

ALMA European Science Advisory Committee

Minutes, Face-to-Face Meeting, ESO Garching, 12 June 2003

Participants:

ESAC members: S. Aalto-Bergmann, R. Bachiller, A. Benz, P. Cox, R. Hills, J. Richer, P. Schilke, L. Testi, E. van Dishoeck, C. Waelkens, J. Yun

Other participants (some part-time): C. Cesarsky, R. Guesten, S. Guilloteau (by videocon), R. Kurz, C. Madsen, G. Raffi, J. Schwarz, P. Shaver, G. H. Tan, M. Tarenghi

1. Introduction

E. van Dishoeck welcomed all participants, particularly the members of the newly-constituted ESAC. Following a general introduction, the Terms of Reference and the relation of the ESAC to the ASAC and the ESO-STC were discussed. E. van Dishoeck commented that at this meeting she was present as chair of the ESAC, and not as the (interim) European Project Scientist. This was one additional reason why the ALMA Project Scientist, S. Guilloteau, had been invited to participate in this meeting.

In the discussion of the Terms of Reference, there were questions about the way in which members were selected for the ESAC, and a possible conflict between points 1 and 2 of the Terms of Reference. It was suggested that point 2 should read simply: "Members shall be appointed by the ESO Director General following current practice on membership of the STC."

The importance of close communication between the ASAC and the ESAC was stressed. M. Tarenghi said that ESAC members could have access to ALMAEDM; the chairman should send the names and e-mail addresses of the members to him, and they will be informed of their access and passwords. Concerning the relation of the ESAC to the STC, it was commented that the STC relies on the ESAC for expert advice in the field of millimetre astronomy and technology, and R. Hills serves as liaison between the two committees. The chair of the STC, currently J.L. Puget, will be copied on e-mails concerning the agenda, recommendations and minutes of the ESAC meetings.

Regarding Rules of Procedure, the ESAC agreed that the European ASAC (vice-)chair will serve as the ESAC vice-chair.

2. Project Overview and Status

R. Kurz gave an overview of recent developments and the status of the project. There have been several important developments in recent days. The selection of the institutions responsible for the Phase 2 European work packages was approved by the ESO Finance Committee on 10 June. France has removed the ad referendum from its positive vote on ALMA made at the ESO Council meeting in July 2002. The negotiations with Chile were now complete; the ESO/Chile agreement was ratified by the Chilean Senate on 10 June. There is optimism that Japan will join the project in April 2004, with the following proposed enhancements ; the ACA, three receiver bands, and contributions to the infrastructure. M. Tarenghi pointed out that this will require ESO Council approval at its meeting in December 2003.

The Alcatel/EIE prototype antenna is now in New Mexico, due for completion at the end of July and acceptance at the end of August. The different prototypes will be evaluated by the same team. Completion of evaluation is due by January 2004, so that the contract for the production antennas can be placed by April 2004.

3. Project Scientist and Science IPT Activities

E. van Dishoeck gave a presentation on this subject in her role as European Project Scientist. She gave an overview of the full range of Science IPT activities. Members of the Science IPT present at the meeting mentioned areas they were involved in, which include data reduction user interface, science software requirements, software system, calibration, phase correction, water vapour radiometer and outreach. E. van Dishoeck made special note of the Design Reference Science Plan currently being organized; leaders in specific areas will select participants from the community to help in the activity.

4. ASAC Activities and Issues

J. Richer elaborated on the role of the ASAC, and its relation to the ESAC. There was a question regarding the status of those in ex officio roles; it was felt that they should be “ex officio participants”, rather than “ex officio members”. Concerning the ASAC reports to the ALMA Board, it was felt that the ALMA Board should be obliged to respond to major recommendations made by the ASAC (as is the case for the AMAC).

J. Richer reviewed the April ASAC meeting and its conclusions, and listed issues for the upcoming meeting in September. There was discussion about the testing of the prototype antennas; to a question on the role of the ASAC in the antenna selection, R. Kurz said that some individual members may be on the selection board.

