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Author: Dr. Israel Vaughn

Australian Defence Force Academy (ADFA), Australia, i.vaughn@unsw.edu.au

Mr. Bart Fordham

Australian Defence Force Academy (ADFA), Australia, b.fordham@unsw.edu.au

Dr. Douglas Griffin

Australian Defence Force Academy (ADFA), Australia, d.griffin@adfa.edu.au

STAVROUDIS-LIKE BAFFLES FOR SMALL SATELLITE IMAGING SYSTEMS

**Abstract**

Reflective Stavroudis baffle designs have been used little, if at all, for small sat sized imaging systems. These designs would typically be manufactured in segments, processed by diamond turning, fine polished, and finally precision assembled. This process is expensive and labour intensive due to the multiple steps required for each individual baffle segment before precision assembly to maintain the optical surface alignment between segments. This traditional way of manufacturing Stavroudis baffle designs has therefore only been suitable for some big space missions, and has previously been used in sun pointing or sun measurement applications. Modern metal 3D printing using Selective Laser Sintering processes allows for complex structures to be monolithically manufactured in titanium and aluminium alloys. We present the design, analysis results for a printable Stavroudis-like small sat star tracker baffle and a printable small sat telescope baffle. The performance of the designs is compared with traditional absorptive designs via scattering simulations coated with Avian-DS. We also manufacture the Stavroudis-like star tracker baffle design and compare the performance to the manufactured absorptive design over the visible spectrum. The manufacturing methods required to post-process and polish the as-manufactured 3D printed part to reveal the reflective surfaces are discussed, as are the trades in using this process for small sat applications.