

NTSB ERA14FA045, Attachment 1 to Digital Engine Controls Specialist's Factual Report

Operator: Aero JL SA de CV

Registration: XA-USD

Source of data: Honeywell Report of engine 1 (left) and engine 2 (right) Digital Electronic Engine Control (DEEC)

Date of Event: 11/19/2013

Location: Ft Lauderdale, Florida

Download and Analysis of Two N1
Digital Electronic Engine Controls
from
Ft Lauderdale, Florida
Learjet Model 35A Accident Aircraft
Registration XA-USD

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Approved by: _____
Jim Allen
Product Integrity

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1. INTRODUCTION AND SUMMARY

PURPOSE

This report presents the findings of the investigation of two N1 Digital Electronic Engine Controls (N1 DEECs) at the Honeywell Aerospace facility in Tucson, Arizona on December 19th, 2013.

The investigation was conducted at the request of the National Transportation Safety Board (NTSB). The examination was performed under the supervision of the Scottsdale Flight Standards District Office (FSDO).

BACKGROUND

The N1 DEEC's, S/N's 45-CF0149 and 45-CF0152 were installed on two TFE731-2-2B engines, serial numbers P74717 (LH) and P74715 (RH) (see note 1 below), of a Bombardier Learjet 35A aircraft, Registration Number XA-USD, Serial Number 35A-255, which crashed into the Atlantic Ocean near Ft. Lauderdale, FL, on November 19, 2013. The aircraft was destroyed and the four persons on board were fatally injured. The aircraft had departed Ft. Lauderdale International Airport bound for Cozumel, Mexico.

SUMMARY

The download of the incident recorder data from both N1 DEECs was completed successfully. Analysis of the data indicated that both engines were rotating, operating, and responding to power lever inputs. During a time period of 35 seconds, N1 rolled back, uncommanded, from a value of 90%- 95% down to a value of 60%-65% and returned to 80-85%. During this 35 seconds of time, PLA did not move. Both the left and right engines were operating at an N1 RPM of between 85-95% for the last 60 seconds of the flight along with an N2 RPM of between 90-101.5% for the same time period all the way to impact.

¹ For the purpose of this background information, the identification and assignment of N1 DEECs to the appropriate left and right engine is based on records and information provided by the NTSB.

2. FINDINGS OF DEEC, SERIAL NUMBER 45–CF0149, FROM ENGINE SERIAL NUMBER P74717, LEFT NACELLE

2.1. GENERAL

- (a) The DEEC circuit card was delivered in a brown cardboard box. (Figure 1 and Figure 2)
- (b) The DEEC circuit card was packaged with Styrofoam “peanuts”. (Figure 3)
- (c) The DEEC circuit card was enclosed in a non–ESD (Electro Static Discharge) protective plastic bag. (Figure 4)
- (d) Water was present within the non–ESD plastic bag. (Figure 5)
- (e) The DEEC circuit card was wrapped in two layers of non–ESD plastic bubble wrap. (Figure 6)
- (f) The DEEC circuit card was partially wrapped in an ESD bag with the open end taped closed with non–ESD adhesive tape. (Figure 7)
- (g) The DEEC circuit card was wrapped with several layers of a wet, cloth material. (Figure 8)
- (h) The DEEC housing was not returned with the DEEC circuit card.
- (i) The DEEC circuit card was marked with the text “NTSB #A” (Figure 9 and Figure 10, denoted with red arrow)
- (j) As instructed by the NTSB, this identifier indicates this circuit card is associated with the DEEC S/N 45–CF0149. (Appendix Q)
- (k) The data tab on the circuit board from DEEC S/N 45–CF0149 contained the following information: (Figure 11)
 - 64547 ASSY C/L
 - 4243294–15 BA
 - B52003–1–0518
- (l) Caps were not present over the sensor inlet ports. (Figure 10, black arrows)
- (m) The dataplate identified the unit as part number 2119020–4004 and serial number 45–CF0149. The series number was unreadable from the images provided. (Figure 12)
- (n) The DEEC circuit card was carefully rinsed with de–ionized fresh water. (Figure 13)
- (o) After the de–ionized water rinse, the DEEC circuit card was subjected to a Zestron 15% alkaline cleaning process. (Figure 14 and Figure 15)
- (p) The DEEC circuit card was placed in an oven for drying (Figure 16, Figure 17, and Figure 18). The drying cycle consisted of 164 hours at 40 Deg Celsius.
- (q) After the drying cycle was complete on December 16, 2013 the circuit board was removed from the oven and allowed to cool to room temperature. The board was then placed in protective packaging for transportation to Honeywell’s Tucson facility for extraction of the data.

2.2. DOWNLOAD OF INCIDENT RECORDER DATA

- (a) The circuit card was transported and received in an ESD, hard case container. ([Figure 31](#))
- (b) The circuit cards from both engine N1 DEECs were individually packaged in ESD bags, protected with ESD sensitive bubble wrap, and individually labeled. ([Figure 32](#) and [Figure 33](#))
- (c) Due to the units having been under water for 2 weeks, exposed to salt water and the potential for corrosion, the team decided not to power up the unit to download the Engine Condition Trend Monitoring (ECTM) and incident recorder data. The team decided that the best course of action would be to remove the NVM IC chip from the circuit card and make a duplicate copy of it (clone it) for use in a slave N1 DEEC unit.
- (d) To facilitate removing the NVM IC chip, the conformal protective coating was removed around the chip by heating the board and applying a solvent.
- (e) The NVM IC chip was de-soldered from the circuit board. ([Figure 34](#) and [Figure 35](#))
- (f) The original NVM chip was labeled with "CF0149 MASTER". ([Figure 36](#))
- (g) The NVM chip was installed in a Data IO Programmer 3980 to copy the data from the chip to a personal computer (PC) ([Figure 37](#) and [Figure 38](#))
- (h) The download was performed successfully.
- (i) The data was then copied from the PC onto a slave NVM IC chip to be used for download. ([Figure 39](#))
- (j) The slave NVM IC chip was then installed into a slave DEEC to download the ECTM file which contains the incident recorder data. ([Figure 40](#))
- (k) The ECTM file was then downloaded using the Production Test Bench. ([Figure 41](#))
- (l) The data was copied onto floppy disks at the production test bench and later used for analysis. ([Figure 42](#))

2.3. DOWNLOAD OF FAULT HISTORY DATA

- (a) In addition to the incident recorder data, the N1 DEEC also records fault information associated with the operation of the unit and of the engine. The following faults were recorded by the N1 DEEC associated with its operation of the engine during the accident flight (See also [Appendix M](#)):
 - a. Time 6534:48:21.8: Fault 38 - TT2 Short Circuit, TT2 < 190 ohms
 - b. Time 6534:48:21.7: Fault 211 - Fuel Control PLA Circuit Failure

- c. Time 6534:48:21.6: Fault 26 - ITT thermocouple circuit open, circuit fail, Defaults to 260 C
- d. Time 6534:48:21.6: Fault 237 - NOTICE ECTM Data buffers filled, Download required to prevent data loss.
- e. Time 6534:48:21.6: Fault 237 - NOTICE ECTM Data buffers filled, Download required to prevent data loss.
- f. Time 6534:47:21.9: Fault 237 - NOTICE ECTM Data buffers filled, Download required to prevent data loss.
- g. Time 6534:47:21.8: Fault 43 - Total Pressure rate change fail, (PT2) > 10 Psia per second

[Appendix K](#) details the faults in a chronological order as recorded by the left engine N1 DEEC.

3. FINDINGS OF DEEC, SERIAL NUMBER 45-CF0152, FROM ENGINE SERIAL NUMBER P71715, RIGHT NACELLE

3.1. GENERAL

- (a) The DEEC circuit card was delivered in a brown cardboard box. ([Figure 19](#) and [Figure 20](#))
- (b) The DEEC circuit card was packaged with Styrofoam “peanuts”. ([Figure 21](#))
- (c) The DEEC circuit card was enclosed in a non-ESD (Electro Static Discharge) protective plastic bag. ([Figure 22](#))
- (d) Water was present within the non-ESD plastic bag. ([Figure 22](#))
- (e) The DEEC circuit card was wrapped in two layers of non-ESD plastic bubble wrap. ([Figure 23](#))
- (f) The DEEC circuit card was partially wrapped in an ESD bag with the open end taped closed with non-ESD adhesive tape. ([Figure 24](#))
- (g) The DEEC circuit card was wrapped with several layers of a wet, cloth material. ([Figure 25](#))
- (h) The DEEC housing was not returned with the DEEC circuit card.
- (i) The DEEC circuit card was marked with the text “NTSB #B” ([Figure 26](#) and [Figure 27](#), denoted with red arrow)
- (j) As instructed by the NTSB, this identifier indicates this circuit card is associated with the DEEC S/N 45-CF0152. ([Appendix Q](#))
- (k) The data tab on the circuit board from DEEC S/N 45-CF0149 contained the following information: ([Figure 28](#))
 - 64547 ASSY C/L
 - 4243294-15 BA
 - B52001-1-0518
- (l) Caps were not present over the sensor inlet ports. ([Figure 27](#), black arrows)

- (m) The dataplate identified the unit as part number 2119020–4004, Series 5, and serial number 45–CF0152. (Figure 29)
- (n) The DEEC circuit card was carefully rinsed with de-ionized fresh water. (Figure 30)
- (o) After the de-ionized water rinse, the DEEC circuit card was subjected to a Zestron 15% alkaline cleaning process. (Figure 14 and Figure 15)
- (p) The DEEC circuit card was placed in an oven for drying (Figure 16, Figure 17, and Figure 18). The drying cycle consisted of 164 hours at 40 Deg Celsius.
- (q) After the drying cycle was complete on December 16, 2013 the circuit board was removed from the oven and allowed to cool to room temperature. The board was then placed in protective packaging for transportation to Honeywell’s Tucson facility for extraction of the data.

3.2. DOWNLOAD OF INCIDENT RECORDER DATA

- (a) The circuit card was transported and received in an ESD, hard case container. (Figure 31)
- (b) The circuit cards from both engine N1 DEECs were individually packaged in ESD bags, protected with ESD sensitive bubble wrap, and individually labeled. (Figure 32 and Figure 33)
- (c) Due to the units having been under water for 2 weeks, exposed to salt water and the potential for corrosion, the team decided not to power up the unit in order to download the Engine Condition Trend Monitoring (ECTM) and incident recorder data. The team decided that the best course of action would be to remove the NVM IC chip from the circuit card and make a duplicate copy of it (clone it) for use in a slave N1 DEEC unit.
- (d) To facilitate removing the NVM IC chip, the conformal protective coating was removed around the chip by heating the board and applying a solvent.
- (e) The NVM IC chip was de-soldered from the circuit board. (Figure 43 and Figure 44)
- (f) The original NVM chip was labeled with “CF0152 MASTER”. (Figure 36)
- (g) The NVM chip was installed in a Data IO Programmer 3980 to copy the data from the chip to a personal computer (PC) (Figure 38 and Figure 46)
- (h) The download was performed successfully.
- (i) The data was then copied from the PC onto a slave NVM IC chip to be used for download. (Figure 47)
- (j) The slave NVM IC chip was then installed into a slave DEEC to download the ECTM file which contains the incident recorder data. (Figure 40)
- (k) The ECTM file was then downloaded using the Production Test Bench. (Figure 41)

- (l) The data was copied onto floppy disks at the production test bench and later used for analysis. ([Figure 42](#))

3.3. DOWNLOAD OF FAULT HISTORY DATA

- (b) In addition to the incident recorder data, the N1 DEEC also records fault information associated with the operation of the unit and of the engine. The following faults were recorded by the N1 DEEC associated with its operation of the engine during the accident flight (See also [Appendix N](#)):
 - a. Time 6564:29:58.2: Fault 237 - NOTICE ECTM Data buffers filled, Download Required to prevent data loss.
 - b. Time 6564:29:57.4: Fault 38 - TT2 Short Circuit, (TT2 < 190 ohms)
 - c. Time 6564:29:57.3: Fault 211 - Fuel Control PLA Circuit Failure
 - d. Time 6564:29:57.2: Fault 26 - ITT thermocouple circuit open circuit fail, Defaults to 260 C

[Appendix L](#) details the faults in a chronological order as recorded by the right engine N1 DEEC.

4. ANALYSIS AND CONCLUSIONS

4.1. ANALYSIS

The PN 2119020–4004 DEECs include an incident recorder which collects engine and aircraft operational data and records it into Non-Volatile Memory (NVM) for post accident/incident download and analysis. The purpose of this recorder is to provide a record of engine speeds and inter-turbine temperatures, aircraft parameters relating to the engine, and control modes during operation. It should be noted that the DEEC casing is not designed to be crash worthy, and memory data could be lost for a variety of reasons including, but not limited to, impact and fire damage.

The incident recorder collects data into ten memory buffers for the last 85 minutes, 20 seconds of engine ground and/or flight time while the DEEC is powered. The recorder will automatically power off approximately five minutes after weight-on-wheels (WOW) is established. This feature prevents the DEEC from accidentally overwriting the data in memory if aircraft power remains on after the engines have been shut down.

The incident recorder stores the following parameters in NVM:

N1 (Low Pressure spool % speed)	N2 (High Pressure spool % speed)
ITT (inter-turbine temperature)	WOW (weight-on-wheels)
Mach	PLA (power lever angle)
ALT (pressure altitude)	TR (thrust reverser deploy)
Control Mode (auto / manual)	Time Stamp

The data set stored in the first memory buffer is recorded once per second for the last 512 seconds (8 minutes, 32 seconds) prior to power down. For data sets recorded beyond 512 seconds, individual scans are stored in nine additional buffers with decreasing frequency. As data points roll into the downstream buffers, data points are dropped. For example, the data points in the second buffer are two seconds apart and the data points in the third buffer are 4 seconds apart, and so on. The recorder scan frequency is shown in [Appendix A](#).

The data is recorded in data “buckets” to minimize the space required for data storage. With this recording methodology, the actual discreet data parameter is not physically recorded to memory. A digital bit value that corresponds to a data parameter range is recorded to memory whenever a parameter is within a given range. Bucket values and resolutions are shown in [Appendix B](#).

To facilitate the plotting of data into a chart format, bucket value ranges are rolled to a single value reflected as a nominal value for each range, for

example a bucket value range of 30% to 40% speed will be shown on a graphical chart as 35% speed. This results in transient data being displayed in a “stair-step” fashion, and not the smooth transient change that actually occurs during operation. Some of the parameters have finer bucket ranges than others, giving some parameters greater resolution than other parameters.

It should be noted that, for this particular version of the N1 DEEC, the values for weight on wheels (WOW), mach number, and thrust reverser (TR) deployment are internally calculated values based on N1 speed, total pressure (PT2), and static pressure. WOW, Mach, and TR Deploy are not directly obtained aircraft signals. This should be taken into consideration when analyzing and viewing the incident data in this report.

4.1.1. INCIDENT RECORDER RAW DATA DOWNLOAD

The incident recorder data from the accident flight was downloaded from a slave copy NVM chip installed in a slave N1 DEEC. The raw data for all recorded parameters for the last 5120 seconds are presented in [Appendix C](#) for the Left Hand engine S/N P-74717 and [Appendix D](#) for the Right Hand engine S/N P-74715. The data is presented in tabular form.

A look at the downloaded data using the Honeywell interface software called “ECTM” identified that the data downloaded from the CF0149 N1 DEEC was associated with engine S/N P-74717 ([Appendix J](#)) while the data downloaded from the CF0152 N1 DEEC was associated with the engine S/N P-74715 ([Appendix I](#)).

4.1.2. INCIDENT RECORDER DATA ANALYSIS

[Appendix H](#) shows a chart of all of the parameter data for the two engines for the entire span of the NVM data, 5120 seconds, as it was downloaded from the NVM chips. It was noticed that there were patterns in the N1 data plot with similar shapes that plotted at different times in the data (i.e., indicating a time shift between the left and right engine data). A thorough analysis of the data was required to try and understand the anomaly.

An analysis was performed of the N1 DEEC data file chronology records ([Appendix K](#) and [Appendix L](#)) in order to help explain the timing anomaly between the two engines in the N1 DEEC incident data. A data file chronology record for the left engine (P-74717) is shown in [Appendix K](#) while the same information for the right engine (P-74715) is shown in [Appendix L](#). Several faults were identified with the left engine (P-74717) during the accident flight that are of interest. Two faults in particular help to identify that a power cycle was applied to the N1 DEEC of the left engine during the accident flight. A “Manual Mode Transfer” occurred at

9:22.3 elapsed time. While in manual mode, Fault 237 “ECTM Data buffers filled” was recorded twice. This fault is generated when all of the data buffers become full and the system is going to start overwriting older data. This is a latched fault message in that it is always recorded at power up if it was valid at the last power down. The fact that two faults were recorded while in manual mode indicates that the N1 DEEC computer’s power was cycled while in manual mode and before returning to auto mode. Based on the 0–512 data that was recorded, and the fact that the right engine N1 DEEC appeared to remain operating throughout the event, it was determined that the left engine N1 DEEC was powered down for approximately 9 seconds while in the manual mode. As such, an adjustment was made to the left engine data, increasing the overall recording by 9 seconds. The adjusted data charts for 0–512 seconds worth of data can be seen in [Appendix O](#) while the 161–373 seconds of data plots can be seen in [Appendix P](#). Around the 164 second time position, the data was seen to be stable. Therefore, the left engine data was lengthened by 9 seconds by duplicating data at the 164 second time point and adding in 9 data points of identical data. The adjusted plots based on the chronology of fault information, indicates better alignment to the data between the left and right engines during the accident flight.

4.1.3. LEFT ENGINE (P-74717) DEEC ANALYSIS

The data from the last 512 seconds of the accident flight is shown in [Appendix O](#) while data between 161 and 373 seconds of data is shown in [Appendix P](#). The data shows the following for the left engine:

- At 270 seconds the following events occur within 1–2 seconds of each other:
 - The N1 DEEC computer senses an N1 error in commanded speed to be less than –100 rpm, indicating the engine is slowing, unexpectedly, below the commanded value.
 - The N1 DEEC computer trips to manual mode.
 - N1 begins an abrupt rollback, eventually declining to a value between 60% and 65%.
 - The Mach value transitions below 0.15 and, as a consequence, the calculated weight on wheels (WOW) transitions from “in air” to “on ground”.
- The N1 rollback lasts for approximately 35 seconds and eventually returns to a value of 80% to 85%.
- During the N1 rollback, there is no indication of movement of the power lever angle (PLA).
- Other than the 35 seconds of N1 rollback, the engine was responding to Power Lever (PLA) movements.

- N2 is unchanged throughout the N1 rollback as well as the rest of the flight.
- The PT2 rate limit exceedance fault, the N1 speed reduction, and the N1 DEEC dropping to manual mode all occur at approximately the same moment in the accident.

4.1.4. RIGHT ENGINE DEEC ANALYSIS

The data from the last 512 seconds of the accident flight is shown in [Appendix O](#) while data between 161 and 373 seconds of data is shown in [Appendix P](#). The data shows the following for the right engine:

- The engine was operating and responding to Power Lever (PLA) movements.
- Altitude was indicated in the 2000 to 4000 ft parameter bucket starting at 247 seconds before impact and lasted for only 8 seconds before returning to an indicated altitude of less than 2000 feet.

4.2. CONCLUSIONS

The download of the incident recorder data from both N1 DEECs was completed successfully. Analysis of the data indicated that both engines were rotating, operating, and responding to power lever inputs. During a time period of 35 seconds, N1 rolled back, uncommanded, from a value of 90%–95% down to a value of 60%–65% and returned to 80–85%. During this 35 seconds of time, PLA did not move. Both the left and right engines were operating at an N1 RPM of between 85–95% for the last 60 seconds of the flight along with an N2 RPM of between 90–101.5% for the same time period all the way to impact.



