ORION D&I Frequently Asked Questions

What are the main components of the OOI? The OOI will have three elements: (1) a global-scale array of relocatable deep-sea buoys, 2) a regional-scaled cabled observatory (RCO) network consisting of interconnected sites on the seafloor spanning several geological and oceanographic features and processes, and 3) an expanded network of coastal observatories. These three elements will be connected by a system-wide cyberinfrastructure that provide continuous, interactive access to the sensor network. The OOI will be funded through NSF’s MREFC account.

What is the relationship between ORION, OOI and IOOS? The Ocean Research Interactive Observatory Network (ORION) and the Ocean Observatories Initiative (OOI) that forms the core of its in situ observing infrastructure (http://www.orionprogram.org/) has been developed in answer to the ocean research community’s needs for sustained time series measurements to advance understanding of our Planet’s ocean/atmosphere/earth system, as well as for furthering technical capabilities for ocean observing. The complementary multi-agency Integrated Ocean Observing System (IOOS) (http://www.ocean.us) will provide timely operational oceanographic information to address societal needs in areas including weather, maritime safety, homeland security, public health, and ecosystem and resource management. The OOI and IOOS are driven by different mandates, but are synergistic. ORION and the OOI will ensure that the IOOS evolves and is infused with modern technologies. Furthermore, research arising from ORION will help enable the IOOS system meet its societal goals through improved sampling schemes and models. In turn, the IOOS observational backbone will provide OOI researchers with access to observations and data for incorporation into models and process studies.

What is an MREFC project? MREFC funds are intended to build major research facilities that provide unique capabilities at the frontiers of science to promote discovery, innovation, and learning. Examples include accelerators, telescopes, research vessels, aircraft, earthquake simulators, networked high-tech research platforms, and advanced computing resources. To qualify for MREFC investment, networked infrastructure must exhibit systems characteristics greater than inferred simply by the connectivity of its parts.

What is the proposed funding level for the OOI MREFC? What can this money be spent on? The proposed budget for the OOI is $309.5M to be spent over a 6-year period beginning in 2007. This money can only be spent on construction and installation of the observatory infrastructure, technical development, project management, data management, core instrumentation, other observing infrastructure components (e.g. mobile platforms). These funds cannot be used to support operation and maintenance of the facility or to support research.

Do the funds for an MREFC project come from the existing Ocean Science budget at NSF? No. An MREFC project is funded through a separate line item account that is part of the overall NSF budget.

What is the Conceptual Network Design (CND)? The OOI CND is a high level description of the science user requirements and system requirements for the observatory network including the assets required to meet science needs and the locations where these assets will be located.

What are the Science User Requirements (SUR)? A clear and complete description, in the words of the user, of everything science users need to perform their science, including functional and performance requirements and necessary elements. This information is needed in sufficient detail to serve as guidance for engineers to design a system.

When the RFA announcement was released I thought this exercise was only going to be used to help scope the size of the OOI. Now it seems that the RFAs are the only way to participate in the OOI. Is this true? Will the RFA Process be repeated? Although the RFAs provided essential information to develop the conceptual design for the OOI there will be the
ability to make improvements to this plan during the Implementation Phase of the OOI as the system baseline is annually reviewed. In addition, through the NSF proposal process, experiments can be proposed that will then be incorporated into the implementation of the OOI network. It was never the intention to repeat the RFA process however, and the announcement released made clear the intention of using the proposals received to develop a conceptual design for the OOI. To quote this announcement: "Successful detailed conceptual proposals will be used to further refine science and engineering designs for the OOI facility to be constructed using MREFC funds and to specify the initial experimental and instrumentation needs of the user community for the OOI." "Infrastructure requirements identified as necessary for executing these projects will strongly guide implementation plans for the OOI."

What is the process to develop the Conceptual Network Design?
Development of the CND represents a community effort, incorporating input from the ocean science community, advisory committees, ORION Program Office, and NSF. In early 2005, the ORION Project Office asked for the ocean research community’s help in developing this design by soliciting “Request for Assistance” proposals (see above). The response to the RFA request was overwhelming with 48 proposals submitted by 549 individually named proponents representing 137 institutions, agencies and industries in 35 states. In September 2005, a review panel of unconflicted members of the ocean research community selected by NSF OCE Program Managers was convened at the ORION Program Office. Each proposal was discussed and binned by panel members into three groupings based on a combination of factors including scientific merit, readiness of the proposed experiment, and maturity of required technologies. Subsequently, the ORION advisory committees worked with the ORION Program Office to develop the CND. While the top binned RFA proposals have provided the initial focus for this process, science user requirements identified in all RFA submissions as well as recommendations and ideas articulated in earlier reports were also considered. The committees iteratively evaluated science objectives, technical requirements and financial constraints to develop the initial CND.

