National Transportation Safety Board

Office of Aviation Safety
Washington, DC

February 12, 2015

Group Chairman's Factual Report

OPERATIONAL FACTORS

DCA15MA029

A. ACCIDENT

Operator: Silver Sage Aviation
Location: Gaithersburg, Maryland
Date: December 8, 2014
Time: 1045 eastern standard time
Airplane: Embraer Phenom E50P, registration number N100EQ

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C. SUMMARY

On December 8, 2014, at about 1041 Eastern Standard Time, an Embraer EMB-500 "Phenom" business jet, N100EQ, crashed and impacted trees and homes about 4,000 feet from Runway 14 at the Montgomery County Airpark (GAI) in Gaithersburg, Maryland. The airline transport rated pilot and both passengers on board were killed in the crash, as well as three persons on the ground. The flight departed from Horace Williams Airport Chapel Hill (IGX), North Carolina and was destined to the Montgomery County Airpark on an Instrument Flight Rules (IFR) flight plan. Marginal visual meteorological conditions prevailed at the time of the accident. The flight was operated as a Part 91 corporate flight.

D. HISTORY OF FLIGHT

On the morning of the accident, the pilot contacted line personnel at the Horace Williams Airport (IGX), Chapel Hill, North Carolina, informing them of a planned flight that morning. The airplane was subsequently fueled with 20 gallons of fuel per wing tank prior to departure. Airport personnel indicated that prior to departure, the pilot was seated in the left cockpit seat and a passenger was seated in the right cockpit seat. An additional passenger was seated in the cabin of the airplane. Airport personnel indicated that the airplane departed IGX about 0945.

Preliminary information indicated that the takeoff and cruise portion of the flight progressed uneventfully. As the airplane approached the Montgomery County Airpark (GAI), Gaithersburg, Maryland, the pilot requested the RNAV (GPS) RWY 14 approach to GAI. The Air Traffic Controller cleared the airplane for the approach and authorized a frequency change to the airport's advisory frequency. The airplane impacted the ground about 4,000 feet from the approach end of the runway. The location of the accident site was about 900 feet left of the extended runway centerline. Both the departure and destination airports were uncontrolled airports without an operating control tower.

Flight tracking data recovered from the airplane's flight data recorder confirmed that the airplane departed IGX at 0945. The airplane then climbed to a pressure altitude of 22,000 feet, where it remained for about 3 minutes before climbing to its final cruise altitude of 23,000 feet. The airplane remained at 23,000 feet pressure altitude for about 12 minutes before beginning a descent.

E. FLIGHT CREW INFORMATION

Pilot-in-Command

The pilot in command (PIC), age 66, held a Federal Aviation Administration (FAA) issued Airline Transport Pilot Certificate with Airplane-Single Engine Land and Airplane-Multiengine Land Ratings. He also had a type rating for EMB-500 airplanes and a letter of authorization for operation of L-39 airplanes. The PIC also held a flight instructor certificate with ratings for single engine airplanes. The PIC was issued a second-class airman medical certificate on February 7,

2014. The limitations section of the medical certificate listed that the pilot must wear corrective lenses.

FAA records indicated that the PIC was involved in a previous accident on March 1, 2010 involving a TBM-700 airplane, N700ZR, at Montgomery County Airpark (GAI) in Gaithersburg, Maryland. NTSB records showed that the accident was investigated by the NTSB and report ERA10CA155 was issued. As a result of the accident the FAA reexamined the PIC on August 19, 2010. The reexamination consisted of one hour of oral examination and one hour of flight examination, which included ILS approaches, missed approaches, go-arounds, balked landings, and landings.

FAA records indicated that the PIC received an enforcement action for a TFR violation that occurred on August 18, 2011.

FAA records indicated that the PIC was involved in a bird strike incident on November 2, 2011, in a TBM-700 airplane. The airplane incurred no damage during the event.

FAA records indicated that the PIC received his type rating for EMB-500 airplanes on April 28, 2014, after completion of a flight test administered by a designated pilot examiner. The flight test was accomplished in the accident airplane from the PIC's home base of operations (KIGX – Horace Williams Airport, Chapel Hill, North Carolina). The records indicated that the PIC reported having 4,500 hours of flight experience on his application for his EMB-500 type rating.

The PIC initially contacted Embraer on November 18, 2013, and the pilot was enrolled in Phenom 100 Web Based Training (WBT) to assist with the sale of an aircraft. On January 12, 2014, the pilot toured the Embraer-CAE Training Services facility and met with a Phenom 100 Instructor and Phenom Sales Representative. The pilot scheduled training on February 18, 2014 for the Phenom 100 initial training course, and later, on January 28, 2014, the pilot canceled initial training with CAE to pursue a type rating in the aircraft. At the time of the cancellation, he inquired about recurrent training with CAE. The pilot then scheduled Phenom 100 recurrent training for July 30th, 2014. On May 28, 2014 the pilot called and canceled the scheduled recurrent training.

It was found that the PIC received training in the accident airplane from several different sources, and that the PIC flew the airplane on every flight since its purchase. The PIC reportedly received training from the seller of the airplane during its flight from France where it was purchased. The PIC then received training from Holland Aero, a company that provided transition and recurrent training in very light jets (VLJ), including the Phenom 100. The PIC initially contacted Holland Aero and requested a 3-day transition course, but the proprietor advised that the PIC to complete the 9-day course since the PIC had no previous experience in VLJ operations. At the completion of the 9-day course, after about 21 hours of flight instruction, the flight instructor did not feel that the PIC met the standards required for him to obtain a type rating for the airplane and advised him to receive more training.

