2014 Geospace Sciences COV Report

1. Introduction

This report summarizes the recent Committee of Visitors (COV) assessment of the Geospace Sciences Section in the two broad areas: (1) quality and integrity of program operations and program-level technical, as well as (2) managerial matters, pertaining to proposal decisions. Our COV report contains an outline of the assessment process, an overview section that highlights the most common and important themes emerging from the review, and finally, detailed answers to the core questions from the COV report templates in each of the five sub-areas - Aeronomy (AER), Magnetospheres (MAG), Solar-Terrestrial Relations (STR), Spaceweather (SWx), and Ground-based Facilities (GF) - that defines the Geospace Sciences Section. Overall, the COV wishes to convey to NSF Geoscience Directorate management that the Geospace Sciences staff possesses a high degree of dedication, competence, professionalism, and energy which became manifest in our assessment. We commend the Section leadership and staff for their service to the community, and for recognizing the importance of continuous self-assessment and improvement; to that end, we provide a summary of findings and specific recommendations for consideration.

2. Outline of the Assessment Process

The Geospace Section COV membership well represents the diverse disciplinary and topical sub-areas, with experts drawn broadly from the community and the institutions that the Section serves and with which they partner. The COV membership distribution allowed for at least two members to assess each sub-area independently as part of the collective review process. A list of COV members and their primary sub-area mappings follow below. The COV Chair, Harlan Spence, also a member of the Geosciences Advisory Committee, was unavailable to attend the in-person meeting of the COV; accordingly, Maura Hagan served as Acting Chair for that meeting, at which John Sahr served as Scribe.

Member	Home Institution	Sub-Area(s)
Cristina Cadavid	California State University, Northridge	STR
Eric Donovan	University of Calgary	MAG
Maura Hagan	National Center for Atmospheric Research	AER/GF
Carlos Martinis	Boston University	GF/AER
Tomoko Matsuo	CIRES University of Colorado	SWx
Susan Nossal	University of Wisconsin	SWx
Nick Omidi	Solana Scientific Inc.	MAG
John Sahr	University of Washington	AER/GF
Harlan Spence	University of New Hampshire	All
Barbara Thompson	NASA Goddard Space Flight Center	STR

The COV met on 10-12 June 2014 to conduct their visit and review. During the visit to NSF HQ, each COV member used the eJacket system to access on average ~20 proposal packages within their immediate sub-area(s) of expertise for review, with the goal of using the individual and collective random sampling to answer the questions posed in the COV instructions. Collectively, the COV reviewed a total of ~200 proposals, representing a statistically significant fraction of the Section's total. Program Directors from the Geospace Section charged with managing each sub-area presented

overviews of their programs to the COV. They also made themselves available to assist COV access to the eJacket system and to answer questions as they arose, but did not influence the COV assessment in any way. COV members independently conducted their assessments at the outset of the process. Those covering the same sub-area subsequently met to compare notes and to jointly complete the FY 2014 NSF COV Report Templates. On the final day of deliberations, the COV met together for a final time in plenary in order to discuss the Section collectively as a whole, looking especially for important areas of commonality that either deserved praise, were worthy of an expression of question or concern, or warranted a specific recommendation. The COV also verbally debriefed the COV process and preliminary findings to the Assistant Director for Geosciences, his Deputy Director, the Atmospheric and Geospace Sciences (AGS) Division Director, and several members of AGS, including the entire Geospace staff. The final outcome of that meeting was thus a comprehensive set of answers to the COV questions, in NSF template form, in the five different sub-areas, plus a meeting summary of the initial findings and recommendations.

Following the in-person COV meeting, the Acting Chair delivered this documentation to the COV Chair who reviewed and sought clarifications on a few points. The COV Chair then visited the NSF HQ on 31 July to assess further. The Geospace Science staff (Richard Behnke - Head, Robert Robinson - GF, Therese Moretto Jorgensen - SWx, Raymond Walker - MAG, Anne-Marie Schmoltner – AER, and Ilia Roussev – STR) met with the COV Chair to discuss the initial findings and to help clarify any remaining issues. Thereafter, the COV Chair developed this consensus summary (see following section 3), informed by the in-person meetings and documentation, which was reviewed and approved by the COV before final delivery to the NSF Geospace Section Head.

3. COV Summary of Findings and Recommendations

This section contains a high-level summary of each element covered in the assessment, focusing particularly on either common findings or recommendations that emerged from each Section sub-area. This summary provides a top level integration of the five separate sub-areas reviewed in detail by sub-groups of the COV. These five more detailed reports follow to complete the report. For ease, the format of this section mirrors the format of the COV report template.

A. Quality and Effectiveness of Merit Review Process

1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?

Yes, across the board. The response from the Aeronomy section captures the sentiment well of the whole of Geospace. They noted: "*Reviews consisted of a mixture of mail-ins (ad hoc reviews), teleconference panels, and in-person panels (for CEDAR). In conversation with and without NSF Program Directors, there was consensus that in-person panels yielded the clearest guidance to NSF, and provided additional, less tangible benefits to the community. For example, the personal interplay among reviewers assisted in the generation of consensus or the identification of fundamental challenges. In addition the in-person panels provide a superb opportunity for scientists at the beginning of their careers to become acquainted with more senior scientists as well as NSF's staff. However, we also*

acknowledged that heavy or exclusive reliance upon in-person panels is expensive in time, money, and environmental costs. In particular, the rolling deadlines associated with the core program are not conducive to the panel review process".

2. *Are both merit review criteria addressed?*

Yes, for the most part. The response from the Magnetosphere section captures the essence of the partial yes response. They noted: "*Similar to the previous COV, we find the two criteria are in general addressed in the reviews, though often somewhat unevenly. The reviews taken together usually fairly completely address the two criteria. In all cases, we found the panel summaries (where there was a panel) and program director review analysis provided a consistent and complete evaluation against both merit criteria*."

3. *Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals?*

Yes, for the most part. The response from the Solar-Terrestrial section describes well the exceptions, noting that: "Most reviewers fully grasp the need to 1) clearly substantiate their comments 2) write their review in an unbiased and professional manner and 3) assign ratings that are commensurate with their comments (i.e. if many flaws are indicated in the review, then an "excellent" rating is questionable). However, there are some reviewers (a small number, but present nonetheless) that appear to either need "coaching" or a reminder of these standard practices (although they are clearly stated in the review request). However, we are also aware of the difficulty in obtaining a diverse and appropriate collection of reviewers for each proposal, and it is important that the program officer not appear to be too discouraging lest it decrease the potential pool of qualified reviewers in the future."

4. *Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)*

Yes, to varying degrees of excellence. The response from the Aeronomy section summarizes the essence of the collective sense of the COV: "*The panel summaries provide excellent synopses of the panel discussions, capturing points of agreement and disagreement. They documented that consensus was often achieved immediately; occasionally there were reports of consensus being achieved after discussion, and less frequently, that no unanimous consensus was achieved. However, even in the latter case the reviews provided substantial and useful information to the Program Directors, and represent legitimate differences of opinion in the analysis of proposals*."

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

Yes, with some minor clarification more on process than content. The broad consensus was that the eJackets contained the documentation, however, there was a commentary on the COV process rather than content that is worth considering. The Aeronomy section noted: "*It was occasionally and infrequently necessary to hunt around in the Jacket to infer justifications for decisions; this was readily*

attributable to imperfections in the electronic interface. If questions remained, the Program Directors and staff were willing and able to answer the COV." Some of the Program Directors were more or less available to the COV team, meaning that some may have been more or less able to navigate the Jackets than others. The degree of availability for "eJacket training" was in deference to remaining as uninvolved in the process as possible, which varied in interpretation in the different areas.

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

Yes, usually, with some minor clarification regarding eJacket system. To varying degrees, documentation ranged from extremely good/impressive to hopes for more documentation, particularly in capturing verbatim e-mail record, which the reviewers understood was not always captured. Indeed, there was a common sense that the Jacket system in some cases was an impediment to easily capturing all relevant email communications. Even if some were absent, however, the COV uniformly felt that even if some were absent, that: *"…. based on the ones that we were able to see, the Program Director did an excellent job of reflecting the reviewers' assessments while providing rationale for the overall decision. "* (from Solar-Terrestrial)

7. *Additional comments on the quality and effectiveness of the program's use of merit review process*

There were no substantial overarching comments that emerged from the subgroups that are not sufficiently captured in the comments to responses 1-6 above. The individual reports include the specific comments: only 3 of the 5 had additional comments.

B. Selection of reviewers

1. *Did the program make use of reviewers having appropriate expertise and/or qualifications?*

Yes, uniformly, typically with praise, and without qualification in the response.

2. *Did the program recognize and resolve conflicts of interest when appropriate?*

Yes, consistently, but with some degree of clarification and the most degree of discussion of alternate approaches. For the most part, the COV expressed the notion that all involved must take responsibility for COI management, including a combination of the computer algorithm (which might be improved), the Program Directors (who add clear value to the assessment beyond the algorithm), and to the reviewers (who may have "hidden" COIs, whether real, perceived, or even overly inclusive on the other end of the spectrum, that need to be raised). Despite the discussion of these issues, an important conclusion that was universal remains, as stated succinctly by the Aeronomy panel: "*We found no instance where either the integrity of a proposal review or the ensuing decision was impacted*

by COI." In other words, despite the fact that the COI management might be improved in some ways, proposal review integrity was not affected.

