

## The Australian SKA Pathfinder Announcement

### Funding:

The [Square Kilometre Array radio telescope \(SKA\)](#) is under consideration by a consortium of researchers from 17 countries. If it proceeds, the SKA will be a next generation radio telescope, 50-100 times more sensitive than any telescope currently available. It will be able to probe key questions in cosmology and physics, including the early origins of the universe. The estimated cost of the SKA is AU\$1.8billion. Australia, with a core site for the SKA in inland Western Australia, is one of two countries short-listed to site the SKA (southern Africa is the other short-listed site).

The Australian Minister for Education, Science and Training, the Hon Julie Bishop MP, announced, as part of the Australian 2007-08 budget, \$56.7 million in Australian Government funding for the Australian Square Kilometre Array Pathfinder (ASKAP). The ASKAP will be one of the world's foremost radio telescopes and an important test bed for SKA technology.

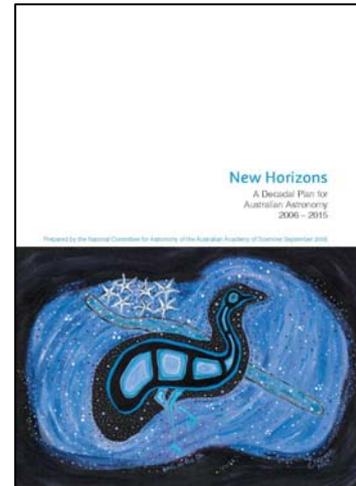
The Press Release from the Hon Minister Bishop MP regarding funding for The Australian SKA Pathfinder is available from [Minister Bishop's website](#).

The funding includes AU\$51.7 million to CSIRO for construction of the ASKAP and AU\$5 million for Australian Government engagement in the international Square Kilometre Array (SKA) program, including participation in the proposed EU FP7 program to conduct a preparatory study for the SKA construction phase. The new funding adds to approximately \$49.2 million already committed for the telescope through Minister Bishop's portfolio.

The Australian Government is currently working with the Western Australian State Government on further development of the Western Australian site as the site for the core of the ASKAP and to meet the stringent requirements of the SKA. CSIRO's early work on SKA technology and the quality of the WA site (which has exceptional radio quietness) has already attracted collaboration and investment from research bodies in the USA and Canada.

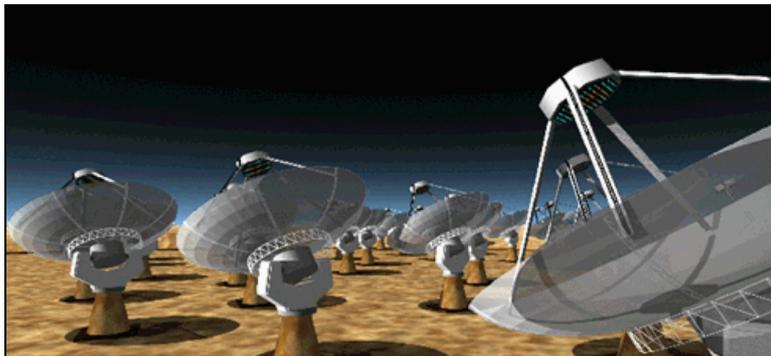
The new funding takes the Australian Government's commitment to the ASKAP to \$100.9 million over the next four years. The funding will enhance Australia's contribution to the development of the SKA concept and technology and help to demonstrate the potential for the SKA to be located in Australia. It builds on Australia's world class standing in both the science of radio astronomy and the innovative engineering that underpins it. The announcement is consistent with the priority placed on the development of new radio astronomy infrastructure in WA articulated in the [Australian Astronomy Decadal Plan 2006-15](#).

*The front cover of the Australian Astronomy Decadal Plan, 2006-15. The artwork on the front cover was commissioned by CSIRO ATNF from Charmaine Green, an indigenous artist in Geraldton, WA, for the SKA2003 meeting in Geraldton.*



### **The Australian SKA Pathfinder telescope:**

Existing investment has enabled Research and Development towards a preliminary version of the pathfinder telescope, called [MIRA](#).



