2018 Committee of Visitor's Report on the Integrative Programs Section of the Ocean Sciences Division of the Geoscience Directorate

RESPONSE 05 September 2018

We sincerely thank the Committee of Visitors (COV) for their diligent review of the Ship Operations (SO), Submersible Support (SS), Oceanographic Instrumentation (OI), Oceanographic Technical Services (OTS), Shipboard Scientific Support Equipment (SSSE), Ship Acquisition and Upgrade (SAU), Ocean Technology and Interdisciplinary Coordination (OTIC), International Ocean Discovery Program (IODP), Ocean Drilling Program (ODP), Ocean Observatories Initiative (OOI), and Education/Human Resources (EHR) programs of the Integrative Programs Section and recognizing the importance of the Ocean Sciences Division funded infrastructure in support of NSF-funded research and training of the oceanographic community. We also greatly appreciate the positive comments on the management, performance and teamwork being demonstrated by the experienced, dedicated and knowledgeable Integrative Programs Section staff in addressing the challenges of supporting the myriad of facilities as efficiently as possible. As recognized in the report, the IPS Program Directors have been proactive in community engagement, managing budgetary challenges, increasing efficiency and modernizing operations and equipment. However, increasing budgetary stress over the past four years and the expected projections into the future will require continued efforts to strike the right balance within the Integrative Programs Section and as well as the science programs across the entire Ocean Sciences Division.

Recommendations

COV Process: General

COV Gen1a Recommendation: The COV recommends, for transparency, all proposals submitted during the review period be *listed* in the eJacket interface, and those not selected for review by the COV not be accessible/viewable. This would allow the COV to download a spreadsheet of the full program portfolio (funded and declined), with high level information potentially useful in the assessment of the full IPS portfolio.

Response Gen1a:

IPS will review with NSF Information Technology the ability to satisfy this recommendation in the eJacket/COV module. Due to the relatively small number of total actions, compared to other programs at the NSF, IPS could upload all submitted proposals to the eJacket/COV module. However, if this recommendation cannot be satisfied, IPS will develop comprehensive data spreadsheets to allow for transparency (Proposal Status, Program Element Name, etc.) but still honor Federal confidentiality provisions by excluding Proposal ID, PI Name and other sensitive information.

COV Gen1b Recommendation: The COV recommends the download function in the interface should also carry the COI "stop sign" indicator ( ) into a column in the spreadsheet, so the COV can better utilize it, as they work through the review process.

Response Gen1b:

IPS will review with NSF Information Technology the ability to satisfy this recommendation in the eJacket/COV module.

COV Gen1c Recommendation: The COV recommends NSF update the COV website, so future committees have the option to be able to view all documents online, rather than having some of them download automatically.

Response Gen1c:

IPS will review with NSF Information Technology the ability to satisfy this recommendation in the eJacket/COV module.

COV Gen1d Recommendation: The COV recommends using a data-driven system for dividing labor on programs reviewed by COV members (e.g. include total number of potential jackets to review per program as part of the program selection process).

Response Gen1d:

Due to a facility focus and cooperative agreement funding (nominally five years) of these facilities, simply dividing time and effort is difficult using total number of jackets (actions) as a metric. IPS will develop a data tool, Microsoft Excel or Access, to assist in balancing review time and effort among the COV members. This tool can be based on total number of jackets (actions) and/or depth of additional material such as Annual Reports and Annual Reviews that reflect review of an individual program and funded facilities.

COV Gen2 Recommendation: The COV recommends future COV's be provided additional guidance on the following:

-the scope of the COV review, in terms of the availability and relative importance of different documents (e.g., spend less time reading individual proposals, and focus more on the reviews, panel summaries, data and analyses available within IPS);

-the variability of review processes across IPS programs (ad hoc reviews only, internal review only, ad hoc and panel reviews, etc);

-the location of relevant information within the eJackets to facilitate the review process.

Response Gen2:

IPS will develop an IPS specific Microsoft PowerPoint presentation, utilizing NSF COV training materials, that will cover the issues listed in GEN 2 above. The presentation, along with other specific IPS COV training materials, will be stored on the Ocean Sciences public drive in a specific IPS COV folder to assist with future COVs.

