Task Book Report Generated on: 07/05/2025

Project Title: Quantification of In-flight Physical Changes - Anthropometry and Neutral Body Posture (NIP) Division Name: Illuman Research Program/Divisipline: HUMAN RESEARCH Program/Divispline: HUMAN RESEARCH Program/Divispline: BUMAN RESEARCH—Space Human Factors Engineering International Agency Name: TechPurt: No (I) HEBP Human Factors & Behavioral Performance (RP Rev H) (I) Dynamic Loads Risks of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads (I) HUMAN RESEARCH—Space Human Systems Integration Architecture None Human Research Program Risks: Of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads (I) ISJA Risk of Adverse Outcomes Due to Inadequare Human Systems Integration Architecture None Pl Lemail: None None Pl Lemail: None None Pl Corganization Type: NASA CPATRIC Phone: 281-483-1847 Pl Organization Name: NASA Foliason Space Center Pl Address 1: Code 813 Pl Address 2: 2101 NASA Plevy Pl Web Page: City: Houston State: TX Zip Code: 70058 Congressional District: 22 Comments: Project Type: Flight Selicitation / Funding Directed Research No. of Pad Dendidates: No. of Master' Degrees: No. of Pad Candidates: No. of Research Selavioral Performance, previously Space Human Factors & Habitability (Ed., 17817) NOTE: Element change to Human Factors & Behavioral Performance, previously Space Human Factors & Habitability (Ed., 17817) NOTE: Element change to Human Factors & Behavioral Perfor					
Project Title: Quantification of In-flight Physical Changes - Authrosponetry and Neutral Body Posture (NBP) Division Name: Iluman Research Program/Discipline: IIUMAN RESEARCH Program Elements IIUMAN RESEARCH Program Elements IIUMAN RESEARCH IIUMAN RESEARCH Program Elements IIUMAN RESEARCH II	Fiscal Year:		ast Updated:	FY 06/21/2016	
Human Research Program/Discipline: HUMAN RESEARCH Program/Discipline: HUMAN RESEARCH Program/Discipline: HUMAN RESEARCH Program/Discipline: HUMAN RESEARCH-Space Human Factors Engineering Human Research Program Elements: (1) HFBP-Human Factors & Behavioral Performance (IRP Rev H) (1) HFBP-Human Factors & Behavioral Performance (IRP Rev H) (1) HFBP-Human Factors & Behavioral Performance Decrements and Long-term Health Effects due to Dynamic Londs, Risk of Law-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Londs, Risk of Adverse Outcomes Due to Inadequate Human Systems lantegration Architecture Space Biology Element: None Space Biology Special Category: None PI Email: Space Biology Special Category: None PI Email: Space Biology Special Category: None PI Comparization Type: NASA Johnson Space Center PP Address 2: PP Address 3: PP Address 3: PP Address 3: PP Address 3: PP Address 4: PP Web Page: City: Houston State: Type Content Find Discrete Research Source: No of Post Dues: No of Pos	PI Name:	Rajulu, Sudhakar Ph.D.			
Program/Discipline: HUMAN RESEARCH Program/Discipline: HUMAN RESEARCH—Space Human Factors Engineering Bluman Research Program Elements: (1) HEBP-Human Factors & Behavioral Performance (IRP Rev H) Human Research Program Risles: (1) HEBP-Human Factors & Behavioral Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Risk of Industry and Performance Decrements and Long-term Health Effects due to Dynamic Loads, Ri	Project Title:	Quantification of In-flight Physical Changes - Anthropometry and Neutral Body Posture (NBP)			
Program/Discipline- Clement/Subdiscipline- Cl	Division Name:	Human Research			
Richment Number Richment N	Program/Discipline:	HUMAN RESEARCH			
Human Research Program Elements (1) HFBP-Human Factors & Behavioral Performance (IRP Rev H) Human Research Program Risks: (1) Opannic Londe-Risk of fa-Mission Injury and Performance Decrements and Long-term Health Effects due to Opannic Londe (2) HISTA-Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture Space Biology Element: None Space Biology Element: None Ple Corporation Name: None Ple Mail: Ple Mail: Ple Corganization Type: NASA CENTER NASA CENTER NASA CENTER NASA JOHNSON Space Center Pl Address 1: Code \$17 Pl Address 2: 2101 NASA Pkey Pl Web Page: City: Houston State: TX Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source No. of Past Decrements No. of Post Decrements: No. of Post Decrements: No. of Post Decrements: No. of Post Decrements: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Degrees: No. of Master' Candidates: No. of Bachelor's Degrees: No. of Bachelor's Degrees: No. of Bachelor's Degrees: No. of Master' Candidates: No. of Bachelor's Degrees: No. of Master' Candidates: No. of Bachelor's Degrees: No. of Halp Program: ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Space Human Factors & No. of Post Degrees: No. of Master Degrees: No. of Revenue Changes/Previous Plice Space (Lockboed Marin) Deric	Program/Discipline Element/Subdiscipline:	HUMAN RESEARCHSpace Human Factors Engineering			
