Scientific Advisory Committee for EVLA
2008 December Report

The SAGE held its second face-to-face meeting on December 19 and 20, 2008 at the DSOC immediately following the first EVLA Workshop; attendees are listed below. The Committee was tremendously impressed 1) with the first results from the Prototype Correlator shown at the Workshop, 2) with the major progress in all areas that has been made since its last meeting, and 3) with the palpable sense of excitement surrounding the project. Several members noted the change from the last meeting – the EVLA has gone from being a project in the distant future to a proximate reality. We believe it will now be much easier to generate community interest and engagement as real spectra and images become available and the enormous power of this new instrument begins to intrude on the research plans of more and more astronomers. Specific suggestions for spreading the word are given below.

Charge 1: Based on the baseline capabilities described to the SAGE in the presentations that began its present meeting, the Committee is asked to recommend a process to involve the community to propose early science experiments for the EVLA that would highlight and exploit the instrument's new scientific capabilities.

The Committee believes the best guarantee of producing exciting early science from the EVLA during its commissioning period will derive from having enthusiastic and experienced scientists from both within the Observatory and from the larger community pursuing their research. We thus applaud the creation of the RSRO program; detailed comments on this program are given below. We also believe it is important for commissioning scientists within the Observatory to be allocated the resources required to pursue first-rate science. Thus, we recommend that Observatory scientists who, over the next three years, will play major roles in the commissioning process be designated clearly, and that the time allocation proposed for them be increased from the current 200 hours per year. Furthermore, we recommend that scientifically useful, calibrated data arising from WIDAR-0 tests should be made publicly available immediately through the archive and announced on the EVLA website and through the NRAO email

listserve; staff scientists should be encouraged to publish worthwhile results as part of the effort to inform the community of the power of the EVLA.

We also believe it is time to start spreading the word aggressively now that actual EVLA data exist. We recommend a special issue of the NRAO Newsletter focusing on EVLA which includes data such as that shown at the Workshop by Michael Rupen, the implementation schedule and details of observing capabilities, descriptions of the RSRO and OSRO programs, etc. We also recommend a short article (with a spectrum!) be prepared for the AAS Newsletter. In addition, we regard it as important that the EVLA Status website be kept current; this is the primary venue for the community to track EVLA progress and formulate their own research plans. Detailed timelines of the growing capabilities of the instrument should be made available and kept current. Plans for future Workshops are given below.

In addition, we are currently pursuing the possibility of having a special session at the Pasadena AAS meeting in June on EVLA. This would be a scientific session rather than a Town Meeting format and, again, will include a selection of astronomers whose science will be significantly enhanced by EVLA.

Charge 2: Based on scientific potential, the SAGE is asked to recommend the next steps after the VLA emulation mode.

The early availability of the high frequency bands has shaped our recommendations on this issue. We recommend the following:

1) Maximizing bandwidth is the highest priority.

2) Owing to the need for better velocity resolution for Galactic science projects, we recommend that recirculation be implemented for use in the high-frequency bands (in which the simplest configuration of adjacent frequency bands is employed) as soon as practical.

3) High-frequency operation also places a premium on improved reference pointing, which we thus recommend be given some priority among the many tasks to be accomplished.

4) Of the possible enhancements listed, we recommend that phased-array operation and VLBI compatibility be given priority over "radar" mode , burst-mode, or pulsar capabilities; it would be desirable for this to occur in the first year of full correlator operations. RSRO proposals that involve this capability should be given careful consideration.

5) Among software priorities, we recommend that parallelization of basic calibration and imaging tasks relevant to wide-bandwidth data be given priority, as these are the areas that will affect most users and will allow spectacular early science results to emerge.

6) In general, some concern was expressed as to whether sufficient analysis of the impacts and a prioritization of tasks have been completed for both the algorithmic development and the major software efforts necessary for the productive commissioning of the facility.

7) We note that the baseline plan is to freeze the OSRO modes to the VLA emulator configuration throughout the 2010-2012 period. We strongly urge the Observatory to consider opening up new modes to OSROs after they have been thoroughly tested and shown to function by RSROs and resident staff.

Charge 3: The SAGE is requested to recommend whether to hold workshops based on facilities or on scientific focus. Accordingly, the SAGE is asked to propose topics for the next science workshop in 2009.

There was general agreement that the first Workshop, organized over a very short period and held at a difficult time of year for many astronomers, was a success at many levels. All reported 1) having learned a lot (the mark of a good meeting), 2) being excited by the EVLA-specific talks, 3) being encouraged by the number of young astronomers in attendance, and 4) being energized to plan future EVLA projects. We are thus enthusiastic about continuing the Workshop series.

We reconfirm our recommendation from last time that meetings should have a scientific focus. However, the majority also felt that an important aspect of the meeting was its location – at the site where the EVLA

activity was happening. Thus, while our next proposed meeting will certainly provide an opportunity to include talks relevant to ALMA science, we felt strongly that the next meeting should be in Socorro. We will also work with ALMA Workshop organizers to assure that EVLA science is included in their programs. There was agreement that even more should be done to bring in astronomers working in other wavelength regimes and to again include relevant theorists. There was also agreement that the meeting should be four days long. There was no consensus as to whether it should be larger, smaller, or the same size.

