

44th STUDENT CONFERENCE (E2)  
Educational Pico and Nano Satellites (4)

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A TECHNOLOGY DEMONSTRATION PROJECT TO PROVE INTER SATELLITE  
COMMUNICATION BETWEEN TWIN NANO SATELLITES AND DE-ORBITING MECHANISM**Abstract**

Project STUDSAT- 2 (STUDent SATellite-2), India's first twin Nano-Satellite mission which aims to demonstrate Inter-Satellite Communication between two Nano-satellites STUDSAT-2A/2B is an interdisciplinary nano-satellite project being designed and developed by undergraduate students from seven engineering colleges across the state of Karnataka, India. Nano-satellites STUDSAT-2A and STUDSAT-2B are the second in series of small satellite after the successful mission of STUDSAT-1, India's First Pico Satellite. The mission objectives of Project STUDSAT-2 are to demonstrate Inter-Satellite Communication between STUDSAT-2A and STUDSAT-2B, demonstrate an In-orbit Satellite Separation Mechanism, implementation of drag sail technology in slave satellite (STUDSAT-2B) for de-orbiting, capture images of Earth with a CMOS Multispectral camera of less than 40 meter resolution. The general objectives are to promote space technology in educational institutions and encourage research and development in miniaturized satellites, to create ecosystem between research organisations, academic institutes and industries. This paper presents the overall satellite design involving all sub-systems, project organization, mission and satellite description. The nano-satellites will be in along-the-track satellite constellation architecture. Each satellite weighs 7 Kg and has the dimension of 300mm x 300mm x 150mm. The twin satellites are ejected from the launch vehicle as single satellite. The satellite uses two phase detumbling methodology, wherein after the first phase of detumbling the indigenously developed satellite separation mechanism separated the satellite and makes it possible to achieve along-the-track satellite constellation. The optional second phase detumbling phase is initiated with respect to the disturbances caused during separation of the satellites. The STUDSAT-2A hosts the CMOS Multispectral camera which images the Earth and transmits it to STUDSAT-2B. Satellite STUDSAT-2B transmits the received image to NASTRAC (Nitte Amateur Satellite Tracking Center) ground station, thus proving Inter-Satellite Communication. The satellite STUDSAT-2B hosts drag sail as payload which is deployed after the completion of first hundred days of mission to de-orbit the satellite. Each subsystem is indigenously designed and developed by the undergraduate students.