Docket No. SA-538

Exhibit No. 6-A

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

Survival Factors - Factual Report of Group Chairman

(18 Pages)

National Transportation Safety Board
Office of Aviation Safety
Washington, DC

February 4, 2014

Survival Factors Group Chairman's Factual Report of Investigation

A.	Accident	:	DCA13MA133
	Location	:	Birmingham, Alabama
	Date	:	August 14, 2013
	Time	:	~ 0447 CDT[1]
	Airplane	:	Airbus A-300-600, N155UP
	Operator	:	United Parcel Service, flight 1354

B. Survival Factors Group

Chairman	:	Mark H. George National Transportation Safety Board Washington, DC
Member	:	Emily Gibson National Transportation Safety Board Washington, DC
Member	:	Kenneth Hoff United Parcel Service Louisville, Kentucky
Member	:	Jim Payne Birmingham Airport Authority Birmingham, Alabama
Member	:	Jim Price Federal Aviation Administration Atlanta, Georgia

[1] All times are reported in central daylight time (CDT) unless otherwise noted.

C. Summary

On August, 14, 2013, at about 0447 central daylight time (CDT), United Parcel Service (UPS) flight 1354, an Airbus A300-600, N155UP, crashed short of runway 18 while on approach to Birmingham-Shuttlesworth International Airport (BHM), Birmingham, Alabama. The captain and first officer were fatally injured and the airplane was destroyed. The scheduled cargo flight was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 121 and originated from Louisville International-Standiford Field Airport (SDF), Louisville, Kentucky.

D. Details of the Investigation

1.0 Airplane Configuration

The airplane was configured with two pilot seats and one observer seat on the flight deck, and 4 passenger jumpseats in the area aft of the flight deck, on the right side of the cabin (figure 1). The remaining main deck area was configured for cargo containers. There was one crew-operable type A emergency exit located in the forward cabin, on the left side (1L entry door). There was one escape window on each side of the flight deck, adjacent to each pilot seat.

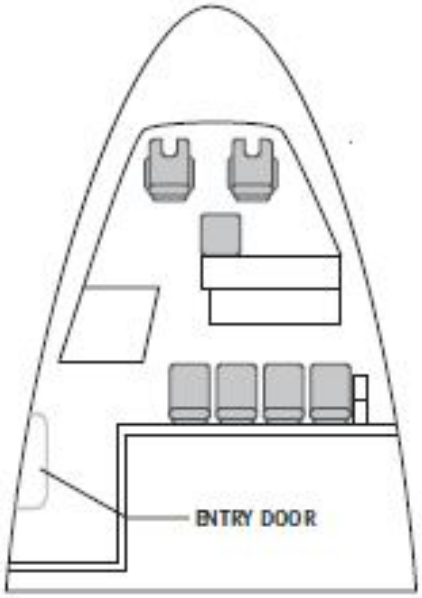

Figure 1. Airbus A-300-600 interior configuration.

2.0 Description of Site

Refer to the Structures Group Chairman's Factual Report for a description of the accident site.

3.0 Airplane Documentation

The airplane was severely damaged by impact and post-crash fire. The forward fuselage, including the flight deck, was largely intact (photo 1), although severely damaged by impact. The lower portion of the fuselage, under the flight deck, sustained severe impact damage (photo 2). The wings and aft fuselage, including the tail, were fragmented and/or burned.

Photo 1. Forward fuselage.

3.1 Exits

The 1L exit door and escape slide were not attached to the fuselage, and were found in the wreckage path. The escape windows on the flight deck were closed, and were unable to be opened by investigators.

3.2 Seats and restraints

Documentation of the crew seats and flight deck was conducted on August 16, 2013.

Captain's Seat

The captain's seat was found outside the airplane, lying next to the forward fuselage. The seat was mostly intact, and the forward seat pan area was bent downward. The floor under the seat was buckled upwards several inches and the seat pedestal base mounting structure was pitched forward, accordingly. The pedestal base was severed at the floor, consistent with reported extrication efforts (photo 3).