COV Gen3 Recommendation: The COV recommends development of a more flexible, IPS-centric assessment template for future COVs.

Response Gen3:

IPS will confer with the Office of Integrative Activities (OIA), which manages the COV program, to see if there is flexibility in the COV template for a program such as IPS. IPS understands that the COV template is an agency wide document that has been developed to address the COV policy.

COV Gen4 Recommendation: The COV recommends providing more time for IPS COVs orientation, planning of their assessment roles, coordination with IPS Program Directors, and for reviewing the materials prior to the actual COV onsite meeting (minimum six to eight weeks).

Response Gen4:

IPS will develop an IPS COV Guidelines document, in coordination with the Directorate for Geosciences front office and the GEO COV Liaison Point of Contact, that addresses the recommendation above. Specifically, time management and milestones prior to the actual COV meeting held at the NSF will be highlighted. The document will be stored on the Ocean Sciences public drive in a specific IPS COV folder to assist with future COVs.

Education/Human Resources (EHR)

EdHR1 Recommendation: The COV recommends EdHR consider sharing the longer term tracking data that successful programs have gathered. If newer and/or younger programs are interested in continued funding, it would be helpful for them to continue to collect this type of data.

Response EdHR1:

This topic will be a focus at the September 2018 REU PI meeting and Program will encourage REU PIs to share their tracking expertise.

EdHR2 Recommendation: The COV recommends EdHR consider recommending that REU sites make professional meeting attendance a part of their proposal/award by including support for a few participants from each REU site to attend and ideally present at a professional meeting.

Response EdHR2:

Within the availability of funding, efforts will be made to have future awards include funding for a few participants from each site to attend a professional meeting, in addition to the program that OCE supports to organize student participation in ASLO.

EdHR3 Recommendation: The COV recommends a common application be given a high priority, as this would greatly simplify both the application process and future data collection.

Response EdHR3:

Program has been requesting that OCE REU Sites be included in the testing for the new tracking systems. The REU PIs must agree to participate in the testing, and to date, OCE has not had enough PIs agree to participate. Full roll-out of the new system is expected within three or four years, and the OCE REU Sites will be included in that effort.

EdHR4 Recommendation: If appropriate, the COV recommends the Advisory Committee consider the issue of diversity beyond the undergraduate level, and determine if there are practices that may be helpful in addressing this issue. GOLD (GEO Opportunities for Leadership in Diversity) and Sparks for Change are existing programs addressing this issue at the faculty level.

Response EdHR4:

Program agrees that the gender distribution of the OCE REU programs, e.g. ~70% female, is not reflective of the gender distribution of oceanography faculty and that this topic would be an excellent one for the OCE Advisory Committee to discuss. The Advisory Committee could also ask for an update on the GOLD projects to better understand what aspects of the culture and climate of geoscience programs limit diversity. Results from these projects will inform GEO's efforts to develop programs that address the lack of diversity in geoscience departments at the faculty level, and disseminating the results to the OCE community may also help address the issue.

EdHR5 Recommendation: The COV recommends the process of using summer interns (or other staff) to gather and collate data continue as the data are very valuable.

Response EdHR5:

Program has an active process of using summer interns and hosted Ms. Angela Ousley who attends Hillsborough Community College in Florida, during the summer 2018. Ms. Ousley collected and analyzed data on the REU program that will be presented at the REU PI meeting in September 2018, at the AGU conference in December 2018, and at the ASLO conference, 2019. We agree that the internship program is highly valuable, both for the program and for the intern. Ms. Ousley is planning to apply for an REU internship next summer and intends to apply to graduate programs in geosciences.

Oceanographic Technical Service (OTS)

OTS1 Recommendation: The COV recommends the program survey the existing pool of technicians involved in these components to determine level of satisfaction with the scheme.

