

## CASE STUDY

**MULTIBEAM ECHOSOUNDER integrated in SB 100 PRO USV**  
for Bathymetry & Mooring Control



Unmanned Surface Vehicle

**WASSP S3R** by FURUNO + SB 100 PRO  
at Club de Vela Blanes (Blanes)



## The Company

Founded in May 2019 in Barcelona as a spin-off of the GPAINNOVA Group, GPASEABOTS' activity revolves around the development of technologies for exploring and preserving the marine environment, such as USVs (Unmanned Surface Vehicles) and buoys. Just a few months after its creation, the company was granted the Fuera de Serie ("state-of-the-art") Design & Innovation Award, promoted by one of the most important publishing groups in Spain, in the category of Sustainability.

In 2020, GPASEABOTS deployed more than 100 buoys to study the coastal waters on beaches in Eastern Spain and launched the SB 100 PRO

model, a multipurpose marine drone for all kinds of tasks in sheltered waters. Depending on the payloads, this USV can be used in the fields of hydrology, water analysis, research, Search & Rescue (SAR), mooring inspection and water surface cleanup tasks. Likewise, its use allows access to restricted areas, in which navigation may be restricted, difficult or dangerous.

Another product developed by GPASEABOTS is SB 100 Cleaner, specially designed for sea surface marine litter cleaning in ports and marinas.



## The Opportunity

Naval robotics can replace tasks that have always been carried out by traditional methods, which have a high ecological impact and expensive operating costs.

USVs are becoming widespread in several areas in the naval sector. In this real case study, we present a need that is shared by many ports: Mooring inspection in harbors and marinas.

## Payloads

**GPASEABOTS' SB 100 PRO USV**, the most versatile USV platform on the market for sheltered waters activities. It is an indispensable tool for a fast, efficient and precise work.

Both the operating cost and its environmental footprint are extremely low, and it allows to expand the range of possibilities in the field of data acquisition.



## WASSP S3R

**GPASEABOTS' SB 100 PRO USV**, is a fully integrated kit which includes all the core components required for a multibeam survey operation, designed to ensure functionality, ease of use and cost effectiveness, all the while achieving accuracies required by international survey standards such as IHO S-44 Standard 1a and Special Order.

**INCLUDES:** S3 with a Processor DRX IP66, Transducer WBFT 90-190kHz, SBG Ellipse Dual RTK INS (heading, position, pitch & roll, heave), Mini SVS Valeport, CDX, RPM and survey licenses.





## Operation

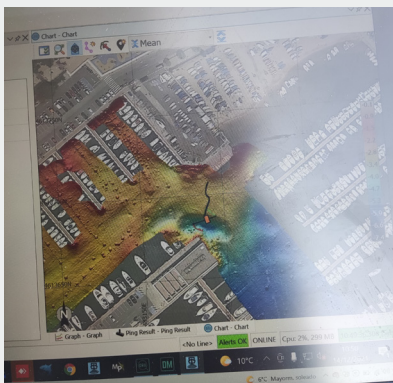
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### Planify Mission & Deployment



