Multibeam Simulation/Playback and New AutoMatrix in Survey Programs

By Joe Burnett

In the HYPACK® 2014 release, one of the new features is the ability to run a full simulation of multibeam data, when you have the HYPACK® and HYSWEEP® SURVEY programs running. This is very similar to our simulation in the single beam Halifax project. It will be a great tool for training employees who are not familiar with collecting multibeam data in the HYPACK® and HYSWEEP® SURVEY programs and want to be able to 'practice' with these programs prior to going out in the field. It will give them familiarity with the SURVEY windows and how to manipulate, size, and place them on the monitors. You can even create and paint a matrix or use the new Auto-matrix feature in the SURVEY program. This allows you to gain confidence and experience before going out on the water, without having to use costly boat time. I will go one step further and say that there is nothing that can totally replace your time on the water.

SIMULATION HARDWARE SETUP

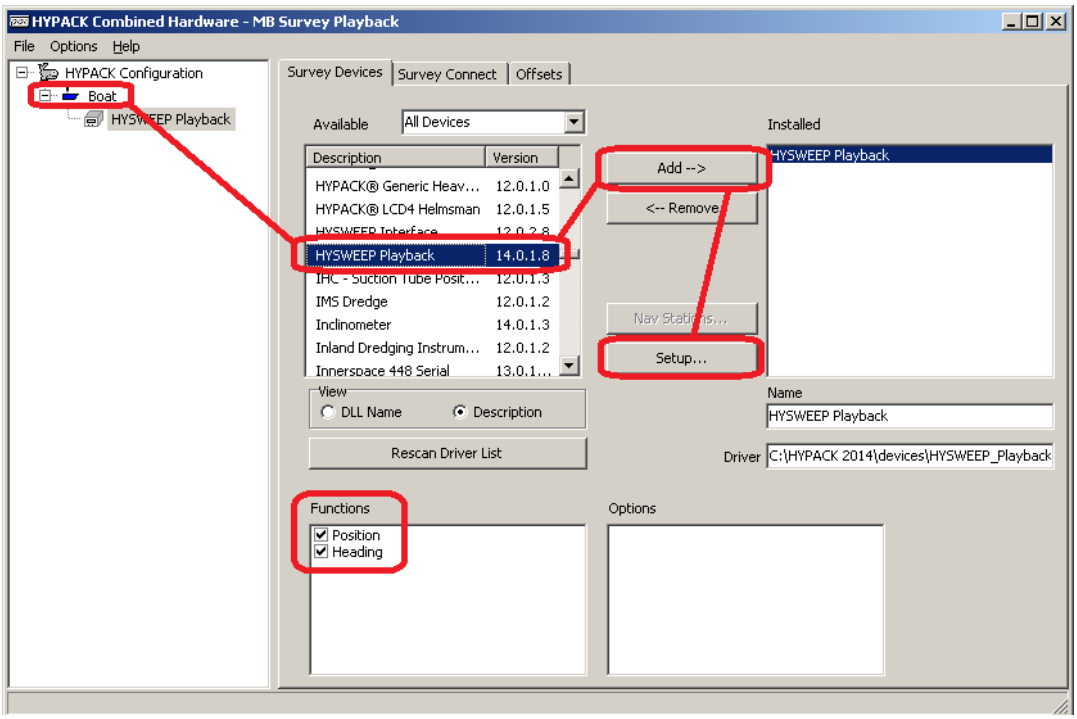
The setup is really very simple and uses raw multibeam data files (HYSWEEP® *.HSX files) that you have already collected on a previous survey. *You will not have the opportunity to make changes to sonar or equipment settings* (Power, Gain, Range, etc.), as these are files that have already been collected. (Again, the main focus of this simulation is to get you familiar with the HYPACK® and HYSWEEP® SURVEY programs, prior to going out on the water.) If, by chance, you did collect some data with improper or incorrect equipment settings, this is displayed in the simulation and you will become familiar with 'what to look for' type displays, when bad data is being collected.

In the 2014 'combined' HARDWARE program:

1. **Click on 'Boat'**.
2. **Select 'HYSWEEP Playback' from the Survey Devices list**.
3. **Click [Add]**.
4. **Select the 'Position' and 'Heading' functions**.

