

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

July 31, 2015

Global Positioning System Device

Specialist's Factual Report

By Sean Payne

1. EVENT SUMMARY

Location: Reynolds, Georgia
Date: March 15, 2015
Aircraft: KOLB MK-II
Registration: N193Y
Operator: Private
NTSB Number: ERA15LA156

On March 15, 2015, at 1818 eastern daylight time, an experimental light sport Kolb Twinstar MK-II, N193Y operated by a private individual, was substantially damaged when it impacted terrain near Reynolds, Georgia. The student pilot was fatally injured. Visual meteorological conditions prevailed and no flight plan was filed for the local personal flight which departed Thomaston-Upson County Airport (OPN), Thomaston, Georgia. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following global positioning system (GPS) device:

Device Manufacturer/Model:	Garmin Aera 500
Serial Number:	1QN011896

3.1. Device Description

The Garmin Aera 500 is a portable GPS unit designed for both automotive and aviation environments. It is capable of storing a detailed tracklog – including latitude, longitude, date, time, GPS altitude, and groundspeed information – within the unit whenever the

receiver has a lock on the GPS navigation signal. All recorded data is stored in non-volatile memory¹. Communication to the device is provided by a built-in USB port.

3.2. Data Recovery

The device arrived with light damage around the unit's black frame but was in working condition. The device was connected to a PC via a USB cable and was downloaded normally using the manufacturer's recommended procedure and software.



Figure 1. Front of Garmin Aera 500.



Figure 2. Back of Garmin Aera 500.

¹ Non-volatile memory – NVM – Hardware memory that does not require power to retain data.

3.3. Data Description

The data extracted included 173 track logs from August 17, 2014² through March 16, 2015. The accident flight was associated with the 169th track log. Track logs 170 through 173 were recorded after the accident and were consistent with data logging during automobile usage.

The accident flight was recorded starting 21:53:14 UTC and ending 22:13:00 UTC on March 15, 2015. The last position logs did not match the location of the aircraft wreckage and the recorded data was determined to have ended prematurely. The early termination of the data log was consistent with the device's electronic data buffering schema. This was confirmed with the manufacturer and is also consistent with downloads of the same model device performed by the laboratory in other accident investigations.

3.4. Parameters Provided

Table 1 describes data parameters provided by the GPS device. Date, Time, Latitude, Longitude, and GPS Altitude are recorded by the device. Groundspeed and Track are derived from the recorded parameters.

Table 1: GPS Data Parameters

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time (UTC) for recorded data point (HH:MM:SS)
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)

3.5. OVERLAYS AND TABULAR DATA

All Google Earth overlays are presented North up. Lighting and weather conditions may not be as depicted through the Google Earth imagery. All times are given in UTC.

Figure 3 is a graphical overlay generated using Google Earth for the entire accident recording. The recording began at 21:53:14 in a grassy area near the Runway 36 arrival threshold at Butler Municipal Airport (6A1), Butler, GA. The recording showed the aircraft taxied to Runway 36 and departed by 21:55:18. The aircraft performed a climbing left turn and departed toward the southeast.

² All dates and times are referenced to [Coordinated Universal Time (UTC)].

Around 21:56:53, the aircraft had picked up an easterly heading along Georgia State Route 96, Butler, GA. During this leg of flight, the aircraft's groundspeed was between approximately 40 and 55 knots and its altitude is around 1,000 feet. Around 22:06:50, the aircraft turned southward along South Winston St. (Georgia State Route 128), Reynolds, GA. Around 22:07:29, the aircraft began a series of turning maneuvers between 600 and 800 feet. The groundspeed was shown as calculated as low as 31 knots during one of these maneuvers. The data recording ended at 22:13:00 at 48 knots and an altitude of 725 feet while the aircraft was traveling southbound along Tommy Purvis Jr. Road (Georgia State Route 195) Reynolds, GA. A pin is shown placed at recorded coordinates for the aircraft wreckage site provided by the Investigator-In-Charge.

Figure 4 is a graphical overlay generated using Google Earth showing the aircraft's departure leg from Runway 36 at Butler Municipal Airport (6A1), Butler, GA.

