NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

January 18, 2000

GROUP CHAIRMAN'S FACTUAL REPORT

OPERATIONAL FACTORS

DCA00MA006

A. ACCIDENT

Operator: EgyptAir
Location: 60-Miles South of Nantucket Island
(N40.20, W69.45)
Date: October 31, 1999
Time: 0148 EST[1]
Airplane: Boeing 767-366ER, Registration: SU-GAP

B. OPERATIONS GROUP

Chairman:

Capt. P. D. Weston, NTSB
Aviation Safety Investigator
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Members:

Capt. Nabil Helmy, EgyptAir
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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

[1] Unless otherwise noted all times are expressed in terms of the 24-hour clock, Eastern Standard Time (EST).

board. There were no survivors. The airplane was destroyed by impact forces. Floating debris from the aircraft was recovered on the morning of October 31, 1999.

D. DETAILS OF THE INVESTIGATION

The Operations Group was formed on November 9, 1999, at the headquarters of the National Transportation Safety Board (NTSB) in Washington, DC. The group was comprised of representatives of the NTSB, the Federal Aviation Administration (FAA), and the Boeing Commercial Aircraft Company. A representative from NTSB Human Performance Division and an advisor from the Federal Bureau of Investigation initially augmented the Operations Group. The representative from EgyptAir did not join the Operations Group until the group reconvened in Cairo, Egypt.

The Operations Group arrived in Cairo on November 19, 1999 and reconvened the next day at the EgyptAir Flight Operations building at Cairo International Airport and the EgyptAir operations group member joined the group at that time. Between November 20, and November 27, the Operations Group interviewed EgyptAir and Egyptian Civil Aviation Authority (ECAA) personnel, including ECAA medical certification personnel. In addition to interviews, the operations group observed four dispatch briefings for EgyptAir domestic and international flights.

Manuals, records, and other materials were requested from the FAA, Boeing, EgyptAir and the ECAA.

The Cairo phase of the investigation ended on November 27, 1999.

On December 1, 1999, a separate Human Performance Group was formed and the NTSB Human Performance representative and the FBI advisor no longer augmented the Operations Group.

The Operations Group reconvened at the Boeing Engineering Facilities in Seattle, Washington, on December 8, 1999. Demonstrations were conducted in the 767 engineering cab simulator with a back-drive scenario from the EgyptAir 990 flight data recorder (FDR). Additional demonstrations were conducted in a static flight test airplane to demonstrate the force required to split the control columns.

The Seattle phase of the investigation ended on December 9, 1999

E. HISTORY OF FLIGHT

Because of the scheduled flight time, EgyptAir flight 990 required two complete flight crews. EgyptAir designated one crew as the active crew and the other as the cruise crew. It was customary for the active crew to make the takeoff and fly the first four to five hours of the flight. The cruise crew then assumed control of the aircraft until about one to two hours prior to landing, at which point the active crew returned to the cockpit and assumed control of the

airplane. EgyptAir designated the captain of the active crew as the Pilot-in-Command or the Commander of the flight.

Captain El Habashy and First Officer Anwar arrived in New York as active crewmembers of EgyptAir flight 989 during the afternoon October 28, 1999. They were scheduled to operate flight 990 from JFK to Cairo as the active crewmembers at 2400 EDT on October 31, 1999.

Captain El Sayed and First Officer El Batouty arrived in New York as crewmembers on EgyptAir flight 989 on October 21, 1999. After a duty break in New York, they operated flight 989 from JFK to Los Angles (LAX) on October 23, 1999. On October 28, 1999, they operated flight 990 from LAX to JFK and were scheduled to operate as the cruise crew on flight 990 from JFK to Cairo on October 31, 1999.

The EgyptAir dispatcher stayed at the same hotel as the crewmembers. On October 31, 1999, accompanied the pilots of EgyptAir flight 990 for the 40-minute van ride from the Pennsylvania Hotel to JFK airport. He reported that he and the crew departed the hotel about 2330 EDT and their departure from the hotel had been delayed about two hours due to the late arrival of the inbound flight from LAX.

At JFK, EgyptAir contracted with Alitalia for dispatch services and with Dynair, Inc. for ground handling, loading, servicing, and preparation of the load manifests. The Alitalia dispatcher who provided the dispatch services for flight 990 on October 31, 1999 stated that he prepared the flight folder. He said a telex was sent to Cairo with the load data giving the zero fuel weight (ZFW), the number of passengers, and the cargo data. Cairo then sent a telex back with the flight plan. The dispatcher said he then compiled the weather and wind data based on the flight plan. Because all EgyptAir flights are Extended Range Operations with Twin Engine Airplanes (ETOPS), he also provided Notice to Airmen (NOTAM) data for airports of intended use and airports listed as equal time point (ETP) airports on the flight plan. All of this information was included in the EgyptAir flight folder for review by the EgyptAir dispatcher.

The EgyptAir dispatcher said he reviewed the flight folder and briefed the active crewmembers of flight 990. He said that normally both the active and cruise crewmembers attend the briefing, but on the night of October 31, only Captain El Habashy and First Officer Anwar attended the briefing. Captain El Sayed and First Officer El Batouty, the cruise crewmembers did not attend the briefing. The dispatcher stated that he did not know why the cruise crewmembers did not attend the briefing, but there was no company requirement for them to do so. The dispatcher also stated that flight 990 was dispatched under the 120-minute ETOPS procedures.

The flight planed route for EgyptAir flight 990 on the night of October 31, 1999, was:

*JFK…SHIPP…LACKS…DOVEY…NATZ…STG *** CAI*

Time enroute at Flight Level (FL) 330 was forecast to be 10:00 hours via NAT[2] "Z" at a cruise speed of .80 mach. The flight plan distance was 5,077 nautical miles and the Instrument Flight Rules (IFR) alternate airport was Hurghada, Egypt (HRG).

EgyptAir flight 990 was pushed from the gate at JFK by the Dynair pushback crew who reported the block-out time as 0100[3] to Alitalia operations. The Alitalia operations agent stated that it was normal for EgyptAir crews to only call in-range for gate information and not radio the blockout and takeoff times to Alitalia operations. EgyptAir 990 taxied to runway 22R and the Alitalia operations agent recorded 0122 as the takeoff time, because that was the time he heard JFK tower issue the takeoff clearance.

EgyptAir 990 was cleared to depart via the Kennedy Seven[4] departure with a Gateway climb. After takeoff, EgyptAir 990 contacted departure control and was cleared to climb to 13,000 feet with a left turn direct to SHIPP intersection. At approximately 0126, when EgyptAir 990 was about 30 miles southwest of Islip, New York, they were cleared to climb to FL230 and instructed to contact New York Center[5]. At approximately 0132, New York ATC[6] radar indicated that EgyptAir 990 had leveled off at FL230 approximately 62 miles southeast of JFK. At approximately 0135, when EgyptAir 990 was about 78 NM south-southwest of Montauk, New York, New York Center cleared them to climb to FL330 and to proceed direct to the DOVEY intersection. At approximately 0141, the center controller issued EgyptAir 990 their Oceanic clearance. At 0144, ATC radar data indicated that EgyptAir 990 was about 78 miles southeast of Montauk Point and level at FL330.

At 0147 flight 990 was instructed to contact New York center and a crewmember acknowledged the clearance. There were no further communications between EgyptAir 990 and ATC. At approximately 0150 EgyptAir 990 began a rapid descent from FL330. The airplane impacted the Atlantic Ocean approximately 60 NM south of Nantucket Island.

F. FLIGHTCREW INFORMATION

1. ACTIVE CREW

(a.) The Commander

Name: Captain Ahmed El Habashy
Date of birth: [redacted] 1941
EgyptAir date of hire: July 13, 1963
Pilot certificates and ratings:
[redacted]
Type ratings: B – 767-200, B –767- 300, B – 737-200, B -707
Medical certificate: October 21, 1999, Fit with glasses

[2] North Atlantic Track (NAT)
[3] The time change from Eastern Daylight Savings Time to Eastern Standard Time occurred at 0159 EDT
[4] See attachment # 1 Kennedy Seven Departure (SID)
[5] Air Route Traffic Control Center (ARTCC)
[6] Air Traffic Control (ATC)
[7] Air Line Transport Pilot, ECAA designation.

EgyptAir training records indicated: All check rides were complete and all required maneuvers were noted as being performed satisfactorily.

Flight experience according to EgyptAir records:

FLYING TIME	HOURS
Total Flying Time	14,384:40
Total Pilot in Command (PIC)Time	9,258:00
Total Flying Time B –767	6,356:00
Total Flying Time Last 24 hours	0:00
Total Flying Time Last 7 Days	6:30
Total Flying Time Last 30 Days	18:30
Total Flying Time Last 60 Days	54:25
Total Flying Time Last 90 Days	77:25

Training and Proficiency checks:

TRAINING AND PROFICIENCY CHECKS	DATE
Most recent recurrent training	August 14, 1999
Most recent proficiency check	March 9, 1999
Most recent Line Check	January 14, 1999

(b.) The First Officer

Name: First Officer Adel Anwar
Date of birth: [redacted] 1962
EgyptAir date of hire: August 29, 1992
Pilot certificates and ratings:
Commercial License: [redacted]
Type ratings: B -767-200, B -767-300, B -737-200
Medical certificate: June 10, 1999, Fit with glasses
EgyptAir training records indicated that all check rides were complete and all required maneuvers were noted as being performed satisfactorily.

Flight experience according to EgyptAir records:

FLYING TIME	HOURS
Total Flying Time	3,361:25
Total Pilot in Command (PIC)Time	0:00
Total Flying Time B-767	1,486:50
Total Flying Time Last 24 hours	0:00
Total Flying Time Last 7 Days	06:30
Total Flying Time Last 30 Days	39:20
Total Flying Time Last 60 Days	100:40
Total Flying Time Last 90 Days	125:35

Training and Proficiency Checks:

TRAINING AND PROFICIENCY CHECKS	DATE
Most recent recurrent training B767	November 6, 1998
Most recent proficiency check	April 27, 1999
Most recent Line Check	Not Reported

2. CRUISE CREW

(a.) The Captain

Name: Captain El Sayed Nour El Din
Date of Birth: [redacted] 1947
EgyptAir Date of hire: January 20, 1981
Pilot certificates and ratings:
[redacted]
Type ratings: B–767, B–737- 500, AB–300B4, AB-600
Medical certificate: June 6, 1999, Fit with glasses
EgyptAir training records indicated that all check rides were complete and all required maneuvers were noted as being preformed satisfactorily. However, on the most recent annual line check, (October 17, 1998) three items were marked as "S-". **Knowledge, Flight Operations Manual (FOM) and Relevant ECARs** was graded "S-". **Flying Skills, Compliance with SOP (Flight Operations Manual & FCOM** was graded "S-". And, **Management, Compliance with Flight Operations Manual (FOM)** was also graded "S-". A grade of "S-" indicated marginally acceptable performance.[8]

Flight experience according to EgyptAir records:

FLYING TIME	HOURS
Total Flying Time	12,204:55
Total Pilot in Command (PIC)Time	7,659:15
Total Flying Time B –767	1,332:45
Total Flying Time Last 24 hours	0:00
Total Flying Time Last 7 Days	5:30
Total Flying Time Last 30 Days	34:45
Total Flying Time Last 60 Days	88:55
Total Flying Time Last 90 Days	132:20

Training and Proficiency Checks:

TRAINING AND PROFICIENCY CHECKS	DATE
Most recent recurrent training	July 10, 1999
Most recent proficiency check	February 17, 1999
Most recent Line Check	October 17, 1998

[8] See attachment # 2 for an explanation of the EgyptAir performance rating system.

(b.) The First Officer

Name: First Officer Gamil El Batouty
Date of Birth: [redacted] 1940
EgyptAir Date of hire: September 8, 1987
Pilot certificates and ratings:
Commercial License: [redacted]
Type ratings: B-767-200, B-767-300, B-737-200
Medical certificate: July 28, 1999, Fit with glasses
EgyptAir training records indicated all check rides were complete and all required maneuvers were noted as being performed satisfactorily.

Flight experience according to records supplied by EgyptAir:

FLYING TIME	HOURS
Total Flying Time	12,538:00
Total Pilot in Command (PIC)Time	5,755:35
Total Flying Time B-767	5,191:40
Total Flying Time Last 24 hours	0:00
Total Flying Time Last 7 Days	05:30
Total Flying Time Last 30 Days	28:50
Total Flying Time Last 60 Days	56:40
Total Flying Time Last 90 Days	96:25

Training and Proficiency Checks:

TRAINING AND PROFICIENCY CHECKS	DATE
Most recent recurrent training B767	December 19, 1998
Most recent proficiency check	June 19, 1999
Most recent Line Check	Not Reported

G. AIRPLANE INFORMATION

1. Acquisition by EgyptAir

According to records supplied by EgyptAir and the ECAA, SU-GAP was a Boeing 767-366 Extended Range (ER), serial number 24542, line number 282. SU-GAP was delivered to EgyptAir new on September 26, 1989. SU-GAP was granted an Export Certificate Airworthiness number E248722 By the FAA on September 26,1989, and Certificate of Airworthiness number 721 by the Arab Republic of Egypt, Ministry of Civil Aviation on September 26, 1989. This certificate was renewed on September 26, 1998 and valid until September 25, 2000. The Ministry of Civil Aviation also issued SU-GAP a certificate of registration number 857.

2. Airplane Trip Sequence

The airplane, SU-GAP, departed Cairo on October 30, 1999, as EgyptAir 989 on a regularly scheduled flight from Cairo to Los Angles with an intermediate stop at JFK. EgyptAir 989 was dispatched with the left thrust reverser out of service, because of a thrust reverser actuator leak that had been entered in the Aircraft Technical Logbook on October 27, 1999, in Cairo.

On October 30, 1999, EgyptAir 989 was scheduled to land at JFK but diverted to Newark International Airport (EWR) because of weather. After a crew change, EgyptAir 989 departed EWR for LAX.

The airplane turned to EgyptAir 990 on October 30, 1999 and was scheduled to operate from LAX to Cairo with a stop at JFK. During the pre-flight inspection at LAX, it was discovered that the number seven tire on the main landing gear was flat. Both the number seven and eight tires were replaced and EgyptAir 990 departed LAX for JFK. EgyptAir 990 landed at JFK at 2348 EDT, and arrived at the gate at 0010 EDT on October 31, 1999.

3. Reported Recurring System Fault

Flightcrew members had reported that an alert indication for the left air-conditioning pack temperature (L PACK TEMP) had appeared during prior flights on airplane SU-GAP. The alert indicated that the automatic function of the pack control system had malfunctioned, or there was an overheat condition in the pack outflow.

According to the respective flightcrews, the L PACK TEMP alert occurred on EgyptAir flight 989, which was the Cairo to EWR leg on October 30, 1999 and also on EgyptAir flight 990, the LAX to JFK leg of on October 30, 1999. The crewmembers of those flight legs reported that when the Quick Reference Handbook (QRH) procedures[9] were followed, the advisory light extinguished and the system operated normally.

Review of the Aircraft's Technical Logbook did not indicate that this item had been entered for EgyptAir flight 989 (CAI-LAX) or EgyptAir flight 990 (LAX-JFK); however, the EgyptAir FOM, section 8.1.11.3 states, in part that entries in the airplane's technical log should include *"… details known to the commander of any defect, including emergency systems, affecting the airworthiness of safe operation of the aeroplane."*

4. Weight and Balance and Fuel Calculations

Weight and Balance[10] calculations for EgyptAir 990 was performed by the Dynair load agent at JFK. The EgyptAir captain had requested an additional 500 kilograms of fuel The additional fuel request was indicated by the captain's hand written notes on the flight papers.

[9] See Attachment # 3 for the QRH procedures.
[10] See attachment # 4 for the flight papers.

(a.) Weight

Weight	Kilograms	Pounds	Allowable
Basic Operating Weight	91,169	200,993.20	
Passengers & Cargo	27,182	59,926.05	
Zero Fuel WT.	118,351	260,919.25	288,000 lbs.(AFM)
Trip Fuel	63,500[11]	139,993.50	
Ramp Wt.	181,851	400,912.75	401,000 lbs.(AFM)
Taxi Burn-off	400	881.85	
Est. Takeoff Weight	181,451	400,030.90	400,000 lbs.(AFM)

(b.) Balance [Center of Gravity (CG)]

CG at ZFW of 118,351 kg.	24% Mean Aerodynamic Chord (MAC)
CG at Takeoff	22.8% MAC
CG Range @ 181,406 kg.	10.6 % to 31% MAC
Takeoff Stabilizer Trim Setting	5 units airplane nose up (ANU)
Takeoff Flap Setting	5
Takeoff Speeds	V_1=166 kts, V_R=170 kts, V_2=175 kts

(c.) Fuel Plan

	Kilograms	Pounds	Time/Hours
Estimated Burn	52,900	116,624.50	10:00
Contingency Fuel	4,200	9,259.42	00:57
Diversion Fuel	3,300	7,275.26	00:41
Holding Fuel	2,200	4,850.17	00:30
Required Fuel	62,600	138,009.35	
Taxi burn off	400	881.85	
Dispatch Fuel	63,000	138,891.20	12:08
Added by Captain	500	1,102.30	
Planed Takeoff Fuel	63,500	139,993.50	

[11] Release fuel was 63,000 kg. but the Captain requested an additional 500 kg.

H. EgyptAir Flight Procedures

1. Dispatch Briefing

The EgyptAir Flight Dispatch Manual (FDM), Section 2.5.3 describes the duties and responsibilities of the Flight Dispatcher, which included furnishing pre-flight information and briefings to outbound flightcrews. This section required that the dispatcher include "*weather reports and forecasts, Notices to Airmen (NOTAMS), aircraft limitations, aeronautical information, flight planing, ATC flight plan, flight documentation, maintenance status provision by its concerned supervisor with reference to MEL/CDL*[12]*, enroute fuel availability and fuel requirements, etc.. in order to initiate and conduct the flight safely."*.

2. Augmented Crew Procedures

Augmented flightcrews were used by EgyptAir when the flight duty period (FDP) required to complete a scheduled flight exceeds the duty period allowed under Section 7 [13]of the EgyptAir Flight Operations Manual (FOM) and the ECARs Part 121, Subpart Q[14]

There were no written procedures in the (FOM) that described or defined when cruise crews should relieve the active crews, or the procedure for switching cockpit seats. The procedures were anecdotal and passed on in training or during route qualification and Initial Operating Experience (IOE). The investigation determined that the details of crew management and rotation during augmented or dual flightcrew operations were agreed upon prior to departure and approved by the commander of the flight.

