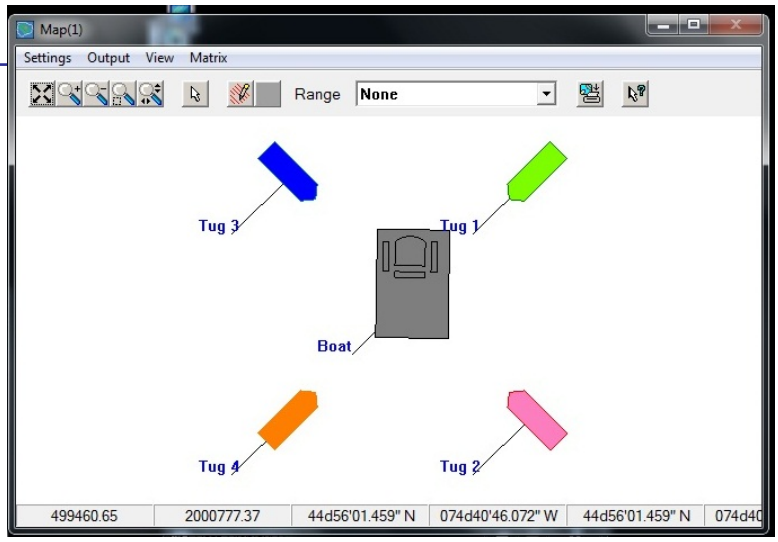
Barge Management in HYPACK

by Pat Sanders

One of the questions that I always hear during my travels is “Why isn’t there a Barge Management option in HYPACK®?” Well, you don’t need any additional module or options to run a Barge Management job in HYPACK®. You just have to know how to configure the HYPACK® HARDWARE program for multiple vessels.

FIGURE 1. *Sample Barge Management Configuration*



Let’s look at an example. In Figure 1, I captured the Area Map window of HYPACK® SURVEY. This example has a main barge (Boat) and four tugs.

We want to set up the HYPACK® HARDWARE program on each vessel so that they can share their position and heading with the other vessels. Also, on each vessel, we want to be able to see the position and heading of the other vessels.

HARDWARE NEEDS:

Each vessel needs a laptop (or desktop) computer with a wireless network connection. On the barge, we’ll put a wireless router with an omni-directional antenna. Off-the-shelf antennas are good for about 200m. Specialty antennas have a range of a couple of miles! Also, each tug and the barge need a GPS system that can provide position and heading. (Heading is an option, but it is certainly nice).

NETWORK SETUP:

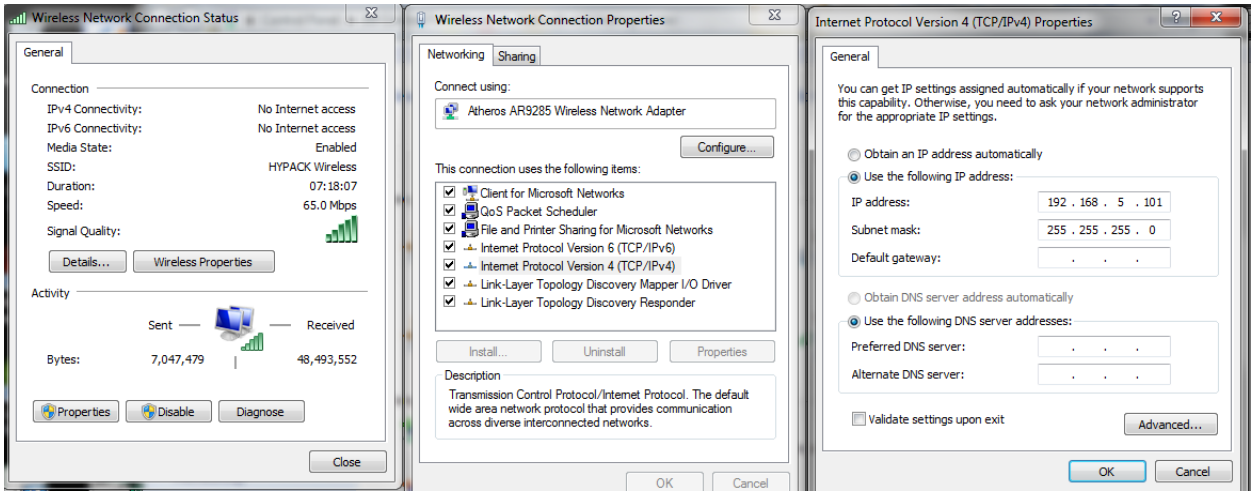
Each notebook computer must be on a static IP address that places them on the same, common sub-net. We’ll also set up each vessel to broadcast its position and heading using the NMEAOUTPUT.DLL. When we set this up, each one will have to be assigned a specific read/write port address.

