Allen Telescope Array begins all-sky surveys

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(PhysOrg.com) -- With commissioning of the 42 radio dishes of the Allen Telescope Array (ATA) nearly complete, UC Berkeley astronomers are now embarking on several major radio astronomy projects, including daily surveys of the sky.

"The ATA is fast by design, covering a wide field of view, which is ideal for dedicated surveys of the sky," said Don Backer, UC Berkeley professor of astronomy and director of the Radio Astronomy Laboratory that oversees the ATA. The array is being built jointly by UC Berkeley and the SETI Institute, a private, non-profit organization based in Mountain View, Calif..

Backer estimates that 80 percent of the telescope's time will be spent on surveys, repeatedly imaging the sky that is visible from an isolated valley in Hat Creek, Calif. Among the objects the astronomers hope to find are transient radio sources, such as supernovas and gamma-ray bursts, that may last from nanoseconds to years.

Radio blasts from supernovas can penetrate gas and dust, allowing astronomers to discover heretofore undetected stellar explosions. And while gamma-ray bursts are impossible to see unless these intense beams of light point directly at Earth, radio emissions from the blast wave can be seen from any direction, which may allow astronomers to find out more about the subset of supernovas that produce such bursts.

"The variable sky has been poorly looked at in radio wavelengths, so we have an opportunity to do something that hasn't been done before,"

including discovering something totally new to astronomy, said Geoffrey Bower, UC Berkeley assistant professor of astronomy and leader of the survey.

With only 42 of a planned 350 radio dishes, the ATA is not yet sensitive enough to rival other large radio telescopes and discover fainter quiescent radio objects or to look farther back in time. But the ATA will obtain spectra of already mapped radio sources, since information about a star's or galaxy's "color" can tell astronomers about its age and composition.

In addition to searching for intelligent signals from space, a project run by the SETI Institute, the ATA also is getting involved in satellite tracking. The U.S. Air Force continually monitors satellites and debris in space so that critical satellites can be diverted from possible collisions. The agency now hopes to use civilian radio telescopes as all-weather, 24/7 satellite monitors to improve ongoing optical and radar monitoring.

Backer continues to seek funding to install more radio dishes and build the ATA to a size where it sensitivity matches or exceeds that of today's 100-meter radio telescopes.

"With this tremendously powerful and innovative design, more telescopes would put us in the world-class category," he said.

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