One of the nice additions to HYPACK® 2017 version was the new 3D MESH program that allows building great 3D models of the terrain. The 3D MESH program generates a surface model from XYZ data using a 3D Poisson Mesh. This method takes longer to generate than the TIN model, but it generates a more accurate representation of vertical and concave surfaces.

I want to compare the complex terrain in some of HYPACK® tools for 3D visualization such as TIN MODEL, CLOUD and finally 3D MESH.

Let’s consider the wreck survey. Back in 2016, I helped Odessa Port Authority, Ukraine, to interface their Reson T20P MBE and during the sea trials we surveyed the “Sulina” wreck. “Sulina” was a Romanian military transport ship that transported troops and supplies, and was sunk by a Soviet submarine during the WW2 near Odessa back in 1942.

In Figure 1, shows a photo of the ship and the XYZ dataset from the HYPACK® survey in 2016.

**FIGURE 1.** Romanian Military Transport Ship SULINA sailing off Konstanca, Romania (left), HYPACK® XYZ Dataset. Black lines show the tracks of the HYSWEEP® SURVEY. (right).
The CLOUD program works really fast (1156175 points were loaded in 1 second) and it is easy to work with. It also allows you to load a background file. It is not a modelling tool though since all it does is load the cloud of XYZ points, nothing more.

FIGURE 2. Sulina Wreck in CLOUD

The TIN MODEL creates an irregular triangular network, connecting the data points into triangles. The resulting model of a complicated terrain doesn’t look very good (see the Figure 4).

Pro:
- Quick and easy to manipulate
- Allows adding a GeoTIF overlay
- Output to GeoTIF
- Compute volumes
- Export contours

Con: The complicated model does not look great.
**FIGURE 3.** TIN MODEL of the Sulina Wreck.

**FIGURE 4.** TIN MODEL of the Sulina Wreck.
**3D MESH**

Unlike the first two programs, 3D MESH requires a few more of clicks to create a model. The modelling time is increased (52 seconds for 1156175 points).

Now the pros and the cons:

**Pros:**
- The best model you can ever have! Check the Fig. 5 and 6 – you can even see the corridors along the main superstructure, the remnants of masts and cranes, the hatches on the main deck etc.
- You can create a constant rotation and log the video.

**Cons:**
- It takes longer time to build the model.
- There are some additional settings that you may need to perform.
- The manipulation is more complicated. (We’re working to improve it!)
- No background
- No GeoTIF to import or export.

*FIGURE 5. 3D MESH with the Sulina Model*
FIGURE 6. 3D MESH with the Sulina Model