Figure 1. 45-CF0149 DEEC Circuit Card Shipping Box as Received



Figure 2. 45-CF0149 DEEC Circuit Card Shipping Box as Received



Figure 3. 45-CF0149 DEEC Circuit Card Packaging Materials as Received



Figure 4. 45-CF0149 DEEC Circuit Card Packaging Materials as Received

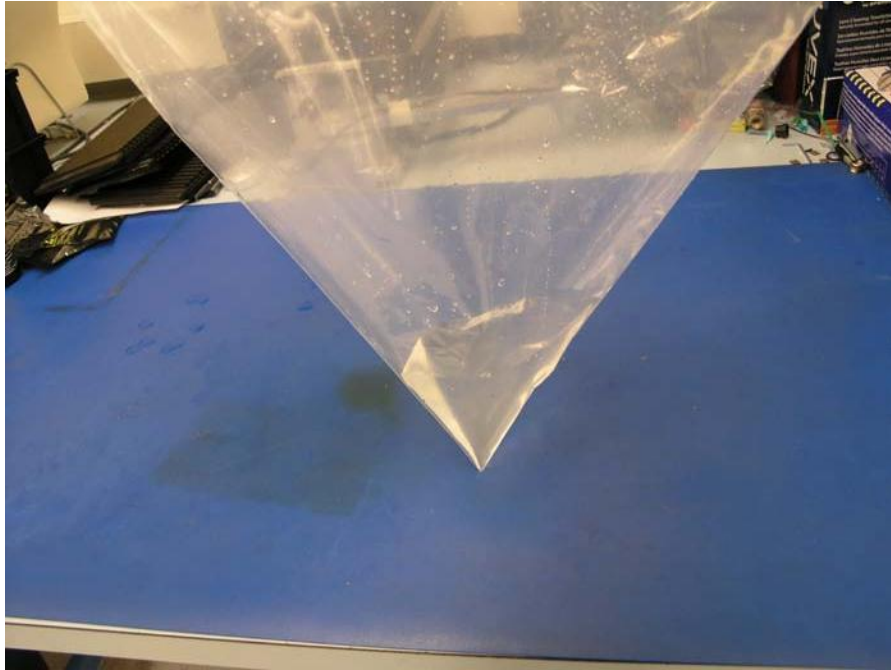


Figure 5. 45-CF0149 DEEC Circuit Card Packaging as Received



Figure 6. 45-CF0149 DEEC Circuit Card Bubble Wrap Packaging as Received



Figure 7. 45-CF0149 DEEC Circuit Card Packaging as Received

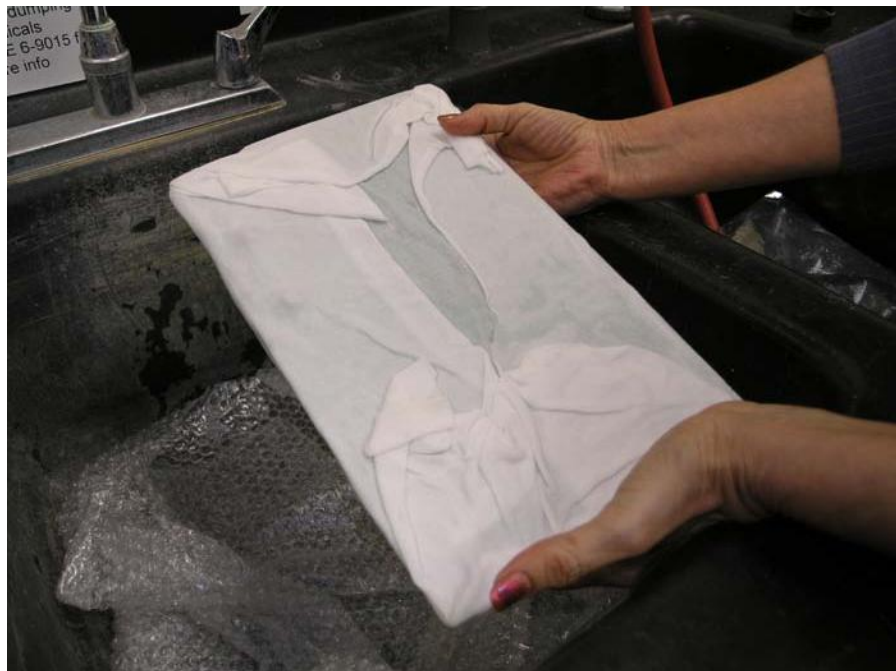


Figure 8. 45-CF0149 DEEC Circuit Card Packaging as Received



Figure 9. 45-CF0149 DEEC Circuit Card



Figure 10. 45-CF0149 DEEC Circuit Card



Figure 11. 45-CF0149 DEEC Circuit Card ID Plate



Figure 12. 45-CF0149 DEEC Data Plate (Photo Supplied by the NTSB)



Figure 13. 45-CF0149 DEEC Circuit Card Being Rinsed with De-Ionized Fresh Water



Figure 14. 45-CF0149 DEEC Circuit Card Undergoing Zestron Cleaning Process

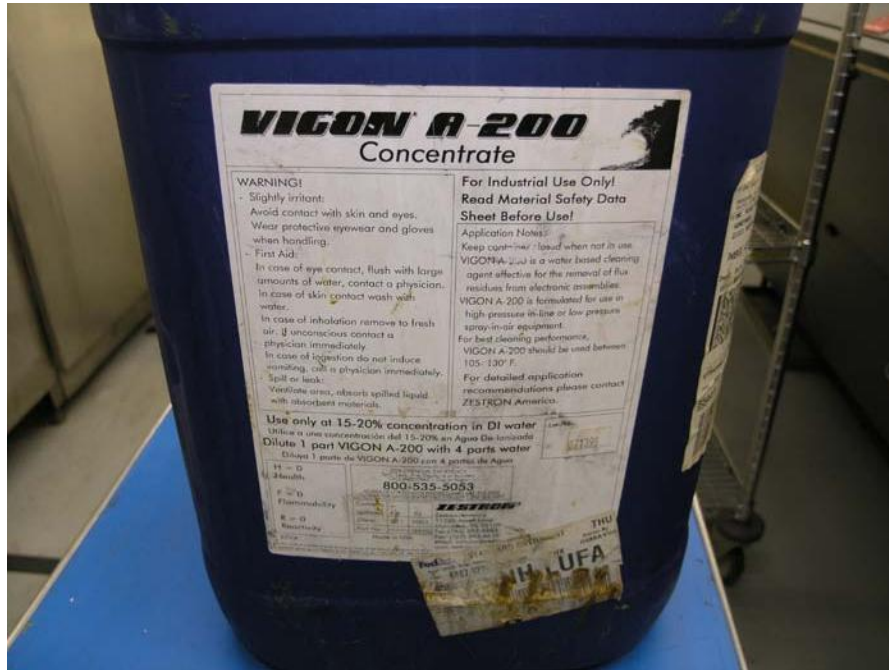


Figure 15. Vigon A-200 Used in the Cleaning Process



Figure 16. DEEC Circuit Cards in Drying Oven



Figure 17. Oven Used for Drying DEEC Circuit Cards



Figure 18. Oven Used for Drying DEEC Circuit Cards



Figure 19. 45-CF0152 DEEC Circuit Card Shipping Box as Received



Figure 20. 45-CF0152 DEEC Circuit Card Shipping Box as Received



Figure 21. 45-CF0152 DEEC Circuit Card Packaging Materials as Received



Figure 22. 45-CF0152 DEEC Circuit Card Packaging Materials as Received



Figure 23. 45-CF0152 DEEC Circuit Card Bubble Wrap Packaging as Received

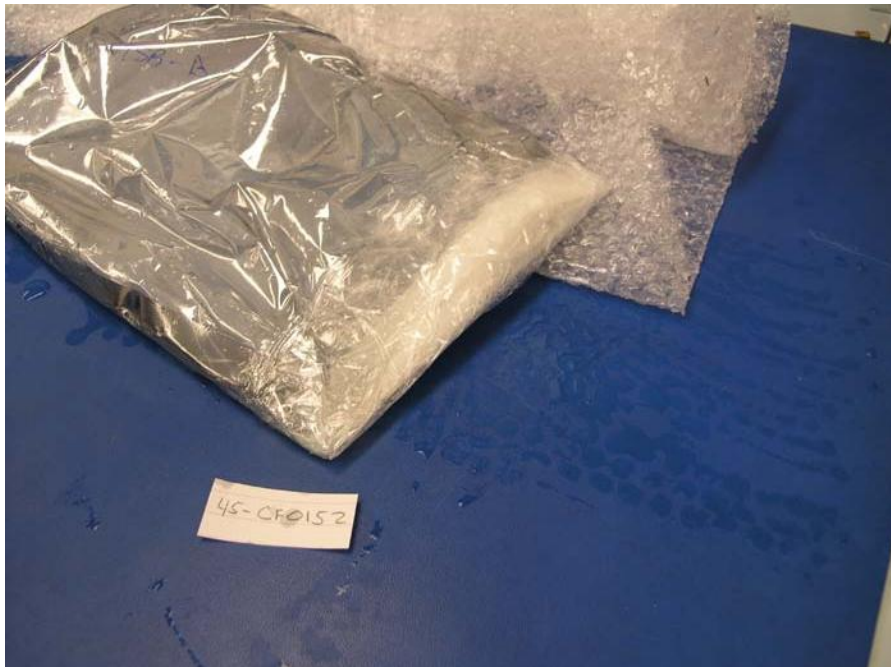


Figure 24. 45-CF0152 DEEC Circuit Card Packaging as Received



Figure 25. 45-CF0152 DEEC Circuit Card Packaging as Received



Figure 26. 45-CF0152 DEEC Circuit Card



Figure 27. 45-CF0152 DEEC Circuit Card



Figure 28. 45-CF0152 DEEC Circuit Card ID Plate



Figure 29. 45-CF0152 DEEC Data Plate (Photo Supplied by the NTSB)



Figure 30. 45-CF0152 DEEC Circuit Card Being Rinsed with De-ionized Fresh Water



Figure 31. N1 DEEC Transportation Container as Received in Tucson



Figure 32. N1 DEEC Circuit Cards as Received in Tucson



Figure 33. N1 DEEC Circuit Cards as Received in Tucson



Figure 34. CF0149 (Left Engine) N1 DEEC Circuit Card and NVM Chip



Figure 35. CF0149 (Left Engine) N1 DEEC NVM Chip After Removal



Figure 36. CF0149 NVM Chip Labeled After Removal From Circuit Card

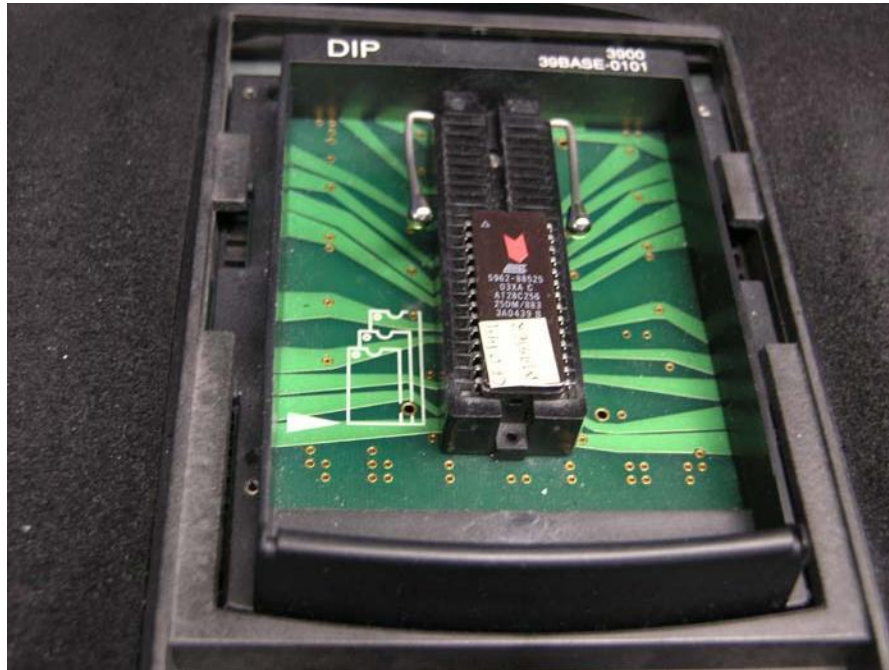


Figure 37. NVM Chip Installed in Data IO Programmer for Copy

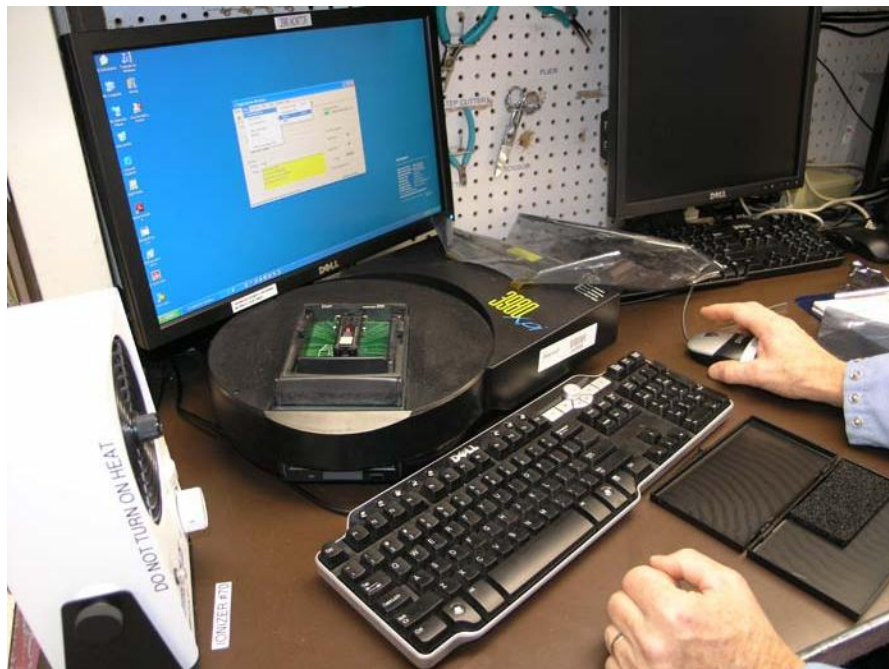


Figure 38. NVM Chip Installed in Data IO Programmer for Copy



Figure 39. NVM Chip Data CF0149 Copied to a Clone IC



Figure 40. CF0149 Clone NVM Chip Installed into Slave N1 DEEC



Figure 41. Slave N1 DEEC Being Downloaded

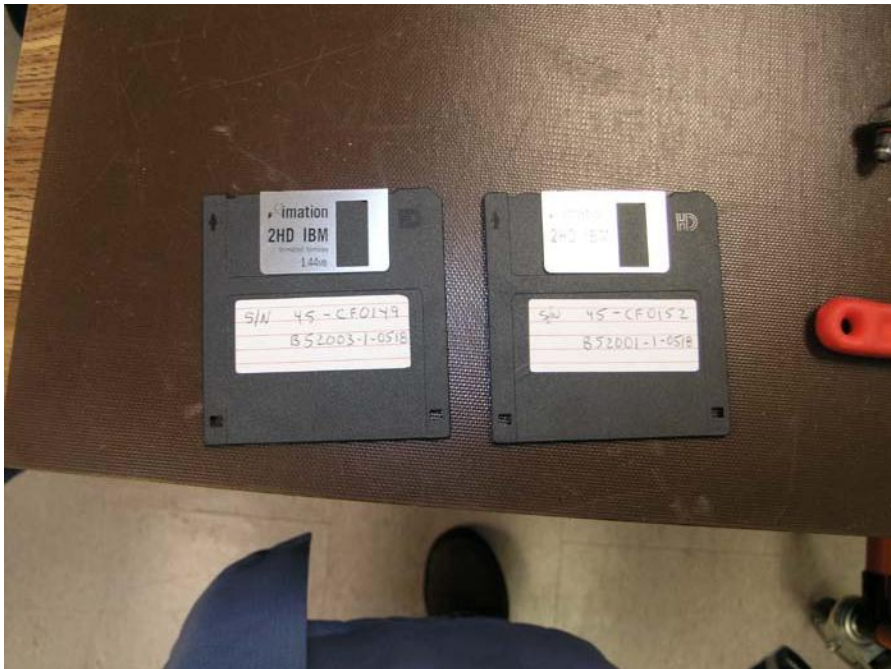


Figure 42. Floppy Disks Containing Downloaded Data



Figure 43. CF0152 (Right Engine) N1 DEEC Circuit Card and NVM Chip

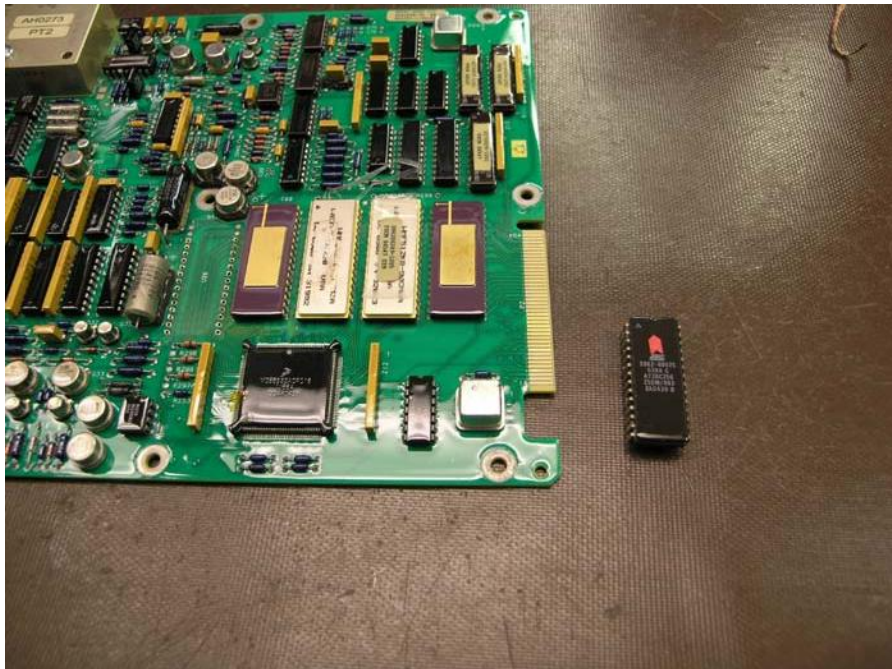


Figure 44. CF0152 (Right Engine) N1 DEEC NVM Chip After Removal



Figure 45. CF0152 NVM Chip Labeled After Removal From Circuit Card



Figure 46. CF0152 MASTER NVM Chip Installed in Data IO Programmer

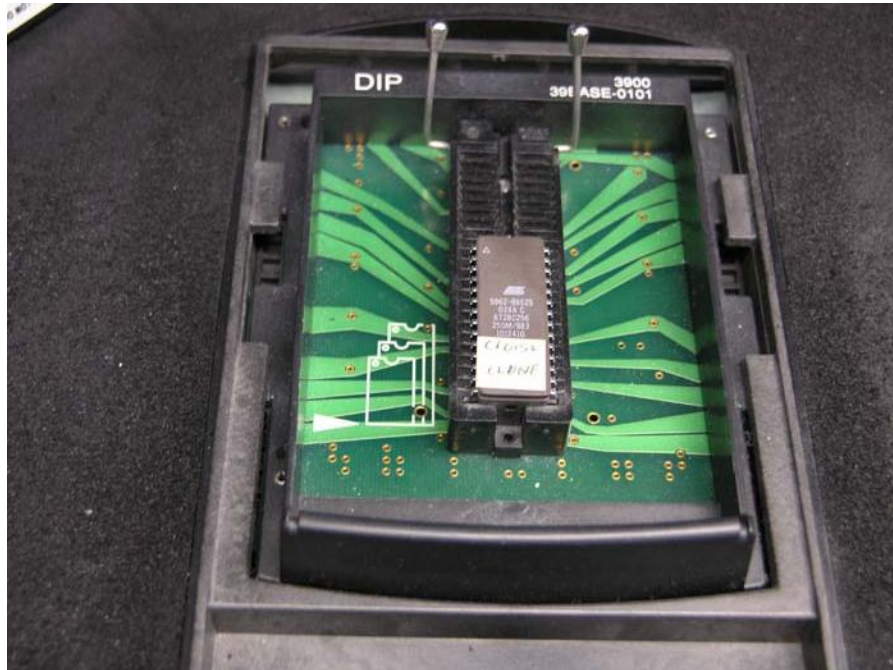


Figure 47. CF0152 Data Copied to Clone IC

Appendix A

N1 DEEC Incident Recorder Scan Frequencies

(1 page)

<u>Data buffer</u>	<u>Data Record Frequency</u>	<u>Total Accumulated Time</u>
(1)	Every 1 second	Last 8 minutes 32 seconds
(2)	Every 2 seconds	to 17 minutes 4 seconds
(3)	Every 4 seconds	to 25 minutes 32 seconds
(4)	Every 8 seconds	to 34 minutes 8 seconds
(5)	Every 16 seconds	to 42 minutes 40 seconds
(6)	Every 32 seconds	to 51 minutes 12 seconds
(7)	Every 64 seconds	to 59 minutes 44 seconds
(8)	Every 128 seconds	to 68 minutes 16 seconds
(9)	Every 256 seconds	to 76 minutes 48 seconds
(10)	Every 512 seconds	to 85 minutes 20 seconds

[Appendix B](#)
Incident Recorder Parameter Bin Resolution
(2 pages)

<u>Parameter</u>	<u>Meaning of Value</u>
PLA	No valid data $PLA < 26$ $26 \leq PLA < 40$ $40 \leq PLA < 60$ $60 \leq PLA < 95$ $95 \leq PLA < 105$ $105 \leq PLA < 117$ $PLA \geq 117$
N1_PCT	N1 signal failed $N1_PCT < 20\%$ $20\% \leq N1_PCT < 30\%$ $30\% \leq N1_PCT < 40\%$ $40\% \leq N1_PCT < 50\%$ $50\% \leq N1_PCT < 55\%$ $55\% \leq N1_PCT < 60\%$ $60\% \leq N1_PCT < 65\%$ $65\% \leq N1_PCT < 70\%$ $70\% \leq N1_PCT < 75\%$ $75\% \leq N1_PCT < 80\%$ $80\% \leq N1_PCT < 85\%$ $85\% \leq N1_PCT < 90\%$ $90\% \leq N1_PCT < 95\%$ $95\% \leq N1_PCT < 101\%$ $N1_PCT \geq 101\%$
N2_PCT	N2 signal failed $N2_PCT < 50\%$ $50\% \leq N2_PCT < 60\%$ $60\% \leq N2_PCT < 70\%$ $70\% \leq N2_PCT < 80\%$ $80\% \leq N2_PCT < 90\%$ $90\% \leq N2_PCT < 101.5\%$ $N2_PCT \geq 101.5\%$
ITT	ITT signal failed $ITT < 400$ $400 \leq ITT < (ITT_MAX - 300)$ $(ITT_MAX - 300) \leq ITT < (ITT_MAX - 200)$ $(ITT_MAX - 200) \leq ITT < (ITT_MAX - 100)$ $(ITT_MAX - 100) \leq ITT < (ITT_MAX - 50)$ $(ITT_MAX - 50) \leq ITT < (ITT_MAX + 10)$ $ITT \geq (ITT_MAX + 10)$

<u>Parameter</u>	<u>Meaning of Value</u>
COMPUTER MODE	MANUAL_MODE = 1 MANUAL_MODE = 0 and ABS(N1_ERR) <=100 rpm MANUAL_MODE = 0 and N1_ERR > +100 rpm MANUAL_MODE = 0 and N1_ERR < -100 rpm
WOW	WOW = 1 (ground operation) WOW = 0 (flight operation)
MACH	< 0.15 MACH $0.15 \leq \text{MACH} < 0.3$ $0.3 \leq \text{MACH} < 0.5$ $\text{MACH} \geq 0.5$
ALTITUDE	ALT < 2000 ft $2000 \leq \text{ALT} < 4000$ ft $4000 \leq \text{ALT} < 6000$ ft $6000 \leq \text{ALT} < 9000$ ft $9000 \leq \text{ALT} < 12000$ ft $12000 \leq \text{ALT} < 15000$ ft $15000 \leq \text{ALT} < 25000$ ft ALT ≥ 25000 ft
TR DEPLOYED	TR_DEPLOYED = 0 TR_DEPLOYED = 1