Human Research Program Risks: Clip Mark Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dayamic Loads (2) HSIA, Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) HSIA, Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) HSIA, Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) HSIA, Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) HSIA, Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) HSIA, Risk of In-Mission Page (4) HSIA, Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dayan Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dayan Risk of In-Mission Injury and Performance Decrements and Long-term Health Effects due to Dayan Risk Institute Page (4) HSIA Risk Injury (Joint Agency Name:	TechPort:		No	
Human Research Program Risks: Dynamic Loads Cyl IISIA:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture	Human Research Program Elements:	(1) HFBP:Human Factors & Behavioral Performance (IRP Rev H)			
Space Biology Cross-Element Discipline: Space Biology Cross-Element Discipline: Space Biology Special Category: None PI Email: sudhakar njulu-160nasa gov. Fax: FY 281-483-1847 PI Organization Type: NASA CENTER NASA Johnson Space Centur PI Address 1: Code SF3 PI Address 2: 2101 NASA Pkwy PI Web Page: City: Houston Type: Type: Flight Solicitation / Funding Surrected Research Sources: Project Type: Flight Solicitation / Funding Sources: No. of Post Does: No. of Post Does: No. of PhD Candidates: No. of PhD Candidates: No. of Master's Candidates: No. of Master's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Master's Deservers No. of Master's Deservers No. of Master's Candidates: No. of Master's Deservers No. of Master's Deservers No. of Master's De	Human Research Program Risks:	Dynamic Loads			
Space Biology Special Category: None Space Biology Special Category: None Permail: sudhkar.miub. Grassa.gov Fax: FY 281-483-1847 Pl Corganization Type: NASA Johnson Space Center	Space Biology Element:	None			
PI Email: sudhakar nijulu-1/@nasa.cov PI Organization Type: NASA CENTER Phone: 281-483-1847 PI Organization Type: NASA CENTER Phone: 281-483-3725 Organization Name: NASA Johnson Space Center PI Address 1: Code SF3 PI Address 2: 2101 NASA Pkwy PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: Start Date: 08/31/2012 End Date: 09/30/2018 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 No. of Bachelor's	Space Biology Cross-Element Discipline:	None			
Pl Organization Type: NASA CENTER Phone: 281-483-3725 Organization Name: NASA Johnson Space Center Pl Address 1: Code SF3 Pl Address 2: 2101 NASA Pkwy Pl Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: 09/30/2018 Start Date: 08/31/2012 End Date: 09/30/2018 No. of Post Does: No. of Master' Degrees: No. of Bachelor's Degrees: No. of Bachelor's Pegrees: No. of Bachelor's Pegrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Master' Degrees: No. of Bachelor's Candidates: No. of Master's Can	Space Biology Special Category:	None			
Organization Name: NASA Johnson Space Center PI Address 1: Code SF3 PI Address 2: 2101 NASA Pkwy PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: Project Type: Slight Source: No. of Post Docs: No. of Post Docs: No. of Post Docs: No. of PhD Dagrees: No. of PhD Dagrees: No. of PhD Dagrees: No. of PhD Dagrees: No. of PhD Candidates: No. of Master' Degrees: No. of Master' Degrees: No. of Master's Degrees: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Master's Degrees: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Master's	PI Email:	sudhakar.rajulu-1@nasa.gov	Fax:	FY 281-483-1847	
PI Address 1: Code SF3 PI Address 2: 2101 NASA Pkwy PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: Directed Research Start Date: 08/31/2012 End Date: 09/30/2018 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: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Master's Degrees: No. of Bachelor's Candidates: No.	PI Organization Type:	NASA CENTER	Phone:	281-483-3725	
PI Address 2: 2101 NASA Pkwy PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: Project Type: Start Date: 08/31/2012 End Date: 09/30/2018 No. of Post Docs: No. of PhD Degrees: No. of PhD Degrees: No. of PhD Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master' Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Master' Degrees: No. of Bachelor's Candidates: No. of Bac	Organization Name:	NASA Johnson Space Center			
PI Web Page: City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: 08/31/2012 End Date: 09/30/2018 No. of Post Does: No. of PhD Degrees: No. of PhD Degrees: No. of PhD Candidates: No. of PhD Candidates: No. of Bachelor's Degrees: No. of Master' Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of PhD Degrees: No. of Bachelor's Degrees:	PI Address 1:	Code SF3			
