NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

April 3, 2020

Flight Data Recorder - 10

Specialist's Factual Report
By Greg Smith

1. EVENT SUMMARY

Location: New Orleans, Louisiana
Date: August 9, 2010
Aircraft: EMB-170, N856RW
Operator: Shuttle America, Flight 7630
NTSB Number: DCA10LA083

On August 9, 2010, about 1134 central daylight time, a Shuttle America Embraer 170, N856RW, flight 7630, was at a cruise altitude of 29,000 feet when they received a Traffic Alert and Collision Avoidance System (TCAS) resolution advisory (RA) to climb. Flight data indicates that within seconds, the flight crew disconnected the autopilot and climbed to 29,600 feet consistent with the TCAS alert. There were 2 pilots, 2 flight attendants and 70 passengers on board the Shuttle America flight. One passenger received a serious injury during the evasive maneuver. The commercial passenger flight was over the state of Mississippi when the TCAS RA occurred. The flight originated from the Chicago O'Hare International Airport (ORD), Chicago, Illinois, and was enroute to Louis Armstrong New Orleans International Airport (MSY), New Orleans, Louisiana. The flight was operating under the provisions of 14 *Code of Federal Regulations* Part 121 on an Instrument Flight Rules (IFR) flight plan.

Radar data indicates that a US Air Force Northrop Corporation T-38 Talon, call sign FAST 13, was on a cross country instrument training flight at 28,000 feet, when they deviated to 28,600 feet for about 30 seconds. When the deviation occurred FAST 13 was converging on flight 7630, causing Shuttle America's TCAS RA. The military flight was operating under the provisions of 14 *Code of Federal Regulations* Part 91 on an IFR flight plan from Campbell Army Airfield (HOP), Fort Campbell/Hopkinsville, Kentucky, to Chennault International Airport (CWF), Lake Charles, Louisiana.   There were two crewmembers aboard the military airplane. This airplane was not equipped with a TCAS.

2. FLIGHT DATA RECORDER GROUP

A flight data recorder (FDR) group was not convened.

3. DETAILS OF FLIGHT DATA RECORDER INVESTIGATION

On August 11, 2010, the Safety Board's Vehicle Recorder Division received the following FDR:

Recorder Manufacturer/Model: **Honeywell DVDR, Model 980-6025-001**
Recorder Serial Number: **00467**

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

3.1.   Recorder Description

The Honeywell Digital Voice-Data Recorder (DVDR) is a dual function recorder providing both Flight data recorder (FDR) and Cockpit Voice Recorder (CVR) functions. The FDR function records airplane flight information in a digital format using solid-state flash memory as the recording medium. The SSFDR 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 256 12-bit words of digital information every second. Each grouping of 256 words (each second) is called a subframe. Each subframe has a unique 12-bit synchronization (sync) word identifying it as either 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 256-word intervals. Each data parameter (e.g. altitude, heading, airspeed) has a specifically assigned word number within the subframe. The DVDR is designed to meet the crash-survivability requirements of TSO–C123a and TSO-C124a.

3.2.   FDR Carriage Requirements

Federal regulations regarding the carriage requirements of FDRs on aircraft can be found in the following regulations: 14 CFR 121.343, 14 CFR 121.344, 14 CFR 121.344a and 14 CFR 135.152. In general, for turbine-powered transport category aircraft manufactured on or before October 11, 1991, an FDR must be installed on board that records a minimum of 18 parameters, and for those turbine-powered aircraft that seat between 10 and 19 passengers, the minimum is 22 parameters. Newly manufactured aircraft are required to be equipped with an FDR that records a minimum of 88 parameters. Specifically, the incident aircraft, N856RW, was operating such that it was required to be equipped with an FDR that recorded 88 parameters, as cited in 14 CFR 121.344.

3.3.   Recording Description

The FDR recording contained approximately 27.25 hours of data. Timing of the FDR data is measured in subframe reference number (SRN), where each SRN equals one elapsed second. The incident flight was the last flight of the recording and its duration was approximately 2 hours and 13 minutes.

