NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

October 24, 2011

17 - GPS Factual Report

by Bill Tuccio

A. EVENT

Location:	Kodiak, AK
Date:	September 23, 2011, 1930 Alaska daylight time (ADT)
Aircraft:	DeHavilland DHC-3
Registration:	N361TT
Operator:	Paklook Air Inc
NTSB Number:	ANC11FA107

B. GROUP - No Group

C. SUMMARY

On September 23, 2011, about 1930 Alaska daylight time (ADT), a float-equipped DeHavilland DHC-3T airplane, N361TT, sustained substantial damage during a go-around at a lake, when it struck a tree and terrain, about 5 miles south-southwest of Kodiak, Alaska. The airplane was being operated by Paklook Air Inc., Kodiak, as a visual flight rules (VFR) passenger flight, under the provisions of 14 Code of Federal Regulations Part 135, when the accident occurred. The commercial pilot was killed, one passenger received serious injuries, and the remaining passenger received minor injuries. Visual meteorological conditions prevailed, and company flight following procedures were in effect. The airplane departed Old Harbor, Alaska, bound for Kodiak, about 1905 ADT.

D. DETAILS OF INVESTIGATION

On October 20, 2011, the NTSB Vehicle Recorder Laboratory received the following device(s):

GPS Manufacturer/Model:	Garmin GPSMAP 696
Serial Number:	unknown

Garmin GPSMAP 696 Device Description

The Garmin GPSMAP 696 is a battery-powered portable multi-function display and GPS receiver with a 7-inch diagonal high resolution LCD display screen. The unit includes a built-in Jeppesen database and is capable of receiving XM satellite radio for flight information including NEXTRAD radar, lightning, METARs, TAFs, and TFRs. The unit can also perform and store weight and balance calculations. A built-in AOPA Airport Directory and Safe Taxi Airport Diagrams are included for selected fields. The unit stores date, route-of-flight, and flight-time information for up to 50 flights. A flight record is triggered when groundspeed exceeds 30 knots and altitude exceeds 250 feet, and ends when groundspeed drops below 30 knots for 10 minutes or more. A detailed track log – 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 track log as a function of time or distance moved, depending on how the unit has been configured. Once the current track log memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. The current track log can be saved to long-term memory and 15 saved track logs can be maintained in addition to the current track log. Track log storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile[1] memory. 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.

GPS Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed that the unit had sustained minimal damage (see figure 1). However, power was applied to the accident unit and recorded waypoint, route, and tracklog data was successfully downloaded from the unit via the USB port.

[1] Non-volatile memory is semiconductor memory that does not require external power for data retention

Figure 1. Photo of damaged Garmin 696.

GPS Data Description

The data extracted included 35 sessions from September 9, 2011[2] through September 24, 2011. The accident flight was recorded starting 03:00:26 UTC and ending 03:22:12 UTC on September 24, 2011. In addition, two previous flights on September 24, 2011, starting 01:09:59 UTC and ending 2:41:05 UTC, were determined to be of interest and are included in this report.

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 Track are derived from the recorded parameters.

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

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 Altitude (feet)
Groundspeed	Average groundspeed between current and previous data point (knots)
Track	Average course between current and previous data point (degrees)

OVERLAYS AND TABULAR DATA

Figure 2 is a graphical overlay generated using Google Earth for the accident flight. The flight departed the Old Harbor at approximately 03:00:26 UTC. The last recorded parameter was as at 03:22:12 UTC on September 24, 2011, with a GPS altitude of 1,079 feet above Mean Sea Level (MSL) and a ground speed of 64 knots. Due to data buffering on the GPS unit, the data recording may have ended before the accident event.

Figure 3 is a graphical overlay generated using Google Earth zoomed in on the last 21 seconds of recorded data. Figure 4 highlights an enroute portion of the accident flight with MSL altitudes ranging from 30 feet to 49 feet while crossing a lake.

Figure 5 is a graphical overlay generated using Google Earth for the flight before the accident flight, from 02:16:11 UTC to 02:41:05 UTC on September 24, 2011. The flight departed Kodiak and landed Old Harbor.

