

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ANC22LA035

GLOBAL POSITIONING SYSTEM DEVICE

Specialist's Factual Report

July 28, 2022

A. INCIDENT

Location: Yakutat, Alaska
Date: May 24, 2022
Time: 15:10 Alaska daylight time (ADT)
23:10 Coordinated universal time (UTC)
Airplane: de Havilland DHC-3, private, N703TH

B. GLOBAL POSITIONING SYSTEM DEVICE SPECIALIST

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

C. DETAILS OF THE INVESTIGATION

A global positioning system (GPS) group was not convened. The NTSB Vehicle Recorder Division received the following GPS devices:

Recorder Manufacturer/Model: Garmin aera 796
Part Number: No part number
Recorder Serial Number: 2CY005897

Recorder Manufacturer/Model: Garmin aera 796
Part Number: No part number
Recorder Serial Number: 2CY012471

1.0 Device Description

The Garmin aera 796 is a battery-powered multi-function display and GPS receiver with a 7-inch diagonal high resolution touch screen. The unit includes a built-in Jeppesen database and can receive XM satellite radio for flight information including NEXRAD Radar, lightning, METARs, and TFRs. The unit can also perform and store weight and balance calculations. A built-in AOPA Airport Directory and SafeTaxi airport diagrams are included for selected airfields. With appropriate subscriptions, the unit can store and display geo-referenced VFR and IFR navigation charts, including IFR approach charts. The unit also has a "scratch pad" feature, allowing the user to hand write electronic notes.

The unit stores date, route-of-flight and flight-time information. A detailed track log including latitude, longitude, date, time, course and GPS altitude information is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Position is updated within the track log as a function of time or distance moved,

depending on how the unit has been configured. The current track log can be saved to long-term memory. Track log storage may be activated or de-activated at user's discretion. All recorded data is stored in non-volatile memory.¹

The unit contains hardware and software permitting the download of recorded waypoint, route, and track log information to a PC via a built-in USB port. An internal button-battery is used to back up power to the internal memory and real-time clock during those periods when main power is removed.

1.1 Data Recovery

Both Garmin aera 796 GPS units were in good condition and the data were downloaded normally using laboratory tools. Figure 1 shows the devices as it was received at the Recorder's Lab.



Figure 1. Photo of both Garmin aera 796 GPS units as received in the Vehicle Recorder lab.

¹ Non-volatile memory is semiconductor memory that doesn't require external power for data retention.

1.2 Recording Description

The data extracted from the first GPS (S/N: 2CY005897) included 18 sessions from April 2, 2022, through May 24, 2022. The incident flight was not recorded on this device.

The data extracted from the second GPS (S/N: 2CY012471) included 43 sessions from April 11, 2022, through June 7, 2022. The incident flight was recorded starting 14:44:56 ADT and ending 15:09:00 ADT on May 24, 2022.

1.3 Parameters Provided

Table 1 describes data parameters provided by the GPS device.

Table 1. GPS Data Parameters.

Parameter Name	Parameter Description (units)
Latitude	Recorded Latitude (degrees)
Longitude	Recorded Longitude (degrees)
GPS Alt	Recorded GPS Altitude (feet)
Groundspeed	Average derived groundspeed (knots)
Track	Average derived true course (degrees)

D. OVERLAYS AND TABULAR DATA

Data obtained from the Garmin aera 796 S/N: 2CY012471 was used to produce the following overlays and tabular data. Figure 2 through Figure 8 were generated using the data downloaded from this device.

The device began recording at approximately 14:44:56 ADT and ended at 15:09:00 ADT on May 24, 2022. Due to data buffering on the GPS unit, the data recording may have ended before the incident event.

