

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



DCA25LA163

FLIGHT DATA RECORDER

Specialist's Factual Report

September 18, 2025

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A. INCIDENT

Location: Orlando, Florida
Date: March 20, 2025
Time: 0930 eastern daylight time (EDT)
1330 coordinated universal time (UTC)
Airplane: Boeing 737-8H4, Southwest Airlines, N8315C

B. FLIGHT DATA RECORDER SPECIALIST

Specialist: Steven Smith
Mechanical Engineer (Recorder Specialist)
National Transportation Safety Board (NTSB)

C. FEDERAL CARRIAGE REQUIREMENTS

The event aircraft, N8315C, was operating as Title 14 *Code of Federal Regulations* (CFR) Part 121 scheduled passenger flight. The event aircraft was manufactured in 2012 and was operating such that it was required to be equipped with a flight data recorder (FDR) that recorded, at a minimum, 91 parameters, as cited in 14 CFR Part 121.344(f).

D. DETAILS OF THE INVESTIGATION

An FDR group was not convened. The NTSB Vehicle Recorder Division received the following FDR:

Recorder Manufacturer/Model: Honeywell HFR5-D
Part Number: 980-4750-009
Recorder Serial Number: FDR-03004

1.0 Honeywell HFR5-D Description

The Honeywell HFR5-D records airplane flight information in a digital format using solid-state flash memory as the recording medium. The HFR5-D can receive data in the ARINC 573/717/747 configurations and can record a minimum of 25 hours of flight data. It is configured to record 512 12-bit words of digital information every second. Each grouping of 512 words (each second) is called a subframe. Each subframe has a unique 12-bit synchronization (sync) word identifying it as subframe 1, 2, 3, or 4. The sync word is the first word in each subframe. The data stream is "in sync" when successive sync words appear at proper 512-word intervals. Each data parameter (for example, altitude, heading, and airspeed) has a specifically

assigned word number within the subframe. The HFR5-D is designed to meet the crash-survivability requirements of TSO-C124b

1.1 Recorder Condition

The recorder was in good condition and the data were extracted normally from the recorder.

1.2 Recording Description

The FDR recording contained 55.77 hours of data. Timing of the FDR data is measured in subframe reference number (SRN), where each SRN equals one elapsed second. The event flight was the last flight of the recording, and its duration was approximately 46 minutes. The parameters evaluated for the purpose of this report appeared to be in accordance with federal FDR carriage requirements.

1.3 Engineering Unit Conversions

The engineering unit conversions used for the data contained in this report are based on documentation from the aircraft manufacturer. Where applicable, the conversions have been changed to ensure that the parameters conform to the NTSB's standard sign convention that climbing right turns are positive (CRT=+).¹

Table 1 in appendix A lists the FDR parameters verified and provided in this report. Additionally in appendix A, table 2 describes the unit and discrete state abbreviations used in this report.

1.4 Latitude/Longitude

The latitude and longitude parameters are 20 bits and 21 bits in length, respectively. At Orlando International Airport (KMCO), the latitude parameter has a resolution of about 63 feet and the longitude parameter has a resolution of about 55 feet. Therefore, the Google Earth overlay presented in Section E utilizes higher precision Automatic Dependent Surveillance-Broadcast (ADS-B) latitude and longitude.²

¹ CRT=+ means that for any parameter recorded that indicates a climb or a right turn, the sign for that value is positive. Also, for any parameter recorded that indicates an action or deflection, if it induces a climb or right turn, the value is positive. Examples: Right Roll = +, Left Aileron Trailing Edge Down = -, Right Aileron Trailing Edge Up = +, Pitch Up = +, Elevator Trailing Edge Up = +, Right Rudder = +.

² The ADS-B data that the NTSB Vehicle Recorder Laboratory received was provided by the Federal Aviation Administration (FAA).

1.5 Time Correlation

Correlation of the FDR data from SRN to the event local time, EDT, was established by using the recorded Greenwich mean time (GMT) Hours, GMT Minutes, and GMT Seconds and then applying an additional 4 hour offset to change GMT to EDT.³

Accordingly, the time offset for the event flight data from SRN to local EDT is the following: EDT = SRN - 156,660. Therefore, for the rest of this report, all times are referenced as EDT, not SRN.

E. FIGURES AND TABULAR DATA

Figures 1 and 2 contain FDR data recorded during the event on March 20, 2025. All the parameters listed in table 1 are plotted except GMT Hours, GMT Minutes, GMT Seconds, Key VHF-1, and Key VHF-2.

Figures 1 and 2 are time history plots of general parameters from 09:29:00 EDT to 09:32:00 EDT and 09:30:00 EDT to 09:30:40 EDT, respectively.