Photo 2. Damage under flight deck.

The five-point restraint system buckle (AmSafe, part number 502214-437) was attached to the seat by the left lap belt. The right lap belt had been cut, and the shoulder harnesses were not attached. The mount for the negative z (crotch) strap was broken, and the negative z strap was inserted into the buckle. The shoulder harnesses were retracted into the seat back, and were locked by the manual strap lock. The lock was released by investigators and the inertia reels for the shoulder straps operated normally. Photographic evidence provided by the Jefferson County Coroner/Medical Examiner's Office indicated

that the captain was wearing the restraint, including shoulder harnesses, at the time of extrication.

The seat was marked: IPECO Pilot A300-600, Part number 3A218-0007-01-2, serial number 38433, Modification SB218-25-01, Date Mfg. 23-01-02, TSO C39b.

First Officer's Seat

The lower portion of the first officer's seat was found in its normal location on the right side of the flight deck. The seat back was not attached to the seat, and had cuts to the structure consistent with reported extrication efforts. The seat back was found outside the airplane. The forward seat pan area was bent downward. The floor under the seat was buckled upwards several inches and the seat was pitched forward, accordingly, which pitched the pedestal base and seat pan forward. The pedestal base was rigidly attached to the floor and was bent forward. The floor area where the seat was mounted was severely buckled.

Photo 3. Buckling of flight deck floor, oval denotes original position of captain's seat base.

The five-point restraint system buckle (AmSafe, part number 502214-439) was attached to the seat by the negative z strap. The lap belt and shoulder harness tabs were inserted into the rotary buckle and the associated belts were severed, consistent with extrication efforts. Photographic evidence provided by the Jefferson County

Coroner/Medical Examiner's Office indicated that the first officer was wearing the restraint, including shoulder harnesses, at the time of extrication.

The seat was marked: IPECO Co-Pilot A300-600, Part number 3A218-0008-01-2, serial number 37094, Modification SB218-25-01, Date Mfg. 19-06-01, TSO C39b.

Jumpseats

The flight deck jumpseat was reportedly unoccupied at the time of the accident, and was found outside the airplane, with damage to the mounting brackets consistent with reported extrication efforts. The four jumpseats aft of the flight deck were unoccupied at the time of the accident, and were undamaged. The restraint systems on the jumpseats were AmSafe part number 502214-401 with four attachment points.

4.0 Medical and Pathological

4.1 Injury Table

Injuries	Flight Crew	Flight Attendants	Passengers	Other	Total
Fatal	2	0	0	0	2
Serious	0	0	0	0	0
Minor	0	0	0	0	0
None	0	0	0	0	0
Total	2	0	0	0	2

4.2 Crew Fatalities

The Jefferson County Coroner/Medical Examiner's Office, Birmingham, AL, provided the crew autopsy reports. The findings from the autopsy reports are summarized below.

Captain, 58-year-old male

Cause of death: blunt force injuries.

A. Blunt force injuries of head and neck:
    1. Laceration of face and fracture of facial bones;
    2. Subarachnoid hemorrhage;
    3. Fracture of body of 6th cervical vertebra.
B. Blunt force injuries of torso:
    1. Fracture of right ribs 7-11 laterally; fracture of left ribs 5-9 laterally;
    2. Lacerations of aorta at level of thoracic vertebrae 5 and 7; 1,200 ml. blood in chest cavities;
    3. Lacerations of liver;

4. Fractures of pelvis with diastasis of pubis symphysis and fracture of left sacro-iliac joint.

C. Fractures and associated lacerations involving right ankle and left leg.

First officer, 37-year-old female

Cause of death: blunt force injuries.

