Spartacus Quick Start Guide

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Spartacus Quick Start Guide Overview

The Spartacus GUI provides a simple way to set up and evaluate Sparton's line of navigation sensor modules, including:

- **DC-4E(P):** Navigation Sensor
- **GEDC-6 E(P):** Gyro-Enhanced Navigation Sensor
- **AHRS-8 E(P):** Attitude Heading Reference System
- **AHRS-M1** Micro Attitude Heading Reference System
- **IMU-10:** Inertial Measurement Unit

Spartacus System Setup

1. Ensure that all device interfaces are connected properly and the NDS-1/NDS-2 adapter board is connected to the PC.
2. Unzip the spartacus_v*.zip to a folder of your preference. Spartacus can be run directly from this folder, so installation in the traditional sense is not required. Specifically, administrator rights are not required to use this application.
3. Open the spartacus.exe file that is located inside of the folder that was just created.
4. After the application opens, click on Spartacus Settings -> Serial Port Settings
5. You will be presented with a serial connection dialog (see Figure 1).

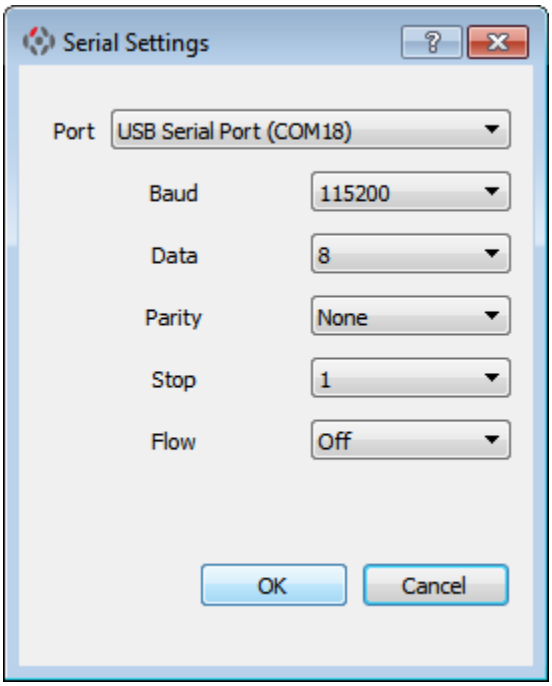
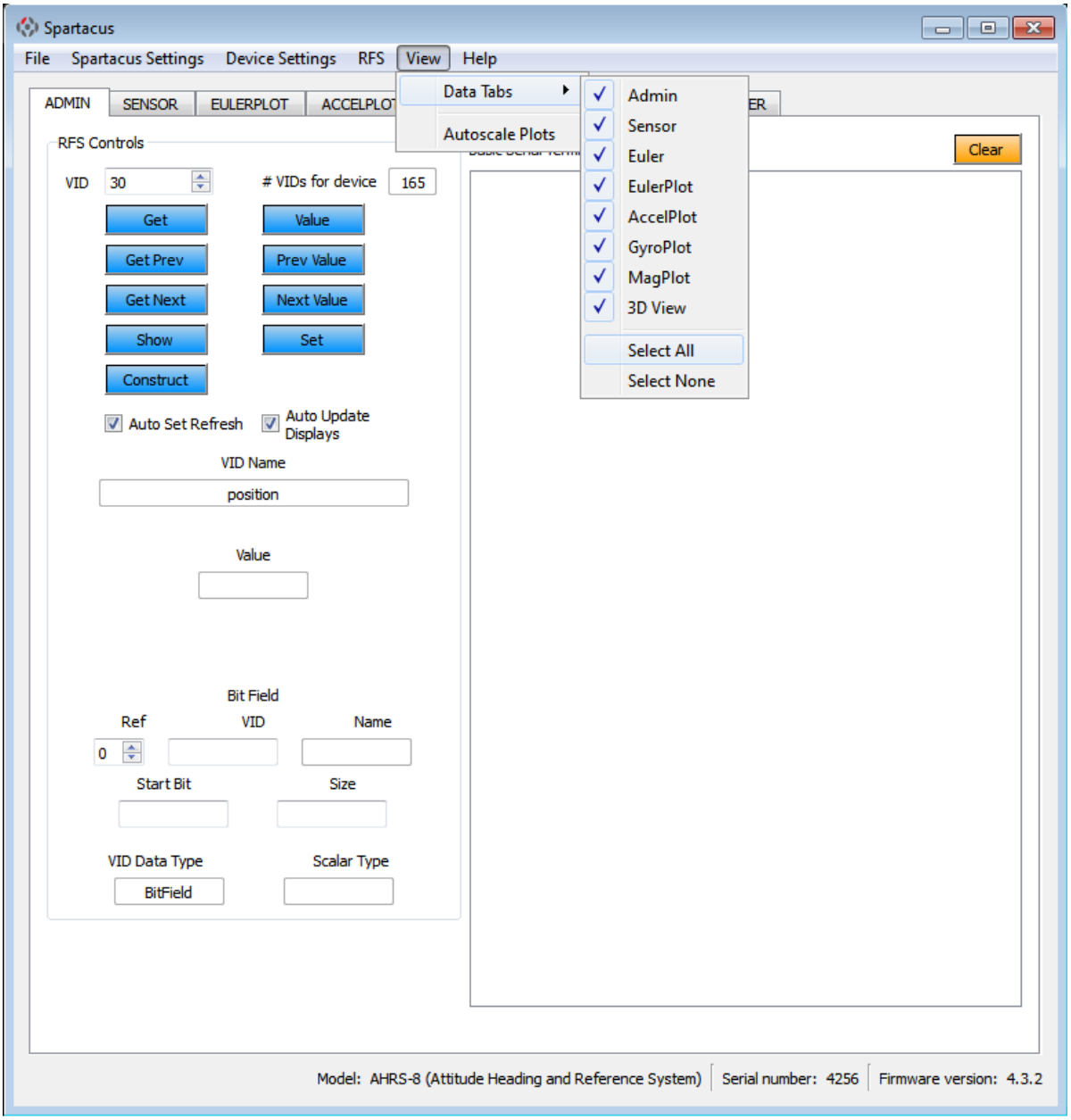


Figure 1: Serial connection dialog

6. Ensure that the device's COM port is selected and click "OK."
    a. The device's COM port may be identified using the Device Manager
7. In order to enable the various data views, select View → Data Tabs → Select All.



