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CUBESAT CONFUSION: CUBESAT ID VIA GROUND-BASED OBSERVATIONS OF A PULSED LED BEACON

Abstract

CubeSats and nanosats offer affordable access to space. Their standardized size and shape have allowed a CubeSat industrial ecosystem to flourish, which has lowered costs for acquisition and launch, and vastly shortened development times. This has enabled access to space for many nontraditional actors in the space arena. What previously might have taken years to develop can now be accomplished in months, and for significantly less money. This has allowed educational institutions to fly their own CubeSats. It has also allowed numerous developing countries their first satellite. It has allowed more traditional aerospace companies and government agencies very rapid cycle times for research and development efforts. However, when scores of CubeSats are launched en masse, many cannot be immediately identified, some not even after months, if ever. This inability to identify the launched CubeSats from their cohort is what gives rise to "CubeSat confusion". There are many factors to mitigate this issue, but chief among them would be the ability of a CubeSat owner/operator to independently identify their CubeSat, perhaps using one of various specialized techniques or technologies to aid in this regard. One technique, demonstrated by the Sapienza University of Rome group, is to modulate the signal from a spacecraft exterior mounted light emitting diode (LED), while ground-based telescopes look for the flashes. Sapienza accomplished this by observing

their WildTrackCube-SIMBA and LEDSAT satellites' LEDs. In this work we plan to report attempts to observe the Aerospace Corp.'s payload Blinker 1.0, aboard the Slingshot-1 mission, launched in July 2022, by the Sapienza team. We are also recruiting other observers for this demonstration. LEDs are small and relatively inexpensive, easily fitting within a CubeSat mission's size-weight-power-and-cost profile. If it can be shown that identifying a CubeSat by its flashing LED signal is reliable and straightforward, they may become the technology of choice for CubeSat mission designers to incorporate on future missions to eliminate CubeSat confusion.