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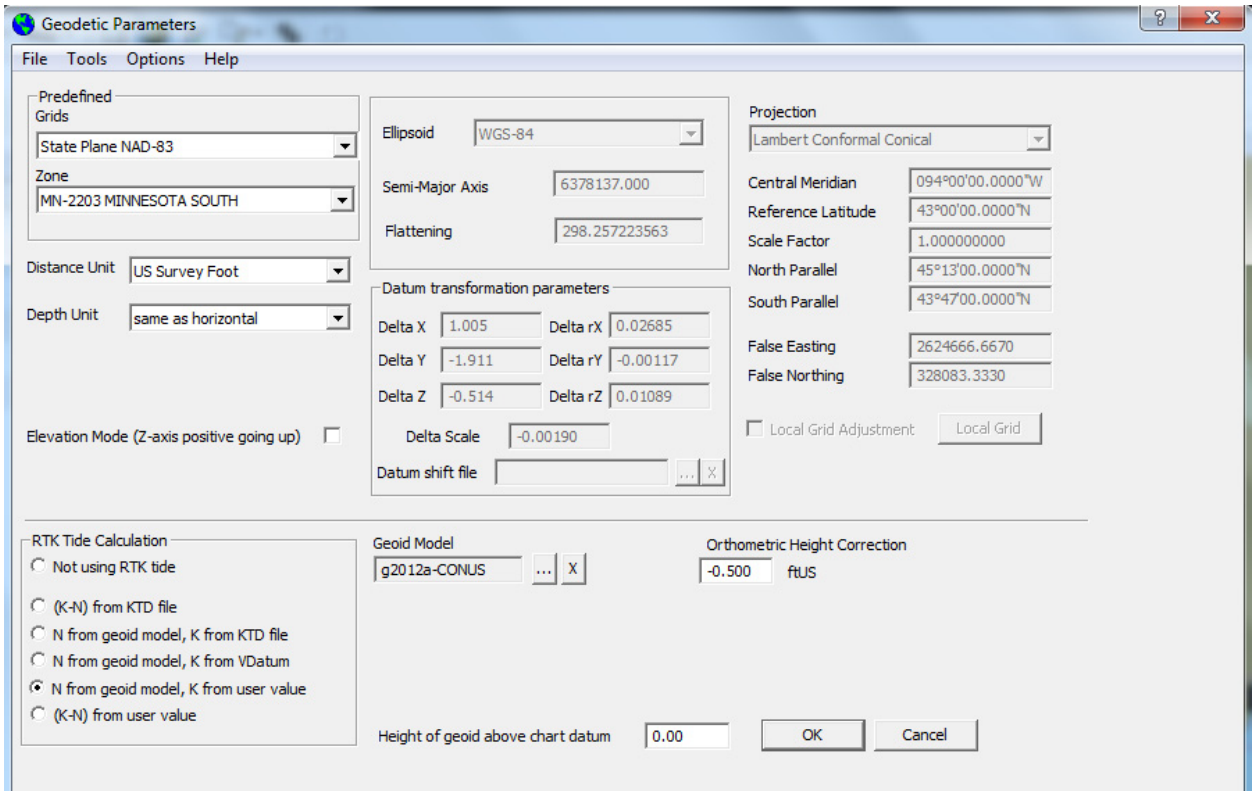
HYPACK Excavator Startup and Configuration Guide

by Christian Shaw

Not all excavators are the same as equipment varies. This guide is for a barge-mounted excavator with RTK GPS on the excavator body, and GPS position for the barge. The machine also has a pitch and roll system. If you have specific questions about your configuration, please contact help@hypack.com and we will be happy to assist.

HYPACK® GEODESY FOR RTK

FIGURE 1. *HYPACK® Geodesy for RTK*



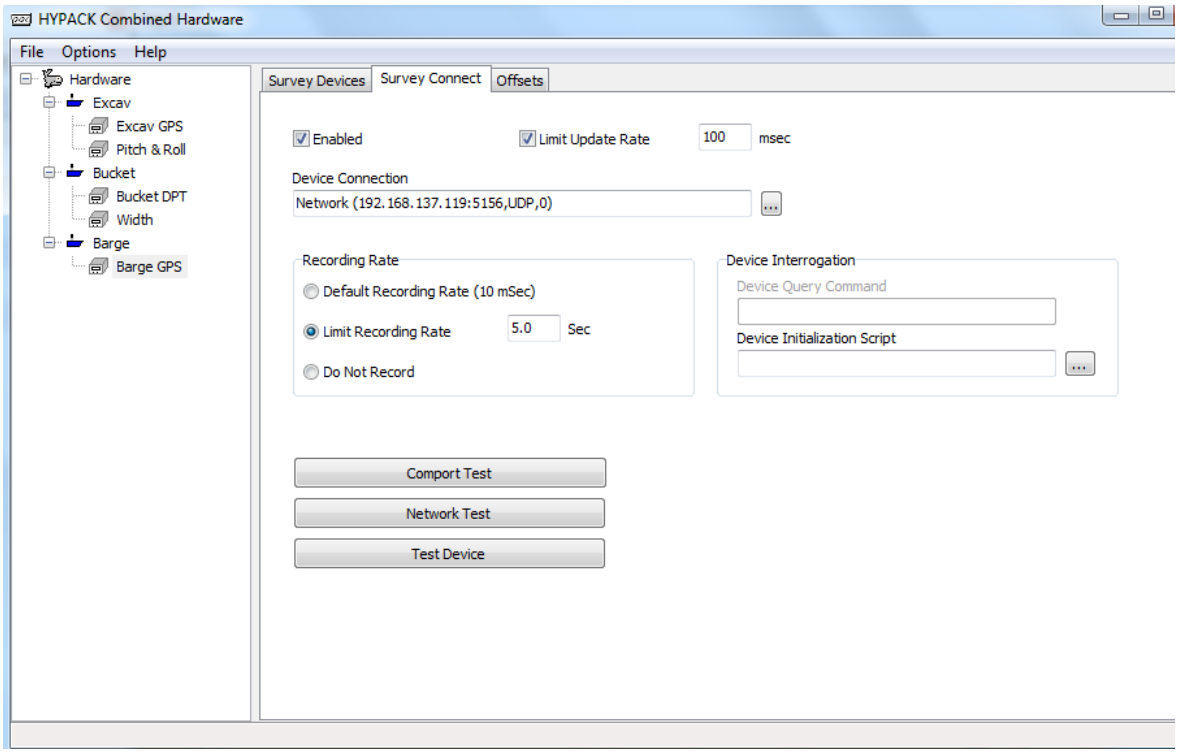
HYPACK® Geodesy should be setup with a **Geoid Model** and any **Orthometric Height Correction**. If there is no Orthometric Height Correction, the CONUS 2012 Geoid will arrive vertically at NAVD88 Vertical Datum.

HYPACK HARDWARE

THE BARGE MOBILE

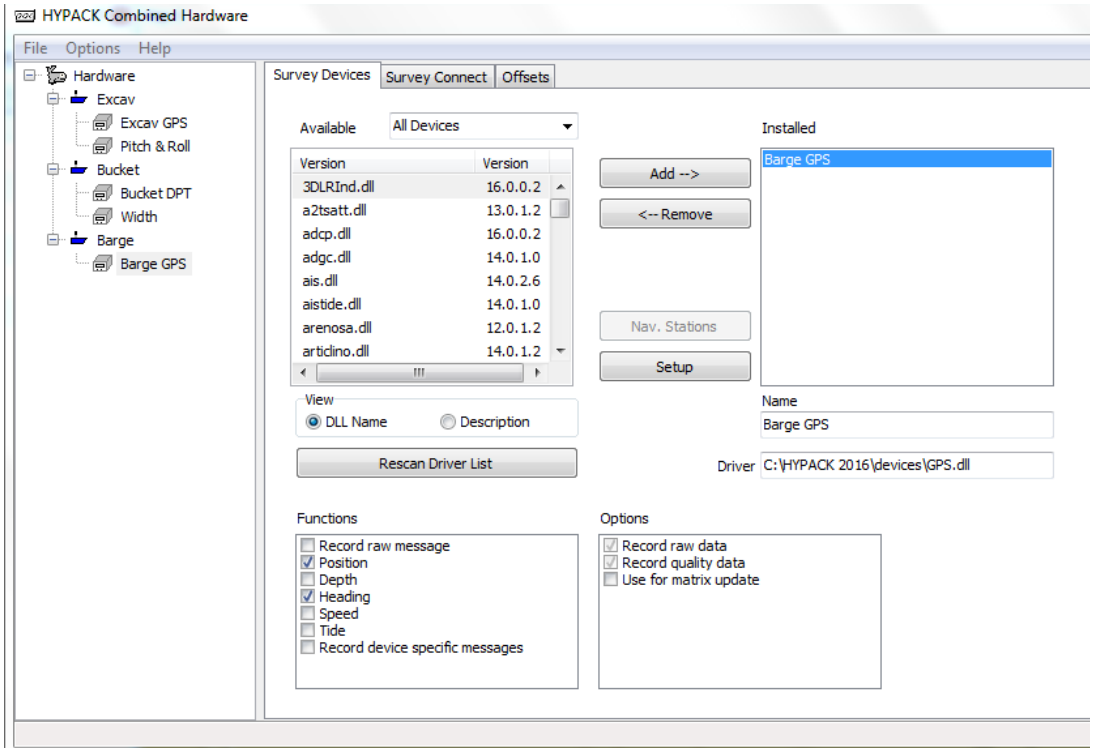
The Barge GPS primary receiver is the aft receiver on the barge. Limiting the Recording rate prevents excessive raw positioning data for a slow-moving vessel.

