

Tech Note: WAAS Status in Eastern North America

11 April 2006

The US Federal Aviation Administration (FAA) have been adjusting the orbits of WAAS satellites in recently weeks as well as adding new satellites to the system. This tech note describes the status of the WAAS system as of the date above.

To understand WAAS status reports, it helps to have a little background on the nomenclature and numbering system for GPS and WAAS satellites. The GPS control community (primarily the US Air Force, the FAA, and some international bodies) assign ID names and numbers to all navigation satellites – both GPS and real-time correction satellites. The ID numbers are called “PRNs” because each satellite broadcasts its ID number in Pseudo-Random Noise (PRN) code. In addition, the National Maritime Electronics Association (NMEA) uses ID numbers that are equal to the PRN code number minus 87 (NMEA IDs must be 2-digit numbers). Besides having a PRN and an NMEA ID number, WAAS satellites also have multiple names. The WAAS satellite that recently came on line in support of real-time differential corrections covering eastern North America is referred to as “PRN #125,” “NMEA #38,” “Telesat CY,” “Anik” and “107W,” the latter name referring to longitude of its (geosynchronous) orbit.

The FAA decided to move the WAAS satellite PRN #122 (NMEA #35) from a position where its signals could be picked up in Eastern North America to a position over the equator at 142 degrees west longitude. This left the Northeast US and the Canadian Maritime provinces without real-time differential correction coverage beginning in March 2006.

Two new WAAS satellites were launched in Fall 2005 and put into geosynchronous orbit over the equator at 107 degrees west longitude (PRN #125) and 133 deg. west longitude (PRN #135). These were originally planned to go live in October 2006 but PRN 135 was reported to be broadcasting corrections in March 2006 and the FAA said PRN 125 would go live on April 1. However, as of the posting of this tech note, neither of these satellites appears to be broadcasting – at least not continuously. To check to see if these new satellites are broadcasting signals *that can be received in your area*, please follow these instructions.

MobileMapper CE

To check WAAS status on a MMCE, turn it on where it has a clear view of the sky. Tap Start>Programs>GPS Utilities>GPS Status and then the “Sig/Nav” tab. Note: it can take a couple minutes after turning on a GPS receiver for it to track and use corrections from a WAAS satellite. The Sig/Nav screen displays a bar chart showing which GPS and WAAS satellites are being tracked and with what SNR. The satellites’ NMEA ID numbers are displayed below the bars and the SNR values are seen within the bars. However, in some cases, it can take a couple minutes of tracking and using WAAS corrections before the NMEA ID number of a WAAS satellite is displayed. If you see that NMEA #38 is displayed (corresponding to PRN #125), the new satellite covering the eastern half of

North American is in fact broadcasting corrections. The GPS satellites' bars turn from gray to blue when the signal is locked onto and being used to correct the position calculated by the GPS receiver in real-time. However, to differentiate the WAAS/EGNOS/MSAS satellites, their bars remain gray whether or not their corrections are being used. So to tell if the corrections *are* being used, look at the bottom of the screen: you should see "Differential GPS" at the lower left and a blue, flashing button at the right.

If you tap the "Azimuth/Elevation" tab on the GPS Status utility, you will see a sky plot showing where the satellites are. There is a defect in the current version of the MMCE operating system software (version 2.63) such that the sky plot's positions of the WAAS/EGNOS/MSAS satellites are hardwired into the firmware and so are now incorrect. You may ignore this defect as it affects only the display on the Azimuth/Elevation screen and will be fixed in a future version of the software. The MMCE will use corrections from the new WAAS satellites as long as it can pick up the signal.

ProMark3

To check WAAS status on a ProMark3, turn it on where it has a clear view of the sky and open up the Utilities. Run GPS Status and open the "Sig/Nav" tab. Then follow the same directions as for the MobileMapper CE.

MobileMapper Pro

To check WAAS status on a MobileMapper Pro, take it outside where it has a clear view of the sky but *do not turn it on*. Instead, depress the NAV and PWR buttons simultaneously until you see a small box on the screen with two zeroes in it. Use the up arrow to increment the rightmost zero to "3" and press ENTER. The top of the display shows not just that you are tracking a WAAS satellite (the sky plot, Position and Logging screens indicate this much) but also which PRNs you are tracking, their SNR and where they are in the sky relative to the receiver (azimuth and elevation).

The **General Info** folder of the Thales Survey and GIS technical support ftp site ([ftp.thalesnavigation.com](ftp://ftp.thalesnavigation.com)) contains a spreadsheet (WAAS-EGNOS STATUS UPDATE.xls) showing the status of all "SBAS" (WAAS, EGNOS and MSAS) real-time correction satellites. This spreadsheet is updated periodically.