

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

January 10, 2020

Flight Data Monitoring (FDM) Device

Specialist's Factual Report

By Sean Payne

1. EVENT SUMMARY

Location: Galliano, LA
Date: March 10, 2019
Aircraft: Bell 407
Registration: N577AL
Operator: Bristown Group Inc.
NTSB Number: CEN19FA095

On March 10, 2019, about 1203 central daylight time (CDT), a Bell 407, N577AL, impacted a marsh after descending from cruise flight from an approximate altitude of 300 feet mean sea level about 5 nautical miles east of South Lafourche Leonard Miller Jr Airport (GAO), Galliano, Louisiana. The helicopter was destroyed by impact forces. The commercial pilot and a passenger received fatal injuries. The helicopter was registered to and operated by Bristow Group Inc. under Title 14 *Code of Federal Regulation* Part 135 as an on-demand passenger flight that was operating on a company visual flight rules flight plan. The flight originated from Bristow US LLC Heliport (2LS0), Galliano, Louisiana, about 1155, and was destined to an offshore platform in Viosca Knoll (VK956), Gulf of Mexico, about 69 nautical miles east/southeast of Venice, Louisiana.

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:	Appareo GAU 2000
Serial Number:	060

3.1. Device Description

The Appareo GAU2000 recorder is a lightweight self-contained attitude, air-data and GPS recording system. The small recorder has an internal GPS unit that provides latitude and

longitude position, GPS altitude and GPS track. The unit also has air data inputs that when hooked to the aircraft's pitot static system, provide indicated airspeed and pressure altitude of the aircraft. The unit also has a mini attitude heading reference (AHARS) unit that senses 3-axis accelerations and records enough information to derive aircraft pitch, roll and yaw. The device stores data on both an externally removable SD card as well as an internal non-volatile memory (NVM) chip.

3.2. Data Recovery

The device arrived to the lab relatively undamaged. The device exhibited evidence of having been exposed to a wet environment, however, the unit is designed to have water resistant properties. The device included a removable SD card which was undamaged. The removable SD card was readout normally via a PC running the manufacturer's software.

3.3. Data Description

The data extracted included 43 tracklogs. Each tracklog is generated when aircraft power is applied to the unit. Not all power cycles are associated with flights. The 43rd record was associated with the accident flight and began recording on March 10, 2019, at 16:54 UTC and ended on the same day at 17:02:52 UTC.

Only the accident flight record is discussed in this report, however, other previous records from the device were provided to the Investigator-In-Charge (IIC).

3.4. Parameters Provided

Table 1 lists the parameters and table 2 describes the unit abbreviations used in this report.

Table 1. Verified and provided parameters.

Parameter Name	Parameter Description
Latitude	Latitude
Longitude	Longitude
Elevation	Altitude
Ground Speed	Ground Speed
Vertical Speed	Vertical Speed
Course	Ground Track
Heading	Heading
Pitch	Pitch
Roll	Roll
RollRate	Roll Rate
YawRate	Yaw Rate
NormalAccel	Normal Acceleration
LateralAccel	Lateral Acceleration
Slip	Slip/Skid Indication

Parameter Name	Parameter Description
TurnRate	Turn Rate
NormalField	Magnetic Field (Z Direction)
LongitudinalField	Magnetic Field (X Direction)
LateralField	Magnetic Field (Y Direction)
Fix	Fix Quality
HAcc	Horizontal Fix Accuracy
Vacc	Vertical Fix Accuracy

Table 2. Unit abbreviations.

Units Abbreviation	Description
Degrees	degrees
Degrees/Sec	degrees per second
G's	g
Gauss	gauss
2D	two-dimensional fix
3D	three-dimensional fix
DGPS	differential GPS fix
ft/min	feet per minute
Millimeters	millimeters

3.5. OVERLAYS AND TABULAR DATA

All times are given in UTC.

Figure 1 is a graphical overlay generated using Google Earth for the accident flight. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording. The graphic shows the entire recorded accident flight.

Figure 2 is a Google Earth overlay showing the final portion of the accident flight.

Figure 3 is a Google Earth overlay oriented to show the flight path during the final phase of the accident flight.

