

ANASAC face-to-face meeting, Chicago 25 August 2003.

Minutes

Attendees: Sanders, Crutcher, Mundy, Johnstone, Wilson, Glenn, Glendenning, Emerson, Jaffe, Hollenbach, Wootten, Lo, Carilli

Welcome, Project Scientist and Project Overview

Dick Crutcher, Chairman of the ANASAC, welcomed the participants to Chicago.

Fred Lo, Director of NRAO, explained the context of the ANASAC within the framework of NRAO and the ALMA Project.

Darrel Emerson, Director of the ALMA Division of NRAO, explained the structure and purpose of the ALMA Division and gave an introduction to the ALMA Project. Level One milestones were shown and explained, and an introduction to the Project Plan, focussing on the Operations Plan described in Chapter 6, was given.

Al Wootten, Project Scientist for North America, then continued the discussion. His talk, ALMA Project Overview and Status, is available on the web at www.cv.nrao.edu/~awootten/mmaimcal/anasac/ALMA-ANASAC-status.ppt He followed by discussing the search for the ALMA Project Scientist and a discussion of the ALMA Science Integrated Product Team (IPT) and in particular the 'Design Reference Science Plan' being developed by the Science IPT. Links to the job description and presentation are given in the agenda reproduced below.

ASAC Charges for next ASAC meeting

Lee Mundy, vice Chair of the ALMA Science Advisory Committee (ASAC) introduced the charges given the ASAC by the ALMA Board for discussion at their Sept4-5 meeting in Hamilton, Ontario and report to the Board at its 3-4 November 2003 meeting in Santiago. There was discussion of problems to be addressed, including Proposals, the Time Allocation Committee (TAC), data rights policies and related issues. Various philosophies on these items could be devised; the science committee input is vital to the discussion of which philosophy ALMA adopts. The extent of the role of the Santiago office is one of these issues, as is the metric by which ALMA designs its operations--one example of a metric is cost minimization for instance. Some concern was expressed that a turno system with fully supported service mode was very difficult on personnel. The general feeling was that another metric must be that operations must enable innovative use of the instrument. We should consider how to make this possible. For example, a group distinct from the TAC might be established to consider innovative use of the instrument. The major question which must be satisfied should be 'Is the science compelling?'. Design of ALMA should employ hardware and software modes to enable its scientific goals.

Brief statements from each ANASAC member

Discussion then turned to statements of the interests of the ANASAC members and those at their home institutions.

Jean Turner, a write-in, emphasized ease of use by non-radio astronomers, along with financial

support to support students, postdoctoral fellows and publication of ALMA results.

Dave Sanders agreed with this view.

Hollenbach noted the wide variety of science topics under study at Ames which would benefit from ALMA observations--disks and their thermal balance and structure, shocks in the interstellar medium, galactic center structure, and emission from distant galaxies in the lines of [C II] and CO. He noted that canned talks were important.

Wootten noted that several canned talks and other resources are available at <http://www.cv.nrao.edu/~awootten/mmaimcal> for use by the community. He expressed several concerns--infrared astronomers will want data in a reduced format for example, and also problems for NASA employees as NASA moves to full cost accounting.

Jaffe noted that at Texas star formation was a central research topic, as well as extragalactic astronomy and submillimeter science in general, owing to Texas' role in the CSO. The community needed to achieve critical mass and to be able to interact technically with the ALMA Science Center. Many groups will probably have a local software expert, someone who would have been trained at the center. Currently there are a number of high level fellowships, which saturate the market, attracting away perhaps the top 30% of potential postdocs. The ALMA Fellow positions need to attract these talented few. Mundy noted the need to focus on increasing our community, convincing universities that their Physics departments are incomplete without an ALMA scientist.