3.4.   Time Correlation

Correlation of the FDR data from SRN to the incident local time was established using the recorded GMT parameters. The incident flight data has been offset from SRN to local Central Daylight Time.

3.5.   Engineering Units Conversions

The engineering units conversions used for the data contained in this report are based on documentation from the aircraft manufacturer. Where applicable, changes to the

conversions have been made to ensure the parameters conform to the Safety Board's standard sign convention that climbing right turns are positive (CRT=+).[1]

3.5.1. Parameters Verified and Provided

The following table lists the FDR parameters verified and provided in this report, including the associated plot label.

Table 1 - Parameters Verified and Provided

Parameter Name	Plot Label	Units
Month	Time GMT Month	month
Day	Time GMT Day	day
Hours	Time GMT Hrs	hrs
Minutes	Time GMT Min	min
Seconds	Time GMT Sec	sec
Lateral Acceleration	Accel Lat	g
Longitudinal Acceleration	Accel Long	g
Normal Acceleration	Accel Vert	g
Airspeed Calibrated - Pilot	Airspeed Cal-L	kts
Airspeed Calibrated - Copilot	Airspeed Cal-R	kts
Pressure Altitude - Pilot	Altitude Press-L	ft
Pressure Altitude - Copilot	Altitude Press-R	ft
Autopilot Engaged	AP Engaged	
Autopilot Selected	AP Selected	
Left Inboard Control Column Position	Ctrl Col Pos-LIB	deg
Left Outboard Control Column Position	Ctrl Col Pos-LOB	deg
Right Inboard Control Column Position	Ctrl Col Pos-RIB	deg
Right Outboard Control Column Position	Ctrl Col Pos-ROB	deg
Magnetic Heading	Heading Mag	deg
Pitch	Pitch	deg
Roll	Roll	deg
TCAS Combined Control	TCAS Combined Control	
TCAS Down Advisory	TCAS Down Advisory	
TCAS Proximate -Display Control	TCAS Proximate -Disp Ctrl	
TCAS RA-TA - Sensitivity	TCAS RA-TA - Sensitivity	
TCAS Up Advisory	TCAS Up Advisory	
TCAS Vertical Control	TCAS Vertical Control	

3.5.2. Pressure Altitude

This FDR records pressure altitude, which is based on a standard altimeter setting of 29.92 inches of mercury (in Hg). The pressure altitude information presented in the FDR plots and in the electronic data has not been corrected for the local altimeter setting at the time of the event.

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[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 = +, Right Aileron Trailing Edge Up = +, Pitch Up = +, Elevator Trailing Edge Up = +.

3.6. FDR Plots and Corresponding Tabular Data

The following 2 plots contain FDR data recorded during the August 9, 2010 event and table 1 lists all of the FDR parameters plotted. Both plots show all the parameters listed in Table 1 except the time parameters. Plot 1 shows a 2 minute 55 second window of time around the event beginning just before the incident aircraft starts its descent from 30,000'. Plot 2 shows a zoomed in window of 100 seconds around the avoidance maneuver covering the period when the autopilot was disengaged. Additionally, these plots 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 FDR data shows that the aircraft was level at 29,000' for about 55 seconds prior to the alert. The initial TCAS indications were TCAS Combined Control = Climb Correction and TCAS Up Advisory = CLIMB. Those lasted about 11 seconds. One second after the TCAS discretes change the AP Engaged discrete transitions to Not Engaged and the column begins to move aft. One second later the AP Selected discrete transitions to Not Selected and the column peaks at its aft-most position, about 8 degrees. Then the column moves forward to about negative 2 degrees about 1 second later. The Pitch oscillates from approximately 2 degrees, before the event, to 7, then 3, then 5, before leveling off at about 4 degrees. The vertical acceleration increases to about 2.4 g's then drops to .5, then 1.25 before the oscillations settle. After the column, pitch and acceleration oscillations the TCAS Vertical Control discrete indicates Increase for 6 seconds, ending at the same time as the other TCAS discretes that changed.

