Task Book Report Generated on: 03/28/2024

Project Title: Displays and Controls Interfaces  Division Name: Human Research  Program/Discipline: HUMAN RESEARCH  Program/Discipline: HUMAN RESEARCH  Program/Discipline: HUMAN RESEARCH  Program/Discipline: HUMAN RESEARCH Frogram Elements: USAFARCH—Space Human Factors Engineering Element/Subdictipline: Joint Agency Name: TechPort: No  Human Research Program Elements: (1) SHFH. Space Human Factors & Habitability (archival in 2017)  Human Research Program Ricks: (1) HISIA, Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture  Space Biology Space Biology Element: None  Space Biology Cross-Element None  Space Biology Special Category: None  PI Email: Aniko Sandor Idirans acov Fav: FY  PI Organization Type: NASA CENTER Phone: 281.483.9726  Organization Type: NASA CENTER Phone: 281.483.9726  Organization Name: Lockheed-Martin/NASA Johnson Space Center  PI Address 1: 2101 Nasa Purkway  PI Address 2: Mail Code: C46  PI Web Page:  City: Mossoon State: IX  Zip Code: Ongressional District IX  Zip Code: Ongressional District IX  Zip Code: Ongressional District IX  None Comments:  Project Type: GROUND Solicitation / Funding Priceted Research Source  Source Books On No. of PhD Degrees: O  No. of PhD Degrees: O  No. of PhD Candidates: O  No. of PhD Candidates: O  No. of PhD Candidates: O  No. of Master's Candidates: O  No. of Bachelor's Candidates: O  No. of Bachelor's Candidates: No Source III Notes III Not			
Project Title: Displays and Controls Interfaces    Human Research   Human Research   Human Discipline:   HUMAN RESEARCH	Fiscal Year:	FY 2011 Task Last Updated	: FY 06/14/2011
Division Name: Human Research Program/Discipline: IRUMAN RESEARCH   Program/Discipline-  Element/Subdiscipline:   HUMAN RESEARCH-Space Human Factors Engineering   Element/Subdiscipline:   HUMAN RESEARCH-Space Human Factors & TechPort: No	PI Name:	Sandor, Aniko Ph.D.	
Program/Discipline: HUMAN RESEARCH Program/Discipline- Lement/Subdiscipline- Lement/Subdiscipline- Lement/Subdiscipline- Lement/Subdiscipline- Joint Agency Name: Tech? No  Human Research Program Elements: (1) SHPH-Space Human Factors & Habitability (archival in 2017)  Human Research Program Elements: (1) HSIA-Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture  Space Biology Element: None  Space Biology Cross-Element: None  None  Space Biology Special Category: None  PL Email: Aniko Sandor-I@masa.gov: Fax: FY  PL Organization Type: NASA CENTER Phone: 281.483.9726  Organization Name: Lockheed-Martin/NASA Johnson Space Center  PL Address 1: 2101 Nasa Parksway  PL Address 2: Mail Code: C46  PL Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation Funding Source  Start Date: 0830/2010 Solicitation Funding Source  Start Date: 0830/2010 Solicitation Funding Source  No. of Pab Degress: 0  No. of Pab Candidates: 0 No. of Master' Degress: 0  No. of Pab Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: 0 No. of Master' Degress: 0  No. of Master's Candidates: No. of Master's Canter Phone: 218-483-3701  Derbara: websident in the Master Degress: 0 No. of Master's Candidates: No. of Mast	Project Title:	Displays and Controls Interfaces	
Frugaram/Discipline-  HUMAN RESEARCH-Space Human Factors Engineering	Division Name:	Human Research	
Element/Subdiscipline: PLANA'S RESEARCH - Space Human Pactors Engineering Joint Agency Name: TechPort: No Human Research Program Elements: (1) SHFH: Space Human Factors & Habitability (archival in 2017) Human Research Program Risks: (1) HSJA:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture  Space Biology Cross-Element Discipline: None  Space Biology Cross-Element Discipline: None  PI Email: Aniko Sandor-167 mos neov Fax: FY  PI Organization Type: NASA CENTER Aniko Sandor-167 mos neov PI Email: Aniko Sandor-167 mos neov PI Email: Aniko Sandor-167 mos neov PI Email: Phone: 281.483.9726  Organization Name: Lockheed-Martin/NASA Johnson Space Center PI Address 1: 2101 Nasa Parkway PI Address 2: Mail Code: C46 PI Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Directed Research No. of Post Docs: 0 Ro302010 End date: 09302013 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0 No. o	Program/Discipline:	HUMAN RESEARCH	
