

<b>Fiscal Year:</b>	FY 2013	<b>Task Last Updated:</b>	FY 03/25/2013
<b>PI Name:</b>	Hurst, Victor Ph.D.		
<b>Project Title:</b>	Assisted Medical Procedures (AMP)		
<b>Division Name:</b>	Human Research		
<b>Program/Discipline:</b>	HUMAN RESEARCH		
<b>Program/Discipline--Element/Subdiscipline:</b>	HUMAN RESEARCH--Operational and clinical research		
<b>Joint Agency Name:</b>	<b>TechPort:</b>	Yes	
<b>Human Research Program Elements:</b>	(1) <b>ExMC</b> :Exploration Medical Capabilities		
<b>Human Research Program Risks:</b>	(1) <b>Medical Conditions</b> :Risk of Adverse Health Outcomes and Decrements in Performance Due to Medical Conditions that occur in Mission, as well as Long Term Health Outcomes Due to Mission Exposures		
<b>Space Biology Element:</b>	None		
<b>Space Biology Cross-Element Discipline:</b>	None		
<b>Space Biology Special Category:</b>	None		
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<b>Zip Code:</b>	77058	<b>Congressional District:</b>	36
<b>Comments:</b>			
<b>Project Type:</b>	GROUND	<b>Solicitation / Funding Source:</b>	Directed Research
<b>Start Date:</b>	10/01/2008	<b>End Date:</b>	04/01/2014
<b>No. of Post Docs:</b>	0	<b>No. of PhD Degrees:</b>	0
<b>No. of PhD Candidates:</b>	0	<b>No. of Master' Degrees:</b>	0
<b>No. of Master's Candidates:</b>	3	<b>No. of Bachelor's Degrees:</b>	0
<b>No. of Bachelor's Candidates:</b>	0	<b>Monitoring Center:</b>	NASA JSC
<b>Contact Monitor:</b>	Watkins, Sharmila	<b>Contact Phone:</b>	281.483.0395
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<b>Flight Program:</b>			
<b>Flight Assignment:</b>	NOTE: Project name change to "Assisted Medical Procedures (AMP)" from "Advanced Integrated Clinical System-Guided Medical Procedure Systems," per JSC (Ed., 7/25/2012) NOTE: End date is now 4/1/2014 per HRP 3/14/12 Master Task List information (Ed., 4/9/2012) NOTE: question of period of performance per information from PI (Ed., 11/30/2011)		
<b>Key Personnel Changes/Previous PI:</b>			
<b>COI Name (Institution):</b>	Rubin, David ( Wyle-Science, Technology & Engineering ) Chin, Duane ( Wyle-Science, Technology & Engineering )		
<b>Grant/Contract No.:</b>	Directed Research		
<b>Performance Goal No.:</b>			
<b>Performance Goal Text:</b>			

