Antarctic Research and Supply Vessel Request for Proposal

Compiled by:

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7400 S. Tucson Way
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General Background Information

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INTRODUCTION

Raytheon Polar Services (RPS or Charterers) solicits proposals for a charter with an option to buy an Antarctic Research and Supply Vessel (ARSV) with icebreaking capability to operate in support of the United States Antarctic Program's (USAP) research activities in and around the waters of the Southern Ocean.

PURPOSE OF THIS REQUEST FOR PROPOSAL

RPS currently charters and provides science support staffing on the R/V LAURENCE M. GOULD and the R/V NATHANIEL B. PALMER for the National Science Foundation, an agency of the U.S. Government. It is on their behalf that RPS pursues the charter of a vessel to meet requirements for scientific research in the Antarctic Peninsula area and logistics support of Palmer Station of the USAP. The preferred charter duration is a 10 year base period with two successive five-year options. However, we encourage bidders to propose the most cost effective charter periods keeping the preferred option in mind. The purpose of this procurement is to charter a vessel to continue the services currently being provided by the R/V LAURENCE M. GOULD.

GENERAL BACKGROUND INFORMATION

A unique feature of the oceans surrounding Antarctica, collectively called the Southern Ocean, is a seasonally varying sea ice zone, which at maximum extent covers 15,000,000 square kilometers. The study of this region is by nature interdisciplinary in scope, and includes marine biology, chemical and physical oceanography, sea-ice dynamics as well as marine geology and geophysics.

The vessel will be required to operate frequently in ice, with the crossing of the often extremely stormy waters of the Drake Passage south of Cape Horn, and to provide logistic and oceanographic research support for Palmer Station, located on Anvers Island in the Antarctic Peninsula. It must be seaworthy and fully found, providing a safe and stable platform from which to conduct research and comfortable enough to support personnel at sea for extended periods. The vessel must be capable of year-round operations in the area of the Antarctic Peninsula, with the potential to call at Palmer Station at any time of the year. The vessel must also be capable of supporting small boat operations as may be necessary to deploy, support and effect personnel and resupply operations at remote field camps in the Peninsula area.

Although the vessel will be employed largely in the southern latitudes for the duration of this charter, the vessel will also make occasional cruises to U.S. waters and ports at the discretion of the Charterers, and may conceivably be employed for occasional cruises to Arctic regions. Further detail of the purpose, area and concept of operation, science mission summary and vessel size estimates can be found in the Technical Requirements in this RFP.

Bidders are not restricted in the manner to which they may respond to this RFP, recognizing the minimum Technical and General Requirements. Existing vessels, modified or converted, or new-build proposals are welcomed. Bidders may submit more than one proposal following the above options.

SECTION II
Instructions to Bidders

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PROPOSAL APPROACH

The Bidder's proposal for the icebreaking research vessel to fulfill the role of Antarctic Research and Supply Vessel (ARSV) shall be prepared in accordance with the requirements of the solicitation. Specific responses to the Raytheon Polar Services (RPS or Charterers) requirements are necessary to enable RPS to evaluate the Bidder's understanding of, and capability to accomplish, the stated objectives. Throughout the proposal, Bidder shall provide sufficient detail to substantiate the validity of all stated claims, comments, or positions. All proposed concepts must be shown to be technically feasible and realistic. Management/cost evaluation and technical evaluation will be done separately, so separate management/cost and technical proposals must be submitted in accordance with the instructions herein. Non-conformance may be cause for proposal rejection. The proposal shall be valid for one hundred twenty (120) days after submittal. The response shall correspond to the requirements of this Request for Proposal (RFP), unless otherwise specified in writing by RPS. Bidders shall provide a milestone schedule and final delivery date in their proposals.

A. This is a competitive solicitation. Any comments and/or questions regarding this solicitation should be submitted in writing (fax acceptable) to RPS Procurement/Subcontracts 7400 S. Tucson Way, Centennial, Colorado 80112, Attention: Jim Weber, fax no. 303-790-9129. Telephone calls are not an acceptable means of communication regarding this solicitation.

B. Any exceptions to the minimum technical requirements, instructions, and/or charter terms and conditions of this RFP must be submitted under a separate cover letter attached to the Bidder's proposal. Any exceptions may form the basis for a Bidder to be determined non-responsive or may result in a lower overall evaluation of the Bidder’s proposal.

Table 1: Proposal minimum criteria requirements.

List and locations of minimum criteria proposals must meet		
Criterion	**RFP Section**	**Paragraph**
Air Temperature	III-B	5
Icebreaking Capability	III-C	1
Stability, Compartmentation	III-C	8
Endurance and Range	III-C	9
Science Requirements	III-D	1-7, 10, 12
General Ship Requirements	III-E	1
Main Propulsion Machinery	III-E	2.A
Cold Weather Starting	III-E	2.B
Fuel	III-E	2.D

C. RPS reserves the right to update this RFP by amendment(s) up to the award date. Amendments may be in areas such as specifications, design, construction/ modification, terms and conditions, data, etc.

D. Charterers intend to award a firm fixed price charter subcontract resulting from this solicitation, to the responsive Bidder whose proposal, conforming to the solicitation, constitutes the best value, and will be most advantageous to RPS.

E. An award in the amount of $10 million or more will not be made under this solicitation unless the Bidder and each of its known first-tier subcontractors (to whom it intends to award a subcontract of $1 million or more) are found, on the basis of a compliance review, to be able to comply with the provisions of the Equal Opportunity clause of this solicitation.

F. Charterers' Rights and Clarifications:

   i. The Charterers may reject any or all offers if such action is in the best interest of the U.S. Federal Government; accept other than the lowest offer; and/or, waive informalities and minor irregularities in offers received.

ii. The Charterers may award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the Bidder's best terms from a management/cost and technical standpoint.

iii. A written award or acceptance of offer mailed or otherwise furnished to the successful Bidder, within the specified time for acceptance in the offer, shall result in a binding subcontract without further action by either party. Before the offer's specified expiration time, the Charterers may accept an offer whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counter offer by the Charterers.

iv. Neither financial data submitted with an offer, or representations concerning facilities or financing, will be part of the resulting subcontract. The resulting subcontract will contain a clause providing for price reduction for defective cost or pricing data; the subcontract price will be subject to reduction if cost or pricing data furnished is incomplete, inaccurate, or not current.

G. The Charterers reserve the right to conduct a pre-award survey or to require other evidence of technical, managerial, financial, and similar abilities to perform prior to awarding the subcontract.

PROPOSAL SCHEDULE

Release of RFP	5 December 2007
Pre-Proposal Conference	12, 13 February 2008
Proposals due to RPS	30 April 2008
Final Revised Proposal release	23 May 2008
Final Revised Proposal due to RPS	23 June 2008
Negotiation and Contract Award	31 October 2008

PRE-PROPOSAL CONFERENCE

A. A pre-proposal conference for all interested Bidders will be held on the 12th & 13th of February 2008 at the Raytheon Rosslyn, VA facility located at 1100 Wilson Blvd. Meeting details will be provided at a later date.

B. The purpose of this pre-proposal conference is for Bidders to bring their draft or in development proposal for review, discussion, and clarification with RPS. If possible, please bring your draft General Arrangement Plan and any concept design and ship particulars.

C. RPS will meet with bidders individually to answer your proposal-specific questions.

PROPOSAL PRESENTATION

A. Binding and Labeling

Each volume of the proposal shall be separately bound in such a manner as to facilitate subsequent changes provided to RPS during the negotiation process. A cover sheet shall be affixed to each volume, clearly marked as to volume number, copy number, and the Bidder's name. Indicate which specific pages and paragraphs contain proprietary information. RPS will treat unidentified pages or paragraphs as non-proprietary information.

B. Page Size, Typing and Spacing

Page size shall be 8-1/2 by 11 inches (standard size) white bond paper. The proposal page shall be in legible print (minimum of 11pt, single spaced); pagination shall be in numerical sequence. Photo reduction of material other than graphs and drawings is not desired. Whenever practical, enclosed headings, subheadings, titles, sequence of material and a number identification system shall be used. Each volume shall contain a glossary of abbreviations used.

C. Foldouts

Foldouts may only be used for essential charts and graphs needed to depict organization, system descriptions and layouts, implementation schedules and plans. Any such charts or graphs must be legible and uncomplicated to preserve clarity.

D. Volumes and Copies

i. Each proposal must be signed by an authorized officer of the company and submitted in the appropriate volumes. Each section within a volume shall start on a new page. In presenting material in these volumes, the Bidder is advised that information quality is significantly more important than quantity.

ii. The proposal shall contain all pertinent information in sufficient detail to permit thorough evaluation. Information requested in the paragraphs below shall be provided in the volumes indicated. If the required information is not located in the proper section, the information will be assumed to be absent.

Volume	**Copies**
Management and Cost Proposal	8 hard copies & 1 electronic copy
Technical Proposal	8 hard copies & 1 electronic copy

iii. The instructions for each of the above sections are set forth below. These instructions represent the minimum information required and do not preclude the submittal of any additional information that the Bidder considers pertinent to the evaluation of its proposal.

E. Organization of Volumes

Each volume shall be organized so that searching through documents is not required to evaluate the proposal. Tabbed dividers are desirable. The proposal shall contain appropriate cross-references to the paragraphs in the technical requirements, the equipment specifications, and this proposal guide. Each section within a volume shall start on a new page.

F. Any portion of material contained in a proposal that is considered to be proprietary shall be identified and clearly marked as "Proprietary Material."

G. The order of importance of the evaluation criteria is: (1) Technical and (2) Management/Cost. The total Technical score is 60% and the total Management/Cost score is 40%. As part of the Management/Cost Volume I, Bidders Cost will be evaluated on firm fixed charter rates and charges as described below. Basic charter term and option years, if any, will be evaluated for reasonableness and realism. Management evaluation will score Bidders on experience, demonstrated management and technical capabilities, planning abilities and other items listed. As part of the Technical Evaluation listed in Volume II, Bidders will be evaluated on proposed vessel(s) construction and/or modifications, mission capability, vessel safety, and other items described below. Proposals that do not demonstrate an understanding of, and ability to meet certain specifically noted technical and management requirements may not be considered further. The U.S. Department of Labor will have the option to review the successful Bidder and determine their compliance with various U.S. laws including Equal Employment Opportunity prior to award of a subcontract.

VOLUME I – MANAGEMENT AND COST PROPOSAL

Volume I shall consist of two sections: Management and Cost.

A. Evaluation of the Management and Cost sections will be based on the degree to which the Bidder demonstrates, through appropriate plans, approaches, and analyses, its managerial ability to sufficiently meet RPS requirements. The management proposal must include, but is not limited to, the information described in the following paragraphs.

i. Personnel and Organization

a. The proposal shall clearly demonstrate the Bidder's overall technical competence by delineating the categories of skills held by engineering, technical, shipyard, and administrative personnel

to be assigned to this subcontract. This information should include experience levels as well as experience on similar subcontracts.

b. The Bidder shall describe the project management organization proposed for the vessel construction/modification effort. The description should include, but not necessarily be limited to, the areas indicated below:

- A proposed task organization chart shall identify task leaders, key personnel, their functions and the facility to which each person will be assigned.
- A discussion of how the proposed organization supports effective management at multiple sites, if applicable.
- A discussion of how the proposed organization shall be coordinated with the Bidder's current organization.
- A discussion of the allocation of the Bidder's internal resources and identification of resource commitment, including personal and real property assets.
- A discussion of the limitations, if any, of the project manager's authority, including a discussion of other duties that may be assigned during the vessel construction/modification effort.

B. Construction/Modification Experience

i. Bidder shall provide references to demonstrate its performance on prior contracts, particularly in construction/modification of items of this type. Such contracts should have been delivered since 1 January 1997. Contracts used as a reference must, as nearly as possible, be within the same shipyard(s), plant(s) and/or division(s) proposed to perform the RPS effort(s). These contracts shall include both those successfully and unsuccessfully completed with respect to meeting management, technical, cost and schedule performance requirements. If the Bidder has not experienced both scenarios it shall certify to that effect.

ii. The synopsis for each prior contract selected must be prepared in the following order and format:

a. Prior contract number and type

b. Program title

c. Brief description of the program including the various stages of acquisition/construction (design, development, production, etc.).

d. Activity associated with the award of the contract, including the address and telephone number of the prime agency's contracting personnel and your company's Program Manager.

e. Prior contract value (1) at time of award and (2) at the present time or at close-out (as appropriate).

f. History of performance to include sufficient information to enable RPS to track both contract changes and variances in performance in the areas of technical performance, schedule and cost.

g. Narrative that shall provide specific details as to why the contract was, or was not, successful.

C. Construction/Modification Management Plans

i. The Bidder, through the implementation of its management and technical plans, shall demonstrate that it has control of the vessel construction/modification effort(s) in compliance with the Technical Requirements. Management plans shall include descriptions identifying how the construction/modification effort will be managed and performed to meet the subcontract requirements.

ii. The Bidder's project management approach should provide reliable visibility of the Bidder's progress through various data. Such data must show work progress; schedule and technical accomplishments; be valid, timely, and auditable; and, supply RPS with a practical level of summarization. The offer shall also address:

a. a time-phased summary schedule of work effort;

b. the system to be used to control schedules;

c. how the performance schedule will be reported to RPS; it shall include actual or potential delays in production;

d. how the Bidder plans to comply with the review requirements; and

e. the cost/schedule impact(s) of any proposed alternative(s).

iii. If the construction/modification effort(s) will occur at more than one Continental U.S. (CONUS) site, the Bidder shall present its approach for managing the total construction/modification effort, at each CONUS site, to ensure a coordinated program effort. In its proposal, the Bidder shall include a description of the procedures and techniques it will use for this purpose. A description of the resources that are to be applied to, or modified for, the construction/modification task shall be included.

iv. Bidder shall include a detailed layout of the facilities dedicated for the vessel construction/modification, the type of personnel needed, including engineering support for multiple production sites, and a discussion of how general work flows throughout the facility or facilities. An outline of the procedures to be used for material transfer, flow of purchased material, etc., shall be provided.

v. The proposal shall describe physical aspects of the shipyard(s) the Bidder proposes to use for this subcontract. The proposal shall also describe any special technical facilities, laboratory, manufacturing and test facilities to be used to comply with the RFP requirements as well as any additional work proposed as part of the proposal.

D. Vessel Operations and Support

The proposal shall describe in detail past and current vessel charter operation and support experience, to include:

i. resumes of Master and Officers, including experience on research vessels overseas and in high latitudes,

ii. information demonstrating crew experience on research vessels overseas and in high latitudes,

iii. proposed crew organization,

iv. crew rotation policies,

v. ability to replace crew vacancies on short notice,

vi. plans for providing onshore operations support to the vessel,

vii. concept of operations for supporting science activities while at sea;

viii. plans for galley operations (include sample menus),

ix. plans and capability for repairs dockside and at sea,

x. management approach to maintenance and repair.

E. Environmental Requirements

The offeror will submit a management plan that contains:

i. description of how all environmental regulations outlined in this solicitation will be met;

ii. bidder's environmental compliance policies (provide copies of existing policies), including a discussion of how the policies will ensure compliance with additional Antarctic environmental requirements;

iii. oil spill and remediation contingency plans and capabilities that address spills in both open water and ice-conditions;

iv. training plans to ensure crew are aware of Antarctic environmental requirements as well as their roles and responsibilities in responding to environmental accidents;

v. an outline of environmental compliance topics to be covered during general orientation and ship's safety briefings for the scientific complement at the beginning of each cruise;

vi. unique safeguards which may be built into the proposed vessel that will help safeguard against spills or other environmental accidents;

vii. waste segregation and disposal methods; and

viii. the experience of the operator in complying with Antarctic or similar unique environmental requirements.

F. Management Section

i. The Management Section Format shall be as follows:

a. Title Page

b. Table of Contents

c. Volume Summary

d. Body of Proposal:

- Personnel and Organization
- Construction/Modification Experience
- Construction/Modification Management Plans
- Environmental Requirements
- Infrastructure and Facilities

ii. The Management Section shall also identify and discuss:

a. Primary Subcontractor(s) for Vessel Design and Construction

b. Operational Experience

c. Crewing, Operation, and Support of the Vessel

d. Schedule of major milestones and delivery of Vessel

G. Cost Section

i. The Cost/Price Proposal Format shall be as follows:

a. Title Page

b. Table of Contents

c. Volume Summary

d. Body of the Proposal:

- Statement of Work
- Completed Pricing Schedule
- Description of Cost Estimating Techniques Used
- Exceptions (if any)
- Financial Report(s) and Proof of Solvency
- Completed Certifications and Representations

ii. Pricing Instructions

a. The requirements of the prime contract necessitate that your proposal be supportable by detailed cost data in accordance with Public Law 87-653 ("Truth in Negotiations Act"). The Charterers reserve the right to require submittal by Bidders of such detailed cost data prior to, and during, the term of a resultant contract between RPS and the vessel Owners/Operators.

b. In the event that any cost data and/or supporting information described herein is deemed to be proprietary, and/or not available to RPS, Bidders must provide the location of pertinent cost work papers and financial records available to assist audit by the government.

c. As identified in Section 1.0, cost/pricing proposal shall remain valid for one hundred twenty (120) days after submittal.

d. Bidders shall propose daily charter rates to be applicable for each of the charter years and any option year if applicable. Bidders shall also propose a firm fixed, daily standby rate expressed as a percentage of the firm fixed charter daily rate. Bidders shall propose a firm fixed accommodation/food daily rate per person for Charterers' personnel. Bidders shall also identify that price at which RPS or the National Science Foundation (NSF) may purchase the vessel at the end of the initial charter or any option years proposed.

SAMPLE PRICING SCHEDULE

A. INITIAL TERM

i.	FIRM FIXED CHARTER DAILY RATE YEAR 1*	US $
ii.	FIRM FIXED CHARTER DAILY RATE YEAR 2	US $
iii.	FIRM FIXED CHARTER DAILY RATE YEAR 3	US $
iv.	FIRM FIXED CHARTER DAILY RATE YEAR 4	US $
v.	FIRM FIXED CHARTER DAILY RATE YEAR 5	US $
vi.	FIRM FIXED CHARTER DAILY RATE YEAR 6	US $
vii.	FIRM FIXED CHARTER DAILY RATE YEAR 7	US $
viii.	FIRM FIXED CHARTER DAILY RATE YEAR 8	US $
ix.	FIRM FIXED CHARTER DAILY RATE YEAR 9	US $
x.	FIRM FIXED CHARTER DAILY RATE YEAR 10	US $

B. OPTION 1

i.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 11	US $
ii.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 12	US $
iii.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 13	US $
iv.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 14	US $
v.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 15	US $

C. OPTION 2

i.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 16	US $
ii.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 17	US $
iii.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 18	US $
iv.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 19	US $
v.	FIRM FIXED CHARTER DAILY RATE OPTION YEAR 20	US $

D. Total Charter with Options US $

(365.25 Days/Year)

E. Firm Fixed Daily Standby Rate Expressed as a % of the Firm Fixed Charter Daily Rate %

F. Firm Fixed Accommodation (hotel costs) US $

G. Food Daily Rate (per charter's personnel) US $

H. Firm Fixed Purchase Price Option:

i.	Upon completion of initial Charter	US $
ii.	Upon completion of Option 1	US $
iii.	Upon completion of Option 2	US $

*For purposes of this Pricing Schedule, the term "Year" shall mean a consecutive twelve month period commencing (i) on delivery of the vessel under the charter for Year 1, and (ii) on the anniversary date of the delivery of the vessel under the charter for each successive Year.

VOLUME II - TECHNICAL PROPOSAL

A. Technical Plans

i. The technical volume, which shall contain specifications furnished by the Owners, should be specific, detailed, and complete to demonstrate that the prospective Bidder has a thorough understanding of the requirements. The technical volume must enable RPS technical

personnel to make a thorough evaluation and arrive at a sound determination as to whether or not the proposal meets technical requirements to provide a vessel that will operate in a fully safe, seaworthy, and technically efficient manner. The proposal shall include the schematics, block diagrams, and interface descriptions sufficient to describe the Bidder's approach and to illustrate clearly the manner in which the Bidder shall conduct the project. Phrases such as "standard procedures will be employed" or "well-known techniques will be used" are insufficient. The technical volume must be sufficient to show how the Bidder proposes to comply with RPS requirements, and it must include a full explanation of the proposed techniques and procedures.

ii. Each section of the Specifications shall be presented in as much detail as practicable and its sections shall align numerically one-to-one with the corresponding section numbers contained in the RFP requirements.

iii. A Cross Reference Matrix shall be provided as a guide indicating how the sections of the proposal correspond to the RFP documents.

iv. Bidder shall provide a full explanation of all exceptions taken to the Technical Requirements, specifications, etc., by paragraph or exhibit line item number at the beginning of each section, as appropriate. If no exceptions are taken, the Bidder shall so state.

B. Vessel Construction/Modification Approach

The Bidder shall present its approach to the construction/modification, integration and testing of the equipment, including a detailed discussion of its quality-control methods and vessel construction/modification assurance throughout the construction/modification process from receiving to delivery. A detailed flow diagram/timeline shall be presented to depict the entire construction/modification process, highlighting, with supporting discussion, critical events and milestones. Included in the event flow shall be the identification of any RPS furnished material/information and/or government furnished material/property (GFM/P) to be used in support of construction/modification.

C. Technical Risk Management Plan

The Bidder shall identify in writing all potential technical, construction/modification risk areas and proposed methods for overcoming/mitigating each identified risk. The Bidder's assessment of existing and potential technical, construction/modification risk shall be presented in terms of the following:

i. Availability of resources such as materials, components, personnel, facilities, outside facilities, etc.

ii. Achievement of all the performance requirements specified in the subcontract technical requirements.

D. Quality Assurance (QA)

Bidder shall describe the plans for maintaining control methods, audits, configuration status, changes control, and inspection and test methods throughout the construction/modification process. The Bidder shall discuss its plans for inspections and tests and describe the methods and required supporting documentation for internal approval. RPS reserves the right for its PA/QA representatives to visit the ship yard during the construction/modification process.

E. The technical proposal format shall be as follows:

i. Title

ii. Table of Contents

iii. Volume Summary

iv. Body of the Proposal:

- Response to Technical Requirements
- Ship Design and Layout
- System Engineering Concept(s)
- Reliability and Maintainability
- Quality Assurance
- Construction/Modification Plan
- Subcontracts (if any)
- Final Technical Summary

TRANSITION PERIOD

The current charter of the RV Laurence M Gould (LMG) expires on 16 July 2010. With this in mind, bidders are requested to indicate the time required to transition any equipment from the LMG to their proposed ship. Preferably, this should be done prior to the LMG charter expiration. If this can't be accomplished prior to the LMG charter expiration the bidder is requested to provide a time table of when this equipment transfer needs to take place.

If the proposed vessel delivery date is later than 16 July 2010, bidders are requested to recommend a course of action to be taken to continue operations to and from Punta Arenas, Chile to Palmer Station, Antarctica. Recommendations may include providing a vessel to charter in the interim or alternative ideas of how to continue operations during the transition period.

VESSEL REGISTRY AND CERTIFICATION

It is acceptable to use a foreign built ship as long as it is refurbished in the U.S. and has been under U.S. flag and registry for a least the prior three (3) years. A new ship must be built in the U.S. and have a U.S. flag and registry. Reference FAR 52.247-64 and U.S.C 46 55305 when applicable.

ADDITIONAL ANTARCTIC REQUIREMENTS

A. Bidders shall review and become familiar with the Antarctic Conservation Act of 1978 and all subsequent revisions, amendments and editions, The Antarctic Treaty and the Agreed Measures for the Conservation of Antarctic Fauna and Flora. The successful Bidder is required to comply with the foregoing documents at all times. Full text is available via the Internet as follows: access the website (WWW.NSF.GOV). Go to “Documents” then to “Text Section”. Type in “Antarctic Treaty”. The Antarctic Conservation Act of 1978 (Public Law 95-541) will appear in PDF format that can be viewed with Adobe Acrobat. Adobe Acrobat can be downloaded at no cost from http://www.adobe.com/.

B. Additional requirements pertaining to operations in the Antarctic environment are set forth by Title 45 of the Code of Federal Regulations (“CFR”), Subpart 671.

QUESTIONS FOR SHIPYARD

Offers that entail vessel construction and/or conversion must include the following.

A. Name and location of proposed shipyard

B. A description of how the shipyard can start and deliver the vessel on time, including:

   i. jobs already started and jobs planned;

   ii. available manpower - skilled, unskilled;

   iii. available trades;

   iv. availability of materials and equipment for this construction; and

   v. a description of the technical skills available to fabricate and weld specialized steels.

C. A description of the shipyard's history in building vessels for cold weather and ice operations, including:

   i. industrial techniques for cold weather product reliability; and

   ii. on-site design and engineering capability to deal with new problems.

D. An evaluation of the shipyard’s versatility, including:

i. ability to move trades around in response to internal and external factors; and

ii. ability to maintain schedule in changing environmental conditions.

E. Shipyard experience and equipment that is available for the application of low friction hull coatings.

F. What is the Shipyard's experience with construction factors specific to the propulsion systems and propulsors proposed? Also note experience building acoustically quiet vessels.

G. History of work stoppages of greater than two weeks in duration that have been experienced by the Shipyard in the last five years. Provide reasons.

H. List of vessels built by Shipyard in the last five years.

I. A description of the organizational structure of the shipyard indicating:

i. responsiveness to Owners/Operators requirements;

ii. progress monitoring and reporting systems; and

iii. shifts and work schedules.