The PIC returned home and was provided contact information for an instructor in his area. The PIC continued training with the new instructor in preparation for his flight check for the Phenom 100 type rating. The instructor reported that he provided training to the PIC that consisted of mainly improving the PIC's performance on procedures, approaches and maneuvers. He provided training on 4 consecutive days and an additional 2 days when the examiner was available. The training flights originated from IGX, but most of the training was done at Kinston Regional Jetport at Stallings Field (KISO), near Kinston, North Carolina, since it had longer runways and more instrument approach procedures. The instructor provided about 24 hours of flight instruction with about 1 hour of ground instruction prior to each flight.

On April 28, 2014 the PIC received a type rating for the Phenom 100 airplane. The examiner who administered the flight check reported that during the oral examination, the PIC exhibited no major deficiencies or flaws in his knowledge of airplane. Prior to the flight examination, the examiner noted that the pilot's home airport had a 4,000 foot runway, which was unusual for the fleet, but still within limits. He discussed this with the PIC and the importance of airplane control and stabilized approaches. He reported that the pilot recited industry approach standards that in instrument conditions with the airplane at 1,000 feet above ground level, or in visual conditions with the airplane at 500 feet above ground level, the airplane should be on glide slope, on target airspeed, and configured for landing. The flight portion of the examination lasted 3.2 hours and the examiner noted that overall pilot performance was good and the PIC passed all Practical Test Standards. He didn't remember anything that pilot was weak on. He noted that he was impressed that pilot handled the stabilized approach to IGX's short runway well.

The examiner that administered the PIC's check flight for the Embraer EMB-500 type rating also conducted recurrent training with the pilot on September 26, 2014. The examiner did not note any deficiencies during the recurrent training and commented that he was impressed by the PIC's handling of weather conditions that were present during the recurrent training.

A review of the pilot's electronic logbook revealed that he had accumulated 4,736.5 hours total flight experience as of the last entry dated November 20, 2014. The logbook indicated that the PIC's flight time included about 1,500 hours in Socata TBM700 series airplanes, about 60 hours in Aero Vodochody L39C airplanes, and 135.9 hours in Embraer EMB-500 airplanes. All of the PIC's logged time in Embraer EMB-500 airplanes was in N100EQ.

An autopsy and toxicology testing was conducted for the PIC. The autopsy report listed multiple injuries sustained in the accident as the cause of death. The toxicology report listed Atorvastatin detected in liver samples. Atorvastatin is a lipid lowering medication marketed as Lipitor.

F. OWNER / OPERATOR INFORMATION

The accident airplane was registered to Sage Aviation, LLC, and operated by the PIC. The corporation was reportedly formed as a vehicle for ownership of the accident airplane, and the PIC was the principal officer of Sage Aviation, LLC. The airplane was acquired on March 26, 2014. It is not known if other pilots operated the airplane since it was acquired. The airplane was

reportedly used for personal and business purposes and the accident flight was a business flight to attend a meeting.

G. WEATHER

The Automated Weather Observation System (AWOS) report at GAI about 6 minutes prior to the accident was as follows:

METAR KGAI 081535Z 04006KT 10SM FEW021 OVC032 M01/M08 A3061 RMK AO1
GAI weather on the 8th at 1535 GMT/ 1035 EST, the wind wass 040˚ at 6 knots (kt), visibility 10 statute miles, a few clouds at 2,100 feet (ft) above ground level (agl), an overcast cloud ceiling at 3,200 ft agl, temperature -1° Celsius (C), dew point -8° C, altimeter setting 30.61 inches of mercury. Remarks: automated observation system without a precipitation discriminator.

Performance data combined with the weather radar echoes indicated that the accident airplane was in instrument meteorological conditions (IMC) until approximately one mile from GAI and also in conditions that were favorable for structural icing for at least ten minutes during the approach. Multiple jet air carriers in the vicinity of the accident site reported icing conditions in the clouds with cloud tops ranging from 4,300 ft to 5,500 ft above mean sea level (msl). In addition, four minutes after the accident, there was another pilot report (PIREP) from a regional turboprop pilot who was encountering moderate mixed icing between 4,000 ft and 5,000 ft msl.

Witnesses that were operating other airplane's at GAI reported that the ceiling was about 2,000 feet and one of the witnesses reported seeing the accident airplane "break out" of the cloud layer during its final approach.

Additional weather information is available in the Meteorology Group Chairman's Factual Report.

H. AIRPORT

The Montgomery County Airpark (GAI), was an uncontrolled airport, located about 3 miles northeast of the city of Gaithersburg, Maryland. The airport had one asphalt runway (runway 14/32), that was 4,202 feet long and 75 feet wide. The three instrument approach procedures listed for the airport were: RNAV (GPS) –A, RNAV (GPS) RWY 14, and VOR RWY 14. The runway had a visual approach slope indicator (VASI) for runway 14.

According to air traffic control communications, N100EQ had been cleared for the RNAV (GPS) RWY 14 approach.

