

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY (AS-50)
Washington, D.C. 20594

July 26, 2000

SPEECH EXAMINATION STUDY
ADDENDUM

A. ACCIDENT: DCA-00-MA-006

Operator: EgyptAir Flight MS-990
Location: Off Quonset Point, RI
Date: October 31, 1999
Time: 0148 Eastern Standard Time
Airplane: Boeing 767-300 SU-GAP

B. SPEECH EXAMINATION GROUP

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C. SUMMARY

About 0150 eastern standard time (EST), on October 31, 1999, a Boeing 767-366ER, SU-GAP, operated by EgyptAir, as flight 990, crashed into the Atlantic Ocean about 60 miles south of Nantucket, MA. EgyptAir flight 990 was being operated under the provisions of Egyptian Civil Aviation Regulations Part 121 and United States Title 14 Code of Federal Regulations Part 129 as a scheduled, international flight from John F. Kennedy Airport (JFK), New York, New York to Cairo International Airport in Cairo, Egypt. The flight departed JFK about 0122 EST, with 4 flightcrew members, 10 flight attendants, and 203 passengers on board. There were no survivors. The airplane was destroyed by impact forces.

D. DETAILS OF INVESTIGATION

In an effort to obtain further evidence from the cockpit voice recorder (CVR) concerning the unidentified statement at 0148:30, and who may have said it, the study examined the recording properties of the HOT-2 microphone. This microphone was located in the first officer's headset and provided muffled recordings of cockpit conversation during the last 9 minutes of the CVR recording. The microphone did not record the statement at 0148:30, although this statement was recorded by the cockpit area microphone located in the instrument panel above the pilots. By comparing the two recordings, investigators hoped to gain evidence that might help identify the speaker of the statement at 0148.30.

DETAILS OF THE INVESTIGATION

History of the headset microphone

First Officer Adel wore his headset from the beginning of the CVR recording until about 0141:03. During this period, the HOT-2 channel provided loud and clear recordings of all his statements and all radio transmissions. Around 0141:03, however, First Officer Adel removed the headset as part of the procedure of being replaced by First Officer Battouti. This was shown by a diminishing in the audio level of the HOT-2 microphone system, by a rustling sound at 0141:11 (that one member of the current group thought resembled the sound of the headset being stowed), and by the failure of the HOT-2 microphone to record First Officer Adel's statements clearly after this time. Subsequently, the HOT-2 microphone provided only a muffled and incomplete recording of cockpit conversation (when compared to the recording made by the cockpit area microphone used to prepare the CVR transcript). The HOT-2 microphone continued to record radio transmissions clearly and recorded many background and instrument sounds. From 0150:24 until the end of the CVR recording, however, the HOT-2 microphone ceased recording cockpit sounds because, apparently, a pilot inadvertently activated the air-to-ground/interphone button on the back of the control wheel and thereby set the HOT channels to this mode.

The exact location of the headset was unknown, but, according to an EgyptAir representative, it would normally be stowed in the storage console to the right of the first officer or in his flight bag located just behind it. Both locations would have been within reach of First Officer Adel (who was still at his seat around 0141:11 when he stowed the headset). Further, the headset had to be located on the right side of the cockpit so its cord did not interfere with the physical movements of First Officers Adel and Batouti in exchanging places. It is possible that the location of the headset moved after 0149:53 when many loose objects moved due to the strong acceleration forces of the emergency.

Data collection

For the present study, the group members met in the NTSB CVR laboratory on June 23, 2000 and systematically reviewed the CVR recording of the cockpit statements made between 0141:11 until 0150:24. A digital copy of the CVR recording (digitized at a rate of 20 KHz.) was displayed in segments on a Waves digital video display. The HOT-2 recording of the chosen segment (speech waveform/time) was displayed above the corresponding recording from the cockpit area microphone. Using the display, and audio confirmation by the group members (one of whom was a native speaker of Arabic), the operator selected and played aloud successive statements from the CVR transcript. The group listened repeatedly to the HOT-2 recording for each individual statement, listened repeatedly to the corresponding recording by the cockpit area microphone, and judged whether any portion of the statement was captured on the HOT-2 recording.