Glenn gave the results of a questionnaire he had sent to his colleagues, who indicated interests in redshifts, masses and astrometry of submillimeter galaxies, lensing for measuring the S-Z effect, VLBI observations of molecular absorption against clouds, YSO imaging, outflow mosaics in our own and other galaxies, and star formation outside the main bodies of galaxies. He encouraged a website be developed to allow input from the community. There was strong support for town meetings, and similar special forums around North America, as well as a program of short courses and summer schools on working with ALMA. He endorsed portable graduate and postgraduate ALMA Fellowships.

Wilson noted that the Canadian point of view differed slightly, as typically in Canada there were on order of 6 astronomers working in a Physics Department, only 1-2 of which had radio astronomy experience typically. Most of these would be very interested in ALMA results, as particular science interests included star formation, nearby galaxies, cosmology. There were about 15 universities with similar groups and interests, many of which had extensive total power experience owing to their partnership in the JCMT. A summer school would be useful to spread expertise in interferometry. She noted that SCUBA had brought in many non-traditional users to the field, but optical astronomers still dominated; there was not a large space community.

Johnstone gave a theorist's perspective, one who got involved in observations owing to the promise of SCUBA.

Lo noted that ALMA emphasized a more finished data product than NRAO traditionally provided.

Crutcher noted that the data rate from ALMA was so tremendous as to necessitate automation.

Carilli noted that he was the NRAO staff representative on the committee, and as such wanted to gauge the feeling on what the face of ALMA should be to the community, as this would help to shape the N. A. ALMA Science Center.

Lo commented that the NRAO staff was in general unaware of the University community viewpoint, to be expressed by the ANASAC. In particular, if the community needed funding to use ALMA to the fullest extent, they must make this known.

Johnstone noted that while Wilson gave a University view, he represented a Canadian government lab which contained a millimeter astronomy group with broad interests and technical expertise in both total power and interferometric techniques. A hallmark of SCUBA success was its ease of use, which should be true of ALMA. He noted that most faculty had some support and that there was no overhead concept at play. Support for postdoctoral fellows was difficult to find.

Mundy noted interests at Maryland included star formation, planet formation, galactic dynamics, molecules in galaxies, comets. ALMA's sensitivity would allow detailed studies of more complex molecules in all environs. However, the community needed to focus on the politics by which more faculty positions could be made available. He suggested that one possibility was to form an AAS division for radio astronomy and infrared science in parallel with that for high energy astrophysics. This could elevate the visibility of long wavelength science as it had for astronomy at short wavelengths.

Crutcher noted that there was a strong millimeter program at Illinois also, with a focus on star formation, disks, astrochemistry, extragalactic objects and the S-Z effect as well as magnetic fields and polarization. NRAO should work with both CARMA and the SMA to bring new users to the field. BIMA had held summer schools. NCSA could work with software developers on improving general performance. He worried that in a funding squeeze situation, software funding was often the first to go. NRAO, through the NA ALMA Science Center, should explicitly fund postdoc and sabbatical leave programs.

Lo noted that the new Science and Academic Affairs division of NRAO included a revitalized visitors program, visiting postdocs, and closer ties with CARMA, ATA and SMA.

Sanders agreed that a visiting program would be important. He noted the range of work at Hawaii, including the collaboration with the SMA would result in further faculty hires. He emphasized the importance of monetary grants to support ALMA science.

ALMA science operations

Wootten then gave an overview of the plans for ALMA Operations, now being fleshed out from the plan sketched in the Project Plan v1.0. A link to that presentation may be found in the agenda below.

ALMA data reduction software

Glendenning gave an overview of software, noting recent changes resulting in a more streamlined, more controlled development path for ALMA software. He presented results which indicate that AIPS++ performance is dramatically improved.