I. WEIGHT AND BALANCE

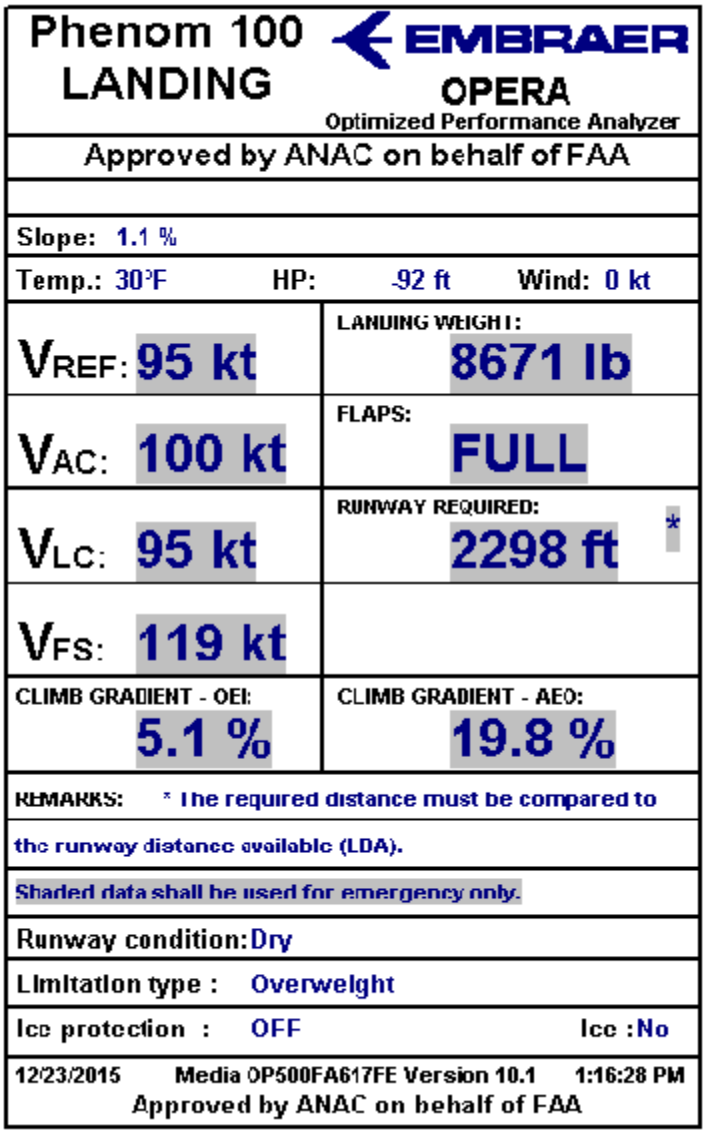
The airplane's weight and balance information was determined by using a weight and balance report, dated October 3, 2009, that was found within the airplane wreckage, pilot and passenger

weights obtained from postmortem examination, and actual weights of items found within the wreckage. The fuel weights were obtained from fuel quantities listed in the Flight Data Recorder information. The calculated ramp weight and center of gravity were 9,598 pounds at 28.604 percent of mean aerodynamic chord. The calculated takeoff weight and center of gravity were 9,498 pounds at 28.511 percent of mean aerodynamic chord. The calculated approach weight and center of gravity were 8,671 pounds at 28.197 percent of mean aerodynamic chord. All of the calculated weight and balance figures were within the limits depicted in the Center of Gravity Envelope found in Section 2 “Limitations” of the Airplane Flight Manual.

J. PERFORMANCE CALCULATIONS

Landing performance was determined using the Optimized Performance Analyzer (OPERA) software, developed and distributed by the airplane manufacturer to airplane owners. The inputs used for the software consisted of the calculated weight and balance data, weather information, and runway information for the destination airport. One of the inputs to OPERA was the status of the airplane’s ice protection systems. With this input selected to “off”, the calculated landing information for FULL flaps was:

Landing Reference Speed (Vref): 95 knots
Approach Climb Speed (Vac): 101 knots
Landing Climb Speed (Vlc): 95 knots
Final Segment Speed (Vfs) : 119 knots
Climb Gradient (one engine inoperative) : 5.1 percent
Climb Gradient (All engines operating) : 19.8 percent
Runway Required: 2,299 feet



Phenom 100
LANDING

EMBRAER
OPERA
Optimized Performance Analyzer

Approved by ANAC on behalf of FAA

Slope: 1.1 %

Temp.: 30°F HP: -92 ft Wind: 0 kt

VREF: 95 kt	LANDING WEIGHT: 8671 lb
VAC: 100 kt	FLAPS: FULL
VLC: 95 kt	RUNWAY REQUIRED: 2298 ft *
VFS: 119 kt	
CLIMB GRADIENT - OEI: 5.1 %	CLIMB GRADIENT - AEO: 19.8 %

REMARKS: * The required distance must be compared to the runway distance available (LDA).

Shaded data shall be used for emergency only.

Runway condition: Dry

Limitation type : Overweight

Ice protection : OFF Ice : No

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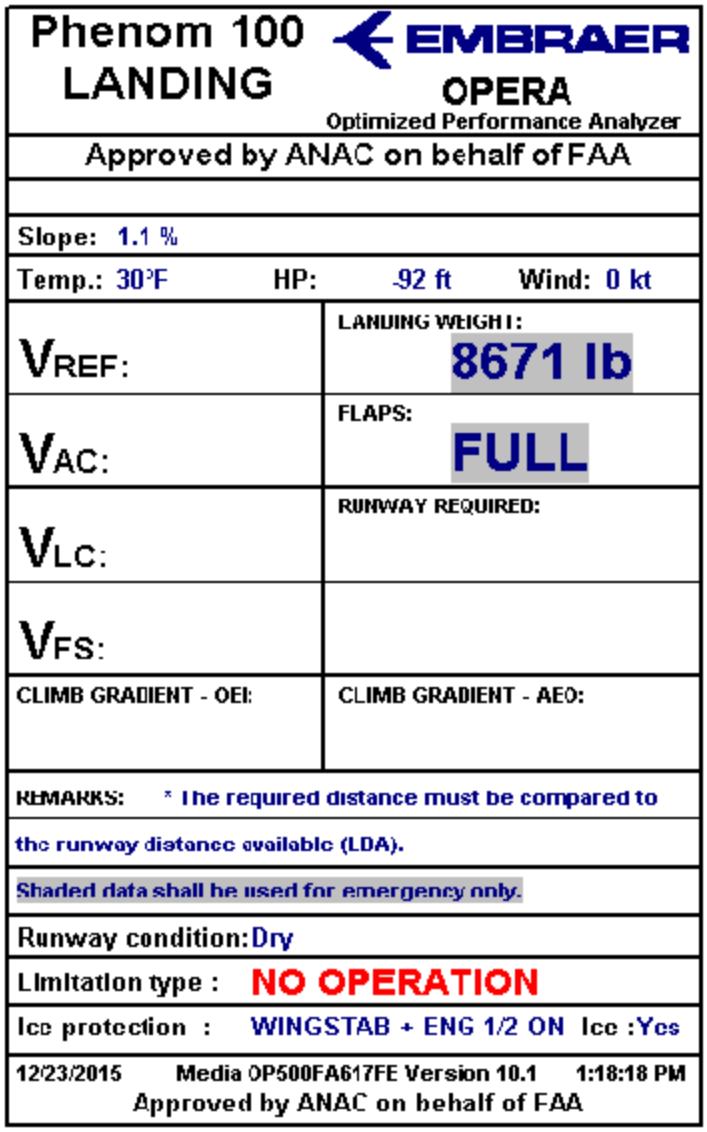
Figure 1 - OPERA generated landing card without ice protection enabled and full flaps

