

MEMORANDUM OF AGREEMENT
SUBMARINE ARCTIC SCIENCE PROGRAM – PHASE 2

1. **PURPOSE.** The purpose of this Memorandum of Agreement (MOA) is to facilitate the use of U.S. Navy submarines for scientific research in the Arctic. This MOA sets forth the functions, responsibilities, and actions of participating parties. Details governing different types of data collection opportunities are delineated in Appendices A and B.
2. **BACKGROUND.** The federal agencies that fund Arctic marine science believe that existing fleet nuclear submarines (SSNs) are unique research platforms in the Arctic, as was demonstrated during the six Submarine Arctic Science Cruises (SCICEXs) conducted from 1993 until 1999. The Navy believes that SSNs must retain a global ocean operational capability. The Submarine Force is committed to sustaining its Arctic training and readiness levels through recurring deployments to that area.
3. **GOALS.** The overall goal of this Submarine Arctic Science Program (SCICEX Phase 2) is to improve understanding of Arctic Ocean processes and their role in the earth's climate system by dual use of nuclear submarines, thus capitalizing on existing national platform capabilities. This Agreement is intended to mutually support the objectives of both the civilian science and military communities. Toward this end, it is intended that all data collected under this agreement be made publically available as soon as possible after collection, following the data policies of the respective sponsors.
4. **DEFINITIONS.**
 - a. **Parties to Agreement.** The following parties are entering into this Agreement:
 - (1) The U. S. Submarine Force, represented by Commander Submarine Force, U. S. Atlantic Fleet (COMSUBLANT) and Commander Submarine Force, U.S. Pacific Fleet (COMSUBPAC).
 - (2) Chief of Naval Research (CNR), represented by the Ocean, Atmosphere and Space Science and Technology Department (ONR 32).
 - (3) National Science Foundation (NSF), represented by the Office of Polar Programs.
 - b. **Functioning Bodies.** The following bodies are established by this Agreement. Specific responsibilities vary with the type of mission (Dedicated or Accommodation) and are detailed in Appendices A and B.

- (1) Operational Planning Board (OPB). The OPB shall be chaired by the Arctic Submarine Laboratory (ASL) and include representatives from COMSUBLANT, COMSUBPAC, and CNO.
- (2) Interagency Committee (IAC). The IAC shall be chaired by ONR and include representatives from NSF, ASL, CNO, and the Arctic Research Commission. Other agencies may be represented at the invitation of any of the above listed members.
- (3) Science Advisory Committee (SAC). The SAC shall be chaired by an individual designated by the IAC with ONR, NSF, and ASL as permanent members. An additional six non-permanent members will be selected from within the scientific community with ONR and NSF each selecting three of these representatives.

5. FUNCTIONS, RESPONSIBILITIES & ACTIONS.

a. The U.S. Submarine Force agrees to:

- (1) Establish the Operational Planning Board (OPB) to coordinate the oversight of the Submarine Arctic Science Program.
- (2) Authorize ASL as the Submarine Force Arctic Advisor to coordinate the operational and technical aspects of each cruise, including planning interface with ONR.
- (3) Provide all operational support for the submarine cruise to include training, operating orders, and associated operational support.
- (4) Carry out other functions described in Appendices A and B.

b. The CNR agrees to:

- (1) Serve as the focal point for the scientific aspects of the Submarine Arctic Science Program, making available the unique attributes of a nuclear submarine to as many in the science community as possible.
- (2) Assist ASL in the science coordination aspects of cruise planning.
- (3) Establish and chair the Interagency Committee (IAC).
- (4) Establish policies to assure that data distributed to ONR-supported investigators are made available to the public at the earliest date possible after collection, following ONR data policies.

(5) Take action to encourage the declassification and release of archived Navy submarine-collected environmental data.

(6) Carry out other functions described in Appendices A and B.

c. NSF agrees to:

(1) Designate an agency representative as a member of the IAC and SAC and participate actively in the program.

(2) Assist CNR in carrying out the scientific aspects of this program.

(3) Establish policies to assure that data distributed to NSF-supported investigators are made available to the public at the earliest date possible after collection, following NSF data policies.

6. **SECURITY.** All scientific and other data collected on each cruise will be evaluated for security purposes by ASL. This evaluation will be completed as soon as possible, normally within 30 days after the ship's return to a U.S. port. The OPB will make every effort to ensure the acquired data are declassified. However, all data will be afforded proper protection if determined to be classified due to extenuating circumstances or existing national security guidance.

