Fiscal Year:	FY 2022	**Task Last Updated:**	FY 06/07/2022
PI Name:	Vimal, Vivekanand Ph.D.		
Project Title:	Vibrotactile Feedback as a Countermeasure for Spatial Disorientation During a Stabilization Task in a Spaceflight Analog Condition		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Sensorimotor**:Risk of Altered Sensorimotor/Vestibular Function Impacting Critical Mission Tasks (Revised as of IRP Rev M)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	vvimaldhye@gmail.com	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	781-861-9697
Organization Name:	Brandeis University		
PI Address 1:	Ashton Graybiel Spatial Orientation Laboratory		
PI Address 2:	415 South St		
PI Web Page:			
City:	Waltham	**State:**	MA
Zip Code:	02453-2728	**Congressional District:**	5
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2020-2021 HERO 80JSC020N0001-HHCSR, Omnibus2. Human Health Countermeasures and Space Radiation Topics Appendix C; OMNIBUS2-Appendix D
Start Date:	03/08/2022	**End Date:**	03/07/2023
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:	Stenger, Michael	**Contact Phone:**	281-483-1311
Contact Email:	michael.b.stenger@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	DiZio, Paul Ph.D. (Brandeis University) Lackner, James Ph.D. (Brandeis University)		
Grant/Contract No.:	80NSSC22K0758		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Spaceflights can cause many sensorimotor-related difficulties that could jeopardize a mission. For example, if astronauts are forced to land manually onto the surface of Mars or the Moon, they will experience a rapid gravitational transition while dynamically stabilizing the spacecraft. In low-g and 0 g environments, gravitationally dependent vestibular and somatosensory cues are minimized and astronauts can easily become spatially disoriented. Vibrotactile feedback has been shown to improve performance of a variety of tasks such as navigation, driving, providing alerts, postural stabilization, rehabilitation, and sports. Additionally, it has been shown that vibrotactile cueing is useful in enhancing control of a motion platform, performance in helicopter flight, control of acrobatic flight in an aircraft, orientation of an astronaut in the International Space Station (ISS), and performance in a nulling task after returning from space. However, there are few controlled studies that have examined the effectiveness of vibrotactile feedback during a manual control task in a disorienting spaceflight analog condition that simulates gravitational transitions. Little is known about what types of training will ensure immediate and successful use of vibrotactile feedback during spatial disorientation felt during a gravitational transition. In Aim 1, we study whether specialized, context-specific training with vibrotactors is required to avoid loss of control when immediately transitioning to a condition without relevant gravitational cues. In Aim 2, we examine whether vibrotactile feedback given at points of stability is better than at points of danger.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2022.
Bibliography Type:	Description: (Last Updated: 08/11/2021)