<p><b>Task Description:</b></p>	<p>The Advanced Integrated Clinical Systems-Guided Medical Procedure System task was to provide the Constellation Program with a robust medical procedure system that fosters both astronaut wellness and mitigates medical issues during missions to the International Space Station (ISS), the Moon (Lunar Sorties and Lunar Outpost), and outreaching planets. With the cancellation of the Constellation Program, the work for the Advanced Integrated Clinical Systems-Guided Medical Procedure System ceased at the end of Fiscal Year 2010 and the project was closed.</p> <p>At the start of Fiscal Year 2012, the NASA Human Research Program (HRP) received funding to conduct the Exploration Medical System Demonstration project (EMSD). The objective of the EMSD is to determine what medical technologies are needed for an exploration class mission and what medical informatics tools for managing evidence and decision making can be integrated into a single system to be used crew in an efficient and meaningful manner. The EMSD will be coordinated by the HRP Element called the Exploration Medical Capability (ExMC) Group who will utilize the International Space Station (ISS) as a test-bed to evaluate these technologies, informatics tools and components.</p> <p>The EMSD will consist of two phases: 1) A ground phase where all capabilities will be tested in a ground-based exercise in 2014 and 2) a space flight-phase where some of the capabilities from the ground-phase will be tested aboard the ISS in 2016. Included in both phases is an electronic ("paperless") medical procedure system called the Assisted Medical Procedures (AMP) that will help crew both select a medical procedure as well as guide them through the procedure. The system will be used for all medical encounters, especially during periods of exploration missions when contact with ground resources (e.g. flight surgeon) will either be minimal or absent (i.e. autonomous medical care).</p> <p>Development of the AMP will be accomplished by generating an operational concepts (OpsCon) document, creation of requirements, procuring of hardware/software (if necessary) and generating corresponding drawings to produce the components of the system.</p>
<p><b>Rationale for HRP Directed Research:</b></p>	
<p><b>Research Impact/Earth Benefits:</b></p>	<p>It is anticipated that the development of the AMP will result in innovations to interfaces with wireless medical peripherals (e.g. ECG monitors, pulse oximetry), informatics tools (e.g. electronic medical record, middleware), and to autonomous medical care in austere environments.</p>
<p><b>Task Progress:</b></p>	<p><b>Documentation and Development</b></p> <p>A baseline version of the EMSD Operational Concept (OpsCon) document was completed on 21 November 2011. Using this document as a reference, the AMP OpsCon document was finalized on 13 February 2012. The AMP OpsCon document was then used to generate a requirements document that has completed formal review by the ExMC Advisory Group and the EMSD's System Requirements Review (SRR) in February 2012 and March 2012, respectively. The AMP requirements have been finalized following these reviews and have been prepared for use in procurement documentation.</p> <p>A formal request for proposal (RFP) for procuring an AMP was sent out to potential vendors in May 2012. The ExMC team received one formal response and a partial response from two of the ten vendors contacted. As a result of this minimal response, the team reassessed the content of its proposal and updated the specificity of the requirements. A second RFP was sent to an updated list of potential vendors in October 2012.</p> <p>In addition to procuring a possible solution, the ExMC Team is also working with software developers within NASA on an electronic procedure display system that was initially developed for the Constellation Program. The devices and their relevant architecture may be able to be configured to meet AMP requirements.</p> <p><b>Evaluations</b></p> <p>During the initial phases of AMP development, ExMC conducted evaluations of how existing ISS medical resources and newly developed procedures and tools would function on an exploration class mission. Doing such evaluations helps ExMC identify what is needed in the AMP to address any gaps in its capability.</p> <p>Results of the Autonomous Mission Operation (AMO) study indicated that written medical procedures can be effectively executed by minimally-trained caregivers (e.g. CMOs) with minimal remote guidance from subject matter experts to provide useful clinical data to ground-based medical support. The study also showed that use of mitigation tools such as the Advanced Diagnostic Ultrasound software (ADUS) enable minimally-trained caregivers to autonomously execute clinical tasks in a manner that increases the quality of clinical deliverables, in this case, ultrasound imagery.</p> <p>Initial review of the data from the Mission Operation Test (MOT) indicates that there are areas where automation can be applied to decrease a) the time to execute a procedure task, b) decrease the number of data transfer steps, and c) decrease the search time for and retrieval time of health records.</p> <p><b>Conclusion</b></p> <p>The work by the ExMC team over the past year has enabled them to 1) identify gaps in procedure flow where AMP capability can enable better crew performance during exploration class mission medical events as provided by the completion of two exploration class relevant simulations, 2) finalize the functional and technical requirements for the AMP, and 3) begin procurement and development of an initial iteration of the AMP. This work immediately addresses Critical Path Roadmap (CPR) Risks #17 and #23 and enables ExMC to better address CPR Risks #17, #20, #22, and #23 in the coming fiscal year.</p> <p>The objectives for FY13 are to 1) generate the first iteration of the AMP either by development, procurement, or a combination of both and 2) conduct an evaluation of this AMP's capability in an analog environment that mimics an exploration class mission.</p>
<p><b>Bibliography Type:</b></p>	<p>Description: (Last Updated: 07/01/2015)</p>

**Abstracts for Journals and Proceedings**

Hurst V 4th, Garcia K, Jain V, Ham D, Menon A, Watkins S. "Evaluation of current space medical capability for exploration space missions." 84th Annual Scientific Meeting, Aerospace Medical Association, Chicago, IL, May 12-16, 2013.

Aviation, Space, and Environmental Medicine. 2013 Apr;84(4):376. See <http://www.ingentaconnect.com/content/asma/asem> for searching. , Apr-2013