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Advanced Navigation Drivers for HYPACK and HYSWEEP®

By Mike Kalmbach

HYPACK® 2019 includes drivers for Advanced Navigation inertial devices:

https://www.advancednavigation.com

The drivers provide position, dual antenna heading, roll, pitch and heave. Testing was done on the Spatial Dual INS, but the drivers will support a range of Advanced Navigation devices:

- Spatial and Spatial Dual
- Spatial FOG and Spatial FOG Dual
- GNSS Compass
- Motus

Both the HYPACK® and HYSWEEP® drivers are needed when collecting multibeam or LIDAR data; otherwise, (e.g. single beam) the HYPACK® driver is sufficient. Setup is slightly different in the HYPACK®/HYSWEEP® configuration. See the UDP Output option, Figure 5 and Figure 9.

SETUP OUTSIDE HYPACK

Figure 1 shows the Spatial Dual Manager program from Advanced Navigation. This is where output baud rates, auxiliary I/O, corrections, filters, packet selection, etc. are entered.

FIGURE 1. *Low level device setup is done using the Advanced Navigation program.*

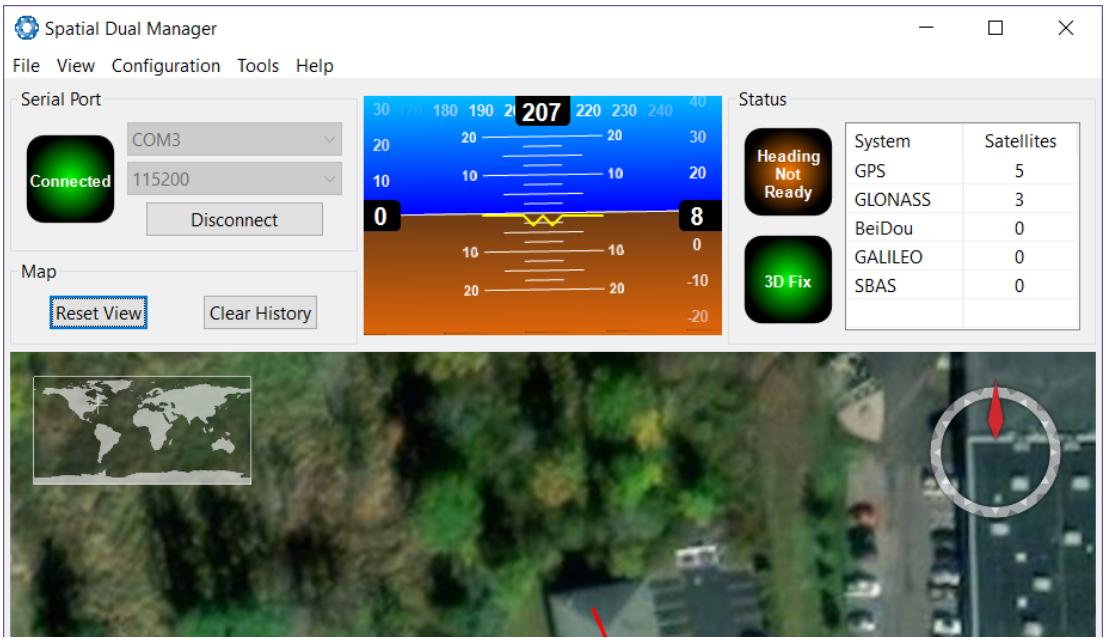
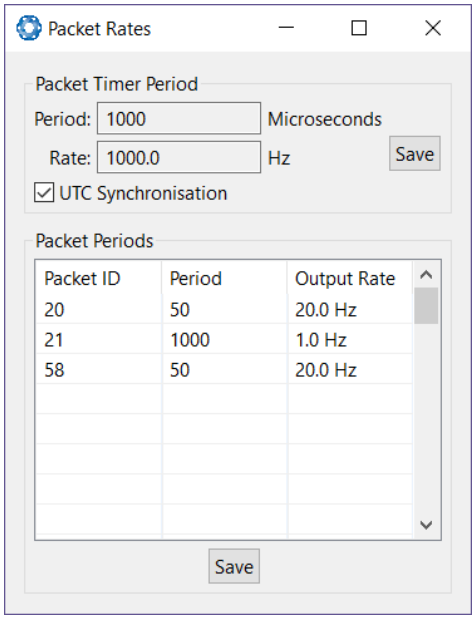


Figure 2 shows the selection of data packets sent from the Spatial Dual to HYPACK®. Use Configuration menu, Packet Rates:

- Packet 20 provides position and orientation,
- Packet 58 provides heave
- Packet 21 provides time synchronization.

