



## SR Surveyor Quick Start Guide

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Revision A

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## IMPORTANT

**THE THRUSTER SAFETY LANYARD MUST BE DISCONNECTED WHEN THE BOAT IS OUT OF THE WATER. Failure to do so could result in bodily harm.**



### 1.0 Boat

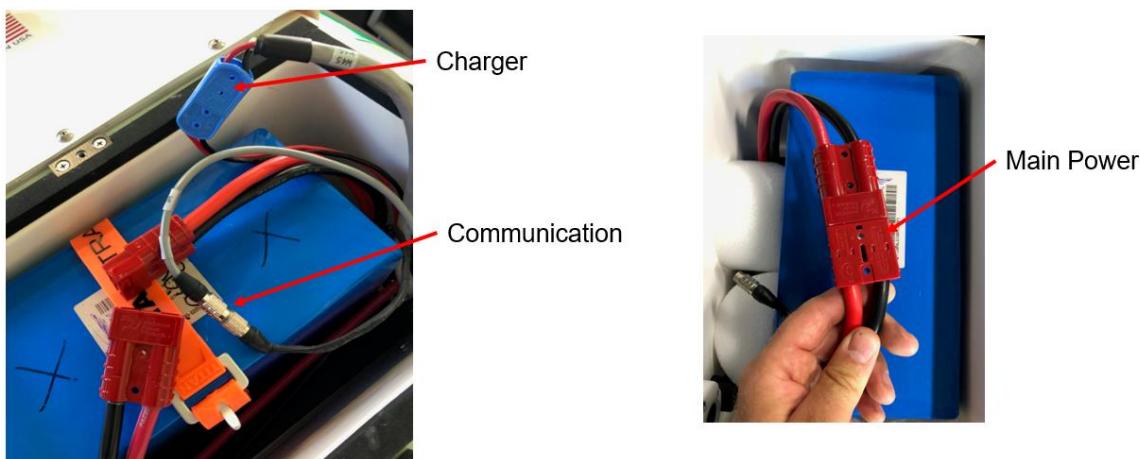
#### Connect Antenna

- Remove the 5.8 GHz radio and antenna from the battery compartment
- Screw the gray antenna into the radio. Ensure connection is tight
- Plug ethernet cable into the bottom of the radio. Ensure connector "clicks" into position
- Screw the radio to the mount in the sequence shown:



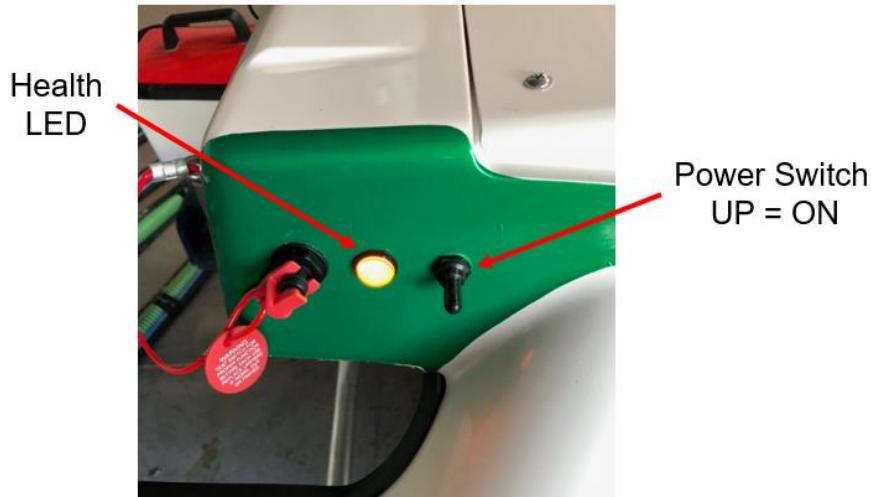
#### Connect Battery

The battery should never be connected to the boat during shipping. The cables can be connected in any sequence as shown below.



## Power Up

After the battery is connected, turn on the main power switch to power up the system. The amber health LED will then be illuminated continuously during the initial start-up routine. When the system has completed the start-up routine the Health LED will begin to blink at a rate of 1 pulse per second (1Hz).



NOTE: Several systems startup with the boat. These Include:

- ASV Controller
- Data Acquisition Computer (DAC)
- Camera
- SBG INS
- Sound velocity sensor
- LiDAR (If installed)
- SonTek ADCP (If Installed)
- **The Edgetech 2205 does not power on with the boat.**

## 2.0 Operator Interface System

### IMPORTANT

**Remove all cables and components from the case before applying power  
DO NOT OPEN THE CASE WHILE A/C POWER IS CONNECTED TO OIS**

**This could result in potential shock hazard**

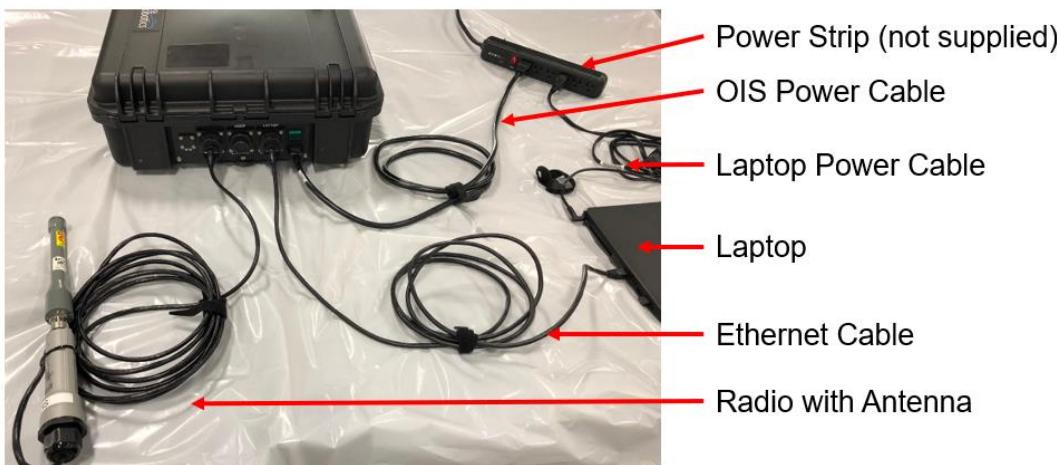
Setup  
Remove the following components from the OIS case:



- Laptop
- Laptop power cable
- OIS power cable
- Ethernet cable
- Radio (with cable attached)
- Joystick
- Mouse (not supplied)

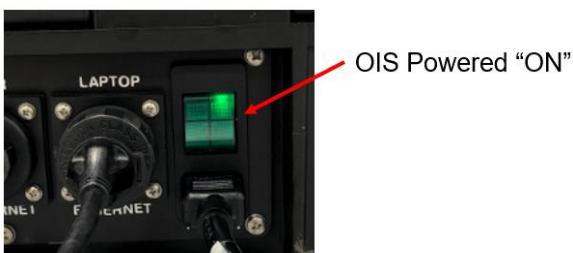
### Connections

Connect the cables as shown below.



### Power Up

Once connections are made *close and latch the OIS case*. Plug the OIS power and Laptop power into 110/220 A/C power and turn the OIS ON via the switch located on the back panel.



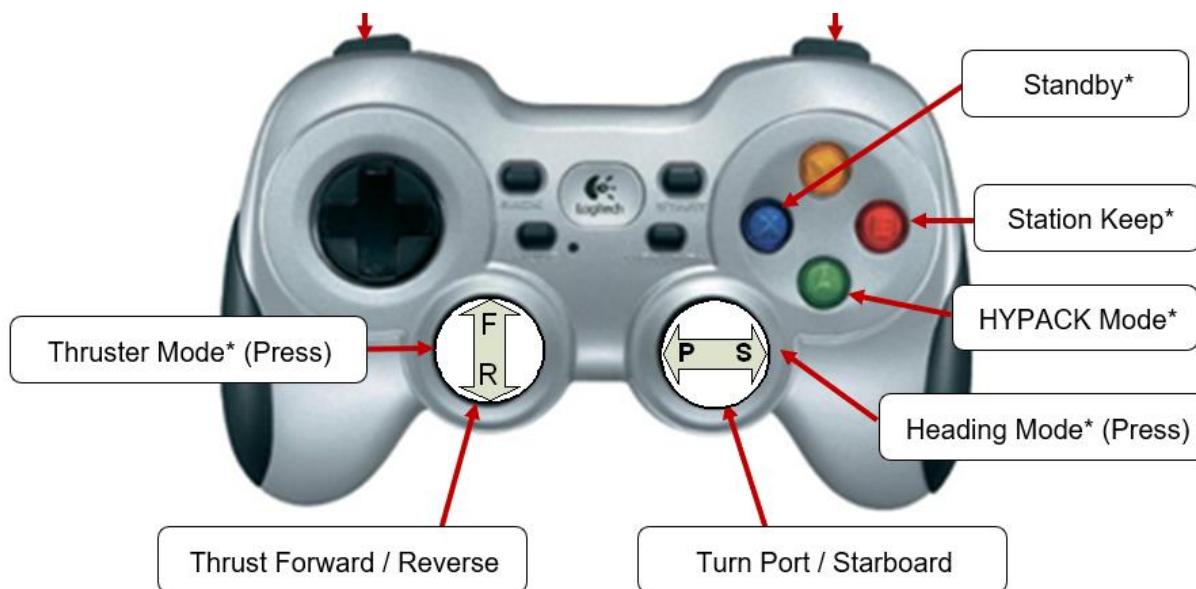
Next turn on the OIS laptop. Windows username= **searobot** password=**searobot**  
Establish Communication

**The controller must be woken up before starting Windows**

Wake up the joystick controller by pressing the “MODE” button twice and pressing the left joystick straight down (indenting).



## 2.1 Button Assignments (Thruster Mode)



## 3.0 Software Setup

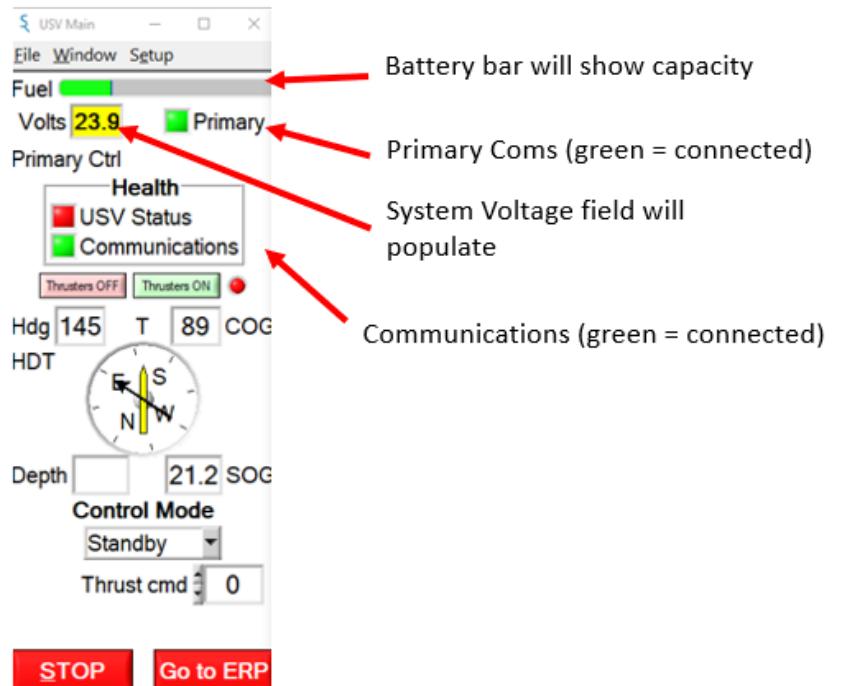
Open SeaRobotics Advanced Software (SAS)



Once launched the software will automatically establish a connection to the boat.

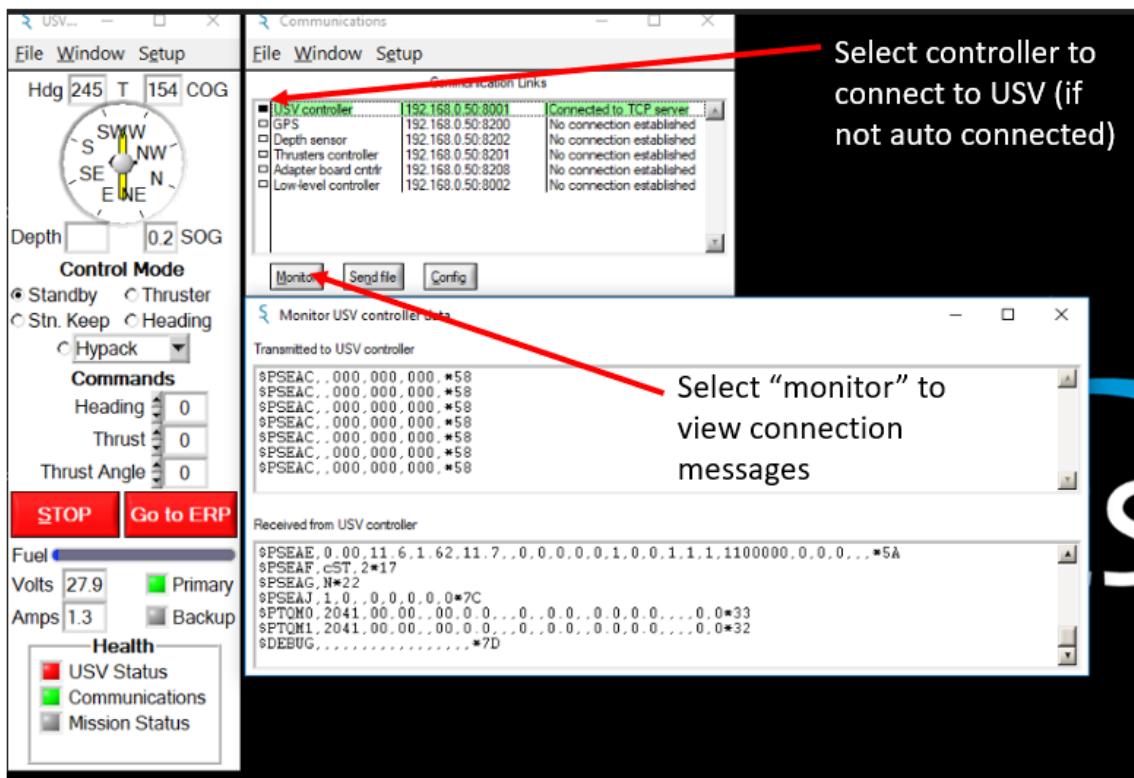
Indications the SAS software has successfully linked to the boat:

- “Primary Coms” icon will illuminate green
- “Health Communications” will illuminate green
- Battery bar will populate
- Volts field will populate.



