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SPACE OPERATIONS SYMPOSIUM (B6)
New Operations Concepts, Advanced Systems and Commercial Space Operations (2)

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LETTING MISSION OPERATORS DO MORE : HOW CAN WE HELP HUMANS DEAL WITH
SYSTEM COMPLEXITY ?

Abstract

Operating a space mission is something very complex. Systems, software, interfaces, data... all come together in a complicated “system of systems”, which through the years is constantly increasing in size and complexity. Yet, behind every mission, there are human beings, involved at every level. How efficient can they possibly be to deal with such a level of system complexity?

In this paper, we want to address the human dimension of the control center. Rather than replacing the existing operational systems by ever more complex ones, or replacing staff by automated software, a good approach may also be to help operators spend their time on what really matters and what they are best at.

Our work in CGI in Darmstadt, Germany, focuses on the ground systems and the operations of space missions, for both public actors like ESA/ESOC and commercial organisations. We have built a transversal presence through the control center, in both its teams and its systems. This is a unique position to understand best the *big picture* of space mission operations.

In the first part of the study, we will survey our customers and partners, talk to spacecraft controllers, operations engineers, analysts, team managers, systems maintenance experts, etc. CGI has actually already started to engage with stakeholders. This survey will investigate which tasks operators are doing every day that they should not have to worry about. This survey will also identify which aspects of the control center are preventing or slowing its evolution. IT security constraints, aversion for change, or lack of resources might be some examples.

The second part of the paper will present possible innovative solutions that can increase the efficiency of operational teams. CGI has already identified potential approaches: removing the dependency on paper to ease communication among the different teams; applying problem solving techniques such as root-cause analysis to keep the decision making process as swift as possible; adding layers of abstraction to protect from information floods; or applying key performance indicators to help operators stay high level. In this second part of the paper we will also present ideas to implement these potential approaches accounting for the hurdles identified in the survey.