

**NSF Committee of Visitor's Report
Upper Atmosphere Research Section
Division of Atmospheric Science
Directorate of Geosciences
September 7-9, 2005**

Updated Response to the UARS Committee of Visitors: October 2006

The review of the Upper Atmosphere Research Section held in 2005 was very laudatory. The COV, however, did make some constructive suggestions and recommendations to improve UARS programs. Following are responses to each of these which were provided initially and an update as of October 2006:

2.4 CONCERNS AND ISSUES

a. Use of criterion #2 (page 8)

The two merit review criteria are intellectual merit and broader impacts and are listed in Chapter III.A of the *Grant Proposal Guide (GPG)*. The criteria include considerations that help define them. These considerations are suggestions, and not all will apply to any given proposal. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

While proposers must address both merit review criteria, reviewers are asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgments. The relative weight of these two merit review criteria is determined by the proposal itself. If the proposal deals mainly with the broader impact area, for example, developing a visitor scientist program or installing a general use instrument at a large upper atmosphere facility, the reviews should concentrate on the broader impacts. The value and quality of the broader impacts will primarily determine the proposal's outcome.

Correspondingly, if the proposal focus is, for example, to develop an understanding of how equatorial scintillations are formed or develop a better magnetosphere-ionosphere model, then the primary consideration will be intellectual merit.

The COV noted that many awards were made in UARS for proposals that had their greatest strengths in criterion 2. These would include the eight FDSS awards, the award funding the new Space Weather Journal and the REU sites and supplements. In fact, UARS is very proud of the emphasis we place on broader impacts. The focus of the majority of UARS proposals, however, is usually a specific research area or "intellectual merit" and, thus it may appear that the broader impact criterion is secondary. But this is only a filtering effect. We consider both criteria to be equally valid criteria for funding proposals. But

in any *specific* proposal, it is unlikely that the two criteria will be of equal weight. The weight will depend on the objectives of the proposal. That said, it is certainly true that any proposal will increase its chances of success by having strong components in both merit review areas. As competition becomes greater and greater, the difference in intellectual merit is often very small. In these cases, as noted by the COV, broader impacts are used as a “tie breaker.”

ACTION

UARS will clarify the use of the two criteria and how the weighting depends on the focus of the proposal to each review panel at the start of the panel deliberations.

October 2006 Update

This clarification has been included in the instructions given to panel members at the start of panel meetings for all UARS panels conducted during the past year.

b. Differences of Panel and Mail-in Reviews (page 9).

The panel made some very clear and constructive suggestions, namely:

- i. Assign proposals to panel members without an initial appointment of the presenter. That will encourage at least two people to read the proposal thoroughly.*
- ii. Use more virtual panels where appropriate or keep number of panelists above 4 or 5. It has been noted that the “herd instinct” is less prevalent when the panel members are on a teleconference and when there is a minimum of 4 or 5 panelists participating on a single proposal.*
- iii. Be sure that the panel objection to the proposal is not limited to a narrow aspect of the proposal. If so, the chair should encourage the panel to review the broader picture of the proposed work.”*

The COV did note, however, that “these remedies might have the disadvantage of overburdening the panel members resulting in more declinations to serve. Hence we make these suggestions with some caution.”

We agree that it would be useful to have at least two of the panelists read the proposal thoroughly. However, the panel’s suggestion that there should not be an initial appointment of presenter is not possible to implement with the current NSF electronic systems. When the panelists are appointed to provide written reviews, the PARS system (Proposal and Review System) requires that the panelists be identified as a primary, secondary or tertiary reviewer. The panel review system in FastLane then requires that one of these designations (usually the ‘primary’ panelist) be designated as the ‘Lead Panelist’, i.e. the presenter. There is, however, an alternate strategy that can be used. If both the primary and the secondary panelists are required to provide written reviews prior to the panel meeting, this will ensure that at least two panelists have read the proposal thoroughly. In order not to overburden the panel members, however, this is likely to require a significant increase in the number of panelists.

