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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 Sensorimo	tor/Vestibular Function Imp	pacting Critical Mission Tasks
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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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
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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
No. of Bachelor's Candidates: Contact Monitor:	Stenger, Michael	Degrees: Monitoring Center: Contact Phone:	NASA JSC 281-483-1311
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No. of Bachelor's Candidates: Contact Monitor: Contact Email: Flight Program: Flight Assignment: Key Personnel Changes/Previous PI: COI Name (Institution): Grant/Contract No.:	Stenger, Michael michael.b.stenger@nasa.gov DiZio, Paul Ph.D. (Brandeis University) Lackner, James Ph.D. (Brandeis University) 80NSSC22K0758	Degrees: Monitoring Center: Contact Phone:	NASA JSC 281-483-1311
No. of Bachelor's Candidates: Contact Monitor: Contact Email: Flight Program: Flight Assignment: Key Personnel Changes/Previous PI: COI Name (Institution): Grant/Contract No.: Performance Goal No.:	Stenger, Michael michael.b.stenger@nasa.gov DiZio, Paul Ph.D. (Brandeis University) Lackner, James Ph.D. (Brandeis University) 80NSSC22K0758)	NASA JSC 281-483-1311

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: 02/17/2024)