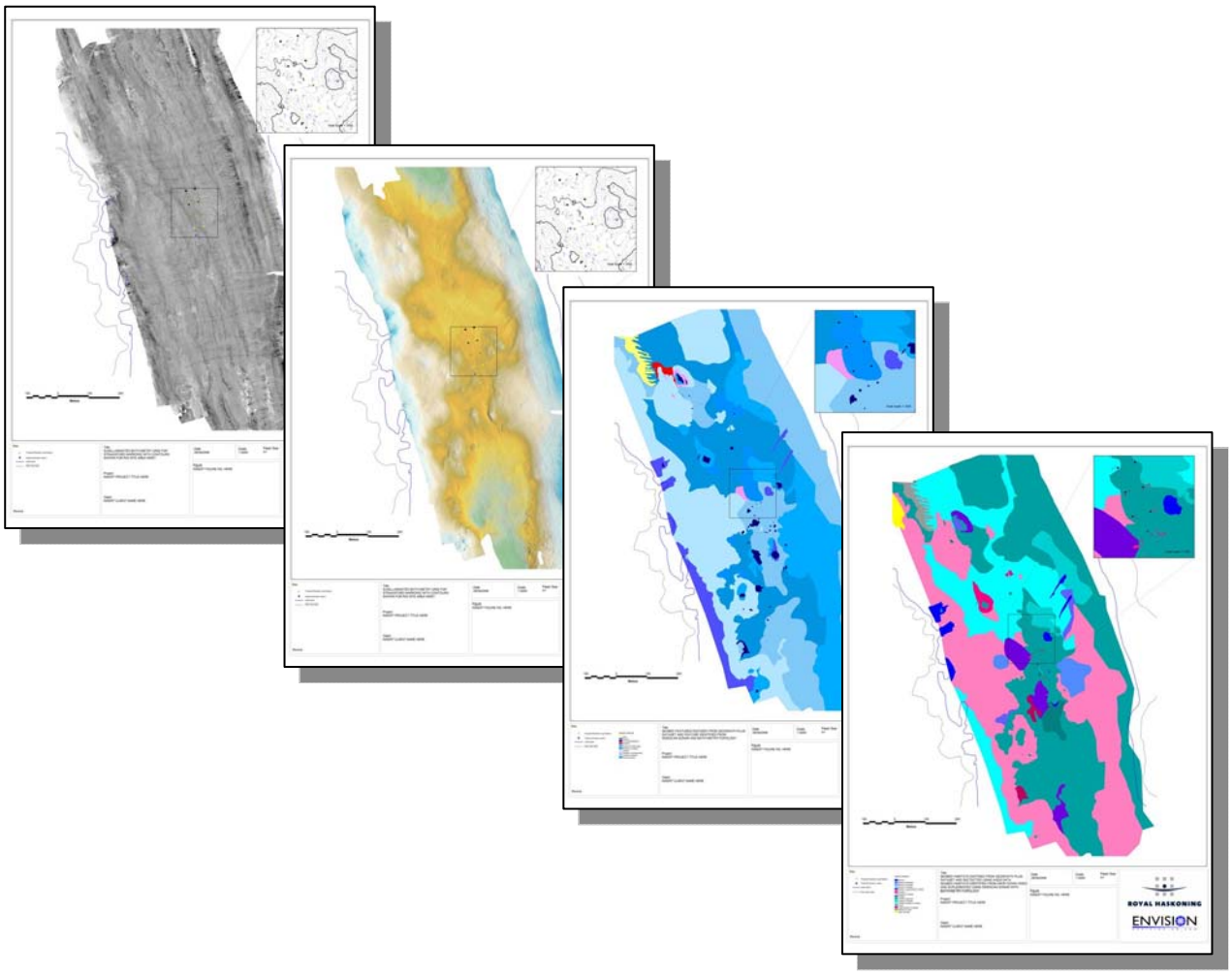
COMPLEMENTARY SURVEY TECHNIQUES FOR MAPPING OF STRANGFORD NARROWS, NORTHERN IRELAND



AIM/OBJECTIVES

To produce seabed habitat and biotope maps for management and site selection within Strangford Narrows, in light of the proposed marine current turbine and placement of the installation rig, using several acoustic remote sensing techniques combined with a variety of video/camera systems and a scanning sonar for ground truthing purposes.

CLIENT

Haskoning, Edinburgh, for **Marine Current Turbines Ltd**.

OUTPUTS

- A seabed habitat and biotope map for management purposes, using several complimentary remote sensing tools and ground truth systems.
- Overview of the biotope & habitats in the vicinity of the proposed site, with reference to the likely impacts of an installation rig and physical limitations of its deployment envelope.

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PROJECT SUMMARY

Envision Mapping Ltd. were commissioned to produce seabed habitat and biotope maps for management and site selection purposes, with reference to the proposed marine current turbine and placement of an installation rig within the Strangford Narrows. Existing sidescan and bathymetric data were provided and used to produce preliminary maps, however the lack of associated ground truth data prevented verification of the habitat or biology. The addition of bathymetry and sidescan sonar data from an interferometric survey were spatially accurate and used to produce a working seabed features map, using only expert interpretation of acoustic data to identify boundaries and seabed features from changes in topology and sidescan sonar return. From the working seabed features map, it was possible to design a survey to collect information on the biology and main seabed habitat types on the seafloor using a drop down camera, as well as AGDS data to further refine the classification of the maps.

Video sample sites were selected on the basis of the different acoustic ground types identified from the working seabed features map. The duration of the videos was kept to between 1 and 2 minutes to reduce positional errors and each sequence was recorded digitally in the surface unit. The drop-down video was deployed from two different systems. For ground truthing data a small rapidly deployed, low drag, 'fish' system was towed to maximise the survey time available due to extreme tidal conditions. A second system was used for site investigation to give a more stable image and also to provide scanning sonar data. A tripod system to which a camera and scanning sonar were attached was lowered to the seabed and footage and sonar data recorded digitally at the surface whilst the tripod remained relatively stationary. The footage was reviewed by Envision staff to record seabed habitats present and estimates of the proportion of substrate types. The footage was reviewed again to attribute biotopes to each video sample.

The acoustic data were collected using a RoxAnn™ GroundMaster AGDS operating at 50 kHz, and together with the GPS data, were logged onto a laptop, keeping the systems portable and self-contained. Although the data can be displayed in real time, Envision analysed the data using image processing and GIS after carrying out detailed data quality assurance procedures. Initially the AGDS data were interpolated to produce raster-based images to which image processing techniques can be applied. Ground truth data were categorised to biotope, and a buffer zone of 20 m created around each video sample, which were then used as 'training' sites to create the acoustic signatures from three AGDS variables. The signatures were then applied using the maximum likelihood classifier, and the process was repeated for the habitat classes.

The results from the AGDS data maps and the ground truth survey were used to refine the classification used for the seabed features map. The interferometric data are spatially more precise than the AGDS data and therefore the boundaries can be expected to be an improvement on the AGDS boundaries. The final habitat and biotope maps were produced by amalgamating the boundaries and classes from the ground truth data, AGDS and swath surveys, and contextually edited within GIS with all the available data to produce the final output.

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