Indeed, enthusiasm for this enterprise was sufficiently high that we have chosen a topic, selected a tentative date, and nominated an SOC Chair. We propose to hold the meeting May 26-29 with a focus on some of the Milky Way science that can be advanced by EVLA. We intend to focus on stars on and off the main sequence. Karl Menten has agreed to Chair the SOC. A future workshop might focus on topics such as Milky Way surveys and astrochemistry, and could usefully be joint with ALMA.

Charge 4: NRAO is establishing a Resident Shared Risk Observing program for EVLA commissioning. Please comment on the program and its ability to provide early exciting scientific returns during the commissioning process.

As indicated above, we are enthusiastic about the RSRO program. We have the following specific recommendations for the program's implementation:

1) The NRAO should release as soon as possible in the new year a call for letters of interest in the program. This call should include a description of the Jan 2010 configuration, possible scenarios for evolution beyond the basic functionality, the expectation that RSRO's should propose projects that will push the capabilities of the new instrument, and a clear description of the expectations that a RSRO is required to meet. The purpose of this is to gauge the level of interest in the community and to assess the size of the likely program and its impact on the commissioning.

2) Respondents should reply with a letter that provides the proposal topic (but not a complete proposal), their degree of commitment, a schedule for

their visit in the 2010-2012 window, and their proposed contributions to the commissioning effort.

3) If warranted by the response, a one-day meeting could be held in conjunction with the next EVLA workshop to explore the details of the program and answer potential participant questions.

4) RSRO proposals could be due at the Oct 1 proposal deadline; these should be evaluated by NRAO and selected on the basis of maximum benefit to the commissioning effort (including quality of science as well as net contribution to the commissioning program).

5) We recommend that graduate students be allowed to accompany their faculty advisors with the proviso that the advisor takes primary responsibility for managing the student's efforts.

6) We agree that the proposed minimum of three months in residence is appropriate.

7) We agree that the scale of time allocation is roughly right, but recommend that flexibility be maintained; as noted above, we believe the time allocation for internal people working extensively on commissioning be increased – our premise is that the rewards for doing the hard work of commissioning the instrument should be comparable for those inside and outside the Observatory.

8) On a tangentially related note, we believe it is important that the double D-array block and the proposed change in the configuration cycle (both of which we endorse) be announced as soon as possible.

9) Our main concern with this program is that the software support may not be available to allow RSROs to be effective in testing all instrument capabilities and producing science from the facility. RSROs should be expected to test CASA software, work on data reduction algorithms, and debug data from the correlator, but they are unlikely to write software for the correlator back end, for example. Thus, we recommend that some organized system be set up so that RSROs have access to appropriate staff and others to assure that their visits are productive and helpful.

10) We recognize the need for the RSROs to provide a net benefit to the commissioning work; we recommend that explicit goals be negotiated between NRAO and the scientists involved. However, we regard as unrealistic that these be viewed as legal agreements and/or involve the scientists' home institutions. Again, we believe the most effective contributions will be realized by getting the most experienced and enthusiastic scientists to come to NRAO and produce great science with this fabulous new instrument.

Charge 5: SAGE is requested to recommend strategies for commensal observations.

We appreciate the complexity of this issue and believe it needs broad discussion within the community.

In our last report, we recommended a process in which a call for commensal observing would be made after the selection of primary science proposals by the TAC. This would involve posting of approved proposals on a website, with a short turn-around time for secondary science proposals using the remaining correlator resources without impacting the original science goals. We continue to believe this is an approach worth trying. In addition, we suggest that a small number of standard observing modes be developed (perhaps just one for extragalactic and one for Galactic pointings) that would be employed in cases were no secondary science proposals are received. We do not feel sufficiently well-informed to design these modes now, but are happy to consider this matter as a continuing charge, and to address it once some experience is accumulated with the real correlator and data storage limitations are better defined. We suggest setting up a Wiki page on which to develop ideas for this process; it was also suggested that a Workshop be convened, perhaps in 2011 after some experience with the full correlator has been gained, to define standard modes.

According to the terms of reference of the Committee, one-third of the membership should rotate off following this meeting. We recommend consideration be given to appointing young members who will be the future users of this instrument and, given the early emphasis on high frequencies, that scientists with experience in these bands be included for consideration.

Our new Chair will be Karl Menten.

In conclusion, the Committee is impressed with the progress the project has made and is excited by the imminent prospects of new science from the EVLA. We continue to stand ready to assist in generating interest in the facility in the astronomical community and in helping the NRAO to optimize the upcoming commissioning period.

Attendees: D.J. Helfand (Chair), J. van Gorkom, S. Kurtz, L. Greenhill. A. Baker, K. Menten, J. Mohr, A. Barger, S. Dougherty, S. Vogel, M. Yun, R. Perley

Absent: S. Kulkarni, S. Baum, Z. Ivesic, K. Chambers, R. Ivison