

## Response to Issues Raised by COV

1. Section A.1, Question 7: “Is the time to decision appropriate?”

*Comments: While three of the proposals considered were handled in a timely fashion, the competition for the management of NCAR went on for a very long time, stretching over at least three years (though the actual proposal from UCAR was reviewed in about six months). This lengthy process likely consumed an enormous amount of staff time and effort at UCAR, NCAR, and NSF. The CoV recognizes that as this was the first time this competition was conducted, great care had to be taken given the size of the award and the many complex issues involved, and many valuable lessons were learned. The CoV hopes that these lessons are preserved and used to inform and significantly shorten the process the next time around.*

It is agreed that lessons learned will help in shortening the review process in the future. In fact, these lessons are currently being applied in other parts of the Foundation with similar activities. It should be noted, however, that the entire recompetition process of an award of this size and complexity will always require a significant amount of time and effort.

2. Section A.2, Question 3: “Did the program recognize and resolve conflicts of interest when appropriate?”

*Comments: This “Yes” comes with a few caveats. ULAFOS needs to carefully vet reviewers for their personal interest in the outcome of a facilities proposal. There were reviewers for both the CHILL and DoW competitions that were or have subsequently become local major users of these facilities.*

Sensitivity to potential conflicts is always a major consideration during the NSF review process. In order to make an informed decision to support a national facility, however, it is important to solicit the opinion of former and potential users. Such opinions are necessary to obtain important information as to the facilities actual or potential performance with respect to community service. For both of the above mentioned competitions, a mixture of actual/potential users and non-users were employed in the reviews and the managing Program found the “user” reviews to be helpful and evenhanded.

3. Section A.2, Question 4: “Additional comments on reviewer selection?”

*ULAFOS should consider carefully the selection of reviewers for the expected proposals related to the new supercomputing center slated for SE Wyoming. This panel needs expertise not only in the construction of such large facilities, but also in the longer term impacts on the local economy, personnel, and operational strategies. Such large centers operated at a distance from the supported researchers present significant management and personnel challenges which the reviewers and ULAFOS staff will need to consider.*

*In a review of a facility, especially when there is the possibility of relocation, reviewers should be vetted for their interest in the outcome of the proposal.*

We are sensitive to the fact that the NCAR-University of Wyoming Supercomputer Center has many stake-holders, complexities and a host of challenges with respect to location of facilities relative to location of its users and primary support services. These factors will be taken into account in the selection of reviewers.

4. Section A.3, Question 2: “Does the program portfolio promote the integration of research and education?”

Second paragraph: *The training of the next generation of observational scientists and supporting engineers remains a challenge. The CoV recommends that ULAFOS encourage each supported observational facility to be particularly proactive in this regard.*

We concur with the importance of training students and early career researchers in the observational sciences. The ULAFOS has recently begun a new program whereby facilities can be requested and deployed only for educational activities. Additionally, the CSU/CHILL has a long history of garnering REU support. All large field Programs are encouraged to entrain students and many will attach REU programs to the field work. ULAFOS will continue to work with the science program(s), which support the field work, to provide training opportunities for observational scientists and engineers.

5. Section A.3, Question 7: “Does the program portfolio have an appropriate balance of awards to new investigators?”

*Our response is taken based on a literal reading of the question. A different approach to assessing this aspect of the ULAFOS’ program portfolio would be to examine the number of new investigators attracted to use these facilities or numbers of graduate students and post-docs trained using these facilities. Unfortunately, the data currently being collected by the facilities regarding their user community does not allow such an examination to be made.*

We concur with the COV that, given the nature of the awards in ULAFOS, the more relevant metric would be an analysis of the career status of users of the facilities rather than the principal investigators. For future COVs, the Section will endeavor to make such information available.

We would further suggest that information on the demographics of researchers who are collaborating with NCAR scientists (e.g. co-authors) would be informative.

6. Section A.3, Question 8: “Does the program portfolio have an appropriate balance of: geographical distribution of Principal Investigators?”

Second paragraph: *The CoV recommends that the ULAFOS consider competing facilities such as the DoWs and the CHILL Radar with an eye toward moving*

*them around the nation. If such competitive awards are made in a fashion similar to the UCAR/NCAR award (initial five year, followed by a review to confirm a second five years = ten years), that would see a move every decade, which seems reasonable. With the maturing of the university based atmospheric science programs in the U.S, the CoV anticipates that several universities might be interested in bidding on hosting one or both systems.*

There are technical difficulties to such a recompetition for the NSF does not own all components of these facilities. Nonetheless, as the cooperative agreements expire, NSF will evaluate the issues of the continuing need for such observational capabilities and whether or not continuation with these specific facilities results in the best solution to satisfy this need.

