

## Preserving the archaeological heritage of the North Sea using innovative data acquisition techniques and webGIS

Incoul Annelies, Philippe De Maeyer, Bart De Wit, Alain De Wulf, Tine Missiaen, Timothy Nuttens, Cornelis Stal and Michiel Van den Berghe

Department of Geography, Faculty of Sciences, Ghent University, Krijgslaan 281 (S8), B-9000 Gent, Belgium  
E-mail: [annelies.incoul@ugent.be](mailto:annelies.incoul@ugent.be)

The knowledge of the underwater cultural heritage in the Belgian North Sea is rather limited. Yet this submerged heritage forms an important aspect of our cultural heritage and offers huge possibilities for scientific and (inter-)cultural purposes. However this unique underwater archive is in danger due to increasing economic activities at sea, such as aggregate extraction, wind farms, dredging, fishing, etc. This is not the only threat. Due to the complexity of the state structure in Belgium, a solid regulation regarding underwater cultural heritage is still lacking, notwithstanding the awareness of the need to take responsibility for this heritage in danger at the political and administrative level. The project SeArch offers solutions to these challenges via the development of an efficient assessment methodology and an approach towards a sustainable management policy and legal framework. This project involves a close collaboration between the following partners: Flanders Marine Institute (VLIZ), Flemish Heritage Agency (FHA), Deltares (Department of Geology and Geophysics) and Ghent University (Renard Centre of Marine Geology, Maritime Institute and Department of Geography). The contribution of the Department of Geography is twofold. First, an innovative survey methodology has to be created which allows accurate and cost-efficient evaluation of the archaeological potential in the intertidal zones of the Belgian beaches. Conventional topographic and bathymetric surface modelling methodologies are not sufficient for these areas and new surveying approaches are required. In the summer of 2013, a field campaign was conducted on the beach of Raversijde (Belgium). A Mobile Terrestrial Laser Scanning (MTLS) configuration on an amphibious vehicle was used to detect archaeological relicts. Previous feasibility studies have demonstrated that this set-up is very promising for intertidal surface modelling in comparison with other measurement techniques. The configuration with an amphibious vehicle also enables data acquisition with unsettled weather and difficult terrain conditions in a reasonable time span and at a reasonable cost. Moreover, the technique appears to close the spatial incompleteness between land measurements and measurements in shallow water (with a depth of less than ten meter). Digital Elevation Models (DEMs) are constructed from the acquired spatial data. Secondly, the Department of Geography is responsible for the set-up of a web-based Geographical Information System/Service (webGIS) as part of a new and specialized Spatial Data Infrastructure (SDI). The application will allow efficient integration and visualisation of archaeological and environmental data in a user-friendly way. By implementing a webGIS, the benefits of standard map reading (such as providing insight) can be combined with facilities such as easy accessible spatial analysis and feature querying in an interactive environment accessible worldwide. The platform is useful for dissemination of information and for support of decision makers.