Fiscal Year:	FY 2010	**Task Last Updated:**	FY 06/21/2010
PI Name:	Crandall, Craig Gerald Ph.D.		
Project Title:	Temperature Regulatory and Cardiovascular Responses to Exercise During Long-Duration Spaceflight		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Cardiovascular Alterations Team		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Cardiovascular**:Risk of Cardiovascular Adaptations Contributing to Adverse Mission Performance and Health Outcomes		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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City:	Dallas	**State:**	TX
Zip Code:	75231-5129	**Congressional District:**	30
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2009 Crew Health NNJ09ZSA002N
Start Date:	05/01/2010	**End Date:**	09/30/2011
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: End date changed to 9/30/2011 (from 4/30/2014) as project was descoped, per NSBRI (Ed., 10/11/2011)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Levine, Benjamin (The University of Texas Southwestern Medical Center at Dallas) Moore, Alan (Wyle Laboratories, Inc.)		
Grant/Contract No.:	NCC 9-58-CA02202		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Appropriate temperature regulation is critical for the safety of astronauts performing physically demanding work, particularly that which occurs during extravehicular activities. Work performance is also greatly reduced if impaired temperature regulation results in large elevations in internal temperatures. Using ground-based models of spaceflight, the prevailing data suggest that temperature control is impaired while astronauts are in space. However, it remains unknown whether these models accurately reflect physiological responses of spaceflight. Within this context, the project will investigate two key questions: 1) Does spaceflight impair temperature regulation while astronauts are in a zero-gravity environment; and 2) Does prolonged spaceflight impair temperature regulation during extravehicular activities that may occur in a partial-gravity environment of a lunar (one-sixth of the Earth's gravity) or Mars (three-eighths of the Earth's gravity) mission? The first objective will be accomplished by evaluating temperature regulatory responses in astronauts during steady-state exercise prior to spaceflight, on a monthly basis while on the International Space Station and upon return to Earth. The second objective will evaluate the effects of prolonged spaceflight on temperature regulatory responses during exercise that simulates an extravehicular activity in a Mars or lunar gravitational environment. For both objectives, the astronauts' temperature regulatory capacity will be evaluated by measuring internal temperature, skin-blood flow and sweat-rate responses during the prescribed exercise conditions. The information collected will be extremely valuable to NASA as it will lead to improved safety and perhaps to improve physical work capacity of astronauts during the indicated exposures.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2010.
Bibliography Type:	Description: (Last Updated:)