

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

February 6, 2014

Electronic Devices Factual Report

Specialist's Factual Report
by Bill Tuccio, Ph.D.

1. EVENT

Location: Anchorage, Alaska
Date: August 24, 2013
Aircraft: Cessna 150L
Registration: N18699
Operator: Private
NTSB Number: ANC13FA084

On August 24, 2013, about 1536 Alaska daylight time, a Cessna 150L, N18699, was substantially damaged after a loss of engine power during a go-around at the Merrill Field Airport (PAMR), Anchorage, Alaska. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91. The commercial pilot and the sole passenger were fatally injured. Visual meteorological conditions prevailed and no flight plan was filed for the cross-country personal flight which originated from Wasilla, Alaska (PAWS), about 1510, with a destination of Merrill Field.

2. DETAILS OF DEVICE INVESTIGATION

The Safety Board's Vehicle Recorder Division received the following devices:

Device 1: Apple iPhone 4S
Device 1 Serial Number: C39HG4N7DTC1

Device 2: Garmin GPSMAP 296
Device 2 Serial Number: 67016522

2.1. Apple iPhone 4S Device Description

The Apple iPhone is a touch-screen operated smart-phone capable of voice calling, text messaging, email, photo/video recording, audio (music) playback, and numerous other specialized functions depending on configuration. The unit is capable of accessing wireless networks using the IEEE 801.11n protocol (wifi) and other wireless devices

supporting Bluetooth¹. Specialized functions are supported by additional user-installed program applications (Apps). Application data is stored in non-volatile memory and may include call logs, text messaging logs, image, video, and position location information. In addition, specialized application data may be stored in a proprietary file structure using numerous file formats including: binary, ASCII, HTML, SQL, etc. The amount and type of data stored varies based on the software version and configuration of the specific device.

2.1.1. Apple iPhone 4S Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had not sustained any damage. Screens and applications were visually examined and information was extracted using forensic software normally, without difficulty.

2.1.2. Apple iPhone 4S Data Description

The phone contained a text message referring to the accident flight as well as some photos taken during the accident flight near Pioneer Peak. Other content was not pertinent to the investigation.

2.2. Garmin GPSMAP 296 Description

The Garmin GPSMAP 296 is a hand-portable GPS unit equipped with a detachable antenna, a 256 color TFT LCD display, built in base map and an internal Jeppesen aviation database. The unit employs a parallel 12 channel receiver and can be operated using external power, or alternatively by using an internal Li-Ion rechargeable battery. The GPSMAP 296 is capable of storing date, route of flight, and flight time information for up to 50 individual flights in the form of a flight log. Flight logging begins when the GPS unit senses a speed increase to greater than 30 knots together with an altitude gain of greater than 500 feet. The record is saved when the speed is sensed to decrease to below 30 knots, and a new log will be started if more than 10 minutes passes from this time. A detailed tracklog – including latitude, longitude, date, time, and GPS altitude information for an unspecified number of points – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Position is updated within the tracklog as a function of time or distance moved, depending on how the unit has been configured. Once the current tracklog memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. The current tracklog can be saved to long-term memory and 15 saved tracklogs can be maintained in addition to the current tracklog. Tracklog storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile² memory. The unit contains hardware and software permitting the download of recorded waypoint, route, and tracklog information to a PC via a built-in serial port using the NMEA 0183 version 2.0 protocol. An internal button-battery is used to back-up

¹ A short-range, low bandwidth wireless protocol used in consumer electronics used mostly for low-overhead functions.

² Non-volatile memory is semiconductor memory that does not require external power for data retention.

power to the internal memory and real-time clock during those periods when main power is removed.

2.2.1. Garmin GPSMAP 296 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained impact damage, as shown in figure 1. Despite damage to the screen, the unit started and information was extracted using the manufacturer's software normally, without difficulty.

Figure 1. GPSMAP 296 as received.



2.2.2. Garmin GPSMAP 296 Data Description

The data extracted included 30 sessions from July 30, 2013 through the accident flight on August 24, 2013 (6,326 total data points). The accident flight was the last (30th) session, recorded starting at 23:11:16 UTC and ending at 23:26:14 UTC on August 24, 2013 (160 total data points). Three flights prior to the accident flight on August 24, 2013 UTC were also examined for this report.