City: Houston State: TX Zip Code: 77058 Congressional District: 22 Comments: Project Type: Flight Solicitation / Funding Source: Directed Research Source: No. of PhD Leading Source: No. of PhD Degrees: No. of PhD Degrees: No. of PhD Degrees: No. of PhD Candidates: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Contact Monitor: NASA JSC Contact Monitor: Williams, Thomas Contact Phone: 281-483-8773 Contact Email: thomas_i.will!@nasa.gov Flight Program: ISS ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. COI Name (Institution): Voung, Karen (Lockheed Martin) Dirich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Directed Research	PI Address 2:	2101 NASA Pkwy			
Comments: Project Type: Flight Solicitation / Funding Source: Directed Research Start Date: 08/31/2012 End Date: 09/30/2018 No. of Pbot Doces: No. of PhD Degrees: No. of PhD Degrees: No. of Master's Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Degre	PI Web Page:				
Comments: Project Type: Flight Solicitation / Funding Source: Project Type: Flight Solicitation / Funding Source: Project Type: Source: Sourc	City:	Houston	State:	TX	
Project Type: Flight Solicitation / Funding Source: Source: 08/31/2012 End Date: 09/30/2018 No. of Post Does: No. of PhD Degrees: No. of PhD Degrees: No. of Master' Degrees: No. of Master's Candidates: No. of Master's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's	Zip Code:	77058 Congression	onal District:	22	
Start Date: 08/31/2012 End Date: 09/30/2018 No. of Post Docs: No. of PhD Degrees: No. of PhD Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: Monitoring Center: NASA JSC Contact Monitor: Williams, Thomas Contact Phone: 281-483-8773 Contact Email: homas, i.willi@nasa.gov Flight Program: ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. COI Name (Institution): Voung, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Directed Research Performance Goal No.:	Comments:				
No. of PhD Degrees: No. of PhD Candidates: No. of Master' Degrees: No. of Master's Candidates: No. of Master's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Master' Degrees: No. of Ma	Project Type:	Flight Solicitation	on / Funding Source:	Directed Research	
No. of PhD Candidates: No. of Master's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Degrees: No. of Becreation of No.s. No. of Bachelor's Degrees: No. of Becreation of No.s. No.	Start Date:	08/31/2012	End Date:	09/30/2018	
No. of Master's Candidates: No. of Bachelor's Degrees: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Candidates: No. of Bachelor's Degrees: NASA JSC Contact Monitor: Williams, Thomas Contact Phone: 281-483-8773 Contact Email: thomas_i,will1@nasa.gov Flight Program: ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	No. of Post Docs:	No. of F	hD Degrees:		
No. of Bachelor's Candidates: No. of Bachelor's Candidates: Williams, Thomas Contact Monitoring Center: Williams, Thomas Contact Phone: 281-483-8773 Contact Email: thomas_i.will1@nasa.gov ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	No. of PhD Candidates:	No. of Master' Degrees:			
Contact Monitor: Williams, Thomas Contact Phone: 281-483-8773 Contact Email: thomas.j.will1@nasa.gov Flight Program: ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	No. of Master's Candidates:	No. of Bachele	or's Degrees:		
Contact Email: thomas.j.will1@nasa.gov Flight Program: ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	No. of Bachelor's Candidates:	Monito	oring Center:	NASA JSC	
ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	Contact Monitor:	Williams, Thomas Co	ntact Phone:	281-483-8773	
ISS NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	Contact Email:	thomas.j.will1@nasa.gov			
NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17) NOTE: Extended to 9/30/2018 per E. Connell/HRP (Ed., 7/20/15) Key Personnel Changes/Previous PI: July 2015: Added Ryan Amick as Co-Investigator. Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	Flight Program:	ISS			
Young, Karen (Lockheed Martin) Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	Flight Assignment:	NOTE: Element change to Human Factors & Behavioral Performance; previously Space Human Factors & Habitability (Ed., 1/18/17)			
COI Name (Institution): Dirlich, Tom (Technical University Munich (TUM)) Amick, Ryan Ph.D. (Lockheed Martin) Grant/Contract No.: Directed Research Performance Goal No.:	Key Personnel Changes/Previous PI:	July 2015: Added Ryan Amick as Co-Investigator.			
Performance Goal No.:	COI Name (Institution):	Dirlich, Tom (Technical University Munich (TUM))			
	Grant/Contract No.:	Directed Research			
Performance Goal Text:	Performance Goal No.:				
	Performance Goal Text:				

