Fiscal Year:	FY 2007	**Task Last Updated:**	FY 05/28/2008
PI Name:	Dulchavsky, Scott A. M.D., Ph.D.		
Project Title:	Intuitive Ultrasound Catalog for Autonomous Medical Care		
Division Name:	Human Research		
Program/Discipline:	NSBRI Teams		
Program/Discipline--Element/Subdiscipline:	NSBRI Teams--Smart Medical Systems Team		
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **ExMC**:Exploration Medical Capabilities		
Human Research Program Risks:	(1) **Medical Conditions**: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		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Web Page:			
City:	Detroit	**State:**	MI
Zip Code:	48202-2608	**Congressional District:**	13
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	Directed Research
Start Date:	01/01/2007	**End Date:**	12/31/2010
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: Title change in October 2009 (previous title, "Ultrasound Catalog for Autonomous Medical Care").		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Hamilton, Doug (NASA Johnson Space Center) Melton, Shannon (Wyle Laboratories) Peck, Donald (Henry Ford Health System) Sargsyan, Ashot (Wyle Laboratories) Soltanian-Zadeh, Hamid (Henry Ford Health System)		
Grant/Contract No.:	NCC 9-58-SMS00002		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The diagnosis and management of acute health problems in space is problematic. There is no radiological capability aboard the International Space Station (ISS) however, an ultrasound system is operational. Terrestrial investigations suggest expanded clinical applications of ultrasound, which could be used to diagnose over 75 percent of space medical conditions. This proposal will use an outcomes-oriented approach to develop an intuitive ultrasound image catalog, coupled with just-in-time training methods, to allow non-experts to acquire and interpret advanced ultrasound examinations. Specific Aims 1. Develop an intuitive ultrasound image cataloging system which incorporates ground-acquired ultrasound whole body images. The catalog will acquire ground-based crew member images to use for medical diagnosis in space. 2. Develops a mathematical coupling model based on existing ground/inflight ultrasound data which will allow microgravity-associated morphometric and topographic changes to be predicted. 3. Assess the ability of non-physician crew medical officer analogs to acquire and interpret complex ultrasound examinations autonomously or with remote guidance. The constraints of spaceflight require the development of novel strategies for crew member health problems including ultrasound. Evidence-based trials have demonstrated the accuracy of ultrasound in aerospace-relevant clinical conditions when performed and interpreted by experts. ISS experiments have shown that just-in-time trained astronaut crew members, augmented by on-board proficiency enhancement, can acquire complex, diagnostic-quality ultrasound images. Expanding just-in-time ultrasound training to autonomous ultrasound operation, coupled with enhanced on-site interpretative capabilities, significantly expands diagnostic capabilities during exploration-class space missions.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	The majority of the training algorithms in this project are readily transferable to terrestrial medicine and provide a significant, clinically-relevant advance in space medical capabilities with profound Earth-based ramifications. We have already modified these training methodologies for professional sporting activities in the NHL, NFL, Olympics and MLB. We are currently partnered with the University of Ottawa and the Canadian Space Agency to monitor High-Altitude Pulmonary and Cerebral Edema on Mt. Everest. We are working with the United Nations to develop a maternal care ultrasound program which will enhance maternal health worldwide.
Task Progress:	New project for FY2007.
Bibliography Type:	Description: (Last Updated: 02/23/2023)