Figure 6 is a graphical overlay generated using Google Earth for the second to last flight, from 01:09:59 UTC to 01:34:32 UTC on September 24, 2011. The flight departed Old Harbor and landed Kodiak.

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

Figure 2. Google Earth overlay showing last flight from Old Harbor, Alaska planned to crash site.

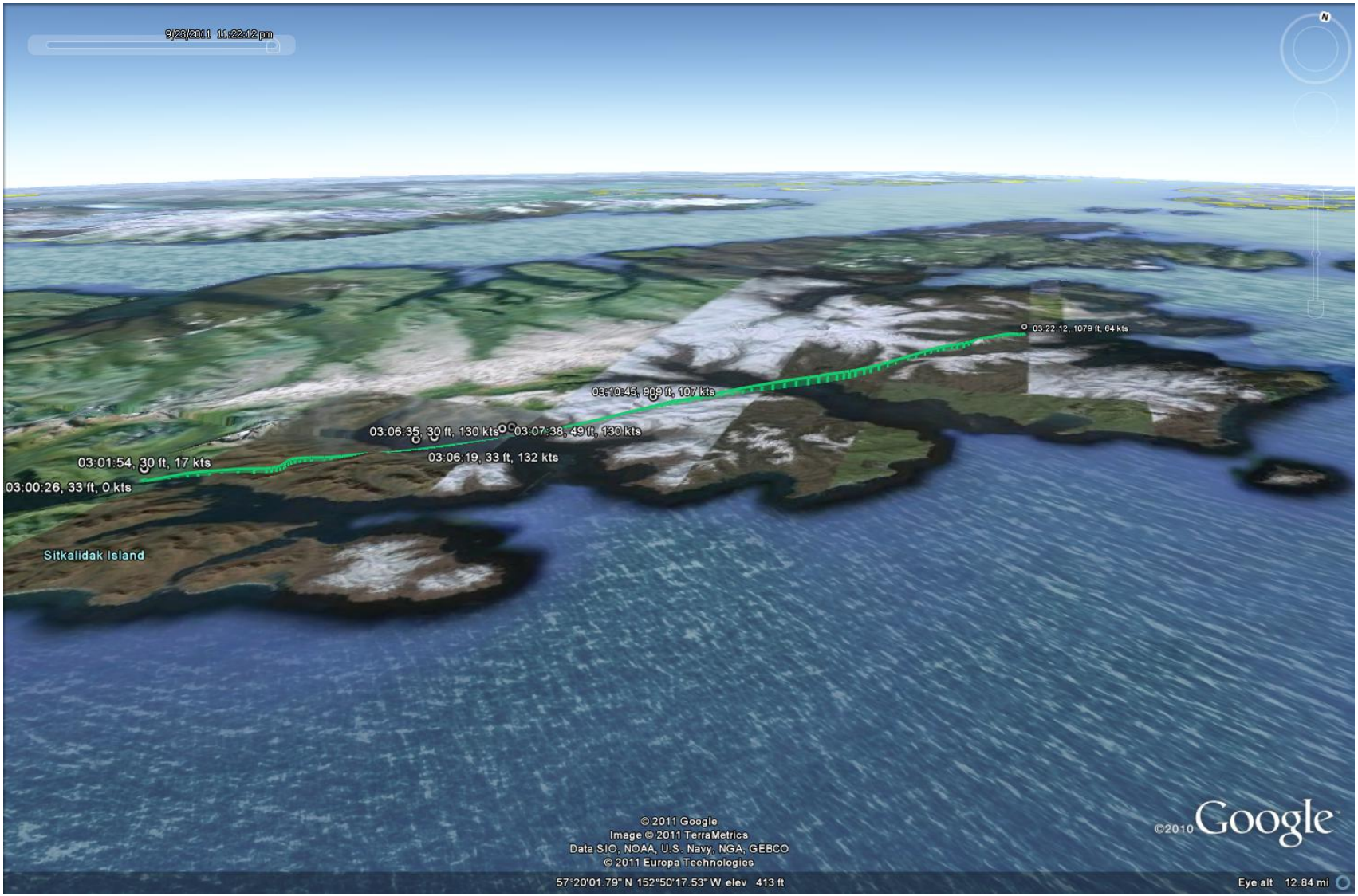

Figure 3. Google Earth overlay, end of accident flight.