### Acquisition Time!

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## Location

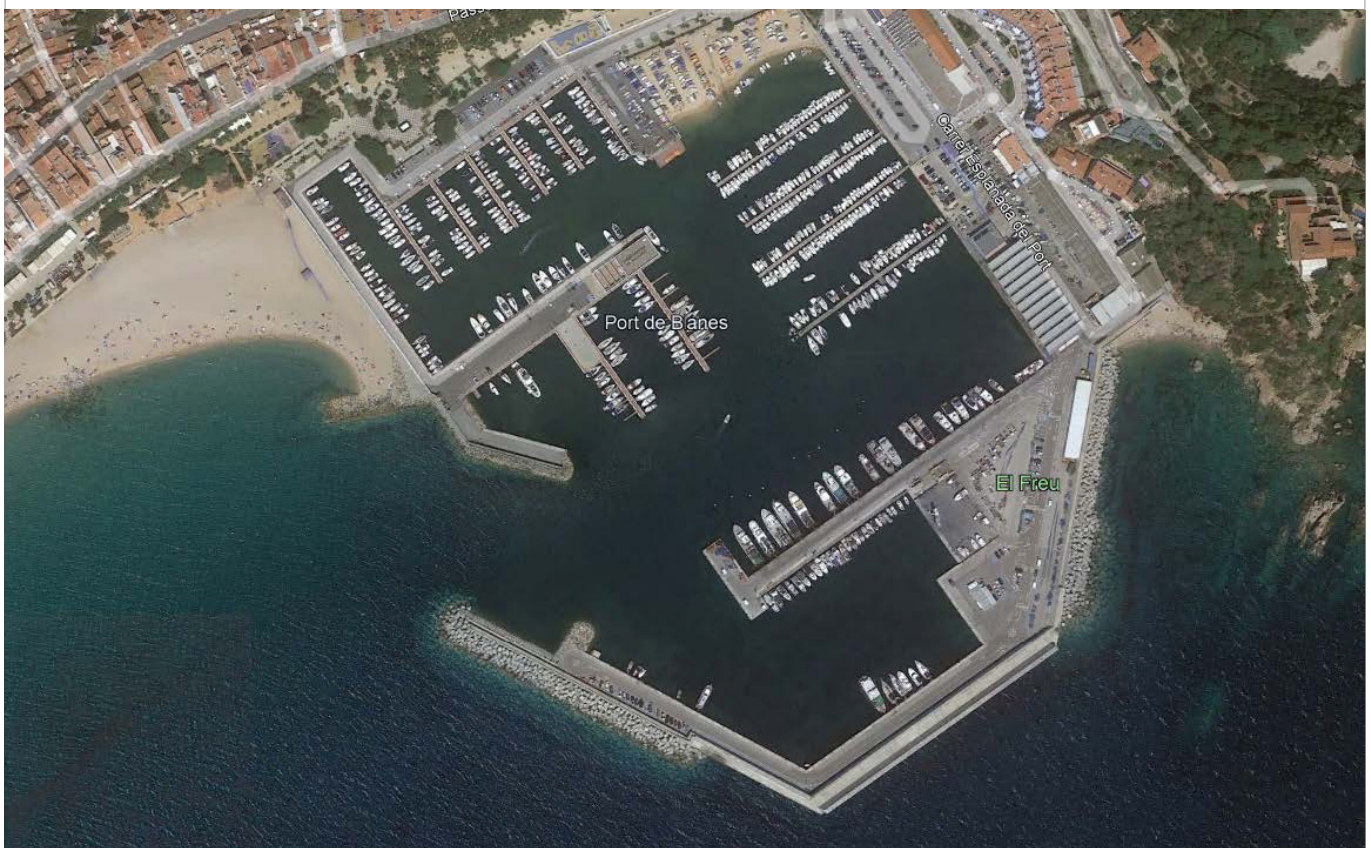
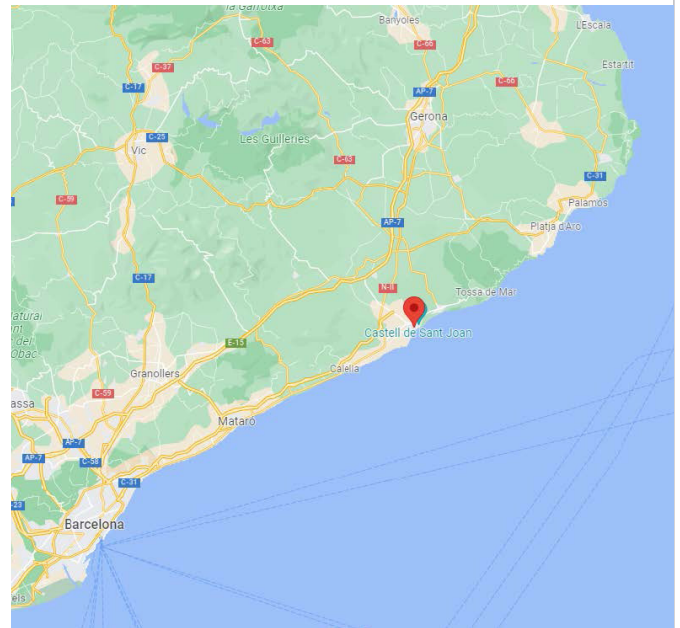
This demo session, carried out in the context of a trade mission, took place at the Club de Vela Blanes, in the coastal town of Blanes, 70 km (43,5 miles) away from Barcelona (Spain).

