Report of the 2010 Committee Of Visitors

NSF Major Research Instrumentation Program

9/6/2010

Report of the 2010 Committee Of Visitors
for the
Major Research Instrumentation Program
Office Of Integrative Activities
National Science Foundation

OVERVIEW

The 2010 Committee of Visitors (COV) for the Major Research Instrumentation (MRI) Program met on June 10 and 11, 2010, at the National Science Foundation. This COV covered the time period for program actions from FY 2005 – FY 2009. The charge to the committee, the committee membership and the meeting agenda are provided in Appendices I - III, respectively. The Director of the Office of Integrative Activities, Dr. Lance Haworth, and the Director of the MRI Program, Dr. Randy Phelps, greatly facilitated every step of the review process, providing the committee with a carefully crafted representative sample of MRI program actions, together with all additional materials and analyses that the committee requested. The NSF MRI Program Guide 2010 was particularly useful due to its extensive statistical analyses of the MRI processes, proposals, and awards over the previous 5 years. The other NSF staff members associated with the MRI team were also extraordinarily helpful to the committee, enabling us to carry out our review in an expeditious and, but thorough manner. At the end of our two-day meeting, the committee members felt that they had achieved a substantial understanding of the setting in which the MRI Program operates and gained great respect for the complexity of the challenges that the MRI program faces. In this context, the major, but one-time, funding from American Recovery and Reinvestment Act of 2009 (ARRA) provided both a great opportunity and a dramatically increased workload that the MRI staff tackled and dispatched efficiently and professionally.

Some of the areas of emphasis in the MRI program have evolved significantly since the last COV Report. In order to best assess the consequences of these new emphases, the MRI Office suggested that the COV also look at the balance and effectiveness of the MRI operation from three different perspectives:

1. **What** types of projects are proposed and supported? (acquisition or development, large vs. small requests; programmatic issues, such as maximum grant size, transparency and fairness of the award process)
2. **Where** will the proposed activity take place? (PhD, non-PhD, non-degree institutions; Minority Serving Institutions, EPSCoR jurisdictions)
3. **Who** is preparing proposals and **who** is subsequently receiving MRI support? (women, minorities, new PIs)

In addition to this evaluation of past performance, the COV was asked to comment as appropriate on three programmatic issues relating to the program's possible future scope:

- Use of Institutional proposal submission limits;

- Role of software and virtual instruments in the MRI portfolio; and,
- Potential role of the MRI in a Mid-Scale Instrumentation program (costing more than appropriate for an MRI, but less than appropriate for an MREFC, grant), and appropriateness of the current limits on maximum grant size.

Based on the desirability of addressing the three perspectives efficiently, the COV was divided into three teams, with each team placing emphasis on one of the three viewpoints; each team also evaluated the jackets in their area of emphasis according to the criteria in the NSF-wide Template for COV reports. The work of each group was subsequently discussed by the entire COV, and, from these discussions, the consensus view of the entire COV was developed, forming the basis for this report.

We have structured our report in a format to first present crosscutting findings and recommendations, followed by discussion, findings and recommendations for each of the three perspectives described above. The findings apply to the time period covered by the COV (FY2005-FY2009). We also provide further remarks in the formal responses to the specific questions posed in the NSF template for COV reports. Again, it was our very great pleasure to be afforded the opportunity to take part in this review of the last five years work of the Major Research Instrumentation Program.

"CROSSCUTTING ISSUES"

Findings:

- The overall quality of the management of the MRI program by the Office of Integrative Activities (OIA) is excellent, especially in light of the enormous volume of proposals, reviews, and awards being processed. The volume of MRI awards strains available resources needed to conduct a high-quality review process and make awards in a timely manner. The OIA is commended for the efforts through FY 2009 to manage the four-fold increase in program size resulting from temporary ARRA funds. This enormous increase in program activity was accommodated with the addition of less experienced temporary staff, and yet the COV found no adverse effect on the timeliness of awards or the quality of the review process. However, this level of program activity cannot be effectively sustained with the current permanent staffing level. The additional processes recommended below also cannot be accomplished at current staffing levels.

