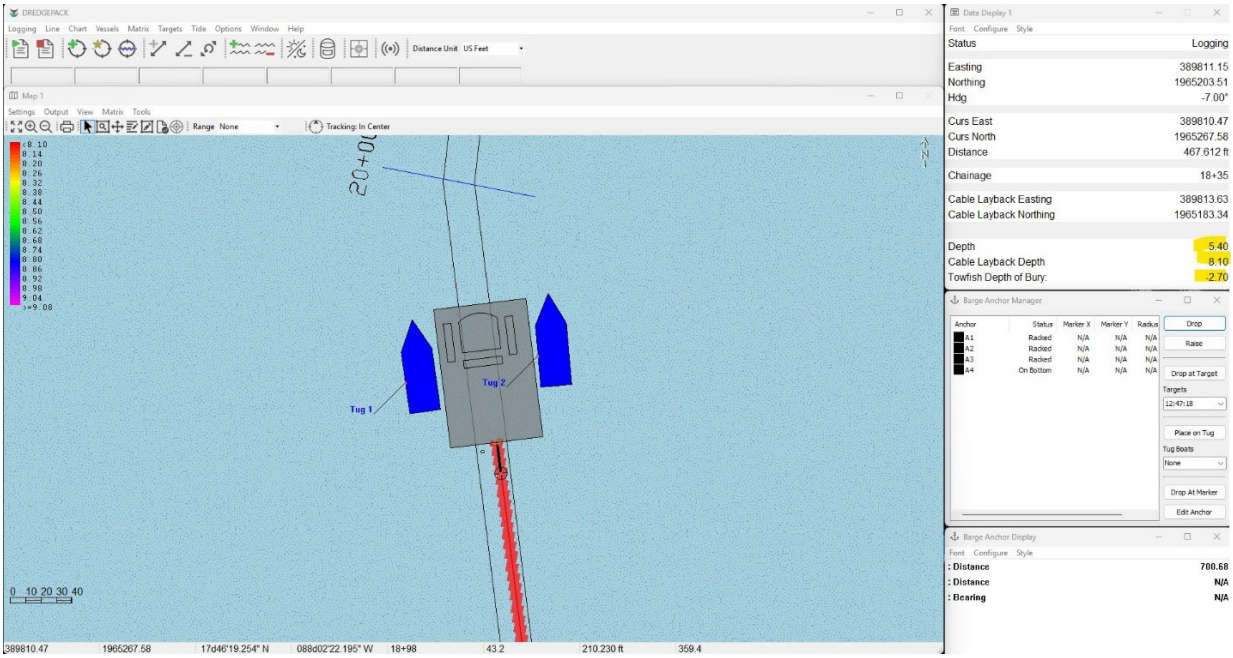
# HYPACK Hardware Setup for Cable Laying

## by Thelen Pumford

Recently, I helped a customer set up HYPACK® for a unique project. They were performing underwater cable laying activities and needed to track the position and depth of the cable beneath the seabed (depth of bury). To perform the work, the company outfitted a barge with a few pieces of standard surveying and dredge equipment. First, they rigged up a trenching tool on the stern of the barge that placed the cable a few feet underneath the seabed. To record the depth of the trenching tool, a standard pressure sensor was mounted on the device that sends ASCII strings to the computer. A single beam transducer was mounted near the trenching tool to measure the seabed elevation before the cable was placed. They also used three tugs to maneuver the barge and place the cable within the corridor boundaries.

As the barge was moved along the corridor, the transducer would measure water depth and the pressure sensor would measure the total depth of the trenching tool, which would be submerged a few feet under the seafloor. A quick modification to the towfish driver allowed us to determine the 'depth of bury' which was just a simple calculation of trench tool depth minus the depth of the matrix cell directly above it. Matrix cells were actively updated using data from the single beam transducer on the barge mobile as it was towed along the project. In the data display window you can see the 'Depth' (from the single beam transducer), the 'Cable Layback Depth' (trenching tool depth), and the 'Towfish Depth of Bury', which is the depth of bury for the cable. Note that for this to work, the towfish driver must have the Fish Depth setting set to 'Depth Sensor'. As a final product, the customer used the single beam editor to extract the X, Y, Z, and Depth of Bury of the cable to send to their client.