J. A description of the shipyard's Quality Control and Compliance Systems and techniques to guarantee product at delivery, including the following areas:

i. Structure

ii. Acoustics

iii. Electronics

iv. Vibration

v. Machinery performance

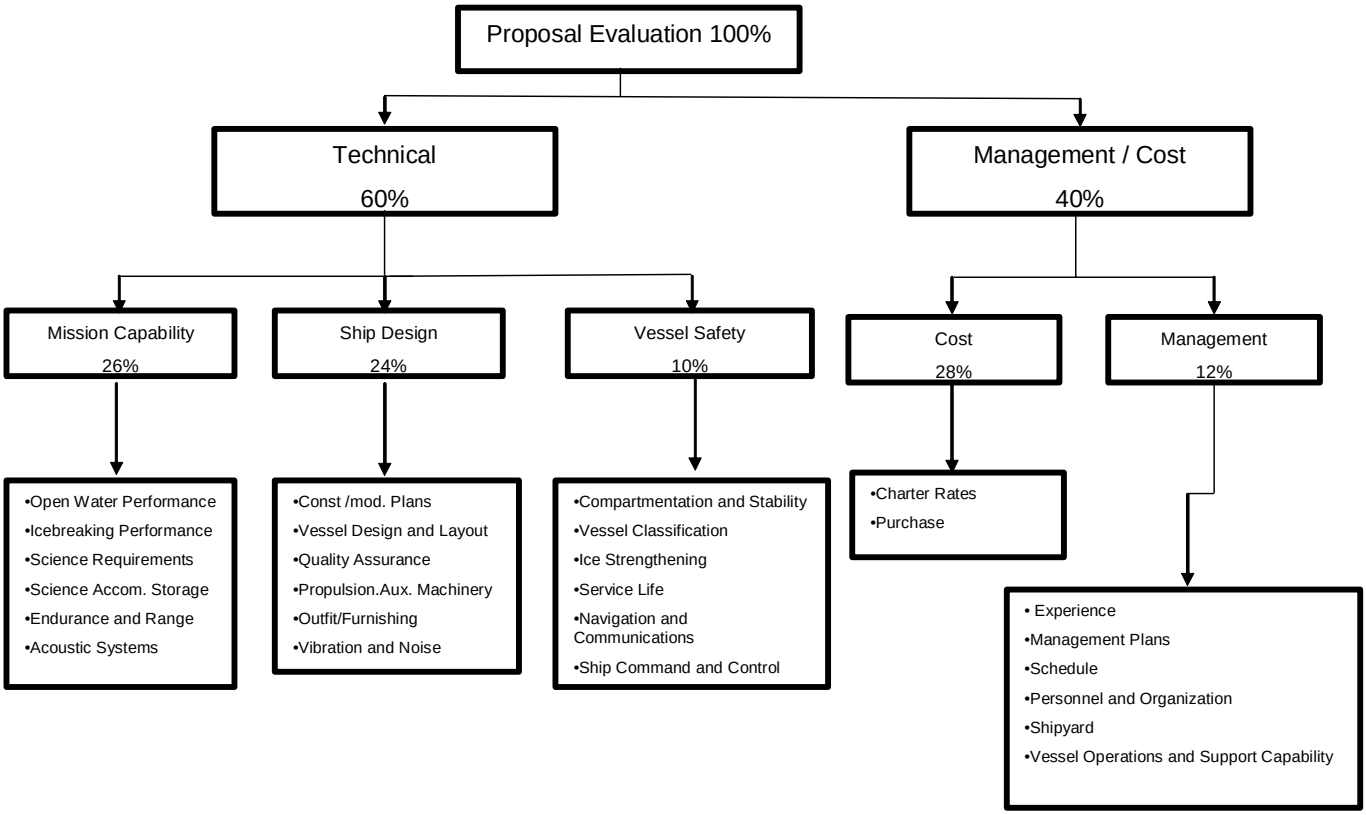
vi. Design compliance/capability

K. What are the critical path items for the proposed construction or modification?

L. Will the Shipyard provide permanent office space for the Charterers' representatives during construction/modification?

PROPOSAL EVALUATION

Figure 1: Evaluation categories and major weighting factors for the ARSV.



SECTION III
Technical Requirements

SECTION III-A
Technical Requirements
Introduction

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INTRODUCTION

1. Purpose

   These requirements are a basis for the charter and operation of a general-purpose, multidisciplinary antarctic research and supply vessel with icebreaking capabilities. It is the intent that the Owners shall deliver and operate this ship complete in all respects for the service intended. The ship shall be fully equipped, fitted out, and operated in accordance with the best commercial practices and applicable laws. Vessels proposed can be an existing vessel, modified, converted or new build. Examples of existing vessels similar in mission requirements can be found at the following sites:

   - The proposed Alaska Region Research Vessel (http://www.sfos.uaf.edu/arrv/);
   - The Finnish vessel R/V ARANDA (http://www.fimr.fi/en/aranda.html);
   - The RRS ERNEST SHACKLETON (http://www.antarctica.ac.uk/living_and_working/research_ships/index.php); and
   - The vessel currently supporting the USAP, the R/V LAURENCE M. GOULD http://www.usap.gov/vesselScienceAndOperations/.

2. Area of Operation

   The primary mission area is the Antarctic Peninsula and adjacent areas such as the southern sectors of the Atlantic and Pacific coasts of South America, but operations throughout the Southern Ocean and adjacent seas may be expected. Although the vessel will be employed primarily in the southern latitudes for the charter's duration, the vessel will also make regular (approximately bi-annual) cruises to the U.S. at the Charterers' discretion. The vessel may also be employed for occasional Arctic science cruises. The ship will operate from Punta Arenas, Chile or Ushuaia, Argentina, for operation in the Antarctic Peninsula area including Palmer Station, the Weddell Sea, and in support of remote island field stations throughout the operating area. Occasionally, the ship may be required to operate out of other ports, such as Hobart, Australia or Lyttelton, New Zealand, for trips to the Ross Sea, Antarctica.

3. Concept of Operation

   The primary mission of this vessel is to resupply Palmer Station, in the Antarctic Peninsula, and support marine science research wherever science missions are proposed in Antarctic waters. The base of operation is in the southern latitudes to minimize transit time to the primary mission areas. Because shore support is remote for a ship operating in these areas, reliability, on-board maintainability, and redundancy of systems is of prime importance.

4. Relationship Between the NSF and Charterers

The Charterers have a contract with the National Science Foundation (NSF) for the operation and maintenance of the United States' facilities in Antarctica. One of the tasks the Charterers perform is management of the research vessels operated by subcontractors.

5. Vessel Mission Summary

   A representative annual operations summary for the ship is shown below. This summary is shown only to provide the bidder with an overview of the types of operations in which the vessel may be employed. This summary is not intended to indicate, in any way, vessel operational limits within the context of this requirement, as the actual ship operation may vary significantly over the life of the charter, and any such variation will in no way imply or permit a change to any other portion of the charter agreement, including the day rate.

Table 1: Representative annual operations summary.

Activity	Speed (knots)	Duration (days)
Ice Docked	0	24
Stationkeeping	0	66
Dredging & Trawling	1-3	43
Towing Instruments	2-6	27
Icebreaking	3	12
Operating in Pack Ice	2	57
Open Water Transit (including about 12 trips per year to Palmer Station)	8-12	86
Total Days Away From Port		315

6. Ship-Size Estimate

   The vessel dimensions should be appropriate for maneuvering, docking and cargo operations at Palmer Station, Antarctica. A drawing of the planned pier design for Palmer Station is attached to this RFP.

7. Technical Evaluation of Responses

A. The technical requirements contained in this document are the criteria for the research vessel performance, equipment, safety, and operation sought through this request for proposal. The technical evaluation of responses to this RFP will be based upon the extent to which each response meets each of the technical requirements. For a proposal to be considered for evaluation the requirements of the sections listed in Table 2 are minimum and must be met in full:

Table 2: List of the minimum criteria a proposal must meet.

Criterion	RFP Section	Paragraph(s)
Air Temperature	III-B	5
Icebreaking Capability	III-C	1
Stability, Compartmentation	III-C	8
Endurance and Range	III-C	9
Science Requirements	III-D	1-7, 10, 12
General Ship Requirements	III-E	1
Main Propulsion Machinery	III-E	2.A
Cold Weather Starting	III-E	2.B
Fuel	III-E	2.D

B. Proposals should include calculations and/or text to demonstrate compliance and understanding with requirements. As an example, calculations and/or data should be included with the proposal regarding endurance, hull strength, intact and damage stability, and other subjects as appropriate.

C. Calculations, simulations, model tests or full-scale tests for existing vessels in open water must be provided to demonstrate the vessel performance. This includes low noise propagation (low propeller cavitation) during slow-speed towing conditions.

D. Operational capability in ice should be shown in the proposal. This can be achieved by comparing the calculated resistance of the vessel, as a function of speed in 1 foot of level ice, to the propeller thrust to overcome that resistance.

E. Solely repeating the technical requirements as stated in this RFP will be considered non-responsive. All requirements as stated in this RFP must be addressed. If a bidder is proposing an existing vessel that does not meet the specification in a particular area, the bidder must identify and quantify how close they are to the requirement in that area. Should conflicts between requirements be discovered, the bidder should identify them. If the bidder identifies a better solution than what is specified, the bidder should present the solution in the proposal.

F. The use of standard U.S. units or metric units (Systeme International d'Unites [SI]) is acceptable. Units of measure shall be consistent and clearly stated throughout all proposals.

G. The ship shall be subject to dock and underway trials to show that the ship can meet the technical requirements. All test and trial requirements, including procedures and data to be collected, are provided below. The trials will be performed by the bidder under the supervision of, and subject to acceptance by, Charterers' personnel and their representatives.

8. Vessel Trials Criteria

A rather standard set of powering and maneuvering trials shall be performed. These trials are in addition to any and all required machinery trials. The proposed trials agenda for powering and maneuvering trials is presented in Table 3. The only trials included in this agenda which are not part of a standard agenda are 8 knot pull-out and the 4 knot turn with thruster(s) operating at full power in the direction which reduces turning diameter, advance and transfer.

A. Required Data and Documentation

i. The Owners shall provide to Charterers a Trials Report describing, as a minimum, the following:

a. Location of the trials and water depth over the range (to be measured if depth is anywhere less than 100 feet and to be estimated from charts if everywhere greater than 100 feet);

b. Environmental conditions (wind speed and direction, measured, observed, or hind-cast wave height and direction, and measured or estimated current velocity during the entire period of the trials;

c. Vessel operating condition (ship speed, propeller RPM, rudder angle(s), thruster power level or RPM and vessel heading) at the beginning of each trial run;

d. Method used to ensure steady-state conditions at the initiation of the trial run;

e. Method of position measurement (Raydist, Decca gyrocompass, etc. and method of measuring other trial variables (propeller or thruster RPM, heading, etc.) ;

f. Discussion of unusual results.

ii. The Owner must provide the following data in this Trials Report:

a. Measured propeller shaft torque, RPM and resulting SP as a function of vessel speed for sufficient vessel speeds to adequately define variation of SHP and RPM with speed;

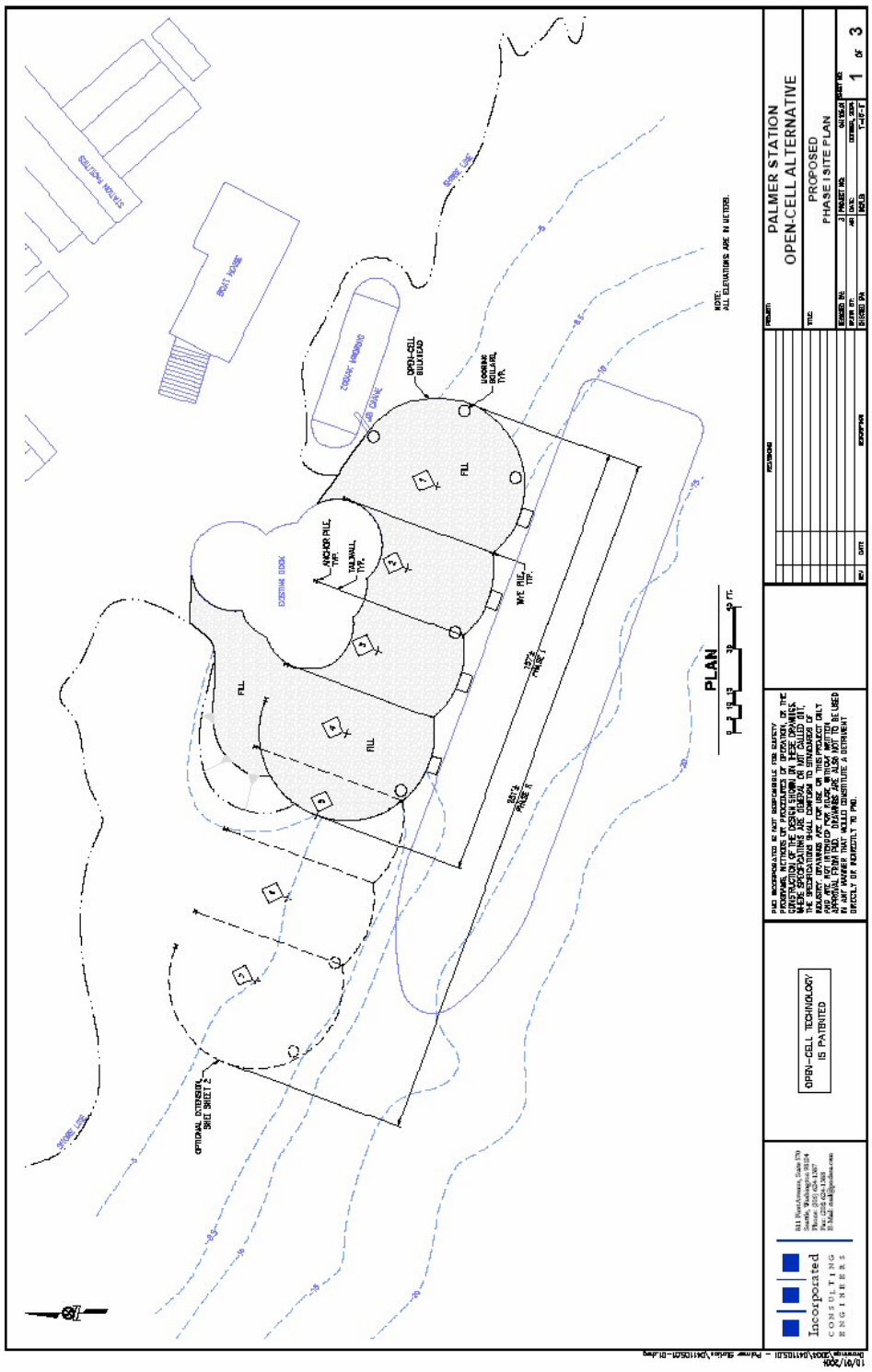
b. Measured vessel tracks for all trial runs, including powering trials, to show time, at appropriate time increments, on the track plots;

c. Time histories of propeller RPM(s), thruster RPM(s) and rudder angle(s) for all runs, where appropriate;

d. Standard measures needed to characterize results of each trials maneuver. These include, but are not limited to: head reach, time to stop, etc., for a crash stopping maneuver; advance, transfer and overshoot angles, times to execute and swept path widths for a zig-zag maneuver; and station and track keeping characteristics including divergence from designated heading, position, and navigation track line.

iii. All results will be presented in suitable graphical and/or tabular form.

Figure 1: Palmer Station Pier Design Drawing



SECTION III-B
Environmental Requirements

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ENVIRONMENTAL REQUIREMENTS

1. Ice Conditions

   The ship will operate in annual ice from the ice edge up to and including consolidated pack and fast ice. The ship is expected to routinely operate in partial coverage of first-year ice floes. Glacial ice and therefore glacial ice fragments also exist in the operating area and care will be exercised by the vessel operator to detect and avoid this type of ice. Icebreaking capability in annual ice is specified in Section III-C 1.

2. Sea State

   Data on sea states in the primary area of operation are shown below. Ship performance in these sea states is specified in Section III-C.

   Table 1: Sea states in primary area of operation.

Sea State	Percentage of Time Exceeded	Significant Wave Height (feet)	Associated Wind Speed (knots)	Average Modal Period (seconds)
4	66	6	20	8.0
5	37	10	25	9.5
6	18	16	38	12.0
7	4	25	50	15.0

3. Sea Water Temperature

   Sea water temperatures can be expected to range from 28°F (-2°C) to 85°F (29°C). The ship should be capable of operation in this water-temperatures range.

4. Air Temperature

   A. Ship operations during the Antarctic winter can be expected to encounter very cold temperatures. The ship shall be capable of operation in a minimum expected winter air temperature of -22°F (-30°C).

   B. Conversely, based on the need for the ship to periodically transit to lower, more temperate latitudes, the ship shall also be capable of operation in warmer air temperatures of about 90°F (32°C).

5. Wind Velocity

   Very high winds occur in the Southern Ocean. The ship shall be capable of enduring a maximum sustained wind speed of 100 knots.

6. Precipitation

   Precipitation in the form of rain, freezing rain, sleet, and snow can be expected. The Owners shall consider ship layout and equipment in regards to all these conditions with the intent of minimizing accumulation aboard the ship, the potential adverse effect on ship operations, and providing for removal.

7. Fog and Reduced Visibility

   Reduced visibility will occur during ship operations. The ship shall have the navigational capability to operate safely in these conditions.

8. Topside Icing

   A. The combination of cold sea water and air temperatures with high sea states in the primary operating area will cause severe topside icing at times. Spray icing rates of a $^1/_2$-inch (13 mm) per hour can be expected in extreme events. The extreme icing event has been estimated to be a 24-hour exposure at this icing rate. This extreme event may result in the following ice accumulations and loads on the main deck forward of the superstructure.

Table 2: Typical topside icing accumulation.

Location	Accumulation (inches)	Load (lbs/sq ft)
Horizontal Surfaces	12.0	43.6
Vertical Surfaces	9.6	34.8
Exposed Gear	10.8	39.4
Radius Rigging and Stays	10.8	111.1 lb/ft

   B. These loads should be reduced linearly with height such that all loads are zero at 100 feet above the Design Waterline (DWL). Icing is assumed not to occur on the shell plating or area below the main deck (uppermost watertight deck). Icing loads should also be reduced linearly with distance aft along the ship. Icing loads should be constant with length over the foredeck and start to reduce aft of the forward end of the superstructure, resulting in zero load at the stern of the vessel. The ship should be capable of maintaining acceptable stability margins in such an icing event. Stability in this icing condition is addressed in Section III-C 8.

   C. Given the severity of the icing loads, decks and superstructure shall be free of all but essential fittings and equipment, to minimize ice accretion.

SECTION III-C

Operational Performance Requirements

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OPERATIONAL PERFORMANCE REQUIREMENTS

1. Icebreaking Capability

   The ship must be able to operate independently, year-round, through thin first-year ice conditions. See table below for details.

   Table 1: Icebreaking capability requirements for vessel.

Level Ice thickness of 1 foot (0.3 meter) with continuous forward progress:	
Ice Strength	
Flexural:	100 psi (0.7MPa)
Compressive:	575 psi (4.0 MPa)

   The ship must also be able to operate in thick close pack ice of 3 feet (0.9 meters) thickness.

2. Trimming

   The ship should have sufficient ballast tankage in the ends of the ship to change the trim by 3 feet (0.9 meters) at both the bow and stern.

3. Open Water Powering

   The ship is required to make a calm water speed of 12 knots at 60 percent of maximum continuous service rating of the diesel engines. Model tests or recent full-scale measurements should be submitted to verify this performance.

4. Seakeeping

   The ship should be able to maintain ship motions that do not exceed the values given below in sea state 5 (10-foot significant wave height) and short-crested seas (cosine squared spreading function) on any heading at speeds up to 8 knots. Wind is co-linear with the seas as described in Section III-B 3 and a steady current of 2 knots is at 45 degrees.

Table 2: Seakeeping Requirements, Sea State 5.

Significant Pitch	5 Degrees
Significant Roll	8 Degrees
Accelerations	
On the bridge wings	0.2 g's Athwartship
	0.4 g's Vertical
On main deck on centerline at after perpendicular	0.2 g's Athwartship
	0.4 g's Vertical
Slamming	10 occurrences per hour
Deck Wetness	
At after perpendicular	5 occurrences per hour
At 5 % aft of forward perpendicular	5 occurrences per hour

5. Stationkeeping

   The ship must be able to maneuver and keep station within a 300-foot, or 5 percent of the water depth, diameter watch circle in seas up to 10-foot significant wave height, with mean winds of 30 knots and 2 knots of steady current. The wind and waves directions are co-linear and the current direction is at 45 degrees to them. Ship heading can be selected to give best stationkeeping ability.

6. Trackkeeping

   The ship shall be capable of remaining within plus or minus 500 feet or 5 percent of the water depth, whichever is greater, of any specified straight trackline and shall be capable of maintaining its mean heading for all forward speeds between 15 degrees of its mean heading for all forward speeds between 1 and 6 knots, in sea state 5 (long-crested seas of 10-foot significant wave height, 25 knots mean wind speed and 2 knots steady current), where the wind and waves are co-linear and have an arbitrary heading relative to the trackline and the current direction is at 45 degrees from the wind/wave direction.

7. Night Operation

   Ship operations are based on year-round science. Science and logistics operations can be expected to take place 24 hours a day and anytime the vessel is underway or alongside. The vessel shall be crewed accordingly. Long periods of darkness can be anticipated during the winter months because of the extreme latitudes of operation. The ship must provide adequate lighting on all working decks as well as lighting of the ice or water surface adjacent to and astern of the ship.

8. Stability, Compartmentation, and Limiting Drafts

   The ship must meet the US Coast Guard requirements of Subchapter U for Oceanographic Research Vessels (CFR Title 46, Parts 188 to 196). Additionally, the ship must meet the intact stability requirements of Subchapter U with the icing load described in Section III-B 9 **Topside Icing**.

9. Endurance and Range

   The ship must be capable of an endurance of 75 days. The minimum range of the vessel must be 12,000 nautical miles calm water transit at 12 knots. The corresponding fuel tankage should be equal to the fuel consumed by the propulsion diesel(s) to achieve a 12-knot calm water speed and the associated fuel consumed by the auxiliary machinery in service during that time. There should be a 10-percent margin of usable fuel left onboard upon returning to port. The total computed volume of fuel should be 95 percent of the required tank volume. The ship must be able to fill the required tank volume with fuel, load a full complement of scientists, stores, fully loaded scientific containers and scientific cargo and still meet her loadline requirements.

10. Service Life

    A minimum service life of 20 years from charter commencement is required.

11. Vibration and Airborne Noise

    The ship and its equipment should be free of excessive vibration and airborne noise during open water and icebreaking operations. Vibration and airborne noise should not exceed the levels given in the latest revision of the ABS rules HAB+ notation for spaces occupied by the crew or scientific personnel. (Reference section III-E 1 **Classification**) All Science working spaces should be considered equivalent to Ship's Offices for the purpose of the ABS HAB+ notation.

12. Underwater Noise

The ARSV is a multi-mission ship but a major emphasis of its science work now and into the future is the acoustic measurement of marine life. This requires the ship to be as acoustically quiet as possible at a range of cruising speeds up to 8 to 12 knots (the higher the better). The International Council for the Exploration of the Seas Cooperative Research Report No. 209 (ICES 209) gives an acoustic standard for ships doing this type of work and several ships have been designed to this standard (reference NOAA FRVs

and NSF ARRV). The criterion is not easily met and typically involves acoustic assessment of all aspects on the ship: hull form, propellers, propulsion and auxiliary machinery, ducting, etc. A ship that meets this criterion is considered to fully meet the requirements for the science. However, it is recognized that meeting the criterion is onerous and bidders may therefore propose alternative approaches to mitigate underwater noise and achieve an acoustically quiet ship.

In addition, noise generated by the ship shall not interfere with the operation of the installed sonars. Further details on sonar systems can be found in Section III-D 8 of the **Science Requirements.**

SECTION III-D
Science Requirements

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SCIENCE REQUIREMENTS

Bidders are required to address all of the science requirements outlined below. Areas where proposals diverge from the stated requirements should be highlighted and specifically addressed in terms of proposed approach.

1. External Work Areas

   A. Main Science Mast

      i. A science mast is required for mounting meteorological and other scientific instruments.

         a. The mast shall be tall enough and located in such a way as to provide mounting surfaces that are clear of air turbulence created by the ship's superstructure and all ship's exhaust when the ship is underway.

         b. The mast must also be 100 percent free of shadowing from any other part of the ship.

         c. This mast shall have, at its base, a wire conduit outlet, with a threaded cap, where the conduit provides for internal cable way to two areas immediately below the bridge where scientific sensors and equipment may be installed and operated, and to the Electronics Workshop. The outboard end cap of this conduit shall be fitted with stuffing tubes to accommodate Charterers' data and electrical wires from the science mast. Cable runs for Science Mast shall accommodate power and shielded data cables.

         d. The mast and its platform shall provide for an unobstructed 360-degree sky view for radiometers, and the ability to support IMET sensors unobstructed by smokestack exhaust plume and radar sweep.

         e. Other instruments, such as GPS antennae shall be mounted on the Mast and its platform.

      ii. Specific Requirements

         a. The mast must be accessible by ladder and have an upper catwalk. The entire length of the ladder shall be surrounded by a protective enclosure.

         b. The catwalk shall be at least 30 inches wide and equipped with safety handrails.

         c. Details of required services can be found in attached tables.

         d. Wire way access- There shall be a 6-inch (minimum) diameter conduit from the top of the mast to the laboratory spaces and the secure server room. This conduit must be installed to accommodate wiring for science instrumentation located on the mast.

(1.) This conduit shall include 3R (bend radius three times the diameter of the conduit) turns and shall include access ports every 50 feet.

(2.) The use of 90-degree turns should be avoided. If 90-degree turns are unavoidable, there shall be an access port at each one to aid in running cables.

B. Bow Science Mast

A bow science mast is required for mounting scientific instruments that will need a clean area for sampling, especially air samples. This mast will be located as far forward on the ship as possible to facilitate collecting air samples before it moves into the air envelope of the vessel. A ladder shall be provided for accessing the top of the mast.

i. Specific Requirements

a. Details of required services can be found in attached tables.

b. Wire way access - The bow mast must be serviced by a minimum of two, 3-inch diameter conduits from the top of the mast to the laboratory spaces. This conduit must be installed to accommodate wiring for science instrumentation located on the mast.

