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DEBRIS COLLISION MITIGATION FROM THE GROUND USING LASER GUIDE STAR ADAPTIVE  
OPTICS AT MOUNT STROMLO OBSERVATORY: RESULTS FROM THE FIRST ARTIFICIAL STAR  
EVER CREATED IN AUSTRALIAN SKIES

## Abstract

The Australian National University (ANU) and industry partners EOS Space Systems and Lockheed Martin are part of the Space Environment Research Centre (SERC), an Australian-Government funded cooperative research centre headquartered in Canberra, Australia. SERC aims to mitigate the threat of collisions with space debris using a ground-based high power (10-20kW) infrared (IR) laser to modify the debris orbit should a collision be predicted. To that end, the ANU has equipped the EOS 1.8m laser tracking station telescope on the ANU Mount Stromlo campus with a state-of-the-art Laser Guide Star Adaptive Optics (LGS AO) system to pre-compensate the IR laser prior to propagation through earth's atmosphere. The ANU LGS AO system is currently being integrated with the EOS telescope and the high-power IR laser. This presentation will provide a brief overview of the LGS AO system and focus more specifically on the design, integration and commissioning of the first LGS facility ever constructed in Australia. The LGS Facility includes two sodium guidestar laser sources which can be either propagated separately or combined so as to produce a brighter reference star to maximise adaptive optics correction. The presentation will describe the two lasers, their beam combining optics, and their common beam transfer optics and laser launch telescope.