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USING UX DESIGN TECHNIQUES TO INCREASE THE EFFICIENCY AND CONFIDENCE OF
MISSION OPERATORS

Abstract

New Space companies are flying ever larger constellations of satellites using smaller operational teams. As the complexity of the space segment grows, so does the amount of (operational) data that needs to be processed and acted upon by human operators. Automation techniques provide a part of the response, by taking more and more responsibility in routine tasks. But another part of the response comes by increasing the efficiency of operators, by allowing them to focus on what is important at any moment and in any context. User Experience design (UX) offers great tools to help us improve ground segment software to achieve these goals. In this paper, we describe our approach to improving the efficiency of operators while developing a new ground segment platform for the New Space market.

We start the paper with an analysis of the usual approaches in today's ground segment software, and specifically how and what kind of data is presented and processed. We follow this by explaining our approach to abstract operators from detailed information (e.g. detailed telemetry, logs, alarms). We then show how, by applying UX design techniques such as behavioral factors of operators, needs and obstacles, we could better show context-relevant information in an ergonomic and visual way, while at the same time increasing confidence in the system. In a fourth part, the paper explains our approach in the dynamic consolidation of metrics into Key Performance Indicators and the interaction with the M&C (Monitoring Control) automation in order to increase operator focus. We then show the platform's philosophy of very high configurability (and its implementation) and how letting the operator compose the UX himself (operational concepts, dashboards, mimics, limits, alarms, simulation models, etc.) does improve overall efficiency. Finally, while the operators must still have the ability to access detailed information, we show that we were able to reduce the necessity of accessing such information in most situations.