(1.) This conduit shall include 3R turns and shall include access ports every 50 feet.

(2.) There shall be no 90-degree turns in this conduit. If 90-degree turns are unavoidable, there shall be an access port at each one to aid in running cables.

C. Working Deck Area

i. The vessel should be configured so that one side of the vessel is the "working" or "clean" side and one the "dirty" side. To avoid as much as possible contaminating samples taken from the working or clean side, all overboard discharges and drains shall opposite the working side.

ii. A fantail working deck area of about 1,000 square feet is required with additional contiguous working area along the working side to facilitate deployment of scientific instrumentation (about 25 feet long by 12 feet wide). This area shall be capable of withstanding local deck loads of 750 pounds per square foot. The work areas shall be about 8 feet above the working draft to make them as dry as possible while still allowing over-the-side work. A portion of the bulwark in this area shall be gated or removable to facilitate loading heavy or bulky objects from the sea or pier side.

iii. Stainless steel, threaded, deck sockets that are flush with the deck (internally threaded 1-inch unified course thread (UNC) shall be provided throughout the working deck area on 2-foot centers.

iv. Bidders should consider a deck heating system to maintain the main deck working areas free of ice accretion.

v. About 200 square feet of deck workspace above the main deck with minimal obstruction to ambient light for light incubation experiments shall be provided. This area shall also have flush deck stainless steel threaded deck sockets on 2-foot centers.

vi. Uncontaminated seawater (discussed in section III-D 10) per attached.

vii. The ship shall also have a clear area on the foredeck near the bow for erection of specialized towers and booms that reach forward of the bow wave for gathering uncontaminated air samples. This area shall also have similar flush deck threaded sockets on two-foot centers.

viii. All working decks shall be provided with 208 VAC 3-phase and 480 VAC 3-phase, 60 Hertz power supplied from IEC-309 standard receptacles, and 110 VAC 60 Hertz power supplied from NEMA 5 receptacles. Power outlets shall be located in interior spaces that are accessible from the working decks via a minimum of 6-inch diameter bulkhead pass-throughs.

ix. Additionally, working decks shall be provided with uncontaminated sea water supply and hydraulic service as supplied to the ship's cranes, A-Frames and deck machinery. There shall be at least two hydraulics service points from this system, on the aft deck available for Charterers' equipment.

x. Provision shall be made for allowing the discharge of expendable probes. This may take the form of an exterior mounted launching platform or a hull penetration such that the probes can be dropped from an interior space.

xi. Working decks and areas aft and outboard under A-frames must be adequately illuminated, preferably with white light, as to not cast shadows across working areas.

xii. All external areas of the vessel: walkways, doors, and ladders, shall have accommodations to prevent ice buildup that will create a hazardous work environment.

D. Weather Deck Storage

There must be at least 500 square feet of weather deck area available for break-bulk storage that is within service range of the ship's crane. Special provisions must be made to maintain walkways and hand rails and access around or immediately adjacent to the designated storage area.

2. Internal Work Areas

A. All spaces described in Section 2 will conform to the following general specifications. Detailed, space-specific specifications are provided in the appropriate sub-section.

i. Safety and engineering controls shall meet or exceed the standard of an equivalent land-based work site in the continental United States as defined under 29 CFR Occupational Safety and Health Administration (OSHA), American National Standards Institute (ANSI) (Z358.1 and others), and National Institute for Occupational Safety and Health (NIOSH) guidelines in effect at the time of the Charter award. In the event of conflict with any regulation, then 46 CFR Subchapter U shall take precedence.

ii. Unless otherwise specified, all science spaces and science berthing shall conform to a minimum guideline of the American Bureau of Shipping HAB+ notation for crew habitability on ships.

B. Laboratory Spaces

i. A total of 1,400 square feet of laboratory space is required, configurable or partitionable into 3 smaller lab spaces. These spaces shall function as research laboratory spaces where chemistry, biology, geology, and other scientific disciplines' experiments are performed.

ii. One laboratory must be able to receive a 20-foot core from the working deck. This could be accomplished, if needed, through another space such as the oceanographic staging hangar (Baltic Room).

iii. One laboratory located near the working deck shall have a sink drain arrangement of 40 gpm and fitted with a large removable sink equipped with a sediment trap which can be mounted or removed within the flexible arrangement of laboratory furniture for mud work or other applications.

iv. In addition to the above requirements, there are requirements for the following spaces:

a. Environmentally Controlled Laboratory (about 100 square feet)

b. Aquarium Room (about 250 square feet)

c. Oceanographic Staging Hangar ("Baltic Room") (about 400 square feet)

d. Laboratory space of about 20 square feet shall be provided for a government-furnished reverse osmosis water unit

e. Laboratory space of 14 feet by 5 feet high shall be provided for a seawater instrumentation wall (3/4-inch sealed plywood) over a stainless steel slop sink

C. Workshops

There is a requirement for workshop areas in addition to the above spaces. These workshops must include:

i. a science workshop of about 300 square feet and

ii. a science electronics workshop of about 80 square feet.

D. Office Spaces

There is a requirement for office areas as follow:

i. Computer workstations (about 225 square feet)

ii. Marine Projects Coordinator office (about 115 square feet)

iii. Chief Scientist Office (about 115 square feet)

iv. Science Support Office (about 60 square feet)

v. Library and Conference Room (about 550 square feet)

E. Special Spaces

Provisions shall be made for the following special spaces:

i. Secure server locations and communications equipment (about 120 square feet)

ii. Hospital (per 46 CFR72.20-35)

iii. Hazardous materials locker (about 65 square feet)

iv. Compressed gas storage locker (about 30 square feet)

v. Science sonar transducer wells and acoustic system (For detailed discussion see Section III-D 8)

F. Electrical

i. Each internal science area shall have a separate electrical circuit on a clean bus to provide continuous power of at least 60 VA per square foot of work space.

ii. Voltages shall be both 110 and 220 VAC at 60 Hertz with US standard NEMA 5 and 6 receptacles unless otherwise indicated.

iii. There shall be a maximum of four 110 VAC, 15 A receptacles or three 110V, 20A receptacles on any feeder circuit. There shall be about one 20 A receptacle for every two 15 A receptacles.

iv. Each 208 VAC receptacle shall be on a dedicated circuit.

v. The total estimated power demand for the work spaces is 100 kVA at any given time.

vi. All science area receptacles must be grounded to the distribution panel, and such panels shall be equipped with a dedicated ground to the main distribution center in the generator room.

vii. Uninterruptible and conditioned power supply (UPS) is required in all internal science spaces. The UPS system shall be capable of supplying a sustained load of 30 kVA.

viii. Breaker Panels for the UPS shall match capacity of the unit (i.e. a minimum of three 100 A panels). Secondary power supply for UPS unit shall come from the emergency generator.

ix. All outlets must be labeled to indicate amperage, breaker location, and UPS or Ship's power.

x. All outlets on UPS power shall be of a unique color different from other receptacles.

xi. All breaker panels must also be appropriately labeled.

xii. Each breaker panel should have about 35 percent of the panel available for future expansion.

xiii. All 110 VAC electrical outlets located in wet areas shall be GFCI protected.

xiv. Outlet locations shall be determined in final design.

xv. The ship shall operate with sensitive electronic equipment, computers, and data acquisition systems intended for scientific sensing and analysis. This equipment shall be placed primarily in the labs, other scientific spaces, the winch control room, the bridge, and on any of the working decks. The Owners shall install electrical, navigational, communication, or other cabling in a configuration that precludes any inductive coupling or other types of interference on one cable due to proximity of other cables. Traps, filters, grounds, etc. shall be installed as necessary to prevent any electro-magnetic interference with scientific equipment. Special attention shall be given to preventing 60-Hertz interference from fluorescent light fixtures.

G. Lighting

Ship's lighting shall conform to guidelines of the Illuminating Engineering Society of North America (IESNA) and ABS HAB+ notation for Crew Habitability on Ships. See Section III-E 1 for notations on vessel classification. A combination of direct and indirect lighting to reduce glare and provide uniform lighting on work surfaces shall be used.

H. Heating, Ventilation & Air Conditioning

i. Temperature range and control and ventilation will be maintained in accordance with ABS HAB+ or 46 CFR Subchapter U, whichever is more stringent. HVAC systems must be able to provide these requirements regardless of outside air conditions, i.e., working in the Antarctic or crossing the equator.

ii. HVAC system shall provide minimum outside air change rates within these spaces per the following schedule:

a. Laboratories – nine to 11 changes per hour normal, complying to 46 CFR Subchapter U for emergencies

b. Workshops – seven to 10 changes per hour

c. Office Spaces – five to eight changes per hour

d. Storage only rooms – two to three changes per hour

iii. If any spaces are combined into a dual role, the more strict ventilation requirement shall apply, e.g., if storage room and office are combined, ventilation for an office space shall apply.

iv. Hazardous materials exhaust must not be to any working deck, locations where personnel are likely to be, or interfere with science experiments.

v. The system shall provide air filtration.

vi. HVAC systems for internal science spaces shall be separate and isolatable from other berthing, cooking, and shipboard systems.

I. Floor covering

Interior deck surfaces must be of a slip-resistant design with suitable underlayment to reduce temperature fluctuation, vibration, and noise.

J. Pass Throughs and Wire Runs

Wire ways must be provided to all science and specialty van areas, working decks and winch locations, and shall have minimum 6-inch bulkhead pass throughs to facilitate running science related cable without removing end fittings. Conduit crossing hallways or other service facilities must also meet the minimum 6-inch requirement.

K. Data and Voice Drops (Serial, LAN, CCTV, Other)

i. Each internal science area shall have the following data connections:

a. LAN connections - GG-45 female jack connectors for connection to the Charterers' computer network located in the server and communications room, over Category 7 (ISO/IEC 11801:2002 Category 7/class F) Ethernet cable. These shall be wired according to ISO/IEC standard 11801.

b. CCTV connections - RG-6U or better coaxial cable terminated with F-type connectors, for connection to the Charterers' CCTV distribution system located in the server and communications room.

c. Telephone connections - RJ-11 female connectors shall be wired according to standard EIA/TIA.

d. T586A for communication over the ship's PBX.

ii. There shall be at least one telephone in each science space.

iii. The ship's PBX system shall be digital and allow easy expansion to at least 150 percent of initial capacity.

iv. Provision shall be made for wire ways such that serial and other data can be connected to the Charterers' data acquisition system in the secure server and communications room.

L. Ship's Alarm

i. Alarms, bells, firefighting equipment, doors, hatches, cable runs, and fittings shall be located in such a way as to maximize available science space and shall all be built for maximizing lab cleanliness.

ii. In addition, provision shall be made to interface science and special purpose ISO vans to the following shipboard systems:

a. General alarm

b. Fire zone monitoring

c. Telephone

d. CCTV, serial data, and network.

iii. See Section III-D 3 for additional details on science and specialty vans.

M. Fire Suppression

Fire suppression in all science spaces shall meet all U.S. Coast Guard (USCG) specifications under 46 CFR Subchapter U for Science Laboratories. In addition, CO_2 (Carbon Dioxide) fire extinguishers shall be provided in laboratory spaces and areas where sensitive electronics and scientific equipment are located.

N. Furniture Standards

i. Furniture will be designed for maximum efficiency and of sturdy construction to withstand continual use and forces experienced during high-sea states. See additional specific requirements in subsequent sections.

ii. All furniture shall have suitable latches, shelf retainers, and other necessary equipment to keep furniture closed during heavy seas.

O. Port Holes

Port holes shall meet ABS and USCG requirements and shall be fitted with deadlight covers.

P. Compressed Air Service

i. A ship's service compressed air system is required to supply science spaces defined in this section, and all working deck areas.

ii. A 120 psi air supply shall be filtered, free of moisture to -50°F and of oil to meet ISO standard 8573.1 class 1.2.1.

iii. The volume must be at least 50 cubic feet per minute.

iv. The inlet for the laboratory air feed shall be away from stack or other hydrocarbon emitting area.

v. Oiling for use with power tools will be accomplished in each space as required.

Q. Fresh Water Service

i. Supply

The Vessel's potable water system shall meet standards of the United States Antarctic Program (USAP) drinking water action levels and EPA Regulations and Analytical Criteria.

a. Potable water shall be distributed in plastic lined piping or flexible Unipipe.

b. Consideration should be given to a continuous recirculating loop water feed so that water doesn't sit stagnant.

c. Potable water pressure to laboratories shall be between 60 and 80 psi.

d. Flow rate to laboratory spaces shall be at least 5 gallons per minute.

e. The Charterers will install a GFP Reverse osmosis water for laboratory support. Charterers will provide detail in design period.

f. Deionized water. Specific GFP deionizing "polishers" shall be provided by the Charterers for at least two lab spaces and shall be bulkhead-mounted above sinks and fed by the Charterers' GFP RO Unit distributed into the lab spaces.

ii. Drainage

a. All science and related space deck drains shall lead to suitably-sized stainless steel overboard discharge lines fitted beneath the vessel's waterline on the 'dirty' or non-working side.

(1.) All such discharge lines shall be fitted with back-flow preventer valves as close to the actual discharge as possible.

(2.) The Owners shall also install shut-off valves upstream and downstream of these preventers for maintenance purposes.

(A.) One such shut-off valve shall be fitted for each branch leading to the discharge if more than one line leads to any such underwater discharge.

b. All drainage shall be functional under all sea states and under all conditions.

c. All science and related space deck drain and associated piping installations shall be heated by electrical trace tape, or other suitable means, to prevent build up or clogging by ice.

d. There shall be an emergency shutoff valve in any space where hazardous materials could be discharged through the drains.

e. Drainage runs shall be as short as possible to minimize the risk of plugging with mud, silt, and ice slush that might be introduced into the drain system.

f. Drain lines shall have a cleanout available.

g. All drains shall have individual backflow preventers so that water flowing in one drain doesn't return out another on the same system.

h. All floor and sink drains must have removable strainers for easy cleaning and maintenance.

i. All drains and back flow preventers are to be positioned so that they can be easily inspected, maintained, and repaired.

R. Laboratory-Specific Requirements

i. These spaces shall function as research laboratory spaces where chemistry, biology, geology, and other scientific disciplines' experiments are performed.

ii. All spaces in this section shall comply with the specifications as defined in the general section of III-D 2 and in addition shall provide the following.

iii. Safety

a. Wall space must be provided for spill containment cabinets, laboratory coat racks, safety eyewear, glove storage, and first aid supplies.

b. Safety Showers – Shall comply with current ANSI standard (ANSI - Z358.1 and others) for temperature, pressure, volume, and placement. No safety shower shall be located next to an electrical panel or electrical service. There shall be a safety shower located in Labs 1-3.

c. Safety Eyewash – Shall comply with current ANSI standard (ANSI - Z358.1 and others).

d. Safety eyewash or drench hose shall be included with every laboratory sink but a minimum of one permanently plumbed eyewash must be in each laboratory space.

iv. Ventilation

a. Must comply to 46 CFR 194.15-5

b. General – Laboratory spaces shall have a separate system from the general ventilation system. Laboratories with hoods and snorkel exhaust installed may require additional heating to comply with general requirements of this section.

c. Any ventilation of hazardous materials shall be independent of other ventilation systems and accommodations shall be made so that hazardous exhaust cannot be pulled into other ventilation system intakes.

d. Fume Hoods

(1.) Labs 1-3 shall have provisions for the installation of four government-furnished low-volume, 6-foot fume hoods (one each per space). Ventilation shall be provided by remote blowers to reduce noise in the laboratory spaces. Remote blowers shall monitor air flow from the hood at all times, they shall be designed to control air flow, automatically adjusting blower speed to maintain an even air flow within the hood using variable air volume (VAV) technology or damper/controller technology.

(2.) Design must meet the Scientific Equipment and Furniture Association (SEFA), OSHA, ANSI, and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standards. Flow rate shall be between 60 and 100 fpm linear face velocity. Each hood shall have a continuous monitoring device to allow convenient confirmation of adequate hood performance, proximity detectors to conserve vessel heat, and sash opening sensors that adjust face velocity. The positioning of the blowers shall be easily accessible for calibration, testing, and repair. The design shall offset interior pressure changes. The hood remote blower shall be designed with full dampers to prevent back drafting when not in use. Fume hood exhaust must not be on any working deck or location where personnel are likely to be located.

(3.) Ventilation requirements shall meet regulatory standards listed previously at all times regardless of wind direction, pressure or temperature gradients within the vessel or working environment.

e. Snorkel or Special Fume Hood Details

(1.) Ventilation ports shall also be incorporated into the integrated overhead systems listed in laboratory furniture standards where GFP portable snorkel-type exhaust apparatus can be used. Remote blower configuration shall meet the same regulatory requirements as chemical fume hoods above.

f. Electrical

(1.) Fume hood installations shall be hard wired directly to circuit breakers within labeled electrical distribution panels.

(2.) It is preferred that all electrical breaker boxes be located external to the laboratory space near the entrance to the laboratory.

g. Laboratory Furniture Standard

(1.) Cabinetry shall be constructed to provide for flexibility through the use of Unistrut (ceiling, wall, and floor) or wall rail system, and threaded deck sockets. Since the ship will be engaged in multi-disciplinary research, its equipment and the investigations it undertakes will change frequently. Equipment mounted in the labs and on the working decks shall be installed such that it can be easily removed, rearranged, or reinstalled.

(2.) Final furniture design shall include a self-closing combination corrosives and flammable storage cabinet, about 35.5 inches high x 48 inches wide x 22 inches deep in each 250 square feet of the main laboratory spaces (Labs 1-3). If necessary, two separate smaller cabinets may be substituted, provided that they provide the same amount of storage as indicated above.

(3.) Integrated overhead utility runs would be preferred in the design of the flexible laboratory furniture. A Thermo Fisher Scientific Max Lab Wall Rail adaptable furniture system or equivalent should be considered as guidance.

(4.) Placement of furniture should maximize usability. Offeror may consider the following, but as a guide all furniture should conform to Scientific Equipment and Furniture Association (SEFA) guidelines.

(5.) Furniture shall be modular in design, and island core design shall be incorporated.

(6.) Countertops and working surfaces shall be Trespa phenolic resin work surfaces (30-inch depth) with adequate splash guards and mounting hardware for sealed plywood tops.

(7.) Provision shall be made for installation of GFP Low-Volume Fume Hoods with lighting, attached electrical outlets, and Trespa phenolic resin work surface.

(8.) GFP additional Snorkel type exhausts shall be incorporated into an overhead utility run.

(9.) Corrosive and Flammable resistant cabinets could be the base support for fume hood requirement and also allow for incorporated cabinet exhaust.

h. Compressed Gases

(1.) Pass throughs and stainless steel piping of at least 1/8-inch inner diameter shall be provided into all laboratory spaces so that at least four types of high-purity gases, in addition to Nitrogen and dry air, can be provided to laboratory overhead gas manifold.

(2.) The design and placement of gas cylinders and the gas line distribution of the gas to the laboratories shall meet the requirements of 46 CFR subchapter U; subpart 194.15-17 (the gas cylinder placement and storage of bottles shall meet subpart 194.15-15 standards and shall facilitate the replacement of gas cylinders during a cruise.)

(3.) An integrated overhead design of the laboratory furniture for delivery of gases shall be incorporated into the overall lab design. The design will include a distribution manifold so that each laboratory can be isolated from the main cylinder manifold or gas supplies.

(4.) Space for compressed gas cylinder restraints shall be provided in Laboratories 1-3. This can be accommodated with the Unistrut design of these spaces.

i. Uncontaminated Seawater Feed

An uncontaminated sea water supply is required in most laboratory spaces. The uncontaminated sea water system is a critical component of the vessel's science mission and as such a representative description in Section 4.10 is provided as guidance.

j. Sinks

(1.) Labs 1-3 and the environmentally controlled lab shall have provisions for hot and cold freshwater with chemical resistant sinks and drains that are discharged overboard.

(2.) Scientific Plastics Company of Kansas City, KS, can be used for guidance.

(3.) Freshwater sinks shall have a flexible arrangement so that quick disconnects in the floor for water sources and drains allow re-configuration of bench layouts and sink placement.

(4.) Covers shall be provided for floor connects when sinks are not connected.

(5.) Fresh water spigots shall include vacuum breakers and aerators.

(6.) All sinks shall also have an emergency eyewash or flush hose integrated into the design.

(7.) Sinks shall include a removable basket strainer in the drains to catch small debris.

(8.) Any sink that is located on an exterior wall must be insulated or heated to prevent freezing.

(9.) Sink material must not crack when subjected to temperature swings such as from dry ice or boiling water.

k. Drainage

(1.) Sink Drains in all labs should be capable of discharging at 20 gallons per minute (gpm).

(2.) Floor Drains – Drainage shall be calculated by area and function of the lab space.

(A.) At least six inches of standing water shall drain from a lab area in two minutes. 500 square feet lab with six drains installed in the floor shall have drainage rate of 13 gallons per minute per drain (231 cubic inches per gallon).

(3.) Emergency Shower should be 25 gpm.

(4.) Seawater wall (Section 4.2.W.2) manifold drains –

(A.) Five 10 gpm drain ports and 40 gpm for the deep sink drain.

(B.) As much as possible seawater drains shall be constructed from a non-corrosive material. (e.g., Schedule 80 PVC, fiberglass, stainless steel)

l. Lighting

(1.) Light banks shall be individually controlled for laboratory spaces so that parts of the laboratory can be kept dark for specific experiments.

(2.) Lighting shall meet guidelines for laboratories as described in the Illuminating Engineering Society of North America (IESNA) Lighting Handbook. A combination of direct and indirect lighting to reduce glare and provide uniform lighting on work surfaces shall be used.

(3.) Lighting shall be at least 810 Lux (75.33 foot-candles) as defined in ABS HAB+ guidelines.

m. Unistrut

Unistrut shall be provided in the deck, overhead, and bulkheads where applicable.

(1.) Floor and ceiling Unistrut shall run fore and aft, be vertically aligned, and be positioned at two-foot centers from the centerline of the space.

(2.) Drain facilities and sump collection will be positioned at the fore and aft ends of each space to drain any water collecting in the Unistrut to floor drains and to facilitate cleaning of the floor.

n. Layout

(3.) There shall be convenient access between all laboratory spaces, working deck areas and scientific storage spaces.

(4.) Laboratories shall be located as close as possible to each other

(5.) Laboratories shall not serve as general passageways.

o. Environmentally Controlled Laboratory - about 100 ft2

The environmental room is designed for use of instruments requiring a constant temperature or other processes requiring a constant temperature. All of the general lab requirements outlined in Section III-D 2 and Section III-D 2.A shall apply to the environmental room. The following are specific requirements for the environmental room:

(1.) Heating, Ventilation, and Air Conditioning

(2.) Temperature requirements of this space will be able to hold +/- 1°C of set point within a range of 18°C to 26°C (65°F to 78°F) and shall have its own control independent from the rest of the ship's HVAC system. It is estimated that GFP and personnel operating in this space will generate a heat load of about 1,800 BTU/hour.

(3.) Environmentally Controlled Laboratory Specific Requirements

(4.) Service drop requirements can be found at the end of this section.

(5.) About 18 ft of linear bench space (30 in deep) shall be provided.

p. Aquarium Room - about 250 ft2

An enclosed aquarium room, contiguous to, and accessible from, the working deck and cranes, is to be provided for in-situ experiments. All of the general lab requirements outlined in section 4.2 shall apply to the aquarium room. The following are specific requirements for the aquarium room.

(1.) Drainage
The space must be fitted with floor drains with starboard-side overboard discharge for tanks supplied by the Charterers. Rate of drainage from this space shall be 125 gpm as there will be continually flowing seawater in this space and the potential for waves from the working deck to enter the space. Floor shall be fiber grate or similar to aid drainage.

(2.) Heating, Ventilation, and Air Conditioning
This space is exempt from the temperature requirements in the general requirements called out in Section III-D 2. However, the space must be equipped with locally controllable heating to maintain temperatures above freezing. Heaters shall provide at least 30,000 BTUs per hour.

(3.) Seawater Feed

(A.) This space shall be supplied with uncontaminated seawater as described in this section. Seawater supply and distribution shall be easily coupled and uncoupled through the use of flexible hosing and quick-connect cam lock type fittings common to all Xactic brand tanks to allow for ease of configuration.

(B.) Each tank shall be provided with its own dedicated seawater drop, control valve, and strainer with removable basket.

(C.) A seawater wash down system capable of supplying two ¾-inch garden hoses at 25-40 psi during continuous use will be provided for the purposes of washing equipment on deck. This system shall have its own dedicated seawater drop and the entire system shall be sized such that with all tanks running, flow in the Xactic tanks is not reduced.

(D.) This space should have no sill or a low sill watertight double-door with dimensions no less than 78 inches high by 60 inches wide to allow for the use of pallet jacks for moving aquaria tanks.

(E.) Threaded deck sockets (internally threaded 1-inch UNC) shall be provided throughout the Aquarium Room on two-foot centers (not to interfere with movement or securing of aquarium tanks) for use in securing other items in this space when tanks are not onboard.

(4.) Tanks

(A.) The Aquarium Room shall be capable of housing six insulated polyethylene fish tanks such as Xactic brand with dimensions of 4-foot length, width and height, with 2-foot wide walk ways between tanks. Appropriate means shall be provided for securing these tanks when full of water.

(B.) Aquaria tanks shall be standardized in regards to hookups so that they are fully interchangeable in any location without re-configuration.

(5.) Additional Requirements

(A.) Access to the Aquarium Room from within the vessel is desirable.

(B.) Unistrut shall be provided on all walls in three different heights not to interfere with securing of tanks and position to be determined during final layout. Any walls where Unistrut is not possible, pad eyes or tie down points shall be provided every two horizontal feet, at two feet and four feet above deck.

(C.) There shall be three six-inch watertight pass-throughs provided from this space to the main deck.