Appendix C

Incident Recorder Raw Data, Left Engine, Full Download,
1 through 5120 Seconds

(22 pages)

AirEvac ← Owner/Operator
 Learjet 35A ← Make/Model
 XA-USD ← Registration Number
 Ft Lauderdale, FL ← Location
 November 19, 2013 ← Date

P74717 Eng 1: Left Engine S/N

Time Step (sec)	Time (sec)	Time (Min)	RAW Data	N1 (rpm)	N2 (rpm)	ITT ©	WOW	Mach	PLA (deg)	Altitude (ft)	Thrust Reversor	Computer Mode	Pointer
0	1	0.017	a420d765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	Mach<0.15	95≤PLA<105	<2000	deployed	n1error > 100	0
1	2	0.033	a420d765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	Mach<0.15	95≤PLA<105	<2000	deployed	n1error > 100	0
1	3	0.050	c721b365	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	4	0.067	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	5	0.083	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	6	0.100	e301b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	7	0.117	e301b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	8	0.133	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	9	0.150	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	10	0.167	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	11	0.183	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	12	0.200	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	13	0.217	c321b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	0
1	14	0.233	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	15	0.250	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	16	0.267	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	17	0.283	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	18	0.300	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
-	--	0.317	-----	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	20	0.333	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	21	0.350	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	22	0.367	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	23	0.383	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	24	0.400	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	25	0.417	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	26	0.433	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	27	0.450	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	28	0.467	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	29	0.483	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	30	0.500	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	31	0.517	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	32	0.533	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	33	0.550	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	34	0.567	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	35	0.583	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	36	0.600	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	37	0.617	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	38	0.633	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0
1	39	0.650	63013765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	0

8	1984	33.067	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	1992	33.200	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2000	33.333	040a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
8	2008	33.467	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2016	33.600	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2024	33.733	8c8a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2032	33.867	8c8a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2040	34.000	8c8a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2048	34.133	8c8a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
16	2064	34.400	0c0a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2080	34.667	0c0a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2096	34.933	fc0a2ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2112	35.200	fc0a2ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2128	35.467	fc0a2ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2144	35.733	180a2ab4	55≤N1<60	80≤N2<90	400-(mx-300)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2160	36.000	180a2ab4	55≤N1<60	80≤N2<90	400-(mx-300)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2176	36.267	0c0a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2192	36.533	0c0a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2208	36.800	a10a2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2224	37.067	a10a2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2240	37.333	a10a2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2256	37.600	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2272	37.867	080e2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2288	38.133	c00e6ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	6000≤Palt<9000	stowed	n1error < -100	0
16	2304	38.400	080e2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2320	38.667	c80e6ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	6000≤Palt<9000	stowed	n1error < -100	0
16	2336	38.933	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2352	39.200	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2368	39.467	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2384	39.733	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2400	40.000	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2416	40.267	9d0e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2432	40.533	150e2ab3	55≤N1<60	80≤N2<90	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2448	40.800	150e2ab3	55≤N1<60	80≤N2<90	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	0
16	2464	41.067	09122abb	60≤N1<65	80≤N2<90	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	0
16	2480	41.333	04122ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	0
16	2496	41.600	8d922eb3	55≤N1<60	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2512	41.867	e2926a22	40≤N1<50	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	7≤PLA<40	9000≤Palt<12000	stowed	n1error < -100	1
16	2528	42.133	19922a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2544	42.400	74922ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2560	42.667	54924ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	n1error > 100	1
32	2592	43.200	67123354	75≤N1<80	90≤N2<101.5	(mx-200)-(mx-100)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	0
32	2624	43.733	6b122f54	75≤N1<80	90≤N2<101.5	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	0
32	2656	44.267	b0122519	30≤N1<40	50≤N2<60	<400	Air	0.3≤Mach<0.5	PLA<7	9000≤Palt<12000	stowed	AM abs(n1error)≤100	0
32	2688	44.800	eb176599	30≤N1<40	60≤N2<70	<400	Air	Mach≥0.5	PLA<7	12000≤Palt<15000	stowed	n1error < -100	0
32	2720	45.333	1f1729a1	40≤N1<50	60≤N2<70	400-(mx-300)	Air	Mach≥0.5	PLA<7	12000≤Palt<15000	stowed	AM abs(n1error)≤100	0
32	2752	45.867	921b2a29	50≤N1<55	70≤N2<80	400-(mx-300)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
32	2784	46.400	fe1b2eb9	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0

32	2816	46.933	fe1b2eb9	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
32	2848	47.467	e41b2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
32	2880	48.000	e41b2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
32	2912	48.533	ec1b2ecb	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
32	2944	49.067	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
32	2976	49.600	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
32	3008	50.133	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
32	3040	50.667	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	3072	51.200	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3136	52.267	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3200	53.333	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3264	54.400	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3328	55.467	d41f32db	80≤N1<85	80≤N2<90	(mx-200)-(mx-100)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3392	56.533	d41f32db	80≤N1<85	80≤N2<90	(mx-200)-(mx-100)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3456	57.600	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3520	58.667	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3584	59.733	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
128	3712	61.867	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
128	3840	64.000	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
128	3968	66.133	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
128	4096	68.267	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
256	4352	72.533	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
256	4608	76.800	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
512	5120	85.333	421f336c	90≤N1<95	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0

Appendix D

Incident Recorder Raw Data, Right Engine, Full
Download, 1 through 5120 Seconds

(22 pages)

AirEvac ← Owner/Operator
 Learjet 35A ← Make/Model
 XA-USD ← Registration Number
 Ft Lauderdale, FL ← Location
 November 19, 2013 ← Date

P74715 Eng 2: Right Engine S/N

Time Step (sec)	Time (sec)	Time (Min)	RAW Data	N1 (rpm)	N2 (rpm)	ITT @	WOW	Mach	PLA (deg)	Altitude (ft)	Thrust Reversor	Computer Mode	Pointer
0	1	0.017	43a1b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	1
1	2	0.033	43a1b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	1
1	3	0.050	43a1b765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Ground	0.15≤Mach<0.3	95≤PLA<105	<2000	deployed	AM abs(n1error)≤100	1
1	4	0.067	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	5	0.083	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	6	0.100	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	7	0.117	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	8	0.133	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	9	0.150	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	10	0.167	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	11	0.183	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	12	0.200	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	13	0.217	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	14	0.233	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	15	0.250	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	16	0.267	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	17	0.283	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	18	0.300	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
-	--	0.317	e3813765	85≤N1<90	-----	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	20	0.333	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	21	0.350	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	22	0.367	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	23	0.383	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	24	0.400	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	25	0.417	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	26	0.433	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	27	0.450	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	28	0.467	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	29	0.483	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	30	0.500	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	31	0.517	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	32	0.533	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	33	0.550	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	34	0.567	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	35	0.583	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	36	0.600	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	37	0.617	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	38	0.633	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1
1	39	0.650	e3813765	85≤N1<90	90≤N2<101.5	(mx-100)-(mx-50)	Air	0.15≤Mach<0.3	95≤PLA<105	<2000	stowed	AM abs(n1error)≤100	1

8	1984	33.067	8c8a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	1992	33.200	8c8a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2000	33.333	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2008	33.467	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2016	33.600	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2024	33.733	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2032	33.867	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2040	34.000	848a2ec4	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	1
8	2048	34.133	0c0a2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	4000≤Palt<6000	stowed	AM abs(n1error)≤100	0
16	2064	34.400	74922ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2080	34.667	689232d4	75≤N1<80	80≤N2<90	(mx-200)-(mx-100)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2096	34.933	689232d4	75≤N1<80	80≤N2<90	(mx-200)-(mx-100)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2112	35.200	689232d4	75≤N1<80	80≤N2<90	(mx-200)-(mx-100)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2128	35.467	64924ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	n1error > 100	1
16	2144	35.733	30922519	30≤N1<40	50≤N2<60	<400	Air	0.3≤Mach<0.5	PLA<7	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2160	36.000	f0926519	30≤N1<40	50≤N2<60	<400	Air	0.3≤Mach<0.5	PLA<7	9000≤Palt<12000	stowed	n1error < -100	1
16	2176	36.267	6f936599	30≤N1<40	60≤N2<70	<400	Air	Mach≥0.5	PLA<7	9000≤Palt<12000	stowed	n1error < -100	1
16	2192	36.533	6b976599	30≤N1<40	60≤N2<70	<400	Air	Mach≥0.5	PLA<7	12000≤Palt<15000	stowed	n1error < -100	1
16	2208	36.800	9f9729a1	40≤N1<50	60≤N2<70	400-(mx-300)	Air	Mach≥0.5	PLA<7	12000≤Palt<15000	stowed	AM abs(n1error)≤100	1
16	2224	37.067	1e972a21	40≤N1<50	70≤N2<80	400-(mx-300)	Air	Mach≥0.5	PLA<7	12000≤Palt<15000	stowed	AM abs(n1error)≤100	1
16	2240	37.333	921b2a29	50≤N1<55	70≤N2<80	400-(mx-300)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
16	2256	37.600	8a1b2a31	55≤N1<60	70≤N2<80	400-(mx-300)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
16	2272	37.867	fe1b2eb9	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
16	2288	38.133	fe1b2eb9	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
16	2304	38.400	fe1b2eb9	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	PLA<7	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
16	2320	38.667	f51b2ec2	65≤N1<70	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	7≤PLA<40	15000≤Palt<25000	stowed	AM abs(n1error)≤100	0
16	2336	38.933	888e2ebc	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2352	39.200	1d8e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2368	39.467	1d8e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2384	39.733	1d8e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2400	40.000	1d8e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2416	40.267	1d8e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2432	40.533	1d8e2a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2448	40.800	958e2ab3	55≤N1<60	80≤N2<90	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2464	41.067	918e2eb3	55≤N1<60	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	40≤PLA<60	6000≤Palt<9000	stowed	AM abs(n1error)≤100	1
16	2480	41.333	85922ebb	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2496	41.600	85922ebb	60≤N1<65	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2512	41.867	8d922eb3	55≤N1<60	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2528	42.133	6b92699a	30≤N1<40	60≤N2<70	400-(mx-300)	Air	0.3≤Mach<0.5	7≤PLA<40	9000≤Palt<12000	stowed	n1error < -100	1
16	2544	42.400	19922a2b	50≤N1<55	70≤N2<80	400-(mx-300)	Air	0.3≤Mach<0.5	40≤PLA<60	9000≤Palt<12000	stowed	AM abs(n1error)≤100	1
16	2560	42.667	b4126ecc	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	0.3≤Mach<0.5	60≤PLA<MX CRS	9000≤Palt<12000	stowed	n1error < -100	0
32	2592	43.200	649b2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	15000≤Palt<25000	stowed	AM abs(n1error)≤100	1
32	2624	43.733	609b32d3	75≤N1<80	80≤N2<90	(mx-200)-(mx-100)	Air	Mach≥0.5	40≤PLA<60	15000≤Palt<25000	stowed	AM abs(n1error)≤100	1
32	2656	44.267	6c9b2ecb	70≤N1<75	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	15000≤Palt<25000	stowed	AM abs(n1error)≤100	1
32	2688	44.800	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2720	45.333	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2752	45.867	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2784	46.400	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1

32	2816	46.933	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2848	47.467	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2880	48.000	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2912	48.533	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2944	49.067	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	2976	49.600	609f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
32	3008	50.133	e01f2ed3	75≤N1<80	80≤N2<90	(mx-300)-(mx-200)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
32	3040	50.667	d41f32db	80≤N1<85	80≤N2<90	(mx-200)-(mx-100)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
32	3072	51.200	d41f32db	80≤N1<85	80≤N2<90	(mx-200)-(mx-100)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	0
64	3136	52.267	549f32db	80≤N1<85	80≤N2<90	(mx-200)-(mx-100)	Air	Mach≥0.5	40≤PLA<60	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3200	53.333	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3264	54.400	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3328	55.467	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3392	56.533	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3456	57.600	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3520	58.667	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
64	3584	59.733	4a1f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	0
128	3712	61.867	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
128	3840	64.000	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
128	3968	66.133	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
128	4096	68.267	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
256	4352	72.533	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
256	4608	76.800	ca9f3364	85≤N1<90	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1
512	5120	85.333	c29f336c	90≤N1<95	90≤N2<101.5	(mx-200)-(mx-100)	Air	Mach≥0.5	60≤PLA<MX CRS	Palt≥25000	stowed	AM abs(n1error)≤100	1

Appendix E

Plots of All Data Parameters, Left and Right Engines, 1-512 Seconds

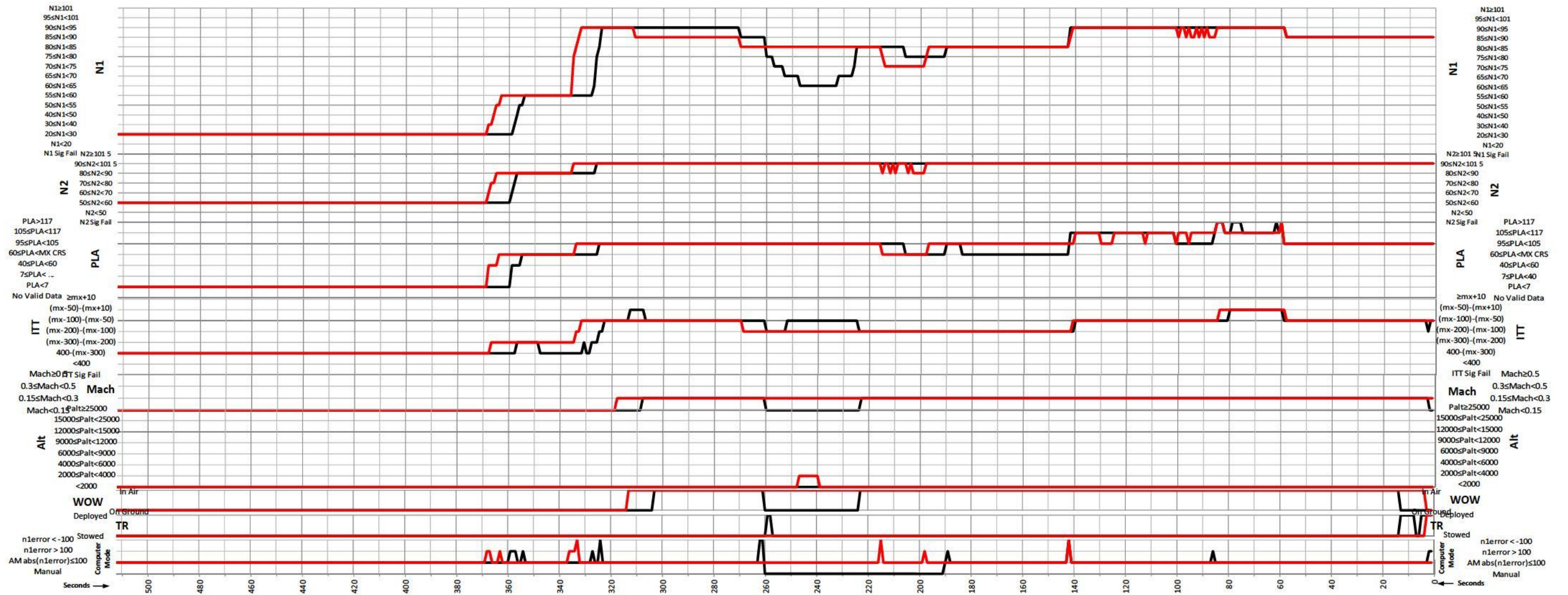
(1 page)

AirEvac, Learjet 35A, XA-USD
Ft Lauderdale, FL, November 19, 2013

1-512 Seconds of Data

P74717 Eng 1: Left Engine S/N

P74715 Eng 2: Right Engine S/N



Appendix F

Plots of All Data Parameters, Left and Right Engines, 161
to 373 Seconds

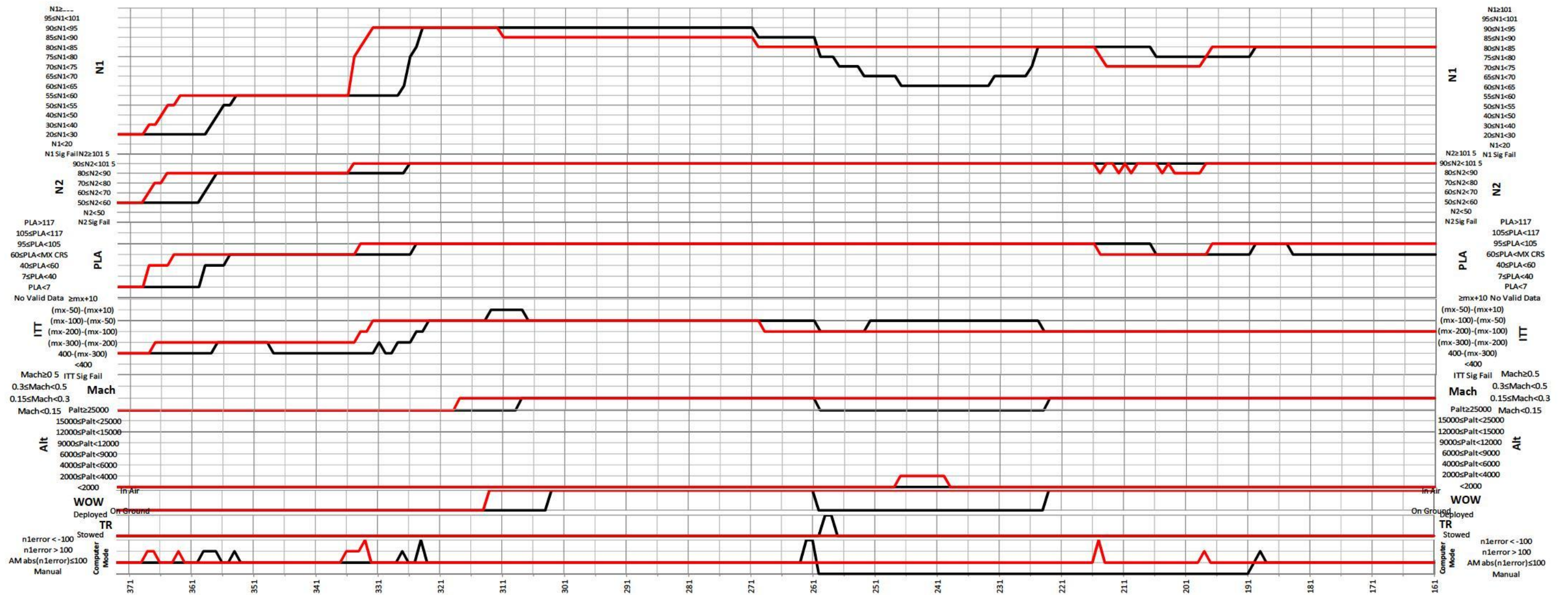
(1 page)

AirEvac, Learjet 35A, XA-USD
Ft Lauderdale, FL, November 19, 2013

1-60 Seconds of Data

P74717 Eng 1: Left Engine S/N

P74715 Eng 2: Right Engine S/N



Appendix G

Plots of All Data Parameters, Left Engine Only, 161 to
373 Seconds

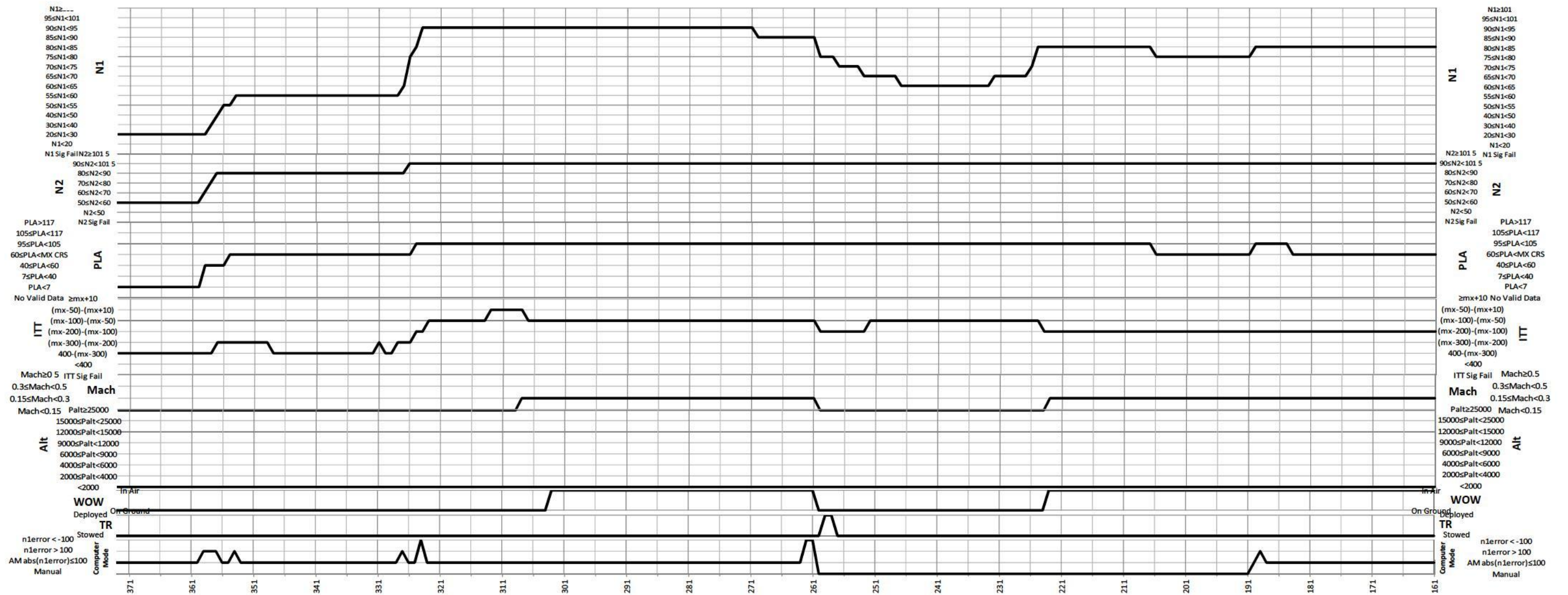
(1 page)