Discussion U. S. ALMA Science Center

After lunch, **Crutcher** led a discussion of the N. A. ALMA Science Center. One theme summarizing the individual reports was clearly finding the funding to enable ALMA Science. **Lo** noted that the support in Congress and OMB for doubling NSF's budget within five years had been expressed, but that without community support astronomy might not share. **Hollenbach** noted that the decadal report had endorsed funding to accompany new instruments, to make full use of the investment place in them. Perhaps

funding should be linked to observing time on ALMA. It was noted that HST-type funding was probably not achievable. Support was expressed for enough funding to allow grad student or postdoc support. This suggested a few thousand dollars per hour of observing time, so that a transit per semester or so could support the student to study and publish the data. For 45% ALMA time allocated to U. S. Scientists, this would require a total budget on order of \$5M per year, seemingly a reasonable number.

Elements of the N. A. Science Center which would be needed to support the NA community include

- fast networks to enable archive use. HST has found that five times the bandwidth out is needed. An Internet II connection, for which the closest node to Charlottesville is currently in Washington, is needed. 10 Gb/s was suggested, but thought to be a high estimate except at peak times.

- the degree of help for specialized purposes was discussed. This should be available--the ASC should work to enable large projects, legacy science (if that were part of the ALMA concept). Director's discretionary time was important also. BG noted that commissioning AND building the ASC at the same time could prove draining of ALMA resources. This would require more Chilean travel for astronomers. Director's discretionary time was one possible enticement, it was noted that the legacy science worked for SIRTf to create demand. It was noted that the archive's presence at the ASC was more important than having a pipeline present there.

- there was next discussion of commissioning and verification. Legacy type programs, where the obvious science is done first, with the data open to the community, is one approach. Examples would include a deep field image, or the Proplyds in Orion. Of course, anything which will be done with the early science array will be done again as ALMA becomes more functional.

- Emerson noted that some operations money may become available earlier even that the early science array--how should it be used? Establish millimeter wave experts at the OSF and at the ASC, establish the archive at the ASC, hold workshops targeting grad students in particular.

AAS Town Meeting

Discussion next turned to the ALMA Town Meeting planned for the January 8 AAS meeting in Atlanta. An outline was suggested in which Lo would give an overview and introduction to the NA ASC. In particular, the plan for community interaction would be emphasized. This would be followed by an overview of the specifications and hardware involved in ALMA, give by Darrel. The science, in particular the design reference science plan, should be presented, probably by Al. Crutcher would chair the meeting. A NA ASC website is planned, and will be available before the meeting.

ALMA Science Meeting NA 2004: Planning Session

In May, a science meeting would be held for the more committed ALMA potential users. It was thought that a full first day, followed by an abbreviated second day ending at ~4pm allowing later afternoon flights was a sound idea. The time should be about the second week in May. The Washington area would be a good easily accessible venue; the Charlottesville NA ASC will still be under construction at this time. There should be

perhaps four major speakers on major themes of ALMA, interspersed with about a dozen half hour talks and a number of posters. Mundy would investigate available venues in the Washington area.

After a short discussion of outreach, the meeting adjourned. Many attendees expressed a like for the one day fly-in-and-out meeting format.

Minutes respectfully submitted by Al Wootten.

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ANASAC Face-to-Face Agenda
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August 25, Chicago O'Hare Four Points Sheraton

10249 W. Irving Park Road, Schiller Park, IL 60176

Telephone 847-671-6000

Conveniently located just minutes from O'Hare International Airport, they offer a complimentary shuttle service to/from the airport - 24 hours a day, seven days a week.

8:00- 8:20: Welcome, R. Crutcher
ANASAC terms of reference
<http://www.cv.nrao.edu/%7Eawootten/mmaimcal/anasac/ANASAC_torv3.pdf>;
relation to ASAC & ESAC K. Y. Lo

8:20- 8:50: Project overview
<<http://www.cv.nrao.edu/%7Eawootten/mmaimcal/anasac/ALMA-ANASAC-status.ppt>>
and status A. Wootten, D. Emerson

