

Minutes of OTC telecon, November 14 2005, 21:00 UTC.

Last revised 2005-11-17, DTE.

Present: Barry Clark, Darrel Emerson, Rick Fisher, Brian Glendenning, Tony Kerr, John Payne, Marian Pospieszalski, Art Symmes, Dick Thompson & John Webber.

Rick Perley also attended the first part of our meeting, to describe the gathering to be held in Socorro on 2005-11-14. (Ken Kellerman had also been invited, but because of travel was unable to call in.)

Agenda:

1. Introduction *(Darrel Emerson)*
2. The meeting with HIA in Socorro on 2005-11-17 *(Rick Perley)*
3. The CDL and NTC after ALMA *(John Webber)*
4. Future NRAO technical projects. *(Everyone)*
5. Outstanding projects including
 - o GBT track, progress *(Art Symmes)*
 - o ALMA Band 10 *(Tony Kerr)*
 - o Etc.
6. Action from the OTC

In practice the agenda was treated just as a guideline, with free discussion over all topics.

Presentations and Discussion

1. Introduction

The theme of today's meeting is future technical development at NRAO.

The meeting in Socorro later this week (see item #2 below) had originally been suggested by Peter Dewdney from HIA, as part of the NAPRA agreement. In June 2003 NRC had pledged \$50M for International Astronomy Projects. The NRC "Long Range Plan for Astronomy and Astrophysics" would be implemented in part through the Canada-U.S.

North American Program in Radio Astronomy (NAPRA), a bilateral arrangement which will offer Canadians access to the NRAO facilities on the same basis as U.S. researchers. A summary of this arrangement can be found in a 2003 News Release at http://www.nrc-cnrc.gc.ca/newsroom/news/2003/lrp_waterloo03_e.html.

2. Meeting with HIA to be held in Socorro on November 17

Rick Perley is the local organizer of this meeting, and described the intention. It is to be a small meeting with Peter Dewdney and Sean Dougherty from DRAO to discuss possible technical collaborations between NRAO and DRAO within the framework of NAPRA. Probably a major topic of discussion will be FPAs. This discussion is preparatory to a meeting in January 2006 between Fred Lo and the Director of the Hertzberg Institute to discuss extensions to NAPRA. The plan is to scope out any/all of the opportunities for collaboration and to discuss any barriers there might be, so as to get a full picture. This is more of a grass-roots approach that could lead to more concrete proposals. Here is the agenda:

Agenda for Socorro "Future NRAO/NRC Cooperative Activities Meeting"

Thursday, 17 Nov, 2005. Array Operations Center Auditorium

The meeting is designed to be a wide-ranging discussion of future cooperation between NRAO and HIA/NRC, principally in cm-wave astronomy.

Start 9:00 am

1. Background (Dewdney/Kellerman)

2. NAPRA Agreement:

- a.) Origin, review, lifetime, explanation.
- b.) How to fold future cooperative work into NAPRA.
- c.) Changes potentially needed to NAPRA, and extension.

3. Synopsis of plans and technical developments associated with medium and long term planning at NRAO. (Emerson)

4. Synopsis of plans and technical developments associated with medium and long term planning at HIA/DRAO. (Dewdney)

5. Historical Background and Status of International SKA project, from US and Canadian perspectives.

a.) Introduction to set the scene. (Kellerman/Dewdney)

b.) NRAO Perspectives

- i.) Low Frequencies (LWA) (Owen)
- ii.) Mid Frequencies (0.3-2. GHz)
 - Stand-alone array. (Napier/Brisken)
 - FPA's on the EVLA. (Napier/Brisken)
- iii.) High Frequencies
 - EVLA II (Perley)
 - EVLA III (Carilli)

c.) Canadian Perspectives

***** Probable Time for Lunch *****

6. Areas of future development and science interest:

- a.) Focal-plane arrays
 - i.) GBT: Science applications and requirements (Lockman)
 - ii.) EVLA: Science applications and requirements (Perley)
 - iii.) Challenges for development of FPA's (Fisher, Brisken, Dewdney)

7. Joint NRAO/NRC Technical Development

- a.) ALMA related cooperation (Dougherty)
- b.) NRC involvement/support in/of CDL activities.
- c.) Other ideas (wild and not so wild).