Figure 4 is a Google Earth overlay showing the final moments of flight in relation to the reported wreckage location.

Figure 5 is a data plot of select parameters for the entire flight. The portion of the recording when the helicopter was on the ground has been excluded. The helicopter lifted off around 16:57:20, then repositioned to a departure area. Around 16:58:20, the helicopter departed. The helicopter climbed to approximately 600 feet and took a heading of around 090 degrees. Around 17:01:00, the helicopter began descending. Around 17:01:20 the helicopter leveled off briefly. Around 17:02:00, the helicopter's heading began changing gradually and the helicopter rolled left. Around the same time, the helicopter pitched down. The helicopter remained in a descending trend until data ceased near the terrain.

Figure 6 is a data plot of select parameters for the end of the flight.

The manufacturer's software creates an animation from the data. This animation was screen captured from the manufacturer's software and is attached to this report as attachment 1.

Tabular data used to generate figures 1 through 6, as well as create the animation are included as attachment 2. Only select parameters have been plotted, however, the attachment contains additional validated parameters which are listed in table 1. This attachment is provided in electronic comma-delimited (.CSV) format.

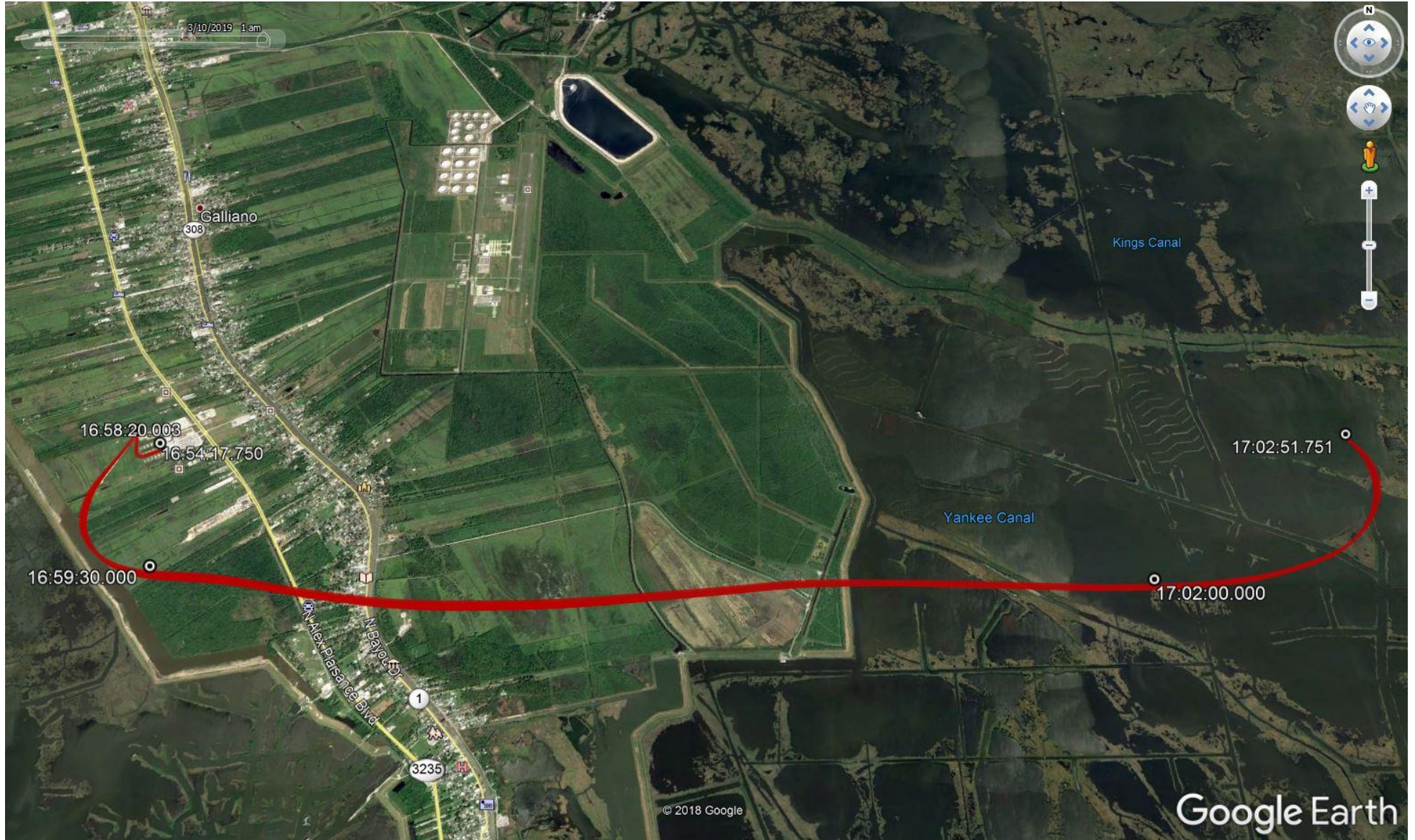


Figure 1. Google Earth overlay showing the entire accident flight.



Figure 2. Google Earth overlay showing the final portion of the accident flight.