Third paragraph: *The ULAFOS might also from time to time use the RFI process to assess the interest of the broader university research community in developing new community facilities, such as ones for small UAVs for atmospheric research or small scientific ballooning. Similarly there would be an opportunity to insert instruments with newly evolving technologies into the pool of observational instruments or instruments that address new scientific questions as earth science knowledge evolves.*

Currently, assessment of new areas of facility investment is made via several mechanisms, which often involve the entire Division and not just ULAFOS. For example, in 2008, the Atmospheric Sciences Division issued a solicitation for mid-sized facilities. The twenty-two pre-proposals that were received effectively fulfilled the purpose of a RFI. Several proposals were funded after review and consideration of ongoing costs of operations. Additionally, the Earth Observing Laboratory of NCAR in concert with NSF hosts workshops and uses other mechanisms to obtain advice on potential new facilities. Outside this process, the science programs identify through similar mechanisms potential areas of investment in observational facilities.

7. Section A.3, Question 9: "Does the program portfolio have an appropriate balance of: Institutional types?"

*Comments: There have been no direct investments made at minority serving institutions in this portfolio. While several such institutions may benefit indirectly, such as through opportunities for their faculty and students, more needs to be done to directly assist such institutions in producing minority scientists for the future workforce.*

It is agreed that directly entraining minority institutions and their researchers should be aggressively pursued. It should be noted that **direct** investments are made by the entities supported by ULAFOS and via other organizations in GEO. NCAR is making progress in the area and has an MOU with four HBCU and they are currently firming-up specific activities with these institutions including having already identified NCAR scientists who will travel to the HBCUs to give seminars and explore areas for research collaboration (the latter activity also includes supporting

visits to NCAR by the faculty of the institutions). The Section does and will continue to work with existing organizations and programs (e.g. NCAR; SOARS) to enhance their efforts and develop new approaches to entrain underrepresented groups in the sciences.

8. Section A.3, Question 11: “Does the program portfolio have appropriate participation of: underrepresented groups?”

*There are few minorities or women in leadership positions at UCAR or in the other facilities management teams.*

UCAR and NCAR recognize the importance of addressing this issue and actually, over the last few years NCAR has made progress in this regard. The total number of women and minority scientist (“ladder” scientist) have increased from 17 to 36 and 14 to 25, respectively from 2001 to 2008. In the same time frame, these numbers include going from zero to 3 minority/women scientist at the director level. UCAR is well into the production of a workforce management plan which will further address this issue, among others. The expectation is that the implementation of this plan, which NSF will be fully apprised, will be influential in shaping the future direction of the UCAR and NCAR enterprise.

9. Section A.4, Issue 2: “Responsiveness of the program to emerging research and education opportunities.”

*With respect to education, training, and outreach, ULAFOS needs to establish metrics for all supported facilities and see regular reports in this area.*

A good suggestion that will be pursued with the facility managers.

10. Section A.4, Issue 3: “Program planning and prioritization process (internal and external) that guide the development of the portfolio”.

*While there was evidence in the materials provided showing that ULAFOS staff had consulted the community on computing needs, it was not clear from the provided materials how decisions on priorities for observational facilities were made. (The CoV recognizes that the NCAR planning documents may indirectly reflect such community input.)*

NSF is entering into the second phase of a community-wide facility assessment activity with an emphasis on identifying gaps in observing facilities available to the community, recommending mechanisms for a systematic process for identifying future facility needs and examining opportunities to enhance education and training of observational scientists. With respect to NCAR, it has well established procedures for setting scientific and facility priorities. These include internal as well as external advice and NSF staff is involved in such activities. Observational facilities outside of NCAR are investments made by the science programs using a variety of advisory mechanisms/considerations. The section will endeavor in the next COV to provide better documentation of these processes.