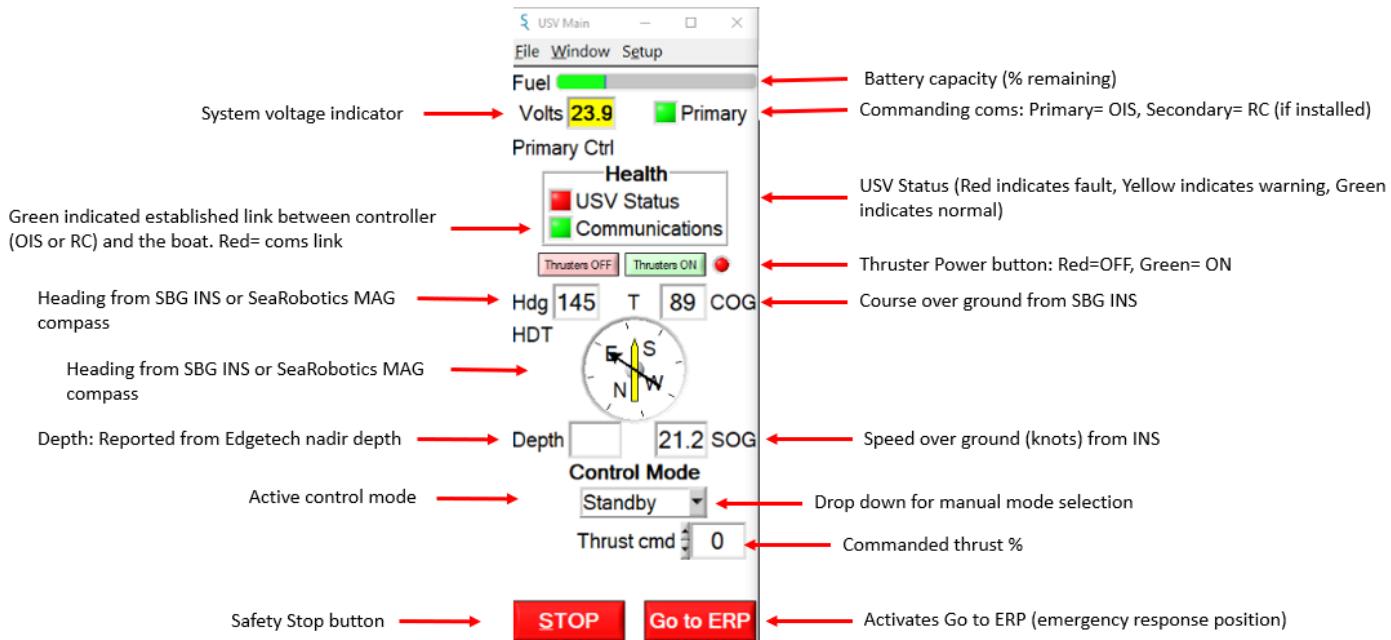
If the link is not automatically established:

1. Select Window > Communications (the Communications window will appear)
2. Select the box next to “USV Controller.” This will prompt the system to connect. Selecting “Monitor” will display the messages being sent between the OIS and the boat. Once the coms are established close these windows.



**Trouble Shooting Tip:** If the OIS fails to connect to the boat after multiple attempts verify all Ethernet and radio connections into the OIS and laptop.

### SeaRobotics Advanced Main Window



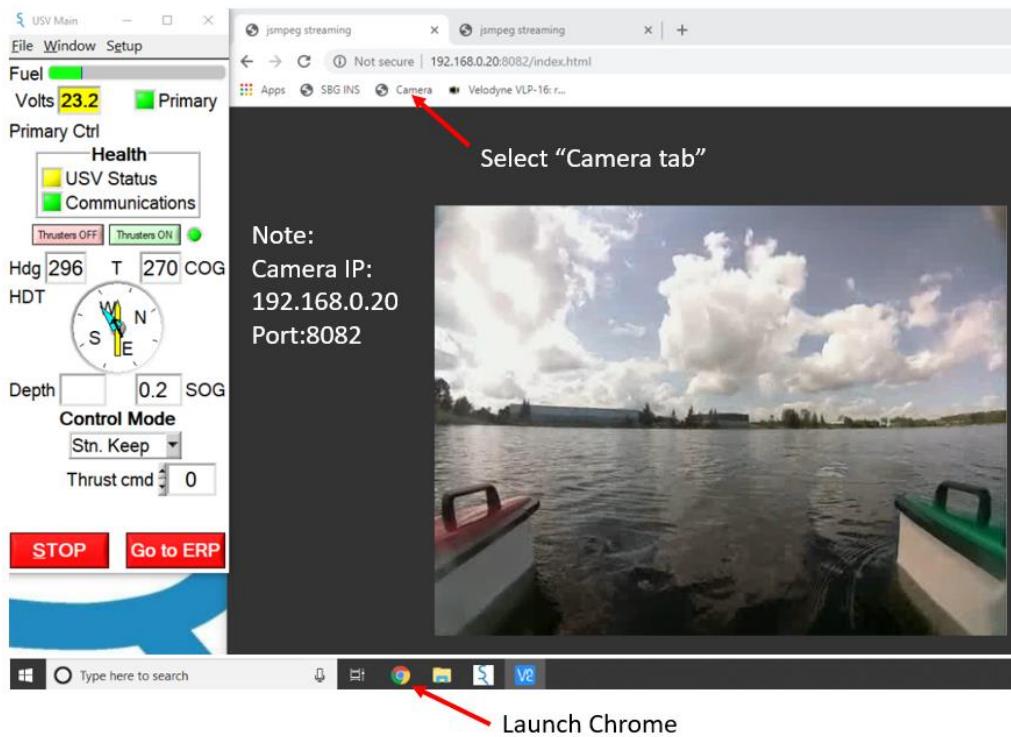
### Test Communications

1. Verify that the kill switch lanyard is inserted.
2. In OIS Main window turn “Thrusters ON” Change control mode Thruster.
3. Enter “10” in the “Thrust” field of the Main window
4. Press “Enter” to send the thrust command
5. Visually ensure BOTH propellers are spinning
6. Press “Stop” to put the boat back into “Standby” and 0 thrust
7. Thrusters can also be tested with the Joystick
8. Detent the left joystick to activate “Thruster” mode
9. The top Left button will increase thrust 10% each time it is indented
10. The top Left Trigger will decrease thrust 10% each time it is indented
11. Press the **BLUE** button to put the vehicle into “Standby”
12. **Remove the safety Kill Switch lanyard until ready to launch**



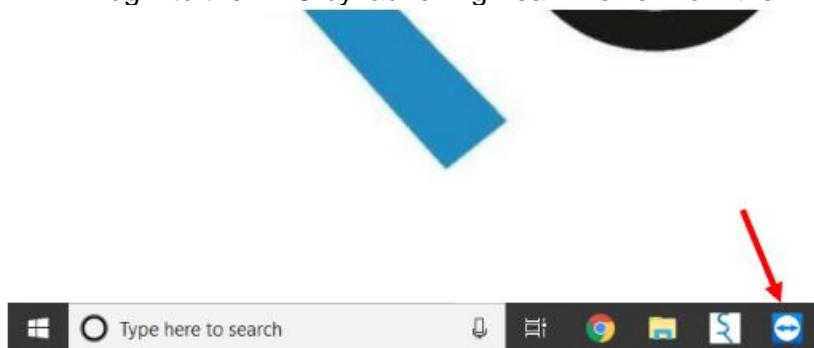
## Camera

1. Open Chrome from the OIS desktop task bar
2. Select “Camera” favorite. Realtime video will load

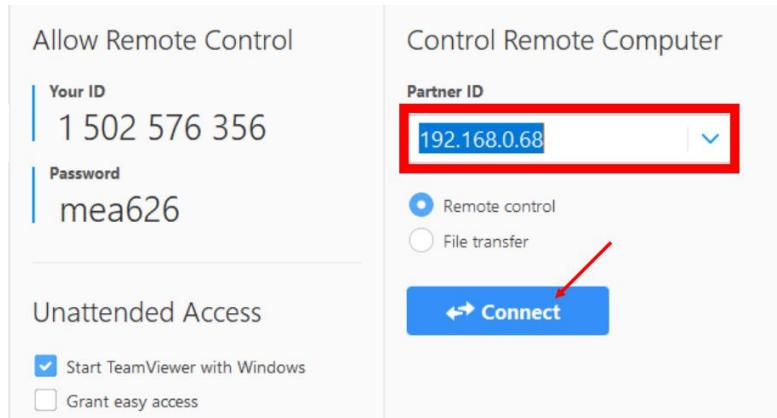


## Data Acquisition Computer (DAC)

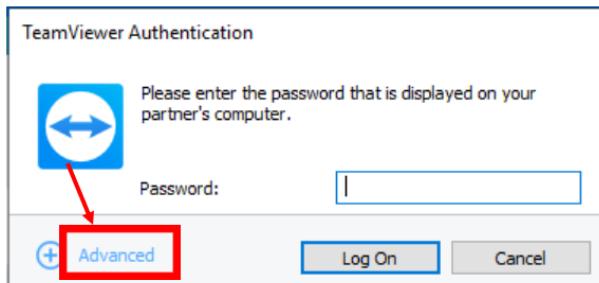
1. The DAC is powered on with the boat
2. Log into the DAC by launching TeamViewer from the Windows task bar



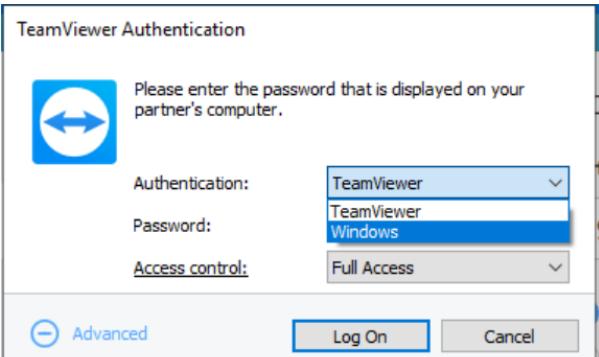
3. TeamViewer will launch. DAC IP address will be listed. Select “Connect”



4. A password window will launch. Do not enter a password. Select “Advanced”

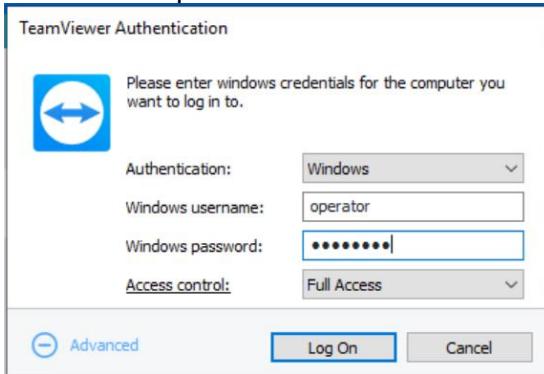


5. A new window will launch. Select “Windows” from the “Authentication” drop down window.



6. Windows username: operator

7. Windows password: searobot



**Trouble Shooting Tip:** If the DAC does not initially connect this may be because it did not boot properly. Power cycle the DAC Via the Windows>Commands> POWER tab. Wait 30 seconds after turning it off to power it back on. It may take a couple minutes for the DAC to com back up. Then try reconnecting via VNC.

Upon login the desktop will appear as shown below.

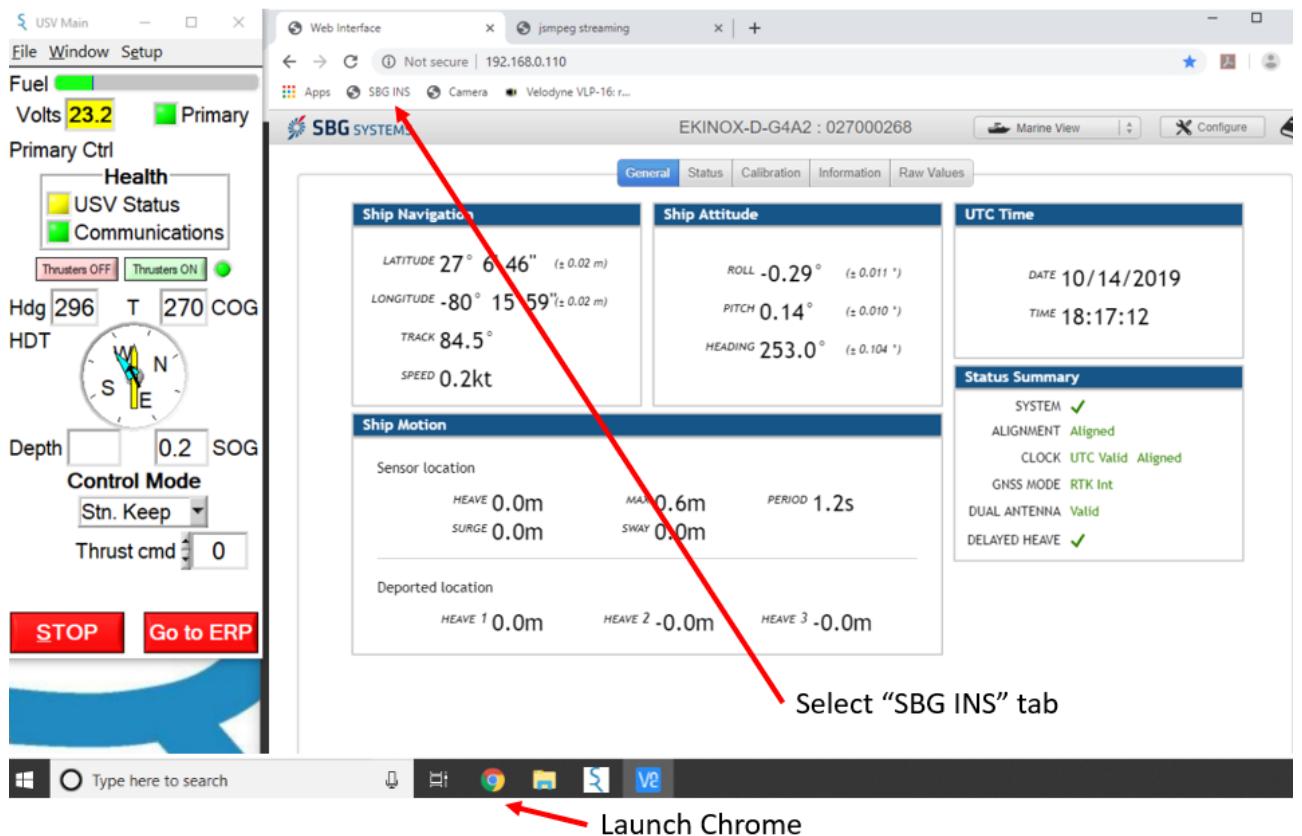
If prompted log into Windows on the DAC. Username= **searobot** Password=**searobot**



**User tip:** Dedicate an external monitor to the DAC. This will help optimize screen space

## SBG INS

1. The SBG EKINOX INS is powered on with the boat.
2. To verify status launch Chrome and select the "SBG INS" tab. The SBG interface will launch.