AirEvac, Learjet 35A, XA-USD
Ft Lauderdale, FL, November 19, 2013

1-60 Seconds of Data

P74717 Eng 1: Left Engine S/N

P74715 Eng 2: Right Engine S/N

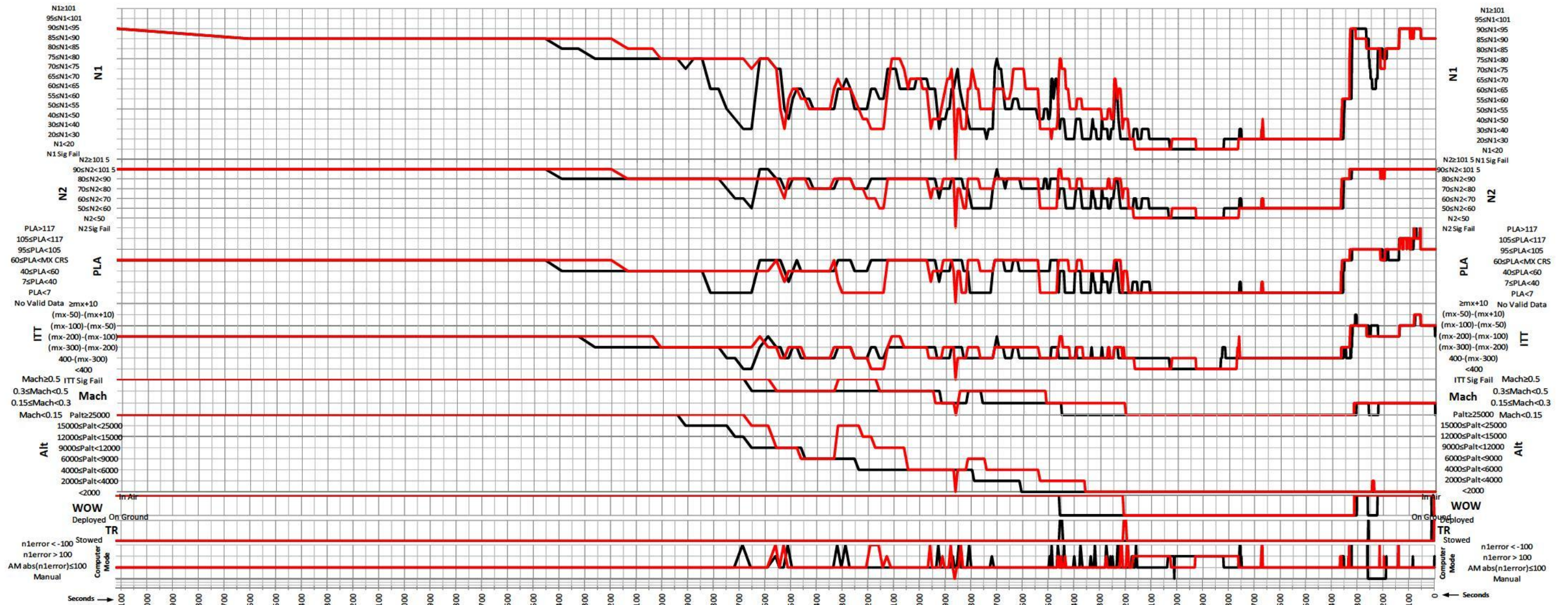


Appendix H

Plots of all Data Parameters, Left and Right Engine, 1
through 5120 Seconds

(1 page)

AirEvac, Learjet 35A, XA-USD
Ft Lauderdale, FL, November 19, 2013
1-5120 Seconds of Data
P74717 Eng 1: Left Engine S/N
P74715 Eng 2: Right Engine S/N



Appendix I
N1 DEEC Event Data, Right Engine P-74715
(15 Pages)

ENGINE STATISTICS DATA

ENGINE P/N ENGINE S/N ENGINE MODEL NO
 3070300-09 074715 TFE731-2-2B

DEEC P/N DEEC S/N DEEC SOFTWARE VERSION
 2119020-4004-05-00 045-CF0152 LC_V08_01

N1 COMPENSATOR

1

32:41:55.7

38:12:58.3

ENGINE OPERATING HOURS (H:M:S.T)
 NUMBER OF DETACHMENTS: 301 MANUAL MODE

29

NUMBER OF T/R DEPLOYMENTS MAJOR

1

NUMBER OF T/R DEPLOYMENTS MINOR

29

NUMBER OF ANTI-COINTEGRATION EVENTS

0:00:00.0

NUMBER OF STARTS	N1 (%)	N2 (%)	ITT (degC)	TT2 (degF)	PT2 (PSIA)	MACH	PLA
(D) STAMP ENG FLT HRS	FUEL RATIOS	FUEL FLOW (PPH)	CONTROL MODE	ALTITUDE (FT)	ENG STATUS	N1C2 (%)	
N2C2 (%)	ITTC2 (degC)						

IGNITOR ON TIME (H:M:S.T)

Dec Serial Number	Download Count	Date/Time
045-CF0152	47	12/19/13 09:39

Total Number of Flights = 27
 (H:M:S.T)

6564:29:58.1	0.00	0.00	260.00	-115.21	17.25	0.73	52.95
32:41:55.7	0.00	0	4	5479	0011000000110000	0.00	0.00
6564:28:44.5	90.02	96.46	801.94	77.83	15.13	0.18	102.76
32:40:42.9	7.72	0	1	-731	0001000000110101	88.43	94.75
89:49:05:31.6	91.49	97.20	822.88	82.93	13.64	0.18	106.76
29:25:00.5	7.94	0	1	2853	0001000000110101	89.45	95.03
773:84	89.26	96.06	792.88	77.55	15.12	0.18	101.69
6536:45:30.1	7.70	0	1	-711	0001000000110101	87.71	94.38
27:27:24.8	86.18	93.68	747.13	55.41	15.35	0.19	98.43
654:36:55.5	7.53	0	1	-1258	0001000000110101	86.48	94.01
25:31:40.9	87.47	95.05	774.19	72.25	13.66	0.19	98.26
6530:23:16.5	7.71	0	1	2842	0001000000110101	86.37	93.86
21:50:34.9							
752.34							

6546:53:35.8	93.31	97.00	824.63	59.88	11.24	0.19	103.75
18:55:42.4	8.25	0	1	8090	0001000000110101	93.23	96.91
754.91	91.35	96.84	817.19	78.98	14.44	0.18	104.52
6541:29:54.5	7.84	0	1	1011	0001000000110101	89.64	95.03
17:48:51.3	93.27	97.45	834.38	67.09	11.16	0.19	104.73
8534:24:13.5	8.35	0	1	8233	0001000000110101	92.55	96.70
16:28:16.4	90.26	96.92	813.88	89.66	15.04	0.18	106.52
786.88	7.83	0	1	-468	0001000000110101	87.70	94.18
6537:27:01.6	93.86	97.62	839.94	70.36	11.17	0.18	108.38
15:53:26.2	8.43	0	1	8235	0001000000110101	92.85	96.57
821.57	87.20	95.86	789.06	89.67	15.12	0.19	101.54
8536:41:20.9	7.81	0	1	-653	0001000000110101	84.73	93.15
15:20:22.8	90.63	95.92	806.38	66.40	11.22	0.19	100.76
768.46	8.10	0	1	8117	0001000000110101	89.99	95.24
6534:58:18.5	93.44	98.02	843.50	87.64	15.16	0.19	117.88
14:10:46.1	7.83	0	1	-721	0001000000110101	90.96	95.42
745.01	91.35	97.29	824.06	84.29	14.83	0.19	107.20
6530:28:06.8	7.83	0	1	85	0001000000110101	89.20	95.00
11:56:05.4	90.22	96.09	805.56	67.56	11.23	0.18	100.33
6528:17:01.8	8.08	0	1	8068	0001000000110101	89.48	95.30
9:55:26.8	88.14	95.76	789.50	82.57	15.12	0.18	101.34
799.36	7.75	0	1	-728	0001000000110101	86.20	93.66
8:52:22.8	90.57	96.16	809.44	65.80	11.20	0.18	100.55
6524:16:51.3	8.15	0	1	8156	0001000000110101	89.99	95.54
7:54:31.2	92.88	97.02	824.63	63.91	12.21	0.18	103.76
792.48	8.07	0	1	5982	0001000000110101	92.44	96.56
6523:02:42.1	90.19	95.86	800.63	61.59	11.21	0.18	99.48
6:56:59.7	8.19	0	1	8119	0001000000110101	89.96	95.62
6510:18:16.6	89.16	95.05	809.13	67.08	11.21	0.19	97.92
5:47:59.4	8.01	0	1	8153	0001000000110101	88.47	94.32
6509:10:26.3	93.47	97.77	837.81	77.94	12.70	0.19	111.24
4:34:43.1	8.04	0	1	4945	0001000000110101	91.81	96.03
816.90	93.46	97.45	836.06	68.72	11.17	0.19	105.92
4:16:44.3	8.33	0	1	8226	0001000000110101	92.59	96.55
796.64	89.54	96.90	807.63	90.60	15.11	0.19	104.75
3:30:29.0	7.83	0	1	-558	0001000000110101	86.94	94.07
6503:11:26.8	93.86	97.70	837.38	63.77	11.24	0.19	105.27
2:48:11.7	8.36	0	1	8089	0001000000110101	93.43	97.25
808.36	91.28	96.71	817.19	74.01	12.21	0.18	103.27
808.36	8.12	0	1	5974	0001000000110101	89.99	95.34
0:43:12.2							
761.25							
649:734:04.3							
0:21:16.1							
829.74							

6496:57:01.2 91.57 96.48 813.06 64.30 11.22 0.18 101.78
 8.19 0 1 8109 0001000000110101 91.11 95.99

0:00:00.0

CRUISE ENGINE PERFORMANCE

TIME STAMP	ENG FLT HRS	N1 (%)	N2 (%)	ITT (degC)	TT2 (degF)	PT2 (PSIA)	MACH	PLA
N2C2 (%)	ITTC2 (degC)	FUEL RATIOS	FUEL FLOW (PPH)	CONTROL MODE	ALTITUDE (FT)	ENG STATUS	N1C2 (%)	

Dec Serial Download
 Number Count Date/Time
 045-CF0152 47 12/19/13 09:39

Total Number of Flights = 27

TIME STAMP	Stable	Cruise	Not Achieved	ITT (degC)	TT2 (degF)	PT2 (PSIA)	MACH	PLA
6559:09:07.6	90.99	95.90	790.56	75.91	10.71	0.32	102.74	
0:00:00.0	7.90	0	1	10294	0001000000110101	89.54	94.38	
29:28:36.5	88.95	95.44	779.88	81.79	11.78	0.31	101.57	
6556:48:30.3	7.73	0	1	7910	0001000000110101	87.06	93.41	
27:30:25.0	92.22	96.16	802.25	72.57	10.65	0.41	103.44	
6554:41:44.8	7.85	0	1	11586	0001000000110101	91.03	94.93	
25:36:30.2	88.48	95.05	771.19	78.50	11.73	0.33	100.23	
6550:26:16.7	7.63	0	1	8239	0001000000110101	86.86	93.31	
21:53:35.1	94.04	96.42	810.88	54.03	8.92	0.41	103.38	
6546:57:58.9	8.21	0	1	15777	0001000000110101	94.49	96.89	
19:00:05.5	90.41	95.13	784.38	73.01	9.90	0.45	100.27	
6544:35:41.7	7.82	0	1	13904	0001000000110101	89.21	93.87	
17:54:38.5	91.56	95.75	794.50	66.90	9.55	0.38	100.98	
6539:28:08.9	8.11	0	1	13803	0001000000110101	90.87	95.03	
16:32:11.8	93.18	96.13	809.00	63.69	8.59	0.47	103.24	
6537:34:12.2	8.17	0	1	17648	0001000000110101	92.77	95.70	
16:00:36.8	90.93	94.87	788.94	59.08	8.40	0.41	96.04	
6536:46:32.0	8.25	0	1	17177	0001000000110101	90.92	94.87	
15:25:33.9	88.48	95.40	775.63	84.59	12.17	0.35	101.48	
6535:38:06.9	7.77	0	1	7657	0001000000110101	86.37	93.13	
14:44:52.0	91.99	95.50	795.13	66.66	8.69	0.56	92.55	
6535:05:43.3	8.02	0	1	18886	0001000000110101	91.31	94.80	
14:18:10.9	95.67	95.76	828.25	19.96	5.51	0.47	102.05	
6530:37:49.0	9.01	0	1	28371	0001000000110101	99.49	99.58	
12:05:47.6	95.40	95.90	823.88	26.66	6.12	0.48	102.45	
6528:29:54.7	8.90	0	1	26042	0001000000110101	98.52	99.04	
10:08:19.7	94.15	96.60	819.25	58.52	8.79	0.41	100.38	
6526:31:48.7	8.22	0	1	16182	0001000000110101	94.19	96.64	
8:57:01.6	89.93	95.15	783.50	75.66	10.32	0.40	100.52	
6524:22:34.6								

Time	7.89	0	045-CF01.047.txt	12156	0001000000110101	88.52	93.65
8:00:14.5	93.50	95.65	808.75	46.67	7.51	0.48	100.02
6523:10:24.9	8.40	0	1	21042	0001000000110101	94.63	96.81
7:04:42.5	92.81	96.54	812.00	67.30	9.92	0.33	103.77
6540:55:16.8	8.05	0	1	12351	0001000000110101	92.07	95.77
5:50:59.6	90.75	95.55	795.50	67.32	9.71	0.32	99.45
6509:43:26.5	8.02	0	1	12617	0001000000110101	90.03	94.79
4:37:43.3	Stable Cruise Not Achieved						
799.20	94.67	96.94	822.94	60.69	9.01	0.44	104.51
6504:10:47.2	8.19	0	1	16029	0001000000110101	94.51	96.78
0:00:00.0							
6525:47.2	94.60	96.62	821.63	54.99	8.08	0.46	104.75
6503:17:06.0	8.36	0	1	18911	0001000000110101	94.96	96.99
2:53:50.9	90.37	96.22	796.75	87.48	11.77	0.32	104.76
8501:39:06.1	7.83	0	1	8162	0001000000110101	87.98	93.69
1:49:05.0	93.25	93.13	771.25	-15.92	3.97	0.56	92.08
8500:49:49.3	9.17	0	1	36955	0001000000110101	100.81	100.88
1:05:12.7	93.27	96.46	810.19	68.25	9.41	0.44	97.74
6497:38:56.0	8.08	0	1	15005	0001000000110101	92.45	95.61
0:26:07.8	92.07	96.09	803.75	65.04	9.55	0.34	101.69
8497:00:01.4	8.07	0	1	13276	0001000000110101	91.54	95.53

0:03:00.2
796.00
N1/N2 ROLLDOWN TREND

OCCURRENCE	(H:M:S.T)	N1 ROLLDOWN TIME (H:M:S.T)	N2 ROLLDOWN TIME (H:M:S.T)
Dec Serial Number	Download Count	Date/Time	
045-CF0152	47	12/19/13 09:39	

Total Number of Rolldowns = 28

Roll Down	Time Stamps	Time	Time
01	6562:21:51.9	0:01:26.2	0:00:30.9
02	6558:44:08.7	0:01:54.4	0:00:31.5
03	6556:35:57.5	99:59:59.9	99:59:59.9
04	6556:35:29.4	99:59:59.9	99:59:59.9
05	6554:11:32.4	0:01:14.1	0:00:34.5
06	6549:52:46.9	0:01:24.4	0:00:37.6
07	6542:41:28.6	0:01:31.8	0:00:40.7
08	6540:53:30.1	99:59:59.9	99:59:59.9
09	6538:05:29.6	99:59:59.9	99:59:59.9
10	6537:17:28.8	0:01:33.6	0:00:36.0
11	6536:16:12.2	99:59:59.9	99:59:59.9
12	6535:28:11.4	99:59:59.9	99:59:59.9
13	6532:46:11.7	99:59:59.9	99:59:59.9
14	6530:16:10.9	99:59:59.9	99:59:59.9
15	6527:34:10.1	0:01:21.0	0:00:37.2
16	6525:19:05.2	0:01:33.8	0:00:40.9
17	6524:00:31.4	99:59:59.9	99:59:59.9
18	6512:06:31.1	0:01:30.7	0:00:41.9

19	6510:27:59.2	0:01:32.5	0:00:39.4
20	6507:22:03.0	99:59:59.9	99:59:59.9
21	6506:38:37.8	0:01:37.2	0:00:38.9
22	6504:56:56.7	99:59:59.9	99:59:59.9
23	6503:56:55.9	99:59:59.9	99:59:59.9
24	6502:41:33.7	0:01:36.2	0:00:41.9
25	6501:02:56.2	99:59:59.9	99:59:59.9
26	6497:56:55.4	99:59:59.9	99:59:59.9
27	6497:20:54.6	99:59:59.9	99:59:59.9
28	6497:20:27.4	99:59:59.9	99:59:59.9

LIFE CYCLE DATA

	26
	0
TOTAL LANDINGS W/O SHUTDOWN	0
TOTAL TOUCH AND GOES	0
TOTAL LANDINGS	

STARTS, TRIPS TO M/M, AUTO IGNITION TIME STAMPS
NUMBER OF APR CYCLES

OCCURRENCE	(H:M:S.T)	TRIPS TO M/M TIME STAMPS (H:M:S.T)	AUTO IGNITION TIME STAMPS (H:M:S.T)
Decc Serial Number	Download Count	Date/Time	
045-CF0152	47	12/19/13 09:39	

TOTALS 6564:29:57.4

ENGINE START	
02	6564:19:37.0
03	6558:52:16.4
04	6556:36:43.2
05	6556:35:56.6
06	6554:29:27.0
07	6550:13:26.5
08	6546:28:31.4
09	6541:13:55.0
10	6539:13:45.6
11	6537:17:53.0
12	6536:32:49.7
13	6535:29:10.0
14	6534:45:04.9
15	6530:22:14.1
16	6528:09:56.5
17	6526:12:45.4
18	6524:07:21.0
19	6522:56:07.4
20	6510:43:50.0
21	6509:02:21.1
22	6507:22:02.1
23	6506:02:33.4
24	6503:57:46.5
25	6503:00:34.7
26	6501:29:19.3
27	6499:50:32.9
28	6497:26:28.5
	6497:20:53.7

29

6496:51:28.3

ENGINE FAULT HISTORY

NO.	(H:M:S.T)	CODE	FAULT CODE	LRU	FAULT DESCRIPTION
Dec Serial Number	Download Count	SEVERITY	Date/Time		
045-CF01	132	47			12/19/13 09:39

Total Number of Faults = 4

1	6564:29:58.2	2	237	NOTICE	ECTM Data buffers filled.
FAULT					
2	6564:29:57.4	4	38	TT2	TT2 Short Circuit
3	6564:29:57.3	4	211	FCU	Fuel Control PLA Circuit Failure
4	6564:29:57.2	2	26	ITT	ITT thermocouple circuit open

EVENT SLOW SCAN 1

TIME STAMP	N1 (%)	N2 (%)	PLA (DEG)	TT2 (deg F)	PT2 (PSIA)	MACH	ITT (degC)
Eng Data	ENG STATUS	CMODE					

EVENT SLOW SCAN 2

TIME STAMP	N1 (%)	N2 (%)	PLA (DEG)	TT2 (deg F)	PT2 (PSIA)	MACH	ITT (degC)
Eng Data	ENG STATUS	CMODE					
6564:30:57.2	0.00	0.00	66.45	-115.21	17.25	0.73	260.00
6564:30:52.2	0.00	0.00	65.97	-115.21	17.25	0.73	260.00
6564:30:47.2	0.00	0.00	63.08	-115.21	17.25	0.73	260.00
6564:30:14.0	0.00	0.00	65.18	-115.21	17.25	0.73	260.00
6564:30:13.0	0.00	0.00	65.16	-115.21	17.25	0.73	260.00
6564:30:13.0	0.00	0.00	65.62	-115.21	17.25	0.73	260.00
6564:30:12.0	0.00	0.00	66.45	-115.21	17.25	0.73	260.00
6564:30:12.0	0.00	0.00	64.78	-115.21	17.25	0.73	260.00
6564:30:11.0	0.00	0.00	64.98	-115.21	17.25	0.73	260.00
6564:30:11.0	0.00	0.00	66.29	-115.21	17.25	0.73	260.00
6564:30:10.0	0.00	0.00	62.97	-115.21	17.25	0.73	260.00
6564:30:10.0	0.00	0.00	60.30	-115.21	17.25	0.73	260.00

8.39 0111000000110000

8.05 0111000000110000

EVENT FAST SCAN 1

TIME STAMP	N1 (%)	N2 (%)	PLA (DEG)	VBIT (V)	IBIT (mA)	FUEL RATIO	ENG STATUS
0604:30:08.1	0.00	0.00	58.76	0.06	-0.24	8.12	0111000000110000