Using the same configuration but with the ice protection input selected to “Wingstab + Engine”, OPERA indicated “No Operation” due to the airplane’s weight resulting in insufficient approach climb gradient on one engine.



Phenom 100
LANDING

EMBRAER
OPERA
Optimized Performance Analyzer

Approved by ANAC on behalf of FAA

Slope: 1.1 %

Temp.: 30°F HP: -92 ft Wind: 0 kt

VREF:	LANDING WEIGHT: 8671 lb
VAC:	FLAPS: FULL
VLC:	RUNWAY REQUIRED:
VFS:	
CLIMB GRADIENT - OEI:	CLIMB GRADIENT - AEO:

REMARKS: * The required distance must be compared to the runway distance available (LDA).

Shaded data shall be used for emergency only.

Runway condition: Dry

Limitation type : NO OPERATION

Ice protection : WINGSTAB + ENG 1/2 ON Ice : Yes

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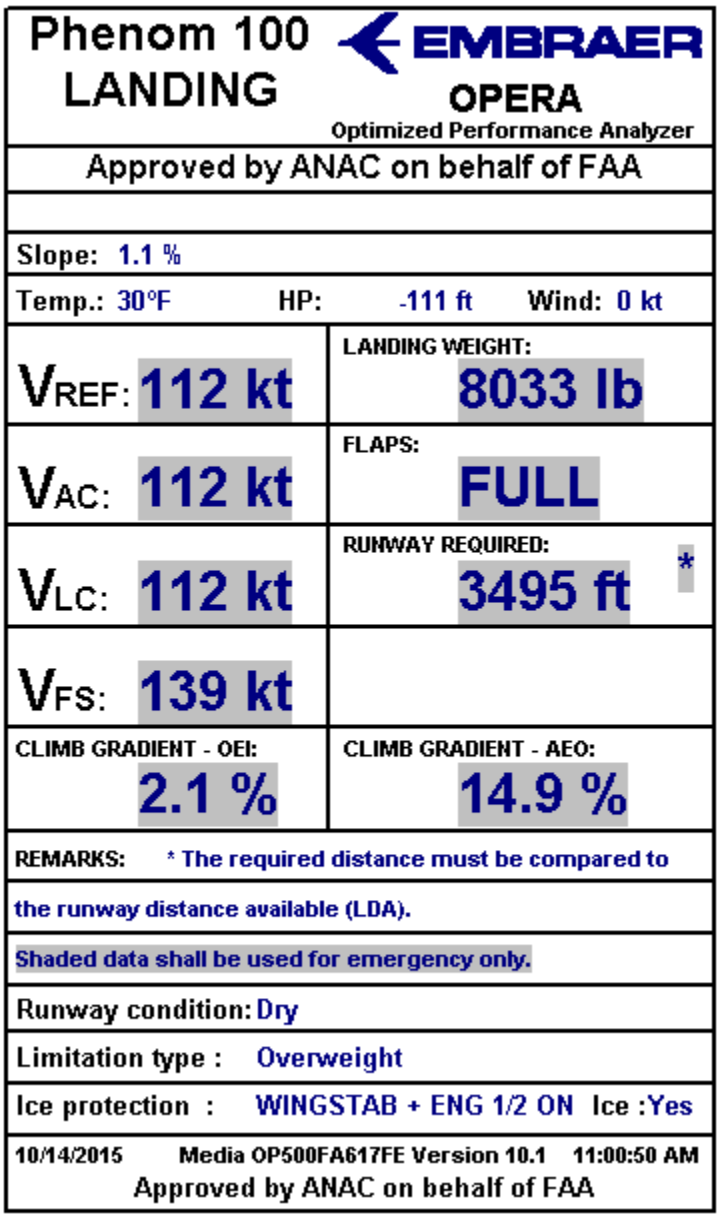
Figure 2 - OPERA generated landing card with ice protection enabled and full flaps

For a flaps FULL approach, the maximum weight to achieve the minimum approach climb gradient was 8,033 pounds. Using this weight as an input to OPERA, the calculated landing information was:

Landing Reference Speed (Vref): 112 knots
Approach Climb Speed (Vac): 112 knots
Landing Climb Speed (Vlc): 112 knots
Final Segment Speed (Vfs): 139 knots
Climb Gradient (one engine inoperative) : 2.1 percent
Climb Gradient (All engines operating) : 14.9 percent
Runway Required: 3,495 feet



Phenom 100
LANDING

EMBRAER
OPERA
Optimized Performance Analyzer

Approved by ANAC on behalf of FAA

Slope: 1.1 %

Temp.: 30°F HP: -111 ft Wind: 0 kt

VREF: 112 kt	LANDING WEIGHT: 8033 lb
VAC: 112 kt	FLAPS: FULL
VLC: 112 kt	RUNWAY REQUIRED: 3495 ft *
VFS: 139 kt	
CLIMB GRADIENT - OEI: 2.1 %	CLIMB GRADIENT - AEO: 14.9 %

REMARKS: * The required distance must be compared to
the runway distance available (LDA).
Shaded data shall be used for emergency only.