- The MRI Program is centrally managed in the OIA, with disciplinary units that are dispersed across essentially all Directorates, Divisions, and Offices of the Foundation providing technical evaluations and funding recommendations. The OIA enjoys an excellent reputation across the NSF for conducting a fair and transparent review process. As the provider of the overall management of the MRI program, the OIA plays a central role in the execution of the MRI program and does so in an open and highly collaborative manner.

- The overall review process is sound and fair. The MRI program appears to be largely successful in balancing awards across multiple dimensions: scientific disciplines, size of award, university size and research/educational orientation, geographical diversity, etc.

- As noted in previous COV reviews, the variability of the review processes (the use of ad hoc versus panel reviews) from one Division or Office to another across NSF presents a significant management challenge. This variability also makes it difficult for a COV to assess the uniformity of the review process. We commend the OIA for the introspection shown in the 2009 Update to the Response to the 2005 COV.

Recommendations:

- The COV urges that NSF explore mechanisms to maintain the higher staffing level that was temporarily available to the MRI program in 2009. The COV believes that this increase is essential, both to implement the modifications that we suggest, and to maintain the quality and uniformity of the review process.

- It is essential that the MRI program continue the development of effective mechanisms to capture the important contributions that the program makes both to science and the infrastructure of science, especially over the long-term, beyond the termination of the MRI awards that enable the acquisition or development of particular infrastructure. The COV applauds the OIA for the steps being taken to acquire MRI impacts; for example, the. planned 2010 Field Survey that will assess near-term and long-term impacts of the MRI program is one which the COV feels will be beneficial to better documenting the impacts of the MRI program.

- The COV emphatically endorses the decision to provide examples of proposal review best practices to the technical coordinators across the foundation, in an effort to promote greater uniformity and transparency in the proposal review process.

- This COV concurs with the 2005 COV Report that the NSF as a whole needs to pay more attention to documentation of the review process. By and large, the review summaries provided good documentation and justification of award decisions to the proposers, though there were clear exceptions. The COV feels that this is one area where no weakness can be allowed, because it. It is vitally important that the NSF's decision rationale be clear and explicit to all proposers.

- The MRI Program staff should investigate methods to enhance the quality of panel summaries and program officer analyses, to include better documentation of why awards may have been made or declined, especially when the scoring or critiques of the reviewers are not obviously consonant with the final decision.

- The MRI COV recommends that each of the NSF's program area COVs (e.g., Physics, Chemistry, Materials Research, etc.) receive an additional charge to review the quality and uniformity of the MRI review process within their respective disciplinary areas. An additional charge to the disciplinary COV should be to evaluate whether or not the fraction of women and minorities submitting proposals reflects their actual compositions in that discipline.

- The MRI COV recommends that the membership of the next COV include one member of the current COV, in order to provide continuity and historical perspective.

"WHAT"

Acquisition or Development; Large vs. Small; Transparency

Much of the discussion in this group focused on the special issues associated with the larger MRI awards, and the different modes of NSF oversight required for small MRI grants, compared to the largest grants and instrument development awards. This group also considered the appropriateness of support of software development and virtual instruments by the MRI, the importance of the awardees' institution continuing to operate and maintain MRI-provided instrumentation, the desirability of increasing the maximum MRI grant size, and the role of the OIA/MRI in a possible new NSF Mid-Scale Research Instrumentation Program.

Proposals submitted to the MRI program are reviewed through ad hoc and/or panel review, consistent with the needs and procedures employed by the various disciplinary divisions. This process seems suitable to maintain participation of a broad range of disciplines. Proposals are evaluated based on their intellectual merit and broader impact criteria, as with all proposals submitted to the NSF.. These procedures are highly appropriate for gauging the quality and potential impact of the proposed acquisition and/or development work. The MRI proposals, however, have both a cost matching requirement for proposing Ph.D.-granting Institutions, as well as a requirement for the proposing Institutions to operate and maintain MRI-awarded instrumentation. The COV is concerned that while the review procedures evaluate the role of the PI in maintaining instrumentation, there is no mechanism to evaluate the degree to which the proposer's **institution** will meet its obligations. Information is needed on how well the institution met its obligations with respect to prior MRI awards. Ancillary methods, such as annual and final reports and site visits during the years the MRI awards are active, are, are also likely to be inadequate to evaluate the institutional stewardship of MRI investments.

