APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH

1. General Information

1.1 Cruise name and/or number:	A16S CLIVAR GO-SHIP Repeat Hydrography/CO2 - UK/CL - F2013-107

1.2 Sponsoring institution(s):		
Name	Address	Name of Director
NOAA/Atlantic Oceanographic and Meteorological Laboratory	Richard Wanninkhof, NOAA/Atlantic Oceanographic and Meteorological Laboratory, 4301 Rickenbacker Causeway, Miami FL 33149 USA. Telephone 305-361-4379, Fax 305-361-4392, Email rik.wanninkhof@noaa.gov	Dr. Robert Atlas

1.3 Scientist in charge of the project:	
Name:	Richard Wanninkhof
Country:	US
Affiliation:	NOAA/Atlantic Oceanographic and Meteorological Laboratory
Address:	4301 Rickenbacker Causeway Miami, Florida 33149-1026 US
Telephone:	305-361-4379
Email:	rik.wanninkhof@noaa.gov

1.4 Entity(ies) /Participant(s) from coastal State involved in the planning of the project:	
Name:	See Section 6.2.
Country:	
Affiliation:	
Address:	
Telephone:	
Fax:	
Email:	
Website (for CV and photo):	

2. Description of Project

2.1 Nature and objectives of the project:
This cruise is part of the decadal re-occupation of select NOAA hydrographic transects to determine natural and man-made changes in chemical and physical properties in the ocean under auspices of the international program Global Ocean Ship-based hydrographic investigations program GOSHIP (www.go-ship.org). The focus of this particular cruise is to determine the changes in anthropogenic CO2, distributions and fluxes in the South Atlantic since the last occupation in 2005 as part of the CLIVAR/CO2 program. Decadal variations of CO2 tracer, oxygen, and temperature distributions are strongly influenced by climate change and natural processes. The repeat hydrography cruises are the only means to obtain climate quality data to study changes and impacts in the ocean. This research is co-sponsored by the USA agencies NOAA and NSF. During the cruise an ancillary project will also be conducted to investigate oceanic lightning, which is poorly understood. An experimental low-frequency receiver will be used to detect and record lightning data in-situ. This will allow comparison of ship-borne measurements of oceanic lightning with measurements from land-based lightning networks and the space-based Lightning Imaging Sensor (LIS) on the National Aeronautical and Space Administrationâ€™s (NASAâ€™s) Tropical Rainfall Measuring Mission. The LIS is a precursor to the satellite-borne Geostationary Lightning Mapper, planned to fly on NOAAâ€™s GOES-R geostationary satellite series.

2.2 Relevant previous or future research projects:
Clearance was obtained from the maritime nations, including Argentina, the United Kingdom, and Chile for the 2005 A16S cruise as part of the CLIVAR/CO2 program.

2.3 Previous publications relating to the project:
Wanninkhof, R., Doney, S., Bullister, J. L., Levine, N. M., Warner, M. J., and Gruber, N.: Detecting anthropogenic CO2 changes in the interior Atlantic Ocean between 1989 and 2005, J Geophys. Res., 115, C11028, C11028, doi:10.1029/2010JC006251, 2010

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):
Meridional transect in the South Atlantic Ocean from approximately 06 S to 63 S and bound by 25W to 32W (see chart); then to a port call in Punta Arenas, Chile; then northward along the coast of Chile to a port call in Valparaiso, Chile.

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 provided - see Section 10.1.

4. Methods and Means to be Used

4.1 Particulars of vessel:	
Name:	RONALD H. BROWN
Type/Class:	Ship
Nationality (Flag state):	United States
Identification Number (IMO/Lloyds No.):	IMO 9105786
Owner:	Department of Commerce, National Oceanic and Atmospheric Adminis
Operator:	Office of Marine and Aviation Operations
Overall length (meters):	83.50
Maximum draught (meters):	5.20
Displacement/Gross tonnage:	3250.00
Propulsion:	Two Fully Rotating Stern Z-Drives, 3000 HP each;
Cruising:	20.00
Maximum speed:	28.00
Call sign:	WTEC
INMARSAT number and method and capability of communication (including emergency frequencies):	GMDSS Equipped; VHF Channel 16; MF/HF; Inmarsat-B, C, & M (156.525 MHz, 2187.5 kHz, 8414.5 kHz)
Name of master:	Captain Joseph A. Pica, NOAA
Number of crew:	26
Number of scientists on board:	30

