Fiscal Year:	FY 2021	**Task Last Updated:**	FY 02/18/2021
PI Name:	Fischer, Ute Ph.D.		
Project Title:	Technological Support for Crew/MCC Communication and Collaboration During Space Exploration Operations		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HFBP**:Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	None		
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:**	2019-2020 HERO 80JSC019N0001-HHCBPSR, OMNIBUS2: Human Health Countermeasures, Behavioral Performance, and Space Radiation-Appendix C; Omnibus2-Appendix D
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 JSC
Contact Monitor:	Whitmire, Alexandra	**Contact Phone:**	
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Mosier, Kathleen Ph.D. (Teamscape LLC)		
Grant/Contract No.:	80NSSC21K0444		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The proposed effort will examine a novel technology, Braiding, for enhancing space-ground communication challenge during future exploration missions to destinations beyond Low-Earth Orbit. As missions travel farther from Earth, the communication between space crewmembers and ground support will be significantly delayed; for a mission to Mars the time lag can be up to 20 minutes one way. The presence of communication delays will require that crewmembers be given more autonomy in these missions than they have in current operations. However, the requirement for space-ground collaboration will remain, given the complexity of the endeavor and the chance that unforeseen problems may arise –as has happened from the Apollo missions to the present day—for which crews will need assistance from ground. Communication delays pose a formidable challenge to the collaboration between space crewmembers and ground support because they impede team members' communication efficiency and may ultimately hinder their joint task success. Previous work by the research team on crew/mission control (Mission Control Center : MCC) communication under time delay identified errors in three critical features of communication: Timing (when to expect a response); Thread (tracking and maintaining conversational threads); and Transmission Efficiency ('chunking' relevant information in a single message). This work led to the development of a communication protocol and a training module to help space crews and MCC personnel communicate and collaborate during time delay. The proposed effort will build on this earlier work through the introduction of a novel, software-delivered communication tool called Braiding that will help space crews and ground support personnel organize and track their time-delayed communications. Braiding enables remote team members to structure their communication into revolving braids (topics) and thus prevents topics from getting 'tangled.' In the proposed work, we will assess the feasibility, acceptability, and benefits of Braiding during one analog mission. The study design includes two Braiding and two control sessions. During the former, crew and MCC will communicate via Braiding while collaborating on designated operational tasks and engaging in daily planning conferences (DPCs). Control sessions will involve comparable operational tasks and DPCs with crew and MCC using currently available media for their communication. Data collected will include participants' ratings of their communications' quality during tasks and DPCs, quantitative and qualitative analyses (i.e., duration, completeness, and efficiency) of crew/MCC communications, and post-mission interviews with participants to elicit user feedback. In short, we will provide a proof-of-concept that will be comprehensive as it will be based on both subjective and objective assessments of Braiding in comparison to the current communication technologies available to crew and MCC during time-delayed conditions. Further testing and refinement may be accomplished in future work using controlled experiments in analog environments.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2021.
Bibliography Type:	Description: (Last Updated: 03/22/2024)