C. Management of the program

1. *Management of the program*

Without exception, the comments from each subgroup were **positive and laudatory**. Representative examples commending the management of the program include: "*… Program Directors are dedicated, professional, and highly capable, demonstrating concerted effort and ability to balance excellence, community need, and resource limitations with integrity. The Geospace staff communicates the basis of their decisions forthrightly, so the community has a high degree of confidence in the fairness of the program. In addition to electronic communications, NSF Staff are active participants in CEDAR, GEM, and SHINE and other relevant workshops, making themselves easily accessible to the community.*"; "*They make decisions, and communicate their rationale forthrightly, so the community has a high degree of confidence in the fairness of the program."; "We were left with a sincere respect and even admiration for the dedication of the Program Directors and Section Head. Ensuring a respectful and thorough review of the proposals requires a great deal of effort and knowledge."; "We are pleased that the Program Directors have flexibility in determining the proportion of funding that goes to Core research programs vs. directed programs such as SHINE, CEDAR & GEM. This allows the Program Directors to allocate according to proposal demand as well as community needs and priorities."; and finally, "The review process is comprehensive, transparent, and of high integrity".*

2. *Responsiveness of the program to emerging research and education opportunities*

Each subgroup expressed **satisfaction** and **gratefulness** in Geospace responsiveness on this topic. Specific programs providing critically important education and training opportunities called out include: conventional graduate student support, CEDAR/GEM/SHINE workshop tutorials and poster presentations, annual radar schools, and Space Weather workshops. There was an equally confident response regarding nimbleness in response to emerging research opportunities, including specific things such as reviewing proposals against the evolving focus groups in the GEM program, using the CAREER, INSPIRE, EAGER, and RAPID opportunities for greater outcomes and synergy across Geospace science.

3. *Program planning and prioritization process (internal and external) that guided the development of the portfolio*

The COV response again speaks to **overall support and encouragement** for the planning and prioritization processes within Geospace. Each subgroup identified ways by which the community provides inputs to the process, including using guiding documents that have emerged from the community, such as the Decadal Survey, or existing cross-cutting programs, such as the National Space Weather Research Program, as well as other community-wide strategic planning documents. There was one item raised specifically relative to Geospace Facilities; that particular issue with respect to *"the*

priorities or strategies guiding the development and continuing support for the GF portfolio", would be something on which the pending Geospace Portfolio Review would provide community input for closure.

4. Responsiveness of program to previous COV comments and recommendations

For the most part, the COV was **satisfied** with the responsiveness to the prior COV comments and recommendations, but also pointed out places where additional progress can be made, typically requiring additional resources beyond the present. Areas where recommendations have led to action include: making the FDSS program a continuing, rather than a "one off" opportunity; supporting more interdisciplinary research; finding more efficient and effective review methods; enthusiastically supporting educational components of the overall program; seeking additional funds to begin a program in comparative magnetospheres in cooperation with the Astronomy Division; developing a comprehensive geospace science strategic plan; and launching then growing the highly successful CubeSat program. Two areas that warrant additional comment are: (1) "*There is currently no clear plan to specify a life cycle for facilities, a need suggested by the previous COV. However, we expect that this will be an important component of the GS portfolio review process that is planned for late 2014." ; and, "The 2011 COV recommended 'that the highly successful CubeSat program presently run by GS should be funded with new NSF division-level resources. With increased resources, the CubeSat program would appropriately form its own "section". The CubeSat program, now housed in the Space Weather Research program, has shown that it is successful. $1.5 M is now devoted to the CubeSat program, but it is still primarily a Geospace program rather than a cross-directorate program. Any growth in scope would require additional funding.'"*

D. Other Comments

Each subgroup provided specific additional comments, many of them amplifying or expanding on issues already covered in the review. They are not noted here as they are available in their full form in the individual reports.

One item however does warrant discussion, namely the analysis of approval rates of women PIs. As noted by the Solar-Terrestrial subgroup: "*An analysis of the approval rate of women and minority PIs indicated a large fluctuation from year to year. However, the success rate of female PIs from 2011-2013 appeared to be anomalously low. The overall success rate from 2011-2013 STR proposals was 32%, while female PIs were only 12% successful, which was only 1/3 the success rate of male PIs (the total number of proposals was 47 from female PIs, so this is statistically significant). Part of this trend appears to be due to the SHINE panel reviews - in three years of panels, they did not recommend funding for a single female PI (all 20 proposals that received the "Fund" recommendation were by male PIs). "*

Additional analysis compelled the subgroup to comment further: "*Please note that we have learned that the awards made during FY2014 have a much better balance for women PIs. However, the COV was tasked with reviewing proposals for FY2011-13, so the FY2014 proposals were not part of the above analysis. We have also learned that NSF is considering including a discussion of "unconscious bias" as a*

prelude to panels, which we believe may help prevent situations like the 2011-13 SHINE results." And then further commented: "*Although we did not detect a clear bias in the evaluation and review process, we recommend that the NSF make efforts to determine the cause of this variation and take action if appropriate. We were very appreciative of the support of the NSF Program Directors in this analysis, as it was apparent that they found this to be an important issue*." Subsequent discussions in plenary and with the COV chair made clear that the issue was recognized, addressed, and was being tracked to assure integrity and a robust, fair process.

E. 2014 COV Overarching Findings and Recommendations

In this section we describe the overarching findings and recommendations of the 2014 COV.

Responses to the 2011 COV

The COV reviewed the recommendations and Geospace Sciences (GS) section responses to those recommendations and developed the following observations:

Geospace as a Division within the Geosciences (GEO) Directorate

Geospace remains a section within the Atmospheric and Geospace Sciences Division (AGS) and has not been elevated to a Division within GEO as recommended by the 2008 and 2011 COVs. This topic was beyond the purview of the 2014 COV charge and thus was not pursued by the 2014 COV.

CubeSats

The 2011 COV report suggested that the GS CubeSats be elevated to an NSF-wide program, requiring a significantly expanded budget. In the absence of any evidence of an expanded or new funding horizon, the consensus (not unanimous) 2014 COV recommendation is that CubeSats remain a GS-centric program in the near term for the following reasons:

- There is a clear GS community demand for CubeSats.
- The GS community already provides significant new proposal pressure.
- The current program provides a huge new GS data source.
- The current program is intrinsically multidisciplinary (i.e., with ENG).
- The current program offers ample educational and technology development opportunities.
- The current program demonstrates successful collaborations w/NASA, NSF CISE, ED, USAF, USN, NRO, as well as Canadian and European partners.

Faculty Development in Space Sciences (FDSS)

The 2014 COV lauds GS for the re-initiation of the FDSS program, as recommended by the 2011 COV. We are most pleased with the GS plans to make an award in the current fiscal year followed by on-going biannual appointments.

Interdisciplinary Research

The 2014 COV review found eJackets wherein cross-disciplinary work was funded/fostered by GS, including FESD and INSPIRE. This evidence indicates that GS is responding to the 2011 COV recommendation. The 2014 COV encourages an expansion of these efforts with particular attention to further partnerships with the middle and lower atmosphere climate, chemistry, and dynamics programs within AGS.

Virtual Panels

The 2014 COV concurs with the general findings of the 2011 COV. Virtual panels are less expensive, easier to organize, and have smaller environmental impact. However, there are substantial and tangible advantages to in-person panels. Thus, a balance between virtual and in-person panels is best, with the possible addition of mixed virtual/in-person panels. We recommend that future virtual panels invoke improved video technology.

Continued Emphasis on Education

The preservation of the current GS emphasis on student access to and participation in the CEDAR, SHINE, and GEM programs and workshop is strongly endorsed by the 2014 COV. Education is a clear GS priority, and the 2014 COV notes the genuine efforts on the part of the GS staff to engage both undergraduate and graduate students in their programs.

Facilities Lifecycle

GS has yet to address the recommendation of the 2011 COV regarding the Geospace Facilities: "We encourage the program directors to develop criteria and a strategic plan for the short-term and longer-term future of the various facilities and their role in the achieving the overarching goals of the program." We find an urgent need to do so. However, the 2014 COV expands this recommendation and encourages a review of the entire GS portfolio. We address this finding in more detail below.

2014 COV Process and Resources

The 2014 COV found the electronic Jacket (hereafter eJacket) tool to be quite useful. However, we identified a number of issues that should be addressed to improve its usability. The eJacket system should be as user friendly as possible for the Program Directors as well as COV. Our recommendations include:

- Related proposals (i.e., lead, collaborative, sub; proposals evaluated by a particular panel) should be automatically linked and immediately visible to the user as a bundle. (N.B., the 2014 COV had to glean summary information about related proposals from an arduous examination of multiple eJackets.)
- The list of review panelists should be linked to the panel proposal bundle.
- A user should be able to change their password.

- The process should enable the COV to request information in advance of the meeting that is tailored to the COV charge.
- The provision of NSF/IT staff to perform database queries during COV meeting would streamline the review process.

Conflicts of Interest (COI)

The 2014 COV found that most COIs were either self-identified by reviewers or flagged by NSF personnel and resolved during the process.

We didn't evaluate the efficacy of the computer generated conflict list, but did observe its *occasional* results in the Communications section of the eJacket. This automated tool provides useful "advice" to the Program Directors. Specifically, the current computer algorithm scans the text of proposals and CVs and declarations of conflicts by PIs. However, it is not a "database" and has many shortcomings. For example, 1) it doesn't search for Program Director COIs; 2) it doesn't distinguish between COI letters of support that say words to the effect that "I think this is a great proposal and should be funded" from statements of fact that are not COIs, such as "These instruments will produce the kind of data needed for this work".

The 2014 COV strongly encourages the development of a more robust COI algorithm or a COI database to assist the Program Directors in avoiding conflicts. The 2014 COV acknowledges that COI can be difficult to define exhaustively and precisely. However, we do believe that co-authorship need not necessarily imply COI, and that COI criteria should include an assessment of financial or material gain or support.

Diversity

GS reviewers and panelists represent a wide spectrum of expertise and bring appropriately comprehensive knowledge to the process. The 2014 COV recognizes that insufficient diversity of gender and underrepresented groups are a perpetual challenge in reviewer selection pool. This issue exists widely in STEM fields, and does not represent a shortcoming of NSF or GS, in particular.

