DMU (VGX, FOG) Analog Outputs Verification Procedure

General: This procedure provides the step-by-step instructions to verify the basic analog outputs (upon initial power up) from the Crossbow DMU (VGX and FOG models). ***Please note that there is a separate verification procedure for the DMU 6X model, which powers up in scaled mode.***

Description:
Upon power up, the DMU VGX and FOG units are in angle mode and provide the scaled roll and pitch readings. To perform the verification, the user needs access to the following:

1. DMU User's Manual (for models 6X, VGX, and FOG).
2. Either a voltmeter or an oscilloscope.
3. Standard DB-15 to RS232 cabling to interface between the DMU unit and a standard serial port on a PC. ***Please note that a PC will not be needed for this verification process.***
4. A schematic of the right-hand Cartesian coordinate system for the DMU, which can be found on the sticker on the front face of every DMU unit.

Procedure:

1 It will be necessary to modify the cable (item number 3) in order to access pins 12, 13, and 4 of the DMU(Please refer to Table 1 of the DMU User's Manual), which output the DMU's roll analog voltage, pitch analog voltage, and ground, respectively. Solder electrical wires for easy access to the pins of interest. ***The user may also modify the cabling to access pins 8, 9, and 10, which provide the Roll, Pitch, and Yaw rate analog voltages.***

2. Power up and set the DMU unit on a flat, vibration-free surface and measure the roll and pitch analog voltages. You should see negligible voltages, on the order of +/- 15mV.

3. **Rotation:**
   Rotate the DMU slowly about each of the 3 Axes, as defined by the schematic of the right-hand Cartesian coordinate system (item number 4) above and measure the:

   3.1 **Roll and Pitch**
   You can quickly verify operation of the analog outputs by rotating. You should see the roll and pitch analog voltage change from +/- 30 mV (corresponding to 0 deg. with respect to the X and Y axes) to +/- 4.096 V (corresponding to +/- 90 deg. with respect to the X and Y axes). ***Please note that the DMU-VGX and –FOG models do not output the yaw analog voltage. For the actual output voltage-to-angle(roll and pitch) conversion, please refer to Appendix C of the DMU User's Manual.***

   3.2 **Roll, Pitch and Yaw Rate**
   You will need an oscilloscope to measure the analog output of the rate sensors. The outputs will only change when the unit is rotating. The DMU VGX and FOG units measure the angular rate (deg/s), which is read out as an output voltage. By rotating the DMU quickly around each axis in turn, you should be able to see the full scale output of +/- 4.096 V. ***For the actual output voltage-to-rate(degrees / s) conversion, please refer to Appendix C of the User's Manual.***

Troubleshooting:
If you do not see the expected output, check the following:
Power supply is within the range 8 – 30 VDC at 100 mA for the DMU-VGX and 15 – 30 VDC at 1A for the DMU-FOG.
Your cabling to the analog outputs is correct.
Your ground reference is pin 4.
The DMU is not connected to the computer.
Cycle power to the DMU, to make sure you are testing the default power-up mode.
If you still have problems, connect to the computer, and use X-View to verify that the DMU is operating.