EVENT FAST SCAN 2

TIME STAMP	N1 (%)	N2 (%)	PLA (DEG)	VBIT (V)	IBIT (mA)	FUEL RATIO	ENG STATUS
0604:30:08.1	0.00	0.00	58.76	0.06	-0.24	8.12	0111000000110000
6564:30:08.0	0.00	0.00	61.03	0.06	-0.24	8.11	0111000000110000
6564:30:07.9	0.00	0.00	56.91	0.06	-0.24	8.10	0111000000110000
6564:30:07.8	0.00	0.00	61.71	0.06	-0.24	8.10	0111000000110000
6564:30:07.7	0.00	0.00	58.93	0.03	-0.24	8.09	0111000000110000
6564:30:07.6	0.00	0.00	57.20	0.06	-0.24	8.08	0111000000110000
6564:30:07.5	0.00	0.00	62.97	0.06	-0.24	8.07	0111000000110000
6564:30:07.4	0.00	0.00	60.91	0.06	-0.24	8.07	0111000000110000
6564:30:07.3	0.00	0.00	63.60	0.06	-0.24	8.06	0111000000110000
6564:30:07.2	0.00	0.00	62.97	0.06	-0.24	8.05	0111000000110000
6564:30:07.1	0.00	0.00	57.92	0.06	-0.24	8.04	0111000000110000
6564:30:07.0	0.00	0.00	58.04	0.03	-0.24	8.04	0111000000110000
6564:30:06.9	0.00	0.00	62.18	0.06	-0.24	8.03	0111000000110000
6564:30:06.8	0.00	0.00	63.07	0.06	-0.24	8.02	0111000000110000
6564:30:06.7	0.00	0.00	54.16	0.06	-0.24	8.01	0111000000110000
6564:30:06.6	0.00	0.00	60.91	0.06	-0.24	8.01	0111000000110000
6564:30:06.5	0.00	0.00	62.32	0.06	-0.24	8.00	0111000000110000
6564:30:06.4	0.00	0.00	58.84	0.00	-0.18	7.99	0111000000110000
6564:30:06.3	0.00	0.00	59.20	0.06	-0.24	7.98	0111000000110000
6564:30:06.2	0.00	0.00	65.04	0.06	-0.24	7.98	0111000000110000
6564:30:06.1	0.00	0.00	61.16	0.06	-0.24	7.97	0111000000110000
6564:30:06.0	0.00	0.00	59.59	0.03	-0.24	7.96	0111000000110000
6564:30:05.9	0.00	0.00	57.80	0.06	-0.24	7.95	0111000000110000
6564:30:05.8	0.00	0.00	62.15	0.06	-0.24	7.95	0111000000110000

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			045-CF01.047.txt			
6564:30:05.7	0.00	0.00	64.96	0.06	-0.24	7.94 0111000000110000
	0.00	0.00	60.89	0.06	-0.24	7.93 0111000000110000
6564:30:05.6	0.00	0.00	60.02	0.06	-0.24	7.92 0111000000110000
6564:30:05.5	0.00	0.00	65.84	0.06	-0.24	7.92 0111000000110000
6564:30:05.4	0.00	0.00	63.16	0.06	-0.24	7.91 0111000000110000
6564:30:05.3	0.00	0.00	65.95	0.06	-0.24	7.90 0111000000110000
6564:30:05.2	0.00	0.00	64.81	0.06	-0.24	7.89 0111000000110000
6564:30:05.1	0.00	0.00	65.20	0.06	-0.24	7.89 0111000000110000
6564:30:05.0	0.00	0.00	61.48	0.06	-0.24	7.88 0111000000110000
6564:30:04.9	0.00	0.00	66.32	0.03	-0.24	7.87 0111000000110000
6564:30:04.8	0.00	0.00	63.48	0.03	-0.24	7.86 0111000000110000
6564:30:04.7	0.00	0.00	63.52	0.06	-0.24	7.86 0111000000110000
6564:30:04.6	0.00	0.00	62.66	0.06	-0.24	7.85 0111000000110000
6564:30:04.5	0.00	0.00	59.89	0.06	-0.24	7.84 0111000000110000
6564:30:04.4	0.00	0.00	63.06	0.06	-0.24	7.83 0111000000110000
6564:30:04.3	0.00	0.00	58.10	0.03	-0.24	7.83 0111000000110000
6564:30:04.2	0.00	0.00	59.86	0.03	-0.24	7.82 0111000000110000
6564:30:04.1	0.00	0.00	60.29	0.03	-0.24	7.81 0111000000110000
6564:30:04.0	0.00	0.00	60.16	0.06	-0.24	7.80 0111000000110000
6564:30:03.9	0.00	0.00	62.24	0.06	-0.24	7.80 0111000000110000
6564:30:03.8	0.00	0.00	64.82	0.06	-0.24	7.79 0111000000110000
6564:30:03.7	0.00	0.00	63.73	0.03	-0.24	7.78 0111000000110000
6564:30:03.6	0.00	0.00	60.15	0.03	-0.24	7.77 0111000000110000
6564:30:03.5	0.00	0.00	61.45	0.06	-0.24	7.77 0111000000110000
6564:30:03.4	0.00	0.00	60.66	0.06	-0.24	7.76 0111000000110000
6564:30:03.3	0.00	0.00	65.84	0.06	-0.24	7.75 0111000000110000
6564:30:03.2	0.00	0.00	63.07	0.06	-0.24	7.74 0111000000110000
6564:30:03.1	0.00	0.00	65.80	0.06	-0.24	7.74 0111000000110000
6564:30:03.0	0.00	0.00	63.01	0.03	-0.24	7.73 0111000000110000
6564:30:02.9	0.00	0.00	66.29	0.03	-0.24	7.72 0111000000110000
6564:30:02.8	0.00	0.00	63.41	0.06	-0.24	7.71 0111000000110000
6564:30:02.7						

6564:30:02.6	0.00	0.00	63.28	0.06	-0.24	7.71	0111000000110000
6564:30:02.5	0.00	0.00	61.98	0.06	-0.24	7.70	0111000000110000
6564:30:02.4	0.00	0.00	62.43	0.03	-0.24	7.69	0111000000110000
6564:30:02.3	0.00	0.00	59.16	0.06	-0.24	7.68	0111000000110000
6564:30:02.2	0.00	0.00	60.30	0.06	-0.24	7.68	0111000000110000
6564:30:02.1	0.00	0.00	65.20	0.06	-0.24	7.67	0111000000110000
6564:30:02.0	0.00	0.00	59.98	0.06	-0.24	7.66	0111000000110000
6564:30:01.9	0.00	0.00	57.03	0.06	-0.24	7.65	0111000000100000
6564:30:01.8	0.00	0.00	60.43	0.06	-0.24	7.65	0111000000110000
6564:30:01.7	0.00	0.00	62.50	0.06	-0.24	7.64	0111000000110000
6564:30:01.6	0.00	0.00	63.53	0.06	-0.24	7.63	0111000000110000
6564:30:01.5	0.00	0.00	63.64	0.06	-0.24	7.62	0111000000110000
6564:30:01.4	0.00	0.00	61.34	0.06	-0.24	7.62	0111000000110000
6564:30:01.3	0.00	0.00	60.18	0.06	-0.24	7.61	0111000000110000
6564:30:01.2	0.00	0.00	58.38	0.06	-0.24	7.60	0111000000100000
6564:30:01.1	0.00	0.00	58.04	0.06	-0.24	7.59	0111000000110000
6564:30:01.0	0.00	0.00	63.15	0.03	-0.24	7.59	0111000000110000
6564:30:00.9	0.00	0.00	62.91	0.06	-0.24	7.58	0111000000110000
6564:30:00.8	0.00	0.00	62.88	0.06	-0.24	7.57	0111000000100000
6564:30:00.7	0.00	0.00	56.16	0.06	-0.24	7.56	0111000000110000
6564:30:00.6	0.00	0.00	58.84	0.03	-0.24	7.56	0111000000110000
6564:30:00.5	0.00	0.00	58.84	0.03	-0.24	7.56	0111000000110000
6564:30:00.4	0.00	0.00	57.55	0.03	-0.24	7.55	0111000000110000
6564:30:00.3	0.00	0.00	58.93	0.06	-0.24	7.54	0111000000110000
6564:30:00.2	0.00	0.00	58.93	0.06	-0.24	7.54	0111000000110000
6564:30:00.1	0.00	0.00	63.09	0.06	-0.24	7.53	0111000000110000
6564:30:00.0	0.00	0.00	58.29	0.03	-0.24	7.53	0111000000110000
6564:29:59.9	0.00	0.00	58.29	0.03	-0.24	7.53	0111000000110000
6564:29:59.8	0.00	0.00	61.77	0.06	-0.24	7.52	0111000000110000
6564:29:59.7	0.00	0.00	63.15	0.03	-0.24	7.51	0111000000110000
6564:29:59.6	0.00	0.00	63.15	0.03	-0.24	7.51	0111000000110000
6564:29:59.5	0.00	0.00	61.13	0.06	-0.24	7.50	0111000000110000
6564:29:59.4	0.00	0.00	61.13	0.06	-0.24	7.50	0111000000110000
6564:29:59.3	0.00	0.00	60.78	0.06	-0.24	7.50	0111000000100000
6564:29:59.2	0.00	0.00	60.78	0.06	-0.24	7.50	0111000000100000
6564:29:59.1	0.00	0.00	58.26	0.06	-0.24	7.49	0111000000110000
6564:29:59.0	0.00	0.00	58.26	0.06	-0.24	7.49	0111000000110000

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Time	0.00	0.00	045-CF01.047.txt	0.03	-0.24	7.48	0111000000110000
6564:29:59.6	0.00	0.00	57.60	0.03	-0.24	7.48	0111000000110000
6564:29:59.5	0.00	0.00	61.34	0.03	-0.24	7.47	0111000000110000
6564:29:59.4	0.00	0.00	58.55	0.03	-0.24	7.47	0111000000110000
6564:29:59.3	0.00	0.00	55.34	0.03	-0.24	7.46	0111000000110000
6564:29:59.2	0.00	0.00	54.30	0.06	-0.24	7.45	0111000000110000
6564:29:59.1	0.00	0.00	57.09	0.06	-0.24	7.44	0111000000110000
6564:29:59.0	0.00	0.00	59.31	0.06	-0.24	7.44	0111000000110000
6564:29:58.9	0.00	0.00	55.72	0.06	-0.24	7.43	0111000000110000
6564:29:58.8	0.00	0.00	61.58	0.06	-0.24	7.42	0111000000110000
6564:29:58.7	0.00	0.00	58.50	0.03	-0.24	7.41	0111000000110000
6564:29:58.6	0.00	0.00	61.41	0.06	-0.24	7.41	0111000000110000
6564:29:58.5	0.00	0.00	57.95	0.06	-0.24	7.40	0111000000110000
6564:29:58.4	0.00	0.00	58.04	0.06	-0.24	7.39	0111000000110000
6564:29:58.3	0.00	0.00	55.02	0.06	-0.24	0.00	0111000000110000
6564:29:58.2	0.00	0.00	52.95	6.63	-49.85	0.00	0011000000110000
6564:29:58.1	0.00	0.00	55.88	6.63	-49.79	0.00	0011000000100000
6564:29:58.0	0.00	0.00	55.48	6.63	-49.73	0.00	0011000000110000
6564:29:57.9	0.00	0.00	56.95	6.59	49.61	0.00	0011000000100000
6564:29:57.8	0.00	0.00	55.59	6.02	44.52	0.00	0011000000100010
6564:29:57.7	0.00	0.00	57.52	0.03	-0.24	0.00	0011000000100010
6564:29:57.6	0.00	0.00	55.15	0.06	-0.24	0.00	0011000000100010
6564:29:57.5	0.00	0.00	55.95	0.00	0.00	0.00	0011000000110000
6564:29:57.4	0.00	0.00	55.35	0.00	0.00	0.00	0011000000110000
6564:29:57.3	0.00	0.00	61.48	0.00	0.00	0.00	0011000000110000

ENGINE EXCEEDANCES

4	EXCEED NO.	PEAK	(H:M:S.T)	TIME STAMP	(H:M:S.T)	TYPE
4						

Dec Serial
 Number
 045-CF0152

Download
 Count
 47

Date/Time
 12/19/13 09:39

Total Number of N1 Exceedances = 0
 N1 %

DURATION

Decc Serial Download
 Number Count Date/Time
 045-CF0152 47 12/19/13 09:39

Total Number of N2 Exceedances = 0
 N2 %

Decc Serial Download
 Number Count Date/Time
 045-CF0152 47 12/19/13 09:39

Total Number of ITT Exceedances = 0
 ITT degC

N1/N2 MAJOR SPEED CYCLES

BIN NO.	(%)	SPEED CYCLES	N2 SPEED (%)	MAJOR SPEED CYCLES
	100.00	0	100.00	0
27	99.81	0	99.89	0
26	99.52	0	99.73	0
25	99.24	0	99.41	0
24	98.90	0	99.09	0
23	98.57	0	98.78	1
22	98.18	0	98.46	0
21	97.76	0	98.01	4
20	97.30	0	97.67	3
19	96.81	4	97.19	7
MAJOR	96.29	8	96.71	4
17	95.72	5	96.24	4
16	95.13	0	95.76	2
15	94.50	3	95.28	0
14	93.85	4	94.81	0
13	93.14	0	94.33	0
12	92.21	1	93.85	0
11	91.22	0	93.38	0
10	89.06	0	92.90	0
09	87.60	0	92.50	0
08	86.64	0	92.27	0
07	83.96	0	91.79	0
06	81.00	0	91.23	0
05	77.76	0	90.52	0
04	74.22	0	89.88	0
03	70.38	0	88.61	0
02	66.22	0	86.23	0

N1/N2 MAJOR THRUST REVERSOR SPEED CYCLES

BIN NO.	(%)	SPEED CYCLES	N2 SPEED (%)	MAJOR SPEED CYCLES
	100.87	0	100.51	0
16	100.00	0	100.00	0
15	99.08	0	99.45	0
MAJOR	98.10	0	98.87	0
14				
13				

12	97.06	0	98.25	0
11	95.92	0	97.58	0
10	94.69	0	96.85	1
09	93.34	0	96.04	0
08	91.84	0	95.15	0
07	90.15	0	94.15	1
06	88.21	1	93.00	0
05	85.91	0	91.63	1
04	83.07	0	89.94	0
03	79.29	0	87.70	0
02	73.39	1	84.19	6
01	21.00	27	46.00	20

N1 MINOR SPEED BINS

Maximum N1 Speed (%)	BIN COUNT																														
100.87	0																														
100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
99.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
98.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
97.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
95.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0															
94.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0															
93.34	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0															
91.84	0	0	0	0	0	0	0	1	0	0	0	0	0	34	52	0															
90.15	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0															
88.21	0	0	0	0	0	0	0	0	0	1	0	1	5	0	0	0															
85.91	0	0	0	1	0	0	0	0	0	0	0	2	3	0	0	0															
83.07	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0															
79.29	0	0	0	1	0	4	1	1	1	0	0	22	6	0	0	0															
73.39	0	0	0	49	22	92	26	38	28	29	24	19	6	0	0	0															
21.00	0	25	37	26	37	28	23	30	55	33	55	37	20	41	52	46	50	52	15	58	47	65	44	73	09	81	09	90	36	100	00

Minimum N1 Speed (%)

N2 MINOR SPEED BINS

Maximum N2 Speed (%)	BIN COUNT															
100.51	0															
100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
96.85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0
96.04	0	0	0	0	0	1	0	0	1	0	1	1	1	1	0	0
95.15	1	0	0	0	0	0	1	0	0	0	0	0	0	7	2	0
94.15	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
93.00	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0
91.63	1	1	0	0	3	0	2	2	0	0	0	2	35	91	0	0
89.94	1	0	2	2	4	1	0	1	0	2	0	2	43	0	0	0
87.70	2	0	0	0	3	2	2	0	4	1	30	37	38	0	0	0
84.19	0	1	29	39	21	28	60	131	45	84	81	54	0	0	0	0
46.00	0	2	1	29	39	21	28	60	131	45	84	81	54	0	0	0

Minimum N2 Speed (%)

ITT PEAK/AVERAGE TEMPERATURE

BIN NO.	deg C	ITT (30 second average)	ITT (peak)
		0	
		0	
		0	
62		0	
61	1030 to <1035	0	
60	1025 to <1030	0	0
59	1020 to <1025	0	0
58	1015 to <1020	0	0
57	1010 to <1015	0	0
56	1005 to <1010	0	0
55	1000 to <1005	0	0
54		0	0
53	995 to <1000	0	0
52		0	0
51	990 to <995	0	0
50	985 to <990	0	0
49	980 to <985	0	0
48	975 to <980	0	0
47	970 to <975	0	0
46	965 to <970	0	0
45	960 to <965	0	0
44	955 to <960	0	0
43	950 to <955	0	0
42	945 to <950	0	0
41	940 to <945	0	0
40	935 to <940	0	0
39	930 to <935	0	0
38	925 to <930	0	0
37	920 to <925	0	0
36	915 to <920	0	0
35	910 to <915	0	0
34	905 to <910	0	0
33	900 to <905	0	0
32	895 to <900	0	0
31	890 to <895	0	0
30	885 to <890	0	0
29	880 to <885	0	0
28	875 to <880	0	0
27	870 to <875	0	0
26	865 to <870	0	0
25	860 to <865	0	0
24	855 to <860	0	0
23	850 to <855	14	0
22	845 to <850	30	0
21	840 to <845	152	1
20	835 to <840	153	3
19	830 to <835	225	3
18	825 to <830	139	9
17	820 to <825	125	2
16	815 to <820	50	4
15	810 to <815	97	3
14	805 to <810	99	0
13	800 to <805	89	0
12	795 to <800	48	0
11	790 to <795	148	0
10	785 to <790	158	0
09	780 to <785	326	0
08	775 to <780	129	0
07	770 to <775	102	0
06	765 to <770		0
	760 to <765		0
	755 to <760		0

ITT (degC)	0	1050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
875	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	17	0	0
825	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	4	8	15	9	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	6	10	10	0	0	0
775	2	0	0	0	1	0	1	0	0	0	0	1	0	1	4	4	4	10	0	0	0	0
750	5	2	4	1	1	1	0	1	0	1	0	1	2	6	4	4	0	0	0	0	0	0
725	4	10	16	9	2	1	1	2	2	2	5	11	4	0	0	0	0	0	0	0	0	0
700	2	2	4	10	1	0	2	2	6	17	5	16	0	0	0	0	0	0	0	0	0	0
675	0	2	8	14	6	5	2	11	23	12	0	0	0	0	0	0	0	0	0	0	0	0
650	1	1	2	13	6	5	5	22	24	0	0	0	0	0	0	0	0	0	0	0	0	0
625	0	3	5	9	13	6	20	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
600	0	4	10	16	10	17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
575	0	5	21	19	34	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550	0	3	13	75	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
525	1	6	20	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
500	0	5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
475	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
450	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
425	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PLA USAGE PROFILE

BIN NO.	DEGREES	PLA BINS (5 second peak)
01		
02		
03	20 to <26	
04	26 to <30	5532
05	30 to <40	0
06	40 to <50	221
07	50 to <60	9336
PLA	60 to <70	1016
		1441

08		
09	70 to <74	
10	74 to <77	1601
11	77 to <80	1792
12	80 to <83	1304
13	83 to <86	
14	86 to <89	406
15	89 to <92	840
16	92 to <95	1775
17	95 to <98	1396
18	102 to <105	1065
19	105 to <108	570
20	108 to <110	2685
21	110 to <113	1453
22	113 to <117	490
23	117 to <123	49

PE NUM DELTA PRESSURE CYCLES
 24 above 123

Maximum Delta Pressure Ratios	BIN COUNT																
1.027	85	3	0	0	0	0	0	0	0	0	3	26	11	11	9	16	320
1.000	2	0	0	0	0	0	0	0	0	0	7	0	1	0	5	0	0
0.972	2	0	0	0	0	0	0	0	0	0	1	2	0	2	3	0	0
0.944	4	0	0	0	0	0	0	0	0	0	1	0	1	6	0	0	0
0.914	6	1	0	0	0	0	0	0	0	0	0	1	0	5	0	0	0
0.884	6	2	0	0	0	0	0	0	0	0	2	2	1	2	0	0	0
0.853	7	2	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0
0.820	5	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0
0.787	5	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0
0.751	9	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
0.714	2	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0
0.673	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
0.630	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
0.581	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.522	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.423	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Minimum Delta Pressure Ratios

0.00

Appendix J

N1 DEEC Event Data, Left Engine P-74717

(17 Pages)

ENGINE STATISTICS DATA

ENGINE P/N ENGINE S/N ENGINE MODEL NO
 3070300-09 074717 TFE731-2-2B

DEEC P/N DEEC S/N DEEC SOFTWARE VERSION
 2119020-4004-05-00 045-CF0149 LC_V08_01

N1 COMPENSATOR

1

32:43:49.0

36:05:55.3

ENGINE OPERATING HOURS (H:M:S.T)
 NUMBER OF STARTS 27

NUMBER OF T/R DEPLOYMENTS MAJOR

2

NUMBER OF T/R DEPLOYMENTS MINOR

34

NUMBER OF ANTI-COINTEGRATION EVENTS 0:00:00.0
 NUMBER OF STARTS 0

TIME STAMP (degC)	FUEL RATIOS	FUEL FLOW (PPH)	CONTROL MODE	ITT (degC)	TT2 (degF)	PT2 (PSIA)	MACH	N1C2 (%)	N2C2 (%)	PLA (DEG)	ITTC2
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IGNITOR ON TIME (H:M:S.T)

Serial Number	Download Count	Date/Time
045-CF0149	110	12/19/13 09:44

Total Number of Flights = 27

6534:48:22.5	0.00	0.00	260.00	-115.21	12.76		0.40		63.66
3243:49:00	0.00	0	4	7097	0111000000110000		0.00		0.00
391.49									
6340:48:48.1	90.57	97.38	803.63	77.22	15.17		0.18		103.27
776.35	7.74	0	1	-856	0001000000110101		89.02		95.71
6340:48:48.1									
6340:48:48.1	92.35	98.38	832.56	81.84	13.67		0.18		109.12
797.45	7.87	0	1	2790	0001000000110101		90.38		96.29
6340:48:48.1									
6340:48:48.1	92.41	97.91	817.00	76.91	15.17		0.19		106.58
789.73	7.74	0	1	-833	0001000000110101		90.85		96.26