In our example in Figure 1, we had five vessels. We set a static IP address for each of the computers.

TABLE 1. *Each Mobile has its own IP Address*

Vessel	IP Address	Subnet
Main Barge (Boat):	192.168.5.101	255.255.255.0
Tug 1:	192.168.5.102	255.255.255.0
Tug 2:	192.168.5.103	255.255.255.0
Tug 3:	192.168.5.104	255.255.255.0
Tug4:	192.168.5.105	255.255.255.0

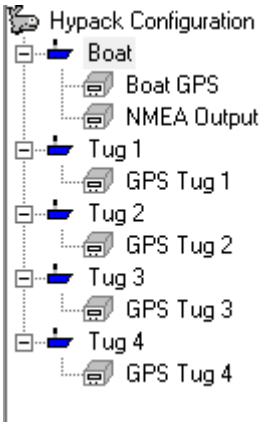
FIGURE 2. *Wireless Connection Settings*



To set a static IP address,

1. **Open the Network and Sharing Center and click on your Wireless Network Connection**. The window shown at the left of Figure 2 will appear.
2. **Click [Properties]** and the window in the center of Figure 2 will appear.
3. **Select the Internet Protocol Version 4 item then click [Properties]**, and the TCP/IPv4 Properties window on the far right of Figure 2 will appear.
4. **Select the 'Use the following IP Address' option and enter the appropriate IP address and Subnet address**.

On each vessel, we will go into HYPACK® HARDWARE and create five vessels. It's best if you keep the names of the vessels the same in each configuration. Each mobile will use the GPS.DLL to obtain the position and heading.



The graphic (right) shows the configuration on the Barge (Boat). It will obtain a position using the GPS driver (Boat GPS). We'll then configure the NMEAOUTPUT.DLL to output the vessel position at a 1Hz rate. You can probably update it faster, but there was no need in this example.

We're going to position each of the Tugs using the GPS.DLL. Each one will be configured to read the NMEA position ($GPGGA) and heading ($GPHDT) information that is being broadcast over the wireless connection.

The HARDWARE configuration for Tug 1 is shown in Figure 3. It would be similar for each of the other tugs. Each one will use the GPS.DLL to obtain position information and will broadcast it over the network using the NMEAOUT.DLL.

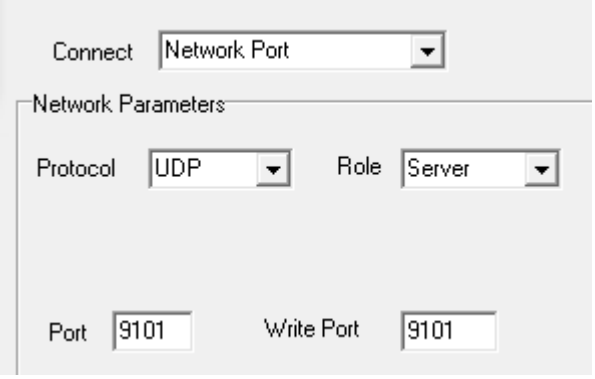
CONFIGURING THE NMEAOUTPUT.DLL

We set up a table so that each vessel would broadcast on a separate read/write port.

