

Fiscal Year:	FY 2014	Task Last Updated:	FY 08/01/2013
PI Name:	Tannenbaum, Scott Ph.D.		
Project Title:	Composing and Developing Resilient, Adaptive, and Self-Sustaining Teams for Long Duration Space Exploration		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline-- Element/Subdiscipline:			
Joint Agency Name:		TechPort:	No
Human Research Program Elements:	(1) BHP :Behavioral Health & Performance (archival in 2017)		
Human Research Program Risks:	(1) BMed :Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders (2) 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		
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City:	Albany	State:	NY
Zip Code:	12203-6006	Congressional District:	20
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2010 Crew Health NNJ10ZSA003N
Start Date:	10/01/2011	End Date:	04/30/2015
No. of Post Docs:		No. of PhD Degrees:	
No. of PhD Candidates:	7	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:	Leveton, Lauren	Contact Phone:	
Contact Email:	lauren.b.leveton@nasa5.gov		
Flight Program:			
Flight Assignment:	NOTE: End date is now 4/30/2015, per NSSC information (Ed., 7/14/14)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Alliger, George (The Group for Organizational Effectiveness, Inc.) Mathieu, John (University of Connecticut) Salas, Eduardo (University of Central Florida)		
Grant/Contract No.:	NNX11AR22G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>Flight crews in Long Duration Space Exploration (LDSE) missions are isolated for prolonged periods with access to only limited, time-lagged communications with ground operations. This creates numerous team-related challenges. Under such conditions, a single crew member who is a "poor fit" can jeopardize mission effectiveness, and even a well-formed team must adapt during its time together to remain effective. The proposed research addresses how best to compose an LDSE team, as well as how to use subsequent team countermeasures to optimize team resilience, adaptability, and viability during a mission.</p> <p>The research program represents a synthesis of existing technologies and knowledge, and the advancement of new methods and applications, all grounded in the unique demands of LDSE. We consider team effectiveness as not only traditional task performance, but also, given the LDSE setting and mission, team sustainability and viability over time. Based on a synthesis of existing research, input from subject matter experts, and new empirical studies, we will recommend evidence-based guidelines for composing LDSE flight teams, identify diagnostic measures to guide preemptive actions, prototype a self-sustainment countermeasure to address psychosocial vulnerabilities, and develop specifications for an automated, diagnostic-driven, Team Autonomous Self-Development and Sustainment (TAS2) module.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>The isolation and time-lagged communications that astronauts experience in Long Duration Space Exploration (LDSE) can create numerous team-related challenges (Caldwell, 2005; Dion, 2004; Halbesleben, Bowler, 2007; Schmidt, Keeton, Slack, Leveton, & Shea, 2009). Mitigating these challenges involves not only selecting appropriate crew members but also ensuring that they have sufficient team resilience, adaptability and vitality to meet the demands of LDSE. This multi-year effort focuses on assisting the LDSE team formation process by extending traditional team member selection models to integrate teamwork and psychosocial requirements with traditional position and mission requirements; utilizing longitudinal multiplex network analysis techniques to better diagnose and anticipate challenges to team coordination and effectiveness before they evolve into problems that could impact team viability and mission success; helping teams sustain their performance and coordination over the duration of the mission by building upon existing debriefing techniques and developing diagnostic-driven, team-guided countermeasures that address psychosocial needs and vulnerabilities as well as more traditional team development needs; and identifying principles for ground-based team training to help ensure teams can and will engage in self-sustainment activities during LDSE missions.</p>
