Directorate for Geosciences (GEO)

Division of Atmospheric and Geospace Sciences

Response to the 2018 Geospace Section Committee of Visitors Report

INTRODUCTION

The Geospace Section (GS) of the Atmospheric and Geospace Sciences (AGS) Division appreciates the 2018 Committee of Visitors (COV) for their time and effort to review the Fiscal Year 2014 to 2017 activities of the following programs in the Geospace Section portfolio: Aermony (including CEDAR, Coupling, Energetics, and Dynamics of Atmospheric Regions), Geospace Facilities, Magnetospheric Physics (including GEM, Geospace Environment Modeling), Solar-Terrestrial Research (including, SHINE, Solar Heliospheric and Interplanetary Environment), and Space Weather.

We commend and thank the COV for the excellent guidance provided in the report resulting from the May 2-3, 2018 meeting and acknowledge the significant amount of work the committee undertook while evaluating the complex portfolio of programs. We greatly appreciate the very positive feedback the COV provided about the integrity of the merit review process and the management of the GS programs.

The following are the Geospace Section responses to the 2018 COV Summary of Findings and Recommendations.

RECOMMENDATIONS AND RESPONSES

Each of the recommendations from the COV report has been extracted verbatim and placed in italic text before the response of the Geospace Section.

Conflicts of Interest

It appears that procedures for management of Conflict of Interest (COI) have changed significantly over the past five years resulting in additional challenges for the Section. In particular, the automated process of COI identification frequently made it harder for POs to build COI-free panels. Even for this COV the Section struggled to find nine COI-free panelists. Another disadvantage of the increased emphasis on COI is that for programs with small numbers of awards, like Facilities, the POs were significantly impacted in their ability to manage their programs. For example, a PI who generates data from a facility (or similar) instrument and shares it freely with the community is unwittingly creating conflicts with every person the data is shared with. For a small community like Geospace, which is becoming increasingly collaborative, it will be increasingly difficult for the Section to manage COIs in the future and they need to be afforded increased flexibility. This issue was flagged by the 2014 COV as a

significant issue. At the time a new automated process had been implemented and the full impact had yet to be felt. The COV recommends that the Section undertake an effort to evaluate options that would satisfy the intent of COI restrictions while enabling Program Officers to do their jobs effectively. One suggestion would be to allow Program Officers and reviewers to self-report the nature of collaborations to prevent perceived COIs, when in fact, none exists.

Response: The Geospace Section remains committed to conducting a review process with the highest levels of integrity free of any conflicts of interest. While just sharing data does not in itself constitute a COI, co-authorship on project, book, article, report or paper within the previous 4 years is a basis for a COI and is typically a disqualification for participating in the review according to the NSF Standards of Ethical Conduct. The increasing tendency for collaborative research and small size of the geospace community does lead to a large number of COIs within the pool of potential reviewers. However, there is room for judgment on this in the case of co-authors on highly collaborative papers who did not directly interact in the science and preparation of the manuscript. In this case, appropriate training of PDs in of paramount importance. If the integrity of the reviewer's service can be shown to be unaffected by the existing conflict the disqualification form participating in the review can be waived by the NSF ethics counselor. The section will work closely with NSF Ethics Officials to utilize this process when appropriate.

Review Types

The COV studied Section jackets to assess the effectiveness of review processes. The Section made effective use of three review types: ad hoc (mail-in) reviews; in-person panels; and virtual panels. All three have well-known strengths and weaknesses. The mail-in reviews were typically less rigorous and showed a wider variation in review scores. The use of mail-in reviews in conjunction with panels was often used effectively to supplement expertise on the panel. The Section discussed an increased use of virtual over in-person panels. The benefits are numerous including increased participation (especially for panelists busy with academic, programmatic and family responsibilities), and significant savings in cost and time. The COV encourages the continued use of virtual panels where appropriate as a way of increasing participation and reducing travel burden on panel members. Virtual panels cost less freeing up funding for research grants. The COV agreed that in-person panels are the best way of conducting certain types of reviews (the COV itself being an example) and may lead to a more uniform set of recommendations and summaries to the program officers. In-person panels reach a consensus more quickly and generate more panelist interactions than their virtual counterparts. The recommendation of the COV is that while shifting to virtual panels has benefits, the other two forms of review are still of value and should be used from time to time as necessary. Overall, the COV found that the Section made effective use of all three types of reviews and that the review analyses from the panels was thorough and effective. The COV recommends considering redacting the names of reviewers and other sensitive information and sending the review analysis to the PIs for their benefit.

Response: The GS section will continue to utilize the review process that is the best fit for the program. We fully expect to utilize virtual panels for a significant fraction of the reviews, but in-person panels will be utilized when needed, especially for programs with complicated review criteria or involvement of other divisions. While providing a redacted version of the review analysis to PIs is not likely to be possible, the section will begin to include additional information program officers feel will benefit the PIs into their communication through expanding the use of the Program Officer Comments section of the review analysis.

