EGYPTIAN MINISTRY OF CIVIL AVIATION

ADDENDUM #1 TO THE FACTUAL REPORT[1]
OF
INVESTIGATION OF ACCIDENT

Flash Airlines flight 604

January 3, 2004

Boeing 737-300 SU-ZCF

Red Sea off Sharm El-Sheikh, Egypt

July 20, 2005

[1] The information in this addendum complement the information included in the factual report issued on November 2004

Contents[2]

[2] Items marked in yellow background are the newly added items

- Captain's flying proficiency and cockpit style from fellow pilots, instructors, and/or check pilots.
- *Flash Airlines chief pilot view regarding the departure procedure from SSH, based on company procedures.*
- *Number of departures from SSH previously made by the captain (day and night)*
- *The captain's time on Russian aircraft (MiG-21). (dates and number of hours). ADI display configuration in comparison with B737-300 ADI display.*
- *The captain's time on American military transport aircrafts (C130). (dates and number of hours). ADI display configuration in comparison with B737-300 ADI display.*

1.5.2 The F/O

1.5.2.1 General

1.5.2.2 Background Information

i- Beginning of his flying career.

ii- All airlines worked for prior to Flash Air .

iii- "All" F/O training records at Flash (including his last recurrent training.

iv- Personal situation.

1.5.2.3 (72-hour) history of the F/O

1.5.2.4 Interviewing the individuals who trained and flew with the F/O (including ground and simulator instructors)

1.5.2.5 Interviewing CAA inspectors who flew with F/O.

1.5.2.6 Interviewing former head of operations at Flash Airlines

1.5.2.7 Additional factual documentation:(F/O)

- Number of days the F/O had been working since his last day off.
- F/O interpersonal characteristics, including perceptions of fellow pilots regarding their capability for assertiveness.
- Reported proficiency information. Outcome and comments from training records and proficiency check forms.
- Spatial disorientation or upset recovery training received at Flash Air
- F/O's flying proficiency and cockpit style from fellow pilots, instructors, and/or check pilots.

1.5.3 The Observer

General

Beginning of his flying career

Interview with Brother of observer Pilot

CAA regulations regarding observation time

- HEA_PQ294_FDR_data.pdf (FDR Data accident flight - Boeing -26 Feb 04 Fig's 1, 2)
- HEA_PQ294_kincon (includes roll rate).pdf (FDR Data accident flight - plotted by Boeing (some selected parameters)-26 Feb 04 Fig's 3, 4
- HEA_PQ294_WindsSIM29402to29442.pdf (26 Feb 04 Fig's 23- 25
- 17871 encl 4 (B-H200-17871-ASI 31 March 2004).pdf (enclosure 4 (B-H200-17871-ASI 31 March 2004). Boeing plots
- M Cab Recovery (Piloted Recovery.xls)
- Simulation Scenario (Simulation Scenario Status20 Sep.,04.xls)
- Simulation Scenario (Simulation Scenario Status 27-30 Sep, 04.xls)

1.16.1.4. Simulated Failures:

- HEA_PQ294_Simulated_Failures Spoilers, LE Slats.pdf (FDR-norm simulation-simulation with spoilers failures)
    - Right outboard flight spoilers (#7) Hardover simulation (hardover starts at 92391)
    - Left outboard flight spoilers (#2) Hardover simulation (hardover starts at 92391)
    - Right outboard flight spoilers (#7) Float simulation (floats starts at 92391)
    - Left outboard flight spoilers (#2) Float simulation (floats starts at 92391)
    - Critical right wing leading edge slat # 6 extends
    - Critical left wing leading edge slat # 1 extends
- Fig 40-43 Lateral Control Jams.pdf (FDR, normal simulation, simulation with spoilers fault)
    - Longitudinal Axis, simulated right wing spoiler cable jam
    - Longitudinal Axis, simulated F/O’s wheel jam
- Hypothetical Scenario, Right Side Cable Jam Induces Right Roll (Right Side Cable Jam Effects.ppt)

1.16.1.5. FDR 25 Hour Data- Observations (CairoMarch04Slides (March Progress Meeting - Cairo).pdf)

1.16.1.6. FDR-CVR Overlay

FDR-CVROverlay.pdf, FDR-CVR Overlay 3R2.pdf (21-June 2004)

CVR- FDR Correlation (CVRFDRCorrelation-1 NTSB.xls)

1.16.1.7. Ailerons system

- IPC wheel posn xducer PW.pdf (Details about the wheel posn xducer- Part Catalog Maintenance)
- CairoMarch04Slides (March Progress Meeting - Cairo).pdf

- Aileron PCU Control Valve.ppt
- ControlWheelBias.pdf, CairoMarch04Slides (March Progress Meeting - Cairo).pdf
- AileronFloat.pdf (PQ294 FDR Aileron Position, Aileron Float from Airload)
- M-Cab Wheel (Flight Director Results Boeing.xls)
- Force vs Wheel.ppt
- Cor8tmp PCU correction.ppt
- Aileron PCU EQA Field Note Summary (Aileron PCU EQA Field Note Summary.ppt)
- Aileron PCU EQA Report (Aileron PCU EQA Report.pdf)

1.16.1.8. Master Caution:
CairoMarch04Slides (March Progress Meeting - Cairo).pdf

1.16.1.9. Auto Flight Systems

- 17833 (B-H200-17833-ASI 12 Feb 2004).pdf
- CairoMarch04Slides (March Progress Meeting - Cairo).pdf
  - Relevant Figures
  - 737-300 (PQ294) Flight Director Control Law (see also FDControlLaw.pdf file)
  - HSI Display
  - Times of Example Display Photos
- M-Cab Flight Director Commands (Flight Director Results Boeing.xls)
- Display Architecture (Display Architecture.ppt)
- Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress Meeting - Cairo.pdf
  - Autopilot Engagement
    - Observation
    - Autopilot Engage Logic
    - Autopilot Engage Attempt- with Time Aligned Data
    - Autopilot Engage Attempt- with CVR Data
    - Estimated Autopilot Availability
- AP Actuator description and Scenario 12 info b.pdf, AP Actuator description and Scenario 12 info 2.ppt
- Scenario 12 ver 2.ppt (Rev - 3 Feb 05)
- Honeywell SP-300 DFCS B737-300.ppt
- Flash Airlines Presentation SP-300 DFCS Health Monitoring Honeywell.ppt

1.16.1.10. Flash Airlines AI236 RAM Simulator Configuration (Flash Airlines AI236 RAM Simulator Configuration.htm, Program_Pins.pdf)

1.16.1.11. Boeing response to raised questions.doc
References
17833 (B-H200-17833-ASI 12 Feb 2004).pdf

CairoMarch04Slides (March Progress Meeting - Cairo).pdf
17848 (B-H200-17848-ASI 04 March 2004).pdf
Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress
Flash Airlines Autopilot Answer to Questions - 31 Jan 2005.ppt
Answers to question_cairo meeting05.ppt
Action Item Response.ppt (Cairo meeting, 1-30-05 to 2-2-05)

1.16.2. *Tests and researches conducted by NTSB:*
c.wheel Dennis Grossi NTSB.ppt

1.16.3. *Tests and researches conducted by BEA*
(Trajecto_may05.jpg)

1.16.4. *Tests and researches conducted by MCA:*
Spatial Disorientation Studies

1.16.5 Systems examination:

- 1.16.5.1 *Cause(s) for the autopilot disconnect* (applied also to the accident aircraft)
- 1.16.5.2 *Cause(s) for "Heading Select" disengage when the autopilot is engaged* (applied also to the accident aircraft)
- 1.16.5.3 *Availability of autopilot during the captain's requests "autopilot, autopilot"* (accident aircraft)
- 1.16.5.4 *MMEL issues associated with operating the airplane with FD TO/GA mode inoperative (won't stay engaged)*
- 1.16.5.5 *Interlock logic for A/P with the definition of the likelyhood (ruled out, not likely, unknown) to the various interlocks regarding the role they may have played in the autopilot disengagement*
- 1.16.5.6 *The effects of the TOGA bit dropping out and way it affects the command bars*.
- 1.16.5.7 *Examination of the selected course compared to the selected heading (probability for having "dropouts").*

1.16.6 CVR examination:

- *1.16.6.1 Examination of the CVR recording for indications of A/P and heading select switch noises*
- *1.16.6.2 Examination of CVR at 2.58.15 (when the MSR crew says that they heard a message from Flash on 121.5).*

1.16.7 FDR examination:

- *1.16.7.1 Spatial disorientation study of the accident flight based on the recorded FDR data*

1.16.8 Aileron PCU inspection and teardown (EQA report).

1.17 Organizational and Management Information

1.17.1 Flash Airlines

- 1.17.1.1 Flash Airlines Air Operator Certificate (AOC)

- 1.17.1.2 History
- 1.17.1.3 Personnels Training and Authorization
  - 1.17.1.3.1 Maintenance Engineers
  - 1.17.1.3.2 Cockpit Crews

1.17.2 Review of oversight by ECAA on 2003

1.17.3 Relevant Flash Airlines procedures 1.18.3. Relevant Flash Airlines procedures:

- 1.17.3.1 Flash Airlines procedures regarding use of autopilot when recovering from unusual attitudes
- 1.17.3.2 Flash Airlines procedures regarding Upset Recovery training
- 1.17.3.3 Flash Airlines procedures regarding “training about PNF assuming control when the PF is not responding to situations, callouts"
- 1.17.3.4 Flash Airlines training/operational information regarding intervention by the non-flying pilot when the flying pilot fails to respond to calls for correcting an unsafe situation.
- 1.17.3.5 Regularity (or irregularity) rules regarding sleeping schedules on and off-duty. Strategies for obtaining adequate rest and managing crew on-duty alertness
- 1.17.3.6 General description about Flash Airline.
- 1.17.3.7 Labor management issues, growth trends, and main competitors.
- 1.17.3.8 Egyptian requirements for the training of pilots at an airline such as Flash Airlines.
- 1.17.3.9 The training that was actually provided to all Flash Airlines
- 1.17.3.10 Flash Airlines procedures regarding pilots training and checking on operation of the auto flight system.
- 1.17.3.11 Flash Airlines program for training and checking pilots in the field of CRM and human factors (as contained in the company training manual)
- 1.17.3.12 Flash Airlines pilots procedures for training and checking pilots on spatial disorientation countermeasures and upset
- 1.17.3.13 Flash Airlines policies regarding use of CRM
- 1.17.3.14 Flash Airlines policies relating to assertiveness and company guidelines as to when a first officer should take control of an aircraft from a captain. .
- 1.17.3.15 Flash Air general company policies related to crew communication, assertiveness, and other CRM-related behaviors
- 1.17.3.16 Flash Airlines policies regarding use of the auto flight system
- 1.17.3.17 Regulations governing operators (like Flash Airlines) regarding Oversight audits by ECAA.
- 1.17.3.18 Details about the ECAA oversight audit on Flash Airlines

1.17.3.19 Outcomes of Oversight audits (previous violations, fines, or bans levied by ECAA)
1.17.3.20 Previous violations, fines, or bans levied foreign aviation regulatory agencies.
1.17.3.21 Selected additional information regarding Flash Airlines Organization.
1.17.3.22 Airline Simulator program contract with RAM, ECAA letter of approval
1.17.3.23 Simulator used by Flash Airlines at RAM.
1.17.3.24 *Flash Airlines procedures regarding which pilot (PF or PNF) engages the autopilot, Boeing recommended practice*
1.17.3.25 Additional information regarding dispatch from SSH
A- All departures from SSH (accident aircraft)
B- Extension of the outbound legs before beginning the turn

1.18 Additional Information

1.19 New Investigation Techniques

1.19.1 Spatial disorientation :

Definition
The way the SD works
Crew fatigue
Human related factors

Exhibit A Maintenance Records Group Factual Report

Exhibit B FDR Group Factual Report

- Attachment 1, Tabular data of the accident flight.
- Attachment 2, FDR Plots
- Attachment 3, five plots represent FDR and CVR correlation
- Attachment 4, Summaries of previous flights of the accident aircraft

Exhibit C CVR Group Factual Report

- CVR Group Factual Report
- Accident flight plan (copy of the flight plan referred to by ATC at 02:38:05 in the CVR transcript)
- Spelling corrections

Exhibit D Airplane Performance Group Factual Report

- Airplane Performance Group Factual Report
- Radar Spec formatted.doc (to complement the item C.2 Radar Data, General specification).

Exhibit E Site and Wreckage Group Factual Report

Exhibit F Operation Group Factual Report

New Content versus the old contents

<table>
<tr><th>Old Content</th><th>New Content</th></tr>
<tr><td>
Contents
1. Factual Information
1.1 History of Flight
1.2 Injury to persons
1.3 Damage to Aircraft
1.4 Other Damage
1.5 Personnel Information
1.5.1 The captain
General
</td><td>
Contents
1. Factual Information
1.1 History of Flight
1.2 Injury to persons
1.3 Damage to Aircraft
1.4 Other Damage
1.5 Personnel Information
1.5.1 The captain
1.5.1.1 General
1.5.1.2 Background information
i- Beginning of his flying career.
ii- All airlines worked for prior to Flash Air
iii- History of military and civilian employment as pilot
iv- Retirement dates
v- NA
vi- "All" captain's training records (including his last recurrent
</td></tr>
</table>

	training. vii- Personal situation 1.5.1.3 (72-hour) history of the captain 1.5.1.4 Interviewing the individuals who trained and flew with the captain (including ground and simulator instructors) 1.5.1.5 Interviewing CAA inspectors who flew with captain. 1.5.1.6 Interviewing former head of operations at Flash Airlines 1.5.1.7 Additional factual documentation: (Captain) - Number of days the captain had been working since his last day off. - Captain interpersonal characteristics, including perceptions of fellow pilots regarding their capability for assertiveness. - Familiarity of the two flight crew members with each other. (Including number of legs flown together this trip, number of legs flown together in the last 30 days. - Description of how well the flying crew got along. - Reported proficiency

	information. Outcome and comments from training records and proficiency check forms. - Spatial disorientation or upset recovery training received at Flash Air or in the military. - Captain's flying proficiency and cockpit style from fellow pilots, instructors, and/or check pilots. - *Flash Airlines chief pilot view regarding the departure procedure from SSH, based on company procedures*. - *Number of departures from SSH previously made by the captain (day and night)* - *The captain's time on Russian aircraft (MiG-21). (dates and number of hours). ADI display configuration in comparison with B737-300 ADI display.* - ***The captain's time on American military transport aircrafts (C130). (dates and number of hours). ADI display configuration in comparison with B737-300 ADI display.***
1.5.2 The F/O General	1.5.2 The F/O 1.5.2.1 General

	1.5.2.2 Background Information i- Beginning of his flying career. ii- All airlines worked for prior to Flash Air iii- "All" F/O training records at Flash (including his last recurrent training. iv- Personal situation 1.5.2.3 (72-hour) history of the F/O 1.5.2.4 Interviewing the individuals who trained and flew with the F/O (including ground and simulator instructors) 1.5.2.5 Interviewing CAA inspectors who flew with F/O. 1.5.2.6 Interviewing former head of operations at Flash Airlines 1.5.2.7 Additional factual documentation:(F/O) - Number of days the F/O had been working since his last day off. - F/O interpersonal characteristics, including perceptions of fellow pilots regarding their capability for assertiveness. - Reported proficiency information. Outcome and comments from training records and proficiency check forms.

	- Spatial disorientation or upset recovery training received at Flash Air - F/O's flying proficiency and cockpit style from fellow pilots, instructors, and/or check pilots.
1.5.3 The Observer General	1.5.3 The Observer General Beginning of his flying career Interview with Brother of observer Pilot CAA regulations regarding observation time Flash Airline policy regarding observation time
1.5.4 Maintenance Engineer 1.6 Airplane Information 1.6.1 Airplane History 1.6.2 Cockpit Instrumentation 1.6.2.1 Electronic Attitude Direction Indicator (EADI) 1.6.2.2 Electronic Horizontal Situation Indicator (EHSI) 1.6.3 Lateral Flight Control System 1.6.4 Autoflight System 1.6.4.1 Autopilot System 1.6.4.2 DFCS Mode	1.5.4 Maintenance Engineer 1.6 Airplane Information 1.6.1 Airplane History 1.6.2 Cockpit Instrumentation 1.6.2.1 Electronic Attitude Direction Indicator (EADI) 1.6.2.2 Electronic Horizontal Situation Indicator (EHSI) 1.6.3 Lateral Flight Control System 1.6.4 Autoflight System 1.6.4.1 Autopilot System 1.6.4.2 DFCS Mode Operation of the FD vertical bar with "Heading Select" disengagement as the AP engages.

1.6.4.3 Flight Director 1.6.5 Engines 1.6.6 Airplane Maintenance 1.6.6.1 Maintenance Records 1.6.6.1.1 Maintenance Program Summary- Flash Airlines B737-300 1.6.6.1.2 Last Heavy Check 1.6.6.1.3 Repairs and Alterations 1.6.6.1.4 Aircraft Total Hours and Cycles 1.6.6.1.5 Weight and Balance Summary 1.6.6.1.6 Engines CFM56-3C-1 1.6.6.1.7 Engines Monitoring System 1.6.6.1.8 Flight Data Recorder/ Cockpit Voice Recorder 1.6.6.1.9 Aircraft Status 1.6.6.1.9.1 Minimum Equipment List (MEL) 1.6.6.1.9.2 Aircraft Condition Report (A/C Deferred Defects) 1.6.6.1.9.3 Type Certificate Data Sheet 1.6.6.1.9.4 Supplemental Type certificate 1.6.6.1.9.5 Aircraft Directives (AD’s) and Service Bulletins (SB) Summary	1.6.4.3 Flight Director 1.6.5 Engines 1.6.6 Airplane Maintenance 1.6.6.1 Maintenance Records 1.6.6.1.1 Maintenance Program Summary- Flash Airlines B737-300 1.6.6.1.2 Last Heavy Check 1.6.6.1.3 Repairs and Alterations 1.6.6.1.4 Aircraft Total Hours and Cycles 1.6.6.1.5 Weight and Balance Summary 1.6.6.1.6 Engines CFM56-3C-1 1.6.6.1.7 Engines Monitoring System 1.6.6.1.8 Flight Data Recorder/ Cockpit Voice Recorder 1.6.6.1.9 Aircraft Status 1.6.6.1.9.1 Minimum Equipment List (MEL) 1.6.6.1.9.2 Aircraft Condition Report (A/C Deferred Defects) 1.6.6.1.9.3 Type Certificate Data Sheet 1.6.6.1.9.4 Supplemental Type certificate 1.6.6.1.9.5 Aircraft Directives (AD’s) and Service Bulletins (SB) Summary

1.6.6.1.9.6 Prior Discrepancies/ Accidents Involvement SU-ZCF 1.6.6.1.9.7 Logbook Forms 1.6.6.2 Contracted Repair Stations Listing 1.6.6.3 Maintenance Performance on the A/C before the Accident Flight 1.6.7 Weight and Balance 1.7 Meteorological Information 1.8 Aids to Navigation 1.8.1 Maps, charts, etc. 1.8.2 Sharm el-Sheikh Radar 1.8.3 Hurgada Radar 1.9 Communications 1.9.1 ATC communications/ Transcript 1.10 Aerodrome Information 1.11 Flight Recorders	1.6.6.1.9.6 Prior Discrepancies/ Accidents Involvement SU-ZCF 1.6.6.1.9.7 Logbook Forms 1.6.6.2 Contracted Repair Stations Listing 1.6.6.3 Maintenance Performance on the A/C before the Accident Flight 1.6.6.4 The maintenance log sheets for the flights after 12/31/03 1.6.6.5 The lack of write-ups on the TOGA problem and slat indication that existed on the entire 25-hours of FDR. (maintenance action done. MEL implications) 1.6.7 Weight and Balance 1.7 Meteorological Information 1.8 Aids to Navigation 1.8.1 Maps, charts, etc. 1.8.2 Sharm el-Sheikh Radar 1.8.3 Hurgada Radar 1.9 Communications 1.9.1 ATC communications/ Transcript 1.10 Aerodrome Information 1.11 Flight Recorders

1.11.1 Flight Data Recorder	1.11.1 Flight Data Recorder
1.11.2 Cockpit Voice Recorder	1.11.2 Cockpit Voice Recorder
1.12 Wreckage and Impact Information	1.12 Wreckage and Impact Information
1.12.1 Scope of Sight and Wreckage group Field Note	1.12.1 Scope of Sight and Wreckage group Field Note
1.12.2 Recovery Operation	1.12.2 Recovery Operation
1.12.3 Partial List of the Recovered Wreckage	1.12.3 Partial List of the Recovered Wreckage
1.12.4 Initial Observation	1.12.4 Initial Observation
1.12.5 Wreckage Databases and Photos	1.12.5 Wreckage Databases and Photos
1.13 Medical and Pathological Information	1.13 Medical and Pathological Information
	1.13.1. Egyptian Air Force – Medical Board Report
	1.13.2. Medical factors related to SD (Spatial Disorientation)
	A. FAA advisory Circular regarding SD
	B- MCA study regarding SD
	C- Medical records for the captain related to any of the conditions conducive to spatial disorientation.
	1.13.3. Most recent medical certification.
	1.13.4. General health information for each crew member
	1.13.5. Toxicological testing .
	1.13.6. Last civil medical check for Captain
1.14 Fire	1.14 Fire
1.15 Survival Aspects	1.15 Survival Aspects
1.16 Tests and Research	1.16 Tests and Research
1.16.1 Performance Evaluation	*1.16.1. Tests and researches conducted by Boeing and Honeywell:*
1.16.2 Baseline Simulation	
1.16.3 Hypothetical Faults resulting in a rolling moment	1.16.1.0. General Overview of Boeing Process_ Kinematic Consistency:
1.16.4 Multi-Purpose Engineering Cab Simulator	
1.16.4.1 Tests conducted in the M-Cab	(CairoMarch04Slides March Progress Meeting

	- Cairo.pdf) (Kincon and Simulation.ppt) 1.16.1.1. Estimated accident flight path, calculated from FDR data: (FlightPathMap.pdf) 1.16.1.2. FDR data plots (presented by Boeing) - FDR Data accident flight - FDR plot.pdf (some selected parameters 24 Feb 04) ▪ Longitudinal axis ▪ Lateral axis - FIG_1_LATERAL_EVENT.pdf (Time aligned FDR data 28 March 05) Overbank during A/P turn- Lateral axis - FIG_2_LONG_EVENT.pdf (Time aligned FDR data 28 March 05) Overbank during A/P turn- Longitudinal axis - FIG_3_LATERAL_GROUNDROLL_TAKEOFF.pdf (Time aligned FDR data 28 March 05) Overbank during A/P turn- Lateral axis, Ground Roll - FIG_4_LATERAL_AFTER_EVENT_TRIM.pdf (Time aligned FDR data 28 March 05) Overbank during A/P turn- Lateral axis, Climbout after event - FDR Parameter Review, B-H200-17884-ASI, 3 May 2004 (ATT For Decoding Grid.pdf) 1.16.1.3. Simulator Match accident flight:

	- SimMatchaccidentflight 24-2-04.pdf (Simulation Match, FDR-Kincon-Simulation) - SimMatchpreviousflight 24-2-04.pdf (FDR-Kincon-Simulation match 24-2-04) - HEA_PQ294_prevfltSIM.pdf (26 Feb 2004, base lines, FDR-Kincon-Sim prvious flight) - HEA_PQ294_baselineSIM.pdf (26 Feb 2004, base lines, FDR-Kincon-Sim) - HEA_PQ294_FDR_data.pdf (FDR Data accident flight - Boeing -26 Feb 04 Fig's 1, 2) - HEA_PQ294_kincon (includes roll rate).pdf (FDR Data accident flight - plotted by Boeing (some selected parameters)-26 Feb 04 Fig's 3, 4 - HEA_PQ294_WindsSIM29402to29442.pdf (26 Feb 04 Fig's 23- 25 - 17871 encl 4 (B-H200-17871-ASI 31 March 2004).pdf (enclosure 4 (B-H200-17871-ASI 31 March 2004). Boeing plots - M Cab Recovery (Piloted Recovery.xls) - Simulation Scenario (Simulation Scenario Status20 Sep.,04.xls) - Simulation Scenario (Simulation Scenario Status 27-30 Sep, 04.xls) 1.16.1.4. Simulated Failures: - HEA_PQ294_Simulated_Failures Spoilers, LE Slats.pdf (FDR-norm

	simulation-simulation with spoilers failures) ▪ Right outboard flight spoilers (#7) Hardover simulation (hardover starts at 92391) ▪ Left outboard flight spoilers (#2) Hardover simulation (hardover starts at 92391) ▪ Right outboard flight spoilers (#7) Float simulation (floats starts at 92391) ▪ Left outboard flight spoilers (#2) Float simulation (floats starts at 92391) ▪ Critical right wing leading edge slat # 6 extends ▪ Critical left wing leading edge slat # 1 extends - Fig 40-43 Lateral Control Jams.pdf (FDR, normal simulation, simulation with spoilers fault) ▪ Longitudinal Axis, simulated right wing spoiler cable jam ▪ Longitudinal Axis, simulated F/O's wheel jam - Hypothetical Scenario, Right Side Cable Jam Induces Right Roll (Right Side Cable Jam Effects.ppt) 1.16.1.5. FDR 25 Hour Data- Observations (CairoMarch04Slides (March Progress Meeting - Cairo).pdf)

	1.16.1.6. FDR-CVR Overlay FDR-CVROverlay.pdf, FDR-CVR Overlay 3R2.pdf (21-June 2004) CVR- FDR Correlation (CVRFDRCorrelation-1 NTSB.xls) 1.16.1.7. Ailerons system - IPC wheel posn xducer PW.pdf (Details about the wheel posn xducer- Part Catalog Maintenance) - CairoMarch04Slides (March Progress Meeting - Cairo).pdf - Aileron PCU Control Valve.ppt - ControlWheelBias.pdf, CairoMarch04Slides (March Progress Meeting - Cairo).pdf - AileronFloat.pdf (PQ294 FDR Aileron Position, Aileron Float from Airload) - M-Cab Wheel (Flight Director Results Boeing.xls) - Force vs Wheel.ppt - Cor8tmp PCU correction.ppt - Aileron PCU EQA Field Note Summary (Aileron PCU EQA Field Note Summary.ppt) - Aileron PCU EQA Report (Aileron PCU EQA Report.pdf) 1.16.1.8. Master Caution: CairoMarch04Slides (March Progress Meeting - Cairo).pdf

	1.16.1.9. Auto Flight Systems - 17833 (B-H200-17833-ASI 12 Feb 2004).pdf - CairoMarch04Slides (March Progress Meeting - Cairo).pdf ▪ Relevant Figures ▪ 737-300 (PQ294) Flight Director Control Law (see also FDControlLaw.pdf file) ▪ FD Display ▪ Times of Example Display Photos - M-Cab Flight Director Commands (Flight Director Results Boeing.xls) - Display Architecture (Display Architecture.ppt) - Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress Meeting - Cairo.pdf ▪ Autopilot Engagement o Observation o Autopilot Engage Logic o Autopilot Engage Attempt- with Time Aligned Data o Autopilot Engage Attempt- with CVR Data o Estimated Autopilot Availability - AP Actuator description and Scenario 12 info b.pdf, AP Actuator description and Scenario 12 info 2.ppt - Scenario 12 ver 2.ppt (Rev - 3 Feb 05)

	- Honeywell SP-300 DFCS B737-300.ppt - Flash Airlines Presentation SP-300 DFCS Health Monitoring Honeywell.ppt 1.16.1.10. Flash Airlines AI236 RAM Simulator Configuration (Flash Airlines AI236 RAM Simulator Configuration.htm, Program_Pins.pdf) 1.16.1.11. Boeing response to raised questions.doc References 17833 (B-H200-17833-ASI 12 Feb 2004).pdf CairoMarch04Slides (March Progress Meeting - Cairo).pdf 17848 (B-H200-17848-ASI 04 March 2004).pdf Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress Flash Airlines Autopilot Answer to Questions - 31 Jan 2005.ppt Answers to question_cairo meeting05.ppt Action Item Response.ppt (Cairo meeting, 1-30-05 to 2-2-05) 1.16.2. *Tests and researches conducted by NTSB:* *c.wheel Dennis Grossi NTSB.ppt*

	1.16.3. *Tests and researches conducted by BEA (Trajecto_may05.jpg)* 1.16.4. *Tests and researches conducted by MCA: Spatial Disorientation Studies* 1.16.5 Systems examination: 1.16.5.1 *Cause(s) for the autopilot disconnect* (applied also to the accident aircraft) 1.16.5.2 *Cause(s) for "Heading Select" disengage when the autopilot is engaged* (applied also to the accident aircraft) 1.16.5.3 *Availability of autopilot during the captain's requests "autopilot, autopilot"* (accident aircraft) 1.16.5.4 *MMEL issues associated with operating the airplane with FD TO/GA mode inoperative (won't stay engaged)* 1.16.5.5 *Interlock logic for A/P with the definition of the likelyhood (ruled out, not likely, unknown) to the various interlocks regarding the role they may have played in the autopilot disengagement* 1.16.5.6 *The effects of the TOGA bit dropping out and way it affects*

1.17 Organizational and Management Information 1.17.1 Flash Airlines 1.17.1.1 Flash Airlines Air Operator Certificate (AOC) 1.17.1.2 History 1.17.1.3 Personnels Training and Authorization 1.17.1.3.1 Maintenance Engineers Cockpit Crews 1.17.2 Review of oversight by ECAA on 2003	*the command bars*. 1.16.5.7 *Examination of the selected course compared to the selected heading (probability for having "dropouts").* *1.16.6 CVR examination:* *1.16.6.1 Examination of the CVR recording for indications of A/P and heading select switch noises* *1.16.6.2 Examination of CVR at 2.58.15 (when the MSR crew says that they heard a message from Flash on 121.5).* *1.16.7 FDR examination:* *1.16.7.1 Spatial disorientation study of the accident flight based on the recorded FDR data AI 081* *1.16.8 Aileron PCU inspection and teardown (EQA report):* 1.17 Organizational and Management Information 1.17.1 Flash Airlines 1.17.1.1 Flash Airlines Air Operator Certificate (AOC) 1.17.1.2 History 1.17.1.2 Personnels Training and Authorization 1.17.1.2.1. Maintenance Engineers 1.17.1.2.2. Cockpit Crews 1.17.2 Review of oversight by ECAA on 2003

	1.17.3 Relevant Flash Airlines procedures 1.18.3. Relevant Flash Airlines procedures: 1.17.3.1 Flash Airlines procedures regarding use of autopilot when recovering from unusual attitudes 1.17.3.2 Flash Airlines procedures regarding Upset Recovery training 1.17.3.3 Flash Airlines procedures regarding "training about PNF assuming control when the PF is not responding to situations, callouts" 1.17.3.4 *Flash Airlines training/operational information regarding intervention by the non-flying pilot when the flying pilot fails to respond to calls for correcting an unsafe situation*. 1.17.3.5 Regularity (or irregularity) rules regarding sleeping schedules on and off-duty. Strategies for obtaining adequate rest and managing crew on-duty alertness 1.17.3.6 General description about Flash Airline. 1.17.3.7 Labor management issues, growth trends, and main competitors. 1.17.3.8 Egyptian requirements for the training of pilots at an airline such as Flash Airlines. 1.17.3.9 The training that was actually provided to all Flash Airlines

	1.17.3.10 Flash Airlines procedures regarding pilots training and checking on operation of the auto flight system. AI 204 1.17.3.11 Flash Airlines program for training and checking pilots in the field of CRM and human factors (as contained in the company training manual) 1.17.3.12 Flash Airlines pilots procedures for training and checking pilots on spatial disorientation countermeasures and upset 1.17.3.13 Flash Airlines policies regarding use of CRM. 1.17.3.14 Flash Airlines policies relating to assertiveness and company guidelines as to when a first officer should take control of an aircraft from a captain. *1.17.3.15 Flash Air general company policies related to crew communication, assertiveness, and other CRM-related behaviors* 1.17.3.16 Flash Airlines policies regarding use of the auto flight system 1.17.3.17 Regulations governing operators (like Flash Airlines) regarding Oversight audits by ECAA. 1.17.3.18 Details about the ECAA oversight audit on Flash Airlines 1.17.3.19 Outcomes of Oversight audits (previous violations, fines, or bans levied by ECAA)

	1.17.3.20 Previous violations, fines, or bans levied foreign aviation regulatory agencies. 1.17.3.21 Selected additional information regarding Flash Airlines Organization. 1.17.3.22 Airline Simulator program contract with RAM, ECAA letter of approval 1.17.3.23 Simulator used by Flash Airlines at RAM, 1.17.3.24 *Flash Airlines procedures regarding which pilot (PF or PNF) engages the autopilot, Boeing recommended practice* 1.17.3.25 Additional information regarding dispatch from SSH A- All departures from SSH (accident aircraft) B- Extension of the outbound legs before beginning the turn
1.18 Additional Information 1.19 New Investigation Techniques	1.18 Additional Information 1.19 New Investigation Techniques 1.19.1 Spatial disorientation : Definition The way the SD works Crew fatigue Human related factors
Exhibit A Maintenance Records Group Factual Report Exhibit B FDR Group Factual Report	Exhibit A Maintenance Records Group Factual Report Exhibit B FDR Group Factual Report Attachment 1, Tabular data of the accident flight. Attachment 2, FDR Plots Attachment 3, five plots represent FDR and CVR

	correlation Attachment 4, Summaries of previous flights of the accident aircraft
Exhibit C CVR Group Factual Report	Exhibit C CVR Group Factual Report CVR Group Factual Report Accident flight plan (copy of the flight plan referred to by ATC at 02:38:05 in the CVR transcript)
Exhibit D Airplane Performance Group Factual Report	Exhibit D Airplane Performance Group Factual Report Airplane Performance Group Factual Report Radar Spec formatted.doc (to complement the item C.2 Radar Data, General specification)
Exhibit E Site and Wreckage Group Factual Report Exhibit F Operation Group Factual Report	Exhibit E Site and Wreckage Group Factual Report Exhibit F Operation Group Factual Report

1.5.1 The Captain

1.5.1.2. Background information.

i- Beginning of his flying career.
Refer to captain CV, and his training records item 1.5.1.2 (vi)

ii- All airlines worked for prior to Flash Air

- The captain joined the A.R.E. Military Aviation College on September 1968, and was graduated on May 1970
- He continued working as military pilot at A.R.E. Air Force since that date flying the L29, MIG17, MIG21, Buffalo (Dash 5), C130 types until he retired from the A.R.E. Air Force at the beginning of 2000
- He joined Scorpio Aviation working as a civil pilot on ATR 42 from March, 2000 up to December, 2001.
- He joined Flash Airline working as a civil pilot on B737-300 from February 2003 until 4 January 2004 (accident date)

(All his flying hours were flown as PIC)

iii- History of military and civilian employment as pilot
The captain flew as a fighter pilot on L29, Mig17, Mig21 since his graduation until 1983. He then flew as a military transport pilot from that date on Buffalo and C130 until his retirement from the Air Force at the beginning of 2000.
(Refer to previous item)

iv- Retirement dates from A.R.E Air Force.
Captain has retired from A.R.E. Air Force beginning of 2000

v- History of position flown for specific aircraft, and dates of upgrades (i.e., copilot to captain)
Refer to page 14 of the Factual Report

vi- "All" captain's training records (including his last recurrent training).

Curriculum Vitae:

(7)

C.V.

ersonal information:

Name:	Khedr abdalla saad said
Nationality:	Egyptian
Data of Birth:	February 26th ,1950.
place of Birth:	Cairo

ilot Qualifications & Certificates:

BSc. In aviation. Air Force Academy

ALT by Egyptian Civil Aviation Organization

R/T Communication License

ilot Courses:

Ground Courses:		Flight Courses	Experience
ilitary	Civil	Gomhoria	Pilot
L29	Gomhoria	L-29	Pilot
Mig-17	Dash-5	Mig-17	Pilot
Mig-21	C-130	Mig-21	Instructor
	ATR-42	Dash-5	Captain
		C-130	Captain and Instructor to all international route
		ATR-42	Captain

lying Hours:

Total Flying Hours:	6967.05
Total on jet A / C:	1009 hrs
Total Civil Time:	5958.05
Total Flying Hours as Instructor:	1967.54 hrs

All the documents are available upon request.

Certificate, A.R.E. Air Force Head Quarter, Training Department

(16)

A. R. E.
AIR FORCE H. Q.
TRAINING DEPARTMENT

CERTIFICATE

Date : 14-12-1999

Air training Department Certifies That : A-C / Khedr Abd Alah Saad Has Flown
on That Types of A/CS Gamhoria / L29 / Mig 15 / 17 / 21 / Boffalo / C130

Single Engine Aircraft								Total hours of the single engine		Multi Engine Aircraft												Total hours of multi Engines.		Total Time		Instrument Flying		Link Simulator	
Day				Night						Day						Night													
Dual		Solo		Dual		Solo				Dual		Solo		2 and pilot		Dual		Solo		2 and pilot									
HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min	HR.	Min
213	10	810	40	79	10	28	25	1091	25	83	–	3649	35	655	15	29	20	938	15	154	55	5343	20	6434	45	342	05	73	30

	HR.	Min
Total Flying Hours On Jet Aircraft .	1009	–
"" "" "" "" Prop Engine .	5425	45
Total Flying Hourse .	6434	45
"" "" "" instruction .	2417	45

Chief of Registering Branch
A.C. Rasmi Abd Elrouf
GAMAL

Chief of Training Dept .
Air Vice Marshal : Hosni Mohamed

Number of Training Flying Hours for Captain/ Khedr Abdallah at Scorpio Aviation (15 June 2000)

عدد ساعات الطيران التدريبي للطيار/

Date	FLT. .No	From	To	Block Time				No. of landings	Instructor
				Day		Night			
				H	M	H	M		
13 APR. 2000	335	AST	AST	03	00	–	–	8	GEO
13 APR 2000	336	AST	CAI	00	20	00	50	1	GEO
18 APR 2000	112	ASW	CAI	01	55	–	–	1	GEO
16.MAY 2000	333	CAI	AST	01	35	–	–	1	GEO
16 MAY 2000	335	AST	CAI	01	10	–	–	1	GEO
13 JUN 2000	112	ASW	CAI	02	05	–	–	1	GEO
28 APR 2000	131	CAI	ARG	01	15	–	–	1	POP
28 APR 2000	101	CAI	LXR	01	25	–	–	1	POP
15 JUN 2000	301	HRG	LXR	00	50	–	–	1	GEO
15 JUN 2000	301	LXR	LXR	00	30	–	–	2	GEO
				14	05	0	50		
TOTAL	14.55			14.55				18	GEO

شركة الطيران الدولية
سكوربيو

15. JUN. 2000
CPT GEORGEVEN

Proficiency Checks at Scorpio Aviation:
17 June 2000

Egyptian Civil Aviation Authority
Flight Safety Standards Sector
"Operations Inspectorate"

الهيئة المصرية العامة للطيران المدنى
قطاع السلامة الجوية
« التفتيش الجوى »

PROFICIENCY / QUALIFICATION CHECKLIST

REF. NO. ....

NAME OF PILOT/F.E. KHEDR ABDALLA

EMPLOYED BY SCORPIO AVIATION

BASE CAIRO

TYPE AIRCRAFT ATR-42

TYPE SIMULATION —

DATE OF CHECK 17 JUN. 2000

TYPE OF CHECK PROFICIENCY

INSPECTOR OR CHECK AIRMAN

NAME GEORGESCU

FLIGHT TIME 01 hrs 35 mins

SIMULATOR TIME — hrs — mins —

FLIGHT MANOEUVRES (S = Satisfactory, U = Unsatisfactory)

PILOT

	Aircraft	Simulator
PREFLIGHT		
Equipment examination (oral or written)	S	
pre-flight inspection	S	
Taxiing	S	
Powerplant checks	S	
TAKE-OFFS		
Normal	S	
Instrument	S	
Cross-wind	S	
With simulated powerplant failure	S	
Rejected take-off	S	
INSTRUMENT PROCEDURES		
Area departure	S	
Holding	S	
Area Arrival	S	
ILS approaches	S	
Other instrument approaches	S	
Circling approaches	S	
Missed approaches	S	
IN-FLIGHT MANOEUVRES		
Steep turns	S	
Approaches to stalls	S	
Specific flight characteristics	S	
Powerplant failure	S	
LANDINGS		
Normal	S	
From an ILS	S	
Cross-wind	S	
With simulated powerplant (s) failure	S	
Rejected landing	S	
From circling approach	S	
Normal and abnormal procedures	S	
Emergency procedures	S	
Judgement	S	

FLIGHT ENGINEER

ITEM	S	U
Equipment exam (oral or written)		
pre-flightcheck of aircraft		
Computation of fuel load and fuel loading procedure		
Completion of company approved forms		
Starting, taxi, and runup		
Powerplant control		
Cruise control and computations		
Aircraft/powerplant operation analysis		
Fuel system management		
Air condition and pressurization control		
Electrical system operation		
Powerplant fire control		
Emergency gear and flap extension		
Heater fire and cargo compartment fire		
Smoke evacuation		
Emergency depressurization		
Fuel dumping procedure		
Powerplant shutdown and restart		
De icing and anti icing		
Location and use of emergency equipment		
Emergencies Hydraulic, pressurization, etc.		
Crew co ordination and monitoring		

REMARKS:

TYPE RATING AS
PILOT IN COMMAND
ATR-42

GEORGESCU [illegible]
17. JUN. 2000 [illegible]

INSPECTOR OR CHECK AIRMAN SIGNATURE

ECAA - INSPECTION FORM (5/96) ICAO - DOC 8335 / C1

شركة الطيران الدولية
سكوربيو
١٧ ميدان أ...

Approved
ECAA Capt
A du Atel
inspector
17/6/2000

[illegible]

8 December 2000

SCORPIO AVIATION

FLIGHT OPERATION DEPARTMENT — **PROFICIENCY CHECK/QUALIFICATION FORM**

AIRMAN	KIDR ABD
A/C REGISTER MARK	SU-BMK
SEAT POSITION	CM1 ☒ CM2 ☐
CHECK PILOT	MAGDY Khaled ALLA
DATE	8-12-2000
AIRPORT	CAI
SIMULAT	SIMULATOR TIME…………
LOCAL FLIGHT	AC ☐ STICK TIME……….. T/O……LND……GA…… VIS.SIM. ☐ SIM TIME……
LINE FLIGHT	NUMBER OF LEGS………. AP…………………………

RECURMENT CHECK

1° CK SEMEST	☐	2° CK SEMEST	☐
LICENCE(IFR)	☐	NIL	
TYPE(ABILIT)	☐	NIL	
THEOR.EXAMIN	☐	NIL	
EMERG.EQUIPM.	☒	NIL	
PROFICIENCY	☒	PROFICIENCY	☐
CAT II QUALIF.	☐	CAT II QUALIF.	☐

QUALIFICATION CHECK

TYPE RATING	☐
LINE QUALIFICATION	☐
CAT II (DH…………RVR……….)	☐
IFR QUALIFICATION	☐

AIRMAN SELF-CERTIFICATION:

Nr. OF T/O and LDN last 3 months	☐
Nr. OF IFR APP. last 6 months	☐
Nr. OF Cat. II APP. last 6 months	☐
Airman signature ______________	

SPECIFIC ITEMS: S-SATISFACTORY, U-UNSATISFACTORY

SPECIFIC ITEMS	SIMULAT S	SIMULAT U	LOCAL FLIGHT S	LOCAL FLIGHT U	LINE FLIGHT S	LINE FLIGHT U
TECHNICAL KNOWLEDGE					✓	
FLIGHT PREPARATION & FUEL PLANNING					✓	
AIRCRAFT AND COCKPIT PREPARATION					✓	
NORMAL ENGINE START PROCEDURE					✓	
ENGINE START MALFUNCTIONS					✓	
GROUND OPERATION AND TAXING					✓	
TAKE OFF PROCEDURES					✓	
REJECTED TAKE OFF					✓	
ENGINE FAILURE AT V V1						
ENGINE OUT APPROACH AND LANDING					✓	
ENGINE OUT GO AROUND						
ABNORMAL CONFIGURATION APP. &LAN.					✓	
ABNORMAL PROCEDURES					✓	
CONDITIONAL PROCEDURES					✓	
EMERGENCY PROCEDURES					✓	
EMERGENCY EVALUATION						
DEPARTURE AREA COORDINATION					✓	
USE OF NAVIGATION SYSTEM					✓	
USE OF RADIO-AIDS ROUTE DOCUM.						
RADIO COMMUNICATIONS					✓	
IN FLIGHT NORMAL PROCEDURES					✓	
ENGINES AND FUEL MANAGEMENT					✓	
DESCENT PLANNING					✓	
MINIMUM SAFE ALTITUDE AWARENESS					✓	
TERMINAL AREA COORDINATION					✓	
INSTRUMENT APPROACH					✓	
VISUAL APPROACH						
LANDING TECHNIQUE						
GO-AROUND TECHNIQUE						
TIME AND POSITIVENESS OF REACTION					✓	
CREW COORDINATION					✓	
SUPER VISION OF CABIN ACTIVITY						
PUPLIC RELATIONS AND INFORMATION						
ECONOMIC AND COMMERCIAL ASPECTS						

REMARKS

Proficiency Check on ATR42.320
Satisfactory

SATISFACTORY	☒	CHECK PILOT SIGNATURE: MAGDY Khaled No.724
UNSATISFACTORT	☐	

شركة الطيران الدولية
سكوربيو

17 June 2001

SCORPIO AVIATION

Flight Operation Department **Proficiency Check/Qualification Form**

PROFICIENCY CHECKLIST

REF.NO..	DATE OF CHECK.....17—06—01..............................
NAME OF PILOT/F.E. KHEDR SAID	TYPE OF CHECK......PROFICIENCY Check........
EMPLOYED BY...S.Corpio Aviation	INSPECTOR OR CHECK AIRMAN
BASE..................CAIRO..................	NAME.........ESSAM.I.BRHEEM..............................
TYPE AIRCRAFT.......ATR 42............	FLIGHT TIME..1:40.....hrs....1....mins....40...............
TYPE SIMULATION.......—....................	Simulator time.....—.....hrs.....—...mins....—..............

FLIGHT MANOEUVERS (S= Satisfactory , U = Unsatisfactory)

PILOT	Air craft	Simulator	FLIGHT ENGINEER ITEM	S	U
PRELIGHT			Equipment exam (oral or written)		
Equipment examination(oral or written)	S		Preflight check of aircraft		
Preflight inspection	S		Computation of fuel load and fuel loading procedure		
Taxiing	S		Completion of company approved forms		
Powerplant Checks	S		Starting taxi and run up		
TAKE- OFFS			Powerplant control		
Normal	S		Cruise control and computations		
Instrument	S		Aircrft/powerplant operation analysis		
Cross - Wind	S		Fuel system management		
With simslated powerplant failure	S		Aircondition and pressurization control		
Rejected take- off	S		Electricl system operation		
INSTRUMENT PROCEDURES			Powerplant fire control		
Area departure	S		Emergency gear and flap extension		
Holding	S		Heater fire and cargo compartment fire		
Area Arrival	S		Smoke evacuation		
H.S approaches	S		Emergency depressurization		
Other instrument approaches	S		Fuel dumping procedure		
Circling approaches	S		Powerplant shutdown and restart		
Missed approaches	S		De- icing and anti- icing		
IN- FLIGHT MANOEUVERS	S		Location and use of emergency equipment		
Steep turns	S		Emergencies - Hydraulic pressurization, etc.		
Approaches to stalls	S		Crew co- ordination and monitoring		
Specific flight characteristics	S		Remarks :		
Powerplant failure	S				
LANDINGS					
Normal	S		PROFICIENCY Check		
From an H.S	S				
Cross - wind	S		Satisfactory		
With simulated powerplant (s) failure	S				
Rejected landing					
From circuling approach	S				
Normal and abnormal procedures	S				
Emergency procedures	S				
Judgement	S		INSPECTOR OR CHECK AIRMAN SIGNATURE		

ESSAM IBRHEEM 17/2001 Lic 655

شركة الطيران الدولية سكوربيو

12 December 2001

SCORPIO AVIATION

Flight Operation Department **Proficiency Check/Qualification Form**

PROFICIENCY CHECKLIST

REF.NO.	DATE OF CHECK 12-12-2001
NAME OF PILOT F.E. KHEDR ABDALL	TYPE OF CHECK PROFICIENCY CHECK
EMPLOYED BY SCORPIO AVIATION	INSPECTOR OR CHECK AIRMAN
BASE	NAME MAGDY KHALED
TYPE AIRCRAFT ATR 42	FLIGHT TIME 1:20 hrs 1 mins 20
TYPE SIMULATION	Simulator time hrs mins

FLIGHT MANOEUVERS (S= Satisfactory , U = Unsatisfactory)

PILOT	Air craft	Simu lator	FLIGHT ENGINEER ITEM	S	U
PREFLIGHT			Equipment exam (oral or written)		
Equipment examination(oral or written)	S		Preflight check of aircraft		
Preflight inspection	S		Computation of fuel load and fuel loading procedure		
Taxiing	S		Completion of company approved forms		
Powerplant Checks	S		Starting taxi and run up		
TAKE- OFFS	S		Powerplant control		
Normal	S		Cruise control and computations		
Instrument	S		Aircrft/powerplant operation analysis		
Cross - Wind	S		Fuel system management		
With simslated powerplant failure	S		Aircondition and pressurization control		
Rejected take- off	S		Electricl system operation		
INSTRUMENT PROCEDURES			Powerplant fire control		
Area departure	S		Emergency gear and flap extension		
Holding	S		Heater fire and cargo compartment fire		
Area Arrival	S		Smoke evacuation		
H.S approaches	S		Emergency depressurization		
Other instrument approaches	S		Fuel dumping procedure		
Circling approaches	S		Powerplant shutdown and restart		
Missed approaches	S		De- icing and anti- icing		
IN- FLIGHT MANOEUVERS			Location and use of emergency equipment		
Steep turns	S		Emergencies - Hydraulic pressurization, etc.		
Approaches to stalls	S		Crew co- ordination and monitoring		
Specific flight characteristics	S		Remarks :		
Powerplant failure	S				
LANDINGS					
Normal	S		PROFICIENCY CHECK		
From an H.S	S				
Cross - wind	S		ON ATR 42-320		
With simulated powerplant (s) failure	S				
Rejected landing	S		SATISFACTORY		
From circuling approach	S				
Normal and abnormal procedures	S				
Emergency procedures	S				
Judgement	S		INSPECTOR OR CHECK AIRMAN SIGNATURE		

MAGDY KHALED
NO 724

١٢٩

Fixed Base Simulator Training:

FLASH

(14)

TRAINING RECORD FBS

LESSON 1

NAME: KHEDR ABDALAA

CREW POSITION: CAPTAIN

A/C TYPE: B 737-300/400/500

BRIFING		**Cruse**	
NORMAL PROCEDURES	S / ~~US~~	Normal procedures	S / ~~US~~
PREFLIGHT		**Descent & Approach**	
Practice AFDS preflight	S / ~~US~~	Normal procedures	S / ~~US~~
Practice FMC/CDU preflight	S / ~~US~~		
Practice IRS Full alignment	S / ~~US~~		
ENGIN START		**Landing**	
Normal procedures	S / ~~US~~	Normal procedures	S / ~~US~~
Taxi-out & takeoff		**Taxi - in & park**	
Normal procedures	S / ~~US~~	Normal procedures	S / ~~US~~
Climb			
Normal procedures	S / ~~US~~		

REMARKS:

CAPTAIN KHEDR NEEDS TO IMPROVE COCKPIT PEREPERATION (NORMAL PROCEDURES)

INSTRUCTOR NAME: IHAB EL SONBATY

INSTRUCTOR SIGNATURE:

DATE: 28-04-03

TRENIY SIGNATURE:

OPERATIONS

TRAINING MANUAL

TRAINING RECORD FBS

LESSON 2

NAME: KHEDR ABDALAA

CREW POSITION: CAPTAIN

A/C TYPE: B 737-300/400/500

BRIFING
NORMAL PROCEDURES S / US
Supplementary Normal procedures
FM alerting &advisory messages
MCP controls and FMA
FMC LNAV operation

PREFLIGHT
Normal procedures S / US
Supplementary Normal procedures S / US

ENGINE START
Normal procedures S / US

Taxi-out & takeoff
Normal procedures S / US

Climb
Normal procedures S / US

Demonstration flight S / US

Cruse
Normal procedures S / US

Descent & Approach
Normal procedures S / US

Landing
Normal procedures S / US

Taxi - in & park
Normal procedures S / US

REMARKS: PROGRESSING BUT STILL NEEDS TO IMPROVE COCKPIT PREPERATION

INSTRUCTOR NAME: IHAB EL SONBATY	INSTRUCTOR SIGNATURE:
DATE: 29-04-03	TRENIY SIGNATURE:

TRAINING MANUAL

TRAINING RECORD FBS

LESSON 3

ME: KHEDR ABDALAA

CREW POSITION: CAPTAIN

A/C TYPE: B 737-300/400/500

IFING		**Cruse**	
IC LNAV OPERATION	S / US	Normal procedures	S / US
:FLIGHT		**Descent & Approach**	
rmal procedures	S / US	Normal procedures	S / US
plementary Normal procedures	S / US	MISSED APPROACH	S / US
GIN START		**Landing**	
n-Normal procedures	S / US	Normal procedures	S / US
		MISSED APPROACH	S / US
xi-out & takeoff		**Taxi - in & park**	
IC LNAV &VNAV OPERATION	S / US	Normal procedures	S / US
		Supplementary normal procedures	S / US
imb			
rmal procedures	S / US		

REMARKS: PROGRESSING

INSTRUCTOR NAME: IHAB EL SONBATY	INSTRUCTOR SIGNATURE:
DATE: 30 - 04 - 03	TRENIY SIGNATURE:

OPERATIONS
TRAINING MANUAL

TRAINING RECORD FBS

LESSON 4

AME: KHEDR ABDALAA

CREW POSITION: CAPTAIN

A/C TYPE: B 737-300/400/500

RIFING
ORMAL PROCEDURES S / US
Non-normal procedures S / US
eview system & FMC / CDU S / US

REFLIGHT
Normal procedures S / US

NGI TART
Normal procedures S / US
Non-normal procedures S / US

Taxi-out & takeoff
Normal procedures S / US

Climb
Normal procedures S / US
Runaway stab. (demo) S / US
W/ W fire (demo) S / US

Cruse
Normal procedures S / US
Fix position S / US
Fix position & abeam S / US

Descent & Approach
Normal procedures S / US
Holding S / US

Landing
Normal procedures S / US
Missed approach procedures S / US
Non - normal procedures S / US

Taxi - in & park
Normal procedures S / US
Non-normal procedures S / US

REMARKS: GOOD PROGRESS
REDY FOR FULL FLIGHT
SIMULATOR

INSTRUCTOR NAME: IHAB EL SONBATY

INSTRUCTOR SIGNATURE:

DATE: 1-05-03

TRENIY SIGNATURE:

TRAINING MANUAL

Full Flight Simulator Training:

TRAINING RECORD FFS LESSON-1

NAME KHEDR ABDALAA	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/400/500	DATE OF COPELETION 03-05-03

Briefing Training plan Operation philosophy S / US	**Cruise** 1. Normal procedures S / US
Preflight Normal procedures S / US Supplementary normal procedures S / US	**Descent & approach** Normal procedures S / US
Engine start Normal procedures S / US Additional training item S / US	**Landing** Normal procedures S / US
Taxi-out & Takeoff Normal procedures S / US	**Taxi -in & park** Normal procedures S / US
Climb Normal procedures S / US Demonstration flight S / US	

REMARKES:

CAPTAIN KHEDR

NEEDS TO MOR- EFFORT

TO REMMEMBER RECALL ITEM'S

INSTRUCTOR NAME: IHAB EL SONBATY	SIGNATURE:

1
2
TRAINING MANUAL

TRAINING RECORD FFS

LESSON-2

NAME *KHEIDR ABDALAA*	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/*400/500*	DATE OF COPELETION *4-05-03*

Briefing Set up MCP , CDU Engine inoperative characteristics S / ~~US~~ **Preflight** Set up MCP , CDU S / ~~US~~ After start checklist S / ~~US~~ **Engine start** Normal procedures S / ~~US~~ **Taxi-out & Takeoff** Rejected T / O S / ~~US~~ T/O engine failure after V 11 S / ~~US~~ T/O engine failure after V 1 S / ~~US~~ Wind shear near VR S / ~~US~~ **Climb** Normal procedures S / ~~US~~	**Cruise , DESCENT** 2. Hydraulic system A loss S / ~~US~~ **Approach , Landing** One engine inop manual, F/D ILS Approach S / ~~US~~ One engine inop visual traffic Patterns full stop. S / ~~US~~ Wind shear training Wind shear flight path control hold S / ~~US~~ A/P , A/T , F/D VOR approach Full stop landing S / ~~US~~ **Taxi -in & park** Normal procedures S / ~~US~~

REMARKES:

PROGRESSING.