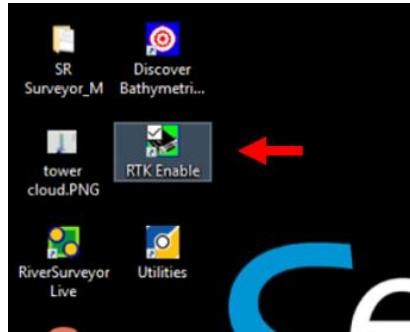


3. Note the "Status Summary" window. This indicates system status, alignment, and GNNS mode.
4. **IMPORTANT! The boat will not navigate correctly or hold station unless the antennas are aligned. Align the antennas immediately after launching the vehicle. Spin the boat on axis counterclockwise then clockwise until Alignment reads "Aligned." Once aligned the boat can be operated. Alignment can take between 3 to 20 minutes.**

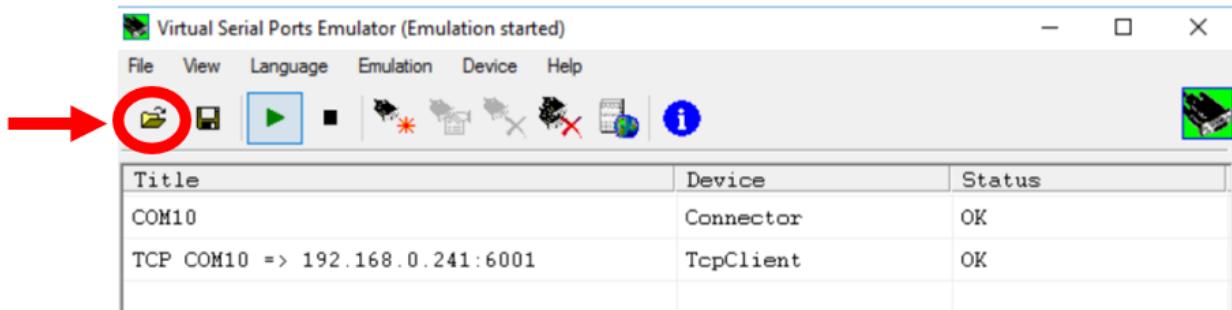
Acquiring NTRIP VRS corrections (for vehicles with cellular modem option)

When available NTRIP VRS corrections can be acquired by the SurveyorM1.8. The vehicle must be within the coverage area of the SIM provider to utilize this option.

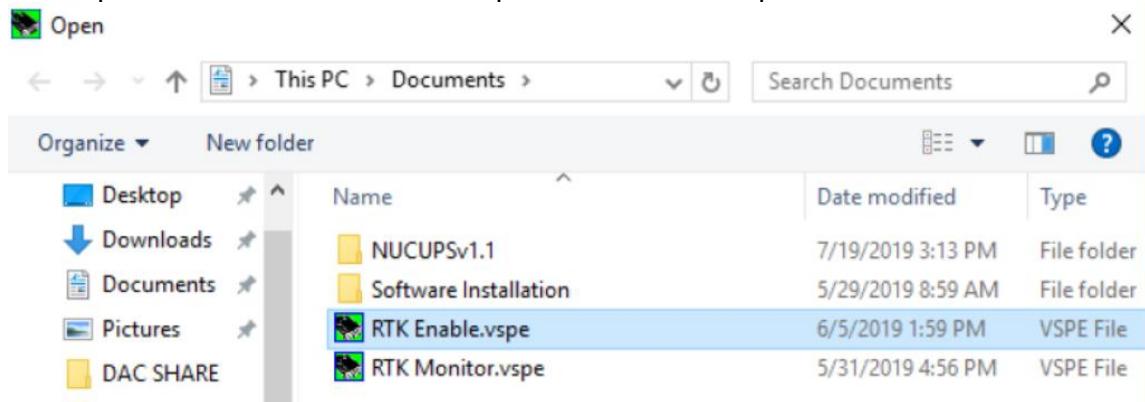
1. Open the VSP utility on the DAC desktop titled "RTK Enable"



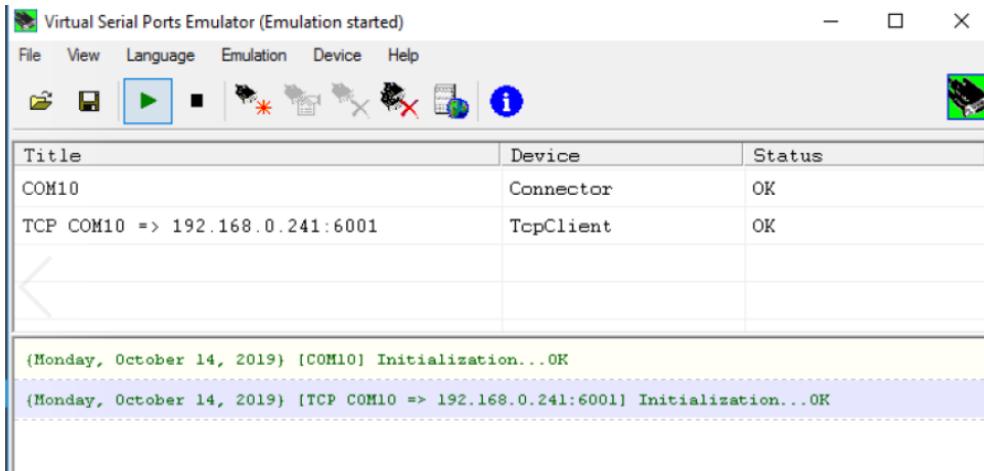
- Once the utility launches select “Open”



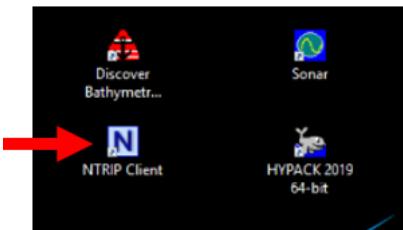
- File Explorer will launch. Select and open “RTK Enable.vspe”



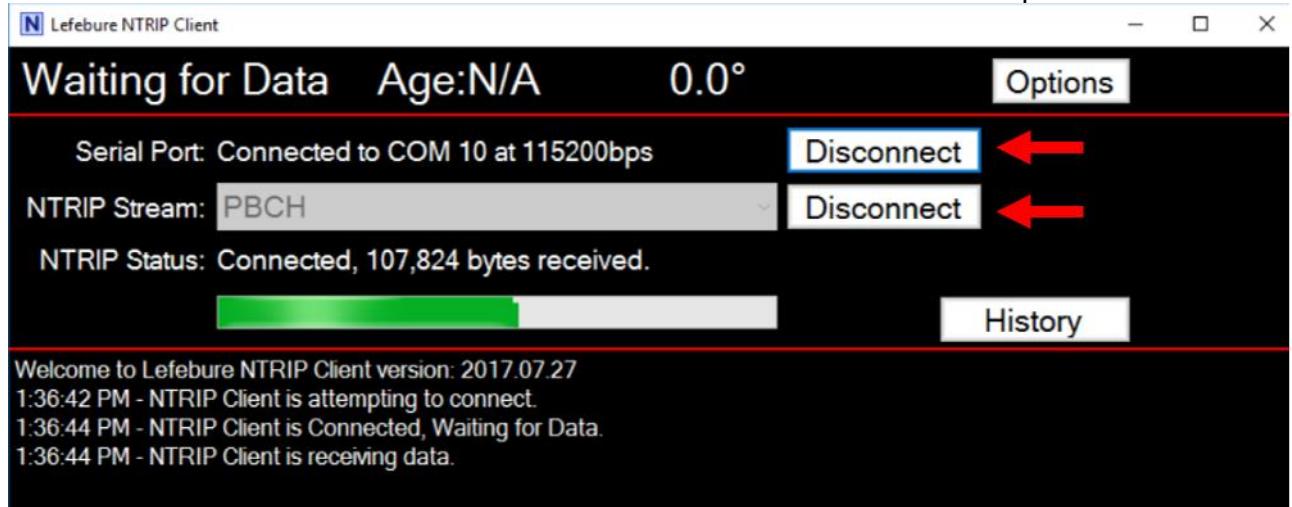
- Once connected the utility should appear as below:



5. Minimize VSP. Leave running during survey.
6. VSP License manager will prompt. Select "No"
7. Open NTRIP client by selecting the shortcut on the DAC desktop



8. Once launched connect to Serial Port
9. Select NTRIP Stream (location)
10. Connect to NTRIP Stream. Once connected Serial and NTRIP status will report "Connected"



11. Minimize NTRIP. Do not close during survey
12. Launch SBG INS web interface. The Status Summary window Mode will read RTK Float or RTK Int indicating VRS reception.

**Ship Navigation**

- LATITUDE  $27^{\circ} 6' 46''$  ( $\pm 0.02$  m)
- LONGITUDE  $-80^{\circ} 15' 59''$  ( $\pm 0.02$  m)
- TRACK  $84.5^{\circ}$
- SPEED 0.2kt

**Ship Attitude**

- ROLL  $-0.29^{\circ}$  ( $\pm 0.011^{\circ}$ )
- PITCH  $0.14^{\circ}$  ( $\pm 0.010^{\circ}$ )
- HEADING  $253.0^{\circ}$  ( $\pm 0.104^{\circ}$ )

**UTC Time**

- DATE 10/14/2019
- TIME 18:17:12

**Status Summary**

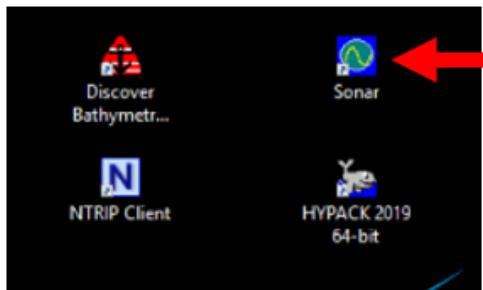
- SYSTEM ✓
- ALIGNMENT Aligned
- CLOCK UTC Valid Aligned
- GNSS MODE RTK Int** (Red arrow points here)
- DUAL ANTENNA Valid
- DELAYED HEAVE ✓

## Edgetech 2205

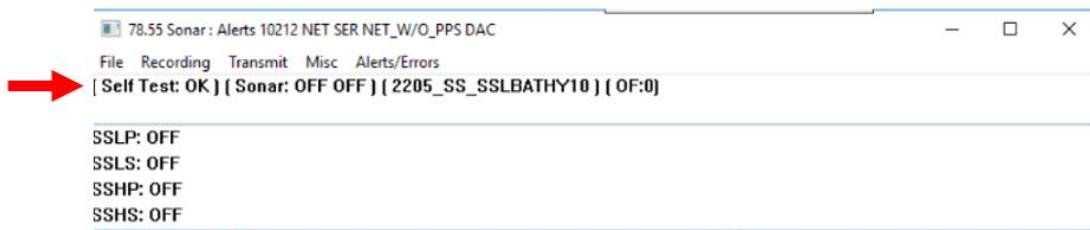
**NOTE: Do not operate this sonar in air. Doing so could damage the system.**

Power the sonar on while the transducers are in the water.