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Guided Tour of the Spartacus Data Views

Not all tabs are available on all compass models. Please allow one second between tab changes to allow the device to be updated with the tab's data values.

Sensor Tab

This tab shows some of the raw and processed sensor values in numerical format.

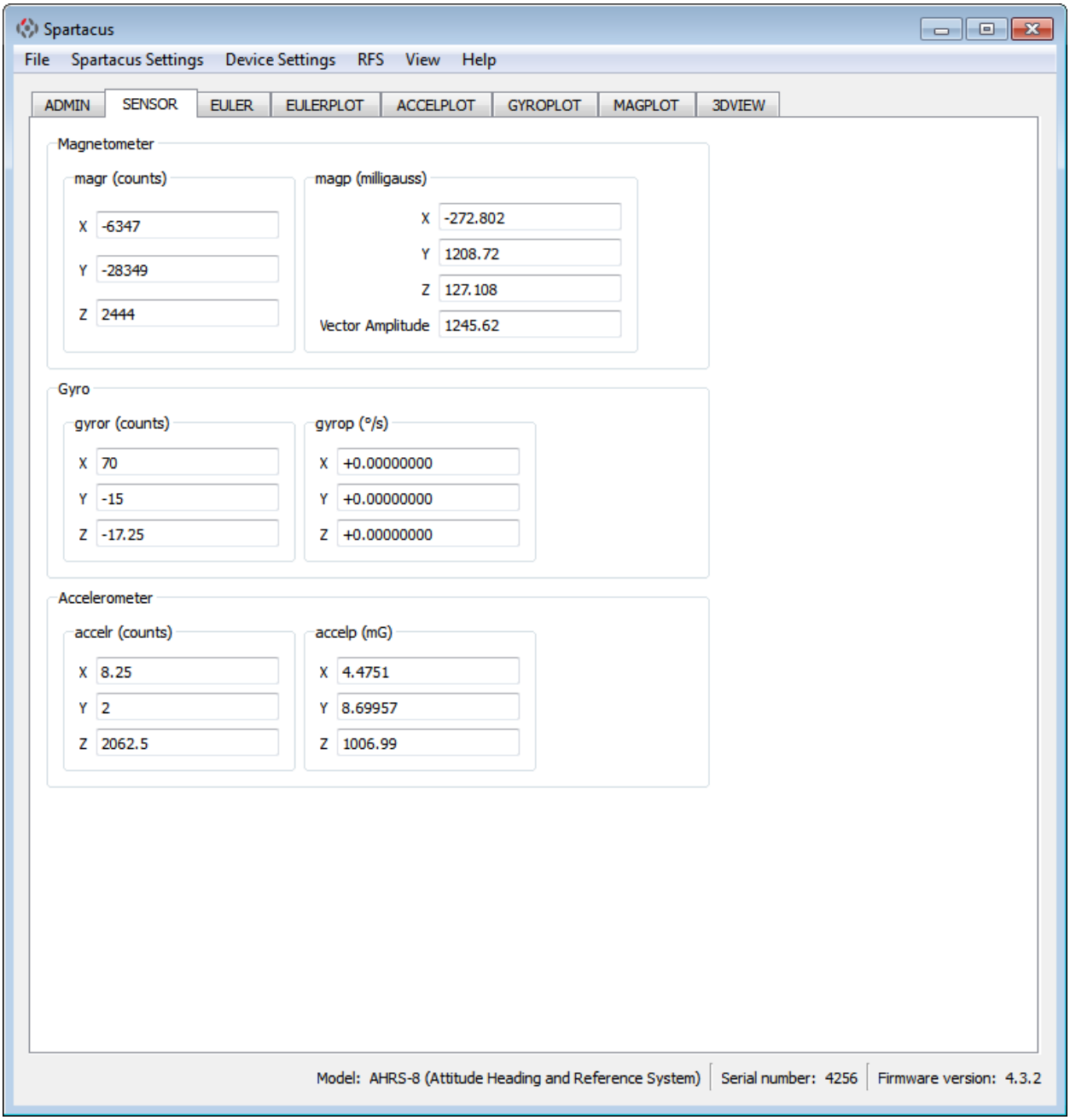

Figure 2: Sensor tab

Euler Tab

This tab shows a standard compass rose along with pitch and roll. In addition, the two variables Mag Error (VID: magErr) and Heading Error (VID: magErr2) are displayed. All values except Mag Error are in degrees.