HE is TENSS NEED'S

TO RELAX

INSTRUCTOR NAME: *EHAB EL SONBATY*	SIGNATURE:

TRAINING MANUAL

TRAINING RECORD FFS

LESSON 3 1

NAME KHEDR ABDALAA	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/400/500	DATE OF COPELETION 6-05-03

Briefing
Review item in phase of flight S / ~~US~~

Preflight
Normal procedures S / ~~US~~

Engine start
Aborted engine starts S / ~~US~~

Taxi-out & Takeoff
Normal procedures S / ~~US~~
Rejected T/O S / ~~US~~
T/O engine failure after V 1 S / ~~US~~
Normal T/O S / ~~US~~

Climb
Wheel well fire S / ~~US~~
Runaway stabilizer
Buss off
Loss of both engine driven gen.

Cruise , DESCENT
Rapid depressurization S / ~~US~~
Emergency descent S / ~~US~~
Steep turns. S / ~~US~~
Approach to stall recovery S / ~~US~~

Approach , Landing
One engine inop A/P , F/D VOR
Approach , circle to land , full S / ~~US~~
One engine inop . ILS approach
Missed approach S / ~~US~~
Hold S / ~~US~~

Taxi -in & park
Normal procedures S / ~~US~~

REMARKES:

STILL PROGRESSING.
STILL NEED'S TO BE
RELAX.

INSTRUCTOR NAME: IHAB EL SONBATY	SIGNATURE:

OPERATIONS
TRAINING MANUAL

TRAINING RECORD FFS

LESSON 4 1

NAME KHEDR ABDALAA	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/400/500	DATE OF COPELETION 8-05-03

Briefing Full auto flight for precision app S / ~~US~~ Review item in phase of light	**Cruise** Steep turns. S / ~~US~~ Approach to stall recovery S / ~~US~~
Preflight Normal procedures S / ~~US~~ Reduced thrust computation S / ~~US~~	**Descent,** Normal procedures S / ~~US~~ Econ path descent S / ~~US~~ Arrival procedures S / ~~US~~
Engine start Aborted engine starts S / ~~US~~	**Approach , Landing** Normal procedures A / P , A/T , (no F/D) AUTOLAND ILS approach S / ~~US~~ Touch & go landing Row data F/D ILS , T & GO. S / ~~US~~ A/P , A/T , F/D VOR approach S / ~~US~~ Touch & go landing S / ~~US~~
Taxi-out & Takeoff Normal procedures S / ~~US~~ N0 autopilot & F/D S / ~~US~~ Reduced thrust takeoff S / ~~US~~ Flap retraction S / ~~US~~	
Climb Normal procedures S / ~~US~~ Max angle climb Econ climb	**Taxi -in & park** Normal procedures S / ~~US~~

REMARKES:

STILL IMPROVING.

BUT HE NEED'S TO

IMPROVE SINGLE ENG

HANDLING.

INSTRUCTOR NAME: KHAIR ELSONBATY	SIGNATURE:

TRAINING MANUAL

OPERATIONS

M. mora

447

8.5.03

TRAINING RECORD FFS

LESSON 5

1

NAME KHEDR ABDALAA	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/400/500	DATE OF COPELETION 09-05-03

Briefing
- Set up MCP , CDU S / ~~US~~
- Engine inoperative flight characteristic S / ~~US~~

Preflight
- Set up MCP , CDU S / ~~US~~
- After start checklist S / ~~US~~

Engine start
- Normal procedures S / ~~US~~

Taxi-out & Takeoff
- T/O engine failure after V1 (1) S / ~~US~~
- T /O engine failure after V1(2) S / ~~US~~
- T/O engine failure after V1 (3) S / ~~US~~

Climb
- Normal procedures S / ~~US~~
- Econ climb

Cruise
- Steep turns. S / ~~US~~
- Approach to stall recovery S / ~~US~~

Descent,
- Normal procedures S / ~~US~~
- Econ path descent S / ~~US~~
- Arrival procedures S / ~~US~~

Approach , Landing
- One engine inop A/P , F/D NO A/T ILS approach S / ~~US~~
- Missed approach S / ~~US~~
- One engine inop. Manual. F/D NOA/T ILS approach S / ~~US~~
- Full stop landing S / ~~US~~
- Normal T/O .manual Row data F/D ILS, T&GO S / ~~US~~
- Loss of both engine driven gen S / ~~US~~
- A/P , A/T , F/D VOR approach S / ~~US~~
- Circle to land rejected landing S / ~~US~~
- A/P , A/T , F/D ILS approach S / ~~US~~
- VISUAL TRAFFIC PATTERNS S / ~~US~~

Taxi -in & park
- Normal procedures S / ~~US~~

REMARKES:

PROGRESSING.

INSTRUCTOR NAME: EHAB EL SONBATY	SIGNATURE:

TRAINING MANUAL 2

TRAINING RECORD FFS

LESSON 6

NAME *KHEDR ABDALAA*	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/*400/500*	DATE OF COPELETION *10-05-03*

Briefing

Set up MCP, CDU	S / ~~US~~
Engine inoperative flight characteristic	S / ~~US~~

Preflight

Set up MCP, CDU	S / ~~US~~
After start checklist	S / ~~US~~

Engine start

Normal procedures	S / ~~US~~

Taxi-out & Takeoff

Rejected T/O	
T/O engine failure after VII	S / ~~US~~
T /O engine failure after V1	S / ~~US~~
Wind shear near VR	S / ~~US~~

Climb

Normal procedures	S / ~~US~~

Cruise&Descent

Hydraulic system A loss	S / ~~US~~

Approach, Landing

One engine inop manual, F/D ILS approach	S / ~~US~~
One engine inop. Visual traffic Pattern full stop.	S / ~~US~~
One engine inop, landing	S / ~~US~~
Wind shear training	S / ~~US~~
Wind shear flight path control hold	S / ~~US~~
A/P, A/T, F/D VOR APPROACH Full stop landing	S / ~~US~~

Taxi -in & park

Normal procedures	S / ~~US~~

REMARKES:

GOOD PROGRESS

INSTRUCTOR NAME: *IHAB EL SONRATY*	SIGNATURE: [signature]

TRAINING MANUAL

M. morel 442 10.5.03

TRAINING RECORD FFS

LESSON 7 1

NAME KHEDR ABDALAA	CREW POSITION:CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/400/500	DATE OF COPELETION 11-05-03

Briefing	**Cruise&Descent**
Review item in phase of flight S / ~~US~~	Hydraulic system A loss S / ~~US~~
Set up MCP , CDU S / ~~US~~	
	Approach , Landing
	A/P , A/T ,no F/D VOR approach
Preflight	Full stop landing S / ~~US~~
Set up MCP , CDU S / ~~US~~	HOLD S / ~~US~~
After start checklist S / ~~US~~	Jammed stabilizer visual traffic
	Pattern full stop landing S / ~~US~~
Engine start	ASS . FLAPS S / ~~US~~
FAST START S / ~~US~~	Hydrolic system A&B FAILURE
	MANUAL REVERGIN S / ~~US~~
Taxi-out & Takeoff	Visual traffic patern all flap up S / ~~US~~
Normal procedures	**Taxi -in & park**
Normal T/O S / ~~US~~	APU fire S / ~~US~~
	Engine fire on 400 S / ~~US~~
	PASSENGER EVACUATION S / ~~US~~
Climb	
Normal procedures S / ~~US~~	

REMARKES:

GOOD PROGRESS

REDY FOR CHECK

RID

INSTRUCTOR NAME: IHAB EL SONBATY | SIGNATURE:

FLASH

OPERATIONS

TRAINING MANUAL

M. Morad

442

11.5.03

TRAINING RECORD FFS LESSON 8

NAME KHGIDR ABDALAA	CREW POSITION: CAPTAIN / ~~F/O~~
AIRCRAFT TYPE BOIEN 737-300/400/500	DATE OF COPELETION 12-05-03

Briefing	
Review item in phase of flight	S / ~~US~~
Preflight	
Normal procedures	S / ~~US~~
Engine start	
Normal procedures	S / ~~US~~
Taxi-out & Takeoff	
Rejected T/O	
T/O engine failure after VI	S / ~~US~~
Normal T/O	S / ~~US~~
Climb	
Wheel well fire	S / ~~US~~
Runaway stabilizer	S / ~~US~~
Cruise&Descent	
Steep turns	S / ~~US~~
Approach to stall recovery	S / ~~US~~
Holding	S / ~~US~~
Engine fire	S / ~~US~~
Wing / body over heat	S / ~~US~~
Bleed trip of	S / ~~US~~
Rapid depressurization	S / ~~US~~
Emergency descent	S / ~~US~~
Approach , Landing	
One engine inop F/D , VOR Approach,circul to land	S / ~~US~~
V1 cut one engin inop . ILS approach Missed approach.	S / ~~US~~
Taxi -in & park	
Normal procedures	S / ~~US~~

REMARKES:

HE HAS PASSED
HES CHECK
SATESFACTORY
REDY FOR BASE TRAINING.

INSTRUCTOR NAME: THAIR EL SONBATY	SIGNATURE:

1

AIRLINES
OPERATIONS
TRAINING MANUAL

m. morad
442
12.05.03

Proficiency Check:

PROFICINCY CHECK FORM

Name KHEDR ABDALAA		ID No. 106	CAPTAIN-PIC
Simulator Owned by ROYAL AIR MAROC		Location MAROC	Simulator Level
Flight Training Time 04:00	Time pf	Time PNF	Date 18-05-03	O

This form is based on ECARS 121 Appendix F.

Write (S or U) indicating Satisfactory or Unsatisfactory of each item.

1. ORAL TEST (operational oriented

• Airplane Systems	S
• Airplane performance	S
• Normal and non-normal procedures**	S
• Appropriate Provisions of AFM	S
• Company flight operations manual	S
• Use of checklists	S

2. FLIGHT CHECK

PRE FLIGHT AND TAXING	
• Pre flight and cockpit preparation	S
• Engine start	S
• Taxing	S
TAKE-OFFS	
• Normal	S
• Instrument(100' ceiling or 400 m RVR)	S
• Cross wind	S
• With simulated Engine failure	S
• Rejected	S
INSTRUMENT PROCEDURES	
• Area departure	S
• Area arrival and Holding	S
• ILS approach (Coupled)	S
• Second ILS approach (Manual)	S
• Missed approach	S
• Non-precision approach	S
• Second Non-precision approach	S
• Circling approach	S
• Engine failure missed approach	S

2. FLIGHT CHECK(cont'd)

INFLIGHT MANOUVERS	
• Steep turns (Min. 180° -Max. 360°)1	S
• Approach to stalls (Two may be waived)2	S
Take-off configuration	
Clean configuration	
Landing configuration	S
Note : one stall must be performed with bank angle 25°	
LANDINGS	
• Normal landing	S
• From ILS	S
• Cross wind	S
• Visual approach	S
• With 50% power plant failure	S
(2 Engines on one side for 4 Engines airplanes)	
• From circling approach	
• Rejected at 50 FT.	
NORMAL AND NON-NORMAL PROCEDURES	
• Anti icing and de-icing	S
• Hydraulics	S
• Electrical	S
• Pneumatic	S
• Gears	S
• Flaps	S
• Flight Controls	S
• Nav/comm. Equipment	S
EMERGENCY PROCEDURES	
• Inflight fire and smoke control	S
• Decompression	S
• Emergency descent	S
Emergency Landing(partial ldg,no flaps,etc.)	S
• Emergency Evacuation	S

OTHER EMERGENCY PROCEDURES RELATED TO SPECIFIC TYPE

* Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
** For Captains only.
*** The applicant must demonstrate the proper use, and apply the correct procedures, of as many of the listed items
1 on direction may be waived 2. two may be waived

OPERATIONS

PROFICIENCY CHECK FORM (cont'd)

RHS TRAINING FOR INSTRUCTORS		RHS TRAINING FOR CAPTAINS	
• Error recovery		• Normal take Off	S
Lateral offsets		• Manual ILS (CAT I minima)	S
Vertical Offsets		• Non-Precision approach and landing	S
• Minimum 3 Touch and Go		• Simulated Engine failure – Take off	S
		• One Engine Out-Approach and landing	S

EVALUATION

KNOWLEDGE	US	S
FLIGHT OPERATION MANUAL (FOM)and Relevant ECARs A/C Systems, Limitations and Performance Normal, Non-Normal Procedures* PHARAOH AIR Operations Specifications		✓
FLYING SKILLS	**US**	**S**
Compliance with SOP (Flight operations Manual & FCOM) Attitude flying and correct trim technique Use of FMC, FMS, FMGS, etc... Aeroplane configuration, Attitude & Speed control Flying accuracy & Smoothness		✓
MANAGMENT	**US**	**S**
Compliance with FLIGHT OPERATION MANUAL (FOM) Planning ahead and use of FMC, FMS, FMGS, etc... Crew co-ordination and use of available resources Adherence to clearances and safe heights Situational awareness Cabin crew safety briefing		✓

COMMENTS :

Good handling
Good standerization

Satisfactory and Ready for Base Training

Base Month (through Last day of) : Month Year	Licence Valid (through Last day of) : Month Year	Next Event 12.5.03
Date of last 3 take-offs & Landings** :	1. / / 2. / /	3. / /
Name*** CP IP IHAB ELSONBATY	ID No. 100	Check Airman's Signature
Training Result Previous US Current S	Trainee's Signature	Training Manager

Base Flight Training:

FLASH AIRLINES

BASE FLIGHT TRAINING FORM

Name: KHEDR ABDALAA		ID No. 106		Crew position: CAPTAIN	
A/C Type: B 737/500	A/C Registration: SIMULATOR	Sim. Level (ZFT): Level D		Location: MAROC	Date: 13-05-03
R/W	GA	TG	FS	Weather: CAVOK	
Flight type		Hours 02	Minutes 00		

Flight Maneuvers

	Sim	A/C
Exterior Inspection	S	
Cockpit preparation	S	
Engines start	S	
Taxi	S	
Flex/reduced Thrust Take-Off	S	
ILS pattern	S	
Automatic approach	S	

	Sim	A/C
Visual approach (ILS supported)-T/Go	S	
Visual approach (No ILS)-T/Go	S	
Visual approach – (ILS supported) -T/Go	S	
Visual approach-No ILS-No/ATH-T/Go	S	
Simulated engine failure after Take-Off	S	
One Engine out visual approach	S	
Engine(s) out landing	S	

Remarks

HE HAS PERFORMED
REJECTED LANDING AT 50'
WITH ONE ENGIN INOP
Satisfactory, Ready for Line Training 20 Sector
with not less than 40 H and up to proficiency

[illegible] 13.5.03

This to certify that: CAPT / Bd. .... Is ready for A/C type rating

Base Check.

CP Name: IHAB ELSONBATY		IP	CP Signature: [illegible]
ID No. 106		Trainee's Signature	
ECAA Notified	Inspector Name: M. Mohamed	Training Manager: [illegible]	

OPERATIONS

Company Oral Test

(12)

FLASH AIRLINES

COMPANY ORAL TEST

Name KHEDIR ABDALAA	ID No. 106	Crew position CAPTAIN
A/C Type B 737-300/400/500	Date 02-05-03	Location MAROCO

The Company Oral Is Oriented to Check the outcoms of all the practical phases of the training program and the knowledge of the operational aspects of the aircraft systems. The trainee must demonstrate knowledge of, but not limited to the items listed below.

Enter : S Satisfactory U Unsatisfactory N/A Not Applicable

Aircraft Limitations	S	Non-Normal and Emergency Procedures	S
• All A/C systems limitation	S	• Ability to perform or state immediate action items	S
• Weight limitation	S	• Ability to locate Non-Normal Check list	S
• Performance	S	• Communication Between Cockpit and Cabin	S
• Knowledge of, and ability to compute		• Emergency Evacuation Procedures	S
-Takeoff data card	S	• Prepared / Unprepared emergency	S
-Landing data card	S	**Aircraft systems**	
-Cruise performance	S	• Electrical – Hydraulic – Pneumatic – Fuel	S
• Effect of MEL on Performance	S	• Powerplant EFIS Air conditioning Pressurisation	S
• High speed Vs low speed Phases of takeoff	S	• Autopilot, F/D– FMS, FMGS Navigation systems	S
• Wet and Contaminated Run Ways	S	• Flight controls-Flight instruments-Landing gears	S
• Flight Level selection, Specific Range and OPT.ALT	S	**Flight operation Manual**	S
• Step Climb and Fuel Saving	S	• Weather minima Limitation(operations Manual)	S
• Cruise mach No. and manouvre capability	S	• Fuel policy	S
Normal Procedures	S	• Windshear, thunderstorms and turbulence	S
• Flight Crew operations Manual (FCOM) SOP	S	• Fueling with PAX on board	S
• Flight operations Manual (FCOM) SOP	S	• Dangerous goods	S
• Flight patterns	S	• Shoulder harness, seat belt policy and cockpit door	S
• Flight Control comm. Procedures (Stokholm radio)	S	• First officer T.O. and landing	S

Remarks

GOOD KNOLEDGE.

Instructor Name	Code#	Result	Instructor Signature
IHAB EL SONBATY	100	S	[signature]
	Average		Passing Grade 70%

Test Result S	Trainee Signature [signature]	Training Manager Signature [signature]

OPERATIONS

M. morad [signature]

CERTIFICATION ORAL

Crew position : ☑ Capt. ☐ F/O	☐ CPT ☐ CSS ☐ FBS
Name : KHEDR ABDALLA	☑ Sim
Code No. : 106	A/C Type : B 737-300/400/500
Date : 12-05-03	Location : MAROC

The Certification Oral may be conducted at the end of CPT-CSS-FBS or before the Sim.Type Rating Check Ride.

The Certification Oral is oriented to the knowledge of the operational aspects of the systems. The trainee must demonstrate a knowledge of the items listed below :	NA	US	S-	S	S+
1. Knowledge of,and ability to compute : - Takeoff Data Card. - Landing Data Card. - Cruise Performance.		☐	☐	☑	☐
2. Ability to compute or validate weight and balance.		☐	☐	☑	☐
3. Preliminary Cockpit preparation : - Emergency equipment check - Cockpit safety check - APU start - Before start Cockpit preparation.		☐	☐	☑	☐
4. Knowledge of flight Engineer Station : N/A Sufficient for safe operation of airplane if the F/E is incapacitated or absent from the flight deck.	☐	☐	☐	☐	☐
5. Ability to perform or state immediate action items.		☐	☐	☑	☐
6. Knowledge of,and ability to,state operating limitations.		☐	☐	☑	☐
7. Knowledge of MEL.		☐	☐	☑	☐
8. Knowledge of the following aircraft systems : - Hydraulic - Pneumatic - Flight Instruments - Landing gears - EFIS,FMS,FMGS. - Fuel - Electrical - Powerplants - Flight controls - Autopilot, F/D - Navigation systems - Air conditioning and pressurization		☐	☐	☑	☐

Result :	US ☐	S- ☐	S ☑	S+ ☐	Trainee Signature : [signature]
Examiner Name : DIAB EL SONBATY					Examiner Signature : [signature]
Examiner Code : 106					GMFT [signature]

Line Training:

(13)

FLASH AIRLINES

LINE TRAINING FORM (IOE)

Crew Position : CAPTAIN

Name : KHEDR ABDALAA — A/C Type : B 73-3

ID No. : 106 — Date : 28-05-03

Date	Route	Time Previous Today	Total	Sectors Previous Today	Total
26-05-03	SSH – LXR	00:50	00:50	1	1
28-05-03	LXR – SSH – CAI	01:40	02:30	2	3
26-06-03	CAI – ABS – ASN	02:05	04:45	2	5
07-06-03	CAI – LXR	01:10	05:55	1	6
07-06-03	LXR – SSH	00:45	06:40	1	7
02-07-03	CAI – BUS	05:10	11:50	1	8

Date	Comments	Instructor Name	Signature
06-06-03	GOOD PROGRESS	IHAB EL SONBATY	
07-06-03	GOOD PROGRESS	IHAB EL SONBATY	
02-07-03	GOOD PROGRESS	IHAB EL SONBATY	

LINE TRAINING FORM (IOE)

Crew Position : CAPTAIN

Name : KHEDR ABDALAA

ID No. : 106

A/C Type : B 73-3

Date :

Date	Route	Time		Sectors	
		Previous	11:50	Previous	8
		Today	Total	Today	Total
02-07-03	BVA - CAI	04:35	16:25	1	9
03-07-03	CAI - HRG	01:10	17:35	1	10
04-07-03	HRG - WAW	04:25	22:00	1	11
04-07-03	WAW - HRG	04:20	26:20	1	12
05-07-03	HRG - CAI	00:55	27:15	1	13
09-07-03	CAI - BVA	04:30	32:45	1	14

Date	Comments	Instructor Name	Signature
04-07-03	PROGRESSING BUT STILL NEED TO IMPROVE P.N.F. DUTIES.	IHAB EL SONBATY	[signature]
09-07-03	GOOD PROGRESS BUT STILL HE HAS ALOT TO DO AT HOME	IHAB EL SONBATY	[signature]

LINE TRAINING FORM (IOE) (cont'd)

Date	Route	Time		Sectors	
		Previous	32:45	Previous	14
		Today	Total	Today	Total
09-7-03	BVA - CAI	04:00	36:45	1	15
10-07-03	SAW - CAI	02:05	38:50	1	16
16-07-03	CAI - SSH	01:00	39:50	1	17
17-07-03	SSH - CAI	01:00	40:50	1	18
29-07-03	SSH - LXR	00:45	41:35	1	19
23-07-03	LXR - SSH	00:45	42:20	1	20

Date	Comments	Instructor Name	Signature
10-07-03	GOOD PROGRESS.	IHAB EL SONBATY	[signature]
17-07-03	STILL PROGRESSING	IHAB EL SONBATY	[signature]
23-07/03	GOOD PROGRESS RGDY FOR CHECK RID	IHAB EL SONBATY	[signature]

Trainee's Signature :....................................	Training Manager: [signature]

Note : 2 Sectors must be conducted from right hand seat (RHS) for Captains (one sector PF and one Sector PNF)

Line Check:

FLASH AIRLINES

LINE CHECK FORM

THE FOLLOWING ITEMS MUST BE COVERD DURING LINE CHECK

( ) Indicates that item has been checked

1. FLIGHT CHCK	
PRE FLIGHT	
Dispatch	
• Reporting for duty	✓
• Computerised and ATC flight plan	✓
• Weather briefing, T.O. and landing min.	✓
• Alternate planing Wx min	✓
• NAT. Operations Specifications*	✓
• NOTAM briefing and "B" snags	✓
• Cabin crew safety briefing	✓
Cockpit	
• Technical log and B snags	✓
• MEL-CDL and the effect on T.O/Landing	✓
• Performance	✓
• Aircraft library and documentation	✓
• Cockpit perparation-FMS/FMGS/PMS	✓
• TAKE OFF BRIEFING	✓
• Load, trim sheet and NOTOC	✓
• Cold Wx operation* Hot Wx operation	✓
• T.O Performance, T.O speeds and C.G	✓
• Engine start procedures	✓
TAXI, TAKE-OFF AND INITIAL CLIMB	
• Push back procedures	✓
• Taxi speed and braking technique	✓
• T.O roll and V1 concept	✓
• Noise abatement procedure and initial climb	✓
• Best angle, best rate and turbulence speeds	✓
• Area departure, SID and holding	✓
CRUISE	
• Flight level selection, specific range and OPT.ALT	✓
• Step climb and fuel saving	✓
• Cruise match no. and manoeuver capability	✓
• Use of weather radar and weather avoidance	✓
• MNPS and MORA (Special routes)	✓
• Drift down procedures	✓
• Enroute alternate and Emergency Proc. (NAT)*	✓
• Alternate Weather minima	✓
• Minimum fuel for diversion(Alternate+Holding)	✓
• Communication failure procedures	✓
• Flight control comm. Procedures (Stockholm radio)	✓

DESCENT AND APPROACH	
ATIS, SNOWTAM and braking action*	✓
• Descent planing	✓
• Approach briefing, stars and	✓
• Approaches: ☑ Precision ☑ N.precision ☑ Visual	✓
• Destination and alternate weather minima	
LANDING AND TAXI IN	
• Landing technique	✓
• Use of auto breaks and reverse trust	✓
• After landing and taxi in procedure	✓
2.KNOWLEDGE CHECK	
A) Flight operation manual	
• IOE, Initial release, USV and Command Responsibility	✓
• Crew luggage content	✓
• The difference between planing and actual Weather min. and Wx min. for new captain.	✓
• Fuel policy	✓
• Windshear, thunderstorms and turbulence	✓
• Fueling with PAX on board	✓
• Dangerous goods	✓
• Shoulder harness, seat belt policy and cockpit door	✓
• First officer T.O. and landing	✓
• ECARS 121	✓
• Flight operations manuals & answers	✓
B) Aircraft performance and technical knowledge	
• Operational system knowledge	✓
• T.O performance limits	✓
• Wet and contaminated runways	✓
• Reduced (flex) thrust	✓
• Approach and landing climb performance	✓
• Normal, non normal and emergency procedure	✓
• Flight patterns	✓
c) Safety procedure	
• Communication between cockpit and cabin	✓
• Emergency evaluation procedure	✓
• Prepared/unprepared emergency	✓
• Bomb on board and least risk location	✓
• Crew in INCAPACITATION	✓

* if applicable

LINE CHECK FORM (cont'd)

Crew position : ☑ Capt. ☐ F/O ☐ F/E Name : KHIDR ABDALLAH Code No.....L.a.6......................	A/c Type :BOEING 737-300

☑ Final line check	☐ Recurrent Line Check	☐ Route check*
Route	No. of sectors	Flight Time
SSH - LXR - LXR - SSH	2	01:50

PERFORMANCE EVALUATION		
KNOWLEDGE	US	S
A/C Systems, Limitations and Performance		✓
Normal Procedures		✓
Operation manual and ECARS		✓
Non-Normal Procedures*		✓
FLYING SKILLS	US	S
Attitude flying and correct trim technique		✓
Use of FMC, PMS, FMGS, etc…		✓
Complying with SOP (Normal, Abnormal & Emerg.)		✓
Aeroplane configuration, Attitude & Speed control		✓
Flying accuracy & Smoothness		✓
MANAGMENT	US	S
Planning ahead and use of FMC, PMS, FMGS, etc…		✓
Crew co-ordination and use of available resources		✓
Adherence to clearances and safe heights		✓
Situational awareness		✓

COMMENTS :

GOOD STANDARD
SATISFACTORY
he can placed as capt in command Y. ZAKI
23/07/03

Check Air man Name: ..KHALED EL SONBATY ID No. :..........10.0.............. Check Result : Satisfactory ✓ Unsatisfactory	Check Airman's signature: .... Trainee's signature .... Training Manager: ....

* Route qualification is mandatory before conducting a route check.
** Non-Normal Procedure: Are Abnormal, Additional, Alternate and Emergency Procedures.

OPERATIONS

Recurrent Training:

FLASH AIRLINES

Ch.: 10

FORMS AND RECORDS

PILOT'S RECURRENT TRAINING FORM			
Name KHEDR ABDALLA		ID No.	BOIENG 737-300/400
Simulator Owned by RoyAL AIR MARoCo		Location CAZA	Simulator Level D
Flight Training Time 04:00 / Time PF 02 / Time PNF 02		Date 16-12-03	
PART ONE : GROUND TRAINING SEGMENT			
[ ] indicates that item has been covered.			
a) OPEN BOOK QUIZ (O&A)*		**b) Briefings**	
• Airplane Systems	✓	• Use of chklists	✓
• Airplane performance	✓	• Review of normal training Scenario:	✓
• Normal and non-normal procedures**	✓	-Normal and Non-normal procedures**	✓
• Appropriate Provisions of AFM	✓	-LOFT	✓
• Company flight operations and route	✓	-Windshear	✓
• PharaohAir Operation Specifications	✓	• CRM	✓
PART TWO : FLIGHT TRAINING SEGMENT			
Scenario :			
PRE FLIGHT AND TAXING		LANDINGS	
• Pre flight and cockpit preparation	✓	• Normal landing	✓
• Engine start	✓	• From ILS	✓
• Taxing	✓	• Cross wind	✓
TAKE-OFFS		• Visual approach	✓
• Normal	✓	• With 50% power plant failure	✓
• Instrument(100' ceiling)	✓	• (2 Engines on one side for 4 Engines airplanes)	
• Cross wind	✓	• From circling approach	✓
• With simulated engine failure	✓	• In Windshear conditions	✓
• Rejected	✓	• Rejected at 50 FT.	✓
• Windshear during take-off	✓	NORMAL AND NON-NORMAL PROCEDURES	
INSTRUMENT PROCEDURES		• Anti icing and de-icing	✓
• Area departure	✓	• Hydraulics	✓
• Area arival and Holding	✓	• Electrical	✓
• ILS approach (Coupled)	✓	• Pneumatic	✓
• Second ILS approach (Manual)	✓	• Gears	✓
• Missed approach	✓	• Flaps	✓
• Non-precision approach	✓	• Flight Controls	✓
• Second Non-precision approach	✓	• Navicomm. Equipment	✓
• Circling approach	✓	EMERGENCY PROCEDURES	
• Engine failure missed approach	✓	• Inflight fire and smoke control	✓
INFLIGHT MANEUVERS		• Decompression	✓
• Steep turns (Min. 180° -Max, 360°)	✓	• Emergency descent	✓
• Approach to stalls	✓	• Emergency Landing(partial l/g,no flaps etc.)	✓
• Specific flight characteristics	✓	• Emergency Evacuation	✓
OTHER EMERGENCY PROCEDURES			
TCAS RESELUTION	✓		
RVSM	✓		

* Q&A : question and answers.
** Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
*** For Captains only.

PILOT'S RECURRENT TRAINING FORM (cont'd)			
RHS TRAINING FOR INSTRUCTORS		RHS TRAINING FOR CAPTAINS	
• Error recovery		• Normal take Off	
Lateral offsets		• Simulated Engine failure – Take off	
Vertical Offsets		• One Engine Out-Approach and landing	
• Minimum 3 Touch and Go		• Minimum 3 Touch and Go's	

EVALUATION

KNOWLEDGE	US	S
FLIGHT OPERATION MANUAL (FOM)and Relevant ECARs		✓
A/C systems Limitations and Performance		✓
Normal Non-Normal Procedures*		✓
PHARAOH AIR Operations Specifications		✓
FLYING SKILLS	**US**	**S**
Compliance with SOP (Flight operations Manual & FCOM)		✓
Attitude flying and correct trim technique		✓
Use of FMC, PMS, FMGS, etc...		✓
Aeroplane configuration, Attitude &S speed control		✓
Flying accuracy & Smoothness		✓
MANAGMENT	**US**	**S**
Compliance with FLIGHT OPERATION MANUAL (FOM)		✓
Planning ahead and use of FMC, PMS, FMGS, etc...		✓
Crew coordination and use of available resources		✓
Adherence to clearances and safe heights		✓
Situational awareness		✓
Cabin crew safety briefing		✓

COMMENTS :

SATISFACTORY

Base Month (through Last day of) : Month Year	License Valid (through Last day of) : Month Year	Next Event ☐ Proficiency check
Date of last 3 take-offs & Landings** :	1. / / 2. / /	3. / /
Name*** CP IP IHAB EL SONBATY	ID No. 107	Check Airman's Signature
Training Result Previous S Current S	Trainee's Signature	Safety & Training Manager

* Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
** Trainee is responsible for the accuracy of this data, and he must sign the form.
*** CP: CheckAirman, IP :Instructor Pilot.

vii- Personal situation

The captain was married and had 3 children ages 29, 25 and 18 years. The eldest son is married and is doing post graduate studies in USA. The second son is an engineer. The youngest daughter is still studying in university.
The captain has no known problems of any kind. He is known to be devoted to his family. He did not suffer from any abnormal health or social problem.
(Refer also to page 72 of the Factual Report (Interviews regarding Captain Kheider Abdullah)

1.5.1.3. 72-hour history of the captain:

Refer to interviews on page 73 of the FR.
The captain and F/O left Cairo to SSH on January 1st, 2004 as passengers on Flash Airline flight departing Cairo at 15:00 GMT
No more factual information could be obtained regarding the 72-hour history.

1.5.1.4. Interviewing the individuals who trained and flew with the captain (including ground and simulator instructors)

Interview with Captain/ Essam Eldin Brahmin Chief Pilot and instructor ATR 42 Scorpio Airlines during the period of employment of Captain/ Khedr in this Airline.

- ***How well did you know Captain/ Khedr?***
  He was a colleague during work at the Egyptian Air force and when he joined Scorpio, we worked together as I was Chief Pilot. I was in charge of organizing his flying schedule and monitoring his standard through line checks.
  He was a well disciplined pilot, observed his flying schedule without any problems, was always careful to observe duty time limitation and rest periods, had good relations with his colleagues, was cheerful with his crew and always prepared his flight carefully.
  During line check he performed well. He was attentive to his work, communicated well with his crew and was not tense. His previous experience on military air transport made him comfortable in flying commercial air transport with relation to route experience and airway flying requirements.

- ***What routes were flown at this time?***
  Mainly domestic flights.

- ***Was Sharm El Sheikh one of your common destinations?***
  Yes.

- ***What was the common departure procedure Followed out of Sharm El Sheikh?***
  The standard procedure followed was depending on the runway in use a turn was initiated towards the sea while climbing in a wide pattern to cross the VOR 11000 Ft to proceed on the 306 Radial to Cairo.

- ***Did you as chief pilot and instructor see or have any report of any kind about Captain/ Khedr?***
  All comment and observations were good Captain and comfortable to work, always well prepared for his flight and kept his cockpit organized.

- ***Why did he leave Scorpio?***
  He left when the company stopped operations.

Interview with Captain/ Emad Sallam Instructor Pilot on C130
In the Egyptian Air force
At the time Captain/ Khedr started to fly in the military air transport.

- ***How well did you know Captain/ Khedr?***

  As a pilot in the Air force we were colleagues although he was more senior than I, when he moved from the fighter squadrons to the air transport and when assigned to the C 130 I was an instructor and when he was assigned to training flights under my command was very willing and had no attitude about my being instructor with less seniority, he was always eager to learn and very attentive in the cockpit had no problem in asking for information from the crew with him and did not exercise unnecessary authority due to his rank, listened well to comments and observations of all the crew members without regard to rank and seniority was cheerful but well disciplined his training progress was standard.

Interview with Captain/ Essam Eldin Ibrahim Chief Pilot and instructor ATR 42 Scorpio Airlines during the period of employment of Captain/ Khedr in this airline.

- ***How well did you know Captain/ Khedr?***

He was a colleague during work at the Egyptian Air force and when he joined Scorpio we worked together as I was Chief Pilot I was in charge of organizing his flying schedule and monitoring his standard through line checks.

He was a well disciplined pilot observed his fighting schedule without any problems was always careful to observe duty time limitation and rest periods had good relations with his colleagues was cheerful with his crew and always prepared his flight carefully.

During line check he performed well was attentive to his work communicated well with his crew and was not tense his previous experience on military air transport made him comfortable in flying commercial air transport with relation to route experience and airway flying requirements.

- ***What routes were flown at this time?***

Mainly domestic flights.

- ***Was Sharm El Sheikh one of your common destinations?***

Yes.

- ***What was the common departure procedure Followed out of Sharm El Sheikh?***

The standard procedure followed was depending on the runway in use a turn was initiated towards the sea while climbing in a wide pattern to cross the VOR 11000 Ft to proceed on the 306Radial to Cairo.

- ***Did you as chief pilot and instructor see or have any report of any kind about Captain/ Khedr?***

All comment and observations were good Captain and comfortable to work, always well prepared for his flight and kept his cockpit organized.

- ***Why did he leave Scorpio?***

He left when the company stopped operations.

1.5.1.5. Interviewing CAA inspectors who flew with captain.
Interviews to be carried out by OPS group

1.5.1.6. Interviewing former head of operations in Flash Airlines
(No official former head of operation in Flash Airlines)

1.5.1.7. Additional factual documentation (Captain)

Number of days the captain had been working since his last day off.

Operation Department.

CAPT. KHIDR ABDULLAH

Date	Route	Remark	Starting Time	Ending Time
SAT.03/01/2004	SSH/CAI/CDG		03:00	X X X
FRI. 02/01/2004	SSH/TRN/SSH		04:30	12:45
THU 1/01/2004	OFF			
WED.31/12/2003	CAI/CDG/CAI		12:00	23:00
TUE.30/12/2003	OFF			
MON.29/12/2003	CAI/BCN/MAD/LXR	Heavy	06:25	19:15
SUN.28/12/2003	OFF			
SAT.27/12/2003	LXR/CDG		11:00	16:00
FRI.26/12/2003	CAI/BCN/MAD/ASW	Heavy	06:45	19:15
THU. 25/12/2003	SSH/CAI		04:00	05:00
WED.24/12/2003	SSH/LXR/SSH		13:45	16:15
TUE.23/12/2003	SSH/AOI/BRI/SSH		15:30	01:00
MON.22/12/2003	CAI/BCN/MAD/LXR	Heavy	06:45	19:15
SUN.21/12/20036	LXR/SSH/NAP/BRI/SSH	Heavy	04:15	15:45
SAT.20/12/2003	CDG/LXR		06:00	11:00
FRI.19/12/2003	OFF			
THU.18.12/2003	CAI/SSH/CAI		17:00	19:30
WED.17/12/2003				
TUE.16/12/2003				
MON.15/12/2003				
SUN.14/12/2003	OFF			
SAT.13/12/2003				
FRI.12/12/20003				
THU.11/12/2003				
WED.10/12/2003				

Note:

The captain and F/O left Cairo to SSH on January 1st, 2004 as passengers on Flash Airline flight departing Cairo at 15:00 GMT

Captain interpersonal characteristics, including perceptions of fellow pilots regarding their capability for assertiveness.
All available information is available in pages 72-73 Factual Report

Familiarity of the two flight crew members with each other. (Including number of legs flown together this trip, number of legs flown together in the last 30 days.
According to the available information, the accident flight was the 3rd sector in the last 24 hours.

Description of how well the flying crew got along. No information available

Reported proficiency information. Outcome and comments from training records and proficiency check forms.
Refer to 1.5.1.2 (vi)

Spatial disorientation or upset recovery training received at Flash Air or in the military. *AI196*
According to CAA regulations, Spatial Disorientation training is not mandatory
No available documents from Flash Airline concerning SD training.
Some verbal reports from the Egyptian Air Force are available concerning the captain SD training the time he was serving in the Egyptian Air Force as a military fighter pilot.
Inputs from different investigation partners are needed.
According to and CAA regulations, Upset Recovery training is not mandatory
Upset Recovery Training recommendation should be included in the Recommendations Chapter.

Captain's flying proficiency and cockpit style from fellow pilots, instructors, and/or check pilots.
Refer to 1.5.1.4 and 1.5.1.2 (vi)

Flash Airlines chief pilot view regarding the departure procedure from SSH, based on company procedures
According to Chief Captain Flash Airline and all other pilots questioned about departure procedure from SSH, all agree that a turn towards the sea is initiated with a bank angle depending on available rate of climb and captain's discretion to cross the VOR on course radial 306 at or above 10500 ft.

Number of departures from SSH previously made by the captain (day and night)

Within the last month, the captain has made five departures from SSH including the accident flight.
(SAT 03-Jan-04 (night), FRI 02-Jan-04 (night), THU 25-Dec-03 (night), WED 24-Dec-03 (day) and TUE 23-Dec-03 (day))

The captain's time on Russian aircraft (MiG-21). Hercules transport aircrafts C130 (dates and number of hours). ADI display configuration in comparison with B737-300 ADI display.
Refer to captain CV, and item 1.5.1.2 (vi)

For B737-300 ADI refer to 1.16.1.9 (reference CairoMarch04Slides (March Progress Meeting - Cairo).pdf file)

Comparison with ADI Displays for other airplanes types might be made by the OPS group if needed

1.5.2. ***The First Officer***

1.5.2.2. Background information .

i- Beginning of his flying career.

- The F/O began his ground training on the aircraft type 737-300 at Luxor Airway from 4 May 2002 to 16 May 2002
- The F/O completed the Full Flight Simulator Training and the Flight Training at Flash Airline on 30 June 02

ii- All airlines worked for prior to Flash Air
Refer to previous item

iii- "All" F/O training records at Flash (including his last recurrent training).
All flying hours before Flash were different training phases

License Renewal Form (Boeing 737-500):

(17)

وزارة الطيران المدنى
قطاع العمليات والنقل الجوى
الإدارة المركزية للعمليات الجوية
الإدارة العامة لإجازات الطيران

إخطار تجديد إجازة طيار

السيد الطيار / مدير عام العمليات

مؤسسة / شركة [illegible]

تحية طيبة وبعد ..

بالإحالة إلى الطلب المقدم من السيد / [illegible]

بخصوص تجديد إجازة / [illegible] رقم [illegible] الحاصل عليها

نتشرف بالإفادة بأنه تم تجديدها من ٣٠ / ١٢ / ٢٠٠٣ إلى ٤ / ٥ / ٢٠٠٤

على طراز : II B737-500

علمًا بأن GM 30 / 6 /2004 BM 31 / 5 /2004

وانتهاء اللياقة الطبية فى ٤ / ٥ / ٢٠٠٤

وتفضلوا بقبول فائق الإحترام ..

مدير عام إجازات الطيران

الهيئة العامة لشئون المطابع الأميرية ٣٤٥٠ س ٢٠٠٢ - ١٥٠٠٠

Certificate of Validity of a license:

جمهورية مصر العربية
وزارة الطيران المدنى
قطاع العمليات والنقل الجوى

شهادة سريان مفعول إجازة طيار

١ - حالة هذه الشهادة بالنسبة للإجازة .

هذه الشهادة جزء من إجازة طيار تجارى

رقم ٣٢٨٤ ويجب وجودها دائمًا بالإجازة .

٢ - سريان مفعول الإجازة .

حامل الإجازة التى تعتبر هذه الشهادة جزءًا منها كشف عليه طبيًا بتاريخ ٥ / ٥ / ٢٠٠٣ وجد لائقًا للعمل وفقًا للاشتراطات الموضحة بالإجازة كما إنه قد أتم جميع الإجراءات لتجديدها وعليه فهى سارية المفعول للمدة من ٣٠ / ١٢ / ٢٠٠٣

إلى ٤ / ٥ / ٢٠٠٤ على طراز II B737-500

إلى —/—/— على طراز —

الشهر الأساسى	فترة السماح
مايو ٢٠٠٤	يونيو ٢٠٠٤

ARAB REPUBLIC OF EGYPT
MINISTRY OF CIVIL AVIATION
SECTOR OF OPERATIONS AND AIR TRANSPORT

CERTIFICATE OF VALIDITY OF A LICENCE FOR PILOT's OF FLYING MACHINES

1 - Status of this certificate .

This certificate forms part of Com

pilot's licence flying machines number 3284

and must always be carried with the licence .

2 - Validity of the licence

The holder of the licence of which this certificate forms part was medically examined on 5 / 5 / 03 and was assessed as fit to act in the capacity, and subject to the conditions, stated in the licence; he has also satisfied all the other requirements for the renewal of the licence , the licence is therefore; Valid :

from 30/12/03, to 4/5/04 Type II B

from —/—/— to —/—/ Type —

BM	GM
May 2-4	Jun 2-4

Copy of the Commercial Pilot license:

— ٣ —

(استمارة رقم ٣٩ ط.م.ر ومكررة)

إجازة طيار تجارى

COMMERCIAL

ILOT'S LICENCE

(تمغة)

الاسم عمرو محمود عبد الحليم شافعى

IV. *Name* Amr-Mahmoud-Shafie

V. *Address* العنوان ٢٠ بالاسراء المعلمين المهندسين

20-Belesraa-elmoalmoon-elmohandse

VI. *Nationality* EGYPTIAN الجنسية

XII. *Signature of Holder* توقيع حامل الإجازة

X. *Signature of Issuing Officer* توقيع المرخص له بإصدار الإجازة

الختم والتاريخ

Date and Stamp

بترخيص من رئيس مجلس إدارة الهيئة المصرية العامة للطيران المدنى

XI. *By Authority of the C.A.A.*

12 - 6 - 97

— ٢ —

صدرت هذه الإجازة بموجب المرسوم بقانون رقم ٢٨ بتاريخ ٢٣ مايو سنة ١٩٨١ والملحق رقم ١ لمعاهدة الطيران المدنى الدولية الموقعة فى ٧ ديسمبر سنة ١٩٤٤ .

DATE OF BIRTH: ١ /٠١ /١٩٦٩

يصرح لحامل هذه الإجازة بقيادة الطائرات الآلية الأثقل من الهواء طبقا للشروط والمواصفات المبينة بالإجازة على أن يكون حاصلا على استمارة رقم ٢٨ (ط.م.ر.) سارية المفعول .

— ٤ —

أهلية طراز الطائرات :

التوقيع والختم والتاريخ Signature, Stamp and Date	Class Rating – أهلية النوع
12-4-97	Single & Multi ENG LAND PLANES
التوقيع والختم والتاريخ Signature, Stamp and Date	**أهلية الطراز (المجموعة ١) Type Rating (Group 1)**
12-4-97	CESSNA – 172

جمهورية مصر العربية
وزارة الطيران المدنى
قطاع العمليات والنقل الجوى.
شهادة سريان مفعول إجازة طيار

١– حالة هذه الشهادة بالنسبة للإجازة.

هذه الشهادة جزء من إجازة طيار ...تجارى...

رقم ...[illegible]... ويجب وجودها دائما بالإجازة

٢– سريـان مفعـول الإجـازة

حامل الإجازة التى تعتبر هذه الشهادة جزءا منها كشف

عليه طبيا بتاريخ ١١ / ٥ / ٢٠٠٢

وجد لائقا للعمل وفقا للاشتراطات الموضحـة بالإجـازة

كما أنه قد أتم جميع الإجراءات لتجديدها وعليه فهى

سارية المفعول للمدة من ١٨ / ٧ / ٢٠٠٢

إلى ٢٨ / ٢ / ٢٠٠٣ على طـراز [illegible]

إلى —/—/— على طـراز —

الشهر الأساسى
يناير ٢٠٠٣

فترة السماح
فبراير ٢٠٠٣

– ٥ –

XII. The Aircraft Rating :

التوقيع والختم والتاريخ Signature, Stamp and Date	أهلية الطراز (المجموعة ٢) Type Rating (Group 2)
REPUBLIC OF EGYPT PERSONNEL LICENCES ~~22/7/98~~	~~B.737/200~~
18.07.02	B.737/3,4,5

ARAB REPUBLIC OF EGYPT
MINISTRY CIVIL AVIATION
SECTOR OF OPERATIONS AND AIR TRANSPORT
CERTIFICATE OF VALIDITY OF A LICENCE FOR PILOT's OF FLYING MACHINES

1- Status of this certificate.

