

Application for Consent to conduct
Marine Scientific Research

Date: 29/11/2013

1. General Information

1.1 Cruise name and/or number:
Developing Geotechno-stratigraphies (DGS)

1.2 Sponsoring Institution(s):	
Name:	School of Biological, Earth and Environmental Sciences University College Cork
Address:	College Road, Cork
Name of Director:	Prof. John O'Halloran

1.3 Scientist in charge of the Project:	
Name:	Prof. Andy Wheeler
Country:	Ireland
Affiliation:	University College Cork
Address:	School of Biological, Earth & Environmental Sciences, Butler Building, North Mall Campus, UCC, Cork, Ireland
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Email:	a.wheeler@ucc.ie
Website (for CV and photo):	http://publish.ucc.ie/researchprofiles/D026/awheeler

1.4 Entity(ies)/Participant(s) from coastal State involved in the planning of the project:	
Name:	n/a
Affiliation:	
Address:	
Telephone:	
Fax:	
Email:	
Website (for CV and photo):	

2. Description of Project

2.1 Nature and objectives of the project:
<p>Ireland has one of the best offshore renewable energy resources in the world. The development of this sector has the potential to yield thousands of new jobs as well as providing Ireland with future energy security.</p> <p>The siting of wind farms requires consideration of foundation design - foundation easily taking up one third of overall investment. Although it is theoretically possible to site wind turbines anywhere offshore, different substrates (and sub-substrates) require different foundation designs (e.g. monopile, tripod, gravity base, steel jacket) and installation approaches (e.g. driving and/or drilling, or suction caissons). An early-development foundation design allows for a tailor-made installation strategy, and thus reduces the costs of transportation, associated crane capacity and the very substantial equipment on the Jack-Up vessels usually required to put these foundations in place. The conditions of the seabed also define where Jack Up vessels best rise on their jack-up legs.</p>

The cost of installing wind turbines in inappropriate substrates can prohibitively affect the viability of the development of a wind farm, leading to the concept of cost-recoverable foundation solutions. Because of the nature of the seabed, some areas of the marine realm will simply never allow profitable wind farms to be developed in. Knowing what areas of the seabed possess appropriate sedimentary sequences allowing profitable wind farm development is thus a first order need and first step assessment towards a national windfarm development strategy.

One of the central objectives of this shiptime proposal is to collect sedimentological, sub-seabed seismic data and in-situ CPT data (cone penetrometer geotechnical data) from offshore of the northern Irish Sea to analyse the marine environmental conditions and thus to optimise the foundation design for offshore renewable energy infrastructure. By recording and analysing fundamental information on seabed and sub-seabed geotechnical properties, this proposal addresses significant knowledge gaps with potentially major bearings on the practicality and costs for both installation and maintenance of offshore renewable energy infrastructure through tailor-made designs for foundation and cable emplacement.

Data collected during this survey will also feed into academic research attempting to understand the development of offshore sedimentary sequences around Ireland where considerable seismics, multibeam and shallow cores have already been taken. Such sequences provide a palaeo-environmental and potential palaeo-climatic record. Understanding the geological history of glacial low-lying coastal areas (now submerged due to sea-level rise) is of fundamental importance in understanding ice sheet dynamics and post-glacial transgressive sequences. We ultimately wish to develop stratigraphic models for Irish near-shore shallow-water shelf sequences to predict (with ground truthing) the geological parameters controlling geotechnical properties. In this way we wish to move toward predictive geotechnical models for the Irish seabed constraining wind turbine foundation potential designs.

The key objectives of the proposal are:

- (1) to determine the sub-seabed stratigraphy (the succession of sedimentary layers below the seabed) in high probability areas for renewable energy farm development with particular relevance to the industry's requirements: the lateral extent and variability in e.g. variation in strata thickness, depth, internal sedimentary unit properties (boulders!) and acoustic reflectivity; thus to advise the industry on optimised foundation designs in target areas
- (2) to collect in-situ geotechnical data (CPT to a maximum sub-seabed penetration of 50m) from key sites
- (3) to generate models (a) of use to government bodies and industry, and (b) for realistic financial modelling for cost-effective installations and maintenance of offshore renewable energy farms.

These objectives will be achieved at several sites in the Irish Sea that are potential areas of identified windfarm development.

2.2 If designated as part of a larger scale project, then provide the name of the project and the Organisation responsible for coordinating the project:

n/a

2.3 Relevant previous or future research projects:

The data from this project feeds into two existing PhD programmes (Marian McGrath and Mark Coughlan). The data is also of potential interest to Gaelectric Developments who have a stated interest in windfarm development in Irish waters.

