

1998 [NRAO](#) USERS COMMITTEE REPORT

July 12, 1998

The Users Committee met June 4-5, 1998, in Socorro, New Mexico. The meeting was chaired by Donald C. Backer, UC Berkeley.

GENERAL ISSUES

Director's Response. The Committee recommends that a standing agenda item be added at the start of future meetings: Director's responses to issues from the previous meeting. This would serve to inform the Committee of the status of the preceding year's concerns, thus eliminating needless discussion on items already resolved. Further, a short Committee discussion directly preceding the Director's response will further be useful to discuss briefly the previous year's report.

Meeting Format. Although the presentations at this year's meeting were interesting and informative, the Committee feels strongly that some presentations were excessively technical and not directly relevant to users. The Committee recommends that future presentations be oriented more toward user issues and their needs. In addition, the Committee recommends that presentations be geared more toward future NRAO research and development plans and how these plans will affect current and future users, rather than presentations on current development. This emphasis needs to be balanced with general introduction of Committee members to progress and problems at the various sites since many will not be familiar with all sites.

At several points during the UC meeting, such as during discussions of the C-Short configurations, members of the committee reported being unaware of various issues and were exhorted by NRAO that "it's on the Web." Although the Web pages that NRAO maintains are an excellent source of information when you know what to look for (and when), the Web should not be the primary method of informing the user community of developments. We suggest that NRAO take a pro-active step and institute use of electronic newsletters (such as the MMA Newsletter which is to be commended in this regard) or listserv. User meeting materials need to continue to be by hard copy.

Committee Role. The NRAO Users Committee meeting is an excellent forum both to remind users of other forums where their collective voice can have an impact on radio astronomy issues--CORF, URSI, AAS, and IAU--and to explore new approaches to improving support for ground based astronomy.

In fact, the U.S. radio astronomy community is not as well organized as it should be given the importance of the planned projects and international developments to the future health of the field. We suggest that the User Committees of NRAO, NAIC, as well as the university-based facilities delegate representatives to act as a standing committee on ground-based radio astronomy for the benefit of the community. We feel strongly that advocacy at the user level, and not just the "top" levels as represented by the many other advisory committees, is important to the long-term health of radio astronomy in this country and internationally. Such a committee could be sponsored by the AAS and cover users of all [National Science Foundation \(NSF\)](#) ground-based astronomy. The NAS/NRC Decade Review panel on radio astronomy can serve in this area over the coming year.

[VERY LONG BASELINE ARRAY](#)

The Committee welcomes the development of VLBA calibration transfer, pulsar gating, and automatic tape allocation. With these capabilities the VLBA is becoming more and more a "user friendly" instrument. The Committee recommends that the NRAO take a more proactive role in advertising the ease of use of the VLBA in order to attract more users, particularly those potential users who still consider VLBI to be only for "black-belts." To this end we have a recommendation:

Provide a limited, automated reduction/imaging process for the subset of projects that are relatively simple. The final products of this preliminary reduction would be both a "first-look" image and, importantly, a history file or data reduction template that can be edited and run by the inexperienced user to generate the final map.

The Users Committee is sensitive to the fact that NRAO personnel have a large number of complex projects in which they are involved. However, we believe this tool could be implemented with relatively little effort and, at the same time, have large returns for the user community.

We welcome additional suggestions from NRAO staff that may further simplify the user interface to VLBA data reduction. The AIPS++ "simple-image" task which was demonstrated at the meeting could evolve in this direction. A procedure to provide simplified, if crude, fast data reduction paths for the VLBA will serve as a testbed to determine if similar automated reduction/imaging processes would be useful for the MMA and the VLA.

ASTRONOMICAL IMAGE PROCESSING SOFTWARE

AIPS. The Committee regards classic-AIPS as a necessary and important resource for the user community, one which must be maintained and supported by NRAO with the highest of priorities. The development of AIPS++ as a follow-on package is eagerly anticipated. However, the further transfer of manpower from the AIPS project to AIPS++ is a matter of great concern. Staffing of the AIPS project should remain at no less than current levels for as long as is necessary until AIPS++ demonstrates equal capability for the processing of VLA and VLBA data, and equal freedom of bugs. The weakening of NRAO support for AIPS could adversely affect a large majority of NRAO users and especially users of the VLBA, for whom AIPS++ is not expected to be generally useful for many years. Since a fully functional version of AIPS++ is far off, the Committee urges NRAO to continue both servicing of ongoing AIPS bug reports and the development of new capabilities that may be achieved efficiently by the experienced, long-time AIPS programmers. The 1998 releases of AIPS have already introduced significant improvements with the incorporation of CVX AIPS into classic AIPS. Because AIPS++ will be a significant step forward in concept and execution when it is ready, the availability of an augmented AIPS package will not detract significantly from the appeal of AIPS++.

