

**Aerospace Medicine Association Conference 2003
Abstract**

An Independent Human Factors Analysis and Evaluation of the Emergency Medical Protocol Checklist for the International Space Station

Thomas Marshburn, MD, MS¹ Mihriban Whitmore, PhD,¹
Rosie Ortiz,² Michele Segal,²
Kieran Smart, MD, MS³
Catherine Hughes^{4,5}

¹ National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston

² Johnson Engineering Corporation, Houston

³ Baylor College of Medicine, Houston

⁴ Texas A & M University

⁵ NSBRI, Houston

Introduction: Emergency medical capabilities aboard the ISS include a Crew Medical Officer (CMO) (not necessarily a physician), and back-up, resuscitation equipment, and a medical checklist. It is essential that CMOs have reliable, usable and informative medical protocols that can be carried out independently in flight. The study evaluates the existing ISS Medical Checklist layout against a checklist updated to reflect a human factors approach to structure and organization.

Method: The ISS Medical checklist was divided into non-emergency and emergency sections, and re-organized based on alphabetical and a body systems approach. A desk-top evaluation examined the ability of subjects to navigate to specific medical problems identified as representative of likely non-emergency events. A second evaluation aims to focus on the emergency section of the Medical Checklist, based on the preliminary findings of the first. The final evaluation will use Astronaut CMOs as subjects comparing the original checklist against the updated layout in the task of caring for a "downed crewmember" using a Human Patient Simulator [Medical Education Technologies, Inc.].

Results: Initial results have demonstrated a clear improvement of the re-organized sections to determine the solution to the medical problems. There was no distinct advantage for either alternative, although subjects stated having a preference for the body systems approach. In the second evaluation, subjects will be asked to identify emergency medical conditions, with measures including correct diagnosis, time to completion and solution strategy. The third evaluation will compare the original and fully updated checklists in clinical situations.

Conclusions: Initial findings indicate that the ISS Medical Checklist will benefit from a re-organization. The present structure of the checklist has evolved over recent years without systematic testing of crewmember ability to diagnose medical problems. The improvements are expected to enable ISS Crewmembers to more speedily and accurately respond to medical situations on the ISS.