SPACE SYSTEMS SYMPOSIUM (D1)
Enabling Technologies for Space Systems (2)

Author: Dr. Malcolm McRobb
Clyde Space Ltd, United Kingdom

Ms. Libby Hoban
Clyde Space Ltd., United Kingdom
Dr. James Buckle
Clyde Space Ltd., United Kingdom
Mr. Steven Greenland
Clyde Space Ltd., United Kingdom
Mr. Alasdair Gow
Clyde Space Ltd., United Kingdom
Mr. Craig Clark
Clyde Space Ltd., United Kingdom

ON THE DEVELOPMENT OF A NOVEL CUBESAT STANDARD STRUCTURE FOR MODERN MISSIONS

Abstract

As the market for nanosatellites continues to expand, and access to Earth's orbit becomes more readily available for a growing and generally CubeSat centred community, advances have been made in the computation, instrumentation and power generating capabilities. Whilst the technology and modularity available within the CubeSat 'stack' has evolved to deliver new capabilities, the structure itself has largely remained unchanged and have failed to keep up with advances and refinements to other subsystems, in particular to accommodate bespoke technologies, new interfaces beyond the CSK PC104 approach, and to facilitate rapid mission-customisation, integration and test.

Often, this can force mission developers to either alter the scope of their mission to compromise on configuration constraints in payloads, antenna, GNC sensors, and other instruments, or to dedicate resources to design and manufacture custom structures specific to their needs. This drives up costs, particularly in qualification testing, and impacts development time between mission conception and launch; all of which is counter to the ethos of the CubeSat platform.

To address this situation, Clyde Space Limited has developed a new CubeSat compliant structure that dramatically changes the way one might typically approach the design and integration of a satellite platform. By incorporating novel design features considering design for assembly and test, the Clyde Space structure is adaptable to a wide range of individual mission requirements. For example, the structure itself can be built around the internal platform stack, whilst individual faces can be removed in order to increase accessibility. Spaced mounting locations along the length of the structural rails will also allow the position of the modules to be altered without the need for bespoke components. Furthermore, the Clyde Space structure remains compatible with all major deployment PODs and offers manned flight compatibility as standard, via the introduction of four deployment microswitches.

This paper details the development process of the Clyde Space structure - from conception, to design, manufacture and subsequent testing, and its application to current missions in Europe and the US such as ocean colour monitoring, solar limb observations, and ubiquitous communications. In doing so, savings and risk reduction have been identified resulting from the new design features.