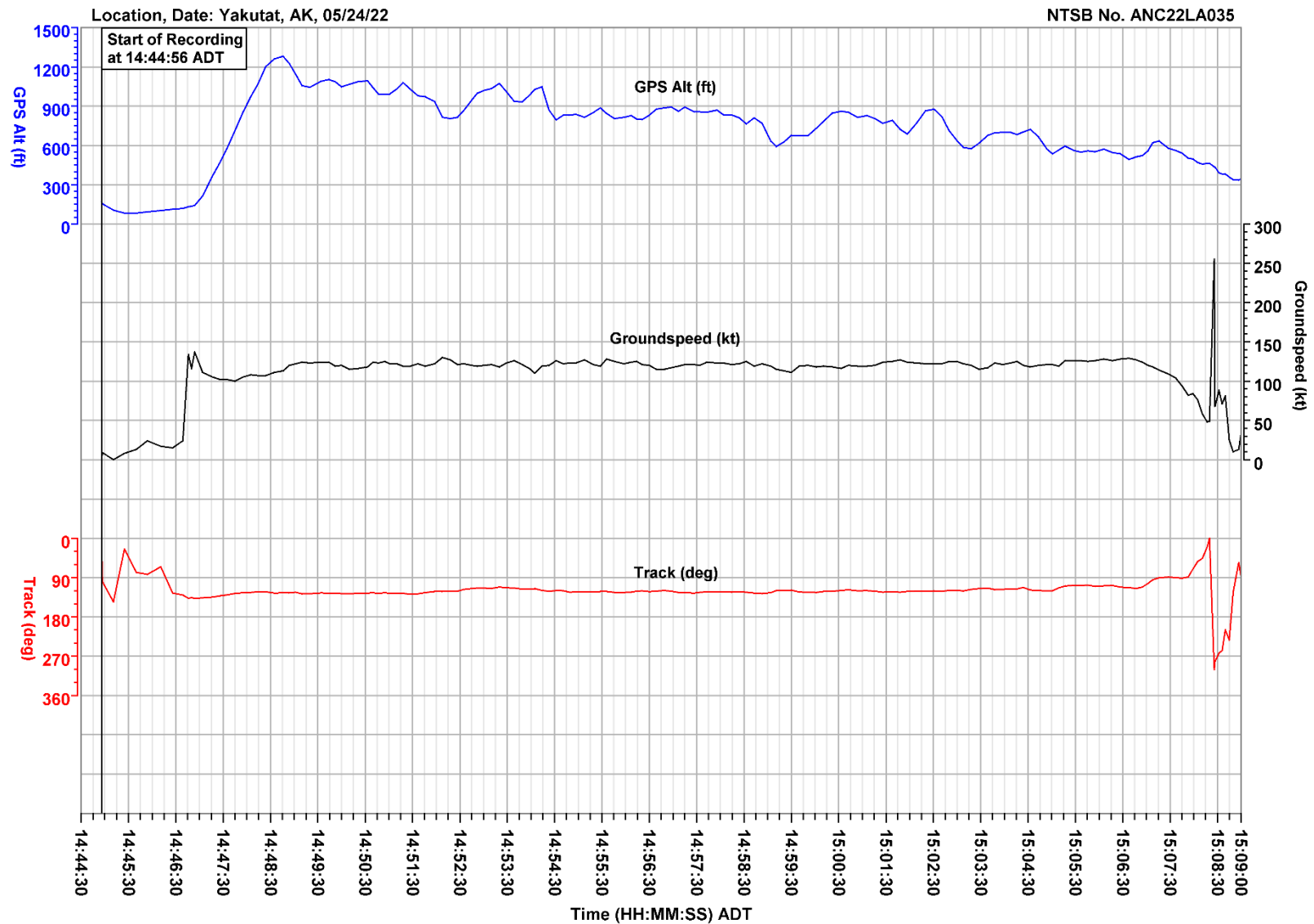
Figure 2 and Figure 3 show time histories of the entire flight and the final 2 minutes of the recording, respectively. Figure 4 through Figure 8 show Google Earth overlays of the entire incident flight track, taxiing, takeoff roll, the aircraft in pattern, and an overlay of the end of the recording, respectively. Note that the weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

In summary, the aircraft began taxiing at approximately 14:44:00 ADT, and began the takeoff roll at approximately 14:46:11 ADT from Yakutat Airport (KYAK). The aircraft headed southeast for the entirety of the flight before entering pattern at approximately 15:07:02 ADT. The last recorded data point collected by the Garmin aera 796 GPS was at approximately 15:09:00 ADT.

The corresponding tabular data used to create Figure 2 through Figure 8 for the entire event flight are provided in electronic comma separated value (CSV) format as attachment 1 to this report.