### Port of Aiguadolç

41° 40' 3" N - 2° 47' 5" E

<https://www.cvblanes.cat/ca>

Localization



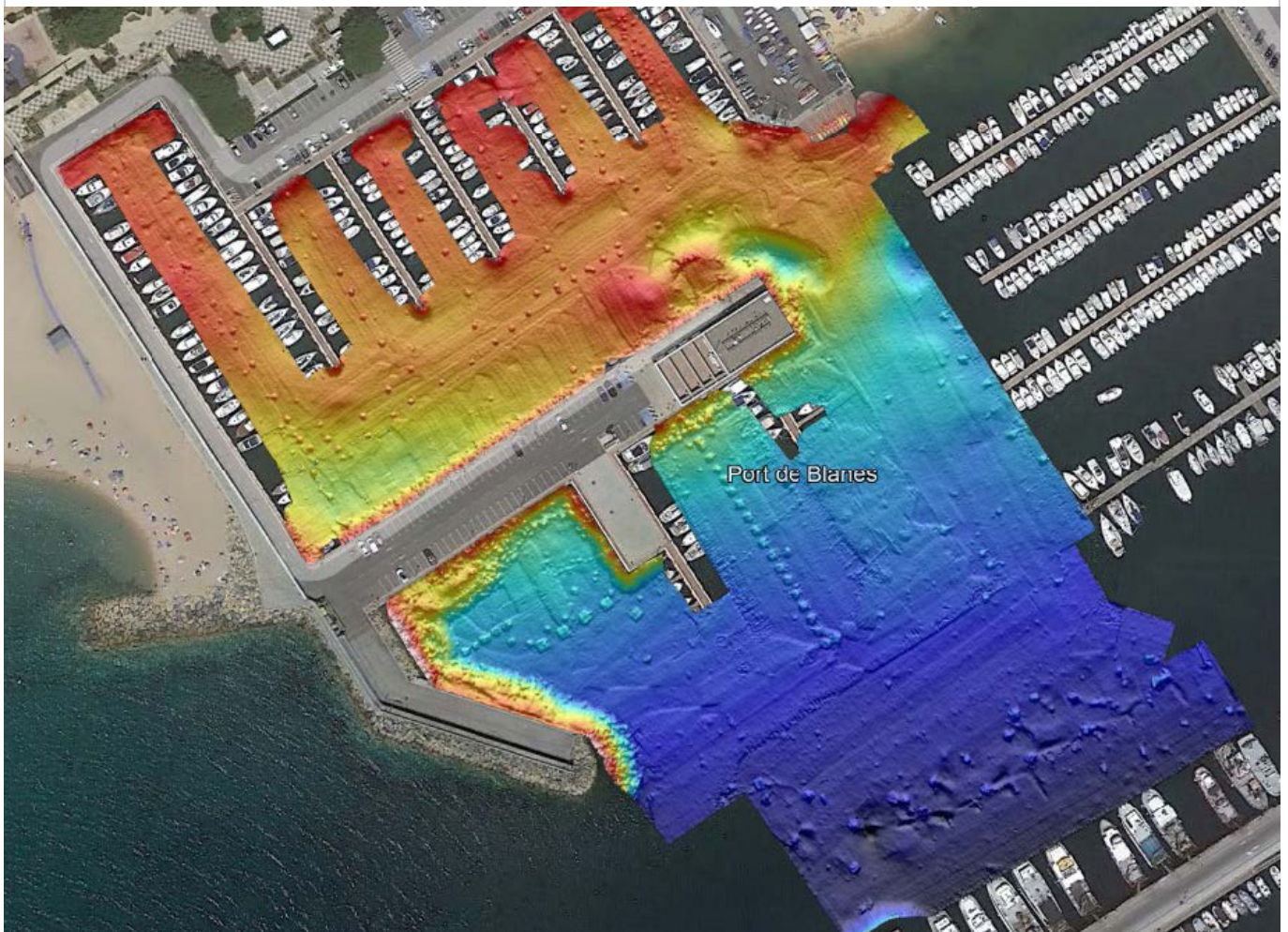


## Data Acquisition

The goal consisted in determining the depth, by means of a precision system, of Club de Vela Blanes' entire area.

This club manages a part of the Port of Blanes, taking responsibility for it and guaranteeing the safety of the boats that moor there. Drafting control is vital for proper signaling and a safe passage of boats and ships.

