Fiscal Year:	FY 2013	**Task Last Updated:**	FY 10/24/2012
PI Name:	Dentinger, Aaron Ph.D.		
Project Title:	Non-Invasive Monitoring of Intracranial Pressure (ICP) with Volumetric Ophthalmic Ultrasound		
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) **HHC**:Human Health Countermeasures		
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) **SANS**:Risk of Spaceflight Associated Neuro-ocular Syndrome (SANS)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	dentinge@ge.com	**Fax:**	FY
PI Organization Type:	INDUSTRY	**Phone:**	518-387-4016
Organization Name:	GE Global Research		
PI Address 1:	1 Research Circle		
PI Address 2:	Bldg. KW, Room C604		
PI Web Page:			
City:	Niskayuna	**State:**	NY
Zip Code:	12309-1027	**Congressional District:**	21
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2011 Crew Health NNJ11ZSA002NA
Start Date:	10/01/2012	**End Date:**	09/30/2015
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: Risk/Gap changes per IRP Rev E (Ed., 3/18/14)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Ebert, Douglas (Wyle Laboratories, Inc.) Garcia, Kathleen (Wyle Laboratories, Inc.) Jagannathan, Srinivasan (General Electric Company) Sargsyan, Ashot (Wyle Laboratories, Inc.) Melton, Shannon (Wyle Laboratories, Inc.) Mills, Davis (General Electric Company) Patwardhan, Kedar (General Electric Company)		
Grant/Contract No.:	NCC 9-58-SMST02803		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Elevated levels of intracranial pressure (ICP), the pressure of the cerebrospinal fluid within skull, have been shown to be correlated with changes in ocular structures. Further research is still needed to understand the role elevated ICP plays in visual impairment observed during and following space missions. The objective of this research is to non-invasively monitor ICP by detecting changes in the structure and functioning of the eye using 3-D ultrasound imaging. An ultrasound probe for ophthalmic scanning through a closed eyelid will be developed and integrated with a portable, high-resolution medical ultrasound scanner. The new volumetric ultrasound system will provide user independent views of the entire ocular anatomy in a single scan with minimal crew time and ground guidance during image capture. Volumetric ultrasound data taken preflight, post-flight, and inflight will be aligned with preflight and post-flight magnetic resonance scans allowing inflight changes in the ocular anatomy to be tracked over time. Sonographs of the optic nerve and globe will be extracted from the volumetric ultrasound data, and reliable measurement techniques for the size and shape of these structures will be developed to serve as indirect measures of ICP. Ultrasound ophthalmic scanning will also be used to measure fluctuations in the ICP and the blood flow in the retinal vessels to monitor the body's ability to compensate for changes in the ICP. This research will lead to the development of tools to non-invasively monitor ICP and the body's ability to compensate for increases in ICP. The simplified ocular scan and new ocular metrics will provide the ability to track the short-term and long-term time course of ICP with minimal burden on the crew, to determine the correlation of ICP with visual acuity changes in response to microgravity, and to investigate effectiveness of potential treatments. In addition to inflight monitoring of crew health during space missions, these techniques are applicable to many clinical applications where ICP plays a key role, such as monitoring patients with head trauma.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2013.
Bibliography Type:	Description: (Last Updated: 09/05/2020)