

National Transportation Safety Board

Office of Research and Engineering

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ERA24LA191

COCKPIT DISPLAY - RECORDED FLIGHT DATA

Specialist's Factual Report

May 28, 2024

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A. ACCIDENT

Location: Raleigh, NC
Date: April 24, 2024
Time: 10:10 Eastern Daylight Time
Airplane: Socata TBM-700(850), Medical Air Inc, N228CH

B. COCKPIT DISPLAY - RECORDED FLIGHT DATA SPECIALIST

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C. DETAILS OF THE INVESTIGATION

A cockpit display - recorded flight data group was not convened.

The NTSB Vehicle Recorder Division visited the wreckage storage location and collected data from the following devices the following electronic devices:

Recorder Manufacturer/Model: Garmin GDU 1060
Part Number: 011-03308-60¹
Recorder Serial Number: 3M4000811¹

Recorder Manufacturer/Model: Shadin ETM Recorder
Part Number: 943200-11 (Rev -)
Recorder Serial Number: 0145

1.0 GDU 1060 Device Description

The Garmin GDU 1060 is marketed under the TXi product line. The GDU 1060 is an Electronic Flight Instrument System (EFIS) that can serve as a primary flight display (PFD), Multi-Function Display (MFD), Engine Information System (EIS), or a combination of all, depending on configuration. The unit comes in a variety of display sizes and orientations and utilizes a color, touch-screen interface. The unit contains an Attitude Heading Reference System (AHRS) device and is capable of providing attitude information and air data information. The unit interfaces with a number of other compatible products and can display navigation, terrain, engine, weather,

¹ Part number and serial number provided by aircraft documentation. The device was not removed from aircraft panel, therefore the part number and serial number were not available from the unit directly.

traffic and other parametric data streams. The unit is synthetic vision capable. The unit records internally to a non-volatile memory (NVM) chip on an internal board, as well as externally, on a SD card (if installed).

The GDU 1060 was installed on N228CH as a component of the G600 TXi system and received data from other Garmin devices.

1.1 GDU 1060 Data Recovery

The GDU 1060 SD card was in good condition and the data were downloaded using the manufacturer's procedure.

1.2 GDU 1060 Recording Description

The GDU 1060 SD card receives and stores flight data in individual flight logs. Flight logs from fourteen previous flights were retrieved from the SD card. The accident/incident flight recording was identified and was approximately 44 minutes in duration.

1.2.1 GDU 1060 Engineering Unit Conversions

The flight log data stored in the individual files was converted to engineering units by the display unit.

Appendix A lists the parameters verified and provided in this report.

1.3 GDU 1060 Time Correlation

The GDU 1060 SD card records time with the data samples based on the unit's internal clock. This clock is set and updated by the unit and is based off GPS time.

2.0 Shadin Engine Trend Monitor Recorder

2.1 Shadin ETM Recorder Description

The Shadin Engine Trend Monitor (ETM) consists of multiple components including the ETM Remote Processor, ETM Display, and ETM Recorder. The ETM provides the ability to maintain and track the performance of turboprop engines. Flight data is displayed and select data, such as flight time, engine hours, performance variations and exceedances, are recorded to non-volatile memory. Data can be exported to a USB flash drive for review.

2.2 Shadin ETM Recorder Data Recovery

The Shadin ETM Recorder was in good condition and the data were downloaded using the manufacturer's procedure.

2.3 Shadin ETM Recorder Data Description

Data exported to the USB flash drive included 15 files recorded from April 17, 2024, through April 24, 2024. The last file corresponded to the date and approximate time of the accident flight. Data included snapshots or certain parameters in time of events such as "Logon," "Engine Start," "Take-Off," "Power Check Report," "Landing Report" and "Engine Off Log." The device is capable of recording engine exceedances, however, none of the files recovered contained an Exceedance Report. The accident flight data file had a duration of approximately 22 minutes and included the events "Logon," "Engine Start," "Take-off," and "Power Check Report" but does not include a "Landing Report" or "Engine Off Log". The event flight data file is included as attachment 2 to this report in text (.etm) format.

2.4 Shadin ETM Recorder Time Correlation

The Shadin ETM Recorder records time with each data sample based on the unit's internal clock. This clock is set and updated by the operator. Data provided in the snapshots of Engine Start and Takeoff indicates that the time provided by the Shadin ETM Recorder is approximately 1 hour ahead of the local time. Times provided by the Shadin ETM Recorder have not been adjusted and are provided in recorder time.

D. FIGURES AND TABULAR DATA

Figures 1 and 2 contain GDU 1060 data recorded during the event on April 24, 2024. All the parameters listed in table 1 are plotted. 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.

