ASTRON makes discoveries in radio astronomy happen!

ASTRON is the Netherlands Institute for Radio Astronomy. Its main mission is to make discoveries in radio astronomy happen, via the development of new and innovative technologies, the operation of world-class radio astronomy facilities, and the pursuit of fundamental astronomical research. Engineers and astronomers at ASTRON have an outstanding international reputation for novel technology development, and fundamental research in galactic and extragalactic astronomy.

ASTRON designed, developed, and built the International LOFAR Telescope (ILT). It also operates the Westerbork Synthesis Radio Telescope (WSRT), one of the most sensitive telescopes in the world. Engineers at ASTRON designed new technology that will increase the field of view of all the Westerbork antennas by a factor of almost forty. This means that astronomers need much less time to acquire far more information about a larger part of the sky. This technology will also be used for the Square Kilometre Array (SKA).

ASTRON hosts JIVE (the Joint Institute for VLBI in Europe) and the NOVA Optical/IR group. ASTRON has about 165 staff members and is an institute of the Netherlands Organisation for Scientific Research, NWO, the Netherlands’ largest science financer.

The International LOFAR Telescope

The International LOFAR Telescope (ILT) is a pan-European collaborative project led by ASTRON. Combining thousands of simple dipole receivers with powerful digital signal processing and high-performance computing, LOFAR can rapidly survey wide areas of the sky, looking in multiple directions simultaneously and operates at relatively unexplored low radio frequencies, opening up a new window on the universe for astronomers.

Fourty LOFAR stations are place in the Netherlands. Eight LOFAR stations are placed in Germany (5), England, Sweden and France. The largest distance between these antenna stations is about 1500 kilometers, which allows astronomers to observe in even sharper detail.

The Square Kilometre Array

The SKA will be a revolutionary radio telescope made of thousands of receptors linked together across an area the size of a continent. The total collecting area of all the receptors combined will be about one square kilometre, making the SKA the largest and most sensitive radio telescope ever built. The SKA will be built in South Africa and Australia.

ASTRON plays a leading role in the technological and scientific development of the SKA. Together with scientists and industry, ASTRON is preparing the Dutch knowledge contribution for the SKA. With the LOFAR telescope and the development of aperture arrays, the institute has a strong position in the international SKA programme. Furthermore, it is ASTRON’s ambition to become the primary SKA Centre of Excellence for Science Support & Operations.

Technology Transfer

ASTRON designs its projects in such a way that the business world is involved as much as possible in the development of new instruments and innovative high-tech systems. Technology Transfer within ASTRON also concentrates on imparting ASTRON’s expertise via innovation projects and consultancy. The measuring facilities in ASTRON’s Dwingeloo laboratories can be hired by companies. The technology developed for radio astronomy can also be applied outside of science, eg. in radio communication (police, fire brigade) and security (RFID, radio-frequency identification). Even wireless internet (WiFi) originated in radio astronomy.

Outreach and education

Besides organising regular open days, ASTRON offers everyone from primary school pupils to university students various opportunities to visit the institute. In addition to an excursion, secondary school pupils can perform a practical assignment using the Dwingeloo telescope. ASTRON, JIVE and the NOVA Optical/Infrared group also organize Girls’ Days, on which female high school students follow an active programme in science and technology and to talk to female scientists and engineers.