Figure 5 is a graphical overlay generated using Google Earth showing the aircraft performing maneuvers in the vicinity of Reynolds, GA. A pin is shown placed at recorded coordinates for the aircraft wreckage site provided by the Investigator-In-Charge.

Figure 6 is a graphical overlay generated using Google Earth showing the end of recording tracklog data in relation to the recorded coordinates for the aircraft wreckage site provided by the Investigator-In-Charge. The recording likely ended prematurely due to data buffering schema contained within the Garmin Aera 500.

Figure 7 is a graphical overlay generated using Google Earth showing the recorded tracklogs for the accident flight overlaid on the Atlanta Sectional chart. A pin is shown placed at recorded coordinates for the aircraft wreckage site provided by the Investigator-In-Charge.

Tabular data used to generate figures 3 through 7 are included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format.

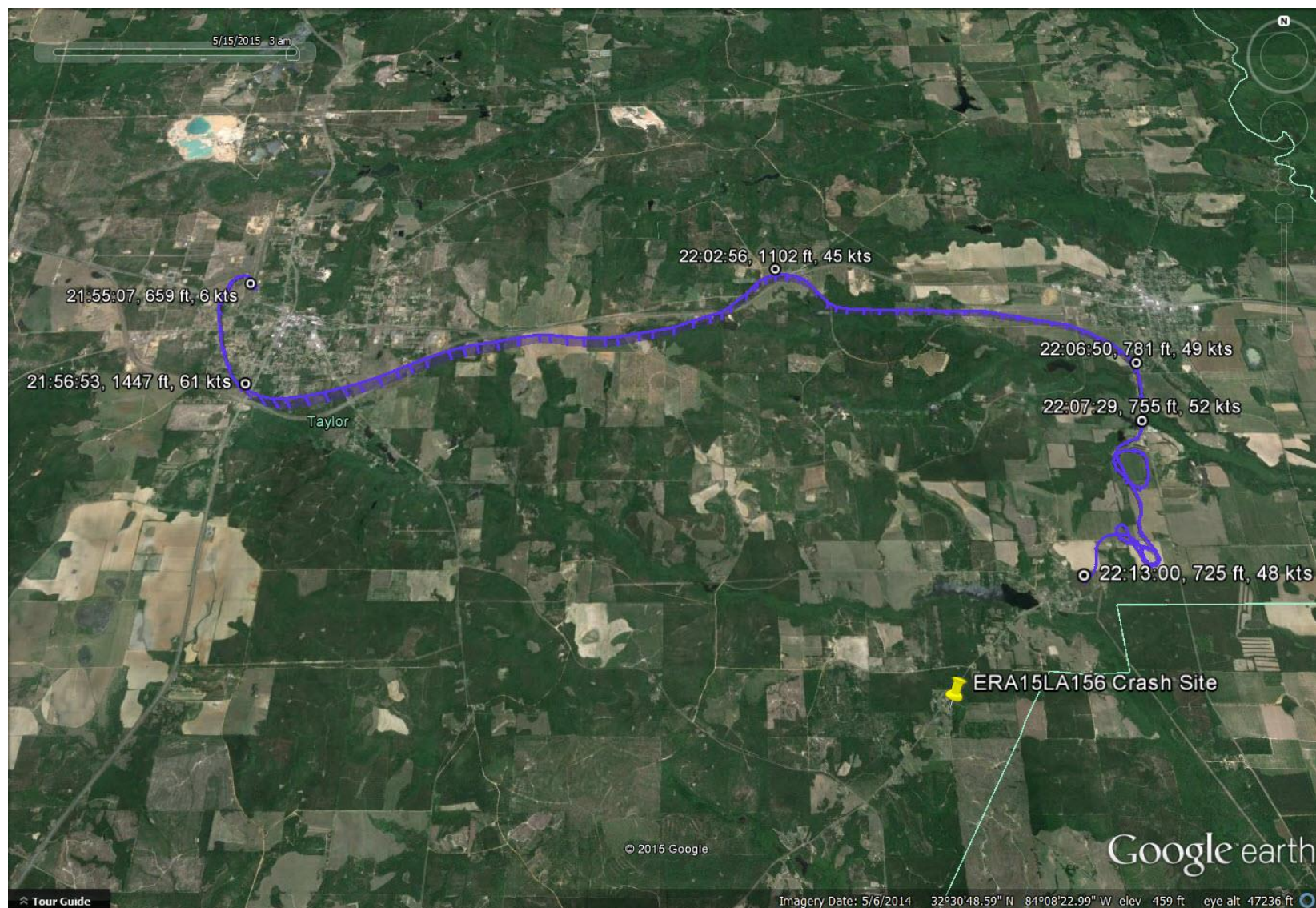


Figure 3. Google Earth overlay showing the aircraft's recorded tracklog data for the March 15, 2015 event.

