Architectural Trade-offs: Avionics Architecture Non-Functional Analysis

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The ESA AAML (Avionics Architecture Modelling Language) study aimed at advancing the avionics engineering practices towards a model-based approach by identifying and prioritizing the avionic analyses based on an architecture model, specifying the modelling language features necessary to support those analyses, and prototyping a software tool to demonstrate the automation of the analyses.
The proposed model-based process provides the means to manage the different phases of conception and implementation of the avionics system as a sequence of subsequent refinements of the avionics definition. This study implemented the Avionics Architecture Modelling Language and a sub-set of the relevant avionics analyses (i.e., bus load and data latency, commandability and observability, and on-board functions and performance). Their feasibility was demonstrated using a prototype tool and a use case based on the ESA's Sentinel-3 satellite.