. location prior to each departure utilizing the current aircraft weight and balance data. He must determine that the aircraft is within the C.G. envelope and weight limitations for all operations, and will remain within the C.G. envelope throughout the flight. The actual computations for weight and balance are performed using Ultra-Nav Aviation Aircraft Performance Software installed on the company virtual computer system accessible anywhere worldwide. In the event the a [sic] internet network interruption occur the pilot may use the aircraft long form procedures to computer [sic] the weight and balance and must fax a copy to the CP office prior to departure.*

According to information from Ultra-Nav, the company provided Performance Software developed directly from the AFM. AFM graphs and charts were digitized and mathematically transformed into equations which replicated the procedures and computations made by the takeoff, landing, and weight and balance sections of the AFM. UltraNav was a type B software application, and the application was provided on a CD disk once purchased that could be run off a laptop or computer.[81]

Pilots would then populate various fields in the program with the weights of the passengers, baggage and fuel, and the program would make calculations to derive weight and balance and performance information for a flight.[82] For a complete printout of each flight's weight and balance and performance information for the 2-day trip as calculated by Execuflight using the Ultra-Nav software, see Attachment 12 – Weight and Balance.

To calculate the takeoff weight of the airplane, the basic empty weight of the airplane must first be determined.[83] The most current weight and balance for N237WR was dated May 30, 2014 and performed by Aircraft Weighing Corporation in Ft. Lauderdale, Florida, and listed the basic empty weight of N237WR at 13,815 pounds.

---

[80] Center of Gravity.

[81] For additional information on Type B software applications, See AC 120-76B (Dated June 1, 2012).

[82] According to Ultra-Nav records, the original purchaser of the software program for airplane N237WR was "Waddell & Reed" on May 15, 2002. The only update to the software program occurred on March 14, 2006, and was for takeoff weight limits due to SIDs and obstacle clearances. On September 25, 2015, Ultra-Nav sent the most current version of the N237WR software to Execuflight that also included the 80% landing performance option.

[83] 14 CFR 135.185(a) stated the following: No person may operate a multiengine aircraft unless the current empty weight and center of gravity are calculated from values established by actual weighing of the aircraft within the preceding 36 calendar months. According to the FAA Weight and Balance handbook (FAA-H-8083-1A), the Basic Empty Weight was the standard empty weight of the aircraft plus optional equipment.

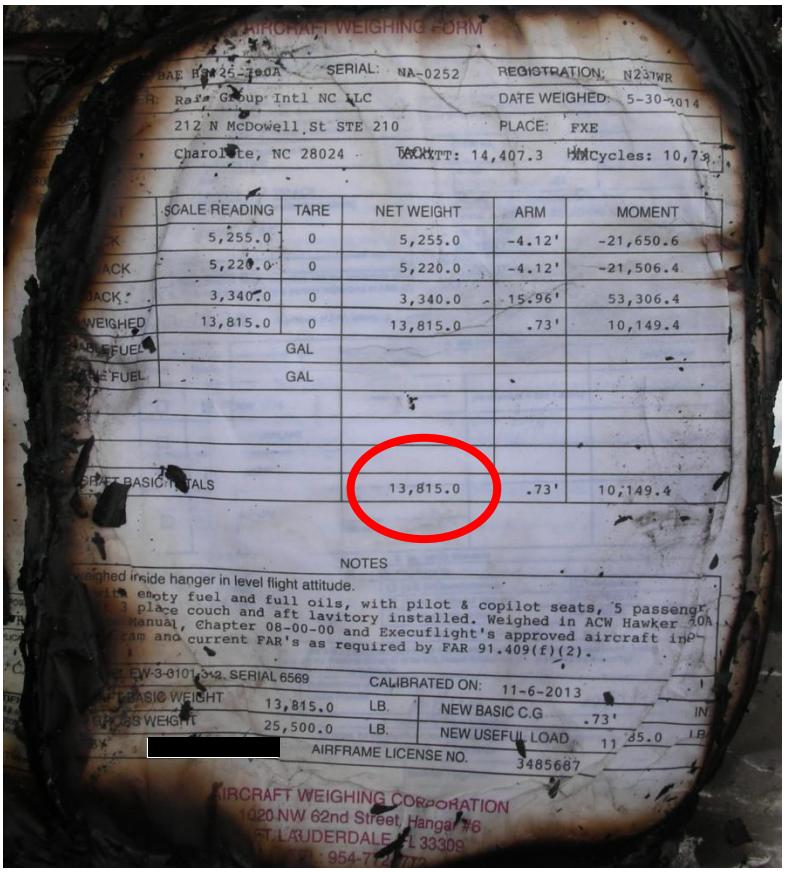
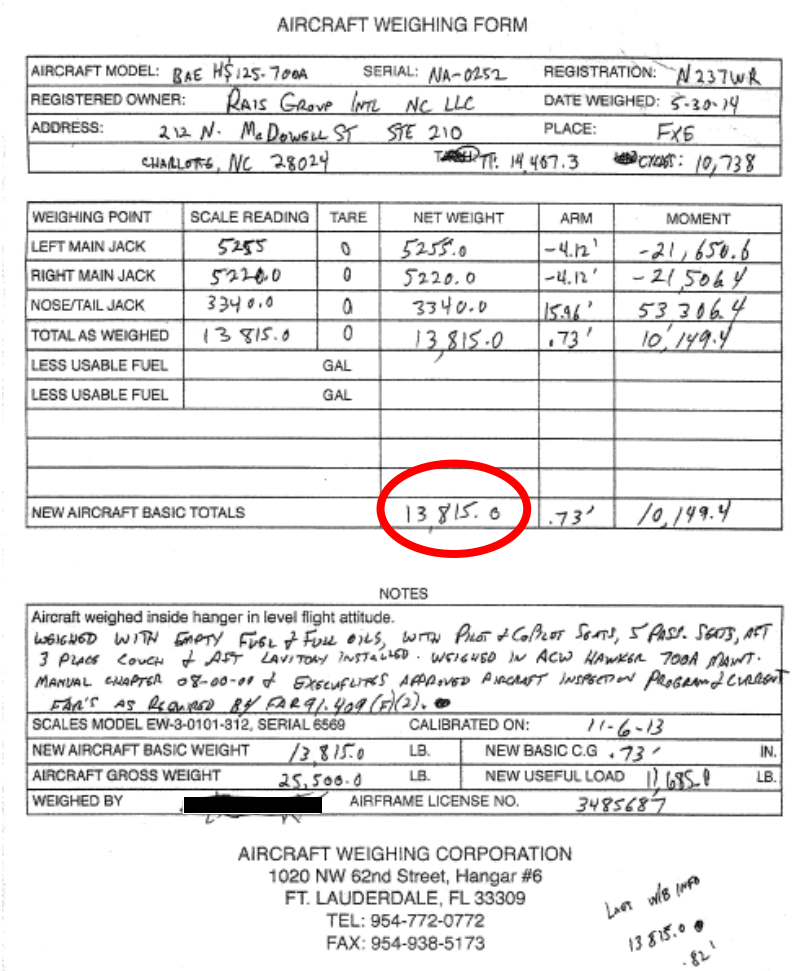


Photo 3: Photo of document recovered from the accident site showing May 30, 2014 basic empty weight of N237WR at 13,815 pounds (indicated by red circle).



AIRCRAFT WEIGHING FORM

AIRCRAFT MODEL: BAE HS125-700A	SERIAL: NA-0252	REGISTRATION: N237WR	
REGISTERED OWNER: RAIS GROUP INTL NC LLC		DATE WEIGHED: 5-30-14	
ADDRESS: 212 N. McDOWELL ST STE 210		PLACE: FXE	
CHARLOTTE, NC 28024	TARE TT: 14,487.3	CYCLES: 10,738	

WEIGHING POINT	SCALE READING	TARE	NET WEIGHT	ARM	MOMENT
LEFT MAIN JACK	5255	0	5255.0	-4.12'	-21,650.6
RIGHT MAIN JACK	5220.0	0	5220.0	-4.12'	-21,506.4
NOSE/TAIL JACK	3340.0	0	3340.0	15.96'	53,306.4
TOTAL AS WEIGHED	13,815.0	0	13,815.0	.73'	10,149.4
LESS USABLE FUEL		GAL			
LESS USABLE FUEL		GAL			
NEW AIRCRAFT BASIC TOTALS			13,815.0	.73'	10,149.4

NOTES

Aircraft weighed inside hanger in level flight attitude.
WEIGHED WITH EMPTY FUEL & FULL OILS, WITH PILOT & CO-PILOT SEATS, 5 PASS. SEATS, AFT 3 PLACE COUCH & AFT LAVITORY INSTALLED. WEIGHED IN ACW HAWKER 700A MAINT. MANUAL CHAPTER 08-00-00 & EXECUFLIGHTS APPROVED AIRCRAFT INSPECTION PROGRAM & CURRENT FAA'S AS REQUIRED BY FAR 91.409(F)(2).

SCALES MODEL EW-3-0101-312, SERIAL 6569			CALIBRATED ON: 11-6-13		
NEW AIRCRAFT BASIC WEIGHT	13,815.0	LB.	NEW BASIC C.G	.73'	IN.
AIRCRAFT GROSS WEIGHT	25,500.0	LB.	NEW USEFUL LOAD	11,685.0	LB.
WEIGHED BY [redacted]			AIRFRAME LICENSE NO.	3485687	

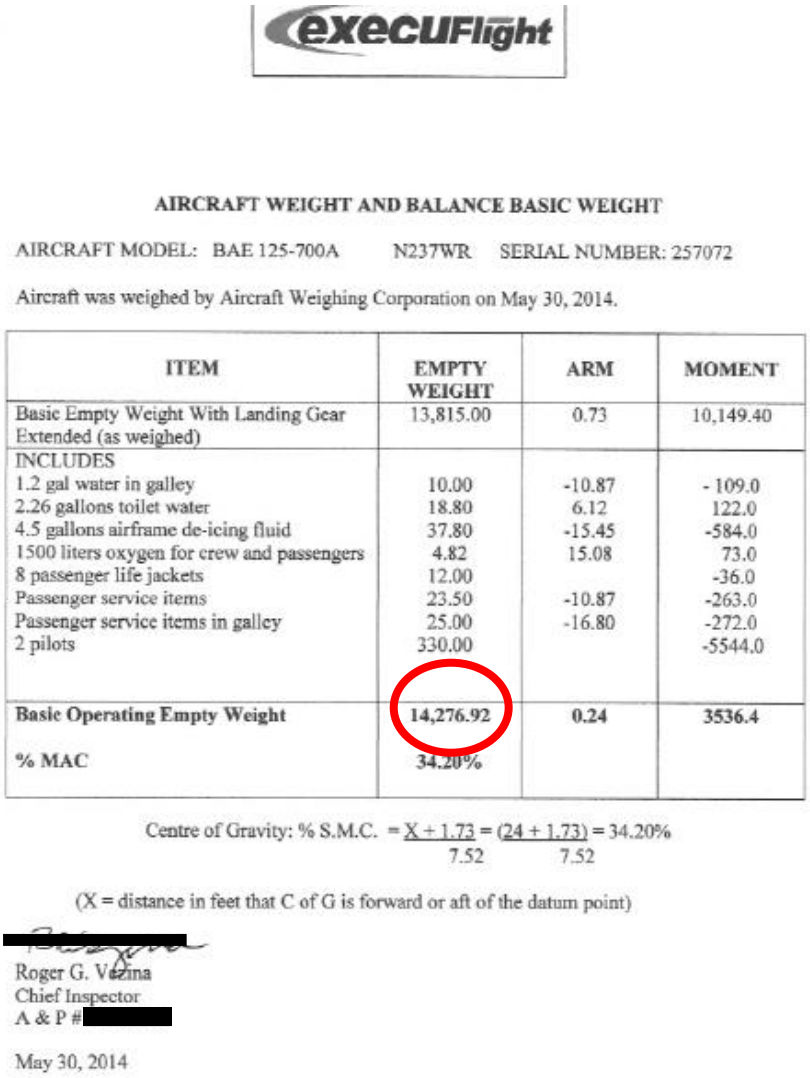
AIRCRAFT WEIGHING CORPORATION
1020 NW 62nd Street, Hangar #6
FT. LAUDERDALE, FL 33309
TEL: 954-772-0772
FAX: 954-938-5173

Last WB Info
13,815.0
.82

Figure 1: May 30, 2014 Basic Aircraft Weight (13,815 pounds basic empty weight indicated by red circle) for N237WR. (Source: Execuflight)

According to the FAA Weight and Balance handbook (FAA-H-8083-1A), the Basic Operating Weight (BOW) was the basic empty weight of the aircraft plus the weight of the required crew, their baggage and other standard item such as meals and potable water. To calculate the takeoff weight, pilots were required to take the basic operating weight and add the weight of the passengers, baggage, and fuel.

Execuflight provided a document dated May 30, 2014 showing the basic operating weight of N237WR of 14,276.92 pounds.



execuFlight

AIRCRAFT WEIGHT AND BALANCE BASIC WEIGHT

AIRCRAFT MODEL: BAE 125-700A N237WR SERIAL NUMBER: 257072

Aircraft was weighed by Aircraft Weighing Corporation on May 30, 2014.

ITEM	EMPTY WEIGHT	ARM	MOMENT
Basic Empty Weight With Landing Gear Extended (as weighed)	13,815.00	0.73	10,149.40
INCLUDES			
1.2 gal water in galley	10.00	-10.87	- 109.0
2.26 gallons toilet water	18.80	6.12	122.0
4.5 gallons airframe de-icing fluid	37.80	-15.45	-584.0
1500 liters oxygen for crew and passengers	4.82	15.08	73.0
8 passenger life jackets	12.00		-36.0
Passenger service items	23.50	-10.87	-263.0
Passenger service items in galley	25.00	-16.80	-272.0
2 pilots	330.00		-5544.0
Basic Operating Empty Weight	**14,276.92**	**0.24**	**3536.4**
% MAC	**34.20%**		

Centre of Gravity: % S.M.C. = $\frac{X + 1.73}{7.52} = \frac{(24 + 1.73)}{7.52} = 34.20\%$

(X = distance in feet that C of G is forward or aft of the datum point)

[redacted]

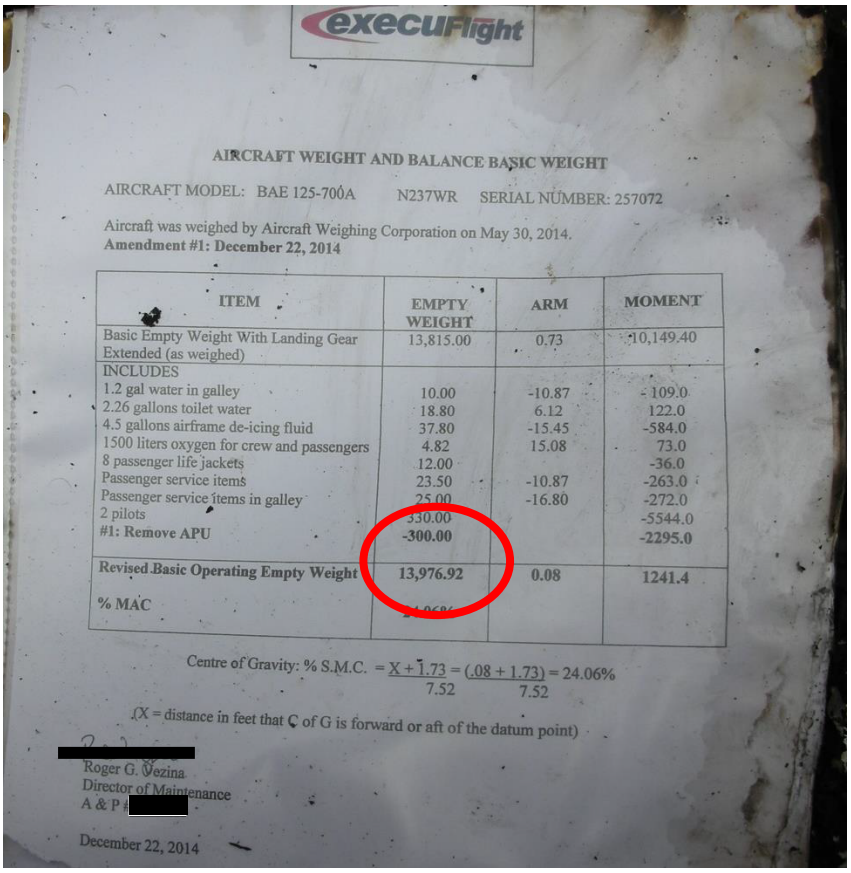
Roger G. Vezina
Chief Inspector
A & P #[redacted]

May 30, 2014

Figure 2: Document showing the basic operating weight of 14,276.92 pounds (indicated by red circle) for N237WR, dated May 30, 2014 (Source: Execuflight).

Documents retrieved from the accident site showed an amendment to the May 30, 2014 basic operating weight for N237WR, dated December 22, 2014, indicating that the Revised Basic Operating Weight for N237WR was 13,976.92 pounds. This weight included additional items such as pilot weights, galley service items and water, de-icing fluids, life vests, and passenger service items. The document also listed a weight reduction of 300 pounds for the removal of the Auxiliary power unit (APU). However, the NTSB recovered the APU at the accident site, indicating that it was installed onboard N237WR at the time of the accident.[84]

[84] For additional information, see Maintenance Group Chairman's Factual Report and Systems' Group Chairman's Factual Report.



execuFlight

AIRCRAFT WEIGHT AND BALANCE BASIC WEIGHT

AIRCRAFT MODEL: BAE 125-700A N237WR SERIAL NUMBER: 257072

Aircraft was weighed by Aircraft Weighing Corporation on May 30, 2014.
Amendment #1: December 22, 2014

ITEM	EMPTY WEIGHT	ARM	MOMENT
Basic Empty Weight With Landing Gear Extended (as weighed)	13,815.00	0.73	10,149.40
INCLUDES			
1.2 gal water in galley	10.00	-10.87	-109.0
2.26 gallons toilet water	18.80	6.12	122.0
4.5 gallons airframe de-icing fluid	37.80	-15.45	-584.0
1500 liters oxygen for crew and passengers	4.82	15.08	73.0
8 passenger life jackets	12.00		-36.0
Passenger service items	23.50	-10.87	-263.0
Passenger service items in galley	25.00	-16.80	-272.0
2 pilots	330.00		-5544.0
#1: Remove APU	**-300.00**		**-2295.0**
Revised Basic Operating Empty Weight	**13,976.92**	**0.08**	**1241.4**
% MAC			

Centre of Gravity: % S.M.C. = $\frac{X + 1.73}{7.52} = \frac{(.08 + 1.73)}{7.52} = 24.06\%$

(X = distance in feet that C of G is forward or aft of the datum point)

[redacted]
Roger G. Vezina
Director of Maintenance
A & P [redacted]

December 22, 2014

Photo 4: Photo of N237WR Basic Operating Weight document recovered from the accident site. The document was dated December 22, 2014 and included a reduction of 300 pounds for removal of the APU. The reduction of 300 pounds for removal of the APU and basic operating weight of 13,976.92 pounds are indicated in the red circle.

In a February 29, 2016 email to the NTSB, the Execuflight Chief Pilot stated that the pilot weights were included in a basic operating weight (BOW) default setting in the Ultra-Nav software.[85] However, in a March 18, 2016 email to the NTSB, the Execuflight Chief Pilot said they did not know what the Ultra Nav default setting was due to the fact that it could be changed by any crew member who is able to access the system.[86]

A review of the Ultra-Nav weight and balance printout provided to the NTSB by Execuflight for the accident flight showed that the takeoff weight and balance computations for N237WR used the basic empty weight of 13,815 pounds (instead of the 13,976.92 pounds basic operating weight from December 22, 2014, which would include pilot weights, galley service items and water, de-icing fluids, life vests, and passenger service items) plus the passenger weight (1,400 pounds), plus the baggage weight (250 pounds), plus the fuel weight (7,700 pounds fuel planned) for a total takeoff weight of 23,165 pounds.

[85] Source: Email received Monday, February 29, 2016 8:24 AM.
[86] Source: Email received Friday March 18, 2016 4:16 PM.

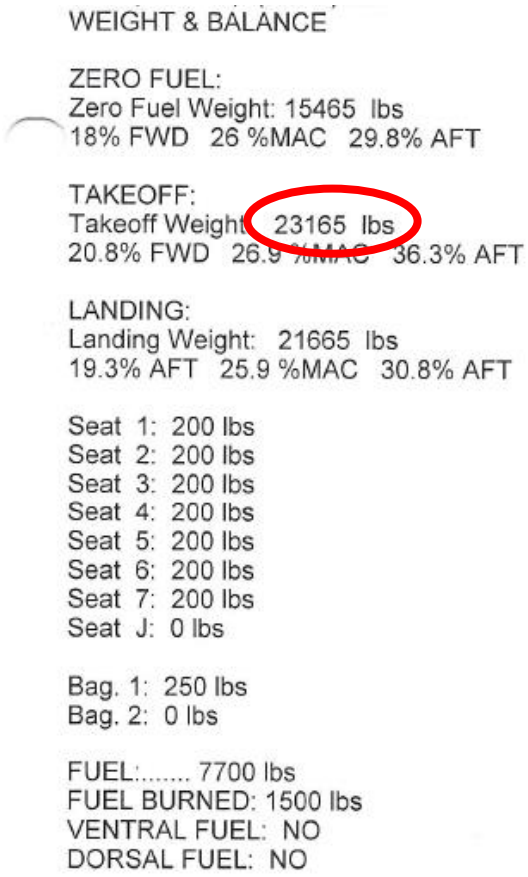


Figure 3: Excerpt from Ultra-Nav printout for accident flight weight and balance. Takeoff weight of 23,165 pounds indicated in red circle.[87]

In addition, the recovery of the APU at the accident site would add an additional 300 pounds to the basic operating weight, and the actual basic operating weight for N237WR was 14,276.92 pounds as stated in the May 30, 2014 document.