045-CF01. 110. txt

6524:55:19.4 2531:20:0 766.32	88.94 7.47	95.19 0	760.06 1	54.77 -1336	15.37 0001000000110101	0.19 89.30	101.73 95.58
6525:41:74.1 6525:41:74.1 769.95	90.34 7.70	96.67 0	788.44 1	71.45 2795	13.69 0001000000110101	0.19 89.27	101.72 95.53
6525:12:59.3 6525:12:59.3 831.28	94.81 8.23	98.29 0	830.19 1	58.32 8026	11.25 0001000000110101	0.19 94.87	106.88 98.35
6524:48:51.1 6524:48:51.1 782.94	92.12 7.80	97.54 0	811.75 1	78.08 962	14.45 0001000000110101	0.18 90.47	106.03 95.80
6527:42:36.5 6527:42:36.5 814.73	93.83 8.22	98.29 0	825.69 1	65.97 8171	11.18 0001000000110101	0.19 93.20	105.84 97.63
6523:40:29.2 6523:40:29.2 769.86	91.75 7.69	97.93 0	813.88 1	88.65 -581	15.07 0001000000110101	0.18 89.23	110.96 95.24
6520:05:05.2 6520:05:05.2 809.82	93.67 8.31	98.19 0	825.50 1	69.04 8171	11.18 0001000000110101	0.18 92.77	106.77 97.25
6521:52:64.4 6521:52:64.4 756.95	89.76 7.76	97.29 0	799.81 1	88.37 -708	15.16 0001000000110101	0.19 87.32	104.53 94.65
6520:10:18.1 6520:10:18.1 811.42	93.44 8.11	97.95 0	821.00 1	65.12 8062	11.23 0001000000110101	0.19 92.89	104.60 97.37
6526:40:30.4 6526:40:30.4 794.37	93.69 7.73	98.63 0	835.88 1	86.10 -775	15.18 0001000000110101	0.19 91.33	117.77 96.15
6525:22:25.3 6525:22:25.3 780.43	92.09 7.78	98.14 0	816.88 1	83.22 21	14.85 0001000000110101	0.19 90.01	109.16 95.93
6526:24:33.3 6526:24:33.3 804.55	92.87 8.10	97.77 0	814.88 1	65.66 7995	11.26 0001000000110101	0.18 92.28	103.81 97.15
6524:44:65.9 6524:44:65.9 752.01	89.01 7.64	96.57 0	785.00 1	81.75 -832	15.17 0001000000110101	0.18 87.12	102.26 94.52
6523:12:18.0 6523:12:18.0 808.72	92.96 8.19	97.74 0	817.38 1	64.55 8096	11.21 0001000000110101	0.18 92.46	103.88 97.22
6523:07:21.4 6523:07:21.4 799.03	92.45 8.06	97.36 0	804.88 1	62.80 5917	12.23 0001000000110101	0.19 92.12	103.09 97.01
6524:50:31.1 6524:50:31.1 792.06	91.51 8.09	96.84 0	794.38 1	60.52 8057	11.23 0001000000110101	0.19 91.37	101.22 96.70
6526:35:65.0 6526:35:65.0 791.44	89.78 6.98	95.48 0	802.00 1	65.92 8097	11.22 0001000000110101	0.19 89.18	96.47 94.85
6520:26:25.3 6520:26:25.3 819.87	95.05 8.15	99.02 0	847.38 1	76.40 4900	12.71 0001000000110101	0.19 93.49	117.01 97.40
6523:10:33.0 6523:10:33.0 819.87	93.98 8.19	98.29 0	829.44 1	68.04 8163	11.18 0001000000110101	0.19 93.17	107.41 97.44

045-CF01. 110. t x t

815.24									
6470:05:32.9	7.80	91.18	97.95	813.38	89.53	15.12	0.19	109.40	
768.16			0	1	-613	0001000000110101	88.61	95.18	
6470:14:35.3	8.13	92.09	97.47	808.56	62.66	11.25	0.19	102.30	
802.89			0	1	8023	0001000000110101	91.76	97.12	
6470:53:31.2	7.98	91.95	97.47	808.75	72.88	12.22	0.18	103.86	
787.67			0	1	5930	0001000000110101	90.74	96.19	
6470:06:36.3	8.06	91.57	96.96	801.19	63.71	11.24	0.19	101.77	
793.98			0	1	8042	0001000000110101	91.16	96.52	

CRUISE ENGINE PERFORMANCE

TIME STAMP (Deg C)	FUEL RATIOS	N1 (%)	FUEL FLOW (PPH)	N2 (%)	ITT (degC)	CONTROL MODE	TT2 (degF)	ALTITUDE (FT)	ENG STATUS	PT2 (PSIA)	N1C2 (%)	MACH	N2C2 (%)	PLA (DEG)	ITTC2
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(H:M:S:T)
 Download Serial
 Number Count Date/Time
 045-CF0149 110 12/19/13 09:44

Total Number of Flights = 27

Stable Cruise Not Achieved

6529:33:39.9	8.71	95.26	97.54	819.25	31.51	6.56	0.43	102.89	
28204:00:0			0	1	23540	0001000000110101	97.89	100.24	
6529:14:34.3	8.59	94.46	96.16	791.81	22.66	6.23	0.46	98.99	
851.48			0	1	25200	0001000000110101	97.95	99.72	
6529:09:09.0	7.87	93.35	96.88	793.19	59.71	9.66	0.42	103.26	
792.10			0	1	14066	0001000000110101	93.28	96.81	
6529:34:41.3	7.54	90.17	96.20	771.63	79.52	11.72	0.32	102.69	
742.26			0	1	8222	0001000000110101	88.44	94.36	
6529:14:22.3	8.05	93.83	97.24	798.25	52.91	9.32	0.36	102.93	
807.73			0	1	14055	0001000000110101	94.38	97.82	
6529:56:28.0	8.10	93.32	96.69	788.44	52.78	8.34	0.47	100.88	
798.01			0	1	18295	0001000000110101	93.89	97.28	
6529:14:27.4	7.87	91.75	96.57	779.94	64.06	9.65	0.39	100.83	
772.40			0	1	13562	0001000000110101	91.30	96.11	
6529:52:36.9	7.96	93.32	96.86	793.06	59.81	8.61	0.47	102.60	
791.83			0	1	17591	0001000000110101	93.25	96.79	
6529:06:19.3	8.05	91.10	95.76	768.63	55.57	8.43	0.41	98.78	
773.74			0	1	17070	0001000000110101	91.40	98.08	
6505:57:49.6		90.60	96.84	781.44	85.67	12.16	0.35	104.59	

045-CF01. 110. tx t									
14:44:36.9	7.59	0	1	7627	0001000000110101	88.36	94.44		
743.22									
	92.07	96.16	778.19	64.56	8.68	0.56	100.37		
6405:25:13.3	7.84	0	1	18818	0001000000110101	91.58	95.65		
6505:28:13.3									
769.93									
	96.34	97.07	812.56	12.63	5.50	0.46	103.18		
6805:50:45.8	8.89	0	1	28297	0001000000110101	100.95	101.73		
6805:50:45.8									
892.34									
	96.42	97.33	812.50	19.60	6.07	0.48	104.54		
6908:43:30.6	8.86	0	1	26240	0001000000110101	100.30	101.25		
6908:43:30.6									
879.29									
	93.76	97.47	802.81	57.69	9.31	0.32	103.79		
8455:48:33.5	8.11	0	1	13594	0001000000110101	93.88	97.59		
8455:48:33.5									
804.85									
	89.33	95.40	755.06	74.19	10.50	0.40	99.38		
8404:40:49.2	7.64	0	1	11804	0001000000110101	88.05	94.84		
8404:40:49.2									
733.58									
	93.56	97.11	793.94	60.34	9.42	0.41	103.77		
7403:24:59.4	7.99	0	1	14503	0001000000110101	93.44	96.99		
7403:24:59.4									
791.90									
	92.81	97.09	793.31	63.78	9.94	0.33	103.09		
6451:07:21.6	7.99	0	1	12264	0001000000110101	92.38	96.65		
6451:07:21.6									
786.07									
	91.87	96.69	785.44	63.96	9.73	0.32	101.15		
6470:50:31.3	7.92	0	1	12539	0001000000110101	91.44	96.23		
6470:50:31.3									
778.00									
	96.12	96.96	811.06	11.01	5.44	0.50	102.28		
6473:42:21.6	9.02	0	1	29060	0001000000110101	100.90	101.78		
6473:42:21.6									
893.75									
	95.01	97.09	808.19	35.71	6.68	0.43	102.65		
6452:45:47.3	8.69	0	1	23145	0001000000110101	97.21	99.35		
6452:45:47.3									
846.19									
	93.42	96.82	794.81	56.94	8.56	0.47	102.23		
6449:23:39.6	8.14	0	1	17659	0001000000110101	93.60	97.01		
6449:23:39.6									
797.98									
	92.10	96.88	790.94	73.37	10.34	0.36	103.85		
6464:56:31.4	7.81	0	1	11623	0001000000110101	90.85	95.56		
6464:56:31.4									
769.61									
	92.41	96.75	790.75	61.74	9.58	0.34	101.79		
6463:00:36.5	7.91	0	1	13160	0001000000110101	92.16	96.50		
6463:00:36.5									
786.60									

Stable Cruise Not Achieved
Stable Cruise Not Achieved

N1/N2 ROLLDOWN TREND

OCCURRENCE	(H:M:S.T)	N1 ROLLDOWN TIME (H:M:S.T)	N2 ROLLDOWN TIME (H:M:S.T)
Dec Serial Number	Download Count	Date/Time	
045-CF0149	110	12/19/13 09:44	

Total Number of Rolldowns = 26

01	6532:46:09.1	0:01:13.9	0:00:34.2
02	6529:04:21.8	0:01:21.5	0:00:34.8
03	6526:51:58.0	0:01:37.0	0:00:31.6
04	6524:24:11.6	0:01:15.3	0:00:30.2
05	6520:07:52.5	0:01:25.2	0:00:32.8
06	6512:56:10.2	0:01:56.4	0:00:36.5
07	6511:05:36.5	0:01:20.4	0:00:31.4
08	6508:21:05.7	0:01:39.9	0:00:38.0
09	6507:35:00.0	0:01:30.2	0:00:32.0
10	6506:33:45.1	0:01:44.0	0:00:38.9
11	6505:47:53.5	0:01:31.5	0:00:32.5
12	6503:02:14.7	0:01:31.0	0:00:36.6
13	6500:34:10.9	0:01:27.9	0:00:32.1
14	6497:49:33.4	0:01:28.1	0:00:31.9
15	6495:34:46.4	0:01:43.5	0:00:35.8
16	6494:18:54.5	0:01:21.6	0:00:31.6
17	6482:22:01.5	0:01:35.6	0:00:36.7
18	6480:45:05.4	0:01:36.5	0:00:34.2
19	6477:42:08.1	99:59:59.9	99:59:59.9
20	6476:54:27.2	0:02:40.6	0:00:37.8
21	6475:12:20.6	0:01:41.7	0:00:37.7
22	6474:14:19.3	0:04:15.2	0:00:34.7
23	6472:58:25.7	0:01:47.2	0:00:37.6
24	6471:20:54.0	0:01:46.7	0:00:31.8
25	6468:15:46.2	0:01:47.8	0:00:40.6
26	6467:38:55.0	0:01:37.3	0:00:35.4

LIFE CYCLE DATA

28

2

TOTAL LANDINGS W/O SHUTDOWN 0
 TOTAL TOUCH AND GOES 0
 TOTAL LANDINGS

STARTS, TRIPS TO M/M, AUTO IGNITION TIME STAMPS
 NUMBER OF APR CYCLES

OCCURRENCE	(H:M:S.T)	TRIPS TO M/M	AUTO IGNITION
Dec Serial	Download	TIME STAMPS	TIME STAMPS
Number	Count	(H:M:S.T)	(H:M:S.T)
		Date/Time	
045-CF0149	110	12/19/13 09:44	

TOTALS		6534:48:21.8	
ENGINE START		6534:47:21.9	
01	6534:37:59.6		
03	6529:21:36.0		
04	6527:00:13.3		
05	6524:48:20.9		
06	6520:36:24.6		
07	6517:03:59.6		
	6511:42:06.1		

08

09 6509:32:47.3
 10 6507:37:20.3
 11 6506:53:56.3
 12 6505:53:07.8
 13 6505:03:36.8
 14 6500:43:33.7
 15 6498:25:56.4
 16 6496:41:28.6
 17 6494:30:37.8
 18 6493:14:22.5
 19 6481:04:32.0
 20 6479:22:59.6
 21 6477:42:07.2
 22 6476:27:13.4
 23 6474:17:40.6
 24 6473:20:36.3
 25 6471:49:13.7
 26 6470:10:31.7
 27 6467:46:21.6
 6467:11:57.2

ENGINE FAULT HISTORY

NO.	(H:M:S.T)	CODE	FAULT	LRU	FAULT DESCRIPTION
Dec Serial	Download	CODE	LRU	FAULT DESCRIPTION	
Number	Count	SEVERITY	Date/Time		
045-CF0149	110	110	12/19/13 09:44		
Total Number of Faults = 8					
1	6534:48:21.8	4	38	TT2	TT2 Short Circuit
FAULT					
2	6534:48:21.7	4	211	FCU	Fuel Control PLA Circuit Failure
3	6534:48:21.6	2	26	ITT	ITT thermocouple circuit open
4	6534:48:21.6	2	237	NOTICE	ECTM Data buffers fille d .
5	6534:48:21.6	2	237	NOTICE	ECTM Data buffers fille d .
6	6534:47:21.9	2	237	NOTICE	ECTM Data buffers fille d .
7	6534:47:21.8	4	43	DEEC/	Total Pressure rate change fail (PT2) > 10 Psia per second
8	6497:49:33.4	1	242	DEEC	ECTM data checksum failed .

(TT2 < 190 ohms)

EVENT SLOW SCAN 1

MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	TT2 (deg F)	PT2 (PSIA)	MACH	ITT (degC)	FUEL
MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	TT2 (deg F)	PT2 (PSIA)	MACH	ITT (degC)	FUEL
No Data										

EVENT SLOW SCAN 2

MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	TT2 (deg F)	PT2 (PSIA)	MACH	ITT (degC)	FUEL
MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	TT2 (deg F)	PT2 (PSIA)	MACH	ITT (degC)	FUEL
Transfer to Manual Mode										
6534:49:21.2			0.00	7 0.00	56.93	-115.21	12.76	0.40	260.00	
8534:49:18.2		0000100000	0.00	7 0.00	60.17	-115.21	12.76	0.40	260.00	
8534:49:19.2		0000100000	0.00	7 0.00	58.28	-115.21	12.76	0.40	260.00	
8534:49:18.2		0000110000	0.00	7 0.00	56.51	-115.21	12.76	0.40	260.00	
8534:49:19.2		0000100000	0.00	7 0.00	59.81	-115.21	12.76	0.40	260.00	
8534:48:58.9		0000110000	0.00	7 0.00	60.89	-115.21	12.76	0.40	260.00	
8534:48:59.9		0000100000	0.00	7 0.00	61.40	-115.21	12.76	0.40	260.00	
8534:48:59.8		0000100000	0.00	7 0.00	59.04	-115.21	12.76	0.40	260.00	
8534:48:48.8		0000100000	0.00	7 0.00	59.41	-115.21	12.76	0.40	260.00	
8534:48:49.8		0000110000	0.00	7 0.00	59.89	-115.21	12.76	0.40	260.00	
8534:48:38.8		0000110000	0.00	7 0.00	63.54	-115.21	12.76	0.40	260.00	
8534:48:39.8		0000110000	0.00	7 0.00	61.66	-115.21	12.76	0.40	260.00	
8534:48:28.8		0000110000		7						

MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	VBIT (V)	IBIT (mA)	FUEL RATIO	ENG STATUS
MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	VBIT (V)	IBIT (mA)	FUEL RATIO	ENG STATUS
No Data									

EVENT FAST SCAN 2

MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	VBIT (V)	IBIT (mA)	FUEL RATIO	ENG STATUS
MODE	STAMP	ENG STATUS	N1 (%)	N2 (%)	PLA (DEG)	VBIT (V)	IBIT (mA)	FUEL RATIO	ENG STATUS
Transfer to Manual Mode									
6534:48:32.5			0.00	0.00	60.84	0.06	-0.24	8.12	0111000000110000
6534:48:32.4			0.00	0.00	60.84	0.06	-0.24	8.11	0111000000110000
7 6534:48:32.3			0.00	0.00	58.72	0.06	-0.24	8.10	0111000000110000
7 6534:48:32.2			0.00	0.00	55.56	0.06	-0.24	8.10	0111000000110000

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6534:48:32.1	0.00	0.00	59.89	0.06	-0.24	8.09	0111000000110000
6534:48:32.0	0.00	0.00	58.05	0.06	-0.24	8.08	0111000000110000
6534:48:31.9	0.00	0.00	61.45	0.06	-0.24	8.07	0111000000110000
6534:48:31.8	0.00	0.00	62.46	0.06	-0.24	8.07	0111000000100000
6534:48:31.7	0.00	0.00	62.32	0.06	-0.24	8.06	0111000000110000
6534:48:31.6	0.00	0.00	63.54	0.06	-0.24	8.05	0111000000110000
6534:48:31.5	0.00	0.00	62.42	0.03	-0.24	8.04	0111000000110000
6534:48:31.4	0.00	0.00	59.28	0.06	-0.24	8.04	0111000000110000
6534:48:31.3	0.00	0.00	62.24	0.06	-0.24	8.03	0111000000110000
6534:48:31.2	0.00	0.00	63.41	0.06	-0.24	8.02	0111000000110000
6534:48:31.1	0.00	0.00	62.47	0.06	-0.24	8.01	0111000000110000
6534:48:31.0	0.00	0.00	65.06	0.06	-0.24	8.01	0111000000110000
6534:48:30.9	0.00	0.00	63.64	0.06	-0.24	8.00	0111000000110000
6534:48:30.8	0.00	0.00	62.63	0.06	-0.24	7.99	0111000000110000
6534:48:30.7	0.00	0.00	62.75	0.06	-0.24	7.98	0111000000100000
6534:48:30.6	0.00	0.00	63.99	0.00	-0.18	7.98	0111000000110000
6534:48:30.5	0.00	0.00	62.13	0.03	-0.24	7.97	0111000000110000
6534:48:30.4	0.00	0.00	60.91	0.06	-0.24	7.96	0111000000110000
6534:48:30.3	0.00	0.00	62.32	0.03	-0.24	7.95	0111000000100000
6534:48:30.2	0.00	0.00	59.57	0.06	-0.24	7.95	0111000000100000
6534:48:30.1	0.00	0.00	61.67	0.06	-0.24	7.94	0111000000110000
6534:48:30.0	0.00	0.00	63.01	0.06	-0.24	7.93	0111000000110000
6534:48:29.9	0.00	0.00	61.70	0.06	-0.24	7.92	0111000000100000
6534:48:29.8	0.00	0.00	61.71	0.06	-0.24	7.92	0111000000110000
6534:48:29.7	0.00	0.00	58.99	0.03	-0.24	7.91	0111000000100000
6534:48:29.6	0.00	0.00	62.34	0.06	-0.24	7.90	0111000000100000
6534:48:29.5	0.00	0.00	61.90	0.06	-0.24	7.89	0111000000100000
6534:48:29.4	0.00	0.00	60.55	0.06	-0.24	7.89	0111000000110000

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6534:48:29.3	0.00	0.00	61.98	0.06	-0.24	7.88	0111000000110000
6534:48:29.2	0.00	0.00	60.63	0.06	-0.24	7.87	0111000000100000
6534:48:29.1	0.00	0.00	60.63	0.06	-0.24	7.86	0111000000110000
6534:48:29.0	0.00	0.00	63.50	0.03	-0.24	7.86	0111000000110000
6534:48:28.9	0.00	0.00	62.19	0.06	-0.24	7.85	0111000000110000
6534:48:28.8	0.00	0.00	62.66	0.06	-0.24	7.84	0111000000100000
6534:48:28.7	0.00	0.00	59.32	0.06	-0.24	7.83	0111000000100000
6534:48:28.6	0.00	0.00	62.82	0.06	-0.24	7.83	0111000000100000
6534:48:28.5	0.00	0.00	62.82	0.06	-0.24	7.82	0111000000110000
6534:48:28.4	0.00	0.00	62.76	0.06	-0.24	7.81	0111000000100000
6534:48:28.3	0.00	0.00	61.42	0.06	-0.24	7.80	0111000000100000
6534:48:28.2	0.00	0.00	61.47	0.06	-0.30	7.80	0111000000110000
6534:48:28.1	0.00	0.00	61.55	0.03	-0.24	7.79	0111000000110000
6534:48:28.0	0.00	0.00	61.58	0.06	-0.24	7.78	0111000000100000
6534:48:27.9	0.00	0.00	61.57	0.06	-0.24	7.77	0111000000100000
6534:48:27.8	0.00	0.00	59.86	0.06	-0.24	7.77	0111000000100000
6534:48:27.7	0.00	0.00	63.88	0.06	-0.24	7.76	0111000000100000
6534:48:27.6	0.00	0.00	61.81	0.06	-0.24	7.75	0111000000110000
6534:48:27.5	0.00	0.00	61.81	0.03	-0.24	7.74	0111000000110000
6534:48:27.4	0.00	0.00	61.81	0.06	-0.30	7.74	0111000000110000
6534:48:27.3	0.00	0.00	56.38	0.06	-0.24	7.73	0111000000110000
6534:48:27.2	0.00	0.00	62.17	0.06	-0.24	7.72	0111000000110000
6534:48:27.1	0.00	0.00	59.02	0.06	-0.24	7.71	0111000000110000
6534:48:27.0	0.00	0.00	62.38	0.06	-0.24	7.71	0111000000110000
6534:48:26.9	0.00	0.00	63.64	0.03	-0.24	7.70	0111000000110000
6534:48:26.8	0.00	0.00	61.54	0.06	-0.24	7.69	0111000000110000
6534:48:26.7	0.00	0.00	61.55	0.06	-0.24	7.68	0111000000110000
6534:48:26.6	0.00	0.00	61.66	0.06	-0.24	7.68	0111000000110000