2.4 Previous publications relating to the project:

CV12006 Cruise Report

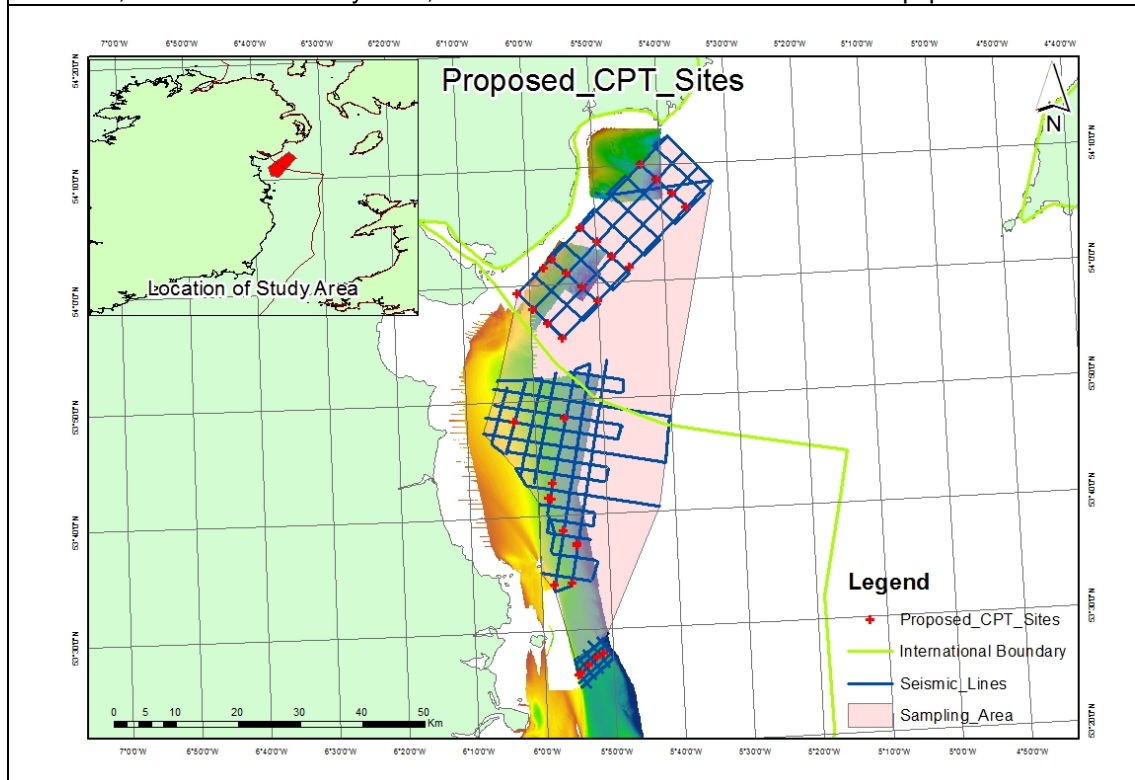
3. Geographical Areas

3.1 Indicate geographical areas in which the project is to be conducted (with reference in Latitude and longitude in decimal degrees, including coordinates of cruise/track/way points/sampling stations). Please provide coordinates in a separate excel spreadsheet.

Below in table format are the coordinates outlining the extent of the sampling survey area

Latitude (decimal degrees)	Longitude (decimal degrees)
54.201	-5.642
53.995	-6.029
53.875	-6.215
53.681	-5.997
53.593	-6.013
53.547	-5.962
53.455	-5.921
53.487	-5.847
53.673	-5.708
54.136	-5.535

3.2 Attach chart(s) at an appropriate scale (1 page, high-resolution) showing the geographical Areas of the intended work and, as far as practicable, the location and depth of sampling Stations, the tracks of survey lines, and the locations of installations and equipment.



4. Methods and means to be used

4.1 Particulars of vessel:

Name:	Celtic Explorer
Type/Class:	Multipurpose Research Vessel
Nationality (Flag State):	Irish
Identification Number (IMO/Lloyds No.):	D100 A1 ICE CLASS ID + UMS +SCM DP (CM)
Owner:	Marine Institute
Operator:	P&O Maritime Services
Overall length (meters):	65.5
Maximum draught:	5.7m
Displacement/Gross Tonnage:	2425T
Propulsion:	2 x 1530 KW, 1000Rpm, 1 x 1020 KW, 1000 Rpm
Cruising & maximum speed:	10 & 16 knots
Call sign:	EI GB
INMARSAT number and method and capability of communication (including emergency frequencies):	00353 91 423397 / 00353 91 423433 00870 763066743 00 353 87 9678520 / 00 353 86 1735500
Name of Master:	Antony Hobin/Denis Rowan
Number of Crew:	13-15
Number of Scientists on board:	18-20 max

