

## More Unmanned Surveying: CEE-PILOT™ In Action

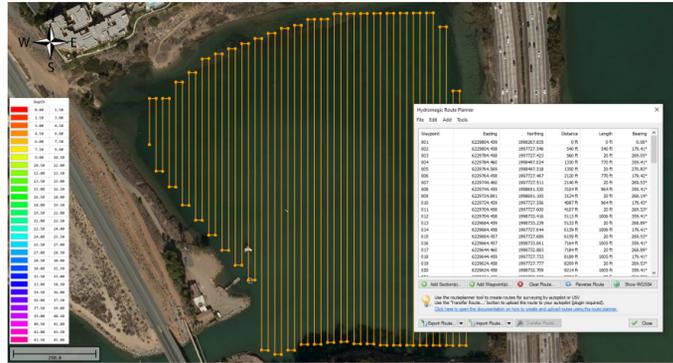
Surveying with a USV comes with certain challenges but also significant potential benefits. The first step is to determine whether the survey is suitable for a USV at all. Often a small manned boat still remains the fastest and best approach. When deciding on the USV survey plan, sometimes using an autopilot to run the survey makes sense. Sometimes it doesn't. The CEE HydroSystems CEE-PILOT™ robotic navigation upgrade for the CEE-USV™ was developed using the advanced Dynautics SPECTRE™ autopilot. With the autopilot in action, survey data can look quite remarkable! Here is a short breakdown of the constituents.....

## CASE HISTORY - Lagoon Survey



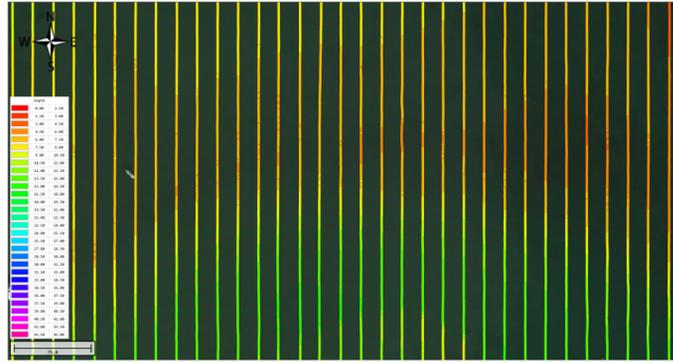
CEE-USV™ with CEE-PILOT™

The CEE-USV™ package is designed, first and foremost, for usability - in manual and robotic mode. Adding the autopilot hardware generates little additional complexity or sources of potential failure and downtime. A lot of time was spent by CEE and Dynautics Ltd avoiding a "science experiment" on the water.



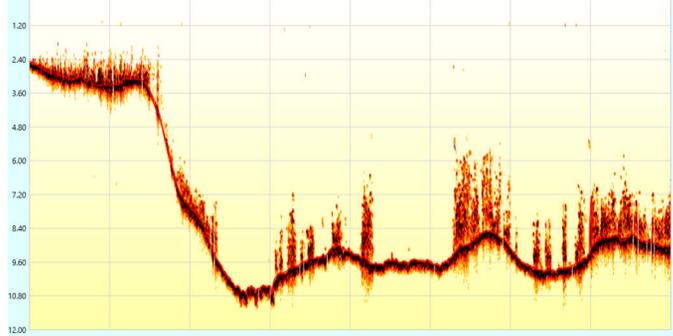
## Integrated Autopilot Interface

The USV route plan is managed within the Hydromagic acquisition software. No third party packages or remote desktops. Just upload the route from the shore PC to the boat and START. This was no coincidence; Dynautics, CEE and Eye4Software together focused on simplicity in operation.



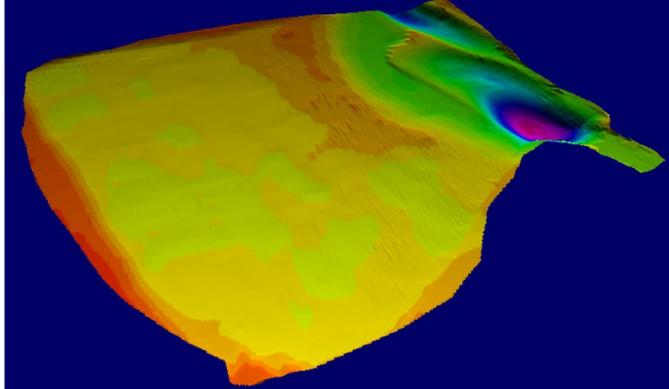
## Laser Straight Survey Lines

These lines were spaced at only 20 ft, with a cross track error that is insignificant over almost the entire survey. This is the benefit of an advanced autopilot. Consistency in line spacing maximizes final product quality and it's clear to anyone that a professional survey solution was used for the job.



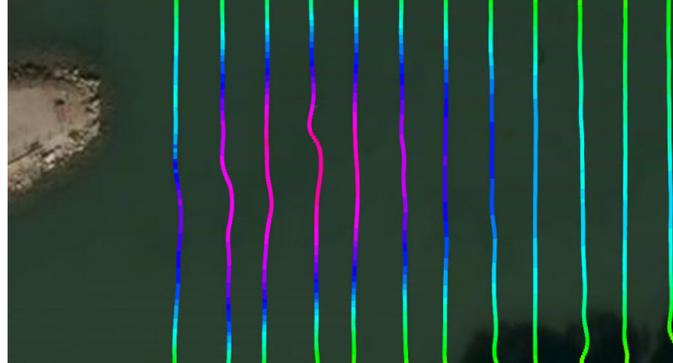
## Detailed Echogram View

Strong sub aquatic vegetation signals were eliminated using the CEESCOPE™ digital echogram, a feature on all advanced CEE echo sounders. Without detailed QA/QC even the straightest survey line can have data that's plain wrong.



## Smooth Contours

The RESULTS: With exactly parallel lines and identical line spacing, the final survey accuracy is maximized. No holes in the data or irregular interpolation artifacts, and no spurious signals from submerged debris or vegetation. Maybe you don't always need a multibeam echo sounder for 3D images.



## Is This as Bad as it Gets?

Even with the tide rising and a 2 mph current at the inlet running perpendicular to the survey lines, the autopilot keeps the boat on line. Even here we only see a 4 ft (1.2 m) maximum deviation off line. That's not far.

[LEARN MORE](#) about the CEE-USV  
[CONTACT US](#) for details

We have posted this video on the newsletter before, but here again is a closer look at the CEE-PILOT™ in operation with the Dynautics autopilot as described in this article:

[\\$VT:119a9e7cf6c9af75:CEE\\_PILOT\]\\$](#)

## Product News - Unmanned Operation



### New CEE-LINK™ Shore Radio is Here

For 2020 CEE-USV™ and CEESCOPE-USV™ systems, we have launched a second generation shore radio module. With enhanced battery management and indication, the standalone runtime is increased to 14 hrs on a charge.

## Software News - Unmanned Operation



### So What About HYPACK?

HYPACK has a feature to communicate with generic autopilots to output navigation information allowing the autopilot to navigate the USV. This does not allow the user to load a route plan to the CEE-PILOT™, so has some disadvantages versus the integrated Hydromagic interface but the main benefit remains - a fully integrated navigation and acquisition package. We will be working on HYPACK options in 2020, and hope to qualify this combination soon.

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