3. GPS 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 True 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, MSL ³)
Groundspeed	Average groundspeed between current and previous data point (knots)
Track	Average true course between current and previous data point (degrees)

4. OVERLAYS AND TABULAR DATA

All graphical overlays in this report were generated using Google Earth.

Figure 2 is a graphical overlay of the recording from PAMR to PAWS until the end of the recording. The recording began on August 24, 2013 at 22:08:36 UTC at the PAMR airport. By 22:19:43 UTC, the aircraft was airborne and flew northeast towards Pioneer Peak. After orbiting near Pioneer Peak until about 22:42:48 UTC, as shown in figure 3, the aircraft proceeded northwest towards the PAWS airport.

Figure 4 shows the aircraft approached the PAWS airport at about 23:02:16 UTC. After landing, the aircraft taxied onto the ramp. By 23:15:08 UTC, the aircraft departed the PAWS airport toward the south.

Figure 5 shows the end of the recording at 23:26:14 UTC as the aircraft was proceeding south towards Anchorage.

Figure 6 shows two prior flights on August 24, 2013. The recording began at 04:37:35 UTC at the PAMR airport. The aircraft proceeded southeast to the Girdwood airport, arriving about 05:19:27 UTC. The aircraft then departed Girdwood at about 06:36:14 UTC, returning to the PAMR airport by 07:02:35 UTC.

Tabular data used to generate figures 2 through 6 are included as Attachment 1. These attachments are provided in electronic comma-delimited (.CSV) format.

³ MSL means altitude above mean sea level

Figure 2. Overview of accident flight.