We note that the demographics of GS reviewers and panelists do include gender diversity, a range of seniority, geographical distribution, and institutional distribution. We encourage GS to track these demographics along with those of the proposal PIs and awardees, which the 2014 COV reviewed. We suggest that any anomalies in relative female/minority versus overall funding rates and/or amounts be vigorously pursued.

Balance between Intellectual Merit (IM) and Broader Impact (BI) criteria in Reviews

The 2014 COV finds that the review process generally requires IM for fundability, while BI is a secondary consideration although it is not ignored. We assert that IM should remain the primary driver for ranking proposals, as the likelihood of any broader impact is very low if the work is not excellent. We also assert that BI is important for a number of reasons. For example, BI is often relevant to how a research area is viewed within an institution, and it is important for researchers to develop better "value propositions"

for their research. This is true for individual projects and for the whole program. We recommend that BI be treated more formally.

We encourage GS to quantify the value of BI to their program. For example, a record of statistics developed by GS to track BI accomplishments and outcomes would provide valuable insight. BI statistics would allow GS to better understand, articulate, and report on the BI of their program across several categories (e.g., student training, engagement of underrepresented groups, public outreach, etc.) Further, presentations of such BI statistics at public workshops and meetings would not only underscore the importance of impactful BI to the GS community, such reports may even foster creativity and increased collaboration in the development of the BI components of future GS proposals.

GS Portfolio Management

The 2014 COV strongly encourages GS to promptly undertake a vigorous, comprehensive portfolio review in order to prioritize various elements of the GS program. *Most importantly, GS needs to explicitly address the 2011 COV comments about facility life-cycle planning that still remain as GS action items.* GS should engage broad community participation in their portfolio review. Further, the outcome of the assessment should demonstrate responses to the recommendations of the Decadal Survey with particular attention to the DRIVE (Diversify, Realize, Integrate, Venture, and Educate) initiative and CubeSats. Note our related recommendations regarding the latter in the subsection of the *Responses to the 2011 COV* above.

The 2014 COV values the importance of NSF nimbleness in the encouragement of new and innovative research, and recognizes the legacy and creativity of GS creativity in these regards. Future GS plans and prioritizations should also allow for continuing innovation.

Interactions Across GS Programs

There are inherent connections between the CEDAR, GEM, and SHINE communities given the interdependent nature of their research agendas and the outstanding questions at the heart of solar-geospace system research. We can identify only a few extant tangible connections (e.g., reciprocal liaison appointments to the GEM and CEDAR steering committees) between the GS programs, and they largely fail to foster the symbiotic GS community that the 2014 COV envisions and advocates. For example, the long-standing schedule of mutually exclusive summer workshops remains a roadblock to fostering collaboration across programs.

We encourage the GS team to work together to develop new and innovative ways to make the connections across GS programs stronger. Further, the aforementioned GS Portfolio Review should explicitly include the robust assessment of current interactions (e.g., support for meetings that bridge programs), along with plans for more interconnected GS program elements.

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2014 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2014 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2014. Specific guidance for NSF staff describing the COV review process is described in the "COV Reviews" section of NSF's Administrative Policies and Procedures which can be obtained at https://inside.nsf.gov/aboutnsf/hownsfworks/rolesresponsibilities/Pages/Committee-of-Visitors.aspx [1] .

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at http://budg-eis-01/eisportal/default.aspx. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see http://www.nsf.gov/od/oia/activities/cov/covs.jsp.

[1] The COV Reviews section has three parts: (1) Policy, (2) Procedures, and (3) Roles & Responsibilities.

FY 2014 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV:
Program/Cluster/Section:
Division:
Directorate:
Number of actions reviewed: **Awards:** **Declinations:** **Other:**
Total number of actions within Program/Cluster/Division during period under review: **Awards:** **Declinations:** **Other:**
Manner in which reviewed actions were selected:
Date of program portfolio review

COV Membership

	Name	Affiliation
COV Chair or Co-Chairs:		
COV Members:		

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: Reviews consisted of a mixture of mail-ins (ad hoc reviews), teleconference panels, and in-person panels (for CEDAR). In conversation with and without NSF Program Directors, there was consensus that in-person panels yielded the clearest guidance to NSF, and provided additional, less tangible benefits to the community. For example, the personal interplay among reviewers assisted in the generation of consensus or the identification of fundamental challenges. In addition the in-person panels provide a superb opportunity for scientists at the beginning of their careers to become acquainted with more senior scientists as well as NSF's staff. However, we also acknowledged that heavy or exclusive reliance upon in-person panels is expensive in time and money. In particular, the rolling deadlines associated with the core program are not conducive to the panel review process. **Data Source: EIS/Type of Review Module**	YES

2. Are both merit review criteria addressed a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? Comments: In almost every review the merit criteria were explicitly called out; in a very few (of the order of 1%) the merit criteria were addressed in the text without being called out explicitly. On rare occasions the "panel summaries" in the Jacket provided only the panel rankings (which were interesting, but less informative than detailed comments about the relevant proposal). In discussion with NSF Program Directors and staff, it appeared that the contents of the Jackets available to the COV were occasionally a subset of that which the Program Directors could access. These cases pointed to the limitations of the COV electronic Jacket system, and not errors on the part of the NSF Directors or staff. Generally such omissions were few, and did not interfere with the panel's ability to perform its review. The electronic Jacket COV tool is quite useful although there is significant opportunity to further improve its usability. The Review Analyses from the Program Directors were always available and were always informative and appropriately detailed. **Data Source: Jackets**	a) YES b) Generally YES c) YES

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? Comments: All the proposals that we looked at had a minimum of three written reports. While a single reviewer on some proposals may have made slender comments, almost all of the reviewers provided sufficient commentary. A significant number of individual reviews can be described as excellent. **Data Source: Jackets**	Generally YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: The panel summaries provide excellent synopses of the panel discussions, capturing points of agreement and disagreement. They documented that consensus was often achieved immediately; occasionally there were reports of consensus being achieved after discussion, and less frequently, that no unanimous consensus was achieved. However, even in the latter case the reviews provided substantial and useful information to the Program Directors, and represent legitimate differences of opinion in the analysis of proposals. **Data Source: Jackets**	YES
5. Does the documentation in the jacket provide the rationale for the award/decline decision? [Note: Documentation in the jacket usually includes a context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.] Comments: It was occasionally and infrequently necessary to hunt around in the Jacket to infer justifications for decisions; this was readily attributable to imperfections in the electronic interface. If questions remained, the Program Directors and staff were willing and able to answer the COV. **Data Source: Jackets**	Nearly Always

6. Does the documentation to the PI provide the rationale for the award/decline decision? [Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written in the PO Comments field or emailed with a copy in the jacket, or telephoned with a diary note in the jacket) of the basis for a declination.] Comments: The Jackets provided very clear evidence of the (anonymous) reviewer reports passed back to the PIs. There was often additional evidence of communication between the Program Officer and the PI, direct or indirect, e.g. an actual email trail, or a statement along the lines, "The PI was contacted by email on (some date)." Although we could see the versions of the written reviews intended for the PI, the absence of a verbatim e-mail record precluded our ability to fully assess the communication with the PI in these cases. **Data Source: Jackets**	Usually
7. Additional comments on the quality and effectiveness of the program's use of merit review process: The COV was provided with documentation that was usually adequate for its task, and NSF Program Directors and Staff were unambiguously helpful in addressing questions and problems with the COV tool. There were a few occasions where the Program Director had to resolve a lack of consensus among reviews or panels. In these cases, the Program Director expressed special care in explaining the funding decision. 1. There was no case of an uncompetitive proposal being funded. 2. In a few cases a "competitive" proposal was funded among a cluster of more highly ranked proposals. 3. There were many instances of "highly competitive" proposals that went unfunded, almost always because of funding limitations, and less frequently because of program goals. In each case the decision was explained clearly and candidly in the Program Director's review analysis. There could be more consistency among records, especially of actions, in the electronic Jacket records system. This appears to be an issue primarily with the software and its user interface, rather than a systematic shortcoming of the part of the NSF Geospace Program Directors or Section Head. We comment further on this issue later in this document.	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: 1. The overwhelming majority of reviewers demonstrated their disciplinary expertise in their comments. Occasionally, the reviewers did not share a consensus view, but this did not reflect poorly on the qualifications of the reviewers. In these cases, the Program Director's review analyses uniformly provided a clear assessment of disparate reviewer perspectives along with the related underlying rationale for her/his decision. Insufficient diversity of gender and underrepresented groups are a perpetual challenge in reviewer selection. This issue exists widely in STEM fields, and does not represent a shortcoming of NSF in general or Geospace, in particular. We call out this issue to encourage NSF Geospace leadership, applauding the fact that two of five (40%) Geospace Program Directors are women. It is worth noting that half of this COV were female, and that two members were from other under represented groups. **Data Source: Jackets**	YES

2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: We noted several mechanisms for COI identification, as follows: • self identification by reviewers, • self identification by NSF Program Directors, • automated identification of reviewers by computer algorithm, • a Program Director's personal archive of reviewer conflicts, and • a Program Director's post-facto identification of reviewer conflicts. We also noted several procedures for COI resolution, as follows: • reviews are not solicited from experts with COI, • a potential reviewer receives a review request and contacts the Program Director requesting recusal, and • the Program Director identifies a conflicted review, documents its receipt, and excludes it from the remainder of the process. The aforementioned COI computer algorithm is insufficiently robust. For example, scientists at JPL can have CalTech e-mail addresses. Similarly, researchers from CU/CIRES can have NOAA e-mail address, making it difficult for Program Directors to identify affiliation COI with the tool. In addition, the algorithm does not identify COI involving Program Directors. We found a few reviews where COI resolution was necessary post-facto, as described above. We found no instance where either the integrity of a proposal review or the ensuing decision was impacted by COI. **Data Source: Jackets**	YES
Additional comments on reviewer selection: Some COI policies appear to be overly restrictive. A co-author need not be a collaborator. For example, reports on the analysis of measurements may include co-authors involved in the instrument development even though the primary authors never consulted with the instrument developers.	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW
1. Management of the program. Comments: The Aeronomy Program Directors are dedicated, professional, and highly capable, demonstrating concerted effort and ability to balance excellence, community need, and resource limitations with integrity. The Geospace staff communicates the basis of their decisions forthrightly, so the community has a high degree of confidence in the fairness of the program. In addition to electronic communications, NSF Staff are active participants in CEDAR, GEM, and SHINE and other relevant workshops, making themselves easily accessible to the community.
2. Responsiveness of the program to emerging research and education opportunities. Comments: Geospace/Aeronomy has been an unflagging sponsor of graduate and undergraduate education. In addition to conventional graduate student support, the CEDAR workshop tutorials and poster presentations, and annual radar schools have provided critically important education and training opportunities.
3. Program planning and prioritization process (internal and external) that guided the development o the portfolio. Comments: Geospace/Aeronomy seeks input from the community about planning and prioritization, both formally and informally. The COV notes that the Geospace section in general (and Aeronomy in particular) is about to undertake a major formal review of the research portfolio. We strongly support and encourage this effort.