## Example Hardware Setup

The final HYPACK® Hardware setup is as follows. The barge and each tug had their own laptop (with DREDGE-PACK®) for navigation and data collection; a GPS position and heading system; and a Wifi bullet for communications. All laptops, GPSs, and Wifi bullets must be on the same IP network for the communications to work properly. The following is an example setup:

| Item | IP Address |
|---|---|
| Barge Laptop | 192.168.1.10 |
| Barge Bullet | 192.168.1.20 |
| Barge GPS | 192.168.1.30 |
| Tug 1 Laptop | 192.168.1.11 |
| Tug 1 Bullet | 192.168.1.21 |
| Tug 1 GPS | 192.168.1.31 |
| etc. for Tug 2 and 3 | |

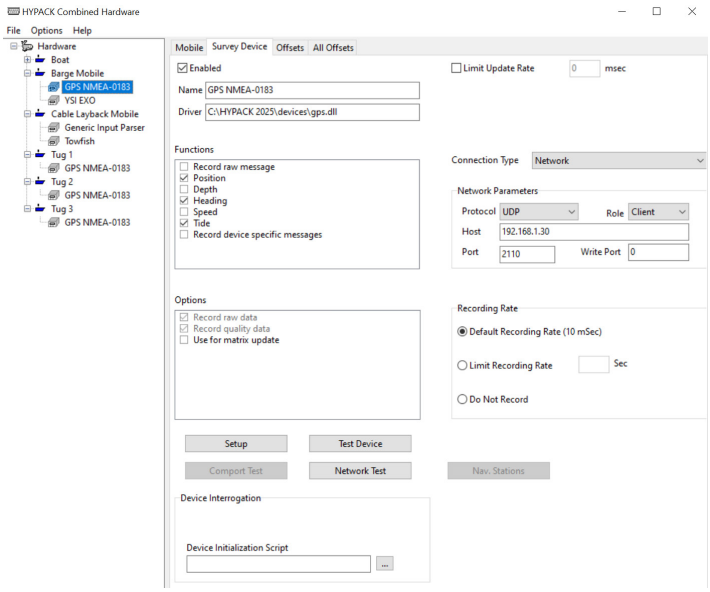
If the network is properly connected, you only need to add the IP address from each vessel's GPS in HYPACK Hardware. There is no need to add the IP addresses of the Wifi bullets anywhere.

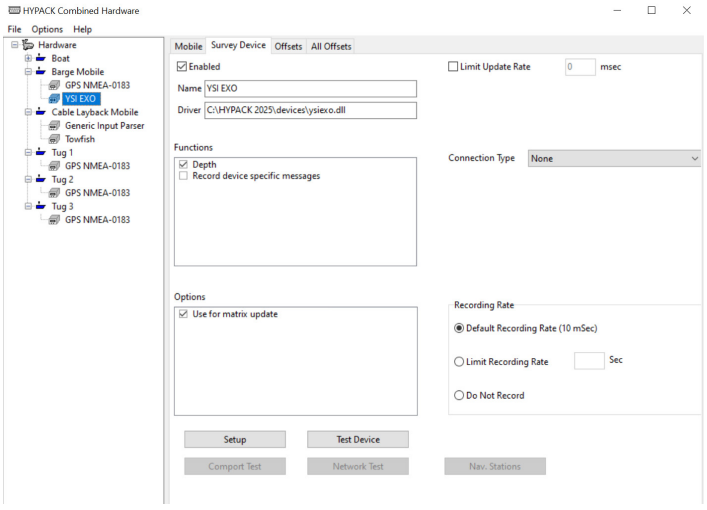
### HYPACK Hardware Settings

**Barge Mobile**
Add drivers for the GPS and the transducer.

- For the **GPS**, in the Survey Device tab, select the following:
  - Check Position, Heading, and Tide
  - Host: 192.168.1.30 UDP
  - Port: 2110