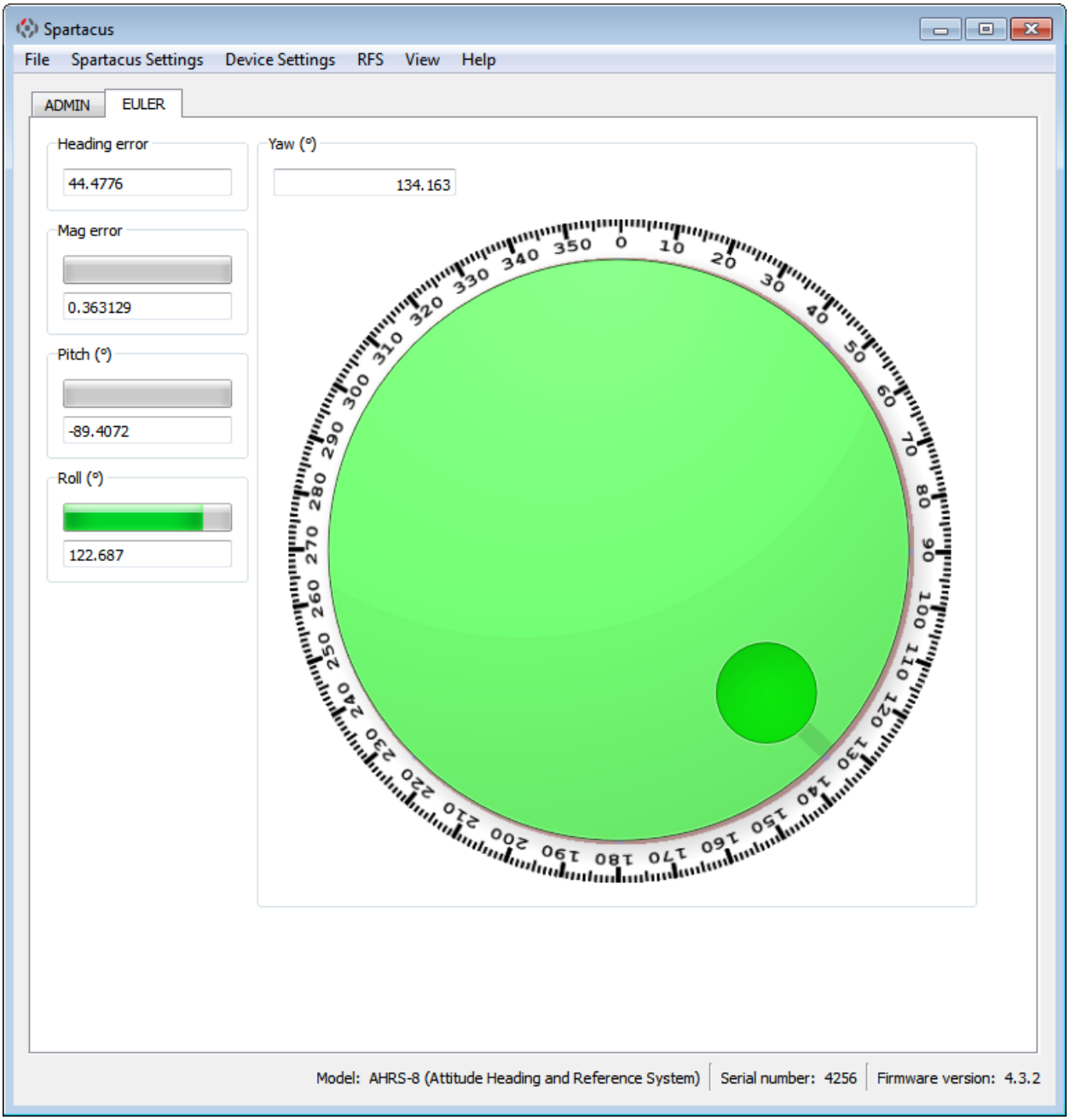

Figure 3: Euler tab

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Euler Plot Tab

This tab displays a real-time plot of pitch, roll, and yaw in degrees. NOTE: All plots can be autoscaled by selecting View->Autoscale Y.