It was customary for the active crew to make the takeoff and fly for the first four to five hours, depending on the length of the flight. The cruise crew would relieve the active crew at the agreed time and one set of pilots would switch, followed by the other set a few minutes later. As each set of pilots would switch seats, the pilot that was being relieved would brief his replacement on the flight plan, the weather, the fuel, and any other pertinent items. The briefing items and the procedures for when and how to switch seats were not documented in any EgyptAir manuals. When the flight was one and one-half to two hours from the destination, the active crew would return to the cockpit and relieve the cruise crew in the same manner as before. The active crew usually made the takeoff and landing.

[12] Minimum Equipment List/Configuration Deviation List

[13] Section 7, Flight Time Limitations, of the EgyptAir FOM was written in Arabic. However, the General Manager of Flight Operation Control stated that section 7 is a direct transcription of the ECARs Part 121, Subpart Q.

[14] See attachment # 5 for a copy of ECAR 121 Subpart Q.

3. EgyptAir Admittance to Flight Deck Procedures

The EgyptAir FOM section 8.3.12[15] describes Admission to Flight Deck authorization and procedures. This section limits access to the flight deck to operating crewmembers, representatives of the ECAA, and employees of other national aeronautical authorities. Additionally, employees of a foreign national aeronautical authority on specific duties or on a familiarization flight, and EgyptAir Company employees may gain access to the flight deck with the approval of the Flight Operations Manager. This section states that the final decision of admission to the flight deck rests with the commander of the flight and this section also states: "*The commander may, at his discretion grant permission to persons other than those listed above."*

The EgyptAir FOM, section 8.3.10.4[16], states "*If one crewmember(s) leave the cockpit for any reason, the cockpit door shall remain unlocked."*

The investigation determined that an accepted procedure to request admission to the cockpit by operating crew or other approved persons was via the cabin/flightdeck Interphone. The FOM did not describe any other specific procedures for an operating crewmember or approved person to gain admission to the flight deck.

The EgyptAir FOM section 10.2.6[17] on security states "*The flight crew compartment door shall be capable of being locked from within the compartment in order to prevent unauthorized access. The door should be opened from the cabin with a key stowed at a specific place in the cabin only known to the cabin crew."*

The investigation also determined that no crewmembers were rarely if ever issued a key to the cockpit door and cockpit door keys were rarely if ever stowed in the cabin of the airplane.

4. EgyptAir Rapid Descent[18] Procedures

A rapid descent would be necessitated if the airplane experienced a rapid cabin depressurization. A cabin depressurization would result in a master warning light, aural warning, and a "CABIN ALTITUDE" warning message on the Engine Indicating and Crew Alerting System (EICAS). The crew is trained to react to this warning by performing the immediate action items (from memory) for the non-normal[19] as follows:

[15] See attachment # 6 for a copy of the EgyptAir FOM section 8.3.12
[16] See attachment # 7 for a copy of the EgyptAir FOM section 8.3.10.4
[17] See attachment # 8 for a copy of the EgyptAir FOM section 10.2.6
[18] Boeing has changed the maneuver "Emergency Descent" to "Rapid Descent."
[19] Boeing deleted all mention of the word "Emergency" from their flight and training manuals and replaced it with the term "Non-Normal" to be more compatible with the vocabulary of the EICAS.

CABIN ALTITUDE (RAPID DEPRESSURIZATION)

CABIN ALTITUDE AND RATE……..……..CHECK

If cabin altitude cannot be controlled:

PASSENGER OXYGEN ……..……ON

DESCENT ……ACCOMPLISH

Without delay, close thrust levers, extend speedbrakes, and descend at V_{MO}/M_{MO}. Level off at lowest safe altitude or 10,000 ft, whichever is higher.

If structural damage is in doubt, Limit airspeed and avoid high maneuvering Loads.

The rapid descent maneuver is designed to bring the airplane down smoothly to a safe altitude, with the least possible passenger discomfort and is intended to be used in the event of an uncontrollable loss of cabin pressurization (rapid depressurization). Use of the autopilot is recommended.

The EgyptAir General Manager of Training stated that EgyptAir did not have their own training Manual, but used the Boeing Flight Crew Training Manual as the EgyptAir Flight Crew Training manual.

Regarding an emergency or rapid decent procedure, the Boeing Flight Crew Training Manual (FCTM) listed three ways to perform the required descent with the autopilot engaged. The first and preferred method was the Flight Level Change (FLCH) method. This directed the pilot to select a lower altitude on the Mode Control Panel (MCP), engage FLCH, extend the speedbrakes, fly straight-ahead, or initiate a turn using the Heading Selector (HDG SEL). The auto throttles should be left engaged. The airplane would pitch down smoothly while the thrust levers retarded to idle. The pilot should then recheck the altitude on the MCP. As the airplane approached the selected altitude the autopilot would capture the altitude and level the airplane. The pitch mode would hold altitude and the thrust levers would hold the speed. The pilot should slowly return the speedbrake to the down or retracted detent during the level off maneuver.

The second method was the Vertical Speed Mode (V/S) method. The pilot would engage the V/S mode by setting the V/S selector to 8,000 feet per minute down and extend the speedbrakes. When approaching the target speed, the pilot would adjust the V/S to maintain the desired target speed. If the autothrottle was engaged, the pilot would not increase the Command Airspeed Bug until target airspeed was reached. This would prevent the thrust levers from moving out of the idle position. The pilot would then select a level off

altitude on the MCP. As the airplane approached the selected altitude, the autopilot would capture the altitude and level the airplane. The pilot would then return the speedbrake to the down or retracted detent and adjust the Command Airspeed Bug to the desired airspeed prior to level off.

The third method is to engage the Control Wheel Steering (CWS). This method required the pilot to fly the maneuver as if he were flying manually but with the aid of the CWS system.

The manual method was to disconnect the autothrottles, retard the thrust levers to idle, extend the speedbrakes, disconnect the autopilot, and smoothly lower the nose to initial descent attitude (approximately 10 degrees nose down). About 10 knots before reaching target speed, slowly raise the pitch attitude to maintain target speed. The pilot should keep the airplane in trim at all times. If M_{MO}/V_{MO} is inadvertently exceeded, change pitch smoothly to decrease speed. Approaching level off altitude, smoothly adjust pitch attitude to reduce rate of descent. The speedbrake lever should be returned to the down detent when approaching the desired level off altitude. After reaching level flight add thrust to maintain desired speed.

I. Egyptian Civil Aviation Administration (ECAA)

1. Surveillance

EgyptAir was granted authority to operate under the Egyptian Civil Aviation Regulations (ECAR) Part 121. The responsibility for surveillance of certificate holders is given to the Egyptian Flight Inspection Central Administration (FICA). The FICA observes ground and simulator training as well as performing random line and enroute checks (Spot Checks).

The FICA has 20 qualified inspectors, 10 of the inspectors are devoted to Commercial Aviation with the remainder divided between General Aviation/Flight schools, Helicopters/Balloons, Dispatch and Cabin Safety. The Commercial Aviation inspectors' work is listed on an Inspection and Surveillance Plan. This plan is developed using guidance from the ECAA Flight Inspection Central Administration Policies and Procedures Manual (Document 1300) section 5.4. This section lists the responsibilities, the procedures to be used, and the areas to be inspected as well as dates that the plan must be completed. Document 1300 also contains guidance for inspectors on the procedures to follow when conducting pilot and flight engineer proficiency checks or competency checks. Guidance is also given for cabin and cockpit enroute inspections.

Records of the FICA showed that from January 1, 1999 until October 31, 1999, the Commercial Aviation inspectors had performed 20 enroute inspections (Spot Checks) on EgyptAir crewmembers.[20]

[20] See Attachment # 9 for a list of enroute inspections involving active and cruise crewmembers of flight 990.

J. Federal Aviation Administration (FAA)

1. International Field Office Oversight

EgyptAir was granted authority to operate into U.S. airspace under the provisions of 14 Code of Federal Regulations (CFR) Part 129 and International Civil Aviation Organization (ICAO) Annex 6.[21] The FAA approves operations specifications and assigns a principal operations inspector (POI) to each foreign carrier.

The POI assigned to EgyptAir on October 31, 1999 had been in his position for five months. He was not qualified in any airplanes that EgyptAir operated, but there were no international or FAA requirements that inspectors be current or qualified on any airplane operated by a foreign air carrier that they have oversight responsibility for. The EgyptAir POI said that he provides oversight for four other foreign air carriers. He also said that there was no interaction between the FAA and the ECAA, the EgyptAir Training Department, the EgyptAir Standards Department or the EgyptAir Safety Department. Additionally, he said that the FAA does not accept or approve any operations manuals of the carriers that they oversee.

Further, the POI stated that part of the FAA oversight of Part 129 carriers includes approving Operations Specifications, adding new airplanes to their certificates, and performing ramp inspections. In addition, the POI stated that the FAA did not conduct line checks or enroute inspections of a foreign carrier.

FAA Order 8400.10[22], "Air Transportation Operations Inspector's Handbook," volume 2, chapter 4, paragraph 297, states that the purpose of surveillance of each foreign air carrier, its aircraft, and its operations is to determine compliance, on a recurrent or rotating basis, with the FARs and the foreign carrier's operations specifications.

Paragraph 297 of the FAA order also states that routine and unannounced ramp inspections of a foreign air carrier conducting operations with foreign-registered aircraft should be limited to those operations being conducted in the United States. The paragraph also states that the inspections should include the following items: aircraft markings airworthiness, registration, and crewmember certificates; air traffic compliance; taxi and ramp and passenger enplaning/deplaning procedures; baggage and cargo (especially hazardous cargo); and compliance with the pilot-in-command age 60 policy, which states that a flightcrew member is prohibited from acting as pilot-in-command if he or she has reached age 60.

2. International Aviation Safety Assessment Program (IASA)

In August 1992, the FAA established the International Aviation Safety Assessment (IASA). According to an overview of the program posted on the FAA's Web site, the IASA is a foreign assessment program that "focuses on a country's ability, not the [ability of an]

[21] Annex 6 addresses the standards and recommended practices for operation of aircraft.
[22] See attachment # 10 for a copy of FAA Order 8400.10, volume 2, chapter 4, paragraph 297.

individual air carrier, to adhere to international standards and recommended practices for aircraft operations and maintenance established by [ICAO]." The overview indicated that "the purpose of the IASA is to ensure that all foreign air carriers that operate to or from the United States are properly licensed and [are provided] safety oversight by a competent Civil Aviation Authority (CAA) in accordance with ICAO standards."[23]

The FAA established three ratings for the status of countries at the time of the assessment. These categories and their definitions are as follows:

- Category I – Complies with ICAO Standards: A country's civil aviation authority has been assessed by FAA inspectors and has been found to license and oversee air carriers in accordance with ICAO aviation safety standards.

- Category II—Conditional: A country's civil aviation authority in which FAA inspectors found areas that **did not meet ICAO aviation safety standards** and the FAA is negotiating actively with the authority to implement corrective measures. During these negotiations, limited operations by this country's air carriers to the U.S. are permitted under heightened FAA operations inspections and surveillance.

- Category III—Does Not Comply with ICAO Standards: A country's civil aviation authority found **not to meet ICAO standards** for aviation oversight. Unacceptable ratings apply if the civil aviation authority has not developed or implemented laws or regulations in accordance with ICAO standards; if it lacks the technical expertise or resources to license or oversee civil aviation; if it lacks the flight operations capability to certify, oversee and enforce air carrier enforce air carrier maintenance requirements; or if it lacks appropriately trained inspector personnel required by ICAO standards. Operations to the U.S. by a carrier from a country that has received a Category III rating are not permitted unless they arrange to have their flights conducted with a duly authorized and properly supervised foreign air carrier appropriately certified from a country meeting international aviation safety standards.

EgyptAir received a Category I classification from the FAA's International Aviation Safety Assessment Program on March 26, 1999.

K. 767 Simulator and Static Airplane Demonstrations

1. E-Cab Back-drive Demonstration

The objectives of the E-Cab simulation was to:

- Obtain a better appreciation of the DFDR and Radar engineering data by observing a simulated flight deck perspective of the accident airplane's profile with back-driven controls.

[23] Paragraph 9.3.1 of ICAO Annex 6 states that operators "shall establish and maintain a ground and flight training program . . . which ensures that all flightcrew members are adequately trained to perform their assigned duties. [The training program] shall also include training in knowledge and skills related to human performance and limitations...[and] shall ensure that all flightcrew members know the functions for which they are responsible and the relation of those functions to the functions of other crew members."

- Provide tactile information on the final flight maneuvers with respect to:
  Timing of the DFD Recorded events — Instrument readings
  Column movement — Pilot workload
  Column forces

- Demonstrate the ease or difficulty related to airplane recovery by taking control at different stages of the accident flight profile.

- Demonstrate the applicability of two potential system failure scenarios relative to what is known on the DFDR.

The back-drive demonstration consisted of three different scenarios The airplane's weight, CG, altitude, and airspeed were set to match the NTSB supplied DFDR data.

Scenario "A" was the back-drive of EgyptAir 990's flight profile with no pilot interaction. Scenario "B" was the back-drive of the flight profile with the pilot taking over at any point in the simulation. Scenario "C" allowed the pilot to attempt to fly the accident flight profile manually. . For all scenarios during this E-cab simulator demonstration, all airplane systems were normal.

2. Split Column Demonstration

Objectives of Split Column Test were to allow pilots to experience the amount of stick movement and force required to replicate the elevator split recorded on EgyptAir 990's DFDR and demonstrate the airplane's elevator system override.

To demonstrate the forces required to split the elevators, pitot and static pressures were applied to the captain's, first officer's, auxiliary #1, auxiliary #2 pitot systems, and the alternate static systems to simulate high airspeed. The stabilizer trim was set to approximately three units airplane nose up (ANU) and airspeed of 420 knots was simulated. For the demonstration five scenarios were used:

- Sweep the control column from neutral to full forward, to neutral and full aft.

- Engage the elevator system overrides by pulling the captain's column full aft while simultaneously pushing the first officer's control column full forward.

- Engage the system overrides by pulling the captain's control column aft to achieve a left elevator surface position of - 3^0 trailing edge up (TEU) and pushing the first officer's control column forward to achieve a right elevator surface position of + 1^0 trailing edge down (TED).

- Engage the elevator system overrides by pulling the captain's control column aft to achieve a left elevator surface position of -1^0 TEU and pushing the first officer's control column forward to achieve a right elevator surface position of + 2^0 TED.

- Engage the elevator system overrides by pulling the captain's control column aft to achieve a left elevator surface position of – 4^0 TEU and pushing the first

officer's control column forward to achieve a right elevator surface position of + 3^0 TED.

L. Company Information

As of October 31, 1999, EgyptAir was a state owned company with special legislation permitting the management to operate as if the company were privately owned without any interference from the government. The company is self-financing without any financial backing by the Egyptian government.

The EgyptAir network covers 72 international destinations including the United States (New York and Los Angles), Europe, the Far East, the Mid-East and Africa using a fleet of 41 jet airplanes. The EgyptAir Boeing fleet is comprised of Boeing 777, B-767, B-747, B-707, and B-737 airplanes. The Airbus airplanes in the fleet included the A-340, A-300-600, A-300-B4 and A-320. The two A-300-B4 airplanes and the B-707 are dedicated to all-airfreight operations and the B-747s are in a passenger/cargo (combi) configuration. The Company has purchased Airbus A318 airplanes to replace the older B-737 airplanes.

EgyptAir holds a 51 percent interest in Shorouk Air (a charter company) in a joint venture with Kuwait Airways. The other company interests include tourist hotels, travel agencies, and a catering facility.

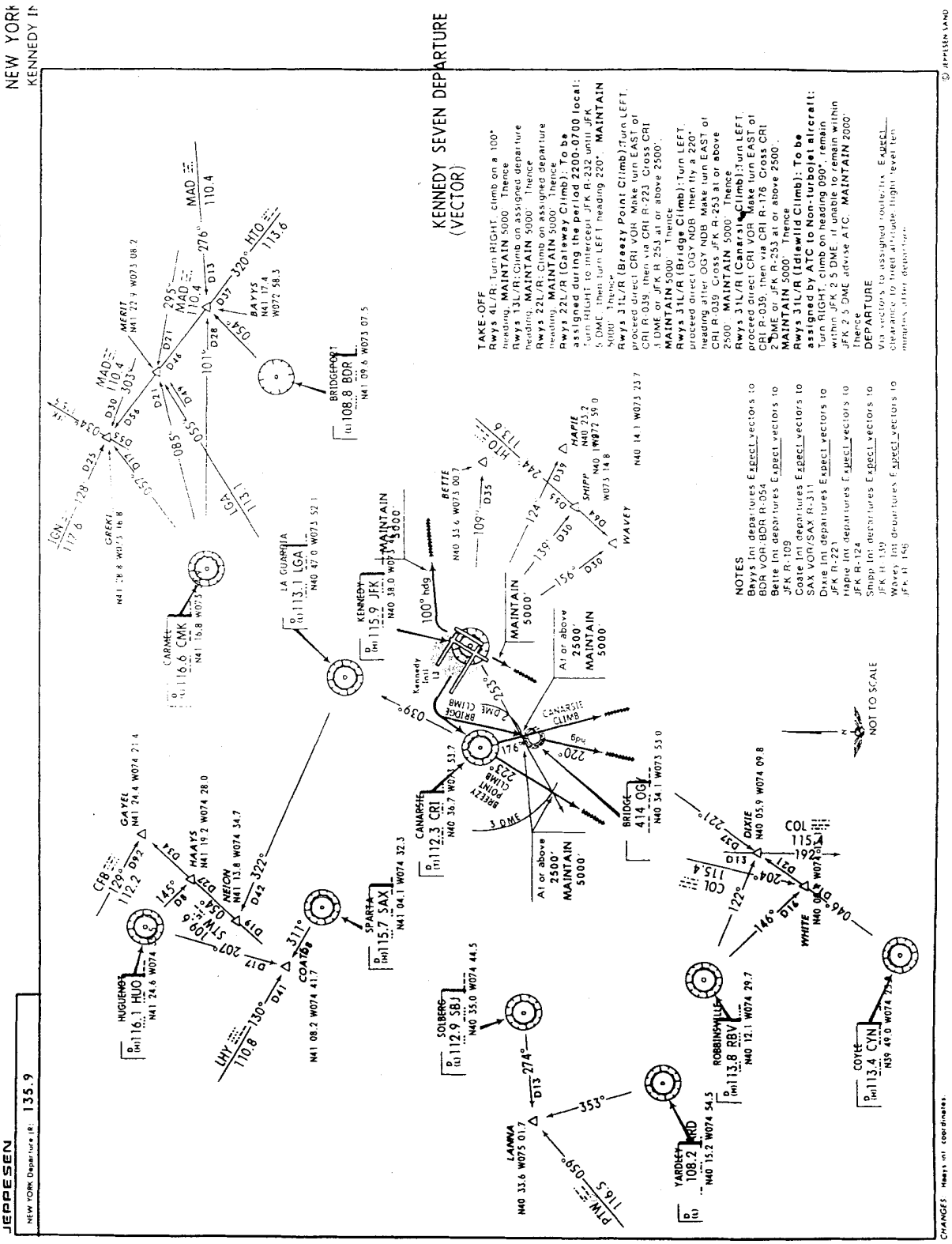
Submitted by: [redacted]
Captain P. D. Weston
Aviation Safety Investigator

Attachments:

1. Kennedy Seven Departure (SID) Page 19
2. EgyptAir Training Manual, 3.3.1 Page 21
3. QRH "Cabin Altitude (Rapid Depressurization)" Page 23
4. EgyptAir Flight 990 Flight Papers Page 25
5. ECARs Subpart Q, 121.503, 121.505 Page 35
6. EgyptAir FOM Section 8.3.12 Page 38
7. EgyptAir FOM Section 8.3.10.4 Page 40
8. EgyptAir FOM Section 10.2.6 Page 42
9. Enroute Inspection List Page 44
10. FAA Order 8400.10, Volume 2, Chapter 4, Paragraph 297 Page 46
11. Interview Summaries Page 49
12. Demonstration Summery Page 79

Kennedy Seven Departure

Copy of Kennedy Seven Departure



EgyptAir Training Manual
Section 3.3.1

3.3 Assessment and Grading System

3.3.0 General

(a) It would be impossible to devise a complete and detailed formula by which an Examiner or Check Airman can assess whether a trainee has passed or failed his check. However, it is essential that the highest degree of standardisation in assessment to be achieved .