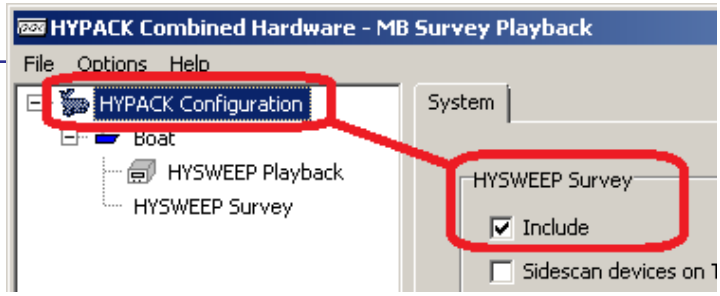
There are no parameters to set up under the ' Setup…' button, as it will be reading everything from the HSX file.

FIGURE 1. Configuring the HYSWEEP® Playback Driver in HARDWARE



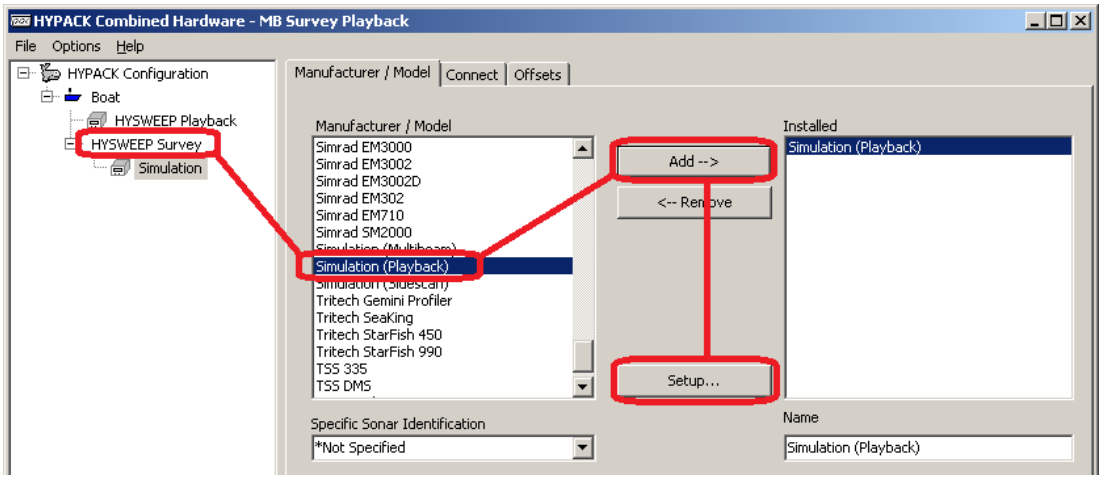
5. **Select 'HYPACK Configuration' and select 'Include' under HYSWEEP® SURVEY.**

FIGURE 2. Accessing Multibeam Device Drivers



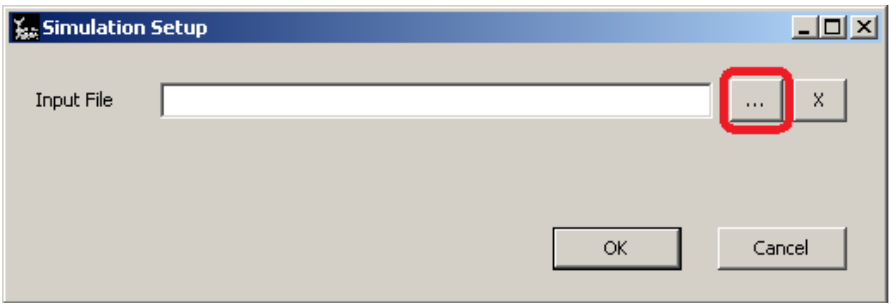
6. **Select 'HYSWEEP® SURVEY'.**
7. **Select 'Simulation (Playback)' from the Manufacturer/Model list and click [Add].**

FIGURE 3. Configuring the Playback Driver



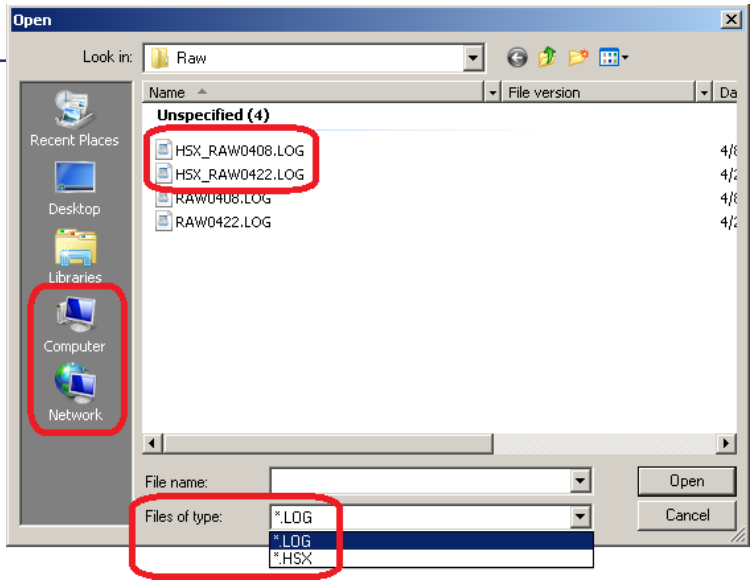
8. **Click [Setup…]**. The Simulation Setup window appears.

