

AIAA Abstract: ISS Operations Cost Reductions through Automation of Real-Time Planning Tasks

In 2008 the Johnson Space Center's Mission Operations Directorate (MOD) management team challenged their organization to find ways to reduce the costs of International Space station (ISS) console operations in the Mission Control Center (MCC). Each MOD organization was asked to identify projects that would help them attain a goal of a 30% reduction in operating costs by 2012. The MOD Operations and Planning organization responded to this challenge by launching several software automation projects that would allow them to greatly improve ISS console operations and reduce staffing and operating costs. These projects to date have allowed the MOD Operations organization to remove one full time (7 x 24 x 365) ISS console position in 2010; with the plan of eliminating two full time ISS console support positions by 2012. This will account for an overall 10 EP reduction in staffing for the Operations and Planning organization.

These automation projects focused on utilizing software to automate many administrative and often repetitive tasks involved with processing ISS planning and daily operations information. This information was exchanged between the ground flight control teams in Houston and around the globe, as well as with the ISS astronaut crew. These tasks ranged from managing mission plan changes from around the globe, to uploading and downloading information to and from the ISS crew, to even more complex tasks that required multiple decision points to process the data, track approvals and deliver it to the correct recipient across network and security boundaries. The software solutions leveraged several different technologies including customized web applications and implementation of industry standard web services architecture between several planning tools; as well as a engaging a previously research level technology (TRL 2-3) developed by Ames Research Center (ARC) that utilized an intelligent agent based system to manage and automate file traffic flow, archiving f data, and generating console logs. This technology called OCAMS (OCA (Orbital Communication System) Management System), is now considered TRL level 9 and is in daily use in the Mission Control Center in support of ISS operations.

These solutions have not only allowed for improved efficiency on console; but since many of the previously manual data transfers are now automated, many of the human error prone steps have been removed, and the quality of the planning products has improved tremendously. This has also allowed our Planning Flight Controllers more time to focus on the abstract areas of the job, (like the complexities of planning a mission for 6 international crew members with a global planning team), instead of being burdened with the administrative tasks that took significant time each console shift to process.

The resulting automation solutions have allowed the Operations and Planning organization to realize significant cost savings for the ISS program through 2020 and many of these solutions could be a viable option for any government or commercial operations and planning organization in business today.