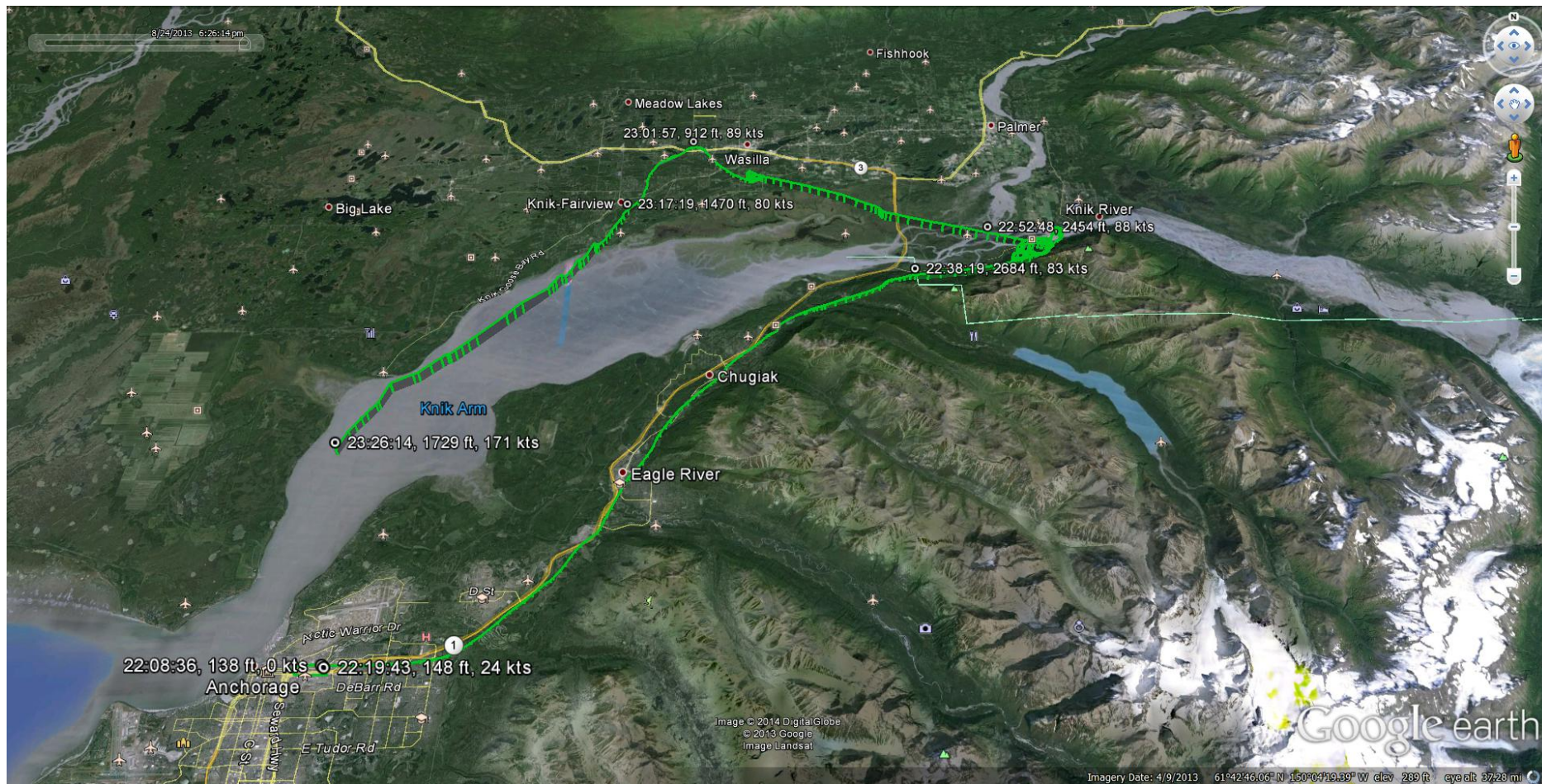


Figure 3. Accident flight orbiting near Pioneer Peak.