No other packets are required by HYPACK®. We've tested this group to 25 Hz at 115200 baud with no problem. If you want to go beyond 25 Hz, you'll likely need to increase the baud rate. 20 Hz is typically sufficient.

FIGURE 2. *Selection of Data Packets and Rates Required by HYPACK®.*

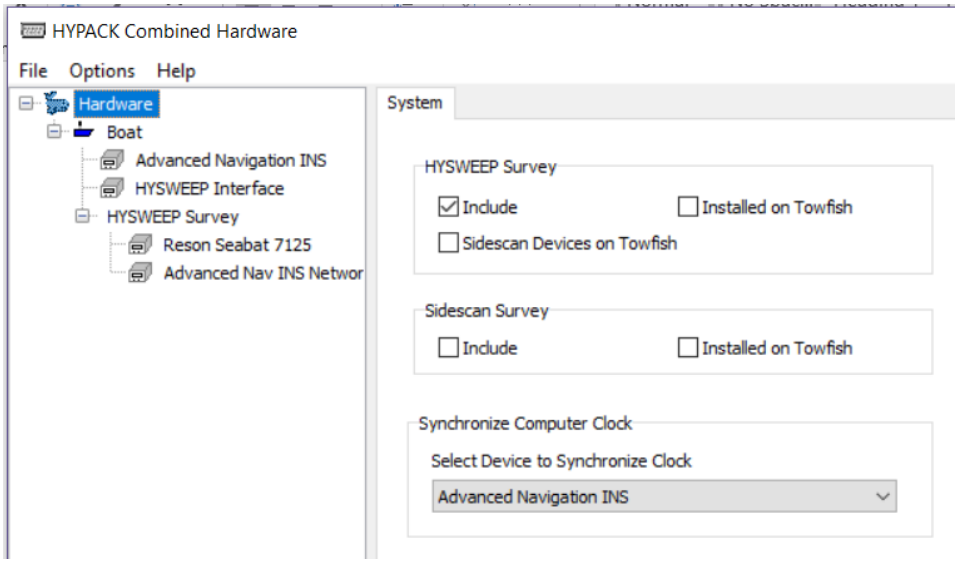


IMPORTANT: Make sure to close the Advanced Navigation program when you're done. If left open, the HYPACK® driver will not be able to connect.

HYPACK® HARDWARE SETUP FOR MULTIBEAM AND LIDAR

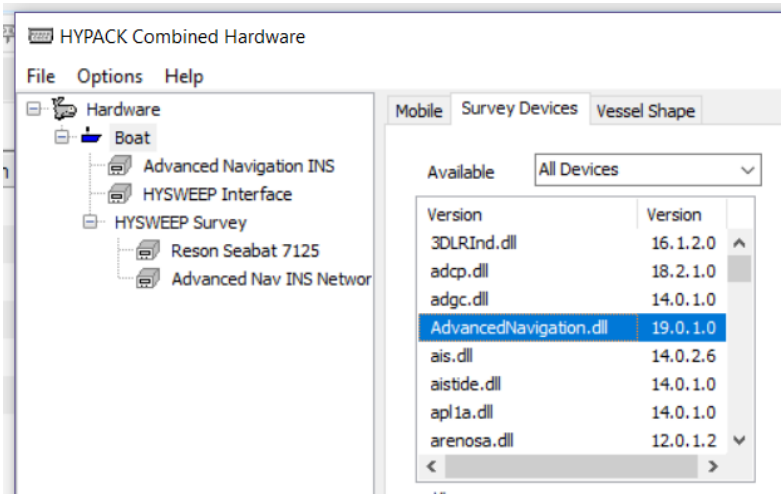
Setup for HYSWEEP® SURVEY in the usual way (Figure 3). Note the computer clock is synchronized to the Advanced Navigation driver.

FIGURE 3. Initial Hardware Setting for HYPACK®/HYSWEEP® Configuration.



AdvancedNavigation.dll is added as the HYPACK® Survey driver (Figure 4). The driver list would show "Advanced Navigation INS" if sorted by description.