FIGURE 2. *Barge GPS Connect Options*



The Barge GPS serves at a position and heading device. It has no offsets. The Barge.shp file in DREDGEPACK® was built around the GPS antenna and its position is absolute.

FIGURE 3. *Barge GPS Functions and Options*



THE EXCAVATOR MOBILE

Bucket Depth

The GPS on the Excavator serves as position, heading and tide device. Tide is the water surface elevation.

FIGURE 4. *Excavator Mobile Functions and Options*

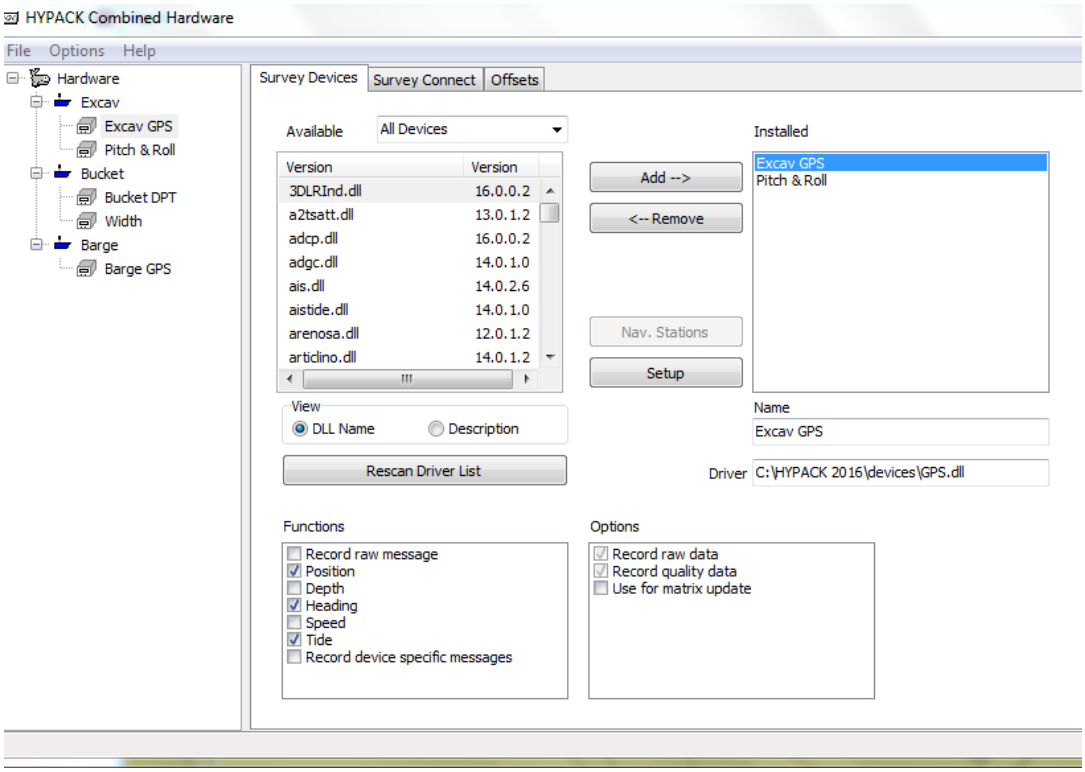
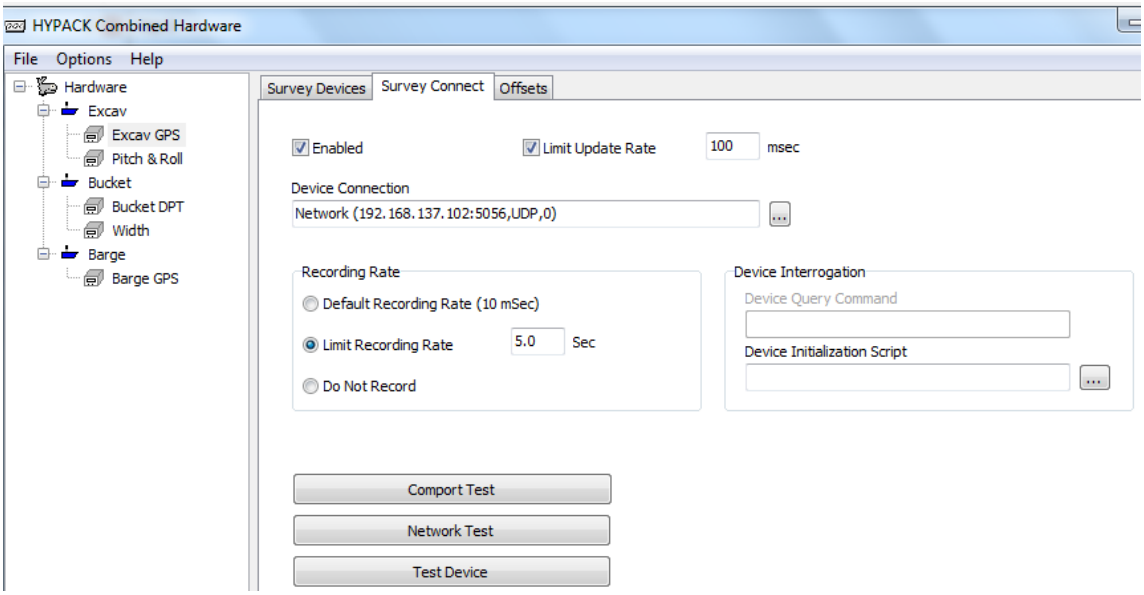
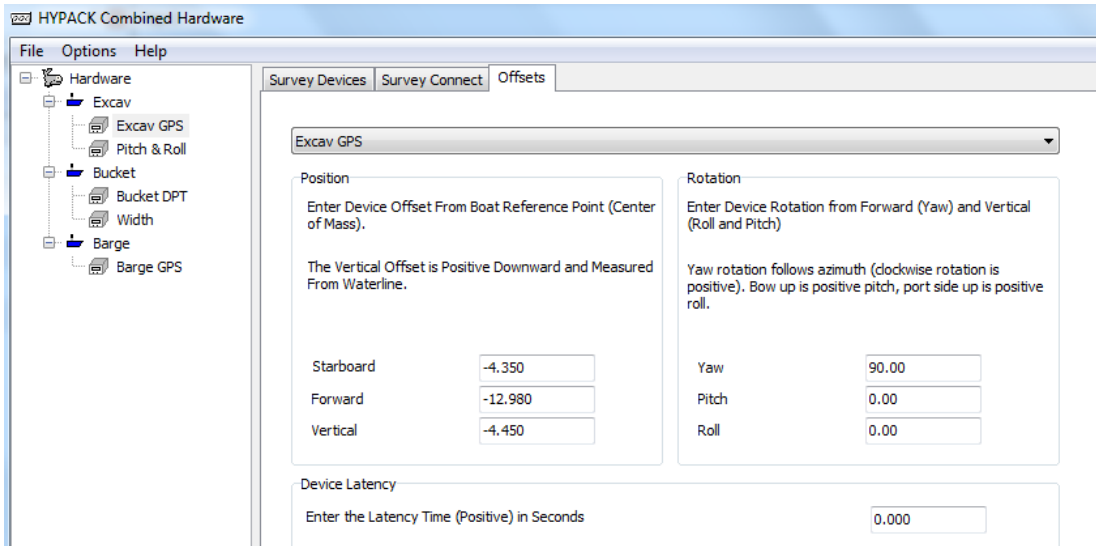


FIGURE 5. *Excavator GPS Connection Settings*



The primary GPS antenna is the port antenna. Its vertical offset is the measurement from the GPS antenna to the boom pin.