A. Blunt force injuries of head.
    1. Linear fractures of the skull;
    2. Film of blood in each subdural space.
B. Blunt force injuries of torso:
    1. Fracture of left ribs 3-11; fracture of right ribs 3 and 5-6;
    2. Laceration of liver;
    3. Laceration of spleen; 250 ml. blood in abdominal cavity.
C. Fractures of right humerus bone and left ulna bone.

5.0 Airport Information

Birmingham-Shuttlesworth International Airport (BHM) was located in Birmingham, AL, and was owned by the Birmingham Airport Authority, a public corporation governed by a seven-member board. The airport was located in the County of Jefferson, and was approximately 4 miles northeast of the Birmingham central business district. BHM was an FAA Class I air carrier airport holding an Airport Operating Certificate for 14 CFR Part 139, Index C, originally issued May 21, 1973, and reissued on December 12, 2012 due to a change in the official airport name. The airport had a total of 56,297 air carrier airplane operations, 46,447 general aviation and military aircraft operations for a period of 12 months ending December 2012. A total of 242 aircraft were based at the airport during the same time period. The last 14 CFR part 139.325 mandated full-scale exercise was conducted on May 19, 2012.

BHM had two air carrier runways: runway 06/24 and runway 18/36 (figure 2). Runway 06/24 was the primary runway and was 11,998 feet in length and 150 feet in width. Runway 18/36 was 7099 feet in length and 150 feet in width. The runway safety areas (RSAs) for both air carrier runways extended 1,000 feet beyond the thresholds and were 500 feet in width.

Runway 6/24 was a grooved asphalt surface with a Cat-I ILS on runway 24, a Cat-II ILS on runway 06 equipped with four-box Precision Approach Path Indicators (PAPI) on both ends. Runway 24 had a MALSR approach light system. Runway 6 had an ALSF2 approach light system.

Runway 18/36 was a grooved asphalt surface. It was a non-precision runway with medium intensity runway lighting with 3 steps, and edge lights only. Runway 18 was equipped with a localizer. Runway 18/36 had runway markings that met the specifications for the approach authorized for each runway. There was a 4-unit (L-880)

PAPI installed on the left side of runway 18, approximately 1161 feet from the runway threshold. There was no PAPI on Runway 36. Runway 18 had a 26:1 approach slope due to rising terrain from the threshold (figure 3).

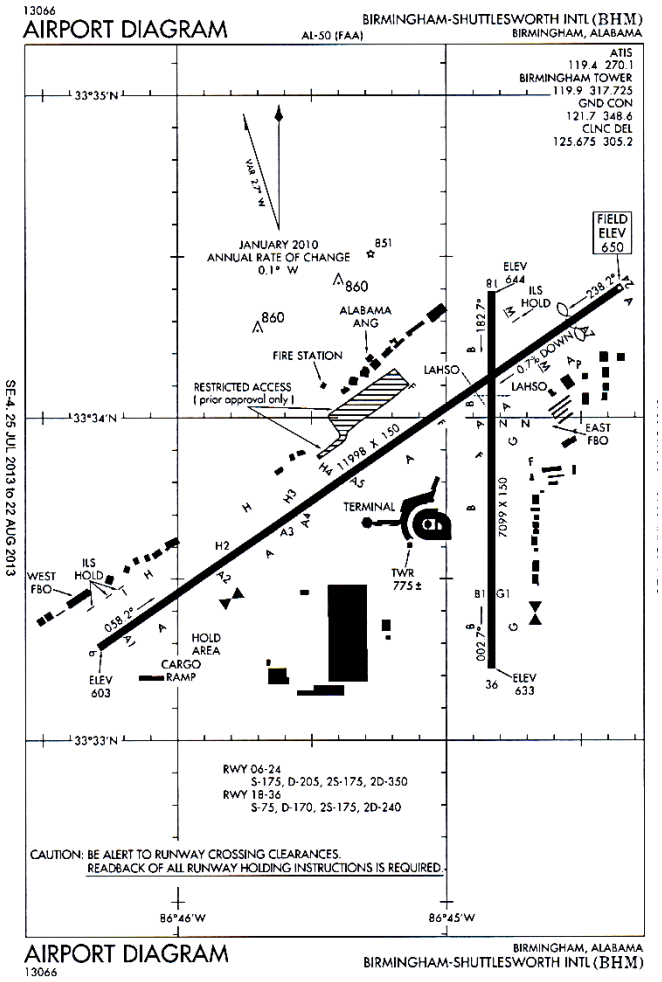

Figure 2. BHM airport diagram.