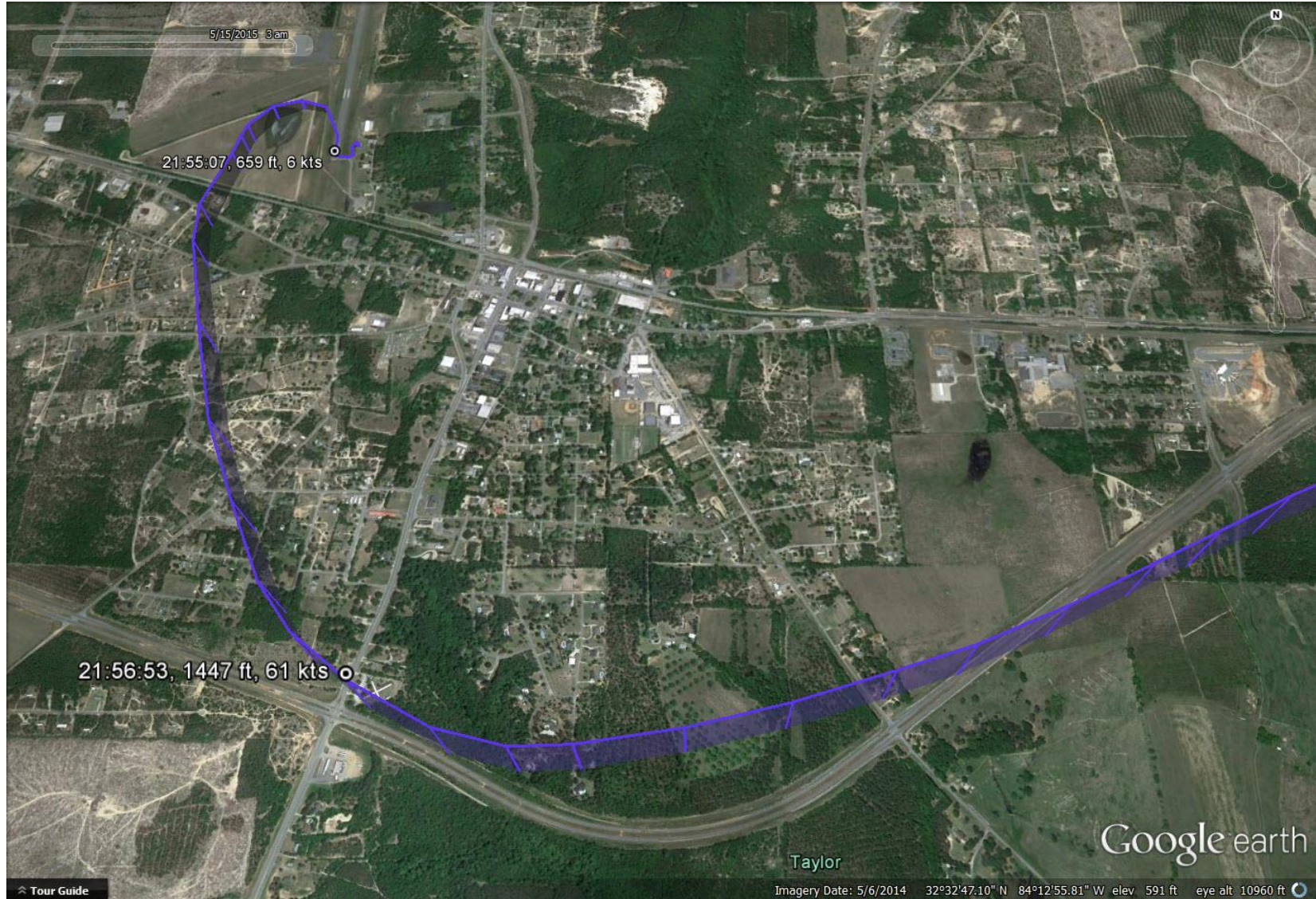


Figure 4. Google Earth overlay showing the aircraft's departure leg from Butler Municipal Airport (6A1), Butler, GA.