Findings

- The large variation in the magnitude of MRI awards results in very different risk/reward relationships across the MRI portfolio, with the largest awards requiring more careful attention to management and oversight. The MRI program staff must pay close attention to the proposed management and operation plans for the large awards. This issue will

become even more critical if the maximum award size is significantly increased.

- The format of current MRI proposals does not provide an effective mechanism to evaluate the history of institutional stewardship of prior MRI awards. Such data would be a valuable component of the information used to determine the track-record of institutions that have received MRI support.

Recommendations

- If the NSF is funded to operate a Mid-Scale Instrumentation program, the COV recommends that the OIA be charged with managing the program foundation-wide.

- Absent a new Mid-Scale Instrumentation Program, the COV recommends maintaining the current maximum size for an MRI Award. If the award ceiling increases in the future, the NSF should develop methods to manage the project risk for these larger proposals – especially for large development proposals.

- The COV recommends that the MRI program consider the desirability of using the reverse site visit process as a part of the evaluation of the large MRI proposals.

- By analogy with the "Results from Prior NSF Support" section of a regular proposal, OIA/MRI should develop a mechanism whereby the institutional commitments to operate and maintain instrumentation can be evaluated as a regular part of the MRI proposal review process.

- The OIA/MRI program staff should clarify in the program documentation what the sub-components of evaluation of these proposals are, pointing out to both proposers and reviewers that, for example, a good management plan can be a key component of *both* evaluation criteria. It is essential that the OIA work closely with the individual NSF program areas to ensure that panel summaries effectively transmit identified deficiencies in proposals.

"WHERE"

PhD, Non-PhD, Non-Degree institutions; Minority Serving Institutions; EPSCoR Jurisdictions

The COV considered the issue of diversity from the perspective of award distribution to various geographical locations, institutions classified by degrees conferred, and minority serving institutions (MSI). In addition, patterns of reviewer selection from different states and institutions were examined. Overall the COV was impressed by the productive attention paid to these issues by the MRI program, as evidenced by the following statistics.

For the EPSCoR program, there are 29 eligible states and jurisdictions. These regions have about one-fifth of American doctoral institutions, and university scientists and engineers. Also, approximately 20% of the nation's population resides in these jurisdictions. Therefore, it is encouraging that 20% of awards were made to EPSCoR jurisdictions. The success rate for converting proposals to awards was approximately the same, one in three, for EPSCoR and non-EPSCoR jurisdictions, although there appeared to be more variation over time in rates for EPSCoR jurisdictions. Competitions in 2009 were not considered in the analyses discussed herein, because of the potential distorting effect of the one-time ARRA funds.

According to the NSF MRI Program Guide 2010, the success rate for proposals from Minority Serving Institutions (MSIs) was also good, approximately 35% between 2005 and 2008, compared to 29% for non-MSIs. It was noted, however, that proportionally the MSIs have not made gains in award receipt since 2005, constituting approximately 8 to 9% of awards each year. While this is higher than the percentage of federal or overall NSF funds obligated for science and engineering research at historically black, Hispanic-serving, and tribal colleges – 2% or less – it is notable that there has not been a detectable upward change in the percent of MRI awards to MSIs over the past 4 to 5 years. It is generally accepted that lab-based experiences attract students to science, and significant numbers of minority students are educated within MSIs. Thus, strengthening the research laboratory experiences at MSIs is an important goal for the MRI program.

The COV examined the inclusion of reviewers from various geographical locations and types of institutions. It was noted that 15-19% of reviewers were from EPSCoR states, which have 15-20% of the scientific researcher population within the country. There was a predominance of reviewers (60%) from the top 100 research universities and the PhD-granting institutions, with a small percentage from other types of institutions, a distribution that mirrors research expenditures. The COV notes that high quality, creative scientists are found in all institutions, and encourages continued NSF efforts to engage reviewers from a diverse set of environments.

