

Thinking about your Mission Control System

Home-Made Mission Control Systems vs. Off-the-Shelf Solutions

Studies report a failure rate approaching 50% in academic satellite missions, which can be mostly traced back to insufficient testing. These findings emphasize the importance of early availability of capabilities for system and end-to-end tests. A proper Mission Control System can greatly facilitate these tests. However most academic satellite projects are focussing their attention to the building of the satellite hardware and leave the ground segment and operations concept for later, not last because the academic value is much higher in these aspects of a mission than in the building of a ground segment. COTS solutions can bridge this gap. An easy to use, flexible and extensible Mission Control System can bring great value to these projects early on by creating meaningful test situations and environments. Although there might be some small costs involved in the procurement and configuration of a third party solution, it is still much more cost-effective than custom-building, or risking to lose the mission.

Make-Buy Trade-Off

Home-Made Solution

Tailored to a specific mission

Reinventing the wheel?

- Often developed in parallel to or after the space segment
- Optimised for the need of a specific mission
- Protocols evolve during the development of the mission
- No toolchain supporting early tests
- Problems found late are source of unforeseen development costs

Custom Mission Control Systems can result in higher costs for solving unexpected problems in a short time with improperly tested solutions.

Off-the-Shelf Solution

Established and flight-proven

Rigid, expensive?

- Follow standards to solve common problems
- Full stack available from the start
- Sometimes difficult to tailor to custom requirements
- Higher upfront costs
- Might require specific training
- Vendor locking for maintenance and support

Off-the-shelf solutions use established and flight-proven standards thus being less risky, but adding some constraints to the development.

Our Solution: Elveti

Combining Standard Protocols With Modern Technologies

Elveti is an easy-to-use, flight-proven and cost-effective mission control system, designed for small satellites. It is based on modern technologies, extensible and customisable, and supports ECSS/CCSDS standards. Elveti offers full monitoring and control functionality for single and multiple satellites.

Extensibility

- Each module of Elveti provides interfaces and extension points
- Support for mission-specific data
- Visual extensions, e.g. 3D models
- Web services allow integration and distribution of data

Elveti

- Flight-Proven
- Reliable
- Flexible
- Full Monitoring and Control Functionality
- Lightweight

Standards

- The Mission Control System is built and optimized for CCSDS PUS (ECSS-E-70-41A)
- AX.25 Frame Protocol
- Standard CCSDS frames (ECSS-E-ST-50-03C and ECSS-E-ST-50-04C) under development