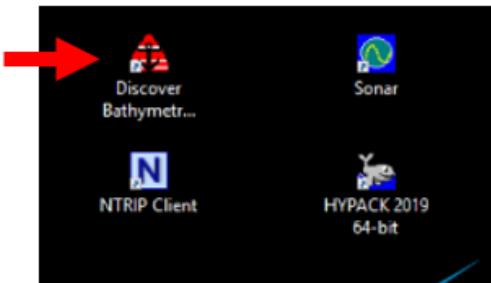
1. Using the SeaRobotics Advanced utility power on the Sonar
  - a. Windows>Commands>Power>Sonar ON
  - b. Wait 20 seconds for the sonar to power up
2. Open the “Sonar” shortcut on the DAC desktop



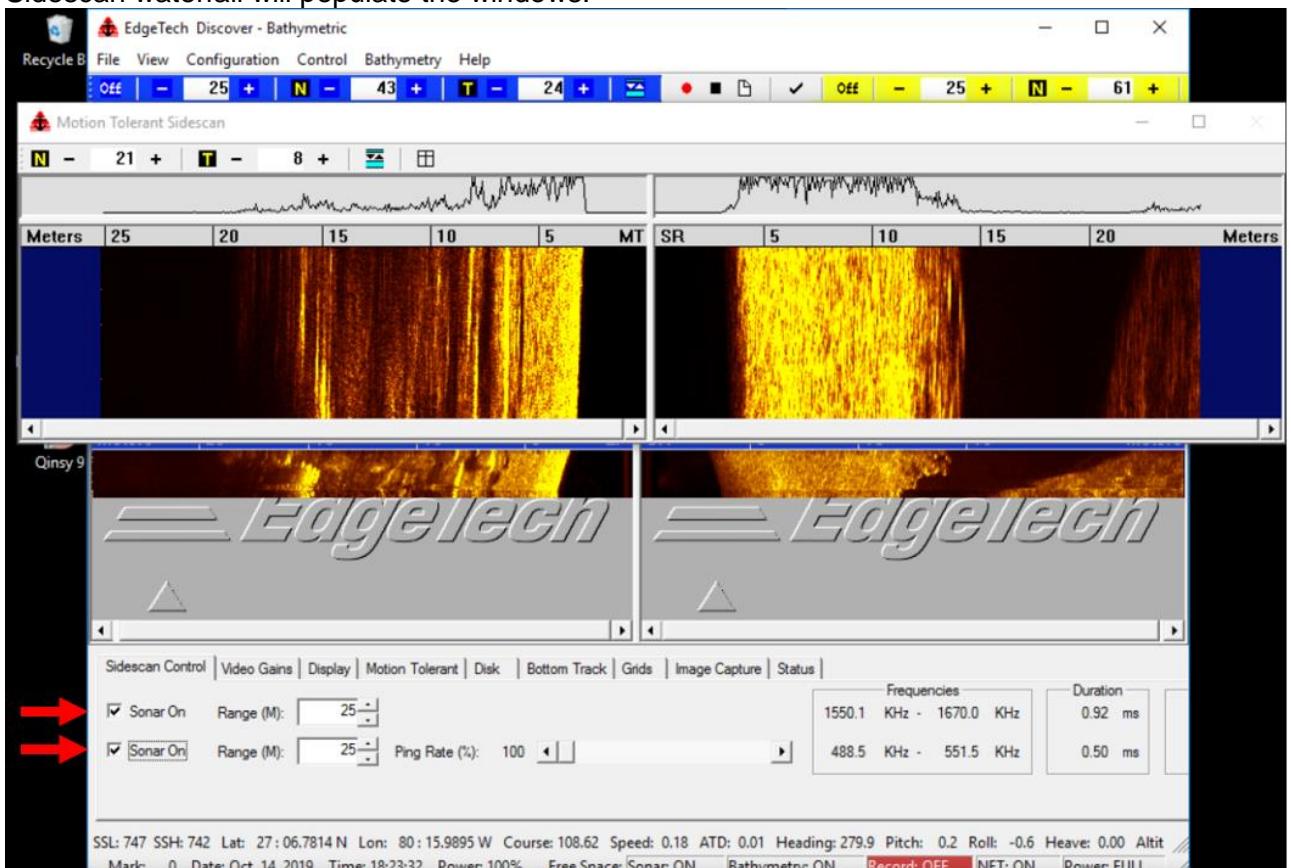
3. The Edgetech Sonar utility will automatically connect to and self-test the sonar. If connected the prompt will appear as shown reading self test OK.



4. If the self test fails. Not enough time was given between powering on the sonar and launching the utility. Close the utility wait 10 seconds and try again.
5. Minimize or hide this utility. Do not close it during survey.
6. Launch Discover from the DAC desktop



7. Once Discover launches toggle the two “Sonar On” boxes to enable the 1600kHz sidescan, 550kHz sidescan & 550kHz bathymetry.
8. The bathymetry turns on with 550kHz sidescan. The data bar at the bottom of Discover will state “Sonar ON,” “Bathymetry ON”
9. Sidescan waterfall will populate the windows.



10. Use Discover Bathymetry>Basic Settings> to configure sonar settings.

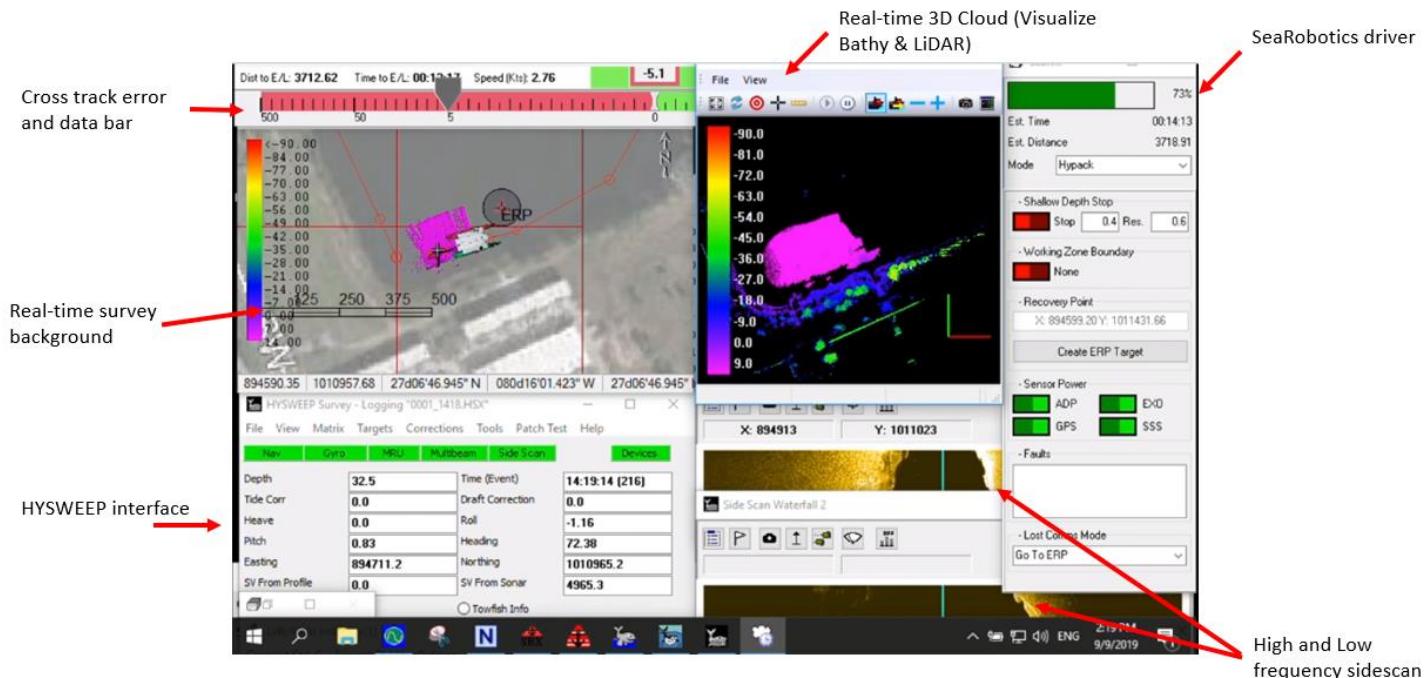
### Hypack

1. Open HYPACK 2019
2. Copy project “SeaRobotics” to create new survey
3. Once survey planning is completed launch “Survey”

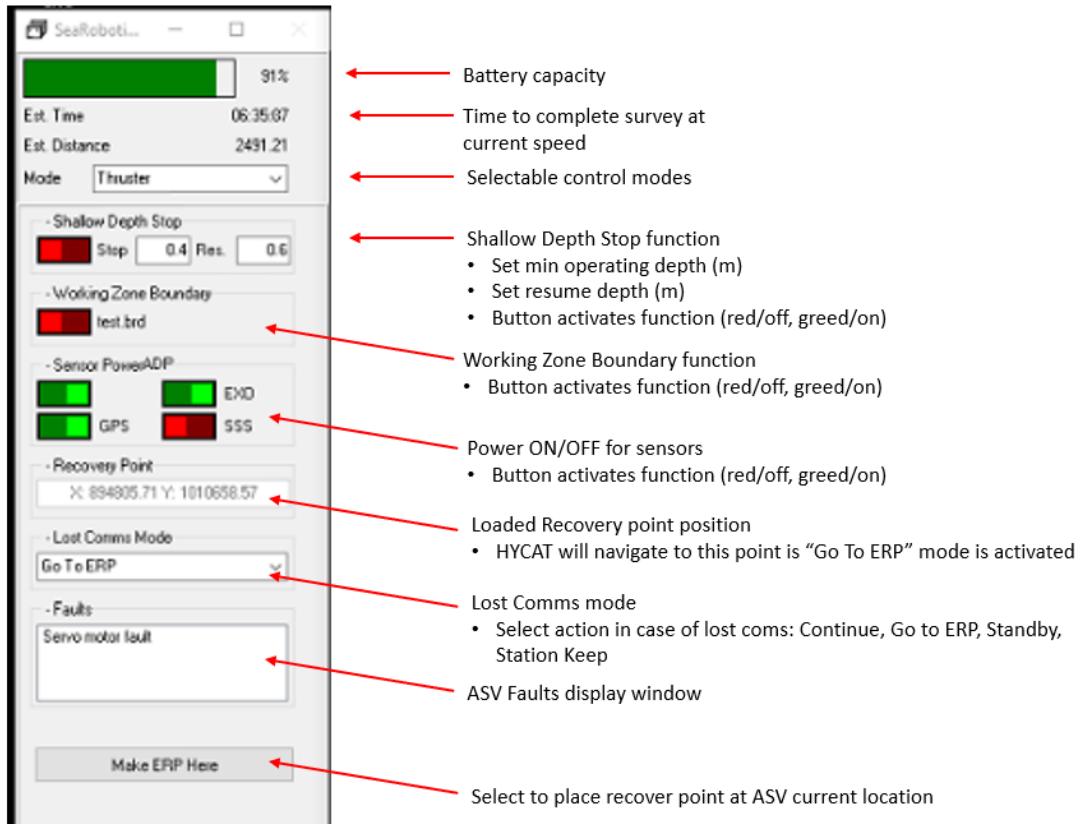
### Notes:

- All hardware, com-ports, and sensor offsets are setup by default in “SeaRobotics”
- Copy this project to create all new jobs
- Change Geodesy as required for specific survey location
- Modify/ create planned line files as required for specific survey location

The windows will launch as shown below:



### SeaRobotics HYPACK Driver Layout



## 4.0 Operations

### Pre-Launch

1. Set response to lost communication event in SeaRobotics OIS set DLL mode.
2. Verify all hatches are secure and watertight
3. Verify hull integrity
4. Verify all external connections are tight and secure
5. Verify HYPACK or QPS Key is installed
6. Verify props are free and clear from obstruction
7. Verify OIS base radio location and line of site to survey area

#### **4.1 Start Mission**

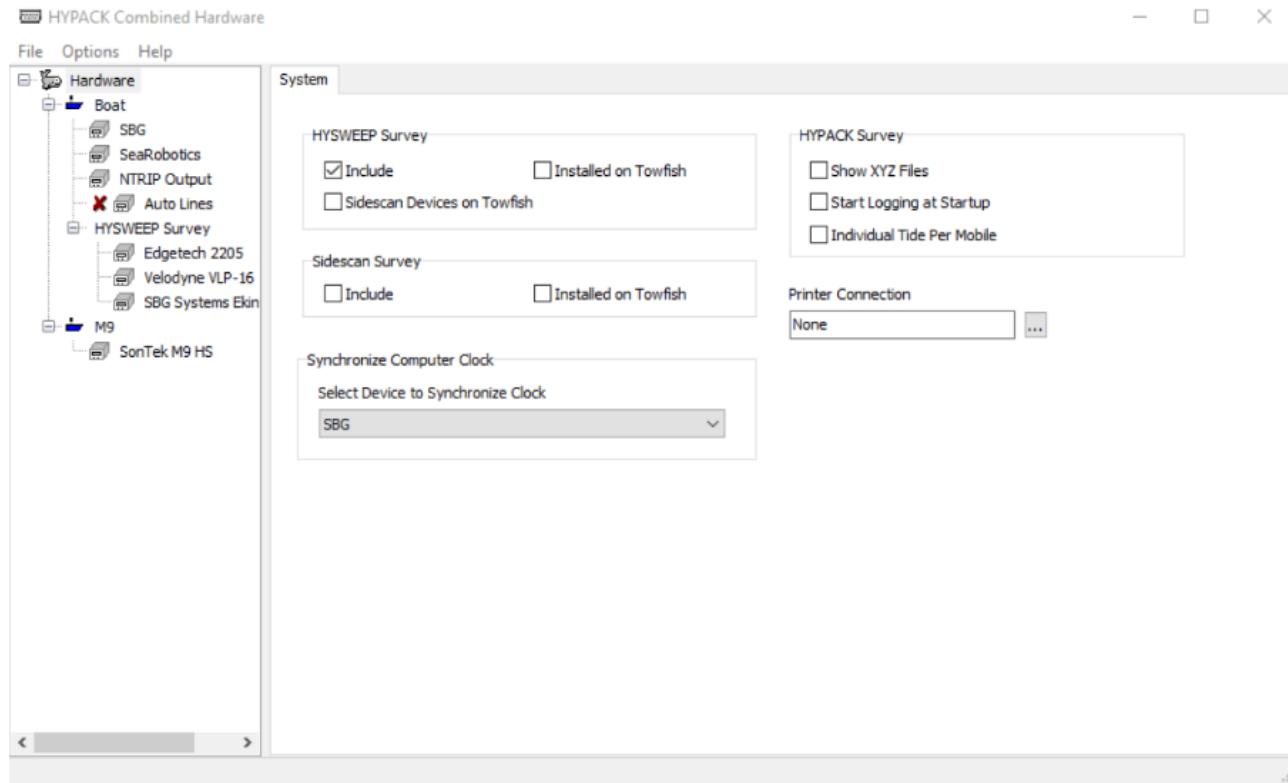
1. Connect thruster Kill Switch lanyard
2. Test thrusters (10% forward & 10% reverse)
3. Drive the boat to safe position in “Thruster” or “Heading” mode
4. Manually drive vehicle turning sharply until SBG INS antennas are aligned
5. Hold position at safe location by selecting “Station Keep Mode”
6. Power on Edgetech Sonar
7. Launch HYPACK Survey. Begin survey by selecting “HYPACK Mode”
8. The boat will hold station at end of last survey line and wait for commands