This certificate forms part of ....Com.... pilot's licence flying machines number....3281... and must always be carried with the licence.

2- Validity of the licence

The holder of the licence of which this certificate forms part was medically examined on 11/05/02 and was assessed as fit to act in the capacity, and subject to the conditions, stated in the licence; he has also satisfied all the other requirements for the renewal of the licence ,the licence is therefore; Valid:

from 18/07/02 to 28/02/03 Type B737/3
from / / to / / Type

BM JAN-03
GM FEB-03

Rating Contained in Licence is Valid

Type —

The Privileges of an Instrument rating contained in the licence may be exercised as pilot in charge or as co-pilot (where one is required to be carried) of a flying machine.

From 18 / 07 / 02

TO 31 / 07 / 03

CERTIFICATE

I the undersigned, a person fully authorised for this purpose by the chariman of SECTOR OF OPERATIONS AND [illegible] TRANSPORT of the Arab Republic of Egypt hereby certify the Facts stated in Paragraphs 2,3,4

Signature

Date 22 / 7 / 02

Stamp

٣ - أهلية مدرب المعتمدة بهذه الإجازة سارية المفعول إلى / / طراز ---

٤ - أهلية الطيران الآلى المعتمدة بالإجازة تخول لحاملها الحق فى العمل كقائد طائرة أو كطيار مساعد (كما تقضى الحالة) على الطائرات الآلية.

من ١٨ / ٧ / ٢٠٠٢

إلى ٢١ / ٧ / ٢٠٠٣

شهادة

أنا الموقع أدناه بمقتضى السلطة المخولة لى من رئيس قطاع العمليات والنقل الجوى بوزارة الطيران المدنى بجمهورية مصر العربية أقر بصحة ما جاء بالبنود ١، ٢، ٣، ٤ من هذا المستند.

التوقيع :

التاريخ : ٢٢ / ٧ / ٢

الختم :

B737-500 Transition Training:

18

GYPTIAN CIVIL AVIATION SUPERVISORY AUTHORITY ECASA)
OLICY AND PROCEDURES MANUAL

DOC. 1230

FORM 1230 – 10P

ORDER OF TRANING NO 6 / 2002 / 1

EVEL : F/O

LACE : Luxor Air

PECIALITY : Transition Course

/ TYPE : B737 300

RAINEES : 1- Amr Mahmoud Shafie

TART : Saturday May 4th, 02

ND : Thursday May 16th, 02

URATION : 12 Days / 30 hours

RAINEES : ENCLOSURE (A)

ROGRAM : ENCLOSURE (B)

ISTRUCTORS : 1- Capt / Ehab El-Sombaty

2- Eng. / Mohamed Khalil 3- Eng / Yousry Hassan

NDERTRANING :

JPERVISOR :

IGATUR

SUPERVISOR

2/5/02

General Operation

FLASH AIRLINES OPERATIONS

ISION 1 DATED OCTOBER 2001 PAGE 31

(19)

FLASH AIRLINES

Member of FLASH GROUP

Boeing 737-300

Ground Training Syllabus

SYSTEM	HOURS REQUIRED
Weight& Balance	4 HRS
Air conditioning,presurization	5 HRS
Flight Controls	8 HRS
Hydraulic	3 HRS
Landing Gear	3 HRS
Navigation	5 HRS
Auto Flight	10 HRS
F.M.C	10 HRS
Pneumatic	3 HRS
Electric	4 HRS
Anti -ice	3 HRS
Oxygen	3 HRS
Engine	5 HRS
Fuel & APU	3 HRS
Performance	10 HRS
Total	80 HRS

FLASH AIRLINES

OPERATIONS

58, Joseph Tito St., El-Nozha El-Gedidah, Cairo,Egypt.
Tel. : 202-2944700-800-550 Fax : 202-2941300
SITA : CAIHPCR

٥٨ شارع جوزيف تيتو النزهة الجديدة - القاهرة ج.م.ع
التليفون : ٥٥٠-٨٠٠-٢٠٢-٢٩٤٤٧٠٠ فاكس : ٢٠٢-٢٩٤١٣٠٠
E-mail:hpline@internetegypt.com

Proficiency Check (June 30, 02):

(20)

FLASH AIRLINES

Member of FLASH GROUP

Form No. 02 – 2/2

PROFICIENCY CHECK FORM (cont'd)

This Training is an AIR T.M requirement and should be covered during Training day

RHS TRAINING FOR INSTRUCTORS		RHS TRAINING FOR CAPTAINS	
• Error recovery		• Normal take Off	
Lateral offsets		• Manual ILS (CAT I minima)	
Vertical Offsets		• Non-Precision approach and landing	
• Minimum 3 Touch and Go		• Simulated Engine failure – Take off	
		• One Engine Out-Approach and landing	

EVALUATION

KNOWLEDGE	US	S
FLIGHT OPERATION MANUAL (FOM)and Relevant ECARs	[ ]	[✓]
A/C Systems, Limitations and Performance	[ ]	[✓]
Normal, Non-Normal Procedures*	[ ]	[✓]
PHARAOH AIR Operations Specifications	[ ]	[✓]
FLYING SKILLS	**US**	**S**
Compliance with SOP (Flight operations Manual & FCOM)	[ ]	[✓]
Attitude flying and correct trim technique	[ ]	[✓]
Use of FMC, PMS, FMGS, etc...	[ ]	[✓]
Aeroplane configuration, Attitude & Speed control	[ ]	[✓]
Flying accuracy & Smoothness	[ ]	[✓]
MANAGMENT	**US**	**S**
Compliance with FLIGHT OPERATION MANUAL (FOM)	[ ]	[✓]
Planning ahead and use of FMC, PMS, FMGS, etc...	[ ]	[✓]
Crew co-ordination and use of available resources	[ ]	[✓]
Adherence to clearances and safe heights	[ ]	[✓]
Situational awareness	[ ]	[✓]
Cabin crew safety briefing	[ ]	[✓]

COMMENTS :

HE HAS PASSED HIS FINAL CHECK SATISFACTORY WITH GOOD PERFORMANC.

[signature] ACP 442

Base Month (through Last day of) :	Licensee Valid (through Last day of) :	Next Event
Month Year	Month Year	[ ] PC [ ] Rec. Trg
Date of last 3 take-offs & Landings** : 1. / /	2. / /	3. / /
Name*** [ ] CP [✓] IP IHABEL SONBATY	ID No. 1004	Check Airman's Signature [signature]
Training Result Previous [ ]US [ ]S Current [ ]US [✓]S	Trainee's Signature [signature]	Safty & Training Manager

FLASH AIRLINES

Member of FLASH GROUP

(21)

Form No. 02 – 1/2

PROFICINCY CHECK FORM

Name AMR EL SHAFI	ID No.
Simulator Owned by OLIMBIC	Location CAIRO
Flight Training Time 32 hrs | Time pf 16 | Time PNF 16	Date 30-06-02
	☐ Capt. ☑ F/O ☐ F/E
	Simulator Level ☐ A ☐ B ☑ C ☐ D
This form is based on ECARS 121 Appendix F.	AIRCRAFT TYPE: B 737 – 300/400/500

Write (S or U) indicating Satisfactory or Unsatisfactory of each item.

1. ORAL TEST (operational oriented	
• Airplane Systems	S
• Airplane performance	S
• Normal and non-normal procedures**	S
• Appropriate Provisions of AFM	S
• Company flight operations manual	S
• Use of checklists	S
2. FLIGHT CHECK	
PRE FLIGHT AND TAXING	
• Pre flight and cockpit preparation	S
• Engine start	S
• Taxing	S
TAKE-OFFS	
• Normal	S
• Instrument(100' ceiling or 400 m RVR)	S
• Cross wind	S
• With simulated Engine failure	S
• Rejected	S
INSTRUMENT PROCEDURES	
• Area departure	S
• Area arrival and Holding	S
• ILS approach (Coupled)	S
• Second ILS approach (Manual)	S
• Missed approach	S
• Non-precision approach	S
• Second Non-precision approach	S
• Circling approach	S
• Engine failure missed approach	S
	S

2. FLIGHT CHECK(cont'd)	
INFLIGHT MANOUVERS	S
• Steep turns (Min. 180° -Max. 360°)1	S
• Approach to stalls (Two may be waived)2	S
Take-off configuration	S
Clean configuration	S
Landing configuration	S
Note : one stall must be performed with bank angle 25°	
LANDINGS	
• Normal landing	S
• From ILS	S
• Cross wind	S
• Visual approach	S
• With 50% power plant failure	S
(2 Engines on one side for 4 Engines airplanes)	
• From circling approach	
• Rejected at 50 FT.	
NORMAL AND NON-NORMAL PROCEDURES	
• Anti icing and de-icing	S
• Hydraulics	S
• Electrical	S
• Pneumatic	S
• Gears	S
• Flaps	S
• Flight Controls	S
• Nav/comm. Equipment	S
EMERGENCY PROCEDURES	
• Inflight fire and smoke control	S
• Decompression	S
• Emergency descent	S
Emergency Landing(partial ldg,no flaps,etc.)	S
• Emergency Evacuation	S

OTHER EMERGENCY PROCEDURES RELATED TO SPECIFIC TYPE

* Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
** For Captains only.
*** The applicant must demonstrate the proper use, and apply the correct procedures, of as many of the listed items.
1 on direction may be waived 2 two may be waived

Flight Training Department
Flight Operations
Page 1 of 2
Form No. C30-0060

HELIOPOLIS AIRLINES

22

PROFICIENCY CHECK FORM

Name: AHL EL SHAFIE		Code No.	FI Capt FI F/O FI A FI B FI C
Simulator Owned By: A/C FLASH AIR	Location	Aircraft Type	Simulator Level
Flight Training Time	Time PF	Time PNF	Date: 11 - 17 - 07	FTA FTB FTC FTD

This form is based on ECARS 121 Appendix F.

Enter (S / U or NA) indicating Satisfactory / Unsatisfactory completion of each item or Not Applicable

1. ORAL TEST (Operational Oriented Questions)	
• Aeroplane systems	S
• Aeroplane performance	S
• Normal and non-normal procedures[1]	S
• ETOPS, North Atlantic or special routes	
• Company flight operations manual	
• Use of checklists	
2. FLIGHT CHECK	
PRE FLIGHT AND TAXIING	
• Pre-flight and cockpit preparation	S
• Engine start	S
• Low visibility taxiing (150/200m RVR)[2]	S
TAKE-OFFS	
• Normal	S
• Low visibility takeoffs (150/200m RVR)[2]	
- X- Wind with loss of visual cues at 100 Kt.	
- Rejected T.O with an engine failure before V_1	
- With simulated engine failure at V_1	
INSTRUMENT PROCEDURES	
• Area departure	S
• Area arrival and Holding	S
• ILS approach (Coupled)	
• Second ILS approach (Manual)	
Missed approach	
• Non-precision approach	
• Second Non-precision approach	
• Circling approach	
• Engine failure missed approach	
CAT II Approaches	
• A min. of 3 CAT II approaches are required for CAT II recurrent	
SPECIAL TRAINING	
• ETOPS	
• North Atlantic En-route diversion scenario	
• MNPS	

2. FLIGHT CHECK (cont'd)	
INFLIGHT MANEUVERS	
• Steep turns (Min. 180° - Max. 360°)[3]	
• Approach to stalls (two may be waived).	
- Take-Off configuration	
- Clean configuration	
- Landing configuration	
Note: One Stall must be performed with bank angle 25°.	
LANDINGS	
• Normal Landing	
• From ILS	
• Cross Wind	
• Visual approaches	
• With 50% power plant failure	
• (2 Eng.'s on one side for 4 Eng.'s aeroplanes)[4]	
• From circling approach	
• Rejected at 50'	
NORMAL AND ABNORMAL PROCEDURES	
• Anti icing and De-icing	
• Hydraulics	
• Electrical	
• Pneumatic	
• Gears	
• Flaps	
• Flight Controls	
• Nav/Comm. Equipment	
EMERGENCY PROCEDURES	
• In-flight Fire and Smoke Control	
• Decompression	
• Emergency Descent	
• Emergency Landing (Partial L/G, No Flaps, etc..)	
• Emergency Evacuation	
EMERGENCY PROCEDURES RELATED TO SPECIFIC TYPE	

1. Non-Normal Procedures: Are Abnormal, Additional, Alternate and Emergency Procedures
2. 150/200m RVR for category C/D aircrafts respectively.
3. One direction may be waved.
4. For Captains Only.

Note:
Heliopolis Airline operation ceased operation and Flash Airline took over its traffic rights and operated under the name of Flash Airline

Flight Training (August 12, 02):

RLINES | *Forms and Records*

No. 04 - 1/4

IOE / USV FORM

Type	ID No.	Capt		

Date	Route	Previous Time Today	Total	Previous Sectors Today	Total
/					
/					
/					
/					
/					
/					
/					
/					
/					
/					
/					
/					

Date / Type of Training	Comments	Instructor Name	Signature
12 / 08 / 02 IOE RHS USV	HE HAS PASSED [illegible] CHECK RID SATISFACTORY	[illegible]	[illegible]
/ IOE RHS USV			
/ IOE RHS USV			
/ IOE RHS USV			

AL RELEASE

This is to certify that Captain..............................is fit fly as a Captain under supervision on..............................aircraft type.

Chairman Name	Signature	Date
IHAB EL SONBATY	[signature]	12-08-2002
1003	Trainee's Signature [signature]	

:Initial Operating Experience
:Right hand Seat (Two sectors :one PF-one PNF)
:Under Super Vision

FLASH AIRLINES | *Forms and Records*

(24)

Form No. 04 - 1/4

IOE / USV FORM

Name AMR EL SHAFEI | ID No. | ☐ Capt. ☑ F/O ☐ F/E

A/C Type B737-300

Date	Route	Time: Previous→ Today	Time: Total	Sectors: Previous→ Today	Sectors: Total
27/07/02	SSH - CDG	05:15	05:15	1	1
27/07/02	CDG - EXR	05:00	10:15	1	2
30/07/02	HRG - CAI	01:00	11:15	1	3
01/08/2002	CAI - BEL - SSH	02:50	14:05	2	5
07/08/02	SSH - CAI	00:50	14:55	1	6
10/08/02	CAI - CDG	04:30	19:20	1	7
11/08/02	CDG - HRG	05:15	24:35	1	8
12/08/02	HRG - BLQ	03:55	28:30	1	9
12/08/02	BLQ - HRG	03:45	32:15	1	10
/ /					
/ /					
/ /					

Date / Type of Training	Comments	Instructor Name	Signature
27/07/02 ☐ IOE ☐ RHS ☐ USV	NORMAL FLIGHT PROGRESSING	IHAB EL SONBATY	[signature]
30/07/02 ☐ IOE ☐ RHS ☑ USV	NORMAL FLIGHT	IHAB EL SONBATY	[signature]
01/08/02 ☐ IOE ☐ RHS ☐ USV	GOOD FLIGHT	IHAB EL SONBATY	[signature]
11/08/02 ☐ IOE ☐ RHS ☐ USV	GOOD FLIGHT REDY FOR CHECK RIDE	IHAB EL SONBATY	[signature]

IOE :Initial Operating Experience
RHS :Right hand Seat (Two sectors :one PF-one PNF)
USV : :Under Super Vision

Form No. 04 – 4/4

IOE / USV FORM (Cont'd)

EVALUATION

KNOWLEDGE	US	S
FLIGHT OPERATION MANUAL (FOM)and Relevant ECARs	?	✓
A/C Systems, Limitations and Performance	?	✓
Normal, Non-Normal Procedures*	?	✓
LUXOR AIR Operations Specifications	?	✓
FLYING SKILLS	**US**	**S**
Compliance with SOP (Flight operations Manual & FCOM)	?	✓
Attitude flying and correct trim technique	?	✓
Use of FMC, PMS, FMGS, etc…	?	✓
Aeroplane configuration, Attitude & Speed control	?	✓
Flying accuracy & Smoothness	?	✓
MANAGMENT	**US**	**S**
Compliance with FLIGHT OPERATION MANUAL (FOM)	?	✓
Planning ahead and use of FMC, PMS, FMGS, etc…	?	✓
Crew co-ordination and use of available resources	?	✓
Adherence to clearances and safe heights	?	✓
Situational awareness	?	✓
Cabin crew safety briefing	?	✓

Remarks

HE HAS PASSED WITH GOOD KNOLEDG AND GOOD PERFORMANCE

Date	ID No.	Signature
12-08-02	1003	[signature]

This is to certify that all applicable Flight Training and Discussion items on this form have been complied and trainee is Ready For final line check and company oral

IP Name	Signature	Date
IHAB EL SONBATI	[signature]	12-08-02
1003	Trainee & Signature: [signature] Shafik	

Training Manager: [signature]

* Non-Normal procedures are Abnormal, Additional, Alternate and Emergency Procedures.

Flight Deck Ground Training/ Competency Check/ General Emergency (22-05-02):

(25)

EGYPT AIR TRAINING DIVISION
Gen. Dept. for Aviation Training
E.T. C .
COMPETENCY CHECK.

قطــاع التدريب
الادارة العامة لتدريب الطيران
مركز تدريب الطوارئ

Flight deck Ground Training / COMPETENCY Check
GENERAL EMERGENCY

NAME. Amr Mahmoud Shafie Code : X		Crew Position Cap ☐ F/O ☑ F/E ☐	
DATE : 22-05-2002	LOCATION E.T.C	☐ INITIAL ☑ RECURRENT ☐ RE-QUALIFICATION	

ALL ITEMS MUST BE COMPLETED CHECK (/) INDICATING COMPLETION EACH ITEMS

COMPETENCY CHECK ITEMS

PART 1 EMERGENCY SITUATION	
- Flight CREWMEMBER DUTIES AND RESPONSIBILITIES	S
- CREW COORDINATION AND COMPANY COMMUNICATION	S
- AIRCRAFT FIRES	S
- FIRST AID EQUIPMENT	S
- ILLNESS,INJURY,AND BASIC FIRST AID	S
- GROUND EVACUATION	S
- DITCHING	S
- RAPID DECOMPRESSION	S
- PREVIOUS AIRCRAFT ACCIDENTS/INCIDENTS	S
- CREWMEMBER INCAPACITATION	S
- HIJACK AND BOMB THREAT	S
PART 2 EMERGENCY DRILL	
- HAND-HELD FIRE EXTINGUISHERS	S
- PORTABLE OXYGEN SYSTEM	S
- EMERGENCY EXITS AND SLIDES. *	S
- DITCHING EQUIPMENT. **	S

INSTRUCTOR NAME AHMED HELMY	CODE NO. 8028	INSTRUCTOR SIGNATURE
RESULT ☑ Satisfactorily Completed	TRAINEE SIGNATURE	E.T.C Manager
		G.M. AVIATION TRAINING

E.T.C 001/06/2001

PROFICINCY CHECK FORM

Name AMR SHAFIE	ID No. F/O F/O
Simulator Owned by ROYAL AIR MOROC	Location CAS Simulator Level D
Flight Training Time 4/00 Time pf 4 Time PNF 4	Date 15/16.05.03
This form is based on ECARS 121 Appendix F	
Write (S or U) indicating Satisfactory or Unsatisfactory of each item.	

1. ORAL TEST (operational oriented	
• Airplane Systems	S
• Airplane performance	S
• Normal and non-normal procedures**	S
• Appropriate Provisions of AFM	S
• Company flight operations manual	S
• Use of checklists	S
2. FLIGHT CHECK	
PRE FLIGHT AND TAXING	
• Pre flight and cockpit preparation	S
• Engine start	S
• Taxing	S
TAKE-OFFS	
• Normal	S
• Instrument(100' ceiling or 400 m RVR)	U
• Cross wind	S
• With simulated Engine failure	S
• Rejected	S
INSTRUMENT PROCEDURES	
• Area departure	S
• Area arrival and Holding	S
• ILS approach (Coupled)	S
• Second ILS approach (Manual)	S
• Missed approach	S
• Non-precision approach	S
• Second Non-precision approach	S
• Circling approach	S
• Engine failure missed approach	S

2. FLIGHT CHECK(cont'd)	
INFLIGHT MANOUVERS	
• Steep turns (Min. 180° -Max. 360°)1	S
• Approach to stalls (Two may be waived)2	S
Take-off configuration	S
Clean configuration	S
Landing configuration	S
Note : one stall must be performed with bank angle 25°	
LANDINGS	
• Normal landing	S
• From ILS	S
• Cross wind	S
• Visual approach	S
• With 50% power plant failure (2 Engines on one side for 4 Engines airplanes)	S
• From circling approach	S
• Rejected at 50 FT.	N/A
NORMAL AND NON-NORMAL PROCEDURES	
• Anti icing and de-icing	S
• Hydraulics	S
• Electrical	S
• Pneumatic	S
• Gears	S
• Flaps	S
• Flight Controls	S
• Nav/comm. Equipment	S
EMERGENCY PROCEDURES	
• Inflight fire and smoke control	
• Decompression	S
• Emergency descent	S
Emergency Landing(partial ldg,no flaps,etc.)	
• Emergency Evacuation	S

OTHER EMERGENCY PROCEDURES RELATED TO SPECIFIC TYPE

* Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
** For Captains only.
*** The applicant must demonstrate the proper use, and apply the correct procedures, of as many of the listed items.
1 on direction may be waived 2 two may be waived

PROFICIENCY CHECK FORM (cont'd)

RHS TRAINING FOR INSTRUCTORS		RHS TRAINING FOR CAPTAINS	
• Error recovery		• Normal take Off	
Lateral offsets		• Manual ILS (CAT I minima)	
Vertical Offsets		• Non-Precision approach and landing	
• Minimum 3 Touch and Go		• Simulated Engine failure – Take off	
		• One Engine Out-Approach and landing	

EVALUATION

KNOWLEDGE	US	S
FLIGHT OPERATION MANUAL (FOM)and Relevant ECARs		S
A/C Systems, Limitations and Performance		S
Normal, Non-Normal Procedures*		S
PHARAOH AIR Operations Specifications		S
FLYING SKILLS	US	S
Compliance with SOP (Flight operations Manual & FCOM)		S
Attitude flying and correct trim technique		S
Use of FMC, PMS, FMGS, etc...		S
Aeroplane configuration, Attitude & Speed control		S
Flying accuracy & Smoothness		S
MANAGMENT	US	S
Compliance with FLIGHT OPERATION MANUAL (FOM)		S
Planning ahead and use of FMC, PMS, FMGS, etc...		S
Crew co-ordination and use of available resources		S
Adherence to clearances and safe heights		S
Situational awareness		S
Cabin crew safety briefing		S

COMMENTS :

Satisfactory
Good handling
[illegible signatures] 16.05.07

Base Month (through Last day of) : Month Year	Licensee Valid (through Last day of) : Month Year	Next Event
Date of last 3 take-offs & Landings** :	1. / / 2. / /	3. / /
Name*** CP IP YORDAN DIMITROV	ID No. 464	Check Airman's Signature [signature]
Training Result Previous US S Current	Trainee's Signature [signature]	Training Manager [signature]

PILOT'S RECURRENT TRAINING FORM

Name AMR EL SHAFIE	ID No.	
Simulator Owned by Royal A.C. MAROCo	Location MAROCo	Simulator Level D
Flight Training Time 04:- Time PF 4 Time PNF –	Date 11-12-03	

PART ONE : GROUND TRAINING SEGMENT

( ) indicates that item has been covered.

a) OPEN BOOK QUIZ (Q&A)*		b) Briefings	
• Airplane Systems	✓	• Use of chklists	✓
• Airplane performance	✓	• Review of normal training Scenario:	✓
• Normal and non-normal procedures**	✓	-Normal and Non-normal procedures**	✓
• Appropriate Provisions of AFM	✓	-LOFT	✓
• Company flight operations and route	✓	-Windshear	✓
• Pharaoh Air Operation Specifications	✓	• CRM	✓

PART TWO : FLIGHT TRAINING SEGMENT

Scenario :

PRE FLIGHT AND TAXING		LANDINGS	
• Pre flight and cockpit preparation	✓	• Normal landing	✓
• Engine start	✓	• From ILS	✓
• Taxing	✓	• Cross wind	✓
TAKE-OFFS		• Visual approach	✓
• Normal	✓	• With 50% power plant failure	✓
• Instrument(100' ceiling)	✓	• (2 Engines on one side for 4 Engines airplanes)	
• Cross wind	✓	• From circling approach	✓
• With simulated engine failure	✓	• In Windshear conditions	
• Rejected	✓	• Rejected at 50 FT.	
• Windshear during take-off	✓	NORMAL AND NON-NORMAL PROCEDURES	
INSTRUMENT PROCEDURES		• Anti icing and de-icing	✓
• Area departure	✓	• Hydraulics	✓
• Area arrival and Holding	✓	• Electrical	✓
• ILS approach (Coupled)	✓	• Pneumatic	✓
• Second ILS approach (Manual)	✓	• Gears	✓
• Missed approach	✓	• Flaps	✓
• Non-precision approach	✓	• Flight Controls	✓
• Second Non-precision approach	✓	• Nav/comm. Equipment	✓
• Circling approach	✓	EMERGENCY PROCEDURES	
• Engine failure missed approach	✓	• Inflight fire and smoke control	✓
INFLIGHT MANEUVERS		• Decompression	✓
• Steep turns (Min. 180° -Max. 360°)	✓	• Emergency descent	✓
• Approach to stalls	✓	• Emergency Landing(partial l/g,no flaps,etc.)	✓
• Specific flight characteristics	✓	• Emergency Evacuation	✓
OTHER EMERGENCY PROCEDURES			
R.T.O.	✓		
TCAS RESOLUTION	✓		

* Q&A :question and answers.
** Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
*** For Captains only.

FLASH AIRLINES

PILOT'S RECURRENT TRAINING FORM (cont'd)

RHS TRAINING FOR INSTRUCTORS		RHS TRAINING FOR CAPTAINS	
• Error recovery		• Normal take Off	
Lateral offsets		• Simulated Engine failure – Take off	
Vertical Offsets		• One Engine Out-Approach and landing	
• Minimum 3 Touch and Go		• Minimum 3 Touch and Go's	

EVALUATION

KNOWLEDGE	US	S
FLIGHT OPERATION MANUAL (FOM) and Relevant ECARs		✓
A/C systems Limitations and Performance		✓
Normal Non-Normal Procedures*		✓
PHARAOH AIR Operations Specifications		✓
FLYING SKILLS	**US**	**S**
Compliance with SOP (Flight operations Manual & FCOM)		✓
Attitude flying and correct trim technique		✓
Use of FMC, PMS, FMGS, etc…		✓
Aeroplane configuration, Attitude & speed control		✓
Flying accuracy & Smoothness		✓
MANAGMENT	**US**	**S**
Compliance with FLIGHT OPERATION MANUAL (FOM)		✓
Planning ahead and use of FMC, PMS, FMGS, etc…		✓
Crew coordination and use of available resources		✓
Adherence to clearances and safe heights		✓
Situational awareness		✓
Cabin crew safety briefing		✓

COMMENTS :

SATISFACTORY

GOOD KNOWLEDGE.

Base Month (through Last day of) : Month Year	License Valid (through Last day of) : Month Year	Next Event [X] Proficiency check
Date of last 3 take-offs & Landings** :	1. / / 2. / /	3. / /

Name*** CP IP	ID No.	Check Airman's Signature
IHAB EL SUNBATY	107	[signature]
Training Result: Previous S, Current S	Trainee's Signature: [signature]	Safety & Training Manager [signature]

* Non-Normal procedures : are Abnormal, Additional, Alternate and Emergency Procedures.
** Trainee is responsible for the accuracy of this data, and he must sign the form.
*** CP: CheckAirman, IP :Instructor Pilot.

(28)

EGYPTAIR
EMRG TRAINING

قطـــاع التدريب
الإدارة العامة للتدريب الطيران
مركز تدريب الطوارئ

نتيجة فرقة : تنشيطية للسـادة الطيـاريـن العاملـين بشـركـه فـلاش

امر تدريب رقم :- ١٢٧ / ٢٠٠٢ (طوارئ)
تاريخ بداية الفرقة :- ٢٢ / ٥ / ٢٠٠٢
تاريخ نهاية الفرقة :- ٢٣ / ٥ / ٢٠٠٢

(Handwritten column labels: First Aid — Hazmat — Aircraft ~~Flight~~ Safety — Practical Test (Procedures))

م	الاســـم	عملي	سلامة طائرات	بضائع خطرة	اسعافات	ملاحظات
١	ك / ايهاب السنباطي	١٠٠	٩٦	١٠٠	١٠٠	ناجح
٢	ك / اشرف زارع	١٠٠	١٠٠	٩٣	١٠٠	ناجح
٣	ك / نـور سعـد	١٠٠	٩٦	غـ	١٠٠	راسب ب خطرة
٤	ك / خريستو لوستانس	١٠٠	١٠٠	٩٥	١٠٠	ناجح
٥	ك / وائـل فكـرى	١٠٠	١٠٠	٩٥	١٠٠	ناجح
٦	ك / جمـال عـون	١٠٠	١٠٠	٩٥	١٠٠	ناجح
٧	ك / عمرو عبد الحميد	١٠٠	٩٢	٩٥	١٠٠	ناجح
٨	ك / علـي رشـاد	غـ	٩٦	غـ	١٠٠	راسـب
٩	م . ك / علـي رشـاد	١٠٠	٩٦	٩٥	١٠٠	ناجح
١٠	م . ك / محمد حسنى	١٠٠	١٠٠	٩٥	١٠٠	ناجح
١١	م . ك / ياسر فكـرى	١٠٠	٩٢	٩٥	١٠٠	ناجح
١٢	م . ك / هبة درويش	١٠٠	٩٦	١٠٠	١٠٠	ناجح
١٣	م . ك / شيريف ابو العز	١٠٠	٩٦	٨١	١٠٠	ناجح
١٤	م . ك / خالد كوثر	١٠٠	٩٦	غـ	١٠٠	راسب ب خطرة
١٥	م . ك / هانى المليجى	١٠٠	١٠٠	٩٥	١٠٠	ناجح
١٦	م . ك / عمر الشافعي	١٠٠ 100	١٠٠ 100	٩٥ 95	١٠٠ 100	ناجح
١٧	م . ك / محمود حنفى	١٠٠ 100	٩٦ 96	٩٥ 95	١٠٠ 100	ناجح
١٨	مرحل / اشرف لملوم	١٠٠	١٠٠	٩٥	١٠٠	ناجح

F/O OBSERVER

التوقيع :-
الاسم :- أ / كلوديـا يحـيي وفـــا
الوظيفة :- مدير ادارة مركز تدريب الطوارئ

التوقيع :-
الوظيفة :- مدير عام الادارة العامة لتدريب الطيران

تحريرا في ٢ / ٦ / ٢٠٠٢

(29)

وزارة الطيران المدنى
قطاع العمليات و النقل الجوى
الادارة العامه لامتحانات الطيران

رقم القيد : ٢٩ >
التاريخ : ٢٠٠٢/٦/٢٦

CAA EXAM (Oral)

2915 To 10/6/2002

Shafie

نتيجة امتحان طيارين طراز B737-300
بوينج ٣٠٠/٧٣٧-٤٠٠ (شركه فلاش)
الذى عقد فى الفتره من ٥/٢٩ : ٢٠٠٢/٦/١٠

Performance Systems

م	الأســــــم	انظمه	اداء	ملاحظـــــات
١	عمرو محمود عبد الحليم شافعى	٩٨	٩٨	ناجـــــح
		98	98	Pass

روجعت طبقا للائحة الامتحانات

ابو الغيط محمد شحات
المشرف على الادارة العامه لامتحانات الطيران

يعتمد،،،،،،

طيار/ صالح احمد موسى
رئيس قطاع العمليات والنقل الجوى

30

Shafie

كشف بنسبة حضور فرقة Basic indoctronation

تاريخ بداية الفرقة 21 / 8 /2002 ، تاريخ انتهاء الفرقة 29 /8/ 2002

م	الاسم	الدورة	ملاحظات
1	رضا السيد مصطفى	Basic indoctronation	حضر الدورة
2	محمود حنفي	Basic indoctronation	حضر الدورة
3	عمرو شافعي	Basic indoctronation	حضر الدورة

توقيع المدرب :

الاسم : م/ رتيب محمد داود / م/ يوسف حسنين

الوظيفة : مدير التخطيط / مدير الجودة

تحريرا في 29/8/2002 : ٢٠٠٢/٨/٢٩ ٢٠٠٢/٨/٢٩

كبير الطيارين / ك/ إيهاب السباعي

٢٠٠٢/٨/٢٩

FLASH AIRLINES OPERATIONS

Form No. 04 – 3/4

IOE / USV FORM (Cont'd)

THE FOLLOWING ITEMS MUST BE COVERD DURING LINE CHECK

(√) Indicates that item has been checked

PRE FLIGHT	
Dispatch	
• Computerized and ATC flight plan	√
• Weather briefing, T.O. and landing min.	√
• Alternate planing Wx min	√
• NAT. Operations Specifications*	N/A
• NOTAM briefing and "B" snags	√
• Cabin crew safety briefing	√
Cockpit	
• Technical log and B snags	√
• MEL-CDL and the effect on T.O/Landing Performance	√
• Aircraft library and documentation	√
• Cockpit preparation-FMS/FMGS/PMS	√
• TAKE OFF BRIEFING	√
• Load, trim sheet and NOTOC	√
• SNOWTAM (de-icing)*	√
• Hot Wx operation	√
• T.O Performance, T.O speeds and C.G	√
• Engine start procedures	√
TAXI, TAKE-OFF AND INITIAL CLIMB	
• Push back procedures	√
• Aircraft geometry during turns	√
• Taxi speed and braking technique	√
• T.O roll and V1 concept	√
• Noise abatement procedure and initial climb	√
• Best angle, best rate and turbulence speeds	√
• Area departure, SID and holding	√
CRUISE	
• Flight level selection, specific range and OPT.ALT	
• Step climb and fuel saving	
• Cruise mach no. and manoeuvre capability	
• [illegible] weather radar and weather avoidance	
• [illegible] and MORA (Special routes)	
• Drift down procedures	
• Enroute alternate and Emergency Proc.	
• Alternate Weather minima	
• Minimum fuel for diversion(Alternate+Holding)	
• Communication failure procedures	
• Flight control comm. Procedures (Stockholm radio)	

DESCENT AND APPROACH	
ATIS, SNOWTAM and braking action*	√
• Descent planing	√
• Approach briefing and stars	√
• Approaches: √ Precision ☐ N.precision ☐ Visual	√
• Destination and alternate weather minima	√
LANDING AND TAXI IN	
• Landing technique	√
• Use of auto breaks and reverse trust	√
• After landing and taxi in procedure	√
DISCUSSION ITEMS	
A) Flight operation manual	
• IOE, Initial release, USV and Command Responsibility	N/A
• Navigation Bag content	√
• The difference between planning and actual Weather min. and Wx min. for new captain.	√
• Fuel policy	√
• Windshear, thunderstorms and turbulence	√
• Fueling with PAX on board	√
• Dangerous goods	√
• Shoulder harness, seat belt policy and cockpit door	√
• First officer T.O. and landing	√
• ECARS 121	√
• Flight operations manuals & answers	
B) Aircraft performance and technical knowledge	
• Operational system knowledge	√
• T.O performance limits	√
• Wet and contaminated runways	√
• Reduced (flex) thrust	√
• Approach and landing climb performance	√
• [illegible] non normal and emergency procedure	√
• [illegible]	√
C) Safety procedure	
• Communication between cockpit and cabin	√
• Emergency evaluation procedure	√
• Prepared/unprepared emergency	√
• [illegible] on board and least risk location	√
• [illegible] incapacitation	√

(32)

TRAINING RECORD., FFS - LESSON 1

NAME :- AMR EL SHAFEI CREW POSITION: F/O
AIRLINE: Flash Airlines TYPE: B 737 - 300-400-500

Briefing
Training plan [S]
Operation philosophy

Preflight
Normal procedures [S]
Supplementary Normal procedures [S]

Engine start
Normal procedures [S]
Additional training item [S]

Taxi- out & takeoff
Normal procedures [S]

Climb
Normal procedures [S]
Demonstration fight [S]

Cruise
Normal procedures [S]

Descent , Approach
Normal procedures [S]

Landing
Normal procedures [S]

Taxi - in & park
Normal procedures [S]

REMARKS

INSTRUCTOR DATE 22-6-2002

(33)

TRAINING RECORD FFS - LESSON 2

NAME :-AMR EL SHAFEI CREW POSITION:---F/O
AIRLINE: Flash Airlines TYPE:---B-737-800-400-500

Briefing
Set up MCP ,CDU — S'
Engine inoperative flight characterstics — S'

Preflight
Set up MCP ,CDU — S'
After start checklist — S'

Engine start
Normal procedures — S'

Taxi- out & takeoff
Rejected T/O — S'
T/O engine failure after V II — S'
T/O engine failure after V I — S'
Wind shear near VR — S'

Climb
Normal procedures — S'

Cruise , Descent
Hydraulic system A loss — S'

Approach , Landing
One engine inop. manual , F/D ILS approach — S'
One engine inop. Visual traffic Patterns full stop. — S'
One engine inop. Landing — S'
Wind shear training — S'
Wind shear flight path control — S'
Hold — S'
A/P ,A/T ,F/D VOR approach , Full stop landing — S'

Taxi - in & park
Normal procedures — S'

REMARKS

INSTRUCTOR DATE 23-06-2002

(34)

TRAINING RECORD, FFS - LESSON 3

NAME :- AHR. EL SHAFEI CREW POSITION:- F/O

AIRLINE: Flash Airlines TYPE:- B737 - 300/400/500

Briefing		**Cruise, Descent**	
Review item in phase of flight	S1	Rapid depressurization	S1
		Emergency descent.	S1
		Steep turns	S1
Preflight		Approach to stall recovery	S1
Normal procedures	S1	**Approach, Landing**	
		One engine inop. A/P , F/D	
		,VOR approach, circle to land, full	S1
Engine start		One engine inop. ILS approach	S1
Aborted engine starts	S1	,missed approach	S1
		Hold	S1
Taxi- out & takeoff			
Normal procedures	S1		
Rejected T/O	S1	**Taxi - in & park**	
T/O engine failure after V I	S1		
Normal T/O	S1	Normal procedures.	S1
Climb			
Wheel well fire	S1		
Runaway stabilizer	S1		
Bus off	S1		
Loss of both engine driven gen.	N/A		

REMARKS

INSTRUCTOR: [signature] DATE 24-06-2002

(35)

TRAINING MANUAL

TRAINING RECORD EFS - LESSON 4

NAME : AMR EL SHAFI CREW POSITION: F/O

AIRLINE: Flash Airlines TYPE: B.737-300/400/500

Briefing

- Full auto flight for precision app. [SI]
- Review item in phase of flight [SI]

Preflight

- Normal procedures [SI]
- Reduced thrust computation [SI]

Engine start

- Aborted starts (1) [SI]
- Aborted starts (2) [SI]

Taxi- out & takeoff

- Normal procedures [SI]
- No autopilot & F/D [SI]
- Reduced thrust takeoff [SI]
- Flap retraction [SI]

Climb

- Normal procedures [SI]
- Max angle climb [SI]
- Econ climb [SI]

Cruise

- Steep turns [SI]
- Approach to stall recovery [SI]

Descent ,

- Normal procedures [SI]
- Economy path descent [SI]
- Arrival procedure [SI]

Approach ,Landing

- Normal procedures [SI]
- A/P , A/T ,(no F/D) autoland
- ILS approach [SI]
- Touch & go landing [SI]
- Row data F/D ILS , T&GO. [SI]
- A/P ,A/T ,F/D VOR approach [SI]
- Touch & go landing [SI]

Taxi - in & park

- Normal procedures [SI]

REMARKS

INSTRUCTOR [signature] DATE 25-08-2002

(36)

TRAINING MANUAL

TRAINING RECORD ,FFS - LESSON 5

NAME :-AHREL SHAFI ---- CREW POSITION:----P/o

AIRLINE: Flash Airlines TYPE:-----------B 737-300/400/600

Briefing

Set up MCP ,CDU	S'
Engine inoperative flight characterstics	S' S'

Preflight

Set up MCP ,CDU	S'
After start checklist	S'

Engine start

Normal procedures	S'

Taxi- out & takeoff

T/O engine failure after V1(1)	S'
T/O engine failure after V1(2)	S'
T/O engine failure after V1(3)	S'

Climb

Normal procedures	S'

Cruise, Descent

Approach, Landing

One engine inop. A/P , F/D	S'
No A/T ILS approach	S'
Missed approach	S'
One engine inop. manual , F/D	S'
No A/T ILS approach	S'
Full stop landing	S'
Normal T/O , manual Row data	
F/D ILS , T&GO	S'
Loss of both engine driven gen.	S'
Manual ILS , T&GO,	S'
A/P ,A/T ,F/D VOR approach	
, circle to land rejected landing	S'
A/P ,A/T ,F/D ILS approach	S'
Visual traffic patterns	S'

Taxi - in & park

Normal procedures	S'

REMARKS

INSTRUCTOR ... DATE 26-06-2002

TRAINING MANUAL

TRAINING RECORD FFS - LESSON 6

NAME : AHR. EL SHAFEI CREW POSITION: F/O

AIRLINE: Flash Airlines TYPE: B 737-300/400/500

Briefing

Set up MCP ,CDU [S]

Engine inoperative flight characterstics [S]

Preflight

Set up MCP ,CDU [S]

After start checklist [S]

Engine start

Normal procedures [S]

Taxi- out & takeoff

Rejected T/O [S]

T/O engine failure after V II [S]

T/O engine failure after V I [S]

Wind shear near VR [S]

Climb

Normal procedures [S]

Cruise , Descent

Hydraulic system A loss [S]

Approach , Landing

One engine inop. manual , F/D ILS approach [S]

One engine inop. Visual traffic Patterns full stop. [S]

One engine inop. Landing [S]

Wind shear training [S]

Wind shear flight path control [S]

Hold [S]

A/P ,A/T ,F/D VOR approach , Full stop landing [S]

Taxi - in & park

Normal procedures [S]

REMARKS

HE IS REDY FOR CHECK RIDE

INSTRUCTOR DATE 28-6-2002

(38)

TRAINING MANUAL

TRAINING RECORD FFS - LESSON 7

NAME : AMR EL SHAFEI
CREW POSITION: F/O
AIRLINE: Flash Airlines
TYPE: B 737 - 300/400/500

Briefing

Review item in phase of flight — ✓
Set up MCP ,CDU — ✓

Preflight

Set up MCP ,CDU — ✓
After start checklist — ✓

Engine start

Fast start — ✓

Taxi- out & takeoff

Normal procedures — ✓
Normal T/O — ✓

Climb

Normal procedures — ✓

Cruise, Descent

Approach, Landing

A/P ,A/T ,no F/D VOR approach , full stop landing. — ✓
Hold. — ✓
Jammed stabilizer visual traffic pattern full stop landing.(Capt) — ✓
ILS approach full stop landing , ASS. Flaps. — ✓
Hydraulic System A &B failure Manual rev. — ✓
Visual traffic patterns all up Flap (capt.) — ✓

Taxi - in & park

APU fire F/O — ✓
Eng. fire on 400' (capt.) — ✓
Passenger evacuation — ✓

REMARKS

HE HAS PASSED THE CHECK RIDE
SATISFACTORY WITH GOOD
PERFORMANCE.

INSTRUCTOR
DATE 30-06-2002

(39)

TRAINING MANUAL

TRAINING RECORD FFS - LESSON 8

NAME :- AMR EL SHAFEI CREW POSITION:- F/O

AIRLINE: Flash Airlines TYPE:- B 737 -300/400/500

Briefing

Review item in phase of flight [S]

Preflight

Normal procedures [S]

Engine start

Normal procedures [S]

Taxi- out & takeoff

Rejected T/O [S]

T/O engine failure after V1 [S]

Normal T/O [S]

Climb

Wheel well fire [S]

Runaway stabilizer [S]

Cruise, Descent

Steep turns [S]

Approach to stall recovery [S]

Holding [S]

Engine fire [S]

Wing /body over heat [S]

Bleed or pack trip [S]

Rapid depressurization (capt) [S]

Emergency descent. [S]

Approach , Landing

One engine inop. F/D , VOR approach, circle to land (capt) [S]

V1 cut One engine inop. , ILS Approach , missed approach [S]

Taxi - in & park

Normal procedures [S]

REMARKS

HE HAS PERFORMED T.O AND LANDING AS BASE TRAINING AND HE IS READY FOR AR BASTRAINING

Dr. mourad

INSTRUCTOR DATE 07-07-2007

iv- Personal situation
To be completed by the OPS Group

1.5.2.3. 72-hour history of the F/O:
Refer to interviews included in pages 72-73 of the Factual Report

1.5.2.4. Interviewing the individuals who trained and flew with the F/O (including ground and simulator instructors)
None available

1.5.2.5. Interviewing CAA inspectors who flew with F/O.
Interviews to be carried out by OPS Group

1.5.2.6. Interviewing former head of operations at Flash Airlines
(No official former head of operation in Flash Airlines)

1.5.2.7. Additional factual documentation (F/O)

Number of days the F/O had been working since his last day off.
Refer to Factual Report

F/O interpersonal characteristics, including perceptions of fellow pilots regarding their capability for assertiveness.
All available information is available in pages 72-73 Factual Report

Reported proficiency information. Outcome and comments from training records and proficiency check forms.
Refer to 1.5.2.2 (iii)

Spatial disorientation or upset recovery training received at Flash Air AI196
According to CAA regulations, Spatial Disorientation training is not mandatory
No available documents from Flash Airline concerning SD training.
Inputs from different investigation partners are needed.
According to and CAA regulations, Upset Recovery training is not mandatory
Upset Recovery Training recommendation may be included in the Recommendations Chapter.

F/O's flying proficiency and cockpit style from fellow pilots, instructors, and/or check pilots.
Not available

1.5.3 The Observer

Background:

The Observer “Ashraf Abdel Hamid” was completing his training as a first officer for Flash Airlines.

Beginning of his flying career:

Training at USA

ISIS Airman Report CAIS Information - Basic Information
Cert Pfx: Cert No: 2440980 Cert Sfx: Soc.Sec.No: 620480104
Name: ABDELHAMID, ASHRAF Name Sfx:
DOB: 1961 10 25 Sex: M Hair: BROWN Eyes: BROWN Ht: 68 Wt: 154
POB: CAIRO, EGYPT
Status: Info: Name/Address Source: Airm
Date of Address Update: 2004 03 10 Citizenship: USA
Street: PO BOX 414 County: 065
City: PALM DESERT State: CA Zip: 92261-0414
Country:

TOT CIVIL HOURS: 03750 TOT MIL HOURS: 00400

ISIS Airman Report CAIS Information - Medical
Cert Pfx: Cert No: 2440980 Cert Sfx: Information
Medical Information for: ABDELHAMID, ASHRAF
Class: First
Certificate Desc.: LIMITED
Medical Date: 2003 01 28 Medical ID#: 200001408794
Restriction:
MUST HAVE AVAILABLE GLASSES FORNEAR VISION.

ISIS Airman Report CAIS Information - Certificate
Cert Pfx: Cert No: 2440980 Cert Sfx: Information
Specl Purp Pilot Info ABDELHAMID ASHRAF
Cert-Level: COMMERCIAL PILOT (FOREIGN BASED)
Rating/Level:
AIRPLANE SINGLE ENGINE LAND/COMMERCIAL PILOT (FOREIGN BASED)
INSTRUMENT AIRPLANE/COMMERCIAL PILOT (FOREIGN BASED)
Type Rating/Level:
Date of Issue: 1991 10 17 OrgDOI: Update Date: 1991 10 17
Seal: Black Cert Status: Active

ISIS Airman Report CAIS Information - Certificate
Cert Pfx: Cert No: 2440980 Cert Sfx: Information
Specl Purp Pilot Info ABDELHAMID ASHRAF
Certificate Limitations
ISSUED ON BASIS OF AND VALID ONLY WHEN ACCOMPANIED BY CANADIAN PILOT LICENSE NO. C275467. ALL LIMITATIONS AND RESTRICTIONS ON THE CANADIAN PILOT LICENSE APPLY. NOT VALID FOR AGRICULTURAL AIRCRAFT OPERATIONS.
INSTRUMENT AIRPLANE (U.S. TEST PASSED).

ISIS Airman Report CAIS Information - Certificate
Cert Pfx: Cert No: 2635768 Cert Sfx: Information
Pilot Information for: ABDELHAMID ASHRAF
Cert-Level: AIRLINE TRANSPORT PILOT
Rating/Level:
AIRPLANE MULTIENGINE LAND/AIRLINE TRANSPORT PILOT
Type Rating/Level:
Date of Issue: 2000 06 15 OrgDOI: Update Date: 2001 06 21
Seal: Blue Cert Status: Active

ISIS Airman Report CAIS Information - Previous Certificate
Cert Pfx: Certificate No: 2440980 Cert Sfx:
Previous Certificate for: ABDELHAMID ASHRAF

Previous Certificate Information:
Pfx Cert Num. Sfx Cert Date Cert Level/Type

NO PREVIOUS CERTIFICATE INFORMATION AVAILABLE

ISIS Accident/Incident (AID) Report Airman Accident/Incident
Airman Name: ABDELHAMID, ASHRAF Cert #: 002440980
Accident Date: 02/15/2001 Air Agency Cert #:
Accident Event: GENERAL AVIATION ACCIDENT Source: .4
Type of Accident: LOSS OF DIRECTIONAL CONTROL
Accident Location--------
City: SAN DIEGO State: CA

Aircraft Involved--------
N-Number: N4922D
Make: CESSNA Model: 172N

ISIS Accident Incident Report Full AID Text Page No.: 1
Case number: 4922D20010215115931 of 3
Jump to page: __ AID Text

ON FEBRUARY 15, 2001, ABOUT 1516 HOURS PST, A CESSNA 172N, N4922D, VEERED OFF THE RUNWAY AND COLLIDED WITH A TAXIWAY SIGN DURING LANDING ROLLOUT ON RUNWAY 28L AT THE MONTGOMERY FIELD, SAN DIEGO, CA. THE AIRPLANE WAS SUBSTANTIALLY DAMAGED. NEITHER THE AIRLINE TRANSPORT CERTIFICATED PILOT NOR PASSENGER WAS INJURED. PLUS ONE FLYERS, INC., IN SAN DIEGO, OPERATED THE AIRPLANE. VISUAL METEOROLOGICAL CONDITIONS PREVAILED AND AN INSTRUMENT FLIGHT RULES FLIGHT PLAN WAS FILED. THE PERSONAL FLIGHT WAS PERFORMED UNDER 14 CFR PART 91, AND IT ORIGINATED IN SCOTTSDALE, AZ. ABOUT 1135. AIRPORT PERSONNEL REPORTED THAT THE

COLLISION OCCURRED ABOUT 1,000 FEET UPWIND OF THE RUNWAY'S THRESHOLD. THE AIRPLANE IMPACTED THE TAXIWAY "C" SIGN, AND VEERED OFF THE RUNWAY. THE AIRPLANE CAME TO A STOP ABOUT 200 FEET NORTH OF THE RUNWAY. THE PILOT STATED THAT DURING THE LANDING ROLLOUT, AS THE AIRPLANE WAS DECELERATING THROUGH ABOUT 50 KNOTS, THE LEFT WING SUDDENLY LIFTED UP. THEREAFTER
HE LOST CONTROL OF THE AIRPLANE. HE ADDITIONALLY REPORTED THAT HE WAS UNAWARE OF THE REASON FOR THIS OCCURENCE. NO MECHANICAL MALFUNCTIONS WERE REPORTED WITH THE AIRPLANE.