4.2 Particulars of Aircraft:	
Name:	n/a
Make/Model:	
Nationality (flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall Length (meters):	
Propulsion:	
Cruising & Maximum speed:	
Registration No.:	
Call Sign:	
Method and capability of communication (including emergency frequencies):	
Name of Pilot:	
Number of crew:	
Number of scientists on board:	
Details of sensor packages:	
Other relevant information:	

4.3 Particulars of Autonomous Underwater Vehicle (AUV):	
Name:	n/a
Manufacturer and make/model:	
Nationality (Flag State):	
Website for diagram & Specifications:	
Owner:	
Operator:	
Overall length (meters):	
Displacement/Gross tonnage:	
Cruising & Maximum speed:	
Range/Endurance:	
Method and capability of communication (including emergency frequencies):	
Details of sensor packages:	
Other relevant information:	

4.4 other craft in the project, including its use: n/a

4.5 Particulars of methods, full description of scientific instruments to be used (for fishing gear specify type and dimension) and location

Types of samples and Measurements:	Methods to be used:	Instruments to be used:	To be carried out within 12nm (yes or no):
In-situ geotechnical measurements of sediment including cone resistance, sleeve friction and pore pressure.	In-situ method using "push-in" tools	<p>GOST Cone Penetration Test</p> <p>GOST is mainly designed to operate from the seafloor. It is powered and controlled via a standard single wire coaxial cable. GOST can handle rod setups of many diameters. So far, we use a 'digital subtraction cone' of 5 cm² in conjunction with a differential pore pressure system on a rod of 2 cm in diameter. GOST has 8.000kg hydraulic push power based on an infinitely variable hydraulic pressure of 0 – 200bar. It has a resolution of 30N or 0,06MPa within a range of 60kN or 120MPa (source: GOST flyer).</p>	Yes
Seismic data collection	Seismic surveying	<p>Geo-Source 400 sparker seismic system</p> <p>The system provides high resolution (<30cm) seismic profiles of the Shallow subbottom strata. The device achieves this level of accuracy due to its multi-tip array of sparker nodes, which are evenly spaced and set in-phase producing a very strong downward projection of acoustic energy. The system which is designed to</p>	Yes

		be towed on or just below the water-surface. High resolution seismic profiles of up to 300m depth can be imaged using the Geo-Spark 200 depending on the composition of the water column, sea conditions and the nature of the underlying geology (http://www.gsi.ie).	

4.6 Indicate nature and quantity of substances to be released into the marine environment:

n/a

4.7 Indicate whether drilling will be carried out. If yes, please specify:

n/a

4.8 Indicate whether explosives will be used. If yes, please specify type and trade name, Chemical content, depth of trade class and stowage, size, depth of detonation, frequency of Detonation, and position in latitude and longitude:

n/a, the seismic system used an electric sound source

5. Installations and Equipment

Details of installations and equipment (including dates of laying, servicing, method and Anticipated timeframe for recover, as far as possible exact locations and depth, and Measurements):

n/a

6. Dates

6.1 Expected dates of first entry into and final departure from the research area by the research vessel and/or other platforms:

10th to 17th January 2014

6.2 Indicate if multiple entries are expected:

During 10 to 17th inclusive

7. Port Calls

7.1 Dates and Names of intended ports of call:

Belfast - tbc

7.2 Any special logistical requirements at ports of call:

tbc

7.3 Name/Address/Telephone of shipping agent (if available):

n/a

8. Participation of the representative of the coastal State

8.1 Modalities of the participation of the representative of the coastal State in the research Project:

n/a

8.2 Proposed dates and ports for embarkation/disembarkation:

Mobilisation in Dublin 10 th January 2014 and Demobilisation in Dublin (Belfast tbc) on the 17 th January

9. Access to Data, Samples and Research Results

9.1 Expected dates of submission to coastal State of preliminary report, which should include The expected dates of submission of the data and research results:

28th February 2014

9.2 Anticipated dates of submission to the coastal State of the final report:

31st June 2014

9.3 Proposed means for access by coastal State to data (including format) and samples:

Please communicate with the Principle scientist who will manage all data releases.

9.4 Proposed means to provide coastal State with assessment of data, samples and Research results:

See above

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples And research results:

See above

9.6 Proposed means of making results internationally available:

See above

10. Other permits Submitted

10.1 Indicate other types of coastal state permits anticipated for this research (received or Pending):

n/a

11. List of Supporting Documentation

11.1 List of attachments, such as additional forms required by the coastal State, etc.:

n/a

Signature:



Contact information of the focal point:

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