*Visualisation of the mid-frequency component of MIRA, currently being developed by CSIRO in collaboration with national and overseas partners. Image credit: Chris Fluke, Swinburne University of Technology.*

The ASKAP is expected to attract further international scientific collaboration and research partnerships. As a result of the new funding the Australian SKA Pathfinder radio telescope will incorporate:

- An increase from 30, to possibly as many as 45 (see below for trade-off considerations) parabolic dishes equipped with phased array receivers, and a low-frequency array of 512 antenna tiles
- Cooled phased array receivers to increase sensitivity, coupled via a trade-off against the potential for additional collecting area at the core. CSIRO is well positioned to have a leading role internationally in the development of cutting-edge phased array receiver technologies, and the funds provided for this work-package have the potential to enable a major breakthrough for astronomy and for communications technology more generally

- A remote array-station in NSW linked to the telescope core in WA via fibre-optic infrastructure, demonstrating the “long baseline observing” that is a key feature of the full SKA (requiring approximately one quarter of the extra funds)
- Key infrastructure and operations resources to demonstrate the Australian sites for the SKA, including a high bandwidth optic-fibre link between Geraldton and the WA telescope site, characterisation and maintenance of the radio-quiet zone, and suitable power solutions for the telescope and for the SKA remote array-stations (requiring almost one third of the extra funds).



*CSIRO engineer, Stuart Hay, testing a linear phased array. Image credit: CSIRO*

In addition, funds will be available to ensure deep engagement in the international SKA processes to maximise benefit to the international SKA program and to Australian SKA developments in particular, including Australian participation in the proposed European Union Framework Program 7 Preparatory Study on SKA.

The Pathfinder telescope will give unprecedented opportunities for students at all levels to work with a world-leading professional telescope. A CSIRO astronomy outreach program in regional WA, called [Wildflowers in the Sky](#), is already highlighting for students the possibilities of careers in science and technology, and will link students in WA with students in Canada, one of the other partner countries in the MIRA project.

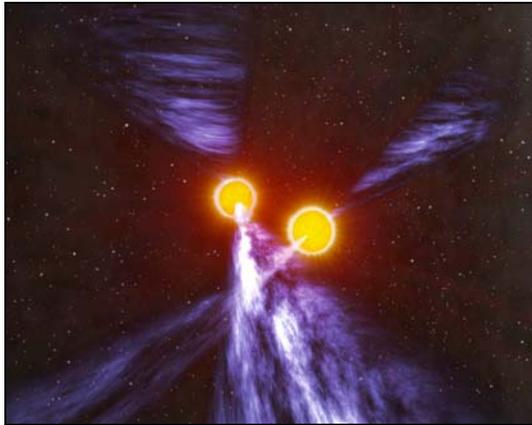


*Daytime observing of the Moon at Cue Primary School. Image credit: Robert Hollow.*

### **Science:**

The ASKAP will carry out ground breaking scientific programs. Access to the pathfinder will be available to the international community on the basis of scientific merit, similar to current practise on Australia’s existing radio astronomy National Facilities.

These funds will significantly increase the scientific impact of MIRA through an increase in its survey speed by a factor of five. As an example, the ASKAP telescope will detect 2 million hydrogen-rich galaxies in its first year of operation, a 400-fold increase over the number known today. The ASKAP will also deliver world-leading performance in a wide range of applications including pulsar astronomy, study of transients, cosmology, and the structure and magnetic field of our own Galaxy.



*A visualisation of the only known double-pulsar system, found with CSIRO's Parkes radio telescope. Credit: John Rowe Animation*

The cross-continent baseline will be an important test-bed for SKA readiness and will enable rapid transient follow-up and improved e-VLBI capability. The full science case for MIRA is available from the MIRA website, including an 'expansion' scenario that outlines the increased scope that will be facilitated by the Australian SKA Pathfinder program.

### **The SKA:**

The Australian SKA Pathfinder program is directly aligned with international SKA priorities. CSIRO looks forward to working with astronomy and industry partners in Australia and the international SKA community on the Australian SKA Pathfinder, building further on this exciting announcement.



*Participants at an international SKA workshop on focal Plane Array receivers, held at CSIRO ATNF in March 2007. Image credit: Tony Sweetnam.*

**Professor Brian Boyle**  
**Director - CSIRO ATNF**  
**May 8, 2007**