Fiscal Year:	FY 2020	**Task Last Updated:**	FY 06/06/2021
PI Name:	Salas, Eduardo Ph.D.		
Project Title:	Dynamic Team Role Allocation in Long Duration, Exploration Missions: Identification of Roles, Triggers, and Measurement Tools		
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) **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:	Houston	**State:**	TX
Zip Code:	77005	**Congressional District:**	7
Comments:	NOTE: Previous affiliation was University of Central Florida, until mid-2015		
Project Type:	Ground	**Solicitation / Funding Source:**	2013 HERO NNJ13ZSA002N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	11/03/2015	**End Date:**	11/02/2019
No. of Post Docs:	0	**No. of PhD Degrees:**	1
No. of PhD Candidates:	5	**No. of Master' Degrees:**	1
No. of Master's Candidates:	3	**No. of Bachelor's Degrees:**	0
No. of Bachelor's Candidates:	0	**Monitoring Center:**	NASA JSC
Contact Monitor:	Whitmire, Alexandra	**Contact Phone:**	
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Flight Program:			
Flight Assignment:	NOTE: End date changed to 11/02/2019 per NSSC information (Ed., 8/6/18) NOTE: End date changed to 11/02/2018 per NSSC information (Ed., 9/27/17) NOTE: Element change to Human Factors & Behavioral Performance; previously Behavioral Health & Performance (Ed., 1/18/17)		
Key Personnel Changes/Previous PI:	None		
COI Name (Institution):	Burke, Shawn Ph.D. (University of Central Florida) Driskell, James Ph.D. (Florida Maxima Corp.) Fiore, Stephen Ph.D. (University of Central Florida)		
Grant/Contract No.:	NNX16AB08G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	ED. NOTE (4/6/2016): Continuation of project (grant NNX14AM73G) with the same title and Principal Investigator, due to PI move in fall 2015 to Rice University from University of Central Florida. Long duration exploration missions present a unique environment characterized by many stressors (e.g., social isolation, danger, confinement, interpersonal dynamics, periods of over/under stimulation), with little ability to escape. Research has found that within such environments interpersonal dynamics occupy a key role in effective functioning (Forsyth, 2010). While the last few years have witnessed an increase in research examining the composition requirements of high performance teams, little work has examined these issues in light of teams embedded in long duration, exploration missions. Therefore, we describe a program of work which addresses Team Gaps 1, 4, and 8 in NASA's Human Research Roadmap. We seek to answer the following questions with regard to long duration, exploration missions: (1) what are the key social and team technical (task) roles which influence team function; (2) what are the behavioral and communicative markers which can be used to assess the degree to which key identified social and team technical roles are being fulfilled; (3) what contextual aspects serve to trigger a need for the dynamic shift of social roles; (4) what are the optimal combinations (i.e., profiles, algorithms) of social roles for the maintenance and regulation of team functions; (5) what are the markers that can be used to select for those most likely to fit social profiles and how do these profiles change across the duration of the mission (i.e., the team's life cycle). In answering these questions we seek to provide a series of scientifically grounded and experimentally validated taxonomies, guidelines, and measurement tools for team selection/composition. In exploring these questions, we take a multi-pronged approach consisting of analysis of archival data (e.g., astronaut diaries, historical accounts of teams operating in isolated, confined environments (ICE), prior collected University of Central Florida astronaut interviews), scientific literatures on group dynamics, personality, team roles, stress, and diversity, interviews, and experimentation in NASA analogs. Forsyth D. R. (2010). Group dynamics. J. D. Hague (Ed.). Belmont CA: Wadsworth, Cengage Learning.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	Research contributes to a better understanding of the task and social roles needed for teams to effectively function, especially within the context of isolated, confined environments such as long duration spaceflight.
Task Progress:	While many insights were learned throughout this project some of the highlights include the following. First, a set of eleven team roles were identified that appear within the context of long-duration spaceflight. More specifically, five social roles were identified (team builder, entertainer, contribution seeker, attention seeker, and negativist). Of these five team roles three are functional (i.e., team builder, entertainer, contribution seeker) in that results illustrated that they tend to be positively related to team dynamics and outcomes such as teamwork, cohesion, and team effectiveness. Two of the social roles identified (i.e., attention seeker, negativist) appeared infrequently, but when they did appear they had a tendency to be dysfunctional in that they had a negative relationship with team dynamics. These latter two roles are ones that should be 'selected' out of crew composition. With respect to task roles, six roles were identified (coordinator, team player, information provider, problem solver, evaluator, task leader), all of which were generally positively related to effective team functioning (e.g., teamwork, cohesion, team effectiveness). While overlap did appear between the team roles which emerged and the larger literature on roles, uniqueness was also identified with respect to the team roles that emerged in the context of spaceflight. Most notably is the notion of an entertainer role, the emphasis on the importance of a nurturer aspect (subdimension - team builder role), which focuses more on some of the aspects of small-group living and personal self-care, and decreased evidence or appearance of team roles that might be traditionally thought of as dysfunctional (as identified through the broader literature on team roles). Regarding the nature of team roles, evidence was found for the dynamic nature of team roles and the fact that within the context of spaceflight team roles are most often shared or distributed throughout the team. Results indicated not only a specific team role often shared amongst members of the crew, but correspondingly that crew members often engaged in multiple roles throughout the course of the mission. With respect to the dynamic nature, results also indicated the manner in which contextual factors may impact the appearance and functionality of task and social roles (as a set) as well as specific roles. Contextual factors that were found to differentially relate to the enactment of roles included temporal factors, workload variations, sleep deprivation, boredom, and isolation. Of note is emerging evidence for the increased importance of social roles as mission duration increases and the potential that failures in social roles may remain hidden and take longer to notice than task roles. Results also began to speak to the notion of person-role fit within this context as is seen in the broader organizational literature on roles, but has rarely been examined with relation to informal team roles nor within the context of long duration spaceflight. In this vein, results suggest that personality may predispose a crew member to occupy particular roles and that there is systematic variance between personality and team role dimensions and frequency of role enactment. However, results from the operational interviews and data collected within the analog that illustrates differential relationships between personality and role enactment over time also speak to moderators on the person-role fit relationship. Research should further investigate those factors that may constrain a crew member's ability to achieve person-role fit and the degree to which contextual factors may impact the impact of such mismatches. It is possible that mismatches could act as a stressor, chronic or acute stressor depending on the degree of mismatch and the duration. Finally, two potential new measures were created, team role measure and TRIAD (Tracking Roles in and Across Domains). More specifically, based on all the evidence gathered throughout the project we created a refined team role taxonomy with a corresponding measure. The measure contains behavioral markers expected to be indicative of each role. As the measure was created towards the end of the project it still requires further validation. Additionally, leveraging older work on team roles, the TRIAD measure was created which produces a different view on team roles as it does not examine roles in terms of the types of team-directed behaviors that occur but in terms of a set of underlying dimensions that have been argued to cut across all roles in varying degrees. Future work should continue to map the dimensions within TRIAD against existing team role taxonomies as the intersection can provide future insight into those role shifts which, when required, would be expected to be easiest for crew members. For example, it is expected that crew members would be more likely to shift between two roles that are both high on sociability as compared to two roles that vary greatly on the degree of sociability required. The latter would be expected to be less likely and more stressful on the crew member, if required. As further developed, this tool could be utilized as the basis for a countermeasure to train crews regarding ease of transition between roles or the occupation of simultaneous roles.

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