Findings

- The success rates for varied institutions that participated in the MRI program appear similar across MSIs, non-PhD granting institutions, and research-intensive institutions (i.e. PhD granting).

- The COV finds no evidence to indicate a variation in the quality of funded proposals with geography or institutional type. Average ratings for MSIs vs. non-MSIs and PhD vs. non-PhD granting institutions differed by ~0.3 on the (1-5) NSF rating scale, an amount judged not to be significant compared with the dispersion in ratings.

- There is a slightly lower success rate for proposals from PhD granting institutions, compared to non-PhD granting institutions. The COV concluded that this was not a matter for concern because this statistic is skewed by the lower success rate for proposals requesting more than $1 million; these proposals are primarily submitted by PhD granting institutions.

Recommendations

Virtually all of the recommendations developed in the "Where" portion of the COV process are relevant to all aspects of the MRI program, and are accordingly included in the crosscutting recommendations. The COV, however, does make one recommendation concerned with increasing participation of MSIs in this program.

- The COV recommends that NSF increase outreach efforts to MSIs to encourage greater participation in the MRI program as both proposers and reviewers.

"WHO"
Women, Minorities and New PI's

The COV evaluated a number of proposal jackets and statistics for all MRI actions, in order to gain a perspective on the numbers and success rates of MRI proposals involving women, minorities, or new Principal Investigators. Overall, the COV was quite pleased with the performance of the program. More detailed findings and recommendations follow.

Findings

- MRI proposals with minority or women involvement have had success rates comparable to proposals without minority or women involvement.

- The COV found it was very difficult to evaluate the submission rate of proposals including women and minorities, relative to their representation in their particular NSF disciplinary area. The NSF collects the information on representation, and it would be very useful to provide such data to a future COV. A recommendation related to this finding is a portion of the crosscutting recommendation for disciplinary COVs.

- The COV found that participation in the MRI program by women, minorities and new PIs has not increased, a consequence of the fact that the numbers and proportion of women and minorities who have submitted MRI grants has remained constant.

- The COV found that women and minorities are less likely to be the lead PI and more likely to be a co-PI on MRI proposals.

- A small number of MRI proposals are returned without review, as a consequence of the proposal failing to meet some submission requirement(s). Proposals involving new investigators were much more likely to fall into this category.

Recommendations

- The MRI program should consider possible mechanisms to increase the submission of proposals by women, minorities and new PI's; for example, by expanding or modifying outreach programs focused on this objective.

- The COV recommends that the NSF develop tools and procedures aimed at reducing the number of proposals returned without review. Mechanisms could include providing model MRI proposals and/or a check-list of requirements for each section of the proposal.

FY 2010 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: June 10-11, 2010
Program/Cluster/Section: Major Research Instrumentation
Division: Office of Integrative Activities
Directorate: Office of the Director
Number of actions reviewed: **Awards: 156** **Declinations:** **Other:**
Total number of actions within Program/Cluster/Division during period under review: **Awards:** **Declinations:** **Other:**

Manner in which reviewed actions were selected:

The methodology for sampling of Jackets for the COV follows. In the given Fiscal Years of 2005 to 2009, the MRI program made 3,932 actions (either award or decline) on competitive proposals. To limit the volume of data that the MRI COV must review, it is suggested that each COV member familiarize him/herself with all 12 actions. Given a total of 13 COV Members, this yields a total of 156 actions for examination by the COV.

Given the interest in providing proposals that touch on a variety of portfolio areas, such as institution type, state of origin, women, minority or new PI involvement, discipline, award size, etc., a random sampling was used to provide a balanced look across the MRI award and decline portfolio. Actions were chosen based on their attribution to at least one of the following categories:

1.) What They Are

a. Example of an Acquisition or Development
b. Example of a Large or Small Award

2.) Where They Go

a. PhD-granting, Non-PhD granting or Non-Degree granting institution
b. Minority Serving Institution
c. Geographic (EPSCoR)

3.) Who They Enable

a. Proposals with PI-Women Involvement
b. Proposals with PI-Minority Involvement
c. Proposals with New PI Involvement