AIPS++. Although the production of new lines of code continues at a prodigious rate, the pace of beta releases has slowed to a crawl. The GUI interface and "simple-image" basic utility demonstrated at the meeting are important steps toward a more user-friendly package, and it is hoped that further improvements will be made in both the software and documentation to address the concerns of the community regarding the usability of AIPS++ as a workhorse replacement for AIPS. The Committee agreed that the current mode of building up the unique imaging capabilities first and later working back through the calibration, editing, then data filling steps be continued, as opposed to the immediate change to a "full-path" approach advocated by the STAG. Deviation from this course would seriously jeopardize the progress toward the timely public release of AIPS++. In making this recommendation, the Committee most strongly encourages NRAO to take steps to ensure a public release in early 1999, e.g., a 15JAN99 target. Toward this goal, extensive in-house and consortium testing should take place in the Fall 1998 quarter, with a shifting of emphasis from coding of new features to the building of a robust and well-tested release with clear and concise documentation, a cookbook, and an extensive set of example

scripts to aid first-time users.

One way of "encouraging" users to AIPS++, when sufficient capability is available for synthesis imaging, would be a series of small attendance, two to three day intensive workshops (Berlitz-style) at sites across the U.S. For example, sites at Charlottesville or CfA, Illinois and Berkeley, or Caltech would provide regional focus and smaller groups (in comparison with 160-strong summer schools). Current beta users could contribute.

SPECTRUM MANAGEMENT AND RFI

RFI and spectrum usage pose a serious threat to the future of radio astronomy. NRAO must be at the forefront of the effort to protect U.S. radio astronomy's interests. The Users Committee makes the following specific requests and recommendations:

1. The Committee commends NRAO's careful and thoughtful handling of the IRIDIUM satellite emissions issue, especially the successful test observations carried out by observatory staff at Green Bank, the VLA, and Tucson. We urge NRAO to continue standing firm in its dealings with the FCC and Motorola, having now demonstrated the latter's violations of the terms of the 1996 MOU.

2. As IRIDIUM is clearly only the "tip of the iceberg," and since input from the community of spectrum users will likely be solicited by regulatory agencies, NRAO should take it upon itself to publicize (e.g., through the NRAO and AAS newsletters) spectrum management issues and to develop opportunities for radio astronomers to make their voices heard.

3. As astronomy and commercial communications interests move to millimeter wavelengths, competition for spectrum usage in this band, now fairly free for passive use, will become fierce. NRAO must be a key player along with its international millimeter array partners in new allocations negotiations to ensure that new astronomy bands are created at high frequencies. NRAO needs to encourage Chile to develop an electromagnetic radiation (DC to light) quiet zone at the Atacama plateau as this is increasingly a site for astronomy developments.

Site RFI. Among the site reports distributed to UC members, only Green Bank has provided a detailed description of [RFI](#) prevention and mitigation efforts. The Committee requests that we hear from all sites on their RFI monitoring, testing and mitigation efforts. In particular, new instrumentation efforts at Tucson and the VLA/VLBA should adopt Green Bank's practice of testing all new equipment for spurious emission that could interfere with astronomical observations, and of documenting and acting on the results of this testing.

GREEN BANK

Green Bank Telescope (GBT)--Telescope Construction. The Committee is deeply disappointed at the news of this most recent lengthy delay in the construction of the GBT. We urge NRAO to remain vigilant in its oversight of the contractor throughout the final stages of construction and the contract arbitration period.

GBT--User Issues. The Committee is pleased to learn of the appointment of a lead manager for software development for the GBT. In this role, G. Hunt has catalyzed the release of version 2.7 of the GBT Monitor & Control software--we look forward to the inclusion of new capabilities, such as control of the Spectral Processor,

in future releases. To collect feedback from a large user base, we urge that the system be demonstrated and discussed in as much detail as possible at the upcoming [GBT science workshop](#).

The Committee endorses the hiring of the first GBT operators and their present roles providing input to the development of the operator's and user's interfaces. As pointed out elsewhere in this document, we stress to NRAO staff the importance of addressing specific user issues in presentations made to this Committee--while engineering developments to date are certainly of interest, we are concerned that decisions about future systems (such as user interfaces) are being made without user input. We urge NRAO to better communicate their plans for interfaces to the telescope and the GBT correlator to the user community, before procedures are "written in stone." Though we appreciate the difficulty of finalizing design decisions in the midst of a clamor of competing ideas, input from the user community is essential to minimize future discontent and possible waste of effort in needless redesigns.

[140 Foot Telescope](#). Given the delays in the GBT construction schedule, the 140 Foot Telescope should remain in operation through most of 1999. The 140 Foot continues to serve as a testbed for GBT systems, and its operation insures that there will be continuous astronomical research at Green Bank. If pressure on staff members actively involved in GBT operation development is sufficiently high, then reduction of 140 Foot operations to five to six days per week is acceptable. Additional calls for proposals should be made as appropriate. We urge that the GBT spectrometer be made available on a limited basis to signals from the 140 Foot, even if its capabilities and data reduction software are not yet fully implemented.

