

## HUMAN SPACEFLIGHT SYMPOSIUM (B3)

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DESIGNING, IMPLEMENTING AND DEPLOYING AN INNOVATIVE VOICE COMMUNICATION SYSTEM FOR NEXT GENERATION OPS CONCEPTS AT THE GERMAN SPACE OPERATIONS CENTER AND THE EUROPEAN ASTRONAUT TRAINING CENTER.

**Abstract**

The most major characteristic of interactions between Humans is to talk to each other. In Human Space-flight Ground Teams communicate together and with Astronauts on Board of the International Space Station to support and coordinate all of their activities. In most current operational concepts for mission control, communication, control of spacecrafts and monitoring of spacecraft data is performed in dedicated mission control room environments and running on dedicated specialized hard and software platforms. Nonetheless, there are already some edge cases, where communication with operations is required to run outside of the common schemes. One of these cases is the support of experiments on board of the space station by external entities like universities. Another type is mobile support for operations like needed for the support of Astronaut training at the European Astronaut Training Center. Design of voice communication systems for Mission Control is for “on console”, not mobile, not offside, not flexible. At least it was. Up to now. The German Space Operations Center designed and created a voice communication platform to support the edge cases, the use cases where voice communication is not just a nice to have, the cases where voice communication empowers new possibilities for new operational concepts. Within this paper we will describe how the communication platform is built to support stationary, mobile and web based communication for Mission Control. We will show how the system is used at the European Astronaut Training Center of the European Space Agency to actually support the training for the next Astronauts, as well as the operational setup used in the German Space Operations Center itself. The architecture and implementation of the system is based on commercial of the shelf hardware, OpenSource software and a vendor independent system design, to avoid any kind of lock-in scenarios. We used different levels of integration to existing open platforms and combined different architectural pattern to build a scalable, maintainable, expendable and secure basement for multi party multi conferencing scenarios for Mission Control Room operations.