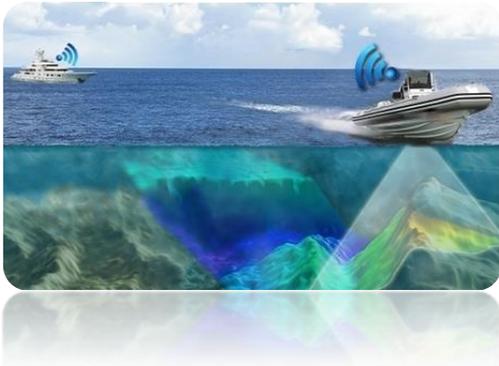


The Wireless WASSP W3 system and applications



INTRODUCTION to Wireless WASSP

WASSP Multibeam Echosounders have been on the market for more than 10 years, with over 3.000 systems operational worldwide in various types of applications. The first WASSP systems were mainly designed for use on commercial fishing vessels and later, new models were introduced for higher accuracy hydrographic survey and bathymetric seafloor mapping.

Recently, WASSP introduced their Wireless W3 models for wireless Remote Forward Mapping applications based on its already proven technology. To date, over 90 Superyachts and Cruise-ships use this solution to successfully generate their own accurate bathymetric maps of the seafloor in unexplored, uncharted or poorly charted areas anywhere around the globe.

WASSP Wireless is specifically suitable for larger vessels (Superyachts, Cruise ships, Explorer vessels, Navy etc.), that are travelling “off the beaten track”, exploring new areas and navigating into shallow uncharted waters.

Still many locations around the world, especially exotic areas with little or no general marine traffic, have limited, old, or non-existing navigational data available in the official (electronic) charts on the bridge of the ship.

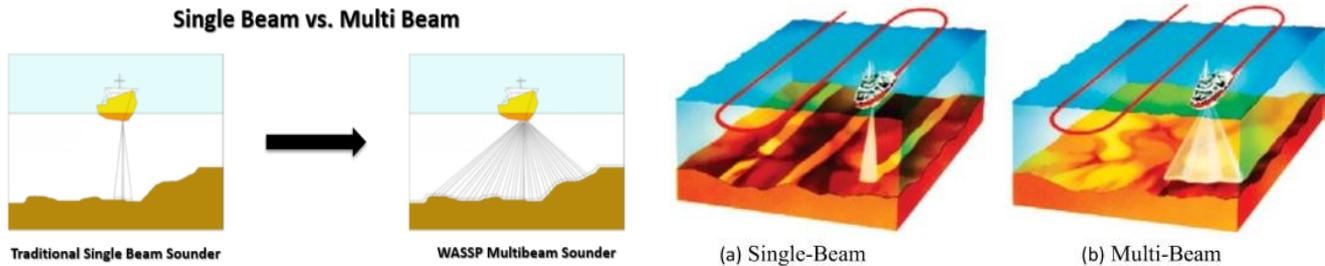
With the wireless WASSP W3 system installed on a remote vessel such as a Tender, Chase boat, Shadow boat or Remote-controlled autonomous vessel (USV), it is now possible to perform your own high-resolution bathymetric surveys of the seafloor in areas where the ‘mothership’ requires to safely enter such as Bays, Lagoons, Fjords, Arctic areas, Archipelagos, etc.

This allows the owners and guests exclusive access to areas one would never access before.

The live mapping data from the remote Tender vessel is transmitted in real-time via a dedicated wireless connection directly to a mapping display in the bridge of the mothership, allowing the bridge crew to immediately see a high-detail real-time live 2D and 3D map of the seafloor of the area that is being surveyed at that very moment by the remote vessel.

WASSP MULTIBEAM ECHOSOUNDER TECHNOLOGY

In comparison to a traditional (single beam) echosounder, which only measures one single depth point with a single beam at the time and vertically below the vessel, the WASSP Multibeam echosounder instead uses not less than 224(!) beams/measuring points at the same time running from Port to Starboard of the vessel in a 120° swath coverage. The continuously measured detailed amount of depth points, combined with an accurate GPS position, generates a very precise detailed map of the seafloor in a wide area in just one single sweep/track.