FIGURE 6. *Barge GPS Offsets*

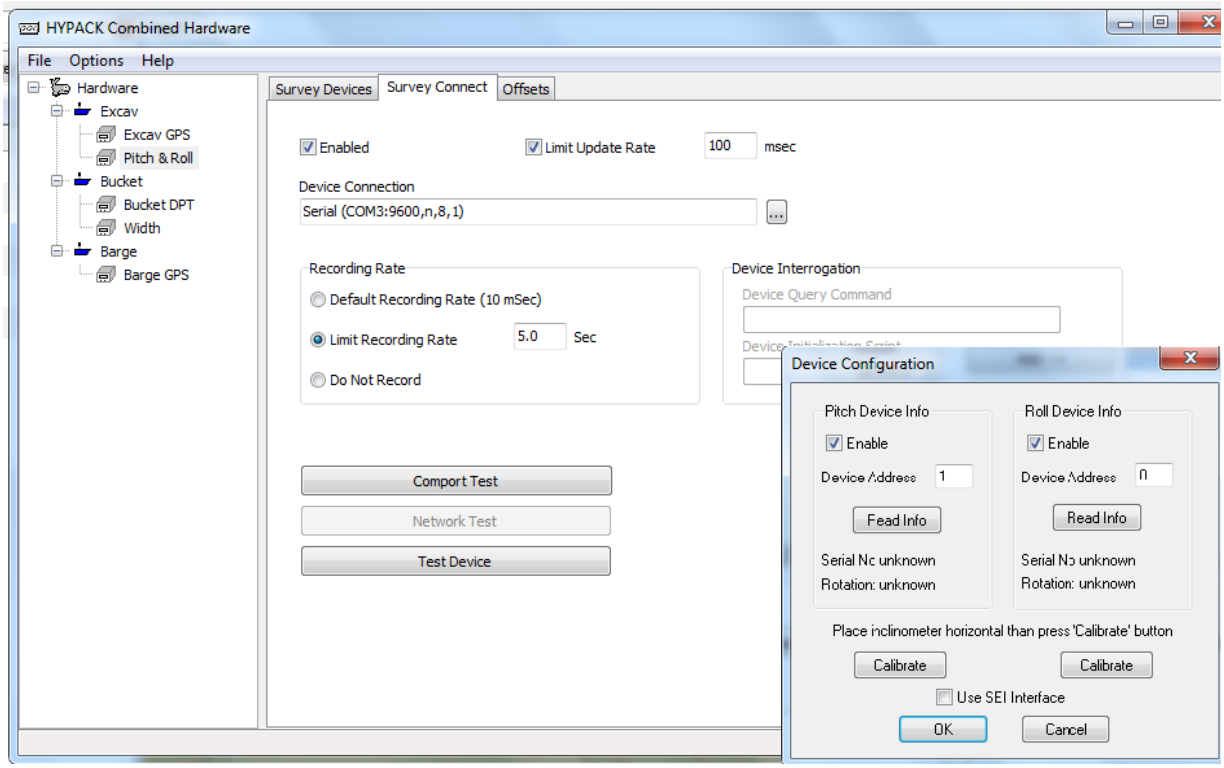


Pitch and Roll

Pitch and roll (collected by the A2TS Pitch and Roll sensor here) is used to augment the water surface elevation calculation. The pitch and roll calculation has been zeroed out when the barge was relatively static with the excavator more toward the center of the machine.

The pitch and roll addresses were found with US Digital SEI explorer on COM 3 @9600 Baud rate.

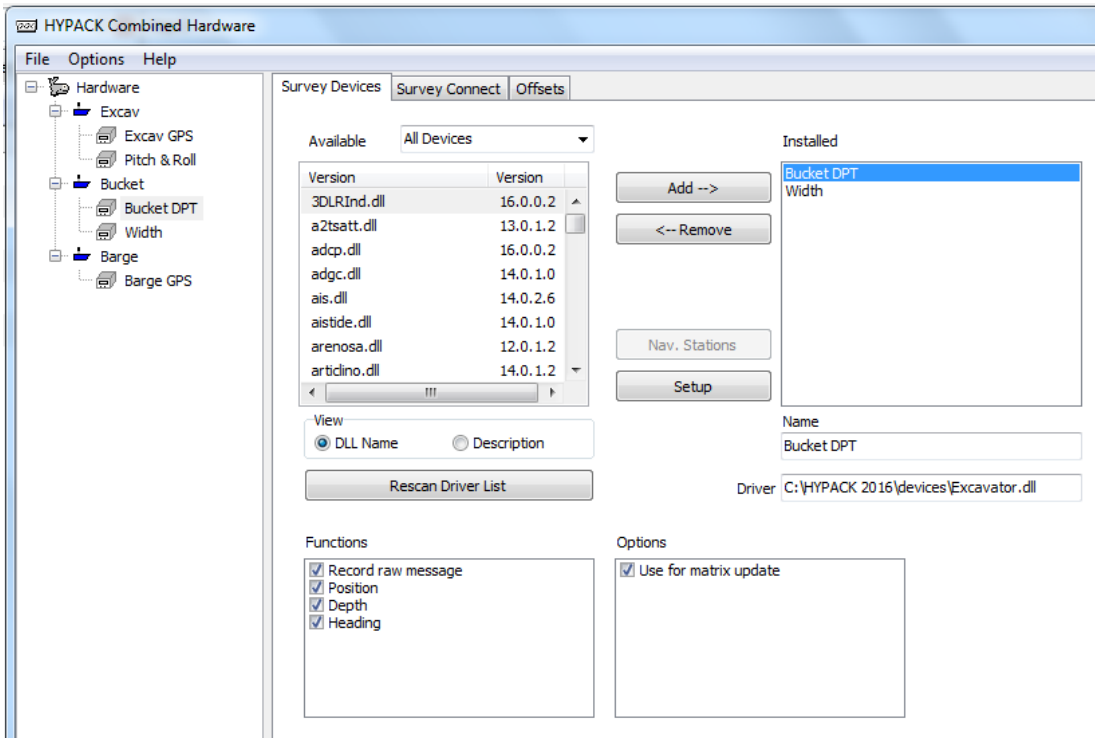
FIGURE 7. *Pitch and Roll Connect Settings (left) and Driver Setup (right)*



THE BUCKET MOBILE

The bucket mobile contains the excavator.dll. This positions the bucket based on the boom, stick and bucket angles. It serves as position, heading and depth.

FIGURE 8. *Excavator Driver Functions and Options*



The connection to the sensors is on COM 5. The addresses are found by US Digital SEI Explorer.

FIGURE 9. *Excavator Connect Options*

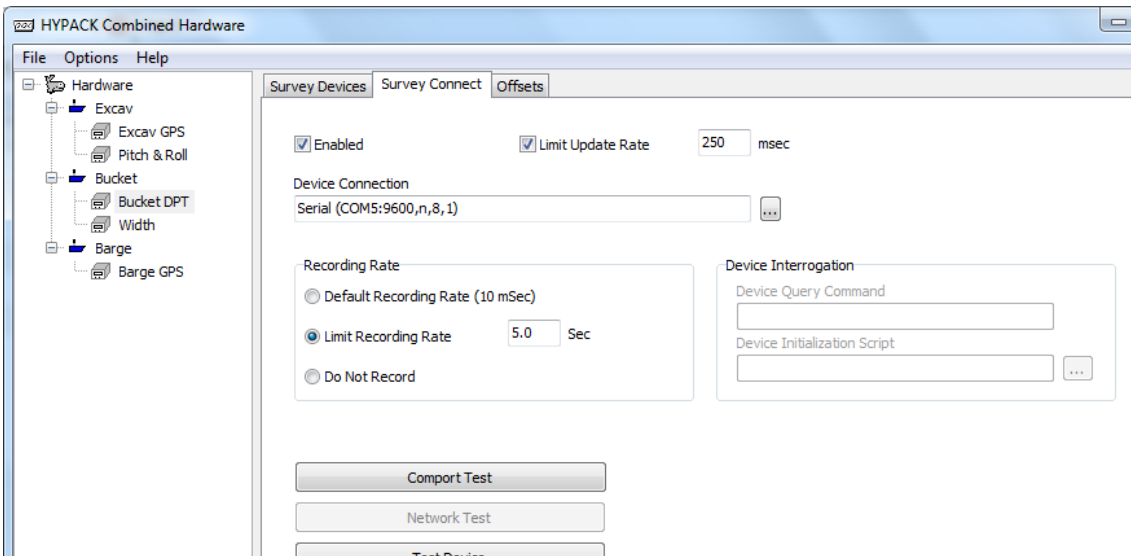
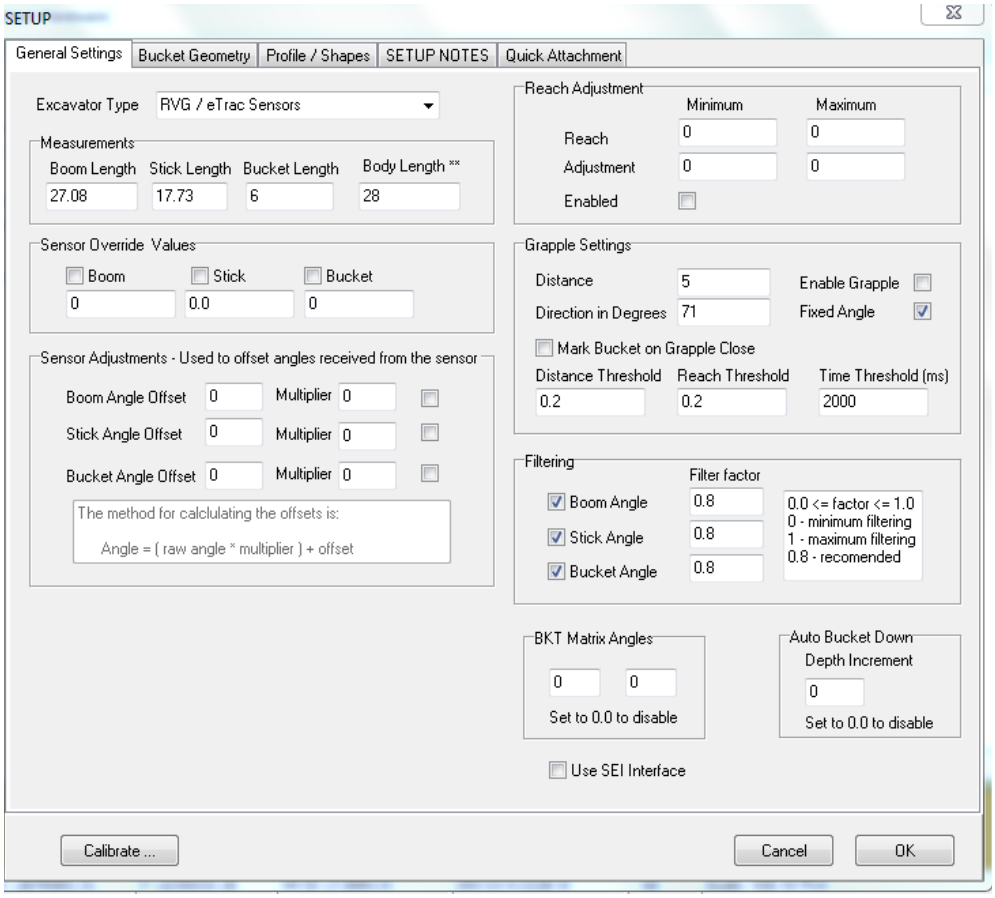


