Fiscal Year:	FY 2008	**Task Last Updated:**	FY 12/04/2007
PI Name:	Borak, Thomas B. Ph.D.		
Project Title:	Lunar EVA Dosimetry: Design of a Radiation Dosimeter for Astronauts During Lunar Extravehicular Activities		
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:	tborak@colostate.edu	**Fax:**	FY 970 491 0623
PI Organization Type:	UNIVERSITY	**Phone:**	970-491-6450
Organization Name:	Colorado State University		
PI Address 1:	Environmental & Radiological Health Sciences		
PI Address 2:	1618 Campus Delivery		
PI Web Page:			
City:	Fort Collins	**State:**	CO
Zip Code:	80523-1618	**Congressional District:**	4
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 Space Radiation NNJ07ZSA001N
Start Date:	11/01/2007	**End Date:**	10/31/2011
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: title changed per NSBRI (12/08)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Heilbronn, Lawrence (Lawrence Berkeley National Laboratory) Braby, Leslie (Texas A&M University) Miller, Jack (Lawrence Berkeley National Laboratory) Benton, Eric (Oklahoma State University) Zeitlin, Cary (Lawrence Berkeley National Laboratory)		
Grant/Contract No.:	NCC 9-58-RE01301		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The major goal of NASA's space radiation program is to enable the human exploration of space without exceeding the limitations on risks from space radiation. One important aspect of this goal is to have accurate and reliable detectors that measure the radiation dose to astronauts in real time and provide warnings when dose rates exceed action levels. This project will develop a new generation of dosimeters to satisfy requirements while astronauts are on the surface of the moon. Specifically, this dosimeter will measure the dose and dose rate during normal lunar conditions as well as during the harsh radiation environments associated with solar particle events (SPE). The design is based on a tissue equivalent proportional counter (TEPC). It will be configured as a compact module that can be placed in an extravehicular activity (EVA) spacesuit or backpack. This module will record and display dose rate and activate an alarm when the particle intensity increases at the onset of an SPE. It will be sensitive to the large dynamic range of charged particles as well as to neutrons emerging from the lunar surface. There will also be a second detector incorporated in the dosimetry module to serve as a safety backup during an SPE. This will consist of a plastic scintillator read out by a Geiger Avalanche Photodiode. The same module can be connected to a Remote Control Unit located on a lunar rover or nearby tool during EVA. This will extend the capabilities to include pulse-height analysis of events that can be used to estimate equivalent dose using radiation weighting factors derived from the distribution of lineal energy recorded by the TEPC. While the concepts outlined here are specifically designed for a lunar EVA, the advanced design could become the basis for the next generation of active space radiation dosimeters.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	0
Task Progress:	New project for FY2008.
Bibliography Type:	Description: (Last Updated: 03/20/2019)