Task Book Report Generated on: 04/26/2024

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Project Title: IntraVenous Fluid GENeration for Exploration Missions (IVGEN)  Program/Discipline: IRUMAN RESEARCH  Program/Discipline: IRUMAN RESEARCH  Program/Discipline: IRUMAN RESEARCH—Operational and clinical research  Flement/Sholdrighine: IRUMAN RESEARCH—Operational and clinical research  Flaman Research Program Elements: IRUMAN RESEARCH—Operational and clinical research  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  None  Human Research Program Risks: IRUMAN RESEARCH—Operation Medical Capabilities  None  IRU	Fiscal Year:	FY 2011	Task Last Updated:	FY 10/11/2011
Program/Discipline:   IUMAN RESEARCH	PI Name:	McQuillen, John		
Program/Discipline:         HUMAN RESEARCH           Program/Discipline:         HUMAN RESEARCH—Operational and clinical research           Illuman Research Program Elements         (I) EAMC Exploration Medical Capabilities           Illuman Research Program Risks:         (I) EAMC Exploration Medical Capabilities           Illuman Research Program Risks:         (I) Medical Conditions, Risk of Adverse Health Outcomes Due to Mission Exposures           Space Biology Cross-Flement         None           Space Biology Special Category:         None           Pl Email:         John BMcQuillen@nssa.gov         Fax: FY 216-433-8050           Pl Organization Type:         NASA CENTER         Phone: 216-433-2876           Pl Address 2:         7-5         Proper Type: 216-433-2876           Clty:         Cleveland         State: Pl Address 2:         Pl Organization Name: Pl Description State:	Project Title:	IntraVenous Fluid GENeration for Exploration Missions (	IVGEN)	
Project Notificial Program (Discipline-Elements)   HUMAN RESEARCH-Operation and clinical research   Program (Elements)   Yes	Division Name:	Human Research		
Element/Suddiscipline:  Joint Agency Name:  Joint Agency Name:  (I) ExtC:Exploration Medical Capabilities  Human Research Program Elements:  (I) ExtC:Exploration Medical Capabilities  Human Research Program Risks:  John Edical Conditions, Risk of Adverse Health Outcomes and Decrements in Performance Public Medical Conditions of Mission Exposures  Space Biology Cross-Element:  None  Space Biology Cross-Element:  None  Space Biology Cross-Element:  None  Ple Email:  John BM-Quillen@nasa.gov  Ple Email:  John BM-Quillen@nasa.gov  Ple Email:  John BM-Quillen@nasa.gov  Ple Address 1:  John SAS A Glenn Research Conter  Ple Medress 2:  Proganization Name:  NASA Glenn Research Conter  Ple Web Page:  Cive deand  John SAS A Glenn Research Conter  Ple Web Page:  Cive Sevenand Justice:  John Contents  Full Glen Sevenand Justice:  John Contents  John Contents  John Contents  John Content Sevenand Justice:  John Content Monitor:  J	Program/Discipline:	HUMAN RESEARCH		
Human Research Program Elements: (I) EMMC: Exploration Medical Capabilities  Human Research Program Risks: (I) Medical Conditions: Risk of Adverse Health Outcomes and Decrements in Performance Due to Medical Conditions Risk of Adverse Health Outcomes Due to Mission Exposures  Space Biology Cross-Element: None  Space Biology Cross-Element: None  Space Biology Special Category: None  PI Capanization Type: NASA CENTER Phone: 216-433-8050  PI Grganization Type: NASA Genn Research Center  PI Address 1: 21000 Brookpark Road  PI Address 2: 77.5  PI Web Page: City: Cleveland State: OII  Zip Code: 44135 Congressional District: 10  Comments:  Project Type: FLIGHT Solication / Funding Nonre: None Project Type: PLIGHT Solication / Funding Nonre: None Project Type: O401/2006 Red Date: (08/12011)  No. of Post Docs: 0 No. of PhD Candidates: 0 No. of Master' Degrees: 0 No. of Master' Degrees: 0 No. of Master' Degrees: 0 No. of Master' Candidates: 0 No. of Master' Degrees: 0 No. of Master' Candidates: 0 No. of Master' Degrees: 0 No. of Master' Candidates: 0 No. of Master' Degrees: 0 No. of Master' Candidates: 0 No. of Master' Degrees: 0 No. of Master' Candidates: No. of Master' Scandidates: 0 No. of Master' Degrees: 0 No. of Master' Candidates: No. of Master' Scandidates: No. of Master' Scandidates: No. of Master' Scandidates: No. of Master' Degrees: 0 No. of Master' Candidates: No. of Master' Scandidates: No. of Master' Degrees: No. of Ma		HUMAN RESEARCHOperational and clinical research		
Human Research Program Risks:  \$   None	Joint Agency Name:		TechPort:	Yes