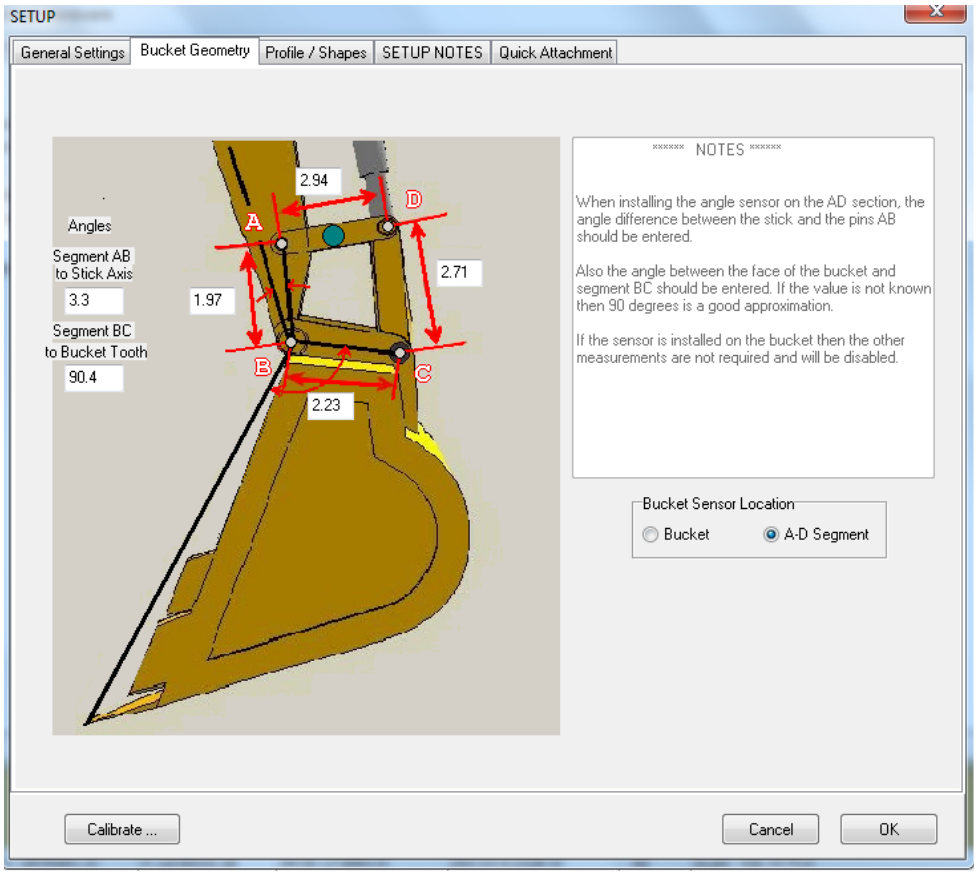
FIGURE 10. *Excavator Driver General Setup Options*



The **boom, stick and bucket measurements** were found by measuring pin-to-pin. The **body** dimension is for display purposes only.

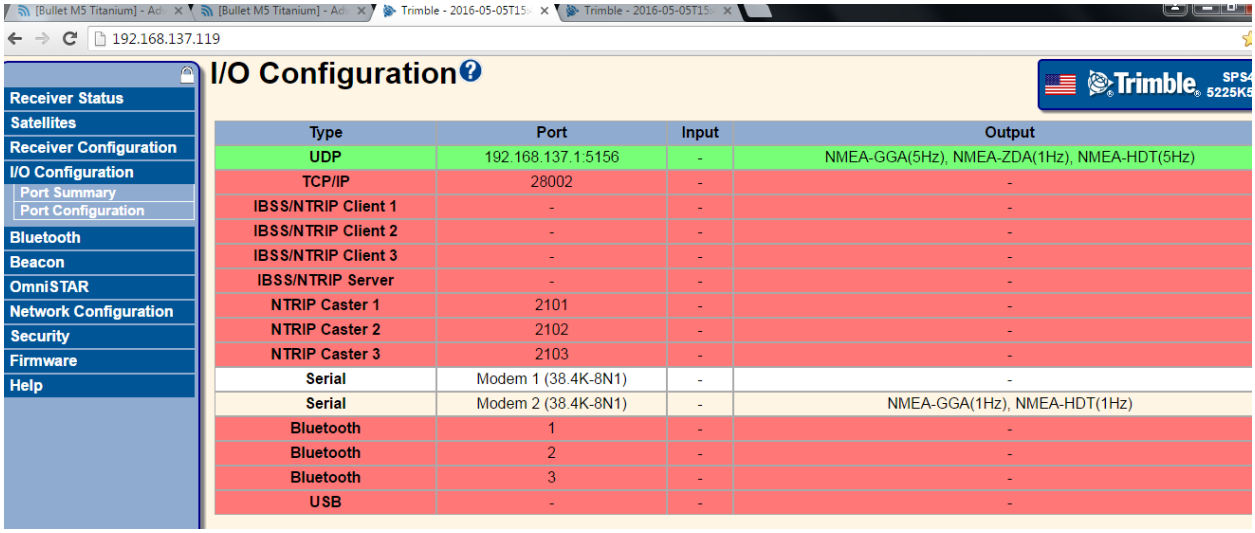
Dog bone math must be accurately entered. These were shot with a robotic total station and verified by tape measurements.

FIGURE 11. *Excavator Driver Bucket Geometry Setup Options*



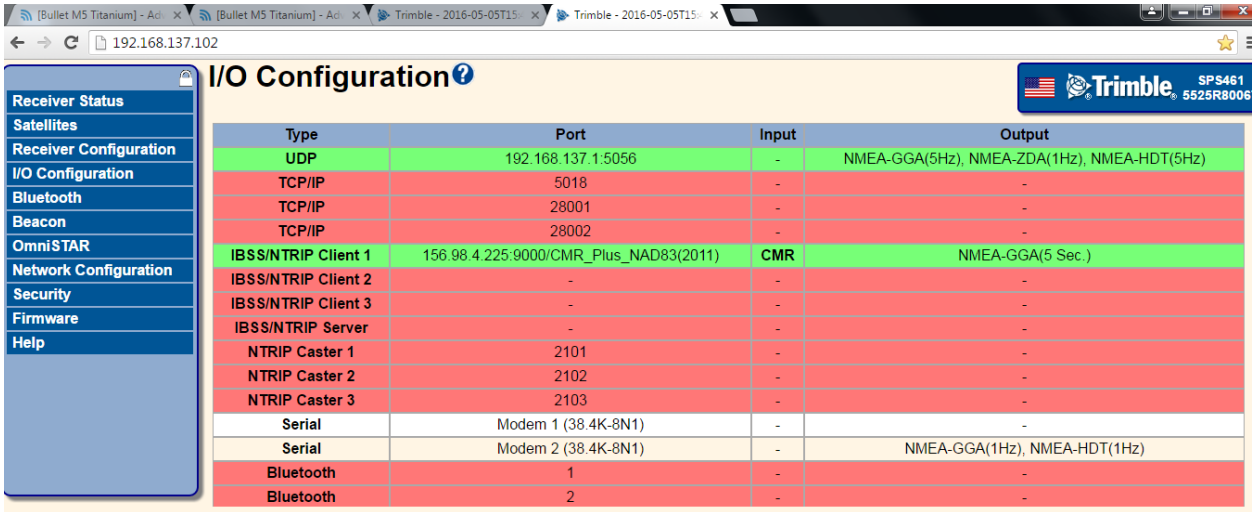
FIRMWARE SETTINGS

FIGURE 12. Trimble GPS Settings Barge



Type	Port	Input	Output
UDP	192.168.137.1:5156	-	NMEA-GGA(5Hz), NMEA-ZDA(1Hz), NMEA-HDT(5Hz)
TCP/IP	28002	-	-
IBSS/NTRIP Client 1	-	-	-
IBSS/NTRIP Client 2	-	-	-
IBSS/NTRIP Client 3	-	-	-
IBSS/NTRIP Server	-	-	-
NTRIP Caster 1	2101	-	-
NTRIP Caster 2	2102	-	-
NTRIP Caster 3	2103	-	-
Serial	Modem 1 (38.4K-8N1)	-	-
Serial	Modem 2 (38.4K-8N1)	-	NMEA-GGA(1Hz), NMEA-HDT(1Hz)
Bluetooth	1	-	-
Bluetooth	2	-	-
Bluetooth	3	-	-
USB	-	-	-

