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CNES 'AUTOMATION', A GENERIC SOLUTION TO FACE TODAY'S NECESSITIES

Abstract

CNES has an history of more than 25 years of successful spacecraft operations, in all orbits and with heterogeneous mission profiles, from LEO to GEO, MEO and ISS-related operations.

The ISIS product line was conceived to use all of the experience gained through the years in order to create a generic control center that could embrace the diversity of the missions handled by CNES. However, the genericity comes with choices and adaptation to each mission had to be made in order to fulfil all the requirements.

In CNES control centers, automation plays a central role in ensuring reliable, repeatable operations, but it also has to accommodate all the differences each missions brings. With automation comes the risk of "black box operations", where, as time goes by, controllers and engineers may end up not knowing what is going on, aggravated by the fact that most of the automation logic has been made generic.

To tackle the issue of highly automate a control center without sacrificing on the ability to take over control of the system if needed, CNES has developed concepts such as layers of operations, phases of operations, rule engine or groups of operations and created tools to visualize, manipulate and operate these concepts.

The paper will also discuss the advantages and benefits of using the same automation software, but also part of the automation logic to operate 4 very different missions (a 3 satellites in formation flight, a scientific satellite, a cubesat and a constellation of 25 satellites) and the challenges brought by the fact that we share some of the configurations along multiple missions.

Although costlier at first, the genericity and reuse of logic already bring benefits and allows CNES personnel to focus on delivering higher value to its partners without having to compromise on operation reliability