The Execuflight GOM, Section 2-3 Cargo and Bag Weights, Page B-1 (Revision 51) stated the following:

> *Upon completion of the weight and balance computations, the Pilot in Command of a company multiengine aircraft shall transfer that data to the Turbine Daily Record Sheet/Manifest form, (see Section S) and complete the remainder of the form prior to each departure.*

Execuflight provided the NTSB copies of the Ultra-Nav computation printouts made for each of the flights on the 2-day accident pairing. These computations were required to be entered in the Turbine Daily Record, found in the aircraft logbook (Ops form 19/M102) per the Execuflight GOM, Section 2-3 Cargo and Bag Weights, Page B-1. A comparison of the records indicated that the Ultra-Nav computations provided by Execuflight did not match the computations populated in the N237WR logbook for the flights prior to the accident flight (November 9-10,

[87] Source: Execuflight. See Attachment 12 – Weight and Balance.

2015). Data from the accident flight from MGY to AKR also did not appear in the logbook for November 10, 2015 (See Photo 2).

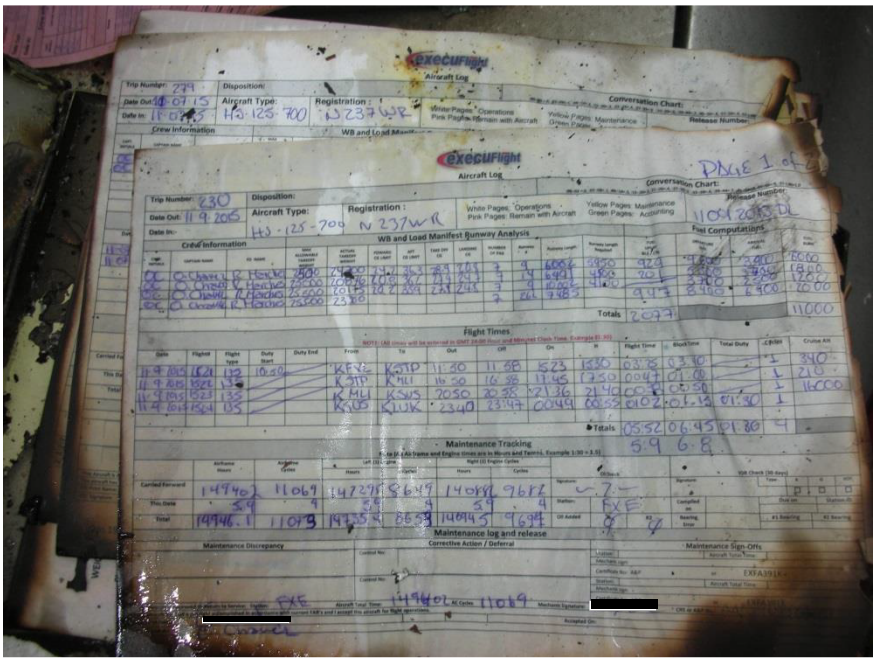


Photo 5: Photo of N237WR logbook entries for November 9, 2015.

The Execuflight Chief Pilot told the NTSB that there could be a circumstance where the pilot could populate the logbook field with numbers different than that produced by the Ultra-Nav program, for example if the weight and balance or performance numbers were computed well before the estimated takeoff time (i.e. the night before or, morning of) and then recalculated right before the departure to comply with the real time requirements considering a change in conditions, passenger or fuel.[88] The NTSB was not provided with the computations used by the accident pilots for the figures entered into the N237WR logbook for November 9 and 10, 2015.

10.1 Passenger Weights

The Execuflight OpSpec A096 Actual Weight Program For All Aircraft, stated that Execuflight was "authorized to use only actual weights when determining the aircraft weight and balance," including passenger weights, carry-on bag weights, checked bag weights, plane-side loaded bags, and heavy bags. Execuflight was also authorized to use solicited ("asked") passenger weight plus 10 pounds. The Execuflight GOM, Section 2-3 Cargo and Bag Weights, Page B-2. stated the following:

> *All cargo and bags shall be weighed on calibrated scales (calibrated within the last 12 months). EXECUFLIGHT aircraft are equipped with scales calibrated by a NIST certified calibration center that will issue EXECUFLIGHT a certificate of calibration for the scale, which will be kept on file and a sticker will be affixed to the scale with the date*

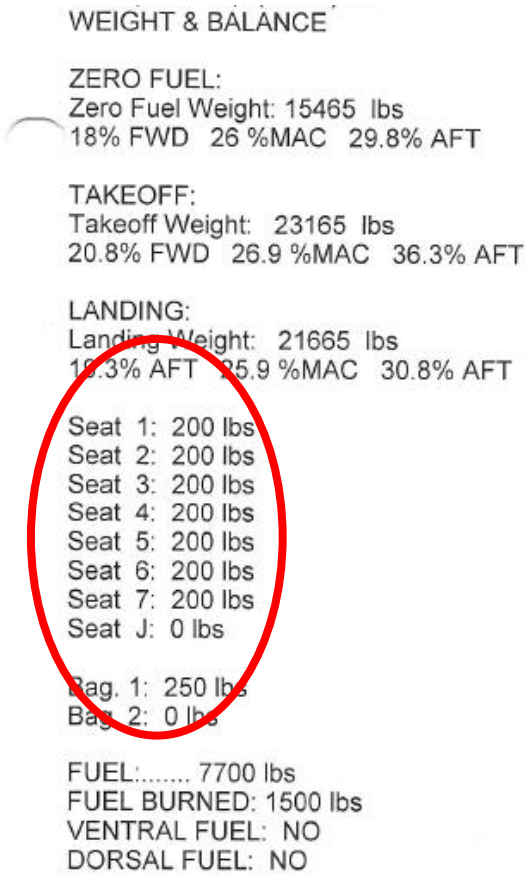
[88] Source: Email received Monday, February 29, 2016 8:24 AM.

of calibration plainly visible. EXECUFLIGHT will track the scale calibration date with its other ships equipment.[89]

According to interviews, the accident airplane was equipped with a portable scale for determining actual passenger and baggage weights. The Execuflight GOM, Section 2-3 Cargo and Bag Weights, Page B-1, stated the following:

> *All aircraft weight and balance computations shall be accomplished utilizing actual weights, passengers and crew shall be asked their weight; however, if the Pilot in Command feels that passengers or crew weights may be inaccurate, he shall weigh that individual.*

A review of the weight and balance records provided by Execuflight for each of the flights on the 2-day accident pairing, including the accident flight, indicated that each passenger weighed "200" pounds, and the baggage weight was "250" pounds for each flight.[90]


WEIGHT & BALANCE

ZERO FUEL:
Zero Fuel Weight: 15465 lbs
18% FWD 26 %MAC 29.8% AFT

TAKEOFF:
Takeoff Weight: 23165 lbs
20.8% FWD 26.9 %MAC 36.3% AFT

LANDING:
Landing Weight: 21665 lbs
19.3% AFT 25.9 %MAC 30.8% AFT

Seat 1: 200 lbs
Seat 2: 200 lbs
Seat 3: 200 lbs
Seat 4: 200 lbs
Seat 5: 200 lbs
Seat 6: 200 lbs
Seat 7: 200 lbs
Seat J: 0 lbs

Bag. 1: 250 lbs
Bag. 2: 0 lbs

FUEL:..... 7700 lbs
FUEL BURNED: 1500 lbs
VENTRAL FUEL: NO
DORSAL FUEL: NO

Figure 4: Excerpt from Ultra-Nav printout for accident flight weight and balance. Passenger and baggage weights are indicated in the red circle.[91]

[89] For portable scale calibration information, see Maintenance Group Chairman's Factual Report.
[90] Actual passenger weights onboard the accident flight were unavailable at the writing of this Factual Report.
[91] Source: Execuflight. See Attachment 12 – Weight and Balance.

10.2 Takeoff Fuel

According to the Ultra-Nav printout provided by Execuflight, the takeoff fuel for the accident flight was planned for 7,700 pounds.

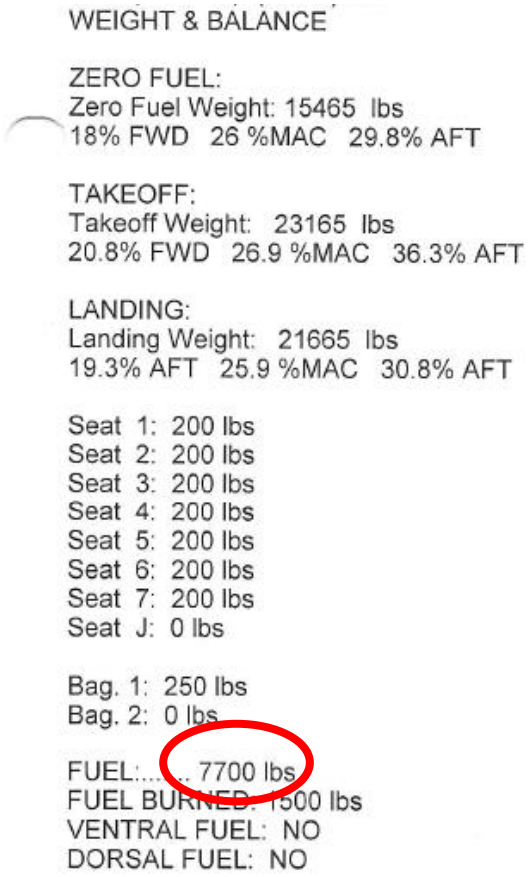


Figure 5: Excerpt from Ultra-Nav printout for accident flight weight and balance. Planned fuel load of 7700 pounds indicated in the red circle.[92]

Fueling records from MGY show that 410 gallons of Jet A fuel were loaded onto N237WR prior to departure to AKR.[93] According to the Aviation Services, Inc. fueler in MGY who fueled the accident airplane prior to the flight to AKR, the accident pilots requested that both wing tanks be "topped off" and filled to their capacity.[94] No fuel was loaded into the ventral or dorsal tanks.[95] The Type Certification Data Sheet No. A3EU for the Model HS 125 Series 700A listed the total wing tank fuel capacity at 8,160 pounds.

The taxi fuel was also not included in the Ultra-Nav printout provided by Execuflight. According to the Execuflight Chief Pilot, 300 pounds of fuel would be considered typical at

[92] Source: Execuflight. See Attachment 12 – Weight and Balance.
[93] See Attachment 13 – MGY Fueling Records.
[94] Source: Email received Monday, February 29, 2016 6:12 PM.
[95] Capacity for the ventral tank was 873 pounds, and the dorsal tank capacity was 406 pounds. Both tanks were located in the aft fuselage.

Execuflight, but could vary depending on delays. According to Ultra-Nav, pilots could account for taxi burn by subtracting the estimated taxi fuel from the takeoff fuel.

10.3 Estimated Weight and Balance

The graph below provides a column for the weight and balance information provided by Execuflight, and the NTSB revised weight and balance for the accident flight based on available evidence. Maximum weights in the table below are indicated in **bold** per the Hawker HS125-700A Airplane Flight Manual (AFM), Section 2 Limitations, page 3. Weights that exceeded limitations are indicated in red.

	Weight Description	Execuflight W/B[96]	Revised W/B
	Basic Operating Weight (BOW)	13,815	13,976
	Pilots Weight	0	0
	APU	0	300
	Passenger Weight	1,400	1,400
	Baggage Weight	250	250
	Zero Fuel Weight	15,465	15,926
	Maximum Zero Fuel Weight	**16,300**	**16,300**
	Fuel Weight	7,700	8,160
	Ramp Weight	23,165	24,086
	Maximum Ramp Weight	**25,500**	**25,500**
	Estimated Taxi Burn	0	300
	Estimated Takeoff Weight	23,165	23,786
	Maximum Takeoff Weight (landing limited)	23,165	23,500[97]
	Maximum Structural Takeoff	**25,500**	**25,500**
	Takeoff CG Limits (per Airplane Flight Manual)	20.8 – 36.3	21.5 – 36.3*
	Takeoff Center of Gravity (CG)	26.9	22.46[98]
	Estimated Fuel Burn	1,500	1,500
	Estimated Landing Weight	21,665	22,286
	Maximum Landing Weight	**22,000**	**22,000**
	Landing CG Limits	19.3 – 30.8	19.9 – 31.1*
	Landing CG	25.9	21.28
	V_{REF}[99] Flaps 45	124	125
	V_{APP}	144	145

*Notes estimated figure

[96] Source: UltraNav weight and balance printout provided to the NTSB by Execuflight.
[97] Maximum takeoff weight was landing limited based on an estimated fuel burn enroute of 1,500 pounds (22,000 maximum landing weight + 1,500 = 23,500 maximum takeoff weight).
[98] Estimated center of gravity. Actual center of gravity would be predicated on the seat locations of each passenger on the airplane, which was unknown.
[99] VREF was defined as 1.3 times the stalling speed in the landing configuration. It is the required speed at the 50-foot height above the threshold end of the runway. (Source: Pilot's Handbook of Aeronautical Knowledge, FAA-H-8083-25A, Chapter 10, page 10-32). VAPP is the approach speed flown by the pilot.

10.4 Center of Gravity

At the request of the NTSB, Textron used the revised weight and balance computations to calculate the center of gravity and provided the following chart:

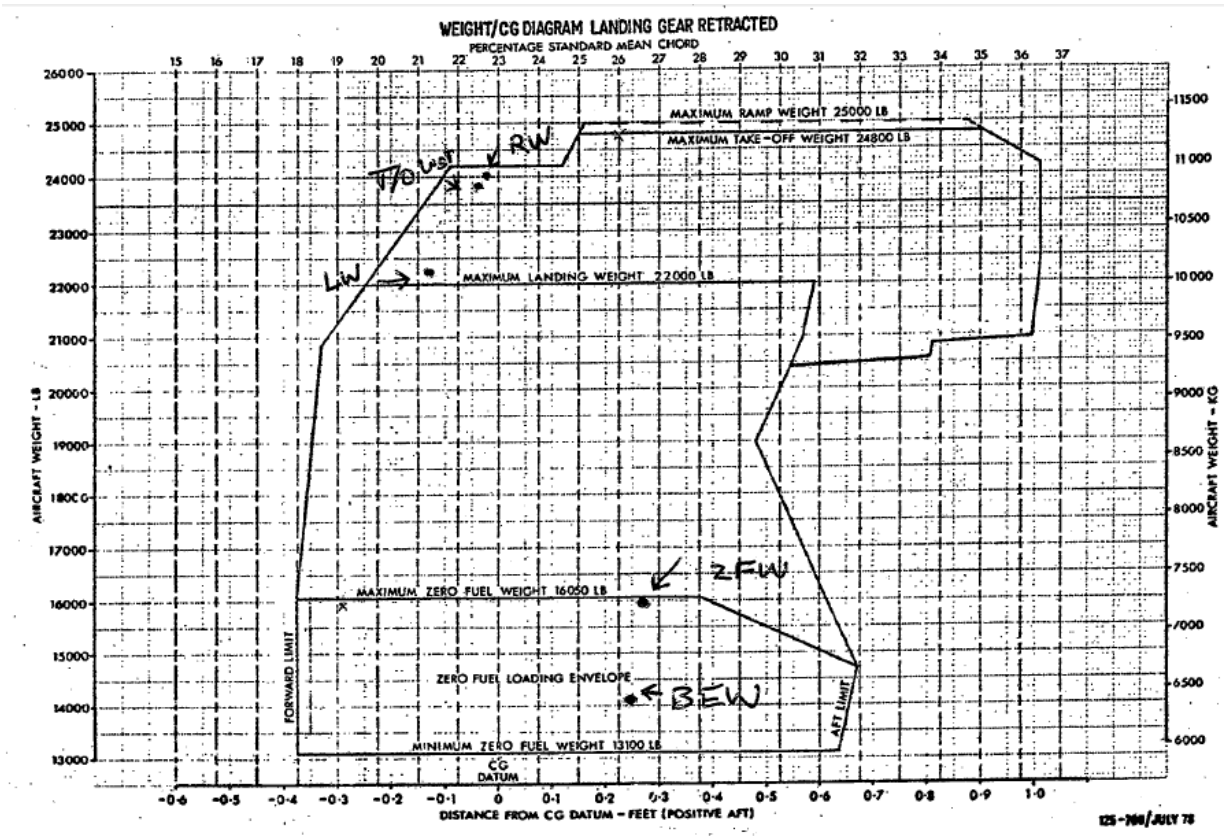


Figure 6: Center of gravity (CG) chart, provided by Textron from the Hawker AFM, indicating basic empty weight (BEW) CG, zero fuel weight (ZFW) CG, Takeoff weight (T/O) CG, and landing weight (LW) CG.[100]

10.5 Landing Reference Speed

During flight, Execuflight Hawker 700A pilots would reference the normal procedures checklist to determine the flaps 45 VREF speed they would use for an approach to a runway.[101] Pilots would determine the flaps 45 VREF from the top portion of the chart (see Figure 6 below) using their estimated landing weight (i.e., for a landing weight of 22,000 pounds, the VREF speed would be 125 knots for the approach). They would then fly the airplane at indicated airspeeds on the profile for the approach in reference to this flaps 45 VREF speed (for instance on the Hawker 700A non-precision approach, when within the terminal area the pilot would slow to a speed of VREF+50 knots at a configuration of flaps 0 and gear up, and when one mile from the FAF, the pilot would configure the airplane with the gear down, select flaps 25 and then slow to a speed of VREF+20). For more detailed information on the Hawker 700A non-precision approach profile, see Section 18.2.1.1 Standard Non-Precision Approach Profile of this Factual Report.

[100] Source: Hawker HS125 700A AFM HS.1.9 (SN 257072).

[101] According to the Hawker AFM, the Hawker 700A had flap settings of 0 degrees (up), 15 degrees (takeoff), 25 degrees (approach) and 45 degrees (landing).

The maximum flaps 45 VREF speed available from the Execuflight normal procedures chart indicated a flaps 45 VREF speed of 125 knots. The chart did not include reference speeds for weights in excess of the maximum landing weight of 22,000 pounds. The software calculations made by Ultra-Nav from data contained in the AFM could interpolate speeds above maximum landing weight, and indicated a flaps 45 VREF speed of 125 knots for an overweight landing at 22,286 pounds.

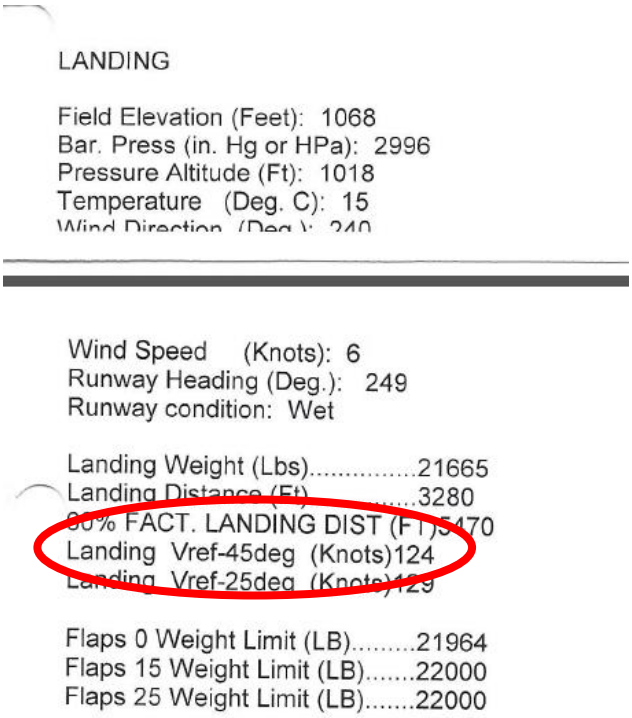


Figure 7: Excerpt from Ultra-Nav printout for accident flight showing landing flaps 45 VREF speeds, indicated by red circle.[102]

[102] Source: Execuflight.

V_{REF} & LANDING DISTANCE REQUIRED (WITH THRUST REVERSERS)

A/C WEIGHT LB x 1000	22		21		20		19		18		17		16		15	
V_{REF} KIAS	125		122		119		116		113		110		106		103	
ELEVATION	OAT/LANDING DISTANCE															
FEET x 1000	°C	ft.	°C	ft.	°C	ft.	°C	ft.	°C	ft.	°C	ft.	°C	ft.	°C	ft.
6	-10	5140	15	4910	20	4710	25	4520	30	4350	34	4200	38	4030	38	3890
5	2	5020	19	4810	24	4620	28	4440	33	4280	38	4120	40	3970	40	3830
4	13	4910	23	4710	27	4520	32	4360	36	4200	41	4040	42	3900	42	3770
3	21	4800	26	4600	31	4430	35	4250	39	4100	44	3950	44	3810	44	3680
2	27	4690	30	4490	34	4310	38	4150	43	4000	46	3860	46	3720	46	3600
1	29	4590	34	4400	37	4240	41	4080	46	3930	48	3800	48	3670	48	3550
SL	33	4500	36	4320	40	4170	44	4010	50	3870	50	3730	50	3610	50	3500

NOTE: NOTE: The temperature shown in the above columns for the higher weights is the WAT limited temperature (flaps 15°) for that weight and altitude.

ZERO WIND AND GRADIENT

WIND CORRECTION

TAILWIND	ZERO WIND DISTANCE	HEADWIND			
10 kt		10 kt	20 kt	30 kt	40 kt
Add ft	ft	Subtract ft			
1000	5000	300	600	850	1100
900	4500	250	550	750	1000
800	4000	250	500	700	900
650	3500	200	450	650	800

Figure 8: Execuflight HS-125-700 Normal Procedures Pilot Checklist, page N-4a.