FIGURE 13. Trimble GPS Settings Excavator

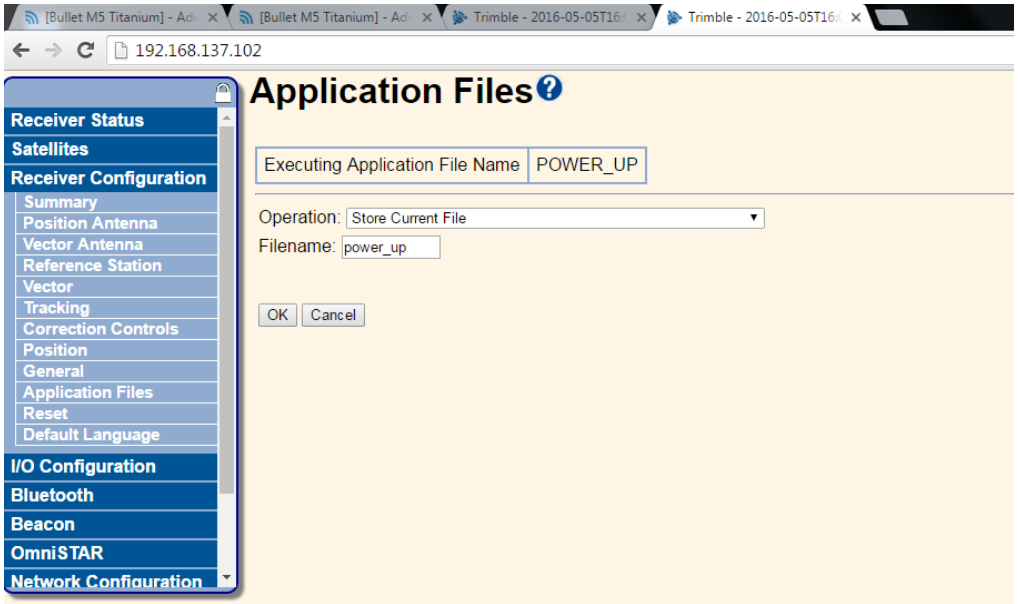


Type	Port	Input	Output
UDP	192.168.137.1:5056	-	NMEA-GGA(5Hz), NMEA-ZDA(1Hz), NMEA-HDT(5Hz)
TCP/IP	5018	-	-
TCP/IP	28001	-	-
TCP/IP	28002	-	-
IBSS/NTRIP Client 1	156.98.4.225:9000/CMR_Plus_NAD83(2011)	CMR	NMEA-GGA(5 Sec.)
IBSS/NTRIP Client 2	-	-	-
IBSS/NTRIP Client 3	-	-	-
IBSS/NTRIP Server	-	-	-
NTRIP Caster 1	2101	-	-
NTRIP Caster 2	2102	-	-
NTRIP Caster 3	2103	-	-
Serial	Modem 1 (38.4K-8N1)	-	-
Serial	Modem 2 (38.4K-8N1)	-	NMEA-GGA(1Hz), NMEA-HDT(1Hz)
Bluetooth	1	-	-
Bluetooth	2	-	-

FIGURE 14. Minnesota DOT log in Credentials were Entered on this Page

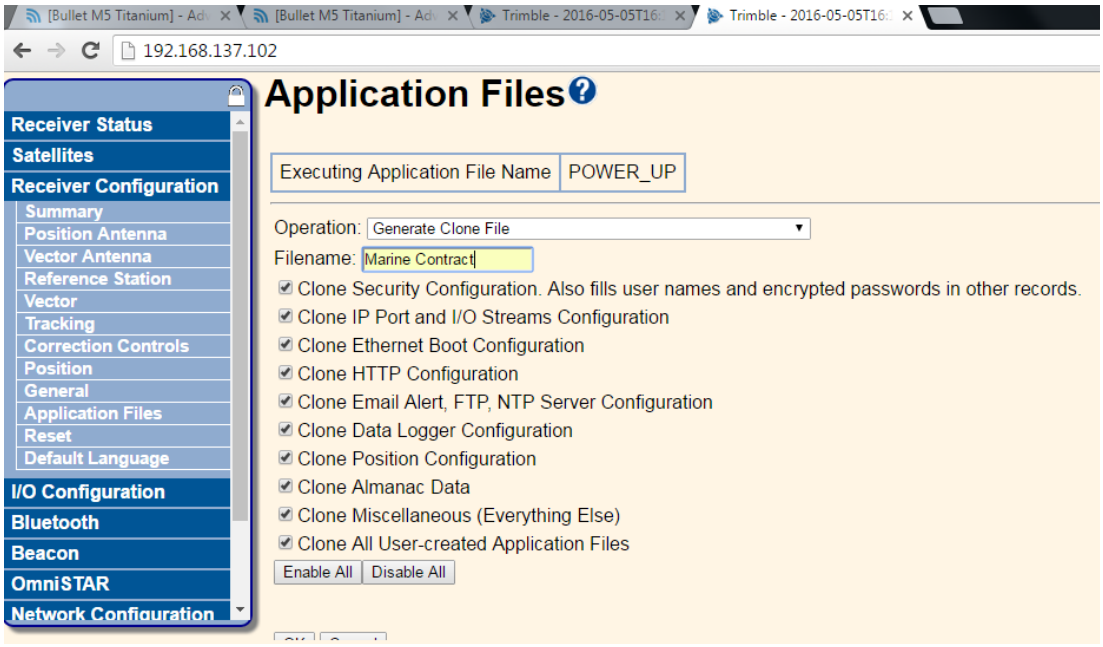
In all Trimble 461 GPS systems you can save the configuration so that it retains settings for every boot: Select REC CONFIG-APPLICATIONS FILES and save the current file.

FIGURE 15. Saving the Trimble Configuration Settings



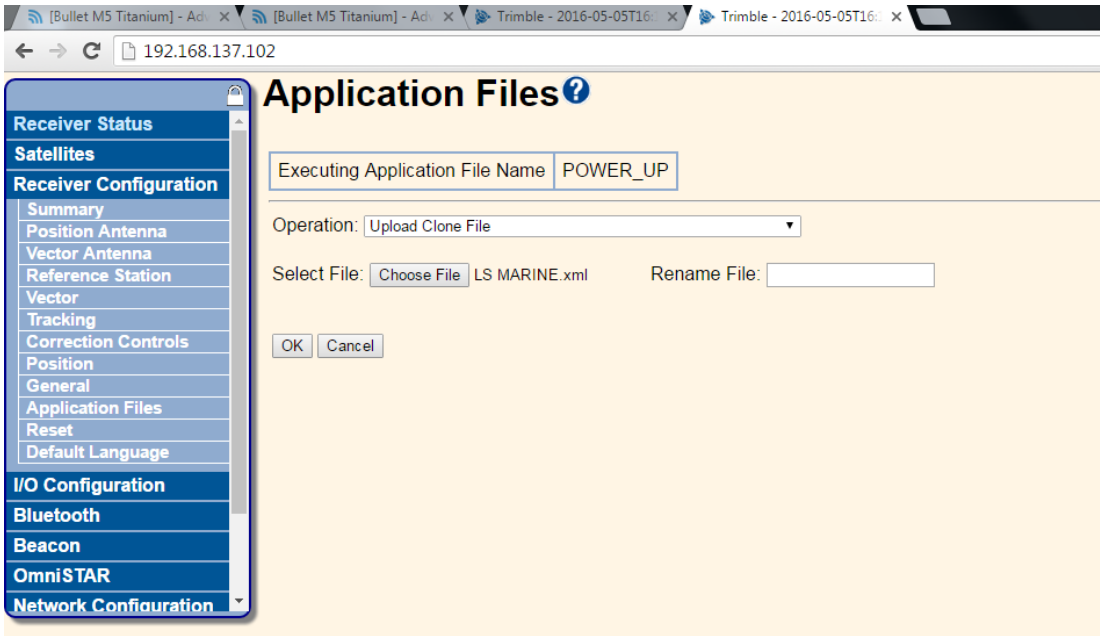
You can save GPS settings to an XML file to use if you experience GPS failures or you need to configure a new unit: Select REC. CONFIG-APP FILES-GENERATE CLONE FILE.

FIGURE 16. *Cloning the Configuration File in XML Format*



To upload an XML Clone file do the same as above but choose to upload.

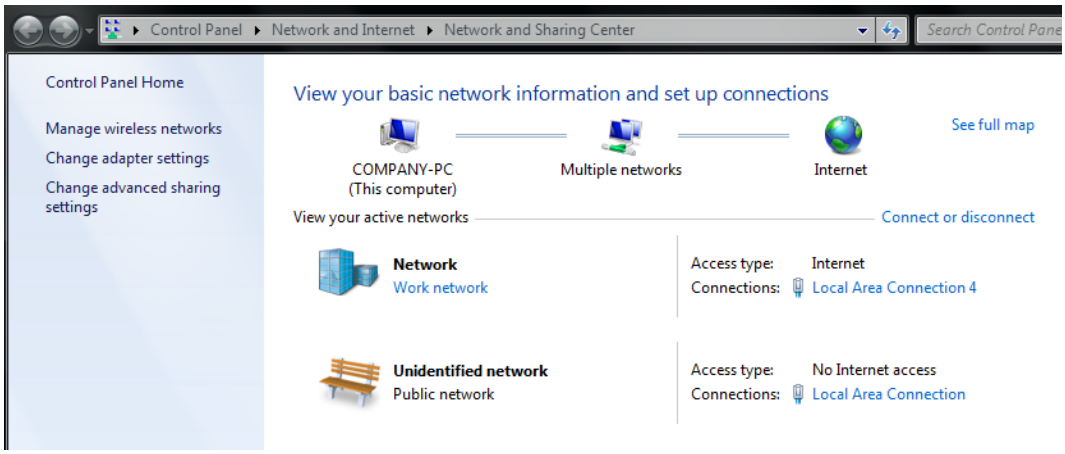
FIGURE 17. *Restoring the Configuration Settings from the XML Clone File*



ETHERNET AND WIFI CONFIGURATION

When a WiFi Card and Ethernet card are present, you will see two network adapters listed. In this example, the LAC (Local Area Connection) is the PC adapter, and the LAC 4 is the WiFi. The WiFi LAC needs to share its connection with the Ethernet LAC.