ON FEBRUARY 15, 2001, ABOUT 1516 HOURS PACIFIC STANDARD TIME, A CESSNA 172N, N4922D, VEERED OFF THE RUNWAY AND COLLIDED WITH A TAXIWAY SIGN DURING LANDING ROLLOUT ON RUNWAY 28L AT THE MONTGOMERY FIELD, SAN DIEGO, CALIFORNIA. THE AIRPLANE WAS SUBSTANTIALLY DAMAGED. NEITHER THE AIRLINE TRANSPORT CERTIFICATED PILOT NOR PASSENGER WAS INJURED. PLUS ONE FLYERS, INC., SAN DIEGO, OPERATED THE AIRPLANE. VISUAL METEOROLOGICAL CONDITIONS PREVAILED, ANDAN INSTRUMENT FLIGHT RULES FLIGHT PLAN WAS FILED. THE PERSONAL FLIGHT WAS PERFORMED UNDER 14 CFR PART 91, AND ORIGINATED IN SCOTTSDALE, ARIZONA, ABOUT 1235 MOUNTAIN STANDARD TIME. AIRPORT PERSONNEL REPORTED THAT THE COLLISION OCCURRED ABOUT 1,000 FEET UPWIND OF THE RUNWAY'S THRESHOLD. THE AIRPLANE IMPACTED THE TAXIWAY "C" SIGN AND VEERED OFF THE RUNWAY. THE AIRPLANE CAME TO A STOP ABOUT 550 FEET FARTHER UPWIND OF THE SIGN AND ABOUT 200 FEET NORTH OF THE RUNWAY. THE PILOT STATED TO THE NATIONAL TRANSPORTATION SAFETY BOARD INVESTIGATOR THAT DURING THE LANDING ROLLOUT, AS THE AIRPLANE WAS DECELERATING THROUGH ABOUT 50 KNOTS, THE LEFT WING SUDDENLY LIFTED UP. THEREAFTER, HE LOST CONTROL OF THE AIRPLANE. HE ADDITIONALLY REPORTED THAT HE WAS UNAWARE OF THE REASON FOR THIS OCCURRENCE. NO MECHANICAL MALFUNCTIONS WERE REPORTED WITH THE AIRPLANE. IN THE PILOT'S PARTIALLY COMPLETED ACCIDENT REPORT, HE INDICATED THAT WHEN THE AIRPLANE WAS "ALMOST HALF WAY DOWN THE RUNWAY" THE LEFT WING ROSE UP, AND THEREAFTER HE LOST CONTROL OF THE AIRPLANE AS IT "VIOLENTLY" VEERED OFF THE RUNWAY. THE PILOT ALSO REPORTED THAT WHEN HE WAS ON FINAL APPROACH THE TOWER CONTROLLER REPORTED THAT THE WIND WAS FROM 270 DEGREES AT 6 KNOTS.

Enforcement for Airman: ABDELHAMID, ASHRAF Recs: 0
Using Certificate: 002440980 (Specl Purp Pilot In thru: 0
A search of EIS data by LAST NAME found 0 other matches, Press F5 to view
Jump to VIOL. DATE ____________ Sort by column: 1 A of: 0
Viol.Date Status Rgn Case# Related case#

NO RECORDS FOUND

Enforcement for Airman: ABDELHAMID, ASHRAF Recs: 0
Using Certificate: 002635768 (Pilot) thru: 0
A search of EIS data by LAST NAME found 0 other matches, Press F5 to view
Jump to VIOL. DATE ____________ Sort by column: 1 A of: 0
Viol.Date Status Rgn Case# Related case#

NO RECORDS FOUND

Inspection for Airman: ABDELHAMID, ASHRAF Recs: 1
Using Certificate: 002440980 (Specl Purp Pilot In thru:
Jump to: RECORD ID _____________ Sort by column: 1 A of:
Record ID Activity Code FAR Status Start Date Completion

NO RECORDS FOUND

Inspection for Airman: ABDELHAMID, ASHRAF Recs: 1
Using Certificate: 002635768 (Pilot) thru:
Jump to: RECORD ID _____________ Sort by column: 1 A of:
Record ID Activity Code FAR Status Start Date Completion

NO RECORDS FOUND

Interview with Brother of observer Pilot/ Ashraf Abdel Hamid:

Captain/Alaa El Saadany Training Captain with EgyptAir was interviewed by Dr. Adel Fouad and Captain Shaker Kelada who said that Ashraf Abdel Hamid was a lively person sociable and easy to get along with, was friendly confident and out spoken.
Asked about his career as a pilot he said that he started his initial training in Cairo than went to Canada and obtained Canadian citizenship and Canadian pilot license and flew single engine planes. He then went to the USA and also obtained USA citizenship and flew there on single engine and Lear jets had a total of around 4000 hrs.
On a family visit to Egypt, he was persuaded by Captain\ Sombaty (Operations Manager of Flash Airline), a colleague and personal friend to stay in Egypt and fly for Flash. He had attended B737 ground school course and was due for examination two days after the accident. He flew as an observer with Captain Sombaty who was assisting him to complete his B737 qualification.

Correction:
The following statement included in page 15 of the factual report should be deleted:
Airline training procedures require a certain amount of observation time prior to serving as an active crew member. The observer was assigned to this flight to observe as a part of that training requirement.

The following statement should replace it:

Ashraf Abdel Hamid was flying as an observer as it is common practice for operators in Egypt is to assign pilots joining an airline or upgrading to a new type to fly as an observer on the type to be flown to get acquainted with company routes and procedures of the operator and type

CAA regulations regarding observation time:
N/A

Flash Airline policy regarding observation time:
As required

1.6.4.2. DFCS Mode

Operation of the FD vertical bar with “Heading Select” disengagement as the AP engages.
Refer to Boeing AMM 22-11-00 Page 38

1.6.6.4. The maintenance log sheets for the flights after 12/31/03
Lost on board and no copies prior to departures from SHH which is a violation of ECAA regulations. Necessary measures are taken by ECAA to ensure adherence.

1.6.6.5. The lack of write-ups on the TOGA problem and slat indication that existed on the entire 25-hours of FDR. Status of the technical log is not known due to being lost on board

1.9.1 ATC communications/ Transcript

Information about the conversation between ATC and MSR 227 (p 44, factual report) translated from Arabic into English.

2:58:15	C>P	
	P>C	
	P>C	Sharm MSR227
	C>P	***Go Ahead Sir***
	P>C	***We heard on frequency 121.5 some one from Flash speaking, I do not know if it is 604 or it is another Flash Aircraft***
	C>P	***It is 604, there is no other aircrafts***
	P>C	***He was speaking on 121.5, so it is O.K.***
	C>P	***Thank you very much Sir***
	P>C	***You're welcome***
	C>P	Ground 121.9 for company information, ***God willing***
	P>C	***Peace be with you 121.9***
	C>P	***And with you***

N.B. Frequency 121.5 was checked no transmission was recorded at the time of the accident with any traffic

1.13.2. Medical factors related to SD (Spatial Disorientation):

A. FAA advisory Circular regarding SD

U.S. Department of Transportation

Federal Aviation Administration

Advisory Circular

Subject: PILOT'S SPATIAL DISORIENTATION | Date: 2/9/83 | Initiated by: AFO-840 | AC No: 60-4A | Change:

1. PURPOSE. To acquaint pilots with the hazards of disorientation caused by loss of visual reference with the surface.

2. CANCELLATION. Advisory Circular 60-4, Pilot's Spatial Disorientation, dated February 9, 1965, is canceled.

3. DISCUSSION.

a. The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight, supported by other senses, allows the pilot to maintain orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of disorientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is "up."

b. During a recent 5-year period, there were almost 500 spatial disorientation accidents in the United States. Tragically, such accidents resulted in fatalities over 90 percent of the time.

c. Tests conducted with qualified instrument pilots indicate that it can take as much as 35 seconds to establish full control by instruments after the loss of visual reference with the surface. When another large group of pilots were asked to identify what types of spatial disorientation incidents they had personally experienced, the five most common illusions reported were: 60 percent had a sensation that one wing was low although wings were level; 45 percent had, on leveling after banking, tended to bank in opposite direction; 39 percent had felt as if straight and level when in a turn; 34 percent had become confused in attempting to mix "contact" and instrument cues; and 29 percent had, on recovery from steep climbing turn, felt to be turning in opposite direction.

d. Surface references and the natural horizon may at times become obscured, although visibility may be above visual flight rule minimums. Lack of natural horizon or surface reference is common on overwater flights, at night, and especially at night in extremely sparsely populated areas, or in low visibility conditions. A sloping cloud formation, an obscured horizon, a dark scene spread with ground lights and stars, and certain geometric patterns of ground lights can provide inaccurate visual information for aligning the aircraft correctly with the actual horizon. The disoriented pilot may place the aircraft in a dangerous attitude. Other factors which contribute to disorientation are reflections from outside lights, sunlight shining through clouds, and reflected light from the anticollision rotating beacon.

e. Another condition creating restrictions to both horizontal and vertical visibility is commonly called "white-out." "White-out" is generally caused by fog, haze, or falling snow blending with the snow-covered earth surface which may obscure all outside references. Therefore, the use of flight instruments is essential to maintain proper attitude when encountering any of the elements which may result in spatial disorientation.

4. RECOMMENDED ACTION.

a. You, the pilot, should understand the elements contributing to spatial disorientation so as to prevent loss of aircraft control if these conditions are inadvertently encountered.

b. The following are certain basic steps which should assist materially in preventing spatial disorientation.

(1) Before you fly with less than 3 miles visibility, obtain training and maintain proficiency in aircraft control by reference to instruments.

(2) When flying at night or in reduced visibility, use your flight instruments, in conjunction with visual references.

(3) Maintain night currency if you intend to fly at night. Include cross-country and local operations at different airports.

(4) Study and become familiar with unique geographical conditions in areas in which you intend to operate.

(5) Check weather forecasts before departure, en route, and at destination. Be alert for weather deterioration.

(6) Do not attempt visual flight rule flight when there is a possibility of getting trapped in deteriorating weather.

(7) Rely on instrument indications unless the natural horizon or surface reference is clearly visible.

5. CONCLUSION. You and only you have full knowledge of your limitations. Know these limitations and be guided by them.

Kenneth S. Hunt

KENNETH S. HUNT
Director of Flight Operations

B- MCA study regarding SD
Refer to Factual Report, page 55 (Dr. Marawan report) and item 1.16.4. Tests and researches conducted by MCA:

C- Medical records for the captain related to any of the conditions conducive to spatial disorientation.
No report found

1.13.3. Most recent medical certification
A- Date, type
Refer to page 14 of the Factual Report
B- Limitations (if applicable)
None (Refer to page 14 of the Factual Report)

1.13.4. General health information for each crew member.
No Factual information available

1.13.5. Toxicological testing.
No toxicological testing was possible because the bodies were not recovered.

1.13.6. Last civil medical check for Captain
Refer to page 14 of the Factual Report

1.16 Tests and Researches:

1.16.1. Tests and researches conducted by Boeing and Honeywell:

1.16.1.0. General Overview of Boeing Process_ Kinematic Consistency:
(CairoMarch04Slides March Progress Meeting - Cairo.pdf)
(Kincon and Simulation (public release).ppt)

FDR Data

- Accelerations and Euler angles recorded on the FDR uniquely determine the path of the airplane

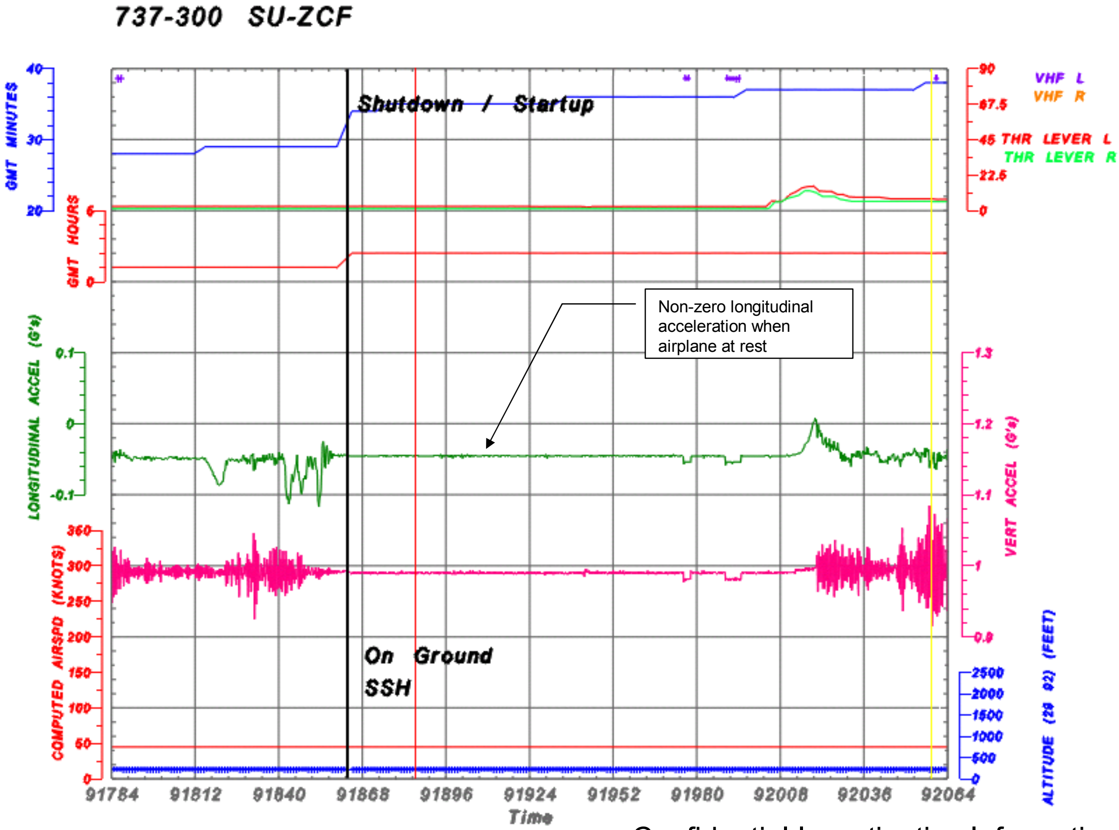
- Accelerations
  - Vertical
  - Longitudinal
  - Lateral
- Euler angles
  - Pitch
  - Roll
  - Heading

- Additional parameters describe path
  - e.g. altitude, ground speed, drift angle

Problem

- Some FDR data may be inconsistent with other FDR data

- Example:
  – Integrating longitudinal acceleration during a takeoff roll results in groundspeed. The calculated value may differ from the recorded value.
- Solution:
  – Add an offset to the acceleration such that the calculated groundspeed matches the recorded groundspeed.



Confidential Investigative Information

Kinematic Consistency

- Kinematic consistence is a process that adds a bias to the recorded accelerations so that the integrated path matches the recorded path

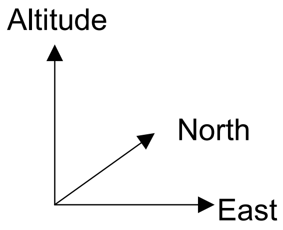
- i.e. calculate c_1 such that

$$v = \int (a + c_1)\,dt$$

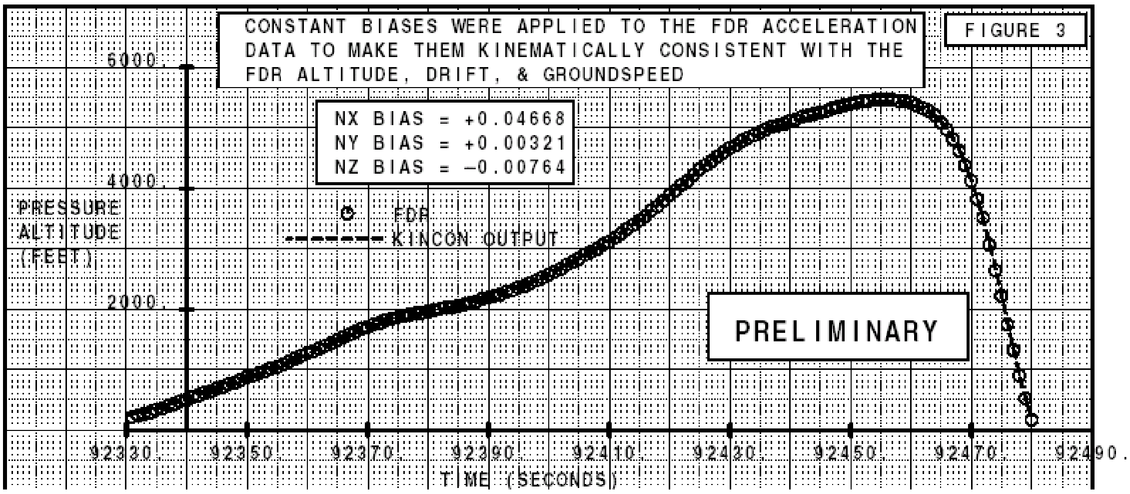
$$where$$

$$v = groundspeed$$

$$a = longitudinal\ acceleration$$

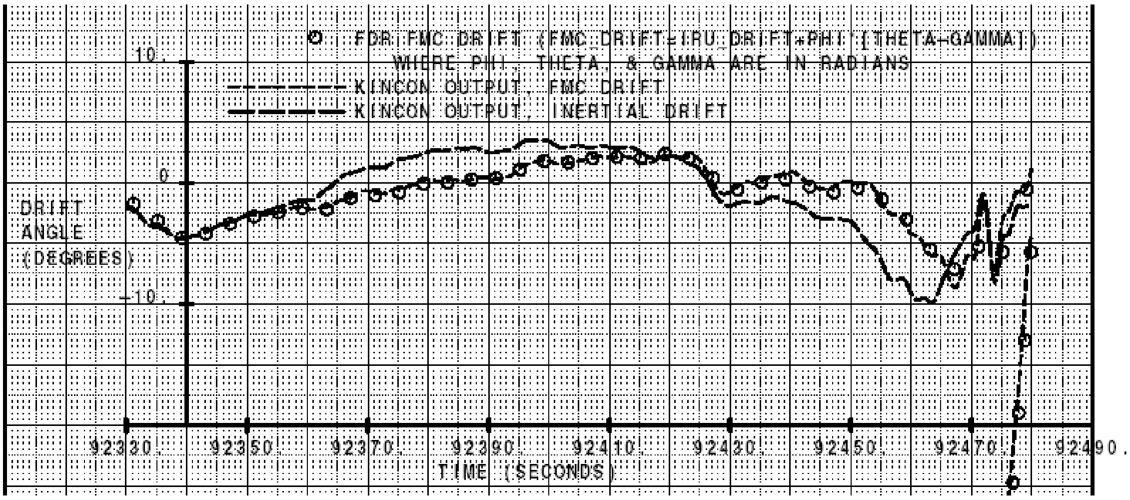


Kinematic Consistency Results



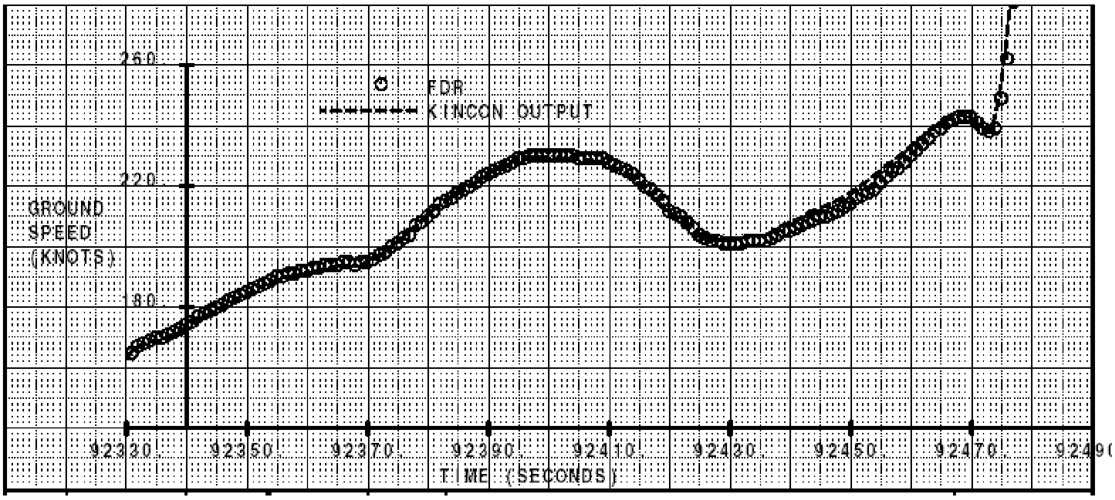
Confidential Investigative Information

Kinematic Consistency Results



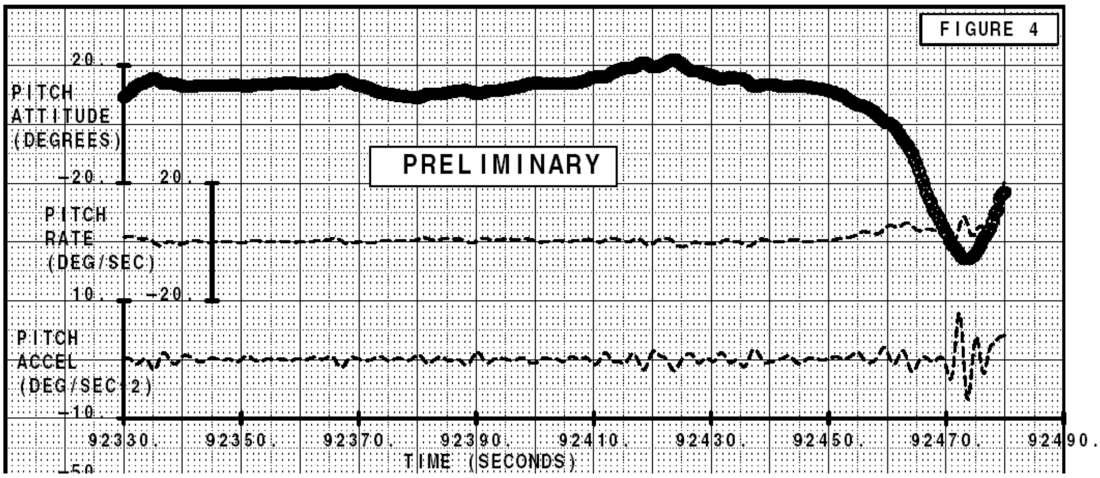
Confidential Investigative Information

Kinematic Consistency Results



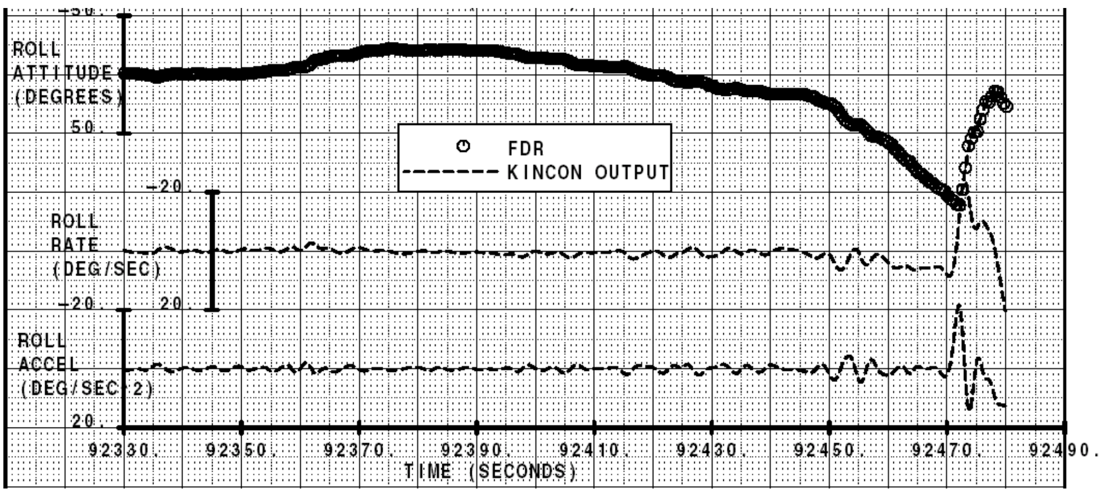
Confidential Investigative Information

Kinematic Consistency Results



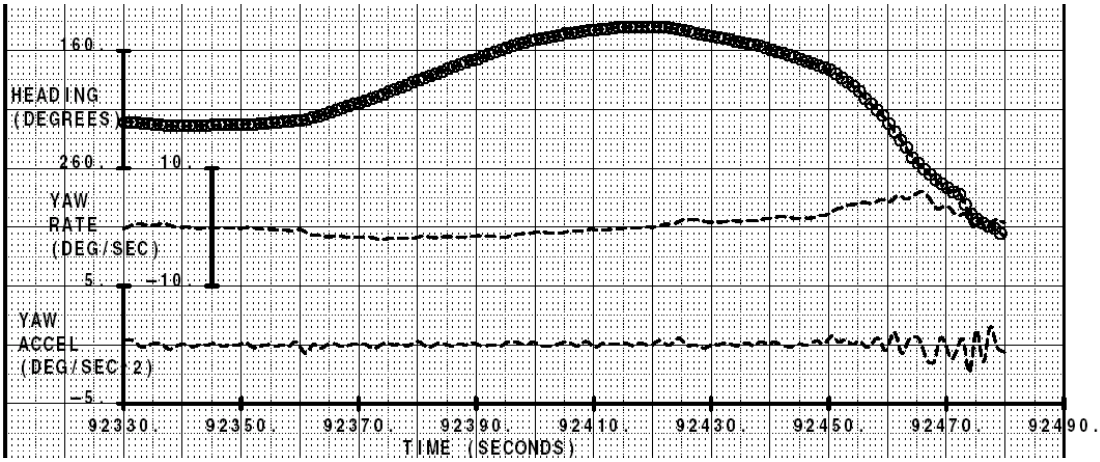
Confidential Investigative Information

Kinematic Consistency Results



Confidential Investigative Information

Kinematic Consistency Results



Confidential Investigative Information

Kinematic Consistency

- Note:
- The kinematic consistency process does not make any assumptions about the aerodynamic properties of the airplane
- In fact, the process can be applied to any moving object

Simulation

- Once the kinematically consistent accelerations and Euler angles have been calculated, an aerodynamic simulation of the airplane is used to reconstruct the flight path
- Time-step integration is used to calculate the motion of the airplane from one step to the next

$$v_{t1} = v_{t0} + a_{t0}\Delta t \qquad x_{t1} = x_{t0} + v_{t0}\Delta t$$

$$Lift = \frac{1}{2}\rho v^2 S C_L$$

$$C_L = f\left(\alpha, v, \, flaps, gear, control\, surfaces, \ldots\right)$$

Sensitivity Example

•Accident flight is approximately 147 seconds long
•Simulator match of altitude differs by approximately 200 feet

•Sensitivity analysis for straight and level flight 147 seconds long

$$F = MA \text{ or } A = \frac{F}{M}$$

For vertical axis $\ddot{z} = \frac{L-W}{W}$ ⟶ $z = \iint \frac{L-W}{W} dt^2$

For constant weight $z = g\frac{L-W}{W}\frac{t^2}{2}\Big|_{t_1}^{t_2}$

Sensitivity Example

For constant weight $$z = g\frac{L-W}{W}\frac{t^2}{2}\Bigg|_{t_1}^{t_2}$$

Assume altitude error is result of incorrect lift $$\Delta z = g\Delta\frac{L-W}{W}\frac{t^2}{2}$$

Solve for ΔL $$\Delta\frac{L-W}{W} = \frac{2\Delta z}{g\,t^2} \qquad \Delta L = \frac{2W\Delta z}{g\,t^2}$$

$$\Delta L = \frac{2(113630\,lb)(200\,ft)}{32.2\frac{ft}{\sec^2}(147\sec)^2} = 65\ lbs$$

Therefore-

A 65 lb error in calculated lift will result in
a altitude error of 200 ft after 147 seconds.

Simulation Differences

The 737-300 simulation model represents a nominal airplane with nominal engines.

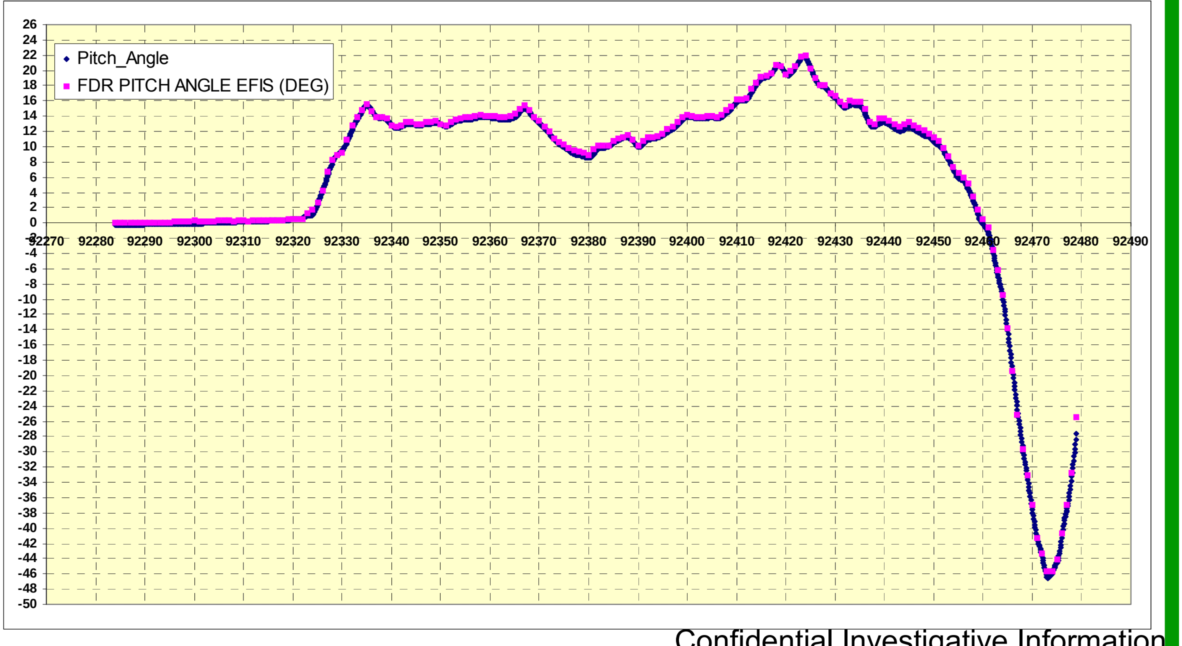
Small offsets between the nominal simulation airplane and an individual airplane in the fleet are common due to differences in rigging, engine wear, etc.

Pass Through Data

For Flash Airlines simulation –

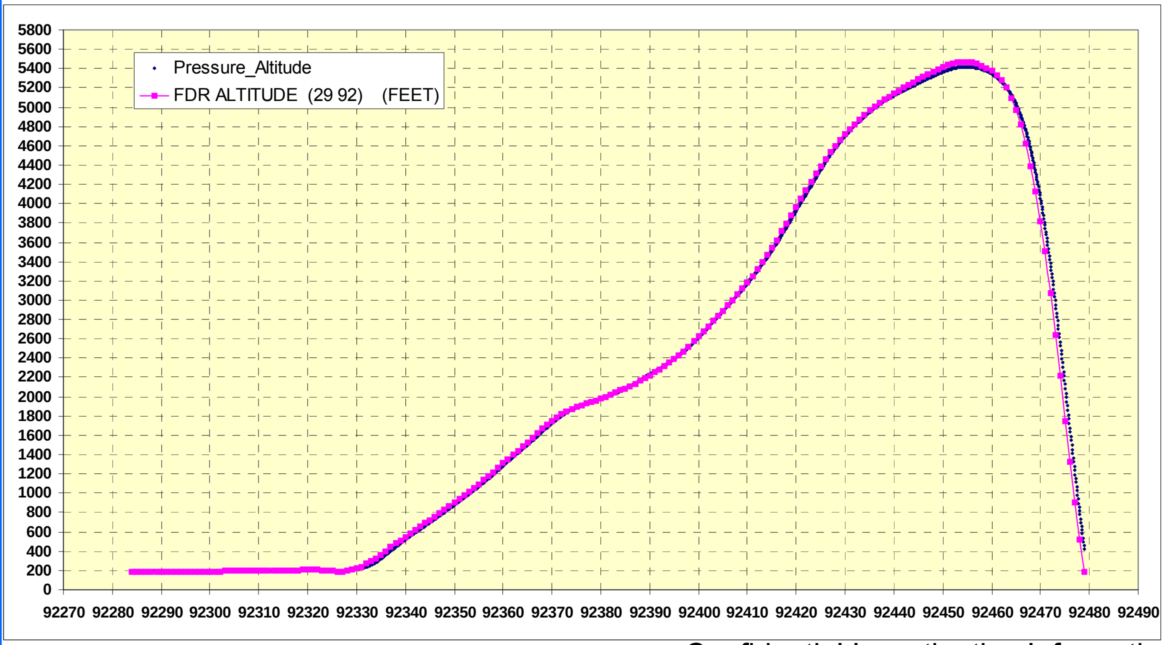
- Stabilizer was adjusted to account for control column bias (2.9° offset)
- Throttle level position was adjusted to improve match of airspeed and altitude

Kincon Data Match



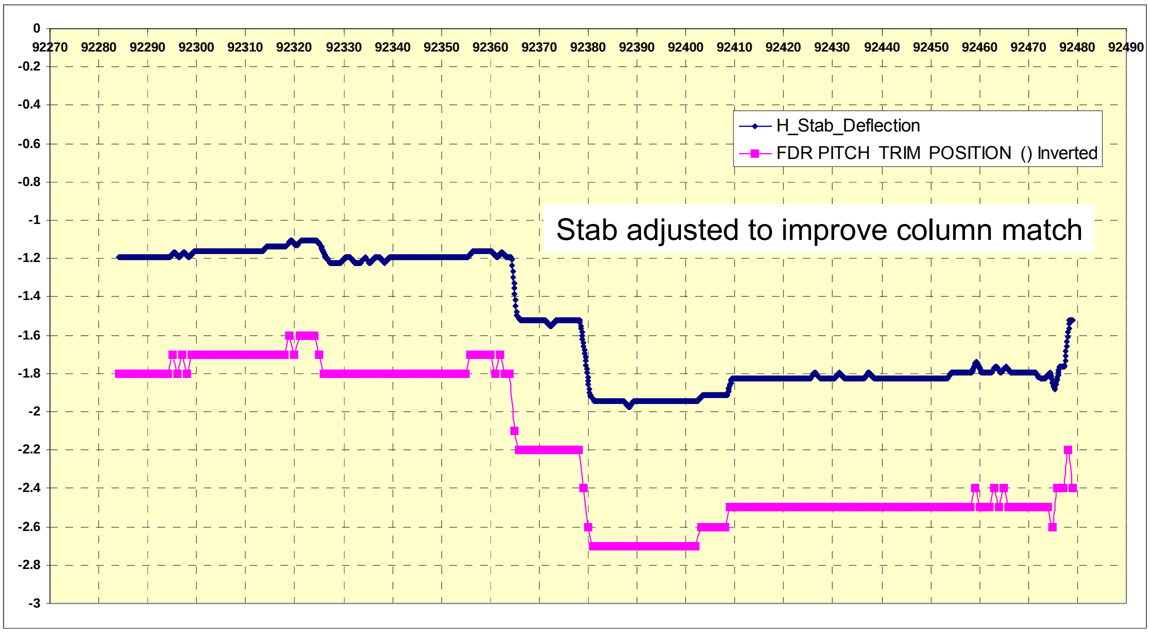
Confidential Investigative Information

Simulator Output Match



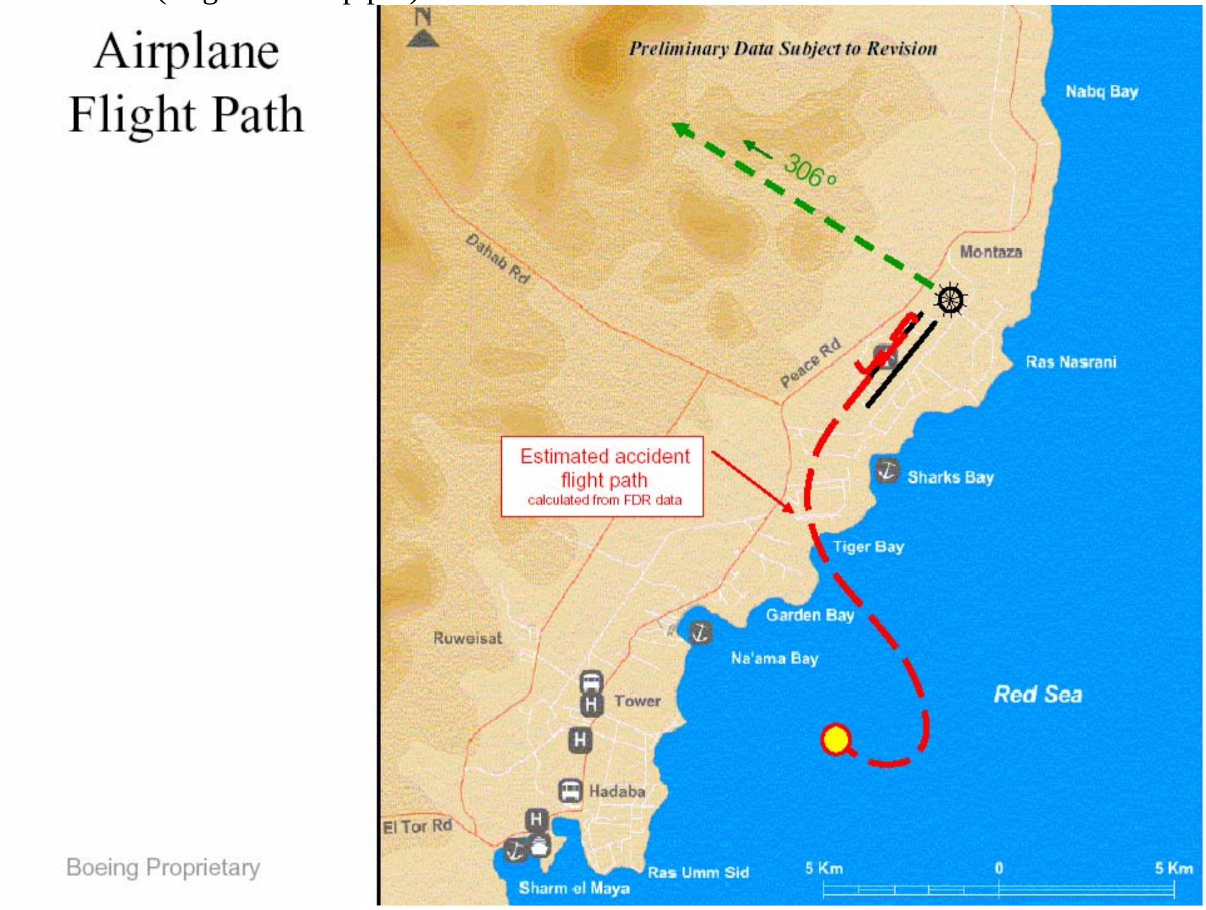
Confidential Investigative Information

Pass Through Data Match



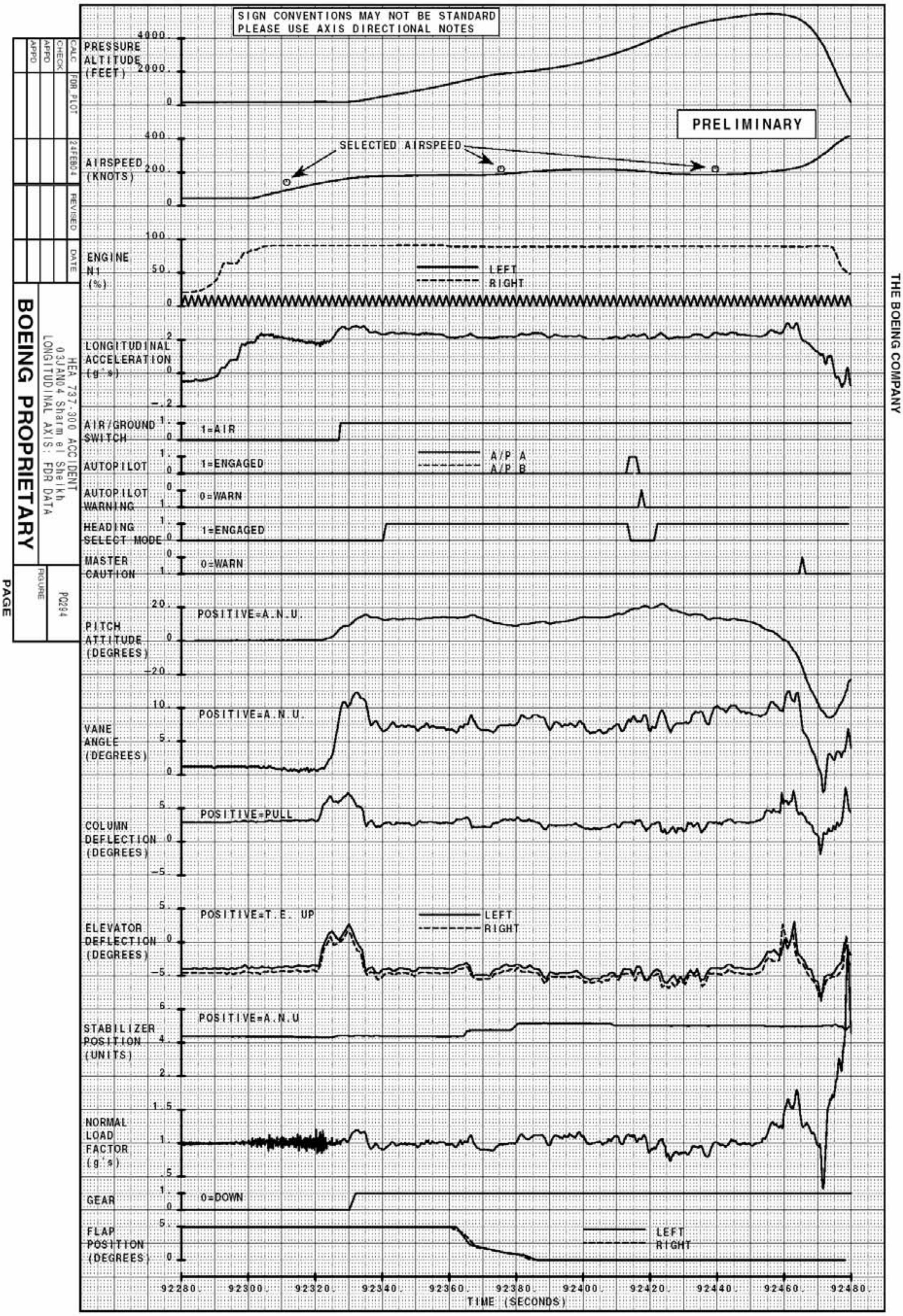
Confidential Investigative Information

1.16.1.1. **Estimated accident flight path, calculated from FDR data:**
(FlightPathMap.pdf)

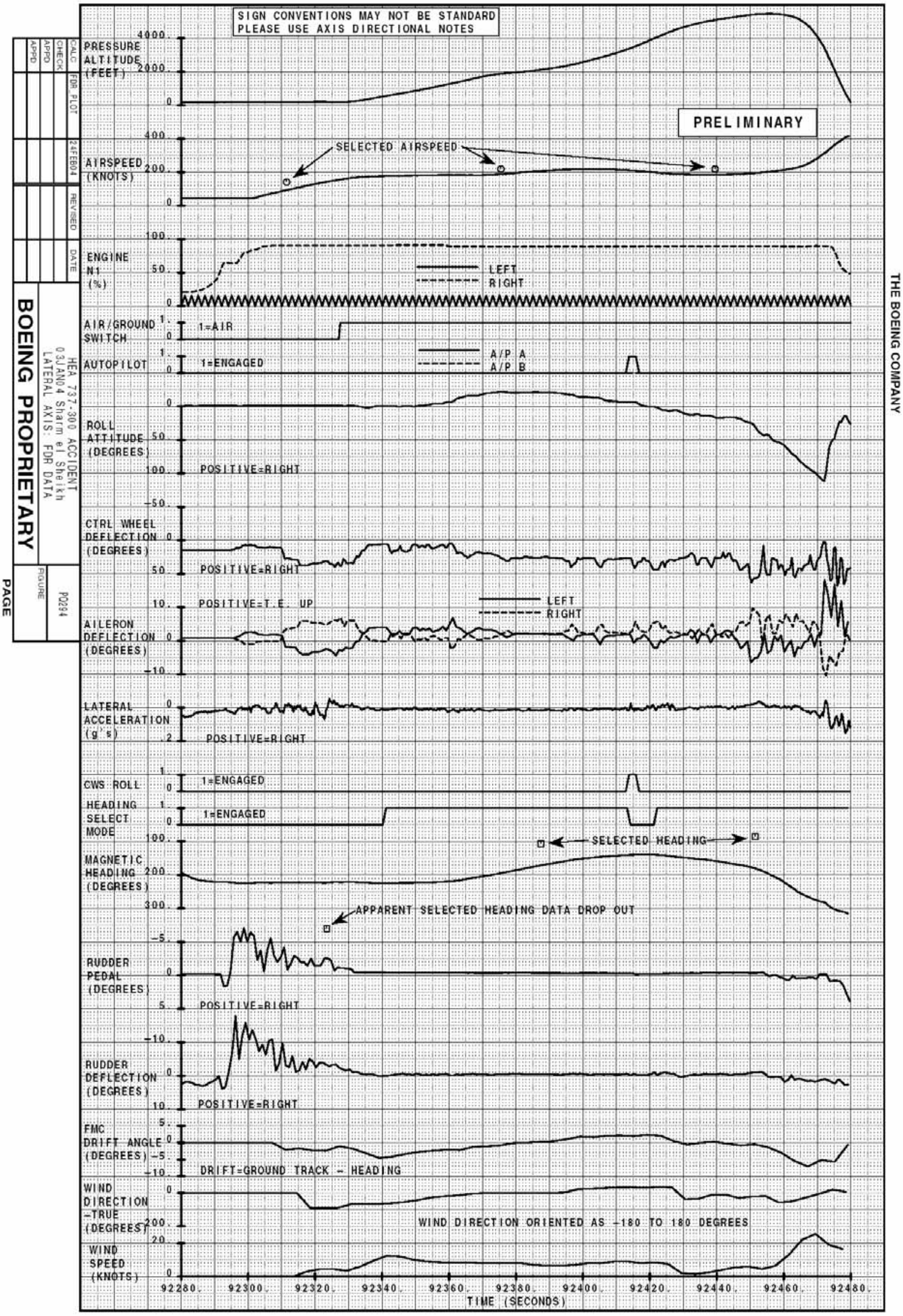


1.16.1.2. FDR data plots (presented by Boeing)

FDR Data accident flight - FDR plot.pdf (some selected parameters 24 Feb 04)
(Longitudinal axis)



(Lateral axis)



FDR Parameter Review, B-H200-17884-ASI, 3 May 2004 (ATT For Decoding Grid.pdf)

Boeing Proprietary information and will not be available for public use

1.16.1.3. Simulator Match accident flight:
SimMatchaccidentflight 24-2-04.pdf (Simulation Match, FDR-Kincon-Simulation)

Boeing Proprietary information and will not be available for public use

SimMatchpreviousflight 24-2-04.pdf (FDR-Kincon-Simulation match 24-2-04)

Boeing Proprietary information and will not be available for public use

HEA_PQ294_prevfltSIM.pdf (26 Feb 2004, base lines, FDR-Kincon-Sim prvious flight)

Boeing Proprietary information and will not be available for public use

HEA_PQ294_baselineSIM.pdf (26 Feb 2004, base lines, FDR-Kincon-Sim)

Boeing Proprietary information and will not be available for public use

HEA_PQ294_FDR_data.pdf (FDR Data accident flight - Boeing -26 Feb 04 Fig's 1, 2)

Boeing Proprietary information and will not be available for public use

HEA_PQ294_kincon (includes roll rate).pdf (FDR Data accident flight - plotted by Boeing (some selected parameters)-26 Feb 04 Fig's 3, 4

Boeing Proprietary information and will not be available for public use

HEA_PQ294_WindsSIM29402to29442.pdf (26 Feb 04 Fig's 23- 25

Boeing Proprietary information and will not be available for public use

17871 encl 4 (B-H200-17871-ASI 31 March 2004).pdf (enclosure 4 (B-H200-17871-ASI 31 March 2004). Boeing plots

Boeing Proprietary information and will not be available for public use

M Cab Recovery (Piloted Recovery.xls)

Boeing Proprietary information and will not be available for public use

Simulation Scenario (Simulation Scenario Status20 Sep.,04.xls)

Boeing Proprietary information and will not be available for public use

Simulation Scenario (Simulation Scenario Status 27-30 Sep, 04.xls)

Boeing Proprietary information and will not be available for public use

1.16.1.4. Simulated Failures:

Boeing Proprietary information and will not be available for public use

HEA_PQ294_Simulated_Failures Spoilers, LE Slats.pdf (FDR-norm simulation-simulation with spoilers failures)

Right outboard flight spoilers (#7) Hardover simulation (hardover starts at 92391)

Boeing Proprietary information and will not be available for public use

Left outboard flight spoilers (#2) Hardover simulation (hardover starts at 92391)

Boeing Proprietary information and will not be available for public use

Right outboard flight spoilers (#7) Float simulation (floats starts at 92391)

Boeing Proprietary information and will not be available for public use

Left outboard flight spoilers (#2) Float simulation (floats starts at 92391)

Boeing Proprietary information and will not be available for public use

Critical right wing leading edge slat # 6 extends

Boeing Proprietary information and will not be available for public use

Critical left wing leading edge slat # 1 extends

Boeing Proprietary information and will not be available for public use

Fig 40-43 Lateral Control Jams.pdf (FDR, normal simulation, simulation with spoilers fault)

Longitudinal Axis, simulated right wing spoiler cable jam
Boeing Proprietary information and will not be available for public use

Longitudinal Axis, simulated F/O’s wheel jam:

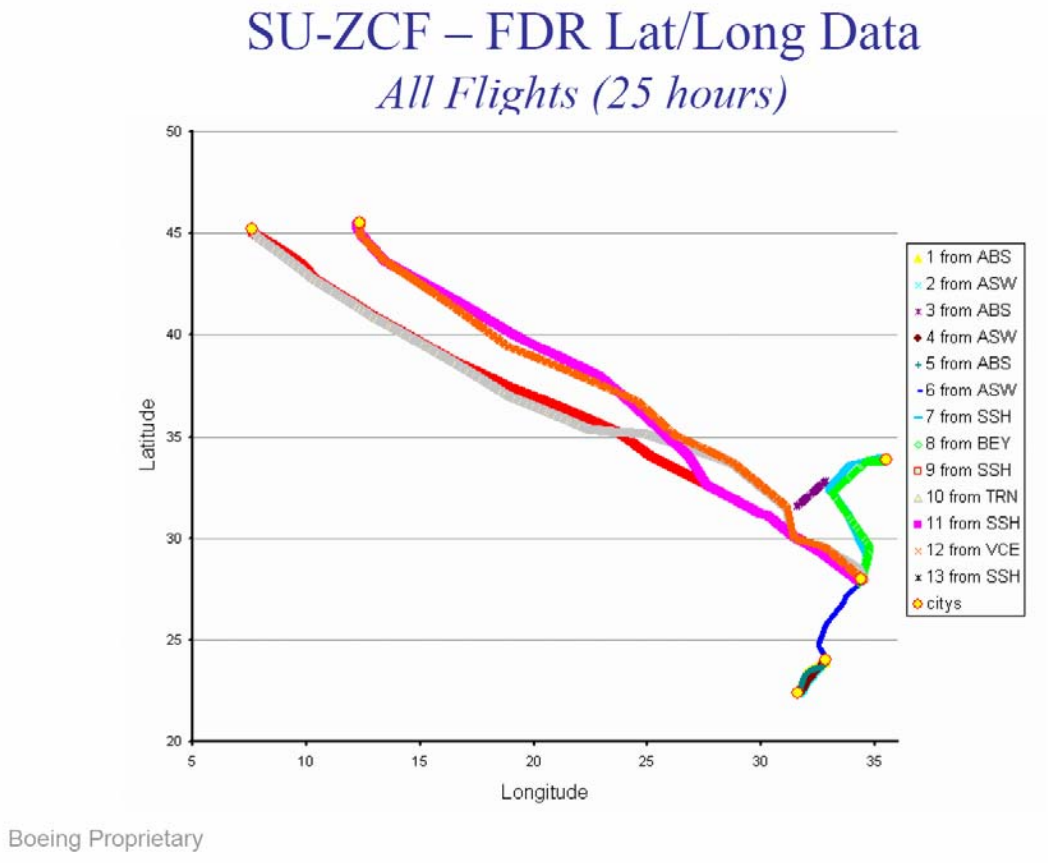
-

Boeing Proprietary information and will not be available for public use

Hypothetical Scenario, Right Side Cable Jam Induces Right Roll (Right Side Cable Jam Effects.ppt)