Figure 4. Google Earth overlay, enroute portion of accident flight.

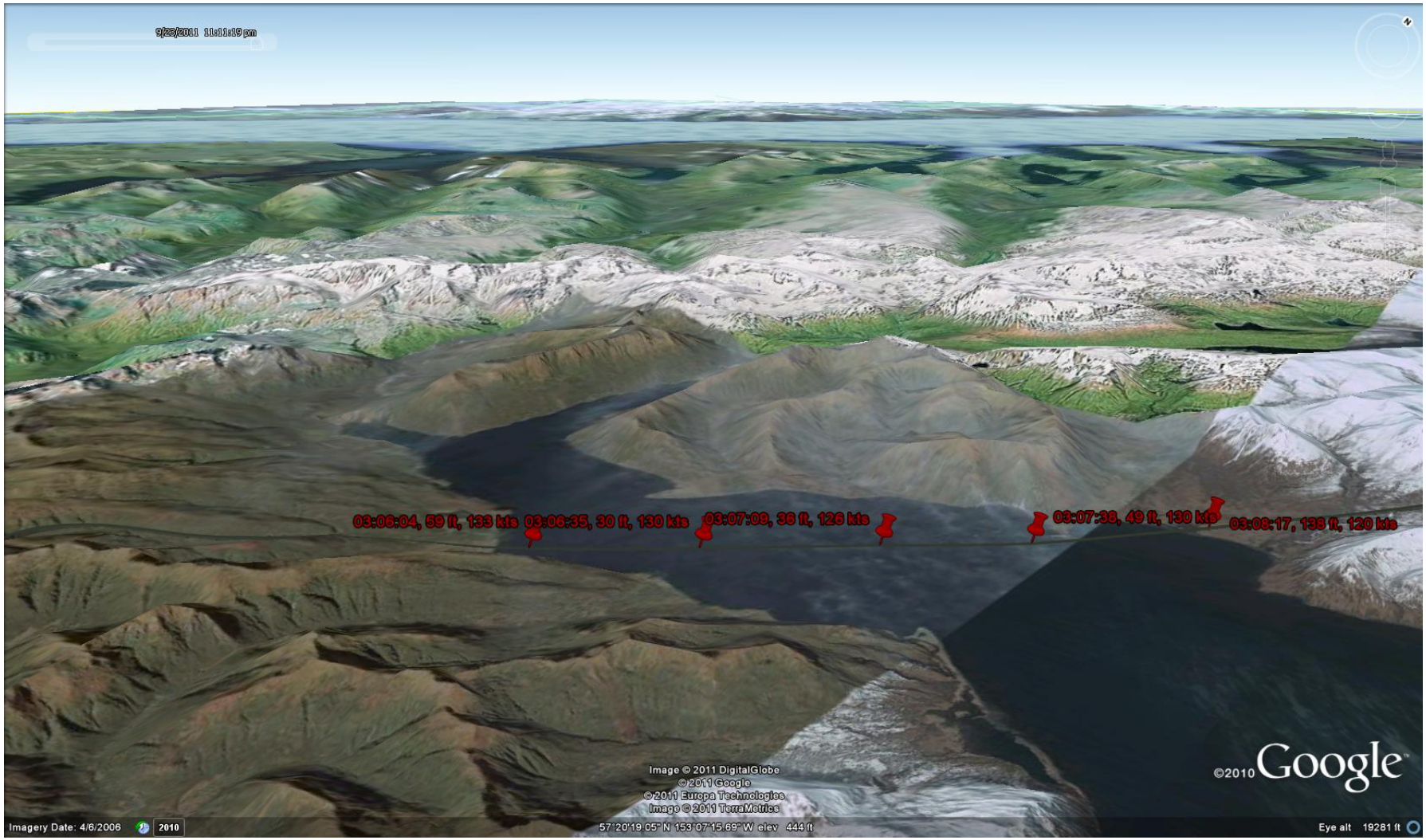

Figure 5. Google Earth overlay, flight before last.