4. Responsiveness of program to previous COV comments and recommendations.

Comments: AERONOMY: Several points in the 2011 COV have dealt with Aeronomy. Geospace/Aeronomy have responded to the request to make the FDSS program a continuing, rather than the initial "burst" mode. Although CubeSats are operated in SpaceWx, they are clearly of interest to Aeronomy, and the program itself has drawn tremendous interest. There is evidence that Geospace has responded to community requests to support more cross-disciplinary work (by partnering with other NSF divisions as well as other federal agencies). Geospace has continued to show active interest in finding more efficient and effective proposal review methods, attempting to strike a balance between ad hoc reviews, tele- and video- panels, and in-person panels. Geospace /Aeronomy has continued to enthusiastically support educational components such as CEDAR and the radar schools.

OTHER TOPICS

1. **Please comment on any program areas in need of improvement or gaps (if any) within program areas.**

   The COV has concerns about timeliness of response to Aeronomy proposal decisions and awards. We anticipate that some delays are attributable to turnover in the Aeronomy Program Director position during the last three years.

2. **Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.**

   The NRC report on the Decadal Survey for Solar and Space Physics includes recommendations specifically targeted at the NSF Geospace section. It is necessary to conduct an exhaustive portfolio review in order to assess the feasibility of carrying these recommendations forward in the context of budgetary constraints along with other goals and objectives described in the Geospace Strategic Plan. We strongly support plans to undertake this review later in 2014, and recommend that the Geospace leadership engage the community broadly in the process.

3. **Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.**

   While the eJacket software is useful, it does have limitations and inconsistencies that hinder not only the Program Directors but also COV analysis. We note specific issues earlier in this document.

4. **Please provide comments on any other issues the COV feels are relevant.**

   The in Program Director positions combined with the increasing press of proposals across the Foundation, heightens the potential for human error in identification of COI. The development of robust COI algorithm or database is recommended for use across NSF. This will also serve to increase the efficiency of proposal review processes.

5. **NSF would appreciate your comments on how to improve the COV review process, format and report template.**

   A three full-day meeting is an appropriate length of time for the immediate data gathering and initial draft report. Our committee of 10(11) is an appropriate size. The report template format is awkward and irritating to look at, although its scope is acceptable. As mentioned above, the eJacket system was our exclusive tool for data extraction (other than specific custom requests of the NSF Program Directors and staff). For example, when examining a particular proposal it was often useful to examine various lead-, sub- or supplementary proposals. While it was possible to get access to these proposals, it required NSF staff intervention to be able to see them. It would be useful to have an IT staff person available to make structured queries of the eJacket data base to, for example:
   a. *"create a list of all the proposal PIs since 2010, followed by a list of the reviewers of each of those proposals"*
   b. *"create a list of all in-person panels, the dates of the panels, and the proposal IDs that were examined."*

Finally, we note that there were numerous inconsistencies in the eJacket system, which were annoying and required extra work on the part of both COV and NSF staff in their resolution.

SIGNATURE BLOCK:

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For the [Replace with Name of COV]
[Name of Chair of COV]
Chair

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2014 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2014 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2014. Specific guidance for NSF staff describing the COV review process is described in the "COV Reviews" section of NSF's Administrative Policies and Procedures which can be obtained at https://inside.nsf.gov/aboutnsf/hownsfworks/rolesresponsibilities/Pages/Committee-of-Visitors.aspx [1] .

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at http://budg-eis-01/eisportal/default.aspx. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see http://www.nsf.gov/od/oia/activities/cov/covs.jsp.

[1] The COV Reviews section has three parts: (1) Policy, (2) Procedures, and (3) Roles & Responsibilities.

FY 2014 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV:
Program/Cluster/Section:Magnetospheric
Division:
Directorate:
Number of actions reviewed: **Awards:** **Declinations:** **Other:**
Total number of actions within Program/Cluster/Division during period under review: **Awards:** **Declinations:** **Other:**
Manner in which reviewed actions were selected:
Date of program portfolio review

COV Membership

	Name	Affiliation
COV Chair or Co-Chairs:		
COV Members:		

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: The MAG program review methods are implemented by the Program Director. From our perspective, the mixture of virtual panel, in person panel, and ad hoc reviews is completely appropriate for dealing with the large number of proposals. Furthermore, the choice to rely on panels for GEM and (usually) ad hoc for the core program is both pragmatic and well justified. **Data Source: EIS/Type of Review Module**	YES
2. Are both merit review criteria addressed a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? Comments: Similar to the previous COV, we find the two criteria are in general addressed in the reviews, though often somewhat unevenly. The reviews taken together usually fairly completely address the two criteria. In all cases, we found the panel summaries (where there was a panel) and program director review analysis provided a consistent and complete evaluation against both merit criteria. **Data Source: Jackets**	 YES (a) YES (b) YES (c)

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? Comments: ~70% of reviews give substantive comments consistent with their score, inform the panel/Program Director in their decision making process, and provide useful feedback to the PI. The remaining reviews should provide more detail. A few are too brief to be of value. For example, a review rated "Excellent" with a justification like "This research will answer important questions" is inadequate in the extreme. Though rare, this places stress on the process. **Data Source: Jackets**	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: The panel summaries provide an excellent and impressively consistent synthesis (borrowing the word the previous COV answer to this question) of the various inputs to the review process. **Data Source: Jackets**	YES
5. Does the documentation in the jacket provide the rationale for the award/decline decision? Comments: In general the reviews alone support the decision, meaning if a proposal was funded or not funded, the reviews painted a clear picture consistent with the outcome. In all cases we looked at, the combination of panel summary and review analysis, in addition to the reviews, provided a strong and clear rationale consistent with the award/decline decision. Furthermore, this was especially valuable in cases where the decision might on the surface appear inconsistent with for example the ratings given by the reviewers, or where the ratings given by the reviewers had an unusually wide range. In every case we looked at where the ratings could appear inconsistent with the outcome (e.g., a 3.7 that was funded or a 4.7 that was not funded) the panel summary and review analysis provided clear justification. In every case where there was a wide range, the same was true. **Data Source: Jackets**	YES
6. Does documentation to the PI provide the rationale for the award/decline decision? Comments: The information provided to applicants provides excellent feedback. Decisions are explained clearly and respectfully, and suggestions are often positive and constructive. This is an area where the system is working extremely well. We were particularly impressed by the communications between the Program Director and applicant during the process, where, for example, opportunities were provided applicants to address (sometimes odd) concerns raised during review, or where suggestions were made for alternate opportunities for a proposal. **Data Source: Jackets**	YES
7. Additional comments on the quality and effectiveness of the program's use of merit review process: We feel the six questions above addressed all of our issues relevant to review.	N/A

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question**.**

SELECTION OF REVIEWERS	**YES , NO, or N/A**
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: We looked at 35 jackets and considered the choice of reviewers (mail in/panel). In all, we believe the reviewers were excellent in terms of level and diversity (meaning different reviewers brought an appropriately comprehensive knowledge to the process) of expertise. It appears that the choice of panellists in different years well reflected the evolving community focus which helped ensure fair review of what must be very different proposals. **Data Source: Jackets**	YES
2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: There were a number of cases where COIs were either self-identified by reviewers or flagged by NSF personnel during the process. In each case that we considered the COI was dealt with quickly and respectfully. **Data Source: Jackets**	YES
Additional comments: (1) The reviewers and panellists appropriately represent gender diversity, range of level of seniority, geographical distribution, and institutional distribution. We recognize that the task of soliciting and following up on reviews places enormous pressure on the MAG Program Directors. It is clear from the varying number of reviewers per proposal that members of the community are not uniformly committed to fulfilling their obvious responsibility to the ongoing success and integrity of our program. On a very few proposals where there were only three reviews, one of those three provided somewhat flippant responses to the questions, with the result being that the information provided the Program Director was perhaps not enough to give a completely informed decision. The last COV suggested the formation of a college of reviewers, which strikes us as a good idea but likely involves too much management to be worth it. Regardless, the community should be more uniformly responsive to requests for review. The status quo is working well, but we would not want to see more variation in the numbers of reviewers per proposal. (2) NSF COI guidelines are strict. In particular, declaring COI for co-authors in this discipline where there are often quite large number of author papers creates situations where numerous community members who have large numbers of COIs. Further, the nature of this type of COI is in many cases such that they are demonstrably insignificant. The result is that we lose very a valuable source of review input because the rules for COI are simply too rigidly applied. While we understand that *perceived* conflicts create some anxiety in times when decisions are increasingly scrutinized from on high, we encourage NSF to relax COI rules where the conflicts are truly insignificant.	