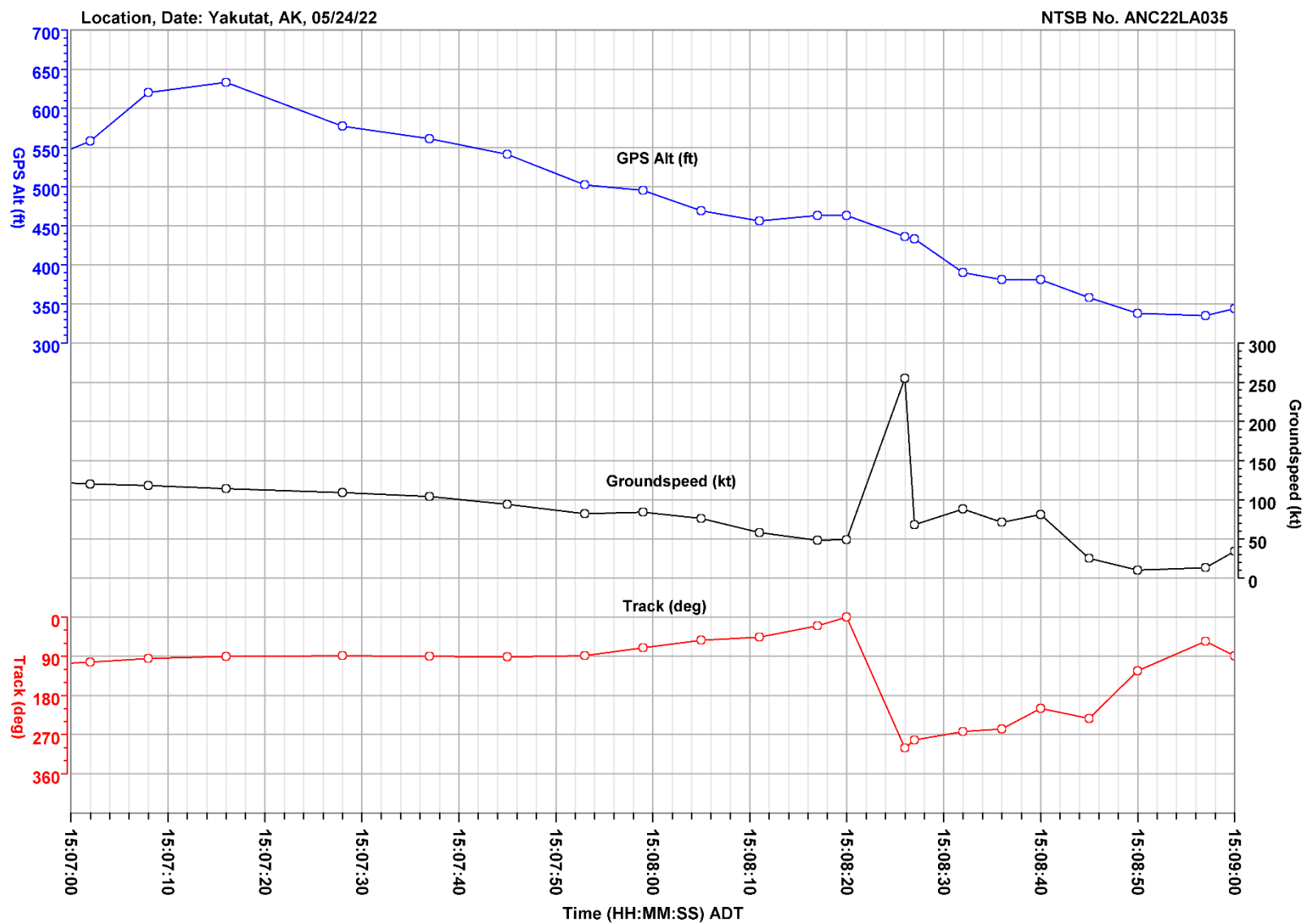
Submitted by:

Steven Smith
Mechanical Engineer (Recorder Specialist)



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Figure 2. Time history for the entire recording.

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Figure 3. Time history for the last 2 minutes of the recording.