Task Book Report Generated on: 07/05/2025

> NASA suit engineers and the Extra-Vehicular Activity (EVA) Projects Office have identified that suit fit in microgravity could become an increasing issue. It has also been noted that crewmembers often need to adjust their suit sizing once they are in orbit. This adjustment could be due to microgravity effects on anthropometry and postural changes, and is necessary to ensure optimal crew performance, fit, and comfort in space. To date, the only data collected in space to determine the effects of microgravity on physical human changes have been during Skylab, STS-57, and a recent Human Research Program (HRP) study on seated height changes due to spinal elongation, Spinal Elongation (Master Task List [MTL] 221, Principal Investigator Rajulu-- https://), (Young, 2011). Skylab and the STS-57 studies found that there is a distinct neutral body posture (NBP) based on photographs. Additionally, Skylab studies found that crewmembers could experience a stature growth of up to 3 percent. The Spinal Elongation study identified that the crewmembers could experience about a 6 percent growth in seated height and a 3 percent stature growth, when exposed to microgravity. The results thus prove that not all anthropometric measurements have the same microgravity percent growth factor. In order for EVA and the suit engineers to properly update the sizing protocol for microgravity, they need additional anthropometric data from space. Hence, this study was picked up by the International Space Station (ISS) as Test bed for Analog Research (ISTAR) Program and was sponsored and funded by EVA to gather additional in-flight anthropometric measurements, such as lengths, depths, breadths, and circumferences to determine the changes to body shape and size due to microgravity effects.

Task Description:

It is anticipated that by recording the potential changes to body shape and size, a better suit sizing protocol will be developed for ISS and other space missions. In essence, this study will help NASA quantify the impacts of microgravity on anthropometry to ensure optimal crew performance, fit, and comfort. Additional in-flight physical changes due to neutral body postures (NBP) and the effects of spaceflight on NBP during extended exposure to microgravity also need to be quantified. This study will use simplistic data collection techniques, digital still and video data, to perform photogrammetric analyses to determine the changes that occur to the body shape, size, and NBP while exposed to a microgravity environment.

The aim of the study is to collect data from a minimum of three subjects per year over a four year time frame leading to a possible 9 subjects total. Data would be collected over multiple six month increments starting with increment 39/40 in November 2013. A minimum of three data collection sessions is required with an initial in-flight data collection session at approximately FD15.

Anthropometric measurements will be collected from crew participants during one pre-flight BDC (baseline data collection), three in-flight data collection points (early, mid, and late at minimum), and one post-flight BDC session. In-flight data collection will include photo and video based measurements for body lengths and postures, as well as tape measure measurements for body segment circumferences. Ground based BDC data collection sessions will be performed in the US Lab mockup and in the Anthropometry and Biomechanics Facility at Johnson Space Center (JSC).

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 Progress:

Inflight data collection began October 2013 with Expedition 37/38 and has continued during Expeditions 38/39, 39/40, 40/41, 42/43, 44/45. The study will continue till an N=9 has completed the study; to-date seven subjects have completed the study, and two are currently performing pre-flight training and data collection sessions. During FY2016 several inflight data collections sessions have occurred along with training and pre-flight data collection sessions to instruct the crew on the procedures and to obtain their baseline measurements before flight (both as Prime crew and Backup crew).

Bibliography Type:

Description: (Last Updated: 03/25/2020)