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

April 23, 2015

Enhanced Ground Proximity Warning System

Specialist's Factual Report
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1. EVENT

Location:	Marco Island, Florida
Date:	March 1, 2015
Aircraft:	Bombardier CL-600-2A12, Registration N600NP
Operator:	Six Hundred NP, LLC
NTSB Number:	ERA15LA140

On March 1, 2015, about 1615 eastern standard time (EST), a Bombardier CL-600-2A12, N600NP, registered to and operated by Six Hundred NP, LLC, experienced a landing overrun and subsequent collapse of the nose landing gear at the Marco Island Airport (MKY), Marco Island, Florida. Visual meteorological conditions prevailed at the time and an IFR flight plan was filed for the 14 *Code of Federal Regulations* Part 91 personal flight from the Florida Keys Marathon Airport (MTH), Marathon, Florida. The airplane sustained substantial damage. The airline transport pilot, co-pilot, 1 flight attendant, and 4 passengers were not injured; 1 passenger sustained serious injuries, and 1 passenger sustained minor injuries. The flight originated from MTH about 1554 EST.

2. DETAILS OF INVESTIGATION

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

Device 1:	Honeywell MK VII Enhanced Ground Proximity Warning System (EGPWS)
Device 1 Serial Number:	4163

2.1. Honeywell MK VII EGPWS Device Description

The EGPWS non-volatile memory[1] (NVM) does not continuously record; rather, the EGPWS device stores data to NVM only when certain criteria are met. The readout process at the manufacturer's facility produces several files of flight history data that encompass operational, documentary, fault, and warning information.

The flight history data warning file outputs performance data as related to the operation of the aircraft. These data do not continuously record; rather, if an alert or warning

[1] Non-volatile memory retains information when power is removed.

related to the EGPWS function activates, the unit retains data points for 20 seconds prior to the activation of the warning and 10 seconds afterwards. The EGPWS parameters are only sampled 1 time per second, but the actual time of occurrence can be anywhere within the second.

2.1.1. Honeywell MK VII EGPWS Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had not sustained any damage and information was downloaded to a proprietary PCMCIA card following the manufacturer's instructions. The manufacturer decoded the PCMCIA card with NTSB personnel present.

2.1.2. Honeywell MK VII EGPWS Data Description

The unit had recorded about 7,283 hours of operational data, including last entries of a takeoff and landing at MTH and MKY, respectively; these flights were identified as flight leg 1946 on the EGPWS. There were no warnings associated with this flight leg. According to Honeywell, the terrain inhibit was not active during the accident flight.

The takeoff and landing records[2] were as follows:

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FLIGHT LEG 1946:          (  7282:39:59)
    Lat/Long:  24.72709 / -81.04912
    Geometric Alt: 74.00   True Hdg: 68.91
    GPS Alt: 44.00
    Pos. Uncert: 0.0024   Pos. Source: GPS1
    Airport:            KMTH

 FLIGHT LEG 1946:          (  7283:00:56)
    Lat/Long:  26.00386 / -81.67461
    Geometric Alt: 58.00   True Hdg: 168.75
    GPS Alt: 68.00
    Pos. Uncert: 0.0032   Pos. Source: GPS1
    Airport:            KMKY
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Figures 1 and 2 show the locations of the takeoff and landing records, respectively, overlaid in Google Earth. Figure 2 shows the landing record occurred about 800 feet before the runway 17 threshold. According to the EGPWS manufacturer, the landing record is generated when: (1) the radio altimeter shows the aircraft passing below 50 feet radio altitude and (2) the gear is down. Review of other historical mode alerts below 100 feet from prior flights revealed no anomalous radio altimeter values.

[2] Lat/Long means latitude/longitude in degrees; Geometric Alt and GPS Alt are measures of altitude in feet; True Hdg is heading in degrees; Pos. Uncert. is a measure of position accuracy (units unknown); Pos. Source is the input source; and Airport is the airport identifier of the associated record. The parenthetical value to the right of the flight leg is time expressed as EGPWS unit operating time.

Figure 1. Takeoff record, leg 1946.

Figure 2. Landing record, leg 1946.