Figure 1 displays the selected parameters for the final minute of data from the accident flight. The data ends at 10:09:18 EDT and does not capture the impact.

Figure 2 displays the selected parameters for the entire accident flight, from 09:30 EDT to 10:10 EDT, starting during taxi at the departure airport.

The corresponding tabular data used to create figures 1 and 2 are provided in electronic comma separated value (CSV) format as attachment 1 to this report.

Submitted by:

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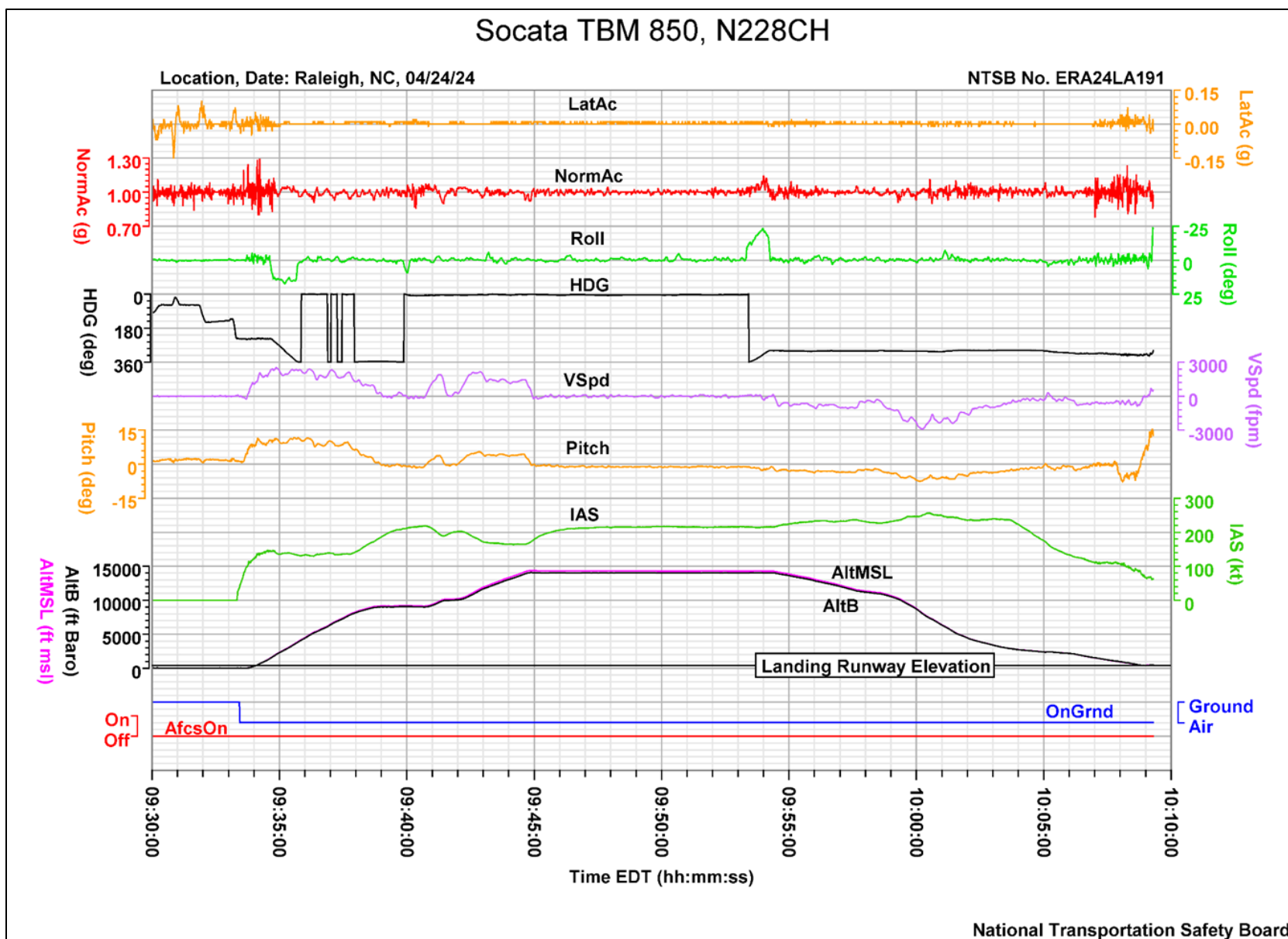


