

Application for Consent to conduct  
Marine Scientific Research

Date: 25<sup>th</sup> May 2016

1. General Information

1.1 Cruise name and/or number:
SAMS Seaglider Ellett Line 6

1.2 Sponsoring Institution(s):	
Name:	Scottish Association for Marine Science (SAMS)
Address:	Scottish Marine Institute, Oban , PA37 1QA, UK
Name of Director:	Prof. Nick Owens

1.3 Scientist in charge of the Project:	
Name:	Stefan Gary
Country:	UK
Affiliation:	Scottish Association for Marine Science
Address:	Scottish Marine Institute, Oban , PA37 1QA, UK
Telephone:	+44 1631 559 419
Fax:	+44 1631 559 001
Email:	Stefan.Gary@sams.ac.uk
Website (for CV and photo):	www.sams.ac.uk/stefan-gary

1.4 Entity(ies)/Participant(s) from coastal State involved in the planning of the project:	
Name:	Hedinn Valdimarsson
Affiliation:	Marine Research Institute
Address:	Hafrannsóknastofnunin, Skulagata 4 , 121 Reykjavik, Iceland
Telephone:	+354 575 2063
Fax:	+354 575 2001
Email:	hv@hafro.is
Website (for CV and photo):	www.researchgate.net/profile/Hedinn_Valdimarsson

2. Description of Project

2.1 Nature and objectives of the project:
<p>This is a water column survey (down to 1000 m) being undertaken by a marine glider (Seaglider), which is an addition to the annual ship borne cruises undertaken by NERC to monitor the conditions of the north Atlantic between Scotland and Iceland. In situ measurements are made every 6 hours to enable the international oceanographic community assess changes in the state of the water properties over a long period of time. The glider relays data back to the receiving station at SAMS in real time. In UK waters these data are then immediately relayed on public access data bases for immediate inclusion in forecast models. Since the data have no strategic importance we would also like this to happen whilst in Icelandic waters.</p> <p>The glider will cross the Rockall Hatton Plateau and then approach Iceland from the south along 20° W. Having reached the Icelandic Shelf edge (around position 63° 19.0' N, 20° 13.0' W) she will turn around and go back to UK waters following the same route. Her speed through the water is about 0.25 m/s so progress is slow and dependent on local conditions. Her progress can be followed from <a href="http://velocity.sams.ac.uk/gliders/">http://velocity.sams.ac.uk/gliders/</a></p>

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:
This deployment is part of the Extended Ellett Line project, funded by the Natural

Environmental Research Council, and jointly led by Scottish Association for Marine Science (SAMS, contact: Dr Stefan Gary [Stefan.Gary@sams.ac.uk](mailto:Stefan.Gary@sams.ac.uk)) and the National Oceanography Centre Southampton (NOCS, contact: Dr Penny Holliday [penny.holliday@noc.ac.uk](mailto:penny.holliday@noc.ac.uk)).  
Project website: <http://prj.noc.ac.uk/ExtendedEllettLine/>

#### 2.3 Relevant previous or future research projects:

The Extended Ellett Line has been occupied almost yearly by UK research ships since 1975. The most recent cruises were:

DY052 aboard *RRS Discovery* in June 2016

DY031 aboard *RRS Discovery* in May - June 2015

JR302 aboard *RRS James Clark Ross* in June - July 2014

JC086 aboard *RRS James Cook* in in May 2013

D379 aboard *RRS Discovery* in August 2012

The complete list of cruises is available at: <http://prj.noc.ac.uk/ExtendedEllettLine/project-information/individual-sections>

The data collected by this glider will be used in conjunction with data collected by other gliders deployed around the Hatton Plateau (in international waters) for the OSNAP (Overturning in the Subpolar North Atlantic Program) project, website: [www.o-snap.org/](http://www.o-snap.org/)

#### 2.4 Previous publications relating to the project:

Sherwin, T.J., D. Aleynik, E. Dumont, & M. E. Inall (2015). Deep drivers of mesoscale circulation in the central Rockall Trough, *Ocean Sci.*, 11, 343–359, [www.ocean-sci.net/11/343/2015/](http://www.ocean-sci.net/11/343/2015/), <http://dx.doi.org/10.5194/os-11-343-2015>