Runway condition: Dry

Limitation type : Overweight

Ice protection : WINGSTAB + ENG 1/2 ON Ice :Yes

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Figure 3 - OPERA generated landing card for highest allowable weight with ice protection enabled and full flaps

The landing reference information for the actual landing weight was determined using the performance charts found in the landing performance section of the Pilot's Operating Handbook. Using the landing weight of 8,671 pounds, rounded to 8,700 pounds, wing and stabilizer ice protection on, full landing flaps, the airport elevation of 539 ft msl, 0 knot headwind, and temperature 15 degrees C below ISA, the landing reference information was as follows:

Landing Reference Speed (Vref): 117 knots

Approach Climb Speed (Vac): 117 knots
Landing Climb Speed (Vlc): 117 knots
Final Segment Speed (Vfs) : 144 knots
Unfactored landing distance: 3,959 feet (adjusted for airport field elevation)

The previous calculations were made using a final landing flap configuration of full flaps as was recorded during the final minute of the flight. Using the landing weight of 8,671 pounds, wing and stabilizer ice protection on, landing flaps in position 3, the airport elevation of 539 ft msl, 0 knot headwind, and temperature 15 degrees C below ISA, the landing reference information was calculated using OPERA as follows:

Landing Reference Speed (Vref): 121 knots
Approach Climb Speed (Vac): 121 knots
Landing Climb Speed (Vlc): 121 knots
Final Segment Speed (Vfs): 144 knots
Climb Gradient (one engine inoperative) : 3.5 percent
Climb Gradient (All engines operating) : 14.0 percent
Runway Required: 3,719 feet

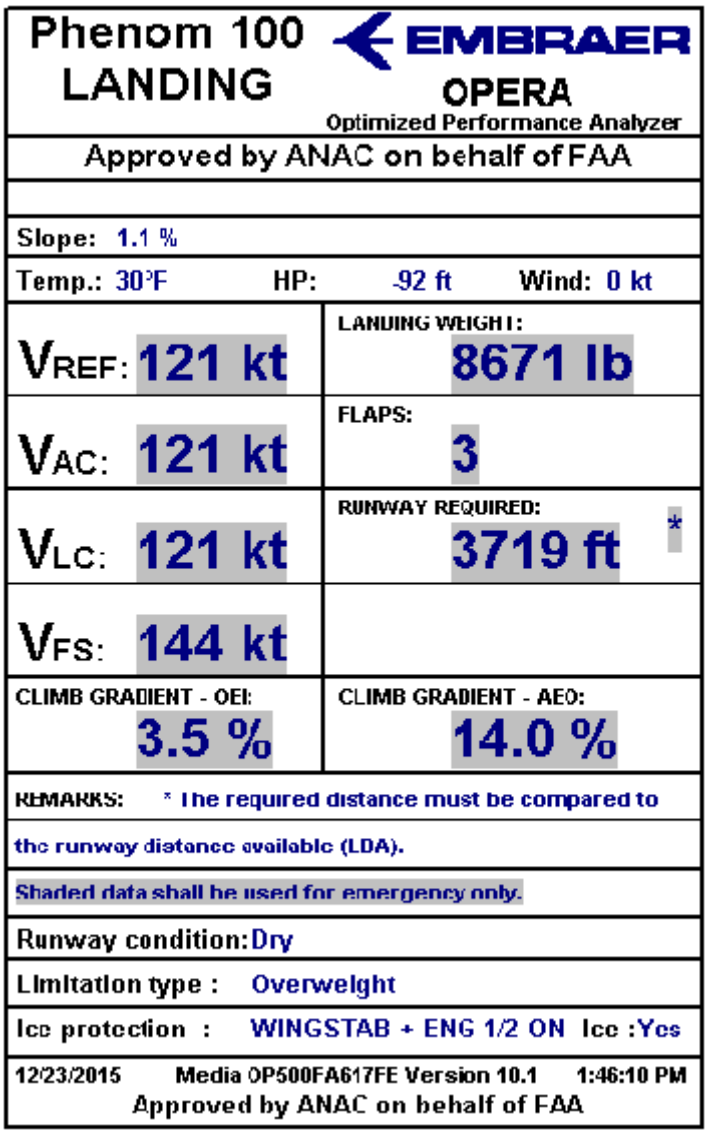

Figure 4 - OPERA generated landing card with ice protection enabled and flaps 3

Landing performance was also determined using the approved Quick Reference Handbook (QRH), which would have been available to the pilot in-flight. Using the calculated landing weight, rounded to 8,700 pounds, a temperature of 0 degrees Celsius, the airport elevation rounded to 1,000 feet, the climb limited maximum landing weight was determined as follows:

Maximum Landing Weight					
Approach flap	Landing flap	Engine Ice Protection	Wingstab Ice Protection	Maximum Landing Weight	Limitation
1	3	OFF	OFF	10582	Overweight Landing Limited
2	FULL	OFF	OFF	10185	Approach Climb Limited
1	3	ON	ON	9091	Approach Climb Limited
2	4	ON	ON	7733	Approach Climb Limited

The QRH was also used to determine the following landing distances and approach speeds using the calculated landing weight, rounded to 8,700 pounds, a temperature of 0 degrees Celsius, the airport elevation rounded to 1,000 feet, zero runway slope and no wind.