These figures are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

The ADS-B and FDR data indicated the following sequences of events:

- **09:25:18 EDT:** Ground speed began to increase from 0 knots (kts), consistent with the aircraft beginning to taxi.
- **09:26:01 EDT:** The aircraft position data began recording via ADS-B. The aircraft was on the north-northwest side of AIRSIDE 2 headed northeast, perpendicular to taxiway juliet 3.⁴
- **09:26:16 EDT:** Both engines 1 and 2 TRA were reduced to 35.7 degree (deg).
- **09:27:26 EDT:** Ground speed was 0 kts. The aircraft was on the east side of AIRSIDE 2, on the ramp, facing south, and perpendicular to taxiway hotel 1.
- **09:27:33 EDT:** Main brake pressure began to increase to approximately 3000 pounds per square inch (psi).
- **09:29:03 EDT:** Main brake pressure began to reduce to approximately 55 psi.

³ GMT is Greenwich mean time which is also known as UTC.

⁴ Reference figure 4 for airport diagram of KMCO and location of AIRSIDE 2.

- **09:29:04 EDT:** Engine 1 TRA began to increase to 41.7 deg. Less than one second later, engine 2 TRA began to increase to 40.6 deg.
- **09:29:06 EDT:** Ground speed began to increase from 0 kts, consistent with the aircraft continuing to taxi.
- **09:29:27 EDT:** Engines 1 and 2 TRA were 44.1 deg. Engine 1 and 2 N1 commands were 38.8 percent revolutions per minute (%RPM). Ground speed was 6 kts.
- **09:29:34 EDT:** The aircraft began a left turn onto taxiway hotel 2. Ground speed was 9 kts.
- **09:30:00 EDT:** The aircraft began a right turn onto taxiway hotel. The ground speed was 14 kts.
- **09:30:04 EDT:** Engines 1 and 2 TRA began to increase.
- **09:30:10 EDT:** Engines 1 and 2 TRA were 71.4 deg. Engines 1 and 2 N1 commands were 90.6 %RPM and 90.9 %RPM, respectively. Engines 1 and 2 N1 were 90.0 %RPM and 90.8 %RPM, respectively. Ground speed was 28 kts and rapidly increasing.
- **09:30:18 EDT:** The aircraft reached a maximum of 71 kts computed airspeed and 65 kts ground speed. Main brake pressure began to increase. The auto brakes were not active, speed brake handle remained in the down position, ground spoilers were not up, and engines 1 and 2 thrust reversers were never in transit. The aircraft had traveled approximately 800 feet from taxiway hotel 2 down taxiway hotel.
- **09:30:19 EDT:** Computed airspeed and ground speed rapidly began to decrease.
- **09:30:34 EDT:** The aircraft made a right turn onto taxiway hotel 3. Shortly thereafter, the aircraft made another right turn onto taxiway golf.
- The aircraft would taxi back to the gate via taxiway golf to golf 1. The aircraft stopped and held short of taxiway hotel 2 before continuing on to the ramp back to the gate.
- **10:08:48 EDT:** The last recorded sample. The aircraft was back at the gate.

