Fiscal Year:	FY 2021	**Task Last Updated:**	FY 03/30/2021
PI Name:	Willey, Jeffrey S. Ph.D.		
Project Title:	A Technology to Measure Gait, Egress, and Locomotor Performance in Perturbed Environmental Conditions After Simulated Spaceflight		
Division Name:	Space Biology		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	(1) Animal Biology: Vertebrate		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Comments:	NOTE: PI formerly at Clemson University when NSBRI Postdoctoral Fellow Feb 2008-Oct 2010 (Ed., 12/18/2014)		
Project Type:	GROUND,New Investigation	**Solicitation / Funding Source:**	2018 Space Biology (ROSBio) NNH18ZTT001N-FG2. App D: Flight and Ground Space Biology Research
Start Date:	02/01/2021	**End Date:**	01/31/2022
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 ARC
Contact Monitor:	Loftus, David	**Contact Phone:**	650-604-1011
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Danelson, Kerry Ph.D. (Wake Forest University)		
Grant/Contract No.:	80NSSC21K0294		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Long-duration spaceflight is challenging for the many body parts that help us maintain normal movements and perform well, which include our bones, joints, vision, and brain. Astronauts must perform to the best of their abilities when they are traveling to a destination like the Moon or Mars, and when they reach the destination. During the travel to the destination, or on the surface of the planet/moon, astronauts could face dangerous situations that require rapid escape movements, or situations where the body could be in peril due to surroundings (like when climbing the rough terrain of a mountain or into a valley). If an astronaut is not performing well due to altered visual performance, but also has damaged bones due to low gravity or radiation, the astronaut could be at risk of catastrophic joint tears or bone breaks while exploring uneven/dangerous terrains, or during a required rapid escape into or out of a spacecraft. Our laboratory has measured that performance is altered in rodents after ~35 days in orbit on the International Space Station. However, these measurements were taken on a treadmill moving forward at a constant speed. This does not represent the dangerous terrain of the Moon or Mars, or other rapid movements astronauts would face during spaceflight. Thus our intent is to develop and fabricate a method to better reflect locomotor performance in rodent models over uneven and dangerous lunar/Martian surfaces in order to best assess how combined spaceflight hazards (e.g, microgravity and radiation) cause deficits in astronaut performance, measure time to recovery, and identify countermeasures. We will create a platform on which sits our treadmill that can measure mouse and rat performance. However, the platform can move (one movable portion under each corner support of the treadmill) in a manner that can reflect uneven terrain or a rapid escape motion. Then we can measure how the animals that have previously been exposed to spaceflight conditions (like reduced gravity or radiation) respond. This platform and performance measurement device can then be used to test ways to maximize performance, and thus improve the technologies and approaches used during successful crewed space exploration.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2021.
Bibliography Type:	Description: (Last Updated: 04/06/2023)