(D.) A permanently plumbed safety eye wash or eyewash/drench hose that is protected from freezing shall be provided in this space.

(6.) Service requirements can be found in the table at the end of this section.

q. Oceanographic Staging Hangar (Baltic Room) about 400 ft2

(1.) The Science Staging Hangar must be an internal space located on the working side, contiguous to the main deck, and close to midships. This space is used for deploying over-the-side oceanographic instrumentation through a Baltic door. The staging Hangar could be designed and constructed in a manner similar to that in use on other USAP research vessels.

(2.) The Oceanographic Hangar shall be constructed as to provide access to the main deck and adjacent interior spaces through water tight doors with low or no sill.

(3.) All of the general lab requirements outlined in III-D 2 shall apply to the Oceanographic Staging Hangar. The following are specific requirements for the Staging Hangar:

(A.) Safety

A permanently plumbed and heat traced (to prevent from freezing) safety shower/eye wash shall be provided in this space. A model S19-300T or a S19-300B from Bradley Corporation, Menomonee Falls, WI should be used as an example.

(B.) Drainage

This space shall be fitted with sufficient deck drains that lead to a port side overboard fitting such that the deck will remain free of water accumulation when water is introduced to the space at a rate of 100 gpm.

(C.) Heating Ventilation and Air Conditioning

This space is exempt from the general temperature requirements in this Section. However, the space must be equipped with locally controllable heating to maintain temperatures above freezing. Heaters shall provide at least 30,000 BTUs per hour.

(D.) Winch

A government-furnished Markey DUSH 5 or equivalent oceanographic winch shall be installed in this space. It must be located in line with the telescoping boom defined in this section.

(E.) Boom

A telescoping boom will be fitted in this space centered to the Baltic door. The boom shall meet the following requirements:

(i.) 6-ton capacity
(ii.) Outboard reach of 15 feet
(iii.) Boom must be able to retract into the hangar a sufficient distance from the Baltic door to allow placement of a 24-position Sea-Bird CTD/Rosette (about 5 feet in diameter) in a position clear of the swing of the Baltic door.
(iv.) Minimum vertical clearance of the boom to the bottom sill of the Baltic door must be 14 feet.
(v.) Must be self securing so that it will not move when not in use.

(F.) Baltic Door

The door to the outboard side shall be hydraulically actuated and shall have the following requirements:

(vi.) 8 feet of clearance side to side
(vii.) Overhead clearance from the sill must be no less than 15 feet.
(viii.) When open, the Baltic door shall not obscure the view of the winch operator.

(G.) Flooring

(i.) Shall be fiber grate or similar to aid drainage.
(ii.) Deck sockets, threaded, stainless steel, (internally threaded 1-inch UNC) shall be provided throughout the hangar on 2-foot centers.

(H.) Reverse Osmosis (RO) water access

There shall be an insulated access port to the GFP RO water system described in Section III-D.

(I.) Hangar Mezzanine Storage

(i.) This storage area shall be as large as possible, but shall not interfere with the boom or winch operation. Access shall be provided from the 01 Deck and from the Hangar. Minimum height must be 122 inches from hangar deck to the underside of the mezzanine decking and 88 inches from mezzanine deck to the overhead above mezzanine.

(ii.) Cabinets, shelves, and tie downs in mezzanine required.

(J.) Ventilation

This space is exempt from the temperature requirements in the general portion of this Section. However, the space must be equipped with locally controllable heating to maintain temperatures above freezing. Heaters shall provide at least 30,000 BTUs per hour.

r. Science Workshops

Scientific workshops are areas separate from normal ship maintenance operations where maintenance and construction of scientific equipment and infrastructure can be carried out by contractor representatives and scientists.
There shall be at least 1,400 cubic feet of storage spaces (shelves, cabinets, lockers) for tools, rigging, and other similar equipment All general requirements from Section 4.2 will apply to these spaces unless noted otherwise. In addition, the following requirements are applied to the spaces in this sub-section.

(1.) Science Workshop - About 300 ft2

(A.) This workshop shall have access to main deck working area through water tight doors. It should have one door (or split doors) with dimensions no less than 60 inches wide by 66 inches high, centered on an overhead rail trolley system of approximately 2 tons with access to main working deck for the movement of heavy items for repair or storage. Interior access from this to other interior science spaces located on the same deck is desirable.

(B.) Activities such as welding, basic carpentry, and mechanical manipulations occur in this space, especially activity directly related to work on the main deck areas.

(C.) Safety

There shall be at least one permanently plumbed eyewash station in this space.

(D.) Drainage

There shall be a direct overboard floor drain with removable strainer basket and backflow prevention in this space capable of draining 30 gpm.

(E.) Service Drops are provided at the end of this section.

(F.) Additional Requirements

(i.) 66 square feet of bench space - minimum 30 inches deep shall be provided.

(ii.) Storage space shall be fitted with securing devices (fiddles, latches, doors, etc.).

(iii.) Lighting shall meet industrial standards – 810 Lux, 75.33 foot-candles.

(iv.) Overhead lighting fixtures shall include at least four locations to be determined by final furniture layout.

(v.) Steel non-skid deck floor with flush threaded deck sockets (internally threaded 3/8 inch UNC) shall be provided throughout the working deck area on 2 foot centers.

(vi.) Space shall be provided for a GFP flammable-storage cabinet (43 inches W x 65 inches H x 18 inches D).

(2.) Science Electronic Workshop - About 120 ft2

This area will house multiple computer racks in a manner that allows access from front and back of the racks. These racks will contain the bulk of the data collection hardware.

It will also be used for repair and maintenance of electronic and computer hardware. It shall be at least 120 square feet and have room for multiple 19-inch computer racks.

There shall be about 32 square feet of counter area, and it shall be suitable for electronics and computer storage. It is desirable that this room be contiguous to the computer workstation room and may be contiguous with the secure server room.

(A.) General

(i.) There will be two computer workstations in this area, and there shall be counter space and under-counter leg room to accommodate these stations.

(ii.) Each workstation shall have a minimum of 10 square feet of counter space.

(iii.) There shall be additional space for an electronics work area with at least 12 square feet of counter space.

(B.) Service drop requirements are found at end of this section.

(C.) Additional Requirements

(i.) There must be space for and a method of shock mounting at least four 19-inch computer racks.

(ii.) Each rack must be individually lockable front and back.
(iii.) Each rack must be accessible from front and back.
(iv.) Overhead lighting fixtures shall include at least four locations to be determined by final furniture layout.
(v.) Wall space shall be provided for storage cabinets, book shelves, racks, and first aid supplies.
(vi.) This space shall include a flammable chemical storage cabinet of about 10 cubic feet.

s. Office Spaces

All general requirements from Section 4.2 will apply to these spaces unless noted otherwise. In addition the following requirements are applied to the spaces in this sub-section:
All office spaces shall be provided with a suitably sized white board and bulletin board
All desks and workstations for computers shall be designed with ergonomics as a priority and include accommodations for keyboard, mouse, and monitor height adjustment. There shall be storage for office supplies.

(1.) Computer Workstation/Printing Room - about 225 ft2
This shall be a multi-use computer area of at least 225 square feet. This area must support multiple computer workstations, printers and plotters and act as a small computer reference library. Additionally, this area may act as a planning and chart reference area. This area shall include the following:

(D.) Additional Requirements

(i.) Furniture will be designed for maximum efficiency with adjustable height computer workstations.
(ii.) There shall be desk space and leg room for a minimum of 6 personal computers. Each workstation shall have a minimum of 12 square feet of counter space.
(iii.) Overhead lighting fixtures shall include at least 4 locations to be determined by the final furniture layout.
(iv.) Wall space shall be provided for storage cabinets, book shelves, racks, and first aid supplies.
(v.) Provision shall be made for a chart table and planning area to be located in this room.
(vi.) Additional 110 VAC and 208 VAC NEMA receptacles, 110V UPS power and network connections shall be included with overhead service. Final placement of all electrical service will be determined during final furniture layout.

(2.) Contractor Representative Office (about 115 ft2)

This space will be the primary location from which all shipboard contractor business is conducted. It shall be at least 115 square feet. This area must support a computer workstation, one or more printers and plotters and act as a small meeting area. This area shall include the following:

(E.) Ship Service requirements are listed in the table at the end of this section.

(F.) Port Holes

(1) Port hole desired

(3.) Chief Scientist's Office - about 115 ft2

This space will be the chief scientist's office from which cruise planning and meetings will be conducted. It shall be at least 115 square feet. This area must support a computer workstation, one printer and act as a small meeting area. This area shall include the following:

(G.) Port Holes

(1) Port hole desired

(4.) Science Support Office - about 60 ft2

(H.) This office space is for use of the onboard laboratory supervisor and marine science technicians.

(A.) General

Shelving shall be provided to maintain technical documents and catalogs for reference.
A suitable desk and computer station of adjustable height shall be provided in this space.

(B.) Service drop requirements listed in table at the end of this section.

(C.) Port Holes

Desired, but not required.

(5.) Library, Conference Room, & Lounge - about 525 ft2

(D.) This space shall be a multi-use area of at least 525 square feet. In addition to serving as a conference room and lounge, this area must support computer workstations, a printer, and act as a library.

(A.) Furnishings

(i.) This area must be able to comfortably accommodate a 10-person conference table.

(ii.) There shall be counter space and under-counter leg room for a minimum of three personal computers. Modular computer workstation furniture will be designed for maximum efficiency with adjustable height computer workstations.

(iii.) Lounge furniture shall be modern, rugged, comfortable and resistant to stains.

(iv.) Each workstation shall have a minimum of 6 square feet of counter space.

(v.) Shelving shall be provided adequate for a 2000 volume library of varied books and media. Included in the shelving design shall be a means of securing books/media during rough seas.

(vi.) Cabinets shall be provided for an entertainment center which shall be able to accommodate, at a minimum, a 40-inch (635 mm) color LCD or tube television, 2 DVD players, a multi-CD player, and additional audio equipment.

(B.) Port Holes

Two or more desired.

(C.) Additional Requirements

(vii.) There shall be a whiteboard of at least 4 feet x 3 feet oriented so as to be easily visible from the lounge furniture.

(viii.) Wall space shall be provided for additional storage cabinets, book shelves, racks, and first aid supplies.

(ix.) (1) Integrated overhead LCD projector is required.

t. Information Technology Spaces

(6.) IT spaces shall provide multiple format data services and infrastructure. All IT spaces shall conform to NIST 800-53 guidelines for fire suppression (control object PE-13), environmental protection (control object PE-14), water damage protection (control object PE-15) and physical access control (control object PE-3).

(1.) Vessel Security Burden

(D.) The vessel's security plan as required by the USCG and other governing bodies shall not rely on these spaces or the equipment therein. In particular (but not limited to), any USCG surveillance requirement placed upon the vessel shall not rely upon the Charterers' equipment including LAN, CCTV, or external communications equipment.

(2.) Secure Server and Communications Room

(E.) A secure, environmentally controlled space of at least 120 square feet that will house multiple computer racks in a manner that allows access from front and back of the racks. This area must be securable in accordance with NIST 800-53 (latest version) or current superseding NIST guidance. It is preferred that this space may be combined with the Electronics workshop if the workshop square footage is more than 200 square feet. This shall be the central location of the premises distribution system. It shall contain the core switching equipment, the main cross connect for all trunk cabling and the core science computer servers. Potentially, more than 400 LAN connections (Work Area Outlets - WAOs) shall terminate here. This shall be the primary terminus for fiber cabling as well.

(F.) This area shall include the following:

(A.) Physical Security

The Secure Server and Communications Room must be lockable and each rack must be lockable.

(B.) Ship service drops are listed in the table at the end of this section.

(C.) Notes on electrical

(i.) Additional electrical supply shall be provided beyond what is called out in this section.

(ii.) This room will require one dedicated 100 A ship's power breaker panel and one dedicated 100 A UPS breaker panel.

(D.) Fire Suppression

Fire Suppression for sensitive electronic equipment shall be provided by the Owners.

(E.) Additional Requirements

(i.) There must be space for and a method of shock mounting a minimum of four 19-inch computer racks.

(ii.) Each rack must be individually lockable front and back.

(iii.) Each rack must be accessible from front and back.

(iv.) Overhead fixtures shall include at least four locations to be determined by final furniture layout.

(v.) Noise emissions from ship's equipment in this area must be in compliance with ISO 9296.

u. Ancillary Science Spaces

(1.) Science Observer Space on the Bridge

(F.) An internal science space in the forward part of the bridge for observing wildlife, and for other science is required. This space shall be forward facing with good unobstructed views of the horizon. About 8 linear feet of counter space is required.

(2.) Aloft Observation Tower

(G.) The aloft observation tower for wildlife observation is highly desirable. Ideally this area will provide space for two researchers, with a 180-degree view of the horizon, or have access to exterior areas that provide such views. Windows shall be heated.

(3.) Deck Changing Room

(H.) A room should be provided on the main deck aft to provide for the changing of interior to exterior clothing, and vice versa. This space is intended to accommodate wet, dirty, and cold weather articles to minimize the transmission of dirt and water throughout the vessel. Space should be easily cleanable with fresh water supply for equipment/clothing wash down. Access should be provided directly to the weather deck and to an interior passageway.

(4.) Science Chemical Locker - Minimum 66 ft2

(I.) This space shall be used to properly store quantities (larger than working quantities) of hazardous chemicals needed for science use.

(5.) Hazardous Materials Storage - Minimum 66 ft2

(J.) A locker shall be provided on the main deck for scientific hazardous materials storage that is at least 66 sq. ft, with full deck height, with shelving, fitted with fire suppression and fire safety lighting and electrical fixtures. The locker must have a lockable door. This space shall comply with 46 CFR 194.20

(K.) General

(i.) This space is to be maintained in accordance to 46 CFR Subchapter U.

(ii.) This space must meet the general temperature requirements of this Section.

(iii.) A permanently plumbed eyewash/drench hose shall be provided for this space.

(iv.) It is preferable if this space has access to interior spaces.

(6.) Compressed Gas Storage Locker - about 27 ft2
This space shall be used to properly store compressed gas cylinders needed for science use.

(i.) General

This space is to be maintained in accordance to 46 CFR Subchapter U.

It is desired that it be a temperature controlled space but not in a space considered to be a chemical store room under 46 CFR194.20-17(a).

Suitable means for securing compressed gas cylinders in racks and space for regulator manifolds to feed the laboratory spaces shall be provided.

This would ideally be an exterior space shielded from wave action and protected from weather. Drainage shall be incorporated if water does intrude into the space. An intrinsically safe heater shall provide adequate temperature control to this space. This space will be tied into the compressed gas requirement in Section 4.2.S.6.

(7.) General Cargo Storage
Below deck storage is required for about 10,000 cu ft of general cargo that will include standard 8 by 8 by 20 foot ISO containers as well as specialty 8 by 8 by 10 ft ISO containers (2 ea in a standard 20-foot spot). The cargo hatch should be sized to handle these containers conveniently and safely. The cargo hold shall also be outfitted with means to secure break-bulk cargo.

v. Other Special Requirements

(1.) Reverse Osmosis System
Scientific laboratories have special support requirements such as a means of producing laboratory grade water. A GFP centralized reverse osmosis (RO) unit will provide continually circulating RO water to the laboratories where individual “polishers” will provide research grade de-ionized (DI) water. The location of the RO unit must be close to the main laboratory spaces (Labs 1-3, oceanographic hangar, and environmental room) and will require Teflon or other suitable plastic lined pass throughs between these spaces. The exact location of the pass throughs will be determined during the final lab layout. The unit will require fresh potable water feed between 30 and 100 psi at 45-100°F and suitable drainage at 20 gpm for operation; (1) 208 VAC, 20 A, GFCI, duplex receptacle; (1) Fresh water connection; and (1) Drain at 20 gpm.

(2.) Seawater Instrumentation Wall

This instrumentation wall, complete with an uncontaminated seawater as defined later in this section, sink, and manifold drain arrangement, is for the mounting and use of a variety of underway scientific instrumentation.

(A.) General

(i.) The wall shall be about 14 feet long by 5 feet high. The wall will be ¾-inch sealed plywood or a similar material that is water proof and securely fastened to the ship. The wall will be designed to make the best use of available space and will be used to mount underway instrumentation.

(ii.) The science circuit of the uncontaminated seawater system will pass over top of this wall and will provide five 2-inch non-metallic valve drops to feed instruments or manifolds with seawater. At the base of the seawater wall shall be at least five ancillary drain openings above and behind a deep stainless steel sink that runs along the entire length of the wall.

(iii.) Although this shall be incorporated into one of the laboratory spaces, the instrumentation located at this station is sensitive to temperature fluctuation and as such, shall be located well away from doors opening to the outside deck where practical or other areas where temperature swings could be introduced.

(iv.) The drains will not create back pressure on any installed instrument, will allow for minimal splash, and will discharge on the discharge side of the vessel.

(3.) GFP Dive Compressor

(B.) A GFP Dive compressor shall be installed to support scientific diving operations and emergency chemical spill response by staff. The space for this unit will be in accordance with requirements for a Bauer Utilus U-E1 Breathing Air Compressor (3 horsepower, single phase).

(4.) Ice Maker

(C.) In one of the main labs there is a requirement for an under-counter flake ice maker for scientific uses only. It shall be of a similar type to the series 200 flake ice machine manufactured by IMI Cornelius, Anoka, Minnesota. All utilities (power, water, drainage) shall meet manufacturer requirements.

3. Scientific and Specialty Van Storage

The USAP, University-National Oceanography Laboratory System (UNOLS), and other institutions have designed scientific and specialty ISO dimension vans for a wide variety of applications. These may be specialty laboratories, hazardous material storage, or even berthing units that can be quickly and easily loaded, configured, and secured for a single cruise and offloaded at the end of the cruise.

A. General

i. Specialty vans will be of a standard 10- or 20-foot ISO configuration. All containers and containerized laboratories locations shall be fitted with Peck & Hale type securing sockets and weight rated to accept a fully loaded container. Several locations on deck and several locations in the sheltered areas shall provide additional securing points between the standard 20-foot footprint to accept two specialty ISO containers of 8 feet high by 8 feet wide by 10 feet long.

ii. Additionally, the ship shall be capable of carrying at least five more 20-foot ISO containers or containerized laboratories on the superstructure or deck at separate locations aft of the forward superstructure. Two 10-foot ISO containers shall be able to be secured in a standard 20-foot ISO slot in at least two locations to be determined during final design layout. Fresh water, uncontaminated sea water and heated drain capabilities shall be provided for three science laboratory vans through standard deck threaded inserts with positions to be determined in final design.

iii. The ship shall be capable of accommodating up to four 20-foot ISO standard shipping containers within a dry, watertight space, accessible from inside the vessel. Two 10-foot ISO containers shall be able to be moved to and secured in any standard 20-foot slot in this space.

iv. Configuration shall be such that van end doors can be opened and side personnel doors can be accessed when van is secured.

v. Provision shall be made to interface all vans to the following shipboard systems through a modular connection such as Harting Han type connectors. This connection shall include general alarm, fire zone monitoring, telephone, CCTV, serial, and network.

vi. Three 6-inch water tight pass throughs shall be provided from this space to the main deck.

a. Ship Service drops are listed in the table at the end of this section.

B. Science Storage - about 650 ft2

i. This storage is for science equipment and supplies separate from the laboratory spaces. This is not necessarily a stand-alone space, but may be made up of various separate spaces that total about 650 square feet.

ii. All general requirements from Section 4.2 will apply to these spaces unless noted otherwise. In addition, the following requirements are applied to the spaces in this sub-section:

b. This space shall be capable of storing up to 15 sheets of 4 foot by 8 foot by ¾-inch plywood, 300 pounds of dimensional lumber in 10-foot lengths, and 600 pounds of various metal stock in 10 foot lengths. Access to these materials shall be safe and convenient while at sea. This space shall be easily accessed from the science workshop.

c. Furnishings

Heavy-duty shelves, cabinets and other suitable storage arrangements.

d. Location

This storage requirement can be broken into several spaces but should be located as conveniently as possible. Space for overhead storage in the Aquarium Room and Oceanographic Staging Hangar is included in this square footage. Storage space in the laboratories is expressly separate from this requirement.

e. Ship service drops are listed in the table at the end of this section.

4. Winches

A. Space, weight-handling, clearance, and electrical or hydraulic service must be provided for at least three government-furnished oceanographic winches to be permanently installed aboard the vessel. These winches consist of the following:

Table 1: Government-furnished winches to be mounted on the vessel.

Type of Winch	**Quantity**
Markey DUSH 4 with independent power pack	1
Markey DUSH 5 with independent power pack	1
Markey DUSH 11 with independent power pack	1

B. For space and weight considerations assume that each winch will have 10,000 meters of wire per drum. The types of oceanographic cables will vary depending on science mission and may be one of the following: 0.322-inch electromechanical cable, 0.225-inch hydrographic cable, 0.680-inch coaxial, 0.680-inch fiber optic cable, or 9/16-inch trawl wire.

C. Location of these winches shall allow for efficient and safe operation. These winches should be installed in an enclosed space provided all wires can be safely and efficiently fair-lead to the intended over-the-side location. Detailed drawings and specifications for these winches are in Attachment B. The Owners are to provide preventive maintenance and repair of these winches, and shall keep routine logbooks of maintenance and repairs completed. The cost of the spare parts inventory is to the Charterers' account.

D. There shall be a government-furnished winch monitoring system (by Measurement Technology NW) or equivalent showing wire out, wire tension and wire speed tied into the vessel data acquisition system is required. The Owners shall plan for local and remote control stations with a clear view of the winch working areas and with reliable communications to vessel laboratories and ship control stations are required.

5. Cranes

Several types of marine cranes are required.

A. All cranes require load cells, and shall be man-rated.

B. One articulated crane shall have a safe working load of 13.5 long tons to be able to load and unload containers and heavy equipment from the pier to the aft working deck and cargo in three minutes or less under fair loading conditions, and be capable of fine control for container placement.

C. Cranes shall be provided to reach all working deck areas, the cargo hold, and all locations where vans, drums and aquaria will be stored.

D. Any crane with a cab shall have heat, windshield defrosters, windshield wipers, base station VHF radio, ship's phone, and load-cell display.

E. An articulated crane shall be provided for dedicated launching and recovery of inflatable boats (Zodiac MK V) and be usable while underway.

F. Additionally, a second articulated crane shall be positioned near the starboard side of the transom servicing the after work area for lifting equipment aboard from the sea or pier side, and for supporting fairlead sheaves for cables.

i. This crane shall be rated with a 3.5 long tons safe working load, and a 20-foot reach.

ii. Such a crane shall be rated for side loading and capable of being used to tow light packages (~500 lbs) at reduced ship speeds (~6 knots).

6. A-frames

A. Stern A-frame

The ship shall be fitted with an A-frame to work off the stern with at least a 20-foot vertical clearance from the main deck and at least a 20-foot horizontal clearance at the base.

a. The A-frame shall extend beyond the stern at least 15 feet. This measurement is from a plumb line rove through the trawl block and hanging vertically beyond the transom.

b. The safe working load shall be no less than 13 long tons. Bulwarks shall be gated or removable in this area.

B. Side A-frame

There shall be an A-frame for deploying oceanographic instrumentation on the main deck, close to midships with a safe working load of not less than 5.5 long tons.

a. This boom shall extend beyond the side of the ship at least 15 feet. This measurement is from a plumb line rove through the trawl block and hanging vertically beyond the side of the hull.

b. A vertical clearance of at least 15 feet above the working deck is required and a horizontal clearance at the base of the A-frame shall be no less than 12 feet.

c. Bulwarks shall be gated or removable in this area.

7. Inflatable Work Boat Storage and Deployment

The ship must provide storage off the main deck or on the superstructure for two government-furnished 20-foot inflatable work boats (Zodiac Mark V HD or equivalent) with appropriately sized and redundant outboard motors and spare parts. A dedicated crane (refer to Section 4.5) and/or launch/recovery system that will allow safe and effective launch and recovery of boats when underway shall also be provided by the Owners.

8. Sonar Systems

A. All sonar transducers shall be hull mounted in an area of the hull free of bubble sweep down.

B. No machinery shall be mounted in such a way as to introduce mechanical or electrical noise into the transducer wells that will diminish the effectiveness of the sonars.

C. All sonar systems shall be installed in such a manner that the operation of each system does not interfere with operation of another.

D. Navigation sonars shall be provided and wholly supported by the Owners. Science sonars shall be provided and supported by the Charterers. However, the Owners shall provide the following to support all sonar systems:

i. Navigation Sonars

a. Navigation sonars shall be compliant with CFR 46 195.27.

b. All navigation sonars shall have their display and operation consoles on the bridge. Refer to Section 5 for more details.

ii. Science Sonars

The following sonars are current standard GFP:

Table 2: GFP Sonar Systems

3.5 or 4.0 kHz full-ocean-depth chirp system, 4 kHz sweep, with a 12-transducer array
12 kHz full-ocean-depth sonar, with one transducer, for bottom and pinger tracking
150 kHz Narrow-Band Acoustic Doppler Current Profiler, 300-meter depth range, with one transducer
38.4 kHz Phased-Array Acoustic Doppler Current Profiler, 1,000-meter depth range, with one transducer

E. The Owners shall provide design, installation, and maintenance of owner-supplied acoustic window material as specified by the transducer manufacturer.

F. Liaison with the American Bureau of Shipping regarding any future design changes, specifically in regards to maintaining watertight integrity.

G. 90 percent fresh water, 10 percent propylene glycol solution shall be used for all wells.

H. A head tank (shared or per well)

I. In addition, the Owners may propose pressurized wells to facilitate the safe replacement of transducers or cabling without dry docking the vessel.

J. Acoustic Positioning System

An acoustic positioning system with a minimum depth range of 2,000 meters is required. The system shall be purchased, including spares parts, installed, and commissioned by the Owners. This system shall provide the latitude, longitude, and depth of underwater packages such as ROVs, benthic cameras, and towed sonars.