ACTION

UARS will implement these strategies at major panels in the coming years to see the effects. We will also insist panel chairs provide a step-by-step argument for the rejection of the mail-in review and the adoption of the panel grading. We also note that in many instances exactly this sort of “paper trail” is provided in the “comments” of the panel review system. This is the “real time” dialogue box that reviewers use during the discussion of the proposal. In the instances giving rise to this concern, it is clear that much discussion was, in fact given to the discrepancy between the panel and mail reviews. UARS will endeavor to ensure that these discussions are fully captured in the panel summary.

October 2006 Update

As noted above, NSF’s electronic Panel Review System requires the a-priori designation of a “presenter”, which makes it impossible for us to implement the COV’s suggestion to not do so. Instead, we now require written reviews prior to the panel meeting from at least 2 panel members. All UARS panels during the last year have followed this new praxis. Our experiences with this, so far, are very encouraging. This measure fully achieves the goal of ensuring that each proposal is being thoroughly read by at least two panel members as the COV requested. In addition, this praxis inherently leads to larger panels so as not to increase too drastically the workload on the individual panel member. As a consequence, most UARS panels conducted during the last year had more than 6 members. The only exceptions were the panels for the AMISR Graduate Student and GEM-SHINE Postdoc competitions that each had 4 members to evaluate 6 and 7 proposals, respectively. All UARS panels during the last year were conducted as virtual panels by teleconference. UARS program officers have made special efforts during these panels to encourage more extensive use of the “comments” feature in the Interactive Panel System. This has helped ensure that panel summaries capture all essential arguments brought up in the panel discussions. Specifically, we should be at 100% of panel summaries addressing any significantly diverging mail-in reviews.

c. High Risk Projects (page 10)

Determining what constitutes “high risk” is very difficult and determining the amount of funds spent on high risk projects would be even more difficult. Thus it is not really possible for us to have a clear and consistent approach to these projects, and, as noted by the COV, we use a very pragmatic approach. We do feel that setting a deliberate percentage of funds for high risk projects might limit the ability of the Program Director to fund some very worthy “high risk” projects. We also note that the COV’s finding that “a few great successes are achieved but a higher failure rate is experienced compared to normal awards” is precisely what one would expect, and hope, for high risk projects.

October 2006 Update

No further action has been taken on this issue.

2.5 OTHER RECOMMENDATIONS TO NSF

a. Accomplishment-based Renewals (page 10)

Actively encouraging submission of ABR proposals would be problematic in today's budget climate. Any significant number of ABR awards would effectively fence-off a significant percentage of core program budgets, and would likely have a significant impact on the goal of increasing awards to young PIs. On the other hand, we certainly agree that ABR submissions should be reviewed in a context that considers their time saving benefits.

ACTION

Reviewers will be instructed to give ABR proposals consideration equal to standard proposals.

October 2006 Update

No ABR proposals were received during the last year. We still feel that actively encouraging submission of ABR proposals would be problematic given the current proposal pressure in UARS.

b. Preservation of CEDAR, GEM and SHINE (page 10)

We appreciate the COV's endorsement of these three focused programs, and we agree that all continue to produce excellent accomplishments in terms of NSF's three strategic goals. It is precisely because these programs are community driven that they remain intellectually stimulating and scientifically vital.

The need for the CEDAR community to refocus objectives based on scientific accomplishments of CEDAR Phase III is echoed by the new Chairman of the CEDAR Science Steering Committee (Dr. Jan Sojka), and was discussed at the 2005 CEDAR Meeting in Santa Fe by the CEDAR Science Steering Committee (CSSC). There appears to be community consensus, growing from that meeting, that a return to organized observation campaigns involving multiple investigators is one direction that the CSSC is preparing to endorse.

