International Antarctic Facilities

Submission to Decadal Plan Working Group 3.1

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Future Antarctic facilities (international)

ALTA

The Australian Large Telescope – Antarctica (ALTA) was first proposed in 2000. ALTA is an optical/IR telescope with a diameter of between 6.5 and 8.4 metres. In the mid-infrared, ALTA would have about a factor of ten better sensitivity than all existing 8-metre telescopes. At shorter wavelengths, through the near-IR and into the visible, ALTA would outperform all existing telescopes in both sensitivity and spatial resolution by a wide margin. It would be the most capable ground-based telescope in the world until the first ELTs were built, and even then would retain unique advantages for many types of observations. The science case for ALTA is currently under development; some performance estimates can be found in *Pub. Ast. Soc. Aus.,* **18,** 158-165 (2001).

Interferometry Science Demonstrator

This project aims to deploy two small infrared telescopes to Dome C to demonstrate the scientific possibilities of long-baseline IR interferometry for Antarctica. First deployment could be as early as 2007.

IPY

During the International Polar Year (2007 – 8) it is proposed to deploy a suite of site-testing instruments to the highest point on the Antarctic plateau, Dome A. See http://www.ipy.org/ This site is expected to be the best ground based site available, especially for terahertz observations. Instrumentation for the IPY deployment will be supplied by a number of countries, with Australia providing some instruments plus the field laboratory itself.

KEOPS/API

These are two international interferometer projects (KEOPS is led by France, API by the US) that aim to deploy multiple 2-metre class infrared telescopes to Dome C Antarctica for extremely high-resolution imaging. Australia is a likely participant in one or both of these projects. See *Proc. SPIE,* **5491,** 1580 – 1586 (2004) and *Proc. SPIE*, **5491**,176 – 185 (2004).

GMTA

The Giant Magellan Telescope – Antarctica will be based on the Giant Magellan Telescope planned for construction in Chile. GMTA will be sited on the high Antarctic plateau, where the favourable atmospheric conditions will give it massive performance gains over all other Extremely Large Telescopes. A description of GMTA is available in *Proc SPIE,* **5382**, 76-84 (2004).