4. 4.) What They Do

a. Disciplinary representation of proposals
b. Multi-disciplinary proposals

5.) Challenging Decision

a. Potentially Transformative
b. High-Risk/Reward
c. "Easy Award" or "Non-Easy Award"

"Easy-Declines" or "Non-Easy Declines"

PART A. 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 under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

A.1 Questions about the quality and effectiveness of the program's use of merit review process. Provide comments in the space below the question**.** Discuss areas of concern in the space provided.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	**YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE[1]**
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: If staffing allows, additional steps would be desirable. There should be planned site visits prior to awards above some threshold (perhaps > 1 million) and include discussion with institutions about their support. There should be institutional accountability for previous MRI awards as part of the MRI proposal process. See main text for a more complete discussion.	Not completely
2. Are both merit review criteria addressed a) In individual reviews? b) In panel summaries? c) In Program Officer review analyses? Comments: A qualified YES, based **solely** upon the limited number of jackets that could be reviewed in the time available. Source: Jackets and data on pages 37-38 of the Data Book	Qualified YES

3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals? Comments: Some comments are substantive, while some are not. The COV found some of the comments perfunctory, even for proposals that were from new PIs, PIs from small institutions, and minority-serving institutions. See main text for discussion. Source: Jackets	Qualified YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: See main text for discussion. Source: Jackets	Yes
5. Does the documentation in the jacket provide the rationale for the award/decline decision? (Note: Documentation in jacket usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.) Comments: Further clarification about why something is funded or not would be helpful—particularly for the declines. Source: Jackets	Qualified Yes

6. Does the documentation to 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 or telephoned with diary note in jacket) of the basis for a declination.) Comments: See main text for discussion. Source: Jackets	Yes
7. Is the time to decision appropriate? Note: Time to Decision -- NSF Annual Performance Goal: For 70 percent of the proposals, **inform** applicants about funding decisions within six months of proposal receipt or deadline or target date, whichever is later. The date of Division Director concurrence is used in determining the time to decision. Once the Division Director concurs, applicants may be informed that their proposals have been declined or recommended for funding. The NSF-wide goal of 70 percent recognizes that the time to decision is appropriately greater than six months for some programs or some individual proposals. Comments: See main text for discussion. Source: Jackets and EIS data on page 34 of the Data Book	Yes

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

The COV would have preferred to see essentially identical review processes (e.g., ad hoc mail and panel reviews) carried out by each of the disciplinary areas. We recognize, however, the key role that the disciplinary reviews play, and the necessity for these disciplinary areas to operate according to their own norms and resources.

A.2 Questions concerning the selection of reviewers. Provide comments in the space below the question. Discuss areas of concern in the space provided.

SELECTION OF REVIEWERS	**YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE[2]**
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: See main text for discussion. Source: Jackets	Yes
2. Is there evidence that the program made an effort to use reviewers balanced with respect to characteristics such as geography, type of institution, and underrepresented groups? Note: The data available to NSF regarding reviewer demographics is limited by the fact that such data is self reported by the reviewers and only about 25% of reviewers choose to report this information. Comments: See main text for discussion. Source: Jackets and EIS data on pages 41-50 of the Data Book	Yes
3. Did the program recognize and resolve conflicts of interest when appropriate? Comments: See main text for discussion. Source: Jackets	Yes

4. Do you have additional comments on reviewer selection: NO

A.3 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE[3], OR DATA NOT AVAILABLE
1. Please comment on the overall quality of the research and research training activities enabled by the program. Comments: See main text for discussion. Source: Jackets and program information	Appropriate
2. Does the program portfolio promote the integration of research and education? Comments: See main text for discussion. Source: Jackets and program information	Appropriate

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3. Are awards appropriate in size and duration for the scope of the projects? Comments: See main text for discussion. Source: Jackets and EIS data on pages 51-54 of the Data Book	Appropriate
4. Does the program portfolio have an appropriate balance of: Innovative/potentially transformative projects? Comments: See main text for discussion. Source: Jackets and program information.	Appropriate
5. Does the program portfolio have an appropriate balance of instrumentation to enable Inter- and Multi- disciplinary research? Comments: See main text for discussion. Source: Jackets and program information	