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6534:48:26.5	0.00	0.00	61.73	0.03	-0.24	7.67	0111000000100000
6534:48:26.4	0.00	0.00	61.78	0.06	-0.24	7.66	0111000000110000
6534:48:26.3	0.00	0.00	64.51	0.06	-0.24	7.65	0111000000110000
6534:48:26.2	0.00	0.00	62.94	0.06	-0.24	7.65	0111000000110000
6534:48:26.1	0.00	0.00	64.52	0.06	-0.24	7.64	0111000000110000
6534:48:26.0	0.00	0.00	62.25	0.06	-0.24	7.63	0111000000110000
6534:48:25.9	0.00	0.00	62.28	0.06	-0.24	7.62	0111000000110000
6534:48:25.8	0.00	0.00	58.48	0.06	-0.24	7.62	0111000000110000
6534:48:25.7	0.00	0.00	59.01	0.06	-0.24	7.61	0111000000110000
6534:48:25.6	0.00	0.00	60.63	0.06	-0.24	7.60	0111000000110000
6534:48:25.5	0.00	0.00	61.13	0.06	-0.24	7.59	0111000000110000
6534:48:25.4	0.00	0.00	61.79	0.06	-0.24	7.59	0111000000110000
6534:48:25.3	0.00	0.00	61.81	0.06	-0.24	7.58	0111000000110000
6534:48:25.2	0.00	0.00	60.25	0.06	-0.24	7.57	0111000000110000
6534:48:25.1	0.00	0.00	57.25	0.06	-0.24	7.56	0111000000110000
6534:48:25.0	0.00	0.00	61.28	0.06	-0.24	7.56	0111000000110000
6534:48:24.9	0.00	0.00	59.27	0.06	-0.24	7.55	0111000000110000
6534:48:24.8	0.00	0.00	62.13	0.03	-0.24	7.54	0111000000110000
6534:48:24.7	0.00	0.00	60.97	0.06	-0.24	7.53	0111000000110000
6534:48:24.6	0.00	0.00	58.06	0.03	-0.24	7.53	0111000000110000
6534:48:24.5	0.00	0.00	59.52	0.06	-0.24	7.52	0111000000110000
6534:48:24.4	0.00	0.00	60.82	0.06	-0.24	7.51	0111000000110000
6534:48:24.3	0.00	0.00	61.91	0.06	-0.24	7.50	0111000000110000
6534:48:24.2	0.00	0.00	60.54	0.06	-0.24	7.50	0111000000110000
6534:48:24.1	0.00	0.00	62.43	0.06	-0.24	7.49	0111000000110000
6534:48:24.0	0.00	0.00	62.23	0.06	-0.24	7.48	0111000000110000
6534:48:23.9	0.00	0.00	63.54	0.06	-0.24	7.47	0111000000110000
6534:48:23.8	0.00	0.00	65.05	0.06	-0.24	7.47	0111000000110000

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6534:48:23.7	0.00	0.00	65.04	0.06	-0.24	7.46	0111000000110000
6534:48:23.6	0.00	0.00	61.90	0.06	-0.24	7.45	0111000000110000
6534:48:23.5	0.00	0.00	62.96	0.06	-0.24	7.44	0111000000110000
6534:48:23.4	0.00	0.00	62.88	0.06	-0.24	7.44	0111000000110000
6534:48:23.3	0.00	0.00	61.66	0.06	-0.24	7.43	0111000000110000
6534:48:23.2	0.00	0.00	61.66	0.06	-0.24	7.42	0111000000110000
6534:48:23.1	0.00	0.00	61.58	0.06	-0.24	7.41	0111000000110000
6534:48:23.0	0.00	0.00	59.57	0.06	-0.24	7.41	0111000000110000
6534:48:22.9	0.00	0.00	61.99	0.06	-0.24	7.40	0111000000110000
6534:48:22.8	0.00	0.00	63.01	0.06	-0.24	7.39	0111000000110000
6534:48:22.7	0.00	0.00	63.51	0.06	-0.24	0.00	0111000000100000
6534:48:22.6	0.00	0.00	63.66	6.63	-49.85	0.00	0111000000110000
6534:48:22.5	0.00	0.00	55.25	6.63	-49.85	0.00	0111000000110000
6534:48:22.4	0.00	0.00	59.67	6.59	-49.73	0.00	0111000000110000
6534:48:22.3	0.00	0.00	58.06	6.59	49.61	0.00	0111000000110000
6534:48:22.2	0.00	0.00	56.54	6.02	44.52	0.00	0111000000100010
6534:48:22.1	0.00	0.00	59.16	0.03	-0.24	0.00	0111000000100010
6534:48:22.0	0.00	0.00	63.03	0.03	-0.24	0.00	0111000000100010
6534:48:21.9	0.00	0.00	61.58	0.00	0.00	0.00	0111000000110000
6534:48:21.8	0.00	0.00	59.77	0.00	0.00	0.00	0111000000110000
6534:48:21.7	0.00	0.00	53.49	0.00	0.00	0.00	0111000000110000

ENGINE EXCEEDANCES

EXCEED NO.	PEAK	(H:M:S. T)	TIME STAMP (H:M:S. T)	TYPE
------------	------	------------	--------------------------	------

Decc Serial Number	Download Count	Date/Time
045-CF0149	110	12/19/13 09:44

Total Number of N1 Exceedances = 0
N1 %

DURATION

Dec Serial Download
 Number Count Date/Time
 045-CF0149 110 12/19/13 09:44

Total Number of N2 Exceedances = 0
 N2 %

Dec Serial Download
 Number Count Date/Time
 045-CF0149 110 12/19/13 09:44

Total Number of ITT Exceedances = 0
 ITT degC

N1/N2 MAJOR SPEED CYCLES

BIN NO.	(%)	SPEED CYCLES	N2 SPEED (%)	MAJOR SPEED CYCLES
27	100.00	0	100.00	0
26	99.81	0	99.89	0
25	99.52	0	99.73	0
24	99.24	0	99.41	2
23	98.90	0	99.09	1
22	98.57	0	98.78	1
21	98.18	0	98.46	4
20	97.76	0	98.01	7
19	97.30	2	97.67	6
18	96.81	3	97.19	2
17	96.29	7	96.71	2
16	95.72	5	96.24	0
15	95.13	2	95.76	0
14	94.50	3	95.28	0
13	93.85	3	94.81	0
12	93.14	0	94.33	0
11	92.21	0	93.85	0
10	91.22	0	93.38	0
09	89.06	0	92.90	0
08	87.60	0	92.50	0
07	86.64	0	92.27	0
06	83.96	0	91.79	0
05	81.00	0	91.23	0
04	77.76	0	90.52	0
03	74.22	0	89.88	0
02	70.38	0	88.61	0
01	66.22	0	86.23	0

N1/N2 MAJOR THRUST REVERSOR SPEED CYCLES

SPEED	N2 SPEED	MAJOR SPEED
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N1 SPEED

BIN NO.	(%)	CYCLES	(%)	CYCLES
16	100.87	0	100.51	0
15	100.00	0	100.00	0
14	99.08	0	99.45	0
13	98.10	0	98.87	0
12	97.06	0	98.25	0
11	95.92	0	97.58	0
10	94.69	0	96.85	1
09	93.34	0	96.04	1
08	91.84	0	95.15	1
07	90.15	0	94.15	1
06	88.21	2	93.00	2
05	85.91	0	91.63	1
04	83.07	0	89.94	0
03	79.29	1	87.70	0
02	73.39	3	84.19	7
01	21.00	28	46.00	20

N1 MINOR SPEED BINS

Maximum N1 Speed (%)	BIN COUNT															
	25.37	26.57	28.23	30.55	33.55	37.20	41.52	46.50	52.15	58.47	65.44	73.09	81.39	90.36	100.00	
100.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
99.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
98.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
97.06	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
95.92	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	
94.69	0	0	0	0	0	0	0	0	0	0	0	0	3	10	0	
93.34	0	0	0	0	0	0	1	0	0	0	0	0	7	12	0	
91.84	0	0	0	0	0	0	0	0	1	0	0	0	3	6	0	
90.15	0	0	0	0	0	0	0	0	0	0	0	0	9	1	0	
88.21	0	0	0	0	0	0	0	0	0	1	0	0	5	0	0	
85.91	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	
83.07	0	0	0	2	0	0	0	0	0	0	0	1	2	0	0	
79.29	0	0	0	2	0	2	2	1	1	0	1	2	4	0	0	
73.39	0	0	0	3	4	5	7	7	9	2	5	19	2	0	0	
21.00	0	25	37	40	47	45	39	25	21	23	19	2	0	0	0	

Minimum N1 Speed (%)

N2 MINOR SPEED BINS

Maximum N2 Speed (%)	BIN COUNT															
	25.37	26.57	28.23	30.55	33.55	37.20	41.52	46.50	52.15	58.47	65.44	73.09	81.39	90.36	100.00	
100.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
100.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
99.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
98.87	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
98.25	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
97.58	1	0	0	0	0	0	0	1	0	1	1	0	1	9	0	
96.85	0	0	0	0	0	0	0	1	0	0	0	0	0	10	0	
96.04	1	0	1	1	0	0	0	0	0	0	0	0	3	6	0	
95.15	0	0	0	0	0	0	0	0	1	0	1	1	7	2	0	
94.15	0	0	0	0	0	0	0	0	2	0	0	1	8	0	0	

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93.00	0	0	0	0	2	0	1	0	0	0	0	0	0	14	0	0
91.63	3	0	0	1	1	1	0	2	0	1	1	1	10	9	0	0
89.94	1	0	1	1	2	1	1	1	1	0	2	2	45	9	0	0
87.70	1	0	1	0	1	1	1	0	3	2	2	68	33	0	0	0
84.19	0	1	0	0	0	0	0	0	0	2	4	38	33	0	0	0
46.00	3	55.58	56.37	57.36	58.74	60.52	62.69	65.26	68.22	71.57	75.32	79.47	84.01	88.95	94.28	100.00

Minimum N2 Speed (%)

46T00 PEAK/AVERAGE TEMPERATURE

BIN NO.	deg C	ITT (30 second average)	ITT (peak)
62		0	0
61	1030 to <1035	0	0
60	1025 to <1030	0	0
59	1020 to <1025	0	0
58	1015 to <1020	0	0
57	1010 to <1015	0	0
56	1005 to <1010	0	0
55	1000 to <1005	0	0
54		0	0
53	995 to <1000	0	0
52	990 to <995	0	0
51	985 to <990	0	0
50	980 to <985	0	0
49	975 to <980	0	0
48	970 to <975	0	0
47	965 to <970	0	0
46	960 to <965	0	0
45	955 to <960	0	0
44	950 to <955	0	0
43	945 to <950	0	0
42	940 to <945	0	0
41	935 to <940	0	0
40	930 to <935	0	0
39	925 to <930	0	0
38	920 to <925	0	0
37	915 to <920	0	0
36	910 to <915	0	0
35	905 to <910	0	0
34	900 to <905	0	0
33	895 to <900	0	0
32	890 to <895	0	0
31	885 to <890	0	0
30	880 to <885	0	0
29	875 to <880	0	0
28	870 to <875	0	0
27	865 to <870	0	0
26	860 to <865	1	0
25	855 to <860	0	0
24	850 to <855	0	0
23	845 to <850	4	0
22	840 to <845	0	1
21	835 to <840	0	1
	830 to <835	0	2

ITT (degC)	MINOR	BINS	Maximum	ITT (degC)	BIN	COUNT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1025	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
925	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
875	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
825	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
775	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
750	3	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
725	7	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
700	4	3	9	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
675	3	8	13	11	4	2	4	18	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
650	1	5	9	10	5	1	9	30	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
625	0	2	6	9	3	4	16	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
600	1	2	6	7	8	19	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
575	0	1	8	15	15	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
550	0	1	9	33	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
525	1	3	29	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
500																											
475																											

450	0	7	17																		
425	2	5		425	450	475	500	525	550	575	600	625	650	675	700	725	750	775	800	825	850
379	2			900	925	950	975	1000	1025	1050											

Minimum ITT (degC)

PLA USAGE PROFILE

BIN NO.	DEGREES	PLA BINS (5 second peak)
01		
02		
03	20 to <26	
04	26 to <30	4262
05	30 to <40	0
06	40 to <50	115
07	50 to <60	97
08A	60 to <70	1169
09	70 to <74	967
10	74 to <77	820
11	77 to <80	805
12	80 to <83	1073
13	83 to <86	1232
14	86 to <89	1710
15	89 to <92	2338
16	92 to <95	2535
17	95 to <98	
18	102 to <105	639
19	105 to <108	845
20	108 to <110	358
21	110 to <113	1949
22	113 to <117	464
23	117 to <123	202
24	above 123	89

Maximum Delta Pressure Ratios	BIN COUNT																
1.027	66	1	0	0	0	0	0	0	0	0	2	22	11	7	12	10	354
1.000	2	0	0	0	0	0	0	0	0	0	2	0	1	0	4	0	
0.972	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	
0.944	4	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	
0.914	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	
0.884	4	1	0	0	0	0	0	0	0	0	2	0	0	4	0	0	
0.853	2	4	0	0	0	0	0	0	0	0	2	2	1	0	0	0	
0.820	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	
0.787	4	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	
0.751	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0	
0.714	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	
0.673	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
0.630	10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
0.581	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0.522	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

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0.423 0 0.09 0.13 0.17 0.23 0.28 0.35 0.41 0.48 0.55 0.62 0.69 0.77 0.84 0.92 1.00
Minimum Delta Pressure Ratios

0.00

Appendix K

N1 DEEC Data File Chronology, Left Engine P-74717
(4 Pages)

DATA FILE CHRONOLOGY

Honeywell E&S

TFE731 TURBOFAN ENGINES

Engine Serial Number
074717

DEEC Serial Number	Download Count	Date/Time
045-CF0149	110	12/19/13 09:44

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT
6534:49:21.2	0:11:21.6	Slow Scan 2 end Manual Mode Transfer event
6534:48:32.5	0:10:32.9	Fast Scan 2 end Manual Mode Transfer event
6534:48:26.6	0:10:27.0	Slow Scan 2 begin Manual Mode Transfer event
6534:48:22.5	0:10:22.9	Aircraft Take Off
		Landing without Shutdown
6534:48:21.8	0:10:22.2	Manual Mode Transfer
6534:48:21.8	0:10:22.2	Fault number 38
6534:48:21.7	0:10:22.1	Fault number 211
6534:48:21.7	0:10:22.1	Fast Scan 2 begin Manual Mode Transfer event
6534:48:21.6	0:10:22.0	Fault number 26
6534:48:21.6	0:10:22.0	Fault number 237
6534:48:21.6	0:10:22.0	Fault number 237
6534:47:21.9	0:09:22.3	Manual Mode Transfer
6534:47:21.9	0:09:22.3	Fault number 237
6534:47:21.8	0:09:22.2	Fault number 43
6534:46:40.1	0:08:40.5	Aircraft Take Off
6534:37:59.6		Engine Start

Flight Number 26 Start

Flight Number 25 End

6532:46:09.1	3:24:33.1	Engine Rolldown
6529:33:39.9	0:12:03.9	Engine Cruise Performance
6529:23:26.7	0:01:50.7	Aircraft Take Off
6529:21:36.0		Engine Start

Flight Number 25 Start

Flight Number 24 End

6529:04:21.8	2:04:08.5	Engine Rolldown
6527:14:31.3	0:14:18.0	Engine Cruise Performance
6527:03:25.9	0:03:12.6	Aircraft Take Off
6527:00:13.3		Engine Start

Flight Number 24 Start

Flight Number 23 End

6526:51:58.0	2:03:37.1	Engine Rolldown
6525:01:09.0	0:12:48.1	Engine Cruise Performance
6524:55:19.4	0:06:58.5	Aircraft Take Off
6524:48:20.9		Engine Start

Flight Number 23 Start

Flight Number 22 End

6524:24:11.6	3:47:47.0	Engine Rolldown
6520:44:41.3	0:08:16.7	Engine Cruise Performance
6520:41:41.1	0:05:16.5	Aircraft Take Off
6520:36:24.6		Engine Start

Flight Number 22 Start

Flight Number 21 End

6517:15:22.3	0:11:22.7	Engine Rolldown
		Engine Cruise Performance

DATA FILE CHRONOLOGY

Engine Serial Number
074717

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT
6517:11:59.3	0:07:59.7	Aircraft Take Off
6517:03:59.6		Engine Start
Flight Number 21 Start		
Flight Number 20 End		
6512:56:10.2	1:14:04.1	Engine Rolldown
6511:56:26.0	0:14:19.9	Engine Cruise Performance
6511:48:18.1	0:06:12.0	Aircraft Take Off
6511:42:06.1		Engine Start
Flight Number 20 Start		
Flight Number 19 End		
6511:05:36.5	1:32:49.2	Engine Rolldown
6509:46:27.4	0:13:40.1	Engine Cruise Performance
6509:42:36.5	0:09:49.2	Aircraft Take Off
6509:32:47.3		Engine Start
Flight Number 19 Start		
Flight Number 18 End		
6508:21:05.7	0:43:45.4	Engine Rolldown
6507:52:36.9	0:15:16.6	Engine Cruise Performance
6507:45:27.2	0:08:06.9	Aircraft Take Off
6507:37:20.3		Engine Start
Flight Number 18 Start		
Flight Number 17 End		
6507:35:00.0	0:41:03.7	Engine Rolldown
6507:06:13.3	0:12:17.0	Engine Cruise Performance
6507:01:02.2	0:07:05.9	Aircraft Take Off
6506:53:56.3		Engine Start
Flight Number 17 Start		
Flight Number 16 End		
6506:33:45.1	0:40:37.3	Engine Rolldown
6505:57:49.6	0:04:41.8	Engine Cruise Performance
6505:54:49.4	0:01:41.6	Aircraft Take Off
6505:53:07.8		Engine Start
Flight Number 16 Start		
Flight Number 15 End		
6505:47:53.5	0:44:16.7	Engine Rolldown
6505:23:38.3	0:20:01.5	Engine Cruise Performance
6505:16:18.1	0:12:41.3	Aircraft Take Off
6505:03:36.8		Engine Start
Flight Number 15 Start		
Flight Number 14 End		
6500:55:49.8	0:12:16.1	Engine Rolldown
6500:46:07.4	0:02:33.7	Engine Cruise Performance
6500:43:33.7		Aircraft Take Off
		Engine Start
Flight Number 14 Start		

DATA FILE CHRONOLOGY

Engine Serial Number
074717

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT

Flight Number 13 End		
6500:34:10.9	2:08:14.5	Engine Rolldown
6498:45:31.6	0:19:35.2	Engine Cruise Performance
6498:32:25.3	0:06:28.9	Aircraft Take Off
6498:25:56.4		Engine Start
Flight Number 13 Start		
Flight Number 12 End		
6497:49:33.4	1:08:04.8	Engine Rolldown
6497:49:33.4	1:08:04.8	Fault number 242
6496:48:33.5	0:07:04.9	Engine Cruise Performance
6496:45:33.3	0:04:04.7	Aircraft Take Off
6496:41:28.6		Engine Start
Flight Number 12 Start		
Flight Number 11 End		
6495:34:46.4	1:04:08.6	Engine Rolldown
6494:40:49.2	0:10:11.4	Engine Cruise Performance
6494:35:15.9	0:04:38.1	Aircraft Take Off
6494:30:37.8		Engine Start
Flight Number 11 Start		
Flight Number 10 End		
6494:18:54.5	1:04:32.0	Engine Rolldown
6493:24:19.4	0:09:56.9	Engine Cruise Performance
6493:20:18.0	0:05:55.5	Aircraft Take Off
6493:14:22.5		Engine Start
Flight Number 10 Start		
Flight Number 9 End		
6482:22:01.5	1:17:29.5	Engine Rolldown
6481:15:21.6	0:10:49.6	Engine Cruise Performance
6481:12:21.4	0:07:49.4	Aircraft Take Off
6481:04:32.0		Engine Start
Flight Number 9 Start		
Flight Number 8 End		
6480:45:05.4	1:22:05.8	Engine Rolldown
6479:33:31.3	0:10:31.7	Engine Cruise Performance
6479:30:31.1	0:07:31.5	Aircraft Take Off
6479:22:59.6		Engine Start
Flight Number 8 Start		
Ground Run Number 1 End		
6477:42:08.1	0:00:00.9	Engine Rolldown
6477:42:07.2		Engine Start
Ground Run Number 1 Start		
Flight Number 7 End		
6476:35:55.0	0:08:41.6	Engine Rolldown
6476:27:13.4		Aircraft Take Off
6476:27:13.4		Engine Start
Flight Number 7 Start		

DATA FILE CHRONOLOGY

Engine Serial Number
074717

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT

Flight Number 6 End		
6475:12:20.6	0:54:40.0	Engine Rolldown
6474:25:25.3	0:07:44.7	Aircraft Take Off
6474:17:40.6		Engine Start
Flight Number 6 Start		
Flight Number 5 End		
6474:14:19.3	0:53:43.0	Engine Rolldown
6473:42:21.6	0:21:45.3	Engine Cruise Performance
6473:30:53.0	0:10:16.7	Aircraft Take Off
6473:20:36.3		Engine Start
Flight Number 5 Start		
Flight Number 4 End		
6472:58:25.7	1:09:12.0	Engine Rolldown
6472:05:07.3	0:15:53.6	Engine Cruise Performance
6471:55:32.9	0:06:19.2	Aircraft Take Off
6471:49:13.7		Engine Start
Flight Number 4 Start		
Flight Number 3 End		
6471:20:54.0	1:10:22.3	Engine Rolldown
6470:23:19.6	0:12:47.9	Engine Cruise Performance
6470:17:15.3	0:06:43.6	Aircraft Take Off
6470:10:31.7		Engine Start
Flight Number 3 Start		
Flight Number 2 End		
6468:15:46.2	0:29:24.6	Engine Rolldown
6467:56:31.4	0:10:09.8	Engine Cruise Performance
6467:53:31.2	0:07:09.6	Aircraft Take Off
6467:46:21.6		Engine Start
Flight Number 2 Start		
Flight Number 1 End		
6467:19:56.5	0:07:59.3	Engine Rolldown
6467:16:56.3	0:04:59.1	Engine Cruise Performance
6467:11:57.2		Aircraft Take Off
		Engine Start
Flight Number 1 Start		

