

Fiscal Year:	FY 2008	Task Last Updated:	FY 05/30/2008
PI Name:	Adams, Gregory R. Ph.D.		
Project Title:	Integrated Endurance and Resistance Exercise Countermeasures Using a Gravity Independent Training Device		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Musculoskeletal Alterations Team		
Joint Agency Name:	TechPort:	Yes	
Human Research Program Elements:	(1) HHC: Human Health Countermeasures		
Human Research Program Risks:	(1) Aerobic: Risk of Reduced Physical Performance Capabilities Due to Reduced Aerobic Capacity (2) Muscle: Risk of Impaired Performance Due to Reduced Muscle Size, Strength and Endurance		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	UNIVERSITY	Phone:	949-824-5518
Organization Name:	University of California, Irvine		
PI Address 1:	Physiology & Biophysics		
PI Address 2:	Dept. of Physiology & Biophysics		
PI Web Page:			
City:	Irvine	State:	CA
Zip Code:	92697-0001	Congressional District:	48
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2007 Crew Health NNJ07ZSA002N
Start Date:	06/01/2008	End Date:	05/31/2012
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:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Baldwin, Kenneth (University of California, Irvine) Caiozzo, Vincent (University of California, Irvine)		
Grant/Contract No.:	NCC 9-58-MA01601		
Performance Goal No.:			
Performance Goal Text:	<p>Extended space flight as well as existence on the Moon and Mars will require exercise equipment and training protocols designed to maintain physical fitness and general health. NASA has determined that current flight rated exercise hardware is not appropriate for use on the future Crew Exploration Vehicle (CEV) (JSC SAT Report 12/06). Studies will investigate protocols designed to maintain both cardiovascular and musculoskeletal fitness using a gravity independent multi-mode exercise device (M-MED), which has been identified by NASA as potential flight hardware. M-MED can provide either high resistance strength- or low resistance endurance-mode exercises.</p> <p>Phase I -ground based integrated strength & CV exercise training under normal weight bearing conditions.</p> <p>Phases 2&3 - application of this protocol with progressive levels of inactivity. Measurements - total body physical work</p>		

Task Description:	<p>capacity, muscular mass, strength and sustained muscle endurance (i.e., EVA related issues). CV-related exercise using M-MED "aerobic" mode configuration designed to minimize the time spent in exercise using high power output, short duration interval training. On alternate days, the M-MED will be configured for strength training which has been shown to result in increased muscle strength and size.</p> <p>These studies will validate the efficacy of concurrent endurance and strength training as a high economy approach to flight crew physical fitness, using a scientifically proven exercise modality that has a high probability for use during prolonged spaceflight missions. This work directly addresses primary requirements in the NSBRI RFA:</p> <ol style="list-style-type: none">1. "New, innovative exercise hardware for deployment on CEV, lunar and Martian surfaces that provide efficient means for maintenance of aerobic capacity, bone and muscle strength, and endurance with sufficient reserve for contingencies".2. "New, innovative exercise protocols that minimize in-flight crew time necessary to maintain aerobic capacity and muscle strength and endurance, and facilitate reserve for contingencies on lunar and Martian missions".
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2008.
Bibliography Type:	Description: (Last Updated: 03/23/2018)