

VIRTUALIZATION OF THE COLUMBUS CONTROL ROOM INFRASTRUCTURE

Nico Trebbin

LSE Space GmbH – Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany, nico.trebbin@dlr.de

André Stöcker

Insyten AG - Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany, andre.stoecker@dlr.de

Michael Szczuka

Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany, michael.szczuka@dlr.de

In times with a growing demand for flexible and adaptable Control Centres, virtualization is one of the core technologies necessary to support different requirements for multiple missions. A common, reliable, stable and flexible IT ground segment is crucial to support several space missions within one Control Centre. As virtualization is just a term for several solutions and products on the market, the general concept to centralize required hardware and provide access through so called Thin Clients via remote desktop is always similar. However, the implementation of virtualization technologies is often driven by mission specific requirements without a wide scope for other missions. Due to different approaches and diverse virtualization technologies, the need for a common base, which supports commonly used software, becomes apparent in order to support multiple missions or instances within one Control Centre. Therefore a middleware is necessary that not only supports different virtualization technologies (VMWare, Linux KVM, Windows Hyper-V), but also fits well into the existing IT infrastructure without increasing the overall complexity. Ideally this middleware helps the ground staff to manage, administer and dynamically assign already existing mission critical software to the control room infrastructure on-the-fly and intuitively, without the need for extensive training. Within the control room the spacecraft- and flight operators should only get the virtual resources they need to perform a specific task, which consequently reduces the overall complexity of the flight console layout, as it can be changed on demand without the need to have everything simultaneously available.

This presentation focuses on the development-, implementation- and transition phase from the physically bound control- and operational infrastructure to the dynamical and virtual infrastructure at the Columbus Control Center, operated by DLR in Oberpfaffenhofen. A particular emphasis is given to the middleware (connection broker) that has been developed to manage and administer involved physical- and virtual resources, providing a configuration tool and offering a minimalist user front-end within the control room.

This work aims to set a standard for future control room virtualizations and to provide guidelines and best practices for similar intentions in other missions.