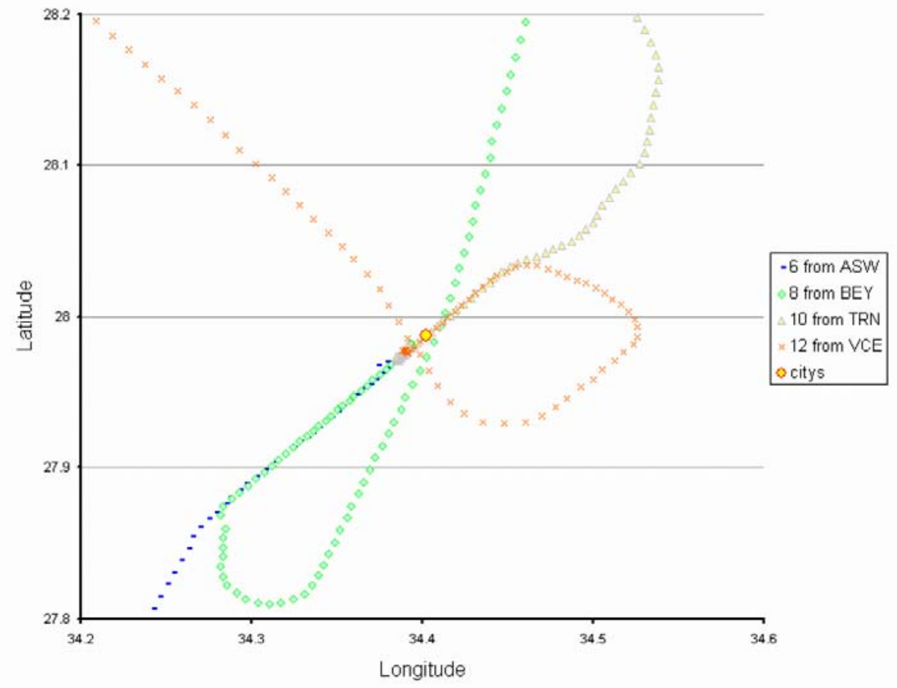
Boeing Proprietary information and will not be available for public use

1.16.1.5. FDR 25 Hour Data- Observations (CairoMarch04Slides (March Progress Meeting - Cairo).pdf, 040301 Flash 737 Cairo Mtg (public release version).pdf)



SU-ZCF – FDR Lat/Long Data

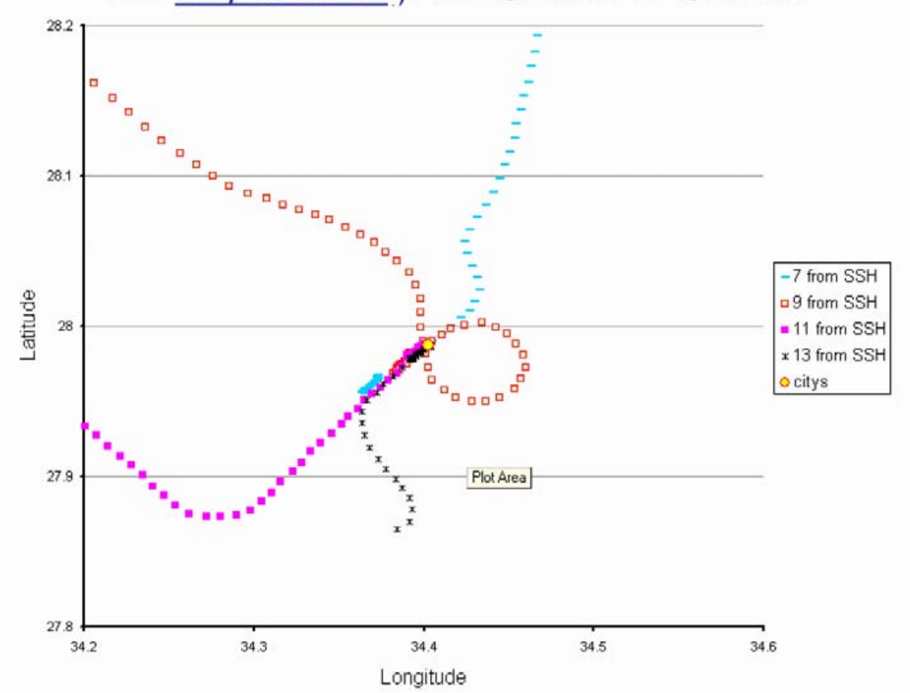
All Arrivals into Sharm el-Shiekh



Boeing Proprietary

SU-ZCF – FDR Lat/Long Data

All Departures from Sharm el-Shiekh



Boeing Proprietary

FDR 25 Hour Data
Observations

- SU-SCF Flight 9 departure from SSH
  - *Departed Rwy 4*
  - *Circling departure to over-fly VOR*

- Use of TOGA on takeoff
  - *SU-ZCF: TOGA typically engaged for ~2 sec*
  - *SU-ZCD: TOGA typically engaged for 1-2 minutes*

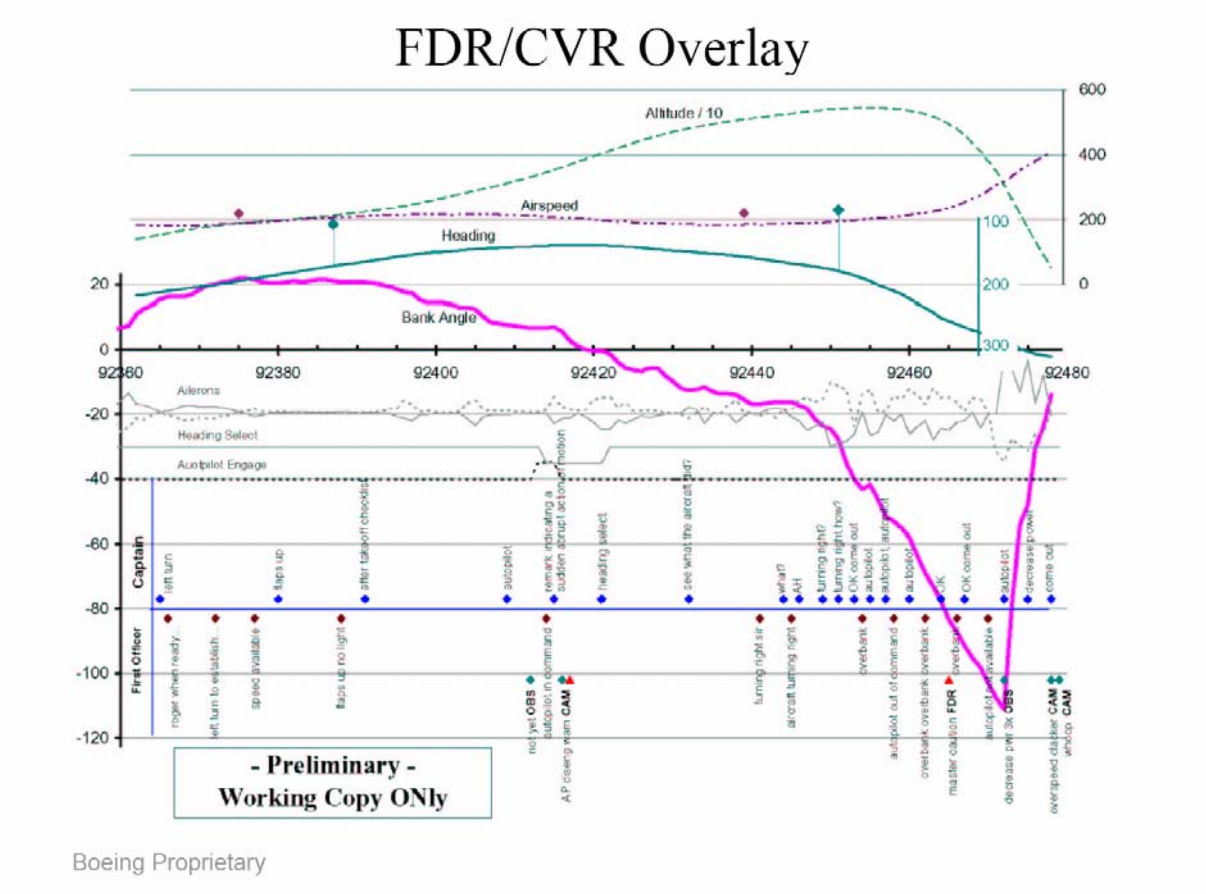
SU-ZCF – FDR 25 Hour Data
TOGA Observations

Flight	Both F/D ON?	Normal looking A/T Takeoff	First TOGA Push (1)	If Second TOGA Push (1)
1	YES	YES	1	2
2	YES	YES	0	
3	YES	YES	2	
4	NO	YES	0	
5	YES	YES	2	
6	YES	YES	1	
7	YES	YES	1	
8	YES	YES	2	
9	YES	YES	2	1
10	YES	YES	0	
11	YES	YES	2	
12	YES	YES	2	
13	YES	YES	2	

(1) Number of samples recorded for TOGA_FCC (sample intvl=1 sec)

1.16.1.6. FDR-CVR Overlay

FDR-CVROverlay.pdf, FDR-CVR Overlay 3R2.pdf (21-June 2004, 040301 Flash 737 Cairo Mtg (public release version).pdf)



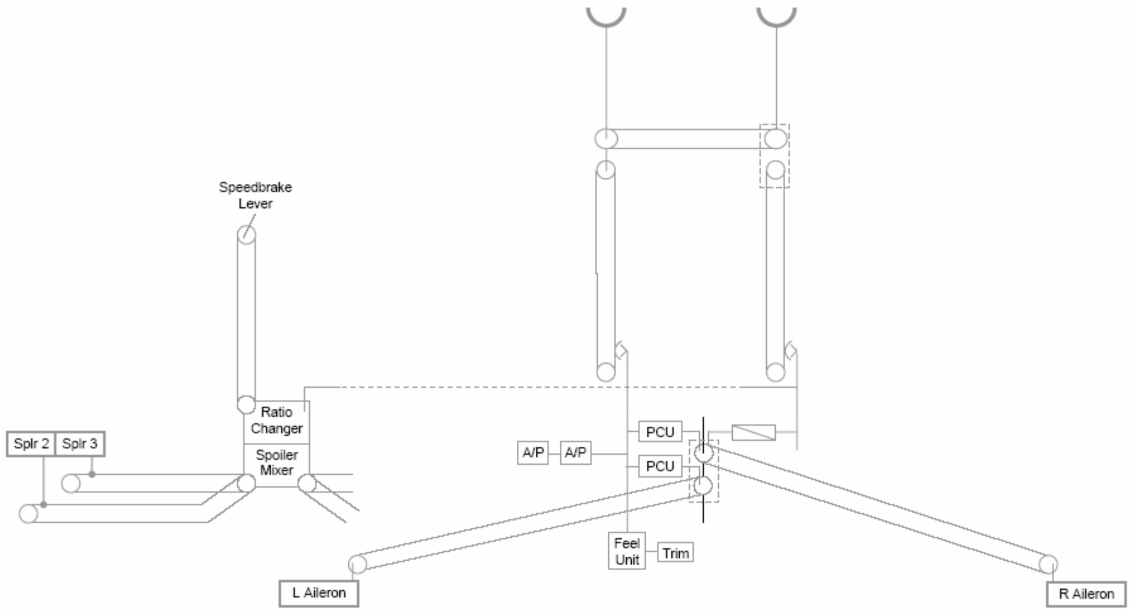
1.16.1.7. Ailerons system

IPC wheel posn xducer PW.pdf (Details about the wheel posn xducer- Part Catalog Maintenance)

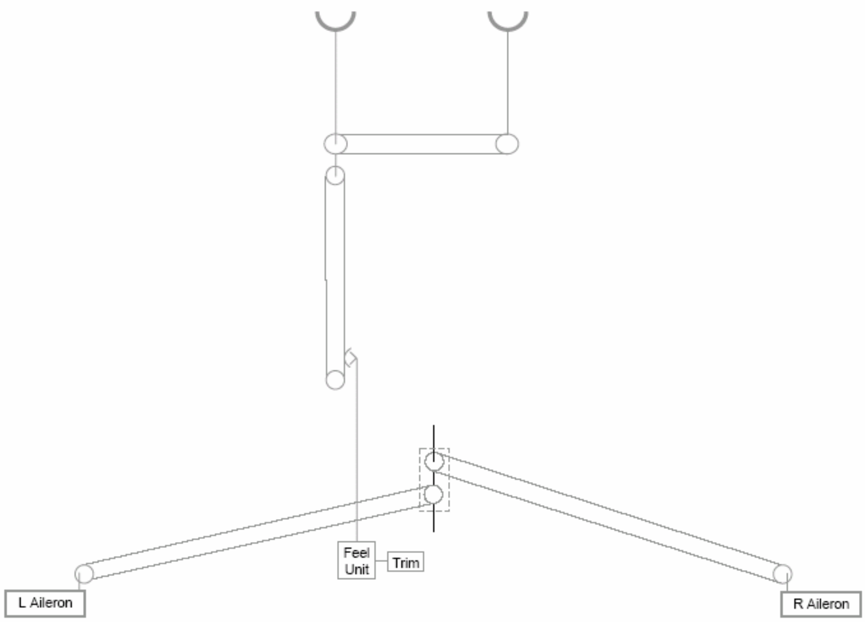
Boeing Proprietary information and will not be available for public use

CairoMarch04Slides (March Progress Meeting - Cairo).pdf

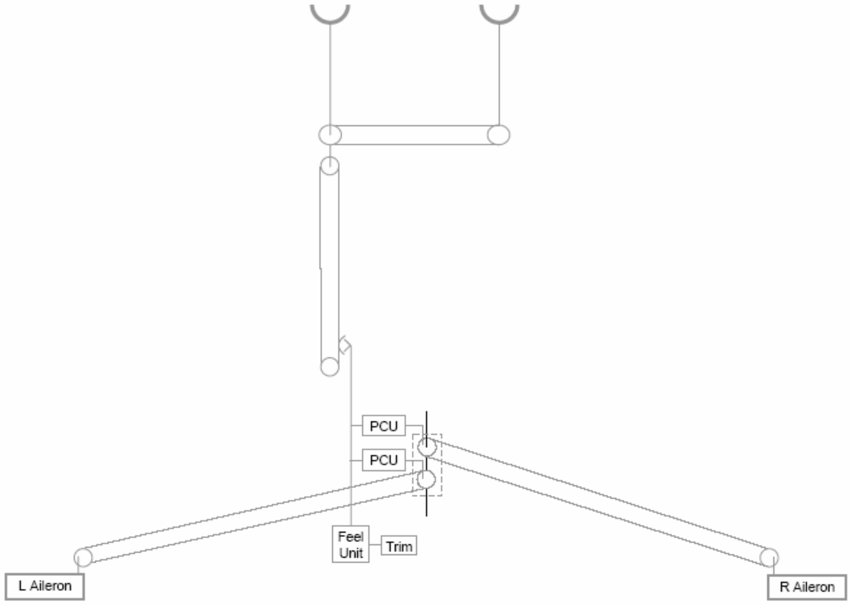
Lateral Control System
Function Schematic



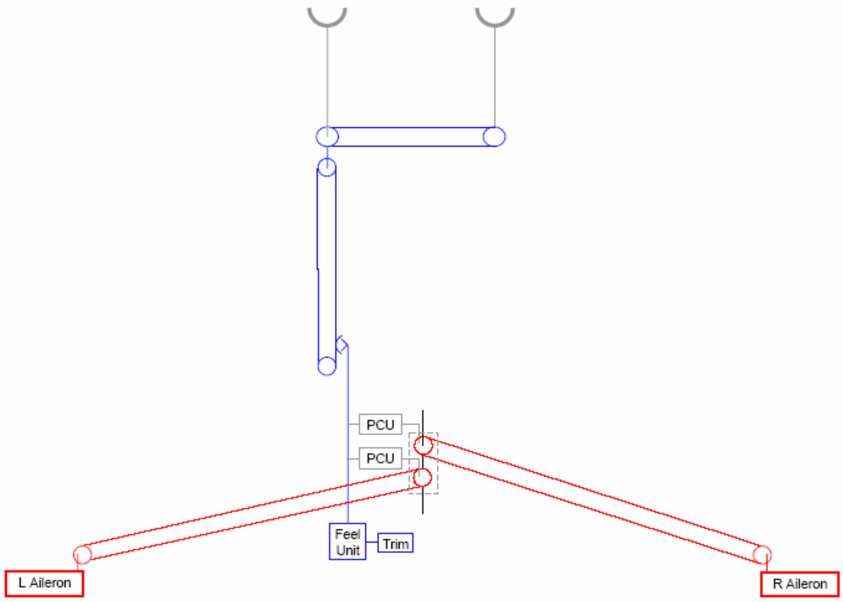
Lateral Control System
Function Schematic



Lateral Control System
Function Schematic

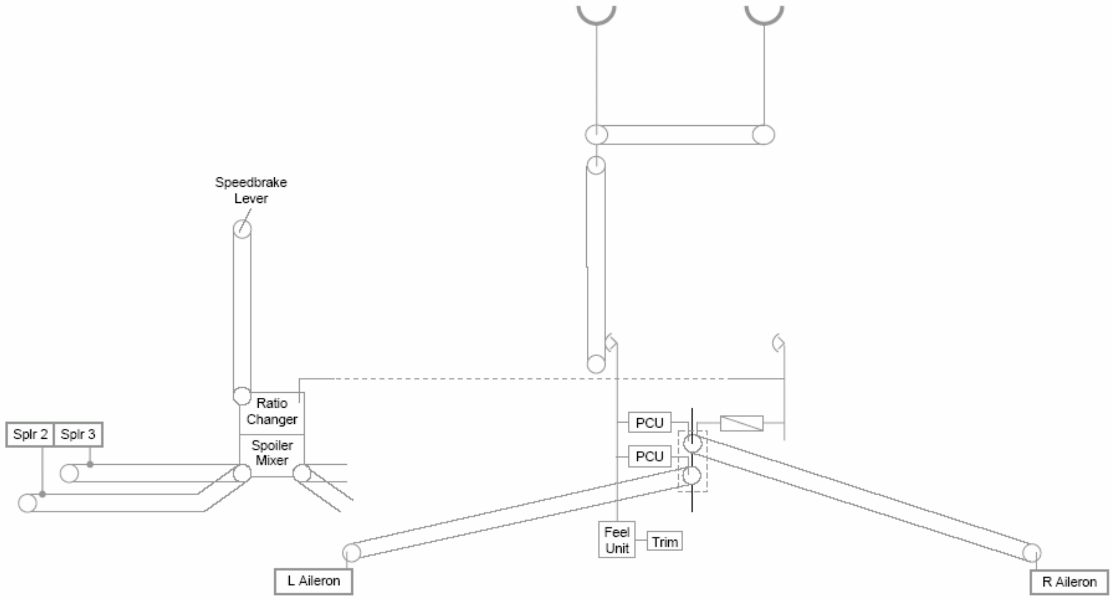


Lateral Control System
Function Schematic

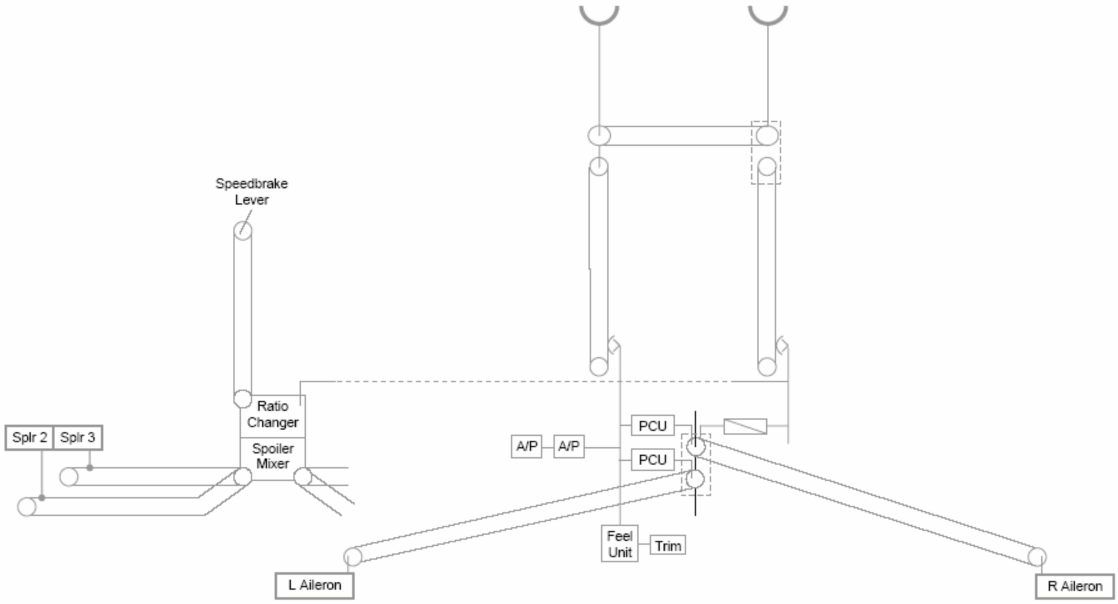


Lateral Control System

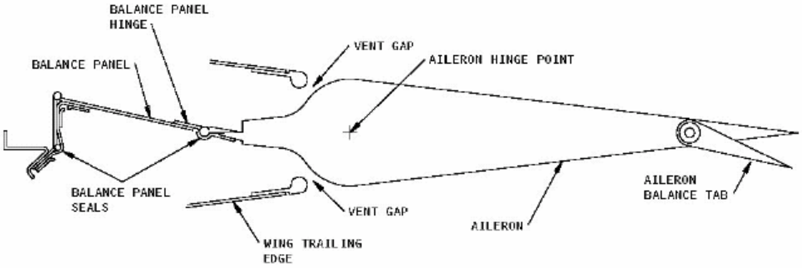
Function Schematic



Lateral Control System
Function Schematic



Aileron



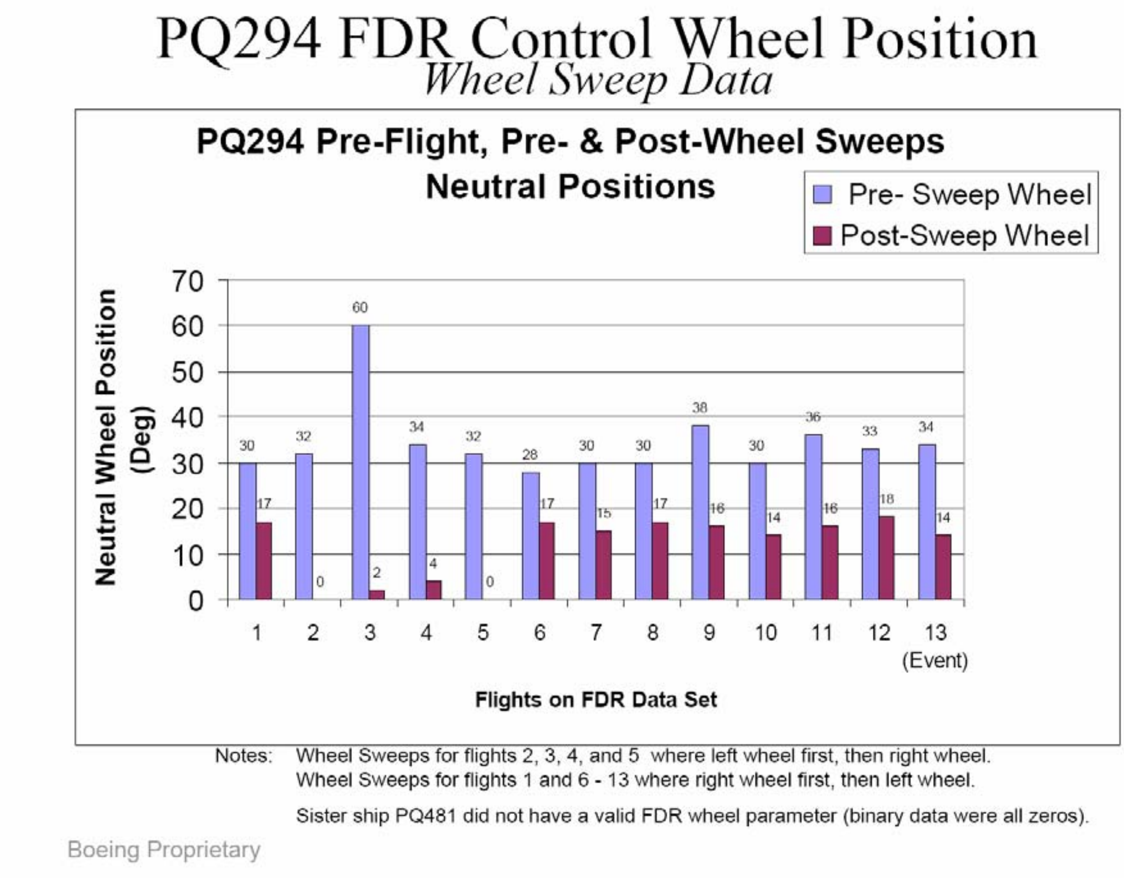
Note

Remaining information is Boeing proprietary information and will not be available for public use

Aileron PCU Control Valve.ppt

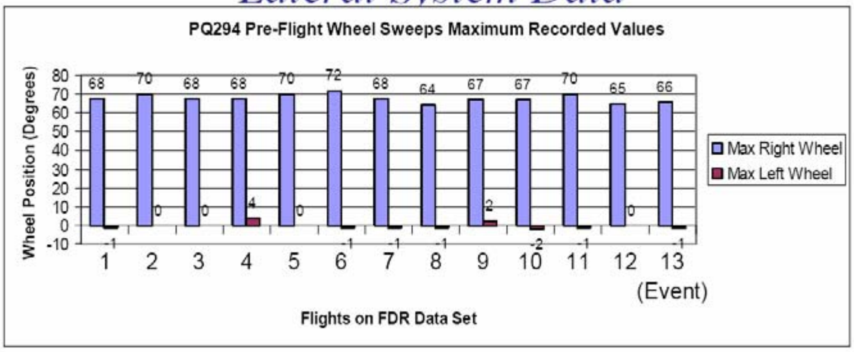
Boeing Proprietary information and will not be available for public use

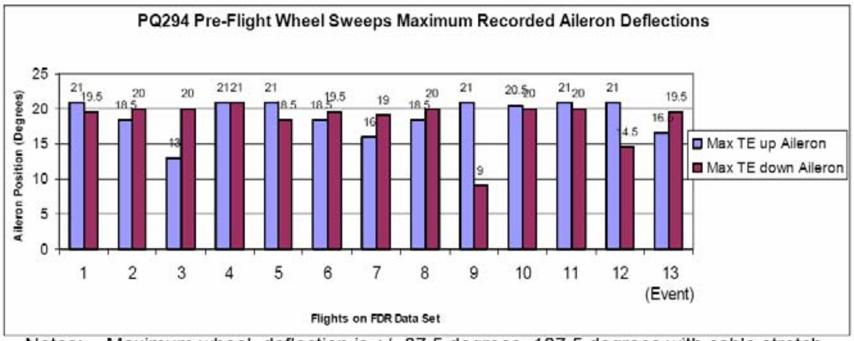
ControlWheelBias.pdf, CairoMarch04Slides (March Progress Meeting - Cairo).pdf



PQ294 FDR Control Wheel Position

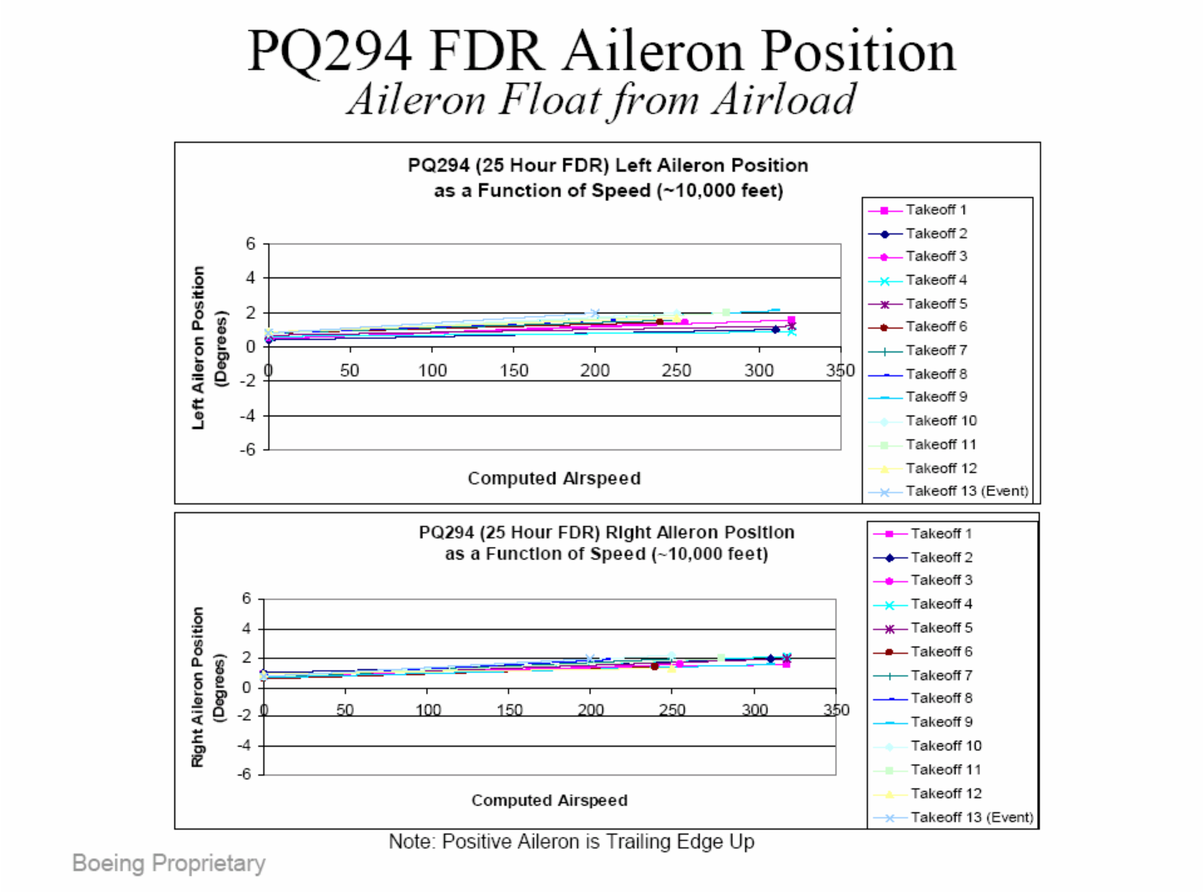
Lateral System Data





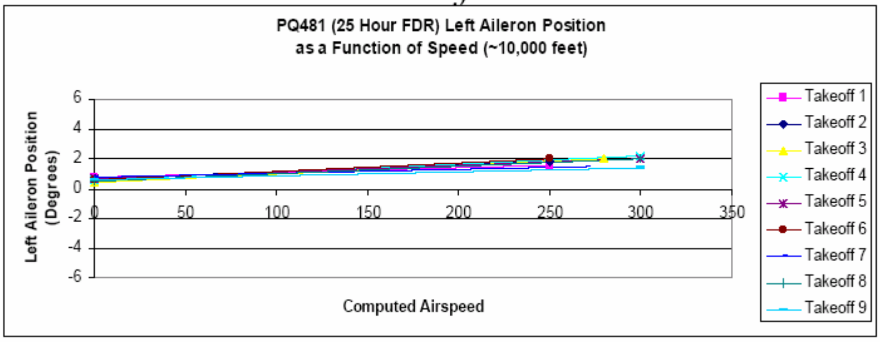
Notes: Maximum wheel deflection is +/- 87.5 degrees, 107.5 degrees with cable stretch
Maximum aileron deflection is +/- 20 degrees

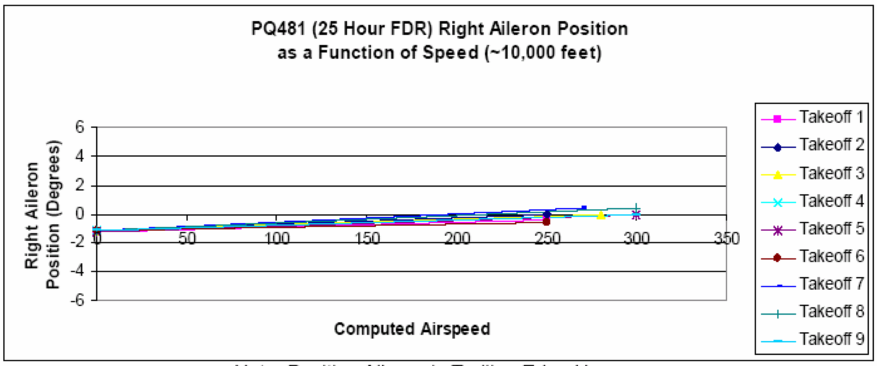
AileronFloat.pdf (PQ294 FDR Aileron Position, Aileron Float from Airload)



PQ481 FDR Aileron Position

Aileron Float from Airload





Note: Positive Aileron is Trailing Edge Up

M-Cab Wheel (Flight Director Results Boeing.xls)

Boeing Proprietary information and will not be available for public use

Force vs Wheel.ppt

Boeing Proprietary information and will not be available for public use

Cor8tmp PCU correction.ppt

Boeing Proprietary information and will not be available for public use

Aileron PCU EQA (Aileron PCU EQA Field Note Summary.ppt)

Boeing Proprietary information and will not be available for public use

Aileron PCU EQA Report (Aileron PCU EQA Report.pdf)

Boeing Proprietary information and will not be available for public use

1.16.1.8. Master Caution:

CairoMarch04Slides (March Progress Meeting - Cairo).pdf

Master Caution Discrete at Time 92465

Flight Controls

- Low Quantity 2
- Low Pressure 2
- Feel Diff Press 2
- Speed Trim Fail 1
- Mach Trim Fail 1
- Yaw Damper 3
- Autoslat Fail 2

Hydraulics

- Low Press – Elec Pump 3
- Overheat – Elec Pump 2
- Low Press – Eng Pump 3

IRS

- Fault 2
- On DC 2
- DC Fail 2

Fuel

- Low Pressure 1
- Filter Bypass. 3

APU

- Low Oil Pressure 2
- Fault 2
- Overspeed 1

Electrical

- Low Oil Pressure 2
- High Oil Temp 2
- Standby Power Off 2
- Transfer Bus Off 3
- Bus Off 3

Overheat Detection

- Engine1 overheat 2
- Engine 2 overheat 2
- APU Detection Inop 1

Anti-Ice

- Window overheat 2
- Pitot heat 2
- Cowl Anti-Ice 3

Doors

- Fwd/Aft Entry 1
- Equipment 1
- Fwd/Aft Cargo 1
- Fwd/Aft Service 1
- Airstairs (not installed on PQ294)

Engine

- Reverser 3
- PMC-Inop 1
- Low Idle 1

Overhead

- Equipment Cooling - Off 2
- Emer Exit Lts-Not Armed 2
- Flight Recorder - Off 3
- Pass Oxy - On 3

Air Cond

- Flt Deck Duct Ovht 2
- Pax Duct Ovht 2
- Dual Bleed 2
- Wing-Body Overheat 2
- Bleed Trip Off 2
- Auto Fail 2
- Off Sched Descent 1
- Pack Trip Off 2

Legend

1 = unknown

2 = unlikely

3 = ruled out

1.16.1.9. Auto Flight Systems

CairoMarch04Slides (March Progress Meeting - Cairo).pdf, 040301 Flash 737 Cairo Mtg (public release version).pdf
Relevant Figures

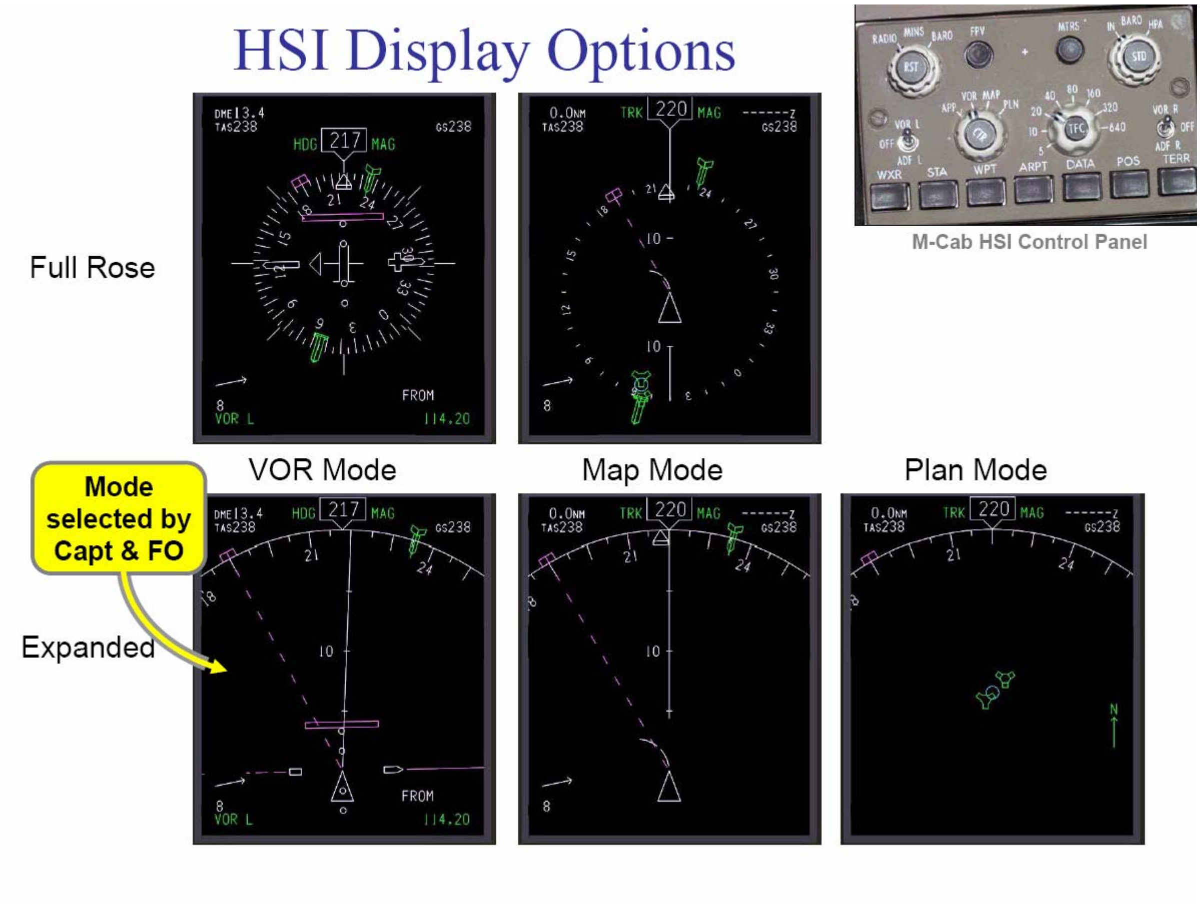
Boeing Proprietary information and will not be available for public use

737-300 (PQ294) Flight Director Control Law: (see also FDControlLaw.pdf file)

Boeing Proprietary information and will not be available for public use

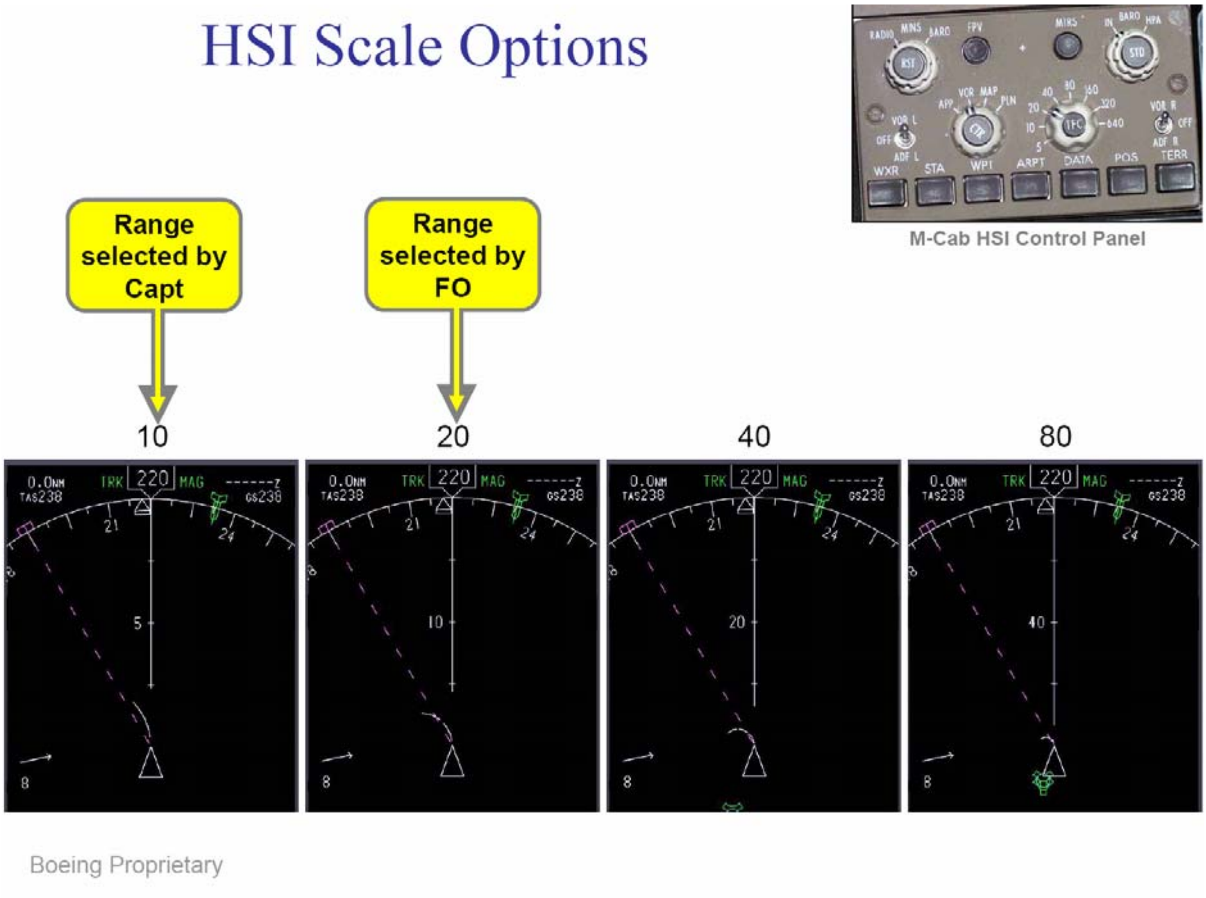
HSI Display

:


HSI Display Options
Full Rose
M-Cab HSI Control Panel
VOR Mode
Map Mode
Plan Mode
Mode selected by Capt & FO
Expanded

Display Settings from FDR

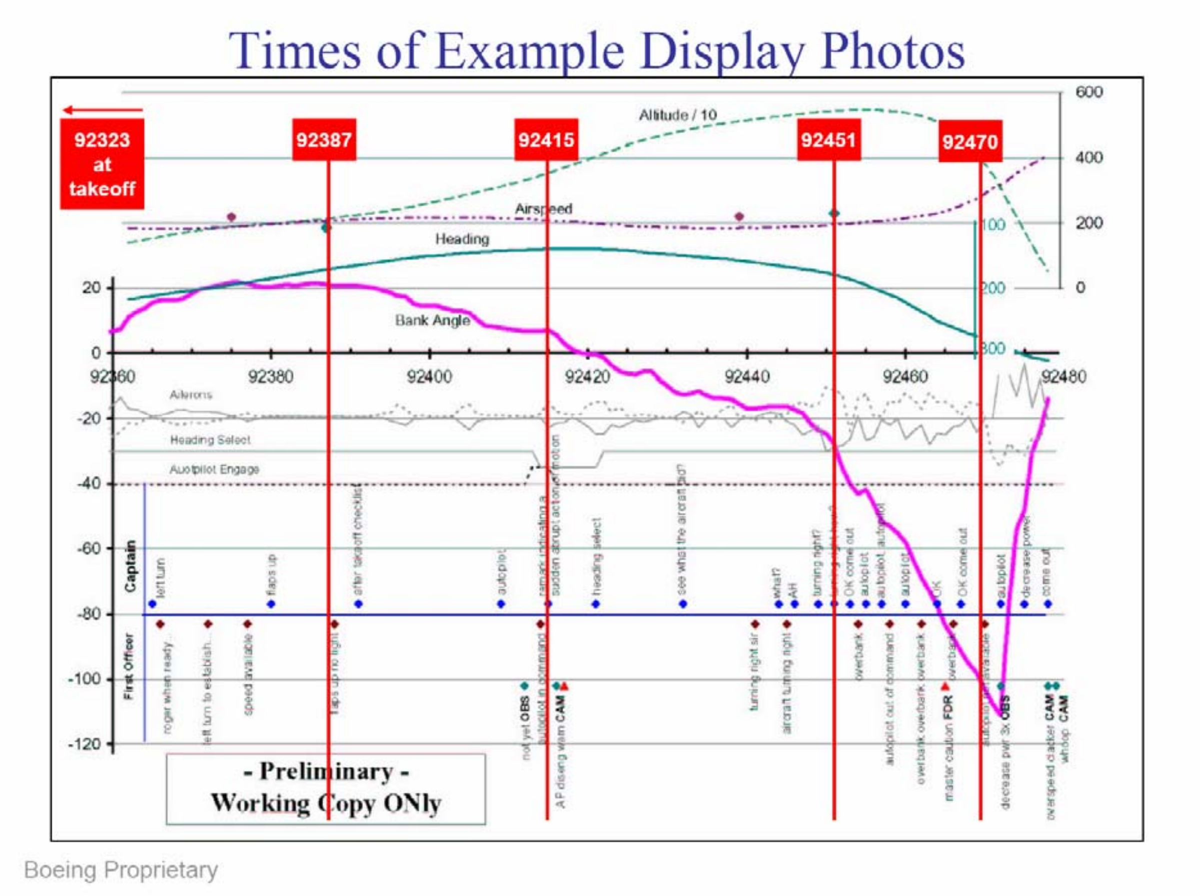
Signal Name	Bit True	Bit False	Capt	FO)
FULL COMPASS ROSE	SELECT	NOT SEL	0	0
AIRPORTS	SELECT	NOT SEL	0	0
RTE DATA	SELECTED	NOT SEL	0	0
WPT	SELECT	NOT SEL	0	0
NAV AIDS	SELECT	NOT SEL	0	0
SPARE	SELECTED	NOT SEL		
NAV MODE SELECTED	SELECT	NOT SEL	0	0
ILS (STD) MODE SEL	ILS (STD)	NOT SEL	0	0
VOR (STD) MODE SEL	VOR (STD)	NOT SEL	0	0
PLAN MODE SEL	PLAN MODE	NOT SEL	0	0
ILS (MOD) MODE SEL	ILS (MOD)	NOT SEL	0	0
VOR (MOD) MODE SEL	VOR (MOD)	NOT SEL	1	1
MAP MODE SELECT	MAP MODE	NOT SEL	0	0
160 MI RANGE SEL	SET	NOT SET	0	0
80 MI RANGE SEL	SET	NOT SET	0	0
40 MI RANGE SEL	SET	NOT SET	0	0
20 MI RANGE SEL	SET	NOT SET	1	0
10 MI RANGE SEL	SET	NOT SET	0	1
WXR DATA	WXR SEL	NOT SEL	0	0 to 1 @ 530-534



Note:

Remaining information is Boeing Proprietary information and will not be available for public use

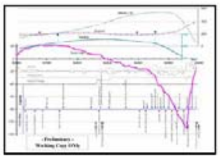
Times of Example Display Photos:



-

SU-ZCF
@ Time
92323

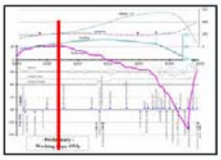
Takeoff



Boeing Proprietary

SU-ZCF @ Time 92387

1st Hdg Sel point



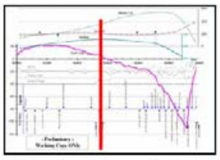
Boeing Proprietary

SU-ZCF @ Time 923415

AP Engage point

28 seconds after previous photo

assumed value for Hdg Sel

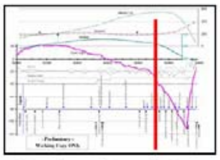


Boeing Proprietary

SU-ZCF @ Time 92451

2nd Hdg Sel point

36 seconds after previous photo

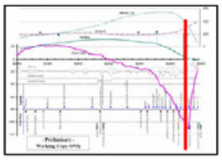


Boeing Proprietary

SU-ZCF
@ Time
92470

near max
bank angle point

19 seconds after
previous photo



Boeing Proprietary

M-Cab Flight Director Commands (Flight Director Results Boeing.xls)

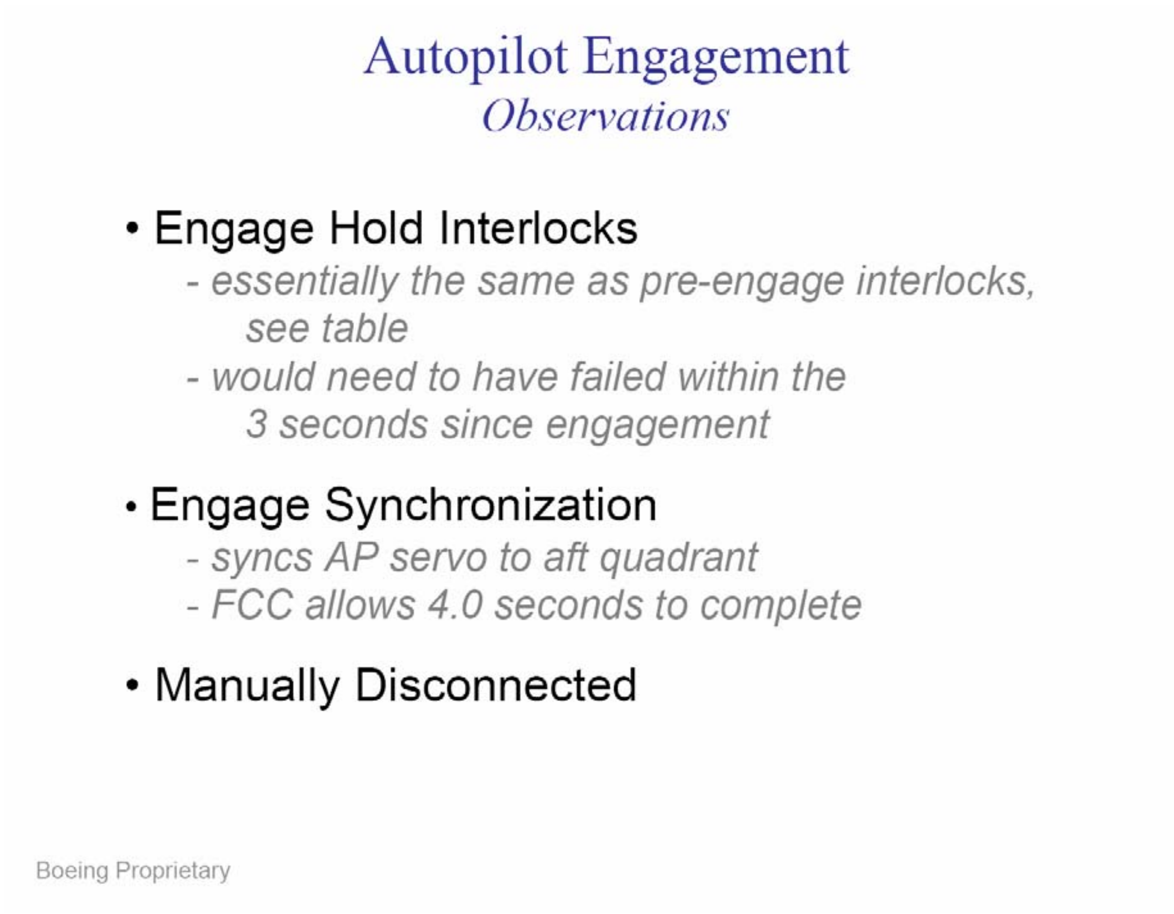
Boeing Proprietary information and will not be available for public use

