

Fiscal Year:	FY 2016	Task Last Updated:	FY 09/13/2016
PI Name:	Stuster, Jack W. Ph.D.		
Project Title:	Generalizable Skills and Knowledge for Exploration Missions		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Space Human Factors Engineering		
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		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Organization Name:	Anacapa Sciences, Inc.		
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PI Web Page:	http://www.anacapasciences.com		
City:	Santa Barbara	State:	CA
Zip Code:	93101-4967	Congressional District:	24
Comments:	New address per PI (12/2012); previous address--301 East Carrillo Street, Santa Barbara, CA		
Project Type:	GROUND	Solicitation / Funding Source:	2014-15 HERO NNJ14ZSA001N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	09/10/2015	End Date:	08/09/2019
No. of Post Docs:	0	No. of PhD Degrees:	0
No. of PhD Candidates:	0	No. of Master' Degrees:	0
No. of Master's Candidates:	1	No. of Bachelor's Degrees:	0
No. of Bachelor's Candidates:	0	Monitoring Center:	NASA JSC
Contact Monitor:	Williams, Thomas	Contact Phone:	281-483-8773
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Flight Program:			
Flight Assignment:	NOTE: Change in grant number to NNX16AQ86G by NSSC and grant extended to 8/09/2019, per D. Risin/JSC (Ed., 6/21/17) NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/19/17)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Adolf, Jurine Ph.D. (NASA Johnson Space Center) Byrne, Vicky M.S. (Lockheed Martin/NASA Johnson Space Center)		
Grant/Contract No.:	NNX16AQ86G ; NNX15AW34G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This research is using a proven method to identify the abilities and skills necessary to perform the work expected of exploration crews and to develop recommendations for optimum training. The process began by developing a comprehensive inventory of tasks based on a review of existing mission planning documents and interviews with astronauts and other experts. The inventory is composed of nearly 1,200 tasks listed in 12 mission phases. A quantitative analysis of the tasks will be performed during Year 2 in conjunction with a systematic assessment of physical, cognitive, and social abilities required to perform the expedition tasks (using Fleischman definitions augmented with job-specific abilities when needed). The task and ability analyses will be conducted with the assistance of astronauts, mission planners, and training experts and will result in a data-driven understanding of the knowledge, skills, and abilities necessary to perform the tasks expected for expedition-class space missions. The key skills and abilities identified by the process will be assessed for perishability, trainability, and generalizability and then optimum strategies for ensuring that those skills and abilities are possessed by expedition crew members when needed will be developed based on principles derived from the research team's detailed understanding of the relevant training literature. Study results will provide the information necessary to close the target research gaps; in addition, results of the task and ability analyses will be useful to the designers of missions, procedures, software, equipment, and habitats, and to those responsible for crew composition. All work will be completed within the specified three-year period of performance by an experienced team of human factors and training specialists.</p> <p>NOTE: Change in grant number to NNX16AQ86G by NSSC and grant extended to 8/09/2019, per D. Risin/JSC (Ed., 6/21/17)</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>The method that is being developed for this project to identify and analyze expected tasks during a three-year expedition to Mars will serve as a model for future human factors research concerning large-scale systems. The number of tasks identified during Year 1 is an order of magnitude larger than that of a typical HF (human factors) analysis, and the complexity of the systems involved and the duration of the expedition render the effort unique and, we hope, exemplary.</p>
Task Progress:	<p>Accomplishments During the Reporting Period: Participated in a pre-kickoff teleconference.</p> <p>Met with NASA HF experts.</p> <p>Participated in kickoff teleconference.</p> <p>Began weekly teleconferences with Johnson Space Center (JSC) teammates.</p> <p>Identified/obtained/reviewed Mars mission planning documents (ongoing).</p> <p>Extracted Mars mission tasks from planning documents; developed lists by 12 mission segments.</p> <p>Conducted interviews re Mars tasks at University of North Dakota Space Studies Department.</p> <p>Received additional medical tasks from JSC team; added launch and landing segments.</p> <p>Received habitability and computer troubleshooting tasks from JSC team.</p> <p>Sent task inventory to Dr. Stephen Hoffman for review; received/incorporated his comments.</p> <p>Requested IRB (Institutional Review Board) approval for task analysis.</p> <p>Met with JSC team and Dr. Hoffman at HF office, JSC, to discuss task inventory.</p> <p>Sent task inventory to Astronaut, Dr. Don Pettit, for review.</p> <p>Received comments from Dr. Pettit: Task lists are comprehensive, but too detailed to rate.</p> <p>Formatted Excel document to permit evaluation of rating format for survey instrument.</p> <p>Conducted experiments to estimate time required to rate tasks (difficulty, frequency, importance).</p> <p>Increased categorization of tasks within each mission segment to reduce rating burden/time.</p> <p>Sent task inventory to Dr. John Charles for review; response: "...looks like The Martian Behind the Scenes."</p>
Bibliography Type:	Description: (Last Updated: 11/13/2019)