

Fiscal Year:	FY 2015	Task Last Updated:	FY 06/30/2015
PI Name:	DeChurch, Leslie Ph.D.		
Project Title:	Team Task Switching in Astronaut Crews on the International Space Station: Integrating Multiteam Membership, Multiteam Systems, Multitasking,& Multidimensional Networks to Monitor & Enable Functional Work Shifts in Astronaut Crews		
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:	(1) HSIA :Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (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		
PI Email:	dechurch@northwestern.edu	Fax:	FY
PI Organization Type:	UNIVERSITY	Phone:	954-646-5083
Organization Name:	Northwestern University		
PI Address 1:	Northwestern University		
PI Address 2:	School of Communication		
PI Web Page:			
City:	Evanston	State:	IL
Zip Code:	60208	Congressional District:	9
Comments:	NOTE: Previously at Georgia Institute of Technology until July 2016.		
Project Type:	FLIGHT	Solicitation / Funding Source:	2013-14 HERO NNJ13ZSA002N-ILSRA. International Life Sciences Research Announcement
Start Date:	05/12/2015	End Date:	10/05/2016
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:	Leveton, Lauren	Contact Phone:	
Contact Email:	lauren.b.leveton@nasa5.gov		
Flight Program:	ISS		
Flight Assignment:	NOTE: End date changed to 10/5/2016 (original due date was 5/11/2018) due to PI move to Northwestern University and new award granted (Ed., 2/12/18)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Contractor, Noshir Ph.D. (Northwestern University)		
Grant/Contract No.:	NNX15AK73G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>We are at the dawn of a new era of human space exploration. Moving beyond low Earth orbit and the relative safety of the International Space Station (ISS) toward near-Earth asteroids and Mars present previously unimaginable opportunities as well as organizational challenges. One significant challenge is the complexity of the operating environment within which astronauts will work. This complexity will place enormous demands on astronauts, and research is needed that develops concrete countermeasures to mitigate the risks stemming from performance decrements due to inadequate cooperation, coordination, communication, and psychosocial adaptation within a team. Astronauts will push the bounds of human cognitive and social functioning as they multitask across tasks, teams, and tools working toward personal, team, and system goals. This multidisciplinary research project is designed to help them do just that. This three-year programmatic investigation into team task switching leverages: (1) agent-based models to understand how task switching behavior and performance-related switching costs occur based on dynamic interplay between independent and interdependent tasks, (2) laboratory experiments conducted in two multiteam systems laboratories (one at Georgia Tech, the other at Northwestern) to test the theoretical model derived from agent-based models, (3) unobtrusive data collection strategies to capture information on the tasks and complex social network structures of ISS crew members, (4) design of interventions to enable adaptive team task switches using virtual experiments, (5) validation of intervention strategies using one of NASA's space analogs, and (6) development of a dashboard decision aid to anticipate and pre-empt dysfunctional task switching. An innovative feature of our investigation is the use of a multidimensional network approach to characterize and model the switches between tasks, tools, teams, and multi-team systems. The combined outputs of this proposed multi-disciplinary project speak directly to NASA Human Research Program's (HRP's) identified team gaps for autonomous, long duration, and/or long distance exploration missions associated with the need to identify (1) key threats to the team (Team Gap 1), (2) countermeasures to support team function (Team Gap 3), (3) validated methods that can be used to maintain team function (Team Gap 5), and (4) psychological and psychosocial factors, measures, and combinations thereof that can be used to compose highly effective crews (Team Gap 8).</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2015.
Bibliography Type:	Description: (Last Updated: 10/25/2023)