Notes:

- The boat will auto navigate to the 1<sup>st</sup> survey line
- Data-logging will auto start/stop at the beginning and end of each line
- Certain wind/current conditions may cause the boat to miss the Start/Stop gate at the end of a line. Be conscious in high wind/current conditions. Operator may want to turn off auto logging and log continually
- Operator can increment/decrement lines in real time
- Operator can change control modes at any time
- By selecting “HYPACK” mode the boat will navigate back to current survey line and continue
- It is best to run the lines in numerical order
- Discover will automatically log .jsf files when HYPACK is logging
- User discover to configure bathymetry range. HYPACK only visualizes the acquired data.
- **The SeaRobotics driver will not load in survey unless there is a planned line file.**

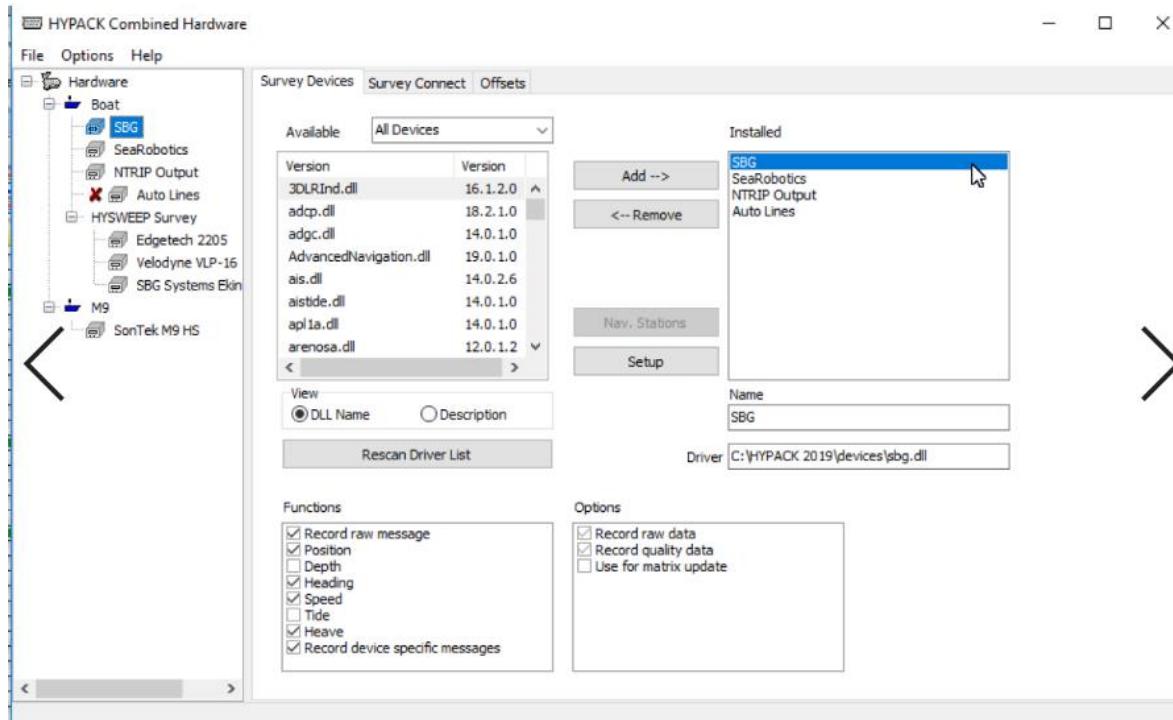
## 5.0 Device Interface Settings

### Offset units= feet

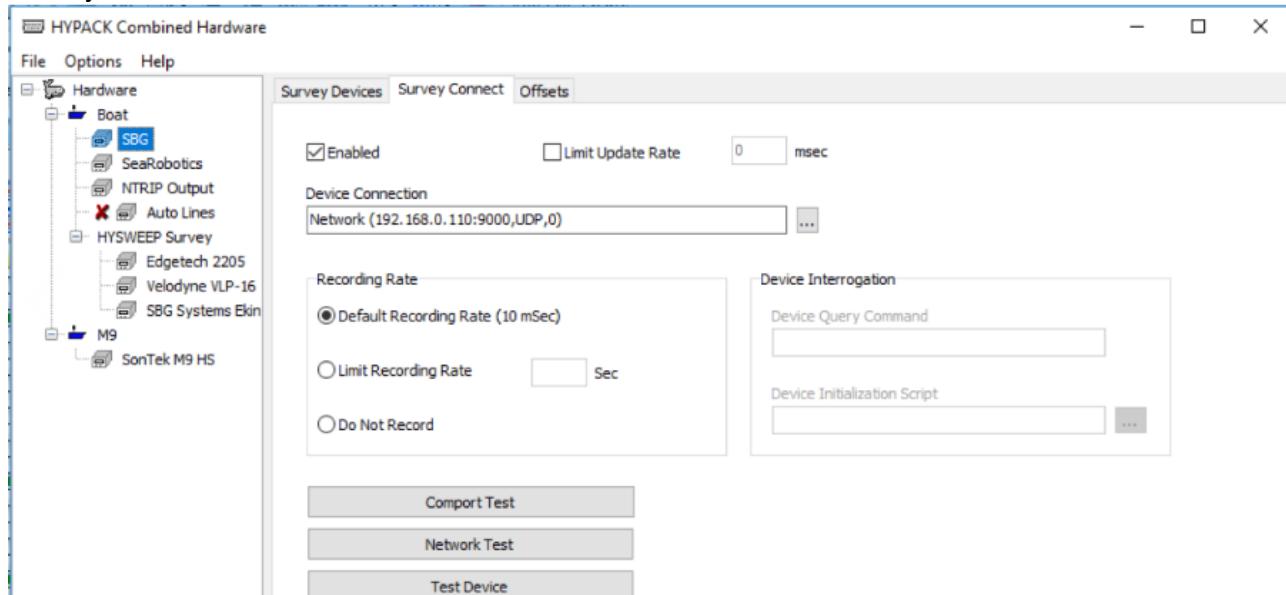


### 5.1 BOAT SBG Ekinox

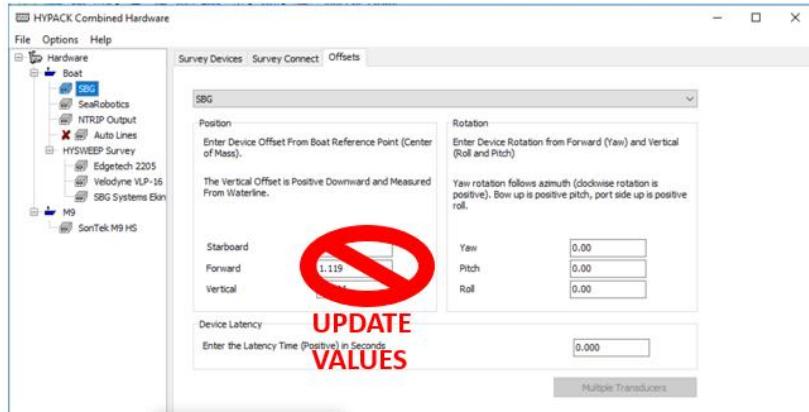
#### Devices



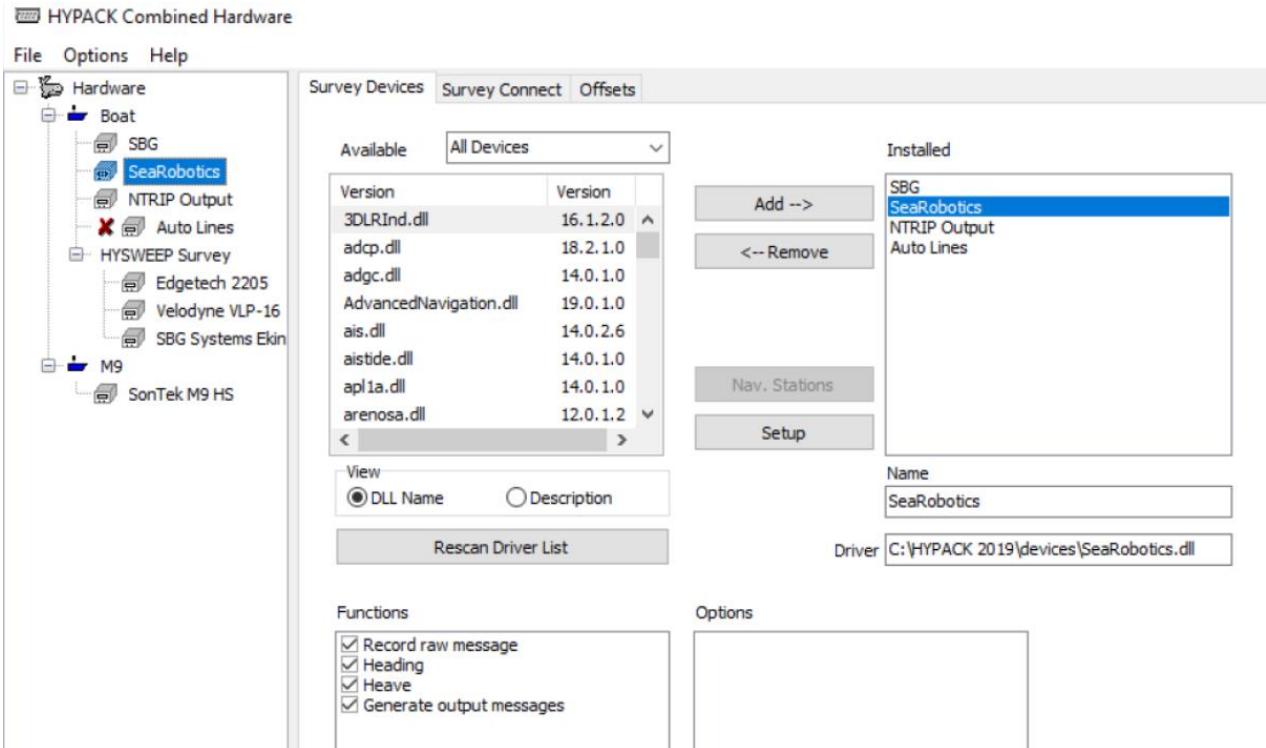
