Fiscal Year:	FY 2011	**Task Last Updated:**	FY 09/06/2011
PI Name:	Christian, James Ph.D.		
Project Title:	Fast Neutron Dosimeter for the Space Environment		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Radiation health		
Joint Agency Name:		**TechPort:**	No
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) (2) **Cancer**:Risk of Radiation Carcinogenesis (3) **CNS**:Risk of Acute (In-flight) and Late Central Nervous System Effects from Radiation Exposure (4) **Degen**:Risk of Cardiovascular Disease and Other Degenerative Tissue Effects From Radiation Exposure and Secondary Spaceflight Stressors		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	JChristian@rmdinc.com	**Fax:**	FY
PI Organization Type:	INDUSTRY	**Phone:**	(616) 668-6897
Organization Name:	Radiation Monitoring Devices, Inc.		
PI Address 1:	44 Hunt Street		
PI Address 2:			
PI Web Page:			
City:	Watertown	**State:**	MA
Zip Code:	02472-4699	**Congressional District:**	7
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	SBIR Phase II
Start Date:	06/01/2011	**End Date:**	05/30/2013
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:	Cucinott1a, Francis	**Contact Phone:**	281-483-0968
Contact Email:	noaccess@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	NNX11CA24C		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Model calculations and risk assessment estimates indicate that secondary neutrons, with energies ranging between 0.5 to >150 MeV, make a significant contribution to the total absorbed dose received by space crews during long duration space missions [1-3]. Advanced scintillation materials, which exhibit radiation type and mass dependent emission times, coupled to SSPM detectors, provide the optimum volume to payload performance and the ability to easily discriminate between the fraction of dose, which results from secondary neutrons, and that which results from exposure to energetic charged particles and background gamma-rays. The Phase-1 effort successfully characterized the critical components of the proposed dosimeter, specifically, the response of the scintillation material to irradiation by gamma-rays, protons, and neutrons, as well as the performance of the SSPM detector. The Phase-1 modeling studies provide a critical foundation for assessing the anticipated signals in the space radiation environment. The proposed dosimeter would overcome many of the limitations in the current generation of neutron dosimeters, and would provide baseline information on the physics, needed with the information from biological studies, to assess risk in future human-space-exploration missions to the moon and Mars. The primary target market for the fast-neutron dosimeter is NASA missions. Key missions are NASA missions that involve extended space-time, such as possible Moon and Mars missions.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	. Governmental and private sector space agencies across the globe will have similar needs for dosimeter devices. . International airlines, especially those investigating space tourism, such as Space X. . The commercial satellite market is a large and growing market that will be interested in monitoring space radiation. . Earth bound or terrestrial markets, including hospitals, national laboratories and industrial research, is the largest potential segment. This market does require some changes in the product design.
Task Progress:	New project for FY2011. Reporting not required for this SBIR Phase 2 project.
Bibliography Type:	Description: (Last Updated:)