Fiscal Year:	FY 2008	**Task Last Updated:**	FY 08/25/2008
PI Name:	Dulchavsky, Scott A. M.D., Ph.D.		
Project Title:	Ultrasound Fracture Diagnosis in Space		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Operational and clinical research		
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 (2) **Renal Stone**:Risk of Renal Stone Formation		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	PUBLIC SERVICE	**Phone:**	313 916 9306
Organization Name:	Henry Ford Health System		
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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:**	2007 Crew Health NNJ07ZSA002N
Start Date:	08/15/2008	**End Date:**	08/14/2011
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:**	NASA JSC
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Amponsah, David (Henry Ford Hospital) Hamilton, Douglas (Wyle) Knuth, Thomas (Henry Ford Hospital) Sargsyan, Ashot (Wyle)		
Grant/Contract No.:	NNX08AV74A		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Crew members on long duration space missions are at significant risk of decreased strength of bones despite counter-measures. The radiographic capabilities of future spacecraft are unknown, however, ultrasound is currently operational on the ISS. Preliminary investigations have shown that ultrasound can reliably diagnose long bone fractures. This proposal will evaluate the accuracy of ultrasound in the diagnosis of bony fractures and develop just in time, training methods to allow astronauts to perform and interpret skeletal ultrasound to answer the specific aims: 1. Evaluate the diagnostic accuracy of ultrasound for bony fractures and fracture healing in ground based studies. 2. Develop training programs to facilitate skeletal ultrasound to exclude fracture. 3. Develop pattern recognition algorithms to allow astronauts to autonomously diagnose skeletal fracture. Methods: Specific Aim 1: The accuracy of ultrasound will be evaluated against X-ray in a large cohort of acutely injured patients at the Level 1 trauma center at Henry Ford Hospital. Ultrasound examinations will be performed by experts in parallel with astronaut equivalents on patients with a history and exam consistent with bony fracture to assess sensitivity and specificity and optimize technique. The randomized trials will include patient groups with probable long bone, axial skeletal, and hand/foot fractures to allow statistical conclusions about exam accuracy to be determined. Specific Aim 2: A computer based ultrasound training program will be developed for astronauts to allow skeletal ultrasound to be performed for axial and extremity fractures based on a successful Onboard Proficiency Enhancement (OPE) program. Specific Aim 3: Autonomous ultrasound diagnostic capabilities will be developed for astronauts by combining cue card reference images, topographic ultrasound guides, and normal/anticipated pathologic images to allow pattern recognition diagnosis by the operators. Significance to NASA: This proposal will develop training and techniques for autonomous/remote guidance of in-flight fracture diagnosis using crew performed skeletal ultrasound.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2008.
Bibliography Type:	Description: (Last Updated: 02/23/2023)