

Application for Consent to Conduct Marine Scientific Research
in Japan

Date: 19 December 2009

Revised: 20 January 2010

Revised 21 January 2010

1. *General Information*

1.1 Project name and/or #:	PhilSea10
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1.2 Undertaking institution:	Scripps Institution of Oceanography
Name:	Elizabeth Brenner/Rose Dufour
Address:	University of California 9602 La Jolla Shores Drive La Jolla, CA 92037 858-534-2841 shipsked@ucsd.edu
Name of Director:	Dr. Tony Haymet

1.3 Government Agency Responsible for Supervising the Project:	
Name	Dr. Ellen Livingston, 321 OA
Address	U.S. Office of Naval Research 875 North Randolph Street, Suit 1425 Arlington, VA 22203-1995

1.4 Scientist in charge of the project:	
Name:	Dr. Arthur Baggeroer
Address:	Professor Mechanical and Electrical Engineering Depts Massachusetts Institute of Technology 77 Massachusetts Avenue Cambridge, MA 02139 USA
Telephone:	(617) 253-4336
Telex:	
Telefax:	n/a
E-mail Address:	abb@boreas.mit.edu
Name:	Dr. Kevin Heaney
Address:	Ocean Acoustical Services and Information Systems, Inc. 5 Militia Dr. Lexington, MA 02421
Telephone:	703-250-5753
Telex:	
Telefax:	703-250-5753
E-mail Address:	Heaney@oasislex.com

1.5 Scientist(s) from Japan involved in the planning of the project:	
Name(s):	None

Address:	
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2. Description of Project (Attach additional pages as necessary)

2.1 Nature and objectives of the project:

In work supporting the Office of Naval Research's deep water acoustics program, OASIS Inc, and the Massachusetts Institution of Technology (Prof. Arthur Baggeroer) plan to deploy a pair of J-15-2 sources for the transmission of acoustic signals in the Northern Philippine Sea during the first two weeks of July 2010. The source transmissions are in conjunction with the PhilSea10 experiment, where a set of acoustic sources and a Distributed Vertical Line Array (DVLA) recording package will be deployed by the Scripps Institution of Oceanography. (P. Worcester State No. 2009-101)

The 2010–2011 PhilSea10 experiment will combine measurements of acoustic propagation and ambient noise with the use of an ocean acoustic tomography array to help characterize this oceanographically complex and highly dynamic region. The tomographic array consists of six acoustic transceivers that both transmit and record low-frequency acoustic signals. It will have a radius of approximately 330 km, spanning much of the northern Philippine Sea. This unclassified academic effort is funded by the Office of Naval Research for use in non-military

The PhilSea10 objectives are to (i) understand the impacts of fronts, eddies, and internal tides on acoustic propagation in this highly variable region, (ii) examine acoustic propagation through mesoscale oceanographic structure. Short range transmissions, conducted in international waters near the DVLA will be used to examine bottom interacting acoustics, convergence zone propagation and signal coherence in the presence of source/receiver motion and dynamic oceanography.

A total acoustic transmission time of 120 hours is expected for the first two weeks of July 2010. Two long transects with a range extent of 300 km are planned from the DVLA location out to the perimeter of the tomography pentagonal mooring (see section 5.2). Two of the tomography moorings are in Philippine water and one is in Japanese waters. The decision about which radial legs to take from the DVLA will be made during the experiment and will be based upon meso-scale oceanographic features (location of eddies and fronts at the time).

Three days of Conductivity/Temperature/Salinity (CTD) surveys are planned within the tomographic array. The location of these profiles will be dependent upon the local oceanography at the time and upon the geometry of the source tows.

The PhilSea10 Pilot Study/Engineering Test will take place in the northern Philippine Sea (see section 5.2). The DVLA location is in international waters.

The location of WRC source mooring T1 is in Japan's Exclusive Economic Zone (EEZ). The locations of WRC source moorings T2, T3, and T6 are in international waters. The locations of WRC source moorings T4 and T5 are in the EEZ of the Philippines. The moorings will be deployed during spring 2010 and recovered approximately one year later, during spring 2011. The research vessel *R/V Roger Revelle* will be used for the source tow cruise.

2.2 Relevant previous or future research cruises:
 April-May 2009: NPAL Philippine Sea Pilot Study/Engineering Test [\[Japan - State Dept. No. 2008-091\]](#)

2.3 Previously published research data relating to the project:
 None

3. Methods and Means to be Used

3.1 Particulars of vessel:	
Name:	R/V Roger Revelle
Type:	Research Vessel
Nationality:	USA Flag
Owner:	U.S. Navy
Operator:	University of California, San Diego , Scripps Institution of Oceanography
Overall length:	84 m [275']
Maximum draught:	5.2 m [17']
Gross tonnage:	3,180 long tons
Propulsion:	Two 3000 hp Propulsion General Electric Bow Thruster: 1180 hp Azimuthing jet Type Elliot Gill Model 50T 35 Propulsors: Two 3000 hp Z-Drives Lips Type FS 2500-450/1510BO
Cruising speed:	12 knots
Maximum speed:	14 knots
Call sign:	KAOU
Method and capability of communication (including telex, frequencies):	Email, master@rv-revelle.ucsd.edu Inmarsat-B, Telephone, Indian, 011-873-336780030 Alternate, 011-873-336780020 Fax, Primary, 011-873-336780031 Alternate, 011-873-336780021 Telex,