8:50- 9:15: Project scientist job
<<http://www.cv.nrao.edu/%7Eawootten/mmaimcal/anasac/ALMAopeningsa.pdf>> and
Science IPT activities <<http://www.cv.nrao.edu/%7Eawootten/mmaimcal/anasac/ALMA-ANASAC-scipt.ppt>> A. Wootten
Discussion of ALMA 'Design Reference Science Plan'

9:15- 9:35: ASAC Charges for next ASAC meeting L. Mundy

9:35-10:15: Brief statements from each ANASAC member All
- your own ALMA-related science interests
- the interests of the community in your University
as related to ALMA
- what your University/colleagues needs/would like to see in
preparation for ALMA

10:15-10:30: Coffee

10:30-11:45: ALMA science operations
<<http://www.cv.nrao.edu/%7Eawootten/mmailcal/anasac/ALMA-ANASAC-Operations.ppt>>:
D. Emerson, A. Wootten
Chile, Regional Support Centers, U. S. ALMA Science Center,
NSF Support, Early science observing

11:45 - 12:30: ALMA data reduction software
<http://www.cv.nrao.edu/%7Eawootten/mmailcal/anasac/2003-08-25_ANASAC.ppt>
and B. Glendenning
observing tools; Pipeline

12:30-13:15: Lunch

13:15 - 14:45: Discussion U. S. ALMA Science Center R. Crutcher

14:45 - 15:00: AAS Town Meeting
<<http://www.aas.org/meetings/aas203/prelim/events.html>> R.
Crutcher

15:00 - 15:15: Outreach: ALMA materials available A. Wootten

15:30 - 15:45 Coffee

15:45 - 16:00: ALMA Science Meeting NA 2004: Planning Session

16:00: AOB

16:00: Adjourn

Reading material:

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- JAO Quarterly Report
<<http://www.cv.nrao.edu/%7Eawootten/mmailcal/JAOQ2report03.pdf>> to the ALMA Board, April-June 2003.

- ANASAC terms of reference
<http://www.cv.nrao.edu/%7Eawootten/mmailcal/anasac/ANASAC_torv3.pdf> (How the ANASAC is to operate)

- Chapter 6, Project Plan*
<<http://www.cv.nrao.edu/%7Eawootten/mmailcal/anasac/ALMAOps.pdf>>, on ALMA Operations
Revisions to be discussed.

- ASAC April 2003 agenda and material
<<http://www.cv.nrao.edu/%7Eawootten/mmailcal/asac/asacgrenobleagendav2.0.html>>:

- ASAC April 2003 report
<http://www.strw.leidenuniv.nl/%7Eewine/ASAC_report_02may2003.pdf>:

- ASAC Charges
<http://www.cv.nrao.edu/%7Eawootten/mmailcal/asac/asac_charge_final_20030811.txt>
> paper:

- ALMA Memo No. 466 <<http://www.alma.nrao.edu/memos/html-memos/abstracts/abs466.html>>. by D'Addario*; receiver stability documents*

- imaging simulations

<<http://www.cv.nrao.edu/%7Eawootten/mmailcal/mholdawaytpmemo19aug03.ps>> from Mark Holdaway*

- DRSP call <<http://www.cv.nrao.edu/%7Eawootten/mmailcal/drsp.txt>> to assess science implications* (some results are in but undigested)

- draft of calibration plan

<<http://www.aoc.nrao.edu/%7Ebutler/work/alma/calibration/CalibrationofALMA3.pdf>>
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- calibration examples

<<http://www.cv.nrao.edu/%7Eawootten/mmailcal/scienceexamples.txt>>*

- Scientific justification
<<http://www.alma.nrao.edu/committees/ASAC/enhancements.pdf>> for the ALMA Enhancements

General background material:

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- ASAC September 2001, April 2002 and September 2002 reports:
<http://www.alma.nrao.edu/committees/ASAC/>
scroll down to "ASAC reports" and click on relevant document
- November 8 2002 ESO discussion day material
<http://www.eso.org/projects/alma/meetings/gar-nov02/>