

DriX and SDB : fully remote solutions for hydrographic surveys

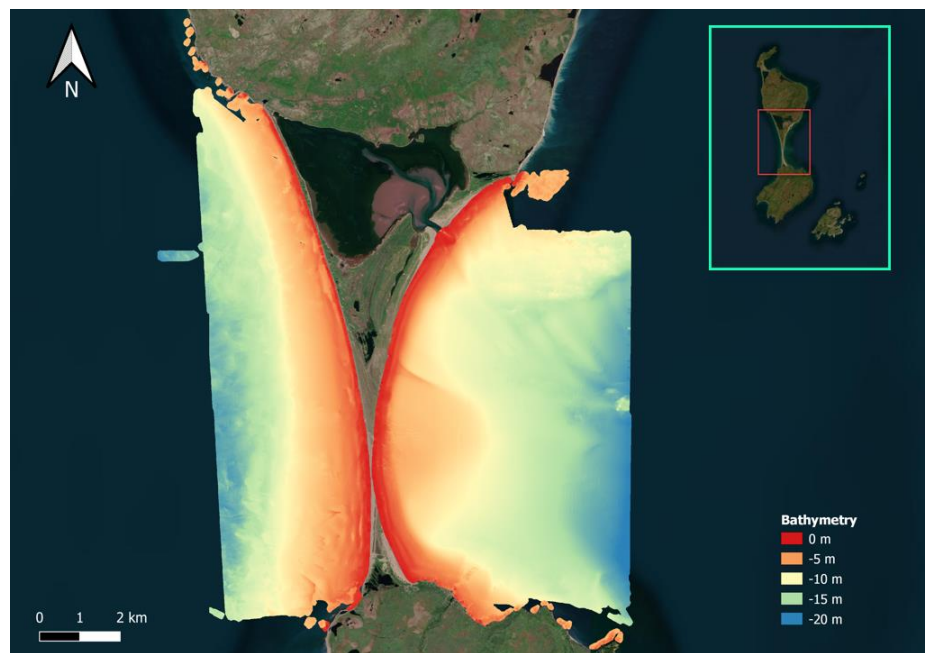
A 15-Day mission in Saint-Pierre and Miquelon to conduct a remote survey in shallow water

PARTNERS



KONGSBERG

In August 2022, Exail's DriX Uncrewed Surface Vehicle (USV) was deployed in the Saint-Pierre and Miquelon archipelago to execute a detailed bathymetric survey. The mission focused on assessing sand stocks on both sides of the Miquelon and Langlade isthmus. Given the shallow nature of the waters in the study area, ranging from -25 meters to the surface, the operation included acquiring very near-shore data using the Hytech Imaging Satellite-Derived Bathymetry (SDB) method. This data was then seamlessly merged with the bathymetric data collected by DriX, which was controlled remotely via satellite from a shore-based control center.