Display Architecture (Display Architecture.ppt)

Boeing Proprietary information and will not be available for public use

Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress, 040301 Flash 737 Cairo Mtg (public release version).pdf

Autopilot Engagement Observations



Autopilot Engage Logic

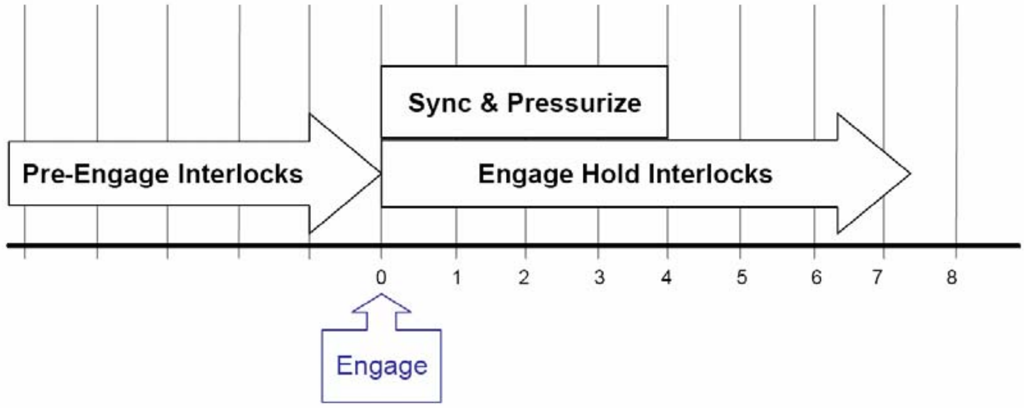
Autopilot Engage & Engage Hold Interlocks

Condition	Pre-Engage: Prevent Engage	Engage Hold: Cause Disengage
Pitch CWS force greater than 5 lbs	X	
Roll CWS force greater than 2.25 lbs	X	
Elevator Detent Pressure Switch Indicates Pressurized	X	
Aileron Detent Pressure Switch Indicates Pressurized	X	
Auto Stab Trim Cutout Switch in Cutout	X	X
Both Flap Switches and Stab Trim Motor don't agree as Flaps Up or as Flaps Down	X	X
Main Electric Trim Switch Activated	X	X
Aileron Force Limiter position does not agree with Flaps UP or Flaps Down	X	X
CAS Invalid	X	X
Uncorrected Altitude Invalid	X	X
26 VAC 400 Hz Invalid	X	X
MCP to FCC Bus Invalid	X	X
Pitch Angle Invalid	X	X
Pitch Rate Invalid	X	X
Roll Angle Invalid	X	X
Roll Rate Invalid	X	X
Baro Altitude Invalid (Prevents CMD only)	X	X
Elevator Detent Pressure Switch Indicates Non-Pressurized		X
Aileron Detent Pressure Switch Indicates Non-Pressurized		X
(Magnetic Heading OR TAS Invalid) AND (Roll CWS) AND (Bank Angle <8 degrees)	X	X

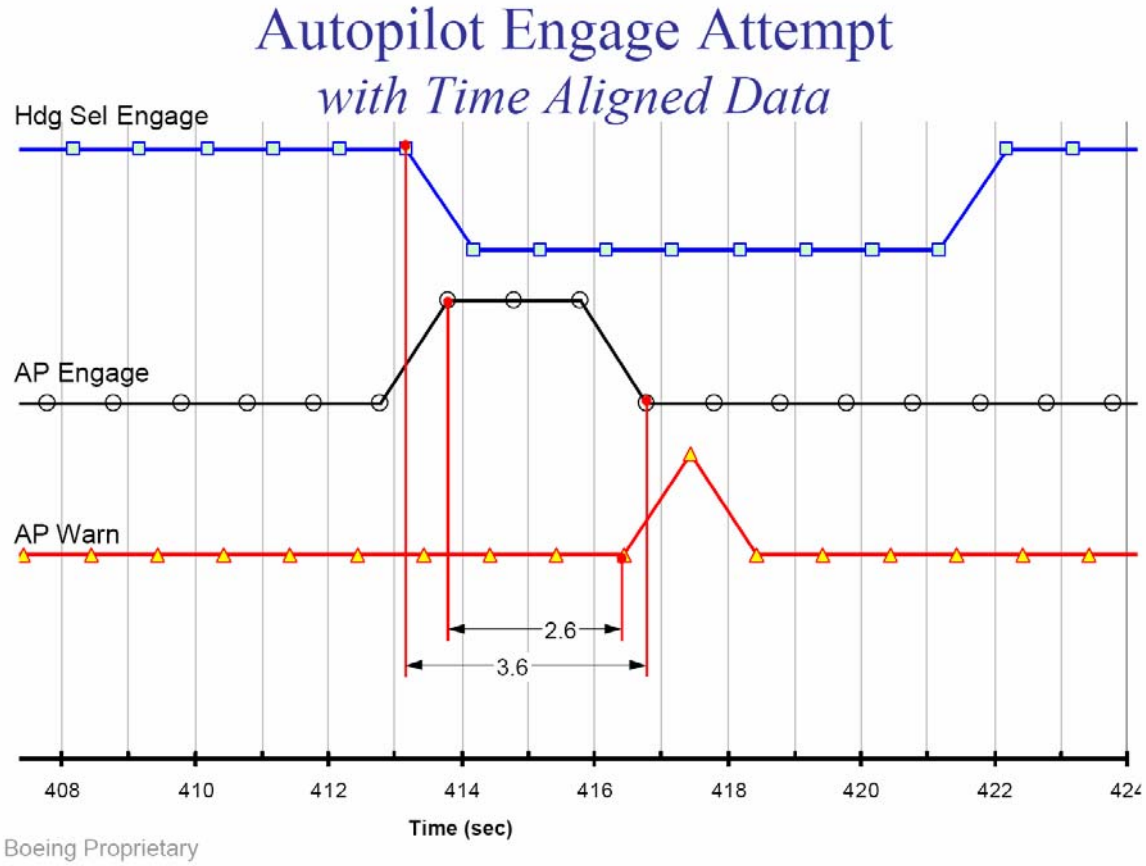
Autopilot Engage Logic

Failure to Sync or Pressurize Scenarios

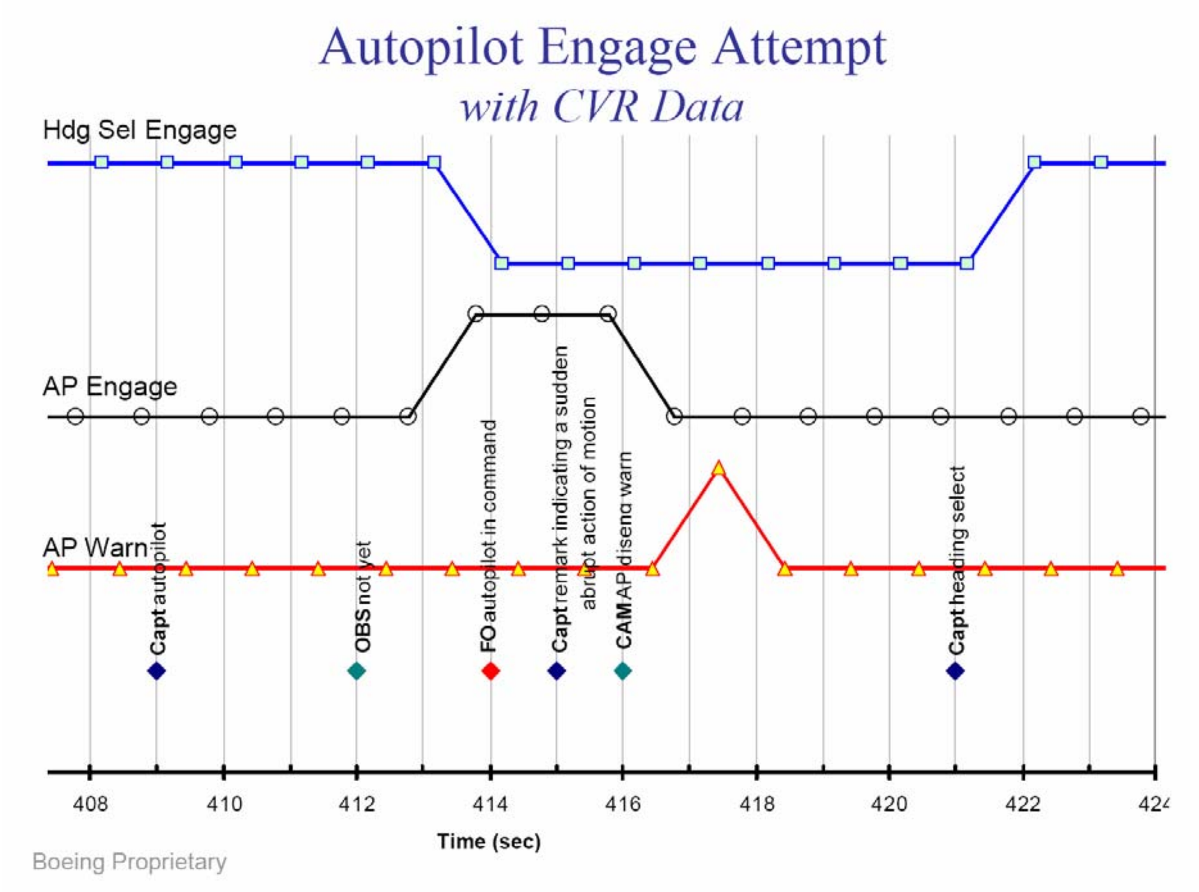
	CMD light ON
1-Failure to synchronize	4.0 sec
2-sync in 0+ sec but fails to pressurize	3.5 sec
3-sync in 4- sec but fails to pressurize	7.5 sec



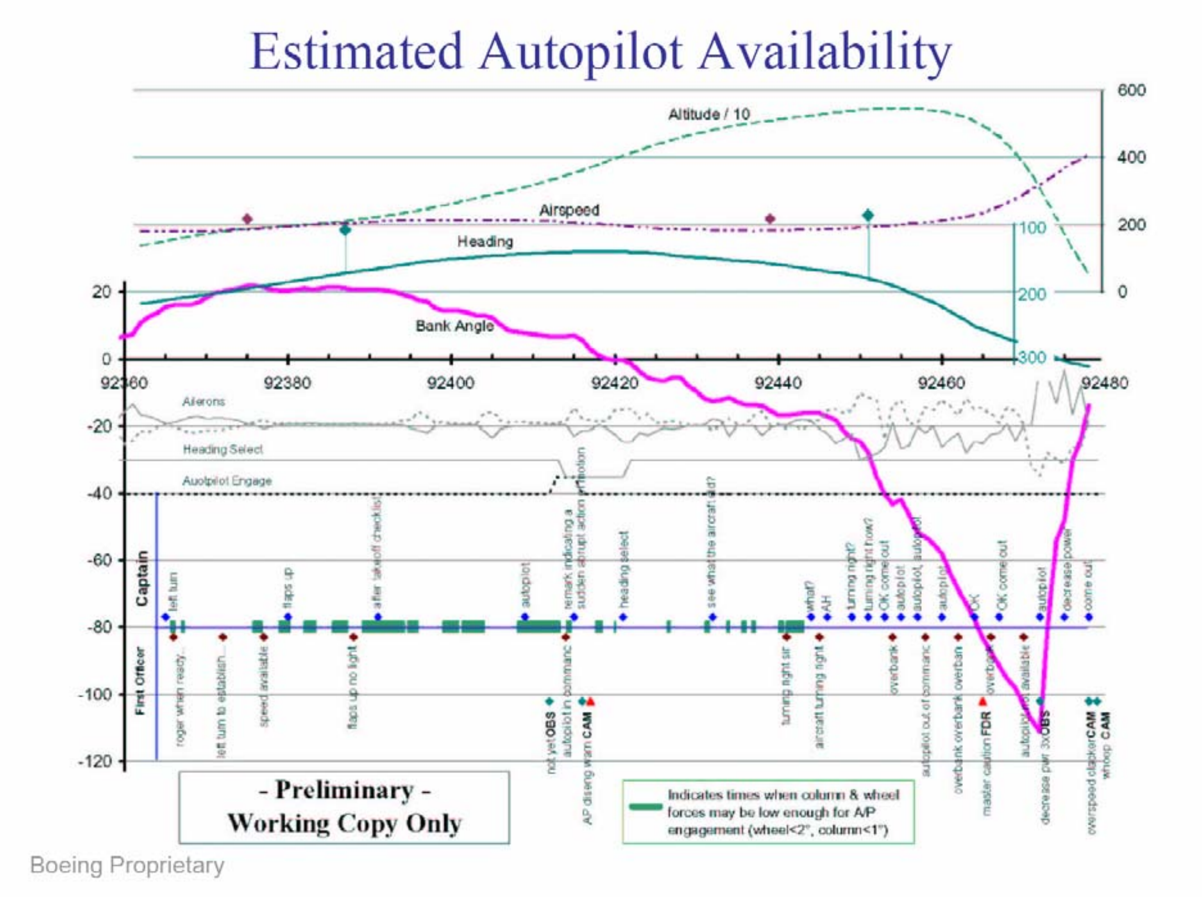
Autopilot Engage Attempt- with Time Aligned Data



Autopilot Engage Attempt- with CVR Data



Estimated Autopilot Availability



AP Actuator description and Scenario 12 info b.pdf, AP Actuator description and Scenario 12 info 2.ppt

Boeing Proprietary information and will not be available for public use

Scenario 12 ver 2.ppt (Rev - 3 Feb 05)

Boeing Proprietary information and will not be available for public use

Honeywell SP-300 DFCS B737-300.ppt

Honeywell Proprietary information and will not be available for public use

Flash Airlines Presentation SP-300 DFCS Health Monitoring Honeywell.ppt

Honeywell Proprietary information and will not be available for public use

1.16.1.9. Flash Airlines AI236 RAM Simulator Configuration (Flash Airlines AI236 RAM Simulator Configuration.htm, Program_Pins.pdf)

Boeing proprietary information and will not be available for public use

1.16.1.10. Boeing response to raised questions.doc

References

17833 (B-H200-17833-ASI 12 Feb 2004).pdf

CairoMarch04Slides (March Progress Meeting - Cairo).pdf

17848 (B-H200-17848-ASI 04 March 2004).pdf

Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress

Flash Airlines Autopilot Answer to Questions - 31 Jan 2005.ppt

Answers to question_cairo meeting05.ppt

Action Item Response.ppt (Cairo meeting, 1-30-05 to 2-2-05)

17833 (B-H200-17833-ASI 12 Feb 2004).pdf

Boeing proprietary information and will not be available for public use

CairoMarch04Slides (March Progress Meeting - Cairo).pdf, 040301 Flash 737 Cairo Mtg (public release version).pdf

Lateral System-answers to questions

A2) What is the effect of hydraulic systems failures on the flight controls?

Answer: The hydraulic system arrangement for the 737-300 flight controls is provided in the attached figure. This figure shows which functions would be lost in the event of either an A or B hydraulic system failure.

A7) What are the aileron travel rates with various hydraulic system availability?

Answer: The aileron PCUs are significantly oversized. Because of this, aileron travel rates are not a function of hydraulic system availability. i.e. aileron travel rates are not significantly different whether either or both hydraulic system is pressurized. For reference, the no load rate is approximately 54 degrees per second of aileron.

B1) Correlation between control inputs and flight control surface deflections, with special emphasis on the inconsistency of control wheel and aileron surface deflection as indicated by the FDR.

Answer: A kinematic consistency check and a simulator proof of match is being accomplished on the accident data at Boeing. This work is still in progress, however, we have been able to make a few observations on the bias in control wheel position. There is a bias in control wheel position that shifts over time, and possibly a scaling issue. Both issues are being further analyzed for possible explanations. ①

B2) Investigate the changes in aileron deflection bias.

Answer: The changes in aileron position bias are caused by the airload on the aileron reacting against the wing cable run between the aileron and aileron PCU. Therefore, the bias in aileron position is due to aileron hinge moment which varies as a function of airspeed. ①

B7) Investigate the effect of flight control surface failures for surfaces like spoiler deflections that are not recorded on the FDR.

Answer: The effects of various spoiler failures are being examined using the Boeing simulation. These results are expected to be available for the next progress meeting in Cairo.

Autopilot - Answers To Questions

A1) Why did the autopilot disengage?

Answer: There are three possible reasons why the autopilot disengaged: the engage synchronization (actuator to surface) failed to complete; the engage hold interlocks were not satisfied; or it was manually disconnected. Based on the data recorded on the FDR, we are not able to pinpoint which of these caused the autopilot to disengage. Additional information on the details of the interlocks and their operation are provided in the Airplane Maintenance Manual section 22-11-01 . ①

B3) Investigate the cause(s) for the autopilot disconnect.

Answer: See response to question A1.

B6) Investigate availability of autopilot during the captain's requests for "autopilot, autopilot".

Answer: The autopilot will not initiate the engage sequence if the A/P engage interlocks are not satisfied (ref AMM 22-11-01 page 54). If the engage interlocks are not satisfied, the attempt to engage (A/P button push) will not be recorded on the FDR. In the case of the accident flight it's possible that forces on the column or wheel prevented the engage logic from being satisfied. Additional information on the details of the interlocks and their operation are provided in the Airplane Maintenance Manual section 22-11-01. ①

FD-answers to questions

A3) What does the FD command? Roll rate? Bank angle?

Answer: The Flight Director (FD) produces a roll and roll rate command to zero the error between the selected heading and the magnetic heading. ①

A5) What does the flight director do when the airplane bank angle exceeds the selected bank angle limit?

Answer: It will produce a command to fly back to the desired bank angle. ①

A6) What does the flight director do when the airplane roll rate exceeds the intended roll rate?

Answer: It will produce a command to fly back to the desired bank angle. ①

A8) How is Selected Heading recorded on the FDR if it is being turned while the knob is being moved)

Answer: The FCC transmits the Hdg Sel value to the DFDAU at a rate of 20 times per second. The DFDAU then takes the latest value once each 64 seconds and sends it to the DFDR for recording. Thus, if Hdg Sel is dynamically changing when the once-per-64-seconds sample is taken, it will record the Hdg Sel value at the time the sample was taken.

B4) Investigate the cause for Hdg Sel disengage when the autopilot was engaged.

Answer: If the FD command is greater than 7 degrees at the time autopilot engagement is attempted, the Heading Select mode will be reset and the roll mode will default to CWS. According to the FDR data, this seems consistent with the probable flight director command which existed when A/P engagement was initiated. ①

Other-answers to questions

A4) Please provide the FMEA for the 737-300 autopilot and flight controls related to the roll axis.

Answer: The following documents were mailed to the NTSB, MCA and BEA:
D6-14070 737-300 Lateral Failure Analysis (7MB)
D6-37432 737-300 Autopilot Failure Analysis (20MB)

A9) Is the hydraulic pump capable of outputting 5000 psi of pressure?

Answer: The following two failures are required In order to reach 5000 psi: /1/ pump compensator failed open (full flow), and /2/ system relief valve failed closed. For the hydraulic system pressure display, in-range is considered to be from -100 to 4,100 psi, so 5000 psi would be out of range. If the system were to actually go to 5000 psi, the affected hydraulic pressure display (on the EIS) would slew to it's lower stop; hold for 2 seconds then the pointer would disappear and dashes would appear in the display.

A10) What caused the Master Caution discrete late in the flight?

Status: The Master Caution discrete occurs at time 92465 in the FDR data file received by Boeing. There are over 40 inputs that could have caused this discrete to be set. We are still evaluating the possible causes of the setting of this discrete, and expect to have an update for the next progress meeting in Cairo. We did notice that the Master Caution discrete was set several times on previous flights. Airplane records, such as technical log entries, may record the reason for previous Master Caution events. These records may help isolate why the Master Caution was set at time 92465 in the accident flight.

Displays-answers to questions

B5) *Investigate the possible failure modes of the Flight Director indicator.*

Status: This is being researched. We will have some preliminary data available to discuss during the next progress meeting in Cairo.

Enclosure to B-H200-17848-ASI

Responses to Queries
Flash Airlines 737 SU-ZCF Accident at Sharm el Skeikh – 3 Jan 04

Questions from 1 March 04

1) How is drift angle matched in KINCON with corrected accelerations?
Response: Wheel-well based accelerometer data recorded on the FDR are integrated and converted into a ground speed vectors and altitude. Using IRU information, the ground speed vectors are converted into a drift angle and ground speed. The calculated altitude, drift angle and ground speed are then compared to the recorded altitude and the FMC's recorded drift angle and ground speed. Differences between the two sets of data are minimized by calculating a unique but constant acceleration bias for each axis. The biases are then applied to the recorded accelerometer data. The biases were calculated based on minimizing the error over the entire accident flight.

2) With the simulator match data vs FDR data, at the end of the flight when rolling back towards wings level, time 92470 thru the end of data, why does the FDR data show the oscillatory motion, but the simulator match does not?
Response: The simulator match is an iterative process in which the difference between the simulator behavior and the recorded FDR data is used as a feedback (with a specific gain) to revise the simulator control inputs. In general, a lower gain produces smoother control inputs (lower frequency content) while a higher gain is required to match highly dynamic maneuvers, but can produce significant noise. The gain used in this iteration was chosen to best match the behavior in the time period from 92337 to 92470. Increasing the gain to match the highly dynamic portion of the flight after time 92470 would have introduced significant noise into the earlier portion of the simulation.

3) From FDR time 92470 thru the end of data, are the aileron rates seen on the FDR within the capability of the system (i.e. is it real)?
Response: Yes, the aileron rates seen at the end of the FDR data are within the capability of the system.

4) With respect to the FDR recorded wheel position data, the wheel bias in the air, just after takeoff, is different on the accident flight than the previous flight, Why?
Response: The bias in the recorded control wheel signal appears to change on numerous occasions. As noted in the earlier presentation material, the bias changes during the control wheel sweep prior to every takeoff. In addition, the bias appears to change during every climb out, typically between takeoff and flaps up. Furthermore, the bias also appears to change just prior to landing, either during descent or approach. See attached slides that show the changing wheel bias for the accident flight and the previous flight. Similar behavior is noted in all flights, including the first recorded landing, control sweep and takeoff from Abu Simbel. The behavior of the recorded FDR wheel signal appears consistent with a slipping synchro body.

5) What equation is Boeing using to convert raw data into EU for Wheel Position?

Response: The conversion steps are as follows:

1. *The raw data is first converted to a signed quantity using two's complement.*
2. *The signed counts (C) are converted to synchro degrees (S) using the formula: S = C * 360 / 1024*
3. *The synchro degrees (S) are converted to degrees of wheel (W) using the formula: W = S * 150.7663958 / 180*

Additional Information: The control wheel sensor on this airplane is a synchro. The synchro signal is interpreted by the FDAU and passed to the flight recorded as counts. Different FDAUs interpret the synchro signal differently. SU-ZCF was equipped with a Sundstrand FDAU which interprets the synchro linearly. Other FDAU's (e.g. Teledyne) use a non-linear interpretation of synchro data. For Sundstrand FDAU's (and any other that interprets synchros linearly), the correct conversion for wheel data is a linear one such as the one shown above in step 2. For a Teledyne FDAU, a non-linear conversion is required. This conversion is built into the RAPS program and is called "dc_TELEDYNE_SYNCHRO". It would not be appropriate to use this function for converting data from a Sundstrand FDAU, such as the SU-ZCF data. In examining the FFD file provided, it appears that this function is being used to convert control wheel data. This conversion will introduce some errors as shown in the attached plots.

The MCA also provide a sheet of paper titled "Analog Signal Description" dated 24 May 1991, with the notation "Project BS7372". The data in this sheet appears to match the D6-55333 data for the 737-2 data frame with 2 exceptions:

D6-55333 defines control wheel as a 10 bit signal. BS7372 lists the signal as a 12 bit signal. The lower two bits of the actual dataframe are used to discrete bits. If both these bits are set, than a wheel position error of ~0.22 degrees will result.

The scaling of the BS7372 differs by a small amount from that of D6-55333. Note: The BS7372 sheet lists separate "Breakpoints" in the data. These "break points" exist to account for the signed nature of the signal (it wraps around from maximum counts back to zero). The function of the "break point" in the BS7372 data is accomplished by the two's complement function listed above and that also exists in the RAPS conversion listed in the FFD file provided.

6) Please provide a schematic showing the dual concentric control valve in the aileron PCU, and how it attaches to the PCU input rod.
Response: Schematics provided.

7) What bias springs are present on the PCU valve, and which direction are they biased?
Response: Schematics provided.

8) Is there any delay between the time the autopilot is disconnected and when the disconnect warning is issued.
Response: The MCP monitors the CMD and CWS discretes from the FCC and immediately sets the warning (light and aural) when an autopilot disconnect is detected.

9) What method does Boeing use to perform differentiation on flight data? Is there software available for purchase, or what is our algorithm?
Response: Without knowing the specifics of the differentiation in question, we can provide a very general answer. Because of the inherent noise associated with differentiation, Boeing tends to avoid differentiation of recorded signals where possible. In some cases, when differentiation is required, we have first modeled the recorded data with a curve fit known to have continuous derivatives and then performed the differentiation on the fitted curve. In other cases, it is possible to take advantage of the known behavior of specific physical quantities and required relationships between different recorded signals when differentiation is required.

<u>Questions from 2 March 04</u>

1) Relative to the photo at time 92415, does the "CMD" and "CWS R" text appear on the EADI immediately when the cmd button is pushed or does it wait until the FCC has completed sync & pressurize (i.e. connected to system)?
Response: Immediately when CMD is received from the MCP (button push or paddle lift) the FCC retransmits it to the EFIS processor for display on the EADI.

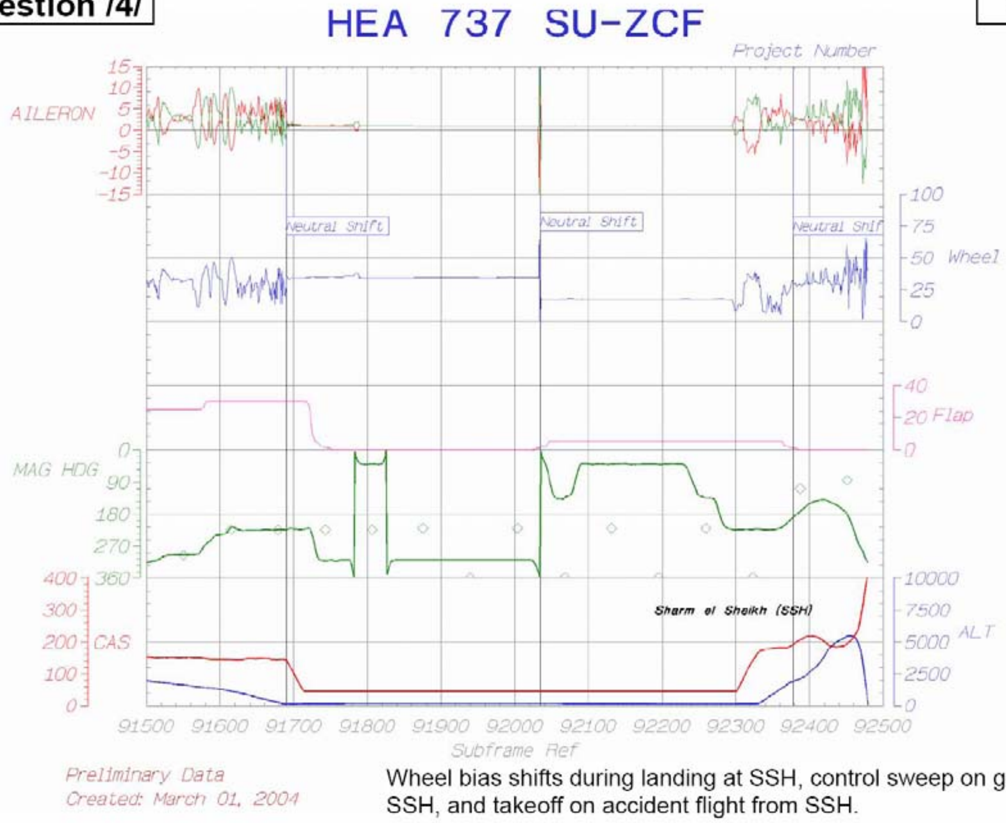
2) Would the roll FD bar really disappear when Hdg Sel was re-set during AP engage. The photo shows the bar gone because Hdg Sel had reset.
Response: Yes, the FD bar will be biased out of view in this situation.

3) How does CWS R mode work?
Response: In CWS R, the autopilot will enter Heading Hold if the bank angle is less than or equal to 8 degrees or Bank Angle Hold if bank angle is greater than 8 degrees (if bank angle is greater than 30 it will return the airplane to 30).

Responses to Queries
Flash Airlines 737 SU-ZCF Accident at Sharm el Skeikh – 3 Jan 04

4) Relative to the photo at time 92470, does the EADI have the feature that forces the blue/brown line to always be present, even in unusual attitudes?
Response: Yes, the forced blue/brown interface is present unless pitch attitude exceeds 85 degrees (up or down), at which point it is removed.

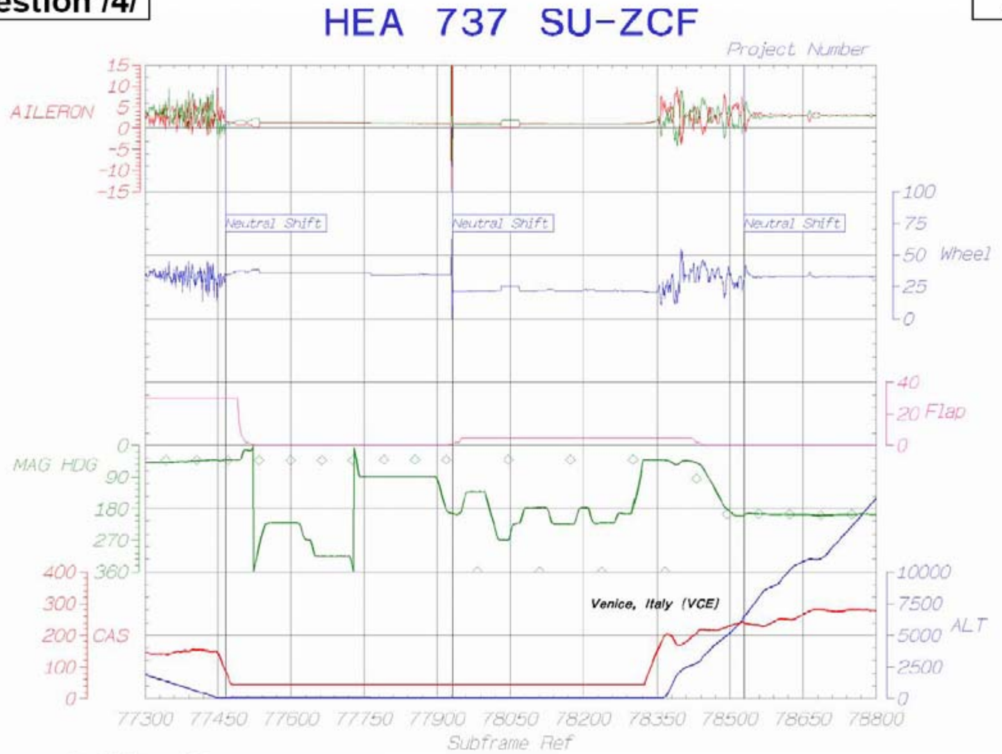
Question /4/ **Day 1**



Wheel bias shifts during landing at SSH, control sweep on ground at SSH, and takeoff on accident flight from SSH.

Boeing Proprietary

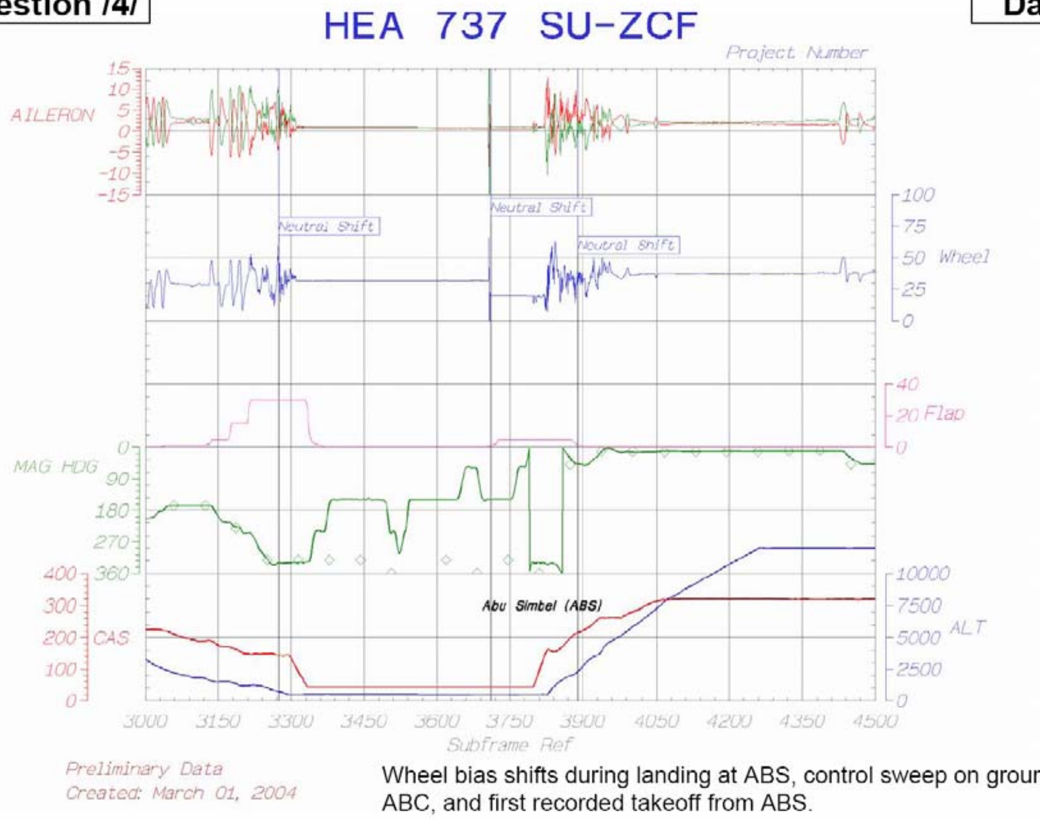
Question /4/ **Day 1**



Wheel bias shifts during landing at VCE, control sweep on ground at SSH, and takeoff on previous flight from VCE.

Boeing Proprietary

Question /4/ **Day 1**

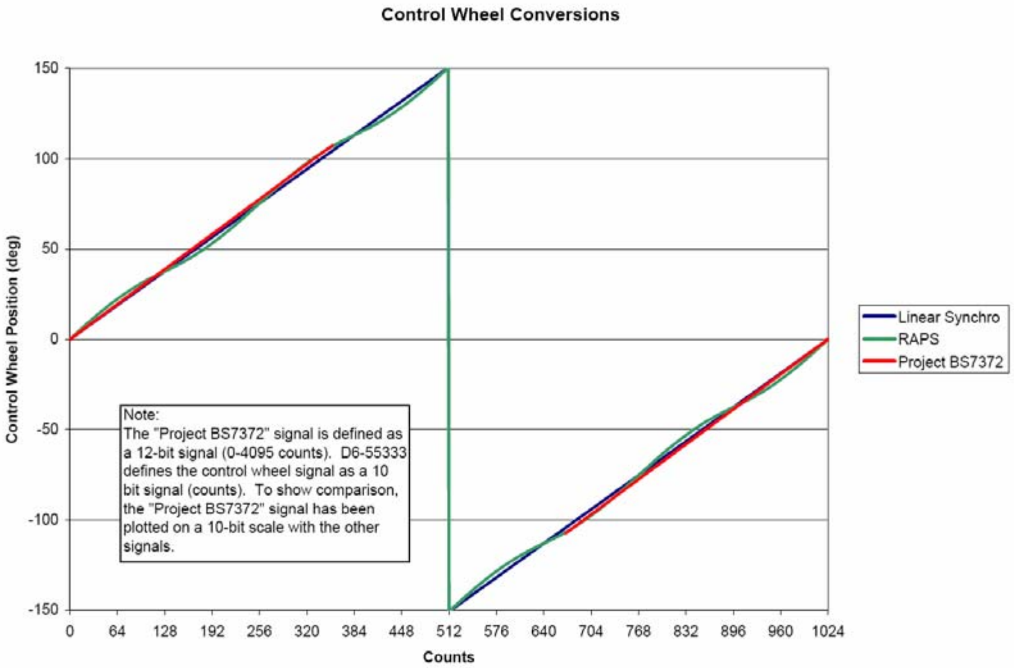


Wheel bias shifts during landing at ABS, control sweep on ground at ABC, and first recorded takeoff from ABS.

Boeing Proprietary

Question /5/

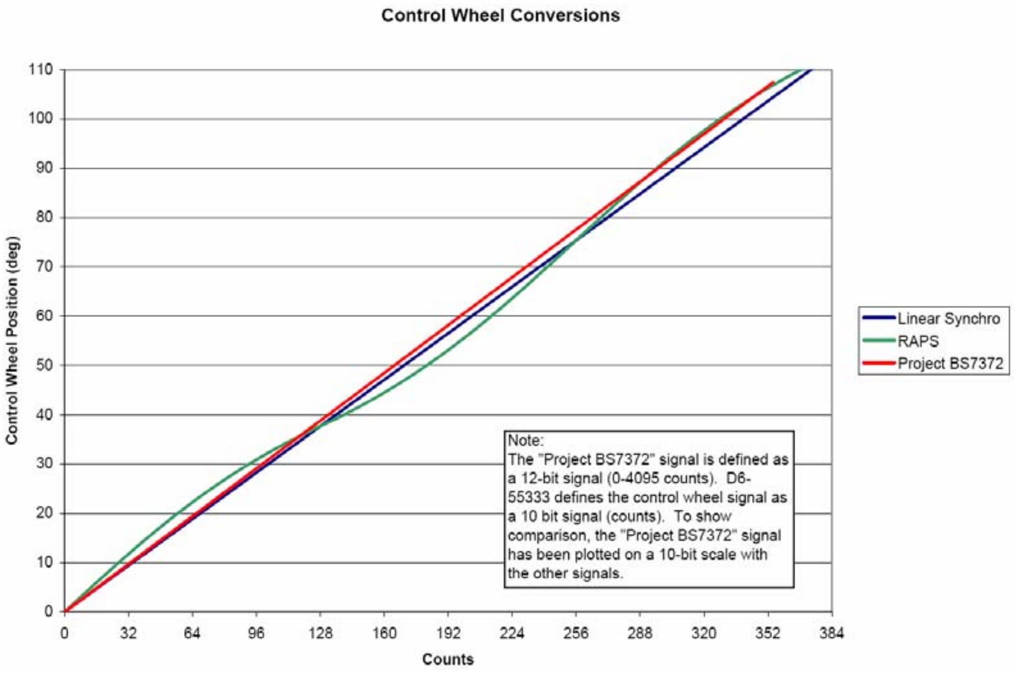
Day 1



Boeing Proprietary

Question /5/

Day 1



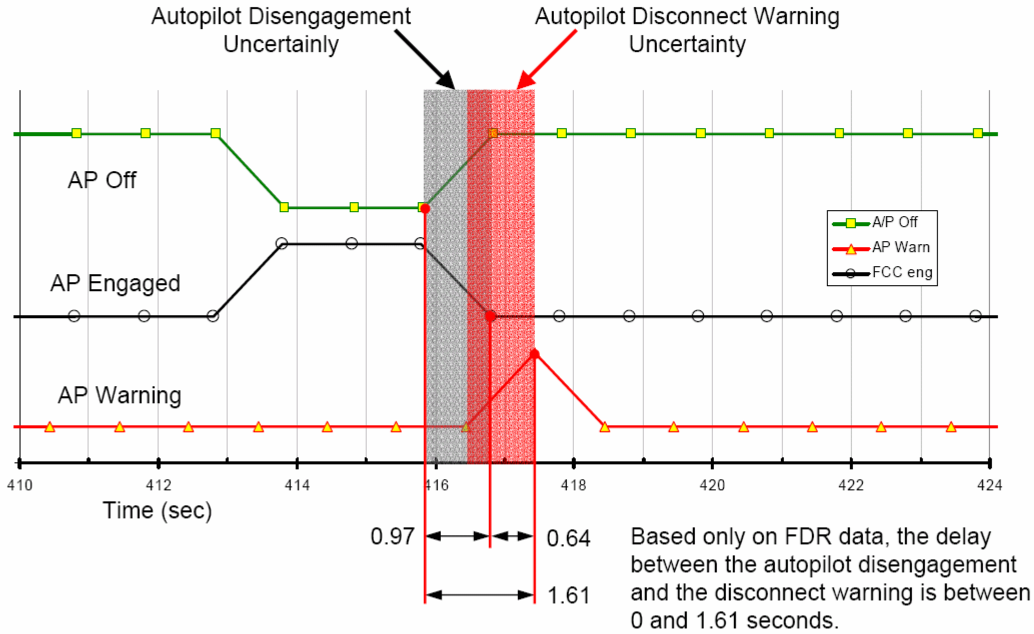
Boeing Proprietary

Question /8/

Day 1

Autopilot Disengagement

with Time Aligned Data



Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress

Boeing proprietary information and will not be available for public use

Flash Airlines Autopilot Answer to Questions - 31 Jan 2005.ppt

Boeing proprietary information and will not be available for public use

Answers to question_cairo meeting05.ppt

Boeing/ Honeywell proprietary information and will not be available for public use

Action Item Response.ppt (Cairo meeting, 1-30-05 to 2-2-05), Boeing Action Items of 30 January (public release).ppt

Question 1
Does the aileron PCU bypass valve interconnect the extend and retract side of the main ram when no hydraulic pressure is available?
What is the correct hydraulic schematic for the PCU?

Question 2
Q) Reference Scenario 9 - What will happen to lateral trim capability after the 12 degrees of lost motion is taken up?
A) Lateral trim capability will be limited to +/- 12 degrees of wheel. The force required to break out the transfer mechanism (50 Lb) is in excess of the feel and centering force (~20 Lb peak).

Question 3
What is the airplane level effect of lateral control scenario #9 (spoiler control drum jammed at neutral)?
Boeing to run desktop simulation

Question 4
Provide proposed corrections to scenario #10 write up
See rewrite.

Question 5
Q) Reference Scenario 9-10 – What is breakout force of the aileron spring cartridge?
A) Breakout force of the aileron spring cartridge (reflected at the control wheel) is approximately 16 Lb.

Question 6
Q) Reference Scenario 16 – What is the effect of a failure in the PCA input rod (A or B)?
A) There is no functional effect of a single failure in the PCA input rod. The entire input rod and fasteners are dual load path. The effect of a multiple failure depends on the position of the primary slide at the time of the failure. Worst case effect is a rate jam of the affected PCU, causing a force fight with the other PCU and stalling of both PCUs. Control of spoilers is available from the FO side if the transfer mechanism is broken out. Lateral trim will not be available. Depressurizing the affected PCU will restore normal control.

Question 7
Q) Reference Scenario 17 – What is the effect of a jam between the primary and secondary slide in the aileron PCA?
1. If the primary slide and secondary slide jam together near neutral, the effect is a minor reduction in rate capability.
2. If the jam occurs away from neutral, the feedback motion of the PCU will cause the primary and secondary slides to counter each other (crossflow condition). At a full crossflow condition, the PCU will lose rate capability and be backdriven by the unaffected PCU.
Question 8
Q) Reference Scenario 18 – What is the effect of a jam between the secondary slide and the sleeve in the aileron PCA?

1. If the secondary slide jams near neutral, the effect is a minor reduction in rate capability.
2. If the jam occurs away from neutral, the feedback motion of the PCU will cause the primary and secondary slides to counter each other (crossflow condition). At a full crossflow condition, the PCU will lose rate capability and be backdriven by the unaffected PCU.

Question 9, 10
Q) Reference Scenarios 20, 21 – What is the effect of a piston to cylinder jam in the aileron PCA?
The effect is same as a jam elsewhere in the captain's side aileron control path. The FO must break out the transfer mechanism and aileron spring rod to move the spoilers. Aileron control is limited to deflections within the valve stops.

Question 11
Provide proposed corrections to scenario #34 write up
See rewrite.

Question 12
Provide proposed corrections to scenario #36 write up
See rewrite.

Question 13
Provide proposed corrections to scenario #47 write up
See rewrite

1.16.2. Tests and researches conducted by NTSB:

c.wheel Dennis Grossi NTSB.ppt

Introduction

- Define Sensor Malfunction
- Evaluate Data Quality
- Validate Control Wheel Adjustments

6/28/2005 2

Discussion Points

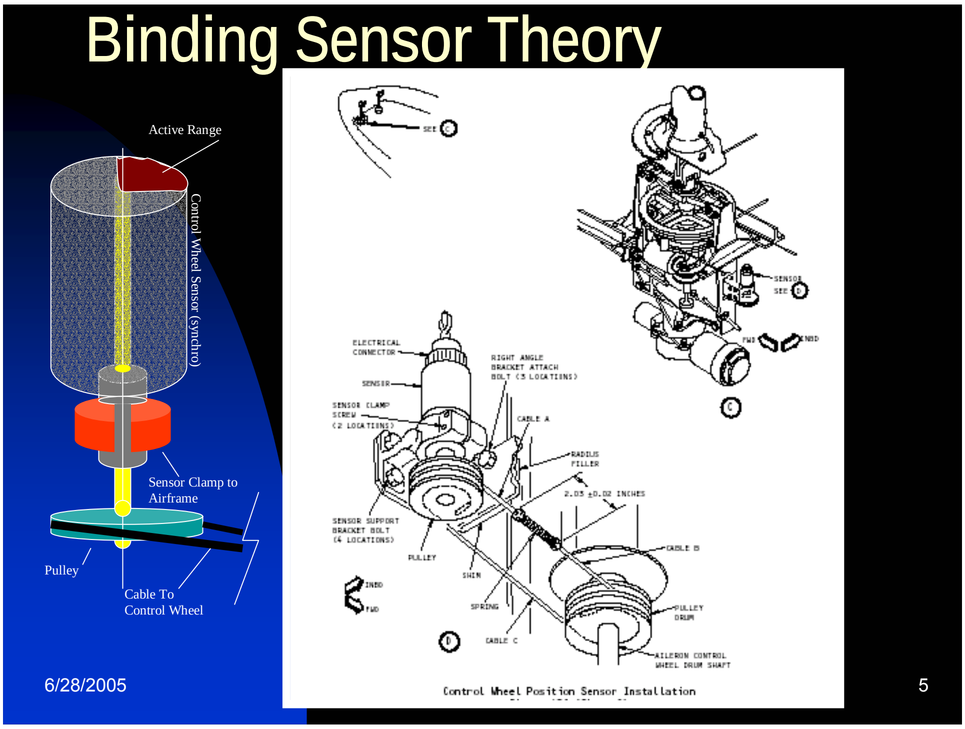
- Fact - Control Wheel Sensor Maximum Minimum Values Recorded on 25-Hours of FDR data (-2.237deg to 81.5 deg)
- Theory - Control Wheel Sensor Moved Freely Within Active Range (–2.237 and 81.5 degrees.), But due to Internal Binding of Rotating Components will not Exceed this Range.
- Theory - Control Wheel Inputs Outside of Active Range Cause Sensor to Rotate in Mounting Bracket and Reposition Control Wheel Sensor/Cockpit Control Wheel Offset.
- Theory - Rapid Control Wheel Inputs Will Also Cause Sensor to Shift in Mounting Bracket.
- Theory - Control Wheel Sensor Values Can Be Used to Evaluate Crew Inputs When Sensor Offset can be Derived From Known Control Wheel Position (i.e. Before and After Preflight Control Checks, 0 - Aileron Deflection.)

6/28/2005 3

Discussion Points (cont.)

- Control Wheel Position Sensor is a synchro with a range of 0 to 360 degrees or +- 180 degrees.
- Full Range of Control Wheel as expressed in sensor units (synchro angles) is +- 128 degrees.
- Full Range of Control Wheel Travel as measured in cockpit is +- 107 degrees.
- The following discussion will reference sensor units only (ie, synchro angles +- 128 degrees)
- Theory – Control Wheel Position (Cockpit) values recorded during accident flight can be corrected to actual by applying the following offsets:
  - From Frame 92250 to 92361.92 subtract 17.5444 deg.
  - From Frame 92362.42 to 92445 subtract 28.9 deg.
  - From Frame 92446 to end of data 28.9 deg sensor offset may not apply due to rapid control wheel inputs.