FIGURE 18. *Network Settings*



If you click on properties for the LAC4 you can set the Internet sharing option.

FIGURE 19. *Setting the Internet Sharing Option for the LAC4.*

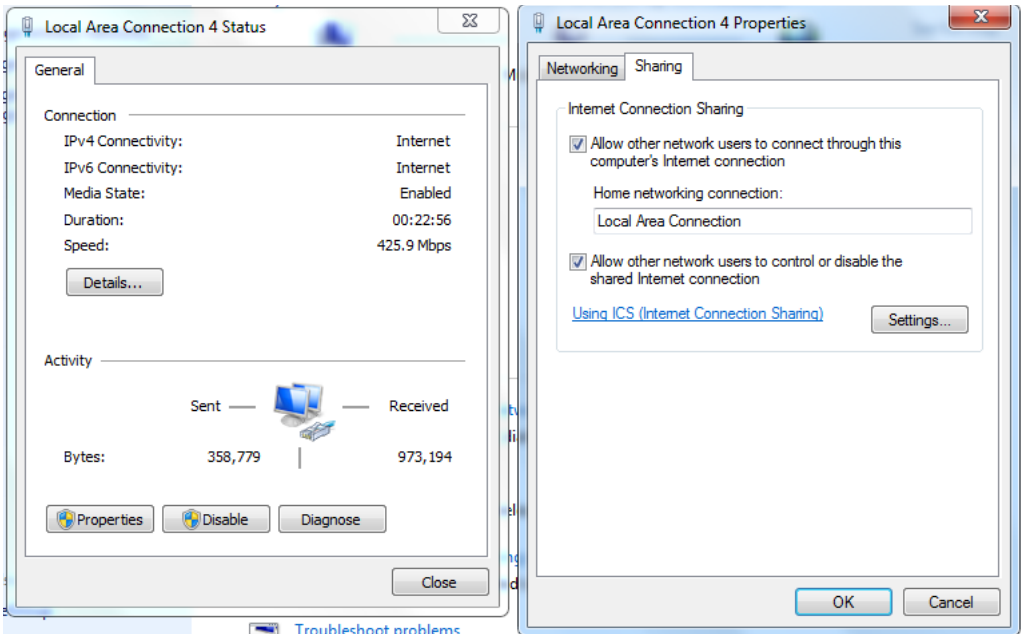
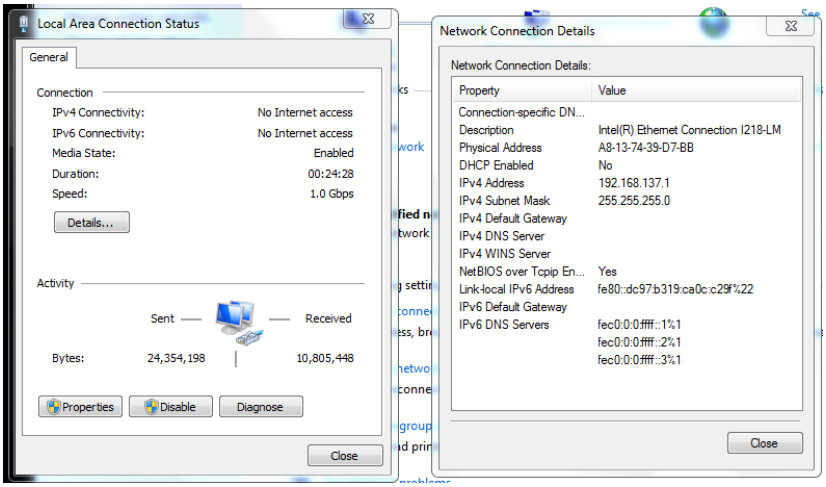


FIGURE 20. Shared Internet Connections



BULLET SETTINGS

WiFi Radios are necessary for the barge position to be shared with the excavator. Options set as in the following figures provides this communication. For detailed descriptions of Bullet settings, please refer to the manufacturer's device manual.

BARGE (STATION)