Speeds and Landing distances									
Engine Ice Protection	Wingstab Ice Protection	Flap Position	Vref	Vac	Vfs	Factored dry landing distance	Factored wet landing distance	Unfactored dry landing distance	Unfactored wet landing distance
OFF/ON	OFF	3	99	109	119	4462	5131	2677	3347
OFF/ON	OFF	FULL	95	101	119	4206	4837	2524	3155
ON	ON	3	121	121	144	6862	7891	4117	5146
ON	ON	FULL	117	117	144	6803	7823	4082	5102

K. AIRPLANE OPERATION

The Airplane Flight Manual, Operating Manual, and Quick Reference Handbook provided detailed information regarding operation of the airplane in different phases of flight and in different weather conditions.

Descent, Approach and Landing

The Airplane Flight Manual listed the normal procedures for the descent, approach, before landing, and landing phases of flight as follows:

DESCENT
- Windshield Heating .....ON
- Pressurization .....CHECK LFE
- Landing Speeds .....SET
- Set VREF, VAC and VFS.
- Icing Conditions .....VERIFY

----------BELOW 10000 ft----------

- SIGNS/OUTLET Switch.....PED-BELTS/OFF

APPROACH
- Passengers..... ADVISE
- FUEL XFR Button..... PUSHED OUT
- Altimeters (pilots and IESI) ..... SET & X-CHECK
- Icing Conditions ..... VERIFY

BEFORE LANDING
- Yaw Damper ..... OFF
- LDG GEAR Lever ..... DN AND CHECK
- Flaps ..... SET FOR LANDING
- Airspeed..... VREF

LANDING
- Thrust Levers..... IDLE

Brakes (after touchdown) ..... APPLY MAXIMUM

The descent and approach phases delineate a step to check for icing conditions.

Icing Systems description

The airplane was equipped with an engine anti-ice system, and a wing and stabilizer de-ice system. The engine anti-ice system used hot bleed air from the related engine compressor to remove or prevent ice formation around the engine inlet cowls. The wing and stabilizer de-ice system included pneumatic de-icing boots mounted on the wings and horizontal stabilizers of the airplane. Each wing had two separate de-icing boots with one mounted on the wing outboard section and the other mounted on the inboard section of the wing. Each stabilizer had a single de-icing boot on the leading edge. The boots were pneumatically inflated using bleed air from the engines. Both the engine anti-ice and the wing and stabilizer de-ice were controlled from the "Ice Protection" panel located at the lower edge of the main panel in front of the left pilot station.

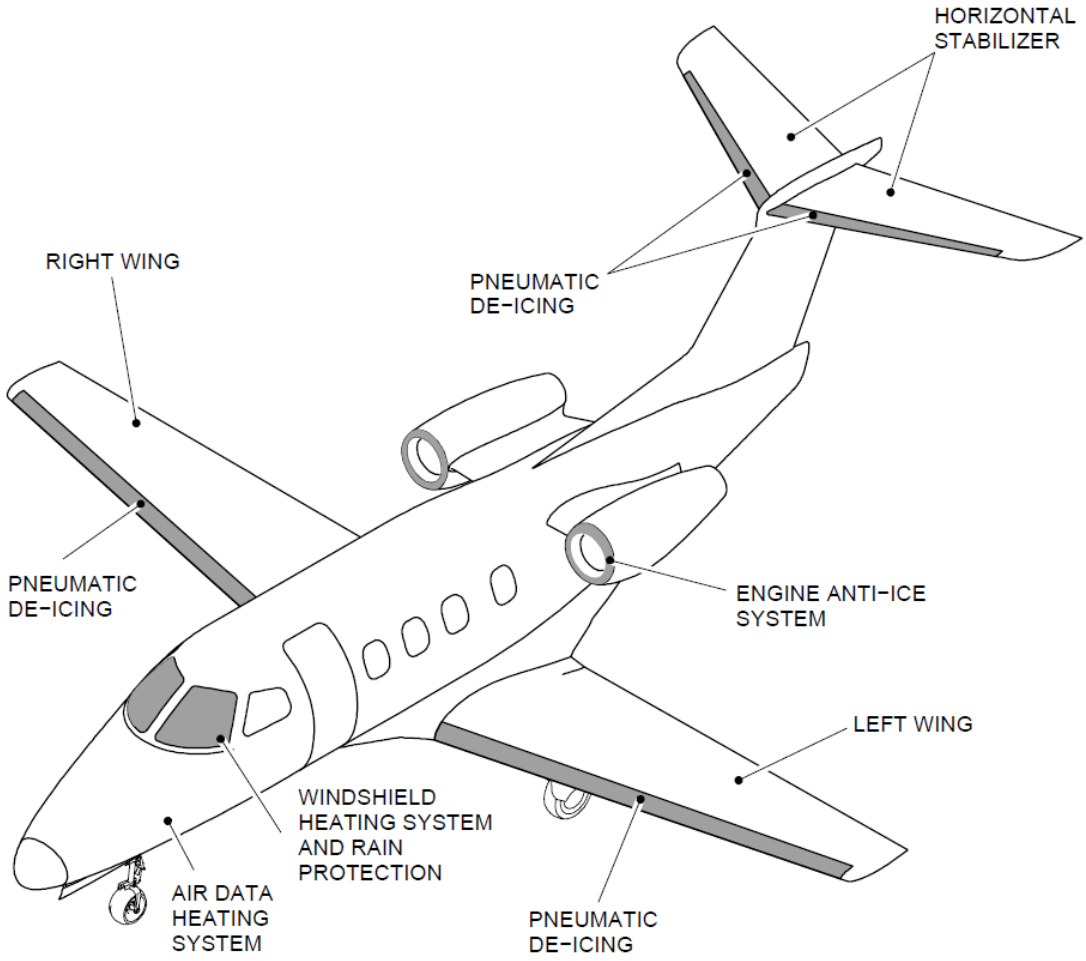

Figure 5 - Ice protection system (Image from Pilot's Operating Handbook)

