Party Submission by Massachusetts Port Authority

NTSB No. ERA14MA271

Gulfstream Aerospace GIV
Laurence G. Hanscom Field
Bedford, Massachusetts
May 31, 2014

Submission Date: May 11, 2015

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May 11, 2015

VIA EMAIL AND OVERNIGHT MAIL

Luke Schiada
Senior Air Safety Investigator
NTSB Eastern Region
[redacted]

Dear Mr. Schiada,

In accordance with 49 CFR 831.14, Massachusetts Port Authority ("Massport") makes this submission concerning the May 31, 2014 accident at Laurence G. Hanscom Field. The submission is based upon information contained in the current NTSB Docket. Massport respectfully requests the right to supplement its submission if additional information becomes available.

Sincerely,

[redacted]

Sharon Williams
Director, Hanscom Field
NTSB Party Representative

I. INTRODUCTION

The Massachusetts Port Authority ("Massport") appreciates the opportunity to make this Party Submission under 49 CFR 831.14 concerning the May 31, 2014 accident at Laurence G. Hanscom Field ("Hanscom Field"), in Bedford, Massachusetts. Consistent with its role as a Survival Factors Working Group member, Massport limits its submission to addressing issues related to the airfield conditions and emergency response.

The record confirms that (i) the airfield conditions at Hanscom Field were safe for take-off and not a factor in the crash and (ii) the emergency response was prompt and appropriate. The runway length and overrun areas were consistent with FAA safety standards. And despite the crash occurring nearly a mile from the fire station, more than 1,800 feet off the end of the runway and through the airport's perimeter fence, firefighters were on scene within approximately 3 minutes. The fire trucks' water and agent supply far exceeded FAA standards. Unfortunately, the high speed crash and the subsequent ignition of the14,000 pounds of jet fuel precluded any successful self-evacuation or any rescue of the occupants of the aircraft. The entire Massport community holds the victims in their thoughts to this day.

II. BACKGROUND

A. Hanscom Field

Hanscom Field is a regional, Index B aviation facility approximately 20 miles from Boston. Massport owns and operates the airport in addition to Boston Logan International Airport and Worcester Regional Airport.

Located adjacent to Hanscom Air Force Base, Hanscom Field covers 1,125 acres including two asphalt runways (11/29 and 5/23). Runway 11/29, the airport's primary runway, is grooved asphalt 7,011 feet in length and 150 feet wide with a 0.1% gradient. At the end of the runway is a paved blast pad measuring 1,039 feet in length and 200 feet in width, which is part of the runway safety area ("RSA") measuring 1,000 feet in length and 500 feet in width, in accordance with Part 139 requirements. Runway 11/29 is marked as a precision instrument approach runway and equipped with high intensity runway edge lights (HIRL). A medium intensity approach lighting system with runway alignment indicator lights (MALSR) exists on the approach ends of both Runway 11 and Runway 29. A localizer antenna was located on the centerline approximately 1,700 feet from the end of Runway 11/29. A fence surrounds the perimeter of the airport. Beyond the perimeter fence to the Southeast lies the Shawsheen River, which flows 12 feet below grade.

B. USAF ARFF Support

The United States Air Force ("USAF") Fire Department has provided Hanscom Field's aircraft rescue and firefighting ("ARFF") services required by 14 CFR Pts. 139.315, 139.317 and 139.319 under a 2011 Support Agreement. (NTSB Survival Factors Report Attachment 8: DOD-Massport Contract) This arrangement is by no means unique. The United States military

provides similar services to other joint use airports. (NTSB Survival Factors Report Attachment 6: DOD/FAA Agreement) The USAF operates from an ARFF Fire Station, located on the property nearly 1 mile (approximately 4,750 feet) from the accident site. (NTSB Survival Factors Report at 27-28 and 33; Massachusetts State Police Collision Analysis and Reconstruction Section Accident Site Diagrams)

In order to address Part 139 ARFF compliance under these arrangements, the Department of Defense ("DoD") and Federal Aviation Administration ("FAA") agreed DoD ARFF standards are "equivalent to or exceed Part 139 requirements." (Id.) They further developed procedures to allow the ARFF provider to demonstrate compliance with DoD and Part 139 standards, including providing the airport operator with, among other things, ARFF vehicle reports and DoD ARFF training summaries. (Id.) The FAA has never notified Massport of any discrepancy between USAF ARFF at Hanscom and Part 139 requirements or taken any related action against Massport.

