Fiscal Year:	FY 2009	**Task Last Updated:**	FY 01/23/2009
PI Name:	Hienz, Robert D. Ph.D.		
Project Title:	Cognitive/Behavioral, Sensory, & Motor Changes Induced by Solar Particle Event (SPE) and Galactic Cosmic Ray (GCR) Irradiations		
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) **BMed**:Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Organization Name:	The Johns Hopkins University School of Medicine		
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City:	Baltimore	**State:**	MD
Zip Code:	21224-6823	**Congressional District:**	7
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2008 Space Radiobiology NNJ08ZSA001N
Start Date:	01/01/2009	**End Date:**	12/31/2010
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:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: Received NCE through 12/31/2010, per J. Dardano/JSC; original end date was 12/31/2009 (9/2009)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Weed, Michael (Johns Hopkins University)		
Grant/Contract No.:	NNX09AC52G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Assessing the biological consequences of living in the space radiation environment represents one of the highest priority areas of NASA research. Of critical importance is the need for an assessment of the vulnerabilities of the central nervous system (CNS) leading to functional neurobehavioral changes during long-term space missions, and the development of effective countermeasures to such risks. The present proposal addresses this need via the application of a comprehensive animal model to determine 1) the effects of radiation exposure on a range of neurobehavioral functions; and 2) the likely mechanisms of damage to the CNS following radiation exposure, (e.g., radiation-induced changes in neurotransmitter system function). To assess the likelihood of space radiation producing immediate and/or long-term functional changes in the CNS, neurobehavioral functions will be measured in rodents via animal tests analogous to the human CANTAB neuropsychological test battery and to "vigilance" tests in humans. Human neurobehavioral functions relevant to astronaut mission performance effectiveness will include assessments of general motor function and speed, vigilance, inhibitory control ("impulsivity"), timing, motivation, and basic sensory function. Groups of animals will be separately trained on each of these tasks, following which they will be exposed to radiation and then immediately re-tested as well as re-tested periodically for up to 18 months post-exposure to assess potential long-term performance deficits. To determine likely mechanisms of damage to the CNS following radiation exposure, pre-radiation and post-radiation pharmacologic assessments of the integrity of the relevant neurotransmitter systems will be conducted, as well as autoradiographic analyses of the integrity of different neurotransmitter systems.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2009.
Bibliography Type:	Description: (Last Updated: 01/12/2021)