(b) The system of assessment and evaluation contains an acceptable performance guide lines in the general areas (knowledge-skills-management), grading scale, and specified tolerances for all manoeuvres, to standardise the evaluation process among Instructor Pilot, Check Airman and Examiner as much as possible.

(c) Crew assesment and evaluation at any trainiig phase shall always be oriented to compliance with EgyptAir Flight Operations Manual (FOM) and Standard Operating Procedures (SOP) for aircraft type.

(d) During flights under supervision, Supervisor Instructor Pilot or Check Airman shall asses crew performance to ensure continous compliance with EgyptAir (FOM) and (SOP) for aircraft type.

(e) Tolerances for any check or evaluation are detailed in 3.3.3. Flight within these tolerances should not be achieved at the expense of smoothness and good co-ordination .

3.3.1 Grading Scale

US	Unsatisfactory or Failed (Training committee meeting required) .
S-	Marginal. (for 2 consecutive times training committee meeting required).
S	Satisfactory or average .
S+	Good standard or above average .

QRH
“Cabin Altitude (Rapid Depressurization)”

Copy of QRH Handbook
“Cabin Altitude (Rapid Depressurization)’

CABIN ALTITUDE (RAPID DEPRESSURIZATION)

CABIN ALTITUDE AND RATE.....CHECK

If cabin altitude cannot be controlled:

PASSENGER OXYGEN.....ON

DESCENT.....ACCOMPLISH

Without delay, close thrust levers, extend speedbrakes and descend at Vmo/Mmo. Level off at lowest safe altitude or 10,000 ft, whichever is higher.

If structural integrity is in doubt, limit airspeed and avoid high maneuvering loads.

EgyptAir 990 Flight Papers

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****  Message Hardcopy   Sat Oct 30 18:17:55 1999   ****

RCV 991030  VP

ZCZC 128 302238 OCT 99
QU CAIOPMS JFKKKMS JFKKKAZ JFKKBAZ JFKOWAZ
.LAXDPCO MS/302236

    990/31 B767  JFK/CAI M80 GAP CAPT.                          RTE Z
.
JFK..SHIPP..LINND..LACKS..DOVEY.NATZ.STG.UN725.QUV.UM601.ALG.B35.CDC.
UM620.RAPIS.UM728.PIDAS.UM978.PLH.UR78.SIT.UG400.KUMBI.G400.BLT.A16.
CVO..CAI

   LAT      IMT   POSITION   ETA   ....  DIS  ISA       WIND   BOF
  LONG      ITT  IDENT/FREQ  TIM   RETA  GDTG FL/MNO    W/C    RM
  MEA       AWY     FIR     ...   TTLT  ATA  GS/TAS    SR     ... .

N40 38.4          JFK        ...   .... 5077 .......  ....   ... .
W073 46.7                    .     .     .   CL/....   ....   0626

N40 19.8   141    SHIPP      ...   ....  030  M01      26/020 0013
W073 14.8  127    .../       006   .... 5035  CL/448   P013   0613 /
           DCT     KZBWZR    ...  00.06 ....  301/288  002    ...../

N39 24.6   141    LINND      ...   ....  090  M34      29/030 0036
W071 42.6  127    .../       014   .... 4945  CL/621   P028   0590 /
           DCT     KZNYZOI   ...  00.20 ....  402/374  000    ...../

N39 27.4   091    TOC        ...   ....  012  M47      30/040 0039
W071 27.3  076    .../       001   .... 4933  CL/690   P030   0587 /
           DCT     KZBWZO    ...  00.21 ....  434/404  001    ...../

N40 00.0   091    LACKS      ...   ....  154  M49      30/041 0058
W068 12.0  076    .../       019   .... 4779  33/799   P031   0568 /
           DCT     KZBWZO    ...  00.40 ....  497/466  001    ...../

N41 07.0   055    DOVEY      ...   ....  087  M49      30/047 0069
W067 00.0  039    .../       011   .... 4693  33/799   P003   0557 /
           DCT     KZNYZO3   ...  00.51 ....  469/466  000    ...../

N42 00.0   096    42060      ...   ....  320  M51      30/045 0107
W060 00.0  078    .../       038   .... 4374  33/799   P033   0519 /
           NATZ    KZNYZO3   ...  01.29 ....  498/465  001    ...../

N43 00.0   099    43050      ...   ....  447  M52      30/048 0159
W050 00.0  078    .../       054   .... 3928  33/800   P036   0467 /
           NATZ    KZNYZO3   ...  02.23 ....  500/464  002    ...../

N43 21.5   099    E-M80      ...   ....  120  M51      28/098 0171
W047 19.1  078    .../       013   .... 3809  33/799   P090   0455 /
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N44 00.0   099    44040      ...   ....  321  M51      28/098 0203
W040 00.0  080    .../       035   .... 3489  33/799   P090   0423 /
           NATZ    LPPOZO2   ...  03.11 ....  555/465  002    ...../

N44 04.6   105    E-M80      ...   ....  099  M49      26/113 0212
W037 42.3  086    .../       010   .... 3390  33/799   P109   0414 /
           NATZ    LPPOZO2   ...  03.21 ....  576/467  001    ...../

N44 00.0   105    44030      ...   ....  334  M49      26/113 0244
W030 00.0  088    .../       035   .... 3058  33/799   P109   0382 /
           NATZ    LPPOZO2   ...  03.56 ....  576/467  002    ...../

N44 00.0   101    44020      ...   ....  432  M49      25/087 0287
W020 00.0  086    .../       048   .... 2626  33/799   P079   0339 /
           NATZ    LPPOZO2   ...  04.44 ....  545/466  002    ...../

N43 55.5   103    E-M80      ...   ....  070  M48      25/069 0293
W018 24.2  093    .../       007   .... 2557  33/799   P063   0333 /
           NATZ    LPPOZO2   ...  04.51 ....  530/467  001    ...../

N43 30.0   103    MUDOS      ...   ....  236  M48      25/069 0317
W013 00.0  094    .../       027   .... 2321  33/799   P063   0309 /
           NATZ    LECMZR    ...  05.18 ....  530/467  002    ...../
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.LAXDPCO MS/302236

N42 55.6   105   STG          ...   ....  204   M47      26/066 0337
W008 25.5  098   .../116.40 023   ....  2118  33/799   P061  0289 /
           NATZ   LECMZR      ...   05.41 ....  529/468  003   ...../

N42 44.6   100   VEDER        ...   ....  113   M51      26/070 0348
W005 52.2  094   .../         013   ....  2005  35/799   P068  0278 /
250        UN725  LECMZR      ...   05.54 ....  533/465  003   ...../

N42 27.2   101   DGO          ...   ....  134   M50      27/068 0361
W002 52.9  096   .../112.60 015   ....  1872  35/799   P066  0265 /
250        UN725  LECMZR      ...   06.09 ....  531/465  003   ...../

N41 39.5   122   ZZA          ...   ....  095   M50      27/064 0370
W001 01.9  119   .../113.00 011   ....  1777  35/799   P057  0256 /
250        UN725  LECMZR      ...   06.20 ....  522/465  003   ...../

N41 35.9   100   RITEX        ...   ....  026   M50      28/062 0373
W000 27.7  097   .../         003   ....  1751  35/799   P063  0253 /
250        UN725  LECBZR      ...   06.23 ....  528/465  003   ...../

N41 17.7   100   GUV          ...   ....  116   M50      28/060 0384
E002 05.1  098   .../114.30 013   ....  1635  35/799   P060  0242 /
250        UN725  LECBZR      ...   06.36 ....  525/465  003   ...../

N41 08.9   097   VERSO        ...   ....  077   M50      29/057 0391
E003 45.4  096   .../         009   ....  1559  35/799   P054  0235 /
250        UM601  LECBZR      ...   06.45 ....  519/465  003   ...../

N41 03.5   098   MUREN        ...   ....  041   M50      30/056 0395
E004 40.0  097   .../         005   ....  1518  35/799   P051  0231 /
250        UM601  LFFFZR      ...   06.50 ....  516/465  003   ...../

N40 44.5   098   GOBIS        ...   ....  125   M51      30/050 0407
E007 22.7  097   .../         015   ....  1393  35/799   P045  0219 /
200        UM601  LFFFZR      ...   07.05 ....  509/464  003   ...../

N40 39.6   100   -LIRR        ...   ....  029   M51      31/043 0410
E008 00.0  099   .../         003   ....  1365  35/799   P036  0216 /
200        UM601  LIRRZR      ...   07.08 ....  500/464  004   ...../

N40 37.7   100   ALG          ...   ....  011   M51      31/043 0411
E008 14.6  099   .../113.80 001   ....  1353  35/799   P036  0215 /
200        UM601  LIRRZR      ...   07.09 ....  500/464  004   ...../

N40 09.9   104   QUENN        ...   ....  109   M55      32/046 0422
E010 32.6  104   .../         014   ....  1245  37/800   P039  0204 /
100        B35    LIRRZR      ...   07.23 ....  499/460  004   ...../

N39 58.0   105   VELEX        ...   ....  044   M55      32/044 0426
E011 27.5  105   .../         005   ....  1201  37/800   P035  0200 /
100        B35    LIRRZR      ...   07.28 ....  495/460  003   ...../

N39 26.0   106   AMANO        ...   ....  113   M55      32/042 0437
E013 49.6  105   .../         014   ....  1087  37/800   P033  0189 /
100        B35    LIRRZR      ...   07.42 ....  493/460  002   ...../

N38 45.3   108   CDC          ...   ....  125   M56      33/038 0449
E016 22.2  108   .../117.30 015   ....  0962  37/800   P030  0177 /
100        B35    LIRRZR      ...   07.57 ....  490/460  002   ...../

N38 24.2   152   RAPIS        ...   ....  024   M56      32/037 0451
E016 35.7  153   .../         003   ....  0938  37/800   P036  0175 /
200        UM620  LIRRZR      ...   08.00 ....  496/460  001   ...../

N36 58.0   124   BELIX        ...   ....  143   M56      32/035 0465
E019 00.0  126   .../         017   ....  0795  37/800   P034  0161 /
250        UM728  LGGGZR      ...   08.17 ....  494/460  002   ...../
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.LAXDPCO MS/302236
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N35 22.0	117	PIDAS	...	....	191	M57	30/036	0482
E022 24.0	119	.../	023	....	0604	37/800	P036	0144 /
	UM728	LGGGZR	...	08.40	....	494/458	002	...../
N35 13.5	095	PLH	...	....	064	M59	28/043	0488
E023 41.0	097	.../114.60	008	....	0541	37/800	P042	0138 /
200	UM978	LGGGZR	...	08.48	....	493/457	001	...../
N35 09.3	093	OTREX	...	....	062	M59	29/047	0494
E024 56.3	093	.../	007	....	0479	37/800	P046	0132 /
250	UR78	LGGGZR	...	08.55	....	502/456	001	...../
N35 04.0	093	SIT	...	....	062	M59	29/051	0499
E026 11.7	094	.../113.30	008	....	0417	37/800	P049	0127 /
250	UR78	LGGGZR	...	09.03	....	505/456	001	...../
N33 42.8	119	KUMBI	...	....	150	M59	29/057	0512
E028 45.0	121	.../	017	....	0267	37/800	P055	0114 /
250	UG400	HECCZR	...	09.20	....	512/457	001	...../
N32 19.9	134	LABNA	...	....	113	M58	29/061	0522
E030 16.2	136	.../	014	....	0154	37/800	P058	0104 /
	G400	HECCZR	...	09.34	....	510/458	001	...../
N31 58.4	135	TOD	...	....	029	M57	29/059	0525
E030 38.7	137	.../	003	....	0126	37/800	P051	0101 /
	G400	HECCZR	...	09.37	....	509/458	001	...../
N31 31.7	135	BLT	...	....	036	M53	29/057	0526
E031 07.4	137	.../116.90	006	....	0089	DC/574	P050	0100 /
	G400	HECCZR	...	09.43	....	382/332	001	...../
N30 05.5	168	CVO	...	....	087	M23	29/035	0528
E031 23.3	170	.../115.20	017	....	0002	DC/479	P014	0098 /
060	A16	HECCZR	...	10.00	....	309/295	002	...../
N30 06.7	045	CAI	...	....	002	P11	32/010	0529
E031 24.8	047	.../	000	....	0000	DC/304	M001	0097 /
	DCT	HECCZR	...	10.00	....	199/200	001	...../

ALTERNATES	HRG	ALT1			ALT2			ALT3
LAT	TRM	POSITION	ETA	....	DIS	ISA	WIND	BOF
LONG	TRT	IDENT/FREQ	TIM	RETA	GDTG	FL/MNO	W/C	RM
MEA	AWY	FIR	...	TTLT	ATA	GS/TAS	SR	...
N30 05.5	225	CVO	...	....	001	P11	32/010	0004
E031 23.3	227	.../115.20	000	....	5293	05/	P001	0071 /
	DCT	HECCZR	...	00.00	....	215/214	001	...../
N29 47.0	124	MENLI	...	....	031	M09	28/025	0014
E031 52.1	126	.../	007	....	5262	17/	P023	0061 /
090	A411	HECCZR	...	00.07	....	304/281	002	...../
N29 40.1	125	TOC	...	....	012	M25	28/033	0018
E032 02.3	127	.../	002	....	5250	24/528	P028	0057 /
090	A411	HECCZR	...	00.09	....	352/324	001	...../
N29 17.0	125	KAMIS	...	....	037	M27	28/033	0022
E032 36.1	127	.../	005	....	5213	25/688	P028	0053 /
090	A411	HECCZR	...	00.14	....	449/421	001	...../
N28 27.6	137	TOD	...	....	065	M27	27/032	0029
E033 23.8	139	.../	008	....	5148	25/687	P021	0046 /
	DCT	HECCZR	...	00.22	....	441/420	001	...../

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****  Message Hardcopy    Sat Oct 30 18:18:03 1999    ****

RCV 991030  VP

ZCZC 132 302238 OCT 99
QU CAIOPMS JFKKKMS JFKKKAZ JFKKBAZ JFKOWAZ
.LAXDPCO MS/302236

LAT      LONG       WAYPT   ITT DIS FL  TROP          SECTOR W/V

.................. KJFK
                                                270    290    330    370
N40 19.8W073 14.8 SHIPP   127 030 120 497
N39 24.6W071 42.6 LINND   127 090 270 497
N39 27.4W071 27.3 TOC     076 012 320 496
N40 00.0W068 12.0 LACKS   076 154 330 496 30035 30037 30041 30044
N41 07.0W067 00.0 DOVEY   039 087 330 495 30044 30047 30047 30048
N42 00.0W060 00.0 42060   078 320 330 452 30042 30043 30045 31047
N43 00.0W050 00.0 43050   078 447 330 397 31047 31047 30048 30052
N43 21.5W047 19.1 E-M80   078 120 330 372 29088 28094 28098 28094
N44 00.0W040 00.0 44040   080 321 330 372 29088 28094 28098 28094
N44 04.6W037 42.3 E-M80   086 099 330 371 25107 26111 26113 26109
N44 00.0W030 00.0 44030   088 334 330 371 25107 26111 26113 26109
N44 00.0W020 00.0 44020   086 432 330 408 24086 25088 25087 25094
N43 55.5W018 24.2 E-M80   093 070 330 445 25063 25068 25069 25076
N43 30.0W013 00.0 MUDOS   094 236 330 445 25063 25068 25069 25076
N42 55.6W008 25.5 STG     098 204 330 471 25051 26059 26066 26071
                                                280    310    350    390
N42 44.6W005 52.2 VEDER   094 113 350 477 25047 26056 26070 26078
N42 27.2W002 52.9 DGO     096 134 350 482 26044 26053 27068 27076
N41 39.5W001 01.9 ZZA     119 095 350 485 26042 27051 27064 27074
N41 35.9W000 27.7 RITEX   097 026 350 487 27042 27051 28062 28072
N41 17.7E002 05.1 GUV     098 116 350 487 27040 28048 28060 28070
N41 08.9E003 45.4 VERSO   096 077 350 485 29037 29044 29057 29067
N41 03.5E004 40.0 MUREN   097 041 350 484 29036 29043 30056 30065
N40 44.5E007 22.7 GOBIS   097 125 350 484 30033 30039 30050 30062
N40 39.6E008 00.0 -LIRR   099 029 350 485 31031 31037 31043 31051
N40 37.7E008 14.6 ALG     099 011 350 485 31031 31037 31043 31051
                                                290    330    370    410
N40 09.9E010 32.6 QUENN   104 109 370 486 32031 32033 32046 31055
N39 58.0E011 27.5 VELEX   105 044 370 490 33032 33035 32044 32051
N39 26.0E013 49.6 AMANO   105 113 370 493 33031 33034 32042 32048
N38 45.3E016 22.2 CDC     108 125 370 485 33026 33032 33038 32044
N38 24.2E016 35.7 RAPIS   153 024 370 478 32022 32032 32037 32041
N36 58.0E019 00.0 BELIX   126 143 370 470 31021 31028 32035 32041
N35 22.0E022 24.0 PIDAS   119 191 370 435 29024 29030 30036 31039
N35 13.5E023 41.0 PLH     097 064 370 405 29029 28036 28043 29043
N35 09.3E024 56.3 OTREX   093 062 370 404 29030 29040 29047 29047
N35 04.0E026 11.7 SIT     094 062 370 405 30033 29043 29051 29050
N33 42.8E028 45.0 KUMBI   121 150 370 409 30040 30050 29057 29055
N32 19.9E030 16.2 LABNA   136 113 370 419 29048 29056 29061 29059
N31 58.4E030 38.7 TOD     137 029 370 428 29049 29056 29059 28059
N31 31.7E031 07.4 BLT     137 036 350 428
N30 05.5E031 23.3 CVO     170 087 230 438
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QU CAIOPMS JFKKKMS JFKKKAZ JFKKBAZ JFKOWAZ
.LAXDPCO MS/302236