Results

The results are summarized in Tables 1-5, showing the group's determination of whether individual statements noted in the CVR transcript were audible (in whole or in part) on the HOT-2 recording.

Table 1 summarizes the results for Captain Habashi, who was seated in the left cockpit pilot seat until about 0148:04 when he moved his seat to depart the cockpit for a toilet break. According to the CVR transcript, he returned to the cockpit during the emergency and was again recorded after 0150:06.37.

Table 2 summarizes the results for First Officer Batouti, who assumed the right cockpit pilot seat around 0142:35 but made several seat adjustments (as shown by whirring sounds similar to the electric seat operating).¹

Table 3 summarizes the results for First Officer Adel, who departed the right pilot seat about 0142:35 and spent some of the remaining time in the cockpit. When present, he either stood or sat in the back of the cockpit, probably in the main jumpseat between the pilots.

Table 4 summarizes the results for First Officer Hisham, who stood or sat in the back of the cockpit, probably behind the captain (while First Officer Adel occupied the area between the pilots).

Table 5 shows that the HOT-2 channel did not record the single statement made by a female flight attendant.

¹ Following 0142:20, the CVR transcript notes whirring sounds similar to the electric seat operating at 0143:09, 0143:53, 0146:56, 0148:04, and 0149:18.37. The HOT-2 microphone recorded all these sounds except at 0148:04.

As shown in Tables 1-5, the HOT-2 microphone recorded many cockpit statements spoken from different positions in the cockpit. However, every pilot in the cockpit made statements that were not captured by the HOT-2 microphone.

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7-26-00

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Table 1: Determination for CAPTAIN HABASHI of which statements were recorded on the HOT-2 channel.

Recorded	Not recorded
0141:24	
0141:30	
0141:45	
0141:55	
0142:35	
0142:59	
0143:04	
0143:08	
0143:11	
0143:13	
0143:15	
0143:18	
0143:22	
0143:25	
0143:29	
0143:31	
0143:52	
0143:54	
0144:06	
0144:26	
0144:37	
	0145:48
	0145:50
	0145:59
	0146:03
0146:40	
0146:44	
0146:46	
0146:49	
0146:51	
0146:56	
0147:00	
	0147:51
	0148:03
	0148:10
	0150:06.37
0150:0853	
0150:15.15	

Table 2: Determination for FIRST OFFICER BATOUTI of which statements were recorded on the HOT-2 channel.

Recorded	Not recorded
	0142:32
	0142:34
0142:42	
0143:00	
0143:12	
0143:14	
0143:16	
0143:19	
0143:24	
0143:28	
0143:30	
0143:38	
0143:56	
0144:09	
0144:24	
0145:04	
0145:35	
0146:12	
	0146:15
	0146:18
	0146:20
	0146:55
	0147:55
	0148:01
	0148:08
	0148:39.92
	0149:48.42
	0149:57.33
	0149:58.75
	0150:00.15
	0150:01.60
	0150:02.93
	0150:04.42
	0150:05.89
	0150:07.07
	0150:08.48

Table 3: Determination for FIRST OFFICER ADEL of which statements were recorded on the HOT-2 channel.

Recorded	Not recorded
	0141:28
0141:47	0142:31
	0142:33
0142:47	
0145:37	
	0147:03

Table 4: Determination for FIRST OFFICER HISHAM of which statements were recorded on the HOT-2 channel.

Recorded	Not recorded
	0145:49
	0145:51
	0146:00
0146:05	

Table 5: Determination for FEMALE FLIGHT ATTENDANT of which statements were recorded on the HOT-2 channel.

Recorded	Not recorded
	0146:11