The PAPI for runway 18 was owned and operated by the FAA. It was set to project a glide path of 3.2 degrees, due to the 26:1 approach surface. The published threshold crossing height (TCH) was 48 feet. The PAPI was ground tested on May 8, 2013, and was found within specifications. It was again ground tested on August 14, 2013 at 0753 local, and was again found to be adjusted correctly. The FAA conducted a flight check of the PAPI on August 16, 2013, and found it to be functioning properly and within specifications for the approach (attachment 1).

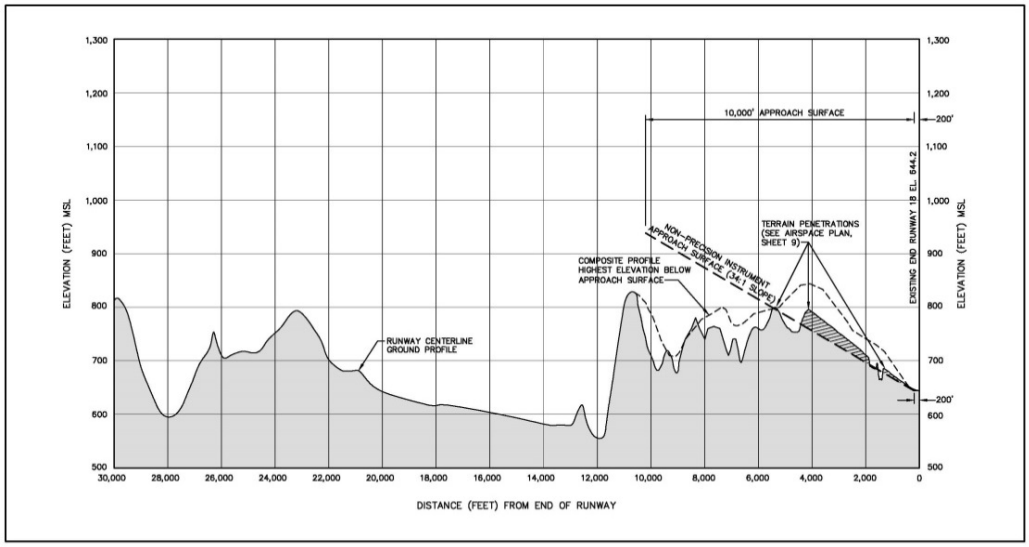

Figure 3. Runway 18 approach profile.

Photo 3. View from the accident site looking toward runway 18 approach.

No discrepancies were noted on runway 18/36 during the most recent 3 years of annual 14 CFR Part 139 certification inspections. These three inspections were conducted by two different FAA inspectors.

Runway 6/24 was closed by Notice to Airmen (NOTAM) for maintenance of runway edge lights from 0400-0500 local time August 14, 2013. This maintenance was in conjunction with a runway repair and obstruction removal project. The MALSR, the PAPI and glide slope for runway 24 were turned off for the duration of the maintenance. Runway 06/24 was reopened at 0455 local. At the time of the accident, runway 18/36 was open and in use.

