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FLEX-CONSOLE - MORE THAN JUST A FURNITURE FOR SPACE OPERATIONS - EXPERIENCES FROM LUNA PROJECT

Abstract

Traditional operator consoles used in control centers in space operations are often rigid and inflexible, hindering the efficiency and adaptability to evolving mission needs. This paper introduces the Flex-Console, an approach that redefines the concept of a console as an integrated system encompassing not only ergonomic furniture but also a sophisticated project switching backend. The presented concept of Flex-Console empowers operators with flexibility by enabling them to seamlessly reconfigure the console layout and functionality to accommodate different mission phases, operator roles, and data streams. Furthermore, it allows for the customization of user interfaces and display configurations to individual operator preferences and cognitive styles. Finally, the Flex-Console facilitates communication and data sharing among operators, experts, and remote teams. The Flex-Console development addresses several key challenges, including integrating hardware components (displays, keyboards, input devices) with software systems (project switching, data distribution, user interface management), ensuring optimal ergonomics and user comfort for extended periods of operation, and designing a scalable and adaptable system that can accommodate the diverse needs of different mission control centers. The Flex-Console will be initially adopted by the LUNA (Lunar surface analogue simulation facility, joint-venture between DLR and ESA), serving as a pilot implementation for this innovative technology. Subsequently, it will be integrated into the newly created Ground Operations Center at GSOC, encompassing all Multi-Mission projects first and ultimately also human spaceflight. The long-term vision is to extend the Flex-Console to all GSOC control rooms and into newly initiated HECC (Human Exploration Control Center by DLR in Oberpfaffenhofen), revolutionizing the human-machine interface for space operations. Last but not least, we present shortly

a concept of Control Room Laboratory which will be set up around Flex-Console and support future concept developments and simulations.