FIGURE 21. Sample Barge Bullet Configuration—Main Window

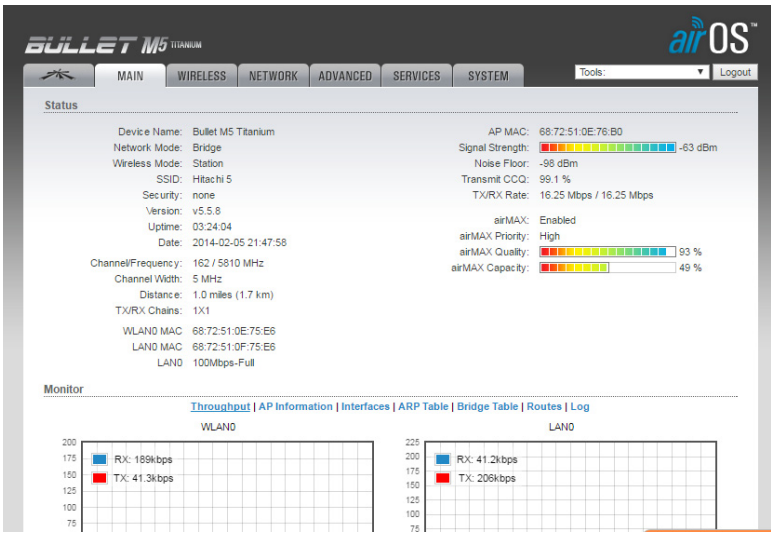


FIGURE 22. Sample Barge Bullet Configuration—airMAX Settings

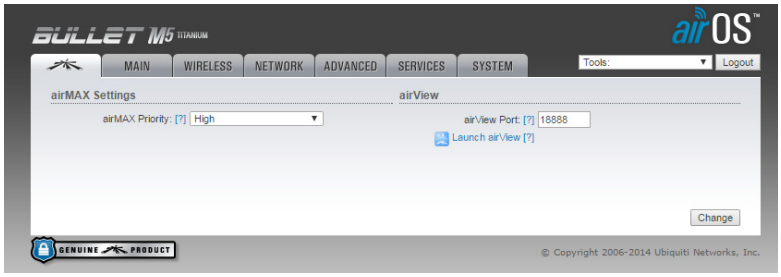


FIGURE 23. Sample Barge Bullet Configuration—Wireless Tab

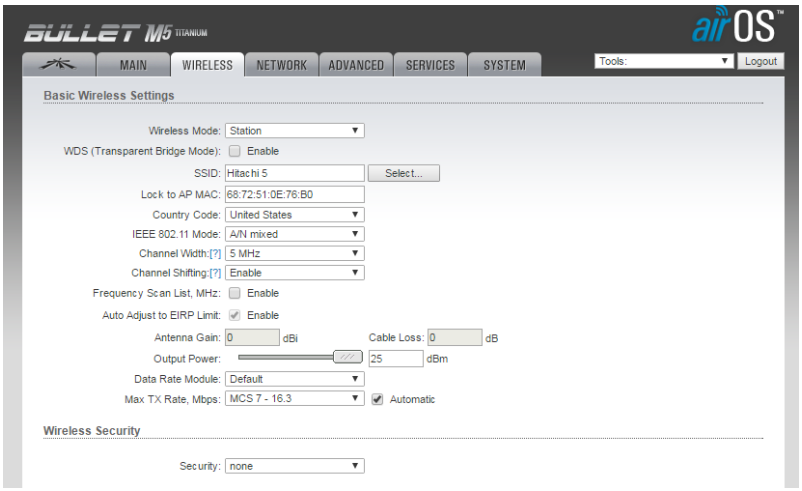


FIGURE 24. Sample Barge Bullet Configuration—Network Tab

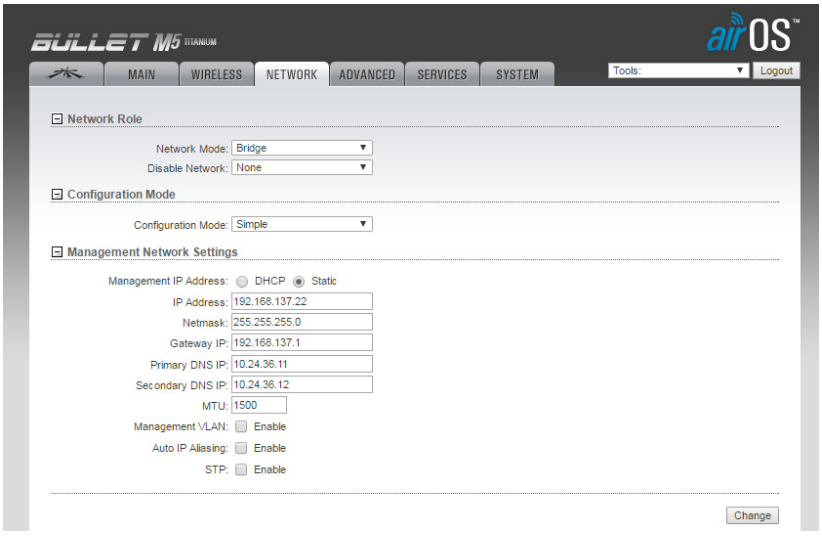
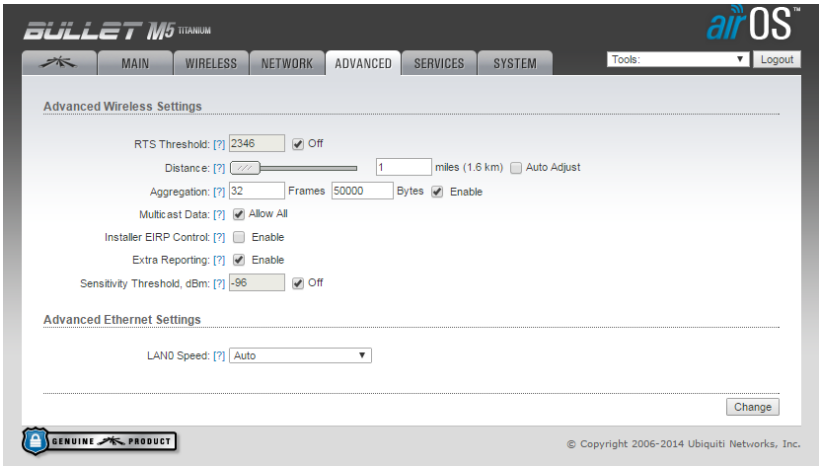


FIGURE 25. *Sample Barge Bullet Configuration—Advanced Tab*



EXCAVATOR BULLET (ACCESS POINT)

FIGURE 26. *Sample Excavator Bullet Configuration—Main Window*

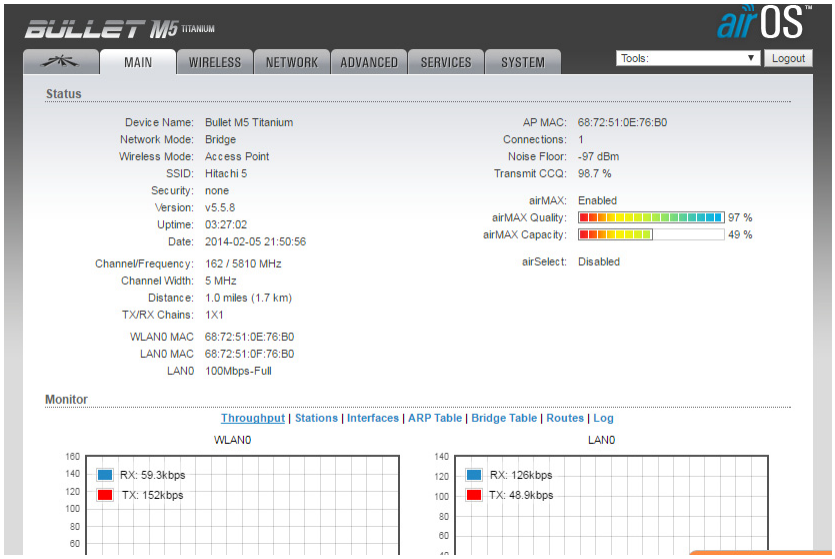


FIGURE 27. *Sample Excavator Bullet Configuration—airMAX Settings*

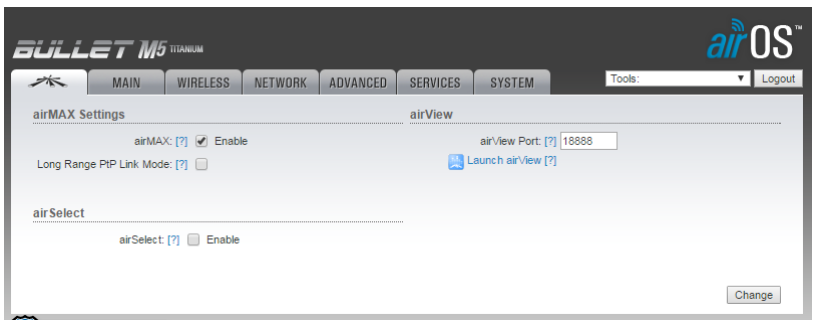


FIGURE 28. *Sample Excavator Bullet Configuration—Wireless Tab*

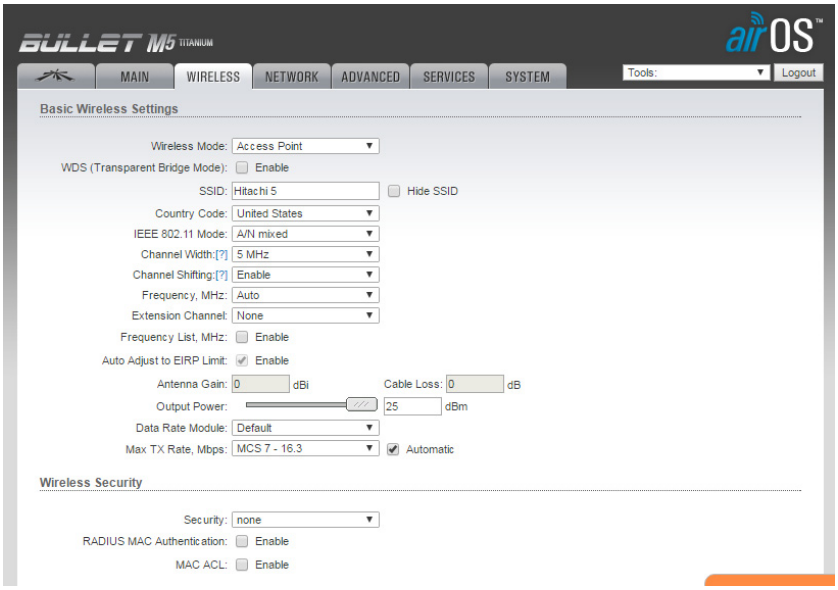


FIGURE 29. *Sample Excavator Bullet Configuration—Network Tab*

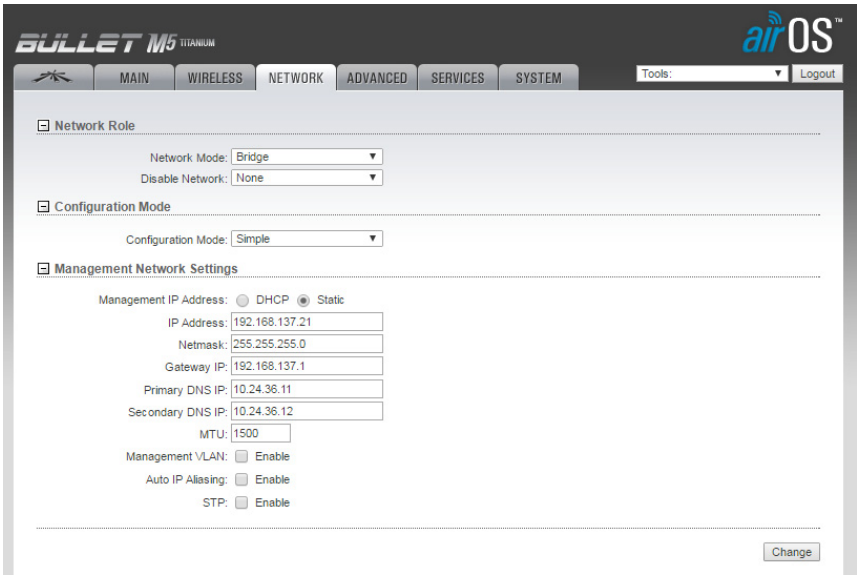
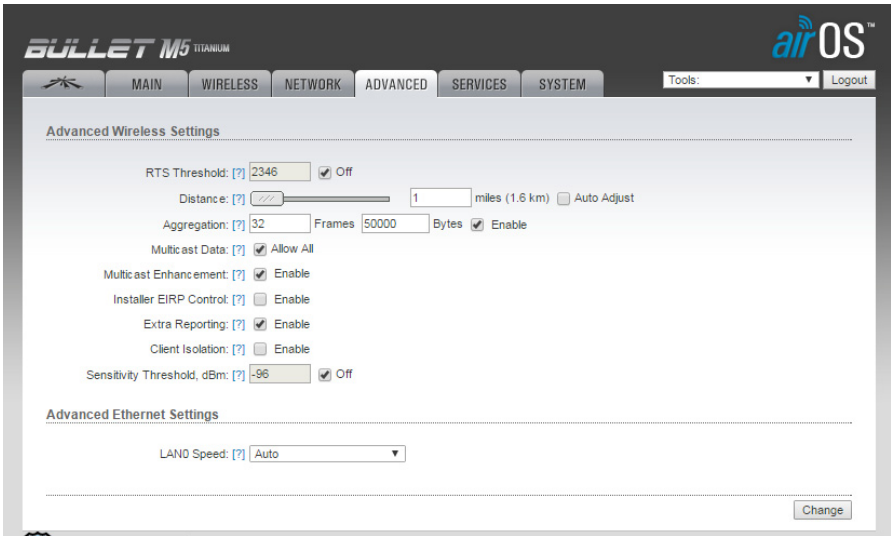