The FAA-required airport self-inspection records were reviewed for the 2-week period preceding the accident. Three airfield inspections were conducted each day. One inspection was conducted each of the 1st, 2nd and 3rd shifts. Airfield inspections were recorded and kept for the previous 12-month period. Airfield inspection reports typically record items that do not meet FAA standards, such as light outages, sign outages, foreign object debris (FOD), wildlife, condition of markings, and pavement conditions. None were noted. An inspection was conducted on August 12 at 1110, 1520 and 2350. No discrepancies were noted on runway 18. Airport inspection was conducted on August 13 at 0710, 1520 and 2342. A discrepancy noted during the 0710 inspection was: "Birds 'B' Approach 18 dispersed."

BHM issued NOTAMs by telephone to Lockheed Martin DCA AFSS in Ashburn, VA. BHM used a specific form to record and distribute the NOTAMs, and routinely faxed and emailed completed forms to tenants, and retained notification that the NOTAM was received. The following NOTAMs were in effect at the time of the accident:

- August 13, 2013 - Runway 06/24 closed August 14, 2013 from 0400-0500 local.
- August 5, 2013 - Runway 06 distance remaining signs missing.
- August 4, 2013 - Runway 06/24 Non-standard markings.
- August 4, 2013 - Runway 24 Touchdown markings missing.
- August 4, 2013 - Runway 06/24 Work in progress trenching 1290 Northeast threshold displaced.
- August 4, 2013 - Runway 24 TORA 10060/LDA 10060/Toda 10060.
- August 4, 2013 - Runway 24 Threshold displaced 1938.
- August 4, 2013 - Runway 06/24 now 10060X150.
- August 4, 2013 - Taxiway A7 closed.
- August 4, 2013 - Taxiway A closed northeast hangar 25B.

5.1 FAA guidance on setting PAPI TCH

One of the considerations when installing a PAPI system on an airport is the relationship between the PAPI glide path angle and the TCH of the airplane as it approaches the touchdown zone. To assist contractors in properly locating and installing PAPI systems on airports, the FAA publishes various types of advisory and guidance material. For example, FAA Order JO 6850.2B defines the TCH as "the height of the

lowest on-course [PAPI] signal at a point directly above the intersection of the runway centerline and the threshold." The Order also cautions that: "The minimum allowable TCH varies according to the height group of aircraft that use the runway… The PAPI approach path must provide the proper TCH for the most demanding height group that uses the runway." FAA Advisory Circular (AC) 150/5340-30G *Design and Installation Details for Airport Visual Aids*, contains identical language describing the need to match TCH with airplane height. Both the Order and the AC include the following table which identifies four airplane height groups and the appropriate TCH for each group.

Representative Aircraft Type	Approximate Cockpit-to-Wheel Height	Visual Threshold Crossing	Remarks
Height Group 1 General aviation Small commuters Corporate turbo jets	10 feet (3m) or less	40 feet (+5, -20) 12 m (+2, -6)	Many runways less than 6,000 feet (1829 m) long with reduced widths and/or restricted weight bearing that would normally prohibit landing by larger aircraft.
Height Group 2 F-28, CV-340/44O/580 B-737, DC-9, DC-8	15 ft. (4.5 m)	45 ft. (+5, -20) 14 m (+2, -6)	Regional airport with limited air carrier service
Height Group 3 B-727/707/720/757	20 ft. (6 m)	50 ft. (+5,-15) 15 m (+2, -6)	Primary runways not normally used by aircraft with ILS glide- path-to-wheel heights exceeding 20 ft. (6 m).
Height Group 4 B-747/767, L-1011, DC-10, A-300	Over 25 ft. (7.6 m)	75 ft. (+5, -15) 23 m (+2, -4)	Most primary runways at major airports.

Table 1. FAA table of threshold crossing heights.