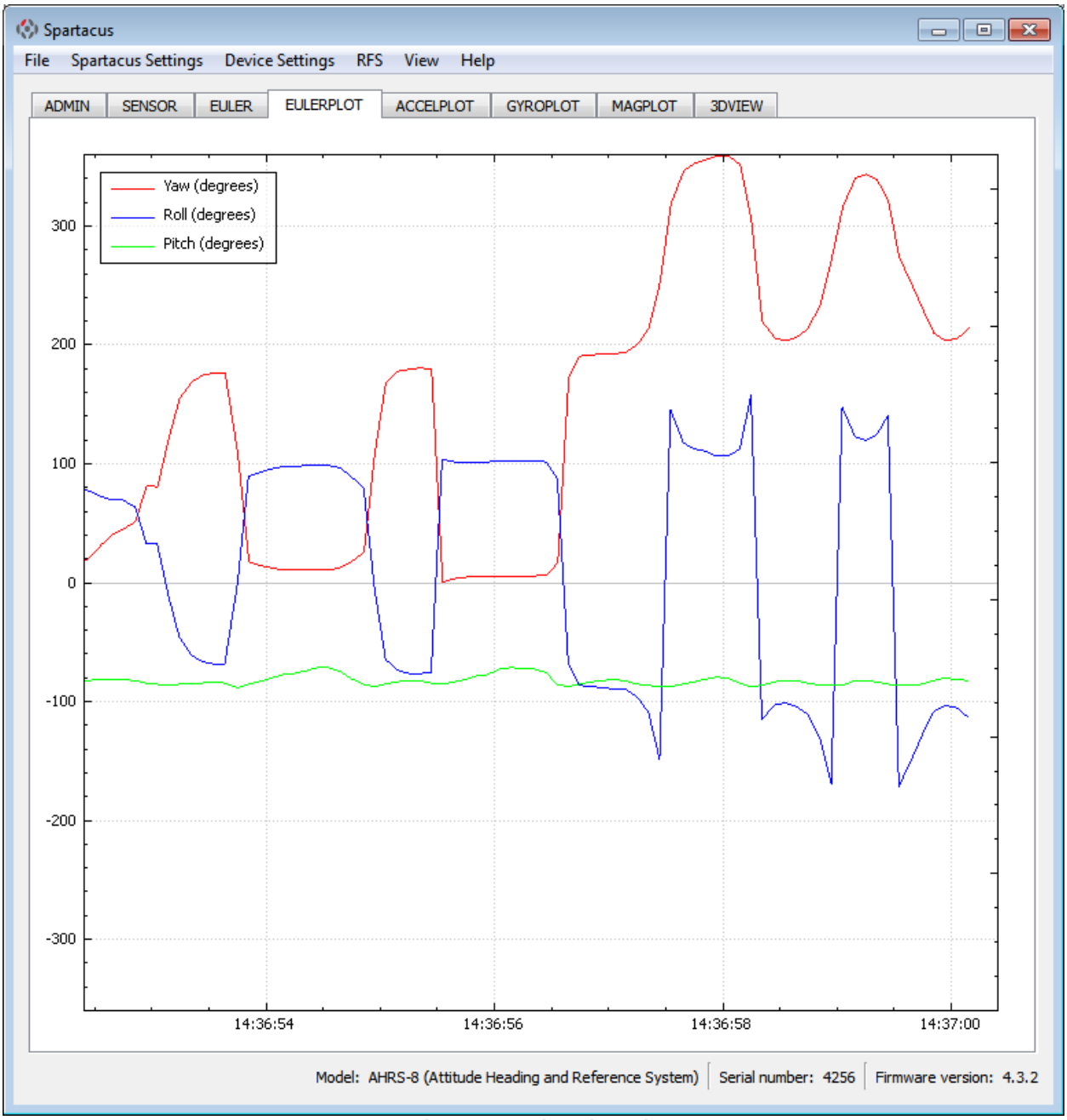

Figure 4: Euler plot tab

Accelerometer Plot Tab

This tab displays a real-time plot of the XYZ accelerometer output in mg (for AHRS-8 and below) or m/s^2 (for IMU-10 and up).

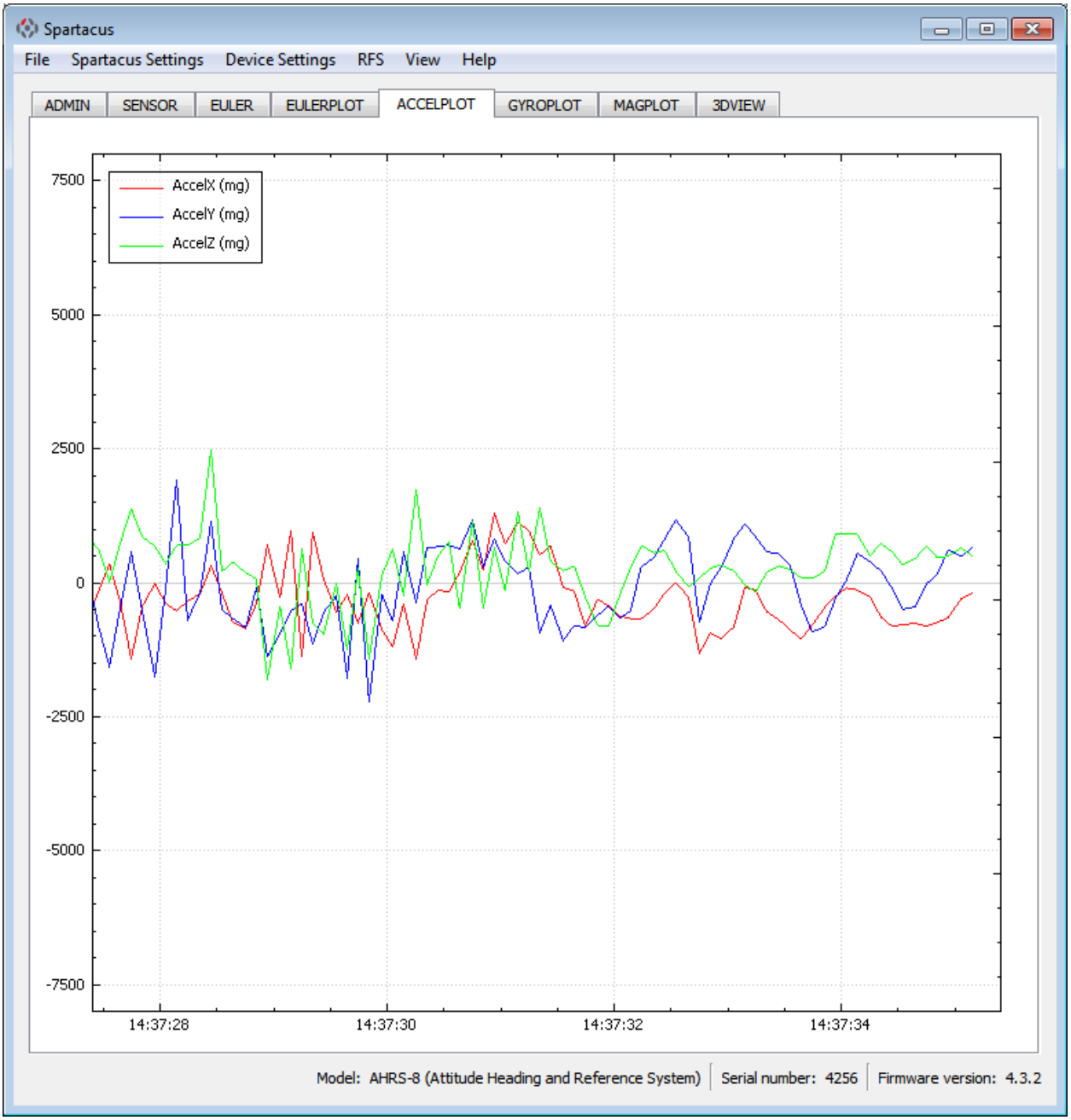

Figure 5: Accelerometer plot tab

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Gyro Plot Tab

This tab displays a real-time plot of the XYZ gyro output in degrees per second.