III. Questions concerning the management of the program under review.

MANAGEMENT OF THE PROGRAM UNDER REVIEW
1. Management of the program. Comments: We are impressed by the dedication, professionalism, and capabilities of the GS staff responsible for the MAG program. This applies to the Section Head and all five Program Directors, as we recognize that our program relies on management from across the section. The Program Directors have done a remarkable job in processing the >200 proposals they dealt with from 2011-2013, and in developing opportunities for the MAG program and community. They have balanced excellence, community need, and resource limitations with integrity. They make decisions, and communicate their rationale forthrightly, so the community has a high degree of confidence in the fairness of the program. This management effectiveness contributes to maintaining the morale of the magnetospheric community, which is often eroded by other external forces.
2. Responsiveness of the program to emerging research and education opportunities. Comments: MAG consists of a core program, and GEM. GEM is organized around time-limited (4-5 years) focus groups (FGs). Each year two or so begin/end, the community proposes new FGs, and a competition is held to select new ones. Requirements are timeliness, excellence, and relevance to GEM. This process guarantees FGs are in emerging and impactful areas. Also, FGs are often bridge new opportunities (e.g., THEMIS, RBSP, etc.) to the MAG community. FG proposals tend to do better if strong connections to education are demonstrated. Regarding management, all proposals to the GEM part of the program have to be against one or more of the FGs. The review process (and thus the Program Directors) has done an excellent job assessing relevance to FGs. The result is that ~40% of the MAG program is entirely organized around emerging opportunities. During the last three years, the Program Director identified that the GEM vision had not been updated during the history of the program, and solicited a white paper from the community. The Program Director worked with the GEM Steering Committee, allowing the vision to emerge from the community, but helping the authors align with potential future NSF (and other) opportunities. Proposals to the core program are more general, however much of the progress is naturally organized around new missions (new data) on one hand and new simulation and modelling capabilities on the other. Thus success in proposing is more likely if the science to be done takes advantage of new opportunities. Finally, broader impacts, including educational opportunities, are typically well-addressed in successful proposals.
3. Program planning and prioritization process (internal & external) that guided development of the portfolio. Comments: The overall quality of the research and education projects supported by the MAG program is excellent. The program promotes integration of research and education. The size and period of awards are appropriate and contain the right mixture of established, emerging, and transformative projects. The program ensures participation of new investigators and geographical and institutional distribution of investigators. The funded projects cover all the relevant areas of magnetospheric physics and by virtue of GEM new and cutting edge topics are included. Activities funded by the program are diverse and in many cases interdisciplinary, and include simulation, theory including nonlinear dynamics, data assimilation, data analysis, virtual observatory efforts, and ground-based observations. We note that some recommendations in for example the Decadal Survey are relevant to MAG, and we encourage the GS staff to consider these in managing the MAG portfolio.
4. Responsiveness of program to previous COV comments and recommendations. Comments: The 2011 COV report for magnetospheric physics had no new recommendations but did carry forward two recommendations from the 2008 COV, namely (1) encouraging study of comparative magnetospheres, perhaps through cooperation with the Astronomy Division, and (2) increased site visits, particularly for evaluating infrastructure awards. We did not find the second recommendation particularly relevant to the MAG Program and can understand no action on it by the Program Director. Regarding (1), the Program Director has made attempts to comply with limited success in securing the necessary funds so far.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

We note that the 2008 GS COV recommended that the portfolio include research in comparative magnetospheres, a recommendation that was carried forward by the 2011 GS COV. We share that enthusiasm for this exciting new area of research, especially given new data from missions such as Cassini and MESSENGER, and we also carry this recommendation forward.

Recent community consultations, such as that leading up to the last National Academies Decadal Survey, have identified an increasing need for long-term, continuous, simultaneous, multi-parameter observations that would enable a next level of system level science. This is relevant to the MAG program, and across and beyond the section. We encourage all levels of NSF management to consider this in the oversight of GS and other sections.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

N/A

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

We note that even during flat budgets, continued decreases in budget for core science is negatively impacting the MAG program by limiting its ability to achieve its stated goals and objectives. We encourage NSF to do what it can to address this.

4. Please provide comments on any other issues the COV feels are relevant.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

See general comments.

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For the 2014 GS Committee of Visitors
Maura Hagan Acting Chair and Harlan Spence Chair

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2014 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2014 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2014. Specific guidance for NSF staff describing the COV review process is described in the "COV Reviews" section of NSF's Administrative Policies and Procedures which can be obtained at https://inside.nsf.gov/aboutnsf/hownsfworks/rolesresponsibilities/Pages/Committee-of-Visitors.aspx [1] .

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at http://budg-eis-01/eisportal/default.aspx. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see http://www.nsf.gov/od/oia/activities/cov/covs.jsp.

[1] The COV Reviews section has three parts: (1) Policy, (2) Procedures, and (3) Roles & Responsibilities.

FY 2014 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: June 10-12, 2014
Program/Cluster/Section: Solar-Terrestrial / Geospace
Division:
Directorate:
Number of actions reviewed: **Awards:** 10 **Declinations:** 21 **Other:**
Total number of actions within Program/Cluster/Division during period under review: **Awards:** 65 funded of the scored proposals **Declinations:** 171 declined of the scored proposals **Other:**
Manner in which reviewed actions were selected: COV panelists selected actions for review based on several criteria, in order to ensure a broad sample with respect to the following: scientific topic, opportunity type (core vs. special program), review type (mail-in vs. panel), program officer (there were several responsible Program Directors that served during this period), date of submission, and proposer demographic (based on gender, seniority, minority status). Additional focus was given to proposals that had seemingly incongruous scores (a high rating that was declined or a low rating that was awarded), similar proposals with different results (either similar topic or same PI), and also proposals that appeared to be on the boundary between awarded/declined.
Date of program portfolio review

COV Membership

	Name	Affiliation
COV Chair or Co-Chairs:		
COV Members:		

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question**.**

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: Panels allow an opportunity for the community to balance a variety of reviews and if needed do supplemental review and make ranking recommendations by comparing the relative merits. They are particularly good for defined opportunities (such as SHINE). However, ad hoc (mail-in) reviews are appropriate for core proposals, because panels also require a specific due date, or a Program Director would have to hold on to proposals until enough are there for a panel (causing delays in selection and notification). The Program Directors have the responsibility to compile and analyze the mail-in reviews for the core proposals, and we found that this was an effective approach. **Data Source: EIS/Type of Review Module**	YES
2. Are both merit review criteria addressed a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? Comments: Not all reviewers did, particularly in the case of broader impact, but the panels and the Program Director were very responsible in ensuring that both review criteria were clearly addressed and given appropriate weight in the final	YES

evaluation and funding recommendation. **Data Source: Jackets**	

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? Comments: Most reviewers fully grasp the need to 1) clearly substantiate their comments 2) write their review in an unbiased and professional manner and 3) assign ratings that are commensurate with their comments (i.e. if many flaws are indicated in the review, then an "excellent" rating is questionable). However, there are some reviewers (a small number, but present nonetheless) that appear to either need "coaching" or a reminder of these standard practices (although they are clearly stated in the review request). However, we are also aware of the difficulty in obtaining a diverse and appropriate collection of reviewers for each proposal, and it is important that the program officer not appear to be too discouraging lest it decrease the potential pool of qualified reviewers in the future. **Data Source: Jackets**	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: The panels responsibly considered differing opinions en route to achieving consensus. Although there were many cases of proposals that received a wide range of initial reviews and ratings, the panels were respectful and responsible in reconciling these differing views and were able to reach a decision that gave appropriate weight to the different viewpoints. **Data Source: Jackets**	YES
5. Does the documentation in the jacket provide the rationale for the award/decline decision? [Note: Documentation in the jacket usually includes a context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.] Comments: Absolutely. The review analysis, correspondence, and (when applicable) panel reports/recommendations were very useful in understanding the processes and the rationales behind the decisions. However, the jackets did not always have the communications with the proposer. The rationale was clear to us because we had access to the review analysis, but in some cases we could not assess whether the PI had received a full rationale for the decision. **Data Source: Jackets**	YES

6. Does the documentation to the PI provide the rationale for the award/decline decision? [Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written in the Program Director Comments field or emailed with a copy in the jacket, or telephoned with a diary note in the jacket) of the basis for a declination.] Comments: For some cases we were unable to see all of the communication between the Program Director and the proposer. We are aware that some communication did not make it into the eJacket system. However, based on the ones that we were able to see, the Program Director did an excellent job of reflecting the reviewers' assessments while providing rationale for the overall decision. In some (somewhat isolated) cases, the panel summary (i.e. what was provided to the proposer) did not completely capture the consensus rationale. The summary was sometimes more of a "NASA-type" summary, where the consensus was stated but the differing opinions and the means by which they reached consensus were not clear. Because the proposer receives the individual reviews, it is more important for the panel to explain how they reconciled the different reviews into the consensus. This can easily be addressed if the panel follows the guidance of the Program Director. **Data Source: Jackets**	YES (For the cases where we had information)
7. Additional comments on the quality and effectiveness of the program's use of merit review process: The period between submission date and finalized decision appears to be approximately six months, which is appropriate considering the steps involved. There appears to be times where there was a greater delay, and these were apparently attributable to the transition period between fiscal years or the retirement of the previous Program Director and the hire of the new Program Director	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: It is extremely challenging to ensure appropriate reviewers for such a wide range of proposal topics. The Program Director in all cases did an excellent job of identifying an appropriate selection of reviewers. In the rare cases where the selection appeared to have a slight imbalance, it could clearly be due to happenstance, as the Program Director has no control over which subset of the reviewers choose to respond to the request. **Data Source: Jackets**	YES
2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: Absolutely. There are many dimensions to COI and they made consistent attempts to identify the conflicts in a timely manner. **Data Source: Jackets**	YES
Additional comments on reviewer selection: We would also like to address the question "did the reviewers appropriately represent a diverse set of demographic (seniority, gender, ethnicity) and professional (i.e. came from a broad range of institutions) backgrounds?" We felt this was an important issue to consider regarding the selection of reviewers, and we were satisfied that this was being appropriately addressed by the Program Director.	YES