	<p>Primary, 336780033 (AnsBk=KAOU) Alternate, 336780022 (AnsBk=KAOU) Inmarsat-C, 436780010 Radio, Vessels guard standard GMDSS frequencies for calling, distress and dissemination of marine safety information.</p> <hr/> <p>MMSI #, 367800100 SELCAL #, 71410 Telex, Primary, 336780033 (AnsBk=KAOU) Alternate, 336780022 (AnsBk=KAOU) Inmarsat-C, 436780010 Radio, Vessels guard standard GMDSS frequencies for calling, distress and dissemination of marine safety information. MMSI #, 367800100 SELCAL #, 71410</p>
Name of master:	Tom Desjardins
Number of crew:	22
Number of scientists on board:	No more than 37

3.2 Aircraft or other craft to be used in the project: None

3.3 Particulars of methods and scientific instruments		
Types of samples and data	Methods to be used	Instruments to be used
Acoustic propagation data	Section 2.1	J-15-2 Acoustic Source
Temperature/salinity profiles	Ship-based CTD casts	Seabird CTD
Temperature, salinity, oxygen, currents, meteorological measurements	Underway measurements from continuously pumped surface seawater and on-board sensors	Thermosalinograph, acoustic Doppler sonars ADCP RDI Narrowband and RDI Broadband 150 kHz
Magnetometer if available	Towed Magnetometer	Marine Magnetics SeaSpy Gradiometer
Bathymetry and sidescan	Swath mapping with multibeam system	EM120 12 kHz 150 deg swath
Sub-bottom profiles	Sub-bottom profiler	Knudsen 320 B 3.5/12 kHz
Gravity if available	Gravimeter	Gravimeter-Bell BGM-3

*Indicate type and specification of instruments (e.g. length and number of cables towed)

3.4 Indicate whether harmful substances will be used: **None**

3.5 Indicate whether drilling will be carried out: **None**

3.6 Indicate whether explosives will be used (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**

3.7 Indicate whether the project involves catching, taking, or exploration of marine mammals and plants: **None**

N.B. When the research project involves catching, taking or exploration of marine mammals and/or plants in the exclusive economic zone of Japan, a separate approval from the Ministry of Agriculture, Forestry, and Fisheries of Japan under the Law on the Exercise of Sovereign Rights Concerning Fisheries in the Exclusive Economic Zone shall also be necessary. Applicants may submit the application form provided in Annex II through diplomatic channels. Catching and taking of marine Mammals and/or plants

in the territorial Sea of Japan is generally prohibited by the Law for Regulation for Fishing Operation of Foreign Nationals and shall not be approved.

4. Installations and Equipment

None.

5. Geographical Areas

5.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude):

Measurements will be taken within the boundaries of the PhilSea10 Tomographic Array:

Mooring	Latitude (N)	Longitude (E)	Water Depth (m)
Acoustic Transceiver T1	23.138°	127.063°	5930
Acoustic Transceiver T2	20.823°	129.789°	5933
Acoustic Transceiver T3	17.788°	128.058°	5753
Acoustic Transceiver T4	18.351°	124.290°	5780
Acoustic Transceiver T5	21.543°	123.818°	5323
Acoustic Transceiver T6	20.468°	126.812°	5585
DVLA	21.360°	126.020°	5530

CTD, underway multibeam, and sub-bottom profiler data will be collected along the lines between the moorings.

5.2 Attach chart(s) at an appropriate scale showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment.

The PhilSea10 Pilot Study/Engineering Test will take place in the northern Philippine Sea (Table 1 and Figure 3). The DVLA location is in international waters. The location of WRC source mooring T1 is in Japan's Exclusive Economic Zone (EEZ). The locations of WRC source moorings T2, T3, and T6 are in international waters. The locations of WRC source moorings T4 and T5 are

in the EEZ of the Philippines. The moorings will be deployed during spring 2010 and recovered approximately one year later, during spring 2011. The research vessel *R/V Roger Revelle* will be used for the mooring deployment cruise. The *R/V Roger Revelle* will also likely be used for the mooring recovery cruise in spring 2011, although it is possible that an alternate vessel in the University-National Oceanographic Laboratory System ([UNOLS](#)) fleet will be used instead.

Mooring	Latitude (N)	Longitude (E)	Water Depth (m)
T1	23.138	127.063	5930
T2	20.823	129.789	5933
T3	17.788	128.058	5753
T4	18.351	124.290	5780
T5	21.543	123.818	5323
T6	20.468	126.812	5585
DVLA	21.360	126.020	5530

Table 1. Approximate mooring locations and (corrected) water depths for PhilSea10, which consists of six acoustic transceivers (T1, T2, ... T6) and the DVLA receiver.