The corresponding tabular data used to create these 2 plots are provided in electronic (.CSV) format as Attachment 1 to this report.
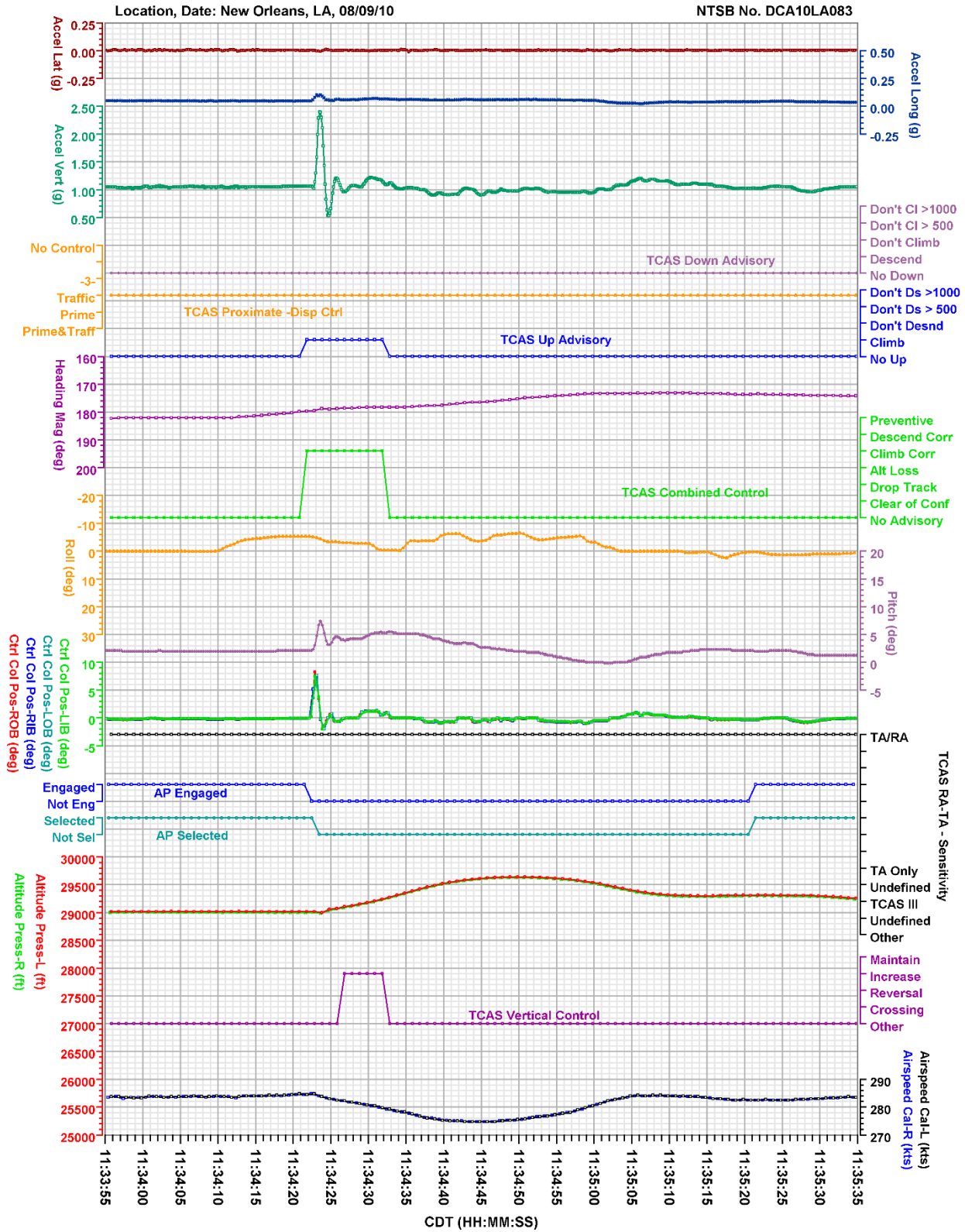
Shuttle America, Embraer EMB-170, Flt# 7630

