

# Satellite-based Bathymetric Mapping in Ireland

UK-based Proteus has been awarded a major contract by the Geological Survey of Ireland (GSI) to deliver complete bathymetric surveys of five Irish bays. In addition to operational mapping, Proteus will use satellite data to create a seabed classification map and perform water quality monitoring on one of the bays for proof-of-concept purposes.

GSI issued a competitive request for proposals following a successful 2012 pilot in which Proteus demonstrated the effectiveness of a commercial satellite-based bathymetry process in Ireland's Wexford Harbour. Developed by EOMAP GmbH and commercialised by Proteus, the technique extracted seafloor elevation measurements to depths in excess of 20 meters with vertical accuracies better than 10% of water depth— using no ground truthing. GSI validated the pilot's results with a multi-beam echo sounding survey.

According to David Critchley, Proteus CEO, the pilot project proved that the company's satellite-derived process can accurately extract bathymetric data from inland bays of the turbid North Atlantic as readily as it does from the clear Red Sea and Caribbean.

The five bays included in the operational contract are among Ireland's most commercially valuable and environmentally important: Cork, Shannon, Dingle, Dundalk and Carlingford. They include turbulent bays fed by fast-flowing rivers that frequently shift submerged sandbars and significant areas of shallows. As a result, bathymetric surveying can be particularly challenging and expensive using marine sonar or airborne Lidar. To date, airborne bathymetric Lidar has failed to achieve coverage in these particular bays.

Covering some 125,000 square kilometers of Ireland's most productive and commercially valuable inshore waters, INFOMAR is producing integrated mapping products covering the physical, chemical and biological features of the seabed, including updated bathymetric charts and physical habitat maps, according to GSI.

Proteus works with EOMAP to commercialise satellite-derived bathymetric and seafloor classification processes developed, and owned by, EOMAP GmbH of Munich, Germany. The process extracts seafloor information from high-resolution, 8-band multispectral imagery collected by DigitalGlobe Inc.'s WorldView-2 satellite and acquired by Proteus through its direct relationship with DigitalGlobe. Derived products have high accuracy, meeting the requirements of engineering, environmental monitoring and strategic geospatial planning applications.

Compared with maritime sonar and airborne Lidar, satellite-derived bathymetric surveys are completed at a fraction of the time and cost, is the opinion of Critchley. Ecological constraints, submerged reefs, and political issues that hamper traditional hydrographic mapping methods are of no hindrance to this way of surveying.

In addition to generating the bathymetric maps for the five Irish bays, Proteus will also deliver a seabed habitat map for one of the bays, also derived from the DigitalGlobe imagery. In Dingle Bay, Proteus will perform water quality monitoring on a demonstration basis. Using a new process applied to NASA MODIS and U.S. Landsat image data, the firm will measure suspended sediments, chlorophyll and other organic matter in the water.

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