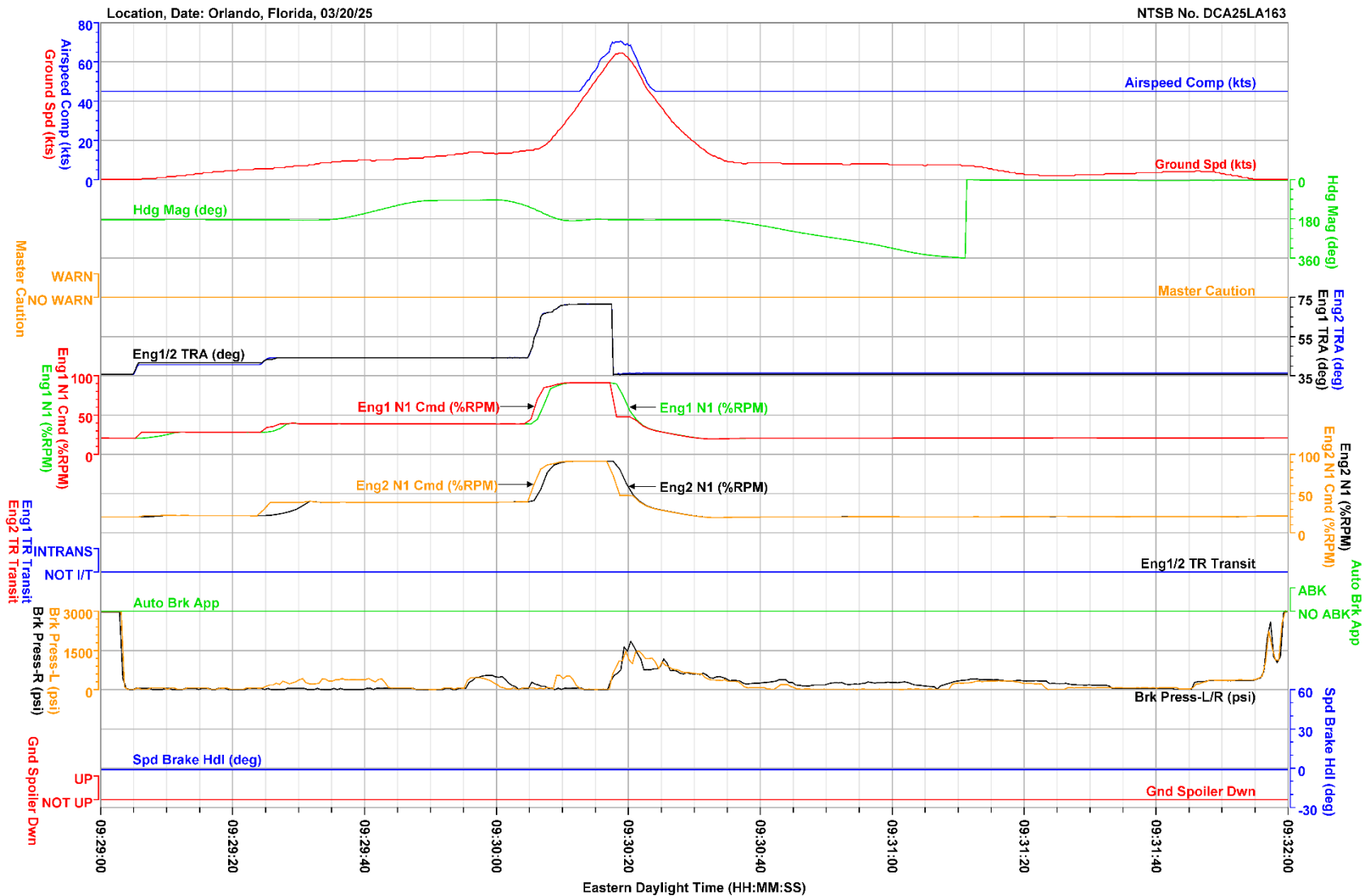
The corresponding tabular data used to create figures 1 and 2, including GMT Hours, GMT Minutes, GMT Seconds, Key VHF-1, and Key VHF-2 are provided in electronic comma-separated value (CSV) format as attachment 1 to this report.

Figure 3 is an overlay of ADS-B data for the event. The weather and lighting conditions in Google Earth are not necessarily representative of the weather and lighting conditions present at the time of the recording. Figure 4 is the Jeppesen airport diagram for KMCO.

The corresponding tabular data used to create figure 3 are provided in CSV format as attachment 2 to this report.

Submitted by:

