

Memorandum of Understanding
between the
Academia Sinica Institute of Astronomy and Astrophysics
and the
National Radio Astronomy Observatory
to establish a
Taiwan-America Program in Radio Astronomy

Recognizing

- That the purpose of the Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), with funds provided by the Academia Sinica (AS) and the National Science Council (NSC) in Taiwan, is to conduct a broad program of forefront research in astronomy;
- That the purpose of the National Radio Astronomy Observatory (NRAO), operated by Associated Universities, Inc. (AUI) and funded by the National Science Foundation (NSF) of the United States, is to design, build, and operate large forefront radio telescope facilities for the scientific community;
- That ASIAA has a strong program in submillimeter-wave radio astronomy, with strong scientific and technical interests in the Atacama Large Millimeter/submillimeter Array (ALMA); which is the largest groundbased astronomical facility ever built, consisting of a main array of 64 12-m telescopes to be built by North America and Europe, and a compact array of 4 12-m and 12 7-m telescopes to be built by Japan;
- That NRAO has a strong program of research in radio astronomy and is the lead institution in North America for the construction and operation of ALMA;
- That the astronomical communities in Taiwan and the United States have been developing close cooperation;

And Noting Further

- The scientific, economic and technical advantages to the scientific communities in Taiwan and the United States of establishing a collaboration for the construction and operation of ALMA;

- The scientific benefits of developing further collaborations of mutual interest to the two astronomical communities; and
- That Chairman Maw-Kuen Wu of the National Science Council of Taiwan sent a Letter of Intent on 7 December 2005 to NSF Director Arden L. Bement, Jr., to support the effort of Taiwan to join ALMA-North America as part of a program for international collaborations, and designated the ASIAA as the official organization to negotiate on behalf of Taiwan;

ASIAA and NRAO, hereinafter called the Participants, thus resolve to establish the Taiwan-America Program in Radio Astronomy (TAPRA) in general accord with the terms below:

- ASIAA will submit an official proposal to the NSC on ALMA participation for funding intending:
 - To support the construction of two to three fully equipped ALMA 12-m telescopes, at the level of about 30M current USD,
 - To provide an appropriate share of funds, for ALMA operations,
 in return for
 - Open access to ALMA, and other NRAO facilities, by Taiwanese astronomers via the normal proposal process,
 - ALMA technological projects, developmental work, and industrial contracts to be executed in Taiwan, to a goal of approximately 50% of the total contributions from Taiwan, to be achieved by best efforts,
 - An appropriate level of Taiwan representation on ALMA advisory bodies and ALMA management committees, and
 - NRAO providing assistance to the ASIAA in technical developments for ALMA.
- NRAO will collaborate with ASIAA and the Taiwanese astronomical community on scientific and technical projects of mutual interest, and in the development of future projects.
- NRAO/AUI will recognize Taiwanese participation in TAPRA by considering appointing appropriate Taiwanese representatives to relevant advisory bodies such as the Visiting, Program Advisory, and Users Committees of NRAO. ASIAA will recognize U.S. participation in TAPRA by considering appointing appropriate U.S. representatives to relevant ASIAA advisory bodies.

This MOU represents the general goal of the Participants to make good faith efforts to implement TAPRA. TAPRA will take effect with the signing of an agreement between NRAO and ASIAA implementing this MOU no later than 31 December 2006. The agreement will

specify further details including the total amount and specific forms of the Taiwanese contribution to ALMA, a schedule of deliverables by Taiwan, the methodology for calculating the Taiwanese share of ALMA operations expenses, and the process of establishing NRAO collaborations with Taiwanese astronomers and the ASIAA.

The expected duration of the agreement will be twenty (20) years, or the first fifteen (15) years of operation of the Joint ALMA Observatory, whichever is longer, and will be renewable upon conclusion of mutually satisfactory negotiations between the participants.

Signatories:

Paul T. P. Ho, Director Academia Sinica Institute of Astronomy and Astrophysics	Date
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K. Y. Lo, Director National Radio Astronomy Observatory	Date
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Concurrence:

Yuan Tseh Lee, President Academia Sinica	Date
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Ethan J. Schreier, President Associated Universities, Inc.	Date
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