Response OTS1:

As recommended, members of the Tech Pool were surveyed to assess their level of satisfaction with the scheme. The results were generally positive although there were some misgivings mentioned in the replies. All members mentioned that they were very pleased that the tech pool offered them flexibility to work (and not work) when they wanted. They appreciated that they earned a higher day rate than technicians at the UNOLS Institutions. They also appreciated the diversity of work offered through the tech pool and liked that they could be considered a "free agent". The group was far more positive than negative about being in the pool, perhaps because many of them were once full-time technicians and chose to become a pooled tech. Nevertheless, when asked to mention the downside of the pool, the responses mentioned instability from year to year, the fact that there were essentially no benefits associated with the job and the fact that they didn't feel a part of an institutional team. For example, Technician 1, with over 25 years of experience supporting science, likes that he can "split time between science support and commercial fishing." He also "Enjoys the technology transfer and being able to share it across the fleet". He does, however, have "Concern over enough work". Technician 2, who has over 10 years of experience notes that the tech pool "Gives me the opportunity to work with several excellent institutions, doing what I love. Varied jobs keeps it interesting" while adding that the "Schedule can be sometimes last minute and unpredictable." Other comments from Pool Techs include: "I enjoy the diversity of work, people, and projects", "Love working on different ships and being exposed to new things all the time. It opens up so many new doors in terms of equipment, networks, operations", but I have "Concern over not enough work and not having the community benefits of being a part of an institution – voting at RVTEC, supporting committees."

OTS2 Recommendation: The Committee supports this effort, and recommends the program should continue to provide support for 3-4 marine technicians on the ships when needed, particularly for cruises that rely on multiple sensor systems as core to the scientific mission.

Response OTS2:

Program agrees and appreciates that the COV recognizes this need. Unfortunately, both because funding is flat and projected to continue to be flat, and because bunks are limited on many vessels (particularly the newer and higher tech vessels), it is not always possible to staff each cruise at the optimal level. Program will continue to work with the science programs and the support institutions to identify the cruises that have this need and staff them accordingly. In many cases, the science program will need to contribute to the cost of additional technical support and the PI will need to compromise on bunks. There is not an easy formula, but Program recognizes the problem and will address it.

OTS3 Recommendation: The COV recommends the program continue to pursue means to increase bandwidth, and to efficiently manage use of individual scientists' computers, shipboard computers, and telepresence equipment in order to maximize the quality of the internet experience and ability of personnel on board to communicate with shore. The SatNAG group is an agile and knowledgeable team that can help address these issues.

Response OTS3:

Like a myriad of other goals in the Tech Services Program, available funding is the biggest limitation. The plan for the last few years has been to develop a methodology for the management of existing bandwidth throughout the Fleet that is fair, robust and common to all users. After that is accomplished, the recommendation from the Satellite Network Advisory Group (SatNAG) is for NSF to increase funding to enable an increase of bandwidth by 10 times (from 512Kb to 5Mb /sec). This increase would cost 3-4 M$/year and would bring the Fleet to a place where telepresence (robust two-way transmission of video) is possible throughout the Fleet. There are a variety of other benefits as well. There would be quantum improvements in the user experience and increased throughput in the at-sea internet, although still a fraction of what is available ashore. It could also accommodate the increasing needs of science and support ship operations as well as improved crew morale. The recommendations by the COV are spot-on and Program has a plan prepared which could be implemented if funding becomes available.

OTS4 Recommendation: The COV recommends further guidance be provided to enable science party and crew on the vessels to minimize background Internet communication by services such as Dropbox, iCloud, Google drive, etc.

Response OTS4:

Program has shared this recommendation with the SatNAG. The expectation is that the documentation currently on the SATNAG website will be expanded to cover more cases like the ones mentioned. The goal will be to provide instructions on how to disable all background updates that have potential for needlessly consuming bandwidth.

Oceanographic Instrumentation (OI) and Shipboard Scientific Support Equipment (SSSE):

OI/SSSE1 Recommendation: The COV recommends proposals should be reviewed and rated with respect to sound scientific justification. The program should strive to include more than one scientist in the review panels or, alternatively, send proposals out for ad-hoc review to scientists in appropriate fields.

Response OI/SSSE1:

Program works hard to include at least one scientist on every panel it holds and does not necessarily agree that more input from science is needed in the review process. With very few exceptions, instruments and equipment requested in both SSSE and OI proposals are based on funded science, i.e. the proposals ask for things that are needed to carry out funded work. The scientific justification related to the SSSE and OI proposals has already been reviewed. The justification needed in the SSSE and OI proposals addresses the due diligence in pricing and the prioritizing of needs. Most requests from these proposals are not new instruments, they are replacements and upgrades to existing systems. In cases where non-standard instruments are requested, additional input from the scientific community has always been requested, e.g. Optical Plankton Counter for WHOI, Liquid Nitrogen Maker for BIOS. In cases like this, Program will continue to solicit input from the science community and/or the science Program Officers. In most cases, however, the mix that exists on the panels works well.