10.6 Destination Airport Analysis Program

Title 14 CFR 135.385(b) Large transport category airplanes: Turbine engine powered: Landing limitations: Destination airports, stated the following in part:

> *(b) Except as provided in paragraph (c), (d), (e), or (f) of this section, no person operating a turbine engine powered large transport category airplane may take off that airplane unless its weight on arrival, allowing for normal consumption of fuel and oil in flight (in accordance with the landing distance in the Airplane Flight Manual for the elevation of the destination airport and the wind conditions expected there at the time of landing), would allow a full stop landing at the intended destination airport within 60 percent of the effective length of each runway described below from a point 50 feet above the intersection of the obstruction clearance plane and the runway.*

The same regulation, 14 CFR 135.385(f), stated the following in part:

> *An eligible on-demand operator may take off a turbine engine powered large transport category airplane on an on-demand flight if all of the following conditions exist:*

(1) The operation is permitted by an approved Destination Airport Analysis in that person's operations manual.
(2) The airplane's weight on arrival, allowing for normal consumption of fuel and oil in flight (in accordance with the landing distance in the Airplane Flight Manual for the elevation of the destination airport and the wind conditions expected there at the time of landing), would allow a full stop landing at the intended destination airport within 80 percent of the effective length of each runway described below from a point 50 feet above the intersection of the obstruction clearance plane and the runway. For the purpose of determining the allowable landing weight at the destination airport, the following is assumed:
(i) The airplane is landed on the most favorable runway and in the most favorable direction, in still air.
(ii) The airplane is landed on the most suitable runway considering the probable wind velocity and direction and the ground handling characteristics of the airplane, and considering other conditions such as landing aids and terrain.
(3) The operation is authorized by operations specifications.

Execuflight was authorized by OpSpecs C049 to utilize the 80% of available runway deviation allowed by 14 CFR 135.385(f) instead of the 60% defined in 14 CFR 135.385(b), and utilized the Ultra-Nav software for landing performance calculations as part of its destination airport analysis program (DAAP). Newer versions of the Ultra-Nav software were able to use inputted weights to calculate the landing distance requirements, and show the 60% and 80% landing requirements of the airplane, as well as the reference landing weights based on different flap settings.

According to Ultra-Nav, the older version of the program used in on May 15, 2002 (the year the program was purchased for N237WR) only calculated the 60% factor, but pilots could still manually calculate the 80% factor by taking the total landing distance required and dividing by .80.

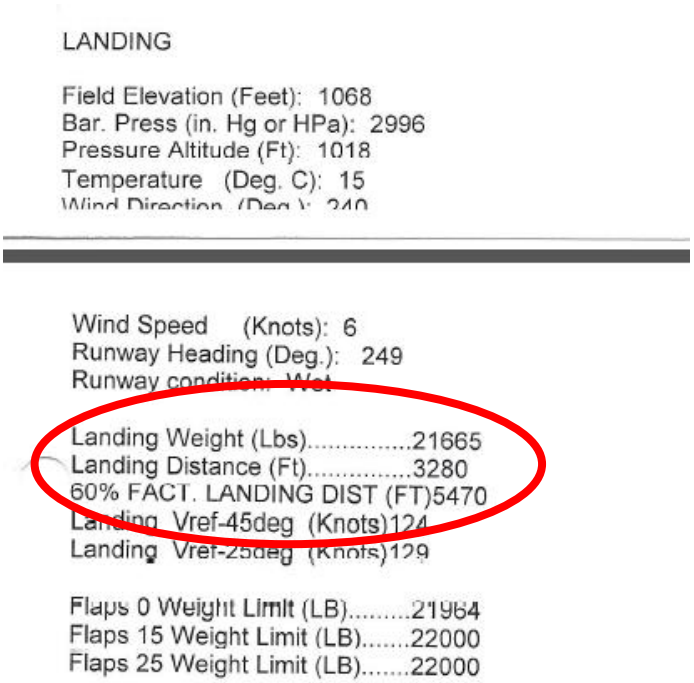


Photo 6: Excerpt from Ultra-Nav printout for accident flight showing destination airport analysis and landing distances, shown in red circle. [103]

As previously mentioned, the performance calculations from the Ultra-Nav printout were based on calculations using the basic empty weight of the airplane and not the basic operating weight. The actual estimated landing weight was 22,286 pounds.

While the Ultra-Nav software took multiple variables into account for its calculations based on the information contained in the airplane's AFM, as stated in the Execuflight GOM, "glide slopes that vary from 3.5 degrees, cross winds, tail winds, and mountainous areas that have quickly changeable wind conditions can increase the landing distance." Pilots were cautioned not to use the 80% landing factor in those cases.

The Execuflight GOM, page R-15 also stated the following:

> *First, there are some criteria that originated in the actual aircraft certification process which serves as the basis for the AFM landing data.*
>
> *1. Certification: 3.5 degree glide slope*
> *2. Certification: 8 ft/sec touchdown rate of descent*
> *3. Certification: Assumes all approach speed additives will be bled off before reaching the 50 foot height*
>
> *Varying from any or all of these will result in actual landing distance being longer than calculated landing distance. Typically very few approaches are actually flown under these conditions or to this precision, so typically a pilot can expect that the landing data*

[103] Source: Execuflight.

that originally is derived from the AFM will actually be less than the actual distance to land to a full stop.

The DAAP process was further defined in the Execuflight GOM, page R-12 through R-15, and included the following statement:

The ExecuFlight Destination Airport Analysis Program emphasizes that as carefully as a flight may be planned, in the final analysis, only actual conditions at the time of arrival will be governing. Expect change, monitor conditions while enroute by utilizing weather reporting sources that are available. Don't be surprised by changes that you could have known.

11.0 Meteorological Information

For a detailed discussion on the accident weather, see the Meteorology Group Chairman's Factual Report.

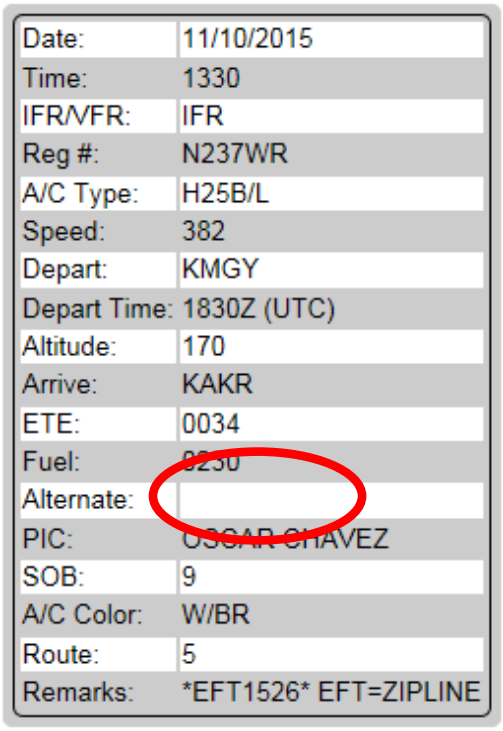
12.0 Flight Planning

Execuflight pilots conducted their own flight planning and filed their own flight plans via an account with the website Flightplan.com. The Execuflight GOM, Section 8-1 Flight Plans, page L-1 (Rev 51) stated, in part:

All company pilots will file with the nearest FAA Flight Service Station a flight plan for each flight operated by the company under FAR 135. (IFR and VFR, Passengers and Freight).

The Pilot in Command retains responsibility for filing and closing said flight plan, however, he may delegate this duty to the SIC. (if applicable).

A review of the Fltplan.com website records indicated that the MGY to AKR flight plan was filed on November 10, 2015 at 1133 (1633Z) shortly after arrival into MGY. The flight was planned for a 1330 departure, and an estimated 34 minutes enroute at a cruise altitude of 17,000 feet msl. An alternate airport was not listed for the IFR flight from MGY to AKR flight.



Date:	11/10/2015
Time:	1330
IFR/VFR:	IFR
Reg #:	N237WR
A/C Type:	H25B/L
Speed:	382
Depart:	KMGY
Depart Time:	1830Z (UTC)
Altitude:	170
Arrive:	KAKR
ETE:	0034
Fuel:	0230
Alternate:	
PIC:	OSCAR CHAVEZ
SOB:	9
A/C Color:	W/BR
Route:	5
Remarks:	*EFT1526* EFT=ZIPLINE

Figure 9: Accident flight plan filed from FltPlan.com website. Red circle indicates where no alternate was listed on the flight plan.[104]

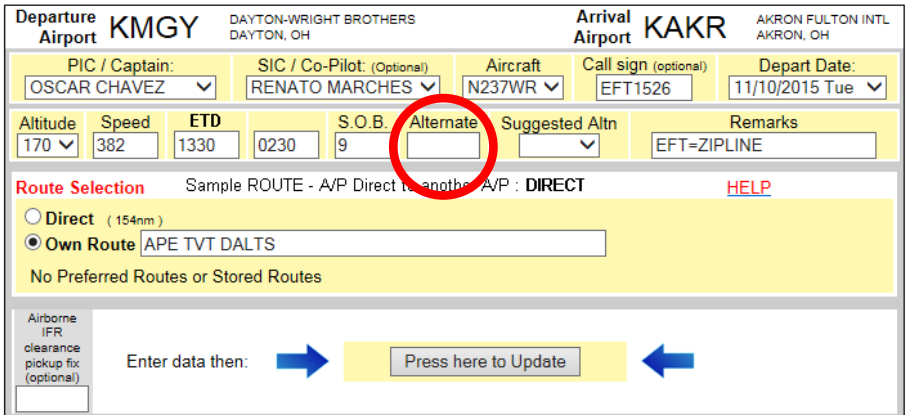


Figure 10: Accident flight plan filed from FltPlan.com (second view). The red circle indicates where the alternate field was blank.[105]

In addition, according to information from the FAA and DUATS (Direct User Access Terminal), no alternate airport was filed for the flight from MGY to AKR. The DUATS information provided to the NTSB indicated the following (red circle indicates where no alternate was filed):[106]

```
Tail/Call Sign:   EFT1526
```

[104] Source: Website screen shot provided by FltPlan.com.
[105] Source: Website screen shot provided by FltPlan.com.
[106] Source: FAA.

```
Flight plan:        IFR
FPL Type:           ICAO
Type Flight:        General Aviation
A/c type:           H25B
Wake Category:      /M
ICAO Equip:         SDFGHRWZ/S
Depart:             KMGY
Arrive:             KAKR
Departtime (UTC):   11/10/2015 1830Z
TAS  :              382 knots
Cruise Alt:         17,000
Route:              DCT APE DCT TVT DCT DALTS DCT
ETE:                0034
Alternate:
Item 10:            PBN/B2D3B4C2C3D2D3 NAV/RNVD1E2A1 REG/N237WR
Endurance:          0230
SOB:                9
Color:              White/Brown
PIC:                [Captain]
Address:            16880 SW 59TH CT  SOUTHWEST RANCHES, FL 33331
Phone no.:          954-341-4604
```

12.1 Alternate Airport Requirements

Title 14 CFR 135.223 IFR: Alternate airport requirements, stated the following:

> ***(a)*** *Except as provided in paragraph (b) of this section, no person may operate an aircraft in IFR conditions unless it carries enough fuel (considering weather reports or forecasts or any combination of them) to—*
>
> > ***(1)*** *Complete the flight to the first airport of intended landing;*
> >
> > ***(2)*** *Fly from that airport to the alternate airport; and*
> >
> > ***(3)*** *Fly after that for 45 minutes at normal cruising speed or, for helicopters, fly after that for 30 minutes at normal cruising speed.*
>
> ***(b)*** *Paragraph (a)(2) of this section does not apply if part 97 of this chapter prescribes a standard instrument approach procedure for the first airport of intended landing and, for at least one hour before and after the estimated time of arrival, the appropriate weather reports or forecasts, or any combination of them, indicate that—*
>
> > ***(1)*** *The ceiling will be at least 1,500 feet above the lowest circling approach MDA[107]; or*
> >
> > ***(2)*** *If a circling instrument approach is not authorized for the airport, the ceiling will be at least 1,500 feet above the lowest published minimum or 2,000 feet above the airport elevation, whichever is higher; and*
> >
> > ***(3)*** *Visibility for that airport is forecast to be at least three miles, or two miles more than the lowest applicable visibility minimums, whichever is the greater, for the instrument approach procedure to be used at the destination airport.*

A circling approach was authorized at AKR for the localizer 25 approach, and the lowest circling minimum was 632 feet agl for a Category C. The lowest applicable visibility minimum for the

[107] Minimum Decision Altitude.

AKR LOC25 was 1 ¼ mile for a Category C. Any weather forecast for AKR that indicated a ceiling lower than 2,132 feet (1500 + Category C circling MDA of 632=2,132), and a visibility lower than 3 ¼ statute miles (2 + Category C straight in visibility of 1 ¼ miles) for at least one hour before and after the estimated time of arrival at the destination would require that an alternate airport be filed for the flight.

No Terminal Area Forecast (TAF) was issued for AKR airport. The closest TAF provided by the National Weather Service forecasted the weather at Akron-Canton Regional Airport (CAK), located approximately 7 miles to the south of AKR,[108] issued at 1731Z covering the planned time of arrival at AKR, included wind from 250 degrees at 6 knots, visibility 3 statute miles, light rain and mist, and an overcast ceiling of 400 feet agl.[109] A TEMPO[110] was also forecasted in the Terminal Area Forecast (TAF) between 1800Z and 2200Z on the day of the accident, and provided the possibility of the visibility decreasing during the time frame surrounding the accident to approximately 1 ½ miles with light drizzle and mist as well as an overcast ceiling of 600 feet agl.[111]

TAF KCAK 101731Z 1018/1118 25006KT 3SM -RA BR OVC004
TEMPO 1018/1022 1 1/2SM -DZ BR OVC006

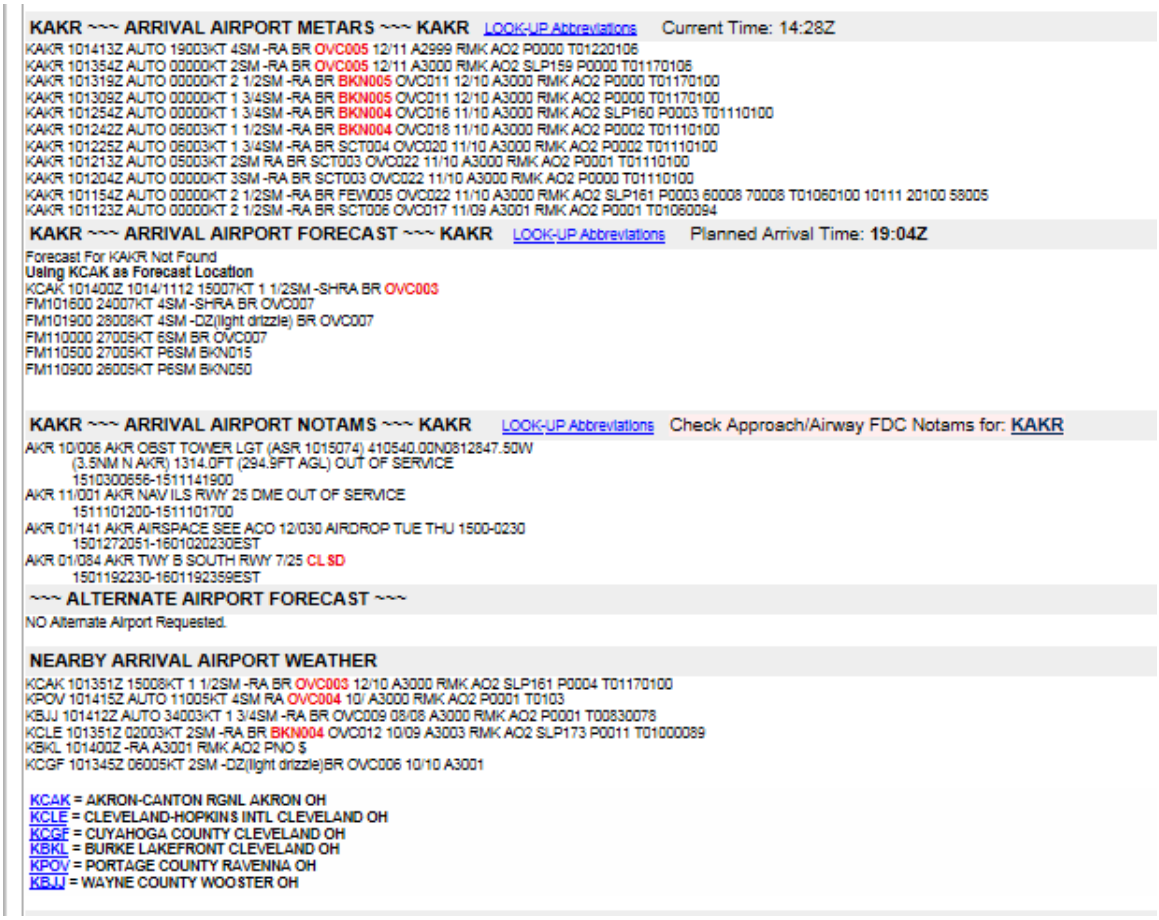
According to the Execuflight Chief Pilot, Execuflight pilots planned and filed their own flight plans, and typically used the Fltplan.com website review weather and file the flight plan. The source of weather used by Execuflight pilots must be approved National Weather Service (NWS) source per OpSpecs A010, and could be accessed via multiple online websites. Pilots were required to print a hard copy of the weather for each flight.[112] The Execuflight GOM, Authorized Aviation Weather Sources, page R-10 (Rev 51) stated the following, in part:

> *EXECUFLIGHT, INC. is authorized to use only those weather reports and forecasts in IFR operations that are prepared by the National Weather Service (NWS), or source approved by the National Weather Service, or other source approved by the FAA.*
>
> *Sources approved by the NWS include the following:*
>
> *…. NWS-operated Automated Surface Observation Systems (ASOS) are approved for flight operations.*

According to Fltplan.com, the weather data provided on their website was from the National Weather Service (an approved weather source for Execuflight). A review of the Fltplan.com website records for the Execuflight account indicated that the weather page listing MGY and

[108] CAK airport elevation was 1,226 feet above mean sea level (msl), and AKR was 1,068 msl.
[109] The minimum decision altitude (MDA) published on the AKR Localizer 25 approach was 1,540 feet msl, or 492 feet agl and 1 ¼ miles visibility, for a category C approach criteria. CFR Part 97.3 defines an Aircraft Approach Category C as Speed 121 knots or more but less than 141 knots based on a speed of VREF.
[110] TEMPO indicates a temporary fluctuation in forecast conditions to cover half of the referenced time for up to 4 hours
[111] For additional weather information, see Meteorological Group Chairman's Factual Report.
[112] No weather documentation for the MGY to AKR flight was recovered from the accident site.

AKR weather reports and forecasts was accessed at 0928 (1428Z) on November 10, 2015.[113] This access to the weather page occurred about 1 hour and 35 minutes prior to the crew departing LUK to MGY at 1603 Z (1103 EST), about 4 hours and 2 minutes before the planned departure from MGY to AKR at 1830Z (1330 EST), and about 4 hours and 34 minutes prior to the scheduled arrival into AKR at 1904Z (1404 EST).[114] The Terminal Forecast (FT) for CAK at the estimated time of arrival into AKR when the Fltplan.com weather page was accessed called for wind from 280 degrees at 8 knots, 4 statute miles visibility with light drizzle and mist, with an overcast ceiling of 700 feet agl.