Johnson, C., Inall, M. & Hakkinen, S. (2013). Declining nutrient concentrations in the northeast Atlantic as a result of a weakening Subpolar gyre, *Deep Sea Research I*, 82, 95-107, <http://dx.doi.org/10.1016/j.dsr.2013.08.007>

Beszczynska-Moller, A. & Dye, S.R. (Eds) (2013). ICES Report on Ocean Climate 2012. ICES Cooperative Research Report No 321, 73pp

Dye, S, Hughes, S.L., Tinker, J., Berry, D., Holliday, N.P., Kent, E.C., Kennington, K., Inall, M., Smyth, T., Nolan, G., Lyons, K., Andres & O., Beszczynska-Moller, A. (2013a), Impacts of climate change on temperature (air and sea), Marine Climate Change Impacts Partnership: science review, MCCIP Science Review 2013: 1-xxx, published online Nov 13.

Dye, S, Holliday, N.P., Hughes, S.L., Inall, M., Kennington, K., Smyth, T., Tinker, J., Andres & O., Beszczynska-Moller, A. (2013b), Impacts of climate change on salinity, Climate Change Impacts Partnership: science review, MCCIP Science Review 2013: 1-xxx, published online Nov 13.

Frost, M, Baxter, J.M., Bayliss-Brown, G.A., Buckley, P.J., Cox, M. & Withers Harvey, N. (2013). MCCCIP, 2013. Marine Climate Change Impacts Summary Report, MCCIP, Lowestoft, 12pp.

Holliday, N.P. and Cunningham, S. (2013). The Extended Ellett Line: Discoveries From 65 Years of Marine Observations West of the UK. *Oceanography* 26(2):156–163, <http://dx.doi.org/10.5670/oceanog.2013.17>

Holliday, N.P., Cunningham, S. & Griffiths, C. (2013). State of the eastern North Atlantic subpolar gyre: the Extended Ellett Line Programme, Annual Report No. 1. National Oceanography Centre Research and Consultancy Report No 36, 15pp.

Holt, J., Hughes, S., Hopkins, J., Wakelin, S.L., Holliday, N.P., Dye, S., Gonzalez-Pola, C., Saetre Hjollo, S., Mork, K-A., Nolan, G., Proctor, R., Read, J., Shammon, T., Sherwin, T., Smyth, T., Tattersall, G., Ward, B. & Wiltshire, K. (2012). Multi-decadal variability and trends in the temperature of the northwest European continental shelf: a model-data synthesis,

Progress in Oceanography, 106, 96-117

Hughes, S., Holliday, N.P., Gaillard, F. & ICES Working Group on Oceanic Hydrography (2012). Variability in the ICES/NAFO region between 1950 and 2009: observations from the ICES Report on Ocean Climate. ICES Journal of Marine Science, 69, (5), 706-719.  
<http://dx.doi.org/10.1093/icesjms/fss044>

Sherwin, T. J., Read, J. F., Holliday, N. P., & Johnson, C. (2012). The impact of changes in North Atlantic Gyre distribution on water mass characteristics in the Rockall Trough. ICES Journal of Marine Science: Journal du Conseil, 69(5), 751-757.

Johnson, C., 2012. Tracing Wyville Thomson Ridge Overflow Water in the Rockall Trough, PhD Thesis, University of Aberdeen.

### 3. Geographical Areas

3.1 Indicate geographical areas in which the project is to be conducted (with reference in Latitude and longitude, including coordinates of cruise/track/way points)

56° N to 63.5° N, 5° W to 20° W.

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.

Chart attached at the end of the form.

