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MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Smart Materials and Adaptive Structures (5)

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# SMART SPACE: AUSTRALIA'S ROLE IN SMART STRUCTURES AND MATERIALS IN SPACE

**Abstract**

The White Paper produced by the 2011 International Space University (ISU) Southern Hemisphere Summer Space Program (SHSSP) suggested that Southern Hemisphere States(1) should identify their unique geographic location, and specialist technology and knowledge which could be used to increase their involvement in space-related activities for the mutual benefit of all stakeholders [SHSSP, 2011]. One such technology area is the emerging field of advanced materials, in particular 'Smart Materials and Structures' (SMS). SMS have many applications within the space industry and According to NASA Science News (2002), improved spacecraft of the future will not be possible without advanced materials.

Australia is known for its innovation and development in the field of advanced materials and has considerable existing infrastructure for materials research and development (CSIRO, 2007). This places Australia in a good position to supply SMS technologies and expertise to international space projects. As these fields are still new, there is also the potential for Australia to secure a niche area or product, or to become world leaders in this field. Another advantage is the many spinoff technologies and applications from which Australia could benefit.

To expand on the outlined goal of the SHSSP11 White Paper, this two phase research project looked at how Australia can increase its involvement in current and future space-related activities through research and development of Smart Materials and Structures. The first phase outlined current and predicted uses of SMS in the Space Industry, provided an overview of Australia's current involvement in this field and identified additional motivators and benefits for increased Australian participation in SMS. Due to the myriad applications of SMS, the research focused on their use in manned and unmanned rockets and rovers. The second phase involved identifying potential areas for Australia's increased involvement in the Space Industry through research and development, products and knowledge in the field of SMS. Potential social, legal and political aspects involved in such collaboration will also be considered.

1. Southern Hemisphere is defined as "those states with any territory below the Tropic of Cancer" [SHSSP, 2011]

CSIRO, 2007. Materials Overview: Fast Facts [online]. Commonwealth Scientific and Industrial Research Organisation, Australia. Available at: <http://www.csiro.au/org/MaterialsOverview.html> [Accessed 20 February 2011]

NASA Science News, 2002. Super Spaceships: The Right Stuff for Super Spaceships. [online]. NASA Science News. Available at: <http://science.nasa.gov/science-news/science-at-nasa/2002/16sep_rightstuff/> [Accessed 15 February 2011]

SHSSP11, 2011. Paths to Progress: Space and the Southern Hemisphere. International Space University & University of South Australia.