

Fiscal Year:	FY 2017	Task Last Updated:	FY 01/05/2017
PI Name:	Roma, Peter Ph.D.		
Project Title:	Development of an Objective Behavioral Assay of Cohesion to Enhance Composition, Task Performance, and Psychosocial Adaptation in Long-Term Work Groups		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:		TechPort:	Yes
Human Research Program Elements:	(1) BHP: Behavioral Health & Performance (archival in 2017)		
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:	pete.roma@nasa.gov	Fax:	FY
PI Organization Type:	NASA CENTER	Phone:	
Organization Name:	KBR/NASA Johnson Space Center		
PI Address 1:	Behavioral Health & Performance Laboratory		
PI Address 2:	2101 NASA Parkway		
PI Web Page:			
City:	Houston	State:	TX
Zip Code:	77058	Congressional District:	36
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2011 Crew Health NNJ11ZSA002NA
Start Date:	10/10/2012	End Date:	10/07/2016
No. of Post Docs:		No. of PhD Degrees:	
No. of PhD Candidates:	2	No. of Master' Degrees:	2
No. of Master's Candidates:		No. of Bachelor's Degrees:	2
No. of Bachelor's Candidates:	3	Monitoring Center:	NASA JSC
Contact Monitor:		Contact Phone:	
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: End date changed to 10/07/2016 per NSSC information (Ed., 10/8/15)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Hursh, Steven (Institute for Behavior Resources, Inc.)		
Grant/Contract No.:	NNX13AB39G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>The long-term goal of the proposed research is to deliver a software tool (currently referred to by its working title of "Team Performance Task" [TPT]) that will allow long-duration exploration crews to autonomously derive objective, standardized, and quantifiable measures on social dynamics while serving as a decision-aid tool in astronaut selection and multinational crew composition. This approach is unique because it is simple, rapid, and operationally feasible like a questionnaire, but is entirely objective, is innovative in that it requires a group-level demonstration of social dynamics rather than relying on individual opinions, and is language-independent, thus making it suitable for cross-cultural applications. Such an empirically validated and operationally feasible software deliverable will contribute to an overall risk mitigation strategy comprised of quantitative, qualitative, objective, and subjective assessment technologies. To accomplish this, we have been conducting ground-based experiments to systematically investigate the effects of group composition (gender and personality) on voluntary cooperative propensity in 3-person teams. We are also assessing the predictive validity of pre-mission TPT "social personality profiles" and the effects of group composition on performance, task cohesion, social cohesion, and biopsychosocial adaptation in mixed-gender "crews" participating in a long-term simulated space exploration task. We are also developing next-generation software to advance the technology beyond our current prototype used for proof-of-concept/validation research into a broadly applicable tool with cross-platform networking and connectivity, enhanced usability/human factors features, extensive parameter manipulation/flexibility to maximize sensitivity, and integrated data collection and processing capabilities.</p> <p>The proposed project will elucidate the influences of personality, gender, behavior, and neurobiology at the individual and group levels while yielding powerful experimental insights on the relationships between group composition, mission performance, task cohesion, social cohesion, and psychosocial adaptation in long-term work groups. The work will provide a scientifically validated TPT concept translated into a flexible and operationally acceptable software tool suitable for field studies of predictive validity and/or countermeasure potential in mission-oriented analog populations and/or high-risk operational and long-duration space analog environments. This work will contribute to the empirical knowledge base used to inform the processes of crew selection, composition, training, monitoring, and maintenance, and will ultimately yield a broadly applicable software tool to help mitigate risks and maximize behavioral health and performance for long-duration space exploration.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>The project will elucidate the interacting influences of personality, gender, and behavior at the individual and group levels while yielding powerful experimental insights on the relationships between group composition, task cohesion, social cohesion, and biopsychosocial adaptation in long-term work groups. The broad knowledge-base and software tools derived from this work are relevant to social relationships, business, and education, as well as military, healthcare, commercial transportation, and other settings involving high-risk/high-performance teamwork and the need for scientifically based objective assessment methods.</p>
Task Progress:	<p>We completed data collection for the Short-Term study (N=252 in 84 teams). We completed data collection for the Long-Term study (N=96 in 32 teams over 12 sessions). We completed data collection for space analog missions at NASA Extreme Environment Mission Operations (NEEMO) (one 7-day mission), Human Exploration Research Analog (HERA) (four 7-day and four 14-day missions), Hawai'i Space Exploration Analog and Simulation (HI-SEAS) (4-, 8-, and 12-month missions), and Concordia Station (three winters). We completed development of a software product called COHESION (Capturing Objective Human Econometric Social Interactions in Organizations and Networks), a simple, rapid, and objective behavioral assay of cooperation, productivity, and fairness in small groups.</p>
Bibliography Type:	Description: (Last Updated: 07/05/2023)
Articles in Peer-reviewed Journals	<p>Hursh SR, Roma PG. "Behavioral economics and the analysis of consumption and choice." Managerial and Decision Economics. 2016 Jun-Jul;37(4-5):224-38. http://dx.doi.org/10.1002/mde.2724 , Jun-2016</p>
Articles in Peer-reviewed Journals	<p>Roma PG, Hursh SR, Hudja S. "Hypothetical purchase task questionnaires for behavioral economic assessments of value and motivation." Managerial and Decision Economics. 2016 Jun-Jul;37(4-5):306-23. http://dx.doi.org/10.1002/mde.2718 , Jun-2016</p>
Books/Book Chapters	<p>Roma PG, Bedwell WL. "Key factors and threats to team dynamics in long-duration extreme environments." in "Research on Managing Groups and Teams. Team Dynamics Over Time (Volume 18)." Ed. E. Salas, W.B. Vessey, L.B. Landon. Bingley, UK: Emerald Group Publishing Limited, 2017. p. 155-187. https://doi.org/10.1108/S1534-085620160000018007 , Jan-2017</p>
Significant Media Coverage	<p>Fisher A. (Interviewed P.G.Roma) "Space Colonization (A. Fisher, interviewer of Peter Roma)." All Sides with Ann Fisher, National Public Radio, September 2016., Sep-2016</p>
Significant Media Coverage	<p>Feder T. "NASA Mars mockup explores team cohesion and performance. Includes comments from P.G. Roma." Physics Today. 2015 Dec;68(12):29-30. http://dx.doi.org/10.1063/PT.3.3015 , Dec-2015</p>