ASKAP: The Australian SKA Pathfinder

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The Australian SKA Pathfinder (ASKAP) is a radio survey telescope located in Western Australia at the Murchison Radio-astronomy Observatory, which also hosts the Murchison Widefield Array (MWA). ASKAP consists of thirty-six 12-m antennas with 188-element phased array feeds (PAFs) at prime focus. The PAFs operate in the band 700–1800 MHz. On-site digital systems use the PAFs to form 36 beams on the sky with a total instantaneous field of view of 30 square degrees and bandwidth of 288 MHz (up to 16k channels). Correlated products are transported on dedicated fiber 650 km to the Pawsey Centre for Supercomputing in Perth, for imaging and archiving.

A program of science surveys has been devised that includes continuum and spectral line (HI emission and absorption) surveys plus a transient search program. Single ASKAP antennas have been used in VLBI experiments and a tied-array backend could be added as a future upgrade. In late 2016 an early science program was begun with 12 antennas. This program is being used to inform the design of the final survey projects, in parallel with commissioning the full system. Initial observations at the full data rate with up to 28 antennas have been made and we anticipate beginning 36-antenna operations in early 2019. Once a funded upgrade of Pawsey Centre supercomputing infrastructure is complete we will commence quasi-real-time pipeline imaging of ASKAP data.

In this paper I will discuss the status and technical performance of ASKAP along with early science results and the science survey plans. I will also put ASKAP in the context of the Square Kilometre Array and the broader radio astronomy program in Australia.