Fiscal Year:	FY 2007	**Task Last Updated:**	FY 04/28/2009
PI Name:	Feary, Michael Ph.D.		
Project Title:	Automation Interface Design Development		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Space Human Factors Engineering		
Joint Agency Name:		**TechPort:**	Yes
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		
PI Email:	Michael.S.Feary@nasa.gov, erin.s.connell@nasa.gov	**Fax:**	FY
PI Organization Type:	NASA CENTER	**Phone:**	650.604.0203
Organization Name:	NASA Ames Research Center		
PI Address 1:	Mail Stop: 262-4		
PI Address 2:			
PI Web Page:			
City:	Moffett Field	**State:**	CA
Zip Code:	94035	**Congressional District:**	18
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	Directed Research
Start Date:	10/02/2006	**End Date:**	09/30/2010
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:	Woolford, Barbara	**Contact Phone:**	218-483-3701
Contact Email:	barbara.j.woolford@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Green, Collin (NASA Ames Research Center) Sherry, Lance (San Jose State University Foundation)		
Grant/Contract No.:			
Performance Goal No.:			
Performance Goal Text:			
	The next generation of space exploration systems will necessarily require increased autonomy of operations that will require an increased reliance on automation. These phenomena will place significantly increased burden on the remotely located human operators, on the training and maintenance of proficiency of these operators, and on the design and testing of the autonomously operated automation. Traditional techniques for the design and evaluation of automation interfaces rely on subject-matter-experts, human-in-the-loop testing (i.e. usability testing), guidelines, heuristics and rules-of-thumb. Given the volume and time-line for the development of new automation required for space exploration, the time and cost required to perform manual design reviews by human factor experts will be prohibitive. Further, guidelines, heuristics, and rule-of-thumb have previously yielded sub-optimum designs (as they are focused on the interface, not on the process of interaction		

Task Description:	between human and automation interface. State of the art cognitive science and Human-Automation Interaction (HAI) approaches may provide the type of analysis needed, but are not currently usable by designers without extensive cognitive science expertise. The automation design community needs methods that are usable by designers early in the design process to meet the demands for the development and testing of automation required for space exploration. The objective of this research project is to develop a set of methodologies and tools to automate the design and evaluation of the human-computer interaction process. The research plan is to integrate existing foundational research results into HAI methods and tools usable by designers. The research is divided into three efforts, with the ultimate goal of developing a suite of tools. • The first effort is to develop a method that enables rapid task decomposition and analysis. • The second effort is to develop a tool that enables rapid prototyping of both the user-interface and the underlying automation behavior. • The third effort is to develop an automated means of human performance analysis based on the results of the task decomposition and a description of the automation user-interface. Besides being usable by domain expert designers, the suite of tools must be tailored for the MOD, CEV, and other space exploration environments. The outcomes of this research will be methods and tools for the automation of the design and evaluation of the automation interfaces. These tools will provide the means to: (i) meet the demand for analysis required for space exploration development time-line, (ii) enable increased iterative human factors testing of automation prototypes early in the design process (ii) reduce the cost of development by design and testing of proposed systems early in the development life-cycle (iii) reduce the cost of training and the maintenance of proficiency (iv) improve safety (and reduce the costs of inefficiency and unsafe operations) through significant reduction in failure to complete task metrics.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2007. [Ed. note: added to Task Book in April 2009 when received task information]
Bibliography Type:	Description: (Last Updated: 07/22/2015)