KAKR ~~~ ARRIVAL AIRPORT METARS ~~~ KAKR LOOK-UP Abbreviations Current Time: 14:28Z

KAKR 101413Z AUTO 19003KT 4SM -RA BR OVC005 12/11 A2999 RMK AO2 P0000 T01220106
KAKR 101354Z AUTO 00000KT 2SM -RA BR OVC005 12/11 A3000 RMK AO2 SLP159 P0000 T01170106
KAKR 101319Z AUTO 00000KT 2 1/2SM -RA BR BKN005 OVC011 12/10 A3000 RMK AO2 P0000 T01170100
KAKR 101309Z AUTO 00000KT 1 3/4SM -RA BR BKN005 OVC011 12/10 A3000 RMK AO2 P0000 T01170100
KAKR 101254Z AUTO 00000KT 1 3/4SM -RA BR BKN004 OVC016 11/10 A3000 RMK AO2 SLP160 P0003 T01110100
KAKR 101242Z AUTO 06003KT 1 1/2SM -RA BR BKN004 OVC018 11/10 A3000 RMK AO2 P0002 T01110100
KAKR 101225Z AUTO 06003KT 1 3/4SM -RA BR SCT004 OVC020 11/10 A3000 RMK AO2 P0002 T01110100
KAKR 101213Z AUTO 05003KT 2SM RA BR SCT003 OVC022 11/10 A3000 RMK AO2 P0001 T01110100
KAKR 101204Z AUTO 00000KT 3SM -RA BR SCT003 OVC022 11/10 A3000 RMK AO2 P0000 T01110100
KAKR 101154Z AUTO 00000KT 2 1/2SM -RA BR FEW005 OVC022 11/10 A3000 RMK AO2 SLP161 P0003 60008 70008 T01060100 10111 20100 58005
KAKR 101123Z AUTO 00000KT 2 1/2SM -RA BR SCT006 OVC017 11/09 A3001 RMK AO2 P0001 T01060094

KAKR ~~~ ARRIVAL AIRPORT FORECAST ~~~ KAKR LOOK-UP Abbreviations Planned Arrival Time: **19:04Z**

Forecast For KAKR Not Found
Using KCAK as Forecast Location
KCAK 101400Z 1014/1112 15007KT 1 1/2SM -SHRA BR OVC003
FM101600 24007KT 4SM -SHRA BR OVC007
FM101900 28008KT 4SM -DZ(light drizzle) BR OVC007
FM110000 27005KT 6SM BR OVC007
FM110500 27005KT P6SM BKN015
FM110900 26005KT P6SM BKN050

KAKR ~~~ ARRIVAL AIRPORT NOTAMS ~~~ KAKR LOOK-UP Abbreviations Check Approach/Airway FDC Notams for: **KAKR**