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW
1. Management of the program. Comments: We were left with a sincere respect and even admiration for the dedication of the Program Directors and Section Head. Ensuring a respectful and thorough review of the proposals requires a great deal of effort and knowledge. The previous STR Program Director retired since the last COV, and a replacement was not identified until months later. The STR transition appeared to be (unduly) difficult because of the lack of overlap between the prior Program Director and the incoming Program Director. The NSF staff performed admirably during this period, as it required a great deal of additional effort. The new Program Director is a well-known and respected scientist, which is extremely important in maintaining community trust in the review process (particularly during a period of extremely high proposal submissions relative to funding). We are pleased that the Program Directors have flexibility in determining the proportion of funding that goes to Core research programs vs. directed programs such as SHINE, CEDAR & GEM. This allows the Program Directors to allocate according to proposal demand as well as community needs and priorities.
2. Responsiveness of the program to emerging research and education opportunities. Comments: There was an appropriate balance of resources to ensure sustainability of long-term activities as well as injecting vitality through new ideas and activities. Programs such as CAREER, EAGER and RAPID allow the Program Directors to make strategic decisions and provide flexibility in strategic allocation of resources. In days of increasingly constrained budgets, this is ever more challenging and important.
3. Program planning and prioritization process (internal and external) that guided the development of the portfolio. Comments: The Program Directors are very active in engaging the community and ensuring that their needs are met; they interact regularly with members of the community and undertake outreach activities to be able to more clearly understand issues and anticipate future needs. This process influenced the development of the new Strategic Plan. Lately, the Program Directors have been faced with the challenge of handling far more proposals than previously, and as a result the selection rates have declined precipitously. The community

outreach and communication efforts ensure that there is trust and respect throughout this difficult time, and the importance of their efforts cannot be understated.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:
The COV this time around (as opposed to last time) was not tasked with issues relating to portfolio composition and allocation. We will address here the topics from the last COV report that are relevant to this program element.

c) Strategic Planning for GS
GS developed and released an updated strategic plan. The plan was responsive to the scientific community's ever-changing goals and priorities, and the Program Directors and Section Head were active in communicating the results.

e) Faculty Development in the Space Sciences
The previous COV recommended continued support of FDSS activities. The competition has been re-initiated this fiscal year and at least one award will be made. Future competitions will be held biannually.

g) Virtual vs. face-to-face panels
We concur with the previous COV that a balance of virtual vs. face-to-face panels best suits the need of the scientific community and allows economy in the review process. However, we somewhat disagree with the previous statement that "virtual panels are appropriate for the CEDAR, GEM and SHINE panel reviews where are the participants in the panel are familiar with the topics being reviewed and are also familiar with each other." That attitude is not at all true for newer researchers, as more senior people are not as familiar with them and vice-versa. There are benefits to face-to-face panels, most notably the full focus of participants and the "organic" discussion environment; consensus is more achievable and panelists are more likely to express satisfaction with the result. However, the cost & travel savings allowed by virtual panels may allow more of the resources to go to research instead of reviews.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

An analysis of the approval rate of women and minority PIs indicated a large fluctuation from year to year. However, the success rate of female PIs from 2011-2013 appeared to be anomalously low. The overall success rate from 2011-2013 STR proposals was 32%, while female PIs were only 12% successful, which was only 1/3 the success rate of male PIs (the total number of proposals was 47 from female PIs, so this is statistically significant). Part of this trend appears to be due to the SHINE panel reviews - in three years of panels, they did not recommend funding for a single female PI (all 20 proposals that received the "Fund" recommendation were by male PIs).

(Please note that we have learned that the awards made during FY2014 have a much better balance for women PIs. However, the COV was tasked with reviewing proposals for FY2011-13, so the FY2014 proposals were not part of the above analysis. We have also learned that NSF is considering including a discussion of "unconscious bias" as a prelude to panels, which we believe may help prevent situations like the 2011-13 SHINE results.)

Although we did not detect a clear bias in the evaluation and review process, we recommend that the NSF make efforts to determine the cause of this variation and take action if appropriate. We were very appreciative of the support of the NSF Program Directors in this analysis, as it was apparent that they found this to be an important issue.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

Based on the proposal actions we directly reviewed, and the data on the rest of the proposals, it was clear that the research topics appropriately addressed all aspects of the science covered by the STR Program. Additionally, the STR goal of supporting educational activities and students was clearly reflected in both the support of the SHINE workshops as well as the individual proposals. Reviewers and the Program Directors were mindful of whether a proposal requested support for a student or young scientist, and this information was given appropriate weight.

We applaud the effort of the STR Program Director in developing a joint program with the Astronomy Directorate to support cross-disciplinary solar research activities. Some vital research can "fall through the cracks" between it applies to both STR and Astronomy but may not receive priority from either. A joint program will allow the support of innovative scientific ideas in a cost-effective manner.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

4. Please provide comments on any other issues the COV feels are relevant.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

In Section II we were asked "Does the documentation to the PI provide the rationale for the award/decline decision?" We found it difficult to evaluate the communication to the PI regarding the award/decline decision because many of the jackets were lacking this information.

Additionally, we believe it would be very useful to provide either preliminary statistical analysis on the proposal data, or provide enough information so that the panelists can perform the analysis. We examined the data to look for selection bias (institution, gender, seniority) and also examined the timeliness of the responses to the PIs. We received an excellent response from the NSF staff when we requested data, and all of the required information was efficiently provided.

SIGNATURE BLOCK:

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For the [Replace with Name of COV]
[Name of Chair of COV]
Chair

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2014 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2014 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2014. Specific guidance for NSF staff describing the COV review process is described in the "COV Reviews" section of NSF's Administrative Policies and Procedures which can be obtained at https://inside.nsf.gov/aboutnsf/hownsfworks/rolesresponsibilities/Pages/Committee-of-Visitors.aspx [1] .

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at http://budg-eis-01/eisportal/default.aspx. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see http://www.nsf.gov/od/oia/activities/cov/covs.jsp.

[1] The COV Reviews section has three parts: (1) Policy, (2) Procedures, and (3) Roles & Responsibilities.

FY 2014 REPORT TEMPLATE FOR NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: June 10-12, 2014
Program/Cluster/Section: Space Weather Program
Division:
Directorate:
Number of actions reviewed: **Awards:** **Declinations:** **Other:**
Total number of actions within Program/Cluster/Division during period under review: **Awards:** **Declinations:** **Other:**
Manner in which reviewed actions were selected:
Date of program portfolio review

COV Membership

	Name	Affiliation
COV Chair or Co-Chairs:		
COV Members:		

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question**.**

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: For the CubeSat program, the primary review method was an in-person panel. 19-member panels were convened on July 13-14 in 2010 and July 10-12, 2012. For most of the cases each proposal was reviewed by 4 panel members (i.e., one primary and three secondary reviewers), who provided individual written reviews. The tertiary reviewer wrote the panel summary. The panel was composed of diverse members – roughly half space scientists and half engineers, one-third female and two-thirds male. Mail-in reviews were primarily used to evaluate proposals whose focus was outside of space physics. Out of the 23 independent proposals submitted to each panel, five proposals were placed in the "highly recommended" category. As it was anticipated that at most two would be funded, the five receiving a rating of "highly recommended" were invited to respond to the reviewers' comments. These responses were considered by the Program Director in consultation with the other Program Directors and the Section Head in the Geospace section when deliberating about final funding decisions. In addition to the reviewers' comments, panel discussions, panel summaries, and responses to the reviewers' comments by PIs of the "highly recommended" proposals, the focus of the science in the context of balance among funded CubeSat projects was considered when making final funding decisions. Efforts were made to select a diversity of science missions and instrument designs. For proposals funded under RAPID and INSPIRE mechanisms, only internal merit review by NSF Program Directors is required out of concerns for urgency	YES

combined with difficulty of appropriate evaluation under a regular submission to any individual program given the strong inter-disciplinary nature of these proposals. The funding of INSPIRE proposals requires that Program Directors from at least two separate NSF science disciplines work together and concur that the proposal is compelling to both programs. In response to the 2011 NASA NSF Space Weather Modeling Collaborations Partnership solicitation, a total of 51 proposals were submitted. The review was done by a combination of mail-in reviews and a panel. The Program Director collaborated with a NASA program officer to define review criteria and procedures that would meet both NASA and NSF requirements and to choose the reviewers. The panel was made up of 17 experienced space scientists (two female members) with the diverse backgrounds, and met over Sept 24-28, 2012. The panel highly recommended 13 proposals, 8 out of which were selected for funding (15% success rate). **Data Source: EIS/Type of Review Module**	
2. Are both merit review criteria addressed a) In individual reviews? YES – except for one individual review b) In panel summaries? YES – except for one case c) In Program Officer review analyses? YES - always Comments: For the CubeSat program, both merit review criteria are addressed adequately. The Program Director's review analysis reflects the fact that both review criteria were discussed and taken into account in the panel deliberations. There is one case in which the assessment of the broader impacts was missing from the panel summary, even though it was addressed in 3 out 4 individual reviews. For the RAPID and INSPIRE proposals, standard merit review criteria (intellectual merit and broader impacts) were not always explicitly addressed, but the Program Director's review analyses adequately described criteria specific to these programs regarding the uniqueness, urgency, innovativeness, or inter-disciplinarity. For proposals funded under the NASA NSF Space Weather Modeling Collaborations Partnership, both merit criteria are addressed explicitly in most individual reviews, panel summaries, and Program Director's review analyses. We noted that the broader impacts criteria are not strongly addressed in comparison with other NSF proposal reviews. **Data Source: Jackets**	YES

