

# Portable Virtual Training Units

## Project Manager(s)/Lead(s)

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## Sponsoring Program(s)

Marshall Space Flight Center/Center Management and Operations  
Technology Investment Program

## Project Description

The Mission Operations Lab initiated a project to design, develop, deliver, test, and validate a unique training system for astronaut and ground support personnel. In an effort to keep training costs low, virtual training units (VTUs) have been designed based on images of actual hardware and manipulated by a touch screen style interface for ground support personnel training. This project helped modernized the training system and materials by integrating them with mobile devices for training when operators or crew are unavailable to physically train in the facility. This project also tested the concept of a handheld remote device to control integrated trainers using International Space Station (ISS) training simulators as a platform. The portable VTU can interface with the full-sized VTU, allowing a trainer co-located with a trainee to remotely manipulate a VTU and evaluate a trainee's response. This project helped determine if it is useful, cost effective, and beneficial for the instructor to have a portable handheld device to control the behavior of the models during training. This project has advanced NASA Marshall Space Flight Center's (MSFC's) VTU capabilities with modern and relevant technology to support space flight training needs of today and tomorrow.



Figure 1: VTU in Lab training complex.

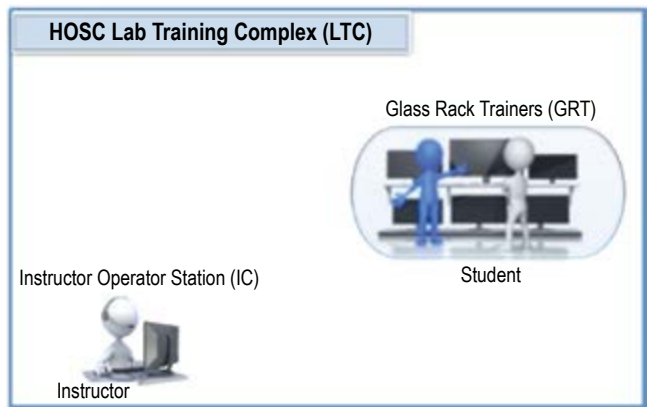


Figure 2: VTU configuration in Huntsville's Operations Support Center (HOSC).

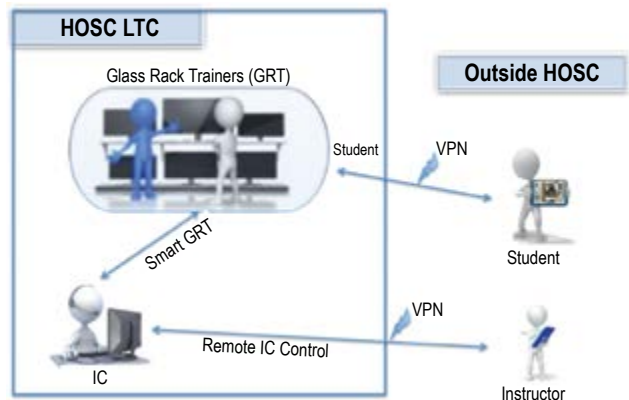


Figure 3: Portable virtual training unit configuration.

### ***Anticipated Benefits***

By strengthening MSFC’s virtual training capability, this project will enhance payload operations training processes and lay the groundwork for making MSFC’s portable VTU capabilities accessible from virtually anywhere and anytime. VTUs for a variety of mobile and desktop platforms will bring training capabilities not only to the payload flight controllers at MSFC, but to flight crew, payload developers, and any other human habitat element design and support personnel.

The United States’ fiscal situation will constrain NASA and other government agency budgets for the indefinite future. In order to fulfill the Agency’s goals, we will have to leverage off current technology and skills while doing it more affordably. A 21st century Space Agency will need to employ the latest technology and create a platform that allows that technology to evolve. The portable VTU is a highly expandable and reconfigurable system. The expansion of capabilities of the portable VTUs is almost limitless. As the phases are developed, they strengthen MSFC’s near- and long-term capabilities for flight controller and crew training.

### ***Potential Applications***

The Mission Operations Laboratory is working to incorporate the portable VTU into flight controller training by enabling ground controllers to use this portable technology to more efficiently train by having ‘desktop’ access to training systems. Mission Operations is pursuing using this training concept for deep space exploration habitation missions. This technology has large potential for Department of Defense (DoD) Air Force applications.

This MSFC effort is in large about ensuring that NASA fully leverages a technology with the potential to transform its mission operations, enhance safety, and promote mission success. In some areas of the technology, NASA is at the leading edge and has captured the interest of other agencies and departments. These vetted technologies, at any point in the phased development, can be marketed to other agencies, DoD, commercial partners, etc. to leverage VTU technology for identified opportunities.

### **Notable Accomplishments**

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The portable VTU project has demonstrated the feasibility and usefulness of a standalone VTU on a mobile device and built the infrastructure to access the integrated Lab Training Complex (LTC) simulations from mobile devices. The security and networking for remote access to the LTC that was put in place under the FY 2014 Technology Investment Program makes it possible to bring high-fidelity, scenario-based training to the student—effectively creating a ‘portable’ LTC.