OI/SSSE2 Recommendation: The COV recommends panels specifically review and provide feedback on the two evaluation criteria, even though the linkage to those criteria of the proposals can sometimes be tenuous.

Response OI/SSSE2:

Program accepts the recommendation that Broader Impacts need to be discussed more in panel and will endeavor to do so in future panels. As is stated by the COV, the linkage to those criteria can be tenuous. The "broader impacts" of these proposals is that they provide infrastructure support for scientists to use the vessel and its shared-use instrumentation in support of their NSF-funded oceanographic research projects (which individually undergo separate review by the relevant research programs of NSF). The acquisition, maintenance and operation of shared-use instrumentation allows NSF-funded researchers from any U.S. university or laboratory access to

working, calibrated instruments for their research, reducing the cost of that research, and expanding the base of potential researchers.

OI/SSSE3 Recommendation: The COV recommends that the Program Director continue to work with the marine technicians to improve the quality of their proposals. The summary document from the 2015 RVTEC proposal writing workshop, which is available on the UNOLS website (https://www.unols.org/sites/default/files/201511rvtap30e_breakout.pdf), could serve as a starting point. Each operating institution should also be encouraged to reach out to scientists within their home institutions for assistance in writing short scientific justifications for each instrument requested. If possible, an example of a well-written project description could be shared (with the permission of the proposal writer). Perhaps one way to present this to the proposers is that their proposal needs to persuade an uninformed, non-expert reader the need is scientifically justified.

Response OI/SSSE3:

Program agrees that many of the proposals received each year are not well-written and despite efforts by Program, they have shown only slight improvement over the past several years. There is a significant difference between proposals (and the success rate) written for this program by PIs who have also written science proposals and those who are technicians without science experience. Program agrees there should be some minimal standard for these proposals but also understands that in many organizations, the sea-going technicians are responsible for the proposal and they are writing for a different audience. Nevertheless, Program will continue to support efforts for improved quality of submitted proposals. Program has held very well-attended workshops at the annual RVTEC meeting specifically on this topic with only limited success in seeing improved proposals. As a next effort, Program will develop a specific template, with examples, for these proposals that minimizes the narrative and specifically asks the proposer the relevant questions then provides a dialog box for their responses. This approach will help standardize the proposals which will make them easier to review, assure that they provide adequate justifications, and provide only the necessary information to Program.

OI/SSSE4 Recommendation: The COV recommends IPS consider completing the merger of the two programs under a single element code. We do not recommend any reduction in the overall budget.

Response OI/SSSE4:

Program will combine OI and SSSE and issue a new solicitation. It will be called Scientific Instrumentation and Support Equipment (SISE). The new solicitation for IPS proposals will provide the guidelines (and examples) for proposals in the future. As mentioned above in the response to recommendation to OI/SSSE3, a template will be provided in an effort to improve

the quality, content and readability of the proposals and to ensure that all relevant issues are addressed.

Ocean Drilling Program (ODP) and the International Ocean Discovery Program (IODP)

IODP1 Recommendation: The COV recommends that IODP remain in IPS, and maintain the current management plan through the cooperative agreements to LDEO and TAMU.

Response IODP1:

NSF/ODP will remain in IPS for the foreseeable future. NSF is currently considering a proposal for the five-year renewal of the Cooperative Agreement to the JOIDES Resolution Science Operator (Texas A&M University as JRSO) that would allow support of the JOIDES Resolution operations on behalf of IODP through 2024. The five-year award to Lamont-Doherty Earth Observatory of Columbia University to support the United States Science Support Program (USSSP) will undergo a mid-award NSF panel review on October 23-24, 2018. The review will help NSF determine whether the USSSP Cooperative Agreement award should be renewed or re-competed.

IODP2 Recommendation: The COV recommends IPS, through JRSO, place a priority on developing plans to mitigate risk for drilling operations.