K. Multi-Beam Sonar

i. In addition to the above-supplied sonars, the Owners may propose a multi-beam system with a depth range of 2,000 to 6,000 meters. The vessel Owners shall purchase, install, and commission the system. In addition, the Owners shall provide a manufacturer-recommended set of spares for the system. The Charterers shall operate the system. All other maintenance and repair costs shall be the Owners' responsibility.

ii. Consumables such as paper and printer ink shall be provided by the Charterers.

iii. Should such a system be proposed, the Owners shall demonstrate that the installed system will function to manufacturer's specifications, through model tests or other supporting data.

9. Ship Command and Control During Science Operations

The functions, communications, and layout of the ship control station shall maximize coordination of ship control and scientific operations. Additionally, the vessel shall be outfitted with an enclosed Aft Control Room, located on the starboard side of the vessel with clear views of the aft work deck, with appropriate controls for the full operation of the ship. There shall be good visibility of all working deck areas from the ship control stations on the bridge or starboard bridge wing.

10. Uncontaminated Sea Water Service

The ship's system that collects uncontaminated sea water provides a mission-critical component of the vessel's science mission requirements. This "clean" seawater is used for underway science measurements, filling of aquaria, and on-deck incubation experiments.

The general description of the system is provided below. All piping measurements are called out using the internal dimension.

A. The system should be capable of sampling surface seawater with the least possible contamination which may be introduced by hull paint or overboard discharges. Special consideration needs to be given to ice in the system which may result during icebreaking operations, or when operating in extreme cold temperatures. Experience has shown that multiple intakes located in different hull locations facilitate the collection of water under differing sea/ice conditions. Also the use of redundant macerator pumps help handle incoming ice and provide positive pressure flow via crossover piping which is required for aquaria, deck, and science laboratory systems. This must be a self-regulating system with high pressure cutoffs in the event ice blockages do occur so that piping and equipment is not damaged. A strainer shall be included in line to keep debris such as ice and krill from plugging the system.

B. That portion of the water stream which is free of ice or bubbles shall be directed for data collection via scientific instrumentation or aquaria. The remaining water which may be a significant portion of the water stream that contains ice crystals and air bubbles is discharged overboard.

C. A sterilization component of the system shall be integrated.

D. The system will require periodic maintenance such as cleaning, replacement of valves, and servicing of the sterilization system, therefore easy access to the overall system is required.

E. Specific details of the uncontaminated sea water system components are given in the paragraphs to follow.

F. Seawater supply to labs shall run through the overhead so that distribution points are below supply piping. This will help prevent bubbles and ice from being drawn into the sampling gear.

i. Inlet

a. Inlets should be located at the bow and skeg with a third location desired. Inlets shall be about 9 inches in diameter with a stainless steel grate with openings of no more than 1 inch.

b. There shall be injection ports at all intakes so that fresh water and/or a sterilizing agent can be introduced to clean the entire system.

c. The installation of remote temperature probes located as close as possible to the inlets is required. Therefore space, access and wire-ways shall be provided.

d. Each intake will have an automated isolation valve allowing the bridge and/or vessel engineers to change the supply intake to the pumps from a remote station on the bridge or the engine control room.

ii. Piping

a. The piping shall be a lined or inert piping suitable for scientific purposes such as Green Thread fiberglass pipe or “Red Thread II®" fiberglass piping manufactured by Smith Fiberglass, Little Rock, AR. A higher grade of USCG approved piping may also be considered.

b. No bend in the installed distribution piping shall have a radius of less than three times the pipe diameter so as to minimize the formation of frazil ice.

c. The ability to collect seawater and maintain the surface water temperature at the inlet through the piping to the scientific instrumentation is critical. Piping shall be insulated from intakes to all access ports so as to maintain the temperature range within +/- 0.5° C.

d. Crossovers shall be provided between systems so that either the aquarium pump or the science pump can supply the other system.

e. Piping from the inlets to the pump shall be 6 inches in diameter.

f. Aquaria and Deck system piping shall be 4-inch diameter from the pump piping from the pump to the uncontaminated seawater wall shall be 3 inches.

g. Laboratories and aquarium piping discharge points shall be run overhead and sampled from the bottom of the piping so that ice and bubbles bypass access ports.

h. Each overboard discharge line shall be 4-inches in diameter throughout the system.

i. Sample manifolds, wash-down pump, and aquarium tanks shall be located along the 4-inch pipe to feed specific laboratory spaces. The contiguous piping shall allow ice to pass through the system without clogging instrumentation or aquaria. The overboard discharge will be via a regulated gate valve controlling variable flow requirements created by scientific demands. In this way, water flow and pressure are constantly maintained with manifold ports being opened and closed. If designed properly the gate valve should also open and clear the 4-inch pipe of accumulated ice that would normally clog a pipe.

j. System shall be configured so that the isolated contents of the system can be drained to the ship's bilge for maintenance or cleaning.

k. Distribution to the science specialty vans shall be off the science lab system via a 1-inch pipe. Plumbing will be valved and isolatable from the continuous plumbing to prevent stagnating water or backflow.

l. Distribution to the deck incubators shall be off the aquarium system via a 1-inch pipe.

m. Design shall be such that it is installed with minimal turns, unions, and or splices.

iii. Pumps

Each positive pressure supply pump shall be a variable speed, reversible, non-contaminating, 100 gpm macerator pump such as those manufactured by Mono Pumps, Ltd., Manchester, England (model SB101*X1R5\V), or equivalent.

iv. Valves

a. There shall be a gate valve or a full-way seacock valve located at the thru-hull penetrations in order to isolate the system for maintenance while at sea.

b. At all seawater distribution points, a 2-inch valve with threaded Cam-Lok fittings shall be provided.

c. On discharge lines there shall be a backflow preventer (check valve) located near the point of discharge.

d. An automated, regulated gate valve shall be on each discharge line to control pressure through entire system.

e. Any component requiring periodic maintenance shall have isolation valves on either side to allow for maintenance at sea.

f. Inert valve materials shall be used to not contaminate system.

g. System shall provide variable flow (manually set at pumps) and constant pressure (automatically controlled by the gate valves) measured at the manifolds.

h. Over pressurization of system resulting from ice blockage or improper valve position shall shut down pump to protect piping and instrumentation.

v. Strainer

a. A lined or inert ice/gas/seawater separating system shall be incorporated with the science system to minimize materials transfer (ice, bubbles, biological matter, rocks) from intake to science manifold.

b. Dedicated overboard discharge shall be provided for the ice/gas strainer.

vi. Sterilization

Ancillary ports, plumbing, and access shall be provided at the intakes so that fresh water and/or sterilizing agent can be introduced to sterilize entire system.

11. Overboard Discharges

The vessel shall be designed such that all overboard discharges shall be on the opposite side from the vessel's working side such that potential contamination of scientific samples is minimized.

12. Habitability for the Scientific Party

A. As stated earlier, all ship accommodations shall meet the ABS HAB+ notation. In addition, the requirements below shall be met:

B. A minimum of two single staterooms (Marine Projects Coordinator and Chief Scientist) shall be provided with a dayroom/office and private shower and toilet facilities. These two single staterooms shall also be provided with a fold-away or Pullman-style bunk such as to accommodate an additional person. In these offices provision shall be made for connection of a VHF base station to a VHF whip type antenna located on the top of the bridge or other suitable location. This connection shall be over RG-8 or better coaxial cable.

C. Each of the single staterooms shall be sized to accommodate additional office furniture such as a desk, a two drawer file cabinet, arm chairs, and a bulletin board. These office areas in the single cabins shall be configured separately from, or partitioned from, the berthing space in the cabin. A minimum of twelve two person staterooms with adjoining head and shower shall be provided for other scientists. Staterooms shall be about 115 square feet. All berthing spaces shall be easily cleanable, well lighted, and provide a berth sized to a standard twin-size (38 x 75 inches) mattress, drawers, hanging space, 20 cubic feet of locker space, a book shelf for each person, and a desk and chair in each room. Berths shall not be obstructed by pipes, ducts or other obstructions, and fitted with privacy curtains of flame retardant materials in multiple person spaces. Bunk lights shall be provided. Red floor lighting (controlled separately) so that sleeping occupants are not disturbed by overhead lighting is desirable. Bunks shall be provided with access ladders and with leeboards or other method of restraint system for foul weather. All drawers and doors shall be latched to prevent opening in a seaway. Portable furniture shall contain a fastening mechanism for securing in a seaway. Lash points low on the bulkheads and permanently installed appointments for securing luggage and other belongings.

D. Additional accommodation must be made available within the vessel for up to 10 personnel transiting to Palmer Station, Antarctica in addition to the 28 Charterers' personnel. The maximum scientific complement including personnel would not exceed 38 persons total. Public access toilets and showers shall be provided appropriate to the total number of scientific persons (38) aboard.

E. Sanitary spaces with a sink, toilet, and associated hardware should be provided near the mess room, the laboratories and other public spaces.

F. All doors from staterooms and toilet and sanitary spaces must be fitted with kick out panels for emergency egress.

G. 110 VAC, 15 A each stateroom shall have a minimum of one duplex receptacle near the desk and a single receptacle in each bunk. Each Dayroom/office shall have at least four duplex receptacles spaced throughout the room.

H. CCTV connections - one for each stateroom.

I. Duplex LAN connections- two for each stateroom, four for each office. Hence, each state room shall have a minimum of four LAN connections, and each office shall have a minimum of eight LAN connections.

Table 3: ARSV Communications, Power, Water, Air, Service Drops.

ARSV Communication, Power, Water, Air Service Drops

	480 VAC 3F IEC-309 100 A Connects	208 VAC 3F IEC-309 Connects			110 VAC NEMA 5 30 A Receptacle	110 VAC NEMA 5 20 A duplex Receptacle		110 VAC NEMA 5 15 A duplex Receptacle			INMARSAT Connects	Ship Phone Connects	CCTV Connects	Duplex LAN Connects	Fiberoptics Connects	Serial Data Connects	Ship's Service Air Connects	Fresh Water/Sink Connects	Uncontaminated Sea Water Connects	Port Holes	Wireway/ Access	Ceiling speakers compatible w/ MPS stereo system	Iridium
		100 A	60A	30 A		UPS	GFCI	UPS	GFCI														
Laboratory 1				5	3	6		17	15	TBD		2	4	22		4	2	3	3	2	1 OH 1 ROX	2	
Laboratory 2				3	3	6		10	16	TBD		2	4	16		4	1	2	2	1	1 OH 1 ROX	2	
Laboratory 3				5	3	6		10	16	TBD		2	4	16		6	1	3	1	2	2 OH 1 ROX	2	
Main Science Mast							4							2		8							
Bow Science Mast						1																	
Main Working Deck		TBD																					
Environ. Controlled Lab			1	2		2	4	6	TBD			1	2	10			1	1	1	1	1 ROX	2	
Aquarium Room	2	1	2						10			1	1	2		4	1	1	7		2 ROX		
Oceanographic Staging hangar	2	1	2				2		8			2	2	3		4	1	1	1		3 ROX		
Overhead Mezzanine	1	1	1				2		6			1	1	6		2					2 ROX		
Science workshop	1	1	4	2	3 Dedicated		12					2	2	6			1	1 hose 1sink		1 DES	2 ROX		
Science Electronic workshop			1			15	18	10			1	3	2	12	2		1			1	2 OH 2 ROX	2	1
Computer workstation and printing room		1 OH				2 2 OH		12	10 2 OH			2	4	20 2 OH						2	2 OH		
Contractor Representative Office								8	2		1	4	2	4		2				1		2	1
Chief Scientist Office								6	2			1	2	2		2				1			
Science Support Office								6	2			1	2	4						1		2	
Library, Conference room and Lounge				2 OH				14 2 OH	4 2 OH			2	5	8		2				2		7	1
Secure Server and Comms room			2			12	12	4			1	3	2	12	2		1			1	2 OH 2 ROX	2	1
Science Observer Space								2						1									
Observation Tower								2															
Hazardous Materials storage																		1					
Compressed gas storage										2							1						
Seawater Wall Added to the space where located									3 GFCI														
Van storage	2	2	4		2	4		6				7	6	8	5	6	1	2	6		3 ROX		
Science Storage							4	4				1											

SECTION III-E
General Ship Requirements

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GENERAL SHIP REQUIREMENTS

1. Classification

The ship must be classed for unrestricted ocean service by a U.S. recognized classification society that is a member of the International Association of Classification Societies (IACS). The vessel is to be certified by the U.S. Coast Guard as an oceanographic research vessel (46 CFR Subchapter U) and maintained in Certificated condition, U.S. registered, and manned by personnel with appropriate licenses, documents and experience, and operated in conformance with all applicable laws. Additional notations shall include American Bureau of Shipping (ABS) HAB+ notation or equivalent and ABS Ice Class A1 or equivalent.

2. Propulsion Plant

A. Main Propulsion Machinery

i. The ship is required to have a minimum of two propulsion diesel engines. The reduction in propulsive power caused by the loss of any single main propulsion engine must not exceed fifty percent of the total installed power.

ii. The use of single- or twin-propeller systems with or without nozzles is acceptable, provided the underwater noise criteria can be met. The propulsion plant must have the capability to:

a. absorb shocks caused by ice impacting the propellers;

b. absorb or generate enough propeller torque during ice impacts and/or ice milling to preclude stalling of the main propulsion engines; and

c. respond to load transients during ice blockage of the propeller nozzles, if installed.

iii. The propulsion machinery must be capable of being controlled from the machinery control room, the bridge, the working side bridge wing, and aft control station.

B. Cold-Weather Starting

Provision should be made for the possible cold weather starting of the main propulsion engines. During certain operations such as ice docking, only hotel services may be required. After a period of time, the temperature of the lubricating oil may drop to a point where engine starting becomes difficult. Consideration should be given to having a lube oil heater or other method to heat lubricating oil in equipment and components.

C. Noise and Vibration Isolation

The propulsion engines, ship service generators, and associated auxiliary equipment shall be mounted in a manner that meets the criteria for vibration and

underwater noise as specified in Sections III-C 11 **Vibration and airborne noise** and III-C 12 **Underwater Noise**. Further detail on vessel sonar systems is in Section III-D 8.

D. Fuels

i. Since fuel supplies are limited in Antarctica, it is necessary to require that the main propulsion and auxiliary machinery can operate on commercial marine diesel fuel. Power levels to meet operational requirements shall be achievable using this fuel type. A fuel monitoring and reporting system to optimize fuel efficiency should be considered.

ii. Design consideration should be given to the storage of all fuels and other hydrocarbon materials in tanks or other containers separated from, not adjacent to, the hull of the ship.

E. Sea Chests

During ice transiting and ice breaking operations, snow, small ice pieces, and entrained air may accumulate in the sea chest. This accumulation may be of such a magnitude to cause overheating of the diesel engines and unscheduled shut-downs. To prevent clogging of the sea chests with snow and ice slush, it is recommended that the sea chests be located deep in the ship, be of adequate size, and be provided with baffles, large vent pipes to eliminate air, and be heated. A thermostatically controlled valve should regulate the recirculating flow based on water temperature in the sea chest. These features should not be used in the scientific sea chest for uncontaminated sea water.

3. Communications and Navigation

A. Internal Communications

i. Telephone Service

The ship must have an internal digital telephony communications system that provides high quality voice communications among all of the scientific spaces, the lounge/conference room, the mess room, the working deck areas, the Helicopter Hangar, and all ship control stations. This system is to be integrated with the ship's overall internal communication system that services all staterooms and other occupied spaces of the ship. The system must be capable of interoperation with onboard analog and satellite phone systems including Inmarsat and Iridium.

B. External Communications

i. The ship shall be compliant with the Global Maritime Distress Safety System (GMDSS) requirements for a world-ranging vessel. The Owners shall provide and be compliant with a Federal Communications Commission (FCC) inspection of the GMDSS system every other year

regardless of the port and every year if the vessel is in U.S. ports in consecutive years. 47 CFR 80.1069.

ii. Additional Communications Requirements:

a. The INMARSAT system shall be a Fleet-77 with at minimum a 256 kbps capability.

b. The HF radio suite shall have at least one transceiver capable of full sweep from 1.2 to 30 MHz in order to communicate with any and all vessels and international coastal research stations.

c. The HF weather fax shall be capable of both coastal and long-range reception.

d. The bridge shall also be equipped for aircraft voice communications.

C. Navigation Systems

i. The ship shall be provided with a complete and modern suite, with appropriate redundancy, of standard marine navigation and safety equipment such as:

a. Electronic Chart Display and Information Systems (ECDIS),

b. GPS receivers,

c. shallow water fathometers,

d. dual gyro compasses suitable for high-latitude operation,

e. barographs,

f. anemometers, and

g. thermometers.

ii. Forward-Looking Sonars

a. Navigation sonars shall be compliant with 46 CFR 195.27. All navigation sonars shall have their display and operation consoles on the bridge.

b. Due to the nature of the operational area, the vessel shall be outfitted with a retractable, forward-looking or sector-scanning sonar for navigation in minimally charted areas. This system will be operated from the vessel's navigation bridge under the control of the Officer on watch. The forward-looking sonar depth range shall be 700 meters and the data from this sonar shall be made available to the National Science Foundation for distribution and archiving.

iii. Ship Control and Positioning System

For station keeping, it is desirable to have an integrated console where the operator can control all main propulsion and maneuvering systems. Control

consoles should be located on the bridge, on the working side bridge wing and in the aft control station. Master control should reside in the console on the bridge. Equipment to constantly display actual position relative to a target station, or actual course relative to a track line is required. These and other capabilities shall be facilitated by the Owners' provision and support of an Electronic Chart Display and Information System (ECDIS), that is current to the technology available at the commencement of this contract.

D. Surface Search Radar

The ship shall be outfitted with both 3 cm and 10 cm surface search radars. Both radars shall have independent and switchable display and operator stations. Both radars shall interface to the bridge ECDIS system. The primary radar will have one video output compatible with the closed-circuit television system.

E. Remote Sensing Weather System

The Owners may propose a remote sensing weather system (a SeaSpace WDS-2/Terascan system is preferred for program consistency) providing remote sensing capability for operational security. The system must be capable of receiving visual, infrared and DMSP SSMI satellite transmitted data. The antenna shall have unobstructed line of sight to the horizon in order to see the satellites. It will require space for the computer workstation including a large LCD screen; it could be rack mounted. The antenna cable may be limited to 100 meters without repeaters; the installation must account for this. The Charterers shall operate the system with all other costs to the Owners. Should such a system be proposed, the Owners shall subsequently demonstrate that such a system will function to manufacturer's specifications, through a manufacturer's site visit, and a field acceptance test. Any data must be available and of archival quality for science purposes.

4. Ship's Auxiliary Systems

A. Electrical Service Generators

i. Ship service generators must be of sufficient number and size to provide power consistent with the mission of the ship.

ii. Electric power must be 220 and 110 VAC, 60 Hertz (Hz), for all laboratories, scientific accommodations, vans, and at other select locations such as the bridge.

iii. 480 VAC, 3-phase, 60 Hz is also required at locations specified in Section III-D. These other locations allow scientists to power portable electrical equipment, instrumentation, and computers. The ship will be calling at ports where shore-side power is not available; therefore one ship service generator must be capable of handling the in-port electrical load for the ship and for scientific needs.

B. Heating, Ventilation and Air Conditioning (HVAC)

The HVAC system should be able to maintain internal ship spaces between 65° (heating) and 78° F (air-conditioning) at 50 percent relative humidity with all Charterers' equipment operating. Laboratory spaces should have a system separate from the general berthing ventilation system and should be able to meet 46 CFR 194.15-5 requirements for an emergency. The HVAC system must be able to meet these requirements regardless of outside air conditions, i.e., working in the Antarctic or crossing the equator. Additional details regarding science spaces are included in Section III-D.

C. Potable Water Makers

Two identical evaporators must be provided, each having a capability of producing 3600 gal (13.7 m3) or 13.5 LT (13.7 MT) of fresh water per day. A minimum of two days fresh water storage must be provided. The Vessel's potable water system shall meet standards of the USAP drinking water action levels (equivalent to EPA Regulations and Analytical Criteria). Potable water shall be distributed in plastic-lined piping or flexible Unipipe®.

D. Waste Management System

i. Non-hazardous Waste Management

a. An incinerator must be provided that is suitable for burning paper, wood products, and other burnables. The unit shall be sized consistent with the size of the complement and waste generated in the course of performing oceanographic research. Incineration by electric or fuel is acceptable, recognizing that the incineration unit must be capable of using the type of fuel onboard. International emission standards in effect at the time of vessel delivery must be met.

b. In addition to the incinerator, a trash compactor of suitable size must be provided for the compaction of glass, metal containers, plastics, and other materials that will accrue from the galley and ship operations.

c. Provision must be made throughout the ship for the segregation of waste. This may take the form of separate trash containers in laboratories, galley, and other spaces to eliminate or reduce the need to sort the trash following collection.

d. Any human waste, garbage, or other effluents must be treated in compliance with the requirements of U.S. law, the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), the Law of the Sea, and the Antarctic Conservation Act. Holding tanks shall be provided such that all waste discharge from the ship can be stopped for a minimum period of five hours during critical science operations.

e. The Bidder will be required to comply with additional USAP environmental protection policies which may come into effect during the course of the charter.

ii. Hazardous Waste Storage

Provisions shall be made to store 15 standard 55-gallon (U.S) drums of hazardous waste generated during a cruise event. This space must have easy access to crane reach for movement of drums. It is preferable that this be an interior space. If the space is located on the exterior, special provisions must be made to maintain personnel walkways and hand rails and access around or immediately adjacent to the designated area.

5. Ship Outfitting

A. Messing Facilities

A single, cafeteria-style mess room for all personnel is desired. The mess room should be adequately sized for the entire crew and scientific complement. A hand sanitation station shall be located just prior to the food service line.

B. Refrigeration and Dry Stores

Storage facilities for refrigerated and dry stores must be consistent with the size of the crew and scientific complement for 75 days at sea. Accommodations shall be provided so foodstuffs that are subject to quarantine in a foreign port can be secured in these spaces without affecting operations of the galley while in said port. At no time shall science spaces be used for vessel food storage.

C. Laundry Facilities

As individuals will do their own laundry while onboard, multiple, smaller-capacity washers and dryers shall be provided in laundry facilities. Laundry facilities must be consistent with the size of the crew and scientific complement.

D. Exercise Room

An exercise room of about 200 square feet, for use by all personnel onboard, is required. The room should be outfitted with the usual set of gym equipment such as a stationary bicycle, treadmill, weight and rowing machines. The Owners shall maintain this equipment and replace promptly when equipment is damaged or worn out. Adjacent to exercise room, shower and sauna facilities shall be provided.

E. Heated Bridge Windows

At a minimum, every other window in the bridge must be heated to prevent icing. Windows in the aft control and aloft observation tower, if so fitted, shall also be heated.

F. Gasoline Drum Storage Rack

A gasoline drum storage rack must be provided for the storage of six U.S. standard 55-gallon gasoline drums. The rack must have the capacity for the remote release of all drums in case of fire. Additionally, space is to be provided to stow up to six each, 6 U.S. gallon, outboard motor 'pony' cans.

G. Floodlights

Floodlights must be provided and mounted on brackets that can be temporarily swung outboard and locked in position to illuminate the water and ice surface directly adjacent to the ship. In addition, all searchlights shall be Xenon, to assist in navigation during hours of darkness.

H. Repair Parts and Storage

Repair parts shall be provided onboard for all mechanical, electrical, and electronic equipment and components in accordance with manufacturer's recommendations for one year of operation. Supply parts inventories onboard should be consistent with the mission of the ship which is typically in remote areas. Storage space should be provided that can maintain spare parts in good working order.

I. Deck Surfaces

All exterior decks must be covered with a durable non-skid coating. This coating should survive one full year of ship operation.

SECTION IV
Time Charter

SECTION IV-A
Time Charter

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TIME CHARTER AGREEMENT

PART II "BALTIME 1939"

Uniform Time-Charter

[Modified Specifically for Charter of Research Vessel by Raytheon Technical Services, LLC] to be used Pursuant to Terms of Contract with the National Science Foundation]

A. Definitions:

In this Agreement, except where otherwise specifically provided, the following terms shall mean, refer to and include:

i. "Agency Representative" shall refer to those representing the ship to assist in port business affairs.

ii. "Owners" shall refer to successful bidder

iii. "Charterers" shall refer to Raytheon Technical Services Company LLC d/b/a Raytheon Polar Services, 7400 S. Tucson Way, Centennial, CO 80112.

iv. "Government" shall refer to the United States of America.

v. "Foundation" shall refer to the National Science Foundation and to its delegated representatives.

vi. "Charterers' Technical Representative" (CTR) shall refer to the person designated by the Charterers in writing to represent the Charterers in the scientific and technical monitoring of all work performed under this Time Charter.

vii. "Charterers' Procurement Officer" (CPO) shall refer to the individual designated in writing to effect changes and issue amendments to this Time Charter by Charterers.

viii. "Vessel" as used in this agreement shall refer to the vessel identified in this RFP or the substitute vessel provided in accordance with this RFP.

ix. "Specifications" shall refer to the Vessel Specifications furnished by Owners and approved by Charterers and shall include all applicable drawings, designs and blueprints.

x. "Fixed Charter Rate" shall refer to the compensation paid to Owners for the use of the Vessel, including all the equipment and the full crew complement, as set forth in the Pricing Schedule, annexed hereto as Schedule 1.

xi. "The Program" or "USAP" shall refer to the United States Antarctic Program which Charterers are required to support as Specified in the Prime Contract between Charterers and the Foundation.

xii. "Master" shall refer to the captain of the vessel.

B. Term of Charter / Port of Delivery / Time of Delivery

The Charter shall commence on the day of delivery of the Vessel by the Owners to the Charterers at Punta Arenas, Chile. Such delivery shall occur on a date to be agreed upon with successful bidder after the signing of the contract and the approval thereof by the Foundation; provided, however, that the Owners shall not deliver the Vessel prior to the date so specified by Charterers. Unless sooner terminated in accordance with the Clause of this Contract entitled "Early Termination of Charter", the Charter shall end on or about midnight on a date to be agreed upon with successful bidder.