N28 13.0   137   ELTOR       ...   ....  019  M25      27/031 0030
E033 38.0  139   .../        004   .... 5129  24/       P020  0045 /
           DCT    HECCZR      ...  00.26 ....  316/296  001   ...../

N27 10.6   169   HGD         ...   ....  063  M09      27/023 0031
E033 48.8  171   .../116.50  014   .... 5066  17/       P002  0044 /
120        V603   HECCZR      ...  00.40 ....  264/262  001   ...../

N27 11.1   302   HRG         ...   ....  001  P17      32/012 0033
E033 48.0  304   .../        001   .... 5065  04/       M011  0042 /
           DCT    HECCZR      ...  00.41 ....  193/204  000   ...../

ZFW 117000 KG     PL 027600 KG     TOW 179600 KG     LWT 126700 KG

CAPTAIN                          DISPATCHER

MINIMUM COST PLAN   53000
GROUND DISTANCE       5077    AVG W/C P054
B/O                 052900 KG        10.00   ADD FUEL 6.8 PCT
CONTINGENCY         004200 KG        00.57
DIVERSION           003300 KG        00.41   HRG
HOLDING             002200 KG        00.30   HOLDING ..... MINS
REQUIRED FUEL       062600 KG
EXTRA               000000 KG        00.00
TAXI/APU            000400 KG
TANK FUEL           063000 KG        12.08   OP PLAN NO. 7848
FINAL  63500
DIVERSION HRG FL 250  P015  0229 NM  003300 KG  T 00.41

-- ADDITIONAL FUEL BURN PER 1000 KGS INCREASE IN TOW - 00272 --

                    M80   EQUAL TIME POINT DATA
ETP   LAT N43 21.5  LONG W047 19.1  BASED ON YHZ /LPLA
TO ETP   BURN 0171    TIME 02.36  DISTANCE 1260
FROM ETP BURN 0086    TIME 01.52  DISTANCE 0956  TO LPLA
WIND COMPONENT. TOWARDS YHZ  M051   TOWARDS LPLA P079
TOTAL ETP FUEL REQUIRED  0258   ETP MAX PYLD
AT BOTTOM OF DRIFTDOWN TOWARDS LPLA ISA TEMP M00 ALTITUDE 330
-------------------------------------------------------------------