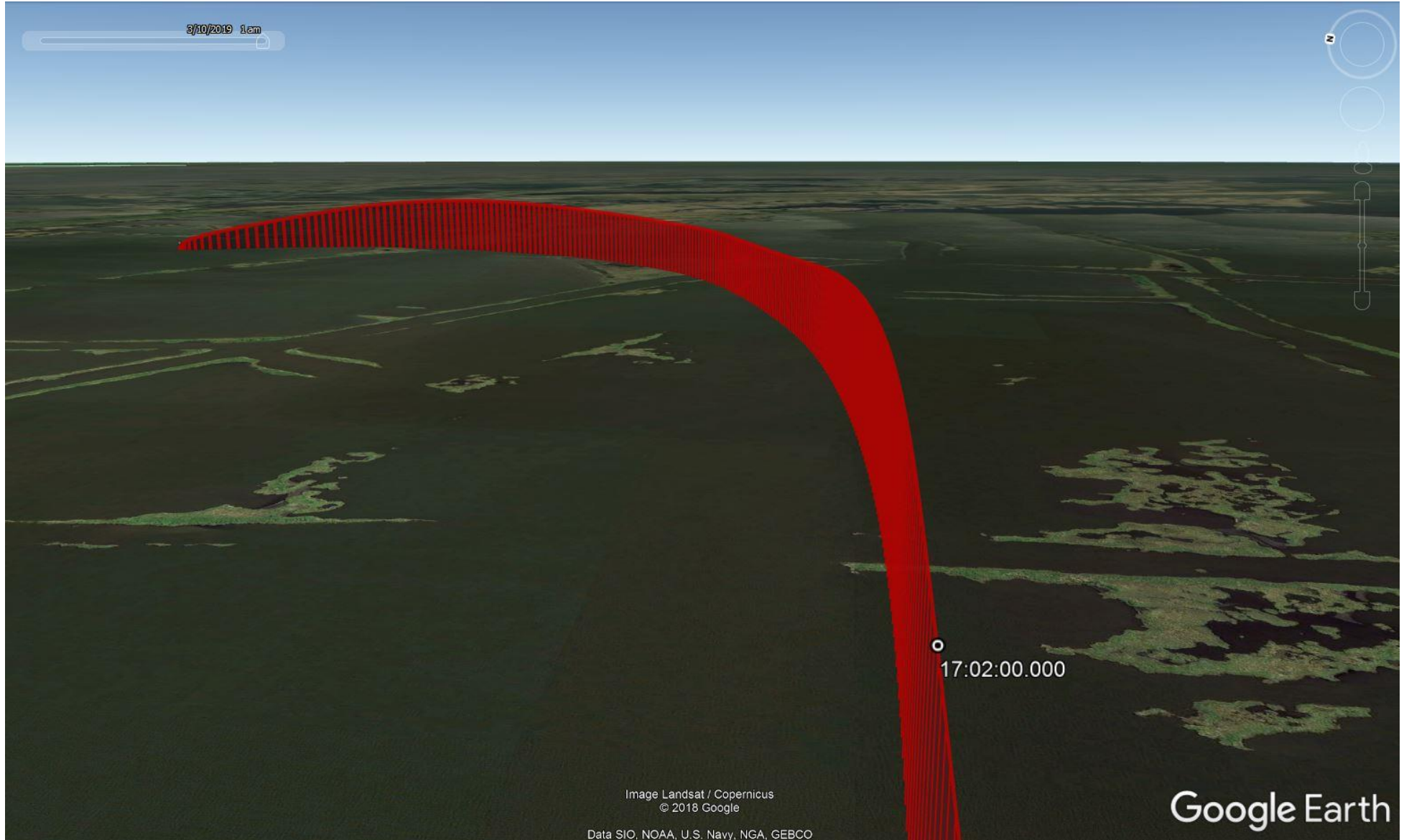


Figure 3. Google Earth overlay oriented to show the flight path during the final phase of the accident flight.