WASSP MULTIBEAM vs Forward Looking Sonar

Compared to generally expensive Forward-Looking Sonar (FLS) systems, which must be mounted inside the bow of the mothership (often requiring the vessel to go in drydock etc.), the wireless WASSP W3 system can be supplied as a fixed installed, or fully portable solution that can easily be mounted on virtually any size of Tender or Chase boat without the need of any complex modifications to the mothership itself.

Forward Looking Sonar systems are mainly suitable for object collision avoidance while in navigation. For example, to avoid running into objects floating in the water-column or below the water surface, such as lost containers, icebergs, logs of wood etc. FLS are, because of their forward looking characteristics, generally not very suitable to generate accurate high-resolution maps of the seafloor area and should therefore not be considered very reliable as such.

Furthermore, with the WASSP W3 Multibeam system mounted on the tender, you will be able to map *“around the corner”*, because you can send the tender vessel far out and around the mothership to scout and map the surrounding area.

For example, when a bay or lagoon is surrounded by rocks or reefs, a Forward Looking Sonar system mounted on the mothership, cannot just be turned around into any required direction to ‘look’ inside the area beyond surrounding reefs, rocks or islands.

While with the WASSP system on the tender, can simply be sent out to scout/explore and create a detailed map of the seafloor allowing for the mothership to safely access the area.



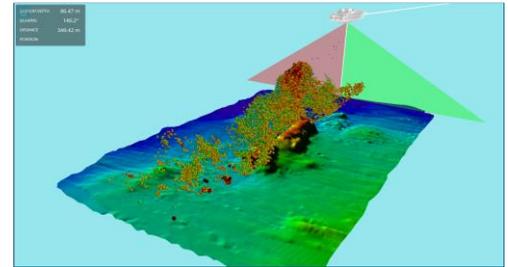
All the mapped 2D and 3D seafloor data is stored and will always be available. If you have mapped a certain area and return in that same spot in the future, you can simply continue to add new mapping data to the existing map or share this data with other vessels using WASSP allowing to build up a large, detailed shared map of the seafloor that everyone can benefit from.

Along accurate mapping the depth of the seafloor for safe navigation, entry or passage, it is also possible to use the mapping data for other purposes such as fishing, snorkelling/diving, submarine mission planning or to share for scientific/environmental research purposes.



Options are also available to map the hardness of the seafloor. This function is called Backscatter. A Backscatter map of the seafloor will indicate what kind of material it is made of, like mud, sand or rocks. This can be important information to find the best anchorage spot - as you generally don't want to anchor on rocks.

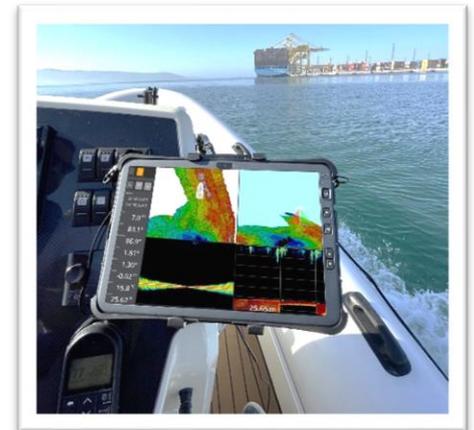
Another feature is the 3D Water Column Target mapping, allowing to show floating 'objects' within the water column between the surface and seafloor. Information and position of schools of fish, mammals (e.g., whales, dolphins), but also to locate and map the position of submarines or ROV underwater robots, etc.