C. Trade / Employment

i. The Vessel shall be employed in lawful activity as a research vessel wherein Charterers are performing a Prime Contract with the National Science Foundation for certain support services in Antarctica. The Vessel will be employed in the support of multidiscipline scientific research and the carriage of scientific equipment and personnel, resupply of Antarctic stations and camps, and such other duties as may be practical and may be required by Charterers in support of the United States Antarctic Program objectives in the waters in and around Antarctica, including south of the 60° South Latitude, South America and Southern Ocean. The Vessel will be required to operate routinely in uncharted waters and in ice within the capability of the ice classification for which she was constructed and classed as indicated in the technical specifications. The vessel can also be expected to return occasionally to the United States at the Charterers' discretion.

ii. The operations are to be carried out in locations selected by Charterers, subject to the Master's approval, said approval not to be unreasonably withheld. Charterers shall act with prudence in their orders to the Vessel as if the Vessel were its own property, having regard to her capabilities and the nature of her employment. However, Charterers do not warrant the safety of any port, berth, or place of operation, and the safety of the Vessel shall always be the responsibility of the Master. The Master shall at all times be the sole judge of the safety or propriety of navigation, or of weather, or of other conditions for the performance of any directive given by Charterers. The Master shall be under the absolute duty at all times to exercise and to act upon his/her own direction as to the safe operation and navigation of the Vessel and no direction given by Charterers shall be deemed to mitigate or to lessen or to relieve the Master of this responsibility or to modify this Charter. The Master's acceptance of, or action upon, any direction of Charterers shall, as between Owners and Charterers, be deemed conclusive proof of the propriety of the particular directive.

iii. Permission from responsible authorities for the Vessel and its crew to work in the area(s) of anticipated operation, if required, shall be the responsibility of Charterers, and Owners shall assist as required by Charterers in every way possible to secure such permission.

D. Owners' Obligations

i. Owners shall provide and pay for all provisions and, for all insurance for the Vessel, for all deck, engine-room, cabin and other necessary stores and supplies, including consumables; other than fuel and lubricants.

ii. Owners shall provide all suitable accommodation for Charterers' personnel and also provide them with suitable provisions including food of first quality and unrationed in quantity; fresh meat, milk, juices, fruit, and vegetables to be provided when available. Owners shall further ensure an adequate galley for food preparation, equipment sanitation, mess facilities, cooks, and catering staff.

iii. It shall be the Charterers' responsibility to inform the Owners' Master of all cargo operations required on behalf of the USAP program. This shall include a list of the following: item, weight, cubic measurement, hazardous materials, and placement upon the vessel. The Owners shall provide the necessary ship's personnel as determined by the Charterers' representative and shall assist Charterers' personnel to carefully load, stow, trim, secure, and discharge all Charterers' cargo. This effort shall be carried out under the supervision and responsibility of the Master. Any assistance given by Charterers to cargo operations shall not in any way lessen or relieve the Owners from this responsibility.

iv. Owners shall furnish and be fully responsible for sufficient and experienced, competent and properly licensed Master, Officers, and Crew for the duration of this Time Charter. Owners shall further be responsible for arranging and paying for all matters related to Owners' personnel including transportation and maintenance and cure expenses. The Master, Officers, Crew, and any of Owners' supervisory or other persons in addition to the crew who shall function to support this Charter shall be able to speak and understand English.

v. Owners shall comply with USAP medical and dental screening requirements and shall be responsible for furnishing Charterers, in a timely manner, the records and information required for the processing of Government medical and dental approvals for Antarctica for all Owners' personnel who are to be present south of 60° South Latitude. All costs associated with this requirement are the responsibility of Owners.

vi. Whenever practicable, Owners shall be required to practice fuel conservation and economy measures within the existing capability of the Vessel.

vii. Owners specifically agree to comply with all United States Coast Guard and Governmental regulations concerning drug testing and screening and further assume all responsibility for failure to do so. Owners certify that they currently have in force a drug testing program that complies with U .S. Government regulations and agree to submit certified proof of compliance when requested.

viii. BIMCO ISPS/MTSA Clause for Time Charter Parties

a. Owners shall comply with the requirements of the International Code for the Security of Ships and of Port Facilities and the relevant amendments to Chapter XI of SOLAS (ISPS Code) relating to the Vessel and "the Company" (as defined by the ISPS Code). Owners shall also comply with the requirements of the U. S. Maritime Transportation Security Act 2002 (MTSA) and relevant U. S. Coast Guard regulations relating to the Vessel and the "Owner" (as defined by the MTSA).

b. Upon request, Owners shall provide a copy of the relevant International Ship Security Certificate (or the Interim International Ship Security Certificate) to Charterers. Owners shall provide Charterers with the full style contact details of the Company Security Officer (CS).

c. Except as otherwise provided in this Time Charter, loss, damages, expense or delay caused by failure on the part of Owners to comply with the requirements of the ISPS Code/MTSA of this Clause shall be for Owners' account.

E. Charterers' Obligations

i. Charterers shall be responsible for the payment of the Fixed Charter Rates, as set forth in Schedule I of this Charter.

ii. Charterers shall provide and pay for all fuel and lubricants except as provided in the clause entitled "Suspension of Hire."

iii. The Vessel shall be delivered with bunkers and lubricants as on board and re-delivered with not less than sufficient bunkers and lubricants to reach the next bunkering stage enroute to the Vessel's next Port of Call. Charterers shall accept and pay for all bunkers and lubricants on board at the time of delivery, and Owners shall on redelivery (whether it occurs at the end of the Time Charter period or on the earlier termination of this Time Charter) accept and pay for all bunkers and lubricants remaining on board, at the then-current market prices at the port of delivery or redelivery, as the case may be, or if such prices are not available payment shall be at the then-current market prices at the nearest port at which such prices are available; provided that if delivery or redelivery does not take

place in a port payment shall be at the price paid at the Vessel's last port of bunkering before delivery or redelivery, as the case may be. Owners shall give Charters the use and benefit of any fuel contracts they may have in force from time to time, if so required by Charterers, provided suppliers agree.

iv. Charterers shall provide and pay for all Agency Representatives other than in matters related to Vessel repair and maintenance and the Vessel's crew. Charterers shall be responsible for all port charges, pilotage, harbor and wharfage due, light dues, tug assistance, consular charges (except those pertaining to the Master, Officers and Crew) removal of discarded materials generated by handling of scientific equipment, communications for Charterers' account, one-half (1/2) of the Vessel's medical supplies to be maintained in accordance with the recommended inventory of the Charterers' medical advisory service, agencies and commissions incurred on the Charterers' business and any other dues and charges other than those of the nation of the Vessel's registry (including but not limited to any foreign state or municipal or port taxes levied on Owners in the performance of Charterers' orders under this Time Charter), expenses for fumigation (including deratisation and extermination of vermin) and of quarantine (if occasioned by the nature of the cargo carried or the ports visited while employed under this Time Charter but not otherwise).

v. Charterers shall provide and pay for the shoreside support for loading and discharge of cargo, and for all dunnage, and shoring equipment for securing cargo, and cordage (excluding such as is required for ordinary Vessel's purposes).

vi. Charterers shall give Owners at least ninety (90) days notice of the Vessel's expected date of redelivery at the end of the Term of the Charter.

vii. Charterers shall pay for the accommodation and food provided by Owners for personnel other than Owners, to whom accommodation and food shall be provided by Owners at the U. S. Dollars rate per person per day as indicated in the Pricing Schedule.

viii. If Owners pay for any of the items listed under Charterers' Obligations, or any other items for which payment is the Charterers' responsibility, Charterers shall reimburse Owners for such costs, as well as other similar directed charges at actual (vendor) costs. Owners shall submit invoices and copies of supporting documentation in quadruplicate, for approval of Charterers' representative on board the Vessel.

ix. The Charterers shall pay for the disposal of used or dirty lubricant oils generated during the routine operations of the vessel in support of this charter. The Owners shall be responsible for all costs associated with the

disposal of oily or otherwise contaminated water such as bilge water and that generated during the routine cleaning of tanks and distribution piping.

F. Fuel, Oil and Lubricants

Charterers own all fuel, oil, and other lubricants in the Vessel's tanks at commencement of this Time Charter and Owners shall pay Charterers for all fuel, oil and other lubricants remaining in the Vessel's tanks at the termination of this Time Charter.

G. Hire

i. Charterers shall pay for use and hire of the Vessel, including all tackle, apparel, furniture, stores and equipment and the full crew complement specified herein, the Fixed Charter Rates, attached as Schedule 1 to this Time Charter for each year of the Charter, payable each month in advance, commencing on a date to be agreed upon with successful bidder and continuing until the hour of the day of redelivery or termination.

ii. In default of payment Owners shall have the right of withdrawing the Vessel from the service of Charterers, without noting any protest and without interference by any court or any other formality whatsoever and without prejudice to any claim Owners may otherwise have on Charterers under the Time Charter.

iii. Standby Rate: Charterers shall have the option of laying up the Vessel for all or a portion of the period of this Time Charter, in which case the applicable Fixed Charter Rate shall be reduced by the U.S. Dollars per day as indicated in the Pricing Schedule for each day that the vessel is laid up. Charterers shall give thirty (30) days prior written notice to Owners of its intention to place Vessel on Standby, or take Vessel off of Standby. Standby periods are to be not less than sixty (60) consecutive days. For Standby periods of less than sixty (60) consecutive days, the full Fixed Charter Rate shall apply, rather than the reduced Fixed Charter Rate. Charterers reserve the right to have a representative on board during any standby periods.

H. Re-delivery

i. The Vessel shall be re-delivered on the expiration of the Charter in the same good order as when delivered to Charterers (fair wear and tear excepted) at Punta Arenas, Chile, between 9 a.m. and 6 p.m. on a weekday, or between 9 a.m. and 2 p.m. on Saturday, but the day of redelivery shall not be a Sunday or legal Holiday in the port of delivery.

ii. Charterers shall give Owners at least ninety (90) days notice on about which day the Vessel will be re-delivered. Should the Vessel be ordered on a voyage by which the Charter period will be exceeded Charterers shall have the use of the Vessel to enable them to complete the voyage, provided

it could be reasonably calculated that the voyage would allow redelivery about the time fixed for the termination of the Charter, but for any time exceeding the termination date Charterers shall pay the market rate, if higher than the rate stipulated herein.

I. Cargo Space

The whole reach and burden and decks of the Vessel shall be at Charterers' disposal, reserving proper and sufficient space for the Vessel's Master, officers, crew, tackle, apparel, furniture, provisions, and stores.

J. Master

i. The Master shall be in sole command of the Vessel and shall be responsible for the welfare of all personnel onboard. He shall be responsible for maintaining strict discipline and good order among the Owners' employees and subcontractors. He shall be the final authority in matters relating to the safety, proper navigation, stability, and sea-worthiness of the Vessel.

ii. The Master shall carry out his duties promptly and the Vessel shall render all reasonable services within her capabilities by day and by night and at such times and on such schedules as the Charterers may reasonably require without any obligation of Charterers to pay to Owners or the Master, officers, or the crew of the Vessel any excess or overtime payments.

iii. The Master shall be under the orders of Charterers as regards employment, agency and other arrangements, and Charterers shall furnish the Master with all instructions and sailing orders.

iv. The Master and Chief Engineer shall keep full and correct logs and records accessible to Charterers.

v. Charterers shall have the right of prior review and approval of the Master and all proposed substitutions of the Master. If Charterers express dissatisfaction with the Master or any crew member, Owners shall promptly make changes in appointments of the Master or crew member.

K. The Crew

Owners' personnel will cooperate fully in carrying out the support of research and logistics operations. The crew shall be at the disposal of Charterer both onboard and at remote sites as required. In addition to the operation and maintenance of the Vessel, this includes:

i. Carefully loading, discharging, and stowing of cargo and scientific equipment as required.

ii. The deployment, operation, and maintenance of small boats and motors including assisting diligently in field party support ashore diligently as required.

iii. The careful operation and maintenance of the equipment, machinery, and facilities provided for scientific support as required.

iv. Assistance in the deployment and recovery of sampling collecting and observing devices, as required.

v. Assistance in deployment of field camps, etc., ashore and on sea ice as required.

L. Suspension of Hire, etc.

i. In the event of any loss of time due to non-compliance with any applicable Certificate of Inspection, deficiency of crew or stores, breakdown of machinery, repairs, grounding, stranding, dry docking, fire, hull or other damage or cause preventing the full working of the Vessel, howsoever, or to any other cause whatsoever preventing the full working of the Vessel and carrying out of a Vessel's operations under this Time Charter, including loss of normal operating speed and including any seizure, attachment or restraint of the Vessel by order of any government or court as a result of the actions, inactions, fault, neglect or failure on the part of Owners to prohibit, vacate or discharge by bond or otherwise secure against all liens, attachments or claims, charter hire shall cease until the Vessel is again in a fully crewed and efficient state to resume her service. Additionally, if during any period of active expedition, normal operating speed is reduced by defect or breakdown or damage to any part of the Vessel's hull, machinery or equipment, and results in lost time under this Charter, the time so lost and the cost of any extra fuel consumed in consequence thereof and all extra expenses shall be deducted from the hire. All such loss of time shall be at Owners' risk and expense, unless caused solely by the negligence of Charterers or Charterers' invitees aboard the Vessel. Not withstanding the above, Owners shall be allowed twelve (12) hours per month, for loss of time and/or reduction of speed as a result of the reasons set forth above before hire shall cease. There shall be no carry over of any accumulated time from month to month and time shall be lost if not used within the calendar month. There shall be no carryover of accumulated time beyond the Charter period. Any unused accumulated time will not be paid and will be canceled at the termination of this Charter.

ii. If the Vessel is ordered in to port or anchorage by Charterers or time is lost solely due to perils of the sea or to faulty scientific equipment which is the property of Charterers or the Government, and which has been maintained by Owners' crew in accordance with the terms of this Time Charter or by other Contract, or to Owners' personnel joining the Vessel, having satisfied the medical clearance requirements of the Program and/or USAP medical clearance requirements per special agreements made between Charterers and Owners, such loss of time shall be for the account of the Charterers.

iii. Fuel/lubricant used by the Vessel while off hire to be agreed to as to quantity consumed, and the cost of replacing same, to be reimbursed by Owners.

iv. If the ship goes into suspension of hire the Charterers reserve the right to have a representative on board.

M. Early Termination of Charter

i. In the event Charterers find it necessary to terminate this Time Charter prematurely after the Vessel has been delivered to Charterers, Charterers may do so by giving Owners not less than ninety (90) days notice in writing of their intention to so terminate. If the Charterers prematurely terminate this Time Charter, Charterers shall pay to Owners upon such termination the daily fixed charter rate as an Early Termination Charge until such time as vessel is rechartered. Hire shall cease and the Early Termination Charge will begin upon the Vessel's re-delivery to Owners at Punta Arenas, Chile (or other agreed port). Upon re-charter of the Vessel, if the re-charter rate for that charter (or those charters) is less than the original Fixed Charter Rate, then Charterers shall pay Owners the difference between the original Fixed Charter Rate and the re-charter rate(s), such amount not to exceed the Early Termination Charge. In case the re-charter rate(s) is higher than the applicable Fixed Charter Rate, no Early Termination Charge of any kind shall be due or owing to Owners during that period of the re-charter when the re-charter rate(s) is higher than the applicable daily Fixed Charter Rate.

ii. The Early Termination Charge stipulated herein shall be the exclusive liability of Charterers to Owners for the early termination of the Time Charter. After receipt of the notice of early termination, Owners shall make every effort to re-charter the Vessel as soon as possible and to minimize the liability of Charterers for Early Termination Charge. Charterers have the right to recommend a charter to Owners and Owners shall not unreasonably refuse to accept such charter or to subcharter the Vessel itself.

iii. Owners' reasonable cost and expenses in re-chartering the Vessel, including brokerage fees and refurbishment costs, will be negotiated with Charterers. These negotiated costs will be allocated in equal parts to the downward adjusted daily Early Termination Charge rate, inclusive of these negotiated costs, exceed the then applicable daily Early Termination Charge rate set forth in the Pricing Schedule. In no event, however, shall the adjusted daily Early Termination Charge rate, inclusive of these negotiated costs, exceed the then applicable daily Early Termination Charge rate set forth in the Pricing Schedule.

N. Maintenance and Repair

i. Owners undertake that throughout the period under this Time Charter they will, wherever the passage of time, wear and tear or any event may require, take prompt and reasonable steps to maintain the Vessel in an efficient state in hull, machinery, and equipment or to restore the Vessel to such state. Owners shall provide and pay for the expenses of maintaining the hull, machinery, and equipment in said sufficient state and in Class, and all costs associated therewith during the employment of the Vessel. Owners to carry sufficient spare parts on board to maintain shipboard systems.

ii. Charterers agree to release the Vessel and shall grant Owners a maximum of twenty-four (24) hours in hire which shall be cumulative per month, or pro-rata for part of a month, during the term of this Charter for regulatory inspections, maintaining and repairs including drydocking connected with Owners' duties under the foregoing. If during any calendar month, all or a portion of the allowance of twenty-four (24) cumulative hours is not used, the portion which is not used shall be carried over into the next month; provided however that the total accumulated allowance shall never exceed two-hundred-eighty-eight (288) hours and that no portion shall carry over into the next charter year.

iii. Owners shall advise Charterers in advance of its intent to utilize accrued maintenance days for routine purposes. To the greatest degree possible, such routine maintenance shall be coordinated to avoid interference with Charterers schedule.

iv. Owners have the right and obligation to drydock the vessel at regular intervals as required by the vessel's Certificate of Inspection. On each occasion Owners shall propose to Charterers a date on which they wish to drydock the vessel, as early as possible but not less than 18 months before such date, and Charterers shall offer a port for such periodical drydocking and shall take all reasonable steps to make the vessel available as near to such date as practicable. Owners shall put the vessel in drydock at their expense as soon as practicable after Charterers place the vessel at Owners' disposal clear of cargo.

v. If a periodical drydocking is carried out in the port offered by Charterers (which must have suitable accommodation for the purpose), the vessel shall be off-hire from the time she arrives at such port until drydocking is completed and she is in every way ready to resume Charterers' service and is at the position at which she went off-hire or a position no less favorable to Charterers, whichever she first attains.

vi. If Owners require the vessel, instead of proceeding to the offered port, to carry out periodical drydocking at a special port selected by them, the vessel shall be off-hire from the time when she is released to proceed to the special port until she next presents for loading in accordance with Charterers' instructions, provided, however, that Charterers shall credit

Owners with the time which would have been taken on passage at the service speed had the vessel not proceeded to drydock. All fuel consumed shall be paid for by Owners but Charterers shall credit Owners with the value of the fuel which would have been used on such notional passage calculated at the guaranteed daily consumption for the service speed, and shall further credit Owners with any benefit they may gain in purchasing bunkers at the special port.

vii. During Maintenance and Repair periods, Charterers personnel shall be allowed free access to the vessel for the purpose of maintaining and/or upgrading government furnished equipment. The extent to which charterers require ship's services shall be negotiated prior to the start of any maintenance periods and this may include berthing, food services, and the assistance of ship's personnel. The time period Charterers are engaged in these efforts shall not be deducted from the 24 cumulative hours that the Owners are granted on hire each month.

O. Structural Alterations and Additional Equipment

Charterers shall have the option at their expense, of making structural alterations to the Vessel or installing additional equipment with the written consent of Owners which consent shall not be unreasonably withheld, but unless otherwise agreed the Vessel is to be redelivered reinstated at Charterers' expense to her original condition. The Vessel is to remain on hire during any period of alteration or reinstatement. Charterers, unless otherwise agreed, shall be responsible for repair and maintenance of any such alteration or additional equipment.

P. Loss of Vessel

In the event that the Vessel is lost or missing or becomes a constructive total loss, hire shall cease on the day of her loss or constructive total loss, or the date of being last heard from or if not heard from seven (7) days from the date of sailing from her last port; and any hire paid in advance and not earned shall be reimbursed to Charterers.

Q. Alcohol and Firearms

No alcohol or controlled substances shall be consumed or used aboard the Vessel, nor shall firearms of any kind be admitted aboard throughout the term of this Time Charter except as specifically authorized by Charterers.

R. Compliance with Laws and Treaties

Owners and the Vessel’s Master, Officers, and Crew shall uphold all provisions and obligations of the Antarctic Conservation Act of 1978 (U.S. Public Law 95-541), The Agreed Measures for The Conservation of Antarctic Fauna and Flora, and all Annexes thereto, and The Antarctic Treaty which are made a part hereof, all other maritime laws and conventions pertinent to the Vessel’s operation and support of this Charter, and the Master shall be responsible to enforce such

compliance on behalf of Owners. In the event any legal action is brought or a fine is levied against Charterers as a consequence of the violation of the aforesaid laws by Owners on the Vessel's Master, officers or crew. Owners hereby undertake to indemnify and hold harmless Charterers for any and all such loss.

S. Deviation to Assist and Salvage

The Vessel shall be entitled at all times to assist vessels and other property in distress and to deviate for the purpose of saving life or property where necessary. All salvage and assistance to other vessels shall be for Owners' and Charterers' equal benefit after deducting the share allocated by law to the Master, officers and crew, legal expenses, hire paid under this Time Charter for time lost in salvage, repairs or damage to the Vessel which was incurred in the salvage operations, and oil consumed, and any other loss or expense sustained as a result of the salvage operation. For purposes of salvage, the Charterers' employees shall be considered part of the Crew and entitled to share equally with the Crew in the salvage award. However, if the property saved or assisted is the property of the Government, or the property of one of the nations signatory to the Antarctic Treaty or one of such nations' authorized agencies, then Owners agree not to claim salvage unless Charterers agree and then only to the extent permitted by Charterers. Should Charterers permit Owners to claim salvage for the salvage of property owned by the U. S. Government or the property of one of the nation's signatory to the Antarctic Treaty or one of that nation's authorized agencies, then Owners shall indemnify and hold harmless Charterers for any salvage payments made to the Master, officers or crew.

T. Shipboard Systems

i. The following listed shipboard systems are considered mission critical to the continued support of the Vessel's scheduled scientific and logistic cruises:

a. Oceanographic Winches

b. Cranes and A-Frames

c. Uncontaminated Sea Water Systems

d. UPS Power Supplies

e. Radars

f. Navigation Systems (radars, gyrocompass, bridge GPS System, Navigation Shallow Water Fathometer)

g. INMARSAT Fleet 77 System

h. Forward-looking or sector-scanning sonar

ii. As such, the Shipboard Systems are subject to the following special provisions, which govern in the event they are in conflict with any other provision included in this Charter.

a. Owners shall exercise due diligence to carry out proper maintenance and to make repairs to the Shipboard Systems when required. If either party has knowledge that any of the Shipboard Systems are not operational for any reason, it shall give prompt notice to the other party of the nature of the problem. Repairs to the Shipboard Systems shall be carried out promptly and with due diligence. These repairs shall be carried out during the scheduled Scientific or Logistics Cruise in which the Vessel is engaged at the time the maintenance and repairs become necessary unless it is impossible for these repairs to be made due to no fault on the part of Owners. If parts not carried aboard the Vessel are required to carry out the repair, then the repairs will be done at the Vessel's next port of call where parts are available or can reasonably be made available by Owners and the repairs are to be completed during the Vessel's stay at that port of call.

b. Owners shall promptly provide Charterers with a plan for the repair of the Shipboard System and Owners and Charterers will mutually agree to a date by which the repair will be completed and the Shipboard System returned to full operation. In considering any plan, Charterers shall allow for reasonable availability of parts and repair facilities or force majeure condition affecting Owners' ability to repair the system.

c. If the Shipboard System is not repaired and fully operational by the date agreed to by the Owners and Charterers, then the Charterers at their option, may notify the Owners that it will deduct $2,500.00 per day from the Fixed Charter Daily Rate(s) hire for each day after the date the parties agreed that the repair would be completed. This deduction by the Charterers is not in any way to be considered a breach of this Charter. If the next scheduled cruise of the Vessel is delayed as a result of the failure to repair the Shipboard System by the agreed date, Charterers may elect to continue the penalty until such Shipboard System is repaired and made fully operational or exercise any of the rights it might have under Clause L to place the Vessel off-hire until the Shipboard Systems are repaired and fully operational. The first item on the list of Shipboard Systems is Government furnished Equipment (GFE) and the Charterers are responsible to supply spare or replacement parts. The Owners maintains the GFE and will promptly notify the Charterers if repairs are necessary and the necessary parts are not onboard. The Charterers may not deduct Charter hire and/or exercise its rights under Clause L to put the Vessel off-hire, if it has not provided these parts in time for the Owners to meet the agreed dates for repair. Owners shall maintain a 2-year

supply of manufacturers' recommended spare parts for mission-critical systems.