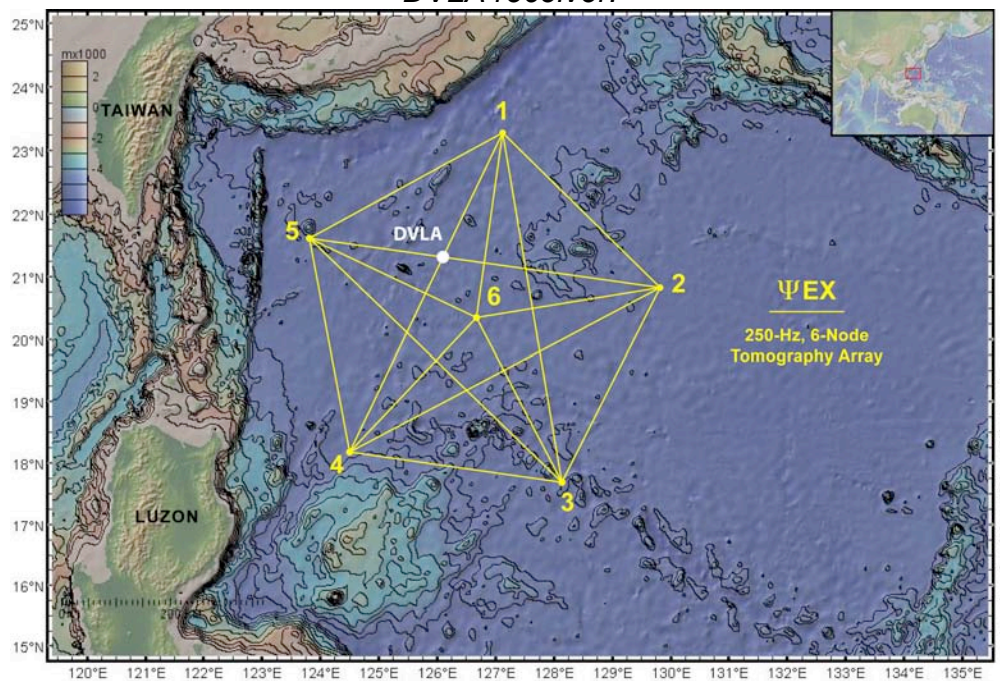


Figure 3. Plan view of the PhilSea10 mooring geometry, consisting of six acoustic transceivers (T1, T2, ... T6) and the DVLA receiver located at the intersection of the T1-T4 and T2-T5 paths.

The subsurface floats supporting the DVLA mooring and the transceiver moorings will be approximately 150 m below the ocean surface (Fig. 4). The moorings are connected to anchors on the seafloor using two parallel acoustic

releases. The moorings are recovered by sending a coded acoustic command to the releases, instructing them to let go of the anchor, so that the mooring can rise to the surface.



Fig. 4. Subsurface float used to support the DVLA mooring.

6. Dates

6.1 Expected dates of first entry into and final departure from the research area of the research vessel:

The safe dates for this cruise are 1-22 July 2010. R/V <i>Roger Revelle</i> 's current schedule can be see at:
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http://strs.unols.org/Public/diu_schedule_view.aspx?ship_id=10019&year=2010

6.2 Indicated if multiple entry is expected:
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Not probable.

7. Port Calls

7.1 Dates and names of intended ports of call:
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None in the Japan

All port calls in Kao-hsiung, Taiwan

N.B. A separate request should be submitted by Note Verbales for intended port calls by public vessels.

7.2 Name/Address/Telephone of shipping agent (if available):
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Mr. H.M. Chao
Jardine Shipping Services
5F, No.21 Chung HWA 3rd Road
Kao-hsiung, Taiwan
Ph# 886-7-281-2804
Fax # 886-7-201-5492
Cell # 886-929-639-939
Email: hm.chao@jm.com.tw or operation.kao@jm.com.tw

8. Participation

8.1 Extent to which Japanese scientists or officials will be enabled to participate or to be represented in the research project:

Participation by Japanese colleagues encouraged. Two bunks will be held for possible Japanese participation.

8.2 Proposed dates and ports for embarkation / disembarkation:

Embarkation: *Currently the departure date from Kao-hsiung is 4 July 2010. The requested safe dates noted in 6.1 encompass a large window of time in order to react to any possible ship schedule changes.*

Disembarkation: *Currently the arrival date into Kao-hsiung is 20 July 2010 . The requested safe dates noted in 6.1 encompass a large window of time in order to react to any possible ship schedule changes.*

9. Access to data, samples and research results

9.1 Expected dates of submission to the Ministry of Foreign Affairs of Japan of preliminary reports and data which should include the expected dates of submission of the final results:

No more than 30 days from the end date of the cruise.

9.2 Proposed means for access by Japanese scientists or officials to samples:

CD or DVD provided, with further access to the data via internet download or CD/DVD on request.

9.3 Proposed means to provide Japan with assessment of data, samples and research results or provide assistance in their assessment or interpretation:

Participation in international data analysis workshops and science symposia during the analysis phase of the project.

9.4 Proposed means of making results internationally available:

Publication in scientific journals and reports.

