

Academia Sinica Press Release

Taichung's East Asia Integration Center Delivers First Receiver to ALMA Radio Telescope in Chile

The first receiver made by the East Asia Front End Integration Center (EAFEIC) for the Atacama Large Millimeter/submillimeter Array (ALMA) radio telescope project was safely delivered to the project site in Chile at the end of December.

The EAFEIC center is a collaboration between Academia Sinica's Institute of Astronomy and Astrophysics (ASIAA), and the Chung-Shan Institute of Science and Technology Aeronautical Systems Research Division (ASRD) and represents the Taiwan arm of the ALMA-Japan partnership. The center, which is an important part of the ALMA-Japan partnership, is located in Taichung and is funded by Academia Sinica.

The EAFEIC is charged with assembling the various receiver components (sensitive low-noise receivers) provided by the US, Canada, Japan, Netherlands and the UK into individual front-end subsystems (sensitive low-noise receivers) for each of the telescopes being constructed by the ALMA-Japan. It is planned to deliver each front-end subsystem to the ALMA site in Chile after testing and verification of performance in Taiwan.

In November, the EAFEIC successfully assembled and performed the integration test for the first front-end subsystem. The subsystem was then safely delivered to the ALMA Operation Support Facility located close to Cerro Chajnantor in northern Chile at 3000 meter elevation above sea level. This is the first front-end subsystem delivered by EAFEIC and the second front-end subsystem completed for the ALMA project. It will eventually be moved to the ALMA Array Operation Site at 5000 meter elevation above sea level to be installed into an ALMA 12-meter telescope. It will then be operated together with the first front-end subsystem delivered by the US National Radio Astronomy Observatory (NRAO) in order to obtain the first ALMA interferometer fringe.

The ALMA Project is the largest ground-based astronomical project ever built. When completed ALMA will be a single research instrument composed of up to 80

high-precision antennas, located on the Chajnantor plain of the Chilean Andes in the District of San Pedro de Atacama, 5000 m above sea level. ALMA will enable transformational research into the physics of the cold Universe, regions that are optically dark but shine brightly in the millimeter portion of the electromagnetic spectrum. Providing astronomers a new window on celestial origins, ALMA will probe the first stars and galaxies, and directly image the formation of planets.

It will operate at wavelengths of 0.3 to 9.6 millimeters, where the Earth's atmosphere above a high, dry site is largely transparent, and will provide astronomers unprecedented sensitivity and resolution. The antennas of the 12 m Array will have reconfigurable baselines ranging from 150 m to 18 km. Resolutions as fine as 0.005" will be achieved at the highest frequencies, a factor of ten better than the Hubble Space Telescope.

The project is an international partnership between Europe, North America, and Japan. Taiwan participates in both the Japan and North American partnerships. Taiwan joined the ALMA-Japan partnership in September 2005. In return for contributing to the construction and operation of ALMA, astronomers in Taiwan will have access to the powerful interferometer to conduct research.

Related Websites:

<http://db1n.sinica.edu.tw/textdb/gatenews/showpost.php?rid=2027>

<http://www.almaobservatory.org/>

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Picture Caption:

ALMA-Taiwan and ALMA-Japan team members after the acceptance test at OSF (Operations Support Facilities) in Chile.