

The Allen Telescope Array as Prototype for the SKA

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The Allen Telescope Array (ATA) is a joint project of the SETI Institute (Mountain View, CA) and the University of California at Berkeley's Radio Astronomy Lab to build a world-class radio telescope facility composed of 350 6.1-meter offset Gregorian antennas. This array incorporates many novel components that allow a high degree of performance and flexibility. The use of commercial-off-the-shelf components where possible, and exploitation of the many new technologies for wide-band applications and manufacturing allow for a very high-performance/cost-effective array to be built. Extensions of these techniques will be required to successfully realize the Square Kilometer Array (SKA).

Some of the particular technologies that we feel are viable candidates for SKA development are: the use of hydroformed, rim-supported dishes; the use of compact drive systems and structural, cast/machined housings; the wide-band, cryogenic log-periodic feed; wide-band low-noise amplifiers; wide-band analog fiber-optic links; a flexible, compact and simple RF/IF signal chain and digital processor; the FX correlator; a robust, component-based software system with TCP/IP connectivity utilizing JAVA.

The ATA will consist of 350 6.1-meter offset Gregorian dishes at the Hat Creek Radio Observatory site arrayed over approximately 1 square kilometer. Given the number of antennas, the large size of the primary beam and the novel signal path implementation, this array will have an unprecedented degree of observing flexibility and excellent sensitivity. A hierarchical assortment of individual users may simultaneously use the array to observe a different part of the sky at independent frequencies and concurrently image the sky at one or more frequencies. Testing is currently underway on the first three elements of the ATA (Figure 1).