VERY LARGE ARRAY

C-Short Configuration. The Committee was asked to comment on whether to replace the normal C configuration with the short C configuration, with the saving of several antenna moves. The short C configuration samples a wider range of spatial scales, with (according to tests) no apparent loss in image quality at the usual C configuration scales. The Committee felt that this would probably be acceptable to most observers (particularly since only one antenna is reconfigured and often one or more are unavailable), but was unsure whether observers carrying out spectral-index measurements in scaled-array projects (where the uv coverage is matched at two frequencies, e.g., A+C configuration data at 20 cm and B+D configuration data at 6 cm) might object. The Committee therefore suggests that tests of the effect of using C-Short rather than C configuration in scaled-array projects be carried out (using either existing data or models). The results should then be communicated to current C-array proposers and they should be polled by e-mail to determine whether there is any scientific objection to replacing C with C-Short.

Modcomp Upgrade. The Committee notes with alarm the fact that Modcomp is likely to terminate support for the computers currently used for the on-line systems at the VLA within two years, whereas it may take four years for current staff to rewrite the on-line code for an alternative platform. The Committee urges that prompt action be taken to prevent the prospect of a failure of the on-line system before the replacement platform is ready. A failure would paralyze the VLA. If Modcomp is unwilling to extend support or if sufficient surplus Modcomps can't be found to ensure sufficient spare parts, then additional resources may be needed to accelerate the rewriting of the on-line system.

VLA Upgrade. The User Committee is very supportive of the [VLA Upgrade Project](#) and is looking forward to the eventual submission of an Upgrade Proposal to the NSF. The Upgrade meeting set for 1998 June 29-30 will be well-attended by members of the user community (including representatives of this Committee). We are pleased that some aspects of the upgrade (such as K-band and Q-band upgrades, and the fiber optic link to Pie Town) are being implemented now through the NSF MRI program. However, an unfortunate side-effect of the MRI channel is that the projects chosen for implementation are based on the NRAO's ability to find funding partners rather

than on priorities set by NRAO staff and users. The VLA/VLBA is an important, versatile, and above all accessible observational resource for the entire astronomy community, and we feel that implementation of the coherent plan proposed by the VLA Upgrade Project is crucial to maintaining the VLA and VLBA as flagship instruments.

TUCSON

The Committee thought that the ten percent maximum time allocation on the 12 Meter for MMA-related testing was reasonable, given the present modest proposal pressure, and the importance of the MMA for the millimeter community. Use of the 12 Meter for 3 mm and 1 mm VLBI is appropriate to support the emergence of imaging capability in these bands. In particular, the 12 Meter provides important UV coverage for the rapidly growing 3 mm VLBI capability in the U.S.

MILLIMETER ARRAY (MMA)

We are pleased to hear that a Project Scientist has been appointed. The Project Scientist is the key person to act as a liaison between the general community and various aspects of the those involved in day-to-day design issues--engineers and scientists.

Some of the Committee expressed concern that the decision to build a prototype antenna with a 10 m diameter might have a negative impact for the prospective partnership with the Europeans. The difference between a millimeter array with and without the Europeans is much greater than the differences associated with dish diameters of 10-m or 12-m. On the other hand others don't want to see the now funded U.S. development delayed while waiting for partners to respond on details such as antenna design. Yet others think that 10-m is too large.

A number of questions were raised about user input to the MMA project. While there are many advisory committees for the MMA already, none represent the general (non-NRAO, non-BIMA/OVRO) U.S. user community. We concur with MMA's MAC (1998 April telecon) that a mechanism to reach these users be established.

OTHER

Central Development Laboratory. The resources of the CDL have been stretched lately by the competition between the needs of NRAO telescopes and the development of amplifiers for outside users (in particular, the large-scale MAP project). NRAO's commitment to the MAP project and other cosmic microwave background experiments has clearly enhanced the capabilities of the CDL, providing equipment not otherwise available in the current fiscal climate. CMB work is also of fundamental scientific interest, which is further justification for NRAO's involvement in such projects. Nevertheless, we are concerned that large-scale outside projects may be disruptive to ongoing small-scale projects both inside and outside of NRAO. We urge NRAO to carefully consider these issues before acceptance of large outside commitments, especially with the ramp-up of MMA design and development. It is also urged that weaknesses in the fabrication capabilities of the CDL turned up during the course of MAP and other HEMT construction, the building of the 3 mm multi-beam system, and other recent programs be addressed by the lab management and NRAO.

Outreach. While NRAO has several ongoing public outreach efforts (e.g., teacher workshops at Green Bank, tour centers, community programs), some committee members are concerned that the current level of outreach and education is inadequate given the increasing emphasis placed on such efforts by the astronomy community and by funding agencies. On other hand we are aware that NSF historically has not provided funds for such things as tour centers. NRAO should seriously consider the appointment of a full-time staff member charged with coordinating the educational activities of the various NRAO facilities and groups, as well as formulating a comprehensive outreach program for the future decades. (Note that during the meeting there was extensive discussion of the level of PR in the press and other media. In fact this is only a small part of outreach and it should be the primary goal of NRAO in this area to bolster its presence in schools around the country and in the communities in which its facilities are located.)

A number of the users (especially the younger members) are currently engaged in a variety of outreach efforts, and NRAO could draw upon, as well as enhance, the expertise in the community in this regard. As in the previous year's report, we ask NRAO to include Public Outreach and Education as an agenda item for next year.

Don Backer, Chair