

15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
Generic Technologies for Nano/Pico Platforms (6B)

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## STRAND-1: USE OF A \$500 SMARTPHONE AS THE CENTRAL AVIONICS OF A NANOSATELLITE

### Abstract

STRaND-1 is the first in a series of SSTL-Surrey Space Centre collaborative satellites designed for the purpose of technology pathfinding for future commercial operations. It is the first time Surrey has entered the CubeSat field and is different from most CubeSats in that it will fly a modern COTS Android smartphone as a payload, along with a suite of advanced technologies developed by the University of Surrey, and one unit by the University of Stellenbosch in South Africa. STRaND-1 is also different in that anyone – not just from the space engineering or space science community – will be eligible to fly their “app” in space, for free. STRaND-1 is currently being manufactured and tested by volunteers in their own free time, and will be ready for an intended launch in the next three months.

This paper outlines the STRaND pathfinder programme philosophy which challenges some conventional space engineering practises, and describes the impact of those changes on the satellite development lifecycle. The paper then briefly describes the intent behind the design of STRaND-1, before presenting details the design of the nanosatellite, focussing of the details of the innovative new technologies. These technologies include two different propulsion systems, an 802.11g WiFi experiment, a new VHF/UHF transceiver unit and a miniature 3-axis reaction wheel assembly. The novel processing setup (which includes the smartphone) is discussed in some detail, particularly the potential for outreach via the open source nature of Google’s Android operating system. A step-through of the planned concept of operations is provided, which includes a possible rendezvous and inspection segment, demonstrating equal or improved capability compared to SNAP-1 with a reduced total system mass. Finally, data from the test campaign is presented and compared against other notable CubeSats known for their advanced capabilities.