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SYMPOSIUM ON TECHNOLOGICAL REQUIREMENTS FOR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Space-Agencies Long-Term Views (1)

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SUPPORTING THE TECHNOLOGY NEEDS OF THE AUSTRALIAN ASTRONOMY AND SPACE SCIENCE COMMUNITY

Abstract

The Australian National University Research School of Astronomy and Astrophysics (ANU RSAA) is Australia's premier University Centre for astronomical research. It has a distinguished heritage in converting the complex scientific requirements of Astronomers into precision instrumentation, including the design, integration and test of advanced instrumentation for international observatories such as the Gemini Observatory and the new Giant Magellan Telescope (GMT).

The recent establishment of the Advanced Instrumentation and Technology Centre (AITC) expanded the ANU RSAA's capability and established the infrastructure to support the design, integration and test of space-based instruments. With a mandate to support astronomy and space science nationally, the AITC provides an intersection between scientists and engineers, between research and industry and enables collaboration across different sectors.

In December 2014 the AITC hosted a workshop to define Australia's next space-based astronomy mission. The workshop brought together astronomers and engineers to identify missions that would make a valuable contribution to the research interests of Australian scientists within the constraints of the CubeSat platform. It also attracted researchers developing the technologies that will expand what is possible in future CubeSat missions.

Of the ten concepts presented at the workshop, three were selected for conceptual design: • The Huntsman Space Eye Telescope: Extremely low surface brightness imaging of nearby galaxies – Dr Lee Spitler, Macquarie University, and Dr Anthony Horton, Australian Astronomical Observatory • Three Frequency Beacon for Ionospheric Faraday Rotation Correction of Low Frequency Radio Astronomy Observations – Professor Mervyn Lynch, Curtin University • A Space High Cadence, Wide-field Ultraviolet Telescope – Dr Bradley Tucker, ANU, and Dr Robert Sharp, ANU

The CubeSat platform provides a low cost solution but the limitations of size, stability, power, and thermal control present significant challenges for astronomical missions, in particular optical missions. This workshop was the start of the development of a roadmap linking current and future science and engineering opportunities in Australia.

This paper will present the science objectives, conceptual design, and technology challenges for the three missions selected. It will also outline some of the technologies being developed in Australia to support future astronomy and space science missions and the importance of the test and evaluation work being undertaken at the AITC to improve their performance and their technology readiness level.