CubeSats

The NSF CubeSat program has become an important part of the portfolio and has enormous potential to benefit space science while training the next generation of space scientists. Both the 2014 GS COV and the Portfolio Review commended the Section on the CubeSat program and made recommendations to collaborate with other NSF Directorates (Engineering and Education) to enhance the science and education productivity of the program. This COV echoes these recommendations as a way to enhance and strengthen the program. There have been questions about the scientific return of the program. As more CubeSats are launched the scientific benefit (or not) of the program should be more obvious. By the time of the next COV the Section will have supported several more Cubesats and the overall scientific impact of the program should be obvious. We recommend that the next COV review the scientific impact of the CubeSat program.

Response: The GS agrees with the COV on the importance of the CubeSat program and the need for additional review of the scientific benefit of the program going forward. The Space Weather Research program currently has a program solicitation (NSF 18-553) accepting proposals for new CubeSat missions. The section is also engaged in discussion with the CISE/CNS and ENG/ECCS programs on development of a new solicitation to support novel science applications of CubeSats and CubeSat constellations, in partnership with those programs, in accord with the COV and Portfolio review recommendations. Prior to the next COV, the Space Weather program will evaluate the scientific impact of the CubeSat program and include that information in its briefing.

Broader Impacts

The 2014 COV recommended quantifying the value of Broader Impacts (BI) to their program. This COV recommends expanded efforts to educate the scientific community about the nature and variety of ongoing and emerging BI and about the NSF expectations for BI. The NSF program officers' presentations to the COV on May 2 were very informative. The COV recommends finding ways to communicate this information to a wider audience at meetings and elsewhere such as webinars. These presentations could educate the community on programmatics, funding opportunities and provide mentoring regarding best practices for proposals. Examples of such practices could include research questions and sample data or modeling results, and could illustrate ways to place the work in the context of broader research field. An additional suggestion from the COV is for the Section hold to hold 'town halls' at conferences to educate the community on the proposal and review process. This would benefit not only students and early career scientists but mid- and late-career scientists as well.

Consistency in proposals and reviews would benefit everyone, make leveling more straightforward, and help increase diversity. Such communication is particularly timely as targeted programs in the Section no longer have proposal deadlines. To be able to reach the broadest audience, the COV recommends that this communication be done in several venues, including written messages to the community, at conferences, and potentially webinars that can then be posted online for later viewing.

Response: The committee's recommendations on educating the geospace community on the importance of the Broader Impacts (BI) to the NSF and diversity of ways that this evaluation criteria can be met in proposals are excellent. As a next step, we will include discussion of the BI in our agency presentations at the upcoming CEDAR, GEM, and SHINE community meetings. In upcoming years, we will work with the meeting organizers to include a proposal preparation townhall during these meetings. At these townhalls, program officers will present examples of outstanding broader impacts and ways the research community can creatively incorporate BI efforts into their research portfolios. All of these presentations will draw upon the guidance related to BI provided to scientific community in the Proposal & Award Policies and Procedures Guide. The section has also begun using pre-panel webinars to educate reviewers on a variety of topics related to the review process including BI. We also plan to hold webinars on the BI topic throughout the year. As the material becomes more refined and feedback from the community is incorporated we will examine the options for recording the presentation making it available for online viewing.

Support for Space Weather Mandate

Space Weather currently has high visibility on a national level as evidenced by the development of a National Space Weather Strategy and National Space Weather Action Plan (NSWAP). The initiative originated in the previous administration, and it is notable that this program has carried forward into the current administration. There is an important role for NSF to play in support of a proven national need. Many space weather operational sensors and models had their origin in NSF sponsored research. The COV recommends that NSF seriously consider providing additional funds to the Section to allow it to take advantage of this once in a generation opportunity to contribute to a national priority.

Response: We agree with the committee assessment on the importance of NSF-supported research to answering the key outstanding questions in the science of space weather. There are numerous ways that additional funds could further advance space weather research including support for novel distributed sensors technologies, development of advanced physics-based numerical models, development of mid-scale research infrastructure, and education of the next generation of space weather scientists. Development of the NSF budget involves balancing many different priorities

FDSS Flexibility

The COV applauds the FDSS program as an example of forward thinking to ensure the vitality of the discipline in the future. The COV recommends that the program consider additional low cost

options in support of this initiative. One example would be to cover start-up packages as an additional means to help universities create new faculty members in Geospace Science.

Response: The Geospace Section is planning to have the next round of the Faculty Development in Space Science (FDSS) competitions in FY19 or FY20. As we begin to revise the program solicitation we will examine options of including various tracks or funding levels. This could allow for the traditional 5-year support award along with smaller proposals, e.g. start-up packages, to be considered at the same time. Development of the solicitation and inclusion of new options will be conducted in collaboration with the NSF Policy Office and Office of General Council.