Response IODP2:

Mitigating risk for drilling operations is a fundamental task of the current Cooperative Agreement with the JRSO, with procedures detailed in the Programmatic Environmental Impact Statement for IODP-USIO Operations. Risk is considered and mitigated during proposal evaluation at the JOIDES Resolution Facility Board Science Evaluation Panel (SEP) and Environmental Protection and Safety Panel (EPSP), with EPSP forcing the moving of site locations or rejecting sites outright for safety mitigation. The JRSO Safety Panel provides an additional layer of risk mitigation, having a final say on whether the location of sites is acceptable. Further mitigation is considered during the scheduling and planning process by the JRSO in working with the Co-Chief scientists in developing drilling plans that seek to minimize operational risk and drilling risk. NSF has encouraged the JRSO to continue to actively use the long-term expertise of its staff in identifying potential operational risk in the development of these drilling plans.

IODP3 Recommendation: The COV recommends continuing education and outreach efforts while maintaining a judicious balance between science and outreach.

Response IODP3:

NSF/GEO has made the determination that education and outreach efforts will be funded through the USSSP rather than the JRSO. NSF/IPS/ODP will continue to support USSSP education and outreach tasks, with the relative importance of these tasks examined during the October 2018 mid-award review.

IODP4 Recommendation: The COV recommends IPS continue efforts to support the seismic community's science requirements, and in particular the site surveys supporting IODP after the *Langseth* divesture.

Response IODP4:

NSF/OCE is committed to providing access to seismic data collection capability to support the U.S. oceanographic community's seismic survey research requirements, currently being provided by the R/V Langseth, to a level of approximately $10M/year.

Submersible Support (SS)

SS1 Recommendation: The COV recommends the SS program should continue to assess, monitor, report to the community, and mitigate any impacts of the *Jason* reconfiguration on non-OOI programs as needed.

Response SS1:

Program agrees and will continue to report assessments of deep submergence science at DeSSC meetings, UNOLS Council meetings, workshops, and as appropriate in other venues.

SS2 Recommendation: The COV recommends IPS direct the UNOLS Deep Submergence Science Committee (DeSSC), which provides oversight for NDSF, to review and provide their endorsement (positive or negative) of the planned *Alvin* 6500 upgrade, particularly in light of reduced working depths of 2-body ROV operations.

Response SS2:

Program agrees and has tasked the WHOI Chief Scientist for Deep Submergence to prepare a white paper describing the state of scientific demand for 6500m diving capability for Alvin. The white paper is under review by DeSSC for potential endorsement and forwarding to the UNOLS Council. The Council could in turn convey the findings to NSF.

SS3 Recommendation: The COV recommends the SS program continue to highlight and leverage the strengths of NSF-funded deep-submergence assets for broad scientific research both within NSF, with other federal agencies (NOAA, NASA, BOEM, etc), and with the scientific community at large.

Response SS3:

Program agrees and will continue to work with the core OCE disciplinary science Programs, including OTIC, to identify emerging deep submergence opportunities, in particular those that could benefit interagency objectives.

SS4 Recommendation: The COV recommends the SS program continue to align its priorities with guidance from DESCEND2, and report via DeSSC to the user community on these alignments.

Response SS4:

Program agrees and will continue to promote the findings in the report from the DESCEND2 workshop to agency partners and the scientific community.

Ship Acquisition and Upgrades (SAU)

No Recommendations were presented in the report.

Ship Operations (SO)

SO1 Recommendation: The COV recommends SO consider issuing a solicitation for the subset of training proposals that exceed a certain funding level (TBD by the program) as a means of attracting PIs and mentors to the program with diverse backgrounds, expertise, and approaches to leadership and leadership training, and as a means of ensuring competitiveness through the external review process.

Response SO1:

Program will develop a solicitation for Early Career Training and concurs with the COV's recommendation that such a solicitation may diversify the mentors and programs available to Early Career scientists. The issues of future ship operation budgets and the need to account for potential costs before a budget is known will be addressed as required.

SO2 Recommendation: The COV recommends as part of the process of updating the proposal solicitation for SO, consider consultation with operators to identify and share best practices in proposal preparation that lead to efficient delivery of essential information.

Response SO2:

Program agrees and will develop an updated SO solicitation which includes consultation with operators to advance best practices in proposal preparation.