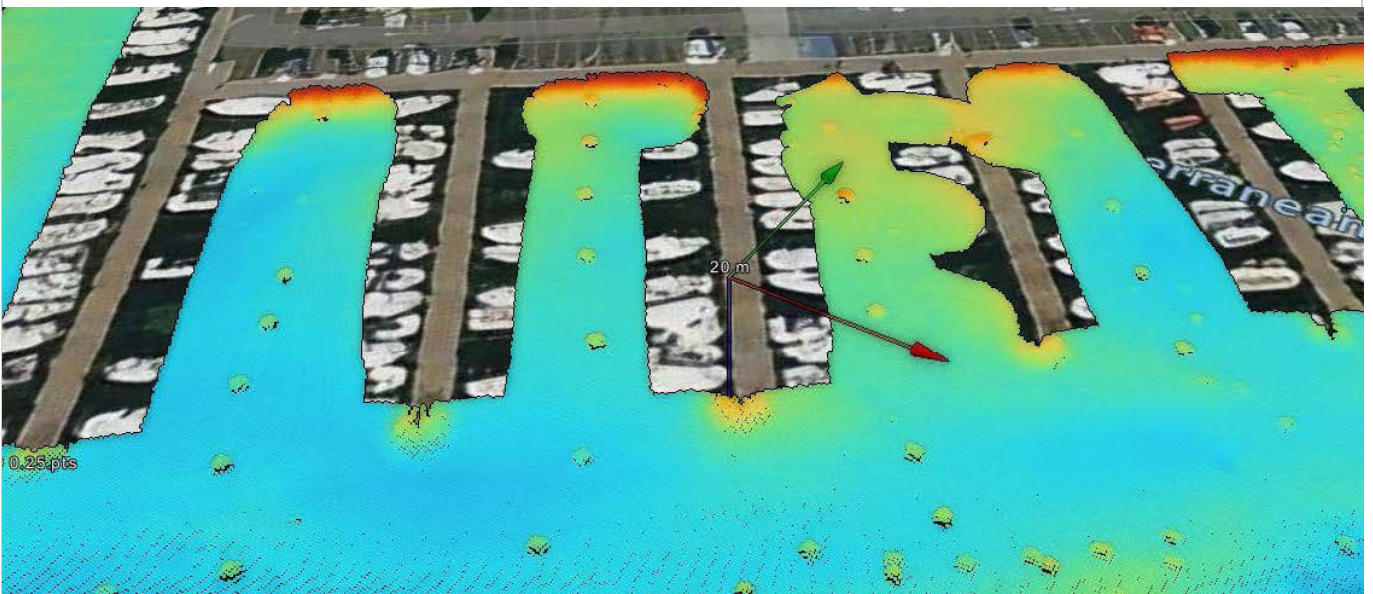
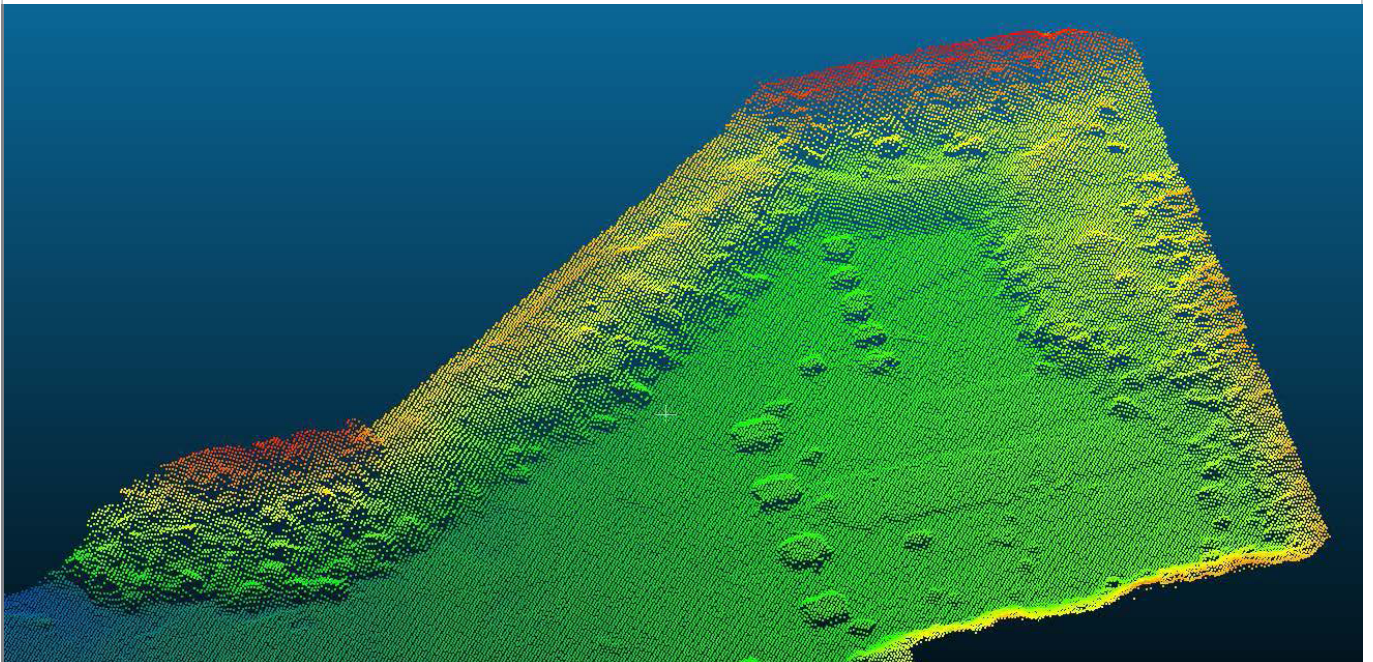
The following images correspond to live data gathering, with the deployment of the USV SB 100 PRO + WASSP S3R by FURUNO and adquisition software BeamworX and Eiva NaviViewer.