It is important to recognize that the intent of this process was to develop the baseline design for the OOI, that is, where observatory nodes will be located and what capabilities they should have. This process was not intended to determine which specific research experiments were to be supported. To the extent that the final design provides broad technical capabilities, it is anticipated that many, if not most, of the research topics presented in the RFA proposals, as well as other community documents, will be accommodated by the OOI infrastructure.

How was the budget for each OOI component determined? A high-level project budget has been developed for each OOI component taking into account costs for program management, cyberinfrastructure, education and outreach, surveying, and environmental impact statements. This budget is based on four guiding principles: (1) a commitment to development of all three OOI components and a system-wide cyberinfrastructure, (2) that the RCO needs to be plate-scale, (3) best management practices that require holding a significant contingency fund in reserve, and (4) that the budget allocations between components reflect the RFA response as well as the high level objectives of the OOI Science Plan. The estimated costs for procurement and installation (including ship time) of infrastructure for each OOI component will guide development of the CND.

Will the development of the OOI from existing documents and designs exclude the participation of the broader community in its future application and expansion?

The CND does not exclude a portion of the community any more so than does the design and infrastructure of a new research vessel. Costs are of the same order as a major research vessel, so the comparison is particularly appropriate. Polar vessels, drilling ships and manned submersibles optimally serve the research needs of defined cross-sections of the community, but they also serve the entire community by expanding access to new venues for scientific inquiry. The CND can be viewed as the design for laying the keel for a new research platform, unlike any
we have constructed, but not dramatically different philosophically. The OOI will build a research platform from which we will gain a clearer understanding of the oceans.

**Why is cyberinfrastructure (CI) important to the OOI?**
CI is a necessary integrative tool to ensure that the scientific vision of the OOI and ORION can be realized across a broad spectrum of users. Funds for CI will not only come from the OOI but also from other funding opportunities leveraged through CI initiatives within NSF. Cutting-edge CI development will be a critical contribution to competitiveness and innovation and was an important factor leading to the inclusion of the OOI into the President's FY2007 budget request.

**What is an implementing organization (IO)?** An IO may consist of an academic institution, consortia of academic institutions, or an academic-industry partnership and will work under contract to the ORION Office to assist in the design, procurement and installation of the OOI infrastructure and the eventual operation of this facility.

**Will it be possible to add sensors/instruments, secondary nodes and cables, mobile platforms etc. to the observing system later if they are not funded as part of the initial observatory design?** Yes, and funds for these additions will be awarded through the normal OCE peer-review process.

**Will it be possible to relocate some observatory assets (Pioneer arrays, some global moorings, etc.) at a later date based on competitive, peer-reviewed proposals?** Yes, it is anticipated that certain observatory assets will be relocated at a later date through a competitive process once science objectives at a given site are met.

**Where will the funds come from to support the operation and maintenance (O&M) of the observatory infrastructure? What level of funding is likely to be required?** Support for the operations and maintenance of the observatory will come from the Research and Related Activities account (R&RA) that is the source of all research funds awarded by NSF. Accurate estimates of the expected O&M costs cannot be made until the OOI CND is better established. However, preliminary estimates suggest that the required O&M will ramp up to $50M/year by fiscal year 2013.

**How will I be able to obtain science funding to analyze data from sensors/instruments on the observatory; conduct experiments; or add new sensors/instruments to the network?** Proposals will be submitted to NSF as for any research project and these proposals will be reviewed according to standard OCE procedures. Projects involving the addition of new sensors to the network are likely to be required to go through an additional feasibility review to ensure compatibility with existing OOI assets.

**Will there be restrictions on the use of data from the observatory?** There will be no restrictions on the use of data from the community sensors other than those necessary for national security. A one-year moratorium will apply to data from sensors installed by individual PIs.

**What is the relationship between NEPTUNE-Canada and the ORION RCO?** NEPTUNE-Canada and the ORION RCO are envisioned to be two phases of a fully integrated, interoperable cabled regional observatory. Because of the time offset in the anticipated implementation of these two phases, it is not yet clear whether their integration will be made through a physical connection or through an integrated data management system.