Task Progress:	<p>Proposed tasks for Year 2 included: 1) examine team countermeasures and provide recommendations, 2) choose/develop targeted diagnostic and criterion measures for use in the research, and 3) conduct empirical research in a lab setting.</p> <p>During Year 2, we:</p> <ul style="list-style-type: none"> • Advanced our conceptual foundation as it relates to team composition, preparation, and resilience; documented in the form of publications and white papers. We focused attention on the construct of team resilience, as this is an understudied variable with key implications for LDSE mission success. We drafted a white paper on team resilience that is under review by NASA personnel. • Conducted additional interviews with NASA subject matter experts to ground our research and recommendations in an understanding of current and anticipated needs. • Developed diagnostic and criterion measures for use in empirical research, including the establishment of self-report, observational, and unobtrusive team measurement techniques. We are using multiple measurement methods in our research and anticipate that both self-report and unobtrusive measures will be needed during LDSE missions to diagnose potential concerns. • Identified self-guided debriefing as a recommended high-potential countermeasure for team self-sustainment. We published a meta-analysis that demonstrates the efficacy of debriefing and are testing self-guided debriefs in our empirical research as a LDSE mission will stress the flight crew's resilience and require them to be able to self-correct with far less support from the ground crew. • Initiated lab-based research to examine teamwork phenomena in a tightly controlled experimental environment. This research examines team composition, teamwork processes and states, debriefing, and resilience. It will provide an early test of hypotheses and allow for the refinement of our diagnostics, debriefing countermeasure, and potential unobtrusive analytics – preparing us for our Year 3 research. <p>As part of this effort, we have focused on the concept team resilience and drafted an unpublished white paper that is under review by NASA personnel:</p> <p>Alliger, G., Cerasoli, C., & Tannenbaum, S. (December, 2012). Building Resilience in Long-Duration Space Flight Teams: Literature Review, Theoretical Integration, and Operational Recommendations. White paper submitted to NASA.</p>
Bibliography Type:	Description: (Last Updated: 02/02/2024)
Abstracts for Journals and Proceedings	<p>Tannenbaum SI, Mathieu JE, Alliger GM, Donsbach JS. "Composing Long-Duration Space Flight Teams." Presented at the 28th Annual Society for Industrial & Organizational Psychology Meeting, Houston, TX, April 11-13, 2013. 28th Annual Society for Industrial & Organizational Psychology Meeting, Houston, TX, April 11-13, 2013. http://www.siop.org/Conferences/13con/Program/printable.aspx , Apr-2013</p>
Abstracts for Journals and Proceedings	<p>Tannenbaum SI, Alliger GM, Cerasoli CP. "Building team resilience in long-duration space flight crews." 2013 NASA Human Research Program Investigators' Workshop, Galveston, TX, February 12-14, 2013. 2013 NASA Human Research Program Investigators' Workshop, Galveston, TX, February 12-14, 2013. , Feb-2013</p>

Books/Book Chapters	Mathieu JE, Tannenbaum SI, Donsbach JS, Alliger GM. "Achieving optimal team composition for success." in "Developing and Enhancing High-Performance Teams: Evidence-based Best Practices and Guidelines." Ed. E. Salas, S.I. Tannenbaum, D. Cohen, G. Latham. San Francisco : Wiley (Jossey-Bass), 2013. p. 520-551., May-2013
Books/Book Chapters	Tannenbaum SI, Beard RL, Cerasoli C. "Conducting team debriefs that work: Lessons from research and practice." in "Developing and Enhancing High-Performance Teams: Evidence-based Best Practices and Guidelines." Ed. E. Salas, S.I. Tannenbaum, D. Cohen, G. Latham. San Francisco : Wiley (Jossey-Bass), 2013. p. 488-519. , May-2013
Papers from Meeting Proceedings	Tannenbaum SI. "Team Composition: Theory, Practice, and the Future." National Research Council workshop on Measuring Human Capabilities: Performance Potential of Individuals and Collectives, Washington, DC, April 3-4, 2013. Presentation. National Research Council workshop on Measuring Human Capabilities: Performance Potential of Individuals and Collectives, Washington, DC, April 3-4, 2013. http://sites.nationalacademies.org/dbasse/bbcss/dbasse_082077 , Apr-2013
Significant Media Coverage	Novotney A. "I/O Psychology goes to Mars. Quotes PI S. Tannenbaum and E. Salas." APA Monitor, 2013 Mar;44(3):38. http://www.apa.org/monitor/2013/03/mars.aspx , Mar-2013