## Data Acquired

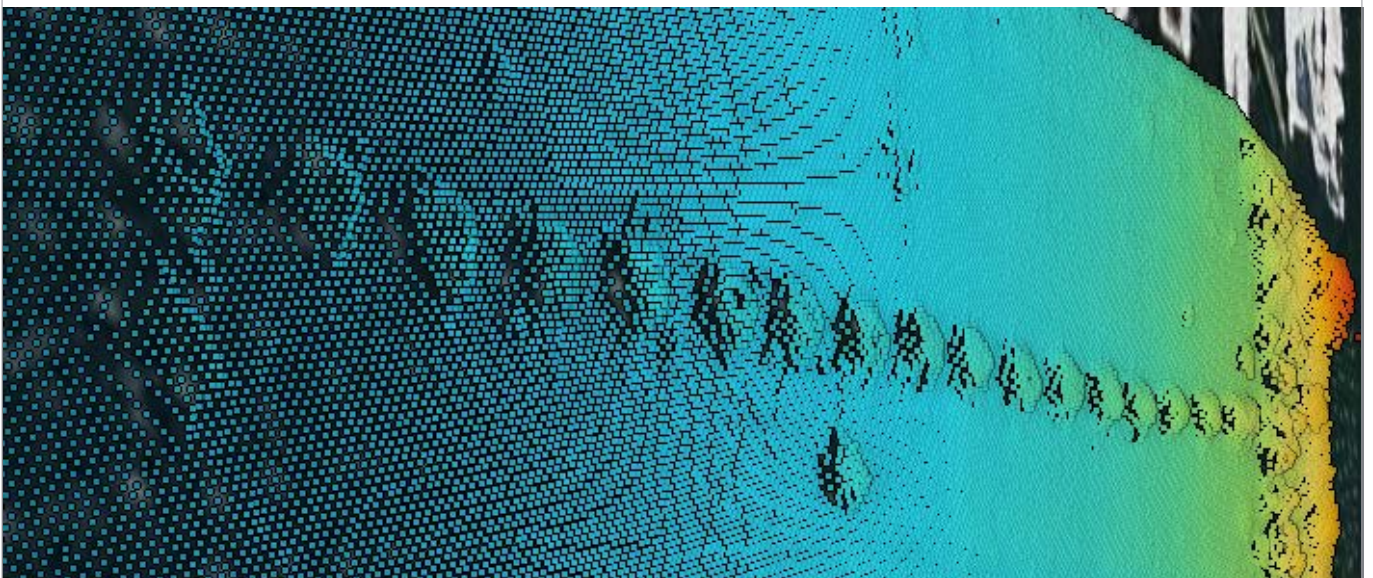
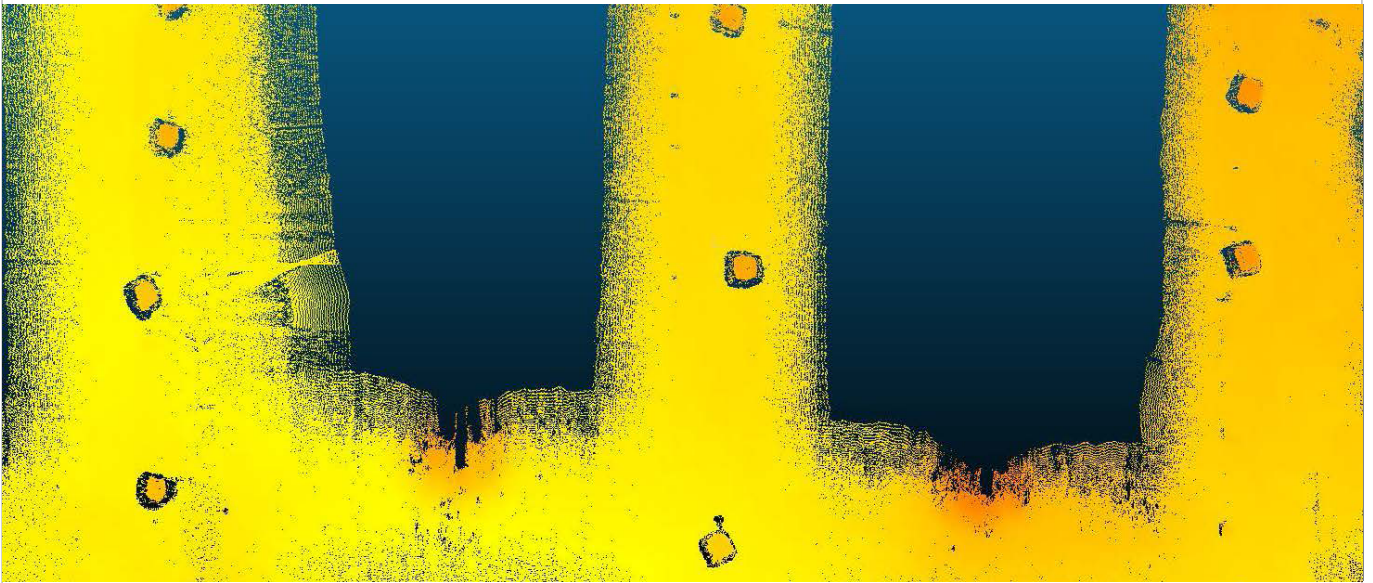
At the same time, the exact location of the boat mooring area was requested. The problems related to these structures range from burying, degradation, movement and breaking of those chains connected to them. Determining where these mooring piles are and their dimensions by using a USV with a multibeam probe, this task may take less than 3 hours for the entire port. Traditionally, this inspection is carried out in several days by hiring professional divers who must dive safely to identify and control mooring piles.