FIGURE 30. Sample Excavator Bullet Configuration—Advanced Tab



DREDGEPACK®

FIGURE 31. DREDGEPACK®

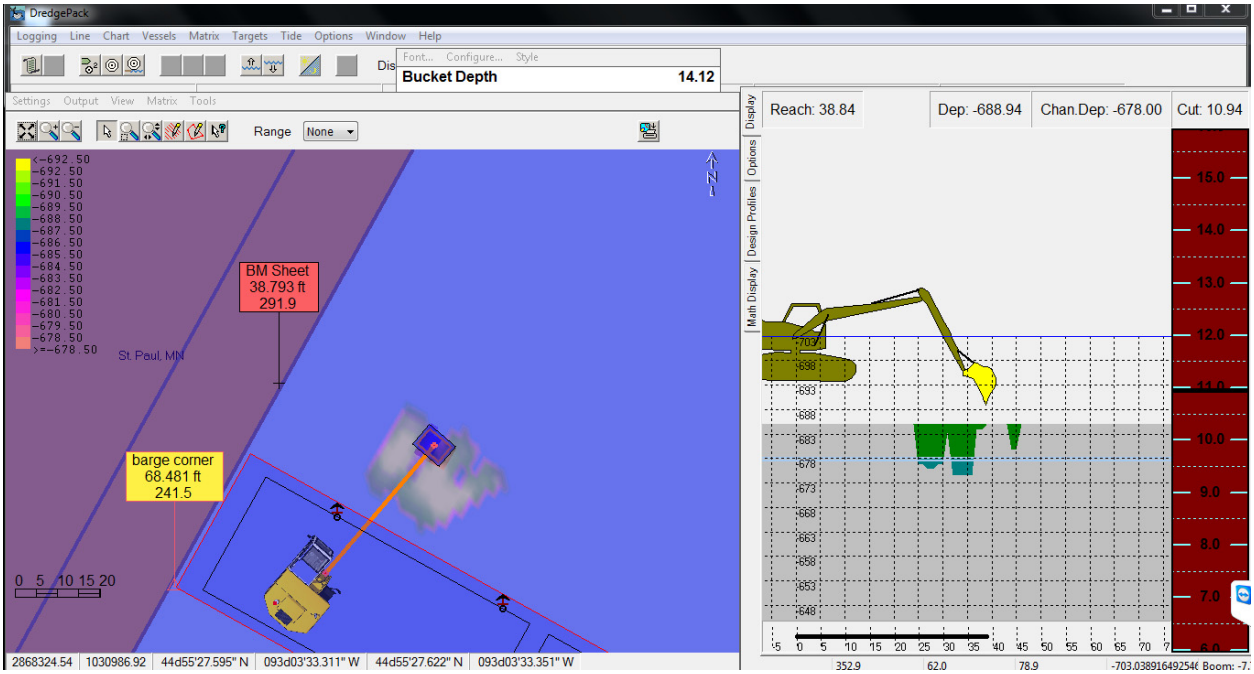


FIGURE 32. Vessel Settings— Barge

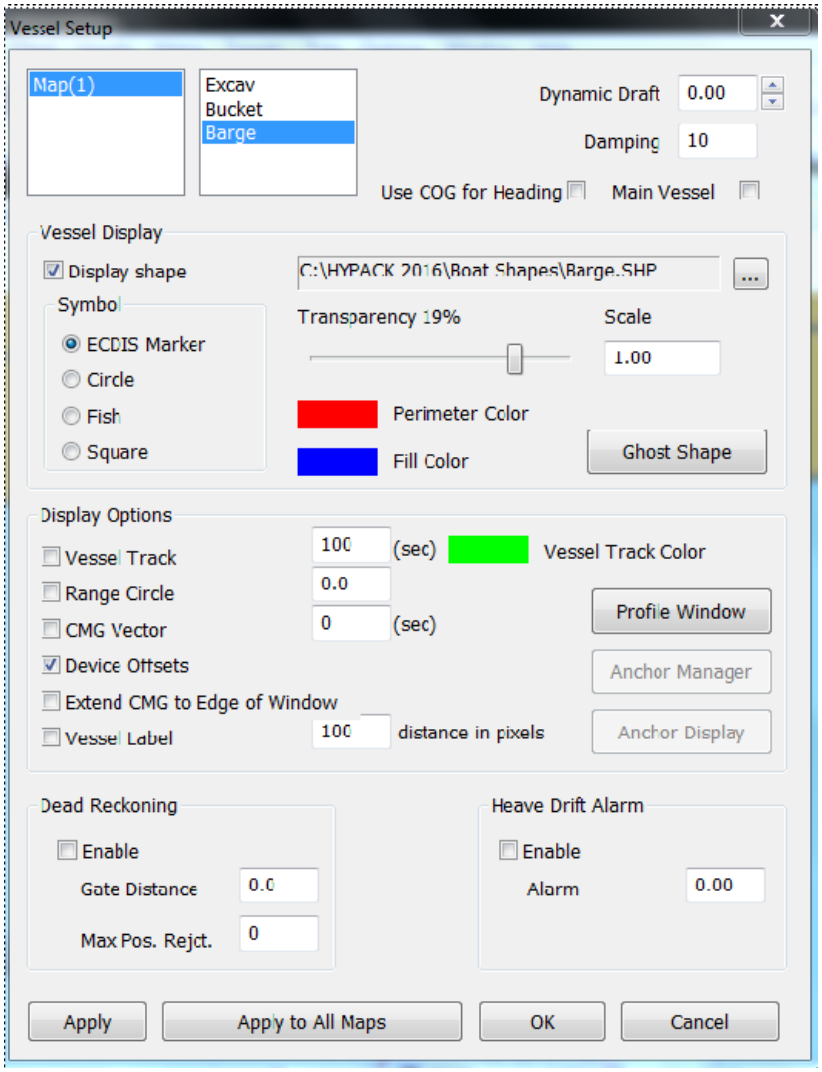


FIGURE 33. *Vessel Settings— Excavator*

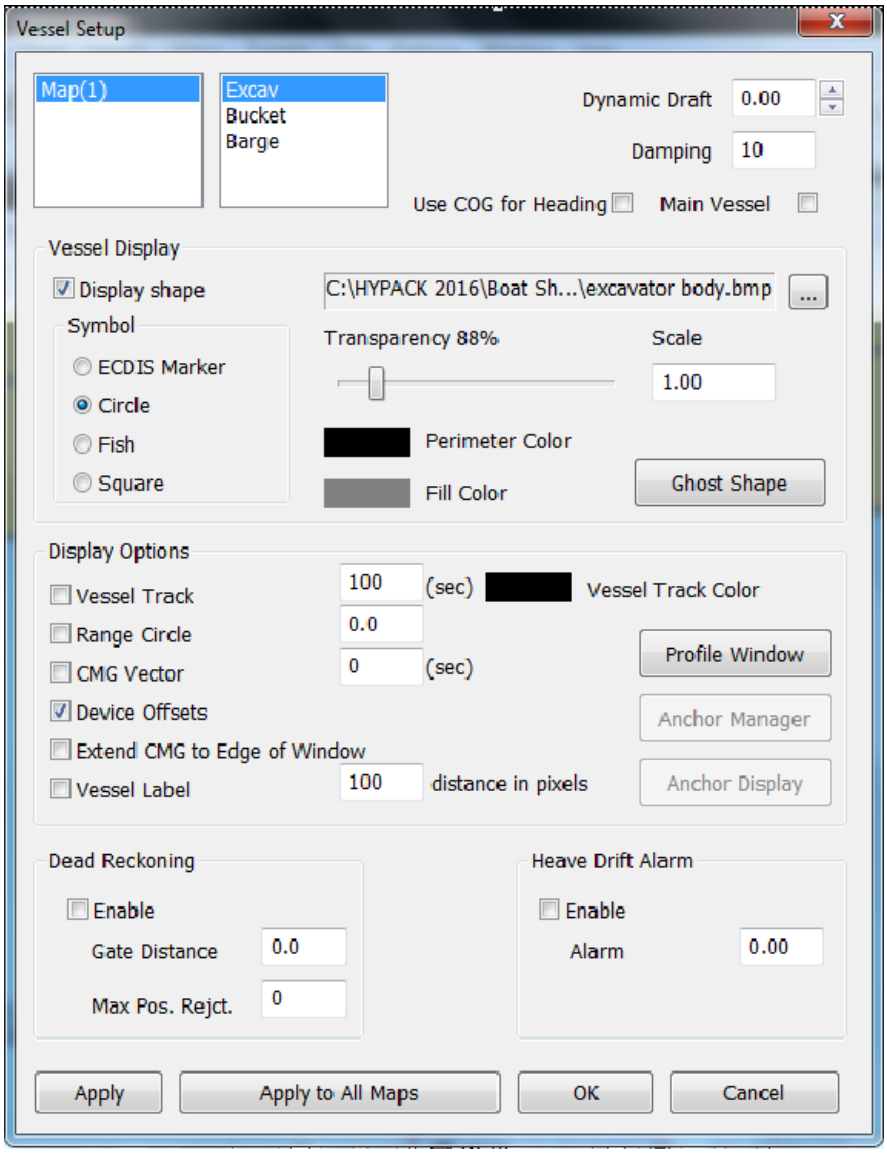


FIGURE 34. *Vessel Settings— Bucket*