7. **PERIOD OF AGREEMENT.** This agreement supercedes the previous MOA established 20 June 1994. It shall be effective upon the date of the last signature below. It may be modified by mutual agreement of all of the parties. Signatory parties may terminate their participation with 6 months notice to all other parties.

[Signature] 5/2/00 *[Signature]* 11 Apr 00
COMSUBLANT Date for CNR Date

[Signature] 3/25/00 *[Signature]* 6/12/00
COMSUBPAC Date for NSF Date

APPENDIX A
DEDICATED SCIENCE MISSIONS

1. **GOALS.** The goal of the Dedicated Science Missions is the collection of new sets of Arctic environmental data during submarine cruises dedicated to this purpose.
2. **DESCRIPTION.** Under this agreement, the Submarine Force will allocate either individual cruises or commit a series of cruises as Arctic science missions. This effort will be specifically aimed at improving upon the successes of the first six SCICEX cruises in supporting high priority Arctic environmental scientific research.
3. **RESPONSIBILITIES.**
 - a. The U.S. Submarine Force agrees to:
 - (1) As available, provide SSN assets for Arctic scientific research. These deployments must be consistent with availability and military commitments as determined by the Fleet Commander. The Submarine Force retains the authority to cancel or shorten any cruise if operationally required. Final commitment of submarine time will be based upon the Science Plan prepared by the IAC and approved by the OPB.
 - (2) Provide an ASL Technical Advisor, knowledgeable in submarine Arctic operations, who will facilitate equipment installation, load out, and data collection, and will be on board for the duration of the science cruise. The Technical Advisor will serve in a liaison role between the embarked scientists and the submarine crew.
 - (3) Make space available for scientific personnel and equipment, as feasible.
 - (4) Obtain data specified in the Science Test Plan. This plan is a classified detailing of the submarine's planned operations developed by the ASL Technical Advisor and Chief Scientist in consultation with all participating investigators. The Commanding Officer of the participating submarine retains the absolute authority to modify or delete portions of the Science Test Plan consistent with the ship's safety. The Chief Scientist may also recommend modifications to the Science Test Plan at sea. These recommendations should be made to the Commanding Officer via the Technical Advisor and only in response to unanticipated environmental conditions, instrumentation malfunctions or failures, or unplanned contingencies/limitations. The

Commanding Officer will execute such changes subject to maintaining safety and remaining within overall operational directives.

- (5) Make science data sets available to principal investigators as soon as possible consistent with the submarine's employment and declassification requirements.

b. The OPB shall:

- (1) Via ASL, inform the IAC of the availability and duration of Dedicated Science Missions.
- (2) Review nominated projects to verify technical and operational feasibility and data declassification. The OPB may limit the extent of some investigations based on operational concerns and to ensure that the research proposed is consistent with efficient and safe use of the submarine.
- (3) Approve the Science Plan submitted by the IAC.
- (4) Approve, in conjunction with the ship's Commanding Officer, the scientific riders nominated by the IAC.

c. The IAC shall:

- (1) Based upon the recommendations from the SAC, submit to the OPB the long-range scientific plan for this program. Where more than one cruise is envisioned, this plan should include the intended focus of each cruise.
- (2) For each Dedicated Science Mission planned:
 - (a) Initiate a Broad Agency Announcement (BAA) requesting proposals from the science community.
 - (b) Based upon the recommendations of the SAC and the ability to provide adequate funding, nominate experiments to the OPB and fund the research to be conducted on each mission.
 - (c) Within one month of science selection, submit to the OPB, a Science Plan delineating the scientific objectives and priorities for the cruise.
 - (d) Based on the science planned, nominate to the OPB the scientists to be embarked on each mission, designating one of these to act as Chief Scientist. Each embarked scientist must meet the

security and physical requirements specified by the Submarine Force and be approved by the OPB.

- d. The SAC shall advise the IAC on overall scientific priorities and specific experiment selection. This will include:
 - (1) Recommending broad scientific priorities and long-range goals for this program.
 - (2) Recommending baseline data to be collected on all cruises.
 - (3) Evaluating proposed science projects based on scientific merit, suitability to this program, and the applicability of results to program goals.