TABLE 2. *NMEAOUTPUT Driver Connection Settings*

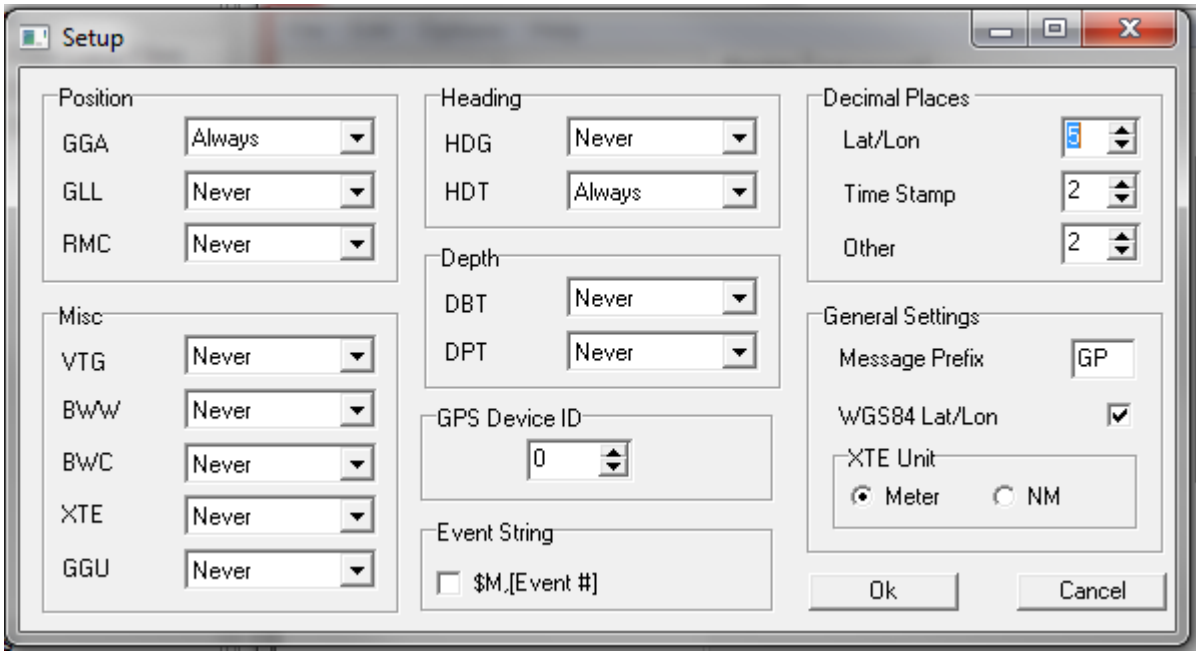
	Type	Client/Server	Read/Write Port
Barge (Boat)	UDP	Server	9101
Tug2	UDP	Server	9102
Tug3	UDP	Server	9103
Tug4	UDP	Server	9104
Tug5	UDP	Server	9105

FIGURE 3. *Connection Settings for the Barge (Boat) Mobile*



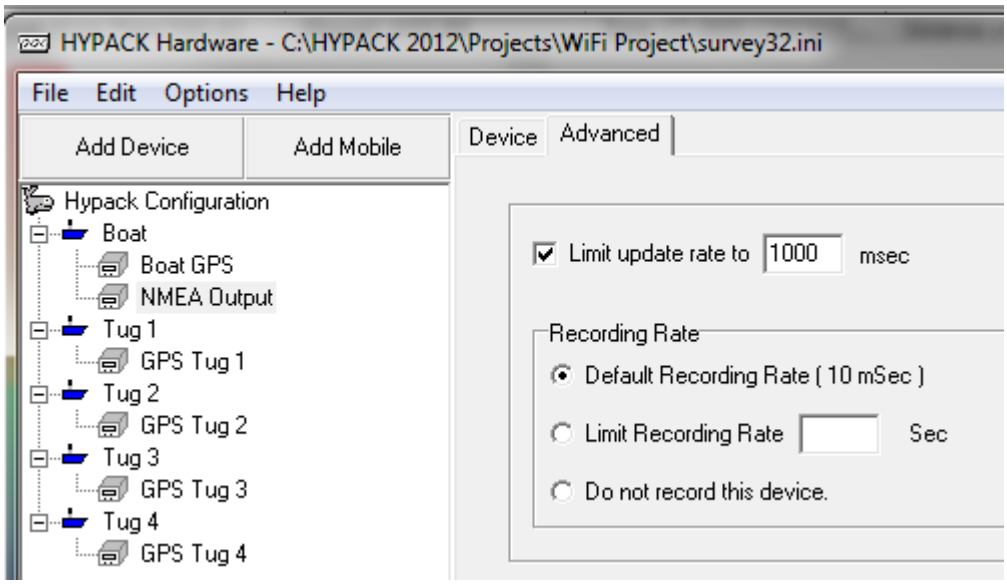
On each vessel, we configured the NMEAOUTPUT.DLL to output the GGA (position) and HDT (heading) messages. The configuration from the Setup window is shown in Figure 4:

FIGURE 4. NMEAOUTPUT Driver Setup



Finally, on each vessel, we told the NMEAOUTPUT.DLL to output at a 1Hz rate. We selected OPTIONS – MODE – ADVANCED in the menu then, in the Advanced tab we set the update rate, as shown Figure 5:

FIGURE 5. Setting the Update Rate to 1Hz

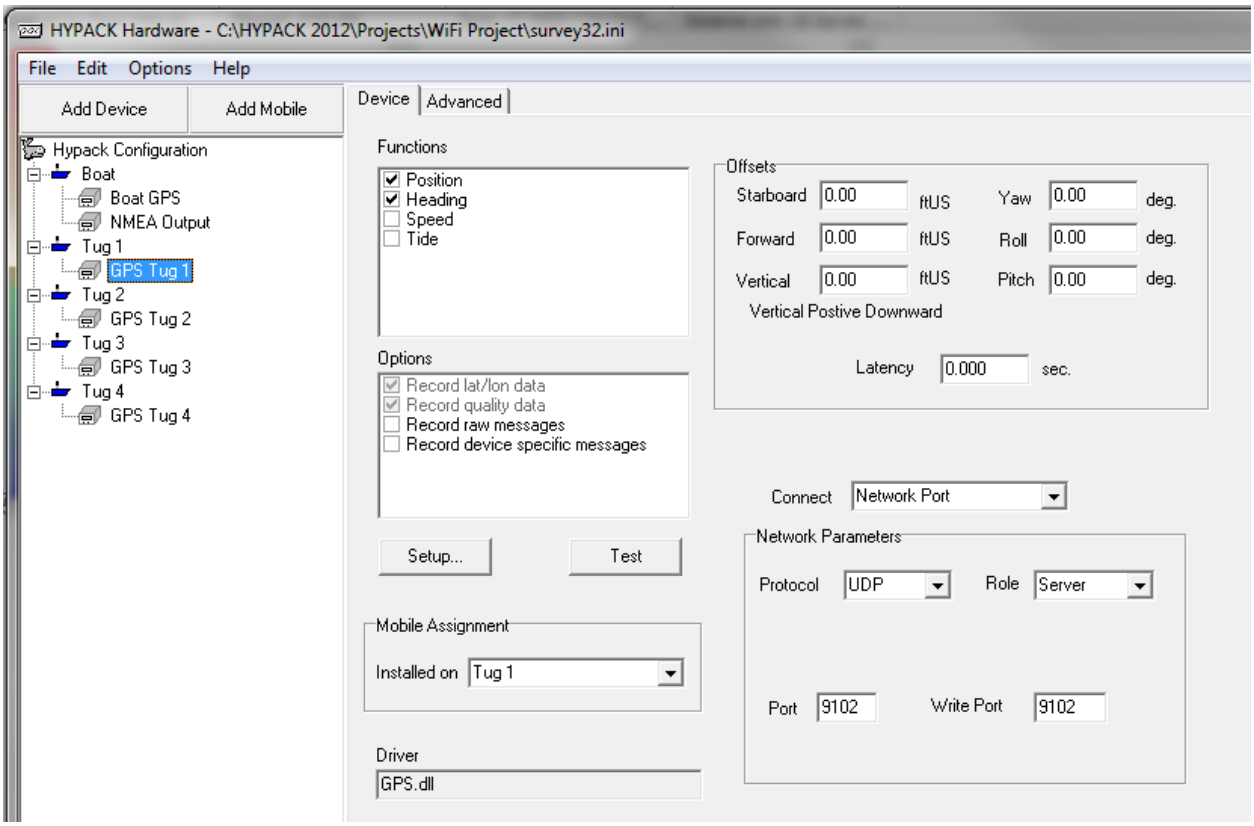


CONFIGURING THE GPS.DLL FOR EACH MOBILE

We created a mobile for each vessel and configured the GPS.DLL driver to read a specific port for each vessel. For example, for Tug 1, it was broadcasting its position and heading

data across Port 9102. The configuration in HYPACK® HARDWARE is shown in Figure 6:

FIGURE 6. *Configuration to Read Position for Each Mobile*

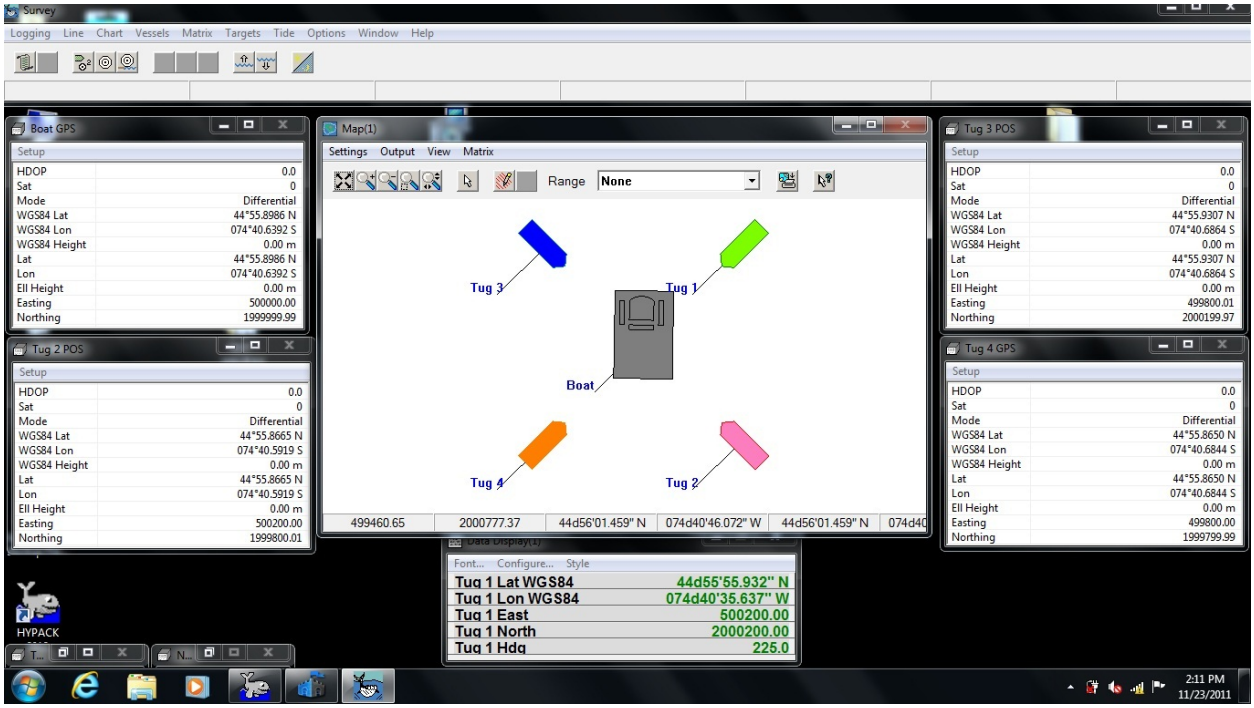


The configuration for the other tugs is similar. The only thing that will change is the Port (read) and Write Port.

HYPACK® SURVEY

You should now be able to start HYPACK® SURVEY on each vessel. As they come on-line, they will broadcast their position across the wireless network and will be shown on each computer.

FIGURE 7. *Viewing All Mobiles in HYPACK® SURVEY*



In Figure 7, we used the Vessel window in HYPACK® SURVEY to assign a different color fill and track line for each vessel. We also turned on the “Label Vessel” option for each vessel so that we could keep track of them. You can assign any vessel Boat Shape to each of the vessels.

CHANGES FOR HYPACK 2012

We are implementing a couple of changes to improve the available information in HYPACK® 2012. This will include:

- Placing a big red ‘X’ over a vessel if it hasn’t reported in a certain amount of time.
- Being able to share Targets using the NMEAOUT.DLL. If the captain on the barge marks a target on his screen, it will be broadcast and displayed on all of the vessels. The same is true if the captain on one of the tugs marks a target.