

## Catena Space Ltd; SLIP (Spacecraft Logarithmic Information Processor)

### Project Summary

Increasing payload performance requirements (in communications, Earth Observation and science) drives innovation in data handling and processing systems. Contemporary spacecraft perform extensive digital signal processing (DSP) to meet these demands, and the use of on-board DSP (rather than ground segment processing) will continue to increase.

However, DSP performance is limited by the throughput of the fundamental arithmetic instructions. Both accuracy and throughput can be improved by optimising the underlying representation of data to suit the application. The proposed project will establish the technical viability for an alternative, optimised for space relevant tasks. In short, we will investigate the digital equivalent of providing onboard processors with a slide rule.

A floating-point arithmetic unit (the engine for all powerful DSP systems) is very versatile - but is also overly complex for many applications where versatility is not relevant. An alternative representation using the binary logarithm constitutes an attractive novel space technology that offers reduced power consumption, higher performance, and deterministic *a priori* error characteristics.

Various applications will be investigated, such as Fast Fourier Transform (FFT) device for spectrometry, an image compression core, or at platform level, an attitude controller. The project contributes to several NSTS themes (Access to Space, Sensing and Telecommunications).