Fiscal Year:	FY 2017	**Task Last Updated:**	FY 05/30/2017
PI Name:	Binsted, Kim Ph.D.		
Project Title:	Using Analog Missions to Develop Effective Team Composition Strategies for Long Duration Space Exploration		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HFBP**:Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) **Team**:Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	binsted@hawaii.edu	**Fax:**	FY
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Zip Code:	96822-2217	**Congressional District:**	1
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2014-15 HERO NNJ14ZSA001N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	07/01/2015	**End Date:**	07/31/2019
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:	2	**No. of Master' Degrees:**	1
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	1
No. of Bachelor's Candidates:		**Monitoring Center:**	NASA JSC
Contact Monitor:	Williams, Thomas	**Contact Phone:**	281-483-8773
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Flight Program:			
Flight Assignment:	NOTE: Extended to 7/31/2019 per J. Garrett/JSC (Ed., 12/21/18) NOTE: Extended to 12/31/2018 per NSSC information (Ed., 8/24/17) NOTE: Element change to Human Factors & Behavioral Performance; previously Behavioral Health & Performance (Ed., 1/17/17)		
Key Personnel Changes/Previous PI:	May 2017 report: Sonja Schmer-Galunder is added as CoInvestigator to serve as the lead scientist for our project at Smart Information Flow Technologies, LLC (SIFT).		
COI Name (Institution):	Bedwell, Wendy Ph.D. (University of South Florida, Tampa) Bishop, Sheryl Ph.D. (University of Texas, Galveston) Hunter, Jean Ph.D. (Cornell University) Kozlowski, Steve Ph.D. (Michigan State University) Miller, Christopher Ph.D. (Smart Information Flow Technologies, LLC) Roma, Peter Ph.D. (Institutes for Behavior Resources, Inc) Wu, Peggy B.S. (Smart Information Flow Technologies, LLC) Schmer-Galunder, Sonja M.S. (Smart Information Flow Technologies, Inc.)		
Grant/Contract No.:	NNX15AN05G		

Performance Goal No.:	
Performance Goal Text:	
Task Description:	Astronaut crews for long-duration multi-national missions will endure many physical challenges and psychological stressors, some largely predictable in type and timing and others unpredictable. Crews are likely to be diverse with respect to educational background, skill set, ethnicity, gender, leadership/followership styles etc., yet they must form a cohesive team, and continue to function together at a high level of objective performance and remain responsive to mission support over the duration of the mission. Crew cohesion will be more fragile at times of high stress and fatigue, yet those are the times when performance must be unimpaired if the crew is to succeed. Adding to the challenge, the pool from which crews must be selected may be significantly constrained by other factors, such as past radiation exposure. For these reasons, it is essential that we understand how best to compose and support crews for long-duration space missions, and that we develop a set of validated tools to this end. In order to enable and advance long duration human space exploration, we are investigating individual and crew characteristics that may affect crew function and performance, by measuring both characteristics and performance on a range of simulated missions in analog environments. Based on the correlations found, we will develop a predictive model of the relationship between crew composition and performance. We will validate and enhance this model via data collected on two 8-month Hawai'i Space Exploration Analog and Simulation (HI-SEAS) missions, and use the results to provide NASA with a set of tools to optimize its crew composition strategies.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	The objective of this investigation is to provide data and recommendations to inform crew composition for long-duration space missions, and to enable the implementation of countermeasures for problems related to crew behavioral health and performance. This ground-based investigation will: 1. Collect, develop and verify a set of individual, dyad, and crew characteristics that we expect (based on past investigations) to be relevant to crew composition. 2. Identify correlations, if any, between those characteristics and crew function/performance, using data from a series of simulated missions of various lengths at analog sites. 3. Build a predictive model based on these correlations. 4. Validate that model over two 8-month simulated missions at the HI-SEAS analog. 5. Develop a set of tools (e.g., rubric, implemented model, best practices) NASA can use to optimize crew composition.
Task Progress:	This research takes place at two analog sites: the Mars Desert Research Station (MDRS) in Utah, and the Hawaii Space Exploration Analog and Simulation (HI-SEAS) habitat on Mauna Loa. The MDRS season runs from October to May, with about 10-12 crews per season. Some of these crews, however, are not suitable for this project, because either a) they are primarily educational crews; b) they are using MDRS primarily as a base for out-of-simulation activities (e.g., geology fieldwork); or c) the crew will be at the habitat for less than two weeks. Nonetheless, we still expect to have a total of 18-22 crews participate in this study. MDRS crews participated in spring 2016 and the 2016-2017 season; the rest will participate in the one remaining season. Although the levels of researcher control at MDRS is much lower than at HI-SEAS (e.g., we will have influence on, but not full control of, crew composition), these missions provide an excellent opportunity increase the number of crews studied and to validate our approach in other environments. At HI-SEAS, in contrast, we have complete control over crew composition and mission conditions. The first of two 8-month HI-SEAS missions is underway, and has recently passed the halfway mark. So far, crew compliance with study procedures has been near 100%, with only a few minor errors or connectivity issues. The next major stage of activity is crew composition for the second HI-SEAS mission. We expect the composition effort to start in July 2017, with the anticipated start of the mission in January 2018. Our research at both locations has been approved by both University of Hawaii and NASA Institutional Review Boards, subject to annual review.
Bibliography Type:	Description: (Last Updated: 09/09/2022)
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Articles in Peer-reviewed Journals	Wu P, Morie J, Wall P, Ott T, Binsted K. "ANSIBLE: Virtual reality for behavioral health." Procedia Engineering. 2016;159:108-11. https://doi.org/10.1016/j.proeng.2016.08.132 , Aug-2016
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