Human Research Program Elements: (1) SHF1L-Space Human Factors & Habitability (archival in 2017)  Human Research Program Risks: (1) HS1A:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture  Space Biology Cross-Element Discipline:  None  Space Biology Cross-Element Discipline:  Aniko Sandort-I@nasa.gov Fax: FY  Pl Organization Type:  NASA CENTER Phone: 281.483.9726  Organization Type:  NASA CENTER Phone: 281.483.9726  Organization Name:  Lockbeed-Martin/NASA Johnson Space Center  Pl Address 1:  2101 Nasa Purkway  Pl Address 2:  Mail Code: C46  Pl Web Page:  City:  Ilouston State: TX  Zip Code:  77058 Congressional District:  Zip Code:  Omnets:  Project Type:  GROUND Solicitation / Funding Source:  Start Date:  08:30/2010 End Date: 09:30/2013  No. of PhD Degrees:  0 No. of PhD Degrees:  No. of Master' Degre	Program/Discipline Element/Subdiscipline:	HUMAN RESEARCHSpace Human Factors Engineering	
Human Research Program Risks: (1) HSIA:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture  Space Biology Cross-Element Discipline: None  Space Biology Cross-Element Space Biology Special Category: None  PI Email: Aniko Sandor-Idmasa.gov Fax: FY  PI Organization Type: NASA CENTER Phone: 281.483.9726  Organization Type: NASA CENTER Phone: 281.483.9726  Organization Name: Lockheed-Martin/NASA Johnson Space Center  PI Address 1: 2101 Nasa Parkway  PI Address 2: Mail Code: C46  PI Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Source:  Start Date: 0830/2010 End Date: 09/30/2013  No. of Post Does: 0 No. of Bachelor's Degrees: 0  No. of PhD Candidates: 0 No. of Master' Degrees: 0  No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: North Surrer  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center )  Boyer, Jennifer L. (Lockheed-Martin/NASA Johnson Space Center )	Joint Agency Name:	TechPort:	No
Space Biology Element: None Space Biology Cross-Element Discipline: None Space Biology Special Category: None PI Email: Aniko Sandor-I/Ginasa egoy Fax: FY PI Organization Type: NASA CENTER Phone: 281.483.9726 Organization Type: NASA CENTER Phone: 281.483.9726 Organization Name: Lockheed-Martin/NASA Johnson Space Center PI Address 1: 2101 Nasa Parkway PI Address 2: Mail Code: C46 PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: GROUND Solicitation / Funding Source: Project Type: GROUND Solicitation / Funding Source: Project Type: Office	<b>Human Research Program Elements:</b>	(1) SHFH:Space Human Factors & Habitability (archival in 2017)	
Space Biology Cross-Element Discipline:  None  PI Email: Aniko Sandor-I@nasa.gov Fax: FY  PI Organization Type: NASA CENTER Phone: 281.483.9726  Organization Name: Lockheed-Martin/NASA Johnson Space Center  PI Address 1: 2101 Nasa Parkway  PI Address 2: Mail Code: C46  PI Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Source: Description of Part Docs: 0830/2010 End Docs: 0930/2013  No. of Post Docs: 0 No. of Phot Degrees: 0  No. of Pandidates: 0 No. of Master' Degrees: 0  No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC  Contact Monitor: Woolford, Barbara gov  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed-Martin/NASA Johnson Space Center)  Fornauce Goal No.:	Human Research Program Risks:	(1) <b>HSIA</b> :Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Are	chitecture
Discipline: To None Space Biology Special Category: None PI Email: Aniko.Sandor-I@masa.gov Fax: FY PO Organization Type: NASA CENTÉR Phone: 281.483.9726 Organization Name: Lockheed-Martin/NASA Johnson Space Center PI Address 1: 2101 Nasa Parkway PI Address 2: Mail Code: C46 PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: GROUND Solicitation / Funding Source: Directed Research Start Date: 08/30/2010 End Date: 09/30/2013 No. of Post Does: 0 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of PhD Degrees: 0 No. of PhD Candidates: 0 No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Candidates: 0 No. of Bachelor's Candidates: 0 Contact Monitor: No. of Master's Candidates: No. of Master's Candidates: No. of Bachelor's Candidates: No. of Master's Can	Space Biology Element:	None	
PI Email: Aniko Sandor-1@nasa.gov Fax: FY  PI Organization Type: NASA CENTER Phone: 281.483.9726  Organization Name: Lockheed-Martin/NASA Johnson Space Center  PI Address 1: 2101 Nasa Parkway  PI Address 2: Mail Code: C46  PI Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Source: Directed Research Source: Directed Research Source: One of PhD Candidates: O No. of PhD Degrees: O No. of Master' Degrees: O No. of Bachelor's Degrees: O No. of Bachelor's Degrees: O No. of Bachelor's Candidates: O No. of Bachelor's Degrees: O No. of Bachelor's Candidates: O No. of Bachelor's Degrees: O N	Space Biology Cross-Element Discipline:	None	