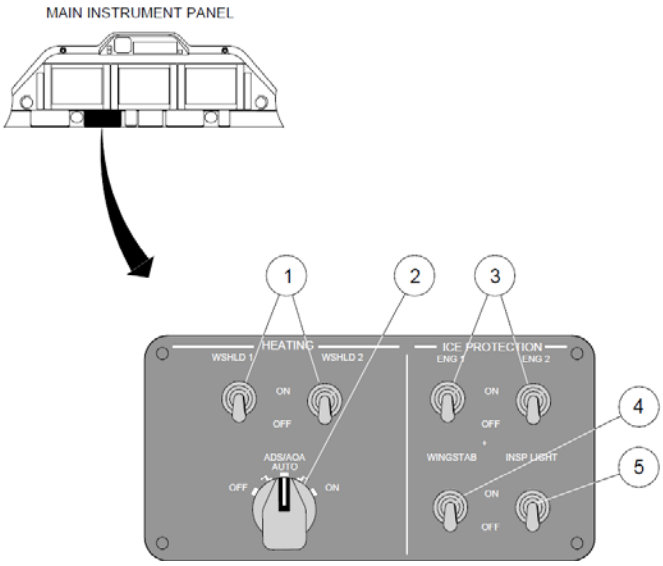

Figure 6 - Icing protection control panel (Image from Pilot's Operating Handbook)

When the “WINGSTAB” switch was selected to the “ON” position, the wing and stabilizer de-ice system would begin a one-minute cycle. This cycle would start with inflation of the horizontal stabilizer pneumatic boots for 6 seconds, followed by the outboard wing pneumatic boots for 6 seconds, and then the inboard wing pneumatic boots for 6 seconds. Inflation of the boots was followed by 42 seconds where none of the boots were inflated. If the “WINSTAB” switch remained in the on position, the cycle would repeat. A momentary activation of the switch would result in the wing and stabilizer de-ice system performing one of the described cycles.

Operation in Icing Conditions

The Normal Procedures Section of the Airplane Flight Manual, Section 3 – Operation in Icing Conditions, included:

AFTER TAKEOFF, CRUISE, DESCENT OR APPROACH
If TAT is below 10°C with visible moisture:
ENG 1 & 2 Switches..... ON
The CAS messages A-I E1 (2) ON must be displayed (after a delay of approximately 10 seconds).
At the first sign of ice accretion in the airplane or if TAT is below 5°C with visible moisture:
WSHLD 1 & 2 Switches..... ON
ENG 1 & 2 Switches..... ON
WINGSTAB Switch..... ON
The CAS messages A-I E1 (2) ON, D-I WINGSTB ON and SWPS ICE SPEED must be displayed after few seconds.
NOTE: If any of the above messages is not presented consider the associated system failed. Refer to the applicable Abnormal Procedure.

The Airplane Flight Manual noted:

> Icing conditions may exist whenever the Static Air Temperature (SAT) on the ground or for takeoff, or Total Air Temperature (TAT) in flight, is 10°C or below and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, and ice crystals).

According to data recovered from the airplane's flight data recorder, the ice protection system was not activated at the time of the accident. It had been activated for about 2 minutes, approximately 39 minutes prior to the end of the recorded data, when the airplane was at a pressure altitude of 23,000 ft. The final outside air temperature recorded by the FDR was 1.75 degrees Celsius. The witness reports that the airplane broke out of the clouds during the approach are consistent with operation in visible moisture.

Stall Warning System

The accident airplane was equipped with a 2-stage stall warning system that consisted of an aural warning followed by a stick pusher system. During a steady deceleration to stall the flight crew would receive an aural warning, and if the impending stall condition was not corrected, the stick pusher system would then activate. According to the system description, the stick pusher applies about 150 pounds of nose down force to the yoke. The stall warning system used airplane flap position landing gear position, wingstab switch position and Mach number to determine the angles of attack at which the system should trigger. These angle of attack values were then correlated to indicated airspeed and displayed as warning bands on the airspeed tape on the primary flight displays. Selection of the airplane's ice protection systems for the wings and horizontal stabilizer resulted in a lower angle of attack at which triggering of the stall warning system would occur, and hence higher indicated airspeeds for the warning bands on the airspeed tape on the PFD.

According to data from the airplane's flight data recorder, the ice protection system was not activated at the time of the accident. Performance data indicated that the for the configuration of the airplane at the time of the accident (Landing gear down, flaps down at position 4), the stall warning angles of attack would have been 21.0 degrees and 28.4 degrees for aural warning and stick pusher activation respectively with the ice protection system turned off, and 9.5 degrees and 15.5 degrees for aural warning and stick pusher activation respectively with the ice protection system turned on.

The final portion of the FDR recorded data depicted the airplane's approach to GAI. Performance data indicated that the airplane experienced an aural stall warning at an indicated airspeed of 88 knots. At the time of the aural stall warning the airplane was at an altitude of 803 ft msl and on the final approach to the airport. The FDR had no parameter to record activation of the stick pusher. According to performance information, had the ice protection been activated the pilot

would have received an aural warning of impending stall about 20 seconds earlier, and the stick pusher would have activated about 5 seconds earlier.