WASSP W3 SYSTEM DESCRIPTION

- The **Remote Vessel (Tender) system** consists of the following parts which can be supplied as separately parts with the *W3 fixed installation*, or as complete *All-in-One* solution inside the *portable W3P pole system*:
 1. WASSP **Transducer** (fixed mounted in the hull of the Tender, or build inside the W3P pole)
 2. WASSP **DRX Processor** 12 or 24 VDC powered with low power consumption (can run for hours on a standard 12V battery).
 3. WASSP **CDX software** to generate and display real-time 2D/3D mapping data and optional features such Water Column Targets, Backscatter and Side Scan sonar view.
 4. Accurate **GNSS Sat Compass** and Heave, Pitch & Roll **Motion Sensor**
 5. **Wireless Transmitter** with antenna (approx. range 1 – 2 NM line-of-sight in ideal situations)
 6. **Wireless Tablet PC** mapping display or **fixed mini PC** with CDX software for real-time mapping visualisation on the Tender.

- The **Mothership** includes the following parts:
 1. Wireless Access Point and Antenna + PoE adapter
 2. WASSP CDX mapping software or MaxSea TimeZero Professional software to show real-time 2D/3D mapping from the Tender overlaid on existing navigational chart



Not included for Mothership (client supply):

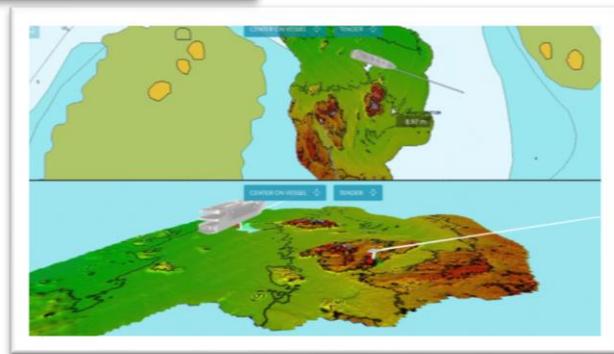
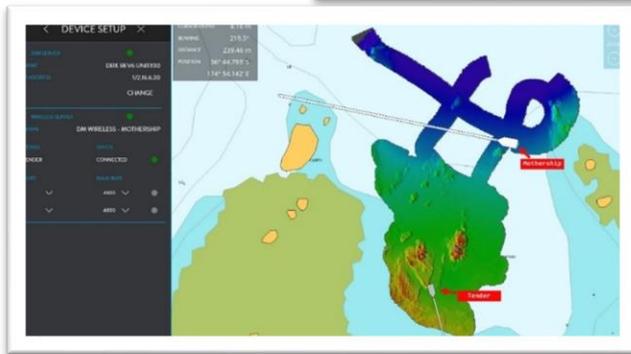
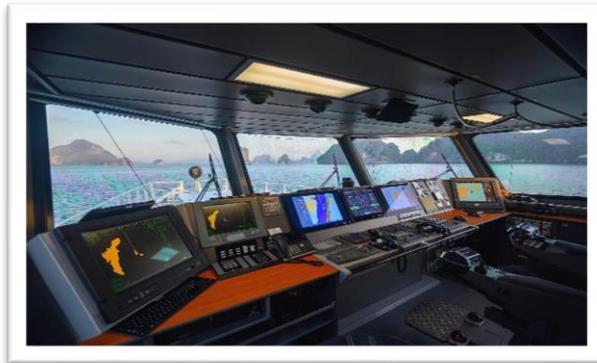
A PC and monitor in the bridge of the mothership to run CDX or TimeZero Pro software is generally not included. The standard Windows PC (consult us for specs) must be connected to the ship's Position and Heading data (NMEA0183) to display the real-time position of the Mothership, which will be visualised together with the position of the remote Tender.

REAL-TIME DATA VISUALISATION IN THE BRIDGE

Below images show the real-time mapping presentation (2D and 3D) from the tender, presented in the CDX mapping software on the bridge of the mothership.

It is also possible to install a WASSP system on the Mothership itself as a high-end Echosounder system and combine the mapping with the data coming from the tender to generate a larger overall map.