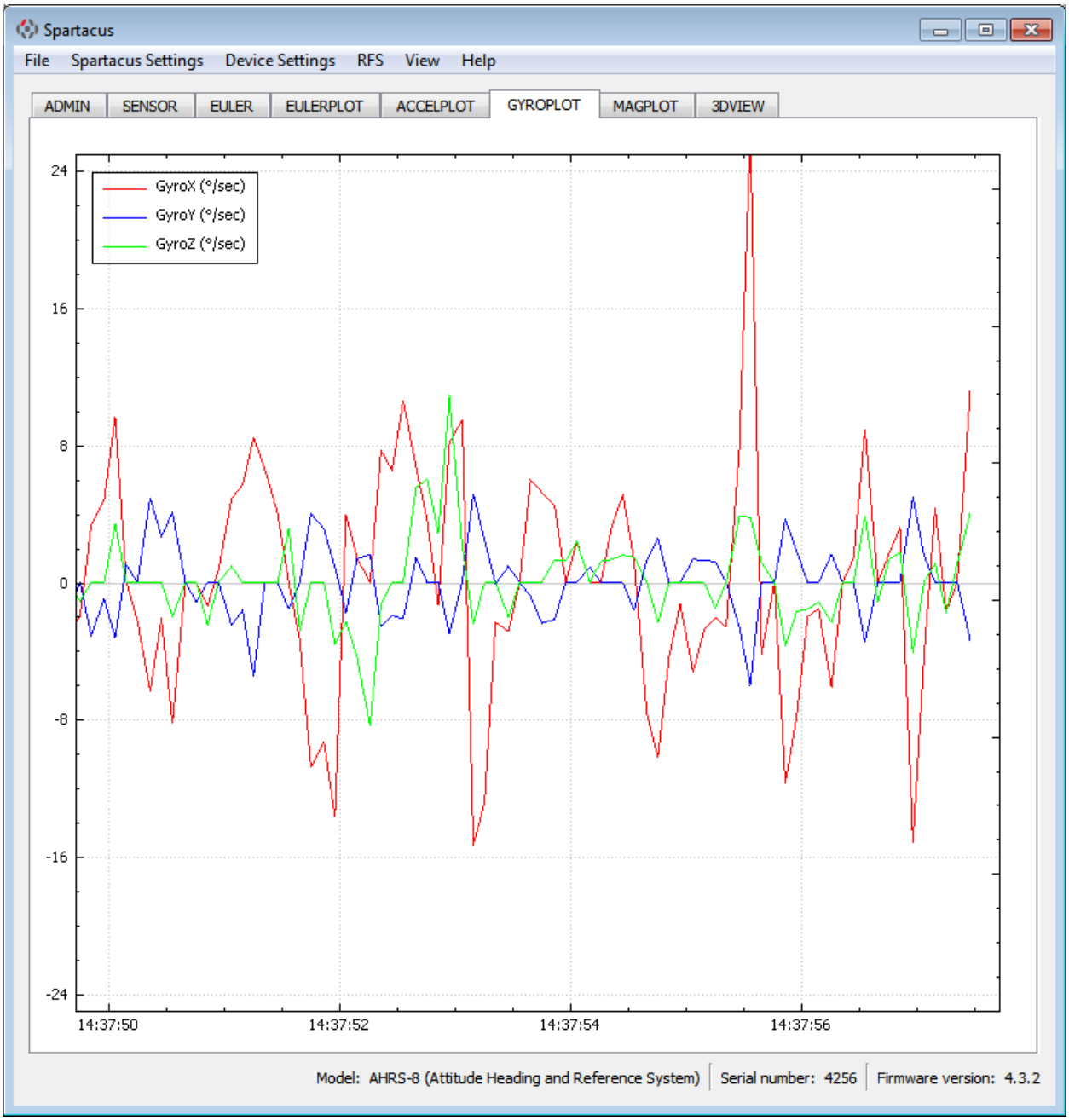

Figure 6: Gyro plot tab

Magnetometer Plot Tab

This tab displays the XYZ magnetometer output is milliGauss.