Pl Organization Type: NASA CENTER Phone: 281.483.9726 Organization Name: Lockheed-Martin/NASA Johnson Space Center  Pl Address I: 2101 Nasa Parkway  Pl Address 2: Mail Code: C46  Pl Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Sourceet Research  Start Date: 08/30/2010 End Date: 09/30/2013 No. of Post Docs: 0 No. of Master' Degrees: 0 No. of PbD Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Master' Degrees: 0 No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0 No. of Bachelor's Candidates: 0 No. of Monitoring Center: NASA JSC  Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara i woolford@masa.aov  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center)  Grant/Contract No.: Directed Research  Performance Goal No.:	Space Biology Special Category:	None	
Organization Name:         Lockheed-Martin/NASA Johnson Space Center           PI Address 1:         2101 Nasa Parkway           PI Address 2:         Mail Code: C46           PI Web Page:         City:         Houston         State: TX           Zip Code:         77058         Congressional District: 22           Comments:         Project Type:         GROUND         Solicitation/Funding Source: Directed Research           Start Date:         08/30/2010         End Date: 09/30/2013         09/30/2013           No. of Post Docs:         0         No. of PhD Degrees: 0         0           No. of Master's Candidates:         0         No. of Master' Degrees: 0         0           No. of Bachelor's Candidates:         0         No. of Bachelor's Degrees: 0         0           No. of Bachelor's Candidates:         0         No. of Bachelor's Degrees: 0         0           Contact Monitor:         Woolford, Barbara in woolford@masa.gov         Vonated Phone: 218-483-3701         218-483-3701           Contact Email:         barbara in woolford@masa.gov         No. of Bachelor's Center Phone: 218-483-3701         (Ed., 1/5/2012)           Key Personnel Changes/Previous PI:         COI Name (Institution):         Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)	PI Email:	Aniko.Sandor-1@nasa.gov Fax	: FY
PI Address 1: 2101 Nasa Parkway  PI Address 2: Mail Code: C46  PI Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Source: Directed Research Start Date: 08/30/2010 End Date: 09/30/2013  No. of Post Does: 0 No. of PhD Degrees: 0  No. of PhD Candidates: 0 No. of Master' Degrees: 0  No. of Master's Candidates: 0 No. of Master' Degrees: 0  No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC  Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara i.woolford@nasa.gov  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center ) Grant/Contract No.: Directed Research	PI Organization Type:	NASA CENTER Phone	: 281.483.9726
PI Address 2: Mail Code: C46  PI Web Page:  City: Houston State: TX  Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Source: Directed Research Start Date: 08/30/2010 End Date: 09/30/2013  No. of Post Does: 0 No. of PhD Degrees: 0  No. of PhD Candidates: 0 No. of Master' Degrees: 0  No. of Master's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC  Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara_i.woolford@nasa.gov  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center ) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center )	Organization Name:	Lockheed-Martin/NASA Johnson Space Center	
Pl Web Page:   City:   Houston   State: TX	PI Address 1:	2101 Nasa Parkway	
City:         Houston         State:         TX           Zip Code:         77058         Congressional District:         22           Comments:         Project Type:         GROUND         Solicitation / Funding Source:         Directed Research           Start Date:         08/30/2010         End Date:         09/30/2013           No. of Post Docs:         0         No. of PhD Degrees:         0           No. of PhD Candidates:         0         No. of Master' Degrees:         0           No. of Bachelor's Candidates:         0         Monitoring Center:         NASA JSC           Contact Monitor:         Woolford, Barbara         Contact Phone:         218-483-3701           Contact Email:         barbara.i woolford@nasa.gov         218-483-3701           Flight Program:         Flight Assignment:         NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)           Key Personnel Changes/Previous P1:         COI Name (Institution):         Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)           Grant/Contract No.:         Directed Research	PI Address 2:	Mail Code: C46	
