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THE A3SAT EMULATOR: A CATALYST IN DISRUPTIVE CUBESAT AND SPACE TECHNOLOGY EDUCATION

Abstract

Over the past two decades, small, low-cost satellites, known as CubeSats, have rapidly progressed from research space platforms to significant mission-capable spacecraft. The capabilities of CubeSats continue to expand and are being deployed in a wide range of sophisticated scientific and commercial missions, demonstrating that CubeSats have earned a legitimate place in the New Space Ecosystem. Using CubeSats as an authentic instructional technology offers unique learning opportunities for secondary and postsecondary students to gain hands-on experience and engage students in real-world space applications. Using CubeSats as an authentic instructional technology offers unique learning opportunities for secondary and postsecondary students to gain hands-on experience and engage students in real-world space applications. CubeSats offer a unique platform for experiential learning, empowering students to actively participate in the entire lifecycle of a satellite mission, from concept to operations to data interpretation. They provide invaluable opportunities for students to gain practical skills, foster innovation, and contribute to scientific research in space. However, the cost to build a space-ready CubeSat may exceed $100,000, prohibiting secondary student involvement in the satellite design process. The A3Sat version 2.0 was designed to authe$
$college students. I Incorporating the A3Sat program has elevated student's satellite experience from using satellite and remote$

The A3Sat Emulator is a 1U CubeSat-class Satellite Designed for Education in a Classroom Setting and is considered a Tier 2 Emulator, ready for space with modifications. A3Sat Emulator: -Authentically replicates a CubeSat build -Authentically replicates CubeSat functionality and operational mechanics -Provides curricular enrichment for secondary- and postsecondary-level studies in electrical engineering, aerospace engineering, mathematics, physics, computer science, control systems, mechanical engineering, materials science

GroundStation feature sets, such that all data, from every A3Sat around the world, will have the option to concurrently upload its data to a central database, which will have new web software developed around it to allow users and citizens from across the world to view A3Sat missions in real-time and track/analyze them. This will allow users to observe their past mission datasets, cross-compare different A3Sat runs, and potentially cross-validate their data to NOAA and other publicly available environmental datasets to monitor any discrepancies.