Figure 4. Google Earth overlay showing the entire flight.



Figure 5. Google Earth overlay of the aircraft taxiing.



Figure 6. Google Earth overlay of the aircraft on takeoff rollout.



Figure 7. Google Earth overlay of the aircraft entering pattern and approach.

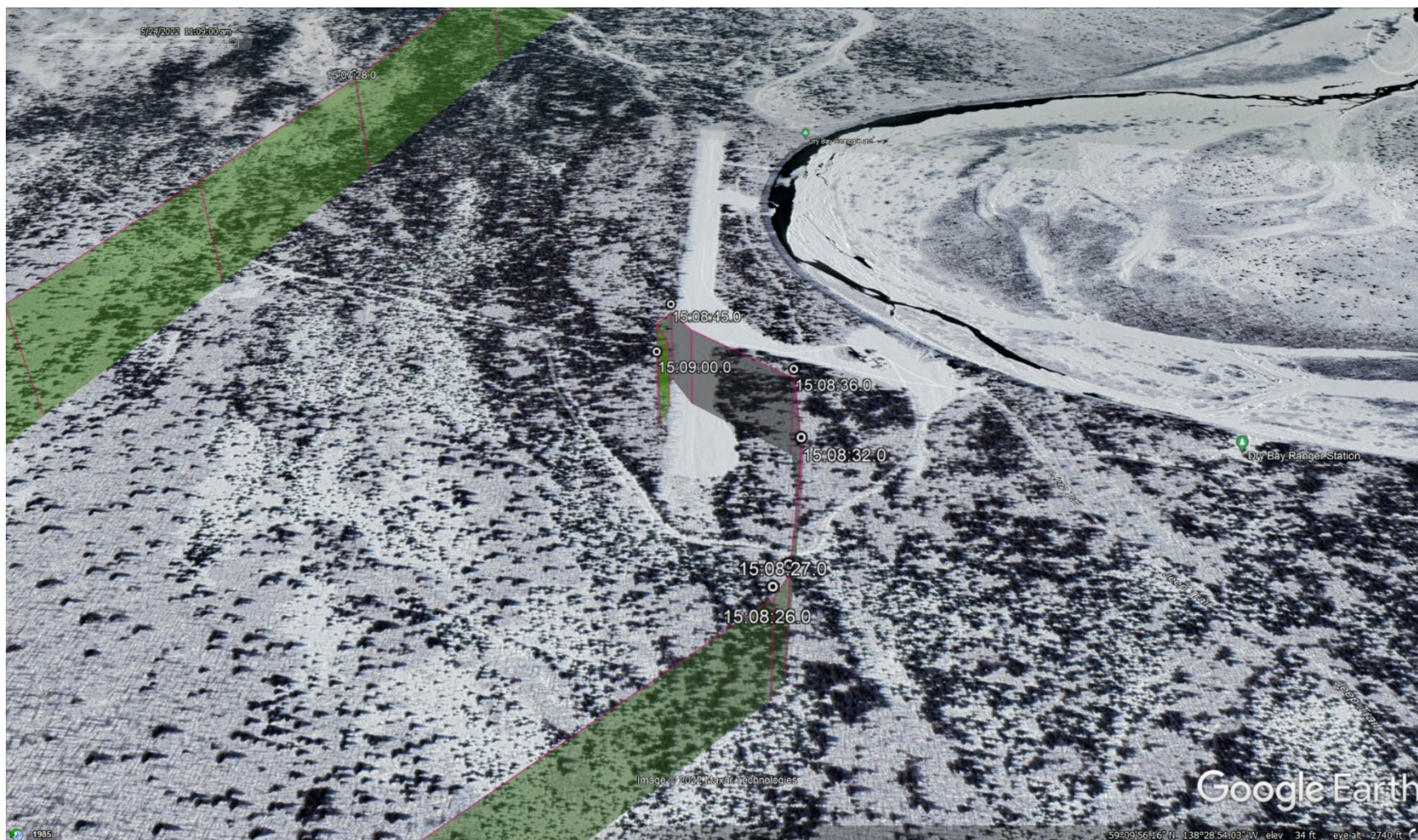


Figure 8. Google Earth overlay showing the end of the recording.