Primes View: Current spacecraft data handling interfaces and future needs at OHB

Dirk Felbach, OHB System AG, dirk.felbach@ohb.de

In current spacecraft architectures, the driving requirements for command and control interfaces are reliability and a time-deterministic transfer of information at a rather low data rate of less than 1Mbit/s. Exactly these key demands have made the MIL1553 bus so widespread and successful in satellites. Its robust physical implementation, a redundant layout, a strict and simple communication protocol combined with the bus master policy maintaining full control on each data transfer satisfy the needs for reliability. This service has to be paid by significant mass contribution, power consumption and interface cost. These disadvantages paired with a low data rate have triggered in the past several alternatives to replace the MIL1553 bus by e.g. a redundant CAN bus, SpaceWire or in recent past by SpFI/TTETH networks.

In addition, a second class of important data handling interfaces are the discrete lines to collect essential telemetry (temperature, bi-level status, analogue voltages) spread over the satellite. These signals are collected by either one or multiple RTUs or directly by the OBC itself. The chosen topology is of importance for identifying the most efficient data handling architecture in terms of weight, power needs, cost and flexibility.

In the presentation the current OHB avionics architecture will be described as well as investigations to optimize the system by e.g. replacing the MIL1553 or the more efficient handling of discrete telemetry in view of future demands for satellite data handling architectures.