Ocean Technology and Interdisciplinary Coordination (OTIC)

OTIC1 Recommendation: The COV recommends that given the size and funding investment of ocean science research programs in OCE, IPS should consider continuing their efforts to bring the OTIC budget back up to the 2009 level.

Response OTIC1:

In the last several years OTIC has received small budget increases bringing the budget up to $10M. Program will work with the Division Director and IPS Section Head in an effort to continue this upward trend even with projected mostly flat budgets for the future.

OTIC2 Recommendation: The COV recommends OTIC pursue wherever possible, additional collaborative efforts (e.g. BOEM, NASA, NOAA, Navy).

Response OTIC2:

NSF OCE has good relations with the other agencies. Through the National Oceanographic Partnership Program (NOPP) OCE participates in NOPP Broad Agency Announcements (BAA) and has recently funded five proposals submitted to the 2017 BAA sensors topic. Program will continue to engage in projects of mutual interest to NSF and the other agencies.

OTIC3 Recommendation: The COV recommends OTIC pursue a pilot effort to take one or two projects to completion (either open source or commercialization).

Response OTIC3:

Program has initiated talks with the OCE science research Programs about projects that are nearing what is called the "valley of death". OTIC currently funds projects through initial testing and calibration which in most cases leads to prototype instruments/sensors. Although the prototypes have been used in the field under the OTIC-funded award, the OCE science research Programs and external panel reviewers recognize there is potential risk in using them in large science research Programs. As recommended, Program will work with the OCE science research Programs to identify candidate instruments/sensors to be taken to the next level of pilot testing.

OTIC4 Recommendation: The COV recommends OTIC add instrument related software, algorithm, and/or technique development to the portfolio, perhaps in conjunction with other programs (e.g. Computer Science).

Response OTIC4:

Program agrees adding new areas of research/development like instrument related software, algorithm, and/or technique development to the OTIC portfolio is desirable but will be subject to the availability of additional funding. As mentioned in the response to recommendation OTIC1, I

will work with the Division Director and IPS Section Head in an effort to increase the OTIC budget and will work with the OCE science research Programs to identify priority projects.

Ocean Observatories Initiative (OOI)

OOI1 Recommendation: The COV recommends metrics of the use of OOI data and nodes be tracked and provided to the OOIFB and the greater scientific community.

Response OOI1:

An initial set of metrics for the use of OOI data and nodes has been tracked under the OOI 1.0 award, however the sharing of the data has been limited. A review of the metrics and an increased emphasis on making the data available to the OOIFB and the greater scientific community is planned under the new OOI 2.0 award which is scheduled to begin October 1, 2018.

OOI2 Recommendation: The COV recommends the program evaluate the cost/benefit in building in redundancy deployments of mission critical elements.

Response OOI2:

The value of mission critical elements in the OOI Program is recognized. Within the constraints of scope, schedule and budget, the OOI Program will continue to evaluate the cost/benefit of building in redundancy through the process of development, review and approval of the Annual Work Plan.

OOI3 Recommendation: The COV recommends the OOI website include acknowledgment and description of global observing efforts and coverage of observing systems at the seabed and in the water column, with some context for oceanographic questions their systems can address.

Response OOI3:

The OOI Program Officer will work with the OOI Program awardee to add information on the OOI website showing the synergy between the OOI, the U.S. Integrated Ocean Observing System (IOOS) and the Global Ocean Observing System (GOOS).

OOI4 Recommendation: The COV recommends NSF track and report the impact of OOI maintenance and servicing activities on non-OOI shiptime requirements, to maintain a balanced portfolio of accessibility to ocean-going assets.

Response OOI4:

The OOI Program Officer and the IPS Ship Operations Program Officer will identify and assess any impacts of the OOI Program shiptime requirements on non-OOI shiptime requirements. The IPS Team will work with the UNOLS Ship Scheduling Committee through the standard ship scheduling process to maintain a balanced portfolio of accessibility to ocean-going assets.

OOI5 Recommendation: The COV recommends the program consider charging the OOIFB to serve as a clearing house for program lessons learned, and for effective anticipatory (preventive) and mitigation measures.

Response OOI5:

The OOI Program Officer will work with the OOIFB and the OOI 2.0 Program awardee to include lessons learned information on the OceanObservatories.org website.