FIGURE 4. Simulation Setup Window



9. **Click […]**. The 'Open' file window appears.

FIGURE 5. Loading your Data to the Simulator

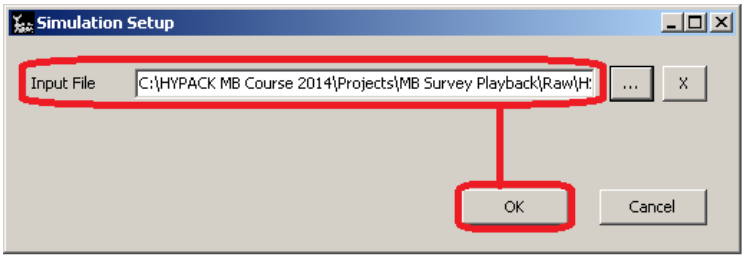


Navigate to the Raw folder containing the *.HSX files that you want to playback in the simulation. The folder can be the Raw folder within your current project, the Raw folder in another project, or a specific folder somewhere else on your computer, or network.

You may play an individual HSX file or a catalog (*.LOG) of HSX files.

10. **Select the *.LOG or *.HSX file to use in the simulation and click [Open]**.
11. **Verify the path and file selected, and click [OK].**

FIGURE 6. Verify the Path and File Selected

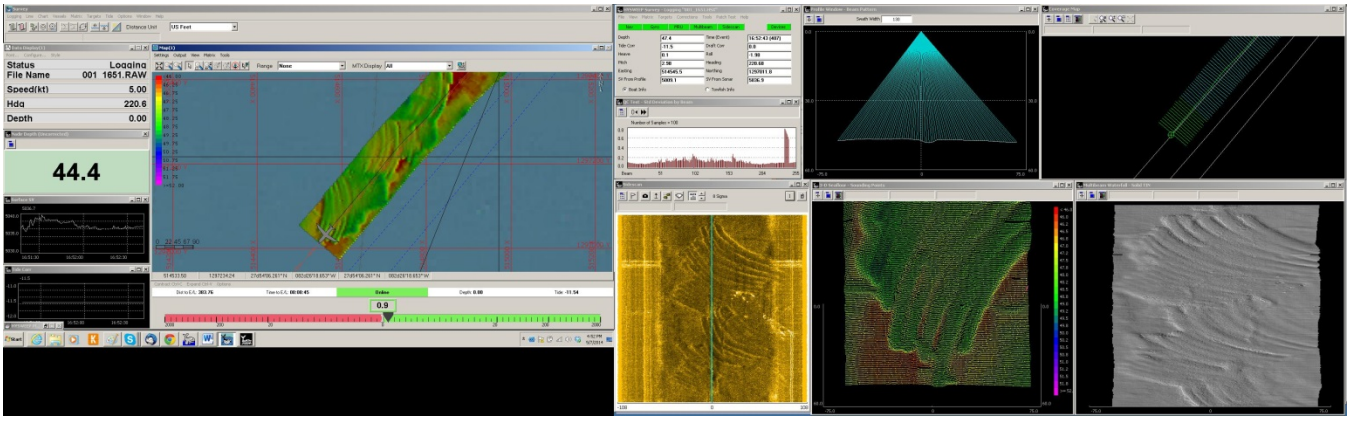


12. **Save your hardware settings and close the HARDWARE program.**

RUNNING THE SIMULATION OF THE SURVEY

1. **Start the HYPACK® SURVEY and HYSWEEP® SURVEY programs**.
2. **Add, size and position the windows to be displayed in each program**.
   - In HYPACK® SURVEY, use the Window menu.
   - In HYSWEEP® SURVEY, use the View menu.

FIGURE 7. *Sample Survey Displays*



NOTE: This may take some time to get the windows oriented the way you want them. Don't worry about the data being played back, as you can shut down the survey programs and re-start them as many times as you want.

Once you have the windows set to your liking, you can 'play' with their settings to learn all the ins-and-outs of each one, and figure out how they will best serve your needs during your survey data collection.