                    M80   EQUAL TIME POINT DATA
ETP   LAT N43 55.5  LONG W018 24.2  BASED ON LPLA/MAD
TO ETP   BURN 0293    TIME 04.51  DISTANCE 2516
FROM ETP BURN 0060    TIME 01.27  DISTANCE 0692  TO MAD
WIND COMPONENT. TOWARDS LPLA M072   TOWARDS MAD  P052
TOTAL ETP FUEL REQUIRED  0355   ETP MAX PYLD
AT BOTTOM OF DRIFTDOWN TOWARDS MAD  ISA TEMP P02 ALTITUDE 330
-------------------------------------------------------------------
```

+500 TX.

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                        M80   EQUAL TIME POINT DATA
ETP   LAT N44 04.6  LONG W037 42.3  BASED ON YHZ /MAD
TO ETP   BURN 0212     TIME 03.21  DISTANCE 1681
FROM ETP BURN 0141     TIME 02.57  DISTANCE 1525  TO MAD
WIND COMPONENT. TOWARDS YHZ  M064   TOWARDS MAD  P071
TOTAL ETP FUEL REQUIRED  0354   ETP MAX PYLD
AT BOTTOM OF DRIFTDOWN TOWARDS MAD  ISA TEMP P02 ALTITUDE 330
-------------------------------------------------------------------

SUMMARY PLAN 0102
FL 33  B/O 053100 TIME 10.00 AV W/C P053 CZ M80 RT Z

SUMMARY PLAN 0103
FL 29  B/O 053100 TIME 09.59 AV W/C P053 CZ M80 RT Z

PLAN VALID 0930Z 31/10/99  NAM 4536

(FPL-MSR990-IS
-B763/H-SXWREY/C
-KJFK0330
-M080F330 DCT SHIPP DCT LINND DCT LACKS DCT DOVEY NATZ ST6/N046SF350
 UN725 QUV UM601 ALG/N0460F370 B35 CDC UM620 RAPIS UM728 PIDAS UM978
 PLH UR78 SIT UG400 KUMBI G400 BLT A16 CVO DCT
-HECA1000 HEGN
-EET/42N060W0129 43N050W0223 LPPO0311 44N030W0356 44N020W0444
 LECM0518 LECB0623 LFFF0650 LIRR0700 LGGG0817 HECC0920 REG/SU-GAP
 SEL/BGCK
-E/1208 P/TBN R/V S/DM J/LF
 A/WHITE RED )


-------------------------------------------------------------------

                        WIND INFORMATION SECTION

DESCENT WINDS

FL 250    289/041
FL 150    298/021
FL 050    319/010
RC 7848 PLAN 0101 PAGE 04 OF 05
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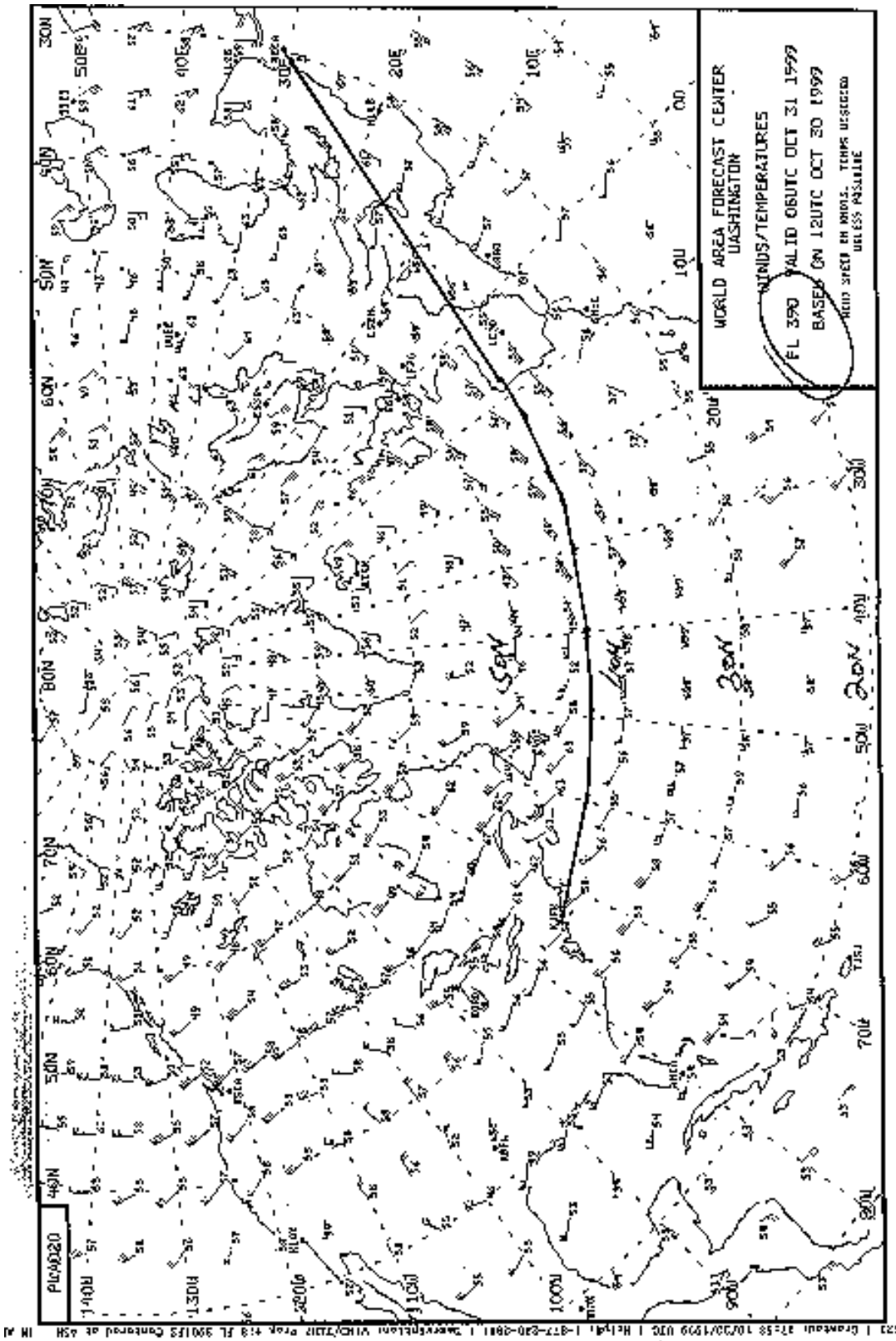
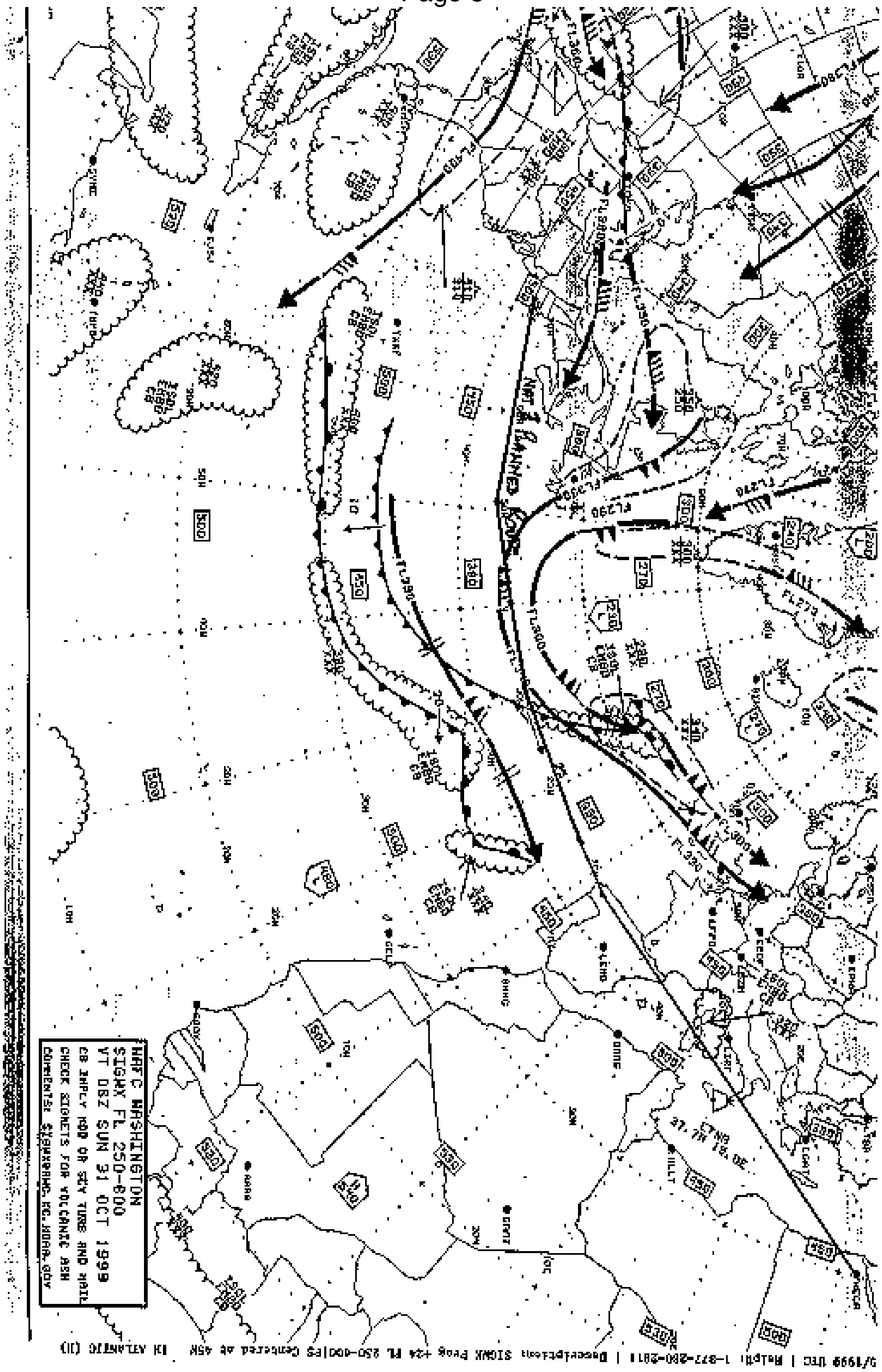
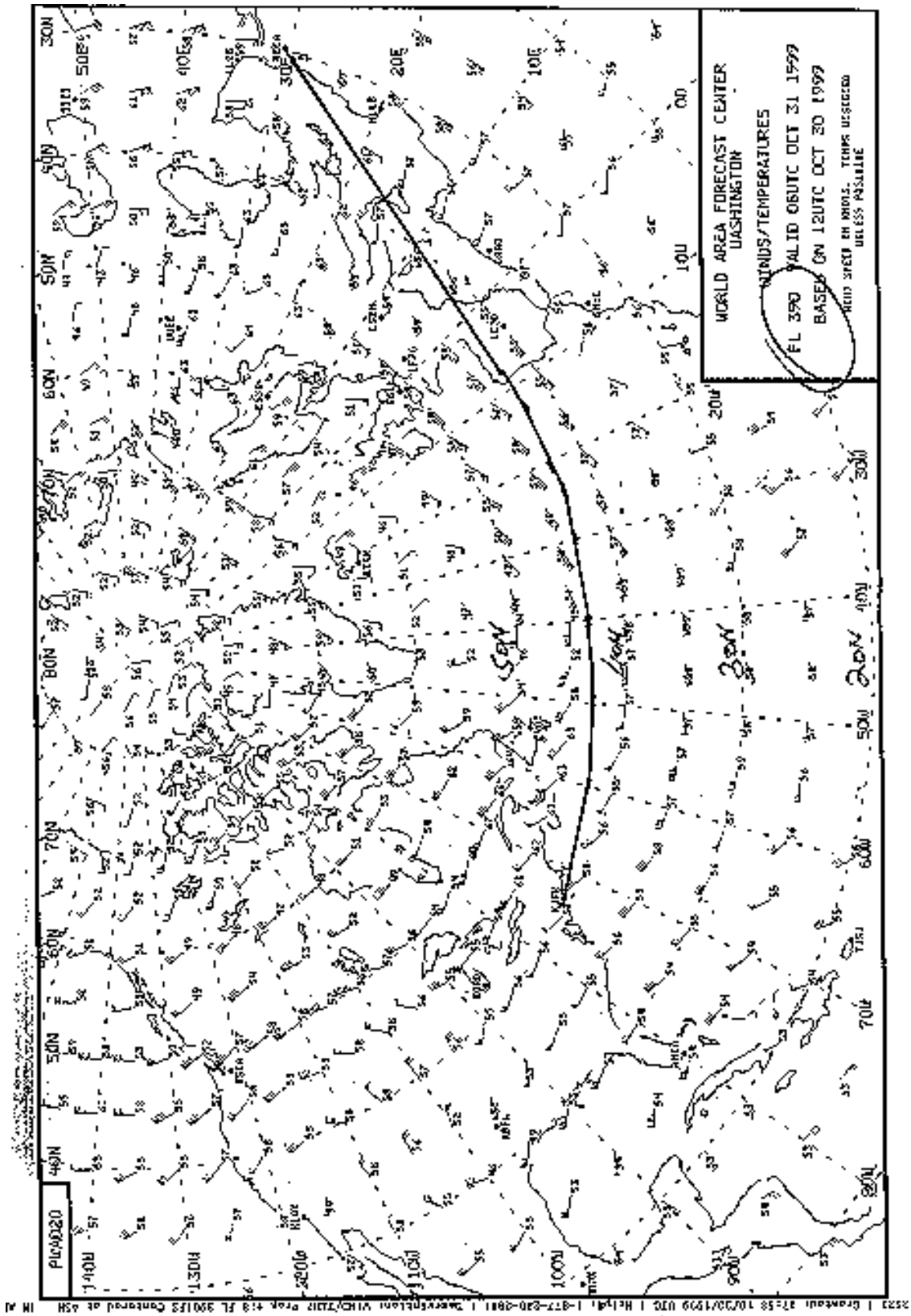

WORLD AREA FORECAST CENTER
WASHINGTON
WINDS/TEMPERATURES
FL 390 VALID 06UTC OCT 31 1999
BASED ON 12UTC OCT 30 1999
WIND SPEED IN KNOTS. TEMPS NEGATIVE
UNLESS PLUS/MINUS

Copy of EgyptAir Flight 990 Flight Papers

Page 8




WORLD AREA FORECAST CENTER
WASHINGTON
WINDS/TEMPERATURES
FL 390 VALID 06UTC OCT 31 1999
BASED ON 12UTC OCT 30 1999

ECAR Subpart Q

Section 121.503

Section 121.505

121.503 LIMITATIONS ON SINGLE FLYING DUTY PERIODS FLIGHT CREW

(a) The maximum rostered FDP (in hours) shall be in accordance with table A or B (two pilot crews, airplanes) or table C (single pilot crews, aeroplane) or table D (helicopters).Rostering limits in the tables may be extended by in-flight relief or split duty under the terms of paragraphs 121.504, and 505 on the day, the aircraft commander may at his discretion further extend the FDP actually worked in accordance with paragraph 121.508.

(b) Maximum FDP- two pilot crews (or larger) airplanes. Table A shall apply when the FDP starts at a place where the crew member is acclimatized to local time, and table B shall apply at other times. To be considered acclimatized for the purposes of this document, a crew member must be allowed 3 consecutive local nights free of duty within a local time zone band which is two hours wide. He will thereafter be considered to remain acclimatized to that same time zone band until he ends a duty period at a place where local time is outside it.

(c) FDP should not exceed 18 hours of night flying during 72 consecutive hours.

(d) FDP starts from one hour and half before the time set for the departure of the flight or series of flights until half an hour after the end of the flight.

TABLE A

ACCLIMATIZED LOCAL TIME

LOCAL TIME	SECTORS							*8 OR*
OF START	1	2	3	4	5	6	7	MORE
0600-0759	13	2 ¼	1 ½	10 ¾	10	9 ¼	9	
0800-1459	14	3 ¼	2 ½	11 ¾	11	10 ¼	9 ½	
1500-2159	13	2 ¼	1 ½	10 ¾	10	9 ¼	9	
2200-0559	11	0 ¼	½	9	9	9	9	

TABLE B

NOT ACCLIMATIZED TO LOCAL TIME

Length of preceding rest (hours)	SECTORS						
	1	2	3	4	5	6	7 OR MORE
over 30	13	12 ¼	11 ½	10 ¾	10	9 ¼	9
Between 28 and 30	12	11 ¼	10 ½	9 ¾	9	9	9

TABLE C

MAXIMUM FDP- SINGLE PILOT CREWS AEROPLANES

LOCAL TIME OF START	SECTORS				
	UP TO 4	5	6	7	8 OR MORE
0600-0759	10	9 ¼	8 ½	8	8
0800-1459	11	10 ¼	9 ½	8 ¾	8
1500-2159	10	9 ¼	8 ½	8	8
2200-0559	9	8 ¼	8	8	8

TABLE D

MAXIMUM FDP- HELICOPTERS

LOCAL TIME OF START	SINGLE PILOT		TWO PILOTS	
	Maximum flying duty period Hr.	Maximum flying time Hr.	Maximum flying duty period Hr.	Maximum flying time Hr.
0600- 1659	10	7	12	9
1700- 0559	9	6	11	8

121.505 EXTENSION OF FLYING DUTY PERIOD BY SPLIT DUTY

When an FDP consists of two or more duties separated by less than a minimum rest period the FDP may be extended beyond that permitted in the Tables by the amounts indicated below:

Consecutive Hours Rest	Maximum Extension of the FDP
1- Less than 3 hours	Nil
2- From 3 hours to 10 hours	A period equal to half of the consecutive hours rest taken

The rest period shall not include the time required for immediate post flight and pre-flight duties. When the rest period is not more than 6 hours it will be sufficient if a quiet and comfortable place is available, not open to the public, but if the rest period is more than 6 consecutive hours, then a bed must be provided.

EgyptAir Flight Operations Manual
Section 8.3.12

8.3.12 Admission to Flight Deck

8.3.12.1 No person, other than flight crew members assigned to a flight, shall be admitted to, or carried on, the flight deck unless the commander himself or his designated deputy is present on the flight deck, and unless this person is

- a member of the operating crew, or
- a representative of the E.CAA responsible for certification, licensing or inspection, if this is required for the performance of his official duties, or
- an employee of other national aeronautical authorities or of the company or its maintenance contractor if this is required for the performance of his official duties, or
- an employee of foreign aeronautical authorities/organisations performing specific duties and/or on a familiarisation flight, as approved by the flight operations manager, or
- an employee of the operator.

Note: When the aeroplane's operation requires a single pilot only, the seat provided for a second pilot may be occupied by a passenger (see also 8.3.13.1).

8.3.12.2 The final decision regarding the admission to the flight deck of persons of the above categories rests with the commander who normally shall request credentials or identification of such persons before granting such admission. The commander may, at his discretion grant permission to persons other than those listed above. In the interest of safety, admission to the flight deck shall not cause distraction and/or interfere with the flight's operation. Persons duly authorised by the Authority, entitled to enter and remain on the flight deck in order to be able to perform their duties, shall only be denied access by the commander if he deems this necessary in the interest of safety.

Note: See Chapter 8.2.3.2 concerning the serving of alcoholic beverages.

8.3.12.3 A person shall only be carried on the flight deck provided that a seat with safety belt/safety harness is available and that the requirements concerning supplemental oxygen are met. The person shall be instructed to keep the safety belt/safety harness fastened at all times (see Chapter 8.3.11.1.1 and 8.3.11.1.2), not to touch any controls, switches, instruments, circuit breakers, and shall be briefed in the use of all flight deck relevant emergency equipment and all relevant procedures.

8.3.13 Use of Vacant Crew Seats

Chapter 8.3.12 contains the relevant provisions as to the disposition of vacant crew seats on the flight deck. The final decision as to the disposition of other vacant crew seats, again, rests solely with the commander. Normally, such permission will only be granted to employees of the operator, or of other operators, or to employees of aeronautical or other authorities, holding reduced-fare transportation.Crew seats (e.g., crew rest seats on a non-passenger carrying deck) which are not certificated for occupation by crew members during take-off/landing or specified other phases of flight (e.g., because of emergency - evacuation problems), shall, of course, not be occupied by other persons during such phases of flight. Vacant crew seats (except those on the flight deck), in order to be occupied by other persons, shall at least meet the emergency relevant requirements for passenger seats (oxygen, seat belt/harness, instruction card, accessibility to all verbal or other instructions given to passengers by cabin or flight crew at all times, visibility of exit signs). Normally, the commander shall not grant permission for occupation of a vacant crew seat located at an emergency exit (also refer to Chapter 8.2.2.2) to

EgyptAir Flight Operations Manual
Section 8.3.10.4

8.3.10 Crew Members at their Stations

8.3.10.1 Flight crew members who are required and allocated for the operation of a particular flight must be at their primary duty station for take-off, initial climb, final descent and landing.

8.3.10.2 During the remainder of the flight one flight crew member at a time may leave his station and the other crew member(s) must remain at their assigned duty station with seat belt and shoulder harness fastened, for the following reasons:

- the necessary performance of duties connected with the operation of the airplane.
- in the case of augmented crews, when relieved by another appropriately qualified flight crew member during recognised rest periods.
- for physiological needs (physiological needs may include stretching the limbs to improve physical alertness. This shall be done in the immediate vicinity of the cockpit and does not include movement to the lower deck of the B747 or the aft section of other aircraft, as this could prevent immediate return to the cockpit in the event of an emergency or if unexpected turbulence is encountered).

8.3.10.3 Captains, in particular must be aware that they are responsible for all aspects of the operation of the aircraft, regardless of whether they are present on the flight deck or not.

8.3.10.4 If one crew member(s) leaves the cockpit for any reason, the cockpit door shall remain unlocked.

8.3.11 Use of Safety Belts for Crew and Passengers

8.3.11.1 Use of the seat belts, shoulder harness and head sets for occupants of the flight deck.

Each required flight crew member on flight deck duty shall remain at his station with his/her shoulder harnesses fastened and head sets on under the following conditions:

- Below 10 000 ft in any phase of flight.
- Any time an assigned crew member has to leave the flight deck.
- During moderate to severe turbulence and adverse weather operations.

Otherwise each required flight crew member on flight deck duty shall remain at his station with his seat belt fastened from prior to engine starting throughout the entire flight and until after the engines have been shut down at the completion of the flight.

8.3.11.2 Passengers

The commander shall instruct and brief the passengers or have them instructed/briefed (Chapter 8.3.16) and ensure or be assured that each passenger on board

- during taxiing,
- before and during take-off or landing,
- whenever deemed necessary in the interest of safety

occupies a seat or berth with his safety belt, restraining belt or , where provided, harness properly secured.

Note: It shall be recommended to passengers to keep, when occupying their seats, their safety/restraining belts/harnesses secured during the entire flight.

Handling staff, cabin crew and the commander shall ensure that multiple occupancy of aeroplane seats may only be allowed on specified seats and does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device. (See also Chapter 8.2.2.2).

8.3.11.3 Securing of Belts, Harnesses

At each unoccupied seat or berth, the safety belt/restraining belt and shoulder harness, if installed, shall be secured so as not to interfere with crew members in the performance of their duties or with the rapid egress of occupants in an emergency.

EgyptAir Flight Operations Manual
Section 10.2.6

10.2 PREVENTATIVE MEASURES AND TRAINING

10.2.1 In order to prevent hijacking and sabotage a set of precautionary measures will be established which can be varied according to the actual threat situation by decision of the company in cooperation with the local police authority.

10.2.2 Confidential information pertaining to security measures in force at stations can be obtained from the manager flight operations.

10.2.3 The commander may require stronger precautionary measures than generally prescribed for a station if the actual situations so warrant. Special impromptu measures, however, decided by the commander should always be discussed with the responsible station personnel prior to enforcing them. The commander shall offer his advice and cooperation to the best possible extent.

10.2.4 In principle, aeroplane doors shall not be opened after the aeroplane has left the parking position. In case a request to open any aeroplane door is received via radio outside the parking area, the aeroplane shall return to the parking position and the doors be opened in the presence of handling agent staff. In case aeroplane doors are forcibly opened, the control tower shall immediately be informed and the aeroplane must return to the parking position for investigation.

10.2.5 Each crew member is responsible for his crew luggage. Luggage which has been left unattended shall be rechecked by the respective crew member prior to being loaded on board the aeroplane.

10.2.6 The flight crew compartment door shall be capable of being locked from within the compartment in order to prevent unauthorised access. The door should be opened from the cabin with a key stowed at a specified place in the cabin only known to the cabin crew.

10.2.7 In the event of the company being informed of critical political situations by the authority of the State and where an aircraft is parked outside during night stop, then special security measures shall be performed. The safety officer and/or station manager will inform the crew of the security measures being taken.

10.2.8 Generally the aeroplane has to be sealed according to the respective AOM during night stops and/or when the aeroplane is parked unattended.

10.2.9 Training programmes for the appropriate personnel will be established and conducted to enable the personnel to act in the most appropriate manner to prevent acts of unlawful interference such as sabotage or unlawful seizure of aeroplane and minimise the consequences of such acts. As far as possible the training will be integrated in the initial emergency training.

ECAA Enroute Inspection List

REPORT

En- Route Inspections Carried Out According The **FICA** Inspection And Surveillance Plan For **MSR** B 767-300 During The Priode Of From **1/1/99 To 31/10/99 :-**

1 - Total en- route inspection **20 .**

2 - En - Route Inspections Carried Out For The Concerned Crew For The Accident **Flight MSR 990 .**

Crew name	Inspector name	Date
Hatem Roushdy	Mokbel Abd-Elhady	8/5/99
	Osman Nour	18/10/99
Ahmed El Habashy	Gamal Lotfy	16/7/99
El - Said Nour Eldien	Mahmoud Kamel	8/4/99
Gamiel Elbatouty	Gamal Lotfy	9/6/99
	Gamal Ltfy	16/7/99
Hesham Farouk	Mokbel Abd - Elhady	8/5/99
	Gamal Lotfy	10/7/99
	Gamal Lotfy	16/7/99
Adel Anwar	Ahmed Haliem	16/4/99
	Gamal Lotfy	10/7/99

FAA Order 8400.10
Volume 2
Chapter 4
Paragraph 297

297. SURVEILLANCE.

A. Purpose. Aviation safety inspectors (ASI) shall conduct surveillance of each foreign air carrier and its aircraft and operations. The surveillance task is to determine compliance with the FAR and the foreign air carrier's operations specifications. Surveillance of a foreign air carrier shall be conducted on a routine or recurring basis. If a foreign air carrier experiences a series of accidents, incidents, violations, or complaints (that relate to safety), the district office manager holding the foreign air carrier's operations specifications shall initiate surveillance as necessary to resolve any safety deficiencies.

(1) Surveillance Program Development. Offices that issue and/or are holders of operations specifications for FAR Part 129 operators shall develop their annual work programs to incorporate any required surveillance "R" items directed under the national program guidelines. Only inspectors who have attended the FAR Part 129 training seminar may accomplish these surveillance items.

(2) Work Programs. Normally, surveillance of FAR Part 129 operators shall be accomplished by the office that issues the operations specifications. Surveillance may include routine and unannounced ramp inspections in addition to the "R" items. Geographic units may plan FAR Part 129 surveillance as part of the scheduled work program at the request of the principal inspector and only if the geographic inspector designated to accomplish the surveillance has attended the FAR Part 129 training seminar.

B. Foreign Air Carriers Operating Foreign-Registered Aircraft. Volume 6, chapter 2, section 2, contains general information for conducting ramp inspections. This information is considered limited for conducting FAR Part 129 surveillance as it does not address the differences that inspectors may encounter while inspecting a foreign operator. Normally, principal inspectors shall limit any routine or unannounced ramp inspection of a foreign air carrier conducting operations with foreign-registered aircraft to those operations being conducted in the U.S and shall normally include only the following inspection items:

* Aircraft markings
* Aircraft airworthiness and registration certificates
* Flight crewmember certificates
* Air traffic compliance
* Taxi and ramp procedures
* Passenger enplaning/deplaning procedures
* Baggage and cargo (especially hazardous cargo)
* Compliance with pilot-in-command (PIC) age 60 policy (Inspectors must ensure that PIC's of foreign or U.S.-registered aircraft being used in FAR Part 129 operations are in compliance with the FAA's policy. See subparagraph 297C.)

C. Pilot Age Policy and Amendment of 0perations Specifications.

(1) FAA Safety Policy. A foreign air carrier conducting operations within the U.S. using aircraft having a passenger seating configuration of more than 30 seats, excluding any required crewmember seat, or a payload capacity of more than 7,500 pounds (3,400 kg), regardless of the state of registry of the aircraft, must comply with the standard contained in Annex I to the Chicago Convention of the International Civil Aviation Organization (ICAO) ("Personnel Licensing," chapter 2, "Licenses and Ratings for Pilots," paragraph 2.1.10.1.); that is, to prohibit a flight crewmember from acting as PIC of an aircraft described above if that person has attained his or her 60th birthday and the aircraft is being operated in scheduled or nonscheduled international air transport operations for remuneration or hire.

(2) Amendment of Operations Specifications. Principal operations inspectors (POI) of FAR Part 129 operators shall add to Part A of each of their assigned foreign flag air

carriers' operations specifications a new sequentially numbered paragraph that addresses each carrier's compliance with the PIC age 60 policy, as follows:

"[Air carrier name] may not use the services of, nor may any person act as, a pilot in command of any aircraft having a passenger seating configuration of more than 30 seats or payload capacity of more than 7,500 pounds (3,400 kg) engaged in operations under the authority of these operations specifications, if the 60th birthday of that person has been attained."

D. Foreign Air Carriers Operating U.S.-Registered Aircraft. Inspectors may conduct routine and unannounced ramp inspections (at any location) of foreign air carriers conducting operations with U.S.-registered aircraft. In addition to including for inspection the items and activities indicated in subparagraph 297B, inspectors should accomplish inspections to determine the following:

* That appropriate U.S. airman certificates are used
* That a U.S. airworthiness certificate is valid for the aircraft
* That an appropriate maintenance program is being used
* That an approved minimum equipment list (MEL) is used, if applicable

E. Frequency of Inspections. Inspectors shall initiate surveillance any time the chief executive officer of the foreign air carrier or the foreign state civil aviation authority requests it in writing. Certain foreign air carriers have requested that FAA inspectors conduct significantly more in-depth inspections of their operations than is required.

F. Need for Diplomacy. Inspectors should take particular care to diplomatically explain, with the foreign air carrier's representative, each discrepancy. Inspectors should also offer suggested corrective action and appropriate FAA assistance to promptly correct each discrepancy. Items not governed by the FAR or approved operations specifications (such as training programs, cabin safety procedures, and non U.S. registered aircraft maintenance programs) shall not be inspected, unless a specific written request has been made by either the foreign air carrier or the state civil aviation authority of the foreign air carrier, or when directed by FAA Headquarters.

G. Disagreements Concerning Inspection Findings. If a foreign air carrier's representative disagrees with any inspection findings, the FAA office that conducted the surveillance shall prepare a written report of these inspection findings and recommended corrective actions and address it to the state civil aviation authority. After coordinating with the district office holding the operations specifications of the foreign air carrier and the appropriate regional and Headquarters personnel (Flight Standards and Regional/Chief Counsel), the initiating office shall mail the report to the state's civil aviation authority with copies to the appropriate regional Headquarters office, to AFS-1, to the Office of International Aviation (AIA-100), and to AGC-200.

H. Serious Safety Deficiencies. If the surveillance reveals serious safety deficiencies that cannot be corrected through positive action by the foreign air carrier's representative, the foreign air carrier principal inspector must directly consult with either the chief executive officer of the foreign air carrier or the state civil aviation authority, or both. This direct contact will usually result in quick correction of any serious safety deficiency (see paragraphs 267 and 269). If the top management of the foreign air carrier or the state civil aviation authority, or both, fail to take positive action, the FAA shall take swift enforcement action to amend or revoke (as necessary) the foreign air carrier's operations specifications.

Interview Summaries

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Ashraf Elaskalani
Senior Ground Instructor ……..….. Page 57

Captain Ibrahim Amin
Manager of Accident Prevention and Safety …….……. Page 58

Captain Shaker Kelada
General Manager of Flight Operations ……..…… Page 59

ECAA Medical Board ……..…….. Page 61
Major General (Retired) Dr. Mohamed Gaafar
Major General (Retired) Dr. Adel Fouad
Colonel Hussain H. M. Hassan

Captain Mohammed El Bradrawi