AKR 10/006 AKR OBST TOWER LGT (ASR 1015074) 410540.00N0812847.50W
(3.5NM N AKR) 1314.0FT (294.9FT AGL) OUT OF SERVICE
1510300656-1511141900
AKR 11/001 AKR NAV ILS RWY 25 DME OUT OF SERVICE
1511101200-1511101700
AKR 01/141 AKR AIRSPACE SEE ACO 12/030 AIRDROP TUE THU 1500-0230
1501272051-1601020230EST
AKR 01/084 AKR TWY B SOUTH RWY 7/25 CLSD
1501192230-1601192359EST

~~~ ALTERNATE AIRPORT FORECAST ~~~

NO Alternate Airport Requested.

NEARBY ARRIVAL AIRPORT WEATHER

KCAK 101351Z 15008KT 1 1/2SM -RA BR OVC003 12/10 A3000 RMK AO2 SLP161 P0004 T01170100
KPOV 101415Z AUTO 11005KT 4SM RA OVC004 10/ A3000 RMK AO2 P0001 T0103
KBJJ 101412Z AUTO 34003KT 1 3/4SM -RA BR OVC009 08/08 A3000 RMK AO2 P0001 T00830078
KCLE 101351Z 02003KT 2SM -RA BR BKN004 OVC012 10/09 A3003 RMK AO2 SLP173 P0011 T01000089
KBKL 101400Z -RA A3001 RMK AO2 PNO $
KCGF 101345Z 06005KT 2SM -DZ(light drizzle)BR OVC006 10/10 A3001

KCAK = AKRON-CANTON RGNL AKRON OH
KCLE = CLEVELAND-HOPKINS INTL CLEVELAND OH
KCGF = CUYAHOGA COUNTY CLEVELAND OH
KBKL = BURKE LAKEFRONT CLEVELAND OH
KPOV = PORTAGE COUNTY RAVENNA OH
KBJJ = WAYNE COUNTY WOOSTER OH

Figure 11: AKR weather information page accessed on the Execuflight FltPlan.com account at 0928 (1428Z) on November 10, 2015.[115]

The Execuflight GOM, Airport and/or Area Weather Reporting, page R-13, stated the following:

> *Use the best available airport and airport area weather information to determine the weather at the time of arrival when planning the flight. Not all airports have current weather and forecast weather capabilities. Some airports have automated systems or use*

[113] Execuflight pilots accessed the Fltplan.com website via a common user name and password. Individual user access and identification was not available.
[114] Planned arrival time into AKR was based on the filed estimated departure time of 1830Z and a 34 minute flight time.
[115] Source: FltPlan.com

other nearby airports' forecast for operations. Area forecast can help determine trends that are predictive of the destinations conditions at arrival times. Requesting weather updates while enroute, especially on longer flights, can be of assistance in evaluating arrival conditions. If forecast or actual conditions increase the likelihood of using additional runway for landing it is recommended that the 80% remaining runway option not be utilized.

The NTSB reviewed an audio recording of one of the accident pilots requesting an IFR clearance from the Lockheed Martin Washington contract Flight Service Station (FSS) (position 67: Flight data) about 1357 (1857Z) on November 10, 2015. The pilot indicated they would be departing runway 20 in "about 5 minutes" from MGY, and received a "hold for release" clearance of about 5 minutes to accommodate another inbound IFR arrival at MGY. The accident pilot did not request a weather briefing from the FSS during the call.

12.2 Previous Flight Plans

The investigation reviewed the available past flight plans filed by the accident Captain while operating as PIC for Execuflight between the dates of August 28, 2015 and November 10, 2015. Besides the accident flight, there were 4 other flights that the Captain operated as PIC where an alternate airport was required but not filed, including the flight previous to the accident flight on November 10, 2015 from LUK to MGY.[116] There were 9 flights where the accident Captain filed an alternate when the weather forecast did not require it, and 3 flights where an alternate was filed and the weather forecast did require it.

In addition, the Execuflight GOM, Flight Locating Procedures, Section 8-5, page L-2, stated the following, in part:

INITIATING FLIGHT: Prior to initiating a FAR 135 flight for the company, the operations management person on duty authorized to exercise operational control shall proceed as follows:

1. Review the flight and duty time status of each crewmember selected to accomplish the flight, and ascertain that the crewmember can complete the flight assignment pursuant to the requirements of FAR 135.263 and 135.267.
2. Contact Flight Service or the National Weather Service and determine from the weather briefing the flight can be conducted safely and within the limitations, authorizations and weather criteria stipulated in the Company Operations Specifications and applicable FARs.
3. Review fuel requirements and weight and balance information for the flight to determine compliance with applicable FARs.
4. Verify an appropriate Flight Plan has been filed and the weather briefing received by the Pilot in Command prior to departure.

[116] The other 3 flights were FXE-MYNN on November 8, 2015; ORL-CYYZ on November 7, 2015; MCI-CYYZ on October 18, 2015.

According to the Execuflight Chief Pilot when asked in reference to the Execuflight GOM, Flight Locating Procedures, Section 8-5, page L-2, if any Execuflight operations management person on duty on the day of the accident reviewed the weather, fuel, weight and balance and verify an appropriate flight plan was filed for the accident flight prior to departure, he stated he "was kept abreast of the aircraft movements through the text messages received from the crew. i.e. 'doors open', 'doors closed.'"[117]

12.3 Weather During the Approach

While AKR did not issue a weather forecast for the airport, AKR did have an Automated Surface Observation System (ASOS) located at the airport that issued aviation routine weather reports (METAR). Pilots could receive a recorded message of the most current AKR ASOS weather by tuning a radio to 126.82 MHz. The AKR special METAR weather observation recorded at 1931Z (about 21 minutes prior to the accident) included wind from 250 degrees at 8 knots, 1 ½ statute miles visibility due to mist, overcast ceilings at 500 feet agl, temperature 11°C, dewpoint 9° C and an altimeter setting of 29.95 inches of mercury. The remarks on the offical 1931Z weather included an automated observation indicating a ceiling of 300 feet variable to 900 feet agl.

SPECI KAKR 101931Z AUTO 25008KT 1 1/2SM BR OVC005 11/09 A2995 RMK AO2 CIG 003V009 T01110094=

At 1438, cockpit audio indicated that the crew received the 1938Z weather at AKR automated weather at AKR showing a ceiling of 600 feet agl broken and a visibility of 1 ½ miles with mist, and a wind from 240 degrees at 08 knots. At 1440, the captain mentioned that they had the visibility.

The AKR ASOS METAR weather recorded at 1954Z (about 2 minutes after the accident) included wind from 240 degrees at 7 knots, 1 ½ statute miles visibility due to mist, broken ceilings at 400 feet above ground level, overcast ceilings at 900 feet agl, temperature 11°C, dewpoint 9° C and an altimeter setting of 29.95 inches of mercury.

METAR KAKR 101954Z AUTO 24007KT 1 1/2SM BR BKN004 OVC009 11/09 A2995 RMK AO2 SLP142 T01060094=

According to the IFR training flight that landed at AKR just prior to the accident flight, they activated the runway lights and precision approach path indicator (PAPI) lights on the Common traffic advisory frequency (CTAF), and those lights remained illuminated after they exited the runway on landing at AKR. During the approach, the pilots stated that they broke out of the clouds 40 feet above the MDA of 1,540 msl, and leveled at the MDA about 3.0 miles as indicated on the distant measuring equipment (DME). The pilots reported having visual contact with the ground and forward visibility, however, the runway environment was not able to be seen until about 2.3 miles, as indicated on the DME, which their first visual reference was the PAPI. As previously mentioned, on landing at AKR, the training flight advised the inbound accident

[117] Source: Email received from the Execuflight Chief Pilot Monday, February 29, 2016 8:24 AM.

flight on the AKR CTAF of the weather they observed, which was acknowledged by the accident flight.

13.0 Aids to Navigation

EFT1526 was executing the localizer approach to runway 25 at AKR. The ground-based localizer transmitter operated on a frequency of 110.9 MHz and provided the pilot with course (lateral) guidance to the runway centerline. A DME (distance measuring equipment) was co-located with the localizer.

According to the Aeronautical Information Manual (AIM) Section 1-1-9b, the localizer provided course guidance throughout the descent path to the runway threshold from a distance of 18 nautical miles (NM) from the antenna between an altitude of 1,000 feet above the highest terrain along the course line and 4,500 feet above the elevation of the antenna site." The localizer only provided lateral guidance on the approach, and there was no vertical guidance associated with the localizer.

FAA post-accident testing of the runway localizer and DME on November 11, 2015 found both to be in tolerance on normal transmitter readings.[118]

14.0 Communications

Both pilots were foreign nationals (the Captain was originally from Columbia, and the FO was originally from Italy) and held English proficiency declarations on their respective FAA ATP certificates. According to CAE instructors who provided both pilots with their most recent simulator training, neither pilot exhibited difficulties communicating in English. Further, according to Execuflight management, pilots and the FAA POI (who provided each accident pilot with their 135.293 evaluations 4-5 months prior to the accident), neither pilot had difficulty understanding or communicating in English.

15.0 Airport Information[119]

Akron-Fulton International Airport was located about 4 miles southeast of Akron, Ohio at a field elevation of 1,067.5 feet msl, and at a latitude/longitude of N41°02.25' W081°28.02'. The airport did not have a FAA Air Traffic Control Tower.

[118] See Attachment 15 – AKR Localizer DME Testing

[119] Airport information was obtained from the Federal Aviation Administration's National Aeronautical Charting Office (NACO) Terminal Procedures Publication (TPP) and Airport Facility Directory (AFD).

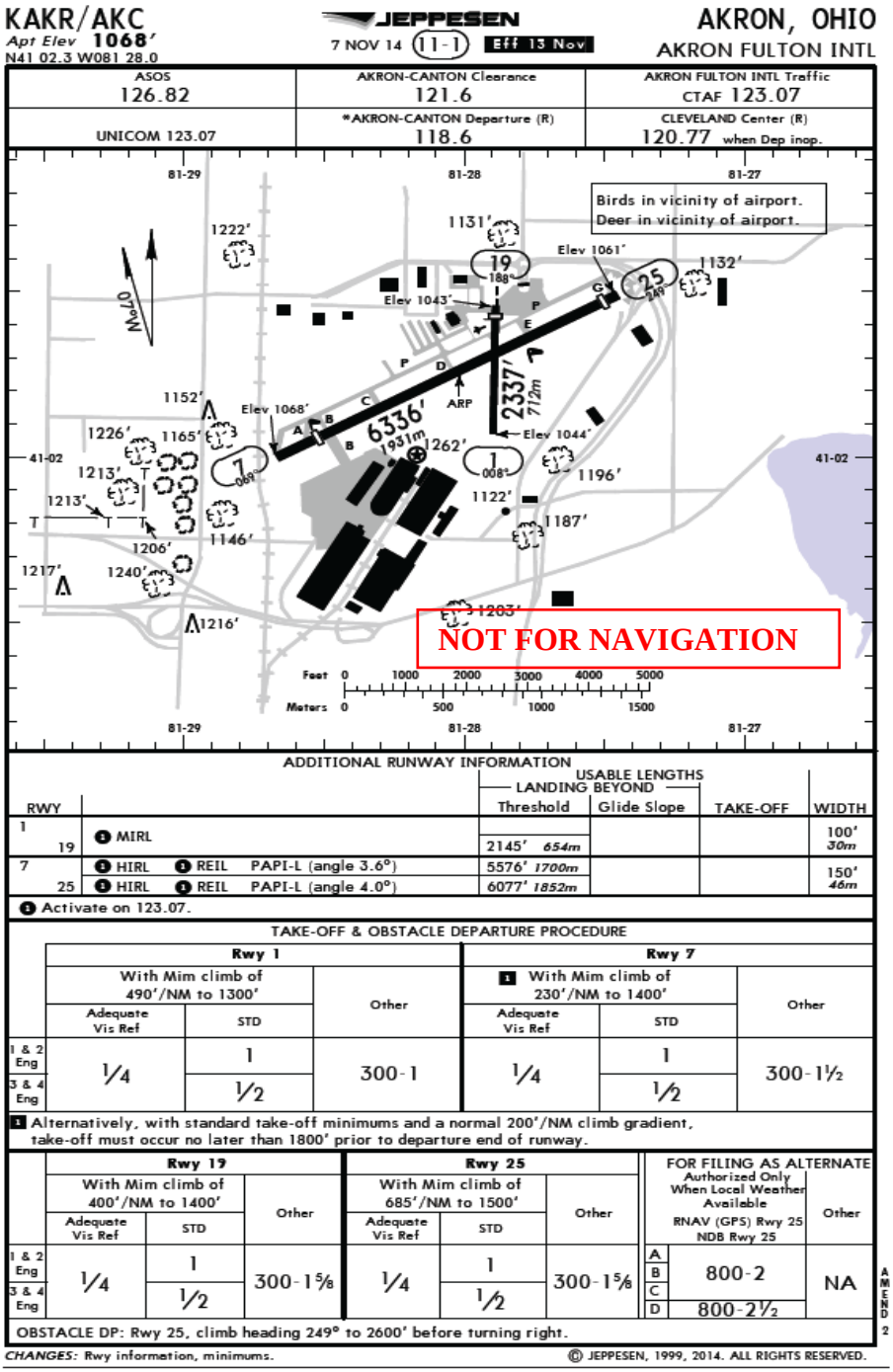


Figure 12: AKR Airport chart for AKR (dated November 7, 2014). (Source: Jeppesen)

15.1 Runway Information

The accident occurred as the airplane was approaching runway 25 at AKR. AKR had two runways; runway 7/25 and runway 1/19. Runway 7/25 which was the longer of the two

runways,[120] had an asphalt surface, and was 6,336 feet long and 150 feet wide. Runway 25 was served by three non-precision approaches; the localizer (LOC) 25, an RNAV[121] (GPS) 25, and an NDB[122] 25 instrument approach. The runway had a high intensity runway lighting (HIRL) system that was pilot controlled lighting (PCL) activated on the CTAF, 123.07 MHz (explained below).

Photo 7: AKR runway 25 taken from airport boundary fence.[123]

15.2 Precision Approach Path Indicator (PAPI)

Runway 25 was equipped with a 4-light PAPI located on the left side of the runway, with a 4.0 degree glide path angle that resulted in a threshold crossing height (TCH) of 45 feet above ground level. Runway 25 had a displaced threshold of 249 feet for an approach ratio of 16:1 to clear 124 foot tall trees located 2,162 feet from the runway threshold and 275 feet left of the of the centerline.[124]

According to the Aeronautical Information Manual Pilot/Controller Glossary, the PAPI is an airport lighting facility, similar to VASI (visual approach slope indicator), providing vertical approach slope guidance to aircraft during approach to landing. According to the Aeronautical Information Manual (AIM) (Chapter 7), the PAPI used light units similar to the VASI but were installed in a single row of either two or four light units. These lights were visible from about 5

[120] AKR runway 1/19 was 2,337 feet long and 100 feet wide with an asphalt surface. Runways 1/19 and 7 were not served by any instrument approach.
[121] Area Navigation (RNAV). According to the Execuflight OpSpecs C052, the RNAV was not an authorized approach at Execuflight. C052 also did not authorize Execuflight to conduct non-precision approaches with vertical guidance (APV).
[122] Non Directional Beacon.
[123] Photograph taken on November 12, 2015 at AKR by Operation Group Chairman.
[124] Source: http://www.airnav.com/airport/KAKR.

miles during the day and up to 20 miles at night. The visual glide path of the PAPI typically provided safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 4 SM from the runway threshold. Descent, using the PAPI, should not be initiated until the aircraft was visually aligned with the runway. The row of light units was normally installed on the left side of the runway and the glide path indications are as depicted. Lateral course guidance was provided by the runway or runway lights.

PAPIs radiated a directional pattern of high intensity red and white focused light beams which indicated that the pilot was "on path" if the pilot saw an equal number of white lights and red lights, with white to the left of the red; "above path" if the pilot saw more white than red lights; and "below path" if the pilot sees more red than white lights.

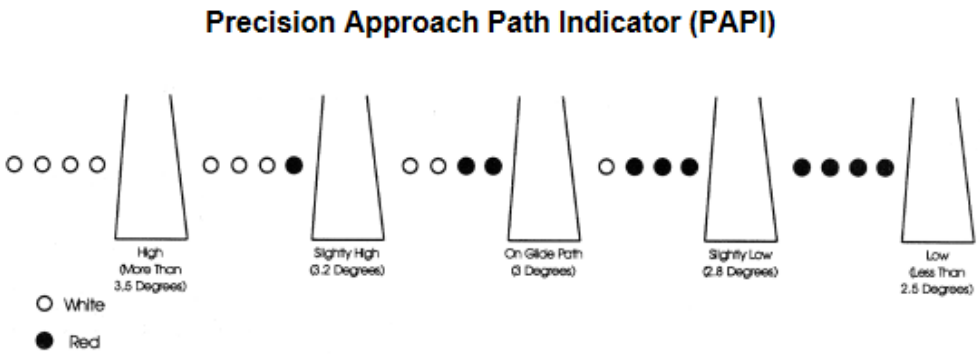


Figure 13: Precision Approach Path Indicator.[125]

[125] Source: Aeronautical Information Manual Chapter 2 Figure 2-1-5.

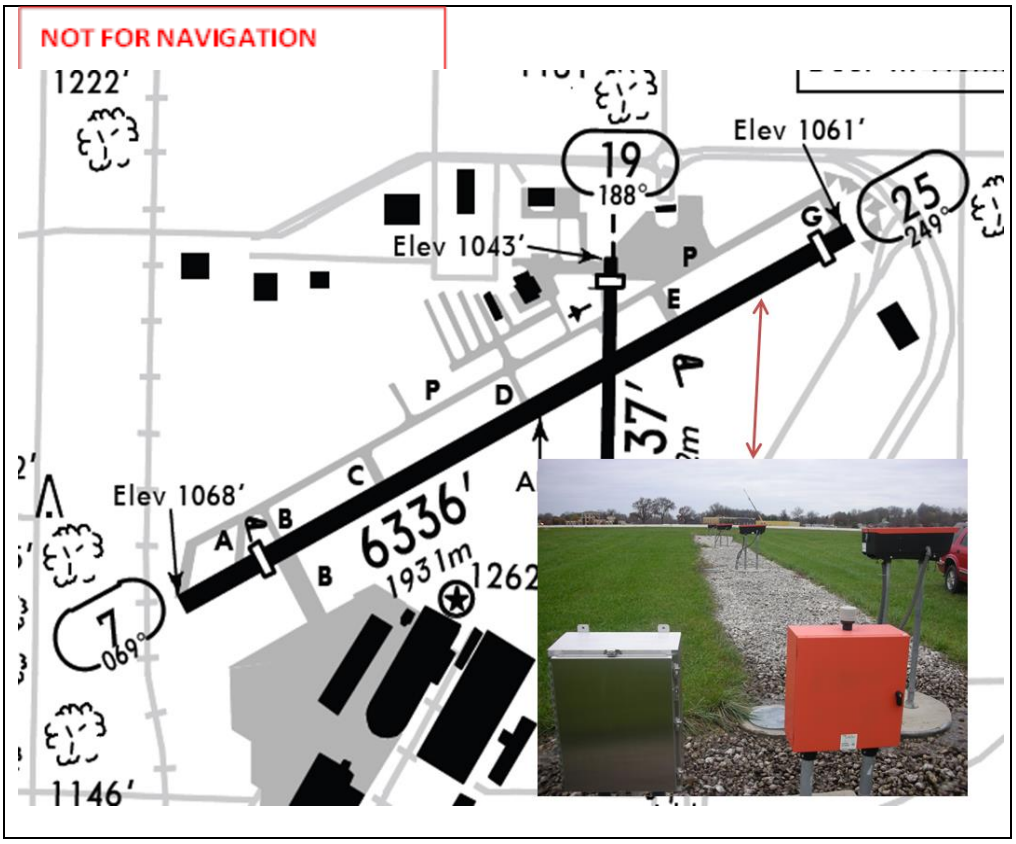


Photo 8: Photo showing location of the runway 25 PAPI lighting system at AKR, overlaid with the Jeppesen AKR Airport chart.[126]

[126] Photo taken November 12, 2015 by the Operations Group Chairman.

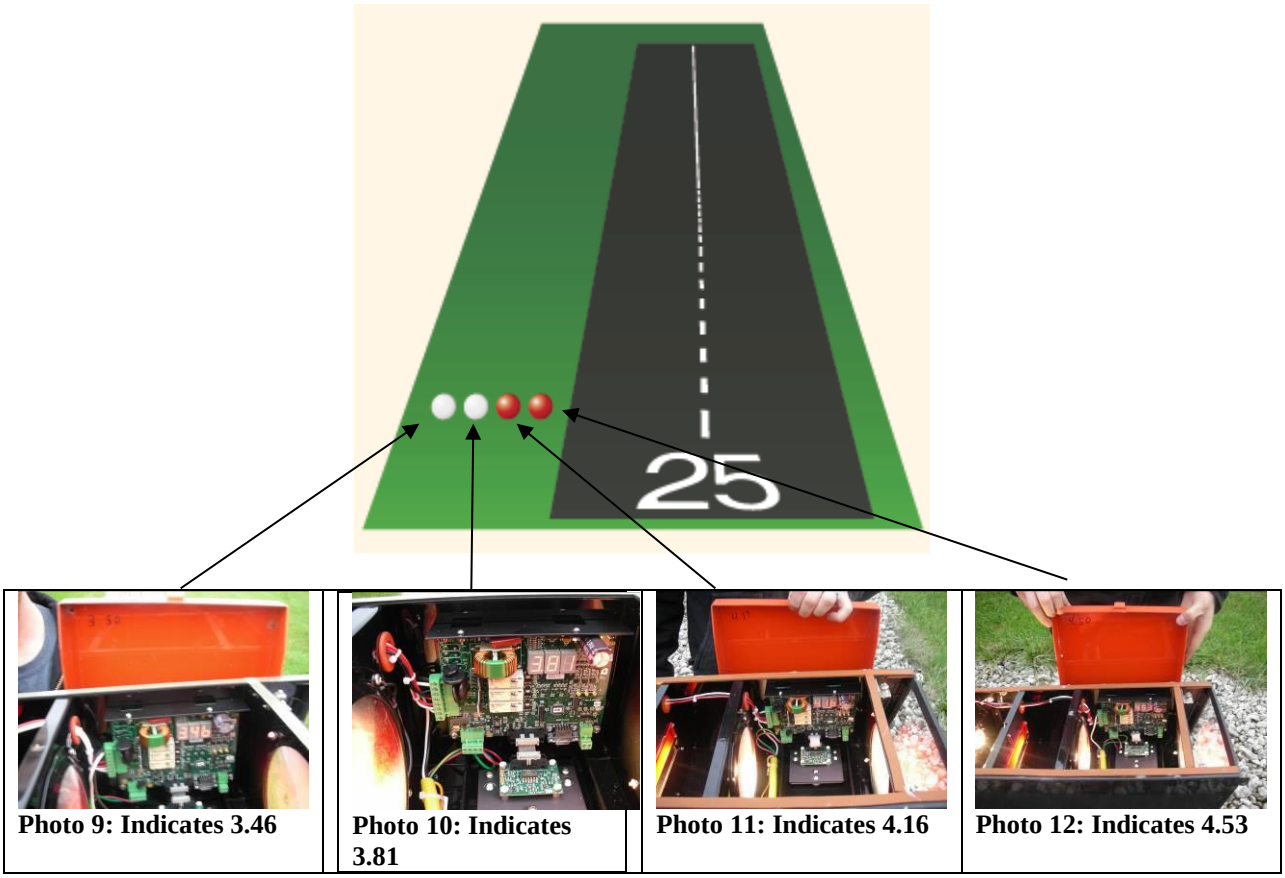


Figure 14: AKR runway 25 PAPI system location diagram, and NTSB photos with readings for each individual light panel.[127]

According to the AKR Airport manager, the airport was responsible for the runway lights and the PAPI. Both were activated by PCL (pilot controlled lighting) with 3 clicks from a radio tuned to CTAF frequency of 123.07 MHz, and the runway lights would illuminate to low intensity with the 3 clicks, or medium intensity with 6 clicks, or high intensity with 8 clicks. The PAPI's were on a 15 minute timer that started when the PAPI's were first turned on. The timer would reset every time the radio was clicked three times within a 30 second time frame. According to an AKR maintenance technician, the PAPI's were visually checked post-accident and found operational.[128]

The AKR runway lights were on a sensor that prevented their illumination during daylight hours. However, according to AKR airport management, due to multiple requests from pilots for the lights to be available during daylight hours, a cover was placed over the sensor to prevent their restriction during daylight, and the runway lights were available day or night. According to interviews with the certificated flight instructor (CFI) and student on the training flight that landed just prior to the accident flight, they activated the runway lights and PAPI lights prior to their landing and observed normal illumination and indications in flight and after landing. During a tour of the airport, the NTSB observed the PAPI and runway lights illuminated via PCL

[127] Photos taken November 12, 2015 by the Operations Group Chairman.
[128] See Attachment 3 – Witness Statements.

(from airport vehicle with radio tuned to 123.07 MHz), and all PAPI lights and runway lights illuminated normally and were functional.

Photo 13: Photo of AKR runway light sensor covered.[129]

15.3 Charts

Execuflight used Jeppesen approach charts, as approved in OpSpecs A009 (Airport Aeronautical Data). Although the former Execuflight Director of Operations was beginning the process of obtaining authorizations from the FAA to use iPads as an Electronic Flight Bag (EFB) prior to leaving the company, according to interviews most Execuflight pilots viewed Jeppesen charts via an iPad on 14 CFR Part 91 flights.

Title 14 CFR 135.83 Operating Information required the operator of an aircraft to provide the pilot pertinent aeronautical charts and for IFR operations charts in current and appropriate form, accessible to the pilot at the pilot station and for the pilot to use, and pertinent navigational enroute, terminal area, and approach and letdown charts.

Prior to any Execuflight flights the pilots were required to print off any approach plates/charts that may be needed during the flight, as well as possible diversion airports along the route. There was no binder set of approach charts carried onboard the airplane. Execuflight utilized a Jeppesen subscription in order to print off the needed approach charts.[130] The airplane was equipped with enroute navigational charts that were kept current by the pilots of Execuflight.

[129] Photo taken November 12, 2015 by the Operations Group Chairman.
[130] No Jeppesen approach charts for AKR were recovered from the accident site.

15.4 AKR Localizer 25 Approach

The accident flight was executing the localizer runway 25 non-precision approach at AKR. The localizer was tuned by setting the localizer frequency to 110.9 and setting the course, utilizing the course selector knob located on the glare shield, on the horizontal situation indicator (HIS) to 249°.

Title 14 CFR 135.225(a) IFR: Takeoff, approach and landing minimums, stated the following, in part:

> *(a) Except to the extent permitted by paragraph (b) of this section, no pilot may begin an instrument approach procedure to an airport unless—*
>
> *(1) That airport has a weather reporting facility operated by the U.S. National Weather Service, a source approved by U.S. National Weather Service, or a source approved by the Administrator; and*
>
> *(2) The latest weather report issued by that weather reporting facility indicates that weather conditions are at or above the authorized IFR landing minimums for that airport.*

The visibility minimum for the AKR localizer approach was predicated on the aircraft's approach category, which was based on the VREF approach speed of the airplane. The Hawker 700A VREF speeds ranged from 103 knots to 125 knots. For the accident flight, based on the estimated landing weight and interviews with Execuflight pilots and CAE Simulflite Hawker 700A instructors, the airplane would fly the AKR localizer 25 approach as a Category C,[131] and the required visibility minimum for the approach would have been 1 ¼ miles. The MDA was 1,540 feet msl (473 feet above the runway 25 touchdown elevation of 1,067 feet).

According to interviews, for non-precision localizer approaches similar to the AKR localizer 25, Execuflight Hawker 700A pilots were trained to laterally navigate on the localizer and use vertical speed to descend to the MDA. The pilots also used the legs page of the Flight Management Computer (FMC) as a "back-up" to the localizer and DME to assist in determining their position relative to the final approach course, but the autopilot and/or flight director would typically be engaged to track the localizer.

The Hawker 700A did not have vertical navigation (VNAV) capabilities to descend from the FAF on a profile descent path similar to a glideslope on an ILS, and Execuflight OpSpecs C052 did not authorize Execuflight to conduct non-precision approaches with vertical guidance (APV). Descents to the MDA in the Hawker 700A were conducted via the vertical speed function of the autopilot and flight director. According to the Execuflight Chief Pilot, they targeted about 1,000 feet per minute (FPM) on the descent from the FAF to the MDA. CAE Simuflite Hawker 700A instructors stated that they recommended a descent rate of about 1,000 fpm not to exceed 1,100 fpm to ensure the autopilot would level off at the MDA.

[131] 14 CFR Part 97.3 defined an Aircraft Approach Category C as having a VREF speed of 121 knots or more but less than 141 knots.

15.5 Jeppesen AKR Localizer 25 Approach Chart

As previously mentioned, Execuflight pilots used Jeppesen approach charts when conducting instrument approaches to runways. The Jeppesen localizer 25 approach chart for AKR was dated November 7, 2014

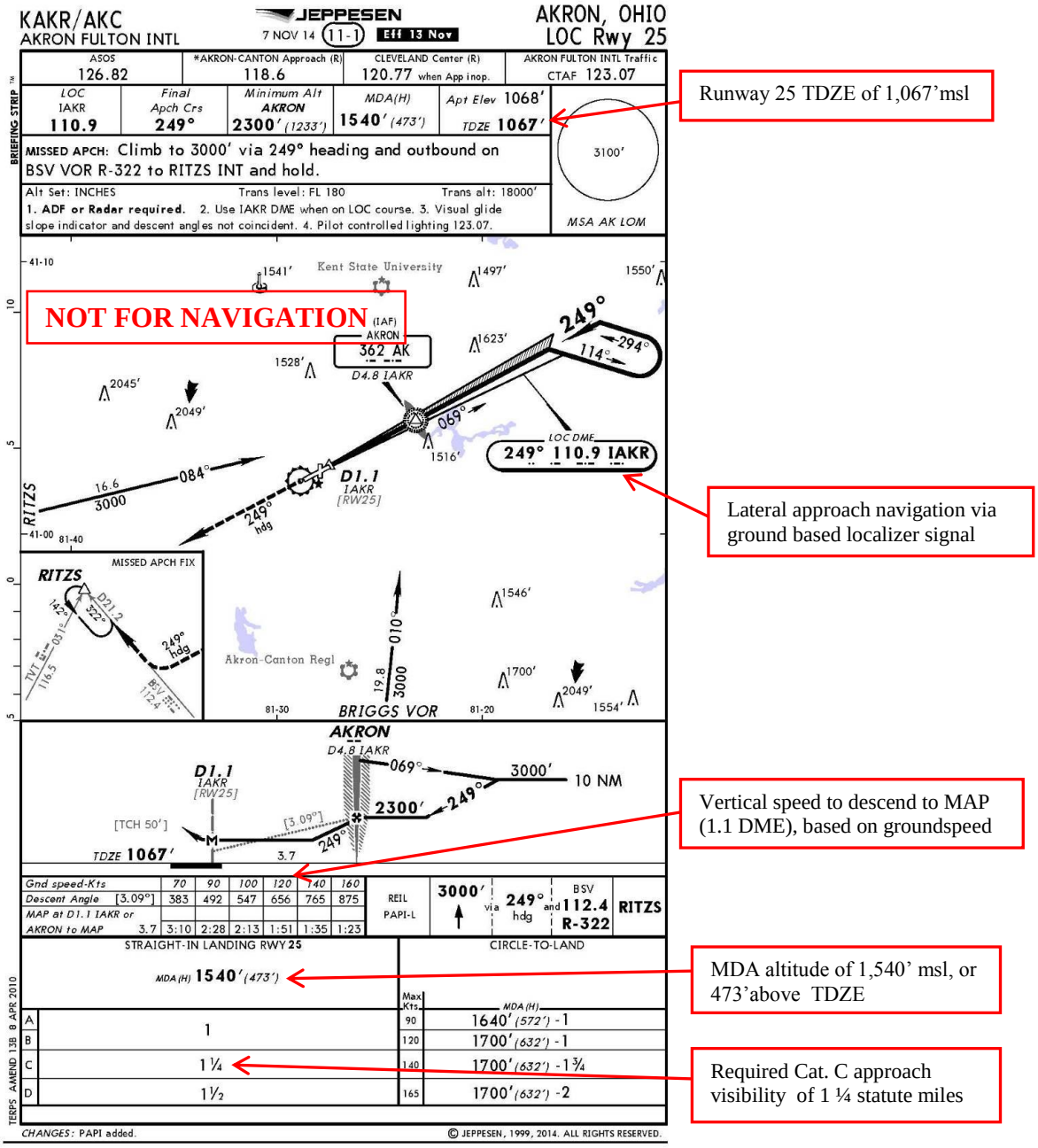


Figure 15: Jeppesen AKR Localizer 25 approach chart dated November7, 2014. (Source: Jeppesen)

15.6 FAA AKR Localizer 25 Approach Chart[132]

The FAA also published approach charts for runways, and the NTSB reviewed the FAA's version of the localizer 25 approach chart to AKR. The MDA published on the FAA's AKR Localizer 25 approach was 1,540 feet msl, or 492 feet agl. This agl height value reflected the MDA's height above the touchdown zone for the runway the approach was charted for. The FAA AKR LOC25 approach chart showed the same msl MDA altitude of 1,540 feet shown on the Jeppesen AKR LOC25 approach chart, but an agl altitude of 492 feet. This 492 foot agl altitude for the MDA depicted on the FAA AKR LOC25 differed from the 473 foot agl altitude depicted on the Jeppesen AKR LOC25 approach chart.

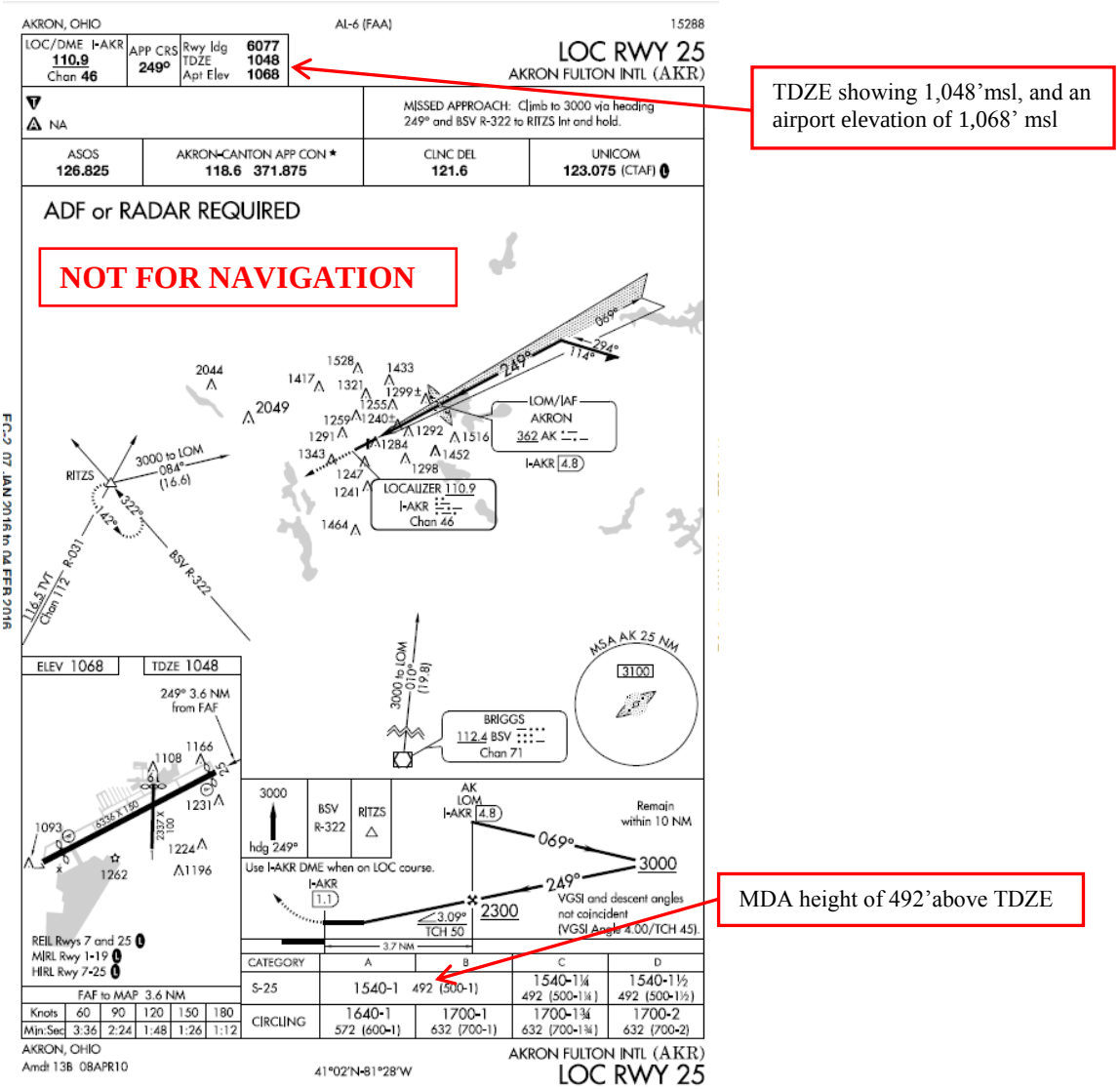


Figure 16: FAA AKR Loc25 approach chart, dated April 8, 2010. The (Source: FAA)

According to Jeppesen, the original touchdown zone elevation (TDZE) for runway 25 at AKR was officially recorded in May of 1993 on FAA Form 8260-5 as 1,048 feet (as shown on the

[132] See Attachment 14 – Chart Information.

FAA approach chart). Per Jeppesen charting and coding specifications, Jeppesen would only use the official TDZE recorded on the FAA Form 8260-5. However, the TDZE was changed in 2007 by the FAA, and according the Jeppesen, no official 8260-5 form was issued to reflect the change. As a practice, in the absence of an official recorded TDZE on a form 8260-5 or NOTAM (Notice to Airmen), Jeppesen used the airport elevation to reflect a runway's TDZE. On November 30, 2008, the FAA issued a change to the AKR TDZE in the National Flight Data Digest (NFDD) reflecting a new TDZE for the displaced threshold of 1,059.1 feet msl.[133] However, the FAA did not reissue a form 8260-5 to reflect this change in the TDZE, and the FAA chart remained at the TDZE value from the original 8260-5 form (1,048 feet msl). Per Jeppesen policy, the AKR LOC25 TDZE remained at 1,067 msl.[134]

15.7 Jeppesen AKR RNAV (GPS) 25 Approach Chart

According to recorded information, at 1437 the FO discussed an approach minimum of 1,520 feet, followed by a discussion of about 501. A review of the AKR RNAV (GPS) 25 approach chart listed "1520" as the MDA for the approach using lateral and vertical guidance, and "501" was the agl altitude for the MDA using the CAK altimeter setting. According to the Execuflight OpSpecs C052, the RNAV was not an authorized approach at Execuflight.

[133] Note: the RNAV (GPS) 25 FAA chart did list a "threshold height" of 1,059 feet msl.
[134] Source: Jeppesen.

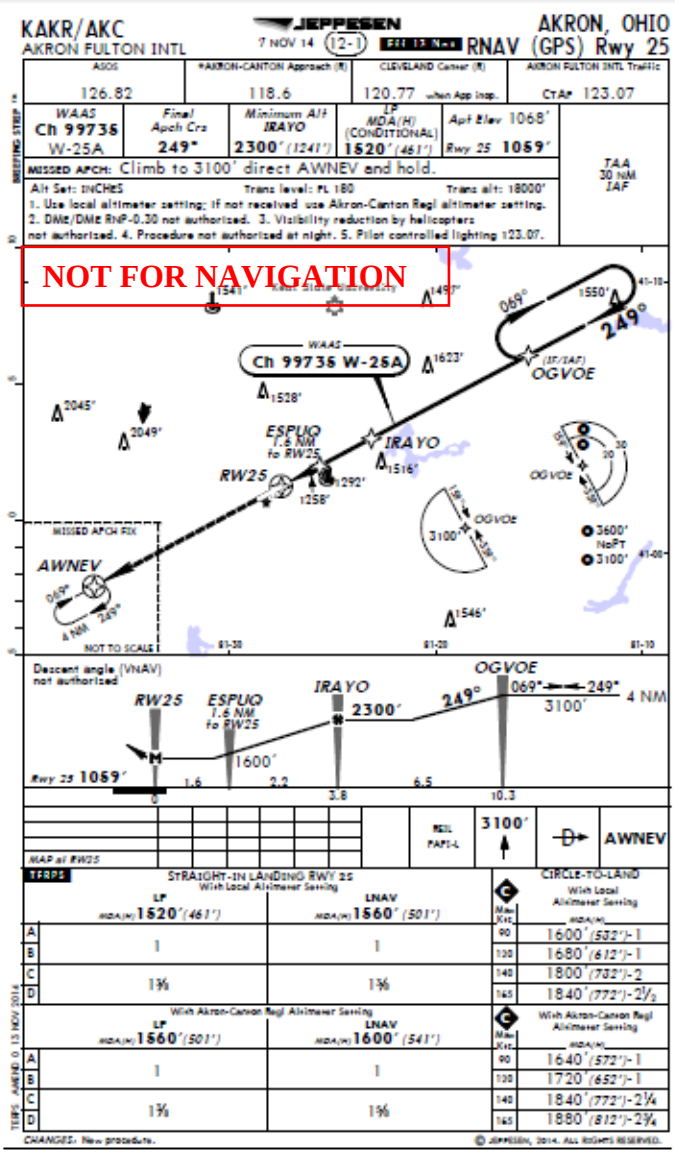


Figure 17: Jeppesen AKR RNAV (GPS) 25 Approach Chart.

16.0 Organizational and Management Information

At the time of the accident, Execuflight was a privately held company based at the Ft. Lauderdale Executive Airport (FXE), Ft. Lauderdale, Florida and was authorized to conduct both passenger and cargo operations under the provision of 14 CFR Part 135 under Certificate Number EXFA391K.

According to the President, Execuflight operated 6 airplanes[135] and had about 20-25 employees, with 11 of those being full time and contract pilots. He also stated that the company was originally established in 2002, and a dormant operating certificate was purchased by the current owner in 2008. According to FAA records, the Part 135 certificate was established with an

[135] Source: Execuflight OpSpecs D085.

effective date of August 21, 2002. The Execuflight fleet consisted of 2 Gulfstream III aircraft, 1 Hawker 800, 2 Hawker 700A aircraft (including the accident aircraft), and 1 Westwind II.
Pilots for Execuflight were based at FXE, and were not represented by a union. Execuflight pilots signed a 2 year contract for which Execuflight paid for the pilot's training expenses. Termination or cancellation of the contract required the pilot to reimburse the company for the costs associated with their training.

Execuflight did not have a formal ASAP[136] program or a non-punitive company reporting system. According to interviews, safety issues and complaints were expected to be brought directly to Execuflight management.

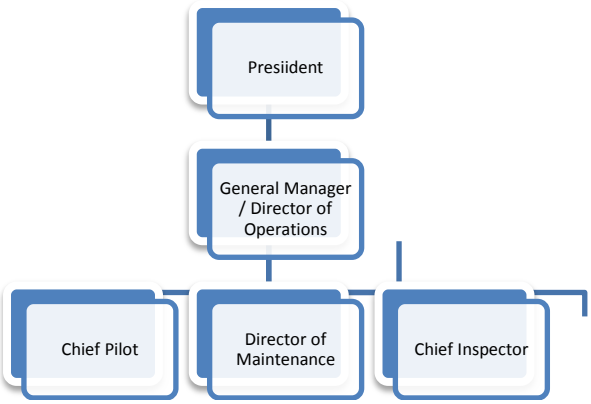
The Execuflight GOM, page R-1, stated the following:

> *All company flight operations shall be conducted in a professional and disciplined manner in the highest tradition of the air transportation industry. Safety of the aircraft and passenger comfort shall be considered of overriding and primary importance.*