4. **DATA.**

- a. Specific Data sets and equipments may vary depending upon the submarine conducting the operation. In general, baseline data under this agreement can include:
 - (1) Conductivity, Temperature, Depth (CTD) profiles taken by expendable probes.
 - (2) CTD data taken from hull-mounted systems.
 - (3) Bathymetry recorded by installed fathometers.
 - (4) Ice profile data from upward-looking sonars.
 - (5) Salinities from water samples.
 - (6) Supporting navigation and operational data at a non-classified level.
- b. Other special data included under this agreement will be proposed by the IAC and approved by the OPB.
- c. Baseline data shall be forwarded by ASL to a national data repository designated by ONR at the same time it is distributed to investigators. Where data needs to be reformatted/calibrated prior to release, water samples require analysis, or data is distributed under a proprietary agreement, the sponsoring agencies will ensure that the investigators involved forward their data to the repository as soon as possible after collection, following the data policies of the respective sponsors.

5. **FISCAL**. This Agreement identifies four fiscal elements required for the Dedicated Science Missions. Parties to the Agreement will contribute as follows:
- a. **Ship Costs**. The Submarine Force will provide funds for the ship time component of the deployment. This is subject to modification by other agreements regarding ship availability and costs.
 - b. **Coordination Costs**. The costs for ASL to act as liaison between the Submarine Force and the scientific community, attend meetings, and to conduct the overall planning will be shared by the Submarine Force and the sponsoring scientific agencies (e.g., ONR and NSF) on an equal-share basis. The scientific agencies' share of the costs will be apportioned on a pro-rata share basis relative to the funded research.
 - c. **Baseline Data Acquisition Costs**. The Submarine Force and the sponsoring scientific agencies will equally share the costs for the installation of baseline equipment, for the embarked Technical Advisor(s), and declassification/distribution of baseline data. Costs for expendable probes/consumables and costs associated with the processing/analysis of data will be borne by the sponsoring scientific agencies. The scientific agencies' share of these costs will be apportioned on a pro-rata share basis relative to the funded research.
 - d. **Special Data Collection Costs**. The sponsoring scientific agencies will provide funding for all effort associated with Special Data. This includes costs for development/installation of equipment, expendables/consumables, declassification/distribution of data, and data analysis.

APPENDIX B
SCIENCE ACCOMMODATION MISSIONS

1. **GOALS.** The goal of the Science Accommodation Missions is to facilitate the collection of scientific data by U.S. Navy submarines during classified Arctic operations.

2. **DESCRIPTION.** Under this agreement, the Submarine Force will, on a case basis, allocate limited portions of otherwise classified submarine Arctic missions to collect high priority environmental data. This collection effort will be specifically aimed at continued monitoring of evolving oceanographic conditions, ice distribution, and contaminant concentrations in the Arctic Ocean. In general, this program differs from Dedicated Science Missions in that it will concentrate on baseline data collection rather than individual experiments. A set of baseline data to be collected will be identified by the IAC as advised by a SAC. These data will then be collected by the embarked Arctic Submarine Laboratory (ASL) personnel, assisted by the submarines' crews.

Within this context, the following specific differences between these and Dedicated Science Missions will also apply:

- a. Science Accommodation Missions will concentrate on data collection of general interest rather than specific experiments to support individual investigators. Most of the submarine-collected data will immediately be declassified and transferred to a repository designated by ONR. Where initial processing/calibration of data or analysis of water samples is required, this effort will be conducted by laboratories designated by ONR with the stipulation that these data be transferred to a designated repository at the earliest opportunity. No data collected under this agreement may have proprietary use by any individual for any period of time.

 - b. Proposals for individual experiments or installation of an individual's equipment on board may be entertained consistent with maintaining the security of the planned submarine operations.

 - c. Because of the nature of the submarine missions, it is not anticipated that civilian scientists will be embarked.
3. **RESPONSIBILITIES.**
 - a. The U.S. Submarine Force shall:

- (1) Provide SSN assets for Arctic scientific accommodation as available. The duration of these accommodation periods must be consistent with availability and military commitments as determined by the Fleet Commander. Start points and endpoints for the accommodation will be selected to avoid any inference of the classified aspects of the submarine's mission. The Submarine Force retains the authority to cancel or shorten any cruise if operationally required.
- (2) Coordinate through ASL the operational and technical aspects of each cruise, including planning interface with ONR.
- (3) Provide a Technical Director (TD), knowledgeable in submarine Arctic operations, who will facilitate equipment installation, load out, and data collection, and will be on board for the duration of the cruise. The embarked ASL Technical Director(s), aided by the submarine crew, will be responsible for the collection of scientific data.
- (4) Make available space for scientific equipment, as feasible.
- (5) Obtain data specified in the Science Plan. This Plan will be proposed by ASL based on the advice of the IAC and approved by the OPB prior to final commitment of submarine time to science accommodation. The Commanding Officer of the participating submarine retains the absolute authority to modify or delete portions of the Science Plan consistent with the ship's safety. The Science Plan may also be modified at sea in response to unanticipated environmental conditions, instrumentation malfunctions/failures, or unplanned contingencies or limitations. At-sea modifications to the Science Plan will be recommended by the TD. The Commanding Officer will execute such changes subject to maintaining safety and remaining within overall operational directives.
- (6) Make science data sets available to the repository designated by ONR as soon as possible consistent with the submarine's operational employment and declassification requirements. On those occasions when experiments may be conducted for specific individuals or such individuals are designated to conduct initial analysis of the data, provide data sets within the same constraints.

b. The OPB will:

- (1) Review proposed research to verify feasibility/safety and the ability to rapidly declassify the data. The OPB may limit the extent of some investigations based on operational concerns and to ensure that the research proposed is consistent with efficient and safe use of the submarine.

- (2) Approve the Science Plan prepared by ASL prior to final commitment of science accommodation time.
- c. The IAC will orchestrate the definition of the Science Plan including both baseline data collection (collected on all cruises) and any special (one-time) data collection. The classified nature of the cruises covered by this Agreement will normally preclude prior announcement to the scientific community. However, where possible, IAC will initiate a Broad Agency Announcement (BAA) requesting proposals from the science community. These proposals may cover specific experiments or the installation of specialized equipment on an individual cruise. For each planned cruise, the functions of the IAC are to:
- (1) Establish broad scientific priorities and define specific baseline data to be collected.
 - (2) If appropriate, initiate the BAA process to solicit individual science projects.
 - (3) If a BAA has been issued, use the recommendations of the SAC and ability to provide adequate funding to nominate experiments to the OPB and fund the research to be conducted on each mission.
- d. The SAC shall:
- (1) Periodically review the baseline data collection agenda and recommend modifications/improvements to the IAC.
 - (2) If a BAA has been issued, evaluate proposed science projects based on scientific merit, suitability to this program, and the applicability of results to program goals.

4. **DATA.**

- a. **Baseline Data.** Baseline data included under this agreement will normally be limited to those data sets available using standard submarine equipment and those systems typically installed by ASL for Submarine Ice Exercise (ICEX) cruises. Specific data sets and equipments may vary depending upon the submarine conducting the operation. In general, the baseline data set will include:
- (1) Conductivity, Temperature, Depth (CTD) profiles taken by expendable probes.
 - (2) CTD data taken from hull-mounted CTD systems.

- (3) Bathymetry recorded by installed fathometers.
 - (4) Ice profile data from upward-looking sonars.
 - (5) Salinities from water samples.
 - (6) Supporting navigation and operational data at a non-classified level.
- b. Special Data. Other special data included under this agreement will be proposed by the IAC and approved by the OPB.
5. **FISCAL**. This Agreement identifies four fiscal elements required for the Science Accommodation Missions. Parties to the Agreement will contribute as follows:
- a. Ship Costs. The Submarine Force will provide funds for the ship time component of these missions.
 - b. Coordination Costs. The costs for ASL to act as liaison between the Submarine Force and the scientific community, attend meetings, and conduct the overall planning will be shared by the Submarine Force and the sponsoring scientific agencies on an equal-share basis.
 - c. Baseline Data Acquisition Costs. The Submarine Force will provide funding for the installation of baseline ICEX equipment and for an embarked Technical Director. Funding for additional baseline equipment, expendable probes and consumables, additional embarked ASL personnel, and the declassification/distribution of baseline data will be shared by the Submarine Force and the sponsoring scientific agencies on an equal-share basis. Costs for processing/analysis of data will be borne by the sponsoring scientific agencies.
 - d. Special Data Collection Costs. The sponsoring scientific agencies will provide funding for all effort associated with Special Data. This includes costs for development/ installation of equipment, expendables/ consumables, additional embarked ASL personnel, declassification/distribution of data, and data analysis.