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Yasser Hussen Boeing
767 First Officer…….……. Page 67

Captain Mehat ElKadah
Line Captain B-767 ……..…… Page 69

Capt. Hany Azmy Yassa
Line Check Captain B-767 ……..…… Page 71

Captain Ahmed Halim
Line Inspector for ECAA ……. Page 73

Mohammed Roshdy Zakaria
Deputy Chief Pilot for the B-767 …….…….. Page 75

Captain Ahmed ElNadi
General Manager of Training …..…….…… Page 77

Captain Zakaria Ibrahim Abou Eliesh
Line Captain B-767 ……..…….……. Page 79

EgyptAir POI ……..…… Page 82

Interview: Samir Azab
Present: Operations Group
Date: November 20, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1948. DOH: September 19, 1979
Position: Flight Dispatcher

Mr. Azab attended dispatcher training at EgyptAir and is qualified to dispatch Boeing 767, 777 and 747 airplanes as well as the Airbus 340 and 300. He receives annual recurrent training from EgyptAir as required to keep his dispatcher's license valid.

When in Cairo, he works a rotating eight-hour shift for three days, then has two days off. It is SOP at EgyptAir for the dispatchers to travel to New York, about once a year. They remain in New York, for one week, dispatching the ETOPS flights from JFK, back to Cairo. The dispatcher would then return to Cairo, and be replaced by another EgyptAir dispatcher.

On October 30, 1999, Mr. Azab arrived at JFK, on Flight 989, from Cairo. He stated the flight from Cairo was very normal, and there were no snags. He then traveled to the hotel in New York.

He remained at the hotel during the day, and stated he saw the accident crew of Flight 990. He said the crew seemed normal to him, and nothing was noteworthy in their conversations.

When asked about the ability of any EgyptAir captain to alter the dispatch fuel. He replied that a captain could increase the amount of dispatch fuel, within the bounds of operational limits. If the additional fuel the captain requested exceeded 3,000 Kg, he would have to request a new flight plan. He said that any MEL that affected airplane performance would be communicated to him, and he would make the adjustments to the airplane's flight plan. He said he dispatched Flight 990 under the 120-minute ETOPS procedures.

The dispatcher returned to the hotel after Flight 990 departed. He was notified of the accident via a phone call. He remained at the hotel and was interviewed early on the morning of the accident by the FBI, FAA, and other agencies.

On November 25, 1999, the Mr. Azab was reinterviewed. He stated that all flight crewmembers were on the bus with him from the hotel to JFK. They departed the hotel at approximately 2330 EDT, and the arrived at JFK, approximately 40 minutes later. The cabin crew traveled in a separate bus

He restated that only the active crew attended the dispatch briefing at Alitalia, and that it was not necessary for both flight crews to attend the briefing. He stated he had been to New York to dispatch aircraft, 14 times in the past 7 years. When asked how often he has experienced an occasion where both the active or cruise crews did not attend the dispatch briefing, he

replied approximately for four flights. [He typically dispatches 5 flights to Cairo when in New York].

He did not know why the cruise crew of Flight 990 did not attend the briefing.

Interview: Ashraf Elaskalani
Present: Operations Group
Date: November 21, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1949 DOH: 1974
Position: Senior Ground Instructor EgyptAir Training Center, Cairo, Egypt

Initially hired as a B-707 ground instructor.

Received B-767 Transition training at Air Canada 1984. Ground instructor course + Basic Instructor skills. Additionally, he attended a maintenance-training course for the B-767 in Seattle, Washington.

Has BSC degree in Aeronautical Engineering from Cairo University.

Presently teaches Initial, transition and recurrent courses.

EgyptAir has 4 B-767 instructors; 2 systems specialists and 2 avionics specialists.

Initial course is 80 hours (school day is 5 hours)
Transition course is 70 hours
Recurrent training is 1-2 days. Length and materials covered are based on needs identified in simulator checks. First Aid, hi-jack, fire fighting training, etc are performed as part of safety training, and conducted recurrently for both cabin and flight crew.

When EgyptAir acquired the B-767-300 he received a 2-day differences training course from Boeing instructors in Cairo. Majority of course was on the engines.

The Egyptian Civil Aviation Authority (ECAA) approves the course curriculum and surveils the classes which are taught using overheads and 35MM slides provided by the Boeing Company with the initial purchase of the airplane.

EgyptAir also provides ground school training for ECAA personnel when needed.

He stated that he had trained all the pilots involved with flight 990 but could only remember the assigned first officer, Adel Anwar because he recognized his picture. To the best of his knowledge, Anwar was an average student.

The ground school does not test the students—just reports attendance. The flight operations department in conjunction with the ECAA performs testing.

Interview: Captain Ibrahim Amin
Present: Operations Group
Date: November 21, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1949 DOH: February 12, 1965
Position: Director of Flight Safety [Manager of Accident Prevention and Safety] for EgyptAir.

Captain Amin received his initial training at the Egyptian Air Institute, and began his employment as a DC-6B first officer. He stopped flying in 1986, due to medical reasons. At that time he was a Captain of a B-707, and had accumulated approximately 13,000 flight hours.

Captain Amin has a secretary and four to five volunteer pilots who assist him in the performance of his flight safety duties. He is responsible for flight incident/accident reporting, publishing a quarterly flight safety magazine, and distributing air safety information. In addition he serves on a flight operations committee which consists of the Vice President of Flight Operations, the General Manager of Flight Operations and the Chief Pilot. The committee determines corrective actions for pilot flight safety violations and makes recommendations to prevent a reoccurrence. He reports to the General Manager of Flight Operations.

When asked if EgpytAir has a mechanism for anonymous pilot reports he replied yes; however; "it's a small company, when one pilot does something everyone knows about it." He receives very few of these reports.

Captain Amin stated that there were no reported safety problems with the crew of the accident airplane. He was asked when he conducted the last safety investigation and he stated that about one year ago he investigated an incident on a B-777 airplane.

He attended a Cockpit Resource Management (CRM) course at Singapore Airlines some time ago. Although there is no formal CRM training at EgyptAir at this time, there is some CRM training incorporated in their simulator training, and a formal CRM program for all pilots is under development. He was then asked if the training program is based on the Boeing Training Program and he said yes.

Interview: Shaker Kelada
Present: Operations Group
Date: November 21, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1944 DOH: 1964
Position: General Manager of Flight Operations

Mr. Kelada stated EgyptAir hired him as a pilot in 1964. He stopped flying in 1985 due to medical reasons and he has been a licensed dispatcher for the past 14 years. His dispatcher's license was added to his pilot's ATP license.

He further stated that EgyptAir employs 41 or 42 dispatchers. There are 3 shifts, Morning, which begins at 0700; Noon, which begins at 1430; and Evening, which begins at 2200. The dispatchers rotate from one shift to the next shift for the first 3 days, then receive 2 days off. The number of aircraft a dispatcher would dispatch depended on the shift and the day of the week. On a normal shift a dispatcher would dispatch several different types of aircraft. Additionally, an ETOPS qualified EgyptAir dispatcher travels to New York to dispatch the ETOPS flights which leave John F. Kennedy International Airport (JFK). There are no EgyptAir dispatchers in Los Angeles. The Egyptian Civil Aviation Authority (ECAA requires the dispatchers for ETOPS flights. The dispatchers who travel to JFK rotate weekly.

Each dispatcher receives recurrent training once a year, which can be conducted either at the Cairo Airport (CAI), or the EgyptAir Training Center. Additionally, dispatchers receive special ETOPS training. The training is the same training pilots receive, except they do not attend the ETOPS simulator training. Additionally, dispatchers received special training to dispatch the Boeing 777, in CAI from Boeing training instructors.

On flights which require two flight crews, it is not a requirement for both flight crews to attend the dispatch briefing. He felt both pilots should attend, but was aware that the reality was that they don't.

A list of approved airports for landing/takeoff could be found in the EgyptAir operations specifications (Ops Specs). Technical personnel performed runway analysis and the information is provided to the dispatchers. Additionally, the flight crew has runway analysis information available in the cockpit library.

EDS and SITA systems are used to generate the flight plans for the aircraft. Pilots are expected to make three position reports during the flights from JFK to CAI. The position reports occur at the entry, mid-point, and exit of the airplane's oceanic crossing. Position reports are made to Stockholm radio and relayed to EgyptAir dispatch. He stated if a position report were delayed more than 30 minutes, the dispatcher on duty would call Stockholm radio and try to contact the aircraft on SELCALL.

Accident response procedures are located in the Flight Dispatch Manual. He was notified of the EgyptAir Flight 990 accident via a phone call from the American Embassy in Cairo, about 1 hours and 40 minutes after the accident.

Interview: ECAA Medical Board
Present: Operations Group
Date: November 20, 1999:
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

: Major General (Retired) Dr. Mohamed Gaafar
Chief, Medical Board, Egyptian Civil Aviation Authority

Colonel Hussain H. M. Hassan
Consultant, Medical Board, Egyptian Civil Aviation Authority

Major General (Retired) Dr. Adel Fouad
Consultant Psychiatrist, Armed Forces and Air Force
Consultant Psychiatrist, Civil Aviation Authority
Consultant Psychiatrist, EgyptAir

The principal speaker for the Medical Board members present was Major General (Retired) Dr. Mohamed Gaafar.

Major General Dr. Gaafar is an internist and aviation medical specialist. He received his medical training from the Farnborough Royal College of Physicians in 1973. Has served as Chief of the Medical for the Egyptian Civil Aviation Authority for the past 2 1/2 years, and has been a member of the medical board for 21 years. He oversees the medical board and participates in the medical testing and medical certification of pilots.

Colonel Hussien Hassan is currently an active duty military officer. He also serves as a consultant with the Egyptian Civil Aviation Authority. He holds an MSc. Degree in Neuropsychiatry and MSc. in Aviation Medicine and is Board Certified in Psychiatry.

Major General (Retired) Dr. Adel Fouad is a psychiatrist who serves as a part time consultant to the Egyptian Civil Aviation Authority Medical Board. He has been called in to consult on the accident. He holds an M.R.C. in Psychiatry.

Major General Dr. Gaafar stated that Egypt currently has no designated aviation medical examiners. Egypt uses the centralized medical board with members in various specialties to medically evaluate and certify pilots. The board consists of members in various specialties. There are approximately 3-4 consultants in each specialty. There are four psychiatric consultants on the board.

Individuals applying for pilot medical certification must submit applications to the ECAA medical board, which issues a letter to the Medical Board to have the applicant tested. The medical board screens applicants using a battery of medical tests such as urinalysis, blood analysis, X-rays, electrocardiograms, etc. The entire battery of examinations takes approximately two days and results are obtained in approximately 3 days. If the urinalysis or

blood analysis indicates a positive result for any drugs that are screened for, the applicant is referred to a psychiatrist for evaluation, and assessment of the reasons for a positive drug test result. Applicants are typically not referred to a psychiatrist unless there is a reason to warrant it.

Commercial pilots and Airline Transportation Pilots (ATPs) must renew their medical certification every six months. The Egyptian Civil Aviation Authority's Medical Board performs all medical certification renewals. The Medical Board of the Egyptian Civil Aviation Authority adopted its standards from the International Civil Aviation Organization (ICAO) guidelines for medical certification of pilots. These standards are very similar to the United States Federal Aviation Administration's standards and guidelines for medical certification of pilots.

The Egyptian Civil Aviation Authority Medical Review Board grants waivers of demonstrated ability. To receive a waiver, the application is reviewed by two consultants in an appropriate specialty. If granted a waiver of demonstrated ability, the pilot may fly so long as the conditions of the restrictions specified are complied with.

The Egyptian Civil Aviation Authority Medical Review Board's post-accident review of the aviation medical records of the accident crew on EgyptAir flight 990 did not reveal any medical conditions among the crew. Some of the crewmembers were required to wear corrective lenses while flying. None of the crewmember's medical certifications specified any waivers. It was thought that Hatem Roushdy, the check pilot onboard the accident flight, had a waiver, but Major General Dr. Gaafar was unsure about the specific details of the waiver.

Drug screening is performed on pilots. Specimens are tested for the presence of drugs of abuse, benzodiazepines, barbiturates, etc. Drug screening is performed during all initial applications for each type of license. In addition, drug screening is performed when the pilot is initially by EgyptAir and then on a random basis.

When asked about the possibility of pilot's seeking treatment for medical conditions without the Medical Board's knowledge, Major General Dr. Gaafar thought that while it may occur, it is not likely occur. He stated that the Medical Board's knowledge of medical care of EgyptAir pilots is essentially a "closed loop". EgyptAir has its own hospital that administers to its employee's medical needs. Many of the Medical Board's consultants are also EgyptAir consultants and EgyptAir's hospital has a liaison to the Medical Board. Furthermore, it is obligatory to report medical conditions and treatments to the Medical Board when pilots apply for renewal of their medical certification.

When asked if EgyptAir has an employee assistance program, Major General Dr. Gaafar replied that in the Egyptian culture usually problems are discussed with friends, older brothers, etc., and there is not a need for a formal assistance program.

If a drug-screening test indicates a positive result, the pilot is suspended for medical fitness. The pilot is interviewed by a psychiatrist to obtain an explanation for the positive result. Often, positive results are due to medications taken, for example medicines containing benzodiazepines. In these cases, the pilot is advised not to take such medication. In other instances, when signs of abuse are evident a treatment or rehabilitation program will be set

up to assist the pilot. Any positive tests and action taken are permanently maintained in the pilot's medical records. If the pilot has a record of abuse, then repeated screenings are done. Medical records and testing is strictly confidential.

Major General Dr. Gaafar stated that aviation medical officers are not trained as pilots. They are not flight surgeons with aviation training.

Civil pilots must retire at age 60. At that age they can no longer fly as a pilot on scheduled and non-scheduled air carrier flights.

Interview: Captain Mohammed El Bradrawi
Present: Operations Group
Date: November 21, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1942. DOH: 1968
Position: Boeing 777 Captain, EgyptAir

Captain Bradrawi stated that EgyptAir first hired him in 1968. Before that he worked as a flight instructor as the Egyptian Air Institute. At EgyptAir he flew as First Officer (F/O) on the Antonov 24, the Comet 4C, Boeing 707, 737 and 707. He has flown as Captain on the Boeing 737, 707, 767, Airbus 300 and the Boeing 777. He has about 17000 hours total flight time and about 8000 hours in the Boeing 767. He flew with Asiana Airlines for a five-year period during his career.

He stated that on the day prior to the accident he saw Captain Rousdy, Captain (sic) ElBatouty, and Captain Habashy. He stated that although ElBatouty was an F/O it was common to refer to him as "Captain" because of ElBatouty's past experience as an instructor at the Egypt Air Institute.

He stated that Captain Roushdy was a smoker and Roushdy was in average health with no specific health problems. He stated that Roushdy drank some alcohol and was a moderate drinker.

He said that they had drunk some whiskey together at the hotel on the night of his arrival in New York. He stated that he arrived at the Pennsylvania Hotel after 6 p.m. on Friday night, October 29, 1999. He was tired and went to rest in his room. About midnight, he received a call from Roushdy to come down to his room. He met with Roushdy and had some whiskey. He returned to his room about 4:20 am on Saturday morning and slept until about 2:00 p.m. About 2:00 p.m. he received a call from F/O ElBatouty. He met with ElBatouty for about an hour and they talked. ElBatouty then left to rest for his upcoming flight. He met again with ElBatouty at 8:30 p.m. He saw ElBatouty in the lobby in uniform, but no other crewmembers were present. ElBatouty told him that he had forgotten about the flight delay. They spent about an hour outside the hotel smoking and talking. He described ElBatouty's behavior as normal.

While in New York, ElBatouty had given the interviewee two Viagra pills as a gift. ElBatouty stated that he had tried the pills in the past and they were effective for him. ElBatouty suggested that Bradrawi try Viagra as well. ElBatouty had received the Viagra from a doctor in New York that he was friendly with. ElBatouty removed two pills from a package of five pills and gave them to Bradrawi. ElBatouty said he was going to give the pills to other friends to try. ElBatouty also gave Bradrawi a pineapple. In their conversations they talked about

ElBatouty's friends that live in Los Angeles. He stated that on that occasion, ElBatouty was "ElBatouty as he knew him" and seemed normal.

Also while in New York, ElBatouty informed Captain Bradrawi about the death of a judge in Cairo, who was a mutual friend of both of them. When asked how he found out about the Judge's death, ElBatouty replied that he spoke to his wife when he was in LA.

He stated that ElBatouty did not smoke and was an occasional drinker, but thought that he had either given up drinking or drank alcohol very infrequently in the past few years. He said that ElBatouty had no problems with alcohol but had just decided to cut back on his alcohol consumption a few years ago. He stated that ElBatouty was in "very good health" and "didn't have any gray hair."

He described ElBatouty as both a good friend and a neighbor. They were both flight instructors in the Egyptian Air Institute and they had known each other for many years. He stated that ElBatouty had five children. Three of ElBatouty's children had already graduated; one of his children was a police officer and two were accountants. His forth child is about to graduate with a bachelor's degree.

ElBatouty's fifth child, a ten-year-old daughter, has a medical condition, lupus. ElBatouty had received a loan from EgyptAir to fund medical expenses to treat his daughter. She was being treated by a specialist in Los Angeles who had changed the way she was being treated and this had positive results on her condition. She was scheduled to return to Los Angeles very soon for further treatments. He stated that everyone in the fleet was very supportive of ElBatouty and his family in assisting to get the medical treatment she needed. The Chairman of EgpytAir had arranged to provide approximately 6,000 U. S. dollars to help defray medical costs. Additionally the workers union had provided about 2,500 U. S. dollars. When ElBatouty's daughter was treated in the past, ElBatouty was able to take leave and stay with her in Los Angeles for about a month.

When asked about ElBatouty's activities, Bradrawi stated that ElBatouty was very engaged in flying and that was what ElBatouty enjoyed doing. He stated that ElBatouty "refused to sit" for his Airline Transportation Pilot (ATP) rating written examination, which was required to be promoted to Captain. He stated that there were two other pilots in similar situations that had not transitioned to the left seat. Bradrawi stated that he had urged ElBatouty to take the ATP examination on several occasions, but ElBatouty never went through with it. He stated that ElBatouty was the most senior F/O flying the 767 and consequently could get preferred flight schedule. ElBatouty did not want the responsibility of being a captain.

In describing Captain Habashy, Bradrawi indicated that he was not close with Captain Habashy. He had known him for 35 years and described their relationship as a normal professional working relationship. They had flown together many times. He stated that Habashy kept a low profile and was very quiet and peaceful. He noted that there was nothing particularly significant about his behavior and described him as "an average man". He said that Habashy was more religious than most of his other colleagues and never drank alcohol and did not smoke. He described Captain Habashy as very domestic, a family man.

Bradrawi described Captain Roushdy as an intimate friend. He stated that Roushdy was a caring person who went out of his way to help people. He said that Roushdy had served as head of the union for a while and because of his personal interest in security had served on an airport security committee. He said that Roushdy was very pleasant and well liked. He stated that Roushdy would have been deadheading on the accident flight. He stated that Roushdy had performed a line check of Captain Raouf Noureldin on the John F. Kennedy International Airport (JFK) to Los Angeles International Airport (LAX) leg, and the LAX to JFK leg, earlier that week.

He stated that ElBatouty had a male friend in Los Angeles who is a hotel manager. ElBatouty would frequently have dinner with this individual when he visited Los Angeles. He also knew an Egyptian doctor and his wife in Los Angeles who had assisted him in finding a specialist to treat his daughter. He also had friends in New York who were Egyptian doctors. His friends in the United States were Egyptians and he was well received by these people because he was from a family of stature in Egypt. He was not very conversant in English and was not friends with any non-Egyptian Americans.