>
> *All applicable rules, regulations, procedures and policies will be carefully followed unless emergency considerations or very sound judgment recommends deviation. When confronted with a matter of choice or interpretation in determining a course of action where the decisions are a matter of judgment, the safer alternative will always be chosen.*
>
> *Economic or service considerations cannot be allowed to compromise safety. However, this policy should not be interpreted as an invitation to disregard cost. If the Company is to succeed, all personnel must continually seek the most efficient and economical means of operation; however, it is to be interpreted as firm and standing instruction to the effect that safety and compliance with all safety regulations will always, without exception, take precedence over economic and all other considerations.*
>
> *The policies and procedures contained herein provide basic operational philosophies and include general procedures and regulations applicable to all Company pilots. For more specific information on aircraft operating procedures, refer to the appropriate AFM.*

16.1 Execuflight Management Hierarchy

The Execuflight GOM Operational Control (page A-11) listed the following as the management hierarchy for the company:

[136] Aviation Safety Action Program. According to the FAA Advisory Circular 120-66B "Aviation Safety Action Program (ASAP)", the objective of the ASAP is to encourage air carrier and repair station employees to voluntarily report safety information that may be critical to identifying potential precursors to accidents. The Federal Aviation Administration (FAA) has determined that identifying these precursors is essential to further reducing the already low accident rate. Under an ASAP, safety issues are resolved through corrective action rather than through punishment or discipline. The ASAP provides for the collection, analysis, and retention of the safety data that is obtained. ASAP safety data, much of which would otherwise be unobtainable, is used to develop corrective actions for identified safety concerns, and to educate the appropriate parties to prevent a reoccurrence of the same type of safety event.



Source: Execuflight GOM, page A-11 Operational Control , dated May 12, 2014.

16.2 Management Duties

Title 14 CFR 119.69 Management personnel required for operations conducted under part 135 of this chapter, stated the following in part:

> *(a) Each certificate holder must have sufficient qualified management and technical personnel to ensure the safety of its operations. Except for a certificate holder using only one pilot in its operations, the certificate holder must have qualified personnel serving in the following or equivalent positions:*
>
> *(1) Director of Operations.*
>
> *(2) Chief Pilot.*
>
> *(3) Director of Maintenance.*

Title 14 CFR § 135.23 Manual contents, stated the following in part:

> *Each manual shall have the date of the last revision on each revised page. The manual must include—*
>
> > *(a) The name of each management person required under§ 119.69(a) of this chapter who is authorized to act for the certificate holder, the person's assigned area of responsibility, the person's duties, responsibilities, and authority, and the name and title of each person authorized to exercise operational control under § 135.77;*
> >
> > *(b) Procedures for ensuring compliance with aircraft weight and balance limitations and, for multiengine aircraft, for determining compliance with § 135.18.*

Management duties were defined in the Execuflight GOM.

16.2.1 President

The Execuflight GOM, Section 1-1, President, stated the following:

> *The President, along with personnel appointed by him, will be responsible for maintaining the financial integrity of the company. He must generate the sales and profits needed to properly maintain the equipment and crews. He is responsible for the product that is ultimately delivered to the customer. The President will formulate plans for the company and assist others in performing their management duties.*
>
> *The President is responsible for the total company operations. Although he may delegate this responsibility to other personnel, the ultimate responsibility is his.*
>
> *The President will be responsible for notification of overdue aircraft and he will also be responsible for accident notification as per NTSB 830.*
>
> *The President shall be responsible for recruiting and terminating all company personnel however he may delegate this responsibility to other persons with management responsibilities. The President will be highly knowledgeable of all Company Manuals, FAA Regulations, Operations, Specifications, NTSB Procedures, State and Local government statues and any other regulations pertaining to his duties as President.*

16.2.2 Director of Operations

The Execuflight GOM, Section 1-2, Director of Operations, stated the following:

> *The Director of Operations (DOM) is directly responsible to the President and supervises the Chief Pilot and Director of Maintenance. He shall have the experience and ratings as specified in FAR Part 119.71 (a), (b).*
>
> *His specific duties are as follows:*
>
> *a. Assists the President in designing and initiating company policies and procedures.*
> *b. Directs execution of company policies and procedures and assures that company operations and equipment standards are complied with.*
> *c. Has control of the GOM and assures that no changes are made to the GOM without his knowledge and consent including the Company Organizational Chart.*
> *d. Schedules aircraft to the available flight crew members and establishes personnel duty hours.*
> *e. Coordinates the scheduling of aircraft for maintenance and return to service after*

maintenance.

f. Conducts personnel interviews and recommends personnel actions to the President.

g. Evaluates personnel and performance records of all company employees.

h. Distributes the Company Manuals and revisions thereto, to those persons listed on the Table of Distribution.

i. Supervises, acquisition, distribution and posting of all information or memoranda relative to any changes affecting company policy, route information, requisitioning of flying aids, aeronautical charts, etc.

j. Reviews all Company Operations records and reports.

k. Adds or deletes aircraft from the Aircraft Status Board.

l. The Director of Operations shall be highly knowledgeable of the company manuals, FAA Regulations, NTSB Requirements, Operations Specifications, Aircraft Flight Manuals and all other information pertinent to his duties.

m. *The Director of Operations may exercise operational control over all flights. He may initiate or terminate a flight for the company in accordance with FAR 135:77. Will ensure that all aircraft assigned to Part 135 operations are listed in operations specifications paragraph D085.*

According to the Execuflight President and Chief Pilot, at the time of the accident, the company did not have a Director of Operations. The previous Director of Operations for Execuflight "technically" left the company in February 2015, but remained on the certificate in a limited capacity until September 2015 while Execuflight attempted to find a replacement.[137]

16.2.3 Chief Pilot

The Execuflight GOM, Section 1-4, Chief Pilot, stated the following:

The Chief Pilot is directly responsible to the Director of Operations. He has the duty to directly supervise all flight crew members. His specific duties, experience and qualifications are as follows:

a. Aids in establishing and maintaining the approved company ground and flight training programs for crew members, check airmen, instructors and other operations

[137] See Attachment 2 – FXE Interview Transcripts, and Section 19.0 FAA Oversight of this Factual Report.

personnel associated with his duties, and for the approval and use of aircraft simulators (if applicable) and other training devices or aids.

b. *Take and pass the appropriate FAA oral, written and flight test to qualify him for the position of Chief Pilot, Company Instructor and Company Check Airman, if the company and the FAA find the position of a check airman is necessary.*
c. *He will hold the required certificates and experience as per FAR Part 119.71 (c), (d).*
d. *He will assure that aircraft and equipment are available for training and directs all training and testing activities of flight crew members. He also directs the training and testing of company personnel who must meet the public.*
e. *Assists the Director of Operations in formulating operations policies, coordinates and enforces company operations policies.*
f. *Advises the Director of Operations on the status of flight operations and the training of flight crew members, and is responsible for crew member standardization.*
g. *Prepares and maintains pilot training and proficiency records, flight schedule reports and correspondence pertaining to operations and training activities. Has the duty to ensure that each assigned crew member is qualified and eligible to serve as a crew member in the aircraft and type of operation assigned including having a current medical certificate and considering flight and rest requirements. The Chief Pilot has the duty to maintain an Electronic Pilot Qualification Summary Board accessible from the secured company website that has list of pilots by name and certificate number as well as the status of each pilots training and flight checks that are required prior to being assigned to a Part 135 flight. Any overdue item will be marked in red color, noted in the remarks section of the board and then notify the DO and President.*
h. *Disseminates information to all crew members, including ensuring a Electronic Trip Kit is provided to the PIC for each trip and processes the Trip Kit when it is returned to him at trip termination.*
i. *Submits required operating reports to the Director of Operations.*
j. *Insures that all company pilots conform to standard procedures as outlined in applicable FAA Regulations and Company Policies. He insures that all pilots maintain current route qualifications and receive proficiency checks as required by*

the FAA and the company.

k. He may delegate functions to other personnel, but retains responsibility.

l. Maintains in a permanent file a copy of all Aircraft Log (containing the Load Manifest) for a period of not less than 30 days from the date it is made.

m. Assures crew member flight and duty records are entered in the Pilots' permanent file on the first day of each month for the preceding calendar month

n. He must be highly knowledgeable of the Company General Operations Manual, FAA Regulations, NTSB Procedures, Operations Specifications, Flight Manuals, etc., and other material pertinent to his duties.

o. Maintains current aircraft checklists.

p. Assures that all multiengine pilots use the Company Load Manifest, and it is properly executed.

q. *The Chief Pilot may exercise operational control over all flights. He may initiate, conduct or terminate a flight for the company in accordance with FAR 135:77.*

According to FAA PTRS records, on October 27, 2015, the Execuflight Chief Pilot was also authorized by the FAA as a company check airman.

16.2.4 Director of Safety

Although the Execuflight GOM did not list the title of Director of Safety (DS) as part of its "Management Hierarchy," the GOM did list the Director of Safety as part of its company organization. The Execuflight GOM, Section 1-7 Director of Safety, stated the following:

ExecuFlight Director of safety (DS) is a position that is assigned by the President or the General Manager / Director of Operations. This individual is responsible for overall company compliance to procedures as outlined in this General Operations Manual and this General Maintenance Manual. This position requires oversight of the entire company and all operations regarding safety and regulatory compliance. Specific assignment are issued by the President an or the GM/DO of ExecuFlight.

ExecuFlight Director of Safety will assist management personnel in the performance of their assigned duties as outlined in the General Operations Manual and this General Maintenance Manual. He will develop an understanding of scheduling, office

management, night operations, maintenance operations and the physical day to day routine aspects of ExecuFlight.

He reports normal and routine operations as well as presenting problem areas, concerns, and possible solutions as required. Close coordination with the Chief Pilot and the Director of Operations is essential for the safe reliable compliance of all company procedures and standards. This position may be assigned to the Chief Pilot or the Director of Maintenance as additional duties at the discretion of the President and/or Director of Operations of ExecuFlight.

The Execuflight President told investigators that the Chief Pilot was acting as Director of Safety. He added "I'm not sure if he had that exact title to be honest with you. So I'm, that's as much as I want to comment on it."[138] According to the Execuflight Chief Pilot, when asked if Execuflight had a Director of Safety, he replied "no," and if there had ever been a Safety Director, or Director of Safety, he responded "no. No, I don't believe so."[139]

16.3 Safety Management System (SMS)

According to the FAA, SMS was the formal, top-down business approach to managing safety risk, which includes a systemic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures (Order VS 8000.367). Development and implementation of an SMS at an aviation operator was voluntary only. Guidance for SMS could be found in the FAA Advisory Circular (AC) 120-92A Safety Management Systems for Aviation Service Providers (Dated August 12, 2010). The AC did not constitute a regulation.

Execuflight did not have a Safety Management System (SMS) in place at the company. The previous Director of Operations drafted an SMS section (Section V – SMS, V1) to be added to the Execuflight GOM for an unpublished Revision 54, and stated "it was tough to get things accomplished out of the South Florida FSDO. You know, documents would be submitted, revisions would be submitted. And sometimes they'd get there, sometimes they didn't. Sometimes they got lost."[140] The Execuflight Chief Pilot stated "the SMS is not yet mandated, but was tailored in on a future rewrite" of the GOM.[141]

Included in the draft SMS section of the GOM future revision was a section on Flight Risk Assessment Tool (FRAT) that would have required the PIC to complete a FRAT on the first flight of the day, taking into consideration the worst conditions of the day. The Execuflight GOM version at the time of the accident did not require Execuflight pilots to complete a risk assessment prior to flight.

[138] See Attachment 2 – FXE Interview Transcripts.
[139] See Attachment 2 - FXE Interview Transcripts.
[140] See Attachment 2 - FXE Interview Transcripts.
[141] Source: Email received from Execuflight Chief Pilot Thursday, February 11, 2016 11:45 AM.

17.0 Relevant Systems, etc.

17.1 Pilots Instrumentation

Each pilot position was equipped with a HSI and an Attitude Director Indicator (ADI) as part of the instrument panel. Each ADI presented a 3-dimensional display of airplane attitude and flight control system steering commands, localizer deviation, glideslope deviation, rate-of-turn, radio altitude, and decision height. Each HSI was mounted immediately below the ADI, and presented a plan view of the airplane's horizontal situation. HIS information displayed included indicated heading, selected heading, VOR or localizer course and deviation, RNAV course and deviation, to/from information, DME distance, glideslope deviation, and a time-to-go/ground speed/elapsed time display.

Photo 14: Photo of CAE Simuflite Hawker 700A simulator cockpit.[142]

[142] Photo taken by the Operations Group Chairman during Simulator testing at CAE Simuflite in January 2016

Photo 15: Captain's Instrumentation[143]

Photo 16: First Officer's Instrumentation[144]

[143] Both photos depicted the instrumentation of the CAE Simuflite Hawker 700A. Photos taken by the Ops Group during Simulator testing at CAE Simuflite in January 2016.

[144] Photo taken by the Ops Group during Simulator testing at CAE Simuflite in January 2016.

Figure 18: The Horizontal Situation Indicator (HSI) and the Attitude Director Indicator (ADI).[145]

17.2 Autopilot System

The flight control system was equipped with a Collins APS-80 autopilot which was managed through the flight guidance panel located on the center portion just below the glare shield. The flight guidance panel included lateral guidance which included HDG (Heading mode), VOR/LOC (VOR and Localizer Mode), APPR (Approach Mode). Vertical guidance modes included VS (Vertical Speed), MACH, and IAS (Indicated Air Speed). The panel also included ALT (Altitude Hold Mode) which would capture the barometric altitude at the time the mode was selected, and ALT SEL (Altitude Select Mode) which would arm the system to capture the altitude selected in the altitude preselect window.

The flight guidance computer took the mode selection(s) made by the pilots and computed the guidance commands which were sent to the ADI command bars and the autopilot.

[145] Source: Collins FCS-80 Flight Control System Pilot Guide.

Figure 19: FGP-80 Flight Guidance Panel.[146]

The altitude in the preselect window was only selectable in divisions of 100 feet. According to interviews with Execuflight pilots and CAE Simuflite instructors, for the AKR localizer 25 approach, after passing the final approach fix at 3,000 feet msl, the pilots should select "1600" in the altitude preselect window as a rounded up figure for the actual MDA (1,540 msl). The pilots would have the option, after leveling off at the 1,600 feet MDA, to remain at that altitude or manually fly the airplane (either by disconnecting the autopilot or using the SYNC feature, (explained below) to descend to the MDA of 1,540 feet.

Descents on non-precision approaches in the Hawker 700A were conducted in vertical speed (VS). The VS mode for the autopilot incorporated a spring loaded toggle switch located near the altitude preselector window. For a pilot to command the airplane to descend the toggle switch would be pressed up (the DN indication next to the toggle switch) and held for a second or two which would command a pitch down, or to command a climb the pilot would toggle the switch down (the UP indication next to the toggle switch) for a second or two which would command a pitch up.

Figure 20: Vertical Speed toggle wheel (left) and Autopilot (and yaw damper – YD) engage panels (right).[147]

The pilot could not select a predetermined descent rate via the toggle switch but could press and hold the AP SYNC on either pilot's control yoke and manually pitch the airplane with the autopilot still engaged until the desired descent rate was achieved and then release the AP SYNC in order for the autopilot to capture the descent rate. Pilots would monitor the vertical speed, and adjust the knob to increase or decrease the vertical speed during descent to MDA. There was an altitude aural alerter that would sound 1,000 feet prior to arriving at the altitude selected in the preselector window. According to the Execuflight Chief Pilot, the company targeted about 1,000 feet per minute (fpm) on the descent from the FAF to the MDA for non-precision approaches. CAE Simuflite instructors stated that they recommended a descent rate of about 1,000 fpm not to exceed 1,100 fpm to ensure the autopilot would level off at the MDA.

[146] Source: Collins FCS-80 Flight Control System Pilot Guide.
[147] Source: Collins FCS-80 Flight Control System Pilot Guide.

According to the Hawker 700A AFM the autopilot had to be disengaged when operating below 1,000 feet above the terrain except:

> *When it is coupled to an ILS glide slope and localizer at which time it could remain engaged until 200 feet above ground level.*
>
> *When there is no glideslope available and the lateral channel is coupled to a localizer or VOR then it may remain engaged until 400 feet above ground level.*

The Execuflight GOM, Autopilot Use Limits, page R-9, further established the following limitations on use of the autopilot:

AUTOPILOT USE LIMITS

1. *Cruise: Not below 500 feet above terrain except during approach.*
2. *ILS coupled approach: not below 50 feet above terrain.*
3. *Other than ILS coupled approach: not below 50 feet lower than the MDA.*

According to the Execuflight President, the company did not have a specific policy to require or encourage the use of an autopilot on instrument approaches, and added that it would be "common sense" to use the autopilot.

Hawker 700A pilots received simulator training on non-precision approaches requiring the autopilot to be engaged as well as hand-flown (no autopilot). CAE Simuflite Hawker 700A instructors indicated that most Hawker pilots would generally use the autopilot for instrument approaches, including non-precision approaches.

17.3 Radio Altitude

The radio altitude display indicated altitude of the airplane from either 2,500 feet agl down to 0 foot. The display remained blank until the airplane descended below 2,500 feet agl.

Selected decision height was displayed on a mechanical drum type display set by rotation of the SET/TEST knob. Decision height may be set to any altitude from 0 to 950 feet agl. Settings between the marked 10-foot increments were set by interpolation between increments. The amber "DH" annunciator illuminated when the airplane descended to or was below the radio altitude preset DH.[148]

[148] The primary function of the DH setting on the radio altimeter was to set the radio altitude decision height for precision approaches similar to an ILS.

Figure 21: Decision Height (DH) select knob and amber DH annunciator (red circle) and radio altitude indicator (red arrow).[149]

Several Execuflight pilots stated that they would set the radar altimeter DH to the agl altitude associated with the approach MDA as a "back up" to assist in determining the arrival at MDA on the approach when a "DH" (decision height) light would illuminate at the radio altitude the pilot set. According to interviews with CAE Simuflite instructors, Hawker 700A pilots were trained to use the barometric altimeter as the primary means to determine the MDA on non-precision approaches, and not the radar altimeter.

18.0 Standard Operating Procedures (SOPs)

Execuflight had defined SOPs for the Hawker 700A in the company's Part 135 Training Program Manual (Standard Operating Procedures, HS-125-700, dated 02/01/2012). The Execuflight GOM, page R-3, stated the following:

> ***STANDARDIZATION OF FLIGHT PROCEDURES***
> *Crewmembers will at all times adhere to published standardized procedures in the conduct of flights. This will ensure that company aircraft will be operated according to procedures that the company deems to be safest. Standardization also facilitates crewmember expectations of other crewmembers, thereby maximizing crew coordination and efficiency, regardless of changes in crew pairings.*
>
> *The substitution of procedures of personal preference, for those established by EXECUFLIGHT, INC., is considered a serious breach of the code of conduct expected of a Captain. Continued infractions after being otherwise counseled may result in termination of employment.*
>
> ***CREW COORDINATION***

[149] Source: Collins FCS-80 Flight Control System Pilot Guide.

Experience has shown that a well-managed cockpit environment, including the timely and correct exchange of information between cockpit crewmembers and the proper accomplishment of their appointed tasks, serves as one of the most effective methods by which air carrier operational safety can be enhanced. Proper crew coordination procedures include, but are not limited to the following:

1. *Accomplishment of all checklists, using response prompts as indicated*
2. *Altitude callouts, in VMC as well as in IFR conditions*
3. *Descent rate and speed management, monitoring, and callouts*
4. *Pre-takeoff and pre-approach briefings*
5. *Navigation and autopilot display monitoring and callouts if applicable*