## Data Acquired

- The operation took only 3.5 hours, approximately.
- The distance between transects had to be modified during the operation, in order to perform a 100% overlap between transects. The transects were separated from 3 m in the shallower areas to 12 m between lines in the deeper areas.
- Only a motor battery change was carried out at 2.5 hours to ensure complete and continuous work, without any loss of data.
- The team worked with RTK on in the USV through the Ntrip system, with the direct connection of the SB 100 PRO to the national network of GNSS stations, ERGNSS. The station corresponding to Blanes was CASE (Cassà de la Selva).



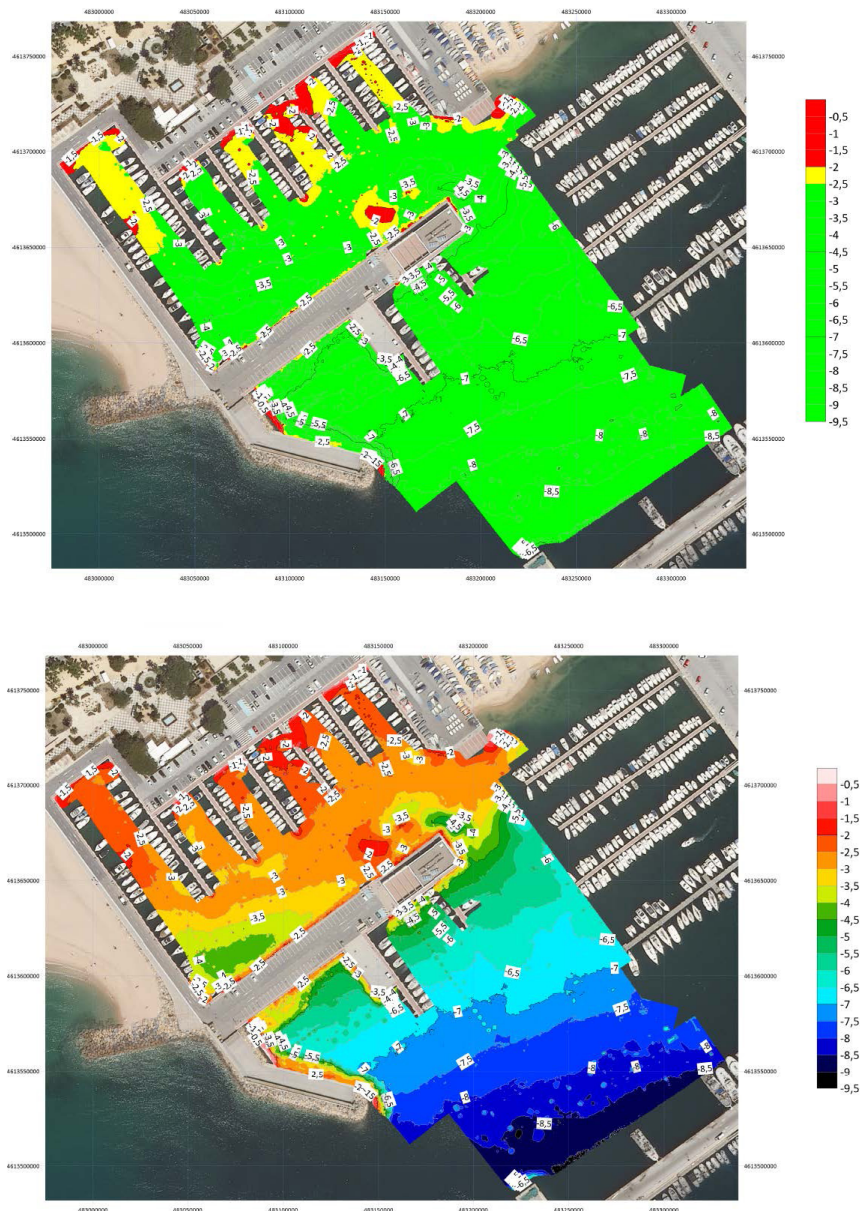


## Results

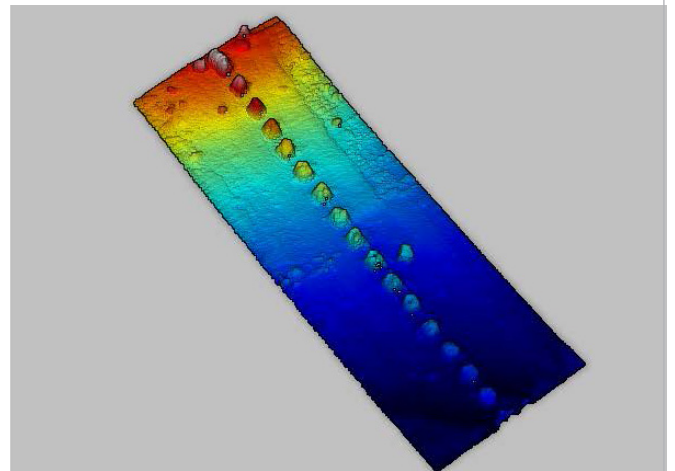
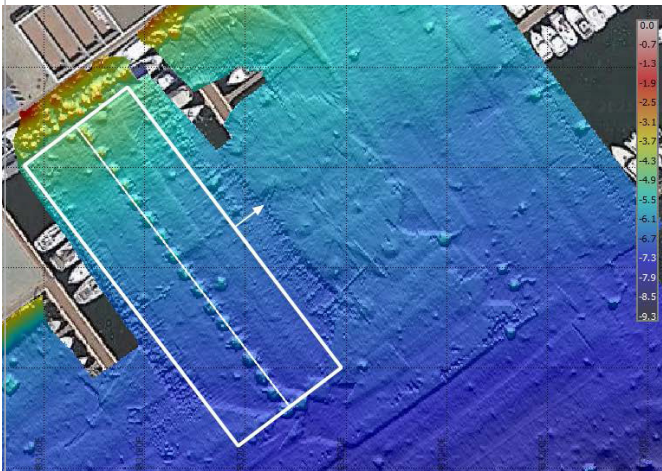
Data obtained allowed to create a set of maps focused on the management of the port's draft and its security.

- Map of contour lines, highlighting the sections below a depth of 2 m (in red), marking a dangerous area between 2 m and 2.5 m (in yellow) and the area in green for depths greater than 2.5m.
- A dynamic color map was also generated on the basis of the total depth, among others.

These maps have been generated with Surfer software from the .xyz, .laz, .las files, after postprocessing operations with BeamworX software.



## Results



## Conclusions

The multipurpose **USV SB 100 PRO** equipped with a WASSP S3R multibeam echosounder offers an unbeatable performance. A complete pack with all the necessary instruments to perform entire works while increasing potential applications in several marine sectors. It can carry out control and monitoring of dock constructions, multibeam bathymetry, draught control, dredging, volume calculation, inspection of structures and location of submerged artefacts. INS SBG Ellipse Dual Antenna and SVS Valeport included on it ensure accuracy and quality of data.





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