Rick Perley
Ken Kellermann
Peter Dewdney

3. The CDL and NTC after ALMA

John Webber reported:

ALMA Operations is expected to begin ramping up for maintenance and repair work in late 2007, to work on things delivered to Chile but for which adequate support will not yet (or ever) exist. The steady state reached in ~2011 is expected to be a staff of 10 engineers and technicians involved in maintenance and 10 more in development and new production of hardware (new receiver bands, advanced correlator etc.). This will absorb some of the current ALMA construction staff whose jobs will otherwise end in 2009-2010. A few staff are expected to move to Chile.

Similarly, EVLA construction at the NTC will be complete in ~2009, so that only maintenance and a few odd jobs will exist for amplifier production staff unless there are new development and production tasks. For example, success of EVLA Phase II would mean more amplifier and electromagnetic device work for about 2 more years, ending in 2011-2012.

The NTC will thus face a reduction in staff unless new areas of R&D and construction get funding. There is a long list of OTC recommendations from one year ago which needs to be updated, from which new tasks could be identified. We need input from the scientific staff in order to prioritize development work.

In the digital signal processing area, Rich Lacasse is beginning a move to Charlottesville as Ray Escoffier prepares to retire at the end of 2005. Although much of Rich's time during 2006-2007 will be consumed by completing and commissioning the ALMA Correlator, he should be able to lead new development areas in the digital domain, with a probable emphasis on new capabilities for the GBT.

4. Future NRAO technical projects.

Tony Kerr reported on a proposal underway with the Arizona Radio Observatory and the University of Virginia:

We are working on a joint UAZ/NRAO/UVA proposal to NSF-MRI to develop receiver technology for 600 GHz - 1 THz. This serves multiple purposes: it will keep the NRAO/UVA SIS mixer work going after the current year's internal NRAO funding runs out in April; it will produce powerful new receivers for the HHT; and it will develop the technology for a US bid on ALMA Band 10. The three main components of the proposal are: (a) design of the mixers and associated RF and IF circuits, (b) fabrication of the superconducting circuits, and (c) construction of a test receiver for testing and evaluation of the new mixers. The combined effort of ARO, the UVA-UVML, and the NRAO-CDL brings expertise and motivation to each aspect of this project. NRAO-CDL will design the mixers. The UVML will develop NbTiN SIS mixer circuits on membrane substrates with beam leads. ARO will construct a 4K test system and evaluate the mixers. NRAO will also participate, as needed, in the evaluation. After we have developed an outline proposal, it will have to be approved by NRAO's Technical Council and Director.

5. Outstanding projects

Art Symmes reported on the status of the GBT track.

GBT Track Modification status:

- * On-site meeting with the GBT Track Review Panel in December 2004
- * Final modification recommendations along with planned specifications were submitted to the Review Panel in August 2005
- * Track modification will consist of:
 - o Removal of the existing wear & base plates
 - o Installation of new 50KSI steel base plates - all base plate joints will be welded (only the top 3 inches will be welded)
 - o Installation of new 4340 Steel 3.5-inch wear plates (currently they are 2.25-Inch 4140 Steel); the new material will have somewhat better fatigue characteristics
 - o Epoxy grout will be used instead of the existing cementious grout
- * Plan is to conduct the replacement work during a telescope shut-down from May to September 2007
- * In order to reduce schedule risks, one half of the base plates welds would be prepared in the Fabricators Facility in Savannah; the remaining 24 Base Plates would be done in the field
- * The budget for conducting the GBT track replacement is very tight; formal bids from the wear and base plate suppliers was somewhat

higher than their initial estimates and we are currently discussing the basis for these increases with them

6. Action

In general discussion, the question was asked about what happened to the review of our 11/2005 Five Year R&D plan which the Director said he was going to request from the astronomical staff? No-one knew of the progress, if any, on this.

The OTC should make sure that upper management are well aware of the existence of the OTC's Five Year plan. The OTC agreed that the plan should be updated and sent to Fred and Phil. Darrel agreed to contact Phil to make sure he was aware of this. We will try to make a draft update on a timescale of about 6 weeks, which we will then discuss with Phil before producing our final version.