

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Astronaut Training, Accommodation, and Operations in Space (5)

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NEUTRAL BUOYANCY TESTING OF WORKSTATIONS FOR SPACE STATION UTILIZATION

Abstract

As humans continue to fly and work in space, it is increasingly important to efficiently test and evaluate space-based systems on Earth. Working in microgravity is a unique environment which requires unique workstations to allow people to work efficiently and effectively. For example, a simple chair, with four legs and a flat surface, does not work in a microgravity environment; sitting is not a natural comfortable position in this environment. Thus, an effective workstation is one that is safe, easy to use, and allows users to work efficiently and effectively.

Testing such a workstation on Earth provides limited data on the practicality of such a structure. One possibility is to utilize Neutral buoyancy testing, which allows divers conduct end-to-end mission simulations. The University of Maryland Space Systems Laboratory features a large neutral buoyancy tank, fifty feet in diameter and twenty five feet deep. This facility allows multiple users to be around the workstation at the same time, so that not only the safety of the user but also the safety of those nearby can be evaluated.

A workstation, made up of sliding panels, has been constructed. This provides a large number of attachment points for cargo transfer bags and can be easily adapted for multiple experiments, missions, or users. Due to the size of the tank, the safety and ease of use will not only be measured by the user but also by those in close proximity. In addition, the possibility of having multiple users at the same workstation will be explored. Testing in neutral buoyancy will evaluate the usage of this workstation and provide insight for future designs for microgravity workstations.