Fiscal Year:	FY 2014	Task Last Updated:	FY 02/26/2015
PI Name:	Wenzel, Elizabeth Ph.D.		
Project Title:	Multimodal Augmented Displays for Surface Telerobotic Missions		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline Element/Subdiscipline:	HUMAN RESEARCHSpace Human Factors Engine	ering	
Joint Agency Name:		TechPort:	No
Human Research Program Elements:	(1) SHFH:Space Human Factors & Habitability (archival in 2017)		
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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PI Organization Type:	NASA CENTER	Phone:	650-604-6290
Organization Name:	NASA Ames Research Center		
PI Address 1:	Human Factors Research & Technology Division		
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PI Web Page:			
City:	Moffett Field	State:	CA
Zip Code:	94035-4799	<b>Congressional District:</b>	18
Comments:			
Project Type:	Ground	Solicitation / Funding Source:	2013 HERO NNJ13ZSA002N-Crew Health OMNIBUS
Start Date:	07/01/2014	End Date:	09/30/2015
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 ARC
Contact Monitor:	Gore, Brian	<b>Contact Phone:</b>	650.604.2542
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Flight Program:			
Flight Assignment:	NOTE: Extended to 9/30/2015 (from 8/1/2015) per A. NOTE: End date is 8/1/2015 (instead of 7/1/2015) per	Chu/ARC (Ed., 6/30/15) E. Connell/JSC (Ed., 4/3/	(15)
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Godfroy, Martine Ph.D. ( San Jose State University R	esearch Foundation)	
Grant/Contract No.:	Internal Project		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Extra-Vehicular Activity (EVA) and telerobotic operations. Surface EVAs and telerobotic operations will include complex missions such as construction and assembly, surface and geologic exploration, and excavation for protective shelter. Specific constraints limit human performance in the particular context of surface operations, leading to a perceptually impoverished environment, combined in some cases with communication delays. The visual field of view [FOV] is restricted, there is no auditory information from the external environment, and somato-sensory systems are negatively affected by distortion of the normal 3-D reference frame. Such limitations can seriously affect mission safety and complex missions such an extreme environment. The proposed research examines performance benefits resulting from virtual visual and auditory enhancements to the astronauts' controls and displays. Studies will be conducted where head-up projections, 2D visual map displays, and virtual spatial auditory cues are combined in a synergistic manner to improve orientation, reaction time, and localization. Our prior work at the NASA Ames Research Center (ARC) ARC-TH Advanced Controls and Displays Laboratory has already demonstrated performance advantages from using spatially congruent visual and auditory cues for situational awareness and navigation. This proposal will further develop this prior work for application to dual-task activities (e.g., navigation and monitoring of mission consumables such as battery power) more congruent with the high workload of anticipated EVA conditions.
Rationale for HRP Directed Research:	
<b>Research Impact/Earth Benefits:</b>	
Task Progress:	New project for FY2014. (Ed. note: added to Task Book when received period of performance information Feb. 2015)
Bibliography Type:	Description: (Last Updated: 03/24/2016)