5. Interests and Communities of ESAC Members

E. van Dishoeck asked all ESAC members to summarize their own ALMA-related science interest, the interest of the communities in their countries related to ALMA, and what their communities needed in preparation for ALMA. The science interests of individual ESAC members cover a wide range of ALMA science: the high-redshift Universe, normal and interacting galaxies at intermediate and low redshifts, the Magellanic Clouds, the galactic centre, astrochemistry, molecular clouds, star and planet formation, accretion disks and outflows, evolved stellar phases, and solar physics. The scientific interests of the communities in most of the member countries also cover a wide range of ALMA topics, although in a few countries there is a concentration of scientific effort in specific areas such as stellar astronomy, and the wide potential of ALMA has yet to be fully appreciated. In several countries there is a corresponding strong interest in the technologies of ALMA. Concerning the needs of the communities for the period leading up to the ALMA era, training, schools, workshops, the use of facilities such as APEX and IRAM, and technical participation were stressed, and for the ALMA era itself, a user-friendly system, strong user support, a strong RSC, and good data reduction software were emphasized. The need to fully merge the mm/submm science with the optical/IR communities was also stressed.

In the context of a brief discussion about the possibility of observing the sun with ALMA, M. Tarenghi reminded the ESAC that this is a level 1 requirement, and asked for the priority frequencies for such observations by September. And, when the subject of talks on ALMA to the community was briefly raised, he asked that, as the JAO has the global overview of the project, announcements

of ALMA-related meetings are sent to the JAO and any presentations to be made on the status of the ALMA project be first sent to the JAO to assure consistency and validity.

6. ALMA-related EU-FP6 Proposals

P. Cox gave an overview of the ALMA-related EU FP6 proposals. ALMA was represented in the Opticon proposal for networking with the optical/IR community, and in the Radionet proposal for networking with the cm-wave community, for transnational access, and technical development. There was a Marie-Curie RTN proposal on millimetre studies of star formation as a training ground to help prepare the community for ALMA. Decisions on these proposals were anticipated in September. In anticipation of positive decisions in favour of these proposals, E. van Dishoeck asked the ESAC members to think of suggestions for workshops for 2004.

7. ALMA EU-FP6 Construction Proposal

E. van Dishoeck introduced this topic. A major item in the EU FP6 programme is 200 million Euros for design and construction proposals. Major enhancements to ALMA, which strengthen the European component, would be eligible in this category. According to the EU directive, they should also be “possible alternatives to new infrastructures”. There will be several calls for proposals, with about 70 million Euros available in the first round. On the basis of past experience, astronomy might expect about 20 million Euros from this programme in total. There was some preliminary discussion about the possible practicalities and time frame for preparing such a proposal. E. van Dishoeck said that the present discussion was intended just to assess the possibilities previously raised; the issue would then go to the European ALMA Board and JAO, and then the proposal activities could begin. It is likely that not all elements presented at this meeting fit into the budget envelope and that a selection has to be made. One main concern is that the proposal has to be led by ESO, but that a leader has not yet been identified. According to new information from C. Madsen, the Call for Proposals for the first round is expected on 11 November 2003, with a deadline for submission of proposals in March 2004.

J. Schwarz summarized the goals and ideas of a possible software proposal. He said that this would add European value to ALMA, and make possible better and faster science exploitation. It would fill gaps in the software, and strengthen the European technical expertise in this area. Possible work would include advanced calibration and imaging tools, visualization and analysis tools, and a Virtual Observatory interoperability layer. There were comments that this is a very full programme, that some of it may be premature, and that some of it may be construed as unfilled parts of the original ALMA proposal.

G. H. Tan discussed possibilities for receivers. Aside from one or more of the remaining receiver bands (and depending on Japan’s entry into the project with the accompanying enhancements), other possibilities mentioned include a new band 11 (960-1120 GHz), changing DSB to 2SB for band 9, and work on SIS junction production to enable a reliable supply of well-characterized Nb based junctions. P. Cox pointed out that the EU expects working deliverables leading to science by the end of the EU contract. A suggested proposal had been for a prototype and 6-8 cartridges.

