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APPLYING MODEL BASED SYSTEMS ENGINEERING (MBSE) TO PLATFORM CONCEPT DEVELOPMENT: THE GOOD, THE BAD AND THE UGLY

Abstract

All satellite developments start with a need and nominally this is quite specific, for example, a desire to obtain images of the Earth to allow fire detection, or to collect sensor data from remote geographical locations to pass onto users. But what do you do when you want to design a platform that will service many different needs, some of which have conflicting requirements and a whole host of different stakeholders?

This was the problem that presented itself at the onset of the development of the Next Generation Microsatellite Platform (NGMP). The NGMP is intended to shift the paradigm and inject disruption into the small satellite market through the development of a performant platform at the price point of a CubeSat. The goal of this transformation is to open up new markets and opportunities and allow business cases to close, in an ever more competitive environment. This development was also framed by wanting to promote the responsible and sustainable use of space.

This is an interesting case study for the use of Model Based Systems Engineering (MBSE) as there was a lot of information to process, stakeholders to consider and constraints to manage. This paper will reflect upon the systems thinking and MBSE approaches that were taken by the team to explore the problem space and the stakeholder concerns. It will also explore how the result of this was developed into a platform concept, with examples provided from across the different stages of the modelling.

There are a number of positive outcomes from this approach which will be discussed in more detail, for example, how it helped in getting the team aligned and agreeing a shared ontology. There have also been challenges in orchestrating this approach, which will also be covered, for example, transitioning teams from 'traditional' approaches to MBSE approaches and tackling model-based reviews rather than document centric reviews.

The paper concludes with a view on where perhaps the MBSE landscape needs to progress to, in order to provide greater and more accessible utility as well as a glimpse into how MBSE techniques are to be employed through the NGMP lifecycle and generational development.