U. War

i. Unless the consent of Owners be first obtained, the Vessel is not to be ordered nor continue to any place or on any voyage nor be used on any service which will bring her within a zone which is dangerous as the result of any actual or threatened act of war, war hostilities, warlike operations, acts of piracy or of hostility or malicious damage against this or any other vessel or its cargo by any person, body or State whatsoever, revolution, civil war, civil commotion or the operation of international law, nor be exposed in any way to any risks of seizure, capture, penalties or any other interference of any kind whatsoever by the imposition of Sanctions, nor carry any goods that may in any way expose her to any risks of seizure, capture, penalties or any other interference of any kind whatsoever by the belligerent or fighting powers or parties or by any Government or Ruler.

ii. Should the Vessel approach or be brought or ordered within such zone or be exposed in any way to the said risks, the Owners, upon prior written notification to Charterers, shall be entitled from time to time to insure their interests in the Vessel and/or hire against any of the risks likely to be involved hereby on such terms as they shall think fit, Charterers to make a refund to Owners of the premium on demand. Charterers, the Foundation and the U. S. Government are to be named as additional assureds under any policies of insurance secured in accordance with the above and the underwriters are to waive subrogation against Charterers, the Foundation, and the U. S. Government.

iii. The Vessel shall have liberty to comply with any orders or directions as to departure, arrival, routes, ports of call, stoppages, destination delivery or in any other wise whatsoever given by the Government, of the nation under whose flag the Vessel sails or any other Government or any person (or body) acting or purporting to act with the authority of such Government or by any committee or person having under the terms of the war risks insurance on the Vessel the right to give any such orders or directions.

iv. In the event the nation under whose flag the Vessel sails becomes involved in war, hostilities, warlike operations, revolution, or civil commotion and if as a result thereof the Vessel is prevented from carrying out her duties under this Time Charter, either Owners or Charterers may cancel the Time Charter and, unless otherwise agreed, the Vessel shall be redelivered to Owners at a redelivery port selected by Charterers, or if prevented through the provisions of Paragraph 1 hereof from reaching or entering it, then at a near and safe port at Owners' option, after discharge of Charterers' property and personnel.

V. Lien

Owners shall discharge at once by bond or otherwise secure against all liens and attachments which are filed or incurred in connection with the Charter or during the course of the Charter and shall indemnify and save Charterers, Foundation and the U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants, agents and insurers harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from such liens and attachments.

W. Option to Buy

Charterers may at anytime of the Term of this Time Charter, exercise an Option to purchase the Vessel as then currently configured. The firm fixed price for such purchase, free from any and all claims, liens, or interests of third parties, shall be as indicated in the Pricing Schedule. Notice of exercise of the Option shall be given by Charterers to Owners in writing not less than one hundred and twenty (120) days before the end of the Charter Year and/or Term of this Charter.

X. Exceptions

Neither the Vessel, nor her Master or Owners, nor Charterers shall be liable for any loss or damage arising or resulting from an act of God, an act of war, riot or strike, perils of the sea or any other special circumstance beyond their control and without their fault or negligence. However, Charterers shall be entitled to the same Option to reduce the rate of hire to the applicable Standby Rate for Schedule 1 and in accordance with the terms of Paragraph 2 B of this Time Charter, except where there is a loss or constructive total loss of the Vessel, in which case hire shall stop immediately upon notice of such loss or constructive total loss or as of the date and time at which there was a last communication received from the Vessel.

Y. Liability Indemnification and Insurance

i. For the purpose of this Time Charter, any indemnity given by Owners for the benefit of Charterers shall be deemed to be given by Owners for the benefit of Charterers, Foundation and the U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants, agents and insurers. For the purposes of this Charter, any indemnity given by Charterers shall be deemed to be given for the benefit of Owners, its affiliates subsidiaries, employees, servants, agents and insurers.

ii. Notwithstanding anything elsewhere contained in this Time Charter, Owners hereby agree to fully defend, indemnify and hold Charterers, Foundation and U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants, agents and insurers harmless from and against any and all losses, claims, demands, costs, expenses and causes of action, including attorneys' fees, prejudgment interest, litigation expenses

and court costs for damages to persons and; or property (including but not limited to claims, demands or actions for bodily injury, illness disease, death, loss of service, loss of society, loss of love and affection, maintenance and cure, wages, or property damages), which may be brought by Owners, its employees, agents, the employees and agents of its subcontractor arising out of or in any way directly or indirectly connected with the use of the Vessel by Charterers, Foundation and U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants and agents, or the ownership, maintenance, management, operation, transportation of passengers, carrying of cargo, loading or unloading of cargo, loading or unloading of passengers or navigation of the Vessel or in any way arising out of or incident to or in connection with any and all operations performed under this Time Charter, howsoever arising, whether or not such losses, claims, demands, costs, expenses or causes of action are occasioned by or are the result of the negligence or fault, sole or contributory, of Charterers, Foundation and U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants and agents or by the unseaworthiness of any vessel or under any theory of strict liability or liability without fault.

iii. Additionally, Owners shall defend, indemnify and hold Charterers, Foundation, and the U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants, agents and insurers harmless from and against any and all losses, claims, demands, costs, expenses and causes of action, including attorneys' fees, prejudgment interest, litigation expenses and court costs for death of or personal injury to third parties invited aboard the Vessel by Owners (other than Charterers', Foundation's, and U. S. Government's respective Officers, employees, servants and agents) and, to scientists who are not direct employees of Charterers, Foundation, or the U. S. Government and who are on the Vessel for purposes incidental to carrying out experiments or other scientific endeavors, pursuant to grants or otherwise, and for damage to or loss of property owned by such third parties or scientists. Owners' obligations hereunder arise when the losses, claims, demands, costs, expenses and causes of action are caused by the negligence of Owners, its employees or agents or the unseaworthiness of the Vessel and, arise out of or in any way connected with the operations performed under this Time Charter.

iv. Owners shall exercise all reasonable diligence to conduct its operations in a manner that will prevent environmental pollution, and Owners shall comply with all applicable laws, ordinances, rules, regulations and charter provisions regarding pollution. Owners shall take reasonable measures to instruct its personnel in such matters and to prevent pollution and shall, at its own expense, within the limits placed upon it by applicable United States statutes, regulations and/or laws and/or the statutes, regulations

and/or laws of any other nation which might be applicable, cleanup any pollution from the Vessel and/or from the operations of the Vessel and/or any other operations required of Owners under this Time Charter as is necessary and/or practical with regard to the circumstances or in any event that Owners is instructed by any governmental authority having jurisdiction to so instruct. Owners are required to report immediately discovery of any oil spill or other source of pollution, regardless of the source, to Charterers and to the appropriate governmental authorities.

v. Owners, shall pay, defend, indemnify, and hold Charterers harmless from and against: (i) any and all taxes on income, profits or gain imposed by any governmental or taxing authority on Owners, or any of the Vessel's Master, Officers and crew or Charterers in respect of any payment made to or earned by Owners or any of the Vessel's Master, Officers and crew; and (ii) any and all sales, use, excise and similar taxes, and customs, import and other duties, imposed by any governmental authority, whether Federal or provincial, on Owners or any of the Vessel's Master, Officers and crew or Charterers in respect of the Vessel or any of her equipment or stores or the services performed by the Vessel. If required by the laws or any country having jurisdiction, Charterers shall have the right to withhold amounts, at the withholding rate specified by such laws, from payments due to Owners hereunder, and any amount so withheld shall be credited against any payment otherwise owing to Owners by virtue of the terms of this Charter.

vi. Without prejudice to, or otherwise diminishing Owners' duties under the Indemnity Clause hereinabove stated, Owners at their own costs and expense shall procure and, throughout the term of this Time Charter, maintain in full force and effect on forms and with insurers approved by Charterers, the insurance policies described below:

   a. Hull and machinery insurance (American Institute Hull clauses, June 1977, or equivalent), with geographic extensions of coverage to any area in which the Vessel may operate under this Time Charter, equal to or in excess of the full value of the Vessel and all equipment on board including: Government Furnished Equipment and deleting from the Inchmaree Clause the exception "provided such loss or damage is not resulted from the want of due diligence by the assured" in the coverage for negligence of Charterers, the Foundation and the U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants and agents;

   b. Protection and Indemnity Insurance including but not limited to coverage for injuries to or death of masters, mates and members of the crew, transportation, wages, maintenance and cure with geographic limits covering all areas required under this Charter and in the amount of at least $100 million per occurrence, with any deductible of said

policy to be for the account of Owners, and with the phrase "as owner named herein" being deleted; providing in rem protection; and, if the Vessel is at any time engaged in towing deleting the exclusion of claims arising out of or having relation to towage of any other vessel or craft;

c. Collision Liability Insurance, whether contained in the hull policy, P&I policy or elsewhere in the amount of at least $100 million per occurrence, with the deductible in said policy for the account of Owners;

d. Pollution Insurance, covering clean up obligations mandated by local and/or national laws, orders, rules and regulations and covering liability for damages to person or property, for clean up of, or for spills contamination, pollution, by or from any pollution substance, whether escaping from a vessel, resulting from, caused by or related to the management, operation, navigation or control of the Vessel in the amount of not less than $100 million per occurrence, with the phrase "as owner named herein" and all other similar phrases purporting to limit the underwriters' liability to that of an owner being deleted. This coverage may be obtained by way of endorsement: to the appropriate insurances above or by separate insurance;

e. Workers' Compensation and Employers' Liability

(1.) Insurance covering all liabilities owed for compensation and other benefits by the Workers' Compensation laws of any state or federal government, including, but not limited to, the Longshoremen's and Harbor Workers' Compensation Act, the Outer Continental Shelf Lands Act, the Workers' Compensation law of any state and Employers' Liability insurance as prescribed by applicable law; providing coverage for any liability asserted against Owners, Charterers, Foundation and U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants and agents.

(2.) B. Employers' Liability Insurance covering all liabilities arising as a result of bodily injury, accident, disease, illness or death, sustained by any employees of Owners arising out of or in the course of his employment, including but not limited to, any liabilities arising under §905 (b) or similar sections of the Longshoremen and Harbor Workers' Compensation Act, the Jones Act, the Outer Continental Shelf Lands Act, the common law, the Death on the High Seas Act, the General Maritime Law and/or any other law or laws' of any state or government, in the amount of at least $100 million per occurrence with a deductible of said policy to be for the account of Owners, and with the

phrase “as owner of the vessel named herein” and all similar phrases purporting to limit the underwriters’ liability to that of a vessel owner being deleted.

f. Comprehensive General Liability Insurance covering all liabilities arising as a result of bodily injury, death or damage to property, including without limitation, contractual liability coverage covering Owners' obligations under this Time Charter and including but not limited to, Owners’ obligation under subparagraph (b) of this clause to Charterers, Foundation and U. S. Government and their respective assigns, affiliates, subsidiaries, employees, servants, and agents, with geographic extensions of coverage to any area in which the Vessel may operate under this Charter in the amount of at least $100 million per occurrence any “watercraft exclusion” being deleted;

g. Cargo Liability Insurance for loss of or damage to or in connection with cargo or other property carried onboard the Vessel.

h. Any other insurance required by the laws of any location where Owners are operating the Vessel under this Charter. Duplication of coverages is not required. Therefore, the above described coverages may be obtained through one or more policies and/or underwriters provided the forms and insurers are approved in advance by Charterers. Owners hereby agree to furnish Certificates of Insurance signed by authorized representatives of Underwriters attesting to the coverage provided, and to make the actual policies available for Charterers’ review upon Charterers’ request. To the extent said policies are to provide coverage to Charterers as an additional insured, said insurance policies must contain clauses to the effect that any other policies covering Charterers, Foundation and U. S. Government or their respective officers, respective assigns, affiliates, subsidiaries, employees, servants and agents are to be non-contributory and the coverage required by Charterers and provided by Owners is to be primary. Owners’ Liability under this Charter is in no way limited to, or by, the insurance set forth above, or by the monetary amounts of those insurances; Owners shall be and remain liable to the full extent as determined otherwise in this Charter or bylaw.

i. Solely to the extent necessary to ensure Owners’ obligation under Clause Y (vi) herein, the policies of insurance listed shall name Charterers, the Foundation and the U. S. Government, and their respective assigns, affiliates, subsidiaries, employees, servants and agents as additional insured. All policies of insurance listed above shall waive all rights of subrogation against Charterers, Foundation and U. S. Government: and their respective; assigns, affiliates, subsidiaries, employees, servant and agents and further stating the

Charterers shall be entitled to payment of any loss or damage as its interest may appear.

j. Any and all deductibles accepted by Owners on any and all of the above listed policies shall be for Owners' account and under no circumstances shall Charterers, Foundation or U. S. Government be required to contribute or pay all or part of any deductible required under the policies.

vii. The costs of all insurances listed above as well as any and all other insurances carried by Owners and bonds, normally carried by Owners are included in the Fixed Charter Rate.

viii. All insurance policies shall be endorsed to provide at least fourteen (14) days prior written notice of cancellation. If Owners fail or refuse to obtain any insurance required to be obtained by it under the provisions of this Clause or to provide Charterers with copies of certificates as and when required, Charterers shall have the right to procure such insurance at its expense in which event any sums so paid by it for this purpose shall immediately become due and payable to it by Owners and, Charterers have the right to deduct such sums paid by it from any money due or which may become due or from any charter hire in addition to any other remedy it may have under this Charter. Any deductions so made shall not be considered a breach of the Charter.

ix. Each party shall afford the other all reasonable assistance which may be required for the preparation and negotiation of insurance claims.

x. Owners agree that they will not claim General Average against Charterers, Foundation, or U. S. Government.

Z. Insurance / Notice of Claim or Damage

i. Each party shall promptly notify the other of every suit or action filed and each claim made against it as to which the other party may be entitled to indemnification under this Charter. Copies of all papers received with respect to each suit, action, or claim, shall be furnished to other party and arrangements shall be made to interview privately any employees having knowledge of the facts giving rise to such claim or suit.

ii. In the event of loss or damage to the vessel or any of the appurtenances, gear, or equipment thereof, Owners promptly shall notify the Charterers' Procurement Officer (CPO) of such loss or damages, and the CPO may without prejudice to any other right of Charterers, order Owners to proceed with replacement or repair in which event Owners shall effect such replacement or repair.

AA. Merger Clause

i. The right of either party to require strict performance shall not be affected by any prior waiver or course of dealing.

ii. The provisions of this Time Charter shall govern to the exclusion of any previous agreement between the parties, unless a subsequent written agreement, executed by both the Owners and the Charterers, indicates otherwise.

SCHEDULE 1: FIXED CHARTER RATES

Firm Fixed Charter Daily Rate	**US $**
Year 1*	
Year 2	
Year 3	
Year 4	
Year 5	
Year 6	
Year 7	
Year 8	
Year 9	
Year 10	
Option Period 1	
Option Year 11	
Option Year 12	
Option Year 13	
Option Year 14	
Option Year 15	
Option Period 2	
Option Year 16	
Option Year 17	
Option Year 18	

Firm Fixed Charter Daily Rate	**US $**
Option Year 19	
Option Year 20	
Total charter for 20 years with options (365.25 days / year)	

* For purposes of this Pricing Schedule, the term "Year" shall mean a twelve-month period commencing (i) on delivery of the Vessel under the Charter for Year 1; and (ii) on the anniversary date of the delivery of the Vessel under the Charter for each successive Year.

BB. Firm Fixed Daily Standby Rate (expressed as a % of the Firm Fixed Charter Daily Rate) _____%

CC. Firm Fixed Accommodation Food Daily Rate** US$_____

**The pro rata charges of $_____ for individual meals other than three per day.

DD. Firm Fixed Hotel Daily Rate US$_____

EE. Firm Fixed Purchase Price Option US $

SCHEDULE 2: GOVERNMENT-FURNISHED PROPERTY

To Be Maintained, Repaired, Protected, and Preserved by the Owners.

See Exhibit "D"

QUANTITY	**DESCRIPTION**	**IDENTIFICATION**
1	Winch, Markey Hydraulic, 75 HP, AC w/75 HP 1,800 rpm Hydraulic Power Unit	DUSH 4
1	Winch, Markey Hydraulic, 75 HP, AC w/75 HP 1,800 rpm Hydraulic Power Unit	DUSH 5
1	Winch, Markey Hydraulic, 75 HP, AC w/75 HP 1,800 rpm Hydraulic Power Unit	DUSH 11

SECTION IV-B
Special Provisions - Charter

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SPECIAL PROVISIONS - CHARTER

1. Description of Vessel

   This Time Charter Party (referred to in this Contract as the "Charterers") covers the chartering of the Vessel which the Owners agree to construct in accordance with this Contract, the Technical Requirements of the RFP, as amended, and the Acceptance/Ship Trials Criteria set forth in the Technical Requirements to this Contract period. Owners warrant that the Vessel is now and at all times during the term of this Charter will be maintained by the Owners, at Owners' expense, unless specified differently herein, properly staunch, strong and in all respects seaworthy and in good repair and running condition.

2. Flag and Registry

   The Vessel is to be of United States flag and registry.

3. Hire

   Charterers shall pay for all fuel, lubricants, port charges, pilotage, removal of discarded materials generated by handling of scientific equipment, communications for the Charterers' account, and one-half (1/2) of the Vessel's medical supplies to be maintained in accordance with the recommended inventory of the Charterers' medical advisory service. If Charterers authorize the Owners to pay for such items, the Charterers shall reimburse the Owners for such costs, as well as other similar directed charges at actual (vendor) costs. The Owners shall submit invoices and copies of supporting documentation in quadruplicate, for approval of the Charterers' representative on board the Vessel.

4. Payment by Charter - Adjustments to Fixed Charter Daily Rate

   The Charterers shall pay for the use and hire of the Vessel at the Fixed Charter Rates and make other payments required by this Contract to the Owners for the period commencing on and from the day of her delivery, as stated in Special Provision, Schedule 1 to this Contract. The Fixed Charter Rates shall be paid monthly and shall be adjusted for other payments (or credits) thereafter upon presentation of invoices in quadruplicate showing full details and duly supported by appropriate vouchers. All such documents are to be verified by the Charterers' Representative as to the number of days of actual operations before presentation to the CPO. Payments of invoices for other charges will be made normally within thirty (30) days.

5. Demise of Vessel

   Nothing herein shall be construed as creating a demise of the Vessel to the Charterers.

6. The Vessel's Space

   A. Charterers' personnel shall be able to make use of the Vessel's available accommodations not being used on the voyage by the Vessel's crew.

   B. Charterers shall have access to all of the Vessel's equipment in the performance of its employment including access to navigational instruments and communications services, subject to the Master's approval, said approval not to be unreasonably withheld.

7. Food Service Aboard

   A. Owners shall provide all suitable accommodation requisites and provisions including food of first quality and unrationed in quantity; fresh meat, milk, juices, fruit and vegetables to be provided when available. Food of first quality shall be defined as follows:

      i. General Specifications

      These specifications shall be applied to all consumable foods including but not limited to canned vegetables, canned fruit, processed meats including all poultry, all seafood, prepared foods, dairy products, frozen vegetables and frozen fruit.

      Items that are acceptable for consumption aboard the ARSV shall meet the specifications below and food procured from foreign markets shall meet or exceed these standards:

         a. Where items are graded and inspected by the United States Department of Agriculture (USDA), then these items shall be U.S. GRADE A OR FANCY GRADE.

         b. Where items are not inspected or graded by USDA then these products shall exceed or meet USDA standards of quality for U.S. GRADE A or FANCY GRADE.

         c. Food shall have the most usable shelf life available. Items shall have the longest possible expiration dates available when purchased and expired food shall not be used for meals aboard the ship.

         d. All canned fruit shall be U.S. Grade A Fancy or Choice, packed in item natural juices or packed in white grape juice or pear juice or packed in water.

         e. ALL seafood shall be of the highest quality available on the market and shall be inspected for quality and compliance with this specification by an inspector of the U.S. Department of Commerce and meet, Packed "Under Federal Inspection (PUFI)" requirements or equivalent foreign.

      ii. Meat Specifications

a. All specifications, item numbers and product names are from THE MEAT BUYERS GUIDE by the National Association of Meat Purveyors (NAMP), 1992. It is the Owners' responsibility to obtain this guide. Adherence to the specifications in this guide, or foreign equivalents, are required.

b. All meats including but not limited to beef, chicken, turkey, veal, lamb procured for the ARSV shall be U.S. Choice or Select grades or foreign equivalents.

c. All items shall be from carcasses which are inspected, and graded to quality and yield by the United States Department of Agriculture (USDA). Packer grades are not acceptable. When procuring from foreign suppliers equivalent standards shall apply. The Charterers shall have the right to inspect any meat procured for the ship.

d. Ground Beef shall be no greater than 20% fat.

e. Ground Turkey or chicken shall be skinless (80-90% fat free).

B. The Owners, through the vessel's Master, shall endeavor to accommodate various dietary regimes and requirements to the maximum extent possible with advance notice of such requirements.

C. There shall be adequate galley and mess facilities.

D. There shall be adequate cooks and catering staff to provide daily meals and services as per common practice with night lunches and provisions to be available when required whenever the Vessel is away from base.

E. There shall be a certified chef who possesses an American Culinary Federation, Chef de Cuisine certification, or equivalent, and is also ServSafe Certified from the National Restaurant Association, who oversees the food purchasing, hygiene, and food preparations for the vessel. This person(s) shall sail on this vessel for at least 6 months of the year.

F. Food preparation personnel, preparation and storage areas, and food quality shall adhere at a minimum with the United States Department of Health and Human Services Food Code of 2005 or later edition.

G. Food service is also subject to and bound by Health Inspections by the NSF contracted entity for this purpose.

H. When launches are operating away from the Vessel they are to be supplied with substantial and hot meals where practicable.

8. Housekeeping

A. There shall be adequate catering staff to provide for the preparation and cleaning of the spaces available for Charterers' personnel and the laundering of the linen required for these spaces.

B. The Vessel's housekeeping services and facilities shall be accessible and available for use by the Charterers' personnel, subject to direction by Vessel Master and Charterers' Representative.

C. The Owners shall provide all linens (to include sheets, towels, pillows, blankets, comforters) and such as may be required by the Charterers. Linens and towels will be of best quality, heavyweight 100% cotton, of 200 thread count or higher, with a minimum inventory as to provide a complete change for all personnel with extra reserves for room changes during station or field camp shuttles. Linens will be maintained in good condition, and provided without unreasonable wear, rips or stains.

D. Owners shall also equip all cabins for Charterers' personnel with television sets and DVD players.

9. Naming of the ARSV

The Charterers shall be entitled to name or re-name the Vessel, subject to the approval of the Owners, which approval shall not be unreasonably withheld, and the Owners shall not change such name during the term of the Time Charter. Owners shall file with the United States Coast Guard a completed application to name or re-name the Vessel within sixty (60) days of the later of the following two events:

A. the fixing of this Time Charter or

B. Owners' receipt in writing of Charterers' request to re-name the Vessel. Owners shall provide to Charterers a copy of the completed application to re-name the Vessel at the same time such application is filed with the United States Coast Guard.

SECTION IV-C

General Provisions - Charter

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52.252-2 CLAUSES INCORPORATED BY REFERENCE(Jun 88)

This Time Charter incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the CPO will make their full text available. Whenever in such clauses the words "Contracting officer" appear, they shall mean the "CPO"; "Contractor" shall mean "the Owners"; "Subcontractor" shall mean Owners' subcontractor(s); and "Prime Contract" shall mean the contract between Charterers and the National Science Foundation.

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

Citation	Title
52.202-1	Definitions (Jul 04)
52.203-3	Gratuities (Apr 84)
52.203-5	Covenant Against Contingent Fees (Apr 84)
52.203-6	Restrictions on Subcontractor Sales to the Government (Sep 06)
52.203-7	Anti-Kickback Procedures (Jul 95)
52.203-8	Cancellation, Rescission, and Recover of Funds for Illegal or Improper Activity (Jan 97)
52.203-10	Price or Fee Adjustment for Illegal or Improper Activity (Jan 97)
52.203-12	Limitation on Payments to Influence Certain Federal Transactions (Sep 05)
52.204-2	Security Requirements (Aug 96)
52.204-4	Printing/Copying Double-Sided on Recycled Paper (Aug 00)
52.208-8	Helium Requirement Forecast and Required Sources for Helium (Apr 02)
52.209-6	Protecting the Government’s Interest when Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment (Sep 06)

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

Citation	Title
52.211-5	Material Requirement (Aug 00)
52.215-2	Audit and Records - Negotiation (Jun 99)
52.215-8	Order of Precedence – Uniform Contract Format (Oct 97)
52.215-11	Price Reduction for Defective Cost or Pricing Data (Oct 97)
52.215-12	Subcontractor Cost or Pricing Data (Oct 97)
52.215-13	Subcontractor Cost or Pricing Data - Modifications (Oct 97)
52.215-14	Integrity of Unit Prices (Oct 97) Alt 1 (Oct 97)
52.215-15	Termination of Defined Benefit Pension Plans (Oct 04)
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits Other than Pensions (Jul 05)
52.215-19	Notification of Ownership Changes (Oct 97)
52.216-7	Allowable Cost and Payment (Dec 02)
52.219-8	Utilization of Small Business Concerns (May 04)
52.219-9	Small Business Subcontracting Plan (Sep 06) Alt II (Oct 01)
52.222-1	Notice to the Government of Labor Disputes (Feb 97)
52.222-2	Payment for Overtime Premiums (Jul 90) (Insert “0”)
52.222-3	Convict Labor (Jun 03)
52.222-20	Walsh-Healy Public Contracts Act (Dec 96)
52.222-26	Equal Opportunity (Apr 02)
52.222-29	Notification of VISA Denial (Jun 03)
52.222-35	Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era and Eligible Veterans (Sep 06)

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

Citation	Title
52.222-36	Affirmative Action for Workers with Disabilities (Jun 98)
52.222-37	Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era and Other Eligible Veterans (Sep 06)
52.222-6	Drug-Free Workplace (May 01)
52.222-14	Toxic Chemical Release Reporting (Aug 03)
52.224-1	Privacy Notification (Apr 84)
52.224-2	Privacy Act (Apr 84)
52.225-11	Buy American – Construction Materials Under Trade Agreements (Nov 06)
52.225-8	Duty-Free Entry (Feb 00)
52.227-1	Authorization and Consent (Jul 95)
52.227-3	Patent Indemnity (Apr 84)
52.229-8	Taxes – Foreign Cost-Reimbursement Contracts (Mar 90)
52.230-2	Cost Accounting Standards (Apr 98)
52.230-6	Administration of Cost Accounting Standards (Apr 05)
52.232-9	Limitation on Withholding of Payments (Apr 84)
52.232-17	Interest (Jun 96)
52.232.22	Limitation of Funds (Apr 84)
52.232-23	Assignment of Claims (Jan 86)
52.232-25	Prompt Payment (Oct 03)
52.232-33	Payment by Electronic Funds Transfer – Central Contractor Registration (Oct 03)
52.233-1	Disputes (Jul 01) Alt 1 (Dec 91)

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

Citation	Title
52.233-3	Protest After Award (Aug 96) Alt 1 (Jun 85)
52.236-5	Material and Workmanship (Apr 84)
52.236-7	Permits and Responsibilities (Nov 91)
52.236-25	Requirement for Registration of Designers (Jun 03)
52.237-2	Protection of Government Buildings, Equipment, and Vegetation (Apr 84)
52.237-3	Continuity of Services (Jan 91)
52.237-7	Indemnification and Medical Liability Insurance (Jan 97)
52.239-1	Privacy or Security Safeguards (Aug 96)
52.242-1	Notice of Intent to Disallow Costs (Apr 84)
52.242-3	Penalties for Unallowable Costs (Mar 01)
52.242-4	Certification of Final Indirect Costs (Jan 97)
52.242-13	Bankruptcy (Jul 95)
52.243-2	Changes – Cost Reimbursement (Aug 87) Alt II (Apr 84)
52.244-2	Subcontracts (Aug 98) Alt I (Jan 06)
52.244-5	Competition in Subcontracting (Dec 96)
52.244-6	Subcontract for Commercial Items (Sep 06)
52.245-5	Government Property (Cost-Reimbursement, Time and Material, or Labor-Hour Contracts (May 04)
52.245-19	Government Property Furnished “As Is” (Apr 84)
52.246-25	Limitation of Liability – Services (Feb 97)
52.247-63	Preference for U.S. Flag Air Carriers (Jan 03)

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

Citation	Title
52.247-64	Preference for privately Owned U.S. - Flag Commercial Vessels (Feb 06)
52-247-67	Submission of Commercial Transportation Documents for Audit (Feb 06)
52.248-1	Value Engineering (Feb 00)
52.249-6	Termination (Cost-Reimbursement) (May 04)
52.249-14	Excusable Delays (Apr 84)
52.251-1	Government Supply Sources (Apr 84)
52.251-2	Interagency Fleet Management System Vehicles and Related Services (Jan 91)
52.253-1	Computer Generated Forms (Jan 91)

CLAUSES INCORPORATED IN FULL TEXT

Clause 1 – Changes

(a) The CPO may at any time, by a written order, and without notice to the sureties, if any, make changes within the general scope of this Time Charter in any one or more of the following:

(1) Specifications, drawings, designs (including final designs), and technical requirements, including installation of scientific equipment of the Vessel.