C. Airport Preparedness

Massport arranges for both annual tabletop exercises and full-scale triennial exercises to prepare for airport emergencies, as required by Part 139. These exercises are designed to familiarize emergency responders with the Airport's emergency operations and identify areas in need of improvement. (NTSB Survival Factors Report Attachment 9: 2012 Airport Table Top Exercise) The 2006 tabletop exercise, for example, involved a scenario in which an aircraft crashed off the end of Runway 29 into the wetlands. Twenty-two agencies participated in the exercise, including the USAF Fire Department and mutual aid responders with the objectives to activate and employ all appropriate elements of emergency plans, prepare for an aircraft emergency response at night, and prepare for a rescue in difficult terrain. Another tabletop in 2012, at which the USAF Fire Chief presented, involved a crash just short of the Runway 29 approach into the culvert. The objectives were to review resource and equipment allocation and availability, improve communications, familiarize participants with the staging areas, and review emergency procedures. (Id.) There also was a successful full-scale exercise on May 20, 2014, eleven days before the crash. 65 people, in addition to all parties with responsibilities under the Airport Emergency Plan, attended that exercise. (NTSB Survival Factors Report at 32) In addition to these exercises, aircraft and airport familiarizations occur regularly.

III. FACTUAL SUMMARY

On May 31, 2014, a Gulfstream jet was destroyed after a rejected takeoff and runway excursion at Hanscom Field. The aircraft was cleared for takeoff from Runway 11, a 7,011 foot-long, 150 foot-wide runway. (NTSB Survival Factors Report at 27) The aircraft, loaded with 14,000 pounds of fuel, took off, reached a maximum speed of approximately165 knots (189.87 mph) before running through the end of the runway, through the 1,000 foot-long RSA and onto the grass where it struck the FAA's approach lighting and localizer antenna assembly some 800 feet beyond the RSA before coming to rest past the airport perimeter fence. (NTSB Preliminary Report; NTSB Flight Data Recorder Report; NTSB Operational Report Attachment 4: Flight Plan) The aircraft straddled a ravine with the fuselage resting in the Shawsheen River. (Massachusetts State Police Collision Analysis; NTSB Airworthiness Group Chairman's Factual

Report at 4) An explosion and fire immediately ensued, consuming most of the aircraft. (Survival Factors Report Attachment 12: Interviews and Statements at 8 and 9; NTSB Preliminary Report)

The majority of the airplane was destroyed by fire, with the greatest fire damage occurring near the wing root area of the fuselage. The exterior paint around the door and aft of the door was discolored or burned away, while the exterior paint forward of the forward entry door remained intact. The cockpit windows were cracked and discolored, and the left side forward windscreen was cut out by rescuers. The nose cone was broken and partially missing. The bottom of the forward fuselage was deformed at approximately a 45 degree angle from the nose cone attachment frame extending down and aft approximately 3 feet. Circumferential buckling around the fuselage was noted approximately 6 feet aft of the nose cone attachment frame. The interior of the cockpit and door entry way was heavily sooted, melted, or destroyed by fire. In short, the aircraft was destroyed by impact forces and an immediate postcrash fire. (NTSB Airworthiness Group Chairman's Factual Report at 4-6)

The USAF received and acknowledged Air Traffic Control's report of the 21:40 crash at 21:40:32. (NTSB Survival Factors Report at 33) USAF firefighters were dispatched immediately. (NTSB Survival Factors Report Attachment 11: ARFF Timeline at 21:41:49) The accident site was nearly a mile (4,752 feet) from the fire station without defined roadway access. (NTSB Survival Factors Report at 32-33) The first engine was on the scene by 21:43:54 and personnel conducted a preliminary search for survivors. (NTSB Survival Factors Report Attachment 11: ARFF Timeline) Two additional crash trucks followed and were fighting the fire by 21:45:07. (Id.) They were joined by three additional USAF vehicles and foam trailer as well as mutual aid responders from Lexington, Bedford, Concord, Waltham, Lincoln Fire and Action Ambulance. (NTSB Survival Factors Report at 32 and Attachment 12: Interviews and Statements at 6) The USAF vehicles alone carried a total of 10,550 gallons of water, 2,800 pounds of dry chemical, and 1,730 gallons of foam. (NTSB Survival Factors Report Attachment 10: Hanscom AFB ARFF Apparatus and Personnel) As reflected in the chart below, these volumes exceed FAA standards by a factor of 5 or more:

	WATER (gallons)	**DRY CHEMICAL (lbs)**	**FOAM (3%) (gallons)**
-Crash 9	3,300	500	500
-Crash 10	1,000	500	130
-Engine 4	500	900	50
-Engine 6	750	900	50
-Tanker 7	5000		
-Rescue 3			
-Foam Trailer			1000
USAF TOTAL	**10,550**	**2,800**	**1,730**
FAA REQUIREMENTS	**1,500**	**500**	**45**

(NTSB Survival Factors Report at 27 and Attachment 10: Hanscom AFB ARFF Apparatus and Personnel;14 CFR 139.317)

Responders encountered a substantial amount of fire and smoke. (NTSB Survival Factors Report Attachment 12: Interviews and Statements at 8) There also was debris and equipment in the field leading up to the aircraft. (NTSB Survival Factors Report Attachment 12: Interviews and Statements at 5 and 8) They called out for survivors, but got no response. (NTSB Survival Factors Report Attachment 12: Interviews and Statements at 9) Jet fuel was flowing down the Shawsheen River and the aircraft was engulfed in flames on both sides. (NTSB Survival Factors Report at 34) The fire was fierce and constantly reigniting. (NTSB Survival Factors Report Attachment 12: Interviews and Statements at 8) There also were on-going secondary explosions. (NTSB Survival Factors Report Attachment 11: ARFF Timeline at 22:12:44; NTSB Survival Factors Report Attachment 12: Interviews and Statements at 9) Firefighting continued well into the night, concluding at 12:39:50 a.m. (NTSB Survival Factors Report at 35)

IV. ANALYSIS

A. Airport Conditions

Nothing in the record indicates any unsafe conditions existed at Hanscom Field. Runway 11's dimensions (7,011 foot long, 150 foot wide) and safety areas (1,000 by 500 feet) complied with FAA safety standards. (NTSB Survival Factors Report at 27) Moreover, the FAA's March 25-27, 2014 Part 139 inspection and certification confirms there were no substantive issues outstanding at the time of the accident. (NTSB Survival Factors Report at 31) The record reflects the Gulfstream pilots could have stopped the aircraft short of the river on the RSA or even on the runway if they had aborted takeoff at an earlier opportunity after the first indication of the lack of directional controls. (See, e.g., NTSB Cockpit Voice Recorder Report; NTSB Flight Data Recorder Report) There is no evidence that airfield conditions contributed to the pilots' inability to stop. The aircraft collided with the FAA's approach lighting and localizer antenna (see, e.g., NTSB Survival Factors Report at 29), which were located beyond the RSA. (Id.)

Proposed Finding: The airport met all relevant Part 139 safety requirements.

Proposed Finding: The runway at Hanscom Field was safe for takeoff and the airfield conditions were not a factor in the accident.

B. Emergency Response and Survival Aspects

Firefighters responded to the crash in a timely and appropriate manner in the difficult environment. Each responder traveled at least 4,750 feet from the Hanscom Air Force base through unpaved terrain to reach the crash site in the dark of night. (NTSB Survival Factors Report at 33) First responders were on the scene within approximately three minutes and, after conducting a preliminary search for survivors and an assessment of the situation, rapidly began fighting the fire. In total, the USAF deployed seven vehicles with all twelve firefighters, which

exceeded the required level of ARFF vehicle deployment the night of crash. And, as reflected in the chart above, the USAF vehicles carried agents far exceeding the Index B requirements applicable to Hanscom Field.