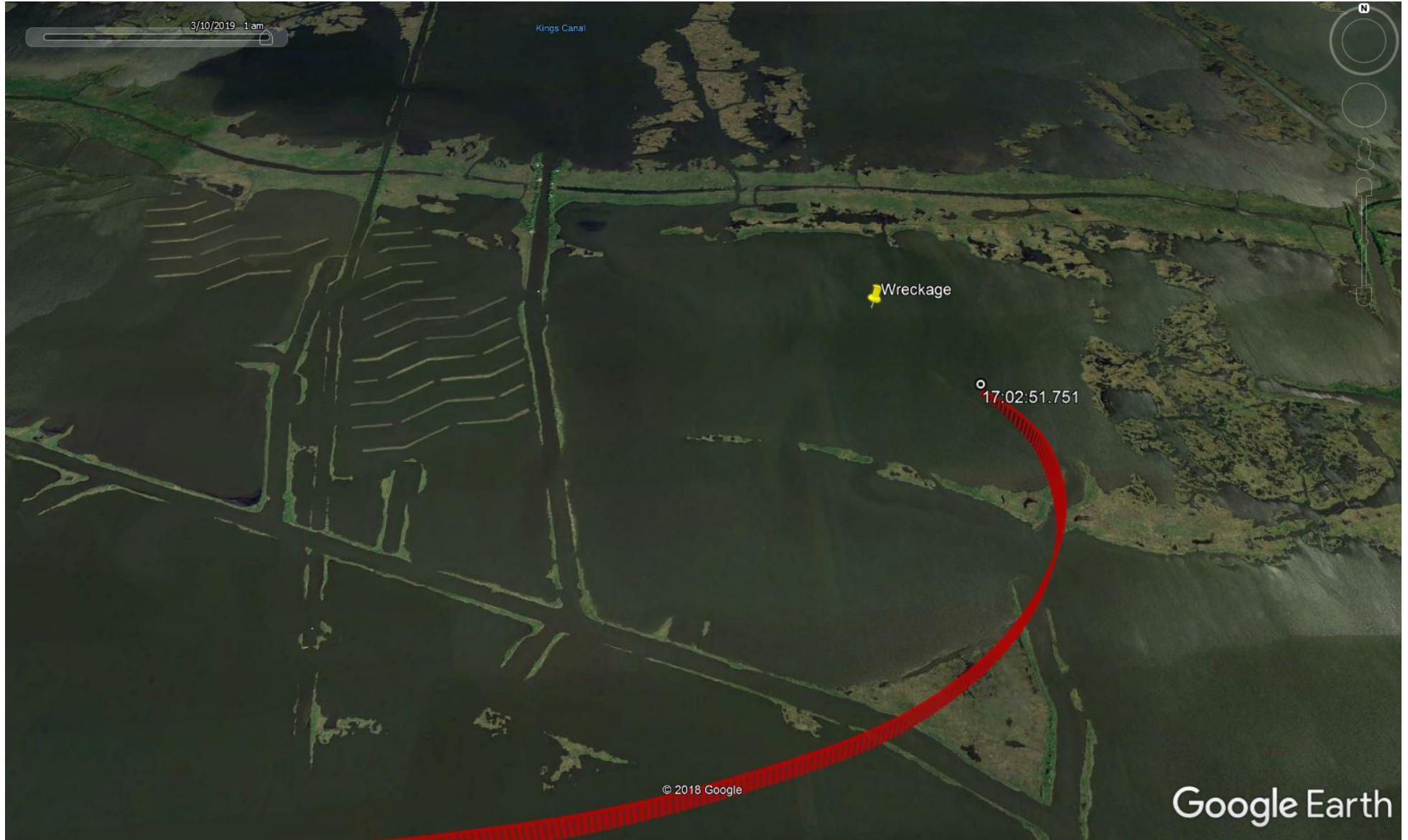


Figure 4. Google Earth overlay showing the final moments of flight in relation to the recorded wreckage location.