## Survey Connect



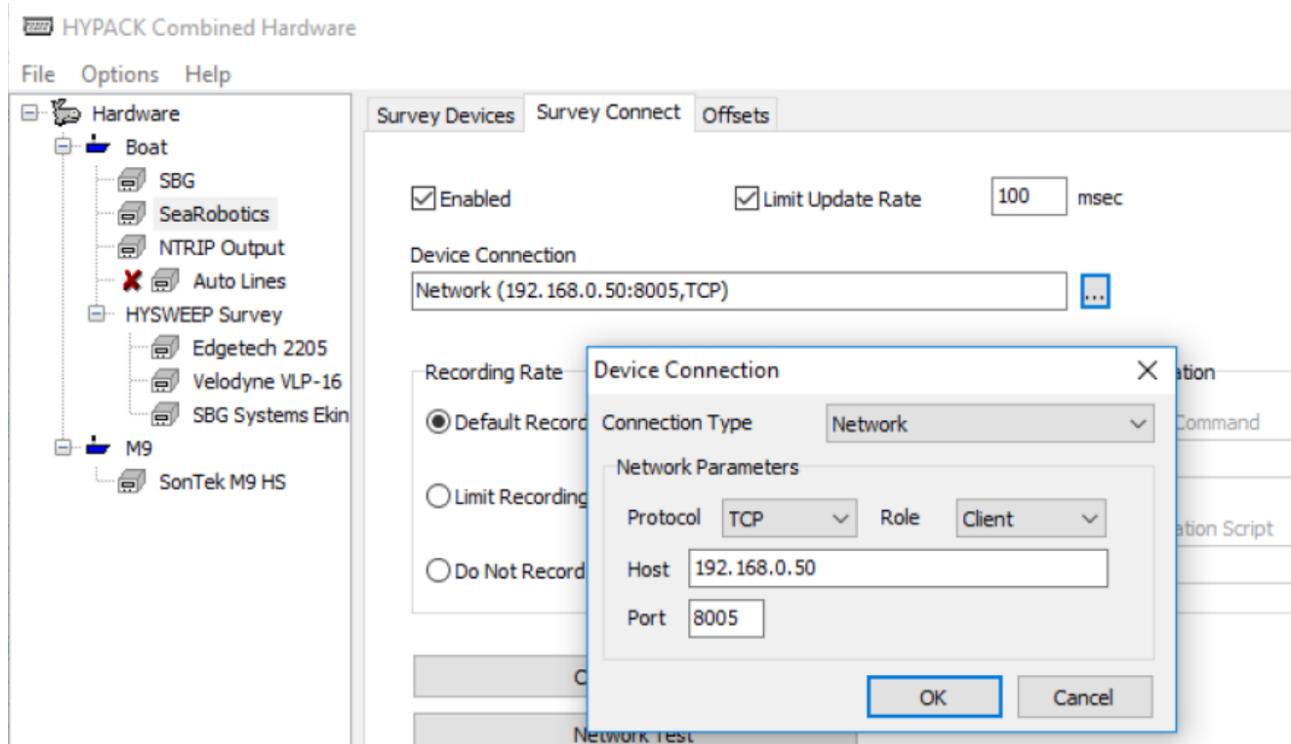
## Offsets



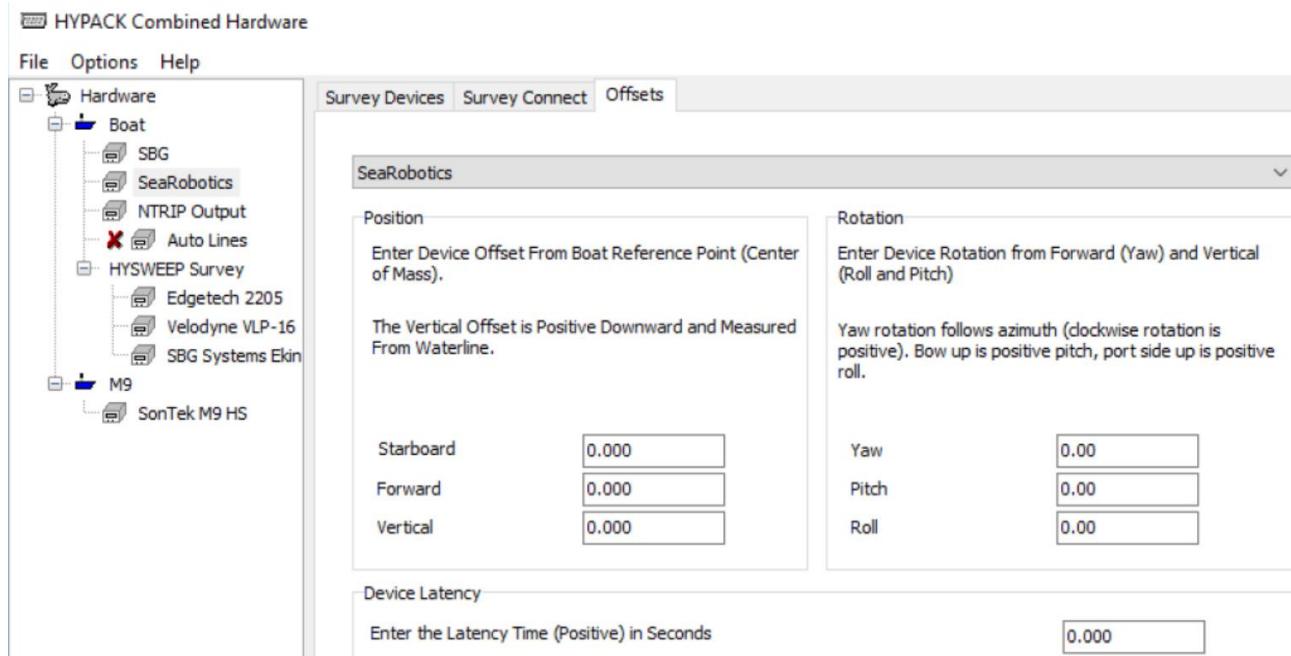
## 5.2 SeaRobotics dll



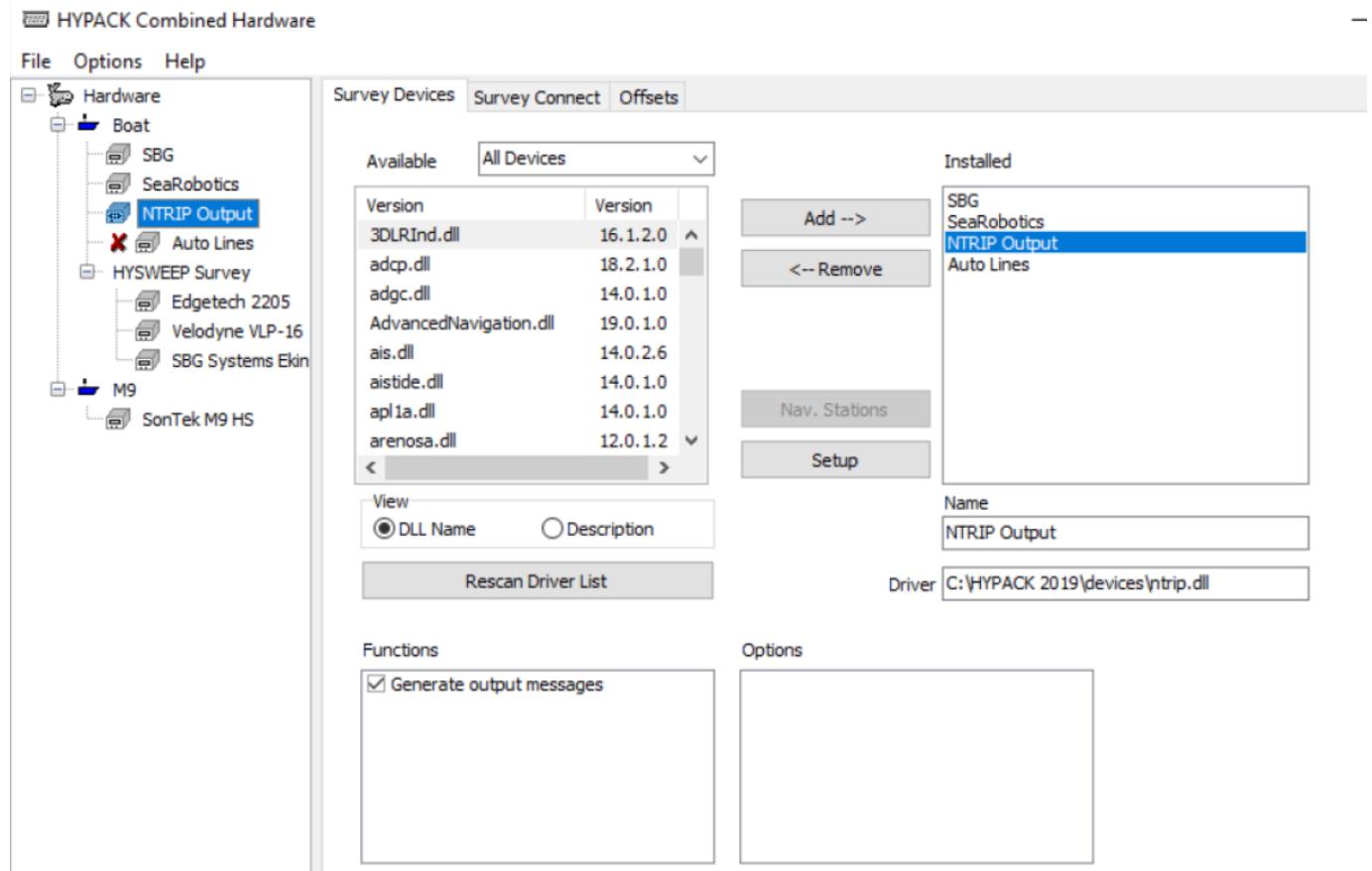
## Survey connect



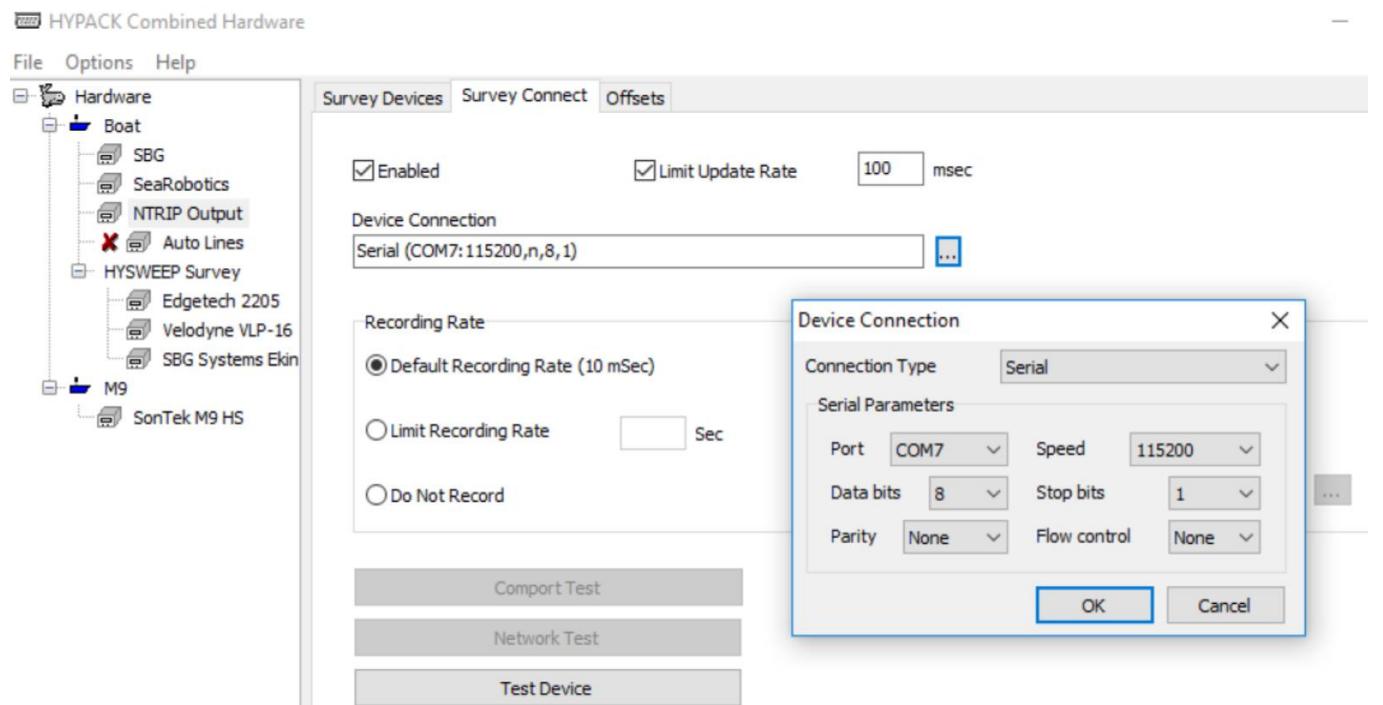
## Offsets



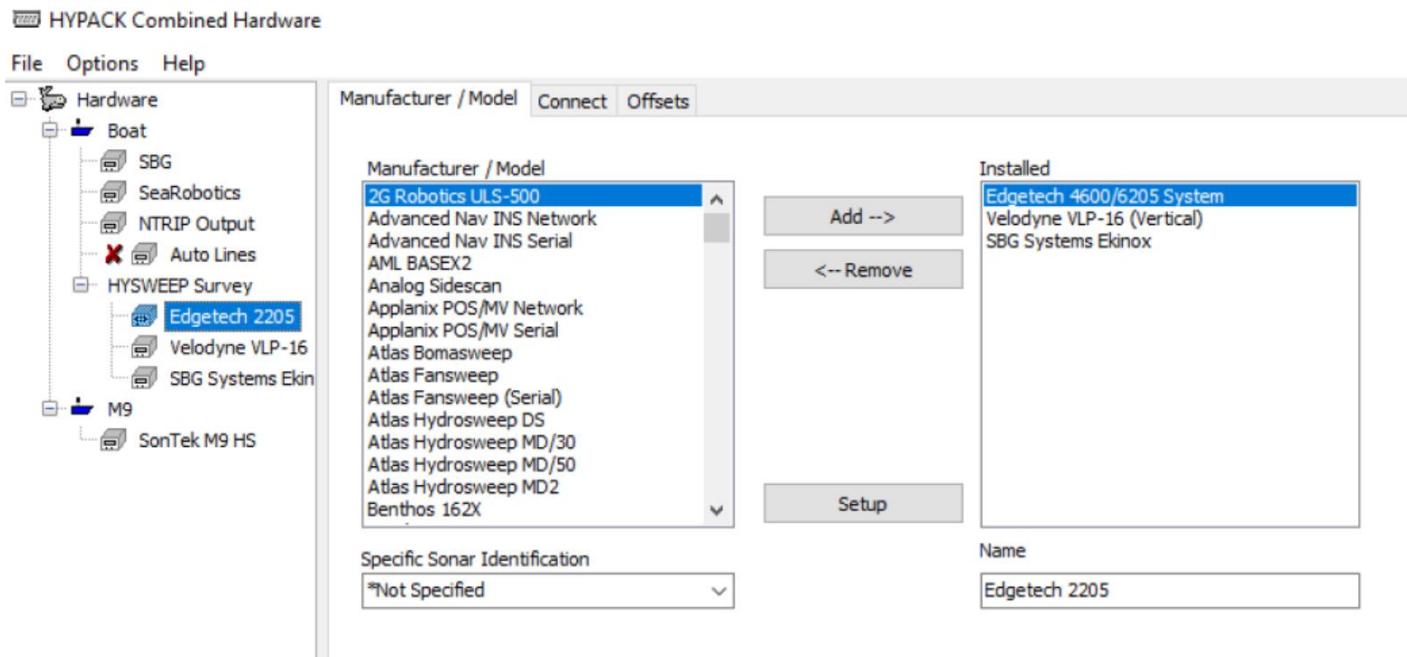
### 5.3 NTRIP



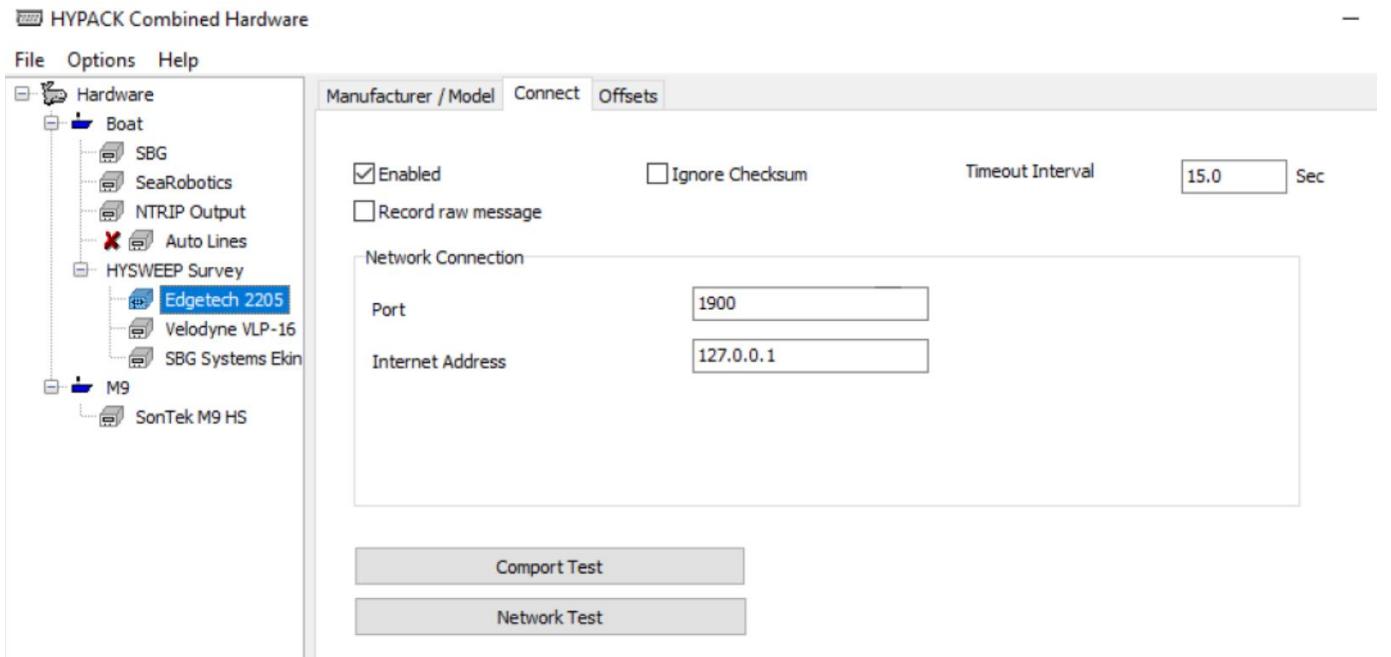
### Survey Connect



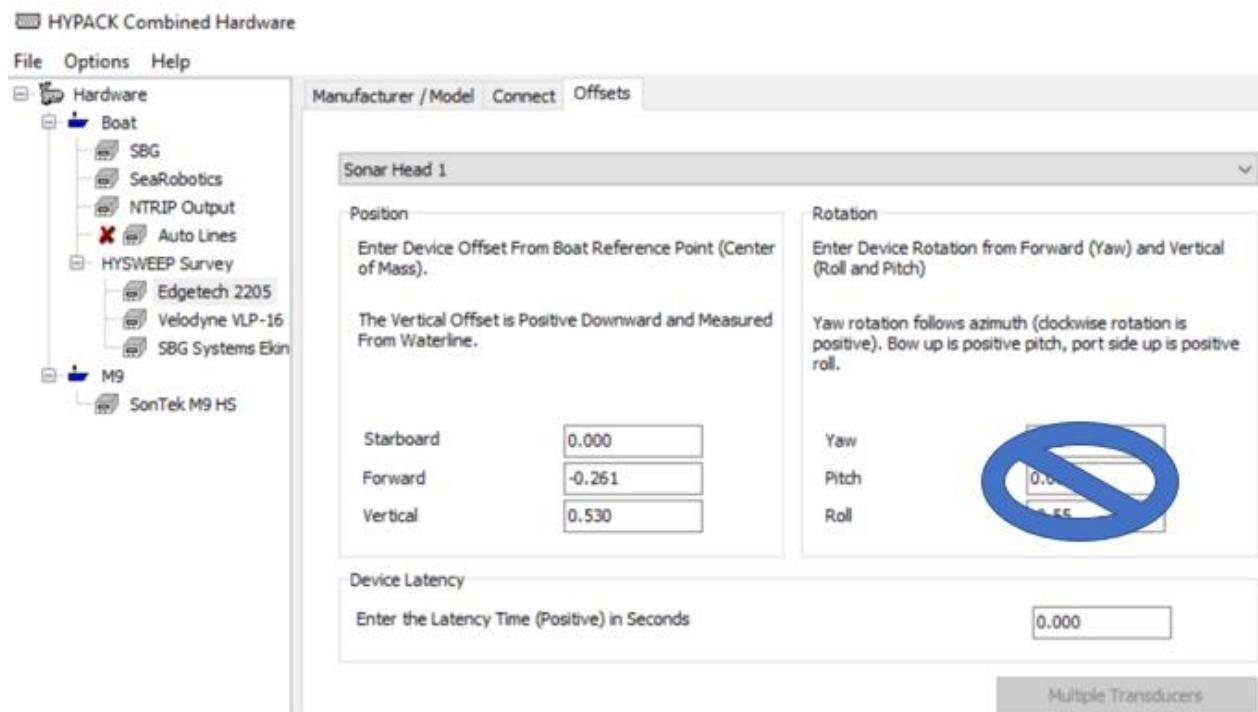
## 5.4 HYSWEEP Edgetech 2205



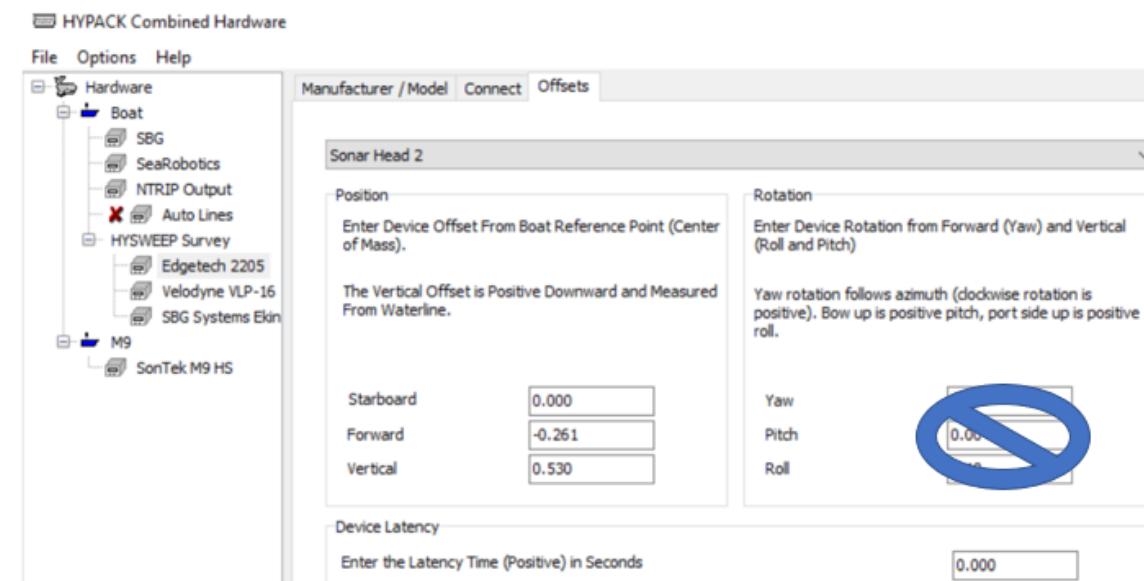
## Survey Connect



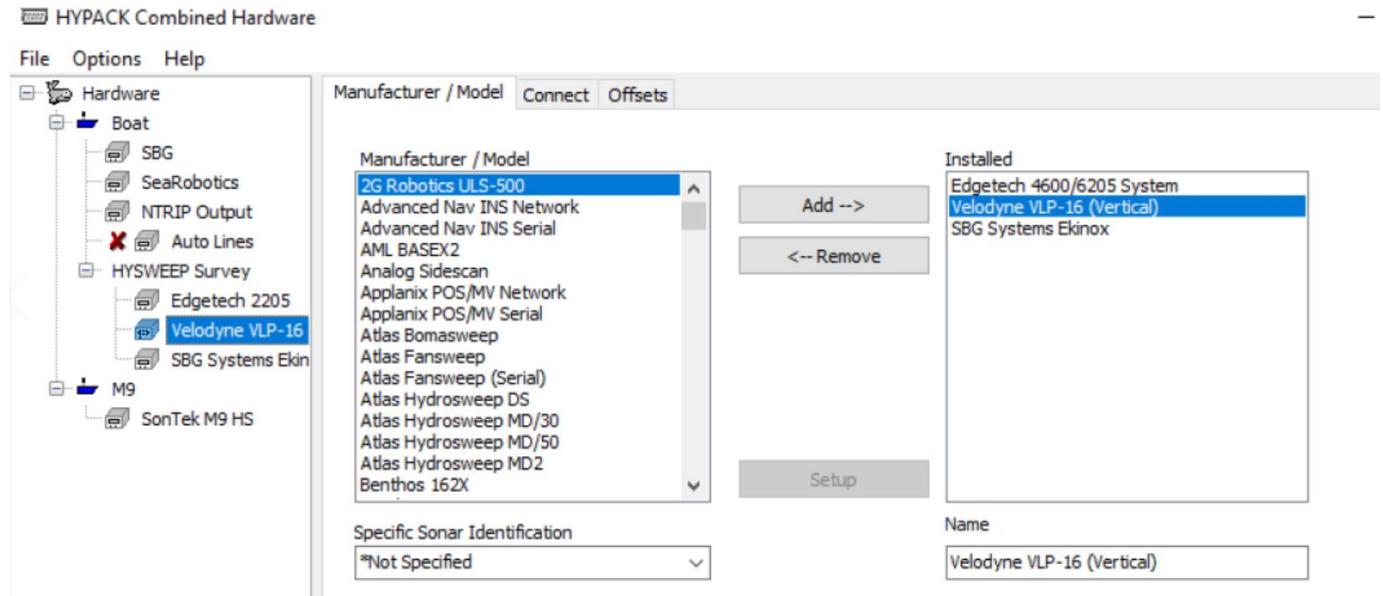
