EMERGENCY MEDICAL PROCEDURES ON ISS: AN INDEPENDENT HUMAN FACTORS ANALYSIS AND REVIEW OF CURRENT PROCEDURES, TRAINING AND EQUIPMENT

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Emergency medical capabilities currently available aboard the ISS were developed over recent years to provide the training and equipment to resuscitate an injured crewmember, along with a reference book -'ISS Integrated Medical Group (IMG) Medical Checklist, JSC 48522'- for the crew's use. Two International Space Station (ISS) Crewmembers are designated as Crew Medical Officers (CMO's) and are trained in these procedures. In the initial phase of the ISS program – up to and including Expedition 8 - no physicians are currently planned as crewmember. As a result, crews will have no specialist knowledge available to them on orbit, but will need to rely upon air to ground communication and the checklist. Concomitantly, continuing cutbacks in the ISS program have diminished the Clinical Care capability that had been planned for the completed station, and recent evaluations of the available procedures and equipment have shown significant decrements in usability, functionality and probable outcomes.

This project will entail a Human Factors assessment of the ISS medical procedures and equipment, in the context of crew training, likely medical emergency scenarios, air to ground communications, and predicted patient outcome. The aim is to determine HMI shortfalls (both in on orbit and in ground support) in the procedures, training, communications and equipment, and to recommend solutions that will improve survival rate of crewmembers in the event of a medical emergency and prevent emergent de-orbits and potentially save the life of a crewmember. Indeed any improvement which mitigates the need for a single emergency return to earth during the life of the station preventing the unnecessary evacuation and shutdown of ISS, will maintain program prestige, potentially save the program the cost of an unplanned de-orbit, up to $500 million, and help to protect its most valuable resource, the crew.

The initial work will include gathering information on the current practices in analog facilities and environments (e.g., 911, Navy medical corpsman training, EMT training) via surveys, interviews and literature reviews, and identification of critical human factors requirements applicable to emergency medical care. In addition, a test plan will be prepared for a preliminary pilot testing to be conducted in collaboration with the Harvard Medical School. This preliminary test will assess the readiness of the ISS critical care currently proposed procedures and algorithms usability.
Central to this proposal is the demonstration to all human spaceflight including the ISS community of the importance of Human Factors involvement in all aspects of development and implementation of critical procedures, equipment and operations.