Final Vacu	EV 2020	Teals Leat Undeted	EX 10/22/2020
PIScal Fear:	FT 2020	Task Last Opuateu:	F I 10/22/2020
Project Title:	Strangman, Gary E Ph.D.		
Troject Thie.	operational renormance Effects and Neurophy	slology in Fatual Gravity	(01 EN-10)
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline Element/Subdiscipline:			
Joint Agency Name:		TechPort:	Yes
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		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	02129-2020	Congressional District:	7
Comments:			
Project Type:	Ground	Solicitation / Funding Source:	2019 HERO 80JSC019N0001-FLAGSHIP & OMNIBUS: Human Research Program Crew Health. Appendix A&B
Start Date:	09/01/2020	End Date:	08/31/2022
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 JSC
Contact Monitor:	Brocato, Becky	Contact Phone:	
Contact Email:	becky.brocato@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Ivkovic, Vladimir Ph.D. (Massachusetts General Hospital) Zhang, Quan Ph.D. (Massachusetts General Hospital)		
Grant/Contract No.:	80NSSC20K1500		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	 Background: Understanding human performance under various partial-gravity loadings is critical to NASA's crewed mission strategies. For example, current vehicle and mission designs for Mars landings require the crew to use robotic teleoperation within 24 hours of landing—unaided from Earth—to connect landing craft power systems with pre-positioned power generators. This design requires the crew to perform a complex sensorimotor operation in order to maintain life support, as soon as possible after a gravitational transition, in an unfamiliar partial-gravity setting. Unfortunately, there remains limited knowledge about how the sensorimotor system is affected by exposure to both partial gravity and gravity transitions. Addressing these gaps will in part require integrated assessment of operational and sensorimotor performance alongside neurovestibular and neurophysiological responses during exposure to various gravitational loads. Hypotheses: (Hyp1) We predict a monotonic but non-linear relationship between Robotics On-Board Trainer-r (ROBOT-r) performance and gravitational load, with larger departures from 1g leading to more impaired performance. (Hyp2) Behavioral alterations will be paralleled by physiological responses, and the amplitude of these responses (i.e., an indicator of individual "sensitivity" to these provocations) will help (3a) predict neurophysiological responses in-flight, and (3b) predict behavioral performance in flight. Our project involves three closely interrelated specific aims: Aim 1: Characterize and quantify changes in operationally-relevant sensorimotor and vestibular performance as a function of gravitational load. Aim 3: Develop a model to predict behavioral performance and neurophysiological responses under different gravity loads ased on preflight ground testing data. Deliverables: Overall, our project will characterize (1) operationally-relevant performance and (2) neurophysiological responses as a function of gravity load, as well as (
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2020.
Bibliography Type:	Description: (Last Updated: 02/05/2025)