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Application of adaptive optics in Space Debris tracking

Adaptive optics can be used to enhance ground based satellite and debris tracking systems by compensating for atmospheric turbulence. Near diffraction limited imaging can be achieved for for telescope capable of resolving features down to 50 cm in size at a range of 1000 km. Satellite shape characteristics such as orientation and configuration can be measured and used to improve orbital propagation. We present initial results of satellites in orbit from an adaptive optics system on a 1 m telescope at Mount Stromlo in Canberra, Australia. We achieve a full width half maximum of 0.25 arcseconds at 850 nm in 2 arcsecond seeing, which is near the diffraction limit at this wavelength of 0.18 arcseconds. We present our plans for future adaptive optics instruments for space situational awareness including laser ranging and remote debris manoeuvring.