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? Comments: For the CubeSat program, the individual reviewers provide sufficiently detailed comments and rationale in their assessment of the proposals with a few exceptions. In one case, a particular reviewer's written review was terse, but there was an additional individual reviewer assigned to this proposal. The individual reviews sometimes reflect significantly different opinions, complementing each other. The reviewers were selected to provide complementary expertise in both the scientific merit and the feasibility of the engineering aspects of the proposed CubeSat projects. The Program Director's Review Analysis did an excellent job of summarizing the individual reviews and panel summaries, as well as adding missing details regarding the panel discussions. For the NASA NSF Space Weather Modeling Collaborations Partnership proposals, the individual reviews provide sufficient detailed comments to specific questions and rationale in their assessment of the proposals. These specific questions include the strength and weakness of proposals with respect to following criteria (1) Scope and Requirements, (2) Scientific and Intellectual Merit, and (3) Relevance to the National Space Weather Program, NASA's Living With a Star, and the NSF, as well as Broader Impacts. **Data Source: Jackets**	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: For the CubeSat program, the panel summary was written by a tertiary reviewer, who did not contribute an individual written review of the proposal. Most of the panel summaries provided a succinct but adequate summary of the individual proposal reviews, but the panel process that led to the rationale for the panel consensus was not always present in the panel summaries. (Perhaps, tertiary reviewer was less engaged with the proposal?) From the panel summaries alone, the proposers may not always be able to obtain sufficient information regarding the rationale for the panel consensus. In almost all cases the panel summaries addressed both the NSF Intellectual Merit and Broader Impacts criteria. In one case the Broader Impacts criteria was not explicitly addressed in the panel summary. For the NASA NSF Space Weather Modeling Collaborations Partnership proposals, four reviewers were assigned to each proposal to provide the individual reviews, and the panel summaries provided the rationale for the panel	YES

consensus. **Data Source: Jackets**	
5. Does the documentation in the jacket provide the rationale for the award/decline decision? [Note: Documentation in the jacket usually includes a context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program director review analysis, and staff diary notes.] Comments: For the CubeSat program, the program director review analysis was particularly excellent, summarizing the proposal, the strength and weakness of the proposal pointed out by the individual reviewers, and detailing the panel process (i.e., explaining how diverging opinions of the individual reviewers came to the consensus, how the panel uncovered substantial technical issues of the proposal and influenced the proposal assessment). In addition, the review analysis explained the rationale for how the CubeSat Program Director in consultation with other program directors arrived at final funding decisions for cases in which proposals were in the "highly recommended" for funding category. For the RAPID and INSPIRE proposals, the Program Director's review analyses and e-mail correspondence between the PI and the Program Directors provided the rationale for the award/decline decision. For the NASA NSF Space Weather Modeling Collaborations Partnership proposals, the information was available in the eJacket system only for a fraction of the 8 successful proposals that were funded by NSF because the proposal review process was managed by NASA. The Program Director's review analyses and e-mail correspondence between the PI and the Program Directors provided the rationale for the award/decline decision. **Data Source: Jackets**	YES

6. Does the documentation to the PI provide the rationale for the award/decline decision? [Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program director (written in the PO Comments field or emailed with a copy in the jacket, or telephoned with a diary note in the jacket) of the basis for a declination.] Comments: For the CubeSat program, the Program Director's review analysis always	YES, but DATA not always available from eJackets

provided substantial rationale for the award/decline decision. But, records of the phone and e-mail exchanges between the PI and the program office were not always available as part of eJacket documents. We recommend keeping a communication log regarding the award communication with the PI. The context statements were well written and provided a detailed description to the PI regarding the panel process, including the handling of conflicts of interest. For the RAPID and INSPIRE proposals, it is not always clear how the rationale for the award/decline decision was communicated to the PI. Again, we recommend keeping a communication log regarding the award communication with the PI. For the NASA NSF Space Weather Modeling Collaborations Partnership proposals, the e-mail correspondence between the PI and the Program Director provided insight into how the rationale for the award decision was communicated to the PI. It is unclear how the decline decision was communicated with the PI. The proposers of highly recommended proposals that were not funded would have especially appreciated a briefing on the decision process. **Data Source: Jackets**	
7. Additional comments on the quality and effectiveness of the program's use of merit review process: The CubeSat program's proposal selection process is very competitive with the success rate of about 10%. For both 2010 and 2012 panels, it was anticipated that only two out of 5 proposals in the highly recommended category would be selected for funding. We understand from conversations with the CubeSat Program Director that one or two additional highly recommended proposals were later funded with resources from other NSF programs and by other agencies. The PIs of the proposals rated "highly recommended" by the panel were invited to respond to the panel review, and the PIs provided an extensive response often almost as long as the proposal itself. This mechanism exemplifies the fairness and openness of this merit review process. We also wish to emphasize the thoroughness and clarity of the Review Analyses by the Program Director for the CubeSat program.	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: For the CubeSat program, the 19-member panels convened on July 13-14 in 2010 and July 10-12, 2012 and were made up of panel members with diverse background, gender, and experiences. Half of the panel members had engineering backgrounds, so they could comment on the technical feasibility of the proposed CubeSat missions, and the other half consisted of scientists who could assess the significance of science questions, including how they would be addressed by the data collected and the likelihood of closure by the analysis of the satellite observations. If the science topic happened to lie outside of the expertise of the panel, external mail-in reviews were requested to fill the gap. For the NASA NSF Space Weather Modeling Collaborations Partnership solicitation, the Program Director collaborated with a NASA program officer to define review criteria and procedures and to choose the reviewers. The 17-member panel convened on Sept 24-28, 2012 was made up of experienced and well-recognized space scientists (two female members) with diverse scientific backgrounds. **Data Source: Jackets**	YES
2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: For the CubeSat program, the conflicts of interest were adequately checked by automated software, and the panel members with conflicts of interest did not participate in the discussion of proposals. In most cases, the jacket contained the results of the conflict of interest generated by the automated system. We found one case where this information was missing. Additionally, in some cases panelists identified additional conflicts of interest and did not participate in the discussion of the conflicting proposal. In the NASA NSF Space Weather Modeling Collaborations Partnership review	YES

process, the conflicts of interest were checked by automated software. In most cases, the jacket contained the results of the conflict of interest generated by the automated system. **Data Source: Jackets**	
Additional comments on reviewer selection:	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW
1. Management of the program. Comments: The Space Weather Research program is a new program within the Geospace Section established late in FY 2013, bringing together several existing cross-sectional activities of high priority. An important component of Space Weather Research program relevant to this COV is the CubeSat program, which was managed under the Facilities program prior to this time. The CubeSat program is housed within the Space Weather Research program and is managed by the Space Weather Program Director. However, this program includes proposals from other disciplines, including lower atmospheric science and astronomy. The Space Weather Research Program Director has done an outstanding job developing and managing the new CubeSat program. The CubeSat proposal selection process is very competitive with a success rate of 10%. The review process is comprehensive, transparent, and of high integrity. The 19-member panel includes both scientists and engineers and the PIs of the highly recommended proposals are invited to respond to reviewer comments before final funding decisions are made. The Space Weather Research program actively partners with other programs within the Geospace Section and the Atmospheric and Geospace Sciences Division and other agencies including NASA and NRO to leverage its limited resources. In particular, some of the program's activities are supported through strong partnership with NASA.
2. Responsiveness of the program to emerging research and education opportunities. Comments: The Space Weather Research program itself is established as a response to the broader Geospace Science community's input regarding crosscutting priorities. Examples include the NASA NSF Space Weather Modeling Collaborations Partnership and the CubeSat program. The CubeSat program in particular provides unique educational opportunities for undergraduate and graduate students who are involved in developing, constructing, testing, launching and operating the small satellite systems and in the analysis of the observations from the missions. The Faculty Development in the Space Science program was created to address the low number of Space Science faculty positions at University around the country. These positions are often housed within physics and engineering departments. The Space Sciences community includes a relatively larger percentage of soft money scientists compared with other disciplines. The Space Weather program also responded well to NSF-wide interdisciplinary initiatives, namely the co-funding of an INSPRIRE award to fund a unique and innovate research idea. On the other

hand, the NSF-Hazard SEES solicitation did not attract any space weather related proposals, in spite of the obvious fit of Space Weather to a major "natural hazards" component of NSF as pointed out by the previous COV.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

Comments:

The Space Weather Research program uses a mix of internal and external guidance to develop the portfolio. This portfolio includes the NASA/NSF Collaborative Space Weather Modeling program ($1.5 M); the NSF contribution to the NASA Community Coordinated Modeling Center ($0.5 M); the Faculty Development in the Space Sciences program; AMPERE, SuperDARN and SuperMAG ($1.7 M); and the CubeSat program ($1.5 M). Several community wide strategic documents are used to inform the portfolio decisions including the NRC Decadal Survey, the CEDAR strategic plan, and the NSFAGS Section strategic planning process.

The rigorous CubeSat review process informs the portfolio decision of selected awards in this highly competitive program. This process includes input from both engineers and scientists on the review panel as well as an opportunity for the PIs of the highest ranked proposals to respond to reviewer comments before funding decisions are made. Additionally the Space Weather Research Program Director, in consultation with other Geospace Sciences Program Directors and the Section Head, seeks to maintain program balance. As evidenced in the Program Director's Review Analysis, both the intellectual merit and broader impacts of the proposed project are strongly considered and the program strives to create a diversity of scientific topics and instrumentation amongst the funded CubeSat projects. Other community wide strategic planning documents also inform the selections.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

In response to the 2011 COV recommendation regarding the CubeSat program, the Geospace Section has taken three concrete actions: 1. the CubeSat program is now installed as part of the Space Weather Research program; 2. a dedicated funding line for the CubeSat program of $1.5M was established; 3. an external evaluation of the CubeSat program was conducted and another is underway.