In October 2013, NTSB staff submitted questions to the FAA Office of Accident Investigation asking for clarification of the proscriptive wording in the Order and AC. Specifically, the phrases "minimum allowable TCH," and "must provide the proper TCH" suggest operational restrictions, rather than "guidance and recommendations," as is the stated purpose of the AC. Further, staff asked the FAA, if the criteria *were* intended as operational restrictions, how are they to be enforced, and by whom. The FAA responded on February 3, 2014, with the following:

> "The requirements of JO 6850.2 and AC 150/5340-30 with respect to PAPI height group criteria are not enforceable on operators or pilots. There is no regulation in CFR 14 parts 91or 121 which would apply to the use of PAPI.
>
> There are also no regulatory restrictions or FAA policies prohibiting the issuance of an instrument approach clearance based on the availability or conditions of a PAPI. CFR 14 section 91.103 does require a pilot to "… *become familiar with all available information concerning that flight."* This would normally include the TCH for both the planned instrument approach procedure (IAP) and the respective PAPI on the landing runway. If the difference between the PAPI TCH and the aircraft's eye-to-wheel height is less than the normal wheel-to-threshold crossing height, it is the pilot's

responsibility to fly a suitably higher glide path to ensure a safe landing. The fact that the BHM Runway (RWY) 18 PAPI was designed for height Group 3 aircraft does not restrict that RWY 18 from use by Group 4 aircraft.

PAPI system design (glidepath angle, TCH, etc) is not an operator dispatch requirement. The PAPI is a visual approach aid that can provide visual approach guidance in the visual segment of an IFP. Again, a PAPI is not required for instrument flight operations nor required for dispatch release, therefore enforcement requirements are not applicable."

Separately, on October 9, 2013, the BHM Director of Operations and Planning submitted questions to the FAA Airport District Office (ADO) in Jackson, MS, about the suitability of the runway 18 PAPI for height group 4 airplanes, and also, whether certain aircraft restrictions were appropriate due to the published TCH height of 48 feet (attachment 2). On November 8, 2013, the FAA Program Manager at the Jackson ADO responded with the following:

"The PAPI for Runway 18 was designed for height group 3 aircraft. The PAPI was not designed for height group 4 aircraft; therefore, it does not meet standards for height group 4 aircraft. The TCH, glide angle, and other data is published in the AFD[2] for users that want to use Runway 18/36.

No FAA NOTAM on the PAPI or aircraft restriction is required because the PAPI and TCH are published in the AFD and approach plates.

As mentioned earlier, no restriction is required. If the airport would like to plan for regular use of Runway 18/36 by larger aircraft (i.e., Height group 4 or aircraft over 300,000 lbs.) we can discuss steps needed to evaluate its feasibility."

5.2 Aircraft rescue and firefighting (ARFF)

BHM met the requirements for Index C ARFF capabilities as specified in 14 CFR Part 139, serving air carrier aircraft at least 126 feet but less than 159 feet in length, with 5 or more average daily departures. The BHM ARFF facilities were provided by a combination of personnel and equipment from Birmingham Fire and Rescue Service, State of Alabama, and Alabama Air National Guard. The Birmingham Airport Authority (BHM) provided one ARFF truck (Redbird[3] 27) funded through FAA, and contracted personnel from Birmingham Fire and Rescue Service through the City of Birmingham. The Birmingham Fire and Rescue Service personnel were assigned to the ARFF station and did not typically rotate in or out of that station. The Alabama Air National Guard (AANG) provided 4 ARFF trucks, four additional response units, and the physical ARFF

[2] Airport Facilities Directory.

[3] The call signs for all BHM ARFF trucks begin with "Redbird."

station. The State of Alabama provided additional personnel in support of Air National Guard functions.