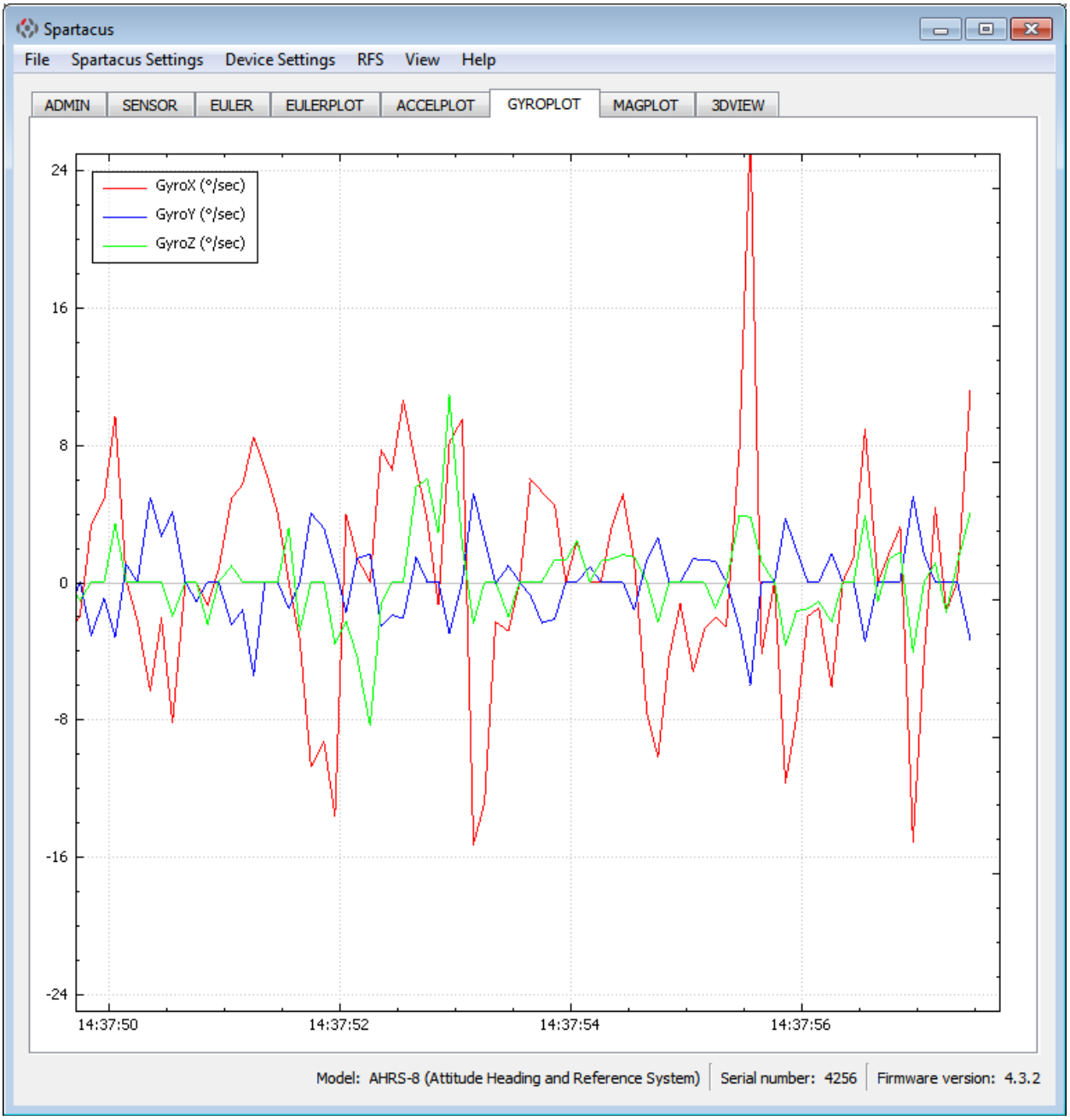

Figure 7: Magnetometer plot tab

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3D View Tab

This tab gives a spatial representation of the device's orientation. This tab utilizes the device's quaternion output rather than Euler angles. Side 1 corresponds to the north face of the device.

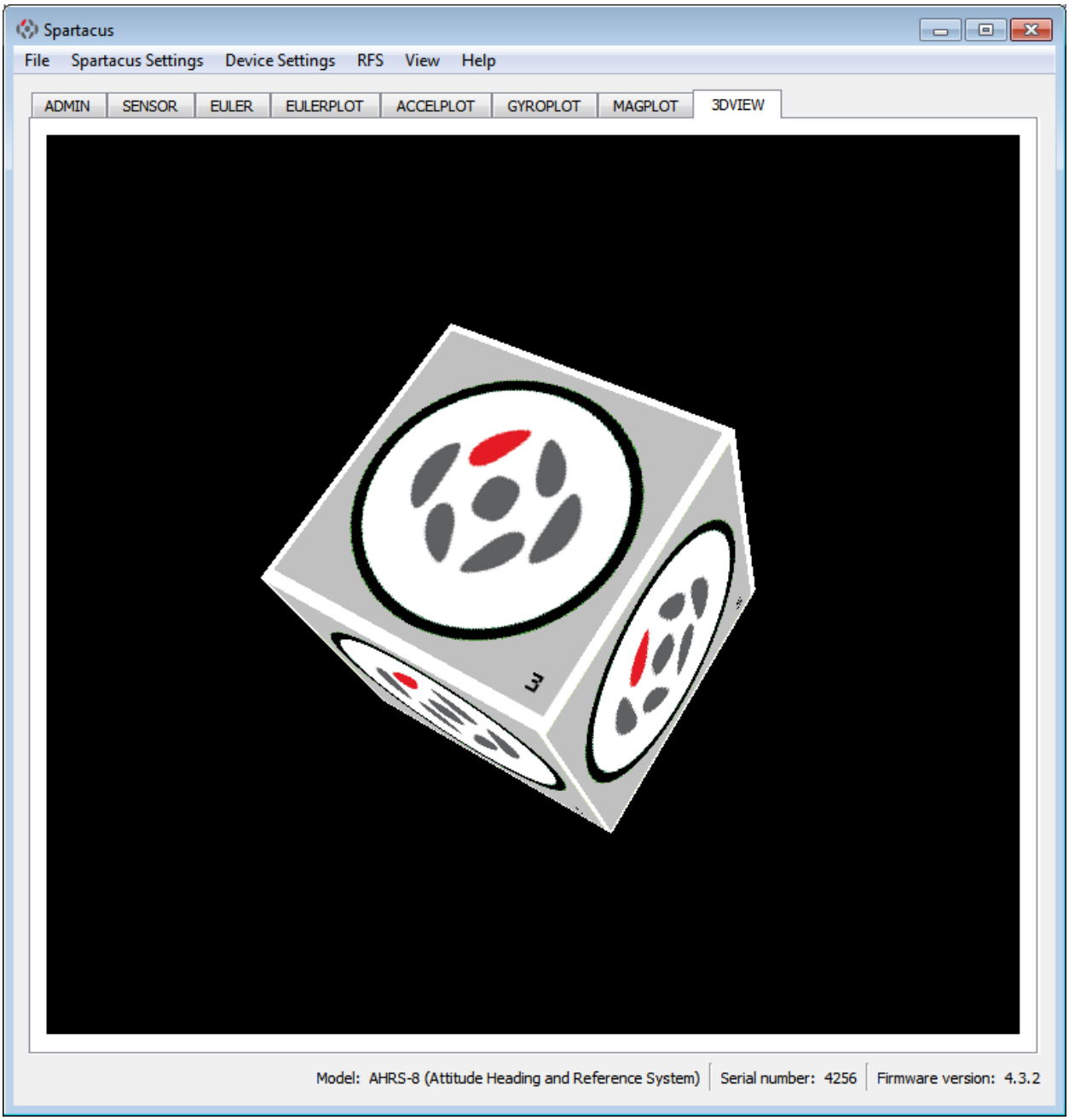

Figure 8: Spatial representation of device orientation

3D Calibration

In order to begin the 3D calibration process, select Devices Settings → In-Field Calibration → 3D Calibrate.

You will be presented with the calibration quality screen if the device's firmware supports the quality variables (older firmware versions do not) (See Figure 10).

