

EXECUTIVE SUMMARY

General Finding

The overall impression of the 2010 COV is that the EAR Instrumentation and Facilities program is remarkably effective and efficient in providing both operational and strategic support to the full spectrum of research and educational endeavors supported by the EAR Division. Under ever-present budgetary constraints, the program fulfills its mission of giving U.S. Earth scientists access to the tools they need and ensuring competitiveness in both research and education on the international scene. The COV perceives, further, that the program is managed with integrity and vision by program officers D. Lambert, R. Kelz and T. Boyd.

Despite this unquestionably positive overall assessment, the COV did identify a few areas where improvements can be made. These are summarized below, beginning with the three issues on which the division and directorate leadership sought specific advice from the COV.

1. Observation: **Broader impacts** (BI) continue to be addressed in a somewhat uneven fashion by proposers and reviewers, but in general the broader impacts of new instruments and facilities are easily and effectively articulated.

Recommendation: The BI criterion should continue to be used in the evaluation of every IF proposal, and the COV encourages the IF program officers and panels to remain flexible in their weighting of the intellectual merit (IM) and BI criteria. The best guarantee of fairness in evaluating and balancing IM and BI in the review process is communication with the scientific community re. expectations.

2. Observation: The disallowance of **cost sharing** beginning in FY05 has muddied the waters in the mail-review process and resulted in a large increase in program loading and reduction in budget effectiveness. More importantly, it eliminates the incentive for administrative buy-in and sustainability of instruments and facilities on U.S. campuses. In the final analysis, the elimination of cost sharing advantaged the rich universities, with little evidence that the poor universities gained very much. Reinstatement of cost sharing is therefore desirable and would provide tangible benefits to the NSF and U.S. scientists.

Recommendation: Given that the cost-sharing policy is set at the highest administrative level of the NSF, the COV recommends that the IF program officers prepare a proposal to reinstate a cost sharing requirement for equipment line items in IF proposals. A simple model following that of the MRI program would be desirable (but see more detailed discussion in section A4.5).

3. Observation: The current **mid-size infrastructure** gap between \$4M and \$100M is inconsistent with the IF mission of fostering the acquisition, development and access to a wide range of GEO research and educational tools and to the overall NSF strategic goal of enabling infrastructure and facilities for research and education. This gap also discourages forward-looking strategies designed to identify and plan for the next generation of large research facilities.

Recommendation: The COV recommends that the IF program officers submit a proposal to the NSF to establish a program for the support of meritorious projects falling in the “mid-size infrastructure” range. This might be accomplished in the short term by raising the cap on MRI proposals to \$10M or \$20M.

4. Observation: The review process is handled in a judicious and efficient manner in almost all cases, but the COV noted a few lapses in **effective communication with PIs** of declined gray-zone proposals, generally due to program officer overload and recourse to non-IF assistance.

Recommendation: The rotator position in the IF program (currently filled admirably well by detailee Tom Boyd) should be made permanent. Communications to PIs on particularly sensitive declinations should be written by one of the three program officers.

5. *Observation:* **The effectiveness, impact and reach of the IF program** may not be appreciated as widely as is desirable, both at the NSF and more broadly within the EAR research and education communities. Publications in *Science* and *Nature*—although unquestionably significant—are not necessarily the best indicators of long-term impact of the program on EAR research.

Recommendation: The COV suggests that the program officers ask all PIs in the program to submit a list of their top 10 most heavily cited publications arising from IF-enabled research, and to describe in layman's terms "What we know today that we did not know 10 years ago." These contributions could then be compiled and perhaps made available at the NSF web site.

6. *Observation:* Continuing along one of the themes of 2007 COV report, it was noted that some large facilities struggle with management issues years after their inception. **Effectiveness of facilities management** may become an increasing concern if changes are made to encourage mid-size infrastructure proposals, so it may be advisable to develop new strategies designed to promulgate best practices.

Recommendation: Optimize management quality by organizing an annual or semi-annual workshop at the NSF that would bring together managers and other representatives of various IF-supported labs and facilities for the purpose of discussing, designing and benchmarking best management practices in a scientific setting.