### 4. Methods and means to be used

#### 4.1 Particulars of vessel:

Name:	
Type/Class:	
Nationality (Flag State):	
Identification Number (IMO/Lloyds No.):	
Owner:	
Operator:	
Overall length (meters):	
Maximum draught:	
Displacement/Gross Tonnage:	
Propulsion:	
Cruising & maximum speed:	
Call sign:	
INMARSAT number and method and capability of communication (including emergency frequencies):	
Name of Master:	
Number of Crew:	
Number of Scientists on board:	

#### 4.2 Particulars of Aircraft:

Name:	
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:	Seaglider
Manufacturer and make/model:	Kongsberg Underwater Technology Inc., model: Seaglider 1KA
Nationality (Flag State):	UK
Website for diagram & Specifications:	<a href="http://www.apl.washington.edu/projects/seaglider/specifications.html">http://www.apl.washington.edu/projects/seaglider/specifications.html</a>
Owner:	SAMS
Operator:	SAMS
Overall length (meters):	instrument length = 1.8m, with antenna 2.8m
Displacement/Gross tonnage:	52kg (dry)
Cruising & Maximum speed:	cruising: 0.25m/s, maximum: 0.35m/s
Range/Endurance:	3,000km / 7 months
Method and capability of communication (including emergency frequencies):	Iridium satellite network
Details of sensor packages:	Digiquartz pressure sensor Seabird conductivity and temperature sensors Aanderaa oxygen optode Wetlabs fluorescence and backscatter sensor
Other relevant information:	

4.4 other craft in the project, including its use:
AUV to be deployed and recovered from a RHIB off Oban, in UK waters.

4.5 Particulars of methods and scientific instruments:		
Types of samples and Measurements:	Methods to be used:	Instruments to be used:
depth	sensor data only – no physical sample	Paine pressure sensor
temperature	sensor data only – no physical sample	Seabird CT sail
conductivity	sensor data only – no physical sample	Seabird CT sail
oxygen	sensor data only – no physical sample	Aanderaa optode 4330
fluorescence	sensor data only – no physical sample	Wetlabs BB2FL puck
backscatter 700nm wavelength	sensor data only – no physical sample	Wetlabs BB2FL puck
backscatter 470nm wavelength	sensor data only – no physical sample	Wetlabs BB2FL puck

4.6 Indicate nature and quantity of substances to be released into the marine environment:
None

4.7 Indicate whether drilling will be carried out. If yes, please specify:
No

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:
No

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):

No equipment installed.

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:

AUV expected first entry in Icelandic waters: 1<sup>st</sup> December 2016 at the earliest

AUV expected final departure from Icelandic waters: 1<sup>st</sup> June 2017 at the latest

6.2 Indicate if multiple entries are expected:

No, one continuous entry of up to 4 months.

7. Port Calls

7.1 Dates and Names of intended ports of call:

None

7.2 Any special logistical requirements at ports of call:

N/A

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:

All data will be made available to the Marine Research institute as required, and in real time if requested.

8.2 Proposed dates and ports for embarkation/disembarkation:

N/A

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:

Six months after completion of AUV deployment.

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

Six months after completion of AUV deployment.

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

Via the SAMS website and also via FTP to the British Oceanographic Data Centre and thereon to the WMO's Global Telecommunication System for global dissemination. Data will also be sent by ftp to MRI if requested.

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

We have invited Dr Valdimarsson to become a Co-PI of the project.

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

We can send copies of published scientific papers produced as a result of the data collected upon request. We would also be able to provide scientists with data in various formats adapted to their requirements (ascii, Matlab, NetCDF, plots), and the necessary scripts to read and process the datasets in scientific software (e.g. Matlab).

9.6 Proposed means of making results internationally available:

The data will be used in future scientific papers.

10. Other permits Submitted

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

None

11. List of Supporting Documentation

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

None

Signature:



(on behalf of the Principal Scientist)

Contact information of the focal point:

Name: Estelle Dumont

Country: UK

Affiliation: Scottish Association for Marine Science (SAMS)

Address: Scottish Marine Institute, Oban , PA37 1QA, UK

Telephone: +44 (0) 1631 559 433

Fax: +44 (0) 1631 559 001

Email: [Estelle.Dumont@sams.ac.uk](mailto:Estelle.Dumont@sams.ac.uk)

Appendix 1: Chart of survey area

