

# Recent GPS Issues with Vaisala AUTOSONDE AS14, DigiCORA® MW41 and MW31 Sounding Systems with Trimble DG14L GPS Receiver Module

Dear Customer,

There have been recent GPS issues with part of Vaisala DigiCORA® Sounding Systems AUTOSONDE AS14, MW41 and MW31. The issues have been found to be caused by Trimble DG14L GPS receiver module.

## **Product Affected**

The problem is applicable to AUTOSONDE AS14, MW41 and MW31 systems with MRG113 GPS Processor Unit installed. The MRG113 units have been delivered approximately between years 2006 and 2013.

You can easily check the GPS Processor Unit model by opening the SPS311 Sounding Processing Subsystem front panel. If GPS Processor Unit is MRG113, your system includes DG14L GPS receiver module.

The problem is globally very limited and customer having the MRG113 GPS Processor unit may not face any problems depending on the locations of the sounding systems.

#### **Symptoms**

The possible symptoms include the following:

- Local GPS satellites are not detected
- Only one or two satellites are detected
- Sounding system does not go to Ready for launch state
- Missing wind

#### Root Cause

The problem is caused by DG14L GPS receiver module manufactured by Trimble Navigation Limited. Since May 18th, the GPS receiver module has had difficulties to receive GPS data.

The Russian Space-Based Augmentation System (SBAS) consisting of three satellites PRN#125, PRN#140 and PRN #141 is called System for Differential Correction and Monitoring (SDCM). The system is now being actively developed and tested. SDCM has recently started broadcasting its almanac. This almanac includes orbital parameters for PRN #140 and PRN #141 satellites. The numbers 140 and 141 are outside the range (120-138) reserved for SBAS systems at the time DG14L was developed.



DG14L GPS receiver cannot handle almanac for PRN #140 and PRN #141 satellites. The reception of the almanac results in receiver reboot and loss of positioning functionality. Satellite PRN#125 is geostationary and located at 16° W, and therefore visible in Europe and East coast of America.

### Hot Fix

Vaisala has made a hot fix to solve the actual problem. This software fix is made for MRP111 board in SPS311 Sounding Processing Subsystem. There are separate fixes for MW31/AUTOSONDE AS14 and MW41 Sounding Systems. The installation of this fix can be done utilizing standard software downloading process of the embedded MRP111 board and current LAN connection between Sounding Workstation and SPS311 Sounding Processing Subsystem.

The fix can be downloaded through Vaisala web link.

The hot fix disables the reception of currently problematic PRN#125 SBAS satellite. The satellite constellation of SBAS system may however change in the future resulting in reception problems of additional satellites in some part of the world. Due to the risk of further changes in SBAS satellite system Vaisala recommends to install permanent firmware fix.

#### Permanent Firmware Fix

Manufacturer of DG14L GPS receiver module, Trimble Navigation Limited has released the permanent firmware fix for the MRG113 GPS board. This fix will disable the reception of all current SBAS satellites including also any potential new satellites.

Fix can be downloaded to the MRG113 board although the hot fix had been already installed.

The installation of this fix can be done utilizing a special downloader program and a null-modem serial cable connection between Sounding Workstation and SPS311 Sounding Processing Subsystem.

#### For Further Information

We are very sorry for the troubles this problem may cause to your operations. Do not hesitate to contact your Vaisala representative if the issue is compromising the continuity of your sounding operations.

Yours Sincerely,

Jarmo Franssila Product Manager

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