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Space Biology Cross-Element Discipline:         None           Space Biology Special Category:         None           PI Email:         John B McOuillen@nass.gov         Fax: FY 216-433-8050           PI Organization Type:         NASA CENTER         Phone: 216-433-2876           Organization Name:         NASA Glenn Research Center           PI Address 1:         21000 Brookpark Road         Fax: FY 216-433-2876           PI Address 2:         77-5         FURTHER STATE ST	Human Research Program Risks:			e Due to Medical Conditions
Discipline:   None   None   Space Biology Special Category:   No.6	Space Biology Element:	None		
PI Email:         John B.McQuillen@nasa.gov         Fax:         FY 216-433-8050           PI Organization Type:         NASA CENTER         Phone:         216-433-2876           Organization Name:         NASA Glenn Research Center           PI Address 1:         21000 Brookpank Road           PI Address 2:         77-5           PI Web Page:         Civeland         State:         OH           Zip Code:         44135         Congressional District:         10           Comments:         Project Type:         FLIGHT         Solicitation / Funding Source:         Directed Research           Start Date:         04/01/2006         End Date:         08/31/2011           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:         Watkins, Sharmila         Contact Phone:         281.483.0395           Contact Email:         sharmila.watkins@nasa.gov         Flight Program:         Shuttle/ISS           Flight Program:         Shuttle/ISS         Shuttle/ISS           Flight Assignment:         ISS: STS-131		None		
Pl Organization Type: NASA CENTER Phone: 216-433-2876 Organization Name: NASA Glenn Research Center  Pl Address 1: 21000 Brookpark Road  Pl Address 2: 77-5  Pl Web Page:  City: Cleveland State: OH  Zip Code: 44135 Congressional District: 10  Comments:  Project Type: FLIGHT Solicitation / Funding Source: Directed Research Source: 0401/2006 End Date: 08/31/2011 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: NASA JSC Contact Monitor: Watkins, Sharmila Contact Phone: 28.1.483.0395 Contact Email: sharmila watkins@nasa.gov Flight Program: Shuttle/ISS Flight Assignment: ISS; STS-131  Key Personnel Changes/Previous PI: CO1 Name (Institution): Grant/Contract No.: Directed Research Preformance Goal No.:	Space Biology Special Category:	None		
Organization Name:         NASA Glenn Research Center           PI Address 1:         21000 Brookpark Road           PI Address 2:         77-5           PI Web Page:           City:         Cleveland         State: OH           Zip Code:         44135         Congressional District: 10           Comments:         Project Type:         FLIGHT         Solicitation / Funding Source: Directed Research           Start Date:         04/01/2006         End Date: 08/31/2011           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         No. of Bachelor's Degrees: 0           No. of Bachelor's Candidates:         0         Monitoring Center: NASA JSC           Contact Monitor:         Watkins, Sharmila         Contact Phone: 281.483.0395           Contact Email:         sharmila watkins@nasa.gov           Flight Assignment:         ISS: STS-131           Key Personnel Changes/Previous PI:         COL Name (Institution):           Grant/Contract No.:         Directed Research	PI Email:	John.B.McQuillen@nasa.gov	Fax:	FY 216-433-8050
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Zip Code:         44135         Congressional District:         10           Comments:           Project Type:         FLIGHT         Solicitation / Funding Source:         Directed Research           Start Date:         04/01/2006         End Date:         08/31/2011           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:         NASA JSC           Contact Monitor:         Watkins, Sharmila         Contact Phone:         281.483.0395           Contact Email:         sharmila.watkins@nasa.gov           Flight Program:         Shuttle/ISS           Flight Assignment:         ISS; STS-131           Key Personnel Changes/Previous PI:         COI Name (Institution):           Grant/Contract No.:         Directed Research           Performance Goal No.:	PI Web Page:			
