Application for Consent to conduct
Marine Scientific Research

Date: _08. Aug. 2015_

1. General Information

1.1 Cruise name and/or number: Measurement of mackerel schools using 2D and 3D sonars /Cruise number 2015116

1.2 Sponsoring Institution(s):	
Name:	Institute of Marine Research
Address:	Nordnesgaten 50,Bergen, Norway
Name of Director:	Tore Nepstad

1.3 Scientist in charge of the Project:	
Name:	Egil Ona
Country:	Norway
Affiliation:	Principal scientist
Address:	Nordnesgaten 50,Bergen, Norway
Telephone:	55238500
Fax:	55238531
Email:	egil.ona@imr.no
Website (for CV and photo):	www.imr.no

1.4 Entity(ies)/Participant(s) from coastal State involved in the planning of the project:	
Name:	Dr. Paul Fernandes or PHD student
Affiliation:	
Address:	School of Biological Sciences, Zoology Building, University of Aberdeen,Tillydrone Avenue, Aberdeen, AB24 2TZ
Telephone:	Tel: +44 (0)1224-274166
Fax:	
Email: fernandespg@abdn.ac.uk	
Website (for CV and photo):	http://www.abdn.ac.uk/biologicalsci/staff/details/fernandespg

2. Description of Project

2.1 Nature and objectives of the project:
The main goal of this project is to enable accurate identification, sizing and abundance estimation of schooling fish using new technology in omni-directional sonar. Subgoals: To develop robust, scientific calibration methods for two specific sonar systems, using new, large standard spheres and individual beam mapping.

To specify new scientific data output, including raw element data, and to study the effect of different pulse transmission forms to maximize the overall signal to noise ratio across the available frequency band. Prototype post-processing tools.

To conduct field trials ex situ experiments on controlled, schooling populations of fish inside acoustically transparent cages at Austevoll Aquaculture station, as well as at sea, coupled with echo sounder, HD video and stereo camera methods.

To conduct three field trial surveys, using commercial fishing vessels with purse seine on two selected fish species, with validation of school biomass estimates from sonar with real purse seine catches.

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:

2.3 Relevant previous or future research projects:

Several research projects are related to the work suggested in this proposal: At IMR, these are: 10242: Absolute abundance estimation of fish; 10108, SIMFAMI (see Fernandes et al., 2006); 10697 Multi-beam sonar MBES, 13222, Implementation of sonar in abundance estimation of pelagic fish and several other internal, regular projects aiming to produce accurate acoustic estimates on pelagic fish and mammals. CRISP, Center for research based Innovation in capture technology and processing): IMR 83850, involving pre-catch identification, biomass estimation and fish sizing.

2.4 Previous publications relating to the project:

Macaulay,G., Ona, E., Calise, L., 2013. Progress on broadband acoustic investigations of individuals and schools. ICES FAST.WG, San Sebastian, Spain, from 16–19 April 2013.

Peña, H., 2013. Improved methods for data processing from omnidirectional fisheries sonar for studying pelagic fish schools. ICES FAST WG, San Sebastian, Spain, from 16–19 April 2013.

Vatnehol, S., Totland, A., Ona, E. 2013. Calibration trials on a omni-directional fishery sonar with the split-beam method. ICES FAST WG, San Sebastian, Spain, from 16–19 April 2013.