ACTION

This COV recommendation shall be a topic for discussion within the November, 2005 CSSC meeting, and that committee will be urged to fashion a statement on CEDAR science direction at a minimum, and possibly a new document defining the science drivers and community objectives that will focus CEDAR activities in future years. We concur that this refocusing of CEDAR objectives is important for the preservation of a program that revitalized aeronomy research by addressing the upper atmosphere as a coupled system, as opposed to a series of unrelated "spheres".

With regard to AMISR, we agree that careful planning is essential to ensure that this research tool provides maximum scientific benefit to both the CEDAR and GEM programs. There must be adequate coordination between the goals of these programs and AMISR, particularly in the initial stage of facility operations. Because the documents that described the scientific rationale for AMISR are more than ten years old, we intend to revisit the AMISR research objectives through a series of workshops

that will eventually lead to the development of a formal science plan. We will also assemble a scientific steering committee for AMISR that will be charged with ensuring that AMISR operations fully support CEDAR, GEM and National Space Weather Program goals, as well as contributing to core aeronomy and magnetospheric physics research. The Upper Atmospheric Facility long-range plan recommended by the UAF site visit panel will also include scientific planning considerations for initial AMISR operations.

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The 2005 CSSC meeting concluded that much of the progress in CEDAR science has been associated with organized campaign studies. The CSSC acknowledged the need for initiatives to encourage the CEDAR community to identify new frontiers in CEDAR science that could spur new campaign initiatives. As a first step, a special “plenary workshop” was conducted as part of the 2006 CEDAR Summer meeting with the title: “Frontiers in CEDAR Science: A workshop to develop campaigns that advance the frontiers in CEDAR Science”. The community response was most impressive, providing more than 40 suggestions of research topics at the fore-front of aeronomy science that could be further advanced through new dedicated CEDAR campaigns. Follow up on this result and further development on the issue of re-defining CEDAR science will be topics of discussion at the October 2006 CSSC meeting.

The first AMISR Science Planning Workshop is being held October 11-13, 2006 at the Asilomar Conference Grounds in Pacific Grove, California.

c. Expand STR to include heliospheric physics (page 11)

Since UARS belongs to the Directorate of "Geo"sciences, it is natural that the section focuses on that subset of solar system phenomena that affect the Earth. The area most relevant to this recommendation is the SHINE program. If SHINE activities are to be expanded beyond the realm of the “inner heliosphere” (as is currently stated by the SHINE mission statement on their web site), the SHINE community must decide to expand its purview. If this is decided, UARS will seriously consider changing the name of the Solar Terrestrial Program to Solar-Heliosphere.

Expansion of UARS programs to include research of comparative planetary atmospheres and magnetospheres, in general, is distinct from the specific recommendation that STR expand its domain to include the outer heliospheric. Comparative planetary research proposals are currently welcomed in AER and MAG, with the condition that the research should truly compare processes on other planets with earth. That condition grows from current programmatic limitations, including the disposition of UARS within the GEO directorate, and the presence of the planetary astronomy program within the Astronomy Division of the Physics Directorate. Nevertheless, AER typically funds between 2 – 5 comparative planetary atmosphere projects within its portfolio and the MAG program typically funds 1-2 projects on comparative magnetospheres. Expansion of that involvement is certainly something that UARS would like to do, but expansion to the extent of program solicitation remains restricted by programmatic definition and by budgets. The

committee charge to bring this new direction to UARS will be further evaluated as NASA redefines its mission for basic planetary research. We certainly wish to become a major player in the support of planetary research, and are actively monitoring opportunities for budget expansion that will permit that level of involvement. We agree that this research is appropriate, and a good opportunity for UARS growth.

ACTION

The NSF Division of Astronomical Sciences (AST) currently has responsibility for funding programs in planetary and solar system astronomy. Based on the COV recommendation, UARS will seek to collaborate more closely with AST in order to make progress in "solar system space physics." That process will require the close cooperation of the respective UARS and AST scientific communities as well. In particular, the STR program will solicit a response and a plan from the SHINE community to revisit their science priorities in light of this COV finding. The plan should be realistic and address priorities within a flat budget scenario.

