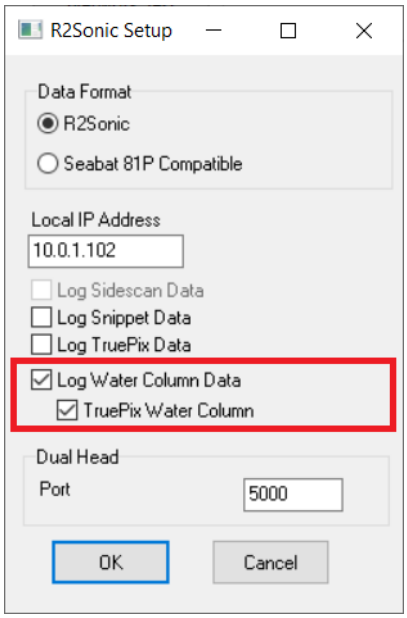
Compressed Water Column in HYSWEEP

By Mike Kalmbach

A new option in HYSWEEP® uses R2Sonic TruePix as compressed water column data. You can select this configuration in the driver setup:



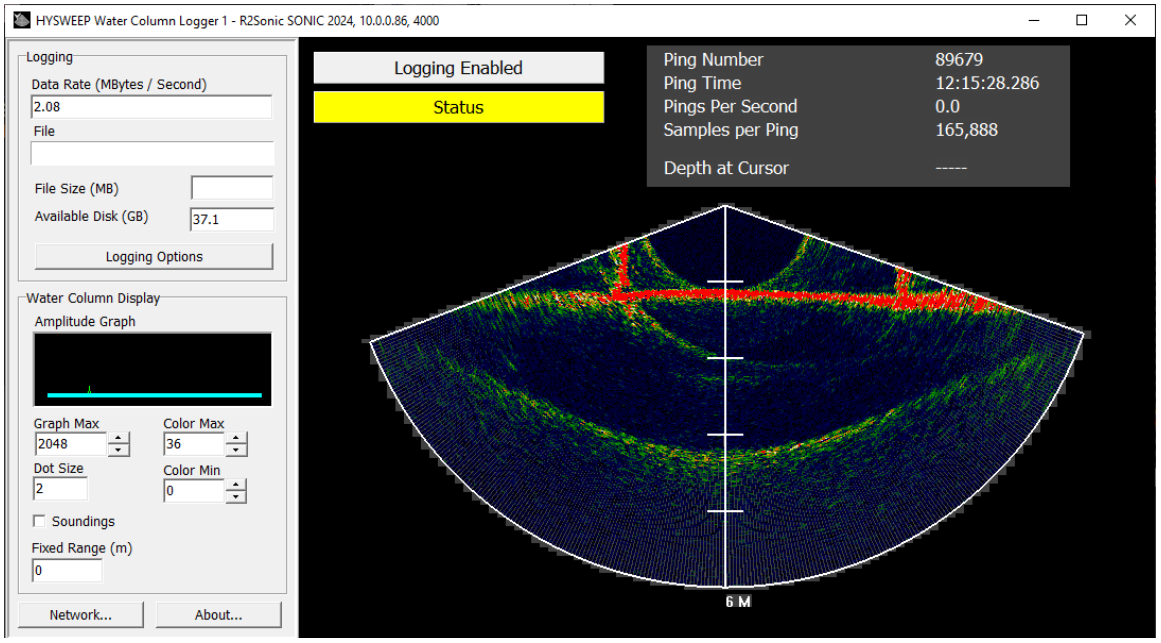
For the TruePix Water Column checkbox:

- If checked, then compressed data is displayed and logged. Configure the R2Sonic control to output TruePix angle and magnitude.
- If unchecked, then full water column data is used. R2Sonic must be configured accordingly.

In both cases, water column data is logged to the file *_WC.R2S, where * matches the HSX filename.

