http://www.seti.org/ata/fact.php

Allen Telescope Array

Fact Sheet

About the Allen Telescope Array

The Allen Telescope Array (ATA) is a joint effort of the SETI Institute and the Radio Astronomy Laboratory at the University of California, Berkeley. The ATA is a radio interferometer that is dedicated to cutting-edge astronomical research and a simultaneous search for signals of intelligent, extraterrestrial origin. It is being constructed at the Hat Creek Radio Observatory, 290 miles northeast of San Francisco, California and will be composed of 350 antennas at completion. The ATA advances the field of radio astronomy.

Gathering DATA

The ATA is a new, innovative research telescope with unique capabilities, including:

- Collecting and analyzing an unprecedented, large amount of data (4.5 octaves of frequency)
- Scanning a much larger area of the sky with a wider view of focus than existing telescopes
- The ATA can be easily upgraded as computer and telecommunications technology improve
- An innovative use of many inexpensive, small radio dishes linked together creating the equivalent of a very large telescope
- Conducting radio astronomical research and SETI research simultaneously

Implications

For scientists at the SETI Institute, the ATA offers not only its inherent speed, but also the simple advantage of being usable 24/7 for research and

data collection. For radio astronomy, the ATA can scan more of the sky very rapidly and create precise measurements of distant celestial objects.

Technology and Scale

The ATA takes advantage of the evolution of electronics and technology:

- Radio telescopes of the past either were giant, single-dish antennas, or consisted of a few dozen large antennas linked together. Thanks to the plummeting price of electronics, a collection of small antennas now costs less than a single, large dish. The ATA utilizes this new circumstance, and the result is a “radio camera” able to make radio images in a fraction of the time of other instruments.
- The capabilities of the ATA versus traditional radio telescopes can be compared the capabilities of a Mathew Brady tripod-mounted camera of the Civil War era, taken with a long, slow exposure, versus a digital point-and-shoot camera of today.
- The ATA can conduct research over a very wide portion of the radio spectrum. Whether being used for astronomy or extraterrestrial intelligence, four separately tunable radio frequency bands can be examined simultaneously. Changing frequencies on the ATA is just a matter tapping a key on a computer to retune, without mechanically having to change receivers.

Timeline

- 2001 – Paul G. Allen Family Foundation provides $11.5 million in funding to support infrastructure building costs for the Allen Telescope Array project
- 2001-2004 – Research and development phase for the Allen Telescope Array leading to the installation of the 3-dish Production Test Array at Hat Creek
- 2003 – Paul G. Allen Family Foundation provides additional $13.5 million to build the initial phase of the ATA project
- 2004 – A three-tier construction plan for telescope is unveiled
- 2005 – Construction begins
- 2006 – The first 30 antennas are in place and installed at Hat Creek Radio Observatory
- 2007 – First phase of project complete with 42 working antennas

Key Science Goals

- Determine the neutral hydrogen (HI) content of galaxies over three-quarters of the sky, to measure how much intergalactic gas external

galaxies are accreting; to search for dark, starless galaxies; to lay the foundation for SKA dark energy detection
- Classify 250,000 extragalactic radio sources as active galactic nuclei or starburst galaxies, to probe and quantify star formation in the local universe; to identify high red shift objects; to probe large-scale structure in the universe; to identify gravitational lens candidates for dark matter and dark energy detection
- Measure the magnetic fields in the Milky Way and other Local Group Galaxies to probe the role of magnetic fields in star formation and galaxy formation
- Detect the gravity-wave background from coalescing massive black holes through pulsar timing
- Measure molecular cloud and star formation properties using new molecular tracers to map the star formation conditions on the scale of entire Giant Molecular Clouds and to determine the distribution of heavy elements in the Milky Way
- Explore the transient sky, to probe accretion onto black holes, to discover orphan gamma-ray burst afterglow, to discover new and unknown transient phenomena
- Survey 1,000,000 stars for non-natural extraterrestrial signals with enough sensitivity to detect the equivalent power of the Arecibo radar out to 1000 light-years within the frequency range of 1 to 10 GHz
- Survey the 4×1010 stars of the inner Galactic Plane in the “water hole” frequency range from 1420 MHz to 1720 MHz for very powerful, non-natural transmitters

Funding

The total cost of the project to date, including research, development and construction costs for the array and the necessary radio astronomy and SETI signal detectors, is $50 million. The first phase of this project was funded through generous grants from the Paul G. Allen Family Foundation totaling $25 million. UC Berkeley, the SETI Institute, the National Science Foundation, Xilinx, Nathan Myhrvold, Greg Papadopoulos, and other corporations and individual donors contributed additional funding. The ATA team is prepared to install more dishes as additional funding is secured.

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