Fiscal Year:	FY 2004	**Task Last Updated:**	FY 03/31/2006
PI Name:	Pisacane, Vincent L. Ph.D.		
Project Title:	Lunar EVA Dosimetry: MIcroDosimeter iNstrument (MIDN) System Suitable for Space Flight		
Division Name:	Human Research		
Program/Discipline:	NSBRI Teams		
Program/Discipline--Element/Subdiscipline:	NSBRI Teams--Technology Development 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		
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PI Organization Type:	GOVERNMENT	**Phone:**	410-293-6412
Organization Name:	United States Naval Academy		
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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:**	2003 Biomedical Research & Countermeasures 03-OBPR-04
Start Date:	08/01/2004	**End Date:**	07/31/2008
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 changed per NSBRI info (12/08)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	NCC 9-58-TD00407		
Performance Goal No.:			
Performance Goal Text:			
	Objective of this project is to develop a rugged, portable, low power, lightweight, solid-state radiation instrument MIDN (MIcroDosimeter iNstrument) to measure probability or frequency distributions of energy deposited in real time in cell-size structures from charged and neutral primary and secondary radiations. Assessment of the space radiation environment addresses the development of a countermeasure of the highest priority for space exploration. Determination of the magnitude of the average radiation quality, Qave, is necessary to calculate the dose equivalent, which is assumed to be proportional to risk and upon which regulatory limits in space are based. Microdosimetry spectra are the most accepted data for calculating Qave. Consequently, the observations are more reliable as a monitor of human cell damage than other macroscopic detectors that measure fluence. Hypotheses: (1) A small, compact, and portable, flight qualifiable, solid-state microdosimeter can be developed to measure quantitative information on the dose and dose		

Task Description:	distribution of energy deposited in silicon cells of tissue size and by inference in tissue. (2) Analysis of MIDN data from radiation beam experiments and comparison with radiation transport codes can provide quantitative information on the radiation environment, potential risk, and the accuracy of the codes to correctly calculate energy-deposition spectra. (3) MIDN data from radiation beam experiments correlated with radiation transport codes can determine the effectiveness of selected materials to minimize the total risk from primary and secondary radiation. MIDN countermeasure capabilities are to: (1) Make real-time measurement of radiation environment to assess and reduce risk (dose equivalent). (2) Actively warn crew during onset of enhanced radiation. (3) Allow crew to determine safe locations during enhanced radiation. (4) Provide observations to validate and improve models for the space radiation environment, the effectiveness of shielding materials, and use with a human phantom could provide microdosimetric information for different organs or tissue types (for example bone versus muscle). A preliminary laboratory breadboard, partially funded by NASA, has demonstrated feasibility. Selection of this project for funding will increase the CRL of the instrument from 5 to 7.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2004; no progress report this period.
Bibliography Type:	Description: (Last Updated: 07/24/2015)