According to the Execuflight SOPs, pilot tasks were defined by the pilot flying (PF) and the pilot not flying (PNF). The PF was the pilot responsible for controlling the flight of the airplane, and the PNF was the pilot who was not controlling the flight of the airplane. The SOPs further defined the PIC as the pilot responsible for the operation and safety of an aircraft during flight time.[150]

18.1 Use of Checklists

For normal operations, Execuflight pilots are required to use the checklists found in the Execuflight Hawker HS-125-700 Normal Checklist, which was FAA accepted on December 15, 2010. A copy of the Normal Checklist was recovered from the accident scene.

The Execuflight GOM, page R-4 through R-5, stated the following:

USE OF CHECKLISTS
The use of checklists to assist in the proper operation of the aircraft is mandatory for all flights. Only those checklists accepted by the FAA for use by EXECUFLIGHT, INC. will be acceptable, including the methodology and procedures developed for checklist use by Company flight crews.

Certain portions of the checklists are identified as requiring the use of the "challenge and response" method of accomplishment. Those portions not so identified may be accomplished silently by the pilot not flying. Either way, the methodical completion of every appropriate portion of the checklist, without omission, is demanded of every crewmember. The pilot completing the checklist (whether silently or by challenge) is responsible for visually checking each item on the checklist, and ascertaining that the correct action has been taken.

Certain portions of the emergency checklist are required to be accomplished immediately, from memory, during an emergency. It is the responsibility of every flight crewmember to commit these portions to memory and review the adequacy of their recall on a frequent basis.

[150] See Attachment 19 – Execuflight SOPs.

The checklist is not intended as a "worklist" or a crutch to lead crewmembers through their routines of controlling aircraft systems. It is rather envisioned that crewmembers will maintain sufficient familiarity and proficiency with these routines or "flows" that the checklist can be used as a check to ensure the flows are properly accomplished.

No crewmember is expected to attempt to accomplish, without omission, every detail of a flow from memory. Such an expectation would negate the rationale and practicality of using a written checklist. The proper method is to accomplish the flow to the extent possible from memory and then to utilize the checklist to ensure that any overlooked items are then accomplished.

During all ground operations, it is the Captain's responsibility to call for all appropriate checklists, giving consideration to other required crewmember duties and allowing time for their completion. The First Officer will query the Captain if there is abnormal delay in the call for any checklist. During airborne operation, the pilot flying will call for the checklist in a similar manner.

Checklist items will be read in a loud, clear voice and the proper response will be equally clear and understandable. If the proper response is not forthcoming, the crewmember reading the checklist will repeat the challenge, if necessary, until the proper response is provided. Undue haste in the execution of any checklist is neither necessary nor desirable.

Upon completion of each individual checklist, the crewmember completing the checklist will announce, "(Checklist Name) CHECKLIST COMPLETE."

A checklist that cannot be completed when initiated because of an interruption or because an item on the checklist cannot yet be completed will be held until the interruption is over or the item can be completed. When the checklist item is accomplished, the challenge will be repeated, the proper action taken, proper response given, and the checklist continued. It is not acceptable to skip a checklist item and then depend on memory to accomplish the item later. In the event that a normal sequence is interrupted when a long delay is encountered, such as during taxi-out, it may be necessary to return to an earlier point and re-accomplish the checklist from that point.

Any interruption of a checklist BEFORE ENGINE START that is caused by one or more crewmembers vacating an assigned flight deck duty station while any person other than those specified in FAR Section 135 occupies a cockpit observer seat or has access to the cockpit during the flight crewmembers absence, requires re-verification of accomplishment of all items of that checklist conducted prior to the interruption. Each switch, control handle, knob, or lever must be checked to be in the proper position prescribed and the associated indicator lights and instrument readings confirm the proper position. If verification reveals any change from the expected condition, then the full procedure, including associated checks for the particular checklist item(s) must be re-accomplished.

"As required" may be printed as a response to a checklist item. THIS IS NOT AN ACCEPTABLE VERBAL RESPONSE. The response will state the actual setting. Responses to items concerning liquid or gas quantity aboard shall be in terms of the actual quantity aboard compared to the specific quantity required. For example, "Fuel 2400 pounds, 2100 required."

Execuflight SOPs called for checklists to be accomplished as challenge-response. After the PF initiated the checklist, the PNF would read each checklist item aloud and confirm the accomplishment of the checklist item verbally. After completion of any checklist, the PNF was to state "___ checklist is complete." The Execuflight SOPs also stated that "effective checklists are pertinent and concise. Use them the way they are written: verbatim, smartly, and professionally."

According to interviews with Execuflight management, Execuflight pilots, and CAE Simuflite instructors familiar with Execuflight procedures, none of the Execuflight normal checklists were considered "silent" checklists, and typically all Execuflight normal checklists were considered "challenge and response" or otherwise always ended with a verbal "checklist complete."

18.2 Crew Briefings

The Execuflight GOM, page R-8, stated the following:

Crew briefings help to standardize an operation and stimulate planning, supervision, teamwork, integrity, and redundancy. They are also a mechanical means of requiring a pilot to consider factors that might otherwise be overlooked.

Execuflight Hawker 700A pilots were required to conduct an approach briefing prior to each landing. The approach briefing was the first checklist item in the Hawker 700A approach check, found in the Execuflight HS-125-700 Normal Procedures – Pilot Checklist, page N-4.

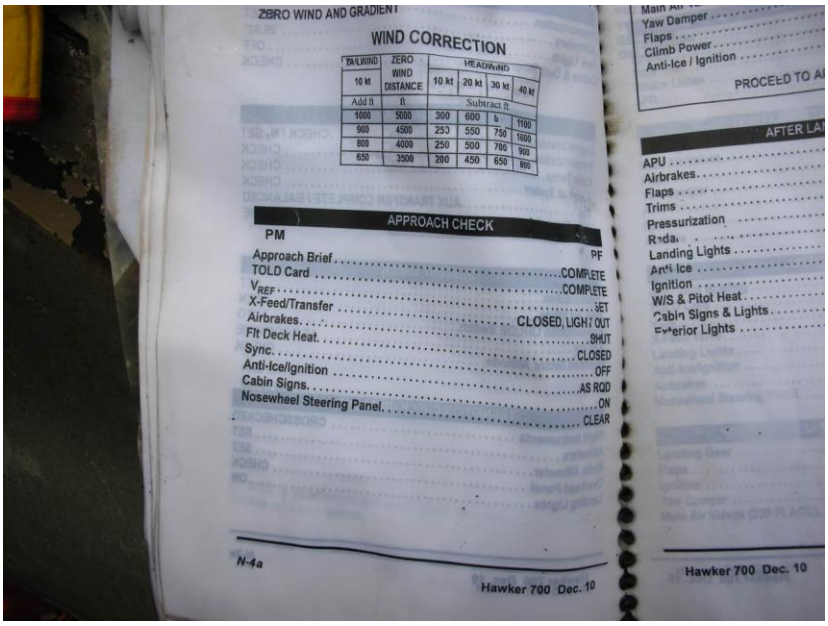


Photo 17: Photo of HS-125-700 Approach Check recovered from the accident site.[151]

According to the Execuflight SOPs (page SOP-10), pilots were required to include the following in their review of an instrument approach at an appropriate workload time during the descent:

Review the following:

- approach to be executed
- field elevation
- appropriate minimum sector altitude(s)
- inbound leg to FAF, procedure turn direction and altitude
- final approach course heading and intercept altitude
- timing required
- DH/MDA
- MAP (non-precision)
- VDP
- special procedures (DME step-down, arc, etc.)
- type of approach lights in use (and radio keying procedures, if required)
- missed approach procedures
- runway information and conditions.

Figure 22: Approach briefing guidance found in the Execuflight SOPs (page SOP-10).

The Execuflight GOM, page R-4 through R-5, stated the following:

> *Prior to commencing an approach, regardless of the weather in IFR or VFR conditions, the pilot flying will brief the pilot not flying. The degree of detail may vary, according to the weather conditions, the experience of the flight crew, the condition of the aircraft, etc., but every approach briefing will cover at least confirmation of the assigned runway and any applicable nav aids. Even under VFR conditions all applicable nav aids should*

[151] Photo taken November 11, 2015 by the Operations Group Chairman.

be used as back up. As an example, "Visual approach to 9 Left, backed-up by the ILS" could be a VFR approach briefing. Approaches under IFR conditions will be afforded an expanded briefing, to include a review of the approach to be conducted, cross-checks of radio setups, agreement on headings, altitudes and speeds, as well as review of the missed approach procedures. Instructions to observe standard altitude callout procedures and timing will be included, if applicable.

This briefing, or as much of it as possible, should take place prior to the arrival in the terminal area, so that the crew may maximize its preparedness and be free to concentrate on the duties of that environment.

18.3 Standard Non-Precision Approach Profile

The Execuflight Part 135 Training Program – Maneuvers (HS-125-700), page Man-6, contained the standard non-precision approach profile for the Hawker 700A. It called for the airplane to enter the terminal area at a speed of flaps 45 VREF + 50 knots with the flaps at zero and the gear retracted. When turned to the approach course, the airplane should be slowed to a speed of VREF + 25 knots with the flaps at 15 and the gear retracted. At a point one mile from the final approach course inbound to the airport, the airplane should be slowed to a speed of VREF + 25 knots, gear extended and flaps 25. At the final approach fix, the airplane was to maintain that configuration and descend to the MDA. Once landing was assured, the pilot would select flaps 45, slow to a speed of VREF + 10 knots, and begin the descent to the runway to cross the threshold at a speed of VREF.[152] The former Director of Operations stated it was "rare" to conduct a non-precision approach down to minimums.

[152] The flap lever had a gate at the flap 15 position for go-arounds from landings at flap 25 or 45.

Typical Non-Precision Approach

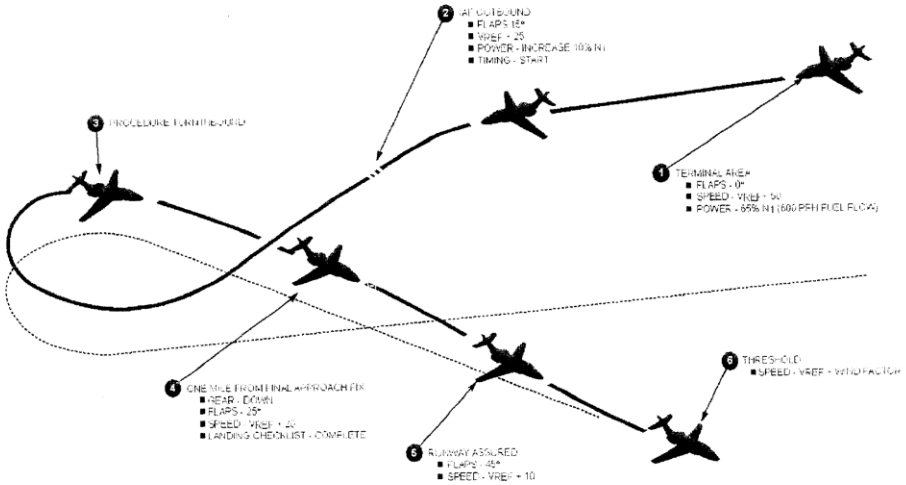


Figure 23: Execuflight Hawker HS-125-700 Non-precision Approach Profile.[153]

According to recorded information, at 1451 the FO called for full flaps (flaps 45) prior to descending to the MDA. The physical evidence collected at the accident site indicated that the airplane impacted the ground with the gear down and the flap configured to 45. Each of the Execuflight pilots interviewed stated that a non-precision approach was only supposed to be flown from the FAF with the flaps at 25 and gear extended. Non-precision approaches on the Hawker 700A were not trained to be flown at flaps 45. CAE Simuflite Hawker 700A instructors stated they trained the non-precision approaches to be flown at flaps 25 with the gear extended, and selecting flaps 45 only should occur when "landing assured."[154]

Selecting flaps 45 prior to MDA would likely require the airplane to fly level at the MDA with the gear extended and flaps 45 until descent to the runway was initiated. One instructor stated that the Hawker 700A had a "lot of drag" when flaps were extended beyond 20 degrees, and it would take quite a bit of power to maintain straight and level at Vref+10 approach speed with the gear down at flaps 45. Another instructor stated that he did not know of any situation in the training program where a pilot was taught to fly with flaps 45 in level flight. He stated he would never do that, was not even sure what the power setting would be, it would be "nuts" to do that

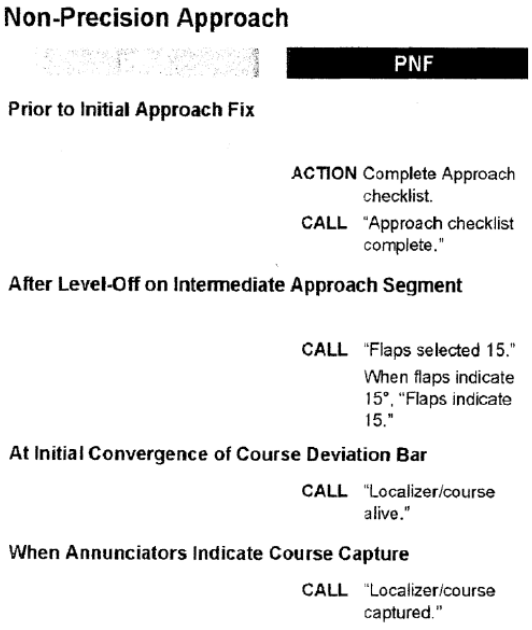
[153] Source: Execuflight Part 135 Training Program – Maneuvers (HS-125-700), page Man-6.
[154] For additional information, see Section 18.4.2 "Runway Assured" of this Factual Report.

since it would involve a lot of power, with a lot of drag, and if the pilot was not paying attention to his speed, the airplane could slow and stall. He added that the only time a pilot would be descending on an approach at flaps 45 would be on an ILS after glideslope capture. Another instructor stated that they would not go flaps 45 at a high elevation because it destabilized the airplane, and changed the pitch "if you aren't ready for it." She further stated the flaps slowed down the airspeed, so power would have to be increased, and that flaps 45 would slow the airplane quickly because they are like "barn doors."[155]

18.4 Non-precision Approach Callouts

The Execuflight non-precision approach pilot callouts for the Hawker 700A were defined in the Part 135 Training Program – Standard Operating Procedures, HS-125-700, dated 02/01/2012.

18.4.1 Execuflight Hawker 700A Non-Precision Approach Procedures[156]



Non-Precision Approach

	PNF
Prior to Initial Approach Fix	
	ACTION Complete Approach checklist.
	CALL "Approach checklist complete."
After Level-Off on Intermediate Approach Segment	
	CALL "Flaps selected 15." When flaps indicate 15°, "Flaps indicate 15."
At Initial Convergence of Course Deviation Bar	
	CALL "Localizer/course alive."
When Annunciators Indicate Course Capture	
	CALL "Localizer/course captured."

[155] See Attachment 1 – Interview Summaries.
[156] Source: Execuflight Part 135 Training Manual – Standard Operating Procedures (HS-125-700.)

PNF

Prior to FAF

CALL "____ (number) miles/minutes from FAF."

CALL "Gear selected down."
When gear indicates down,
"Gear indicates down."

ACTION Complete Landing checklist except for full flaps, main air valves, and autopilot/ yaw damper.

PNF

At FAF

CALL "Outer marker." or "Final fix."

ACTION
- Start timing
- Visually crosscheck that both altimeters agree.
- Set MDA (or nearest 100 ft above) in altitude alerter.
- Check PF and PNF instruments.
- Call FAF inbound.

CALL "Flaps selected 25."
When flaps indicate 25°, "Flaps indicate 25."

CALL "Altimeters check."

At 1,000 Ft Above MDA

CALL "1,000 ft to minimums."

At 500 Ft Above MDA

CALL "500 ft to minimums."

At 200 Ft Above MDA

CALL "200 ft to minimums."

At 100 Ft Above MDA

CALL "100 ft to minimums."

PNF

At MDA

CALL "Minimums. _____ (time) to go." or "Minimums. _____ (distance) to go."

At Point Where PNF Sights Runway or Visual References

CALL "Runway (or visual reference) _____ o'clock."

CALL "Flaps selected 45." When flaps indicate 45°, "Flaps indicate 45."

PNF

At MAP

CALL "Missed approach point. Missed approach."

ACTION Assist PF in setting power for go-around.

CALL "Flaps selected 15." When flaps indicate 15°, "Flaps indicate 15."

At Positive Rate of Climb

CALL "Positive rate."

CALL "Gear selected up." When gear indicates up, "Gear indicates up."

ACTION Announce heading and altitude for missed approach.

At V_{REF} + 30 and 400 Ft Above Airport Surface (Minimum)

CALL "Flaps selected UP." When flaps indicate UP, "Flaps indicate UP."

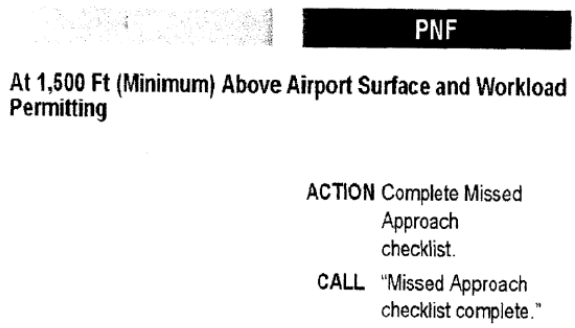


Figure 24: Execuflight Hawker 700A non-precision SOPs and required callouts.[157]

18.5 Stabilized Approach

According to recorded information, about 1452 after initiating the descent from the FAF to the MDA, the Captain had a discussion with the FO about diving 2,000 feet per minute. According to radar data, the flight was descending at a rate of about 2,000 feet per minute. FAA Advisory Circular 120-71A, Standard Operating Procedures for Flight Deck Crewmembers (dated February 27, 2003) defined a stabilized approach as "one of the key features of safe approaches and landings in air carrier operations, especially those involving transport category airplanes." The AC further stated the following:

> *A stabilized approach is characterized by a **constant-angle, constant-rate of descent** approach profile ending near the touchdown point, where the landing maneuver begins. A stabilized approach is the safest profile in all but special cases, in which another profile may be required by unusual conditions.*
>
> *All appropriate **briefings and checklists** should be accomplished before 1000' height above the touchdown (HAT) in instrument meteorological conditions (IMC), and before 500' HAT in visual meteorological conditions (VMC).*
>
> *Flight should be **stabilized by 1000'** HAT in IMC and 500' HAT in VMC.*
>
> *An approach is stabilized when all of the following **criteria** are maintained form 1000 HAT (or 500 HAT in VMC) to landing in the touchdown zone:*
>
> > *The airplane is on the correct track.*
> >
> > *The airplane is in the proper landing configuration.*
> >
> > *After glide path intercept, or after the final approach fix (FAF), or after the derived fly-off point (per Jeppesen) the pilot flying requires no more than normal bracketing corrections to maintain the correct track and desired profile (3° descent angle, nominal) to landing within the touchdown zone. Level-off below 1000' HAT is not recommended.*

[157] Source: Execuflight Part 135 Training Manual – Standard Operating Procedures (HS-125-700.)

The airplane speed is within the acceptable range specified in the approved operating manual used by the pilot.

The rate of descent is no greater than 1000 feet per minute (FPM).

- *If an expected rate of descent greater than 1000 fpm is planned, a special approach briefing should be performed.*
- *If an unexpected, sustained rate of descent greater than 1000 fpm is encountered during the approach, a missed approach should be performed. A second approach may be attempted after a special approach briefing, if conditions permit.*

Power setting is appropriate for the landing configuration selected, and is within the permissible power range for approach specified in the approved manual used by the pilot.

AC 120-108 also characterizes a stabilized approach by "maintaining a stable approach speed, descent rate, vertical flightpath, and configuration to the landing touchdown point. Depart the final approach fix configured for landing and on the proper approach speed power setting, and flightpath before descending below the minimum stabilized approach height; e.g. 1,000 feet above the airport elevation and a rate of descent no greater than 1,000 feet per minute, unless specifically briefed."

Execuflight SOPs for a stablized approach called for the airplane to be within an "approach window" when within 500 feet above the touchdown. If the airplane was not within the approach window, a missed approach was required to be executed.

The Execuflight Part 135 Training Program, Standard Operating Procedures, page SOP-19, defined the approach window as follows:

***NOTE**: An approach window has the following parameters*

- *Within one dot CDI[158] deflection or 5° bearing*
- *IVSI[159] less than 1,000 feet per minute*
- *IAS[160] within V_{AP} = 10 kts (no less than V_{REF} or 0.6 AOA[161] whichever is less)*
- *No instrument flags with the landing runway or visual references not in sight*
- *Landing configuration, except for full flaps (non precision or single engine approaches).*

The Execuflight President stated that stable approach criteria was "specific to the aircraft based on the criteria of the airplane that you're flying," and that meant the airplane was descending less

[158] Course Deviation Indicator.
[159] An Instantaneous Vertical Speed Indicator (IVSI) utilizes accelerometers to compensate for the lag in a typical vertical speed indicator.
[160] Indicated Airspeed.
[161] Angle of Attack.

than 1,000 fpm under 1,000' above the ground. The Chief Pilot said that stable approach meant the airplane was descending no more than 1,000 fpm when inside the final approach fix.

When asked what the their stable approach criteria was, one CAE Simuflite instructor said was not sure what the CAE stable approach criteria was, and was told by the FAA that more than 1,200 fpm on the approach was unstable. Another instructor said it was 3 degrees per 100 feet, and the airspeed was also defined from the FAF VREF plus 10 knots minimum, and over the threshold they must be at VREF with the wings level. And another instructor said that a stable approach was within 10 knots, rate of descent was no more than 1,000 feet, and maybe heading aligned and the airplane had to be within a "box." For instance, on an ILS approach, it must be within the first dot, vertical less than 1,000 feet per minute descent and 10 degrees of heading.[162]

18.5.1 Constant Descent Final Approach (CDFA)

According to interviews with Execuflight pilots and CAE Simuflite instructors, the descent from the FAF on a non-precision approach in the Hawker 700A entailed a step-down procedure known as "dive and drive." The descent was initiated at the FAF, and upon arrival at the MDA, the airplane was leveled off until in a position ("landing assured") to descend to the runway.

Advisory Circular AC 120-108, Constant Descent Final Approach (CDFA) dated January 20, 2011 defined CDFA was a technique for flying the final approach segment of a non-precision approach as a continuous descent. The technique was consistent with stabilized approach procedures and has no level-off. A CDFA started from an altitude/height at or above the FAF and proceeds to an altitude/height approximately 50 feet (15 meters) above the landing runway threshold or to a point where the flare maneuver should begin for the type of aircraft being flown. This definition harmonized with the ICAO and the European Aviation Safety Agency (EASA). The AC stated the advantages of CDFA included:

> *(1) Increased safety by employing the concepts of stabilized approach criteria and procedure standardization.*
>
> *(2) Improved pilot situational awareness (SA) and reduced pilot workload.*
>
> *(3) Improved fuel efficiency by minimizing the low-altitude level flight time.*
>
> *(4) Reduced noise level by minimizing the level flight time at high thrust settings.*
>
> *(5) Procedural similarities to APV and precision approach operations.*
>
> *(6) Reduced probability of infringement on required obstacle clearance during the final approach segment.*

Execuflight training guidance did not contain language for CDFA on non-precision approaches. While several CAE Simuflite instructors indicated they may teach CDFA as a technique, there was no formal instruction on CDFA.

[162] Attachment 1 – Interview Summaries.

18.5.2 "Runway Assured"

For descents from the MDA to landing, 14 CFR 91.175(c) stated in part:

> *(c) Operation below DA/ DH or MDA. Except as provided in paragraph (l) of this section, where a DA/DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, below the authorized MDA or continue an approach below the authorized DA/DH unless—*
>
> > *(1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and for operations conducted under part 121 or part 135 unless that descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;*
> >
> > *(2) The flight visibility is not less than the visibility prescribed in the standard instrument approach being used; and*
> >
> > *(3) Except for a Category II or Category III approach where any necessary visual reference requirements are specified by the Administrator, at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:*
> >
> > *(i) The approach light system, except that the pilot may not descend below 100 feet above the touchdown zone elevation using the approach lights as a reference unless the red terminating bars or the red side row bars are also distinctly visible and identifiable.*
> >
> > *(ii) The threshold.*
> > *(iii) The threshold markings.*
> > *(iv) The threshold lights.*
> > *(v) The runway end identifier lights.*
> > *(vi) The visual approach slope indicator.*
> > *(vii) The touchdown zone or touchdown zone markings.*
> > *(viii) The touchdown zone lights.*
> > *(ix) The runway or runway markings.*
> > *(x) The runway lights.*

The normal landing flap configuration on the Hawker 700A was flaps 45. For precision approaches (similar to an ILS), Execuflight Hawker 700A procedures called for the pilot to select flaps 45 at "glideslope intercept" and fly the remainder of the approach at flaps 45 to landing. However for non-precision approaches, the Execuflight Part 135 Training Program, Maneuvers, page Man-6, called for the airplane to be flown with flaps 25 flap with the gear extended at a speed of V_{REF} + 20 from the FAF to the MDA. The pilot would then select final flaps 45, slow to a speed of V_{REF} + 10, and begin the descent from MDA when "runway

