**IDM-CIC and SIMU-CIC applications to establish a technical reference during design phases of a satellite**

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Developed over the past ten years, IDM-CIC and SIMU-CIC applications provide a technical reference during the concurrent engineering process required during the design phases of a satellite. A modular approach is implemented to build a database that interacts with dedicated engineering modules.

IDM-CIC application allows to build 3D configuration with characteristics of mass, and consumed / dissipation power. IDM-CIC also provides the ability to manage mission scenarios which describe trajectories, attitudes, modes and associated ephemeris produced by SIMU-CIC application. Engineering modules can connect and exchange with this repository to perform specific simulation (electric, thermal, communication, data handling…) and the IDM View application offers visualisation capabilities.

All of these modules aim to establish and present system budgets: Mass Center and Inertia, Power budget, Propellant budget, Link and Data budgets. IDM View offers advanced functions for consultation of the 3D model and representation of the satellite configuration in orbit. Post processing functions are today implemented to present simulation results.

This presentation will be a demonstration of the new functions developed and will focus on:

* The ability to describe orbit and attitude with SIMU-CIC,
* The ISI plugin to import a geometric model from CAD tools,
* the new IDM-CIC modeling functions,
* and new IDM View capabilities.

The SIMU-CIC application allows to produce in the Scilab - CelestLab environment the ephemeris files compliant with the CIC protocol derived from CCSDS standard. The application describes the mission scenarios and associated data: orbit parameters, ground stations, spacecraft geometry (orientation of the solar array and field of view) and attitudes sequences. The demonstration will focus on the description of sequences of laws of attitude defined by combination of basic attitudes and management of conditions.

Developed by Virtual IT, the ISI module allows to present the structure of a CAD model in STEP format and to import it in the form of assembly and IDM subsystem equipment. This imported model will allow the establishment of mass and power budgets. It can also be used as a reference for developing a simplified model for exchanges or simulations.

The new modeling functions of IDM-CIC allows curves modeling with polyline or Bezier description. This new pattern is used to create pipes, surfaces or extruded volume shapes and can also be used for defining a new type of joint. Equipment, assemblies or elements can thus move along these curves.

IDM View application has been optimized to improve the rendering and performance of loading models. The latest developments enable the new shapes and joint to be taken into account. New functionalities also offer the management of several models allowing the visualisation of several satellites in orbit.

The demonstration will describe the new functions of the tools and will present some illustrative examples performed at the Concurrent Design Facility at CNES.