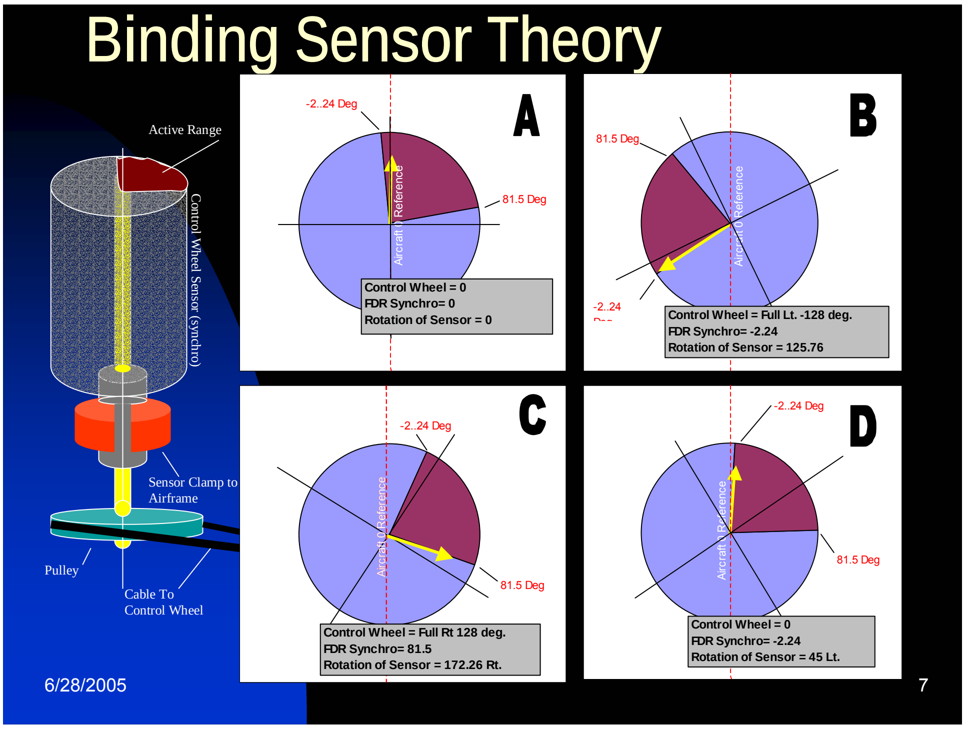
6/28/2005 4

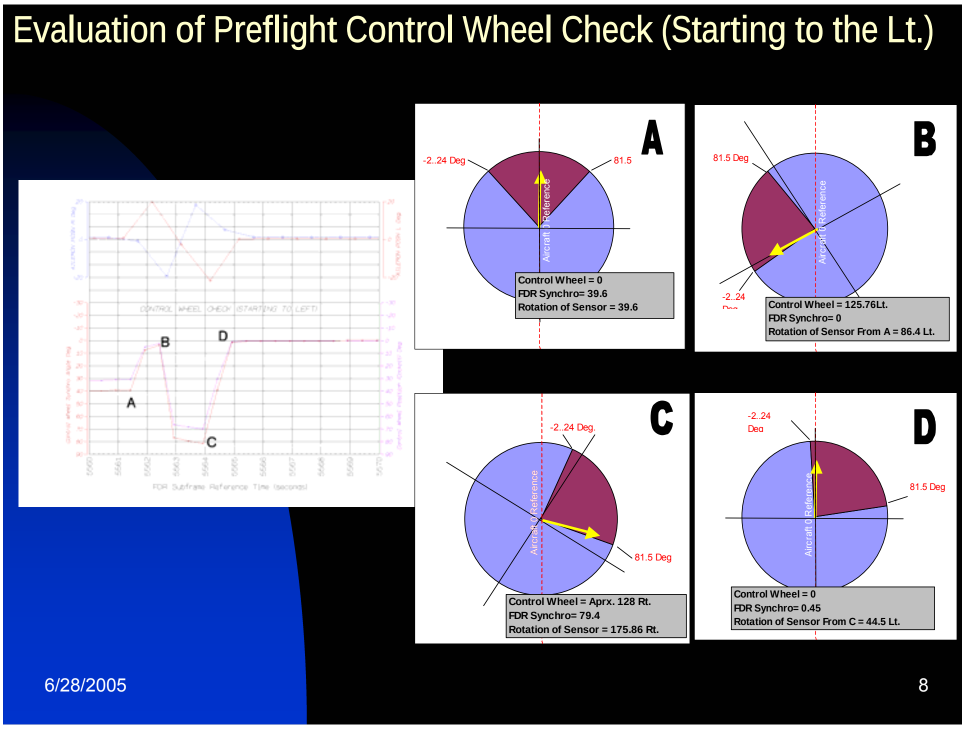

Binding Sensor Theory
Active Range
Control Wheel Sensor (synchro)
Sensor Clamp to Airframe
Pulley
Cable To Control Wheel
ELECTRICAL CONNECTOR
SENSOR
SENSOR CLAMP SCREW (2 LOCATIONS)
RIGHT ANGLE BRACKET ATTACH BOLT (3 LOCATIONS)
CABLE A
RADIUS FILLER
2.03 ±0.02 INCHES
SENSOR SUPPORT BRACKET BOLT (4 LOCATIONS)
PULLEY
SHIM
SPRING
CABLE B
CABLE C
PULLEY DRUM
AILERON CONTROL WHEEL DRUM SHAFT
INBD
FWD
SENSOR SEE D
Control Wheel Position Sensor Installation
6/28/2005
5

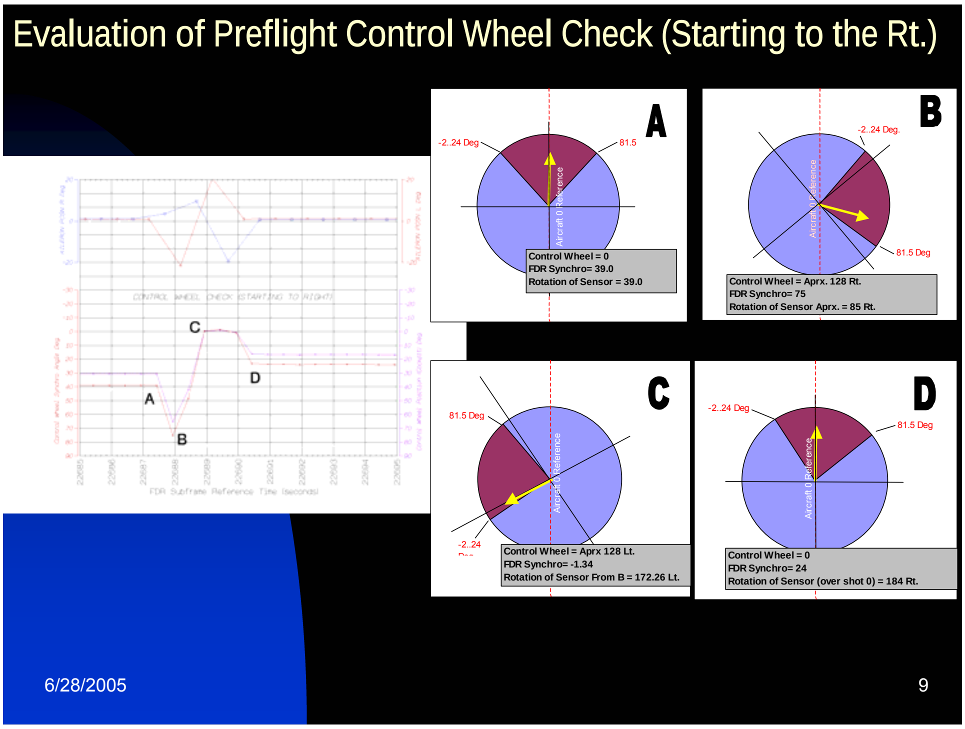
Control Wheel Position Sensor Values for Neutral Aileron Before & After Preflight Control Checks

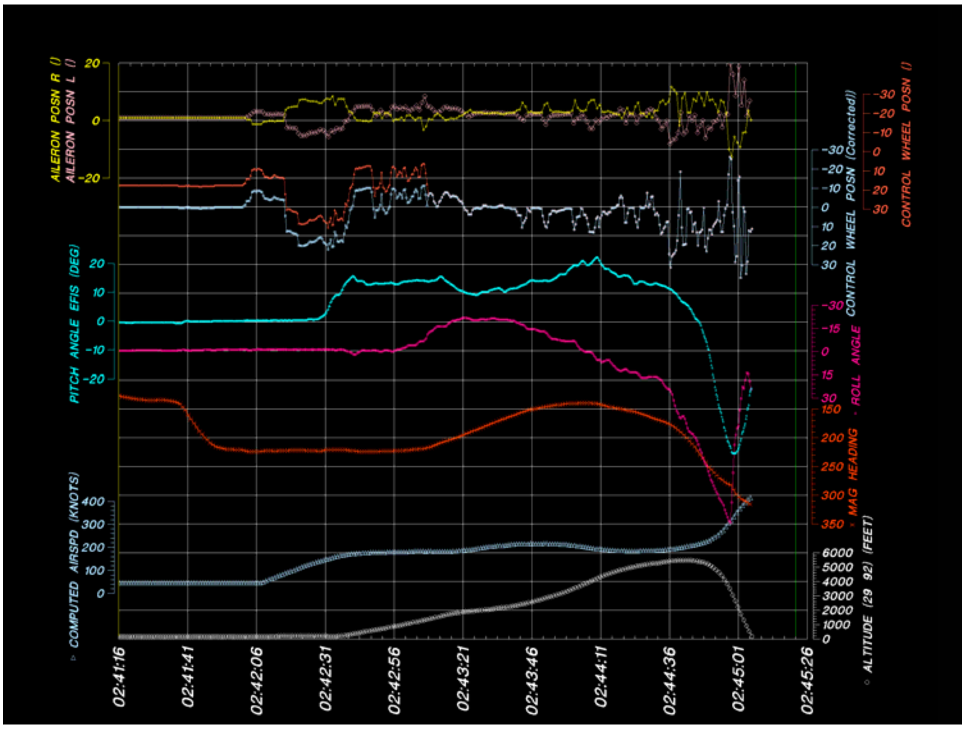
	Time in Seconds (FDR Sub Frame)	Control Wheel Position Before Check	Control Wheel Position After Check	Control Check Direction
1	3713	29.4466	16.7846	Rt. To LT.
2	5568	31.2134	0	Lt. To Rt.
3	7801	58.8932	2.35573	Lt. To Rt.
4	9789	33.8636	3.23913	Lt. To Rt.
5	12124	31.8023	0.294466	Lt. To Rt.
6	14134	28.5632	16.4901	Rt. To LT.
7	17431	29.1521	14.7233	Rt. To LT.
8	22682	30.6245	16.7846	Rt. To LT.
9	30419	37.6915	15.012	Rt. To LT.
10	46964	30.6245	14.1344	Rt. To LT.
11	62156	35.6304	15.6067	Rt. To LT.
12	77924	32.9802	17.668	Rt. To LT.
13	92030	33.5691	14.4288	Rt. To LT.

6/28/2005 6

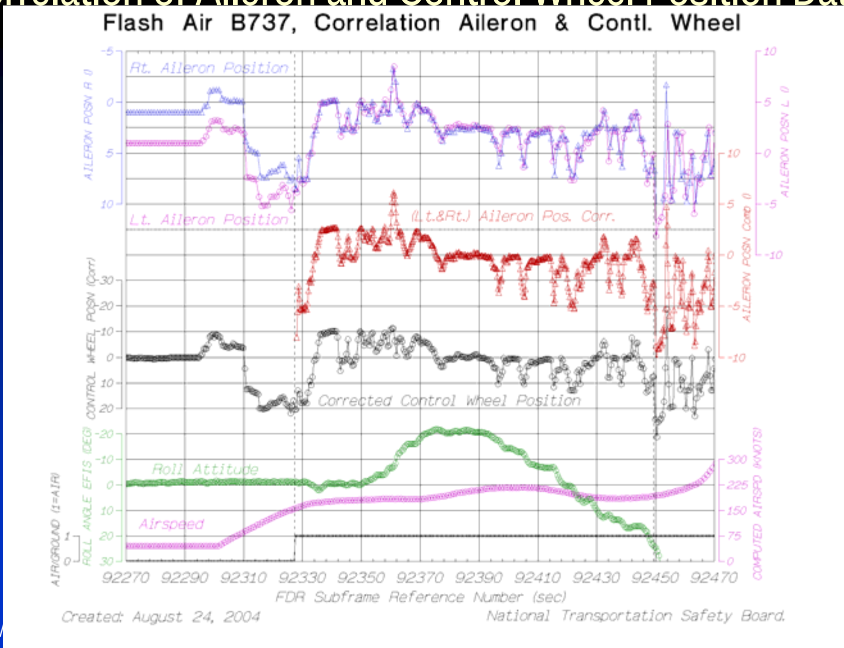

Binding Sensor Theory
Active Range
Control Wheel Sensor (synchro)
Sensor Clamp to Airframe
Pulley
Cable To Control Wheel
A
-2..24 Deg
81.5 Deg
Aircraft 0 Reference
Control Wheel = 0
FDR Synchro= 0
Rotation of Sensor = 0
B
81.5 Deg
-2..24
Control Wheel = Full Lt. -128 deg.
FDR Synchro= -2.24
Rotation of Sensor = 125.76
C
-2..24 Deg
81.5 Deg
Aircraft 0 Reference
Control Wheel = Full Rt 128 deg.
FDR Synchro= 81.5
Rotation of Sensor = 172.26 Rt.
D
-2..24 Deg
81.5 Deg
Control Wheel = 0
FDR Synchro= -2.24
Rotation of Sensor = 45 Lt.
6/28/2005
7


Evaluation of Preflight Control Wheel Check (Starting to the Lt.)
A
-2..24 Deg
81.5
Control Wheel = 0
FDR Synchro= 39.6
Rotation of Sensor = 39.6
B
81.5 Deg
Control Wheel = 125.76Lt.
FDR Synchro= 0
Rotation of Sensor From A = 86.4 Lt.
C
-2..24 Deg.
81.5 Deg
Control Wheel = Aprx. 128 Rt.
FDR Synchro= 79.4
Rotation of Sensor = 175.86 Rt.
D
81.5 Deg
Control Wheel = 0
FDR Synchro= 0.45
Rotation of Sensor From C = 44.5 Lt.
6/28/2005
8

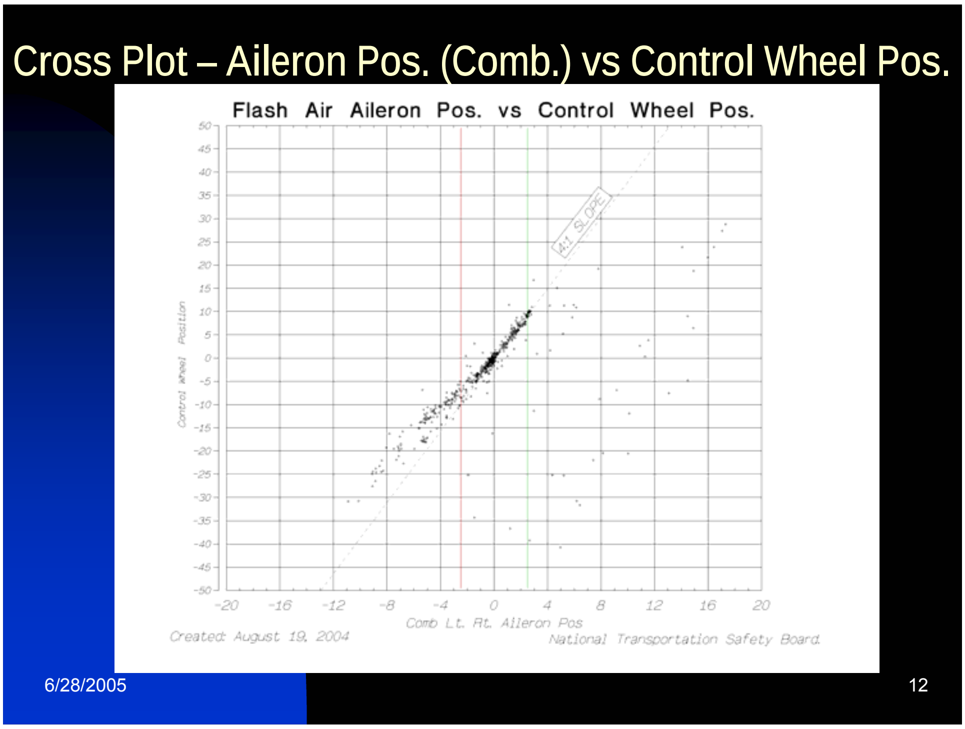

Evaluation of Preflight Control Wheel Check (Starting to the Rt.)
CONTROL WHEEL CHECK (STARTING TO RIGHT)
A
B
C
D
FDR Subframe Reference Time (seconds)
A
-2..24 Deg
81.5
Aircraft 0 Reference
Control Wheel = 0
FDR Synchro= 39.0
Rotation of Sensor = 39.0
B
-2..24 Deg.
81.5 Deg
Control Wheel = Aprx. 128 Rt.
FDR Synchro= 75
Rotation of Sensor Aprx. = 85 Rt.
C
81.5 Deg
-2..24
Aircraft 0 Reference
Control Wheel = Aprx 128 Lt.
FDR Synchro= -1.34
Rotation of Sensor From B = 172.26 Lt.
D
-2..24 Deg
81.5 Deg
Aircraft 0 Reference
Control Wheel = 0
FDR Synchro= 24
Rotation of Sensor (over shot 0) = 184 Rt.
6/28/2005
9


AILERON POSN R ()
AILERON POSN L ()
CONTROL WHEEL POSN (Corrected)
CONTROL WHEEL POSN ()
PITCH ANGLE EFIS (DEG)
ROLL ANGLE
MAG HEADING
COMPUTED AIRSPD (KNOTS)
ALTITUDE (29 92) (FEET)
02:41:16
02:41:41
02:42:06
02:42:31
02:42:56
02:43:21
02:43:46
02:44:11
02:44:36
02:45:01
02:45:26

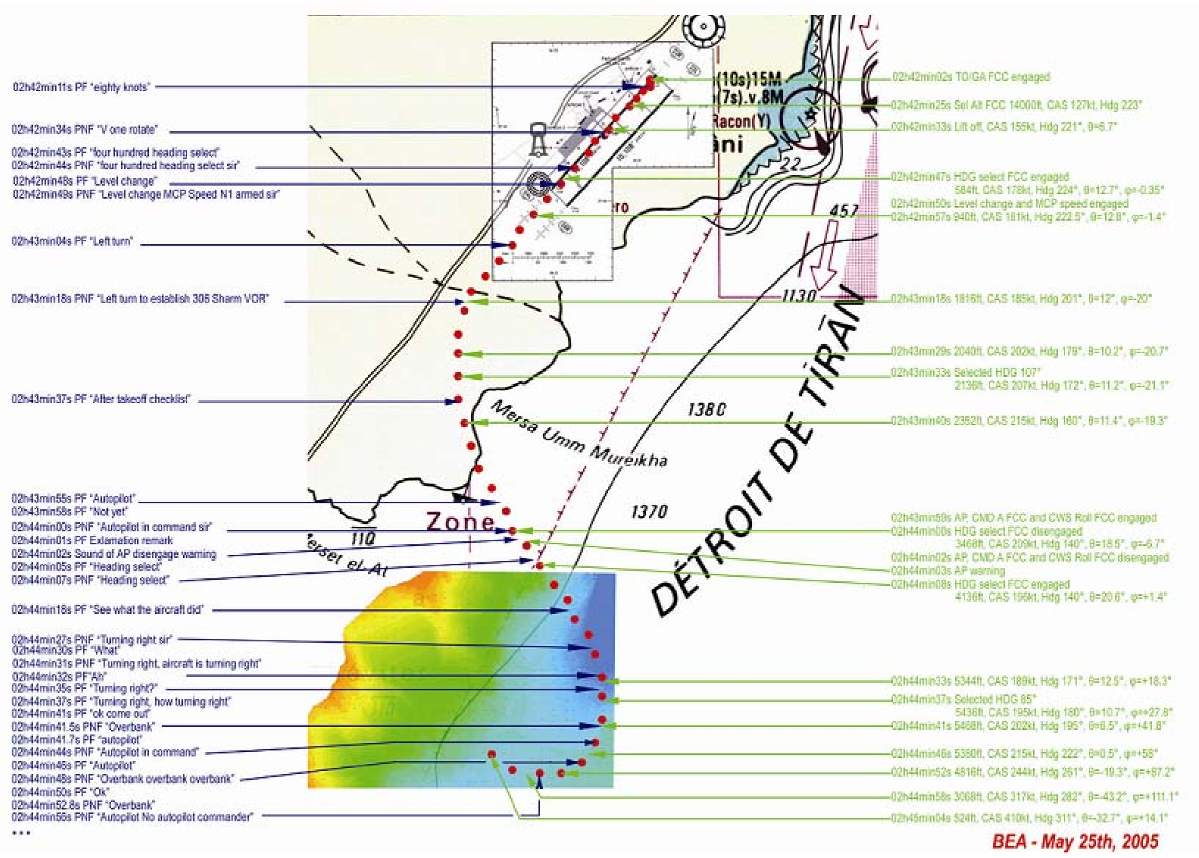
Correlation of Aileron and Control Wheel Position Data.



6/ 11


Cross Plot – Aileron Pos. (Comb.) vs Control Wheel Pos.
Flash Air Aileron Pos. vs Control Wheel Pos.
4:1 SLOPE
Control Wheel Position
Comb Lt. Rt. Aileron Pos
Created: August 19, 2004
National Transportation Safety Board
6/28/2005
12

1.16.3. Tests and researches conducted by BEA
(Trajecto_may05.jpg)



1.16.4. Tests and researches conducted by MCA:

Spatial Disorientation[3]

[3] All studies are compiled and extracted from the "World Wide Web"

Spatial Disorientation

Contents

- **Elevator Illusion**
- **Oculoagravic Illusion**

PROPRIOCEPTIVE ILLUSIONS

PREVENTION OF SPATIAL DISORIENTATION

TREATMENT OF SPATIAL DISORIENTATION

Spatial Disorientation

Spatial disorientation contributes more to causing aircraft accidents than any other physiological problem in flight. Regardless of their flight-time experience, all aircrew members are subject to disorientation. The human body is structured to perceive changes in movement on land in relation to the surface of the earth. In an aircraft, the human sensory systems—the visual, vestibular, and proprioceptive systems—may give the brain erroneous orientation information. This information can cause sensory illusions, which may lead to spatial disorientation.

COMMON TERMS OF SPATIAL DISORIENTATION

SPATIAL DISORIENTION

9-1. Spatial disorientation is an individual's inability to determine his or her position, attitude, and motion relative to the surface of the earth or significant objects; for example, trees, poles, or buildings during hover. When it occurs, pilots are unable to see, believe, interpret, or prove the information derived from their flight instruments. Instead, they rely on the false information that their senses provide.

SENSORY ILLUSION

9-2. A sensory illusion is a false perception of reality caused by the conflict of orientation information from one or more mechanisms of equilibrium. Sensory illusions are a major cause of spatial disorientation.

VERTIGO

9-3. Vertigo is a spinning sensation usually caused by a peripheral vestibular abnormality in the middle ear. Aircrew members often misuse the term vertigo, applying it generically to all forms of spatial disorientation or dizziness.

TYPES OF SPATIAL DISORIENTATION

TYPE I (UNRECOGNIZED)

9-4. A disoriented aviator does not perceive any indication of spatial disorientation. In other words, he does not think anything is wrong. What he sees—or thinks he sees—is corroborated by his other senses. Type I disorientation is the most dangerous type of disorientation. The pilot—unaware of a problem—fails to recognize or correct the disorientation, usually resulting in a fatal aircraft mishap:

- The pilot may see the instruments functioning properly. There is no suspicion of an instrument malfunction.
- There may be no indication of aircraft-control malfunction. The aircraft is performing normally.

- An example of this type of SD would be the height-/depth-perception illusion when the pilot descends into the ground or some obstacle above the ground because of a lack of situational awareness.

TYPE II (RECOGNIZED)

9-5. In Type II spatial disorientation, the pilot perceives a problem (resulting from spatial disorientation). The pilot, however, may fail to recognize it as spatial disorientation:

- The pilot may feel that a control is malfunctioning.
- The pilot may perceive an instrument failure as in the graveyard spiral, a classic example of Type II disorientation. The pilot does not correct the aircraft roll, as indicated by the attitude indicator, because his vestibular indications of straight-and-level flight are so strong.

TYPE III (INCAPACITATING)

9-6. In Type III spatial disorientation, the pilot experiences such an overwhelming sensation of movement that he or she cannot orient himself or herself by using visual cues or the aircraft instruments. Type III spatial disorientation is not fatal if the copilot can gain control of the aircraft.

EQUILIBRIUM MAINTENANCE

9-7. Three sensory systems—the visual, vestibular, and proprioceptive systems—are especially important in maintaining equilibrium and balance. Figure 9-1 shows these systems. Normally, the combined functioning of these senses maintains equilibrium and prevents spatial disorientation. During flight, the visual system is the most reliable. In the absence of the visual system, the vestibular and proprioceptive systems are unreliable in flight.

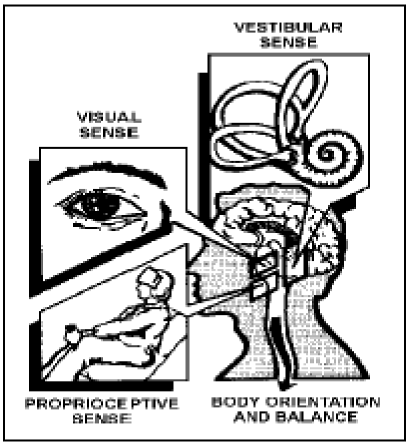


Figure 9-1. The Three Equilibrium Systems

VISUAL SYSTEM

9-8. Of the three sensory systems, the visual system is the most important in maintaining equilibrium and orientation. To some extent, the eyes can help determine the speed and direction of flight by comparing the position of the aircraft relative to some fixed point of reference. Eighty percent of our orientation information comes from the visual system. (Chapter 8 contains information about the eye).

9-9. On flights under IMC, crew members lose fixed points of reference outside of the aircraft. Under IMC, the pilot must rely on visual sensory input from the instruments for spatial orientation. The decision to rely on the visual sense—and to believe the instruments rather than the input of the other senses—demands disciplined training.

9-10. The eyes allow the pilot to scan sensitive flight instruments that give accurate spatial-orientation information. These instruments indicate unusual aircraft attitudes resulting from turbulence, distraction, inattention, mechanical failure, or spatial disorientation.

VESTIBULAR SYSTEM

9-11. The inner ear contains the vestibular system, which contains the motion- and gravity-detecting sense organs. This system is located in the temporal bone on each side of the head. Each vestibular apparatus consists of two distinct structures: the semicircular canals and the vestibule proper, which contain the otolith organs. Figure 9-2 depicts the vestibular system. Both the semicircular canals and the otolith organs sense changes in aircraft attitude. The semicircular canals of the inner ear sense changes in angular acceleration and deceleration.

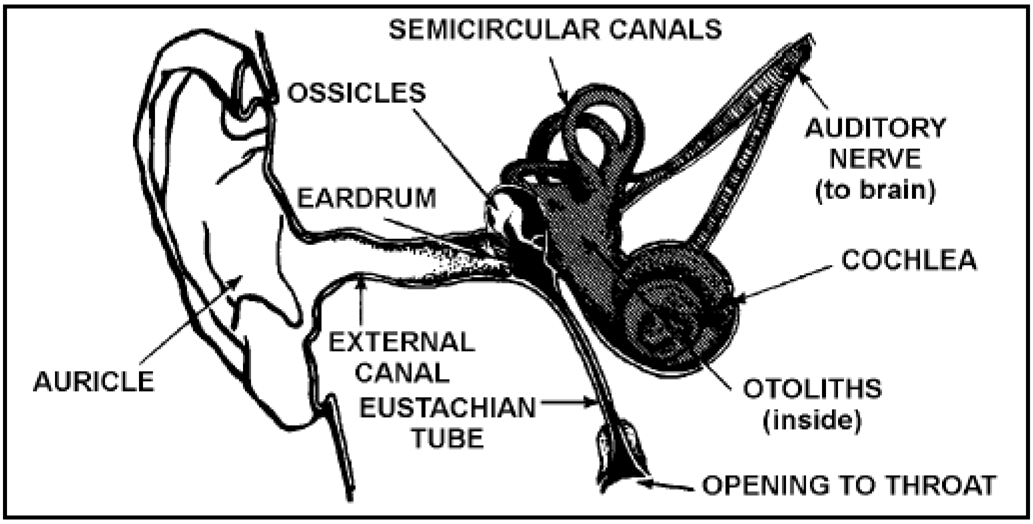


Figure 9-2. The Vestibular System

Otolith Organs

9-12. The otolith organs are small sacs located in the vestibule. Sensory hairs project from each macula into the otolithic membrane, an overlaying gelatinous membrane that contains chalklike crystals, called otoliths. The otolith organs, shown in Figure 9-3, respond to gravity and linear accelerations/decelerations. Changes in the position of the head, relative to the gravitational force, cause the otolithic membrane to shift position on the macula. The sensory hairs bend, signaling a change in the head position.

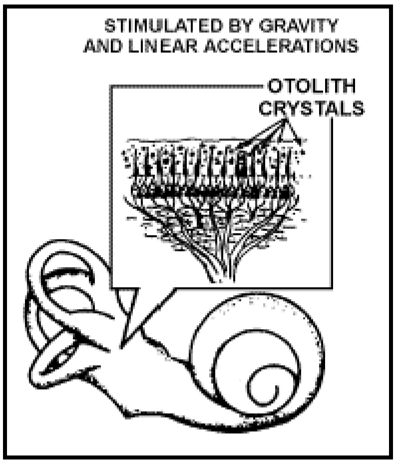


Figure 9-3. The Otolith Organs

9-13. When the head is upright, a "resting" frequency of nerve impulses is generated by the hair cells. Figure 9-4 shows the position of the hair cells when the head is upright.

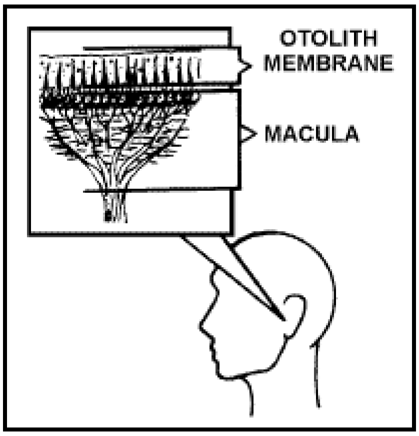


Figure 9-4. Position of the Hair Cells When the Head Is Upright

9-14. When the head is tilted, the "resting" frequency is altered. The brain is informed of the new position. The positions of the hair cells when the head is tilted forward and backward are shown in Figure 9-5.

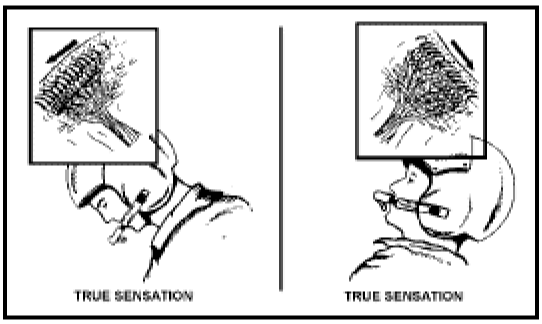


Figure 9-5. Position of the Hair Cells When the Head Is Tilted Forward and Backward

9-15. Linear accelerations/decelerations also stimulate the otolith organs. The body cannot physically distinguish between the inertial forces resulting from linear accelerations and the force of gravity. A forward acceleration results in backward displacement of the otolithic membranes. When an adequate visual reference is not available, aircrew members may experience an illusion of backward tilt. Figure 9-6 shows this false sensation of backward tilt.

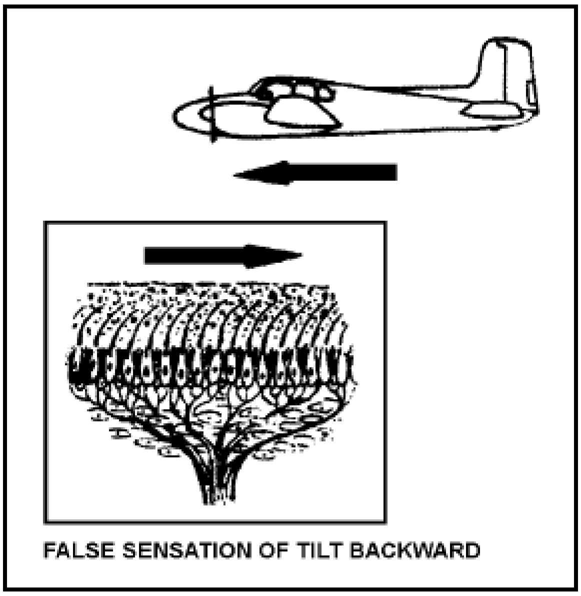


Figure 9-6. False Sensation During Backward Tilt

SEMICIRCULAR CANALS

9-16. The semicircular canals of the inner ear sense changes in angular acceleration. The canals will react to any changes in roll, pitch, or yaw attitude. Figure 9-7 shows where these changes are registered in the semicircular canals.

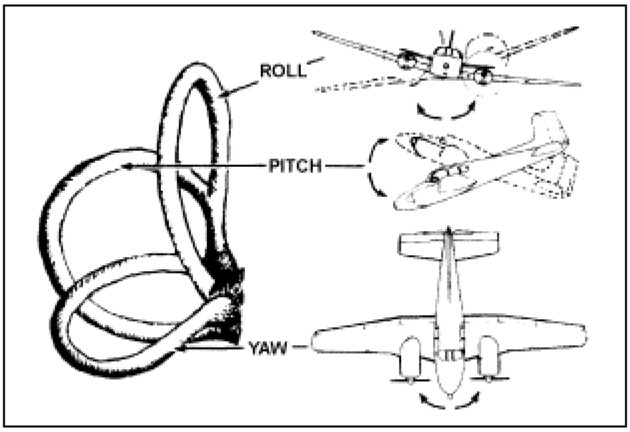


Figure 9-7. Reaction of the Semicircular Canals to Changes in Angular Acceleration

9-17. The semicircular canals are situated in three planes, perpendicular to each other. They are filled with a fluid called endolymph. The inertial torque resulting from angular acceleration in the plane of the canal puts this fluid into motion. The motion of the fluid bends the cupula, a gelatinous structure located in the ampulla of the canal. This, in turn, moves the hairs of the hair cells situated beneath the cupula. This movement stimulates the vestibular nerve. These nerve impulses are then transmitted to the brain, where they are interpreted as rotation of the head. Figure 9-8 shows a cutaway section of the semicircular canal.

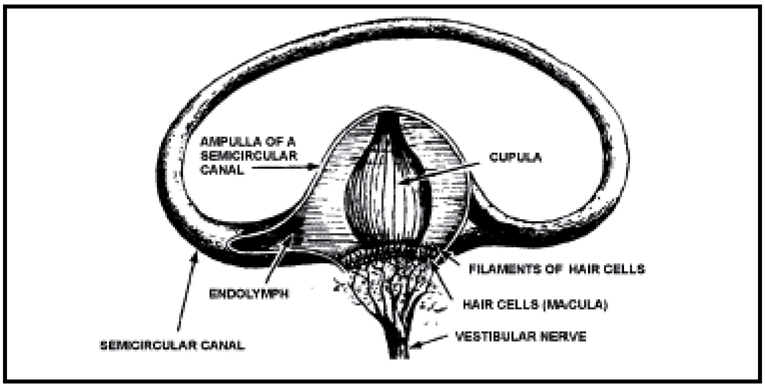


Figure 9-8. Cutaway View of the Semicircular Canals

9-18. When no acceleration takes place, the hair cells are upright. The body senses that no turn has occurred. The position of the hair cells and the actual sensation correspond, as shown in Figure 9-9.

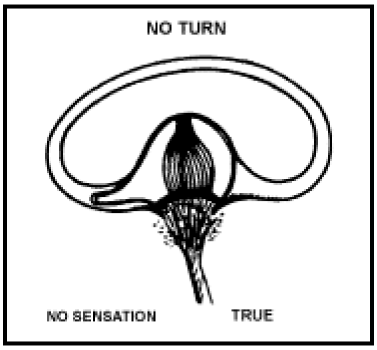


Figure 9-9. Position of Hair Cells During No Acceleration

9-19. When a semicircular canal is put into motion during clockwise acceleration, the fluid within the semicircular canal lags behind the accelerated canal walls. This lag creates a relative counterclockwise movement of the fluid within the canal. The canal wall and the cupula move in the opposite direction from the motion of the fluid. The brain interprets the movement of the hairs to be a turn in the same direction as the canal wall. The body correctly senses that a clockwise turn is being made. Figure 9-10 shows the position of the hair cells and the resulting true sensation during a clockwise turn.

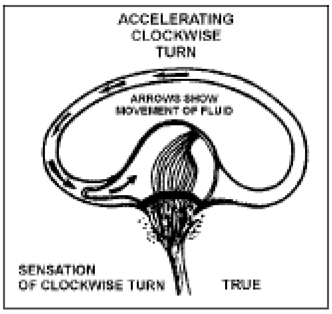


Figure 9-10. Sensation During a Clockwise Turn

9-20. If the clockwise turn then continues at a constant rate for several seconds or longer, the motion of the fluid in the canals catches up with the canal walls. The hairs are no longer bent, and the brain receives the false impression that turning has stopped. The position of the hair cells and the resulting false sensation during a prolonged, constant clockwise turn is shown in Figure 9-11. A prolonged constant turn in either direction will result in the false sensation of no turn.

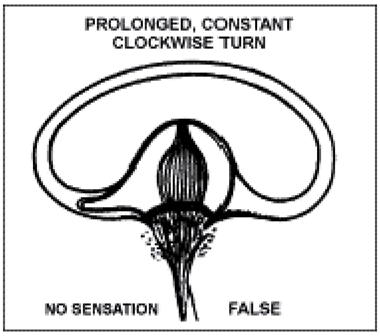


Figure 9-11. Sensation During a Prolonged Clockwise Turn

9-21. When the clockwise rotation of the aircraft slows or stops, the fluid in the canal moves briefly in a clockwise direction. This sends a signal to the brain that is falsely interpreted as body movement in the opposite direction. In an attempt to correct the falsely perceived counterclockwise turn, the pilot may turn the aircraft in the original clockwise direction. Figure 9-12 shows the position of the hair cells—and the resulting false sensation when a clockwise turn is suddenly slowed or stopped.

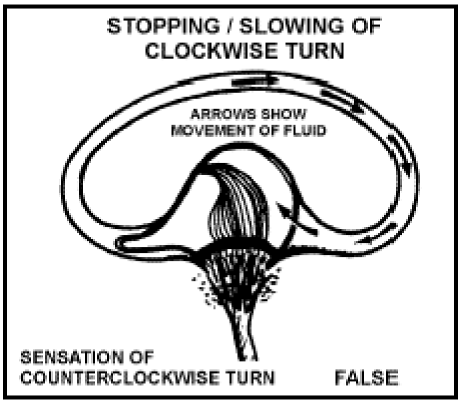


Figure 9-12. Sensation During Slowing or Stopping of a Clockwise Turn

PROPRIOCEPTIVE SYSTEM

9-22. This system reacts to the sensation resulting from pressures on joints, muscles, and skin and from slight changes in the position of internal organs. It is closely associated with the vestibular system and, to a lesser degree, the visual system. Forces act upon the seated pilot in flight. With training and experience, the pilot can easily distinguish the most distinct movements of the aircraft by the pressures of the aircraft seat against the body. The recognition of these movements has led to the term "seat-of-the-pants" flying.

VISUAL ILLUSIONS

9-23. Illusions give false impressions or misconceptions of actual conditions; therefore, aircrew members must understand the type of illusions that can occur and the resulting disorientation. Although the visual system is the most reliable of the senses, some illusions can result from misinterpreting what is seen; what is perceived is not always accurate. Even with the references outside the cockpit and the display of instruments inside, aircrew members must be on guard to interpret information correctly.

RELATIVE-MOTION ILLUSION

9-24. Relative motion is the falsely perceived self-motion in relation to the motion of another object. The most common example is when an individual in a car is stopped at a traffic light and another car pulls alongside. The individual that was stopped at the light perceives the forward motion of the second car as his own motion rearward. This results in the individual applying more pressure to the brakes unnecessarily. This illusion can be encountered during flight in situations such as formation flight, hover taxi, or hovering over water or tall grass.

CONFUSION WITH GROUND LIGHTS

9-25. Confusion with ground lights occurs when an aviator mistakes ground lights for stars. This illusion prompts the aviator to place the aircraft in an unusual attitude to keep the misperceived ground lights above them. Isolated ground lights can appear as stars and this could lead to the illusion that the aircraft is in a nose high or one wing low attitude (Part A of Figure 9-13). When no stars are visible because of overcast conditions, unlighted areas of terrain can blend with the dark overcast to create the illusion that the unlighted terrain is part of the sky (Part B of Figure 9-13). This illusion can be avoided by referencing the flight instruments and establishing a true horizon and attitude.

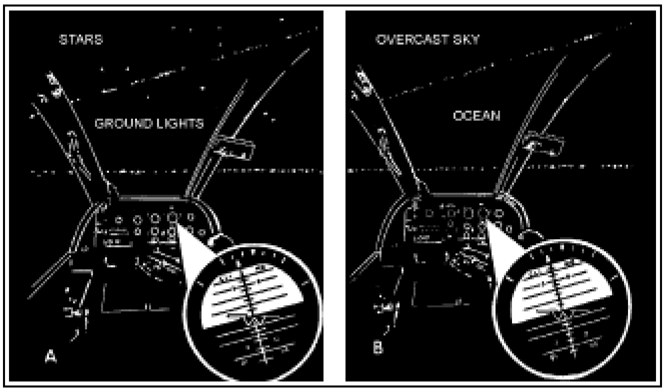


Figure 9-13. Confusion of Ground Lights and Stars at Night

FALSE HORIZON ILLUSION

The false horizon illusion (Figure 9-14) occurs when the aviator confuses cloud formations with the horizon or the ground. This illusion occurs when an aviator subconsciously chooses the only reference point available for orientation. A sloping cloud deck may be difficult to perceive as anything but horizontal if it extends for any great distance in the pilot's peripheral vision. An aviator may perceive the cloudbank below to be horizontal although it may not be horizontal to the ground; thus, the pilot may fly the aircraft in a banked attitude. This condition is often insidious and goes undetected until the aviator recognizes it and makes the transition to the instruments and corrects it. This illusion can also occur if an aviator looks outside after having given prolonged attention to a task inside the cockpit. The confusion may result in the aviator placing the aircraft parallel to the cloudbank.

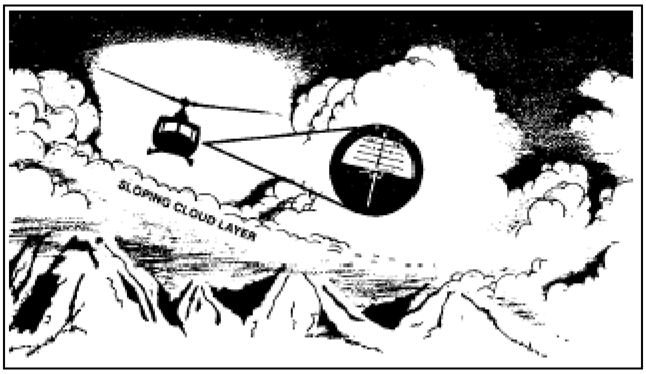


Figure 9-14. False Horizon Illusion

HEIGHT-DEPTH PERCEPTION ILLUSION

2-27. The height-depth perception illusion is due to a lack of sufficient visual cues and causes an aircrew member to lose depth perception. Flying over an area devoid of visual references—such as desert, snow, or water—will deprive the aircrew member of his perception of height. The aviator, misjudging the aircraft's true altitude, may fly the aircraft dangerously low in reference to the ground or other obstacles above the ground. Flight in an area where visibility is restricted by fog, smoke, or haze can produce the same illusion.

CRATER ILLUSION

9-28. The crater illusion occurs when aircrew members land at night, under NVG conditions, and the IR searchlight is directed too far under the nose of the aircraft. This will cause the illusion of landing with up-sloping terrain in all directions. This misperceived up-sloping terrain will give the aviator the perception of landing into a crater. This illusionary depression lulls the pilot into continuing to lower the collective. This can result in the aircraft prematurely impacting the ground, causing damage to both aircraft and crew. If observing another aircraft during hover taxi, the aviator may perceive that the crater actually appears to move with the aircraft being observed.

STRUCTURAL ILLUSIONS

9-29. Structural illusions are caused by the effects of heat waves, rain, snow, sleet, or other visual obscurants. A straight line may appear curved when it is viewed through the heat waves of the desert. A single wing-tip light may appear as a double light or in a different location when it is viewed during a rain shower. The curvature of the aircraft windscreen can also cause structural illusions, as illustrated in Figure 9-15. This illusion is due to the refraction of light rays as they pass through the windscreen. When encountering environments that contain these visual obscurants, the aviator must remain aware that these obscurants may present a false perception.

Figure 9-15. Structural Illusion

SIZE-DISTANCE ILLUSION

9-30. The size-distance illusion (Figure 9-16) is the false perception of distance from an object or the ground, created when a crew member misinterprets an unfamiliar object's size to be the same as an object that he is accustomed to viewing. This illusion can occur if the visual cues, such as a runway or trees, are of a different size than expected. An aviator making an approach to a larger, wider runway may perceive that the aircraft is too low. Conversely, an aviator—making an approach to a smaller, narrower runway—may perceive that the aircraft is too high. A pilot making an approach 25 feet above the trees in the State of Washington, where the average tree is 100 feet tall, may fly the aircraft dangerously low if trying to make the same approach at Fort Rucker, Alabama, where the average tree height is 30 feet. This illusion may also occur when an individual is viewing the position lights of another aircraft at night. If the aircraft being observed suddenly flies into smoke or haze, the aircraft will appear to be farther away than before.

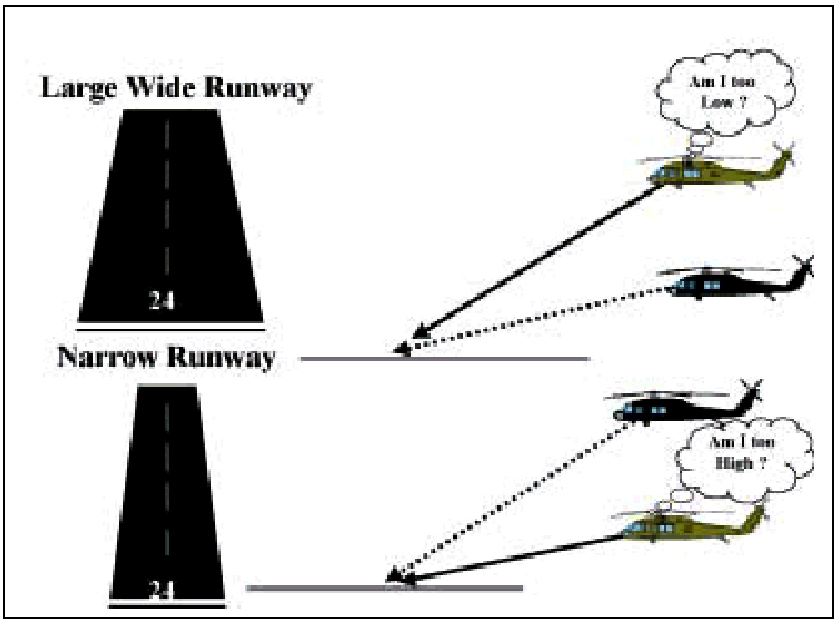


Figure 9-16. Size-Distance Illusion

FASCINATION (FIXATION) IN FLYING

9-31. Fascination, or fixation, flying can be separated into two categories: task saturation and target fixation. Task saturation may occur during the accomplishment of simple tasks within the cockpit. Crew members may become so engrossed with a problem or task within the cockpit that they fail to properly scan outside the aircraft. Target fixation, commonly referred to as target hypnosis, occurs when an aircrew member ignores orientation cues and focuses his attention on his object or goal; for example, an attack pilot on a gunnery range becomes so intent on hitting the target that he forgets to fly the aircraft, resulting in the aircraft striking the ground, the target, or the shrapnel created by hitting the target.

REVERSIBLE PERSPECTIVE ILLUSION

9-32. At night, an aircraft may appear to be moving away when it is actually approaching. If the pilot of each aircraft has the same assumption, and the rate of closure is significant, by the time each pilot realizes the misassumption, it may be too late to avoid a mishap. This illusion is termed reversible perspective and is often experienced when an aircrew member observes an aircraft flying a parallel course. In this situation, aircrew coordination is paramount. To determine the direction of flight, the aircrew member should observe the other aircraft's position lights. Remember the following: red on right returning; that is, if you see an aircraft with the red position light on the right and the green position light on the left, the observed aircraft is traveling in the opposite direction of your flight path.

ALTERED PLANES OF REFERENCE

9-33. In altered planes of reference(Figure 9-17), the pilot has an inaccurate sense of altitude, attitude, or flight-path position in relation to an object so great in size that the object becomes the new plane of reference rather than the correct plane of reference, the horizon. A pilot approaching a line of mountains may feel the need to climb although the altitude of the aircraft is adequate. This is because the horizon, which helps the pilot maintain orientation, is subconsciously moved to the top of the ridgeline. Without an adequate horizon, the brain attempts to fix a new horizon. Conversely, an aircraft entering a valley that contains a slowly increasing up-slope condition may become trapped because the slope may quickly increase and exceed the ability of the aircraft to climb above the hill, causing the aircraft to crash into the surrounding hills.

Figure 9-17. Altered Planes of Reference

AUTOKINESIS

9-34. Autokinesis primarily occurs at night when ambient visual cues are minimal and a small, dim light is seen against a dark background. After about 6 to 12 seconds of visually fixating on the light, one perceives movement at up to 20 degrees in any particular direction or in several directions in succession, although there is no actual displacement of the object. This illusion may allow an aviator to mistake the object fixated as another aircraft. In addition, a pilot flying at night may perceive a relatively stable lead aircraft to be moving erratically, when in fact, it is not. The unnecessary and undesirable control inputs that the pilot makes to compensate for the illusory movement of the aircraft represent increased work and wasted motion, at best, and an operational hazard at worst.

FLICKER VERTIGO

9-35. Flicker vertigo (Figure 9-18) is technically not an illusion; however, as most people are aware from personal experience, viewing a flickering light can be both distracting and annoying. Flicker vertigo may be created by helicopter rotor blades or airplane propellers interrupting direct sunlight at a rate of 4 to 20 cycles per second. Flashing anticollision strobe lights, especially while the aircraft is in the clouds, can also produce this effect. One should also be aware that photic stimuli at certain frequencies could produce seizures in those rare individuals who are susceptible to flicker-induced epilepsy.

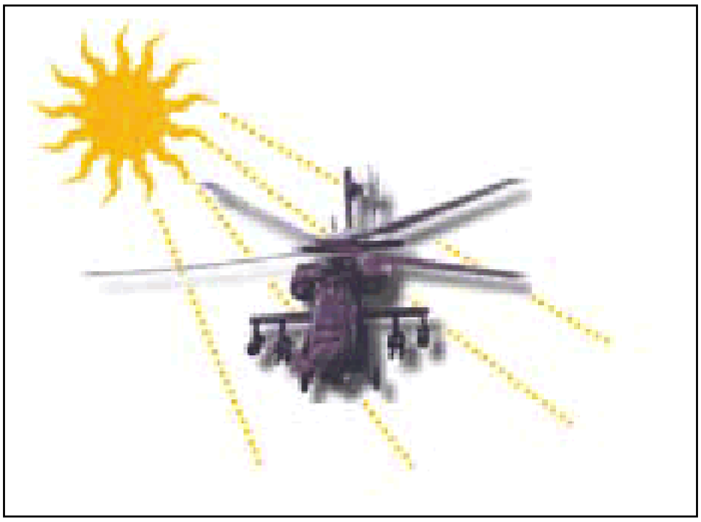


Figure 9-18. Flicker Vertigo

VESTIBULAR ILLUSIONS

9-36. The vestibular system provides accurate information as long as an individual is on the ground. Once the individual is airborne, however, the system may function incorrectly and cause illusions. These illusions pose the greatest problem with spatial disorientation. Aircrew members must understand vestibular illusions and the conditions under which they occur. They must be able to distinguish between the inputs of the vestibular system that are accurate and those that cause illusion.

SOMATOGYRAL ILLUSIONS

9-37. Somatogyral illusions are caused when angular accelerations and decelerations stimulate the semicircular canals. Those that may be encountered in flight are the leans, graveyard spin, and Coriolis illusions.

Leans

9-38. The most common form of spatial disorientation is the leans. This illusion occurs when the pilot fails to perceive angular motion. During continuous straight-and-level flight, the pilot will correctly perceive that he is straight and level (part A, Figure 9-19). However, a pilot rolling into or out of a bank may experience perceptions that disagree with the reading on the attitude indicator. In a slow roll, for instance, the pilot may fail to perceive that the aircraft is no longer vertical. He may feel that his aircraft is still flying straight and level although the attitude indicator shows that the aircraft is in a bank (part B, Figure 9-19). Once the pilot detects the slow roll, he makes a quick recovery. He rolls out of the bank and resumes straight-and-level flight. The pilot may now perceive that the aircraft is banking in the opposite direction. However, the attitude indicator shows the aircraft flying straight and level (part C, Figure 9-19). The pilot may then feel the need to turn the aircraft so that it aligns with the falsely perceived vertical position. Instead, the pilot should maintain straight-and-level flight as shown by the attitude indicator. To counter the falsely perceived vertical position, the pilot will lean his body in the original direction of the subthreshold roll until the false sensation leaves (part D, Figure 9-19).