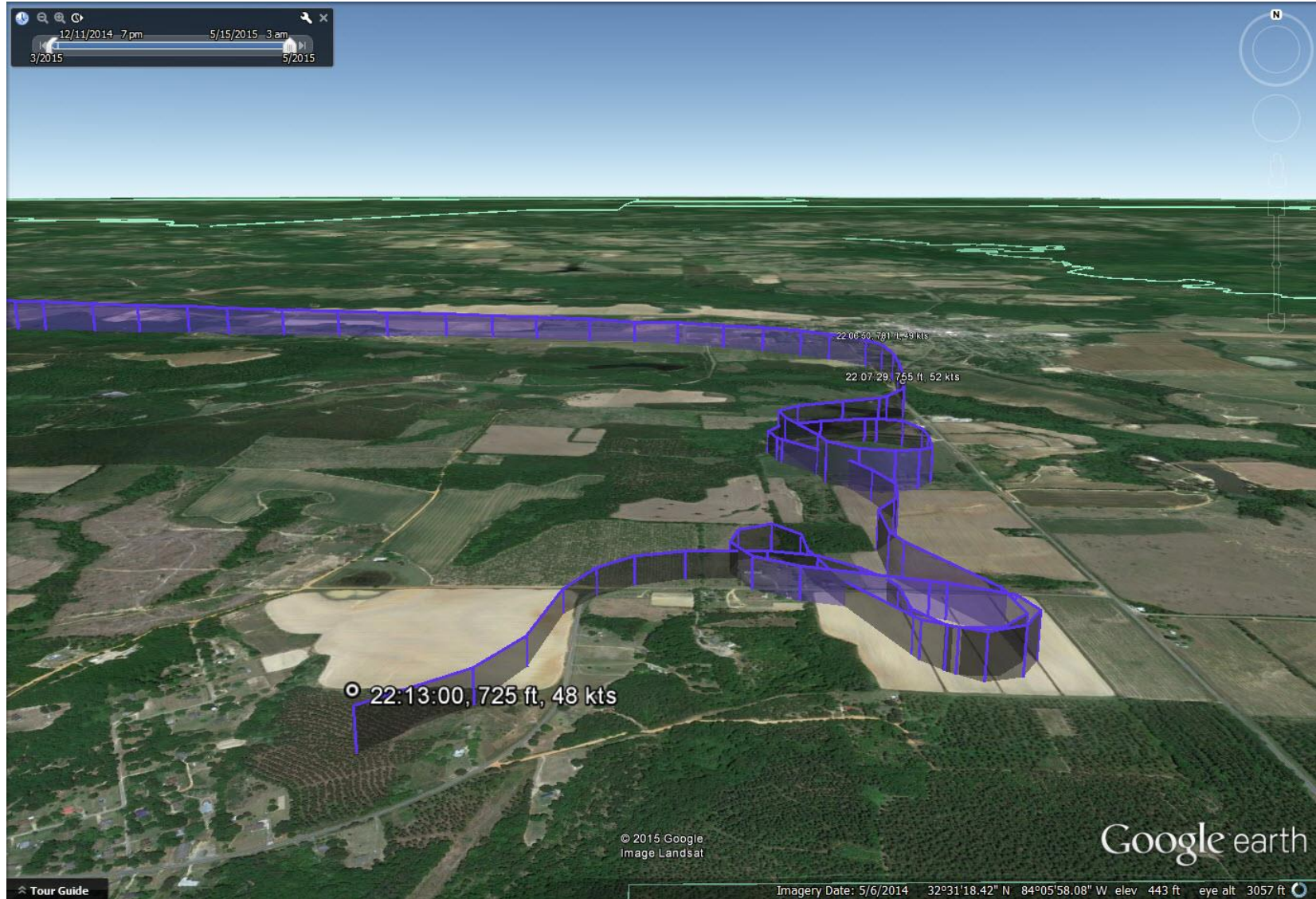


Figure 5. Google Earth overlay showing the aircraft's maneuvers in the vicinity of Reynolds, GA.