ensured."[163] The Execuflight GOM, Training Manual or SOPs did not define "runway assured" for selection of flaps 45 on a non-precision approach. The Execuflight Chief Pilot stated that runway assured meant the pilot would not select flaps 45 and descend from the MDA until the runway was in sight. For a non-precision approach similar to the AKR localizer 25 approach, this would entail a configuration change of the airplane while the airplane was 473 above the ground (the agl altitude of the MDA).

NTSB interviews with CAE Simuflite Hawker 700A instructors found multiple meanings to the term "landing assured" or "runway assured." One instructor stated that his personal meaning of "landing assured" was if the pilot lost both engines and needed to "dead-stick" the airplane to the runway, and that would mean the runway was assured. Another CAE Simuflite instructor stated that the pilots would select flaps 45 on a non-precision approach when the landing was assured, which would occur when they broke out of the clouds on a stabilized approach with the runway in sight, and it was based on "pilot's discretion based on a number of variables." Another instructor stated that "landing assured" was based on visibility and runway conditions, in his opinion, and there was no set definition for "landing assured." Another instructor stated that "landing assured" meant when the wheels touched the runway, and added that he trained Hawker 700A pilots to remain at flaps 25 until they touched down on the runway and could bring the thrust levers to idle. They would then bring flaps 45 during the landing rollout and then raise the lift dump and use maximum braking. This instructor further said on a non-precision approach, there was no time that the pilot would have flaps 45, and that was how they were supposed to be trained.

All of the CAE Simuflite instructors interviewed said that pilots were never trained to conduct a non-precision approach at a flaps 45 setting.

According to the H.S. 125 700A Flight Manual Section 5 page 88 "Landing Procedures" when utilizing the landing "Procedure with Both Engine Operating," stated in part:

> *"The flaps may be lowered to 25° and 45° as required, reducing air speed to a minimum of VREF + 20 knots with 25° and to the recommended approach speed of VREF + 10 knots with flaps 45° (see Figure 5-39). Lowering the flaps to 45° causes a nose-down change of attitude and, because of the extra drag, rate of descent will be increased unless power is added."*[164]

18.6 Hawker Approach Power Management

According to interviews with CAE Simuflite Hawker 700A instructors, because the Hawker 700A did not have auto-throttles for speed/descent rate adjustments on approaches, pilots were required to adjust the thrust of the engines manually during an approach, and pilots were generally taught the technique of targeting certain engine fuel flows to manage their descents. Target fuel flows were provided in an energy management chart used at CAE Simuflite.

[163] Based on interviews and multiple descriptions, the terms "runway ensured," "runway assured," and "landing assured" are considered synonymous.
[164] According to Textron, the Hawker 800A AFM contained the same statement.

CAE Training Centers

Hawker 700,800,800XP Energy management 21,000lbs. to 22,00lbs.

MANEUVERS

Phase	Speed	Pitch	Flaps	Gear	N1	Fuel Flow
Level Flight	220 kts.	+3°	UP	UP	70%	700 lbs. ±
Steep Turns	220 kts.	+4°	UP	UP	76%	800 lbs. ±
* Approach to Stalls, Clean		+14°	Up	UP	IDLE	
* Approach to Stalls, Departure		+14°	15°	UP	IDLE	
* Approach to Stall, Landing		+14°	45°	DOWN	65%	
* *Discontinue Trimming at Vref+20*						

Non Precision Approach

Approach Vectors Level	180 kts.	+3°	Up	Up	60%	600 lbs. ±
Non Precision Approach	160 kts.	+3°	15°	UP	63%	700 lbs. ±
Non Precision Approach Level	Vref+25	+3°	15°	Down	65%	750 lbs. ±
FAF° Inbound Descent	Vref+20	0°	25°	Down	58%	600 lbs. ±
Level to Step Down Fix	Vref+20	+3°	25°	Down	70%	900 lbs. ±
Landing Assured	Vref+10	0°	45°	Down	55%	550 lbs. ±

Precision Approach

Approach Level	160 kts.	+3°	15°	Up	63%	700 ±
Glideslope Alive 1.5 Dot Up	Vref +25	+3°	15°	Down	65%	750 ±
Glideslope Intercept	Vref +20	+3°	25°	Down	67%	800 ±
Maker Inbound	Vref+10	+3°	45°	Down	70%	850 ±

Note:

The N1 and fuel flow are to be considered reference points. From these items one should only have to make small adjustments.

9/13/2012

Figure 25: Hawker Energy Management Chart for Hawker weights between 21,000 and 22,000 pounds.[165]

19.0 FAA Oversight[166]

The Certificate Management Office (CMO) was FAA SO19 Flight Standards District Office (FSDO) located in Miramar, Florida. The Principal Operations Inspector (POI) for Execuflight had responsibilities for the certificate's oversight since May 24, 2004 when he first certified the operator. He was an Aviation Safety Inspector and POI and took care of multiple Part 135, 141, and 137 certificates. The structure at the FSDO included the POI, a front line manager, assistant manager, and a manager. The POI did not have an assistant at the time of the accident.

[165] Source: CAE Simuflite.

[166] The following information was primarily obtained during the POI interview. For additional information, see Attachment 1 – Interview Summaries.

The POI oversaw 16 certificates; 14 of those certificates belonged to Part 135 operators, one of the certificates was for a Part 141 ground school only, and one of the certificates was for a Part 137 [agricultural aircraft] operator, and characterized his workload as "very busy." FAA Inspector guidance was found in FAA Order 8900.1. According to the FAA, "this order establishes the Flight Standards Information Management System (FSIMS) as the repository of all Flight Standards policy and guidance concerning aviation safety inspector job tasks. Technically speaking, FSIMS is a Flight Standards directive, which aviation safety inspectors use as the system of record for all Flight Standards policy and guidance."[167]

When conducting surveillance activities the POI stated he was required to complete specific surveillance items, and periodically conduct line and ramp checks. The POI stated that he conducted ramp checks wherever he could, and "samples" flight manifest and training records. He got to Execuflight maybe 4 to 5 times a year, and did not conduct enroute checks with any of his Part 135 operators.[168] The POI also stated that he did not know what pilots did in normal operations since he only got to see them during their 135.299 line checks, as was required. The POI did not perform line checks on revenue flights,[169] he was typically the inspector that did the 135.299 line checks for Execuflight, and he would use other inspectors to provide him feedback.

8900.1 CHG 270, Volume 6, Surveillance, Chapter 2 Part 121, 135, and 91 Subpart K: Inspections (Section 9: Cockpit En Route Inspections) stated, in part:

> *The primary objective of cockpit en route inspections is for an inspector to observe and evaluate the in flight operations of a certificate holder within the total operational environment of the air transportation system. En route inspections are one of the Federal Aviation Administration's (FAA) most effective methods of accomplishing its air transportation surveillance objectives and responsibilities. These inspections provide the FAA with an opportunity to assess elements of the aviation system that are both internal and external to an operator.*

According to the FAA Order, cockpit enroute inspections allow inspectors the opportunity to observe and evaluate the crew during each phase of flight, to include an evaluation of crewmember adherence to approved procedures and a proper use of all checklists. The inspector should also observe the PIC's crew management techniques, delegation of duties, and overall conduct. The areas that should be observed and evaluated during each flight phase include the following:

> *Approach. Procedures used during the selected approach (instrument or visual) should be accomplished as outlined in the operator's maneuvers and procedures document.*

[167] Source: FAA Order 8900.1 Flight Standards Information Management System (FSIMS), Effective Date: 09/13/2007.
[168] See Attachment 20 – POI Work Plan.
[169] According to Execuflight records, the captain flew a line check for 0.8 hours in a Hawker 700 (N880RG) from FXE. The line check was conducted by the Execuflight POI, who told investigators he would typically have the pilots up to Melbourne, FL for instrument approaches during a line check. According to the Captain's 8410-3 line check form, he flew one instrument approach (ILS) and no non-precision approaches during the 135.299 check. The line check was not conducted on a revenue flight for Execuflight. Source: Execuflight and the FAA.

Inspectors should observe and evaluate the following areas during the approach phase of flight:

- *Approach checklists,*
- *Approach briefings, as appropriate,*
- *Compliance with ATC clearances and instructions,*
- *Navigational tracking/heading and pitch control,*
- *Airspeed control, reference speed for final approach (VREF), Flap and gear configuration schedule,*
- *Use of FD, autopilot, and autothrottles,*
- *Compliance with approach procedure,*
- *Sink rates,*
- *Stabilized approach in the full landing configuration,*
- *Flightcrew callouts and coordination, and*
- *Transition to visual segment, if applicable.*

Flight check records as well as PRIA records were at the Execuflight office as it was a required item to be inspected by the FAA. The POI was not able to recall who either of the accident pilots' previous employers were, and he could not recall if the accident co-pilot had been terminated from previous employment or if there were any substandard records on the co-pilot. Inspector guidance for review of PRIA records was found in FAA Order 8000.88 (dated March 14, 2006) and included scheduled inspections of PRIA-related records. According to the FY2015 POI work plan for Execuflight,[170] on February 9, 2015, the POI entered the following:

Reviewed the Operator's PRIA Office Proceudres [sic] Manual and found it to be satisfactory and in compliance with Notice 8900.279.[171]

The POI was also responsible for oversight of an operator's records related to the load manifest and weight and balance. FAA Order 8900.1 CHG 0, Volume 6, Surveillance, Chapter 2 Part 121, 135, and 91 Subpart K: Inspections Section 10 Safety Assurance System: Operator Trip Records Inspections further stated the following in part:

6-405 PART 135 OPERATOR TRIP RECORDS REQUIREMENTS. Part 135 operators who operate multiengine aircraft are required by part 135, § 135.63 to prepare a load manifest in duplicate for each flight conducted. Copies of these load manifests must be retained by the operator for at least 30 days at the operator's principal base of operations or at another location approved by the FAA. A load manifest must contain the following information:

[170] See Attachment 20 – POI Work Plan.

[171] FAA Order 8900.279 (dated December 12, 2014) discusses the pilot record retention requirements of the Pilot Record Database (PRD) provision in the Airline Safety and Federal Aviation Administration (FAA) Extension Act of 2010 and the related requirements of the Pilot Records Improvement Act of 1996 (PRIA). The statute requires Title 14 of the Code of Federal Regulations (14 CFR) Part 119 certificate holders (all air carrier and operating certificate holders conducting operations under 14 CFR Parts 121, 125, and 135) to retain certain pilot training records and other records for entry into the PRD. Principal operations inspectors (POI) must review and evaluate their assigned part 119 certificate holder's records to ensure that the appropriate records are being retained.

· *Total number of passengers;*

· *Total weight of the loaded aircraft;*

· *Maximum allowable takeoff weight for that flight;*

· *CG limits;*

· *CG of the loaded aircraft or an entry on the manifest that the aircraft CG is within limits according to an approved loading schedule or method;*

· *Aircraft registration number (N-number) or flight number;*

· *Origin and destination of the flight; and*

· *All crewmember names and position assignments.*

6-406 TRIP RECORDS INSPECTION AREAS. During a trip records inspection, the inspector should not consider any one inspection area to be more important than any other inspection area. Five general inspection areas have been identified as areas to be evaluated during trip records inspections. These areas are: general, flight plan, dispatch/flight release, load manifest, and other required documents.

The Execuflight POI had not had the opportunity to go to CAE Simuflite in Dallas to observe Execuflight simulator training because of limitations of funding, and he did not always know when the pilots went for training until after they completed their training. The POI stated that he had never had the opportunity to sit through training at Execuflight.

FAA Order 8900.1, CHG 0, Volume 6 Surveillance, Chapter 2 Part 121, 135, and 91 Subpart K Inspection, Section 21 Safety Assurance System: Training Program Inspections for Parts 121 and 135, stated in part:

6-624 GENERAL. This section contains direction and guidance to be used by principal inspectors (PI) for conducting training program inspections. The inspector's objective is to ensure that the operator's training program complies with regulatory requirements and instructional methods are effective. This section is related to Safety Assurance System (SAS) Elements: 2.1.1 (OP), Training of Flight Crew Members; 2.1.2 (OP), Training of Check Airmen and Instructors; 2.1.3 (OP), Simulators/Training Devices; 2.1.4 (OP), Outsource Crewmember Training; 2.1.5 (OP), Appropriate Airmen/Crewmember Checks and Qualifications; 2.1.6 (OP), Advanced Qualification Program (AQP); and 3.1.1 (OP), Training and Qualifications of Dispatchers and Flight Followers.

NOTE: As part of the approval process, inspectors must conduct training program inspections in phase four of the initial approval process of a training program (see Volume 3, Chapter 19, Section 2, for more information).

A. Training Program Inspection Areas. Training program inspections involve much more than simply observing training in progress. Flight Standards Service (AFS) has identified five primary inspection areas to be observed during training program inspections:

- *Training curriculums,*
- *Courseware,*
- *Instructional delivery methods,*
- *Testing and checking methods, and*
- *Specific topics (identified from Program Tracking and Reporting Subsystem (PTRS) archived data or other sources).*

B. Indicates new/changed information. Annual Inspection Plan. PIs and aircrew program managers (APM) in Aircrew Designated Examiner (ADE) programs must develop annual inspection programs. For certificate holders with ADE programs, principal operations inspectors (POI) and APMs should follow the guidance in Volume 13, Chapter 2, Section 2. Training programs vary in their complexity depending on the operator's size, aircraft fleet diversification, number of crewmembers and dispatchers, training locations, and scope of operation. PIs may find that a single annual inspection is sufficient to verify the effectiveness of a simple operator's program. Inspection of a complex operator, however, requires a modular approach in which specific program components Indicates new/changed information. or locations are identified and inspected in progressive increments.

The owner of Execuflight was not the Director of Operations at the time of the accident, and the POI was aware that the position of Director of Operations was not filled at Execuflight. According to the POI, at the time of the accident, Execuflight was in the process of trying to find someone, and the Chief Pilot temporarily took over some of the duties in the process and did an "excellent" job.[172]

The POI considered Execuflight a very good operator, and he only dealt with the operations portion. In general, he felt Execuflight did a "pretty good job."[173]

19.1 FAA Guidance

Advisory Circular (AC) 120-108

This advisory circular (AC) provides guidance for all operators using the continuous descent final approach (CDFA) technique while conducting a Non-precision Approach (NPA) procedure. It describes the rationale for using the CDFA technique, as well as recommended general

[172] See Attachment 1 – Interview Summaries.
[173] See Attachment 1 – Interview Summaries.

procedures and training guidelines for implementing CDFA as a standard operating procedure (SOP). While the use of CDFA is beneficial to all aircraft operators, the AC is intended for those operators governed by Title 14 of the Code of Federal Regulations (14 CFR) parts 91 subpart K (91K), 121, 125, and 135. This guidance and information describes an acceptable means, but not the only means, of implementing the use of CDFA during NPAs and does not constitute a regulation.

AC 120-92A
This advisory circular (AC) provides a Framework for Safety Management System (SMS) development by aviation service providers. It contains a uniform set of expectations that align with the structure and format of the International Civil Aviation Organization (ICAO) Framework; and Aviation Safety (AVS) policy in Federal Aviation Administration (FAA) Order VS 8000.367, AVS Safety Management System Requirements, Appendix B.

AC 120-71A
Standard operating procedures (SOPs) are universally recognized as basic to safe aviation operations. Effective crew coordination and crew performance, two central concepts of crew resource management (CRM), depend upon the crew's having a shared mental model of each task. That mental model, in turn, is founded on SOPs. This advisory circular (AC) presents background, basic concepts, and philosophy in respect to SOPs. It emphasizes that SOPs should be clear, comprehensive, and readily available in the manuals used by flight deck crewmembers.

AC 120-68F
The Pilot Records Improvement Act of 1996 (PRIA), as amended, was enacted to ensure that air carriers and air operators adequately investigate a pilot's background before allowing that pilot to conduct commercial air carrier flights. Under PRIA, a hiring employer cannot place a pilot into service until he or she obtains and reviews the last 5 years of the pilot's background and other safety-related records as specified in PRIA.

AC 120-66B
This Advisory Circular (AC) provides guidance for establishing an air transportation Aviation Safety Action Program (ASAP). The objective of the ASAP is to encourage air carrier and repair station employees to voluntarily report safety information that may be critical to identifying potential precursors to accidents. The Federal Aviation Administration (FAA) has determined that identifying these precursors is essential to further reducing the already low accident rate. Under an ASAP, safety issues are resolved through corrective action rather than through punishment or discipline. The ASAP provides for the collection, analysis, and retention of the safety data that is obtained. ASAP safety data, much of which would otherwise be unobtainable, is used to develop corrective actions for identified safety concerns, and to educate the appropriate parties to prevent a reoccurrence of the same type of safety event. An ASAP is based on a safety partnership that will include the FAA and the certificate holder, and may include a third party, such as the employee's labor organization. To encourage an employee to voluntarily report safety issues, even though they may involve the employee's possible noncompliance with Title 14 of the Code of Federal Regulations (14 CFR), enforcement-related incentives have been designed into the program.

SAFO[174] 15011 - Roles and Responsibilities for Pilot Flying (PF) and Pilot Monitoring (PM)
Purpose: This SAFO encourages operators to define roles and responsibilities for the PF and PM.

SAFO 13002 - Manual Flight Operations
Purpose: This SAFO encourages operators to promote manual flight operations when appropriate.

SAFO 12003 - Standard Operating Procedures (SOP) for Title 14 CFR Part 135 Certificate Holders and Part 91K Program Managers
Purpose: This SAFO reminds part 135 certificate holders and part 91K operators of the criticality of using SOPs during all phases of flight.

20.0 Previous Accidents

DCA08MA085
On July 31, 2008, about 0945 central daylight time, 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 killed, and the airplane was destroyed by impact forces. The nonscheduled, domestic passenger flight was operating under the provisions of 14 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.

The National Transportation Safety Board (NTSB) determined that the probable cause of this accident was the captain's decision to attempt a go-around late in the landing roll with insufficient runway remaining. Contributing to the accident were (1)the pilots' poor crew coordination and lack of cockpit discipline; (2) fatigue, which likely impaired both pilots' performance; and (3) the failure of the Federal Aviation Administration (FAA) to require crew resource management (CRM) training and standard operating procedures (SOPs) for 14 CFR Part 135 operators.

20.1 Previous NTSB Recommendations

Require principal operations inspectors of 14 CFR Part 121, 135, and 91 subpart K operators to ensure that Federal Aviation Administration – approved non-precision instrument approach landing procedures prohibit "dive and drive" as defined in Advisory Circular 120-108. (A-14-076)

Status: Closed – Unacceptable Action

Require 14 CFR Part 121, 135, and 91K operators to review their standard operating procedures to verify that they are consistent with the flight crew monitoring techniques described in Advisory Circular (AC) 120-71A "Standard Operating Procedures for Flight Deck

[174] Safety Alerts for Operators.

Crewmembers"; if the procedures are found not be consistent, revise the procedures according to the AC guidance to promote effective monitoring. (A-10-010)

Status: Closed – Unacceptable Action

Require 14 CFR Part 135 and 91 subpart K operators to establish and ensure that their pilots adhere to, standard operating procedures.

Status: Closed – Unacceptable Action

Revise applicable 14 CFR Part 121 and 135 regulations to prohibit pilots from descending below the minimum descent altitude during non-precision instrument approaches unless conditions allow for clear visual identification of all obstacles and terrain along the approach path or vertical guidance to the runway is available and being used. (A-06-09)

Status: Closed – Reconsidered

Define detailed parameters for a stabilized approach, develop detailed criteria indicating when a missed approach should be performed, and ensure that all 14 CFR Part 121 and 135 carriers include this information in their flight manuals and training programs. (A-01-059)

Status: Closed – Unacceptable Action

Issue guidance to air carriers to ensure that pilots periodically perform non-precision approaches during line operations in daytime visual conditions in which such practice would add a risk factor. (A-00-011)

Status: Closed – Acceptable Action

Title 14 CFR Part 135 and 91 subpart K operators to establish, and ensure that their pilots adhere to, standard operating procedures.(A-11-020)

Status: Closed – Unacceptable Action

Title 14 CFR Part 135 pilot-in-command line checks be conducted independently from other required checks and be conducted on flights that truly represent typical revenue operations, including a portion of cruise flight, to ensure that thorough and complete line checks, during which pilots demonstrate their ability to manage weather information, checklist execution, sterile cockpit adherence, and other variables that might affect revenue flights, are conducted. (A-11-030)

Status: Closed – Acceptable Action

F. LIST OF ATTACHMENTS

Attachment 1 – Interview Summaries
Attachment 2 – FXE Interview Transcripts
Attachment 3 – Witness Statements
Attachment 4 – Flight Crew Information
Attachment 5 – Captain Training Records
Attachment 6 – First Officer Training Records
Attachment 7 – CRM Training Results
Attachment 8 - Captain Previous Employer

Attachment 9 - FO Previous Employer
Attachment 10 – Sky King Check Airman Interview
Attachment 11 – Trip Kit
Attachment 12 – Weight and Balance
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Attachment 17 – Party Forms
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Attachment 20 – POI Work Plan

Submitted by:

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