Zip Code: 77058 Congressional District: 22  Comments:  Project Type: GROUND Solicitation / Funding Source: Directed Research  Start Date: 08/30/2010 End Date: 09/30/2013  No. of Post Docs: 0 No. of PhD Degrees: 0  No. of Post Docs: 0 No. of Master' Degrees: 0  No. of Master's Candidates: 0 No. of Master' Degrees: 0  No. of Bachelor's Candidates: 0 Monitoring Center: NASA JSC  Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara_i.woolford@nasa.gov  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center )  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center )  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center )  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center )	PI Web Page:		
Comments:  Project Type:  GROUND  GROUND  Solicitation / Funding Source:  Start Date:  08/30/2010  End Date:  09/30/2013  No. of Post Docs:  0  No. of PhD Candidates:  0  No. of PhD Candidates:  0  No. of Master' Degrees:  0  No. of Master's Candidates:  0  No. of Bachelor's Degrees:  0  No. of Bachelor's Candidates:  0  No. of Bachelor's Candidates:  0  No. of Bachelor's Center:  No. of Bachelor's Degrees:  0  No. of Master' Degrees:  0  No.	City:	Houston State	: TX
Project Type:  GROUND  Solicitation / Funding Source: Start Date:  08/30/2010  End Date: 09/30/2013  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: 0 No. of Bachelor's Degrees: 0  No. of Bachelor's Candidates: 0 Monitoring Center: No. of Bachelor's Candidates: 0 Monitoring Center: No. of Bachelor's Candidates: 0 Contact Monitor: Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara i woolford@nasa.gov  Flight Program: Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/NASA Johnson Space Center) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.: Directed Research	Zip Code:	77058 Congressional District	: 22
Start Date: 08/30/2010 End Date: 09/30/2013  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: 0 No. of Bachelor's Degrees: 0  No. of Master's Candidates: 0 Monitoring Center: NASA JSC  Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara.i.woolford@nasa.gov  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Grant/Contract No.: Directed Research  Performance Goal No.:	Comments:		
No. of Post Docs:  0	Project Type:	GROUND Solicitation / Funding Source	Directed Research
No. of PhD Candidates:  0	Start Date:	08/30/2010 End Date	: 09/30/2013
No. of Master's Candidates:  0	No. of Post Docs:	0 No. of PhD Degrees	: 0
No. of Bachelor's Candidates:  O  Monitoring Center: NASA JSC  Contact Monitor:  Woolford, Barbara  Contact Phone: 218-483-3701  Contact Email:  barbara.j.woolford@nasa.gov  Flight Program:  Flight Assignment:  NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution):  Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.:  Directed Research  Performance Goal No.:	No. of PhD Candidates:	0 No. of Master' Degrees	: 0
Contact Monitor: Woolford, Barbara Contact Phone: 218-483-3701  Contact Email: barbara.j.woolford@nasa.gov  Flight Program:  NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.: Directed Research  Performance Goal No.:	No. of Master's Candidates:	0 No. of Bachelor's Degrees	: 0
Contact Email: barbara.j.woolford@nasa.gov  Flight Program:  Flight Assignment: NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution): Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.: Directed Research  Performance Goal No.:	No. of Bachelor's Candidates:	0 Monitoring Center	: NASA JSC
Flight Program:  Flight Assignment:  NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution):  Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.:  Directed Research  Performance Goal No.:	Contact Monitor:	Woolford, Barbara Contact Phone	: 218-483-3701
Flight Assignment:  NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11/2011 (Ed., 1/5/2012)  Key Personnel Changes/Previous PI:  COI Name (Institution):  Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.:  Directed Research  Performance Goal No.:	Contact Email:	barbara.j.woolford@nasa.gov	
Key Personnel Changes/Previous PI:  COI Name (Institution):  Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center)  Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.:  Directed Research  Performance Goal No.:	Flight Program:		
COI Name (Institution):  Archer, Ronald (Lockheed-Martin/ NASA Johnson Space Center) Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.:  Directed Research  Performance Goal No.:	Flight Assignment:	NOTE: End date changed to 9/30/2013 per HRP Master Task List information dtd 11/11	/2011 (Ed., 1/5/2012)
Boyer, Jennifer L. (Lockheed Martin/NASA Johnson Space Center)  Grant/Contract No.:  Directed Research  Performance Goal No.:	Key Personnel Changes/Previous PI:		
Performance Goal No.:	COI Name (Institution):		
	Grant/Contract No.:	Directed Research	
Performance Goal Text:	Performance Goal No.:		
	Performance Goal Text:		