Appendix L

N1 DEEC Data File Chronology, Right Engine P-74715
(4 Pages)

DATA FILE CHRONOLOGY

Honeywell E&S

TFE731 TURBOFAN ENGINES

Engine Serial Number
074715

DEEC Serial Number	Download Count	Date/Time
045-CF0152	47	12/19/13 09:39

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT
6564:30:57.2	0:11:20.2	Slow Scan 2 end Manual Mode Transfer event
6564:30:08.1	0:10:31.1	Fast Scan 2 end Manual Mode Transfer event
6564:30:02.2	0:10:25.2	Slow Scan 2 begin Manual Mode Transfer event
6564:29:58.2	0:10:21.2	Fault number 237
6564:29:58.1	0:10:21.1	Aircraft Take Off
		Landing without Shutdown
6564:29:57.4	0:10:20.4	Manual Mode Transfer
6564:29:57.4	0:10:20.4	Fault number 38
6564:29:57.3	0:10:20.3	Fault number 211
6564:29:57.3	0:10:20.3	Fast Scan 2 begin Manual Mode Transfer event
6564:29:57.2	0:10:20.2	Fault number 26
6564:28:44.5	0:09:07.5	Aircraft Take Off
6564:19:37.0		Engine Start

Flight Number 26 Start

Flight Number 25 End

6562:21:51.9	3:29:35.5	Engine Rolldown
6559:09:07.6	0:16:51.2	Engine Cruise Performance
6559:05:31.6	0:13:15.2	Aircraft Take Off
6558:52:16.4		Engine Start

Flight Number 25 Start

Flight Number 24 End

6558:44:08.7	2:07:25.5	Engine Rolldown
6556:48:30.3	0:11:47.1	Engine Cruise Performance
6556:45:30.1	0:08:46.9	Aircraft Take Off
6556:36:43.2		Engine Start

Flight Number 24 Start

Ground Run Number 3 End

6556:35:57.5	0:00:00.9	Engine Rolldown
6556:35:56.6		Engine Start

Ground Run Number 3 Start

Flight Number 23 End

6556:35:29.4	2:06:02.4	Engine Rolldown
6554:41:44.8	0:12:17.8	Engine Cruise Performance
6554:36:55.5	0:07:28.5	Aircraft Take Off
6554:29:27.0		Engine Start

Flight Number 23 Start

Flight Number 22 End

6550:26:16.7	0:12:50.2	Engine Rolldown
6550:23:16.5	0:09:50.0	Engine Cruise Performance
6550:13:26.5		Aircraft Take Off
		Engine Start

Flight Number 22 Start

Flight Number 21 End

DATA FILE CHRONOLOGY

Engine Serial Number
074715

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT
6549:52:46.9	3:24:15.5	Engine Rolldown
6546:57:58.9	0:29:27.5	Engine Cruise Performance
6546:53:35.8	0:25:04.4	Aircraft Take Off
6546:28:31.4		Engine Start
Flight Number 21 Start		
Flight Number 20 End		
6542:41:28.6	1:27:33.6	Engine Rolldown
6541:35:41.7	0:21:46.7	Engine Cruise Performance
6541:29:54.5	0:15:59.5	Aircraft Take Off
6541:13:55.0		Engine Start
Flight Number 20 Start		
Flight Number 19 End		
6540:53:30.1	1:39:44.5	Engine Rolldown
6539:28:08.9	0:14:23.3	Engine Cruise Performance
6539:24:13.5	0:10:27.9	Aircraft Take Off
6539:13:45.6		Engine Start
Flight Number 19 Start		
Flight Number 18 End		
6538:05:29.6	0:47:36.6	Engine Rolldown
6537:34:12.2	0:16:19.2	Engine Cruise Performance
6537:27:01.6	0:09:08.6	Aircraft Take Off
6537:17:53.0		Engine Start
Flight Number 18 Start		
Flight Number 17 End		
6537:17:28.8	0:44:39.1	Engine Rolldown
6536:46:32.0	0:13:42.3	Engine Cruise Performance
6536:41:20.9	0:08:31.2	Aircraft Take Off
6536:32:49.7		Engine Start
Flight Number 17 Start		
Flight Number 16 End		
6536:16:12.2	0:47:02.2	Engine Rolldown
6535:38:06.9	0:08:56.9	Engine Cruise Performance
6535:35:06.7	0:05:56.7	Aircraft Take Off
6535:29:10.0		Engine Start
Flight Number 16 Start		
Flight Number 15 End		
6535:28:11.4	0:43:06.5	Engine Rolldown
6535:05:43.3	0:20:38.4	Engine Cruise Performance
6534:58:18.5	0:13:13.6	Aircraft Take Off
6534:45:04.9		Engine Start
Flight Number 15 Start		
Flight Number 14 End		
6530:37:49.0	0:15:34.9	Engine Rolldown
6530:28:06.8	0:05:52.7	Engine Cruise Performance
6530:22:14.1		Aircraft Take Off
		Engine Start
Flight Number 14 Start		

DATA FILE CHRONOLOGY

Engine Serial Number
074715

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT

Flight Number 13 End		
6530:16:10.9	2:06:14.4	Engine Rolldown
6528:29:54.7	0:19:58.2	Engine Cruise Performance
6528:17:01.8	0:07:05.3	Aircraft Take Off
6528:09:56.5		Engine Start
Flight Number 13 Start		
Flight Number 12 End		
6527:34:10.1	1:21:24.7	Engine Rolldown
6526:31:48.7	0:19:03.3	Engine Cruise Performance
6526:27:09.9	0:14:24.5	Aircraft Take Off
6526:12:45.4		Engine Start
Flight Number 12 Start		
Flight Number 11 End		
6525:19:05.2	1:11:44.2	Engine Rolldown
6524:22:34.6	0:15:13.6	Engine Cruise Performance
6524:16:51.3	0:09:30.3	Aircraft Take Off
6524:07:21.0		Engine Start
Flight Number 11 Start		
Flight Number 10 End		
6524:00:31.4	1:04:24.0	Engine Rolldown
6523:10:24.9	0:14:17.5	Engine Cruise Performance
6523:02:42.1	0:06:34.7	Aircraft Take Off
6522:56:07.4		Engine Start
Flight Number 10 Start		
Flight Number 9 End		
6512:06:31.1	1:22:41.1	Engine Rolldown
6510:55:16.8	0:11:26.8	Engine Cruise Performance
6510:52:16.6	0:08:26.6	Aircraft Take Off
6510:43:50.0		Engine Start
Flight Number 9 Start		
Flight Number 8 End		
6510:27:59.2	1:25:38.1	Engine Rolldown
6509:13:26.5	0:11:05.4	Engine Cruise Performance
6509:10:26.3	0:08:05.2	Aircraft Take Off
6509:02:21.1		Engine Start
Flight Number 8 Start		
Ground Run Number 2 End		
6507:22:03.0	0:00:00.9	Engine Rolldown
6507:22:02.1		Engine Start
Ground Run Number 2 Start		
Flight Number 7 End		
6506:16:30.5	0:13:57.1	Engine Rolldown
6506:02:33.4		Aircraft Take Off
6506:02:33.4		Engine Start
Flight Number 7 Start		

DATA FILE CHRONOLOGY

Engine Serial Number
074715

DEEC TIME STAMP (H:M:S. T)	ELAPSED TIME (H:M:S. T)	EVENT

Flight Number 6 End		
6504:56:56.7	0:59:10.2	Engine Rolldown
6504:10:47.2	0:13:00.7	Engine Cruise Performance
6504:05:59.0	0:08:12.5	Aircraft Take Off
6503:57:46.5		Engine Start
Flight Number 6 Start		
Flight Number 5 End		
6503:56:55.9	0:56:21.2	Engine Rolldown
6503:17:06.0	0:16:31.3	Engine Cruise Performance
6503:11:26.8	0:10:52.1	Aircraft Take Off
6503:00:34.7		Engine Start
Flight Number 5 Start		
Flight Number 4 End		
6502:41:33.7	1:12:14.4	Engine Rolldown
6501:39:06.1	0:09:46.8	Engine Cruise Performance
6501:36:05.9	0:06:46.6	Aircraft Take Off
6501:29:19.3		Engine Start
Flight Number 4 Start		
Flight Number 3 End		
6501:02:56.2	1:12:23.3	Engine Rolldown
6500:19:49.3	0:29:16.4	Engine Cruise Performance
6499:57:48.8	0:07:15.9	Aircraft Take Off
6499:50:32.9		Engine Start
Flight Number 3 Start		
Flight Number 2 End		
6497:56:55.4	0:30:26.9	Engine Rolldown
6497:38:56.0	0:12:27.5	Engine Cruise Performance
6497:34:04.3	0:07:35.8	Aircraft Take Off
6497:26:28.5		Engine Start
Flight Number 2 Start		
Ground Run Number 1 End		
6497:20:54.6	0:00:00.9	Engine Rolldown
6497:20:53.7		Engine Start
Ground Run Number 1 Start		
Flight Number 1 End		
6497:00:01.4	0:08:33.1	Engine Rolldown
6496:57:01.2	0:05:32.9	Engine Cruise Performance
6496:51:28.3		Aircraft Take Off
		Engine Start
Flight Number 1 Start		

Appendix M

N1 DEEC Fault History, Left Engine P-74717

(1 Page)

ENGINE FAULT HISTORY

Honeywell E&S

TFE731 TURBOFAN ENGINES

Engine Serial Number
074717

DEEC Serial Number	Download Count	Date/Time
045-CF0149	110	12/19/13 09:44

NO.	TIME STAMP (H:M:S. T)	FAULT SEVERITY CODE	FAULT CODE	LRU	FAULT DESCRIPTION
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Deec Serial Number	Download Count	Date/Time
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Total Number of Faults = 8

1	6534:48:21.8	4	38	TT2	TT2 Short Circuit (TT2 < 190 ohms)
2	6534:48:21.7	4	211	FCU	Fuel Control PLA Circuit Failure
3	6534:48:21.6	2	26	ITT	ITT thermocouple circuit open Circuit fail, Defaults to 260 C
4	6534:48:21.6	2	237	NOTICE	ECTM Data buffers filled. Download Required to prevent data loss.
5	6534:48:21.6	2	237	NOTICE	ECTM Data buffers filled. Download Required to prevent data loss.
6	6534:47:21.9	2	237	NOTICE	ECTM Data buffers filled. Download Required to prevent data loss.
7	6534:47:21.8	4	43	DEEC/	Total Pressure rate change fail
8	6497:49:33.4	1	242	DEEC	ECTM data checksum failed. Download ECTM data as soon as possible

Appendix N

N1 DEEC Fault History, Right Engine P-74715

(1 Page)

ENGINE FAULT HISTORY

Honeywell E&S

TFE731 TURBOFAN ENGINES

Engine Serial Number
074715

DEEC Serial Number	Download Count	Date/Time
045-CF0152	47	12/19/13 09:39

NO.	TIME STAMP (H:M:S.T)	FAULT SEVERITY CODE	FAULT CODE	LRU	FAULT DESCRIPTION
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Deec Serial Number	Download Count	Date/Time
045-CF0152	47	12/19/13 09:39

Total Number of Faults = 4

1	6564:29:58.2	2	237	NOTICE	ECTM Data buffers filled. Download Required to prevent data loss.
2	6564:29:57.4	4	38	TT2	TT2 Short Circuit (TT2 < 190 ohms)
3	6564:29:57.3	4	211	FCU	Fuel Control PLA Circuit Failure
4	6564:29:57.2	2	26	ITT	ITT thermocouple circuit open

Appendix O

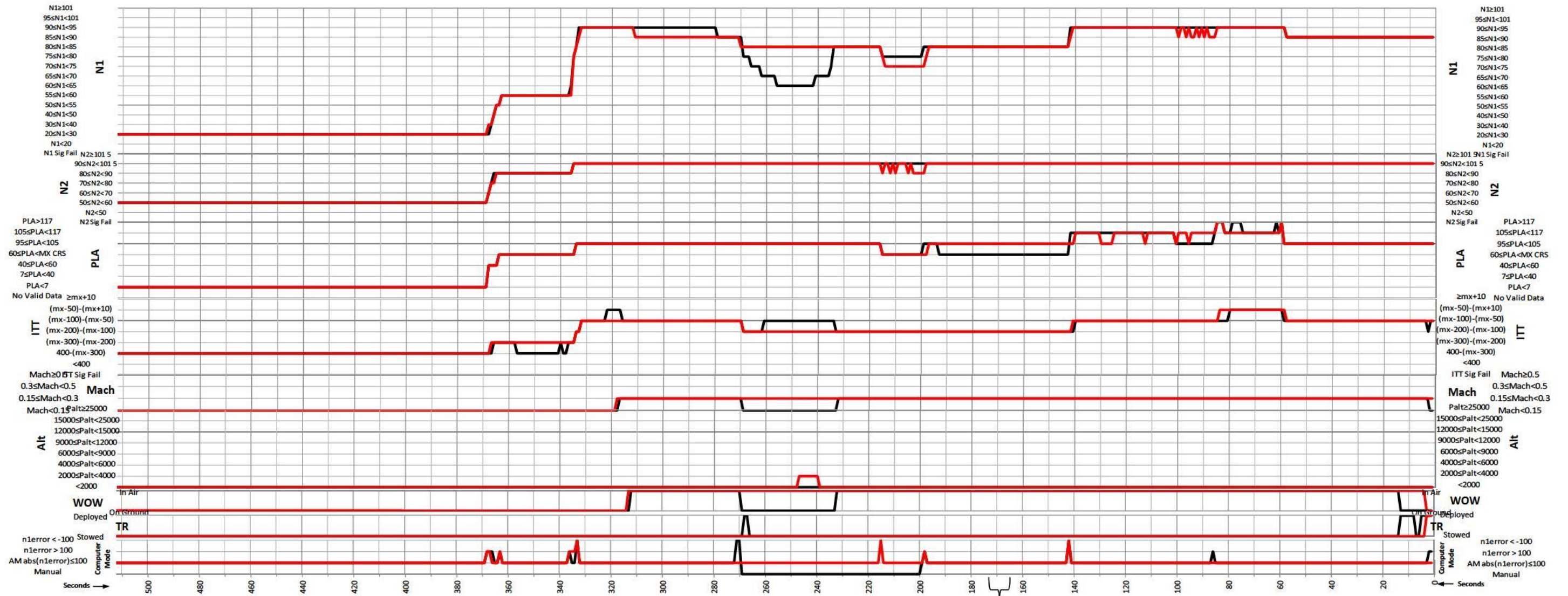
Plots of All Data Parameters, Left and Right Engines, 1-512 Seconds with 9 Second Alignment Adjustment

(1 page)

AirEvac, Learjet 35A, XA-USD
 Ft Lauderdale, FL, November 19, 2013
 1-512 Seconds of Data (with 9 second correction)

P74717 Eng 1: Left Engine S/N

P74715 Eng 2: Right Engine S/N



164-172
 Time area where 9 seconds of
 duplicate data is added for correction
 to left engine data.

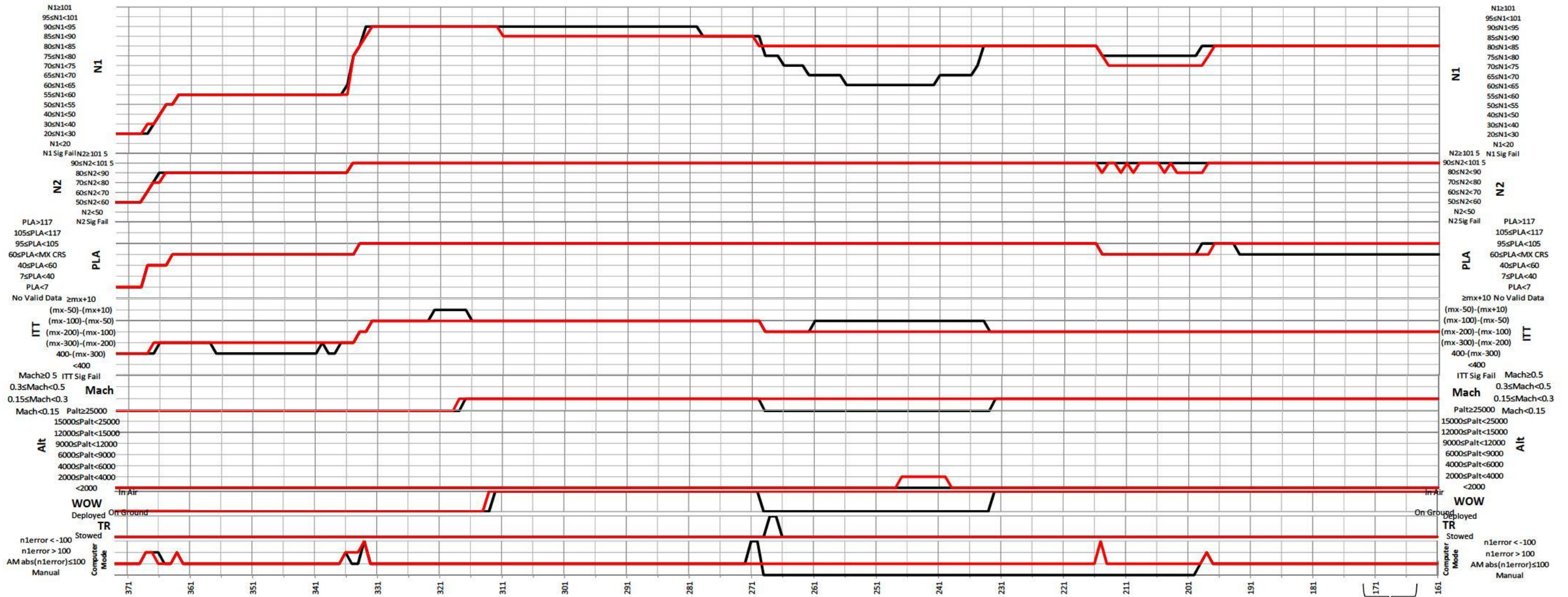
Appendix P

Plots of All Data Parameters, Left and Right Engines,
161–373 Seconds with 9 Second Alignment Adjustment
(1 page)

AirEvac, Learjet 35A, XA-USD
Ft Lauderdale, FL, November 19, 2013
161-373 Seconds of Data (with 9 second correction)

P74717 Eng 1: Left Engine S/N

P74715 Eng 2: Right Engine S/N

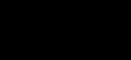
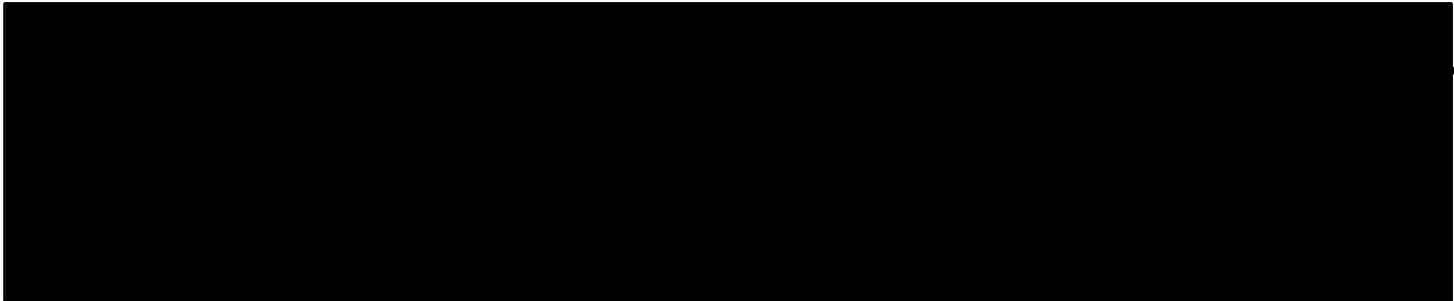


164-172
 Time area where 9 seconds of
 duplicate data is added for correction
 to left engine data.

Appendix Q

NTSB Email Confirmation of Unit Serial Numbers

(1 page)



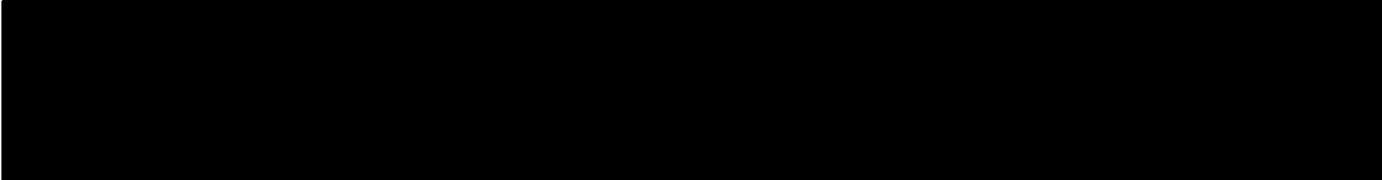
I confirm your labelling.

Thus, the labelling relationship:

NTSB#A = Unit Serial Number 45-CF0149

NTSB#B = Unit Serial Number 45-CF0152

Thanks for the photos and working with me to resolve this issue.



Got the units in this morning. Got them out of the boxes and initial rinse completed.

Attached are two photos in which I have placed a label which, based on [redacted] email, should be identified correctly. [redacted] please confirm the photos with the ID labels are correct.