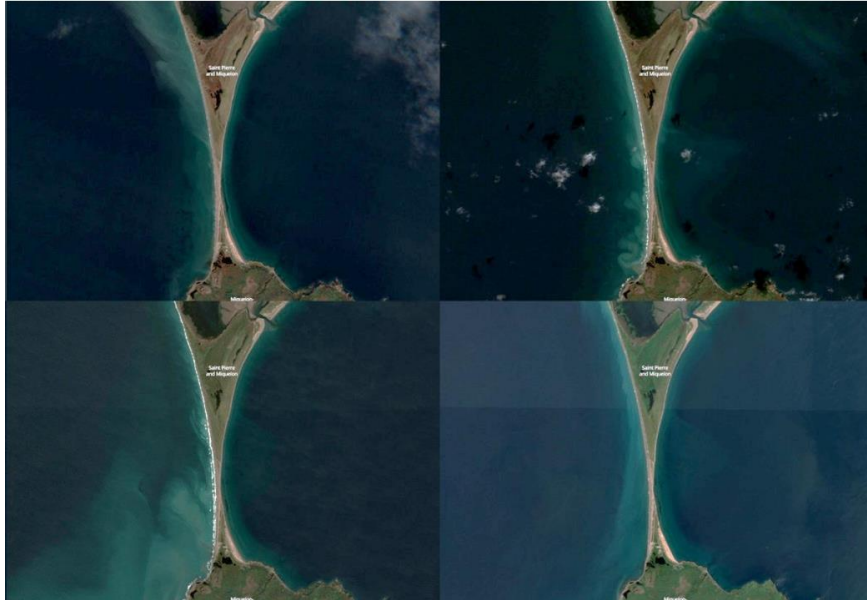


▲ Merged SDB and DriX Bathymetry

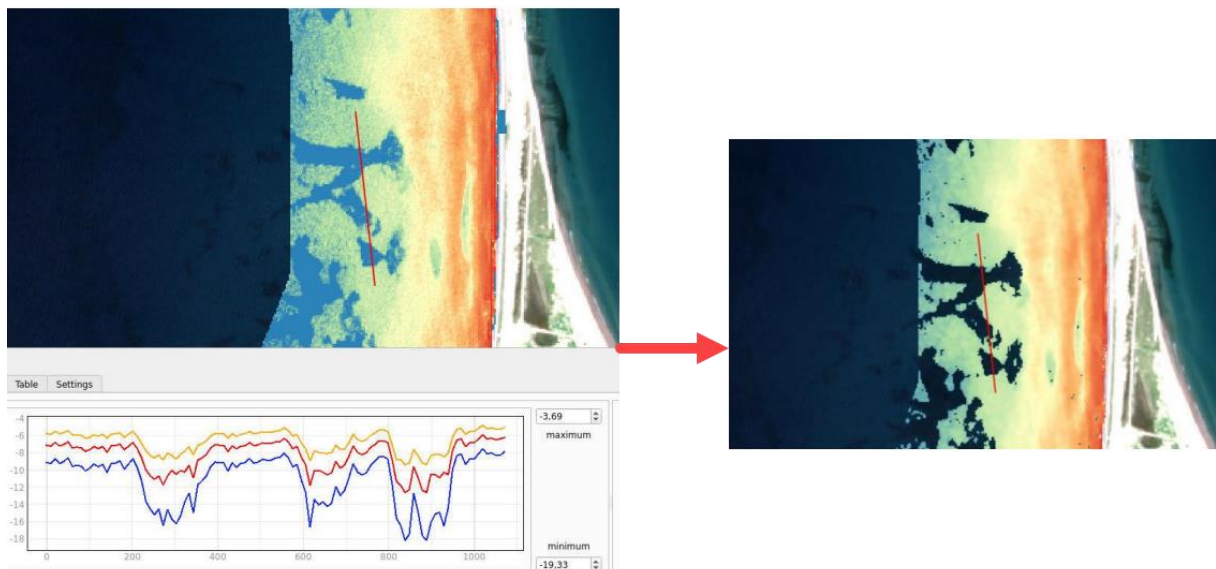
CASE STUDY

1. Satellite-Derived Bathymetry acquisition

The Satellite-Derived Bathymetry (SDB) data for the survey was acquired by Hytech Imaging, utilizing images from the Sentinel-2 and Pleiades satellite constellations. To ensure high reliability and accuracy, especially in the turbid waters of the western part of the isthmus, multiple satellite images were combined.



After computing the SDB data, the high uncertainty areas were filtered out, leading to the final image of 0 to -7m bathymetry.

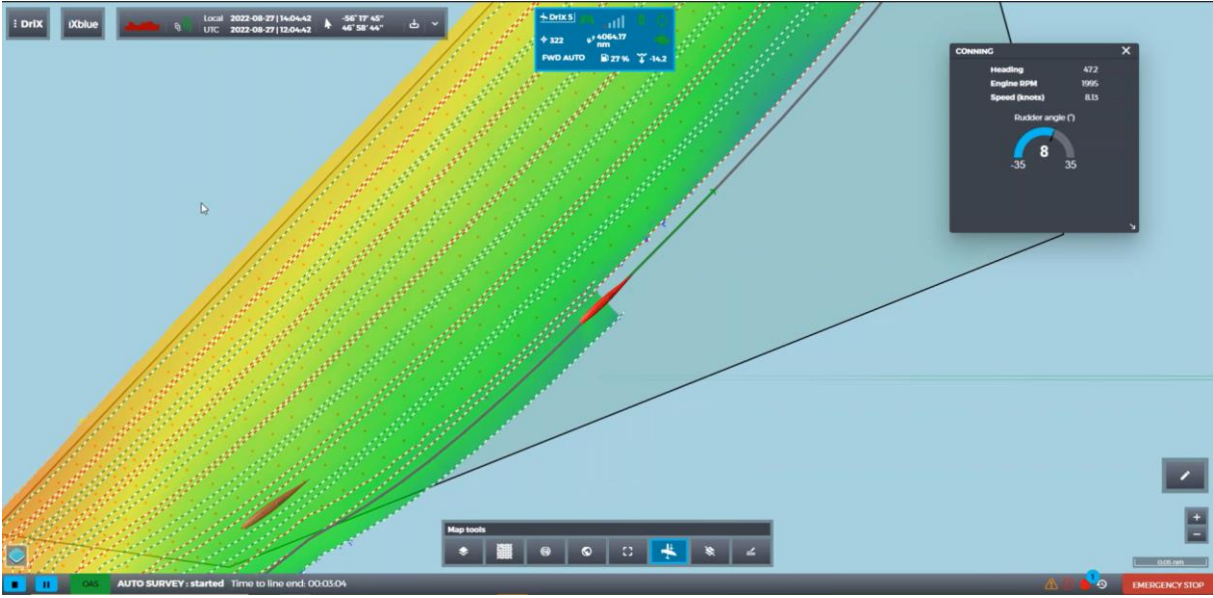


Several corrections were applied to the data set to compensate for atmosphere and water column influence and to correctly position the data.

CASE STUDY

2. DriX bathymetry acquisition & data merging

For this survey DriX was equipped with a Kongsberg EM2040 MKII multibeam, and used its new Autoline feature, improving surveys efficiency by more than 20%. With an average speed of 10 knots and the Autoline feature set to achieve a mean overlap of 5%, DriX was able to efficiently cover the 85 km² survey area in just under six full days of work. For refuelling needs, DriX was remotely supervised on its way to port and recovered by a support vessel before entry.



To further correct the SDB data from any potential vertical offset, a series of profiles were recorded closer to shore when the depth allowed it, to have more MBES data overlapping the SDB, serving as ground truth.

Both data sets were then merged to obtain the global terrain model.

The combination of DriX USV and SDB enabled efficient and safe fully remote operations in a challenging environment characterized by shallow waters, strong tidal currents, and exposure to wind. The use of the Autoline feature, which was implemented for the first time during this operation, significantly enhanced survey efficiency by approximately 25%. This feature eliminated the need for manual line planning and continuously optimized line spacing, thereby streamlining the data collection process and improving overall operational effectiveness.