AUTO-MATRIX SETUP

One of the new features in HYPACK® 2014, is the ***AutoMatrix*** feature. To set it up, you must first be have the HYPACK® SURVEY program up and running.

From the HYPACK® SURVEY main window,

1. **Select MATRIX-OPTIONS**.

FIGURE 8. *Accessing the Matrix Options Dialog*

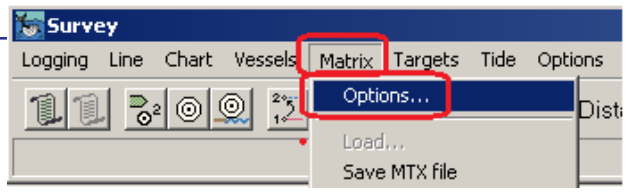
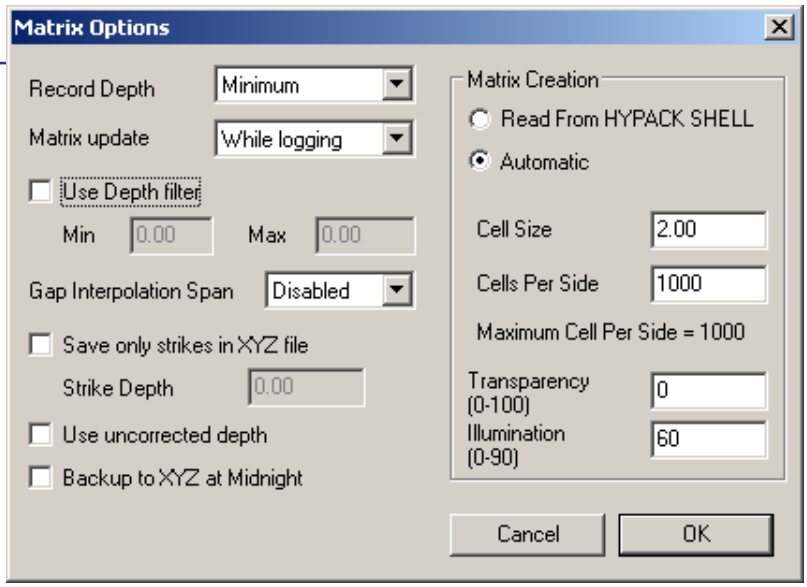


FIGURE 9. Matrix Options Dialog



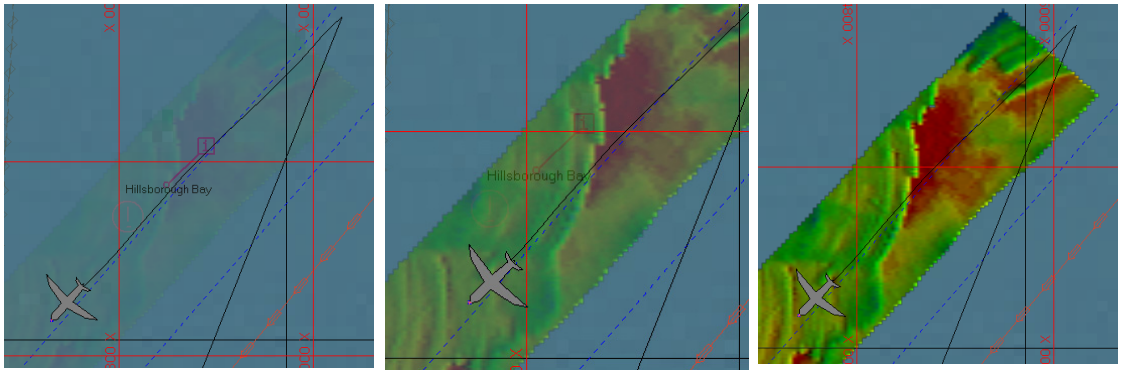
2. In the '**Matrix Creation**' area, select '**Automatic**'.
3. **Enter a 'Cell Size'** (in your horizontal survey units). The cell is always square.
4. **Enter the number of 'Cells Per Side'** (Max. value of 1000).

   In Figure 9:

   - The matrix is 2000 by 2000 horizontal survey units.
   - The matrix only updates (or paints) when you start logging data.
   - The Minimum Depth will be 'painted' in each cell.

You can set a **Transparency** level, so you can see other background files through the matrix.

FIGURE 10. Matrix Transparency—90% (left), 50% (center) and 0% (right)



You can also set an **Illumination** angle, so the matrix can take on a shaded, 3D appearance.

FIGURE 11. Illumination at 90% (left) 60% (center) and 0% (right)