Key Technologies (7)
Key Technologies (1) (1)

Author: Mr. Ignaty Romanov-Chernigovsky
Space Products and Innovation, Germany, iromanovchernigovsky@community.isunet.edu

Mr. Ran Qedar
Space Products and Innovation, Germany, ran.qedar@spinintech.com
Mr. Saish Sridharan
Space Products and Innovation, Germany, saishsridharan@spinintech.com

A SIMPLE CONFIGURATION SYSTEM FOR PLUG AND PLAY CUBESAT OBSW DEVELOPMENT.

Abstract

The last decade has seen an explosion in the number of cubesat missions. From a beginning as a concept for cheaper LEO missions, cubesats are now becoming used in non-typical configurations and mission profiles, from high orbits to deep space missions. As launch costs become increasingly lower, the larger part of mission costs is increasingly taken up by components, development and integration costs. While typical LEO missions' development and integration can be easily addressed by a set of standardised hardware and software components, less typical mission designs will usually require software designed in a large part from the bottom-up.

In this paper, the authors present a concept for a standardised configuration system which can be used for automated configuration of On-Board Software, significantly speeding up phases B and C of mission development. The format allows for communication between the OBC and other cubesat subsystems to be defined at a high level, allowing for OBSW development to focus only on the high level behaviour of the spacecraft.

The configuration system is designed with a focus on several criteria. Firstly, providing a universal and highly flexible framework that allows for most subsystems' supported communication protocols to be implemented and configured with minimal amounts of low-level development of OBSW. Secondly, minimising impact on in-flight performance when compared to traditionally developed OBSW, mainly achieved by performing the configuration of the OBSW mostly at compile-time. Thirdly, providing a human-friendly configuration interface, in our implementation in the form of an easy-to-read config file. And fourthly, workflow incorporating the configuration system must present tangible time and/or cost savings over the current industry-standard development process.

An implementation of this approach is used during the development of the SPiN-1 cubesat mission. The details of constraints, advantages and limitations of this approach found over the course of mission development are also presented in this paper, and extrapolated into more complex non-standard mission design cases.