6. Does the program portfolio have an appropriate balance of awards for small and large scale instrumentation? Does the portfolio support an appropriate balance of award sizes? Comments: See main text for discussion. Source: Jackets, program information, and EIS data on page 53 of the Data Book	Appropriate
7. Does the program portfolio have an appropriate balance of: • Awards to new investigators? NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant. Comments: See main text for discussion. Source: EIS data on page 66 of the Data Book	Appropriate
8. Does the program portfolio have an appropriate balance of: • Geographical distribution of Principal Investigators? Comments: See main text for discussion. Source: EIS data on pages 55-56 of the Data Book	Appropriate
9. Does the program portfolio have an appropriate balance of: • Institutional types? Comments: Source : EIS data on pages 57, 61, and 63 of the Data Book	Appropriate

10. Does the program portfolio have an appropriate balance across disciplines and subdisciplines of the activity? Comments: Source: Jackets and program information	Appropriate
11. Does the program portfolio have appropriate participation of underrepresented groups? Comments: See main text and recommendations for discussion. Source: EIS data on pages 59-60 of the Data Book	Appropriate
12. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports. Comments: Source: Program information	Appropriate
13. Additional comments on the quality of the projects or the balance of the portfolio: None	

A.4 Management of the program under review. Please comment on:

1. Management of the program. Comments: Strong and effective, but the small number of MRI staff limits the number of things that could be done to make the program even more effective. See main text for discussion.
2. Responsiveness of the program to emerging research and education opportunities. Comments: Appropriate, given available resources
3. Program planning and prioritization process (internal and external) that guided the development of the portfolio. Comments: Appropriate, given available resources
4. Responsiveness of program to previous COV comments and recommendations. Comments: A number of issues raised by the prior COV (desire for additional documentation on decisions, different formats for reviews in different disciplines) remain concerns. OIA/MRI personnel are aware of the issues and are attempting to address them, within the constraints that come from the distributed nature of the MRI program.
5. Additional comments on program management: None

PART B. RESULTS OF NSF INVESTMENTS

The NSF mission is to promote the progress of science; advance national health, prosperity, and welfare; and secure the national defense (NSF Act of 1950).

In this Section, the COV is asked to comment on (1) noteworthy achievements based on NSF awards in the portfolio under discussion; (2) ways in which funded projects have collectively affected progress toward NSF's mission and the strategic outcome goals of Discovery, Learning, and Research Infrastructure: and (3) expectations for future performance based on the current set of awards.

NSF investments produce results that appear over time. Consequently, the COV review may include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made.

In addition to identifying particularly noteworthy accomplishments or "highlights," the COV is encouraged to comment on the impact of NSF supported contributions to the field. For example, the COV report may include comments on NSF supported work in context of contributions to advance a field, impact of NSF investments to stimulate emerging new areas, and potential for transformative impact in research or education.

To assist the COV, NSF staff will provide award "highlights" as well as information about the program and its award portfolio. The COV is asked to use this information, members' own knowledge of the field, and other appropriate information to develop its comments for this section.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes ("highlights") as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 OUTCOME GOAL for Discovery: "*Foster research that will advance the frontier of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformational science and engineering."* This category includes NSF's disciplinary and interdisciplinary research in science and engineering, education research, and centers.

Comments: See main text for discussion.

B.2 OUTCOME GOAL for Learning: "*Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.*"

This category includes K-12, undergraduate, graduate, and postdoctoral education and training; public understanding of science; and lifelong learning.

Comments: See main text for discussion.

B.3 OUTCOME GOAL for Research Infrastructure: "*Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.*"

This category includes facilities, research instrumentation, and cyberinfrastructure.

Comments: MRI plays a very important role. See main text for discussion.

PART C. OTHER TOPICS

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

The main report text and a recommendation relate to a possible larger (mid-scale) instrumentation program.

C.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.

no comments

Please consider the following in your response:

The program's use of institutional submission limits

Appropriate. However, there is some concern that institutional submission limit may potentially limit the participation of women and minorities. NSF needs to make a strong statement that it is evaluating the participation by women and minorities in its proposals.