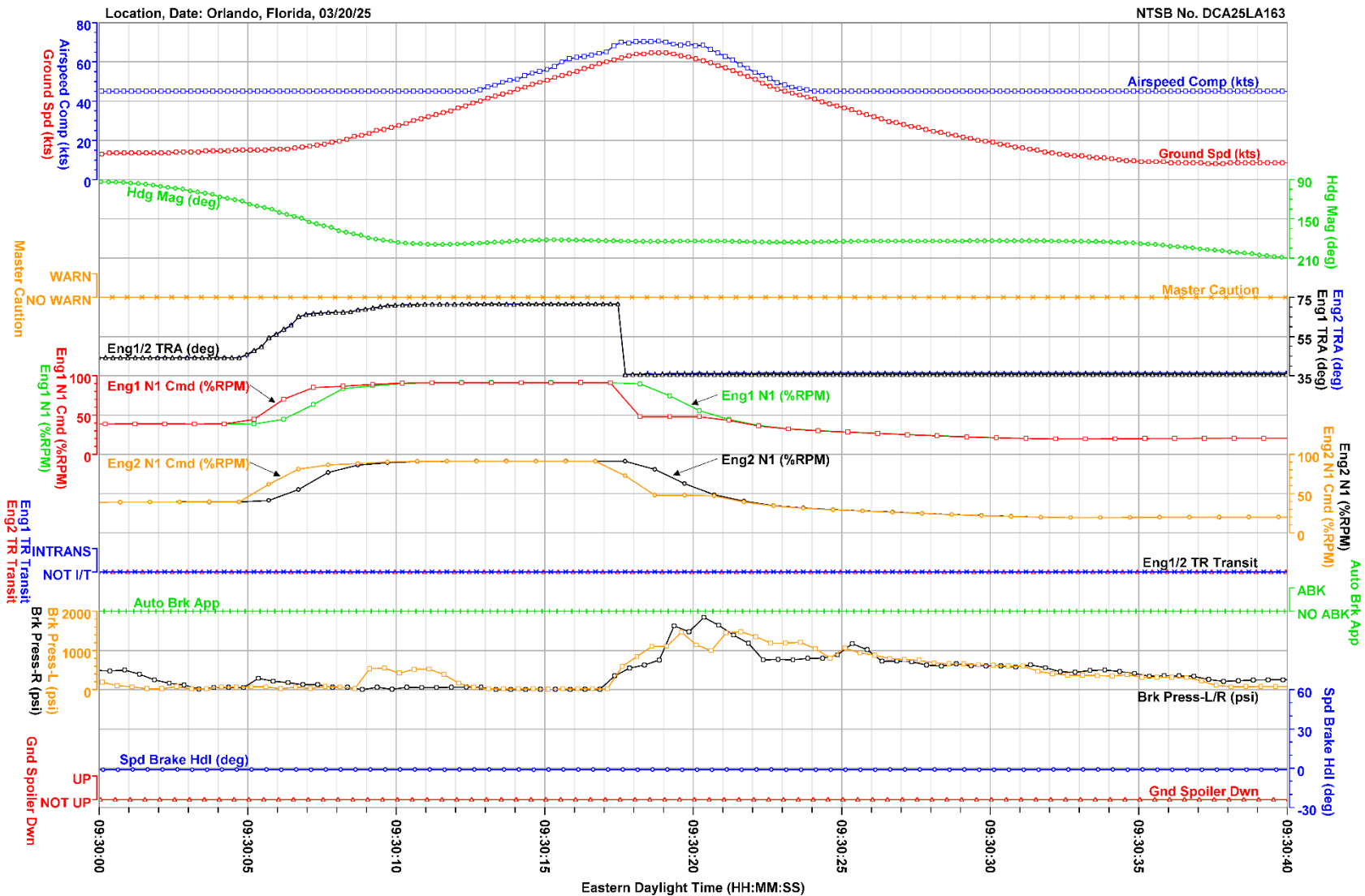
Steven Smith
Mechanical Engineer (Recorder Specialist)



Southwest Airlines, Boeing 737-8H4, SWA3278, N8315C

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Figure 1. Time history plot of general parameters from 09:29:00 EDT to 09:32:00 EDT.



Southwest Airlines, Boeing 737-8H4, SWA3278, N8315C

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Figure 2. Time history plot of general parameters from 09:30:00 EDT to 09:30:40 EDT.



Figure 3. Google Earth overlay of the incident from 09:27:02 EDT to 10:05:51 EDT.