Balance in Career Stage Support

As inflation-corrected funding rates and proposal success rates have trended down in recent years, some geospace scientists with ten or more years of experience have been forced to leave either the field or the United States. Perhaps some consideration should be given to the balance between, on the one hand, programs to attract new students and establish new Ph.D.-producing tenure-track professorships, and, on the other hand, efforts to help mid-career scientists stay in the field. A first step might be to gather information on the rate at which mid-career scientists are being forced out, to supplement existing anecdotal information.

Response: The committee has identified a challenging issue facing the geospace sciences community. The Section does not intend to expand the size of support for early career researchers and students and will continue to track these numbers from year to year. Gathering quantitative information on the rate at which mid-career scientists are leaving the field is particularly challenging. NSF does not currently track data on career status of proposers so determining a trend line will involve some cumbersome data processing. The Division is planning to hire a staff member with data analytics capabilities who will be tasked with addressing these types of questions quantitatively.

COV Duration

The 2014 COV was satisfied with a three-day COV. With better access to eJackets ahead of the actual meeting for the 2018 it was decided to reduce the time to 1 ½ days. In principle this is enough time to complete the COV, especially if the COV members are familiar with the program and the COV process. This COV recommends a little more time - an extra day would have been useful. The first day of NSF presentations were highly enlightening and spawned much discussion within the COV.

Response: We acknowledge the need for providing the COV with more face-to-face time to interact with the program staff and fellow committee members. Geospace Section leadership will provide this feedback to the next COV chair in the planning process and work with them to determine the optimal length of the face-to-face meeting.

Diversity

The program officers presented thoughtful and informative presentations with much attention to diversity issues. The Section has put an emphasis on inclusion of women in the review process

and is working to generate more awards to women. In particular we note that both of the two new FDSS awards were to women. As a way to increase diversity we recommend that NSF Program Officers continue to develop ways to provide mentoring regarding writing and reviewing proposals to a broad audience. Some ideas to do so include communicating best practices for writing and reviewing proposals in several venues, including written messages to the community, at conferences, and potentially through a webinar that can then be posted online for later viewing. An additional way to invite community members to learn more about the proposal writing and reviewing process is to have the NSF Program Officers consider holding "office hours" during some lunch times during CEDAR, GEM, and SHINE.

Response: As discussed in our response to the Broader Impacts recommendation, the section will be developing materials on best practices regarding preparing and reviewing proposals for presentation at upcoming CEDAR, GEM, and SHINE meetings. In later years, we will expand these sessions to townhall style discussions at these meetings. Since the CEDAR, GEM, and SHINE meetings also have significant involvement by graduate students we will work with conference organizers to support proposal development sessions in conjunction with student-related activities at these meetings. The idea of the program officer having 'office hours' for informal discussions with prospective PIs during meetings is an excellent one and we will look into mechanisms for doing this at the community meetings as well as at the larger annual meetings. These 'office hours' will focus on providing the community with insight into the best practices for reviewers and proposal writing. As discussed above, we will also produce webinar presentations on best practices for proposal preparation, which can be refined and posted.

Part I

5. Does the documentation in the jacket provide the rationale for the award/decline decision?

Yes for the most part*. As discussed above the review types were appropriate to the proposals, and the reviews were for the most part comprehensive and consistent with the ratings. In nearly every case the PO review analysis matched the reviews and summaries. In some cases the review analysis came to a final recommendation that differed from the panel consensus and supported a proposal that was not in the competitive range. Usually, there were other factors that the PO cited and the difference was justified.*

Response: As highlighted in the program reports the program officer provide detailed information about the rationale for decision in the jackets. The AER report called out the program officer for providing "through explanation" of the rationale but noted in some cases a project summary was missing from eJacket. We believe this related to collaborative proposals and will work to ensure the project summary is present in all jackets. The MAG reported noted that for core proposals not evaluated by a panel the jacket didn't contain information on how these proposals "were inter-compared to decide on award." These proposals are evaluated on the basis of their ad-hoc reviews and need to be selected on their own merits not by inter-comparison. The MAG report highlights it "is clear how the award/decline" decision was made for proposals evaluated by panels.

6. Does the documentation to the PI provide the rationale for the award/decline decision?

Yes*. In almost all cases the appropriate rationale was provided.*

Response: Several of the program evaluations thought that the PIs could be provided with more information about the rationale and developed the recommendation that a redacted version of the Review Analysis be sent to the PIs. This recommendation is included "Review Types" section of their report. As we noted in that response providing a redacted RA is not likely to be possible, but the section will expand its use of the PO comments to provide the PIs with more information about the rationale behind the decision.