Bradrawi said that Captain Habashy would occasionally pray on flights. He did not think that any of the other flight officers prayed during flight. He stated, that Roushdy or ElBatouty would not pray while flying. In addition, he said Roushdy prayed "maybe once a year", and ElBatouty maybe prayed on weekends.

He stated that Hatem Roushdy has a brother who is a heart surgeon in Detroit, and a sister also living in Detroit.

Bradrawi said that ElBatouty came from a socially elite family in Egypt. His father was a mayor and a landowner and family members were well educated and affluent. Consequently ElBatouty had a lot of connections with high profile Egyptians. ElBatouty also had a high profile position at the Egyptian Air Institute. At EgyptAir, it did not bother ElBatouty that he did not hold the position of Captain, he was just “ElBatouty”.

Bradrawi stated that exterior pre-flight inspections of the aircraft are the responsibility of the Captain, but can be delegated to the F/O. When asked about cockpit security procedures, Bradrawi said that flight crew and cabin crew would simply knock on the door to gain access to the cockpit. They keep the door locked with the solenoid lock and none of the crewmembers have cockpit door keys.

Bradrawi further advised that ElBatouty received the Viagra pills from a doctor friend in New York was a psychiatrist. Bradrawi was uncomfortable providing the name of the psychiatrist without first getting his permission, he later identified this individual as Doctor [first name] Nabil. He said he would like to talk with the Doctor first, before providing his full name.

Interview: Yasser Hussen
Present: Operations Group
Date: November 22, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1967 DOH: 1992
Position: Boeing 767 First Officer (F/O)

Mr. Hussen spoke mostly in Arabic and Captain Nabil Helmy provided translation, assisted by Hani Fakhry. Kolta, United States Embassy, Cairo.

Mr. Hussen stated he received his flight training at the Egyptian Air Institute. He was hired by EgyptAir as a Boeing 737-200 First Officer (F/O) in 1992. He became a Boeing 767 F/O in 1996. He had accumulated approximately 3,000 hours of total flight experience, of which, about 1,500 hours were in the Boeing 767.

He attended Boeing 767 ground school training in Cairo (CAI), and Boeing 767 simulator training in Frankfurt, Germany. He receives recurrent training in the simulator two times each year.

Regarding the procedures for swapping between the active and cruise crews. Mr. Hussen said the time when the active crew would swap with the cruise crew depends on the trip flight time. Usually the cruise crew takes over the flight after the active crew has flown F/Or about 4 or 5 hours. The active crew would then return to the cockpit prior to landing. When the crew swap occurs, the relief crew is briefed on items such as: any route changes, frequencies in use, charts being used, any Air Traffic Control requests, and in general, “anything concerning the airplane.” The briefing items are not written down in a checklist, but were covered during North Atlantic Route Training and are performed from memory.

Mr. Hussen said that it is required for the cockpit door to be lock at all times. The door should be locked before engine start and until the airplane arrives at the gate of its destination. A person would use the interphone, and call the cockpit to gain access. There are no keys for the cockpit door kept on the airplane.

On flights, which require two crews, both the active and the cruise crews attend the dispatch briefing. He had been flying the trip to John F. Kennedy International Airport (JFK) 2-3 times a month F/Or the past 2 years, and has never experienced an occasion in which both crews were not present F/Or the dispatch briefing.

Pre-flight walk around inspections are the responsibility of the Captain; however, the active First Officer is normally delegated to perform the pre-flight walk around inspection.

He had flown with Captain ElHabashy in the past and said he was an “OK” pilot. Additionally, he said Captain ElHabashy was a calm, quiet and religious man. He never heard Captain ElHabashy pray in the cockpit or while on duty.

He also had flown with Captain Nour Eldin in the past and said he was an “OK” pilot.

He said F/O Adel Anwar was a very good friend. Mr. Anwar was 3 years older then Mr. Hassen, and they would go out together during layovers. Mr. Anwar was not a smoker and did not drink alcohol. Additionally, he was a religious man and in good health.

He knew F/O ElBatouty, as a fellow colleague, but did not spend any social time with him because of their age difference; unlike the other 767 F/O's, who were about the same age group and had gone to school together. Mr. ElBatouty seemed in good health. The other F/O’s were about the same age group and had gone to school together. He did not remember if Mr. ElBatouy smoked or drank alcohol, and he was not aware of an occasion where Mr. ElBatouty prayed in the cockpit.

During the time Mr. Hassen has worked for EgyptAir, he has never heard of an occasion where a crewmember would get into trouble or have any problems while on a layover. If a crewmember were to experience a problem while on a layover, the problem would be reported to the Captain, who would seek help from the company [EgyptAir].

Interview: Captain Mehat ElKadah
Present: Operations Group
Date: November 22, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

Position: Captain Boeing 767, for EgyptAir

Captain Medhat ElKadah, a Boeing 767-300 Captain for EgyptAir, was interviewed by the operations group to discuss flight operations procedures and his knowledge of the lifestyle, behavior, and activities of the accident flight crew. Captain ElKadah spoke mostly in Arabic and Captain Nabil Helmy provided translation, assisted by Hani Fakhry. Kolta, United States Embassy, Cairo.

When asked about procedures for crew changes between the active crew and the cruise crew on Trans-Atlantic flights, Captain ElKadah responded that typically the crew change occurs about 5 hours into the flight and the active crew returns to the cockpit about one hour before landing. If an active crewmember is tired before the crew change or if a cruise crewmember cannot sleep, then on occasion, the individual pilot may make a request to the active captain to make a crew change earlier than scheduled. Personally, he stated that he is in good health and consequently has not had a need to change crews at other than the scheduled time agreed upon before the flight.

When the crew change is made, the active captain briefs the relief crew on route clearances, weather, altitude changes, etc. Typically, the first officers switch about one half hour before the captains switch.

When asked about policy regarding the cockpit door, Captain ElKadah stated that during takeoff and landing the door is always locked, but during cruise phases of flight, the door is not locked but usually remains shut. He stated that requests for re-entry after leaving the cockpit the interphone is used to call the pilot in the cockpit and regain entry.

Captain ElKadah stated that he is currently flying the route from Cairo (CAI) to John F. Kennedy International Airport (JFK) in New York about 4 or 5 times a month, because he prefers the short layovers in New York. He is qualified to fly the JFK to Los Angeles (LAX) leg, but he has not flown it for some time.

Captain ElKadah stated that he is required to attend recurrent simulator training two times per year. He stated that spot checks are performed randomly by Egyptian Civil Aviation Authority inspectors. He has received three of these spot checks in the last two years. He also receives line checks from company check pilots. He said that he started flying as Captain on the Boeing 767 in 1996.

When asked what he personally was like as a Captain, Captain ElKadah responded that he would deal with situations with whatever approach was necessary. He is tough when he

needs to be and mild when he needs to be, much as farmers like him learn to deal with the ground they work with. When he is not flying, he spends his time as an olive farmer.

When asked about the personal habits of the accident crew, Captain ElKadah indicated that Captain Habashy did not smoke, but he did not know whether Captain Habashy ever drank alcohol. Captain ElKadah explained that as a religious man he does not accompany individuals when they are drinking alcohol, and therefore does not know whether or not other pilots drink alcohol. Captain ElKadah stated that he did not know Captain Habashy well and knew nothing in particular about his lifestyle or any recent significant events in Captain Habahy's life. Captain ElKadah stated that Captain Nour Eldin was a smoker, but he did not know whether Captain Nour Eldin drank alcohol. He stated that Captain Nour Eldin was generally in good health.

When asked about F/O Adel Anwar's flying skills, Captain ElKadah replied that he personally had not observed his flight handling because he is not an instructor and does not give control of the aircraft to his first officers. He described F/O Anwar's ability as a F/O as good. Captain ElKadah stated that he did not know any details about F/O Anwar's personal habits, but was aware that F/O Anwar was supposed to get married soon. He described F/O Anwar as a very good person who loves and takes care of his mother and sister.

When asked about F/O El Batouty, Captain ElKadah stated that he respected him very much. When asked about ElBatouty's flying skills he replied that he had never observed him because ElBatouty never asked to fly while he was in command of the aircraft. He described ElBatouty's skills as a F/O as good. He described ElBatouty's health as good. He said that ElBatouty did not smoke, nor drink alcohol. He knew that ElBatouty did not drink alcohol because of religious beliefs. He said that ElBatouty was religious and had made a pilgrimage last year. He and F/O ElBatouty were acquaintances and would do things together on layovers, but they typically would not socialize when home in Cairo. He stated that they sometimes talked about their home life. Captain ElKadah stated that on October 30, 1999 he met with F/O ElBatouty in the hotel room of Captain Eleish. During that visit, F/O ElBatouty had spoken to Captain ElKadah about his retirement plans to split his time between a villa outside Cairo and a beach house near El Alamin. He seemed quite happy that day and happy about his upcoming retirement from the standpoint of not having the responsibility of work.

Responding to the speculation of the media, Captain ElKadah added that he thought it almost inconceivable that an Egyptian, brought up in a culture of devout religious faith, would commit an act of suicide or murder. He stated that the rate of suicide in Egypt is very low.

Interview: Capt. Hany Azmy Yassa
Present: Operations Group
Date: November 22, 1999
Time: 1530
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1957 DOH: Late 1981
Position: Line Check Captain B-767

Capt. Yassa stated that prior to his employment at EgyptAir, he had flown a short time with Arab International Airlines as a B-737 F/O. His first assignment at EgyptAir was also as a B-737 F/O. He then flew as F/O on the B-767,and the A-300-600. He then flew as captain on the B-737-200/500, A-300B4 and in July 1992 he was promoted to captain on the B-767. The captain said the he has accumulated about 10,000 flying hours with about 1000 hours on the B-767.

The captain discussed the division of flying time on flights that require an augmented crew. He said that the amount of time depends on the length of the flight and that the flightcrew agree among themselves when to swap seats. The crews do not swap at the same time; there is about 30 minutes between the crew members swapping seats. He said that it is not unusual to alter the agreed on time of swapping seats if the captain approves.

The captain then discussed the EgyptAir policies. The cockpit door is required to be kept closed and locked except when a crewmember is out of the cockpit. There are no cockpit keys given to any crewmembers at EgyptAir. It is common practice for EgyptAir flightcrews to eat at their duty station in the cockpit if they desire. The captain has seen some flightcrew members pray in the cockpit. The captain does not recall any reports of cockpit crewmembers getting into trouble during layovers in LAX or JFK. In the past, when trouble occurred he recalled that it may have involved a cabin crewmember, but he could not recall any further details.

The captain said that he gives about two proficiency checks a year and does about one line check per year. The captain has received two Spot Checks this year from the ECAA.

The captain said that the ECAA has observed his simulator training in the past. He said that the medical examinations he must take every six months last all day (0900-1400). Sometimes it will be half on one day and half the next day. He said that the Doctors might ask questions during the exam. The questions are about health not personal issues.
The captain said that both crews, active and cruise, are required to attend the ETOPS briefing before the oceanic flight, if one crewmember misses the briefing the others will briefing.

The captain said that closing and locking the cockpit door is not on the checklist. He stated that it takes at least two trips to get qualified on the North Atlantic routes.

The captain then commented on the members of the accident crew:

F/O ElBatouty - was an average pilot with no problems and had not been promoted to captain because he did not want to take the ATP written examination. He was a non-smoker, a very light drinker, and in good health. The captain was not close to ElBatouty because of their age difference, but he knew about ElBatouty's daughter's illness.

F/O Anwar - was a good F/O and was to get married on his return to Cairo. A non-smoker and non-drinker. He was in good health and very close to his family.

Capt. ElHabashy – Captain Yasser stated he had served as a F/O for Capt. ElHabashy in the past, and has flown with him as Captain.

Capt. Nour Eldin - He has the same seniority as the captain, and they would go to the club to play tennis together. He was a smoker and drank moderately.

The captain stated that all the accident flightcrew members were religious and sometimes would briefly pray in the cockpit, "just a word."

The captain stated that it was EgyptAir policy that headsets would be worn until the top of climb and when the descent was started.

Interview: Captain Ahmed Halim
Present: Operations Group
Date: November 23, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1938 DOH: March 1999
Position: Line Inspector for Egyptian Civil Aeronautics Board

During the interview, Captain Halim provided the following information:

He was retired from EgyptAir in 1997 and was now a Line Inspector for the ECAA. Prior to flying for EgyptAir he had been an Army Aviation instructor for eight years, then to EgyptAir. He has flown the AN-24 and the B-707 as an F/O. He checked out as a captain on the B737-200 in 1976 then as captain on the 707 and finally as a B-767 captain in 1984. In 1985 he became a 767 simulator instructor and retired from line flying in February 2, 1999.

In his position as Line Inspector for the ECAA, he is qualified to give line checks on the B-767 and the B-777. When he joined the ECAA he was given a one-week indoctrination course and a review of the ECARS. He gives all his line checks with out any advanced warning to the crew (Spot Check). In his short time as a Line Inspector he has only given one or two line checks a month. He has also observed just one simulator check. When finishes a line check he goes his office the next day and delivers the required forms.

During the course of his checks he has two sets of standards for the crew. One standard for the captain and a lower one for the F/O. He will question the crew on two areas during the line check, technical details of the airplane systems and the company procedures. He stated that if he observed some small actions, in the cockpit, that are not in the procedures he would bring them to the attention of the crew and not record them in his report. However, if the infractions were of a serious nature he would put them in his report and turn the report into the authorities. He would not take any action himself.

Captain Halim said that ECAA line spot checks are pass or fail with no other rating used. The ECAA keeps copies of all check records.

Captain Halim said that he has not received any recurrent training since he has joined the ECAA and doesn't know if he will receive any in the future.

Regarding Initial Operating Experience (IOE), the check captain occupies the right seat of the airplane for the required time. This time is 25 hours for the smaller airplanes and on the lager airplanes they count the segments flown because of the length of the legs. (CAI to JFK 12 hours, JFK to CAI 10 hours) He explained that with the long legs a new captain could satisfy the requirements, but only have two landings. When these requirements are met the check captain will sign that the new captain is fit to fly under supervision. He would then

move to the jump seat and remain as a supervisor until he is satisfied that the new captain can perform at his new duties.

The captain was asked to explain his early association with the F/O ElBatouty of the accident flight. He said that they were drafted into the Army and because the Army needed flight instructors and they were pilots, the Army trained them to be flight instructors. He and the ElBatouty received spin training and instructed aerobatics while in the Army. All student pilots at the Egyptian Air Institute receive spin recovery training. They stayed in the Army for about eight years along with one other instructor. After about eight years the captain and the other flight instructor moved on to EgyptAir, while ElBatouty remained in the Army.

The captain and ElBatouty remained friends, and ElBatouty eventually came to EgyptAir. The captain described ElBatouty as a man who "*enjoyed life*", was active, a nondrinker, a nonsmoker, and would brush his teeth all the time. He was in good health overall. The last time the captain had spoken with the ElBatouty was when he called him on February 4 to wish him a happy anniversary and birthday. The last time the captain had seen ElBatouty was about six or seven months ago. The captain has flown with ElBatouty and described him as an average pilot.

Captain Halim spoke about active F/O Adel Anwar and described him as making normal progress in his flying and eager to learn. He does not know about his personal life.

Captain Halim commented that the active and cruise captains were normal and never got nervous.

Captain Halim said ElBatouty was never upgraded to captain because he did not want to study for the ATP written examination. He was educated in an Arabic school and was not proficient in English.

Captain Halim was not aware of any problems that ElBatouty had during his time in the military and stated ElBatouty was highly respected by all.

Interview: Mohammed Roshdy Zakaria
Present: Operations Group
Date: November 24, 1999
Location: EgyptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 19957. DOH: 1982
Position: Deputy Chief Pilot for the B-767

Captain Zakaria began his career with EgyptAir as a B-737-200 F/O. He then flew the B-767, and A-300-600, also as a F/O, before being promoted to the position of Captain of a Boeing 737-500, in 1990. He was promoted to Captain of the B-767 in 1996. Captain Zakaria has accumulated approximately 8-9,000 hours of total flight experience, of which, about 1,300 hours were in the Boeing 767.

On flights which require two flight crews, the operating crew usually fly about 4 or 5 hours, then is relieved by the cruise crew, until about two hours before landing; however, it was not unusual for the relief crew to take control of the airplane earlier in the flight. The procedures for crew swapping is not documented in a manual. When the crews swap, the relieving crew is to be briefed on the airplane's route, any changes regarding air traffic control, fuel remaining, etc. The briefing items are standard policy for EgyptAir; however, the briefing items or content are not written down.

Captain Zakaria stated the cockpit door should be locked before the engines are started and the door should remain closed and locked unless there is a particular reason to open it. If someone needed to gain access to the cockpit during the flight, the purser would call the cockpit on the interphone. None of the crewmembers have a key to the cockpit door and there are no keys for the cockpit door kept on the airplane.

Captain Zakaria stated he is an Egyptian Civil Aviation Authority (ECAA) Check Captain, and performs simulator check rides for other pilots. The simulator approaches are made to different airports, and he uses an instructor's guide to outline what training topics are used. He gives about 5 or 6 line checks each year and an ECAA Check captain could approve another captain to become an ECAA Check Captain.

For an emergency decent scenario, the pilot flying would rotate the altitude down, use "level change", and deploy the speed brake. The pilot not flying would make the appropriate radio calls, and check for any damage to the airplane. EgyptAir teaches their pilots that they do not have to disconnect the autopilot for an emergency descent.

When two crews are required for a flight, it is a requirement for both crews to attend the dispatch briefing. He has never experienced an occasion where either of the two flight crews did not attend the dispatch briefing.

EgyptAir pilots do not receive unusual attitude training; however, they receive controlled flight into terrain training.

Captain Zakaria considered Captain Habashy a “good” pilot. Additionally, Captain Habashy did not smoke or drink alcohol, and overall seemed in good health.

Captain Zakaria considered F/O ElBatouty a “good” pilot, who did not have a particular strength or weakness. F/O ElBatouty did not smoke or drink alcohol, and overall seemed in good health. Captain Zakaria was not aware of any significant developments occurring in F/O ElBatouty’s life.

Captain Zakaria considered F/O Adel Anwar a “good” pilot, who did not have any particular strength or weakness. F/O Anwar did not smoke or drink alcohol, and overall seemed in good health. Captain Zakaria stated that F/O Anwar was to get married when he returned to Egypt.

Captain Zakaria considered Captain Nour Eldin a “good” pilot, and a close friend. They started working at EgyptAir at the same time. Captain Nour Eldin did not smoke and he drank alcohol occasionally, but never before flying.