11. Section A.4, Issue 5: “Additional comments on program management”.

*The ULAFOS team needs to consider how it describes its relationships with UCAR and NCAR (and other cooperative agreement holders). For example, the appearance of “UCAR” in the section name and on ULAFOS organizational charts blurs the distinctions between UCAR management, the NCAR science and facilities programs, and the ULAFOS team. Sharpening these distinctions will in the long run be good for ULAFOS, UCAR, NCAR, and the science. The CoV suggests that ULAFOS develop a written document that spells out these distinctions and a style sheet to be followed in the preparation of documents in this area.*

Point is well taken. The Section will undertake these tasks including consideration of a name change.

12. Section B.1: “Outcome Goal for Discovery” and Section C.5, “NSF would appreciate your comments on how to improve the COV review process, format and report template.”

Section B.1 (second paragraph): *2) Beyond the anecdotal reports – some of which describe interesting work – contained in Tab E of the briefing book, the CoV was provided with little information regarding the overall scientific outcomes from the various facilities.*

Section C.5: *Since these facilities are to be community resources, it is important to show that there is good return (in terms of community use) on the NSF investment. The ULAFOS needs to provide more quantitative information on “Results of NSF Investments”. The information provided is nice but largely anecdotal. The ULAFOS should have each supported facility collect and report annually in common format detailed user information (how many, who, hours of use, dollar costs by user, brief project summary, etc...), including listings of publications and other results produced by each user of the facility. Each facility should conduct an annual survey of its users during the past year to get feedback on its operations and provide to NSF a summary of the survey results and the response of the facility management team.*

The COV makes an excellent point and current information gathering procedures will be reviewed with facility managers to provide a consistent and thorough measure of the scientific, educational and training return on investment.

While the COV comments focused on facilities, similar data exists for NCAR scientific output and in addition to the scientific nuggets, more statistical information can be provided to the next COV.

13. Section B.2: “Outcome Goal for Learning”: and

Section: B.2 (first paragraph): *From the information available to the CoV, it appears that the work force at UCAR/NCAR and the other supported facilities is*

*indeed first class. However, it can not be described as broadly inclusive. Only a few minorities and women are found in senior positions and throughout the organizations. Some efforts are being made to rectify this situation, e.g., SOARS, but much more needs to be done. Consider initiatives and collaboration with geosciences faculty at targeted minority institutions.*

See Response to Issue #8.

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

Section C.1: *The ULAFOS should have requested that each supported facility develop a strategy and implementation plan for increasing diversity in both leadership and staff roles, and submit annual progress reports. Additionally, in recognition of the aging scientific workforce, each supported facility needs a plan to recruit and promote younger scientific/engineering staff to prevent loss of technical expertise and experience.*

As noted in the response to issue #8, UCAR/NCAR is undertaking a workforce management plan that is addressing issues of diversity within the organization. NSF will be appraised of how UCAR/NCAR intends to implement the recommendations from this plan. Further, progress in this regard is part of the annual evaluation of the Center and will be a focus of the mid-award review of the Center.

For the smaller facilities, such issues are generally within the purview of the managing institution (e.g. the managing university). Nonetheless, review of these facilities include efforts of diversity.

15. Section B.2: "Outcome Goal for Learning":

Section B.2 (second paragraph): *The CoV takes note of the efforts, particularly at NCAR with the development of the museum aspects of the Mesa Laboratory, to reach out to the wider citizenry in terms of science education. The UCAR website also provides many useful materials for the K-12 community. What appears to be lacking is a well-framed, comprehensive, coherent effort involving all the ULAFOS programs in reaching out to the general population.*

The COV notes the efforts of NCAR in informal education. The smaller facilities, however, do not have the resources to take on major activities in informal education. Their educational resources are focused on the observational training of graduate, undergraduate and K-12. NSF believes this is the correct focus for these entities.

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

Section C.3: *The ULAFOS needs to consider and clarify its role in education and outreach, as carried out by UCAR/NCAR and the other facilities for which it provides oversight.*

The role of ULAFOS is the same as any program at NSF. The Section encourages, facilitates and evaluates the activities of NCAR/UCAR and other facilities using the standard NSF criterion that applies to this issue.

17. Section C.4: "Please provide comments on any other issues the COV feels are relevant."

Second paragraph: *The review that will precede the decision on the five-year renewal of the cooperative agreement to manage NCAR should include an assessment of the management performance of UCAR as well as the quality of science produced in NCAR.*

UCAR management performance is evaluated each year and will be one of the areas of focus of the mid-award review. Likewise, it will remain a focus of any renewal proposal.