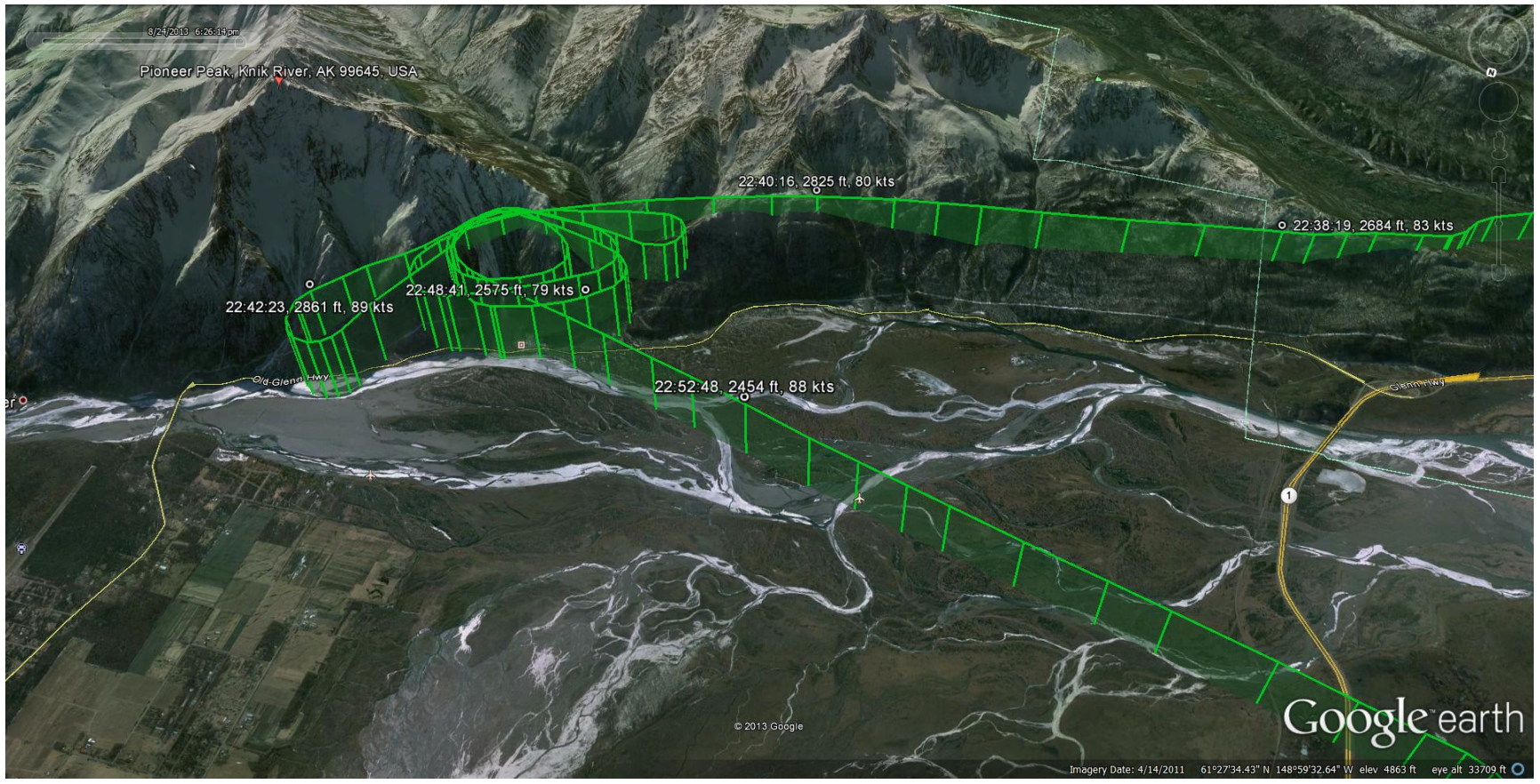


Figure 4. Accident flight landing and departing PAWS airport.

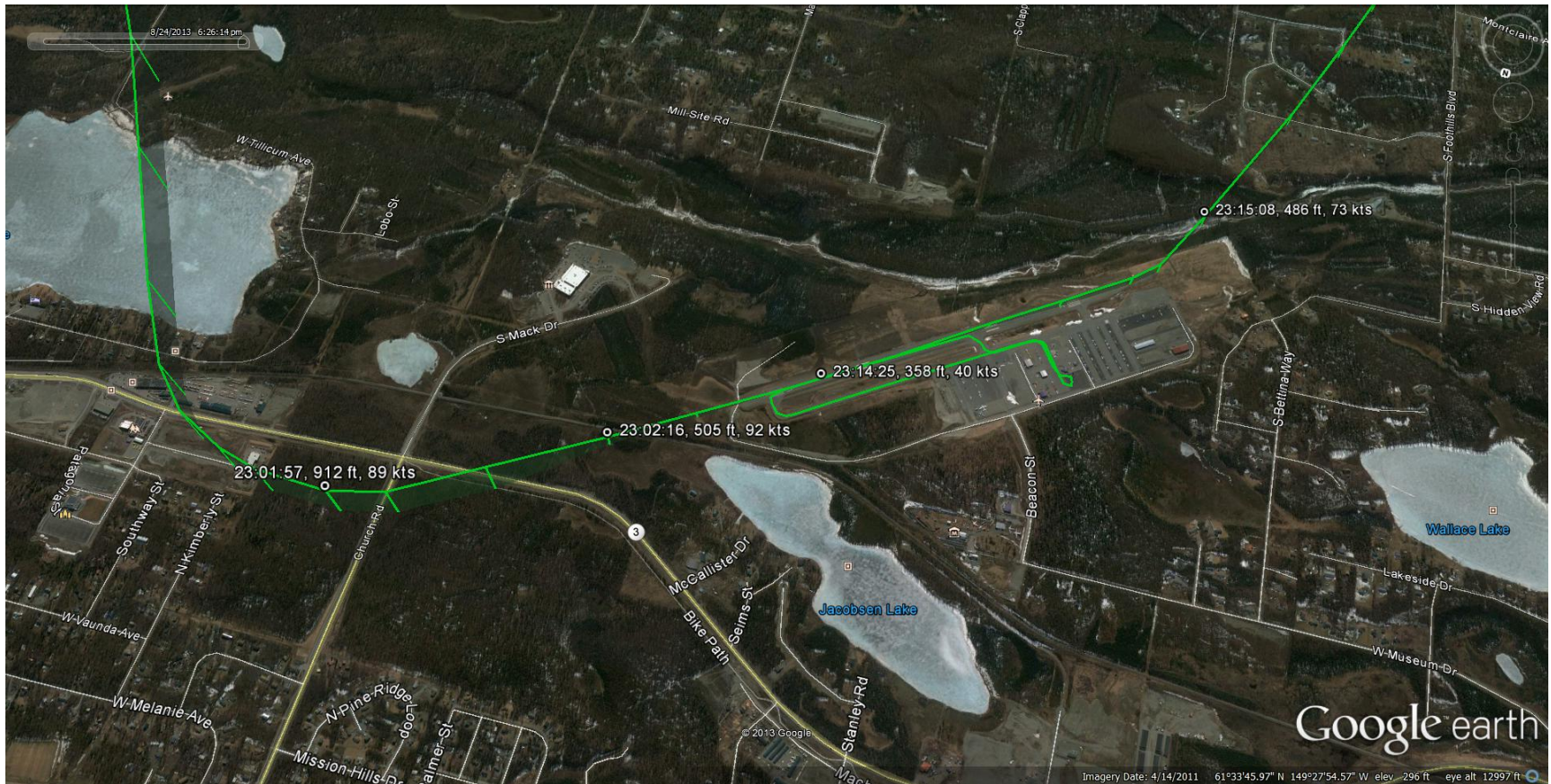


Figure 5. End of accident flight recording.