- For the **transducer**:
  - Check Depth and Matrix Update





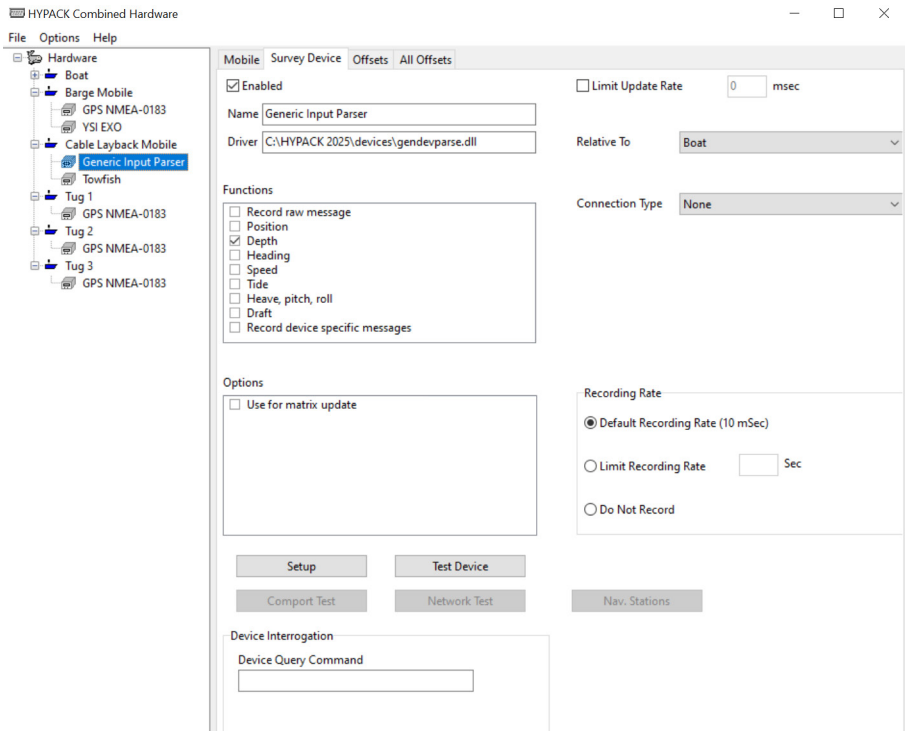


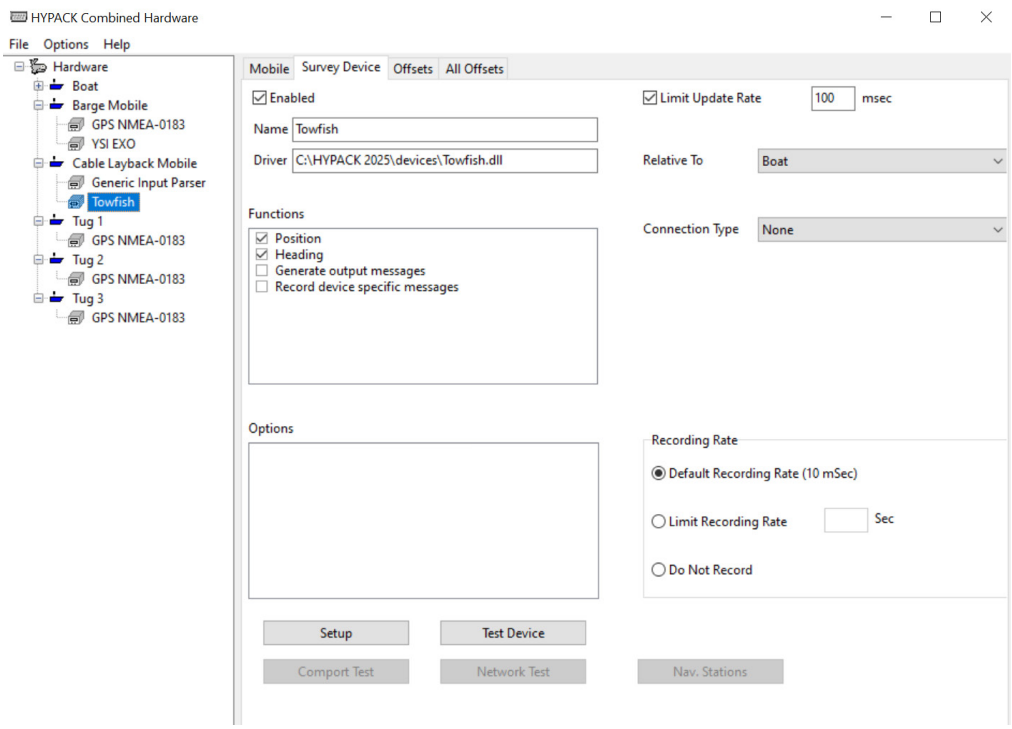

xylem
Let's Solve Water

**Cable Layback Mobile**
Add drivers for the generic input parser and towfish.

- For the **Generic Input Parser** (gendevparse.dll):
  - Check Depth

- For the **towfish**:
  - Check Position, Heading







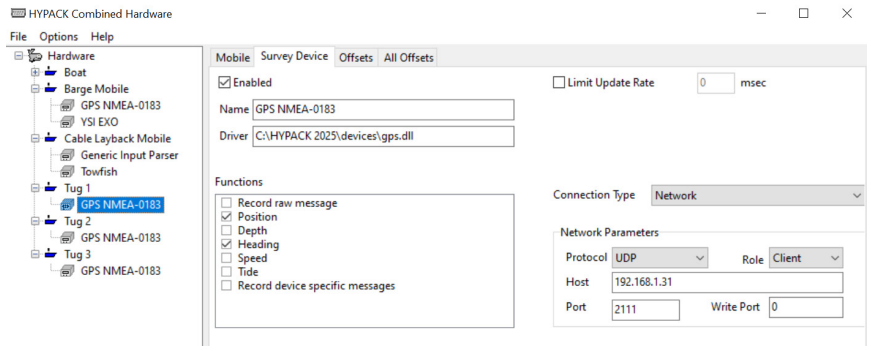

xylem
Let's Solve Water

**Tug Mobiles**

Add a separate mobile for each tug - Tug 1, Tug 2, Tug 3.

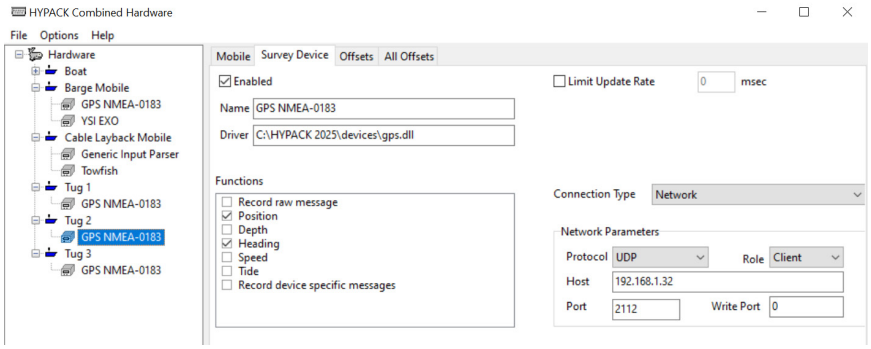