The USAF response further was supplemented by mutual aid responders from surrounding towns such as Lexington, Bedford, Concord, and Lincoln. In addition to searching the runway for survivors, first responders from the surrounding towns made numerous attempts to put personnel and equipment on the far side of the river where the cockpit was located. (Survival Factors Report at 34) They were eventually successful and aided USAF firefighters in gaining entry to the cockpit. (Survival Factors Attachment 12: Interviews and Statements at 3)

The record clearly demonstrates the dangerous conditions of the site — jet fuel burning in the aircraft, on the grass on either side of the river, and in the river itself. Explosions continued well after the crash. The incident occurred in the dark of night over rough, uneven terrain. Winds were calm, which kept thick black smoke close to the ground, making visibility difficult. Crews responding had to watch out for the debris and any potential passengers outside the wreckage. The fire was fierce and constantly reigniting. The secondary explosions further impeded visibility, exacerbated the fire, and disrupted firefighting efforts. The conditions naturally necessitated resupplying the trucks. Accessing the cockpit, which rested past the perimeter fence on the opposite bank of the river, presented an additional challenge. There was a significant drop-off into the river. The fire in the river impeded access to the other side of the bank and the water in the river continued to move fuel, making it very difficult to fight and extinguish. Numerous attempts were made before the cockpit could be reached.

The record also reflects an extremely short window of time, if any, between the initial impact of the crash and deaths in this tragic accident. After reaching a maximum speed of approximately165 knots (189.87 mph), impact forces, together with immediate explosions and fire, would have been devastating. The Hanscom Air Force Fire Captain explained that "once at the scene of the crash there was a large amount of fire in the sky." (NTSB Survival Factors Attachment 12) Similarly, Hanscom Air Force firefighter Todd Grierson explained that "upon arrival at crash site, [he] found heavy smoke and fire coming from the crashed aircraft." (NTSB Survival Factors Attachment 12) This was a small private aircraft and in such an enclosed space the combination of heat, fire and toxic smoke would have swiftly killed anyone who may have survived the initial violent impact. As recognized by the National Fire Protection Association ("NFPA"):

> The survivable atmosphere inside an aircraft fuselage involved in an exterior fuel fire is limited to approximately 3 minutes if the integrity of the airframe is maintained during the impact. This time could be substantially reduced if the fuselage is fractured.

(NFPA 402 Guide for Aircraft Rescue and Fire-Fighting Operations 6.1.1) Notably, FAA regulations require aircraft manufacturers to demonstrate that planes seating more than 44 passengers allow the evacuation of passengers and crew in 90 seconds or less. (14 CFR 121.291) The rationale for this requirement is that after 90 seconds, non-survivable conditions are likely to develop within the cabin. (E.R. Galea, et. al., Predicting the likely impact of Aircraft Postcrash

Fire on Aircraft Evacuation using Fire and Evacuation Simulation; cf. Timothy Maker, Full-Scale Test Evaluation of Aircraft Fuel Fire Burnthrough Resistance Improvements, 1999) Conditions such as toxic smoke and heat in a smaller plane fare no better.

Here, the great majority of the fuselage was destroyed aft of the nose cone (Airworthiness Report at 3 - 4) "The bottom of the forward fuselage was deformed at approximately a 45° angle from the nose cone attachment frame extending down and aft approximately 3 feet. Circumferential buckling around the fuselage was noted approximately 6 feet aft of the nose cone attachment frame." (NTSB Airworthiness Group Chairman's Factual Report at 5) The plane came to rest across the Shawsheen gulley with airflow underneath. (Massachusetts State Police Collision Analysis and Reconstruction Section Accident Site Diagrams) Photos of the plane the next day suggest heavy fire damage on the inside of the plane. (NTSB Airworthiness Group Chairman's Factual Report at 3)

The severe damage to the fuselage and the plane's positioning suggest the fire burned through the plane very quickly.

Proposed Finding: The emergency response was timely and appropriate and was not a factor in the survival of the crew and passengers.

V. CONCLUSION

Massport submits the following proposed findings concerning airfield conditions and emergency response for the NTSB's consideration:

(i)(a) The airport met all relevant Part 139 safety requirements.

(i)(b) The runway at Hanscom Field was safe for takeoff and the airfield conditions were not a factor in the accident.

(ii) The emergency response was timely and appropriate and was not a factor in the survival of the crew and passengers.

Massport is grateful for the NTSB's work over the course of the investigation and looks forward to continuing to assist the NTSB as the investigation reaches a conclusion.