The program's use of an additional submission to support development activities

Appropriate, See main text for discussion.

The role of software and virtual instruments as major research instrumentation

Both are absolutely appropriate candidates for MRI support. Software and virtual instruments that are not appropriate for funding by other NSF programs could be supported by MRI. It should serve the specific scientific interest of a research community or be tied to a particular instrument. The software should be a final product deployed in concert with an instrument, a simulation tool (e.g., modeling software) or cyber-infrastructure. In all cases, it should be ready for regular research use by the end of the award period.

The potential role of MRI in meeting the need for mid-scale instrumentation costing more than $6 million (the current authorized cap depends on appropriations)

See main text for discussion.

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

C.4. Please provide comments on any other issues the COV feels are relevant.NSF would appreciate your comments on how to improve the COV review process, format and report template.

The COV feels strongly that this report template is almost an impediment to providing a useful COV report. It asks far too many, detailed questions, mixing critical and minor issues.

The template desperately needs to be rethought and simplified!

For the Major Research Instrumentation Program COV,

W. Carl Lineberger, Chair

Appendix I.

National Science Foundation

CHARGE TO THE COMMITTEE OF VISITORS

For the Major Research Instrumentation Program - a cross-Foundation program coordinated by the Office of Integrative Activities June 10-11, 2010

A. CHARGE TO THE COMMITTEE

In accordance with National Science Foundation (NSF) policy, the Committee of Visitors (COV) for the Major Research Instrumentation (MRI) program shall review the proposal actions and project outcomes of the program to provide NSF with an independent evaluation that:

(a) Assesses the quality, integrity, and transparency of program operations and program-level technical and managerial matters pertaining to proposal decisions, and

(b) Comments on how the results generated by awardees have contributed to NSF's mission, the attainment of NSF strategic goals, and MRI program objectives.

The COV for the Major Research Instrumentation (MRI) program is further charged to provide its findings and recommendations in these matters in a written report to NSF.

B. SPECIFIC DUTIES

The COV review of program management is to consider Major Research Instrumentation (MRI) proposal actions that were completed during five fiscal years: FY 2005, FY 2006, FY 2007, FY 2008, and FY 2009.

The portfolio of awards to be assessed includes MRI projects that are currently active or have been closed out during the previous five fiscal years. The COV review may also include consideration of significant impacts and advances that have developed since the previous COV review in 2005 and are demonstrably linked to MRI investments, regardless of when the investments were made, including incremental progress made on results reported in prior fiscal years.

Specific aspects of the MRI program to be addressed are:

(a) relative to the quality, integrity, and transparency of processes used to solicit, review, recommend, and document proposal actions:

- Selection of an adequate number of highly qualified reviewers who are free from bias and/or conflicts of interest;
- Appropriate use of NSF merit review criteria;
- Documentation related to program officer decisions regarding awards and declines, and the scope, duration, and size of projects;
- Balance of awards in terms of subject matter; emerging opportunities; high risk and innovation; size versus number of awards; new investigators; diversity of underrepresented groups; geographic distribution of principal investigators;
- Overall technical management of the program; and,
- Response of the program under review to recommendations of the previous COV review.

(b) relative to the contributions of the results generated by awardees to the attainment of program objectives and NSF's strategic outcome goals:

- The relationships among award decisions, program goals, and Foundation-wide programs and goals;

- Results, in the forms of outputs and outcomes of MRI investments for the relevant fiscal years, as they relate to the Foundation's current strategic goals and annual performance goals;
- The significant impacts and advances that have developed since the previous COV review and are demonstrably linked to MRI investments, regardless of when these investments were made; and
- Examples of new products or processes, or new fields of research whose creation can be traced to the outputs and outcomes of MRI-supported projects over an extended period of time.

C. REPORTING RESPONSIBILITIES

The COV Core Questions and Reporting Template for 2010 will be used to guide the assessment process and provide structure to the written assessment by the COV.

The Core Questions in Section B of the template are to be addressed in light of the NSF goals in the four strategic areas: Discovery, Learning, Research Infrastructure, and Stewardship.