A video of combined Tender and Mothership mapping can be viewed here: <https://youtu.be/Zf-US4BbY8c>

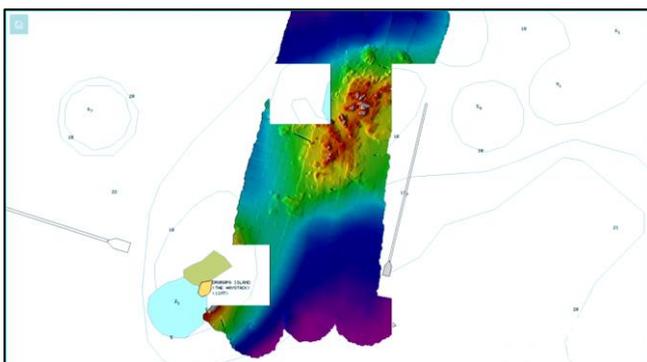


“STORE & FORWARD”

In case the remote Tender vessel goes **out of wireless coverage range** from the Mothership, the Tender will just continue to map the seafloor without any interruptions, however the real-time mapping data will in that case not be visible anymore on the Mothership - due to the missing wireless data link.

However, as soon as the Tender is back into the wireless range with the Mothership again, the data mapped with the Tender while out of wireless range, will automatically be forwarded from its mapping buffer. This way you will never lose any important mapping information generated by the remote vessel.

A short video of this functionality can be viewed here: <https://youtu.be/S9VKtcN4EGc>



WASSP W3 HARDWARE PARTS & INSTALLATION EXAMPLES:

WASSP DRX Processor technology



DRX Processor unit IP66

WASSP Transducer technology

In-hull Transducer installation examples
(flush with the Tender hull)

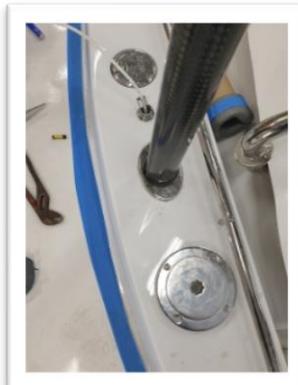
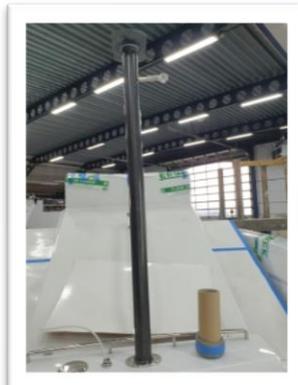
On-hull Transducer installation examples
(protruding/sticking-out from the Tender hull)



