Fiscal Year:	FY 2008	**Task Last Updated:**	FY 07/08/2008
PI Name:	Crum, Lawrence A. Ph.D.		
Project Title:	Smart Therapeutic Ultrasound Device for Mission-Critical Medical Care		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Smart Medical Systems and Technology 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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City:	Seattle	**State:**	WA
Zip Code:	98105-6606	**Congressional District:**	7
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 Crew Health NNJ07ZSA002N
Start Date:	08/01/2008	**End Date:**	07/31/2012
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:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Sapozhnikov, Oleg A (University of Washington) Carter, Stephen J (University of Washington) Bailey, Michael R (University of Washington)		
Grant/Contract No.:	NCC 9-58-SMST01601		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The principal, long-term objective of this proposed effort is to develop a smart medical device that would be lightweight, portable, FDA-approved, commercially produced, and capable of addressing a variety of risks described in the Bioastronautics Roadmap [NASA/SP-2005-6113]. This device would be based upon the platform technology of ultrasound, would potentially incorporate other imaging and therapy modalities, and would not require high skill levels from the user. Such a device supports the goals of the Strategic Plan of the Smart Medical Systems Team, which seeks to develop portable, autonomous systems, based upon a limited number of platform technologies, to address critical medical care in space medicine. In particular, we seek to address under Risk 18, the risk of blunt internal trauma and internal bleeding. The device we propose would be capable of detecting internal bleeding and inducing transcutaneous hemostasis. Under Risks 18 and 28, as recent experiences in Antarctica demonstrate (Nielsen, 2001), malignant tumors that require some form of surgery may well appear without warning, especially under the high-radiation load of outside LEO, even when extensive pre-screening is undertaken. The device we propose would be capable of performing transcutaneous, bloodless ablation of detectable tumors without fear of metastasis. Under Risk 4, the formation of renal calculi has been suggested by Schneider, et al. (1994) and Ball and Evans (2001) as a likely result in extended space flight; indeed, precedent exists of early mission termination due to a ureteral stone (Pietrzyk, et al, 2003; Moran, 2007). The proposed device would be capable of detecting and sufficiently comminuting a calculus for it to pass without obstructing the urinary system. In addition, such a multi-capability device, based on the platform technology of ultrasound (which is probably to be included in lunar and Martian missions) is likely to have applications beyond the risks outlined here.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2008.
Bibliography Type:	Description: (Last Updated: 03/22/2019)