

# **Surrey Satellite Technology Ltd; Development of an integrated Ka-Band dish antenna and feed for the SSTL Antenna Pointing Mechanism**

## **Executive Summary**

Under a NSTP2 Grant for Exploratory ideas, SSTL has undertaken the design of the antenna and feed for its future Ka-Band Antenna Pointing Mechanism product.

The first step was to define the requirements and understand the key parameters for a small Ka-Band antenna in the context of small satellites such as the future evolution of the NovaSAR platform. Indeed, previous work on Ka-Band was focused on inter-satellite links or much larger Low Earth Orbit platform.

A baseline link budget was then established and a comprehensive review of all Ka-Band antenna technologies undertaken to select the most appropriate one meeting the size and gain requirements. The Cassegrain antenna selected is a single channel circular polarised antenna working over the frequency bandwidth 25.5 to 27GHz.

All the key elements of the antenna including the waveguides transition, septum, feed horn, sub-reflector and main dish were electrically simulated and optimised to provide the best performance. A Computer Aided Design model of the antenna was created including mechanical features for assembly and manufacturing and the electric simulation was iterated.

The design obtained has a gain of 27.8dB minimum and an axial ratio of 0.57dB maximum over the frequency bandwidth at boresight. Further work on detailed components design and sensitivity analysis will be undertaken before a breadboard is manufactured.