**Tug 1**

- For the **GPS**, in the Survey Device tab, select the following:
  - Check Position and Heading
  - Host: 192.168.1.31
  - UDP Port: 2111



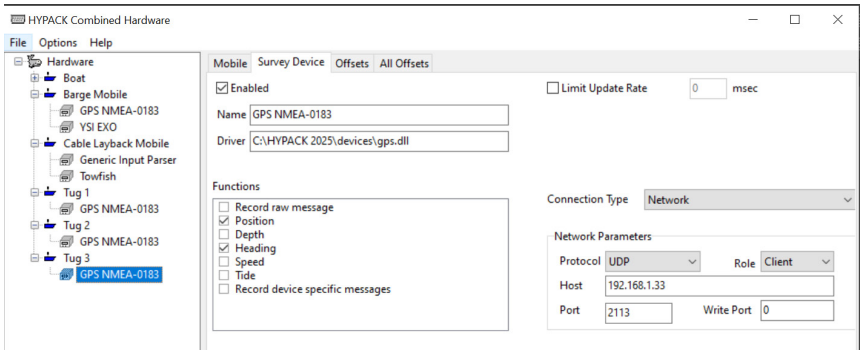

**Tug 2**

- For the **GPS**, in the Survey Device tab, select the following:
  - Check Position and Heading
  - Host: 192.168.1.32
  - UDP Port: 2112




**Tug 3**

- For the **GPS**, in the Survey Device tab, select the following:
  - Check Position and Heading
  - Host: 192.168.1.33
  - UDP Port: 2113








xylem Let's Solve Water