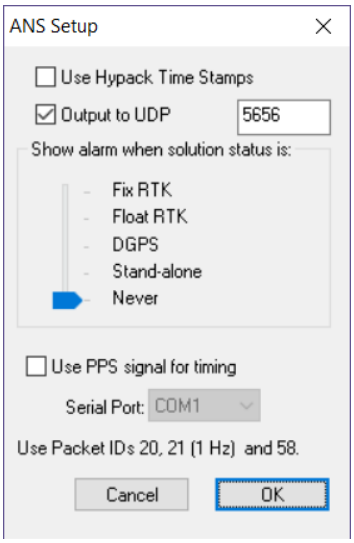
FIGURE 4. Driver selection for HYPACK® Survey.



Two things about HYPACK® driver setup (Figure 5):

- **First, we don't use HYPACK® (computer clock) time stamps with INS systems for multibeam or LIDAR**. Timing of roll, pitch and heading is too critical for anything other than device time tags.
- **Second, UPD output is checked using the default port of 5656.** This is how the data gets into HYSWEEP® SURVEY.

FIGURE 5. *HYPACK® Driver Specific Setup. Don't use HYPACK® time tags and output to UDP port 5656 for loopback to the HYSWEEP® driver.*



The default baud rate of 115200 is shown in Survey Connect (Figure 6). The COM port is auto-selected by Windows and may or may not be COM3. The Comport Test button will show the available ports.

FIGURE 6. *HYPACK® Driver, Typical COM Port Settings.*

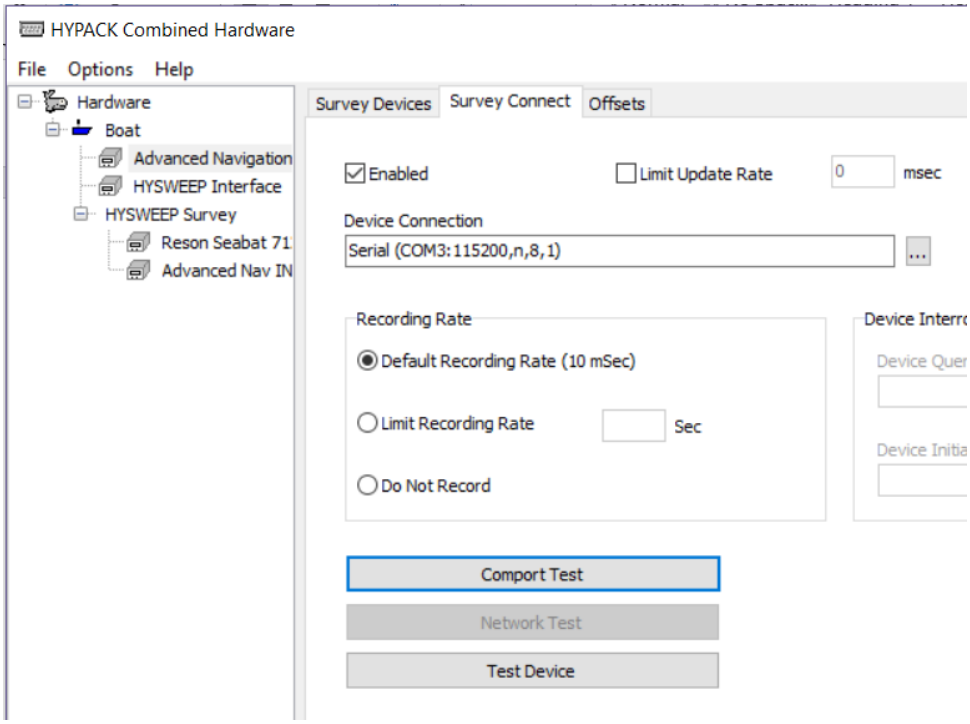
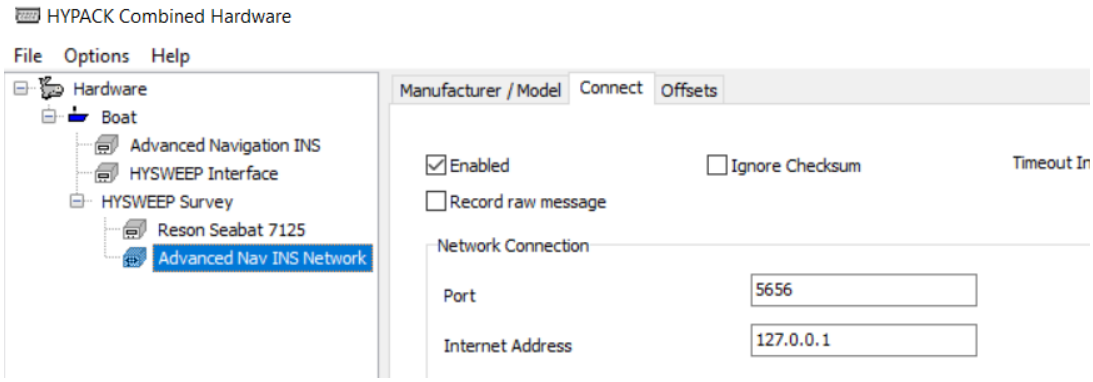


Figure 7 shows the network connection for the HYSWEEP® driver. There are two drivers in HYSWEEP® (serial and network), always use the network driver in HYPACK®/HYSWEEP® configurations.