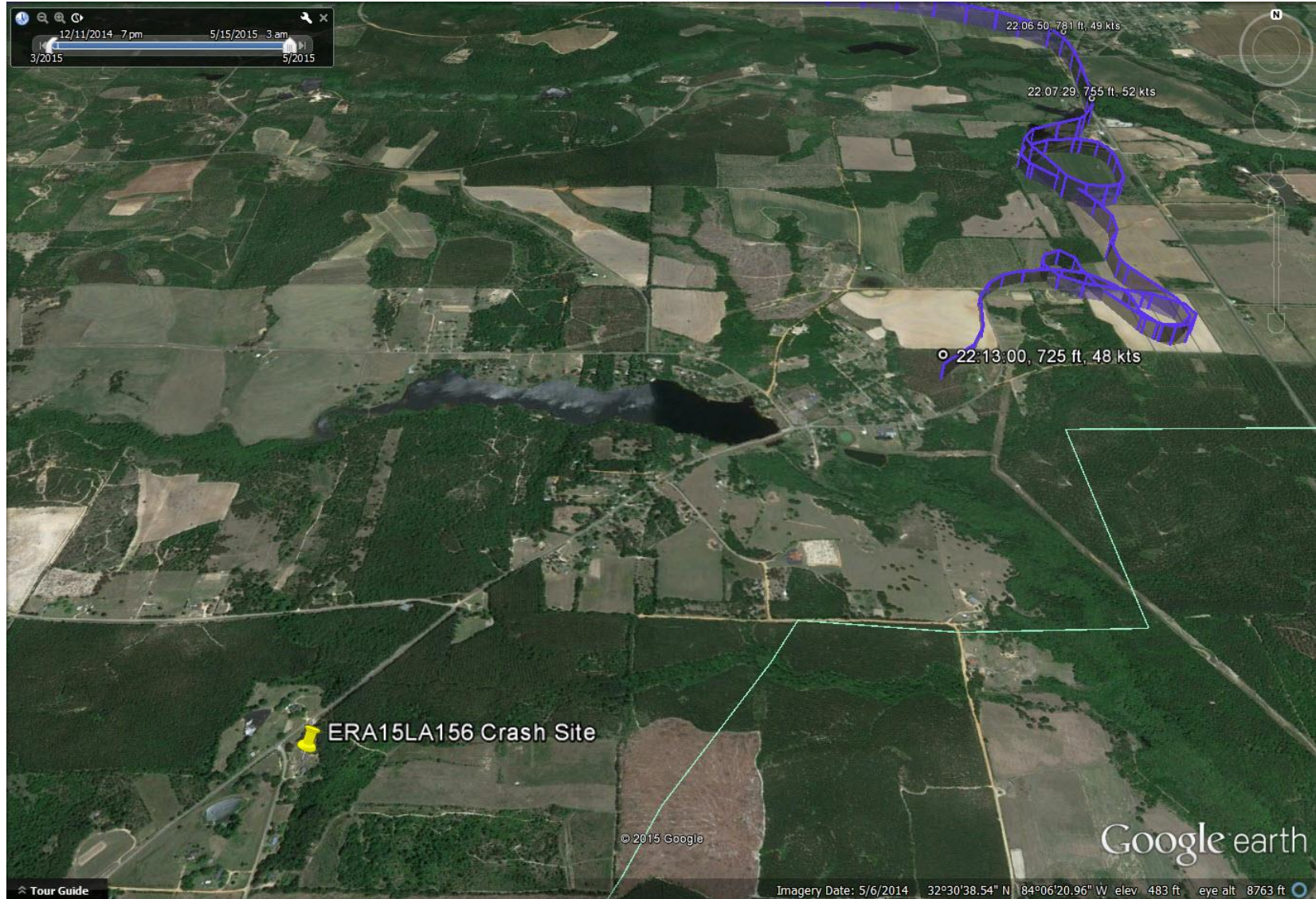


Figure 6. Google Earth overlay showing where the aircraft's tracklogs terminated in relation to the aircraft wreckage site.



Figure 7. Google Earth overlay showing the entire recorded tracklog for the accident flight overlaid on the Atlanta Sectional Chart.