October 2006 Update

During the last year UARS has funded several research projects concerning comparative planetary atmospheres and physics of the outer heliosphere, respectively. Specifically, two of this year's CEDAR-GEM-SHINE postdoc awards were in subjects related to these areas.

d. Use of virtual panels

We agree with the panel's assessment of the pros and cons of virtual panels. Currently, we use virtual panels when the panels are not too large and when we expect participants to be familiar with the panel process and each other. UARS intends to continue using virtual panels in this way.

October 2006 Update

All UARS panels during the last year were conducted as virtual panels by teleconference. No panel had more than 10 participants. See also updated response to 2.4b above.

e. Admission of Proposals from other Federal Agencies

Except in exceptional cases as defined in the Proposal and Awards Manual (PAM) we are simply not given the leeway to fund civil servants at other agencies or employees at other non-NSF FFRDC's. This policy has been put in place by the National Science Board and it is not something that UARS or even the GEO directorate can change unilaterally. As noted when this issue was raised during the committee's visit, it is important that NSF avoid any appearance of "thwarting the will of Congress." It is also our impression that another reason for having this policy was the concern that scientists at government laboratories and FFRDC's would have an unfair advantage in procuring NSF funding. Whether or not that would really be the case, it is certainly true that in the current budget climate, funding researchers at other government agencies would necessarily mean a further decline in the success rate for researchers at universities.

October 2006 Update

No further action has been taken on this issue.

Responses Specific to the Aeronomy (AER) Program

Section A.1.1. Is the review mechanism appropriate?

The proposed remedy is accepted.

ACTION

Subsequent panels will produce two written panelist reviews and one scribe-prepared panel summary. The forum for panel discussion prior to formal presentation is more difficult to achieve logistically, but can be facilitated by encouraging e-mail and telephone interactions among panel members prior to the panel meeting. That encouragement will now appear in letters to the panel organizing the process. One outcome of this panel review restructuring will be an increase in panel size (and therefore panel expense). Presently, panelists are asked to prepare written reviews of three proposals within the competition pool. Rather than augment that burden to six, we will increase the number of written reviews per panelist to four or five, and increase the number of panel members.

October 2006 Update

As described in the updated response to 2.4b above, not only AER but all UARS programs have adopted a new praxis for conducting panels that includes the request of two written panelist reviews and one scribe-prepared panel summary for each proposal.

Section A.3.3. Did the program make appropriate use of reviewers to reflect balance among characteristics such as geography, type of institution, and underrepresented groups?

The panel was offered a tabular breakdown of reviewer demographics by geographic location, by gender, and by ethnicity – as compiled by NSF. Those statistics are recognized to be nearly irrelevant, as the committee noted, because only about 10% of reviewers provide this information.

ACTION

We shall internally encourage better recovery of this information to improve those statistics.

October 2006 Update

No actions to report, so far, on this issue

Section A.4.2. Are awards appropriate in size and duration for the scope of the projects?

ACTION

Longer duration awards can and will continue to be encouraged.

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Unfortunately, because of the vast increase in number of proposals seen by all UARS programs over the last year it has not been possible for us to sustain the desired trend towards longer duration awards. The AER program was no exception to this. However, UARS remains committed to the goal of increasing the number of longer-duration awards and will continue to encourage this.

Responses Specific to the Solar-Terrestrial Research (STR) Program

Section A.1.8. Discuss any issues identified by the COV concerning the quality and effectiveness of the program's use of merit review procedures.

STR accepts ABR proposals and has funded them in the past. However, the success of these proposals has been limited because of negative reactions by the STR reviewer community to the ABR format.

ACTION

In order to mitigate such negative responses, STR will provide guidance to ABR reviewers reminding them that this class of proposals is legitimate and appropriate under NSF guidelines.

October 2006 Update

No ABR proposals were received during the last year.