Fiscal Year:	FY 2009	**Task Last Updated:**	FY 12/04/2008
PI Name:	Pisacane, Vincent L. Ph.D.		
Project Title:	Lunar EVA Dosimetry: Microdosimeter-Dosimeter Instrument		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Radiation Effects Team		
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **SR**:Space Radiation		
Human Research Program Risks:	(1) **ARS**:Risk of Acute Radiation Syndromes Due to Solar Particle Events (SPEs)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	pisacane@usna.edu	**Fax:**	FY 410-293-2591
PI Organization Type:	GOVERNMENT	**Phone:**	410-293-6412
Organization Name:	United States Naval Academy		
PI Address 1:	Aerospace Engineering Department		
PI Address 2:	Stop 11B		
PI Web Page:			
City:	Annapolis	**State:**	MD
Zip Code:	21402-1314	**Congressional District:**	3
Comments:	PI retired October 2011 (Ed., 2/29/2012; information from NSBRI)		
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 Crew Health NNJ07ZSA002N
Start Date:	01/01/2009	**End Date:**	09/30/2011
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:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: PI retired and end date changed to 9/30/2011 from original end date of 12/31/2012; task transferred to James Ziegler and continues through 3/31/2013, per NSBRI (Ed., 2/29/2012)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Cucinotta, Francis (NASA Johnson Space Center) Rozenfeld, Anatoly (University of Wollongong) Nelson, Martin (US Naval Academy) Zaider, Marco (Memorial Sloan-Kettering Cancer Center) Dicello, John (US Naval Academy) Dolecek, Quentin (US Naval Academy)		
Grant/Contract No.:	NCC 9-58-RE01601		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The objective of this project is to develop a prototype real-time microdosimeter-dosimeter instrument (MIDN) for space applications. It will determine real-time stochastic and deterministic risks to personnel in time-varying radiation fields of unknown intensity and composition. The NASA Bioastronautics Roadmap identifies four radiation risks for space missions acute radiation risks, acute and late central nervous system risks, chronic and degenerative tissue risks, and carcinogenesis. Consequently, prevention, protection, management and treatment of radiation exposure are critical to the performance, health and survivability of humans. Measurements at skin-equivalent and organ-equivalent depths provide the physical absorbed dose, average radiation quality, dose equivalent, gray equivalent, and their rates. To make these measurements, the instrument consists of three, proprietary solid-state sensors a skin-dose equivalent dosimeter (Hp(0.07)), deep-dose equivalent dosimeter (Hp(10)), and microdosimeter. This instrument will provide dose equivalents to assess stochastic risks and gray equivalents to assess deterministic risks. The rates will be made available to the astronaut and mission control in real time, so action can be taken to reduce exposures. The proposed MIDN instrument will be suitable for portable application, including spacesuits, rovers and extravehicular tool boxes. MIDN will be based on the heritage of the MIDN microdosimeter launched on the MidSTAR spacecraft in March 2007. The research project has five elements: Work with collaborators at NASA Johnson Space Center, especially the new lunar spacesuit development, to assure compatibility; Develop ground-based instrumentation to further the state of the art of solid-state microdosimetry; Develop a proto-flight instrument; Assess performance by radiation source and beam tests and by comparison with the GEANT4, MCNPX, and proprietary Zaider-developed microdosimetric radiation transport codes; and Develop radiation sensors with improved signal-to-noise ratio.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2009.
Bibliography Type:	Description: (Last Updated: 07/24/2015)