4.2 Other craft in the project, including its use:
none

4.3 Particulars of methods and scientific instruments:		
Types of samples and measurements	Methods to be used	Instruments to be used
CTD/O2 profiles. Stations will be completed to full water depth of maximum 6000 m, Water samples will be collected in rosette bottles for chemical measurements.	Temperature, conductivity, and oxygen will be collected with a CTD. Water samples from rosette bottle will be analyzed on board by spectrophotometry (nutrients), coulometry (inorganic carbon), infrared analysis and gas chromatography (dissolved gases and tracers), and titration (alkalinity and oxygen)	CTD (conductivity, temperature, depth) profiler, chemical analyzers on board
Water transport	Acoustic doppler current profiling	RDI Acoustic Doppler Current Profiler (ADCP)
Surface seawater partial pressure of CO2 (pCO2), oxygen, salinity, and temperature	automated instruments connected to the scientific seawater intake line on the ship	pCO2 - underway pCO2 system; oxygen - SeaBird optode; salinity and temperature - thermosalinograph
lightning measurements	Antennas on foredeck used for detecting electromagnetism in the atmosphere. System runs unattended	Custom produced antennas (4 antennas 1-m tall)

4.4 Indicate nature and quantity of substances to be released into the marine environment:
No

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

4.6 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

4.7 Indicate whether protected species be studied. If yes, please specify:
No

5. Installations and Equipment

Details of installations and equipment (including dates of laying, servicing, method and anticipated timeframe for recovery, locations and depth, and measurements):
No

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:
Project Start Date: Dec 17, 2013
Project End Date: Feb 22, 2014

6.2 Coastal State-specific details:		
Coastal Area	Estimated Entry Date	Estimated Departure Date
Chile	Jan 29, 2014	Feb 22, 2014
Explanation of multiple entries: All dates are approximate and depend on weather and other factors affecting the operations of the ship. If the schedule changes, we will notify the coastal states. Current plans: Enter EEZ near Punta Arenas, Chile, on Jan 29, 2014. Depart EEZ near Punta Arenas, Chile, on Feb 6, 2014. Enter EEZ near Valparaiso, Chile, on Feb 10, 2014. Depart EEZ near Valparaiso, Chile, on Feb 22, 2014.		
Research will be performed: between 12-200 nm		
Extent to which Chile will be enabled to participate or to be represented in the research project: The work in Chile will only include automated surface water sampling. Participants are welcome but ship will be in transit from Punta Arenas to Valparaiso		
Name, affiliation and contact information for all participants from coastal state Chile:		
Coastal Area	Estimated Entry Date	Estimated Departure Date
United Kingdom	Jan 16, 2014	Jan 29, 2014
Explanation of multiple entries: N/A		
Research will be performed: between 12-200 nm		
Extent to which United Kingdom will be enabled to participate or to be represented in the research project: All hydrographic and chemical data will be made available to coastal state.		
Name, affiliation and contact information for all participants from coastal state United Kingdom: Name: Rachel Shelley Affiliation: Florida State University, Earth, Ocean and Atmospheric Science; Address: 114 N. Woodward Ave., Tallahassee, FL, 32306-4320, USA; Phone: +1 850-645-4639; E-mail: rshelley@fsu.edu		

7. Port Calls

Port	Arrival Date	End Date	Special Logistical Requirements	Shipping Agent
Punta Arenas	1/30/2014	2/5/2014	To be determined.	Not available at this time.
Valparaiso	2/11/2014	2/21/2014	To be determined.	Not available at this time.

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:
See Section 6.2.

8.2 Proposed dates and ports for embarkation/disembarkation:
See Section 6.2.

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:
No more than 60 days from the end date of the research as provided in Section 6.1.

9.2 Anticipated dates of submission to the coastal State of the final report:
No more than 2 years from the end date of the research as provided in Section 6.1.

9.3 Proposed means for access by coastal State to data (including format) and samples:
Data will be provided through official channels at no cost to the coastal State(s). Samples will be provided upon request.

9.4 Proposed means to provide coastal State with assessment of data, samples and research results:
Assessment of data, samples and research results will be provided at no cost to the coastal State(s).

9.5 Proposed means to provide assistance in assessment or interpretation of data, samples and research results:
Assistance in further assessment or interpretation will be provided upon request.

9.6 Proposed means of making results internationally available:
Results will be made available through an open website: http://www.aoml.noaa.gov/ocd/gcc/A16S/

10. List of Supporting Documentation

10.1 List of attachments, such as additional forms required by the coastal State, etc.:			
Attachment Type	Description	Attachment	Submission Date
Supplemental Material	CV of Richard Wanninkhof, chief scientist	2941406250_Vita_Wanninkhof_Clearance.doc	Nov 08, 2013
Supplemental Material	Wanninkhof_passport picture	4856562500_Wanninkhof_passport.png	Nov 08, 2013
Proposed Cruise Track	CLIVAR GO-SHIP A16S cruise track	6852968750_Station_map_ENG.jpg	Nov 12, 2013
Supplemental Material	CV of Richard Wanninkhof, Chief Scientist in Spanish	7247500000_Vita_Wanninkhof_Clearance_SP.pdf	Nov 12, 2013
Proposed Cruise Track	Detail of A16S cruise track near the South Georgia/Sandwich Islands	2386093750_zoom_in_GeorgiaIslands.jpg	Nov 13, 2013
Supplemental Material	Application to Conduct Marine Scientific Research, translated to Spanish	4795937500_RATS_Application_A16S_SP_UK-CL.pdf	Nov 15, 2013