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UNDEB EWROPEAIDD EUROPEAN UNION
Llywodraeth Cymru Welsh Government
Cronfa Datblygu Rhanbarthol Ewrop
European Regional Development Fund

SEACAMS2: Application of remote sensing technologies to assess the vulnerability of Marine Renewable Energy support infrastructure

AIMS: To assess the efficiency and benefits of integrated multibeam, photogrammetry and laser scan surveys to monitor the impacts of climate change on Holyhead Breakwater

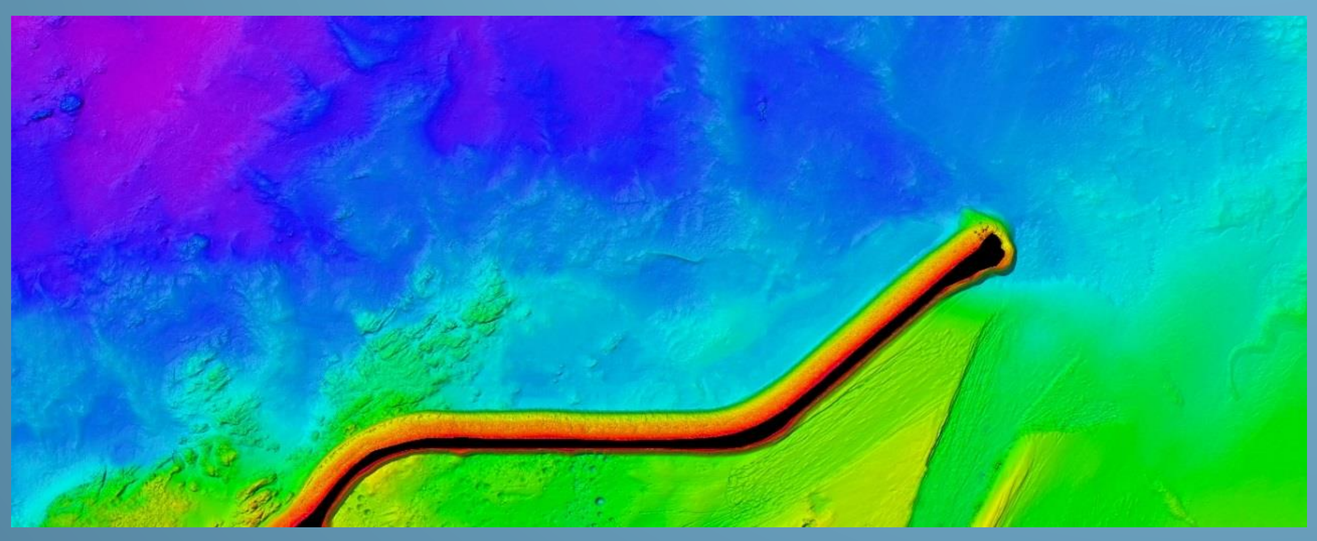
RATIONALE:

Holyhead breakwater is a Grade II listed structure built over 150 years ago, designed to provide protection to the primary port facilities at Holyhead on Anglesey. Holyhead port has become the second busiest in the UK and supports the bulk of marine traffic between the UK and Ireland. Through support from Welsh Government (WG) there are ambitions to develop and expand this sector, together with establishing the port as a manufacturing and support base for major marine renewable energy projects in Wales. The breakwater structure is sited on an eroding 'rubble-mound' extending up to 100m wide and 15m high along its entire length. Several studies undertaken by engineering consultancies have highlighted the issue of erosion on the north-facing seaward side and various solutions have been proposed to WG. Significant costs associated with all these options mean more information and research into the issue is required. High resolution surveys to assess rates of temporal and spatial variability associated with erosion of the foundation above and below the waterline have never been attempted due to uncertainties associated with appropriate methodologies, costs and related outputs. This project proposes to utilise data from a suite of high-resolution surveys (multibeam sonar, drone photogrammetry and laser scan survey) together with data obtained from a multibeam survey undertaken in 2013 to determine the most suitable and cost-effective approaches in monitoring the integrity of coastal defence infrastructure such as this and further quantify the impacts of storm activity on the breakwater foundation itself.

METHODS:

High resolution multibeam surveys using Bangor University's inshore survey vessel 'Macoma' and the Reson SeaBat 7101 multibeam sonar system.

Aerial photogrammetry and laser scan surveys to be undertaken by DTM Technologies Limited.



OUTPUTS:

3-D visualisation, Digital Terrain Models (DTM), AutoCAD outputs and cross-sectional profiles to be incorporated into a final project report providing information on temporal and spatial change of the foundation structure.

Future research publication/s associated with methodologies for the surveying of coastal defence infrastructure and impacts of climate change on coastal defence infrastructure in the Irish Sea. This study will be of direct relevance to the proposed nearshore loading facility planned in association with the nearby Wylfa Newydd nuclear project.

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