R. Guesten discussed the possibility for direct photonic LO development. He commented that it would be a very positive technical development for Europe. He also discussed the science case for a new band 11. Possible deliverables would be photonic LOs for bands 5 and 11, and building 3-4 units for an ALMA sub-array. A rough estimate of the cost would be 4-5 million Euros. An alternative proposal, put forward by R. Guesten in discussions after the meeting, is to demonstrate band 11 with a single unit on APEX. M. Tarengi expressed concern about any such additions to

ALMA provided from outside the project, and said the project could not be responsible or have any related financial obligation. J. Richer pointed out that the VLA had received seed money for some 40 GHz receivers which produced exciting science, and that now all 27 antennas are equipped with these receivers.

Finally, S. Guilloteau made a presentation on absolute calibration. This would provide a fundamental parameter for astrophysics: calibration for all millimetre astronomy, with particular usefulness for comparisons with other wavebands and for planetary atmospheres. An accuracy of 1 % may be possible. The proposal involves measuring the antenna gain using a gain horn cross-correlated with nearby antennas. This would build on the recent experiments by J. Welch, who achieved an accuracy of about 1.5 % at 23 GHz. The proposal would employ a simpler method giving improved results. The estimated cost would be roughly 4-5 million Euros. The timescale would be reasonable for FP6. There were comments that this would be difficult, and questions about whether the 1% accuracy would be feasible. It was suggested that this should be discussed in detail by a group of experts.

R. Kurz was not available to summarize the 2G correlator, but E. van Dishoeck said that there were no changes compared with previous discussions and the write-up.

The ESAC had a preliminary discussion on the proposed elements and relative priorities, and will continue this discussion at its September meeting.

8. Status of Plans for European RSC

C. Cesarsky made a presentation on the status of plans for the European Regional Support Centre. She started by welcoming the members of this new ESAC. She gave an overview of the advisory committees of ESO. She commented that this is a very interesting and important time for ALMA, as major approvals and agreements have recently been completed, as summarized earlier by R. Kurz.

C. Cesarsky summarized the background on the European RSC. At the November 8, 2002 meeting held at ESO, attended by many from the wide community, and in the subsequent questionnaire, it was clear that a strong central node was much favoured for the RSC. It had long been foreseen that, in the operations phase, ESO would at least take responsibility for phase 1 proposal handling and for archiving in Europe. With time, and in light of the VLT experience, it became clear that it would be difficult if phase 2 proposal handling (in which the details of the observations are specified by preparing the “observing blocks”) were to be exported from ESO, as this would break the continuity and concentration of effort. In view of this, and the urgent need for concrete plans for ESO’s Long Range Plan, it was decided that the phase 2 effort would also be at ESO. The estimated requirement is for 7-8 FTEs by 2008, plus another four FTEs for data reduction support. For the development of advanced algorithms, a distribution of effort is required, to take advantage of the expertise that is spread throughout the community. Some rotation of experts from the community to ESO will be desirable. The LRP to 2008 has to be ready for endorsement by the ESO Council in December 2003, and the document will be needed by October.

E. van Dishoeck proposed that the main focus of the ESAC meeting in late August/September is on this important subject. C. Cesarsky suggested that D. Silva attend the meeting.

9. Election of European ASAC Members

The members of the ESAC were asked to nominate the European ASAC members. Five European ASAC members are required. J. Richer was already included, as he is the present chairman of the

ASAC. Thus, four more members had to be selected from the six ESAC members who expressed willingness to serve on the ASAC. This was done by private ballot, and P. Cox, P. Schilke, L. Testi and E. van Dishoeck were nominated to serve on the ASAC.

10. Outreach

C. Madsen gave a brief summary of outreach activities for ALMA which are taking place at ESO and NRAO. (This took place late in the day, after several of the ESAC members had to leave.) Major features from ESO include a new video and animation, many images from the new computer simulation, and preparations for major displays, such as the one at the IAU General Assembly in Sydney next month. The ESAC was subsequently invited to send images of recent (sub)millimeter results to ESO and NRAO for inclusion in the material.

11. Next ESAC Meeting

The next ESAC meeting will take place in September, most likely on September 1 at a location to be determined.