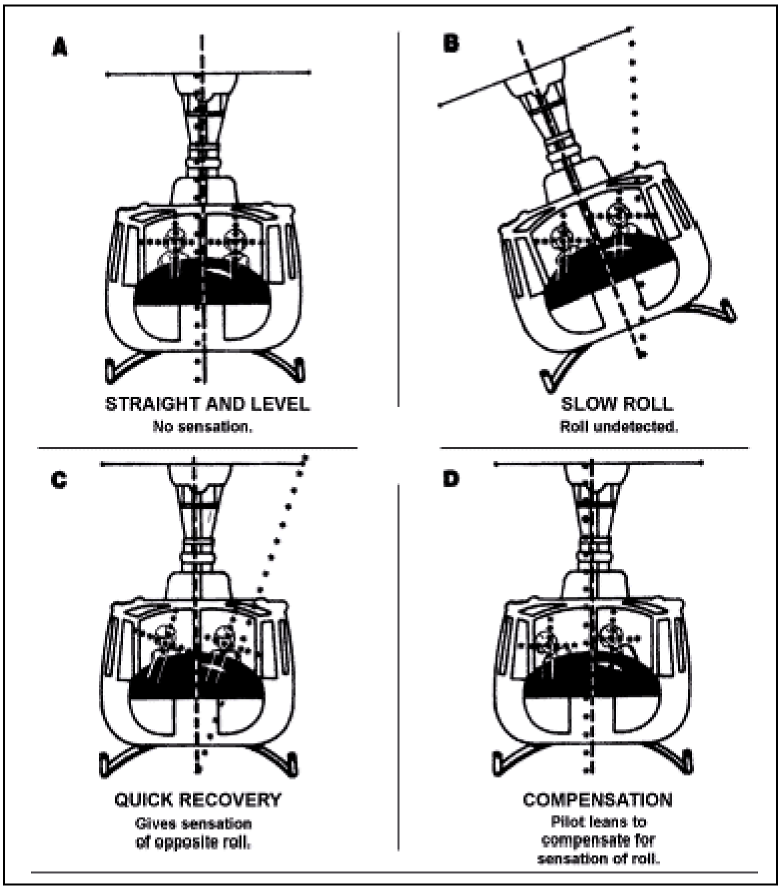


Figure 9-19. Leans

Graveyard Spin

9-39. This illusion, shown in Figure 9-20, usually occurs in fixed-wing aircraft. For example, a pilot enters a spin and remains in it for several seconds. The pilot's semicircular canals reach equilibrium; no motion is perceived. Upon recovering from the spin, the pilot undergoes deceleration, which is sensed by the semicircular canals. The pilot has a strong sensation of being in a spin in the opposite direction even if the flight instruments contradict that perception. If deprived of external visual references, the pilot may disregard the instrumentation and make control corrections against the falsely perceived spin. The aircraft will then reenter a spin in the original direction.

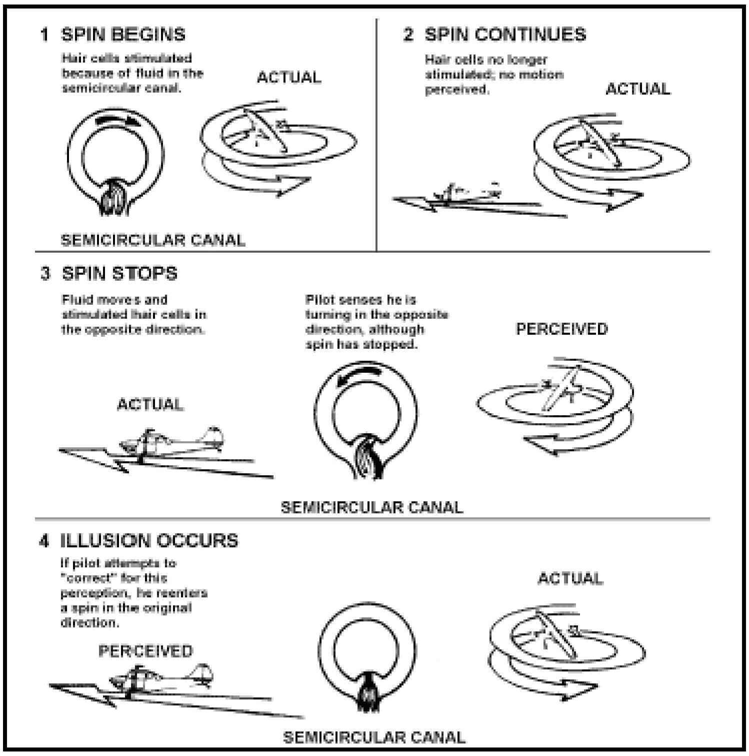


Figure 9-20. Graveyard Spin

9-40. To compound the action of the semicircular canals under these conditions, a pilot, noting a loss of altitude as the spin develops, may apply back pressure on the controls and add power in an attempt to gain altitude. This maneuver tightens the spin and may cause the pilot to lose control of the aircraft.

Coriolis Illusion

9-41. Regardless of the type of aircraft flown, the Coriolis illusion is the most dangerous of all vestibular illusions. It causes overwhelming disorientation.

9-42. This illusion occurs whenever a prolonged turn is initiated and the pilot makes a head motion in a different geometrical plane. When a pilot enters a turn and then remains in the turn, the semicircular canal corresponding to the yaw axis is equalized. The endolymph fluid no longer deviates, or bends, the cupula. Figure 9-21 shows the movement of the fluid in a semicircular canal when a pilot enters a turn.

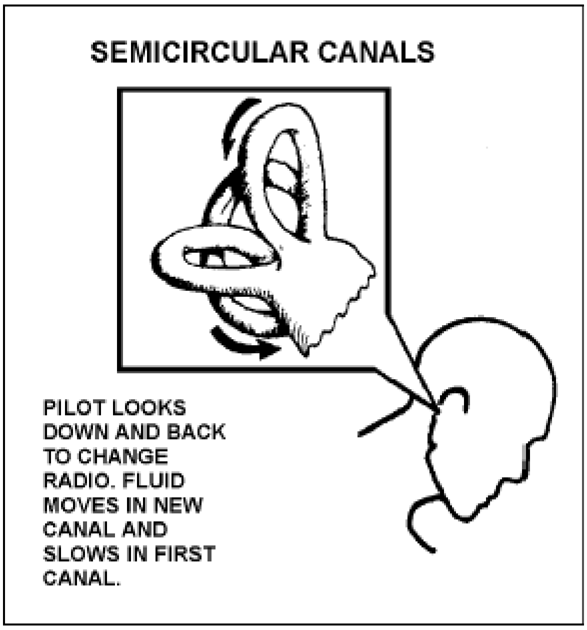


Figure 9-21. Movement of Fluid in the Semicircular Canals During a Turn

9-43. If the pilot initiates a head movement in a geometrical plane other than that of the turn, the yaw axis semicircular canal is moved from the plane of rotation to a new plane of nonrotation. The fluid then slows in that canal, resulting in a sensation of a turn in the direction opposite that of the original turn.

9-44. Simultaneously, the two other canals are brought within a plane of rotation. The fluid stimulates the two other cupulas. The combined effect of the coupler deflection in all three canals creates the new perception of motion in three different planes of rotation: yaw, pitch, and roll. The pilot experiences an overwhelming head-over-heels tumbling sensation.

SOMATOGRAVIC ILLUSIONS

9-45. Somatogravic illusions are caused by changes in linear accelerations and decelerations or gravity that stimulate the otolith organs. The three types of somatogravic illusions that can be encountered in flight are oculogravic, elevator, and oculoagravic.

Oculogravic Illusion

9-46. This type of illusion occurs when an aircraft accelerates and decelerates. Inertia from linear accelerations and decelerations cause the otolith organ to sense a nose-high or nose-low attitude. In a linear acceleration, the gelatinous layer, which contains the otolith organ, is shifted aft. The aviator falsely perceives that the aircraft is in a nose-high attitude. A pilot correcting for this illusion without cross-checking the instruments would most likely dive the aircraft. This illusion does not occur if adequate outside references are available. If making an instrument approach in inclement weather or in darkness, the pilot would be considerably more susceptible to the oculogravic illusion. An intuitive reaction to the sensed nose-high attitude could have catastrophic results

Elevator Illusion

9-47. This illusion occurs during upward acceleration. Because of the inertia encountered, the pilot's eyes will track downward as his body tries, through inputs supplied by the inner ear, to maintain visual fixation on the environment or instrument panel. With the eyes downward, the pilot will sense that the nose of the aircraft is rising. This illusion is common for aviators flying aircraft that encounter updrafts.

Oculoagravic Illusion

9-48. This illusion is the opposite of the elevator illusion and results from the downward movement of the aircraft. Because of the inertia encountered, the pilot's eyes will track upward. The pilot's senses then usually indicate that the aircraft is in a nose-low attitude. This illusion is commonly encountered as a helicopter enters autorotation. The pilot's usual intuitive response is to add aft cyclic, which decreases airspeed below the desired level.

PROPRIOCEPTIVE ILLUSIONS

9-49. Proprioceptive illusions rarely occur alone. They are closely associated with the vestibular system and, to a lesser degree, with the visual system. The proprioceptive information input to the brain may also lead to a false perception of true vertical. During turns, banks, climbs, and descending maneuvers, proprioceptive information is fed into the central nervous system. A properly executed turn vectors gravity and centrifugal force through the vertical axis of the aircraft. Without visual reference, the body only senses being pressed firmly into the seat. Because this sensation is normally associated with climbs, the pilot may falsely interpret it as such. Recovering from turns lightens pressure on the seat and creates an illusion of descending. This false perception of descent may cause the pilot to pull back on the stick, which would reduce airspeed. Figure 9-22 shows proprioceptive illusions.

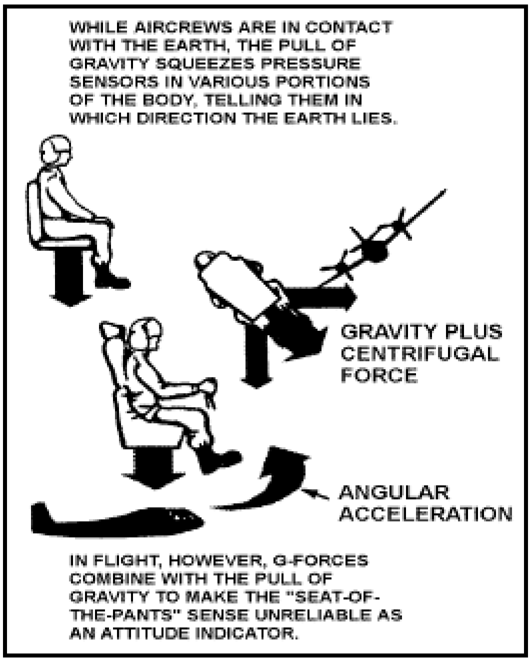


Figure 9-22. Proprioceptive Illusions

PREVENTION OF SPATIAL DISORIENTATION

9-50. Spatial disorientation cannot be totally eliminated. However, aircrew members need to remember that misleading sensations from sensory systems are predictable. These sensations can happen to anyone because they are due to the normal functions and limitations of the senses. Training, instrument proficiency, good health, and aircraft design minimize spatial disorientation. Spatial disorientation becomes dangerous when pilots become incapable of making their instruments read right. All pilots, regardless of experience level, can experience spatial disorientation. For that reason, they should be aware of the potential hazards, understand their significance, and learn to overcome them. To prevent disorientation, aviators should—

- Never fly without visual reference points (either the actual horizon or the artificial horizon provided by the instruments).
- Trust the instruments.
- Avoid fatigue, smoking, hypoglycemia, hypoxia, and anxiety, which all heighten illusions.
- Never try to fly VMC and IMC at the same time.

TREATMENT OF SPATIAL DISORIENTATION

9-51. Spatial disorientation can easily occur in the aviation environment. If disorientation occurs, aviators should—

- Refer to the instruments and develop a good cross-check.
- Delay intuitive actions long enough to check both visual references and instruments.
- Transfer control to the other pilot if two pilots are in the aircraft. Rarely will both experience disorientation at the same time.

Note:
The following references are made available for the specialized investigation group to assist in the studies.

- Surviving Spatial Disorientation
- Spatial Disorientation, From Wikipedia, the free encyclopedia.
- Spatial Disorientation -Why you shouldn’t fly by the seat of your pants
- Spatial Disorientation Deaths of Visual Flight Rules Pilots: J. F. Kennedy, Jr., et. al.
- Spatial Disorientation Stories, From AVWEB Question Of The Week

1.16.5 Systems examination:

1.16.5.1 *Cause(s) for the autopilot disconnect*
(Refer to 1.16.1. (Tests and Researches), Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress, Autopilot Engagement)

1.16.5.2 *Cause(s) for “Heading Select” disengage when the autopilot is engaged* (applied also to the accident aircraft)
(Refer to 1.16.1. (Tests and Researches), Boeing response to the raised questions, enclosure to B-H200-17833-ASI Question B4)

1.16.5.3 *Availability of autopilot during the captain's requests "autopilot, autopilot"* (accident aircraft)
(Refer to 1.16.1. (Tests and Researches), Cairo March 04 Autopilot Flash 737 March Progress Meeting Flash 737 March Progress, Estimated Autopilot Availability, Boeing response to the raised questions, enclosure to B-H200-17833-ASI Question B6)

1.16.5.4 MMEL issues associated with operating the airplane with FD TO/GA mode inoperative (won't stay engaged)
Relevant information to be added upon Human Factors Group discretion

1.16.5.5 *Interlock logic for A/P with the definition of the likelyhood (ruled out, not likely, unknown) to the various interlocks regarding the role they may have played in the autopilot disengagement*
(Refer to 1.16.1. (Tests and Researches), Honeywell SP-300 DFCS B737-300.ppt file, and Flash Airlines Presentation SP-300 DFCS Health Monitoring Honeywell.ppt file)

1.16.5.6 *The effects of the TOGA bit dropping out and way it affects the command bars.*
(Refer to 1.16.1. (Tests and Researches), Boeing AMM 22-03-00, 22-04-00)

1.16.5.7 *Examination of the selected course compared to the selected heading (probability for having "dropouts").*

1.16.6 CVR examination:

1.16.6.1 *Examination of the CVR recording for indications of A/P and heading select switch noises*
(Could not be identified)

1.16.6.2 Examination of CVR at 2.58.15 (when the MSR crew says that they heard a message from Flash on 121.5).
121.5 recording has been checked, no such message was recorded

1.16.7 FDR examination:

1.16.7.1 *Spatial disorientation study of the accident flight based on the recorded FDR data*

TBC (CBS group)

1.16.8 *PCU inspection and teardown (EQA report):*

(Refer to 1.16.1.7. Aileron system)

1.17 Organizational and Management Information

1.17.1. Flash Airlines

1.17.1.1. Flash Airlines Air Operator Certificate (AOC)

ARAB REPUBLIC OF EGYPT
MINISTRY OF CIVIL AVIATION

AIR OPERATOR CERTIFICATE

This certifies that

FLASH AIRLINES

Has met the requirements of the MINISTRY OF CIVIL AVIATION and related operating regulations and rules prescribed thereunder for the issuance of this certificate and is hereby authorized to conduct Air-Carrier operation in accordance with said operating regulations and rules prescribed thereunder and the terms, conditions and limitations contained in the attached Operation Specifications.

This certificate is not transferable and, unless sooner surrendered, suspended or revoked, shall continue in effect until ***February 23, 2004*** *or terminated.*

Pilot / Saleh Moussa
SALEH . A . MOUSSA
Head of Operations & Air Transport Sector
20-2-2003

CERTIFICATE NO. : 18
CERTIFICATE ISSUE DATE : **February 24, 2000**

1.17.3. Relevant Flash Airlines procedures:

1.17.3.1 Flash Airlines procedures regarding use of autopilot when recovering from unusual attitudes
Refer to Flash Airline FOM (Ops Group)

1.17.3.2 Flash Airlines procedures regarding Upset Recovery training

MCA requirements regarding Upset Recovery are not mandatory.
Refer to Flash Airline FOM (Ops Group)

1.17.3.3 Flash Airlines procedures regarding “training about PNF assuming control when the PF is not responding to situations, callouts"

4. CREW HEALTH PRECAUTIONS

A crew member's sickness/illness, his feeling unwell/indisposed or the impairment of his senses and reflexes by narcotics, drugs or pharmaceutical preparations/medicaments have quite often contributed to incidents and accidents.
Therefore, crew health is of the highest importance and has a direct impact upon flight safety. This is reflected in very stringent requirements for regular medical examinations and medical certificates. It hardly needs to be mentioned that living health - consciously is in the self-interest of every crew member.
Note: For incapacitation of crew members
crew member shall not perform duties on an aeroplane if he is in any doubt of being able to accomplish his assigned duties, or if he knows or suspects that he is suffering from fatigue, or feels unfit to the extent that the flight may be endangered.

4.1 Incapacitation of Crew Members

4.1.1 Definition

Incapacitation of a crew member is defined as any condition which affects the health of a crew member during the performance of duties - associated with the duty/position assigned to him - which renders him incapable of performing the assigned duties.

The definition includes either total or partial incapacitation which does not allow the fulfilment of duties in the "normal" way.

4.1.2 General

In-flight pilot incapacitation is a valid safety hazard and has already caused many accidents. Incapacities have occurred more frequently than other emergencies which are the subject of extensive training (such as engine failure, cabin fire etc). Aviation history and statistics indicate that incapacities may occur in all age groups and during all phases of the flight. There are many forms of incapacitation ranging from obvious sudden death to a lingering and difficult to detect partial loss of functions.

4.1.3 Types of Incapacitation

Obvious incapacitation; means total functional failure and loss of capabilities. This generally will be easily detectable and will be a prolonged condition. Among the possible causes are heart disorders, severe brain disorders, severe internal bleeding, etc.

Subtle incapacitation; this may be considered a more significant operational hazard, because it is difficult to detect and the effects can range from partial loss of functions to a complete unconsciousness. Possible causes might be minor brain seizures, hypoglycemia (low blood sugar), other various medical disorders or preoccupation with personal problems. Since the crew member concerned may not be aware of, or capable of rationally evaluating his situation, this type of incapacitation is more dangerous!

4.1.4 Causes and Effects

As explained before, incapacitation may range from minor cases of physiological upsets associated with intercurrent mild disease or mental stress which may result in reduced levels of judgement or physical coordination up to a complete collapse.

Among the causes for a mild incapacitation one may list: Body pains such as toothache, headache, gastroentehtis, the delayed effects of alcohol, drugs or medication, common disorders such as a cold, etc.

Heart troubles, an acute infection thrombosis, epilepsy, hypoglycemia (extremely low level sugar) and others belong to the more serious causes of a sudden collapse. At least one incident is known, where a crew member had a heart attack right after his aviation medical examination, so a passed medical exam is not a guarantee!

It is obvious that living more health consciously may reduce the number of occurrences of also the avoidance of stress in your business and private life. Chapter **4.1** covers the subject of health precautions.

4.1.5 Recognition of an Incapacity

An early recognition of a incapacity is of outmost importance. A silent collapse will hardly be detected during normal activities (for instance during the cruise phase of a flight), as communications may sometimes be reduced to a minimum. This requires that all crew members monitor each other very closely.

"Closely" means, observing the other crew members for any "abnormal" reaction/action or behavior. One good method is to use the so called "TWO COMMUNICATION RULE". This simply means, that one crew member's comment must be answered by the other crew member(s).

If - for instance - the PNF reports the aeroplane being left of course, it is essential, that the PF not only corrects this problem but also confirms this verbally. If a crew member doesn't answer any question or checklist item

in the normal way, there is reason to believe that there might be the beginning of a subtle incapacitation.

the number of occurrences of crew member incapacitation. This includes avoidance of drugs, moderate consumption of alcohol, adequate rest time -and its proper use for recreation - adequate sleep and nutrition but

Here is an illustration of the use of the Two Communication Rule:

1. the PNF, for example, notices the airplane is left of course,

2. the PNF notifies the PF of the abnormal condition (the first communication), but
3. the PF does not respond in any manner (verbally or by correcting the flight path),
4. the PNF repeats the abnormal condition to the PF (the second communication),
5. the PF again fails to respond,
6. after the PF fails to respond to the second communication, the PNF should assume the PF is incapacitated and should take action as described in Section **4.1.6**

At the worst he may simply have fallen asleep.
Other symptoms of the beginning of an incapacitation are:

- incoherent speech;
- strange behaviour;
- irregular breathing;
- pale fixed facial expression;
- jerky motions that are either delayed or too rapid.

If any of these are present, incapacitation must be suspected and action taken to check the state of the crew member.

4.1.6 Actions to be taken when an incapacity is recognised.

First Step

- take over control of the aeroplane by announcing "I have control",
- engage autopilot,
- declare an urgency or emergency -whichever is applicable -,
- have an incapacitated cockpit crew member removed from his seat. In any case his seat should be moved fully back to prevent obstruction of flight controls, switches, levers, etc. The help of other crew members or passengers might be required,
- if necessary, reset COM and NAV to your side

Second Step

- take care of the incapacitated crew member by trying to provide first aid (ask if doctors or other medical persons are aboard),
- arrange a landing as soon as practicable after considering all pertinent factors,
- arrange medical assistance after landing
- giving as many details about the condition of the affected crew member as possible.

Third Step

- prepare for landing (cockpit and cabin), but do not press for a hasty approach
- perform approach checklist earlier than normal (request assistance from other crew members or "capable" persons),
- request radar vectoring and make an extended approach where possible - to reduce workload,
- for landing do not change seats - fly the aeroplane from

that position you initially were assigned to.

- organise work after landing; this shall include
  - depending on the situation, a change of seats for taxiing in, but only after the aeroplane has come to a complete stop;
  - having the incapacitated crew member offloaded and to the ambulance as quickly as possible;
  - arrangements for the parking of the aeroplane.

NOTE:

1. The company operations department must be kept informed at all times regarding the above circumstances for immediate relay to the Manager Flight Operations.
2. In case of incapacitation of the system panel operator, pilots shall refer to procedures as published in the AOM.

4.1.7 Summary

The problems involved with incapacitation of crew members may be summarised as follows:

1) If you do not feel well, say "NO" before the flight.

2) Remember, that the best medical examination as well as a health conscious life still do not guarantee that an incapacitation during flight will not happen to you or to your other crew members.

3) The "TWO COMMUNICATION RULE" must be used in order to have a chance of detecting any incapacitation in time. Take notice of any abnormal or unusual action of another crew member, as this might also be an indication of onset of incapacitation.

4. Once an incapacitation is identified, remember the three basic steps:

<u>Step 1)</u> Take over the aeroplane and bring it under YOUR control.

<u>Step 2)</u> Take care of the incapacitated pilot (either have him removed from his seat or fixed so that he will not interfere the controls).

<u>Step 3)</u> Prepare for landing.

Finally, it is emphasised that incapacitation requires special actions using the good judgement of the crew member left in command of the aeroplane.

4.2 ALCOHOLIC BERVERAGES

The use of intoxicating beverages by **FLASH AIR** flight crew members must of necessity be strictly regulated.

The following rules must be strictly observed by all flight crew members at all times:

1. No alcoholic beverage shall be consumed on the same calendar day that a crew

1.17.3.4 *Flash Airlines training/operational information regarding intervention by the non-flying pilot when the flying pilot fails to respond to calls for correcting an unsafe situation.*
Refer to previous item

1.17.3.5 Regularity (or irregularity) rules regarding sleeping schedules on and off-duty. Strategies for obtaining adequate rest and managing crew on-duty alertness
Refer to Flash Airline FOM (Ops Group)

1.17.3.6 General description about Flash Airline.
(Date of foundation or transition, location of offices and bases, number of aircrafts operated, number of pilots and other personnel, annual flights, passengers carried, revenues, routes flown, and financial health)
(All relevant information are already included in the Factual Report)

1.17.3.7 Labor management issues, growth trends, and main competitors.
Closed

1.17.3.8 Egyptian requirements for the training of pilots at an airline such as Flash Airlines.

GENERAL. The following outline is intended to clarify the six categories of training used by operators and defined in Part 121, Subpart N. This clarification is intended to both define the type of training and describe for the Operator when each category of training is applicable.

APPLICABILITY OF TRAINING CATEGORIES. Usually, operators will need to conduct training in all six categories of training. Recurrent training applies to all operators. Initial equipment training, transition training, upgrade training, and requalification training apply in most situations. However, transition training is not applicable for an operator who operates only one aircraft type. Initial new hire training applies to operators who train and qualify newly hired personnel or personnel who have not been previously qualified as a crewmember by that operator.

CATEGORIES OF TRAINING. There are six basic categories of training applicable to Part 121 operators. The primary factors which determine the appropriate category of training are the student's previous experience with the operator and previous duty position. Each category of training consists of one or more curriculums, each one of which is specific to an aircraft type and a duty position (for example: A-320 SIC, and A-320 PIC). Training should be identified with and organized according to specific categories of training. When discussing training requirements, MoCA inspectors should be specific regarding the category of training being discussed and use the same references as are stated in Part 121 Subpart N. Inspectors should encourage operators to use this nomenclature when developing new training curriculums or revising existing training curriculums. Use of this common nomenclature improves standardization and mutual understanding. The six categories of training are briefly discussed in the following subparagraphs:

A. Initial New Hire Training. This training category is for personnel who have not had previous experience with the operator (newly hired personnel). It also applies, however, to personnel employed by the operator who have not previously held a cockpit crewmember duty position with that operator. Initial new hire training includes basic indoctrination training and training for a specific duty position and aircraft type. Except for a basic indoctrination curriculum segment, the regulatory requirements for "initial new hire" and "initial equipment" training are the same. Since initial new hire training is usually the employee's first exposure to specific company methods, systems, and procedures, it must be the most comprehensive of the six categories of training. For this reason, initial new hire training is a distinct separate category of training and should not be confused with initial equipment training. Initial equipment training is a separate category of training.

B. Initial Equipment Training (PIC and SIC). This category of training is for personnel who have been previously trained and qualified for a duty position by the operator (not new hires) and who are being reassigned for any of the following reasons:

(a) Reassignment is to any duty position on an airplane of a different group (Group IIIP is reciprocating and turbopropeller powered and Group IIIJ is turbojet powered).

(b) Reassignment is to a different duty position on a different airplane type when the cockpit crewmember has not been previously trained and qualified by the operator for that duty position and airplane type.

C. Transition Training. This category of training is for an employee who has been previously trained and qualified for a specific duty position by the operator and who is being assigned to the same duty position on a different aircraft type and the different type aircraft must be in the same group. If it is not in the same group, initial equipment training is the applicable category of training.

D. Upgrade Training. This category of training is for an employee who has been previously trained and qualified as SIC or PIC (not eligible for requalification training) by the operator and is being assigned as PIC to the same aircraft type for which the employee was previously trained and qualified as SIC or PIC on the same type.

E. Recurrent Training. This category of training is for an employee who has been trained and qualified by the operator, who will continue to serve in the same duty position and aircraft type, and who must receive recurring training and/or checking within an appropriate eligibility period to maintain currency.

F. Requalification Training. This category of training is for an employee who has been trained and qualified by the operator, but has become unqualified to serve in a particular duty position and/or aircraft due to not having received recurrent training and/or a required flight or competency check within the appropriate eligibility period. Requalification training is also applicable in the following situations:

* PICs who are being reassigned as SICs on the same aircraft type when seat dependent training is required
* PICs and SICs who are being reassigned as FEs on the same aircraft type, provided they were previously qualified as FEs on that aircraft type

G. Summary of Categories of Training. The categories of training are summarized in general terms as follows:

(a) All personnel not previously employed by the operator must complete initial new hire training.

(b) All personnel must complete recurrent training for the duty position and aircraft type for which they are currently assigned within the appropriate eligibility period.

(c) All personnel who have become unqualified for a duty position on an aircraft type with the operator must complete requalification training to reestablish qualification for that duty position and aircraft type.

(d) All personnel who are being assigned by the operator to a different duty position and/or aircraft type must complete either initial equipment, transition, upgrade, or requalification training depending on the aircraft type and duty position for which they were previously qualified.

Experience Hours Pre-Requisites for Different Training

ECAR Part 121.400 Groups of aircraft	*Requirements For*	Upgrade	*Initial New Equipment*		*Initial New Hire*	
			SIC	*PIC*	*SIC*	*PIC*
***(A) 121 - Air Taxi.* Not exceed 5700 kg's**						
Group (I): Single Engine Airplane	1.Total Flight Experience. 2.Flight Experience on Aeroplane Group. 3.Flight Experience on Aeroplane Type.	2150 300 100	500 300	2150 300	200	2150 300
Group (II) : Multi -Engines Airplane	1.Total Flight Experience. 2.Flight Experience on Aeroplane Group. 3.Flight Experience on Aeroplane Type.	2500 500 150	500 300	2500 500	200	2500 500
(B) 121 –Air Carriers & Air Taxi Group (IIIP) >5700 kg						
Reciprocating power	1.Total Flight Experience. 2. Flight Experience on Aeroplane Group. 3.Flight Experience on Aeroplane Type.	3000 750 300	500 300	3000 750	200	3000 750
Turbopropeller powered	1.Total Flight Experience. 2.Flight Experience on Aeroplane Group. 3.Flight Experience on Aeroplane Type.	3500 1500 500	700 500	3500 1500	200	3000 1500
Group (IIIJ) >5700 kg Turbo– Jet Powered	1.Total Flight Experience. 2.Flight Experience on Aeroplane Group. 3.Flight Experience on Aeroplane Type.	4000 2500 300	1200 1000	4000 2500	300	4000 2500
(C) 121 – Air Carriers & Air Taxi Helicopter	1.Total Flight Experience. 2. Flight Experience on Aircraft Category. 3.Flight Experience on Aircraft Type.	1000 300 120	450 300	1000 300	150	1000 300

Two Pilots Flight Training Minimum Hours Required

ECAR Part 121.400 Groups of aircraft	Upgrade SIC to PIC	Transition		*Initial New Equipment*		*Initial New Hire*	
(A) 121 - Air Taxi. **Not exceed 5700 kg's**		***SIC***	***PIC***	***SIC***	***PIC***	***SIC***	***PIC***
Group (I): Single Engine	2	4	4	4	4	8	8
Group (I) & (II): VFR only	4	4	4	4	4	4	4
Group (II) & (II): IFR/VFR	4	8	8	12	12	16	16
(B) 121 - Air Carriers & Air Taxi **Group (IIIP) : Exceeds 5700 kg**							
• **Reciprocating power**	12	20	20	20	20	24	24
• **Turbopropeller powered**	12	20	20	20	20	24	24
Group (IIIJ) : Turbo– Jet Powered	12	24	24	24	24	28	28
(C) 121 – Air Carriers & Air Taxi Helicopter							
• **VFR only**	4	4	4	4	4	4	4
• **IFR/VFR**	4	8	8	12	12	16	16

One Pilot Flight Training Minimum Hours Required

ECAR Part 121.400 Groups of aircraft	Upgrade SIC to PIC	Transition		*Initial New Equipment*		*Initial New Hire*	
(A) 121 - Air Taxi. Not exceed 5700 kg's		*SIC*	*PIC*	*SIC*	*PIC*	*SIC*	*PIC*
Group (I): Single Engine	4	4	4	4	4	6	6
Group (I) & (II): VFR only	2	3	3	3	3	4	4
Group (II) & (II): IFR/VFR	4	6	6	6	6	8	8
(B) 121 – Air Carriers & Air Taxi							
Group (IIIP) : Exceeds 5700 kg							
• Reciprocating power	6	12	12	14	14	14	14
• Turbopropeller powered	6	12	12	15	15	15	15
Group (IIIJ) : Turbo– Jet Powered	6	12	12	16	20	16	20
(C) 121 – Air Carriers & Air Taxi Helicopter							
• VFR only	2	3	3	3	3	4	4
• IFR/VFR	4	6	6	8	8	10	10

See also Pilots training documents included in items 1.5.1 and 1.5.2

1.17.3.9 The training that was actually provided to all Flash Airlines pilots
Pilots training documents are included (refer to 1.5.1 and 1.5.2)

1.17.3.10 Flash Airlines procedures regarding pilots training and checking on operation of the auto flight system. .
No specific form is available (refer to 1.5.1 and 1.5.2)

1.17.3.11 Flash Airlines program for training and checking pilots in the field of CRM and human factors (as contained in the company training manual)
No mandatory training was required by ECAR at the time of the accident. However, CRM course is outlined in Flash Airline Training Manual 4.10

1.17.3.12 Flash Airlines pilots procedures for training and checking pilots on spatial disorientation countermeasures and upset recovery
Spatial Disorientation training is not a requirement by Civil Aviation Authorities. However, some literature about this subject is included in Flash Airline Training Manual.

1.17.3.13 Flash Airlines policies regarding use of CRM.
Refer to 1.17.3.11.

1.17.3.14 Flash Airlines policies relating to assertiveness and company guidelines as to when a first officer should take control of an aircraft from a captain.
Refer to 1.17.3.3.

1.17.3.15 Flash Air general company policies related to crew communication, assertiveness, and other CRM-related behaviors
Refer to 1.17.3.3.

1.17.3.16 Flash Airlines policies regarding use of the auto flight system
(To be referred to the OPS group)

1.17.3.17 Regulations governing operators (like Flash Airlines) regarding Oversight audits by ECAA.
ECAA regulations require every operator to undergo an oversight audit once every 12 month

1.17.3.18 Details about the ECAA oversight audit on Flash Airlines
Is already included in the Factual Report

1.17.3.19 Outcomes of Oversight audits (previous violations, fines, or bans levied by ECAA)
Is already included in the Factual Report

1.17.3.20 Previous violations, fines, or bans levied foreign aviation regulatory agencies.
None identified

1.17.3.21 Selected additional information regarding Flash Airlines Organization including:

- Organization and responsibilities Chapter 1 FSH 1.5.1/ 1.5.2
- Organization and responsibilities Chapter 1 FSH 1.8.7
- Qualification requirements Chapter 3 FSH 3.3.1/ 3.3.2
- Crew Health Precautions Chapter 4 FSH-4.1.1- 4.1.4
- Operating Procedures Chapter 6 FSH 6.3.44/ 6.3.45/ 6.3.46
- Training details Flash Training Manual Chapt 05 Page 7

All pertinent information are included in the Factual Report

1.17.3.22 Airline Simulator program contract with RAM, ECAA letter of approval

ARAB REPUBLIC OF EGYPT
MINISTRY OF CIVIL AVIATION
Egyptian Civil Aviation Safety & Security Authority

Full Flight Simulator Approval Certificate

Aircraft Type B737 - 500

Issued to: ***EgyptAir***

AIR OPERATOR CERTIFICATE

AOC Number: ***MSR-AC 010 (B737/500SIM-2DG)***

Simulator Operator: **Air Maroc – Casablanca**

CAIRO
September, 2003

Arab Republic of Egypt Ministry of Civil Aviation **Egyptian Civil Aviation Safety & Security Authority**		جمهورية مصر العربية وزارة الطيران المدنى سلطة الطيران المدنى المصري

Our Ref. MSR - AC010 – B737-500 FLT SIM-2/D
Date: **24, *September 2003***

The General Manager Flight Training (GMFT)
Flight Operations, EgyptAir,
Cairo International Airport,
Cairo, Egypt.

To: GMFT, EgyptAir

APPROVAL TO USE THE FLIGHT SIMULATOR SPECIFIED IN THE ENCLOSED DOCUMENTATION

Please find enclosed the required Approval Certificate and Licensing Considerations for the use of the requested Flight Simulator.

Yours sincerely,

Issued at: ***Cairo, Egypt***
Date: **24, *September 2003***

Signature: SALEH-A.MOUSSA
Head of,
Egyptian Civil Aviation Safety & Security Authority

Enclosure.

1. ***B737-500.FLT. SIM Approval to EgyptAir.***
2. ***Approval Certificate to Air Maroc, Casablanca***
3. ***Licensing Considerations***
4. ***Terms of Approval***

Arab Republic of Egypt Ministry of Civil Aviation **Egyptian Civil Aviation Safety & Security Authority**		جمهورية مصر العربية وزارة الطيران المدنى سلطة الطيران المدنى المصري

CERTIFICATE OF APPROVAL

FLIGHT SIMULATOR

*Number: **MSR-AC010-B737-500 FLT. SIM-2D***

This Certificate is issued to:

EgyptAir

Whose Business Address is:

Cairo International Airport
Cairo, Egypt.

On behalf of the Egyptian Civil Aviation,
It is hereby certified that the Flight Simulator for

B737-500

Located at

Royal Air Maroc,
Casablanca Airport
Anfa

Has Satisfied the Qualification Requirements Prescribed In

Egyptian Civil Aviation Regulations (ECARs) Part 121 Section 121- 407 Approval of Aircraft Simulators, and Appendices "E" and "F" Flight Training, Proficiency Check Requirements Respectively, and Appendix H to Part 121- Advanced Simulation. The Simulator must Maintain French DGCA, Approval and Qualification Level with JAR STD 1A as Reference

Subject to the conditions of the attached Specifications.

*This Certificate is not transferable, and unless cancelled, revoked, suspended or varied shall continue in effect **from September 24th 2003 until the end of September, 2004**.*

Issued at: ***Cairo, Egypt***
Date: 24, ***September 2003***

Signature: SALEH.A. MOUSSA
Head of,
Egyptian Civil Aviation Safety & Security Authority

Arab Republic of Egypt Ministry of Civil Aviation **Egyptian Civil Aviation Safety & Security Authority**		جمهورية مصر العربية وزارة الطيران المدني سلطة الطيران المدني المصري

APPROVAL CERTIFICATE

FLIGHT SIMULATOR

This Certificate is issued to:

Air Maroc

Whose Business Address is:

Air Maroc,
Casablanca
RAM

Upon finding that its organization complies in all respects with the requirements of the Egyptian Civil Aviation Regulations relating to the establishment of a Flight Simulator as described below, for the approved Training and Testing for ***EgyptAir-Cairo***. This certificate, unless cancelled, suspended or revoked, shall continue in effect until ***end of September 2004***

Simulator Specifications:

Aeroplane/Type/Class Simulated Category Data Package	*B737/400-500* : *Full Flight Simulator* : *Boeing STD*
Manufactured by Approval and Level	: *CAE Electronics LTD - 1993.* : *JAR – STD 1A Level "GD"*
Engines Type Engine Instrumentation	: *CFM – 56 – C1* : *Boeing Standard*
AFCS / EFIS *Flight Management System*	***: Honywell / Collins*** ***: Smith Industires***
Visual System Manufacturer ;and Type	: *Vital VII, Day / Bright Day / Dusk / Night.* : *180 *40*
Motion System/ and control loading Manufacturer	: *CAE/Hydraulic actuator with digital control electronics* : *6 Degrees of Freedom CAE series 500 6 DOF*
Other Equipment	: TCAS-ATIS & RT Chatter-SATCOM-EGPWS-GPS
Simulated Computer Manufacturer; and Type (Host Computer)	: *IBM Risc 6000*
Instructor's Station	: *Dual Indigo Touchscreen*

Note: (1) A satisfactory assessment of one simulator session is required before use.

Note: (2) A satisfactory assessment of flight Simulator Operators is required by ECASSA Flight Inspector.

No. and Date of Issue: ***MSR-B737/500 2D*** ***24, September 2003***	*Signature:* SALEH.A.MOUSSA ***Head of,*** **Egyptian Civil Aviation Safety & Security Authority**

Arab Republic of Egypt Ministry of Civil Aviation Egyptian Civil Aviation Safety & Security Authority		جمهورية مصر العربية وزارة الطيران المدنى سلطة الطيران المدنى المصري

TERMS OF APPROVAL

Issued To: ***Royal Air Maroc - Casablanca***
Number: ***MSR-AOC-AC 010 –B737/500 FLT SIM - Issue 1***
Date of Issue: ***24/09/2003***

The following terms of approval have been granted to **Royal Air Maroc - Casablanca** *in respect of their organization at:*

Royal Air Maroc,
Casablanca Airport
Anfa

1. ***B737/500 Simulator to maintain French DGCA Approval.***
2. ***The Simulator maintains Qualification Level "D" with JAR -STD 1A as reference Document until the end of September 2004, unless sooner refused, revoked, suspend or varied.***

Issued at: ***Cairo, Egypt***
Date: ***24th of September 2003***

Signature: SALEH A. MOUSSA
Head of,
Egyptian Civil Aviation Safety & Security Authority

Liberté · Égalité · Fraternité

RÉPUBLIQUE FRANÇAISE

ministère de l'Equipement des Transports du Logement du Tourisme et de la Mer

direction générale de l'Aviation civile

service de la Formation aéronautique et du Contrôle technique

Certificat de Qualification STD

(STD QUALIFICATION CERTIFICATE)

Nr F-173Z

Pour le compte de la Direction Générale de l'Aviation Civile, membre des Autorités Conjointes de l'Aviation (JAA), il est déclaré par ce document que le simulateur de vol

(on behalf of the French DGAC, a member of the Joint Aviation Authorities it is hereby certified that the under mentioned flight simulator)

B 737-500

Situé à

(located at)

[redacted]

A satisfait les exigences de qualification du JAR-STD 1A et est qualifié pour le niveau **DG**

(has satisfied the qualification requirements prescribed in JAR-STD 1A and is qualified for level DG)

Ce certificat n'est pas transmissible et, à moins qu'il ne soit suspendu, retiré ou modifié, reste valable jusqu'au :

(this certificate is not transferable and unless sooner suspended revoked or varied, shall continue in effect until)

[redacted] *(31st October 2005)*

L'adjoint au Chef du Bureau des Équipages et des Procédures

Paris, le 27 Octobre 2004 *(Paris, on 27th October 2004)*

B.

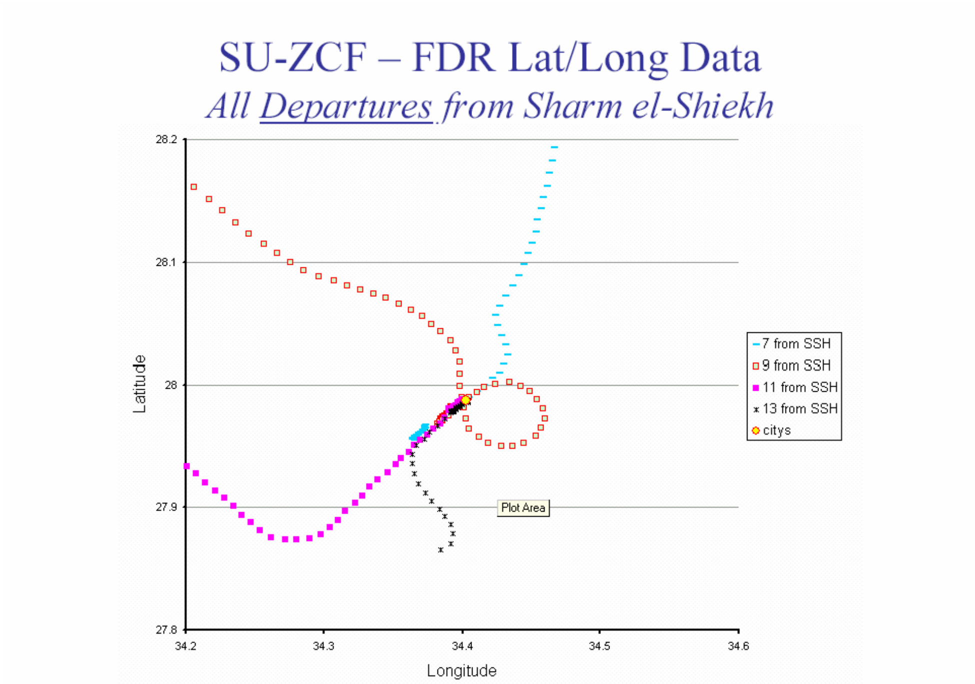
Ingénieur Principal des Études et de l'Exploitation de l'Aviation Civile

1.17.3.23 Simulator used by Flash Airlines at RAM).
Including
- FCC options
- Ground proximity
- Bank angle options
- Display type installed
- FD type (split or integrated cue)

Pending Boeing response, see also 1.16.1.10.

1.17.3.24 *Flash Airlines procedures regarding which pilot (PF or PNF) engages the autopilot, Boeing recommended practice*
No written procedure was found in Flash Airline FOM regarding this issue. Boeing procedures and common practices are for PF to connect the autopilot.

1.17.3.25 Additional information regarding dispatch from SSH
A. All departures from SSH (accident aircraft)



-7 Departure from SSH
-9 Departure from SSH
-11 Departure from SSH
-13 Departure from SSH

Same crew did flight no13 "Accident flight" and flight no 9 "SSH /TRN", following a comparison between the two flights.

FDR SSH Departure no.	Flight 13 Accident Flight	Flight no.9
Date	3rd Jan, 04	2nd Jan, 04
Take off Time	2.42 GMT	4.37 GMT
Runway	22R	04L
Captain	Khedr Aabdalla Saad	Khedr Aabdalla Saad
First officer	Amr Mahmoud Shafe	Amr Mahmoud Shafe
Autopilot in Command	A	A
Autopilot engaged at	3392 ft	2836 ft
Autopilot Mode	CMD /Heading Select	CMD /Heading Select

B- Extension of the outbound legs before beginning the turn

Interviewing Flash Airlines chief pilot:
Flash Airlines chief pilot stated that during the departure from SSH, Flash Airline pilots might extend the circuit as the situations need whether day or night departures (departure over water is mandatory)

Actual pattern flown depends on airplane performance (weight, OAT, etc). Most airplanes widen the pattern to gain additional altitude as a pilot technique. VOR crossing altitude restriction is shown on charts. This information should be added to Operations Group Notes.

1.19 New Investigation Techniques

1.19.1 Spatial disorientation :

- Definition
- The way the SD works
- Crew fatigue
- Human related factors

Refer to (tests and researches), 1.16.4. Tests and researches conducted by MCA, Spatial Disorientation Studies
Additional work can be done through adding the report of the CBS group meeting)

Exhibit B FDR Group Factual Report

Attachment 4: Summaries of previous flight(s) by accident crew
Refer to 1.17.3.25, all departures from SSH (accident aircraft)

Accident flight plan (copy of the flight plan referred to by ATC at 02:38:05 in the CVR transcript)

FLASH AIRLINES

Aerodrome

مطار

FLIGHT PLAN
PLAN DE VOL

برنامج رحلة

PRIORITY / Priorite: <<≡ FF →
ADDRESSEE(S) / Destinataire(S)

FILING TIME / Heure de depot
ORIGINATOR / Expediteur <<≡

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR
Identification Precise du(des) destinataire (s) et/ou de l'expediteur

3 MESSAGE TYPE / Type de message: <<≡ FPL →
7 AIRCRAFT IDENTIFICATION / Identification de l'aeronef: FSH604
8 FLIGHT RULES / Regles de vol: I
TYPE OF FLIGHT / Type de vol: N

9 NUMBER / Nombre:
TYPE OF AIRCRAFT / Type of d'aeronef: B733
WAKE TURBULENCE CAT / Cat de turbulence de de sillage: / M
10 EQUIPMENT / Equipement: S / C

13 DEPARTURE AERODROME / Aerodrome de depart: HESH
TIME / Heure: 0200 <<≡

15 CRUISING SPEED / Vitesse croisiere: N0400
LEVEL / Niveau: F240
ROUTE / Route: → DCT SHM A411 KAR? IS DCT CVO

16 DESTINATION AERODROME / Aerodrome de destination: HECA
TOTAL EET / Duree totale estimee HR. MIN: 0350
ALTN AERODROME / Aerodrome de degagement: → HESN
2 ND.ALTN AERODROME / 2eme aerodrome de degagement: →

18 OTHER INFORMATION / Renseignements divers:
OPR/ FLASH AIL
REG/ SUZCF

SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)
Renseignements complementaires (a NE PAS TRANSMETTRE DANS LES MESSAGES DE PLAN DE VOL DEPOSE)

19 ENDURANCE / Autonomie HR. MIN: E/ 0300
PERSONS ON BOARD / Personnes a bord: → P/ 018?
EMERGENCY RADIO / Radio de secours: UHF R/ U — VHF V (crossed) — ELBA E

SURVIVAL EQUIPMENT/Equipement de survie: → S — POLAR / Polaire P — DESERT / Desert D (crossed) — MARITIME / Maritime M (crossed) — JUNGLE / Gungle J
JACKETS/Gilets de sauvetage: → J — LIGHT / Lampes L — FLUORES / Fluores F (crossed) — UHF U — VHF V (crossed)

DINGHIES/Canots
NUMBER / Nombre: → D 018 — CAPACITY / Capacite: 215 — COVER / Couverture: C — COLOUR / Couleur: YELLOW <<≡

AIRCRAFT COLOUR AND MARKINGS / Couleur et marques de l'aeronef: A/ WHITE

REMARKS / Remarques: → N/ <<≡

PILOT-IN-COMMAND / Pilote commandant de bord: → C/ KHEDR) <<≡

FILED BY/Depose par

Signature of Pilot-in command or designated representative

SPACE RESERVED FOR ADDITIONAL REQUIREMENTS

b. Spelling corrections

Two spelling corrections should be made:

- The phrase “02:34:25 Attendant: "on behalf of Captain Kheder" should read “02:34:25 Attendant: "on behalf of Captain Khedr"
- The phrase “advice ready for departure" should read " advise ready for departure "

Exhibit D Airplane Performance Group Factual Report
Radar Spec formatted.doc (to complement the item C.2 Radar Data, General specification)

ASR 12 Radar (Aircraft Surveillance Radar)

Secondary 250 nm
Primary 60 nm
15 Revolution Per minutes approximately (Scan time = 4.13 sec)

<u>Field</u>	<u>Valid Field Variables</u>	<u>Data Field Description</u>
1	A-Z, 0-9	Aircraft flight identifier or callsign
2	#, *, +, or blank	Special processing indicator: # = track is inhibited from CA processing, either with another specified track or with all other tracks * = track is inhibited from MSAW processing + = track is inhibited from both CA and MSAW processing blank = track is subject to both CA and MSAW processing
3	H, M, or L	Aircraft wake indicator: H = heavy M = medium L = light
4	000-999 or ••••	Cleared level: NNN= assigned altitude in hundreds of feet •••• = altitude unavailable or less than sea level
5	T, ↑, ↓, or blank	Cleared level qualifier: T = temporary altitude ↑ = vertical movement of track - climbing ↓ = vertical movement of track - descending blank= permanent cleared level

6	000-999 or ••••	Reported altitude: NNN = reported altitude in hundreds of feet 999 = altitude greater than 99,900 feet •••• = altitude unavailable, altitude less than sea level or altitude has not been updated for approximately 15 seconds
7	a, C, E, e, N, n, or blank	Altitude transition indicator: a = indicates altitude source is mode C, aircraft is below adapted transition level and altitude is in hundreds of feet above mean sea level C = indicates altitude source is mode C, aircraft is above adapted transition level and altitude is in flight levels E = indicates altitude source is manually entered, aircraft is above adapted transition level and altitude is in flight levels e = indicates altitude source is manually entered, aircraft is below adapted transition level and altitude is in hundreds of feet above mean sea level

Field	Valid Field Variables	Data Field Description
7 (Cont.)	a, C, E, e, N, n, or blank	Altitude transition indicator: N = indicates mode C altitude has not been updated for approximately 7.5 seconds and is considered unreliable, aircraft is above adapted transition level and altitude is in flight levels n = indicates mode C altitude has not been updated for approximately 7.5 seconds and is considered unreliable, aircraft is below adapted transition level and altitude is in hundreds of feet above mean sea level blank= no data is available or altitude data has not been manually entered
8	0000-7777 (octal)	Reported code
9	0000-9999	Track ground speed in knots
10	0000-7777 (octal)	Assigned code
11	A-Z, 0-9	Aircraft type (field is blank for manually created sim tracks)
12	A-Z, 0-9	Destination aerodrome or last adapted point on flight plan route (XXXX)
13	A-Z, 0-9	Scratch pad note entered by controlling operator (XXXXXX)