GNSS Sat Compass + WiFi fixed on roof



GPS Compass + WiFi on a removeable pole

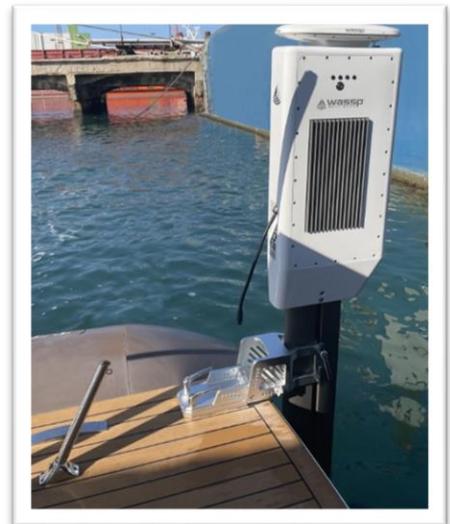


Wireless Mapping Display

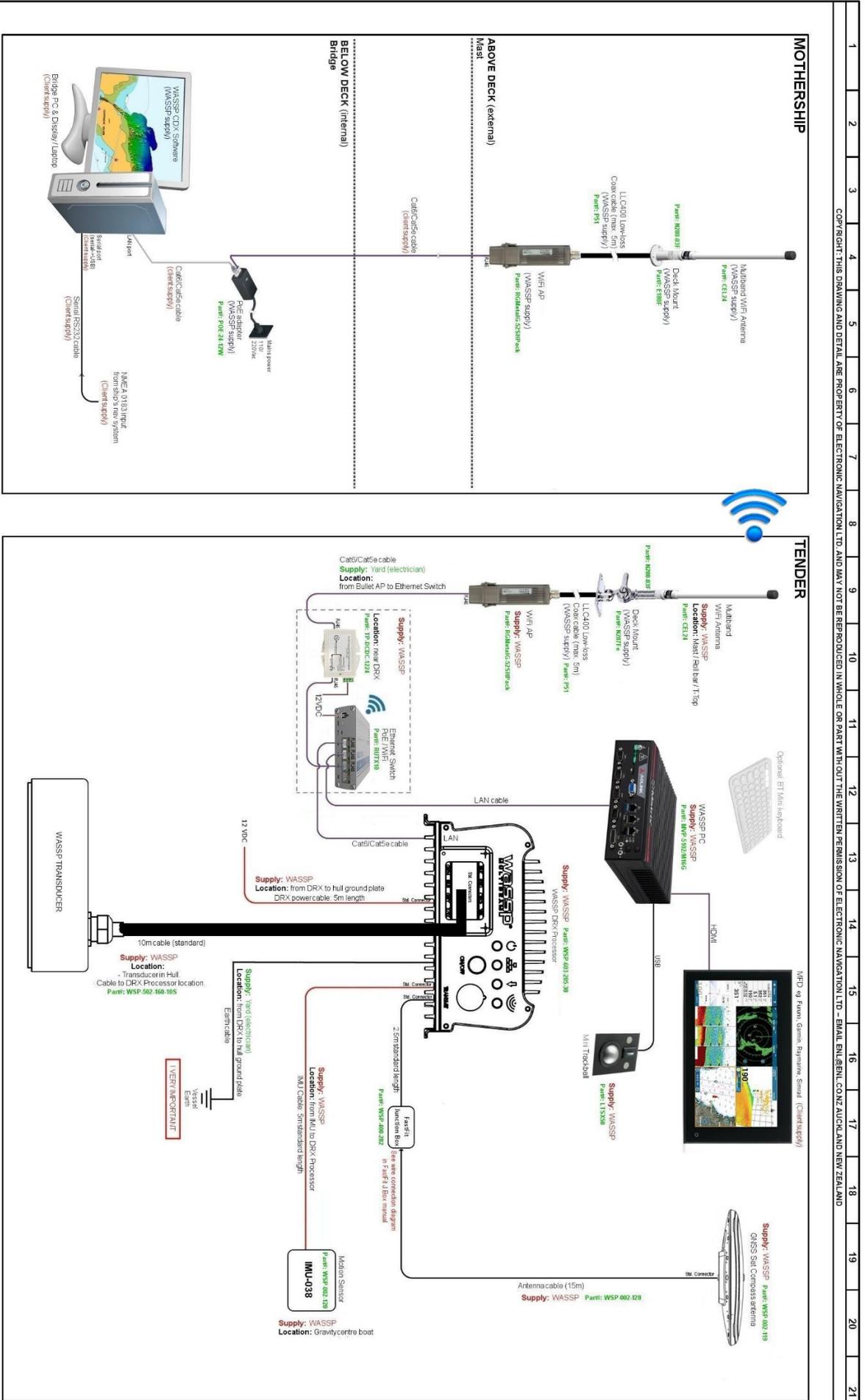


WASSP W3P *'All-in-One'* portable pole-mount solution

- Ideal for quick / fast-fit mounting and exchange between different tenders
- Minimal modification required to Tender vessel
- Only requires DC power (12 or 24 VDC) with low power consumption
- All-in-One Pole system includes: DRX Processor, Transducer, Wireless Transmitter, Motion Sensor, local wireless router, GNSS Satellite Compass and pole mount bracket
- Mapping display with wireless Tablet PC and mounting bracket



WASSP W3 system configuration (Fixed Tender installation with fixed PC and video connection to MFD)



