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# NSLSAT1, HIGH GAIN, DEPLOYABLE KA-BAND COMMUNICATION PAYLOAD, SYSTEM AND PERFORMANCE

**Abstract**

NSLComm is an innovative "New Space" company which focuses on Nano-Satellites for ultra-high bitrate communication. This Nano-satellite has the capability to provide an ultra-high bitrate (1Gbps) data link with ground-stations and small SATCOM earth antennas. NSLComm's breakthrough deployable technology will be demonstrated during 2019 when NSLSat1 (a 6U CubeSat) will be launched. The system is based on an offset-Gregorian dual optics satellite antenna. The offset-Gregorian dish antenna may be mounted on a LEO/GEO satellite. When stowed, the main reflector is folded inside the satellite. After satellite launch and earth orbit has been reached, the main-reflector is deployed. The deployment of the main-reflector will reveal the feed and sub-reflector, and allow the antenna to be functional. The performance of a Ka-Band antenna depends on the accuracy of the main-reflector. The use of a low-cost deployable main-reflector may result in inaccuracies in the main-reflector shape. To compensate for these inaccuracies, after deployment of the main-reflector, the sub-reflector surface may be modified by changing actuators which will modify the sub-reflector shape. Changing the sub-reflector shape may also be used for antenna beam shaping. The paper we will be divided into 2 parts. In the first part we will describe the system and especially the performance of the communication payload with a 55cm deployable high-gain main-reflector at Ka-Band (40dBi gain), adaptive sub-reflector and an antenna feed. Link-budget calculation will be given for several ground station configurations (>1Gbps performance) and some application examples will be discussed. In the second part we will show the simulation results of a larger antenna (80cm at Ku-band) with footprint management (defocusing, squint nulling). The footprint management (antenna beam shaping) is done by changing the shape and geometry of the sub-reflector (by changing actuators which modify the sub-reflector shape).