APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH

1. General Information

1.1 Cruise name and/or number:	SABOR - F2014-015

1.2 Sponsoring institution(s):		
Name	Address	Name of Director
National Aeronautics and Space Administration	National Aereonautics and Space Agency (NASA) 300 E St., SW, Washington, D.C. 20546	Paula Bontempi

1.3 Scientist in charge of the project:	
Name:	Ivona Cetinic
Country:	US
Affiliation:	University of Maine
Address:	193 Clark's Cove Road Walpole , Maine 04573-3307 US
Telephone:	207-563-8325
Email:	ivona.cetinic@maine.edu

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:
SABOR is a highly collaborative effort, combining several groups funded under auspices of NASAâ€™s Ocean Biology and Biogeochemistry program. Main objective of this program, centered on this research cruise, is to evaluate polarization measurements of the light in the ocean, combining multiple approaches and techniques. Each of the groups in this alliance is bringing different set of tools to the table ensuring that the final goals of this effort are achieved: 1) usage of remote sensed polarization in retrieval of in-situ optical properties; 2) Usage of in-situ measured polarization in retrieval of oceanic inherent optical properties; 3) Usage of polarization in retrieval of climate important biogeochemical parameters (carbon pools, productivity estimates, 4) usage of LIDAR in retrieval of important biogeochemical parameters. During this cruise numerous measurements will be collected that will facilitate cross validation of different approaches, and allow for development of next generation algorithms.

2.2 Relevant previous or future research projects:
NASA funded: Development of a methodology for the retrieval of characteristics of water constituents from satellite polarimetric observations MULTI-SENSOR, ECOSYSTEM-BASED APPROACHES FOR ESTIMATION OF PARTICULATE ORGANIC CARBON Advanced Ocean Retrievals Using Lidar and Polarimeter Measurements Results from the research performed during this cruise will allow for evaluation of next generation polarization measurements, as well as development of future remote sensing algorithms.

2.3 Previous publications relating to the project:
No papers have been published yet through this project since it commences with the cruise. Paper associated with this project and published by the participants of this field effort are following: Graff, Jason R., Allen J. Milligan, and Michael J. Behrenfeld. "The measurement of phytoplankton biomass using flow-cytometric sorting and elemental analysis of carbon." Limnol. Oceanogr.: Methods 10 (2012): 910-920. Behrenfeld, Michael J., Yongxiang Hu, Chris A. Hostetler, Giorgio Dall'Olmo, Sharon D. Rodier, John W. Hair, and Charles R. Trepte. "Space-based lidar measurements of global ocean carbon stocks." Geophysical Research Letters 40, no. 16 (2013): 4355-4360. Cetinic, Ivona, Mary Jane Perry, Nathan T. Briggs, Emily Kallin, Eric A. D'Asaro, and Craig M. Lee. "Particulate organic carbon and inherent optical properties during 2008 North Atlantic Bloom Experiment." Journal of Geophysical Research: Oceans (1978â€“2012) 117, no. C6 (2012). Briggs, Nathan T., Wayne H. Slade, Emmanuel Boss, and Mary Jane Perry. "Method for estimating mean particle size from high-frequency fluctuations in beam attenuation or scattering measurements." Applied optics 52, no. 27 (2013): 6710-6725. Ibrahim, Amir, Alex Gilerson, Jan Stepinski, Ahmed El-Habashi, and Samir Ahmed. "The retrieval of scattering coefficient of marine particles from polarimetric observations." In SPIE Optical Engineering+ Applications, pp. 88730U-88730U. International Society for Optics and Photonics, 2013.

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):
Narragansett, RI - 41Â°29'29.90"N, 71Â°25'6.28"W, Gulf of Maine, (centered around) 42Â°49'14.71"N, 69Â°41'1.37"W Transect to Bermuda EEZ - 33Â°29'43.97"N, 64Â°58'37.83"W transect back to Chesapeake Bay, 36Â°51'17.64"N, 75Â°43'8.73"W transect back to Narragansett, RI - 41Â°29'29.90"N, 71Â°25'6.28"W see attached Map, showing current cruise plan

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:	ENDEAVOR
Type/Class:	Ship
Nationality (Flag state):	United States
Identification Number (IMO/Lloyds No.):	
Owner:	National Science Foundation
Operator:	University of Rhode Island
Overall length (meters):	184.00
Maximum draught (meters):	17.50
Displacement/Gross tonnage:	784.00
Propulsion:	
Cruising:	
Maximum speed:	
Call sign:	WCE 5063
INMARSAT number and method and capability of communication (including emergency frequencies):	2182 kHz
Name of master:	Rhett McMunn
Number of crew:	12
Number of scientists on board:	18

4.2 Other craft in the project, including its use:
Currently not defined

4.3 Particulars of methods and scientific instruments:		
Types of samples and measurements	Methods to be used	Instruments to be used
Temperature, Salinity, Depth	Underway flow through and CTD casts	Seabird CTD, rosette..
Inherent optical properties, flow through and vertical profiles	optical measurements of scattering, polarization, absorption....	ac-S, bb3, flntu, c-star, LISST, MASCOT, Multi-spectral volume scattering meter (MVSM)
Radiometry (in and above water)	radiometry	Satlantic Radiometers
Primary production	Incubation of water samples	on deck incubator
Pigment composition	filtration	none - preservation for later analysis
Chlorophyll concentration	fluorometry	fluorometer
Phytoplankton composition and carbon	flow cytormetry, cell sorting and imaging	flow cytometer, flow cam and cell sorter
polarized scattering (tentative)	over the side LIDAR	Polarimetric lidar

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: Jul 18, 2014
Project End Date: Aug 06, 2014

6.2 Coastal State-specific details:		
Coastal Area	Estimated Entry Date	Estimated Departure Date
Bermuda	Jul 24, 2014	Jul 28, 2014
Explanation of multiple entries: N/A		
Research will be performed: between 12-200 nm		
Extent to which Bermuda will be enabled to participate or to be represented in the research project: Data will be shared with researchers from the Bermuda though the SeaBASS data depository. A scientist from Bermuda is welcome to participate. Interested participants should contact the Chief Scientist as soon as possible (before May 15th 2014) so that accommodations can be arranged.		
Name, affiliation and contact information for all participants from coastal state Bermuda:		

7. Port Calls

No port calls

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:
Following the NASA (OBB) data policy, we intend to make data publicly available via SeaBASS within the year of the collection). SeaBASS website gets high usage from the international scientific community, and it is maintained by NASA: http://seabass.gsfc.nasa.gov/ Our data-sharing plan will comply with recent policy regarding the SeaBASS metadata and dataset submission. Due to the collaborative nature of this proposal, and extensive pre-, during and post-calibration that we plan to execute, we plan to update our SeaBASS based dataset several times before the completion of the funding period. Final deliverables to SeaBASS will be the original (instrument output), intermediate (factory calibrations) and final (in-house or project based calibrations) datasets. We will provide, as part of our calibration report, metadata for each of the datasets (including calibration sheets, deployment images), details on methodology and processing, as well as matlab codes used.

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
Proposed Cruise Track	Current planned cruise track.	7693281250_SABOR_20131205_image.jpg	Jan 23, 2014

Supplemental Material	Parameter, methods, analysis and deployment specifics for the SABOR cruise (current version)	0107031250_SABOR deployment overview.pdf	Jan 23, 2014