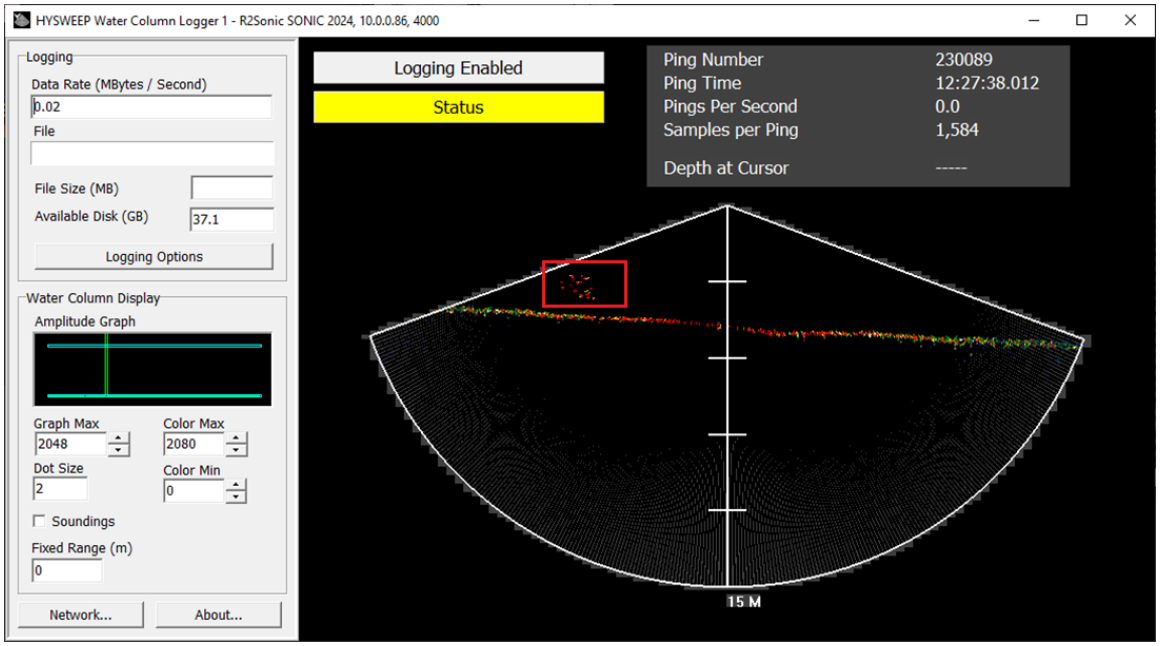
Compression is massive. While testing with a 256-beam Sonic 2024 MBES, we found 1.5k samples per ping using the compressed water column data format (15 m range) vs. 166k samples per ping with full water column (6 m range). For this example, at 100 samples/ping/m for compressed data and 27.6k samples/ping/m for full water column data, the data compression ratio is 276:1. It's a good option to consider if you are concerned with resulting water column file size.

To see what is lost from compression, we can do a visual comparison. I do not yet have a dataset with both a full and compressed water column, that's coming soon. So this is a bit of an apples to oranges comparison but gives the general idea. First, the full water column:



We see the seafloor and pilings along with various sonar artifacts. No water column detections in this particular example. As you can see, this is a very detailed image.

Now, this is the compressed water column:



Water column detections are clearly seen in the compressed data.

How do we convert TruePix input to water column imagery in HYSWEEP®? TruePix is side scan with angles, while water column in HYSWEEP® is an echogram per beam. So we start with a bunch of empty echograms, then insert TruePix samples at the appropriate time and angle to form the water column image.

It's true that HYSWEEP® currently doesn't do much with water column. Logging, 2D playback, and overlay while editing is the current extent of its capabilities. This is because most survey operations don't want to deal with so much data. Maybe this type of compression will rekindle interest and we can take the next steps in processing.

A Beta version will be available in the HYPACK® 2023 Q1 release. Give it a try! Enhancements will be provided as time goes on and we receive feedback.