**Human Factors in Training**

**Human Research Program - Space Human Factors & Habitability**

Space Human Factors Engineering Project

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**TRAINING DIRECTED RESEARCH PROJECT OVERVIEW**

Future space missions will be significantly longer than current Shuttle missions and new systems will be more complex than current systems. Increasing communication delays between crews and Earth-based support means that astronauts need to be prepared to handle the unexpected on their own. As crews become more autonomous, their potential span of control and required expertise must grow to match their autonomy. It is not possible to train for every eventuality ahead of time on the ground, or to maintain trained skills across long intervals of disuse. To adequately prepare NASA personnel for these challenges, new training approaches, methodologies, and tools are required. This research project aims at developing these training capabilities. Training efforts in FY07 focused strongly on crew medical training, but also began exploring how Space Flight Resource Management training for Mission Operations Directorate (MOD) Flight Controllers could be integrated with systems training for optimal Mission Control Center operations. Beginning in January 2008, the training research effort will include team training prototypes and tools.

The Training Task addresses Program risks that lie at the intersection of the following three risks identified by the Project:

- Risk associated with poor task design
- Risk of error due to inadequate information
- Risk associated with reduced safety and efficiency due to poor human factors design

**FY07 MEDICAL TRAINING PRODUCTS**

**Crew Medical Training Review**

In FY07, work on medical training focused on identifying the type of training received and issues surrounding medical training for the astronaut crewmembers. The current length of crew training has been identified as a major issue in various crew reports and debriefs and it is predicted that Orion medical training will not increase greatly over what is currently available for Crew Medical Officers (CMOs) — about 70 hours of training, typically one year prior to flight. This work provided a framework of relevant issues for the research team to understand clearly the current philosophy, policy, and practice of crew medical training, and how future training for medical operations personnel.

**Basic Training Principles - Review of Research Literature**

- **Established Training Principles**
  - Describes a set of training principles that have a sound basis in empirical research and can be recommended more or less intact for training NASA personnel for future long-term space flights.

- **Partially Established Training Principles**
  - Describes principles that have some evidence to support them but need further investigation to establish their general validity.

**Medical Training in Related Domains - Overview**

**Training Approaches in Relevant Domains:**
- Emergency Medical Technicians (EMTs)
- Flight Attendants and Pilots
- Disaster Assistance and Rescue Team
- Polar Expeditions
- Underwater Habitats

**FY08 MEDICAL TRAINING ACTIVITIES & NEXT STEPS**

**Constellation (C) Program Medical Training Needs Analysis**

- **Just-in-time Training concepts for medical operations**
  - Gather information and demonstrations of current JIT training techniques
  - Compile a demonstration package highlighting relevant features

**Stakeholders:**

Dr. Joseph Schmid, Lead,
Space Medicine Training, Medical Operations, JCS/SD

John McCullough, Chief,
Space Flight Training Management Office, JSC/DA7

**Report to ask the Book**

Space Human Factors Engineering
Training Directed Research Project
PI: Immanuel Barshi, ARC
Other Contributors: Lucia Arsintescu, LMJSC
Report on Current Methods in NASA Crew Medical Training
March 30, 2007

**Report to ask the Book**

Space Human Factors Engineering
Training Directed Research Project
PI: Immanuel Barshi, ARC
Report on Current Methods in NASA Crew Medical Training
June 29, 2007

**Report to ask the Book**

Space Human Factors Engineering
Training Directed Research Project
PI: Immanuel Barshi, ARC
Training Prototype
September 28, 2007

**Operationally-Oriented Training – A Conceptual Framework Prototype**

**Beginning January 2008:**

Research on Training for Distributed Teamwork

Lead: Judith Orasanu, ARC