Total ARFF Units on the Airfield

Unit call sign	Vehicle type	Agent	Portable extinguishers	Staffing	Owned by
Redbird 27 (responded to scene)	2006 Ford F550	300 Gal. Water 40 Gal. Foam 450 lbs. Dry Chem.	1-Type A-2 ½ Gal. 2-Dry Chem-20 lbs.	2	BHM
Redbird 20	1994 Teledyne Continental Motors P23	3300 Gal. Water 500 Gal. Foam 500 lbs. Dry Chem	1-Class D-30lbs. 1-Dry Chem-20 lbs.	1	AANG
Redbird 21 (responded to scene)	1994 Teledyne Continental Motors P23	3300 Gal. Water 500 Gal Foam 500 lbs. Dry Chem	1-Class D-30lbs 1-Dry Chem-20 lbs.	1	AANG
Redbird 22 (responded to scene)	2002 Oshkosh T1 1500	1500 Gal. Water 210 Gal Foam 450 lbs. Dry Chem		1	AANG
Redbird 26	1986 Oshkosh P19	1000 Gal. Water 130 Gal. Foam 500 lbs. Dry Chem		1	AANG
Redbird 25	1987 Kovatch P18	2000 Gal Water		1	AANG
Redbird 24	1984 Chevrolet P10 Rescue		1-Class D-30 lbs 1-Dry Chem-20 lbs.	1	AANG

Unit call sign	Vehicle type	Agent	Portable extinguishers	Staffing	Owned by
Redbird 13	2002 Ford Excursion Command Vehicle			1	AANG
Redbird 12	1990 FordF450/ Kovatch P20			1	AANG
	Foam Trailer	1000 gal foam			AANG

5.3 Summary of emergency response

The accident occurred approximately 1.5 nautical miles north of the runway 18 threshold, outside of the airport operations area (AOA) and airport perimeter fence. The accident was observed by both the tower controller and BHM airport operations field personnel. Immediately after observing the accident, airport operations personnel on the airfield asked ATC what had happened. According to the FAA transcript of ATC communications, ATC responded, "there's a crash, UPS thirteen-fifty-four heavy crashed

Photo 4. Redbird 21 and 22 at the accident site.

on the hill." Airport operations personnel notified airport operations dispatch of the accident, and responded to the accident site. While en route, operations personnel noted that the PAPI and runway end identifier lights (REILs) for runway 18 were on. Statements of operations personnel are in attachment 3.

After witnessing the accident, ATC activated the crash phone circuit.[4] According to the ATC transcript, the controller stated, "attention, attention, alert three, airport crash, aircraft crash, three-mile final, runway one-eight." ARFF requested that ATC repeat the information. ATC repeated, "aircraft aircraft crash, three-mile final, runway one-eight, is a Airbus 306, Redbird copy." ARFF responded, "Redbird copies," and ATC repeated, "two mile final, runway one-eight."

The ARFF representative who answered the crash phone initially heard an abbreviated "half-a-ring" from the crash phone, rather than a full-duration ring. After he picked up the phone, he heard ATC already talking, providing information prior to his joining the call. According to interviews with the firefighter (attachment 4) who answered the crash phone, he did not hear "alert 3" during the notification. He stated he heard "three mile final, runway one-eight." When the information was repeated, he heard, "two-mile final, runway one-eight," and assumed the airplane was still inbound. He then alerted the other fire fighters by turning on the sleep room lights, and sounding the Klaxon (punch bell) three times. All five ARFF Redbird trucks left the station expecting to go to "standby" positions on the airport.[5]

After leaving the ARFF station, Redbird 27 called ATC and asked for more information. ATC said that the UPS Airbus crash "was about two-mile final, runway one-eight." Redbird 27 asked ATC if they were clear to go to their stand-by positions. ATC told him that the "aircraft is not coming to the airport." Redbird 27 asked if it had already crashed, and ATC replied "affirmative." ARFF was given clearance to proceed to the scene.[6]

ARFF units 27 and 22 responded to the scene through a perimeter gate that was already open due to contractor activity on the airfield. Redbird 21 was later requested to respond to the scene. Redbird units 20 and 26 returned to the station in order to maintain Index C coverage for the airport.

