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ARINC

MEMORANDUM FOR THE RECORD

Event: ARINC (service provider for communications to/from aircraft)

Type: Briefing by Conference call

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Special Access Issues: None

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Teams: 7

Participants (non-Commission): Dave Knerr (United Airlines technical expert on cockpit communications); Loretta Redmond (outside counsel to United Airlines); John Midgett (outside counsel to United Airlines); Steve Ledger (Director of AQP services—a group within ARINC that provides ground to air, and air to ground communications with commercial aircraft)

Participants (Commission): Bill Johnstone and John Raidt

Location: by conference call from the 9-11 Commission's conference room at the GSA office, Washington, DC

Background

[U] ARINC provides the airlines with the Aircraft Communication and Response System (ACARS), which is one of the means of communication between the ground and a commercial aircraft in-flight. The purpose of the briefing was to focus on how the ACARS functioned on 9/11 particularly with respect to United Airlines and the messages sent to and from United Flights 175 and 93.

[U] The briefers explained that the term "selcall" refers to Selective Calling, which is another means of communicating with an aircraft. Specifically, each aircraft is assigned a "selcall tone" (or frequency), and if a ground station "punches" this, a bell is rung in the cockpit of the target aircraft, alerting the flight crew that they have an incoming radio call. It alerts them to go to a frequency for communications. The briefers indicated that "selcalling" is not a normal means of communicating with an aircraft, and as best they can tell, was not used in the cases of Flights 175 and 93.

ACARS Terminology

[U] The briefers reviewed actual ACARS messages transmitted to and from Flights 175 and 93, and provided the Commission with the following explanation of various key terms and symbols present in those messages:

- In the first line of the messages, the terms "DLMSG" and "ULMSG" indicate whether the communications were "downlinked" (from the aircraft) or "uplinked" (from the ground), respectively.

- The Central Processing System (CPS) time stamp in the second line is the Greenwich mean (universal) time at which the message was electronically processed at the ARINC center in Annapolis, MD, before being sent to a ground station and then transmitted to the aircraft. The time it would take for the message to get from this point to the cockpit of the aircraft would vary, depending on the size of the message, and how much message traffic there was. In rare cases, this could mean that it would take minutes for the final delivery, but typically, for short messages (under 220 characters) like the ones sent to Flights 175 and 93, the delivery time would be within 10 seconds. The message is not stamped with the time it is received in the cockpit. (Note: all of the codes noted on the ACARS messages were briefed to Commission staff. Many of them signify technical data that are not relevant to our purpose are not mentioned here).

- On the third line, "Org Address" indicates the address of the originating station (for example, "CHIAKUA" was the 9/11 address for Ed Ballinger's workstation at United headquarters in Chicago, IL. "Org TimeStamp," for originating time stamp, indicates the date and the time when the message was transmitted from its author to ARINC. This time appears again, in shortened form, in the message block in the second line after "SOH" and follows the restatement of the originating address (i.e. "CHIAKUA 111323" indicates a message from Ed Ballinger's workstation originating at 13:23 on the 11th). This is followed by a "/" and a brief (two or three letter) indication of the first name of the author (ED = Ed Ballinger; ROB = Robert Brittain; AD = Alessandro "Sandy" Rogers; CHA = Chad McCurdy), which was automatically entered into the message field.

- The term "SOH" refers to "start of header," and indicated the start of the message field. It is followed by "QU" (which indicates high priority, but all ACARS messages to and from aircraft are in this category), which is followed by an indication of where the message was processed (for example, "DDLXCXA" indicates the ARINC CPS in Annapolis, MD).

- "CMD" stands for "Command response" and indicates that the ACARS message was sent to the ACARS screen in the cockpit. "AGM" signifies "Air Ground Message," which goes directly to the printer in the cockpit and prints. (These notations appear in two places in the messages: after the term "SMI," and after the term "STX.") The briefers indicated that CMD was the usual method of sending ACARS messages to the aircraft because it was both cheaper and more apparent to the flight crew (because the screen, unlike the cockpit printer, was readily in the pilots' field of vision). The AGM messages to the printer were typically used for lower priority messages.

- After the shortened restatement of the originating time and author, and the "STX," "CMD," or "AGM" sequence, three lines follow which indicate: the destination point (such as "N591UA," the tail number of Flight 93, followed by "/GL PIT, which means that the message is via a ground link through the Pittsburgh station); another line specifying the destination; and a final line indicating the originating point (like "CHIDD" for United's Chicago dispatch operation). All of this information is automatically provided by the ACARS system.

- The term "BEL" (or a symbol of a bell) would appear in the second of the three lines just mentioned, and would indicate a message that was sent to the cockpit accompanied by the ringing of a chime (for notification of the message's arrival).

- After all of the above information, the actual text typed in by the author appears. For a United dispatcher, he or she would only need to type in "Heyu" followed by the flight number, to elicit all of the foregoing information from the system, and then the actual text to be transmitted.

- The terms "ETX" (for end of text) and "EOT" (for end of transmission) appear at the conclusion of the message block.

Message Process

[U] ARINC personnel indicated that they had a high degree of confidence that ACARS messages would be received as transmitted. There are built-in codes which are transmitted with the messages and which are scanned to insure accuracy. All of the briefers stated that there was no reason to believe that all of the 9/11 messages in question were not accurately received. Problems were extremely rare.

[U] For United aircraft, there was no way on 9/11 for a dispatcher to send messages to all of his or her aircraft with a single address. Each flight had to be addressed individually. A single message can be addressed (individually) to up to 15 aircraft. Post-9/11, a capability has been created to contact a defined group (for example, all of a dispatcher's aircraft) via a single address.

[U] Once an ACARS message had been composed, it remained on the screen of the author unless removed. Thus, it was possible for the author of the message to simply input the new addressee flight number or numbers and immediately retransmit the previous message.

[U] In the view of the briefers, ACARS was the appropriate method to convey emergency information to a number of flights. Radio contact would have been inefficient in such cases because ARINC would have had to "selcall" each flight separately anyway in order to just let them know to standby on a designated radio frequency for a group call. With ACARS, the individual contacts would also transmit the message itself. The option to

require a chime to sound in the cockpit by inputting in a coded instruction (signified by a bell symbol in the message document) would not be a means of adding urgency to the communication. They said that sending a message to the screen itself means it's an important message and should be read immediately. They said there is no conformity for when the chime function is used.

[U] The briefers also reported that ACARS had (and has) a capability called "Ground Voice Request" through which the chime in the cockpit would be activated and a text message transmitted to the aircraft limited to displaying a radio frequency that the flight crew was to tune to.

[U] The briefers indicated that when a downlink message was transmitted from an aircraft to a United dispatcher, a light on the dispatcher's console would be illuminated and the dispatcher could access the message by clicking on the flashing light. That was the only way notification of such a message was provided.

[U] In the opinion of all of the briefers, while the workload management manual for dispatchers indicated that dispatchers were always to give priority attention to incoming messages from aircraft, the manual was addressing routine operations only, and did not contemplate the set of circumstances that existed on 9/11. Under the circumstances that day, the briefers thought it appropriate for dispatchers to focus first in getting the necessary information to their aircraft, before responding to messages that were incoming. (NOTE: The question does arrive of whether the dispatcher was receiving the assistance he might require in order to send his messages while being able to answer an incoming inquiry).