For the strategic areas of Discovery, Learning, and Research Infrastructure, the COV should look carefully at the outcomes of the MRI award portfolio over time and report on:

(1) noteworthy achievements of the year based on MRI awards in each area;

(2) the ways in which funded projects have collectively affected progress toward NSF's goals in each area; and

(3) expectations for future performance based on the current set of awards.

For the response to the strategic goal for Stewardship, the COV should comment, where appropriate, on NSF providing an agile, innovative organization capable of supporting excellence in scientific and engineering research and education, including:

(1) improving the quality and transparency of the merit review system;

(2) utilizing emerging technologies for business application and customer service to improve access to critical program information; and

(3) expanding efforts to increase participation in the MRI program by underrepresented groups and diverse institutions throughout the United States, its territories, and possessions.

Appendix II: Members of the 2010 MRI COV

Stanley C. Ahalt
Renaissance Computing Institute

Yemane Asmerom
University of New Mexico

Joan Edwards
Williams College

Chester Gardner
University of Illinois at Urbana-Champaign

Laura Jenski
University of South Dakota

Patricia Knezek
National Optical Astronomy Observatory

W. Carl Lineberger, Chair
University of Colorado

Patrick Looney
Brookhaven National Laboratory

Douglas S. Luther
University of Hawaii

Carlos Rinaldi
University of Puerto Rico, Mayagüez

Uschi Simonis
San Francisco State University

Joseph Whittaker
Morgan State University

Lisa Zurk
Portland State University

Appendix III. Meeting Agenda

Major Research Instrumentation (MRI) Program Committee of Visitors

Meeting Agenda

June 10-11, 2010
National Science Foundation
Room 515 – Stafford II[1]
Arlington, Virginia

Thursday, June 10, 2010

7:45 am	Sign in/Light refreshments
8:15 am	Welcome and Introduction of COV Members and NSF Staff *Carl Lineberger, MRI COV Chair* *W. Lance Haworth, OIA Director*
8:25 am	Charge to COV – Purpose and Expected Outcomes *W. Lance Haworth, OIA Director*
8:35 am	Confidentiality and Conflict of Interest *Kathryn Sullivan, Senior Advisor, OIA*
8:40 am	MRI Program *Randy Phelps, MRI Lead Program Officer in OIA* *Craig Henderson, MRI Program Officer in OIA*
9:40 am	Review of MRI COV Template *Pamela O'Neil, Staff Associate, OIA*
9:50 am	Using e-Jacket for Proposal Review *Nick Proferes, Science Assistant, OIA*
10:05am	Review COV Charge and Process *Carl Lineberger, MRI COV Chair*
10:20 am	Break

[1] Unless otherwise indicated, COV sessions will be held in Room 515, Stafford II

10:30 am COV Review and Discussion (Closed Session)

Thursday, June 10, 2010 (con't)

Noon	Working Lunch (Closed Session) Box lunch to be delivered to COV
1:00 pm	COV Review – Breakout Groups (Closed Session) Rooms – TBD *currently 515 and BFA conference room on 6th floor of Stafford II are reserved; exploring if we can find space for all on 5th floor*
2:45 pm	Roundtable Discussion with NSF-wide MRI Management Team *OIA staff and Directorate/Office Technical Coordinators*
3:30 pm	Break
3:45 pm	COV Review and Discussion (Closed Session – Full Committee)
4:00 pm	COV Review – Breakout Groups (Closed Session) Rooms – TBD
5:30 pm	COV Review and Discussion (Closed Session – Full Committee)
6:00 pm	Adjourn
6:30 pm	Dinner at Dan & Brad's Restaurant in Hilton Hotel Private dining room
Evening	Access to the "Renoir" meeting room available (Located on the same floor as Dan & Brad's)

Friday, June 11, 2010

8:00 am	Report Preparation (Closed Session)
Morning	Breaks as needed
Noon	Working Lunch (Closed Session) Box lunch to be delivered to COV
1:00 pm	Report Preparation (Closed Session)
3:00 pm	Presentation of COV Findings
4:00 pm	Finalize COV Report (Closed Session)
4:30 pm	Adjourn