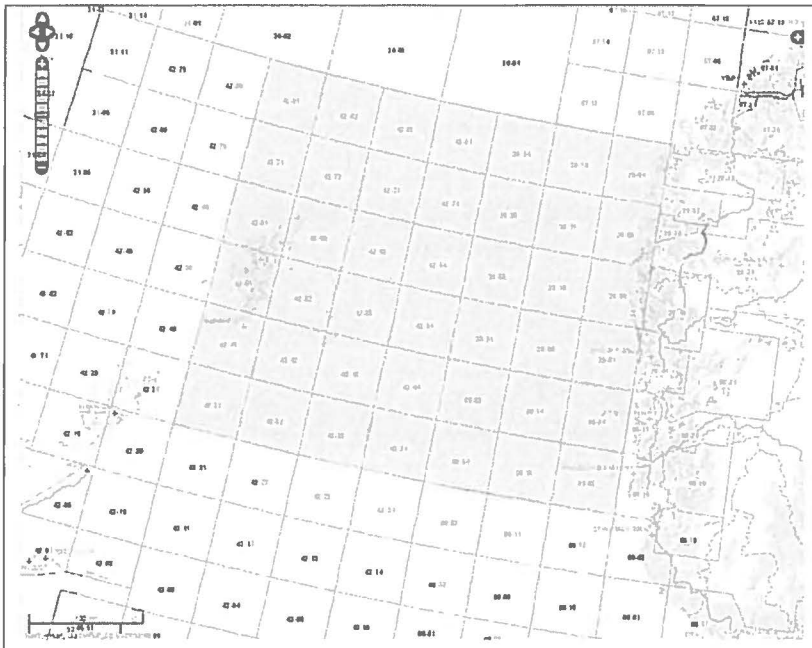
Tenningen, M., Peña, H., and Macaulay, G. J. 2014. Estimates of net volume and fish density during commercial purse seining. Fisheries Research 161 (2015) 244–251

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.

62° 00' N -02° 00' W, 62° 00' N – 05° 00' W,59° 00' N – 02° 00' W, 59° 00' N - 05° 00' 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.



The survey will be carried out in the mackerel fishing grounds, either in Norwegian or UK waters

4. Methods and means to be used

4.1 Particulars of vessel:	
Name:	G. O. Sars
Type/Class:	Research vessel
Nationality (Flag State):	Norwegian
Identification Number (IMO/Lloyds No.):	9260316
Owner:	Institute of marine research/University of Bergen
Operator:	Institute of marine research, P.O. Box 1870 Nordnes, N-5024 Bergen
Overall length (meters):	77,5
Maximum draught:	7,30
Displacement/Gross Tonnage:	4067
Propulsion:	DC-Electric
Cruising & maximum speed:	10-11 knots, 17 knots
Call sign:	LMEL
INMARSAT number and method and capability of communication (including emergency frequencies):	Telephone: +47 55906440 Telefax: +47 55906441 e-mail: GOSars@imr.no
Name of Master:	John Hugo Johansen/Preben Vindenes
Number of Crew:	15
Number of Scientists on board:	Max. 20

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:	
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:

4.5 Particulars of methods and full description of scientific instruments to be used(for fishing gear specify type and dimension)		
Types of samples and Measurements:	Methods to be used:	Instruments to be used:
Echo surveying	Echo sounders (multibeam, keel mounted)	SIMRAD echo sounders
Sonar surveying	Fisheries sonars	SIMRAD sonar

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:
None

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):

None

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:
Dates for first entry and final departure planned at 20. October 2015 and 05. November 2015, respectively.
6.2 Indicate if multiple entries are expected:
Multiple entries within the period 20. October and 05. November 2015 may be expected.

7. Port Calls

7.1 Dates and Names of intended ports of call:
25. October 2015 at Lerwick port or Kirkwall port

7.2 Any special logistical requirements at ports of call:
No

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

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:
No plans, maybe visting PHD student, entering Bergen, leaving Bergen

8.2 Proposed dates and ports for embarkation/disembarkation:
Bergen/ Bergen

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:

9.2 Anticipated dates of submission to the coastal State of the final report:
Final report expected within 3 months after end of cruise

9.3 Proposed means for access by coastal State to data (including format) and samples:
Access to data and samples through Institute of Marine Research database, and exchange with cooperating partners, University of Aberdeen, Dr. Paul Fernandes and students

9.4 Proposed means to provide coastal State with assessment of data, samples and Research results:
Cooperation with University of Aberdeen, Dr. Paul Fernandes

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples

And research results:

9.6 Proposed means of making results internationally available:
Available to the international scientific community through Institute of marine research

10. Other permits Submitted

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

11. List of Supporting Documentation

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

Signature:

Contact information of the focal point:
Name: Egil Ona
Country: Norway
Affiliation: Principal scientist
Address: Nordnesgaten 50,Bergen, Norway
Telephone: 55238500, 55906442 (on vessel)
Fax: 55238531
Email: egil.ona@imr.no