Task Book Report Generated on: 03/28/2024

Future exploration missions will require much greater crew autonomy, particularly for suited operations. Crews will be extremely dependent on the information available within the spacesuit for monitoring their health and suit resources, and for performing tasks. Suit data such as battery power, oxygen remaining, crew biomedical data, procedure and task information, and navigational data are all needed by EVA crewmembers to successfully complete their mission. If informational displays are poorly designed, or not easily accessible, crews will not have access to critical data, putting their mission and personal safety at risk. Suits pose special challenges in terms of information display and interaction, given limited display real estate, and gloves and helmets compromise vision, hearing, and touch. The methods by which information is delivered need to support, not hinder, task completion. Current EVA crewmembers depend heavily on communication with the ground for completion of their tasks. Future missions to more distant destinations will require a much different approach to ensure crew independence.

This line of research will focus on: 1) special techniques for formatting data delivered in a spacesuit, and 2) mechanisms for delivering and interacting with that data, given suit constraints. Researchers will first identify the different classes of information needed by the suited crewmember, then determine the modality and format of the data required for each class, and finally investigate the best technology solution to provide the data. Researchers will work with EVA Physiology, Systems and Performance (EPSP) researchers and developers using the metabolic data display issue as a case study. Various information designs and technology solutions will be empirically compared and requirements developed.