In accordance with the airport emergency plan (AEP), BHM operations/ARFF notified Birmingham Fire Dispatch of the airplane accident. The Birmingham Fire and Rescue Service dispatch log indicates that notification of the accident occurred at 0451, and fourteen trucks were dispatched at 0453. The first truck arrived at the scene at 0459,

[4] The crash phone was activated 1 minute and 17 seconds after airport operations personnel observed the accident. Refer to the Air Traffic Control Group Factual Report for additional information.

[5] Alerting methods and preparatory activities for "alert II" (standby) and "alert III (accident) are similar.

[6] According to the BHM airport emergency plan (AEP), "on-airport," and "off-airport" fire and rescue response are available.

and the remaining trucks arrived within the following 10 minutes. Multiple additional apparatus were dispatched to the scene (attachment 5).

The chief of Battalion 3 reported that he was dispatched "around 0400," through an "all call" that was sent to all city fire stations. He was initially given the wrong location of the accident, but received corrected information en route. He noted that the initial error did not delay his arrival. Once he arrived at the scene, he realized the fence need to be removed to access the crash site, so he had the firefighters remove the fence to gain access. It took "about a minute and a half" to remove the fence. Redbird 21 arrived at the scene slightly before the battalion chief. Redbird 21 and 22 were the first two vehicles to engage the fire with foam.

The battalion chief assumed command of the scene, and was surprised that the wreckage path was as large as it was. He divided the command into two tactical groups: one for the cockpit area and a second for the fuselage section. While the fire was being fought, three large explosions were heard from the burning fuselage. After one explosion, a large piece of the airplane wing was ejected from the wreckage, and landed near a fire truck.

The chief in command of the cockpit tactical group identified two victims in the cockpit of the airplane that appeared "lifeless." However, the conditions around the cockpit were too dangerous to make entry immediately: there was a large "fuel slick" near the cockpit, with numerous small fires, and continued explosions in the area. The debris field around the cockpit was searched for additional victims, and none were found. After the area had been foamed, and conditions improved, the chief directed an EMT to enter the cockpit and check the victims. The EMT reported that the two individuals "had no signs of life." The incident command activity log (attachment 6) noted that the pilots were deceased at 0520. The log also noted that the fire was "brought under control" at 0735.

5.4 Crash phone

According to the BHM AEP, when the crash phone from ATC was used, it automatically rang phones in the BHM ARFF station, BHM operations center, Kaiser/Pemco, and the AANG. The phones were configured such that they would continue to ring until one of the parties picked up the phone, and then all phones ceased ringing. A letter of agreement (LOA) between BHM and the ATCT stated that, after an aircraft crash occurs, ATCT will notify ARFF via the emergency phone, state the type of emergency, the location, and a number of other pertinent details. The LOA specified that information is specifically intended for ARFF, and "other parties on the emergency phone shall refrain from interfering with communication between tower and ARFF, and shall ask for clarification only after ARFF has acknowledged receipt of the information."

In addition to the requirements of the LOA, after the accident, BHM revised their standard operating procedures (SOPs) for responding to the crash phone. The new procedure directed BHM operations personnel to wait before answering the crash phone

until, 1) it stops ringing; or, 2) after counting to 3 – whichever occurred first. This change was intended to prevent "short rings" and to ensure that ARFF was on the line before information dissemination began. The other parties on the crash line were asked to follow the same procedure.

Further, BHM has authorized a purchase order for a new Alert II crash phone system to replace the current system. The new system is expected to provide BHM operations with a visual display screen of all crash phone participants during alerts. Additionally, the Redbird fire station will receive "extra loud" ringing devices and "broadcast paging" to project the crash phone conversation throughout the fire station. The new crash phone system is expected to be operational at BHM in early 2014.

6.0 Attachments

1) FAA Tech Ops and flight inspection reports
2) Email from ASO ADO to BHM
3) Airport operations personnel statements
4) Interviews
5) Birmingham Fire and Rescue Service (BFRS) Dispatch log
6) Birmingham Fire and Rescue Service (BFRS) Command Activity Log