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**FOR
INFORMATION**

COUNCIL

**Negotiations with the National Astronomical Observatory of Japan
on Enhanced ALMA**

Status Report #1

NEGOTIATIONS WITH THE NATIONAL ASTRONOMICAL OBSERVATORY OF JAPAN ON ENHANCED ALMA

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Introduction

1. There have been on-going discussions with the National Astronomical Observatory of Japan (NAOJ) for several years. Originally NAOJ wished to become a third, equal, partner with ESO and NSF. On the advice of their Ministry this goal was reduced to their becoming a smaller but still significant partner with funding from April 2004 at the earliest.
2. ESO and NSF then proceeded with the bilateral ALMA project (hereinafter ALMA), which is now under construction under the provisions of the Bilateral Agreement signed by NSF and ESO in February 2003. Council is informed of the specification, schedule, and projected cost of ALMA, and is kept informed of progress.
3. The ALMA Board agreed the basic principles under which NAOJ could join ALMA, the main elements of which are:
 - NAOJ should provide high priority enhancements to ALMA as assessed by the ALMA Board with advice from the ALMA Scientific Advisory Committee (ASAC);
 - The enhancements should be acceptable to ALMA and should be provided to ALMA standards;
 - The Value of the enhancements should be according to the ALMA cost model;
 - There should be no additional costs to ESO or NSF in either Construction or Operations, and NAOJ should contribute to infrastructure;
 - The NAOJ teams should be integrated within the ALMA management structure;
 - ALMA should not be delayed;
 - NAOJ should sign a separate Agreement with ESO/NSF, subsidiary to the Bilateral Agreement;
 - There should remain a single ALMA with joint interfaces to Chile.
4. An ALMA Negotiating Team (JNT) was established and the European members (van der Kruit replacing Freytag, Cesarsky, Corbett) agreed by Council. With the North American members (Dickman, Giacconi, Donahoe) this team has conducted the negotiations with NAOJ.

NAOJ Proposal

5. After several iterations and detailed discussions with the JNT and the ALMA project team, NAOJ propose the following enhancements:

- A Compact Array (ACA) comprising twelve 7m antennas and four dedicated 12m antennas, all equipped with receivers.
 - Three new receiver bands for all antennas, ALMA and ACA (80 in total).
 - A correlator to be used for the ACA (instead of expanding the ALMA correlator).
 - The infrastructure required for the proposed enhancements, and additional contributions to infrastructure, possibly including a power supply system.
6. As part of their proposal, NAOJ would purchase equipment (for example, receivers for the ACA in the 4 baseline bands), and services from ESO and AUI.
 7. NAOJ is seeking government funding to enable it to join ALMA on 1 April 2004, and is pursuing a vigorous R&D programme to that effect, including a prototype 12m antenna in Socorro alongside the two ALMA prototypes.
 8. NAOJ also undertook to cover an appropriate fraction of the Operations costs of enhanced ALMA.

The ALMA Response

9. ASAC has confirmed the scientific value and priority of the ACA and the additional receiver bands. While the proposed correlator is potentially interesting in terms of developing more advanced correlators, it is not seen as a priority. The infrastructure and contribution to Operations are essential.
10. The Board has endorsed the ASAC assessment, and discussions with NAOJ have concentrated on the detailed Value of the enhancements, on the interfaces with ALMA, on the schedule for the enhancements, and on possible impact on ALMA. Detailed discussions continue between ALMA personnel and NAOJ personnel.
11. A draft ESO/NSF – NAOJ Agreement has been drawn up and is being discussed by ESO, NSF and AUI.
12. NAOJ has been invited to send observers to ALMA meetings, and NAOJ personnel are participating effectively in a range of ALMA activities. Relationships at all levels are good and the working environment is constructive.

Recent Meetings

13. The most recent JNT meetings took place on May 8th (face to face), June 25th (teleconference), and June 30th (Chair and Vice Chair of ALMA Board went to Japan). The situation can be summarised as follows:
 - The proposed NAOJ enhancements are accepted by the ALMA Board;
 - The proposed schedule does not delay ALMA but has resource implications;
 - ALMA can supply the goods and services requested by NAOJ, against reimbursement;
 - The Value assigned to the NAOJ enhancements by ALMA is significantly lower than the value assessed by NAOJ, largely in the correlator and Band 10;

- There are additional costs which will fall to AUI and/or ESO which will have to be reimbursed;
- AUI/ESO will jointly own the land purchased and continue to receive the land concession;
- The likely cost of Operations is estimated to increase by 40% while the Value of the enhanced ALMA will be increased by 33%, implying that NAOJ should pay a proportionately higher share of Operations than would be calculated from the capital contribution. This could be achieved if NAOJ paid for the operation of the enhancements;
- The NAOJ share of observing time has not yet been discussed;
- NAOJ is currently submitting its proposal to the Ministry for funding from April 2004, and the outcome will be known in the December Japanese budget;
- Reorganisation of the research structure within which NAOJ is situated may delay the submission and assessment process but not the budget announcement;
- NAOJ will have greater autonomy in the reorganised structure and may wish to delay formal signatures until after 1 April 2004.

14. Discussions continue and the likely outcome could be agreement on the share of observing time and on the share of Operations costs, rather than a detailed agreement on Values.

Possible Timetable for Agreement

15. A timetable has been drawn up which envisages the following major milestones:
- ALMA Board approval in principle of terms of ESO/NSF - NAOJ Agreement - 3-4 November 2003.
 - NAOJ agreement in principle - November 2003.
 - ESO Council approval of ESO/NSF - NAOJ Agreement - December 9/10 2003.
 - NSF approval by end 2003.
 - NAOJ funding announced in Japan December budget followed by formal NAOJ confirmation of participation level.
 - Formal ALMA Board approval (February or March 2004) after ESO and NSF approval.
 - Signature of ESO/NSF - NAOJ Agreement on or before 1 April 2004.
 - Notification of Chilean authorities on or before 1 April 2004.