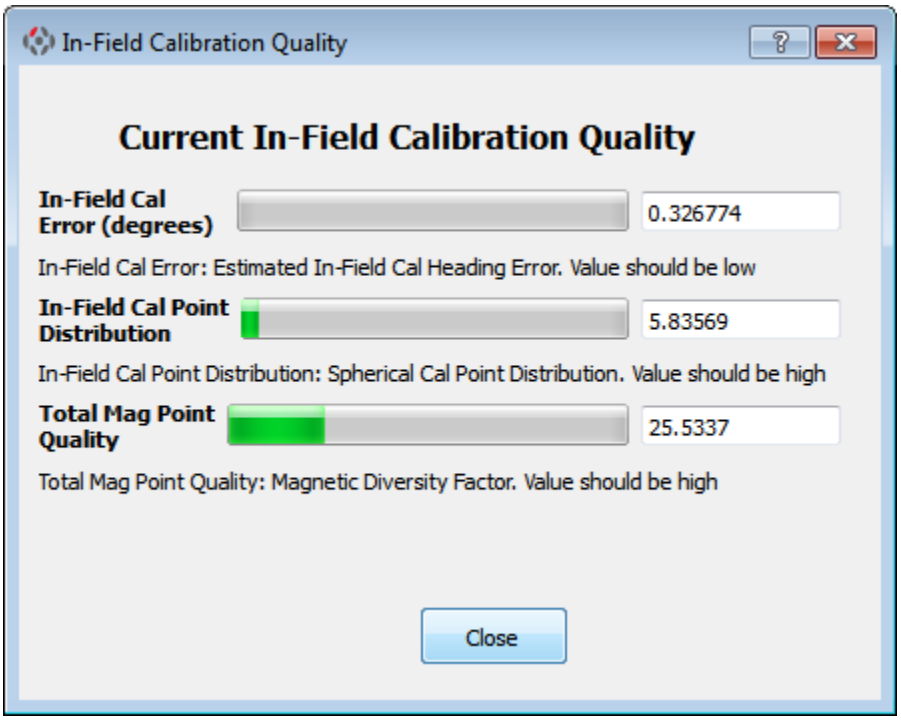

Figure 9: In-field calibration quality

- The In-Field Calibration Error (VID: magFieldCalErr is the device's current estimated heading error in degrees (this value should be low).
- The In-Field Calibration Point Distribution (VID: calPointDistribution) is a measure of how evenly distributed the last calibration point selection was on a spherical plane (this value should be high).
- The total magnetic point quality (VID: magPointQF) is a measure of how diverse the magnetometers readings were for the last calibration point selection (this value should be high).

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Upon selecting “Yes,” the In-Field Calibration dialog appears (See Figure 11). Utilize the “Capture Point”-button to begin capturing calibration points. As more points are captured, the “Possible Mag Point Quality” indicator (VID: possibleMagPointQF) can be used to maximize the calibration point magnetic diversity. Maximizing this indicator, by rotating the device in between capturing each calibration point, is essential to acquiring a superior in-field calibration.

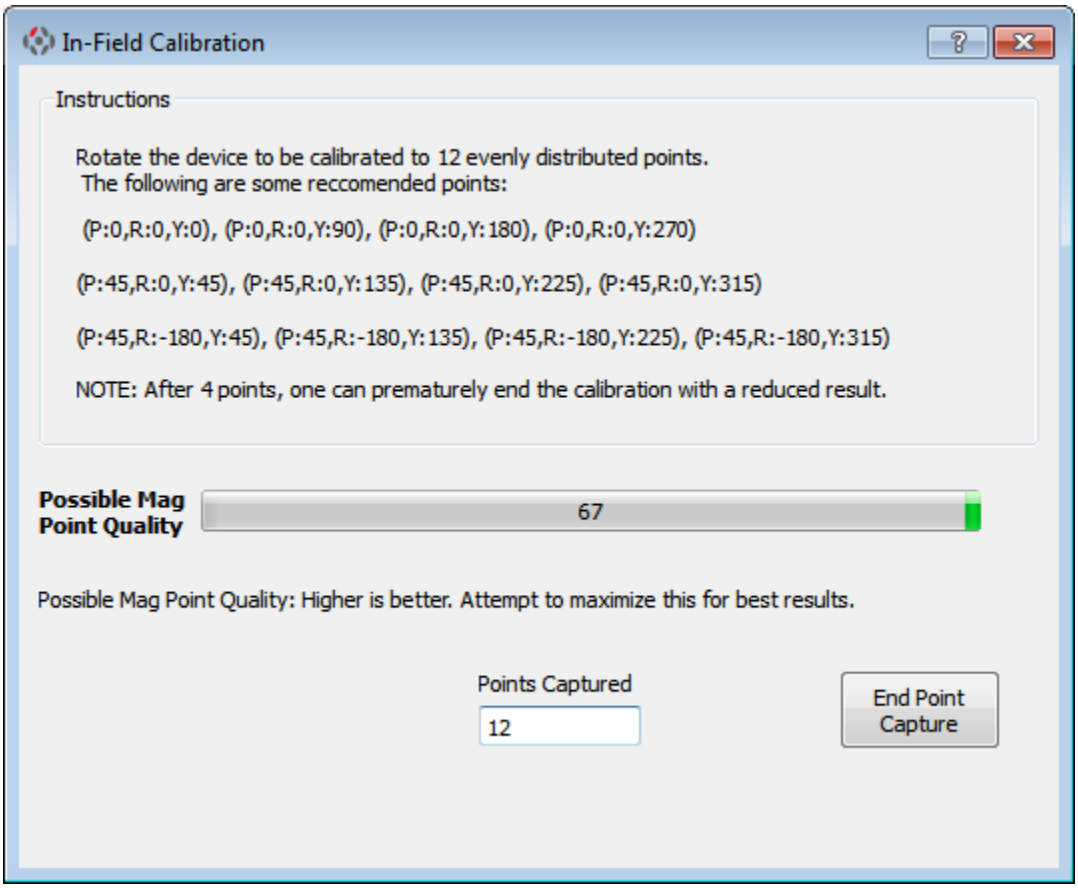

Figure 10: In-field calibration dialog

It is recommended that 12 points are captured for the best calibration result. However, the process can be ended after 4 points with a degraded result.