Figure 1. Plot of basic parameters for entire accident flight

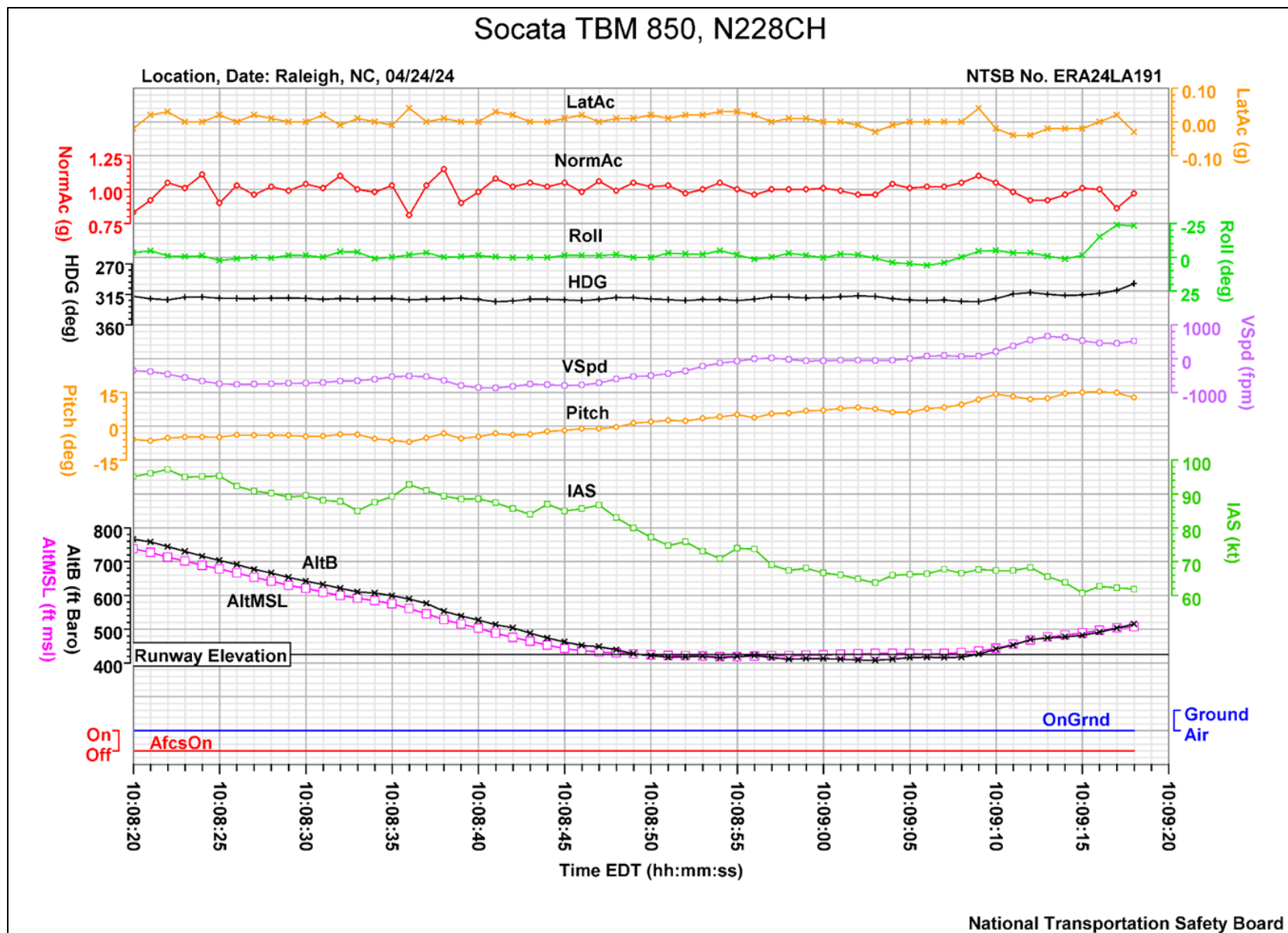


Figure 2. Plot of basic parameters for final minute of the accident flight

APPENDIX A. VERIFIED AND PROVIDED PARAMETERS FROM GDU 1060

This appendix describes the parameters provided and verified in this report. Table 1 lists the GDU 1060 parameter names, units, and descriptions used in this report.

Table 1. Verified and provided parameters.

Parameter Name	Parameter Description	Units
AfcsOn	Automatic Flight Control System On	on/off
AltB	Barometric Altitude	feet (ft)
AltMSL	Altitude above Mean Sea Level	feet (ft)
HDG	Heading	degrees (deg)
IAS	Indicated Airspeed	knots (kt)
LatAc	Lateral Acceleration	acceleration of Earth's gravity (g)
NormAc	Normal Acceleration	acceleration of Earth's gravity (g)
OnGrnd	On Ground	air/ground
Pitch	Pitch	degrees (deg)
Roll	Roll	degrees (deg)
VSpd	Vertical Speed	feet per minute (fpm)