FIGURE 7. HYSWEEP® Driver Network Settings.



Finally, offsets measured from the HYPACK® reference point to the INS reference point are entered under the Offsets tab. Offsets are entered for both the HYPACK® and HYSWEEP® drivers.

HYPACK HARDWARE SETUP WITHOUT MULTIBEAM OR LIDAR

In this case, HYSWEEP® is not included (Figure 8). Add the Advanced Navigation driver, select the COM port and enter offsets as with the HYPACK®/HYSWEEP® setup above. What's different is shown in figure 9, which is the device specific setup. HYPACK® time tags are fine for non-directional devices like single beam, magnetometer, etc. Also, there is no need for UDP Output when HYSWEEP® survey is not run.

FIGURE 8. Typical Selections for HYPACK® Only Configuration.

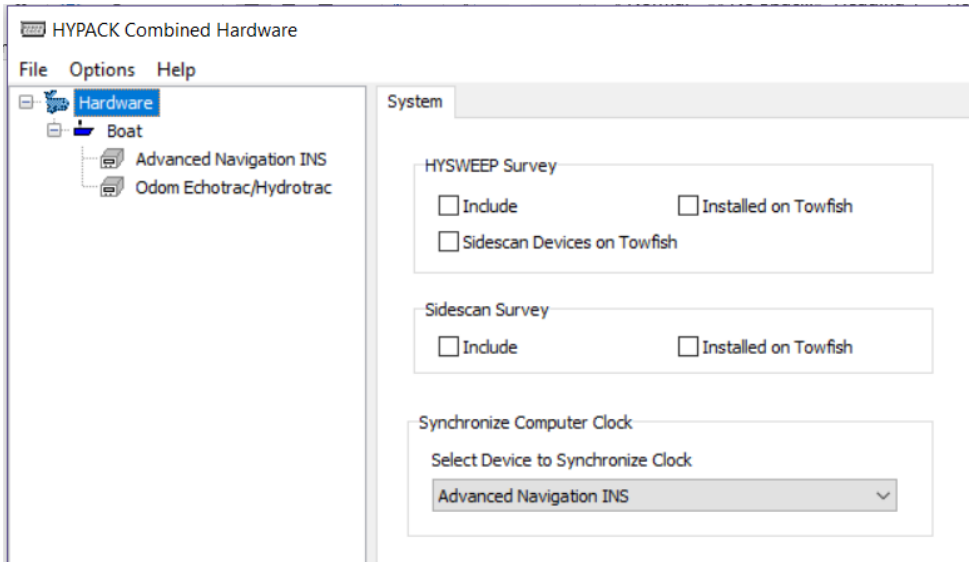
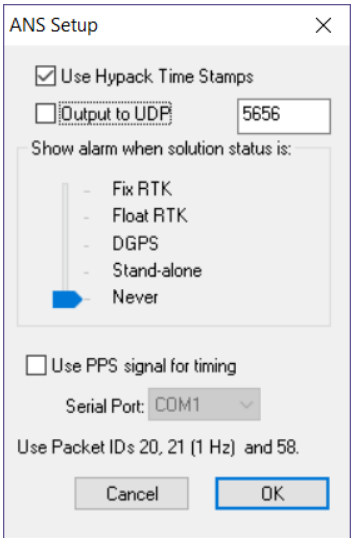


FIGURE 9. HYPACK® time tags are fine for single beam and UPD Output is not required.



ADVANCED NAVIGATION WINDOW IN HYPACK SURVEY

Figure 10 summarizes the data read from the device. This window is useful for trouble shooting and to verify the device is sending good data. Initialization is particularly useful as a red / green indicator. While red the device is running through its initialization sequence. Might take a while, particularly for dual antenna heading. Don't start surveying until it turns green.

FIGURE 10. Device Window in Survey. Make sure initialization is complete before surveying!