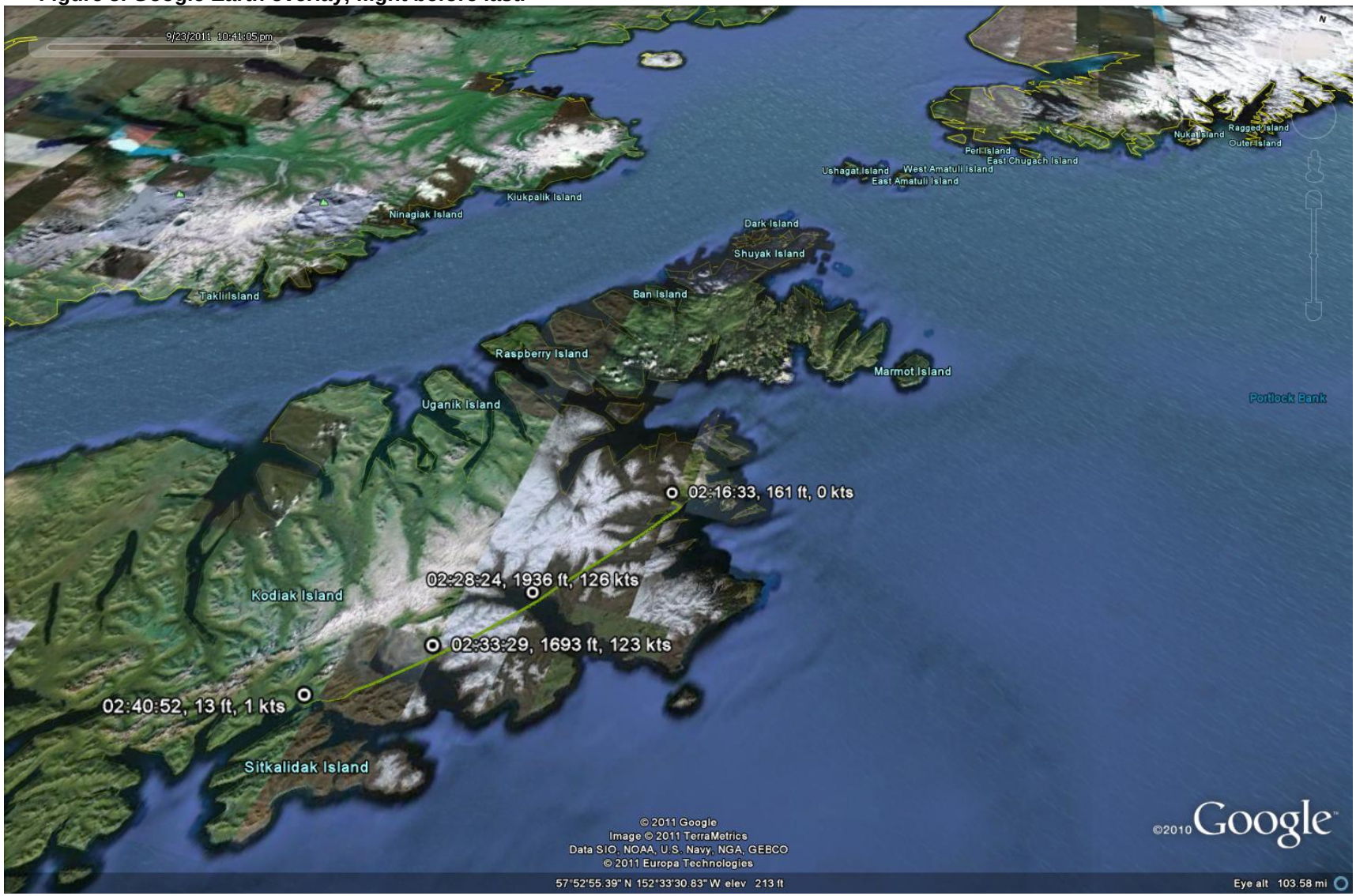

Figure 6. Google Earth overlay, second to last flight.