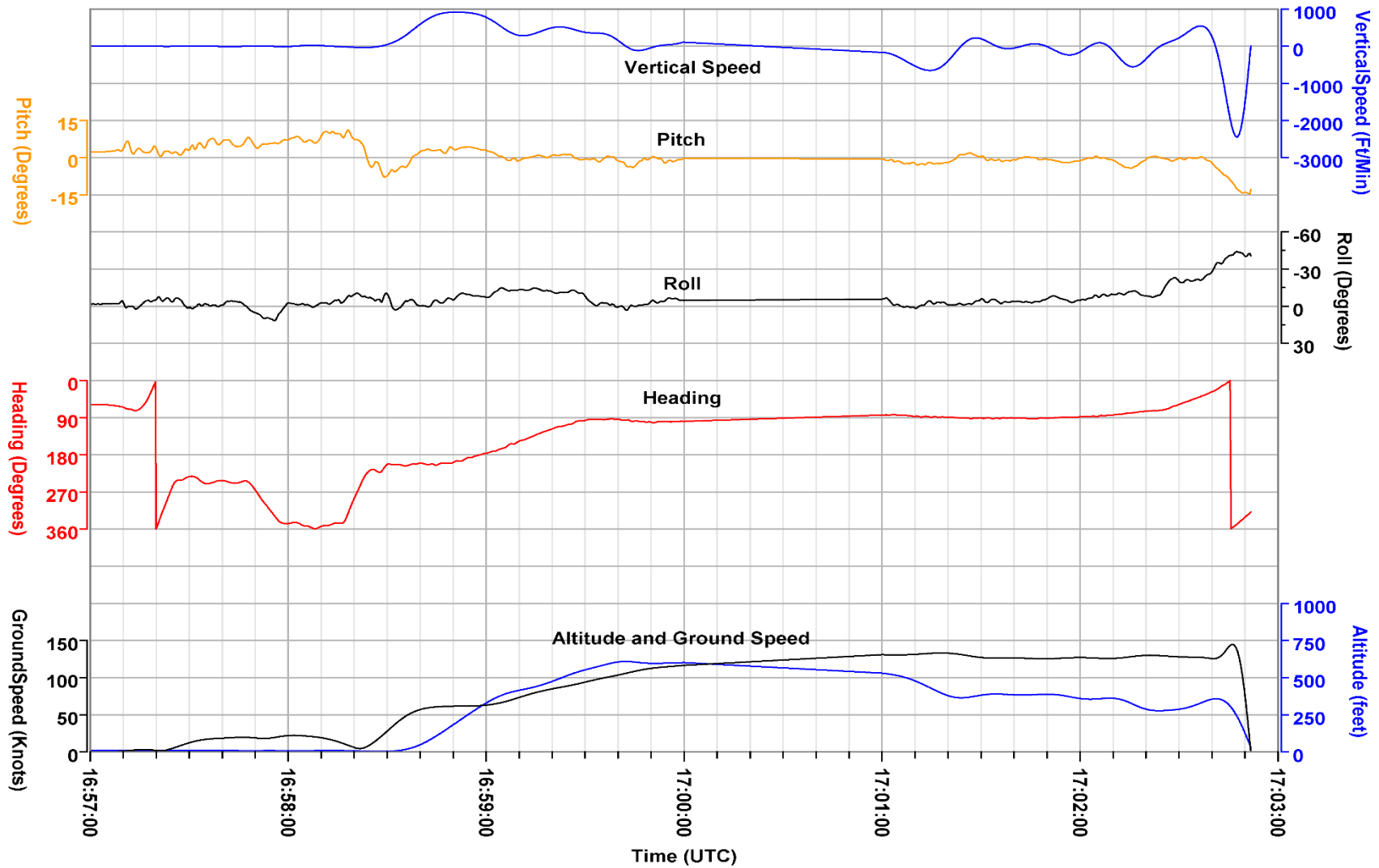


Figure 5. Data plot of entire flight.