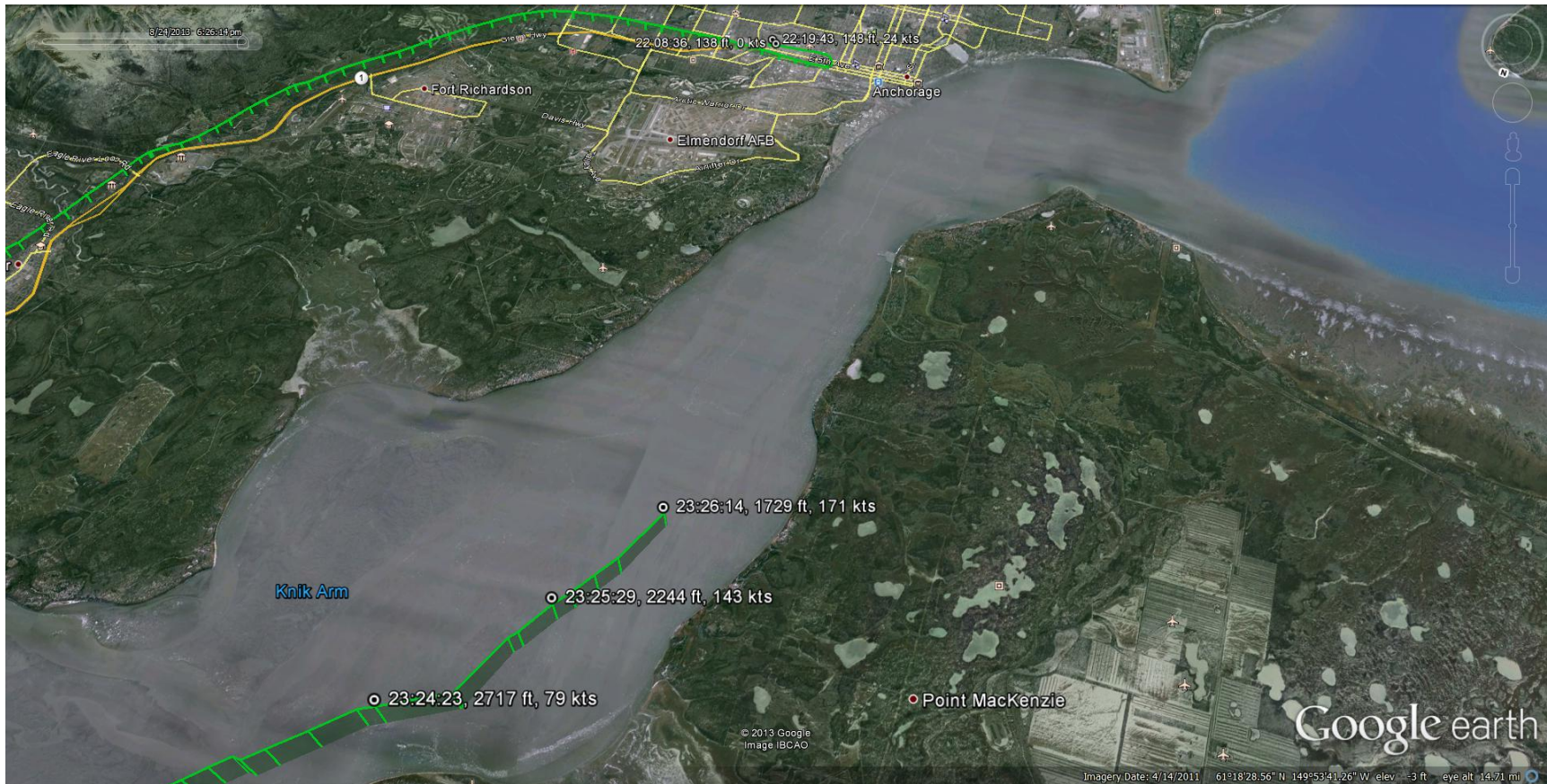


Figure 6. Prior flights on August 24, 2013.