KMCO/MCO

Apt Elev 96'
N28 25.8 W081 18.5

JEPPESSEN ORLANDO, FLA

28 MAR 25 (20-9) ORLANDO INTL

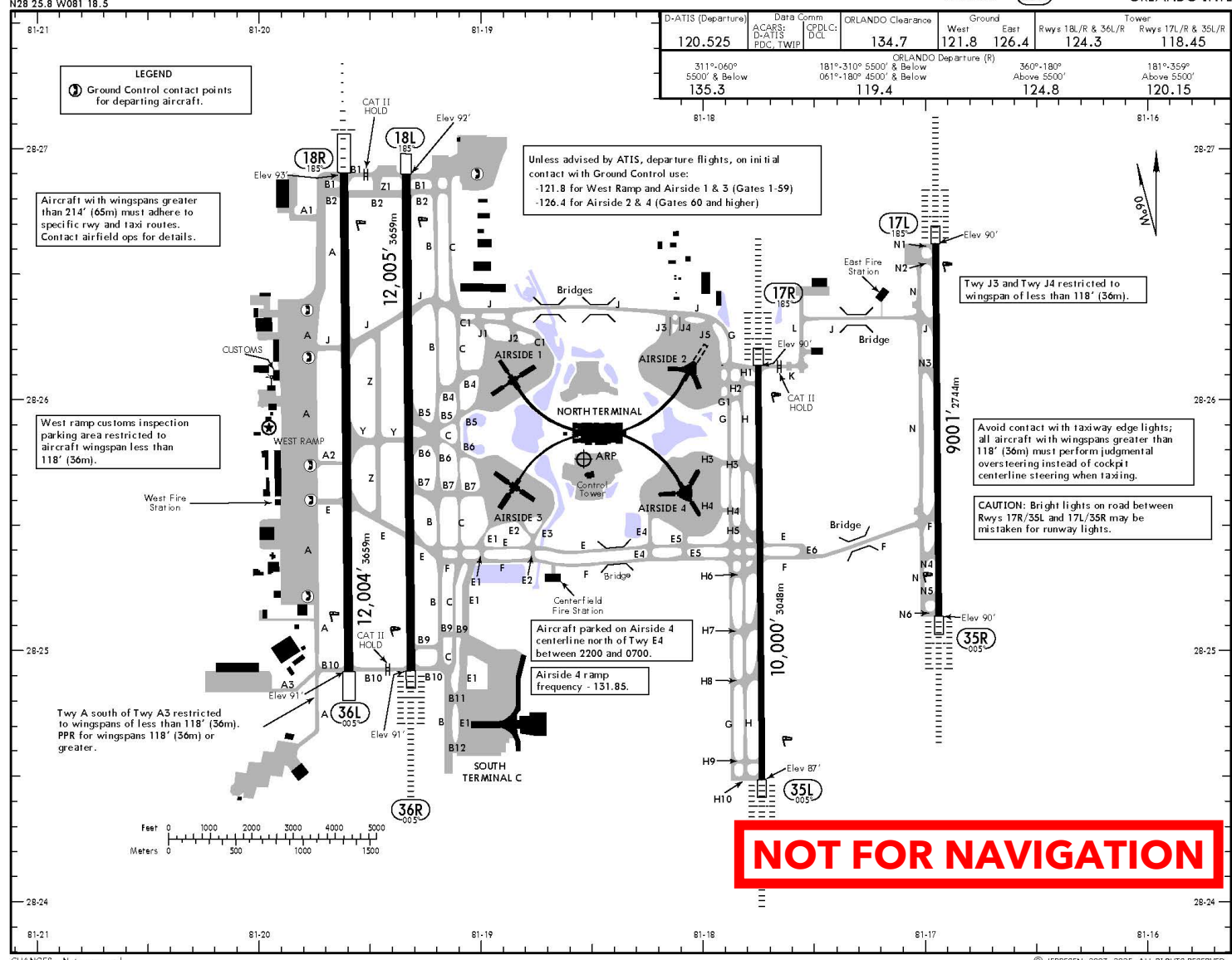


Figure 4. Airport diagram of KMCO (Source: Jeppesen).

APPENDIX A. VERIFIED AND PROVIDED PARAMETERS

This appendix describes the parameters provided and verified in this report. Table 1 lists the plot/table labels, parameter names, and units. Additionally, table 2 describes the unit and discrete state abbreviations used in this report.

Table 1. Verified and provided FDR parameters.

Plot/Table Labels	Parameter Names	Units
Airspeed Comp	Computed Airspeed	kts
Auto Brk App	Auto Brake Applied	
Brk Press-L	Left Main Brake Pressure	psi
Brk Press-R	Right Main Brake Pressure	psi
Eng1 N1	Engine 1 Fan Speed	%RPM
Eng1 N1 Cmd	Engine 1 Fan Speed Commanded	%RPM
Eng1 TR Transit	Engine 1 Thrust Reverser In-Transit	
Eng1 TRA	Engine 1 Throttle Resolver Angle	deg
Eng2 N1	Engine 2 Fan Speed	%RPM
Eng2 N1 Cmd	Engine 2 Fan Speed Commanded	%RPM
Eng2 TR Transit	Engine 2 Thrust Reverser In-Transit	
Eng2 TRA	Engine 2 Throttle Resolver Angle	deg
Gnd Spoiler Dwn	Ground Spoiler Down	
Ground Spd	Ground Speed	kts
Hdg Mag	Magnetic Heading	deg
Key VHF-1	Microphone Keying Very High Frequency-1	
Key VHF-2	Microphone Keying Very High Frequency-2	
Master Caution	Master Caution	
Spd Brake Hdl	Speed Brake Handle Position	deg
Time GMT Hrs	Greenwich Mean Time Hours	hrs
Time GMT Min	Greenwich Mean Time Minutes	min
Time GMT Sec	Greenwich Mean Time Seconds	sec

Note: Parameters with a blank unit description in table 1 are discrettes. A discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.

Table 2. Unit and discrete state abbreviations.

Unit and Discrete State Abbreviations	Descriptions
%RPM	percent revolutions per minute
deg	degrees
hrs	hours
kts	knots
min	minutes
psi	pounds per square inch
sec	seconds