Location, Date: New Orleans, LA, 08/09/10   NTSB No. DCA10LA083
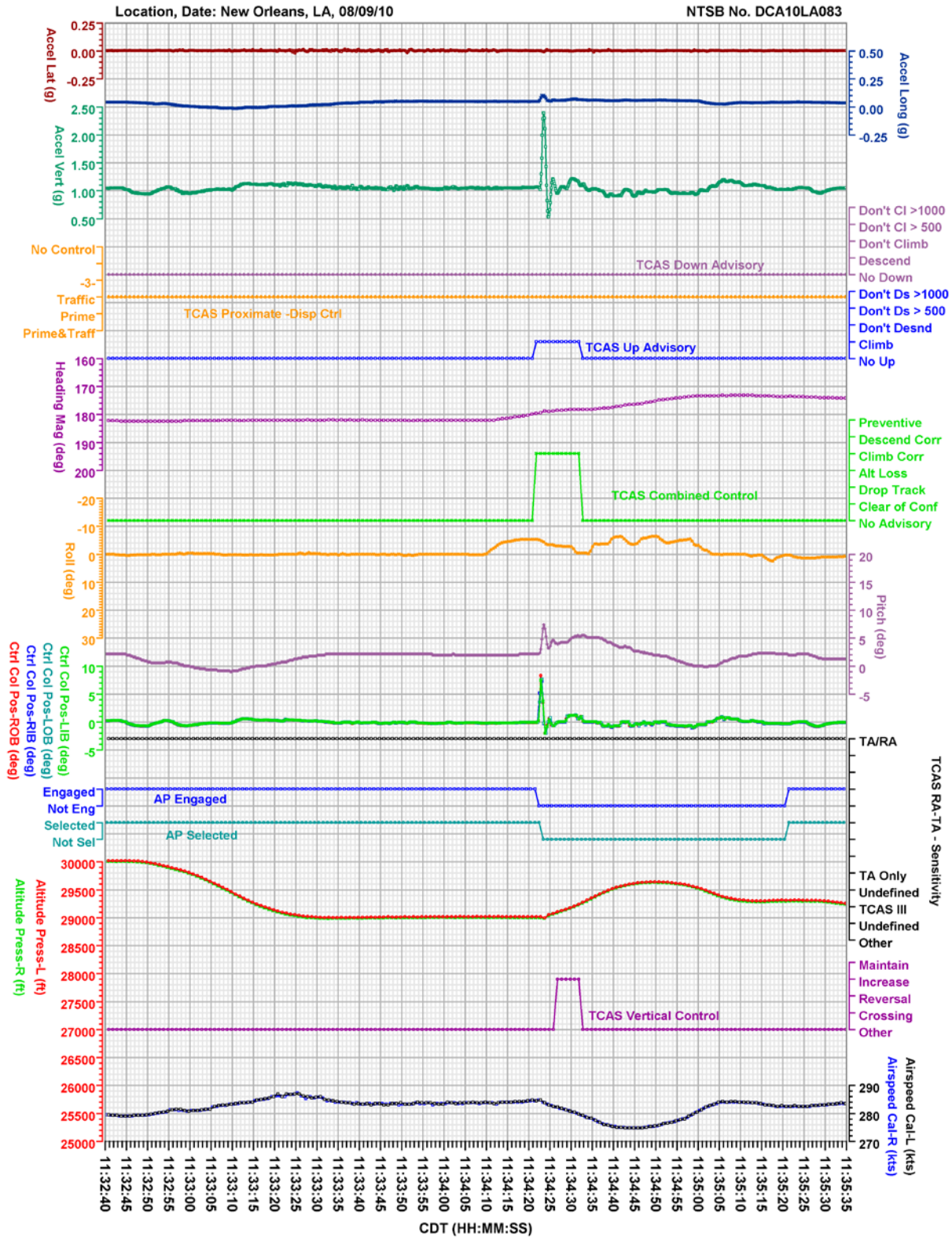
Revised: 22 December 2010   Descent and Avoidance Maneuver   National Transportation Safety Board

Plot 1

Shuttle America, Embraer EMB-170, Flt# 7630

Location, Date: New Orleans, LA, 08/09/10

NTSB No. DCA10LA083

Revised: 22 December 2010

Flight and TCAS Params - Avoidance Maneuver - 100 Sec

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Plot 2