(2) Place or time of delivery of the Vessel.

(b) If any such change causes an increase or decrease in the cost of preparing the Vessel for acceptance tests and trials, or the time required for the performance of any part of the work under this Time Charter, whether changed or not changed by any such order, or otherwise affects any other provision of this Time Charter, an equitable adjustment shall be made:

(1) in the applicable Fixed Charter Rate or under separate reimbursement to Owners/Charterers, or delivery schedule, or both; and

(2) in such provisions of the Time Charter as may be affected, and the Time Charter shall be modified in writing accordingly. Any claim by the Owners for adjustment under this Clause must be asserted within 30 days from the date of receipt by Owners of the notification of change; provided, however, that the CPO, if they decide the facts justify such action, may receive and act upon any such claim asserted at any time prior to final payment under this Time Charter. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the Clause 5 ("Disputes/Arbitration") of these General Provisions. However, nothing in this Clause shall excuse Owners from proceeding with the Time Charter as changed.

(c) Notwithstanding the provisions of paragraphs (a) and (b) above, the Fixed Charter Rate shall not be increased or deemed to be increased except by specific written modification of the Time Charter issued by the CPO indicating the new Time Charter Fixed Charter Rate.

Clause 2 - Notification of Changes

(a) Notice. The primary purpose of this Clause is to obtain prompt reporting of any conduct or circumstances which Owners consider would constitute or would require a change to this Time Charter. The parties acknowledge that proper administration of this Time Charter requires that potential changes be identified and resolved as they arise. Therefore, except for changes identified as such in writing and signed by the CPO, Owners shall notify the CPO of any conduct or circumstances which Owners consider would constitute or would require a change to the Time Charter. Such notice shall be provided promptly and in any event within 10 calendar days from the date Owners

identify any such conduct or circumstance. Such notice shall be written and dated and shall state, on the basis of the most accurate information available to Owners:

(1) The date, nature, and circumstances of the conduct regarded as a change;

(2) The name, function, and activity of the individuals directly involved in or knowledgeable about such conduct;

(3) The identification of any documents and the substance of any oral communication involved in such conduct;

(4) The particular elements of Time Charter performance for which Owners might seek an equitable adjustment under this Clause, including:

(i) To the extent practicable, labor or materials or both which have been or might be added, deleted, or wasted by the potential change;

(ii) To the extent practicable, Owners' preliminary order of magnitude estimate of cost and schedule effect of the potential change; and

(iii) What and in what manner are the particular technical requirements, Specifications, or other Time Charter requirements regarded as changed.

(b) Continued Performance. Following submission of the Notice, Owners shall take no action to implement a potential change until advised by the CPO in writing as provided in (c) below, unless the potential change was previously directed by the CPO, in which case Owners shall conform therewith. Nothing in this paragraph (b) shall excuse Owners from proceeding with Time Charter work other than implementation of the potential change or from proceeding in accordance with directions issued by the CPO.

(c) Charterers' Response. The CPO shall promptly, and in any event within 15 calendar days after receipt of notice, respond thereto in writing. In such response, the CPO shall either:

(1) Confirm that the conduct of which Owners gave notice would constitute a change, and when necessary, direct the mode of further performance, or

(2) Countermand any conduct regarded by Owners as a change, or

(3) Deny that the conduct of which Owners gave notice would constitute a change and, when necessary, direct the mode of further performance.

In the event Owners' notice information is inadequate to make a decision under (a) (4) (i) , (ii) , or (iii) above, Charterers will advise Owners what additional information is required.

Failure of the Charterers to respond within the time required above shall be deemed a countermand under subparagraph (c)(2) above.

(d) Equitable Adjustments. Equitable Adjustments for changes confirmed or countermanded by the CPO shall be made in accordance with Clause 1 ("Changes") of these General Provisions.

(e) When Owners identify any conduct which may result in delay to delivery of the Vessel, Owners shall promptly so inform the CPO thereof prior to providing the notice required by paragraph (a) above.

Clause 3 - Publicity Releases

Prior to the public release of any information relating to this Time Charter or the USAP or the Foundation, Owners will secure the written approval of such release from the CPO.

Clause 4 – Government-Furnished Property

(a) Government-Furnished Property ("GFP")- The delivery or performance dates for the Vessel are based upon the expectation that GFP suitable for use will be delivered to Owners at the times stated in the Time Charter or, if not so stated, in sufficient time to enable Owners to meet such delivery or performance dates. In the event that GFP is not delivered to Owners by such time or times, the CPO shall, upon timely written request made by Owners, make a determination of the delay occasioned Owners and shall equitably adjust the applicable Fixed Charter Rate or delivery or performance dates, or all of them, and any other contractual provisions affected by such delay, in accordance with the procedures provided for in Clause 1 ("Changes") of these General Provisions. In the event that GFP is received by the Owners in a condition not suitable for the intended use, the Owners shall, upon receipt thereof, notify the CPO of such fact and, as directed by the CPO either (i) return the property at the Charterers' expense or otherwise dispose of the property, or (ii) effect repairs or modifications. Upon completion of (i) or (ii) above, the CPO upon written request of the Owners, shall equitably adjust the applicable Fixed Charter Rate or delivery or performance dates, or all of them, and any other contractual provisions affected by the return or disposition, or the repair or modification, in accordance with the procedure provided for in Clause 1 ("Changes") of this Rider of Additional Provisions. The foregoing provisions for adjustment are exclusive and Owners shall not be entitled to claim for breach of Time Charter by reasonable delay in delivery of GFP or delivery of such property in a condition not suitable for its intended use.

(b) Title -- Title to all GFP shall remain in the Government. Title to GFP shall not be affected by the incorporation or attachment thereof to the Vessel or any property not owned by the Government, nor shall such GFP, or any part thereof, be or become a fixture or an appurtenance of the Vessel or lose its identity as personal property by being attached to any real property or the Vessel, and Owners shall not exercise any lien on said property or cause or permit any lien to be exercised by any third party on said property as a result of any conduct or obligation of Owners. Should any such lien be placed, Owners shall discharge at once or bond or otherwise secure against all liens and attachments which are filed and shall defend, indemnify and save Charterers, the Foundation and the Government harmless from and against any and all loss, damage, injury, liability and claims thereof resulting directly or indirectly from such liens or attachments.

(c) Use of GFP - The GFP shall be used only for the performance of this Time Charter.

(d) Maintenance and Repair of GFP -- Owners shall maintain and administer, in accordance with sound business practice, a program for the maintenance, repair, protection and preservation of GFP so as to assure its full availability and usefulness for the performance of the work under this Time Charter. Owners shall take all reasonable steps to comply with all appropriate directions or instructions which the CPO may prescribe as reasonably necessary for the protection of such GFP. Owners shall not dispose any GFP, whether sound or damaged, without the written consent of the CPO.

(e) Capital Equipment

(1) All Capital Equipment (defined for purposed of this Clause as any item of equipment having a value in excess of $25,000 and a useful service life in excess of two years, or which is normally capitalized under generally accepted accounting principles), Accountable Property (defined as property with an acquisition cost of $5,000 to $24,999 and an expected service life of two years or more) shall be identified as "U.S. Government Property" by a suitable marking immediately upon receipt by Owners.

(2) Property records and receipts are required for any usable components which are permanently attached to or removed from items of GFP as a result of modification to the same extent as would be the case if such components had been provided separately by the Government.

(f) Access - Owners agree to make available to authorized representatives of the Charterers at all reasonable times on board the Vessel and at the office of the Owners all of its GFP records under this Time Charter, and to provide access to any location where any of the GFP is located, for the purpose of inspecting such GFP.

(g) Risk of Loss - Owners shall assume the risk of, and shall be responsible for, any loss, or destruction of, or damage to GFP (including expenses incidental thereto) resulting from Owners' negligence. Owners are not responsible for reasonable wear and tear to such GFP or for GFP properly consumed in performing this Time Charter.

Clause 5 - Disputes/Arbitration

(a) Any dispute arising under, in connection with or incident to this Time Charter shall be heard and decided at New York, New York, by three persons, one to be appointed by each of the parties hereto, and the third by the two so chosen; their decision or that of any two of them shall be final and, for the purpose of enforcing any award, this Time Charter may be made a rule of the court. Should a party fail to appoint an arbitrator within ten days of notice of demand for arbitration, the demanding party may appoint the second arbitrator with the same force and effect as if appointed by the second party. Should the two arbitrators be unable to agree on the appointment of a third arbitrator within 14 days after appointment of the second arbitrator, the President of the Society of Maritime Arbitrators, Inc. shall make the appointment upon the request of either party without further notice. The proceedings shall be conducted in accordance with the Rules of the Society of Maritime Arbitrators, Inc., including Section 2 "Consolidation". The

arbitrators shall be commercial men and not practicing attorneys. This Time Charter shall be deemed to have been executed and fully performed within in the State of New York, and shall be interpreted and construed in accordance with and subject to the federal maritime law of the United States or, should no such law exist on any particular issue, the laws of the State of New York (excluding otherwise applicable conflict of laws principles), to the exclusion of the laws of any other state or country. The arbitrators shall consider this Agreement an honorable engagement rather than merely a legal obligation; they are relieved from all judicial formalities and may abstain from following the strict rules of law. The arbitrators shall award reasonable attorneys fees and costs to the prevailing party. The parties irrevocably stipulate to the jurisdiction of the United States District Court for the Southern District of New York for purposes of compelling arbitration or confirming an arbitration award, and the prevailing party in any such legal action shall be awarded reasonable attorneys fees and costs. With regard to petitions to compel arbitration or to confirm an arbitration award, the parties consent to service of process by certified mail, certified international mail, Federal Express or DHL courier service to the address provided in Clause 14 ("Notice") of these General Provisions, and irrevocably waive their right to personal service of these documents. A party which brings enforcement proceedings to enforce any arbitration award or judgment obtained under this Clause likewise shall be awarded reasonable attorneys fees and costs incurred in enforcing such award or judgment.

(b) Owners shall diligently proceed with performance of the Time Charter during arbitration proceedings unless Charterers shall order the suspension thereof. Such a suspension shall be a suspension of work according to Clause 1 ("Changes") of these General Provisions. No payments due or payable by the Charterers and that are not the subject of arbitration shall be withheld on account of a pending demand for arbitration.

(c) No arbitration arising out of or relating to the Time Charter shall include, by consolidation, joinder, or in any other manner, the Foundation, its employees or consultants. Owners shall defend, indemnify and hold harmless the Charterers and/or the Foundation if any of Owners' employees or any of their subcontractors or their employees make any claim and/or file any suit against the Charterers and/or the Foundation (including reimbursement of all legal expenses).

(d) Notice of the demand for arbitration shall be made in writing to the other party to this Time Charter. The demand for arbitration shall be made within a reasonable time after the claim, dispute, or other matter in question has arisen, but in any event any claim by any party against the other shall be time-barred unless notice in writing has been given by the claimant to the other party by overnight courier within two (2) years after the time the event giving rise to such claim has arisen. Owners and Charterers agree to waive any other prescriptive or limitations period which may be applicable. The written notice to be given under this Clause is to be sent to the address provided in Clause 14 ("Notice") of these General Provisions. This provision is not to be read to foreclose one party from tendering the defense of a third party claim to the other party to this Time Charter, or vouching in the other party to this Time Charter.

Clause 6 – Owners as Independent Contractor

All of Owners' operations hereunder are those of an independent Contractor and neither it, its agents, nor its employees shall be considered employees or borrowed employees of the Charterers. As an independent Contractor, Owners assume all legal and contractual obligations arising out of its performance of the work hereunder, including the obligations of its subcontractors.

Clause 7 - Assignment and Subcontract

(a) This Time Charter shall not be assigned by Owners without the written consent of the Charterers, nor may any subcontracts in excess of $100,000 be entered into by Owners without the prior written consent of the Charterers.

(b) Charterers may assign this Time Charter at any time to any subsidiary or affiliate of Raytheon Technical Services, LLC, to the Foundation, or to any party selected by said Foundation. Charterers shall provide Owners with at least thirty (30) days written notice prior to such assignment.

(c) The consent by Charterers to any subcontract shall not impose any liability whatsoever on the Charterers, or limit or alter in any way the liability of Owners or its subcontractors in any manner under this Time Charter.

Clause 8 - Inspection

(a) The Government and the Charterers, through their authorized representatives, have the right at all reasonable times to inspect or otherwise evaluate the work performed or being performed hereunder and the premises on which it is being performed. If any inspection, or evaluation, is made by the Government or the Charterers on the premises of Owners or a subcontractor, Owners shall provide and shall require his subcontractors to provide all reasonable facilities and assistance for the safety and convenience of the Government's and Charterers' representatives in the performance of their duties. All inspections and evaluations shall be performed in such a manner as will not unduly delay the work. Any inspection or evaluation by the Charterers or the Government shall not relieve Owners from any responsibility regarding its obligations or performance under this Time Charter and shall in no way mitigate or lessen the absolute warranty of seaworthiness herein expressed; and shall in no way create or give rise to any liability or responsibility to the Charterers, the Foundation or the Government for seaworthiness of the Vessel, which liability or responsibility shall at all times remain upon the Owners.

(b) Charterers shall have the right to place a full time Charterers' representative at the shipyard where the Vessel is being outfitted, repaired or otherwise undergoing shipyard work. Charterers shall have the right to place personnel at the shipyard during these yard periods for the purpose of installing or monitoring installation of specialized equipment for Charterers' research mission. Owners shall provide without charge reasonable office space and office furniture to facilitate the monitoring of such activities by Charterers' representative. Records of all inspection work by the Owners or their subcontractors shall

be kept complete and available to the Charterers during the performance of this Time Charter and for such longer period as may be specified elsewhere in this Time Charter.

Clause 9 - Allowable Costs and Payment to Owners on Cost Reimbursable Items

(a) For performance of the designated cost reimbursable work under this Time Charter, the Charterers shall pay to Owners:

The costs thereof (hereinafter referred to as "costs") determined by the Charterers to be allowable in accordance with:

(1) The applicable Part 31 of the Federal Acquisition Regulation in effect on the effective date of this Time Charter; and

(2) The terms of this Time Charter.

(b) Once each month (or at more frequent intervals, if approved by the Charterers), Owners shall submit to an authorized representative of the Charterers, in such form and reasonable detail as such representative may require, an invoice or public voucher, together with supporting documentation, itemizing costs incurred by the Owners in performance of the above referred to cost reimbursable items and claimed to constitute allowable costs.

(c) After receipt and verification of each invoice or voucher, the Charterers shall, subject to the provisions of Paragraph (d) below, make payment thereon.

(d) At any time or times prior to final payment under this Time Charter, the Charterers may have invoices or vouchers audited. Each payment theretofore made shall be subject to reduction or reimbursement for amounts included in the related invoice or voucher which are found by the Charterers not to constitute allowable or allocable costs. In the event that an audit under this Clause results in a finding that a reduction or reimbursement is due to Charterers, Charterers are entitled to deduct that reduction or reimbursement from hire payments owed to Owners.

Clause 10 - Termination for Convenience of the Government

(Applicable to any termination for convenience prior to commencement of the Time Charter period, and only if any such termination has been directed by the Foundation.)

(a) The Charterers may terminate performance of work under this Time Charter in whole or, from time to time, in part if the Foundation determines that a termination is in its best interest. The CPO shall effectuate such termination by delivering to Owners a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the CPO, Owners shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this Clause:

(1)Stop any work as specified in the notice, including work of subcontractors.

(2) Place no further subcontracts or orders (referred to as subcontracts in this Clause) for materials, services, or facilities, except as necessary to complete the continued portion of the Time Charter.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Charterers, as directed by the CPO, all right, title, and interest of Owners under the subcontracts terminated, in which case the Charterers shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the CPO, settle all outstanding liabilities and termination settlement proposals arising from the termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.

(6) As directed by the CPO, transfer title and deliver to the Charterers (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the Time Charter had been completed, would be required to be furnished to the Charterers.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the CPO may direct, for the protection and preservation of the property related to this Time Charter that is in the possession of Owners or its subcontractors and in which the Charterers have or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the CPO, any property of the types referred to in subparagraph (6) above; provided, however, that Owners (i) are not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the CPO. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Charterers under this Time Charter, credited to the price or cost of the work, or paid in any other manner directed by the CPO.

(c) After termination, Owners shall submit a final Termination Settlement Proposal to the CPO in the form and with the certification prescribed by the CPO. Owners shall submit the Proposal within thirty (30) days of receiving written notice of the termination. If Owners fails to submit the Proposal within thirty (30) days, the CPO may determine, on the basis of information available, the amount, if any, due Owners because of the termination and shall pay the amount determined.

(d) Subject to paragraph (c) above, Owners and the CPO may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (d) or paragraph (e) (iii) below, may not exceed the total Fixed Charter Rates for the Basic Term of the Time Charter. The Time Charter shall be

amended, and Owners paid the agreed amount. Paragraph (f) below shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(e) If Owners and the CPO fail to agree on the whole amount to be paid because of the termination of work, the CPO shall pay Owners the amounts determined by the CPO as follows, but without duplication of any amounts agreed on under paragraph (d) above:

(1) The total of:

(i) The costs incurred in the modifications to the Vessel before the work was terminated.

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the Time Charter if not included in subdivision (i) above; and

(iii) A sum, as profit on subdivision (i) above; as determined by the CPO to be fair and reasonable; however, if it appears that Owners would have sustained a loss on the entire Time Charter had it been completed, the CPO shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including:

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of the termination settlement, proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(f) Except for normal spoilage, the CPO shall exclude from the amounts payable to Owners under paragraph (e) above, the fair value, as determined by the CPO, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Charterers.

(g) Owners shall have the right to arbitrate, under Clause 5 ("Disputes/Arbitration") of these General Provisions, any determination made by the CPO under paragraph (c), (e), or (i). If the CPO has made a determination of amount due under paragraph (c), (e), or (i), the Charterers shall pay Owners (1) the amount determined by the CPO, or (2) if submitted to arbitration, the CPO will pay the amount finally determined by arbitration.

(h) In arriving at the amount due Owners under this clause, there shall be deducted:

(1) All unliquidated advance or other payments to Owners under the terminated portion of this Time Charter;

(2) Any claim which the Charterers have against Owners under this Time Charter; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by Owners or sold under the provisions of this Clause and not recovered by or credited to the Charterers.

(i) If the termination is partial, Owners may file a proposal with the CPO for an equitable adjustment of the applicable Fixed Charter Rates. The CPO shall make any equitable adjustment agreed upon. Any proposal by Owners for an equitable adjustment under this Clause shall be reinstated within ninety (90) days from the effective date of termination unless extended in writing by the CPO.

(j) Payments

(1) The Charterers may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by Owners for the terminated portion of the Time Charter, if the CPO believes the total of these payments will not exceed the amount to which Owners will be entitled.

(2) If the total payments exceed the amount finally determined to be due, Owners shall repay the excess to the Charterers upon demand, together with interest computed at the Prime Interest Rate as charged by the Chase Manhattan Bank, N.Y. Interest shall be computed for the period from the date the excess payment is received by Owners to the date the excess is repaid.

(k) Unless otherwise provided in this Time Charter or by statute, Owners shall maintain all records and documents relating to the terminated portion of this Time Charter for six (6) years after final settlement. This includes all records and other evidence bearing on Owners' costs and expenses under this Time Charter. Owners shall make these records and documents available to the Charterers and the Government, at Owners' office, at all reasonable times, without charge.

Clause 11 - Guarantee

(a) Definitions

(1) Supplies: the word "supplies" as used in this Clause includes without limitation, components, intermediate assemblies, end products, and technical data.

(2) Defects: the word "defects" as used in this Clause, means any and all defects, deficiencies, deteriorations and failures, except deficiencies, deteriorations or failures caused by Government misuse or mishandling.

(b) Owners warrant and guarantees that at any time during performance of this Time Charter, and during the period of the Time Charter, the Vessel, appurtenances, equipment and supplies furnished under this Time Charter shall be seaworthy and free from defects in material and workmanship and will conform with the technical requirements, Specifications and all other requirements of this Time Charter, as well as Government regulations and Vessel's Class Society rules, provided, however that with respect to GFP, Owners' guarantee shall extend only to its proper installation, unless Owners perform some modification or other work on such property, in which case Owners' guarantee shall extend to such modification or other work.

(c) Remedies

(1) Right to corrective or replacement action -- In the event of a defect within the scope of Owners' guarantee in Paragraph (b) above, the Charterers may: (i) require Owners to repair or replace, at Owners' election, defective or nonconforming supplies, or (ii) require Owners to furnish such materials or parts and installation instructions as may be required to successfully accomplish the required correction or replacement. Owners shall also prepare and furnish to the Charterers data and reports applicable to any correction or replacement required under this Clause (including revision and updating of all affected data called for under this Time Charter).

(2) Rights if Owners fails to proceed -- If Owners fail to proceed with reasonable promptness to replace or correct such defects, the Charterers (i) may contract or otherwise replace or correct such supplies and charge to Owners any increased cost occasioned the Charterers thereby, or may reduce the Fixed Charter Rate by such amount as may be equitable under the circumstances, or (ii) may terminate this Time Charter for default as provided in Clause 12 ("Termination for Default") of these General Provisions. Failure to agree to the amount of any such increased cost to be charged to Owners or such reduction in the Fixed Charter Rate, shall be a dispute concerning a question of fact within the meaning of Clause 5 ("Disputes/ Arbitration") of these General Provisions. Failure of the Charterers to exercise their rights under this Clause shall not relieve the Owners of their guarantee obligations under this Clause.

(d) Corrected or Replaced Supplies -- Any supplies or parts thereof corrected or furnished in replacement pursuant to this Clause shall also be subject to all the provisions of this Clause to the same extent as supplies initially delivered.

(e) Additional Provisions -- The rights and remedies of the Charterers provided in this Clause are in addition to and do not limit any rights afforded to the Charterers by any other clause of the Time Charter.

Clause 12 - Termination for Default

If material delays in carrying out The Program or other material unsatisfactory performance under this Time Charter are caused by faulty performance on the part of the Vessel, her Master, or Owners, Charterers may give the Owners written notice specifying the occurrences of which Charterers are complaining, and allow the Owners a period of ten (10) days (or such longer period as authorized by Charterers) to cure such faulty or delayed performance. If the Owners fail to commence correction of the faulty or delayed performance on the part of the Vessel, her Master, or her Owners, within the period of time rotated by the Charterers, the Charterers shall have the right to terminate the Time Charter for default by giving seven (7) days notice of termination, in writing, to the Owners. In that event, the last day of the Time Charter shall be the day that the seven (7) day notice period ends. The Owners shall have the right to dispute such termination under Clause 5 (“Disputes/Arbitration”) of these General Provisions.

The rights and remedies of the Charterers provided in this Clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Time Charter.

Clause 13 - Consequential Damage

Notwithstanding any other provision herein contained, neither Charterers nor Foundation nor Owners shall be liable to the other or to any of their respective employees or agents assigns or insurers hereunder for any indirect, consequential, incidental, special (including multiple or punitive) damages or loss of any kind whatsoever arising out of or relating to any act or omission in or during the performance of this Time Charter.

Clause 14 – Notice

Where notice is required by this Time Charter to be given to the Owners or Charterers, it shall be addressed as follows:

To the Charterers:

Raytheon Technical Services, LLC, d/b/a Raytheon Polar Services

7400 South Tucson Way

Centennial, CO, 80112

Attention: Jim Weber

Charterers' Procurement Officer

The Charterer's Procurement Officer (CPO) who is designated by Charterers to effect changes and issue amendments and other contractual actions under this Time Charter is Jim Weber.

To the Owners:

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