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Project Type: FLIGHT Solicitation / Funding Source: Directed Research Source: Start Date: 04/01/2006 End Date: 08/31/2011  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: NASA JSC  Contact Monitor: Watkins, Sharmila Contact Phone: 281.483.0395  Contact Email: sharmila.watkins@nasa.gov  Flight Program: Shuttle/ISS  Flight Assignment: ISS: STS-131  Key Personnel Changes/Previous PI:  COI Name (Institution):  Grant/Contract No.: Directed Research  Performance Goal No.:	Zip Code:	44135	<b>Congressional District:</b>	10
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Flight Program: Shuttle/ISS  Flight Assignment: ISS; STS-131  Key Personnel Changes/Previous PI:  COI Name (Institution):  Grant/Contract No.: Directed Research  Performance Goal No.:	Contact Monitor:	Watkins, Sharmila	Contact Phone:	281.483.0395
Flight Assignment: ISS; STS-131  Key Personnel Changes/Previous PI:  COI Name (Institution):  Grant/Contract No.: Directed Research  Performance Goal No.:	Contact Email:	sharmila.watkins@nasa.gov		
Key Personnel Changes/Previous PI:  COI Name (Institution):  Grant/Contract No.: Directed Research  Performance Goal No.:	Flight Program:	Shuttle/ISS		
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The ability to generate intravenous (IV) fluids for medical care from available spacecraft potable or technical water supplies will greatly reduce launch mass for NASA's future exploration class missions. In spite of designing and testing several systems, NASA has not yet met that goal. As a result, NASA's Human Research Program initiated a detailed effort examining several different technologies for first purifying water and then mixing effectively with appropriate IntraVenous Fluid GENeration for Exploration Missions (IVGEN) will demonstrate a microgravity compatible water purification to the standards required for intravenous administration, and a pharmaceutical mixing system. This hardware is a prototype that will allow flight surgeons more options to treat ill or injured crewmembers during future long-duration exploration missions. Trade studies were used to down-select different technologies based on minimizing mass, volume, and power requirements. Experiments were conducted in normal and short duration reduced gravity facilities to verify actual performance of the selected technologies. Pressure driven systems with a gas-liquid separator and a DI (deionization) cartridge have been shown to generate Sterile Water for Injection per the United States Pharmacopeia (USP) standards. Furthermore, by pre-positioning a sterile magnetic stir bar and salt within an IV (intravenous) bag, the desired medical solution can be quickly and effectively **Task Description:** generated. Given the limitations with both the normal gravity and ground-based reduced gravity testing, these results need to be verified on orbit using a prototype. Further, an appropriate system level test should be conducted prior to deployment. Accordingly, the objectives of this experiment include the following: • Produce an acceptable IV solution that meets USP requirements · Verify on orbit, using available microgravity-compatible technology and techniques, the acceptability of that solution, and • Obtain sufficient engineering data to permit scaling of the system per actual mission needs · Demonstrate end-to-end system level performance See also https:// Rationale for HRP Directed Research: IVGEN technology could be used on Earth to generate purified water and IV fluid in Third World countries where **Research Impact/Earth Benefits:** medical resources are limited. During the past year, electronic data was analyzed. A plan was developed and implemented to ascertain the cause for not meeting the USP target for acceptable saline concentration in the two samples that were produced. For the first case, the cause was attributed to the introduction of a larger than acceptable air bubble into the liquid feed. For the second case, Task Progress: the cause was that an insufficient amount of salt was premeasured into the mixing bags. A final report was generated--see Bibliography section. **Bibliography Type:** Description: (Last Updated: 09/07/2020)

**NASA Technical Documents** 

McQuillen JB, McKay TL, Griffin DW, Brown DF, Zoldak JT. "Final Report for Intravenous Fluid Generation

technical memorandum; NASA/TM-2011-217033. https://ntrs.nasa.gov/citations/20110014585, Jul-2011

(IVGEN) Spaceflight Experiment." Washington, D.C.: National Aeronautics and Space Administration, 2011. NASA