## Offset sonar head 1



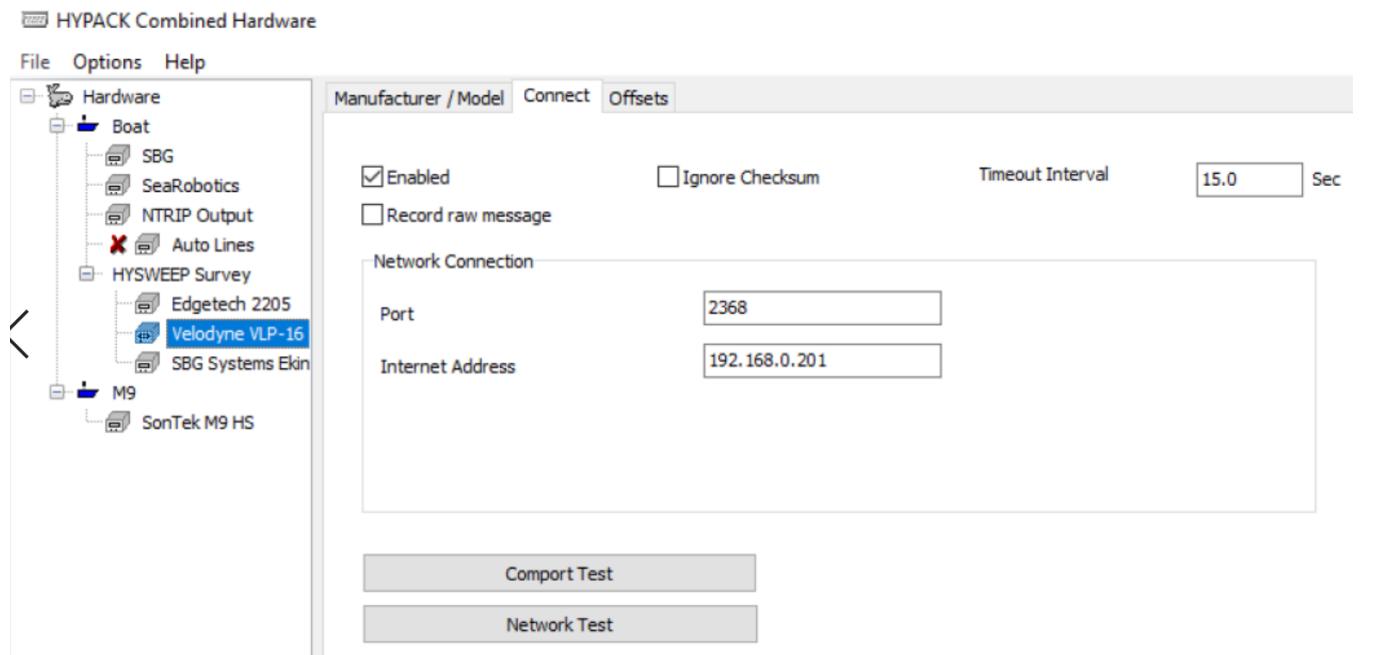
## Offset sonar head 2



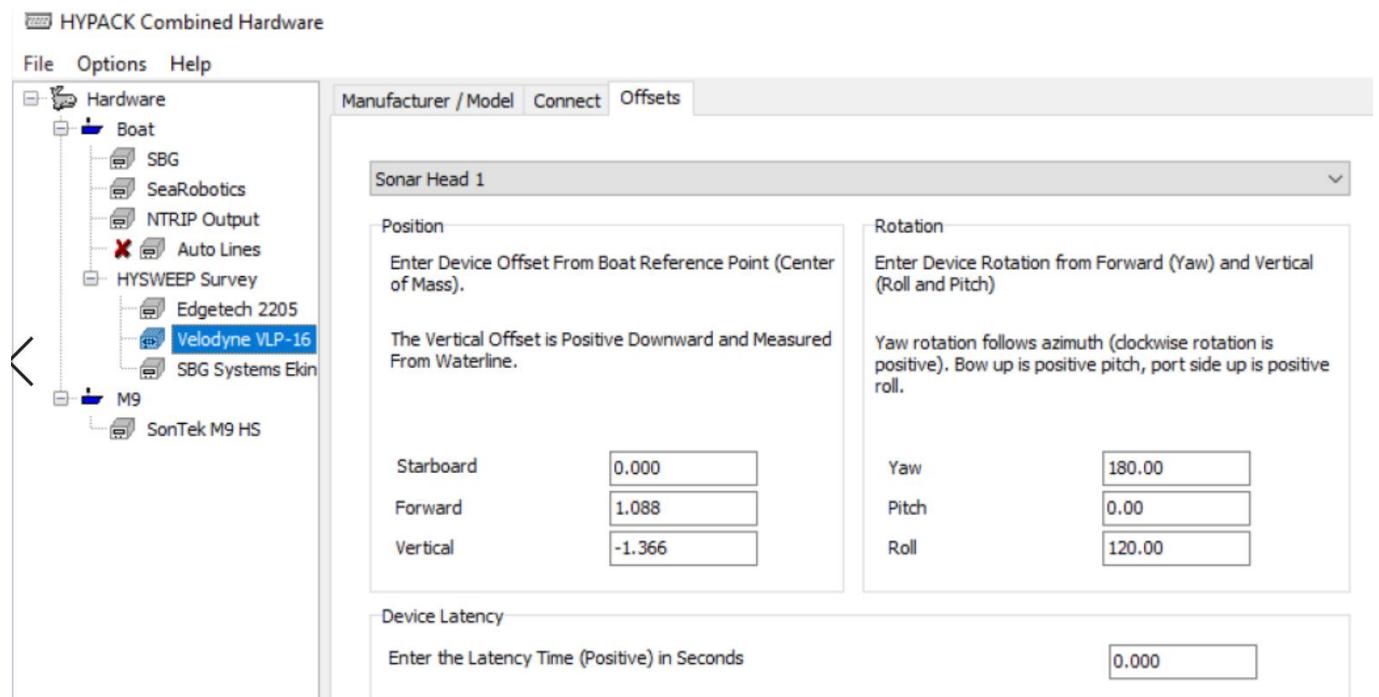
## 5.5 HYSWEEP Velodyne LiDAR



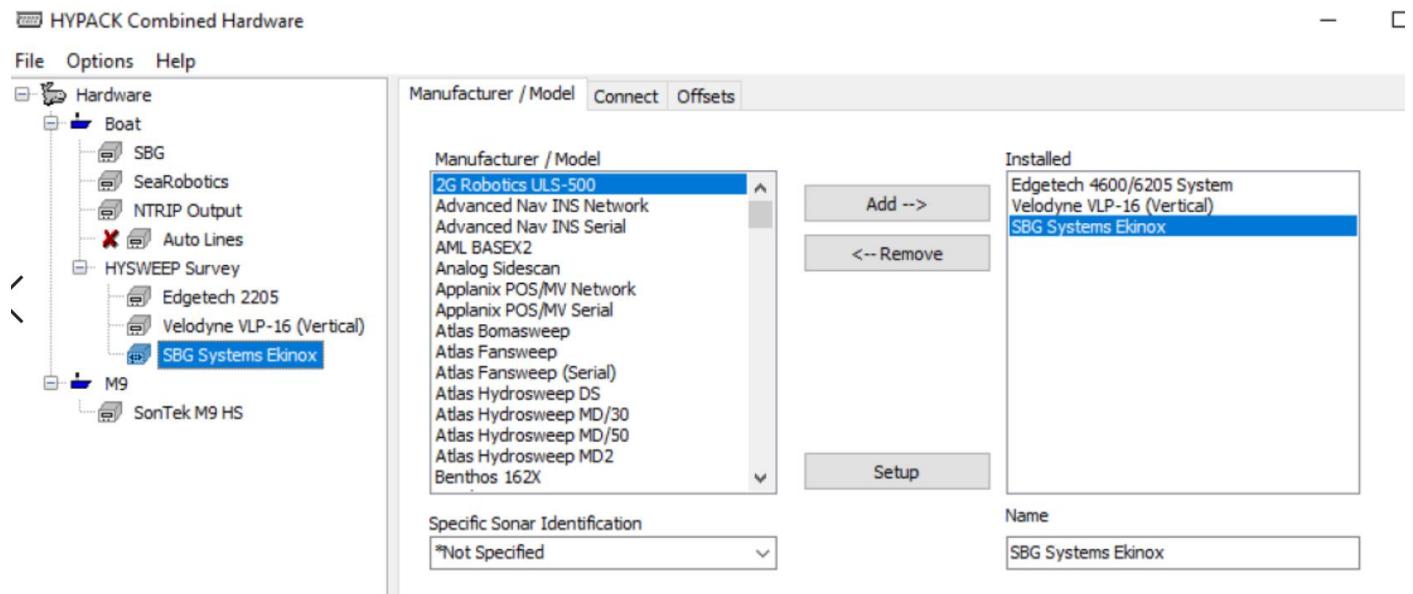
### Survey Connect



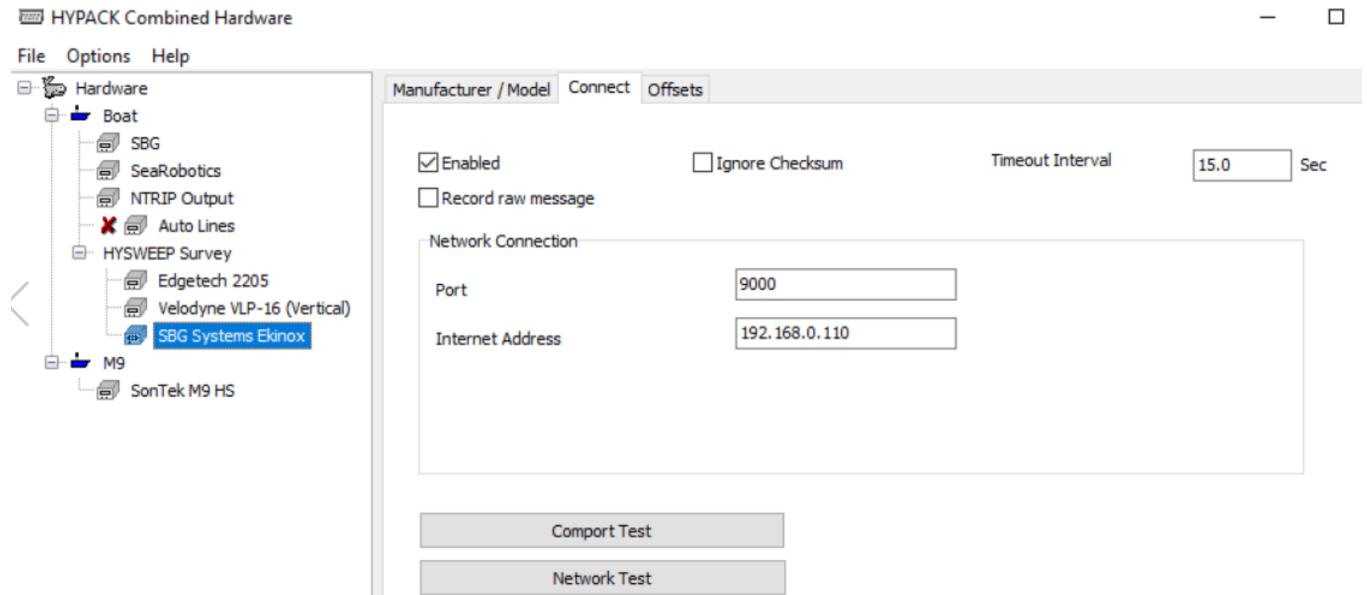
## Offsets



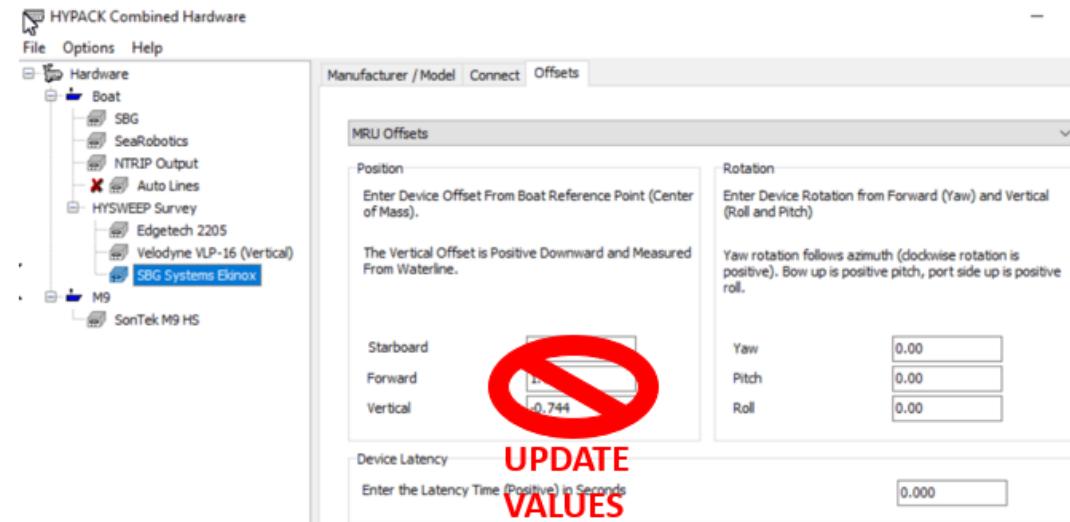
## 5.6 HYSWEEP SBG



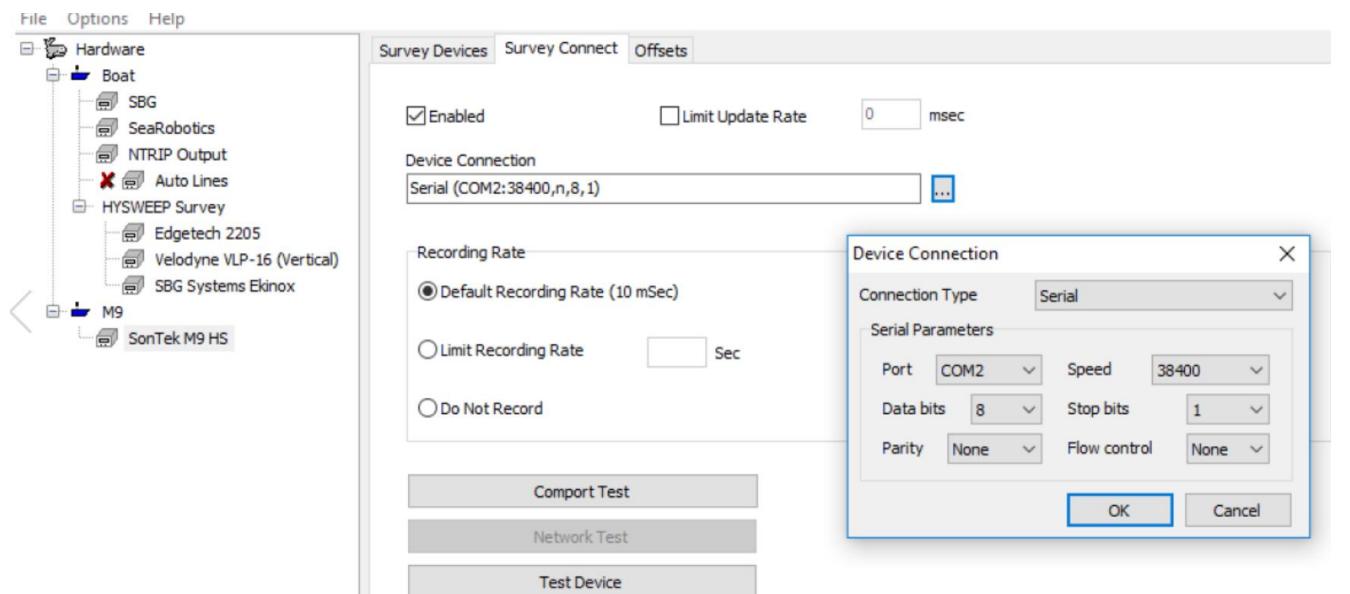
## Survey connect



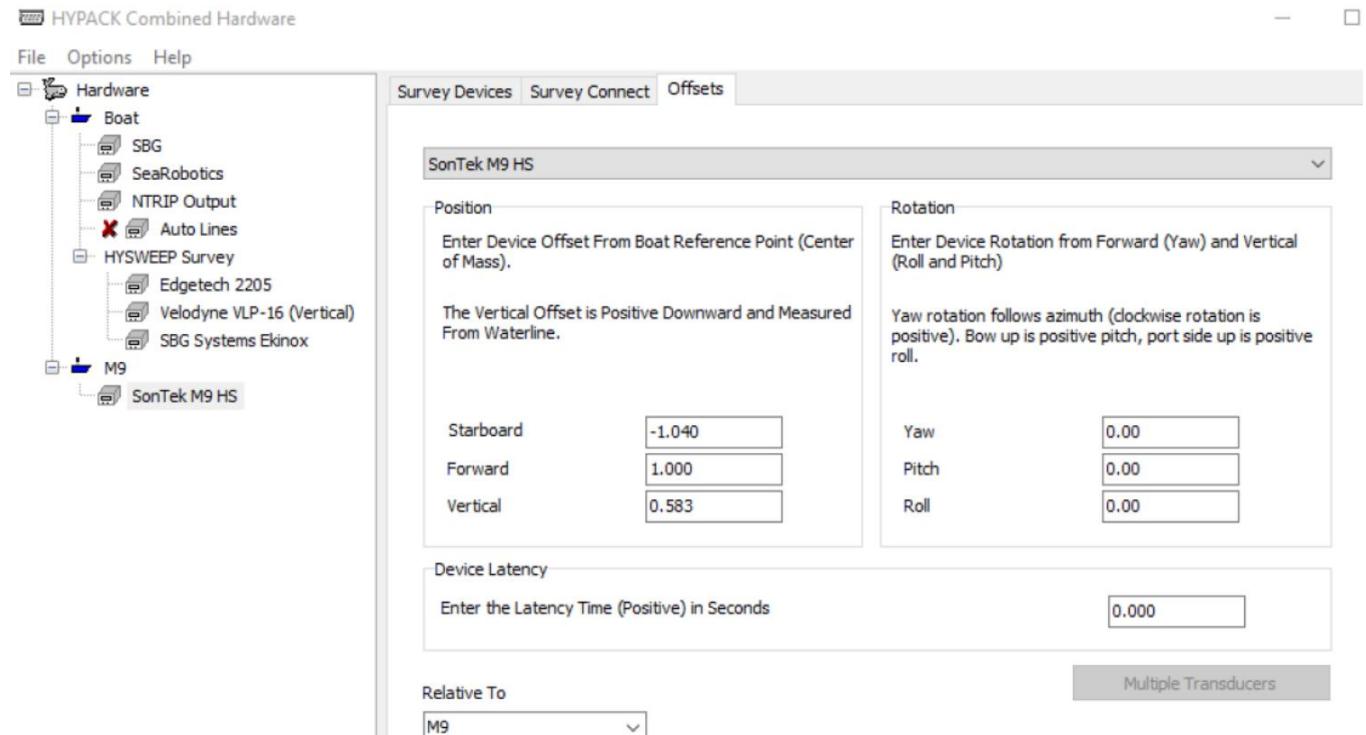
## Offsets



## 5.7 SonTek M9



## Offsets



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