Fiscal Year:	FY 2007	**Task Last Updated:**	FY 10/11/2007
PI Name:	Bacher, Jeff Ph.D.		
Project Title:	A Novel Biodosimetry Method		
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:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	53711-5399	**Congressional District:**	2
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 Space Radiation NNJ07ZSA001N
Start Date:	09/01/2007	**End Date:**	08/31/2010
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:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Bailey, Susan (Colorado State University) Halberg, Richard (University of Wisconsin)		
Grant/Contract No.:	NNX07AQ02G		
Performance Goal No.:			
Performance Goal Text:			
	Exposure of astronauts to space radiation during extended space missions may cause serious health problems. Accurate methods for measuring the biological effects of radiation exposure are, therefore, critical for estimating an individual¿s health risks. Biodosimetry measurements reflect variation in radiation sensitivity and consequently result in highly individualized estimates of dose and risk. Our novel biodosimetry approach is based on the hypothesis that non-coding repetitive DNA sequences are sensitive to radiation-induced mutations and that these mutations are not harmful to a cell. Therefore, mutations in non-coding repetitive DNA sequences can accumulate and provide a stable molecular record of genetic damage that can be used to determine cumulative radiation exposure and health risk. In our previous NASA grant, we demonstrated the feasibility of using radiation-induced mutations in non-coding repetitive DNA sequences to estimate radiation dose. Our initial data indicate that radiation-induced mutations in non-coding repetitive DNA markers		

Task Description:	are stable over time and additive over multiple exposures. In this successor proposal, we plan to extend our previous work by developing optimized multiplex marker panels for human and mouse biodosimetry, validate our approach by comparing our assay to current gold standard cytological methods and then utilize the novel system to assess risks from space radiation and improve our understanding of how these risks are affected by variations in dose rate, dose fractionation and genome stability. The main contribution of the proposed research to manned space exploration is the validation of a novel biodosimetry method for estimating dose and risks from exposure to space radiation. Completion of this research should provide new insights into the effects of space radiation on DNA mutagenesis and establishes panels of human and mouse biomarkers with broad utility for future studies in radiation biology, toxicology and cancer research.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2007.
Bibliography Type:	Description: (Last Updated: 04/16/2019)