Airspeed Display

The airplane was equipped with an electronic display system that included two primary flight displays PFD, one for each pilot station. The PFD displayed airspeed, attitude, altitude, heading, and slip/skid indicators in a standard “Basic T”. Core primary information was complemented with other communication, navigation, flight control, annunciation, and planning information. The airspeed information was displayed on the PFD in a vertical tape format. The airspeed tape was overlaid with additional airspeed information, including cues for low speed awareness. The low speed awareness indicators consisted of red and yellow bands and a green circle that moved in conjunction with the main speed tape. The top of the red band denoted the airspeed for aural stall warning activation., the top of the yellow band just above the red band marked a three knot area prior to the activation of the aural stall warning, and the green circle denoted 1.3 times the speed at which stick pusher activation would be expected. The positioning of the low speed awareness cues was dependent on angle of attack measurements and airplane configuration, including the position of the wingstab switch. When a change to airplane configuration was made, the low speed awareness cues would be repositioned to reflect the current airplane configuration. Based on angle of attack measurements and the airplane’s configuration, with ice protection turned off during the landing approach at GAI, the airspeed tape display would have showed prior to autopilot disengagement the top of the red band at 86 knots, the top of the yellow band at 89 knots, and the green circle at 102 knots. With wingstab ice protection turned on, the display would have showed the top of the red band at 102 knots, the top of the yellow band at 105 knots, and the green circle at 121 knots.

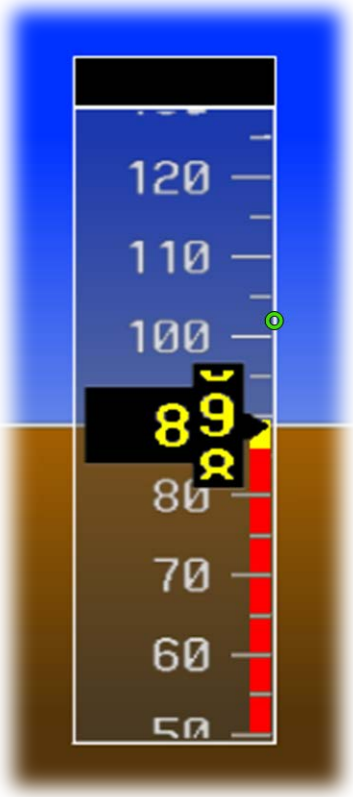

Figure 7 - Simulated airspeed display with ice protection disabled

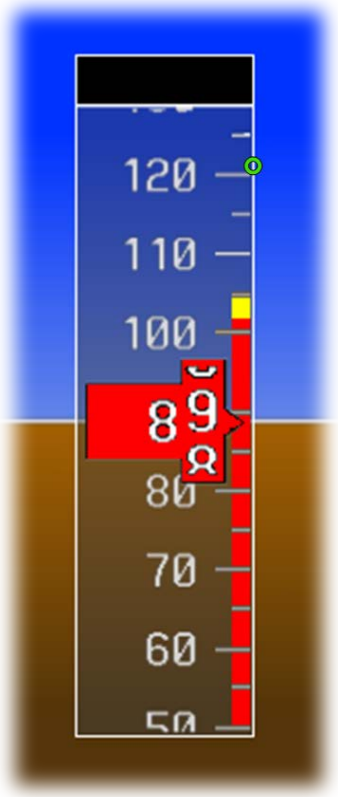

Figure 8 - Simulated airspeed display with ice protection enabled

L. REGULATORY OVERSIGHT

The airplane was operated under 14 Code of Federal Regulations Part 91 as a corporate flight. As such, the accident flight was not subject to the same level of regulatory oversight prescribed for commercial operations. Federal Regulations (14 CFR 61.31a) required that a person who acts as a pilot in command of the accident airplane, since it was a turbojet powered airplane, must hold a type rating for that aircraft. Additionally, 14 CFR 61.58 states:

(a) Except as otherwise provided in this section, to serve as pilot in command of an aircraft that is type certificated for more than one required pilot flight crewmember or is turbojet-powered, a person must—

(1) Within the preceding 12 calendar months, complete a pilot-in-command proficiency check in an aircraft that is type certificated for more than one required pilot flight crewmember or is turbojet-powered; and

(2) Within the preceding 24 calendar months, complete a pilot-in-command proficiency check in the particular type of aircraft in which that person will serve as

pilot in command that is type certificated for more than one required pilot flight crewmember or is turbojet-powered.

M. ADDITIONAL INFORMATION

Investigators learned that the German Federal Bureau of Aircraft Accident Investigation was conducting an investigation into an accident involving an Embraer EMB-500, on February 15, 2013 (BFU interim report # CX001-13), at the Berlin-Schönefeld Airport (SXF), Germany. The interim report of the accident stated that the airplane rolled to the left during the landing flare resulting in the left wing contacting the ground. Investigators found ice accretions up to 10 millimeters in thickness on the airplane's nose, wing leading edges, and horizontal stabilizer. The weather condition at the time of this accident included: Temperature 0 degrees Celsius; Dew point -2 degrees Celsius; Cloud cover 5 to 7 oktas (5/8 to 7/8 cloud coverage), at 1,400 feet above aerodrome level; visibility 4,800 meters with mist. Flight data recorder plots from the interim report indicated that wing and stabilizer de-ice was not used during the landing approach.

N. ATTACHMENTS

Attachment 1 – Interview Summaries

Attachment 2 – Pilots Operating Handbook – Excerpts (Ice protection system)

Attachment 3 – Pilots Operating Handbook – Excerpts (Stall warning system)

Attachment 4 – Pilots Operating Handbook – Excerpts (Landing Performance)

Attachment 5 – Airplane Weight and Balance Information

Attachment 6 – GAI RNAV (GPS) RWY 14 Instrument Approach Procedure

Attachment 7 – Pilot Training Records

Attachment 8 – Pilot Logbook

Attachment 9 – Quick Reference Handbook – Excerpts (Landing Performance)