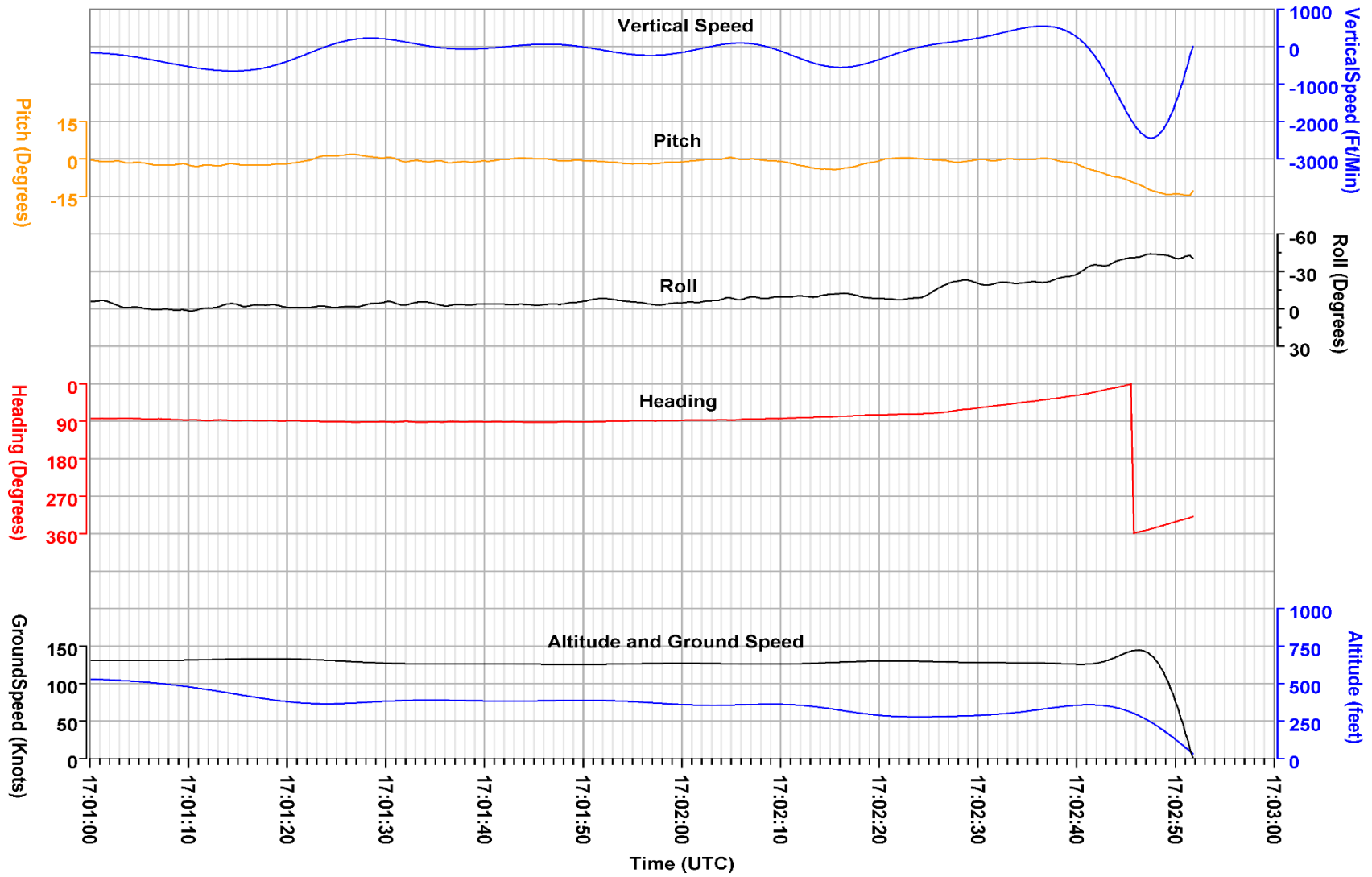


Figure 6. Data plot of end of flight.