After the final point is captured (or the process was ended before 12 points), the Calibration dialog will switch from the capture view to the convergence view (See Figure 12)

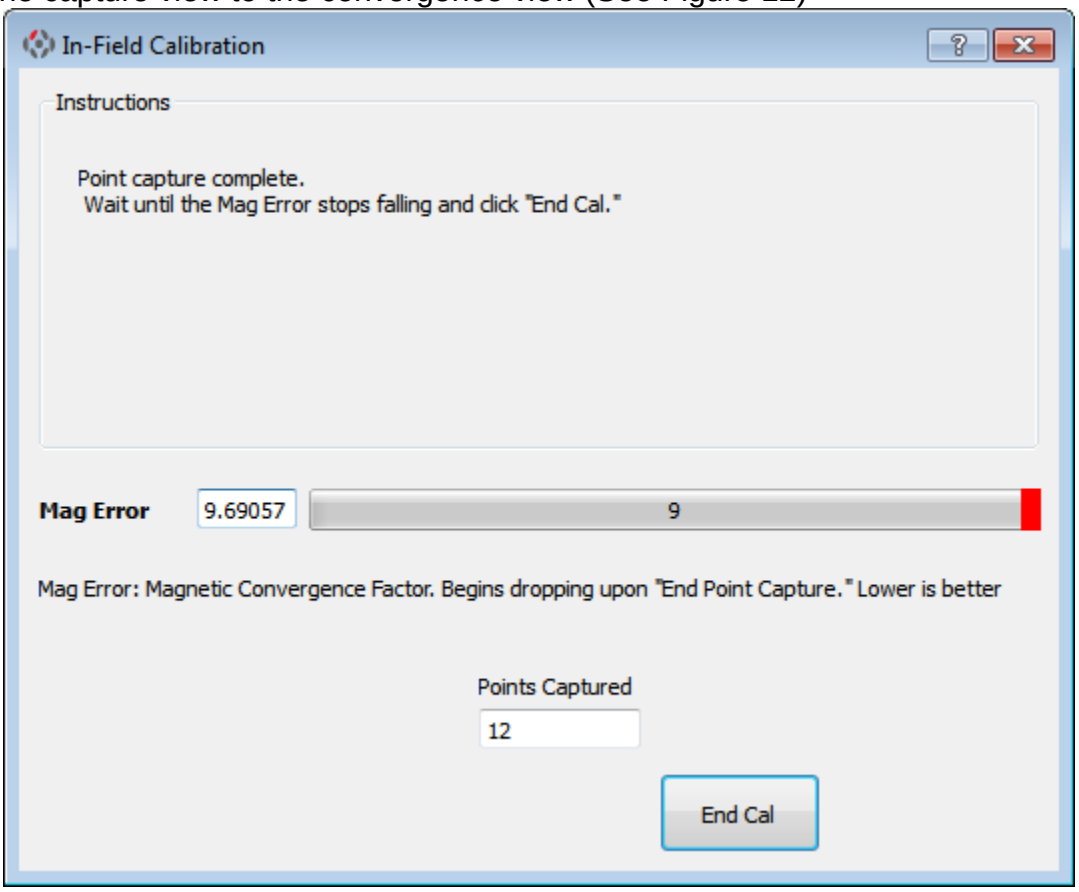

Figure 11: Convergence view

The Mag Error (VID: magErr) should decrease within the first few seconds (older firmware versions may take a few minutes) and stabilize. After the Mag Error has ceased dropping, the “End Cal” button commits the in-field calibration to the device.

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The new calibration quality values will be displayed (See Figure 13) after the calibration process.

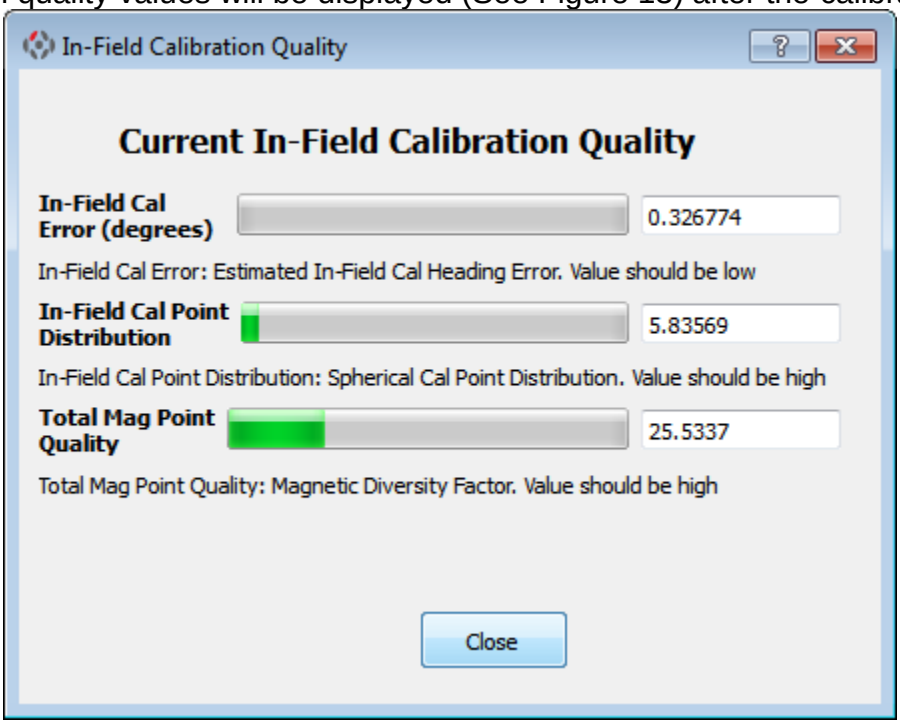

Figure 12: In-field calibration quality after completed in-field calibration

NOTE: If the original factory calibration is desired over the in-field calibration, select Device Settings → In-Field Calibration → Restore Factory Cal.