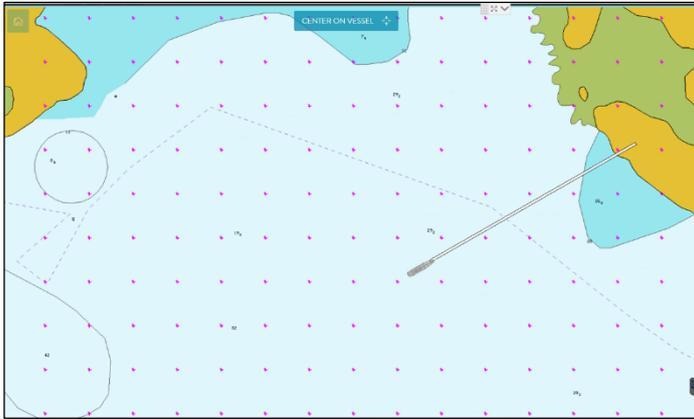
SEE IT ALL		INSTALLATION TO COMPLY WITH CLIENTS SPECIFICATIONS, APPLICABLE VESSEL CLASS REGULATORY CODE, ENL STANDARDS AND EQUIPMENT SUPPLIER INSTALLATION REQUIREMENTS.		PROJECT WASSP		TITLE WASSP W3 SYSTEM		CLIENT WASSP WIRELESS		REV PRE	
DRAWN		CHECKED		CREATED		EDITED		DWG NO NTS		PAGE 1 of 1	
NOTES		1. ALL EQUIPMENT CASES TO BE EARTHED 2. ALL CABLES TO BE SCREENED									