The 2011 COV expressed concerns that community interest in the Cubesat program might be reduced due to the low funding rates, but there were 23 independent proposals submitted for both 2010 and 2012 panels that the 2014 COV reviewed. The success rate of the CubeSat proposals was about 10%, and only 2 out of the 5 Highly Recommended proposals were awarded. We understand from conversations with the CubeSat Program Director that one or two additional CubeSat proposals were later funded with other resources. It is a tough competition, but the Program Director has effectively used the opinions of the panel and advice of other Program Directors to inform the fair and transparent award selection process.

The 2011 COV encouraged clarification of the primary objective of the CubeSat program. All the CubeSat awards reviewed by the 2014 COV strived to meet dual-objectives of education and training of students and creating new scientific knowledge.

To help facilitate the external evaluation process, the annual report of the CubeSat program was

published in October 2013. The CubeSat program has been reviewed in the NRC Decadal Survey. At NSF, the 2014 COV focused on the evaluation of the CubeSat program within the Space Weather Research program. It will be evaluated again in the extensive Geospace portfolio review that is planned for later 2014.

The 2011 COV recommended virtual panels when possible with the exception of the CubeSat panel, which was recommended as a continuing face-to-face panel. As noted above, the 2010 and 2012 CubeSat panels were face-to-face panels with representation from both scientists and engineers.

The 2011 COV recommended "that the highly successful CubeSat program presently run by GS should be funded with new NSF division-level resources. With increased resources, the CubeSat program would appropriately form its own "section". The CubeSat program, now housed in the Space Weather Research program, has shown that it is successful. $1.5 M is now devoted to the Cubesat program, but it is still primarily a Geospace program rather than a cross-directorate program. Any growth in scope would require additional funding.

The previous COV recommended that the Geospace Section undergo a more systematic strategic planning exercise. The Geospace Section completed a draft strategic plan for the section, after obtaining community input.

The 2011 COV recommended continuation of the Faculty Development in Space Sciences program. The Geospace Section is continuing this program with a staggered series of FDSS opportunities. A new solicitation for the re-initiation of the FDSS program was submitted for clearance in October 2013.

The 2011 COV recommended that the Geospace Section directors work together to enable more ways for coupling research across the different Geospace Section programs. The directors have worked together to offer interdisciplinary opportunities, for example through the NASA NSF Space Weather Modeling Collaboration.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

   We recommend exploration of the possibilities of expanding the CubeSat program by elevating it to an NSF-wide program and seeking additional sources of funding within the NSF and with other agencies such as NASA. The Space Weather Research program has done an excellent job in developing the CubeSat program and illustrating its potential for advancing scientific understanding while offering outstanding educational benefits. If the CubeSat program were to elevated to higher-profile cross-directorate program or section, a larger diversity of scientific projects across the NSF might take advantage of this opportunity.

4. Please provide comments on any other issues the COV feels are relevant.

   We applaud the approachability of the Geospace Section Program Directors and Section Head and consider approachability essential for interaction with the scientific community.

   The increasing number of proposals increases the workloads of the Program Directors and reviewers. We are concerned about this workload as they are already stretched thin with their current duties.

   There are highly qualified proposals that are not funded due to a lack of revenue. A diversity of observational and modeling studies is important for obtaining a system perspective of the complex geospace environment and its connection to both the space environment and the lower atmosphere.

   We thank the NSF Geospace Section for their service to the Geospace research and education community.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

SIGNATURE BLOCK:

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For the [Replace with Name of COV]
[Name of Chair of COV] Chair

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2014 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2014 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2014. Specific guidance for NSF staff describing the COV review process is described in the "COV Reviews" section of NSF's Administrative Policies and Procedures which can be obtained at https://inside.nsf.gov/aboutnsf/hownsfworks/rolesresponsibilities/Pages/Committee-of-Visitors.aspx [1] .

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at http://budg-eis-01/eisportal/default.aspx. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see http://www.nsf.gov/od/oia/activities/cov/covs.jsp.

[1] The COV Reviews section has three parts: (1) Policy, (2) Procedures, and (3) Roles & Responsibilities.

FY 2014 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: June 10-12, 2014
Program/Cluster/Section: Geospace Facilities
Division: AGS
Directorate: GEO
Number of actions reviewed: **Awards: 19** **Declinations: 4** **Other: 3**
Total number of actions within Program/Cluster/Division during period under review: 72 **Awards: 47** **Declinations: 6** **Other: 19**
Manner in which reviewed actions were selected: **Examples were selected to cover a broad mix of actions, like awarded proposals, declined proposals, high score proposals declined, low score proposals awarded.**
Date of program portfolio review

COV Membership

	Name	Affiliation
COV Chair or Co-Chairs:		
COV Members:		

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: **The GF program relies mainly on mail-in reviews. All proposals have received at least 3 reviews. The majority of the reviews were comprehensive and ratings were appropriately assigned.** **Data Source: EIS/Type of Review Module**	YES
2. Are both merit review criteria addressed a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? Comments: **Mail-in reviews and Program Director review analysis reflect both criteria. Reviewers took special care to address the relevance of both review criteria.** **Data Source: Jackets**	 a) YES b) N/A c) YES

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? Comments: **Individual reviewers thoughtfully and completely described their comments and concerns.** **Data Source: Jackets**	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: **Panel reviews are not part of the review process in the GF program.** **Data Source: Jackets**	N/A
5. Does the documentation in the jacket provide the rationale for the award/decline decision? [Note: Documentation in the jacket usually includes a context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.] Comments: **The review analysis included well-documented rationale and justification for the award/decline decision. The 'Review Analysis' files were very helpful in summarizing the individual reviews and the merit review criteria.** **Data Source: Jackets**	YES

6. Does the documentation to the PI provide the rationale for the award/decline decision? [Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written in the PO Comments field or emailed with a copy in the jacket, or telephoned with a diary note in the jacket) of the basis for a declination.] Comments: **There was uniform evidence that the PD contacted the PI and provided clear explanations of the decision to decline or award the proposal.** **As far as we could determine, the documentation forwarded to the PI did not always include individual mail-in reviews. The official NSF notification did include them (or links to access them).** **Data Source: Jackets**	YES
7. Additional comments on the quality and effectiveness of the program's use of merit review process: **Overall, the merit review process is properly addressed.**	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question.

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: **Reviewers had the expertise to provide a thorough summary. The range of reviewers' expertise reflects the scope of Aeronomy research, and was not directly limited to the foci of the facility being reviewed. Nonetheless, their inputs provided fresh and objective evaluations.** **Data Source: Jackets**	YES
2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: **No panel reviews were part of the process. No conflicts of interest were identified in the GF mail-in reviews.** **Data Source: Jackets**	YES
Additional comments on reviewer selection:	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW
1. Management of the program. Comments: **The GF Program is managed extremely well. Feedback to the PIs is detailed.** **Reaching out to other Program Directors allowed splitting the cost to support proposals that, otherwise, would not have been funded. This is a clear example of the interest and concern of the GF PD to help the Aeronomy community.**
2. Responsiveness of the program to emerging research and education opportunities. Comments: **In addition to the typical 'facility proposals', the GF program supported a significant number of proposals dealing with EPO activities, like the AMISR summer schools and the Space Weather workshops. The GF Program Director reached out to other programs to split costs in support of INSPIRE awards. This allowed in some cases a real synergy between entities that apparently do not have a lot in common (e.g., OIIA, CNS, and GF; or GF and ICER)**
3. Program planning and prioritization process (internal and external) that guided the development of the portfolio. Comments: **The Working group on Incoherent Scatter Radar Deployment Scenarios (WISRDS) has met to discuss the priorities for future deployments. This group focuses on the best way to create facilities which can effectively address the goals articulated in 'CEDAR: The New Dimension' and the 'Geovision Report', particularly in regard to the geospace system science.** **Nevertheless, the priorities or strategies guiding the development and continuing support for the GF portfolio of facilities remains unclear. It appears, for example, that support for development in Facility awards is maintained at a near-constant level through both the first**

and second five-year periods of performance.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

There is currently no clear plan to specify a life cycle for facilities, a need suggested by the previous COV. However, we expect that this will be an important component of the GS portfolio review process that is planned for late 2014.

A proper balance for funding for 'operations' versus funds allocated to science should exist. Previous COV expressed concerns about this issue. Different factors might contribute to reduced budget allocations for science. The GF Program should consider this issue.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

There is no well-defined direction and strategy for the existing Facilities. These should be addressed in order to guarantee the continuing success and relevance of the Program.

As pointed out in the previous COV, the funding of staff scientists need to be properly justified. Initial steps in this direction have occurred at MH.

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

N/A

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

N/A

4. Please provide comments on any other issues the COV feels are relevant.

The panel found few cases when proposals received very good ratings (e.g., 4 or higher), but the decision was not to fund them. The PD provided the rationale and justification for the decision. The panel feels that the actions were acceptable.

One case involved an awarded proposal where the inter-agency transfer was held up because it was contingent on additional non-achieved project milestones.

The success rate is higher than other programs. Out of 72 proposals, 62 were awarded. This includes supplement awards (total 15)

Women involvement in the proposals is also high: 22 out of 72

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

It would be helpful to have a 'lead' proposal from which sub-awards and/or Supplement proposals could be identified. The current format lists a single proposal several times. Information on Supplement proposals was not easily accessible at the beginning. This delayed the evaluation of specific proposals, in particular those related to large facilities and lidar consortium.

SIGNATURE BLOCK:

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For the [Replace with Name of COV]
[Name of Chair of COV]
Chair