VSEE-CDF Data Model Transfer and Modelling Guidelines

The ESA Concurrent Design Facility (CDF) is using the Open Concurrent Design Tool (OCDT) for conceptual space system definition in the early mission phases 0 and A. OCDT provides an open source environment for concurrent, collaborative and distributed engineering, which is based on the ECSS-E-TM-E-10-25A meta-model. Model-Based Systems Engineering (MBSE) for space systems in later mission phases (B, C, D, E) is addressed through the Virtual Spacecraft Engineering Environment (VSEE). The VSEE framework is based on the ECSS-E-TM-10-23A meta-model. One of the main tools of the VSEE is the Space Systems Design Editor (SSDE) which is used for creating and editing space system models. In the future it is envisaged to merge both ECSS meta-models into a single standard that can be used across all space system life-cycle phases (i.e. Phases 0 to F). This activity addresses the envisaged integration on meta-model as well as on tooling level. As part of the activity, the compatibility between the two meta-models has been analyzed and a set of required model transformations from 10-25 to 10-23 and vice versa have been defined. Further, an integration between the SSDE and OCDT tooling has been implemented and validated with reference data sets to demonstrate the integration approach. The implemented integration enables model exchange between the OCDT and VSEE environments, fostering reuse of system engineering models elaborated in different mission phases. Finally, a set of system technical budget reports have been developed and associated modelling guidelines for producing the budgets have been defined.