Captain Zakaria stated that he was not the type of person who approached people and asked them about their problems; however, he would always be willing to talk to people about their problems if they came to him. He was not aware of any occasions where a crewmember got into trouble while on a layover.

Captain Zakaria stated that EgyptAir does not have a procedure for a pilot to don an oxygen mask when another pilot leaves the cockpit.

Interview: Captain Ahmed ElNadi
Present: Operations Group
Date: November 24, 1999
Location: EygptAir Flight Operations, Cairo International Airport, Cairo, Egypt

DOB: [redacted] 1945 DOH: October 1964
Position: General Manager of Training [G.M. Training Dept.] for EgyptAir.

Captain ElNadi received his initial training at the Egyptian Air Institute, was hired by EgyptAir in October 1964, and began his employment as a DC-6B first officer. He has flown the Comet 4C, the AN-24, and the B-707 as a F/O. He checked out as a captain on the AN-24 in 1973. He has been a captain/instructor pilot on the B-707, the B-737-200, A300-B4, the A300-600, the B-747, the A-320 and the finally on the B-777. During his career at EgyptAir he has spent time with Saudi Arabian Airlines. He has accumulated approximately 17,500 hours of total flight experience.

Captain ElNadi is responsible for all ground and flight training and sets standards for all airplanes in the EgyptAir fleet. In addition, he sets training policy, reviews all training records, and monitors the EgyptAir training program. He also serves on a flight operations training committee which may consists of the Vice President of Flight Operations, the General Manager of Flight Operations, Director of Flight Safety [Manager of Accident Prevention and Safety] and the Chief Pilot. The committee determines corrective actions for pilot training issues and makes recommendations to prevent a reoccurrence. He reports to the Vice-President of Flight Operations

Captain ElNadi uses the chief pilot for each fleet as the chief training captain for that fleet and line instructor pilots to accomplish the training tasks in both the simulators and the airplanes. He stated that his organization is developing the General Standard Operating Procedures (GSOP). This process is anticipated to be an ongoing process.

The 767 fleet had five instructor pilots. Captain Hatem Roshdy was on the accident airplane, leaving the 767 fleet with four instructor pilots.

He was asked how EgyptAir selects a full flight simulator for use. He stated that the simulator must match the flight test data, EgyptAir configuration, and also meet with the approval of the EgyptAir instructor pilot assigned to check the simulator. The simulator must meet all of the standards established by EgyptAir, ICAO, and final approval must come from the ECAA.

Although there is no formal CRM training at EgyptAir at this time, CRM training is incorporated in the simulator training, and a formal CRM program for all pilots is under development. He was then asked if the training program is based on the Boeing Training Program and he said yes.

Captain ElNadi explained the grading system used on the EgyptAir checkride evaluation form. He stated that S+ was above average, S was average, S- was below average and US was unsatisfactory. He then said that if a pilot received an S- on successive checkrides in the any area of performance, additional training/counseling would be required. If a pilot continued to have problems he would be referred to the training committee where action would be taken. When asked what was the worst issue that the committee had to deal with, he responded that a pilot who could not cope with the new technology had to be sent back to his old airplane.

When asked about the personal habits of the accident crew, Captain Captain Hatem Roshdy was a very helpful guy who was always helpful and very sociable person. He only knew Captain Nour ElDin professionally and did not comment on his personal habits.

When asked about F/O Gamil ElBatouty he indicated that ElBatouty was a pleasant guy who liked to tell jokes and laugh a lot. He stated that ElBatouty never checked out as a captain because he was reluctant to take the ATP written test. He also stated that EgyptAir policy provided that pilots above the age of 55 would not be put through a transition course. He further stated that no promotions were given to pilots who were above the age of 55.

He did not know F/O Adel Anwar until he had some problems during a simulator check ride. He called him into the office to counseled him and determine an appropriate course of action. He quickly scheduled him for more simulator training with another instructor and that seemed to solve the problem.

He was then asked when he saw the accident crew for the last time and he said that he had seen Captain Hatem Roshdy, in Cairo, a couple of days prior to Captain Roshdy's departure for New York.

He saw F/O Gamil ElBatouty in New York about a month prior to the accident and the conversation centered around a puppy that ElBatouty had given Captain ElNadi. He said that F/O ElBatouty was an "easy going guy".

When asked what pilots would do if they had any type of problems, he replied that they would go to the Chief Pilot to resolve these issues. He also said that Egyptian culture is such that problems of a personnel nature are usually discussed with family and close personal friends.

Also he was asked if he was familiar with the Flight Operations Support Program (FOSP) offered by Boeing and he replied that EgyptAir had a visit after the B-777 had been put in service (approximately 1 1/2 years ago).

Interview: Captain Zakaria Ibrahim Abou Eliesh
Present: Operations Group
Date: November 22, 1999
Location: EygptAir Flight Operations, Cairo International Airport, Cairo, Egypt

Captain Zakaria spoke mostly in Arabic and Captain Nabil Helmy provided translation, assisted by Hani Fakhry. Kolta, United States Embassy, Cairo.

Captain Zakaria Ibrahim Abou Eliesh, a Boeing 767-300 Captain for EgyptAir, was interviewed by the operations group to discuss flight operations procedures and his knowledge of the lifestyle, behavior, and activities of the accident flight crew. Captain Eliesh spoke mostly in Arabic and Captain Nabil Helmy provided translation.

Captain Eliesh stated that he would retire in just over two years. His son is currently flying the Airbus 300-600 for EgyptAir.

When asked about procedures for crew shift changes on Trans-Atlantic routes, Captain Eliesh indicated that the timing of the crew changes is not documented but is determined by agreement among the crew and standard procedures introduced during route training. He stated that by policy, the crew that is on duty for the takeoff must also be on duty for the landing. Typically, the first crew change between active and cruise crews occurs after about four to five hours, depending on the length of the flight. Sometimes the captains switch first and sometimes the first officers switch first. These switches occur about one half-hour to one hour apart. He said that sometimes pilots may change earlier with the pilot and captains permission, but normally this is arranged before the flight begins. He stated that he personally would agree to switch early if he was the active captain only if he thought he could go to sleep. The active crew briefs the relief crew when the crew change is made. The active and cruise crew assignments are listed on the duty roster.

When asked about policies and procedures for cockpit access, Captain Eliesh stated that the cockpit door must be closed and locked before engine start. The door is unlocked after arrival at the gate. He stated that keys to the cockpit are neither issued nor available in the aircraft. He stated that when one crewmember leaves the cockpit, the other crewmember must lock the door. He stated that upon returning to the cockpit the procedure is to knock on the door or use the interphone. Upon returning to the cockpit after leaving to use the toilet, etc., he gets a briefing about clearance changes and aircraft status changes.

He stated that the crews on duty eat their meals in the cockpit if they want to eat.

He stated that during the Trans-Atlantic crossing, he does not get enroute alternate weather updates unless weather is expected to deteriorate.

Regarding the use of oxygen, Captain Eliesh stated that above 33,000 feet, crewmembers must don oxygen masks when occupying the cockpit alone.

He stated that EgyptAir does not have courses in Crew Resource Management (CRM).

He stated that at JFK, it is normal procedure for both active and cruise crews to attend the briefing at Alitalia. Sometimes, a member of the cruise crew may be excused from attending the briefing. The cruise crew does not usually start their duty until after the aircraft has received its oceanic clearance and coasted out on eastbound flights. In comparison, on westbound flights, the cruise crew usually comes on duty before beginning the Trans-Atlantic crossing. Therefore, it is more important for the cruise crew to attend the briefing for eastbound flights.

Speaking about Captain Hatem Roshdy he stated that he was the Chief Pilot and Chief Instructor for the Boeing 767 at EgyptAir. He was well experienced and served as a father figure to the 767 pilots. He described Captain Roshdy as a person who enjoyed life. He stated that Captain Roshdy was a smoker, but did not recall if Captain Roshdy drank alcohol. He stated that he saw Captain Hatem Roshdy in the Pennsylvania Hotel lobby in New York City on October 30, 1999. They spoke and Captain Roshdy inquired about Captain Eliesh's health. After speaking, Captain Roshdy returned to his hotel room to rest because of the flight delay.

Describing F/O ElBatouty he said that ElBatouty liked to laugh and enjoyed life. He said that ElBatouty liked to be a funnyman. He stated that ElBatouty did not smoke and he knew that ElBatouty used to drink alcohol a long time ago, but recently he either did not drink at all or drank very infrequently. He saw ElBatouty briefly on October 30, 1999. He asked ElBatouty about ElBatouty's daughter. He did not detect anything unusual in ElBatouty's appearance or behavior.

He stated that he knew F/O Adel Anwar only professionally and knew nothing about his personal habits or lifestyle. In describing Captain Habashy he only said that he was a good man.

He stated that of the EgyptAir pilot's on the accident aircraft, he only knew Hatem Roshdy well. He stated that there were no significant events recently in Captain Roshdy's life. He did not typically ask the other crewmembers what was going on in their lives and had no information on significant events occurring in their lives.

When asked if any crewmembers party or get into any mischief on layovers, he stated that this occurs sometimes when a crewmember does things to "enjoy his life". If a crewmember gets into trouble, the captain would be informed and the company will handle the situation.

Group Member, Captain Nabil Helmy, was asked his opinion as to why F/O ElBatouty did not take the ATP written examination. He replied that he felt F/O ElBatouty did not take the ATP written examination was because his command of English was limited and the exam and study materials were in English.

Interview:	Ronald Hughes, Principal Operations Inspector (POI) for EgyptAir
Present:	P. D. Weston, NTSB (AS-30)
	Kenneth Egge, NTSB (AS-30)
	Anthony James, FAA (AAI-100)
Date:	January 6, 2000
Location:	Via telephone from NTSB Headquarters, Washington, D.C.

During the course of the interview Mr. Hughes provided the following information:

Mr. Hughes said that he has been with the Federal Aviation Administration (FAA) for 11 years. He has been a POI for nine years. Prior to joining the FAA, he worked in Part 141 training schools, as a pilot for Part 135 on-demand charters, and as a flight instructor. He holds type ratings in the Learjet series of airplanes, the Canadair Challenger and the MD-90.

Mr. Hughes said that he is assigned to the International Field Office (IFO) located at JFK International Airport in Jamaica, New York. This office has the responsibility for overseeing 120 Part 129 airlines that range in size from two airplanes to 200 airplanes. The JFK IFO has five Operations Inspectors that share the workload. Mr. Hughes is responsible for one Part 141 pilot school, and 20-25 Part 129 operators.

Mr. Hughes stated that he has been the EgyptAir POI for five months. He said that he basically has no contact with EgyptAir. He said that he is not required to accept or approve EgyptAir flight manuals, nor does he do any line checks or enroute checks. He performs ramp checks but he has never ramp-checked EgyptAir.

His duties mostly involve handling requests for Operations Specifications changes when new airplanes are added to the certificates, and interpreting rules. He stated that he does “a lot of paper work, not much hands on.” He stated that guidance for his job function comes from FAA Order 8400.10.

Mr. Hughes said that the IFO does a total of about 50-100 ramp checks a year. He said that if during one of the ramp checks he observed a possible violation, he would gather evidence and possibly issue a Letter of Investigation (LOI). He stated that he would also open an EIR. He stated that he had never received orders to “go easy” on a Part 129 carrier.

Mr. Hughes is aware of only one Enforcement Investigative Report (EIR) concerning EgyptAir. This EIR is “open” at this time and Mr. Hughes stated that he is not allowed to discuss it.

Mr. Hughes said that for Part 129 airlines, most of his time was spent on requests for changes in Operations Specifications and the addition of new aircraft to an airline’s certificate. For foreign airlines flying “N-numbered” airplanes it was a different story. In

addition to requests for changes to the Operations Specifications, more time must be spent dealing with maintenance issues, particularly Part 129.14.

He stated that he was aware of the International Aviation Safety Assessment (IASA) program. He did not know when Egypt had received its last assessment but he assumed that they must still be Category 1 because they still had their Operations Specifications.

Demonstration Summary

A SIMULATOR DEMONSTRATION:

1. Objectives of the E-Cab Simulations:

   (a) Obtain a better appreciation of the DFDR and Radar engineering data by observing a simulated flight deck perspective of the accident airplane's profile with back-driven controls.

   (b) Provide tactile information on the final flight maneuvers with respect to:

Timing of the DFD Recorded events	Instrument readings
Column movement	Pilot workload
Column forces	

   (c) Demonstrate the ease or difficulty related to airplane recovery by taking control at different stages of the accident flight profile.

   (d) Demonstrate the applicability of two potential system failure scenarios relative to what is known on the DFDR.

2. Engineering Cab (E-cab) Limitations, Modifications and Notes:

   Demonstrations were held in the 767 E-cab simulator at the Boeing facility in Seattle, Washington. The following limitations, modifications, and notes were presented to the group prior to the start of the demonstration:

(a) Limitations:

Cab Limitations:
1. The cab is fixed-based. Motion is not available.
2. The visual landscape is a featureless land with a visible horizon.
3. No Mach or stall buffet is modeled.
4. Numerous status messages are displayed erroneously on EICAS.
5. No metric displays for fuel quantity and fuel flow.
6. No thrust reverser isolation lights.
7. No stand-by compass.
8. The mode control panel is different than the EgyptAir configuration (no control wheel steering)

Modeling Limitations:
1. The control columns and elevators can only be moved symmetrically in the cab.

2. There is no hydraulic decay model or elevator blowdown model that simulates the decay of hydraulic pressure to the flight controls as the engines wind-mill and speed decreases.

3. The asymmetry and un-steady aerodynamics of stalls are not accurately represented.

4. The low oil pressure light does not illuminate, nor does the caution alert (beeper) function during the FDR low oil pressure operation . The four items that could cause the aural alert are: alternating current (a/c) power loss, low hydraulic pressure, fuel configuration, and low oil pressure.

5. Ship's Air Data Computer (ADC) calibration has not been verified at speeds in excess of M = .91. Note: Post-simulation demonstration teleconference with Aerodynamics verified that the ADC calibration is accurate to M=.91; and it has been extrapolated with reasonable confidence to approximately M=.94.

Back-drive Limitations:
1. For back-drive, throttles handles can only be driven at autopilot rate (around 10 deg/sec), although the engine information (EPR, N I, N2) are driven at the rates recorded on the flight data recorder.
2. During back-drive, must manually arm speed brakes to enable the back-drive to deploy according to the DFDR.

(b) Modifications:

Aerodynamic data has been modified above Mach =.91 for the following terms:
1 Lift Coefficient, Pitching Moment Coefficient, and Drag Coefficient of the Wing-Body.
2. Spoiler Blowdown.
3. Spoiler Lift and Pitching Moment Coefficients.

(c) Items of Note:
1. Simulator model accounts for hydraulic power generation (for example, wind-milling engines) independently from hydraulic power usage (for example, flight controls).
2. Additional instrumentation has been added to the simulator cab environment to facilitate this investigation: G-meter, left and right Flight Data Recorder elevator display, fuel cut-out lights (located above FDR elevator displays in the simulator cab environment).
3. A "chase-plane view" will be displayed on a separate monitor in the cab area and in a briefing room. Various airplane/flight deck information will be displayed.
4. The primary altimeters display "off flags" during excessive descent rates (normal operation).

2. Simulation:

Members of the Human Performance Group and the Vehicle Performance Group joined the Operations Group for the E-cab demonstration. For the actual demonstration flights the group was divided into four groups of four pilots each. Each group was allotted forty minutes for the scripted demonstration.

The demonstration consisted of three different scenarios. Scenario “A” was the back-drive of the accident flight profile with no pilot interaction. Scenario “B” was the back-drive of the accident flight profile with the pilot taking over at any point during the

simulation. Scenario “C” allowed the pilot to attempt to fly the accident flight profile manually. For all scenarios during this E-cab simulator session, all airplane systems were normal. The weight, CG, altitude, and airspeed were set to match the NTSB supplied DFDR data.

(a) Group Simulator Run Schedule

Run	Scenario	Seat Flying	Comments
0	----	N/A	familiarization with cockpit “G” meter, fuel cutoff light right/left elevator display arming of Speed Brake handle
1	A	N/A	no stops
2	A	N/A	with stop sat various points during the profile
3	A	N/A	no stops
4	B	L1	left seat pilot (1) takes control at his discretion
5	B	R1	right seat pilot (1) takes control at his discretion
6	C	L1	left seat pilot (1) manually flies maneuver.
7	C	R1	right seat pilot (1) manually flies maneuver.
8	B	L2	left seat pilot (2) takes control at his discretion
9	B	R2	right seat pilot (2) takes control at his discretion
10	C	L2	left seat pilot (2) manually flies maneuver.
11	C	R2	right seat pilot (2) manually flies maneuver.

3. Group Conclusions:

- ✈ E-cab closely replicates the flight characteristics of the Boeing 767-300.
- ✈ The forward column force that was required to follow the accident airplane's profile was proportional to the airspeed of the airplane.
- ✈ Continued forward push is required to maintain "0" g.
- ✈ The transition from the primary flight instruments to the standby flight instruments was easily accomplished.
- ✈ When attempting to manually recover from the accident airplane's DFDR profile, care must be exercised to avoid high "G" loads and the stick shaker.
- ✈ The airplane is capable of a hands-off recovery (phugoid).
- ✈ If correct QRH procedures are followed, engines will restart at almost any place in the accident flight profile.
- ✈ The operation of the Hydraulic Driven Generator[24] (HDG) was not observed during the back-drive scenarios. It was not determined if the E-cab was set-up to display the operation of the HDG. This question will be passed to the systems group.
- ✈ During an attempted recovery from the accident flight's profile, longitudinal (stabilizer) trim is available to assist in reducing control loads.

Demonstration of System Failures:

- ✈ With the loss of left and right hydraulic systems, full control of the airplane can be maintained.
- ✈ With the application of an erroneous activation of the stick nudger (25# of down force):

    1. With autopilot engaged airplane will maintain desired flightpath.
    2. With autopilot disengaged, nudger is easily overcome and airplane is completely controllable.

B. 767 SPLIT ELEVATOR GROUND TEST

1. Objectives of Split Column Test

Allow pilots to experience the amount of stick movement and force required to replicate the elevator split recorded on the accident flight's DFDR and demonstrate the airplane's elevator system override.

2. Split Elevator Test Airplane QV002

The test set to demonstrate the forces required to split the elevators during simulated high speed flight. Pitot and static pressures were applied to the captain's, first officer's, auxiliary #1, auxiliary #2 systems, and the alternate static systems to simulate high airspeed. The stabilizer trim was set to approximately three units airplane nose up (ANU) and airspeed of 420 knots was simulated.

[24] The HDG is a required airplane component for ETOPS operation.

3. Test Scenarios:

The same pilot paring that was used in the E-cab simulation was used during this ground test. The following scenarios were demonstrated to each pair of pilots.

- ✈ Sweep the column from neutral to full forward, to neutral and the full aft. Conduct sweep for each pilot.
- ✈ Engage the elevator system overrides by pulling the captain's control column full aft while simultaneously pushing the first officer's control column full forward.
- ✈ Engage the elevator system overrides by pulling the captain's control column aft to achieve a left elevator surface position of -3^0 trailing edge up (TEU) and pushing the first officer's control column forward to achieve a right elevator surface position of $+1^0$ trailing edge down (TED).
- ✈ Engage the elevator system overrides by pulling the captains' control column aft to achieve a left elevator surface position of -1^0 TEU and pushing the first officer's control column forward to achieve a right elevator surface position of $+2^0$ TED.
- ✈ Engage the elevator system overrides by pulling the captain's control column aft to achieve a left elevator surface position of -4^0 TEU and pushing the first officer's control column forward to achieve a right elevator surface position of $+3^0$ TED.

3. Group Conclusions:

- ✈ Observed that the columns would split.
- ✈ When columns did split, it was smooth and almost unnoticeable.
- ✈ All forces required during the tests were high, but within the capability of all pilots.