Methods to be used consist of the following: Task analysis, to identify and understand the suited tasks to be performed, including interviews with EVA astronauts to understand suited information needs and issues from the astronauts perspective; literature reviews on different information display techniques for different classes of data (e.g., procedures, alarms, metabolic data) and available technologies (e.g., Head Mounted Displays (HMDs), cuff checklists, voice); and usability testing and experimental studies to assess human performance with the proposed designs using metrics such as error rates, task completion times, verbal protocol comments, and questionnaire responses, ratings, and rankings. Standard parametric and non-parametric statistical methods will be used for data analysis. Multiple methods, metrics, and information developed as part of the Information Presentation (2008-2010) DRP will be leveraged in this project, including information on labels, alarms, cursor control devices, HMDs, and health and status displays. Products developed as part of the Usability (2008-2009) Directed Research Project will be validated as part of this new DRP, including methods and metrics for error rates, legibility, and consistency.

This research is directed because it contains highly constrained research, which requires focused and constrained data Rationale for HRP Directed Research: gathering and analysis that is more appropriately obtained through a non-competitive proposal.

Research Impact/Earth Benefits:

**Task Description:** 

Suit data are displayed on specific EVA informational displays. Suits pose special challenges in terms of information display and interaction, given limited display real estate. Furthermore, gloves and helmets compromise vision, hearing, and touch. The methods by which information is delivered need to support task completion. If informational displays are poorly designed, or not easily accessible, crews will not have access to critical data, putting their mission and personal safety at risk. Current EVA crewmembers also depend heavily on communication with the ground for completion of their tasks that adds to the complexity of interfaces. Future missions to more distant destinations will require an approach that makes information presentation to EVA crews more efficient to ensure crew independence. A literature review was conducted on EVA display and control module and related studies on head-mounted displays, voice input and cuff displays used with EVA. Most studies reviewed were conducted by NASA JSC and NASA GRC. A second activity was conducting a series of meetings with EVA stakeholders on EVA consumable data needs. The purpose of this report was to summarize the data gathered on EVA consumable data information. This was the first step toward deciding 1) what data should be displayed for crew during and EVA, 2) what is the most critical data that need to be accessed at a glance, 3) in what format should the data be displayed. The results show that generally, a procedural quick look check of all critical consumable data would be important: at the beginning of an EVA, and more frequently toward the end of the EVA. The data should be presented in the same order and same format as much as possible for consistency. Color coding, icons, and graphs are good options if they are easy to interpret. Self-check reminders are good if they are customizable for frequency. Caution and warning messages should be associated with critical values and troubleshooting information should be made available along with the C&W message. The other crewmember's (buddy's) data should be available in the same format as own data, but is needed only in contingency situations. In case of teams of two or more the data can be checked when one checks their own data. When viewed, own data and buddy data could be presented side-by-side for easy comparison with clear indication of own and buddy data. These results will be used to design an software prototype display for EVA consumables.

Task Progress:

In a third study we evaluated a legibility method developed under the Usability Directed Research Project in FY10. The main objective of the evaluation was the use of an HMD while completing a procedure suited. The legibility part was very similar to the software method developed in FY10: the target items on the HMD screen were presented with rapid serial visual presentation for 1s and the participant task was to verbally identify the item. The results show that the method can be used in suited conditions and accuracy can be calculated as specified in the Human Systems Integration Requirements verification.

A fourth study evaluated a modified legibility methodology in conditions when software cannot be used during a hardware evaluation. This objective was conducted as part of a larger suited evaluation in the Human Engineering Structural Mockup. The legibility method was a timed readability approach with time and accuracy recorded.

A brief review of voice recognition software was also conducted with the purpose of using it for voice commanding during EVA operations. The review focused on general background information to understand advantages and disadvantages of voice recognition software. Furthermore, previous NASA studies using voice recognition software for EVA purposes were also reviewed.

**Bibliography Type:** 

Description: (Last Updated: 03/03/2016)