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

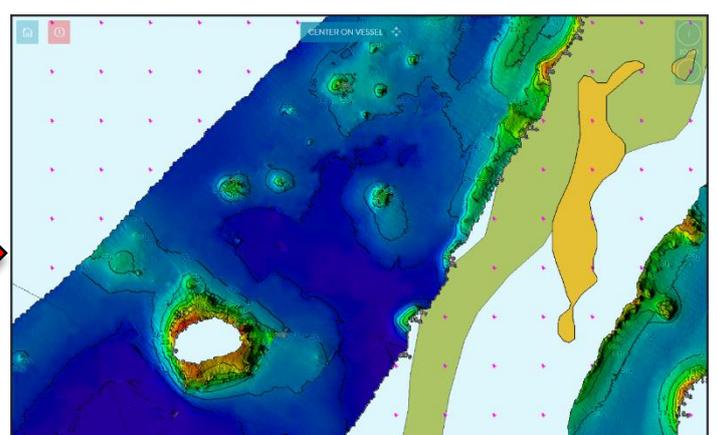
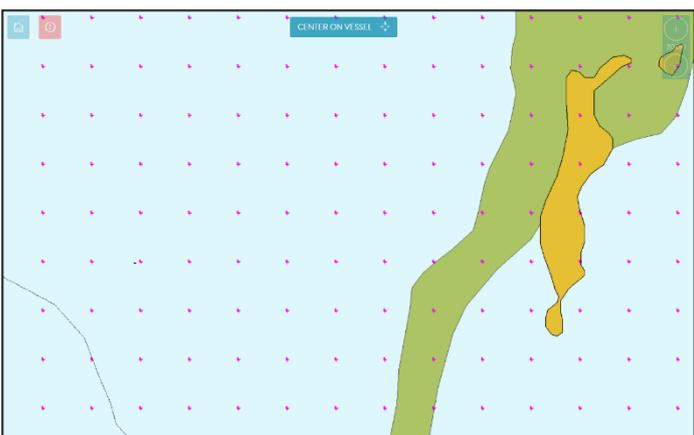
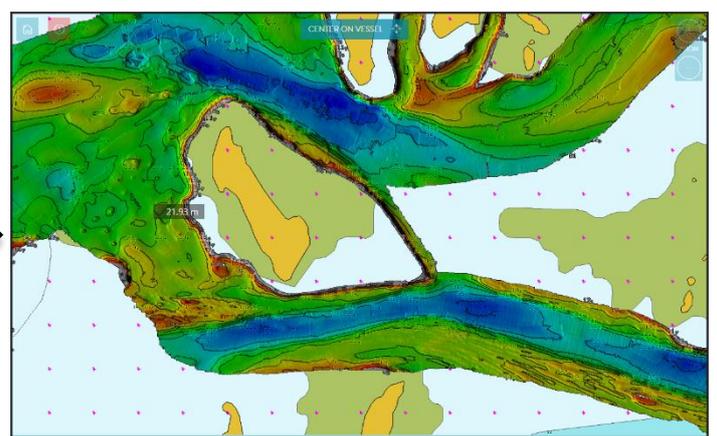
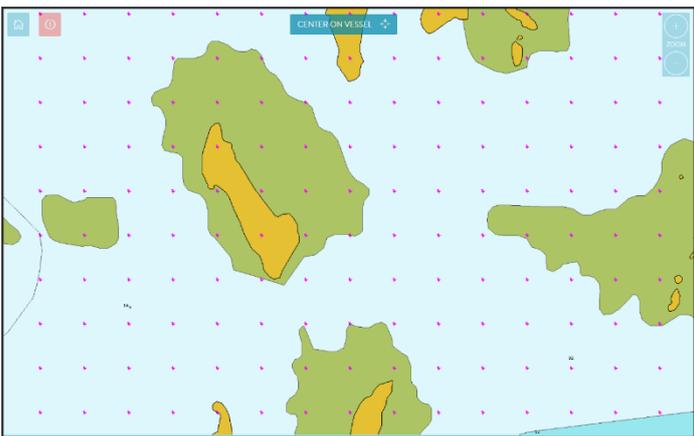
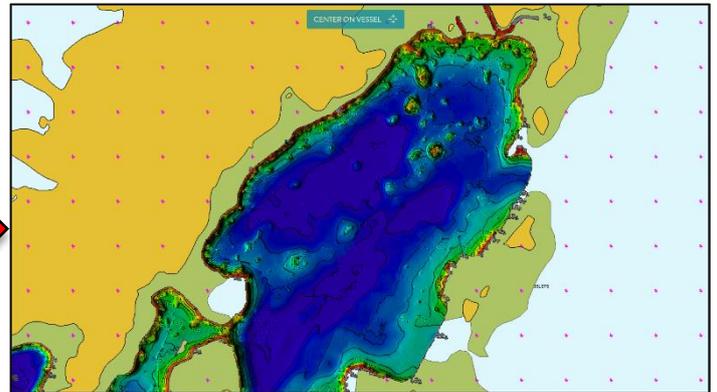
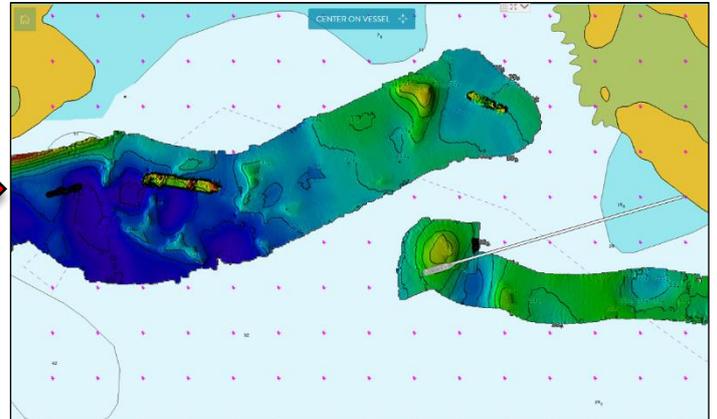
COPYRIGHT THIS DRAWING AND DETAIL ARE PROPERTY OF ELECTRONIC NAVIGATION LTD. AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT THE WRITTEN PERMISSION OF ELECTRONIC NAVIGATION LTD - EMAIL: ENL@ENL.CO.NZ AUCKLAND NEW ZEALAND

Below images show a standard electronic navigational chart (Navionics) of an area and the same chart with a layer of high detailed WASSP mapped seafloor data as superimposed layer on top of the chart.

Area with standard Navigational chart



Same area mapped with WASSP Multibeam Sonar



Examples of mapping details from the WASSP Multibeam Echosounder:

