Fiscal Year:	FY 2018	**Task Last Updated:**	FY 03/03/2020
PI Name:	Zoldak, John		
Project Title:	Medical Consumables Tracking-GRC		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **ExMC**:Exploration Medical Capabilities		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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City:	Cleveland	**State:**	OH
Zip Code:	44130-7994	**Congressional District:**	16
Comments:			
Project Type:	Flight,Ground	**Solicitation / Funding Source:**	Directed Research
Start Date:	06/01/2009	**End Date:**	09/30/2018
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
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Flight Program:	ISS		
Flight Assignment:	ISS NOTE: End date change to 9/30/2018 per B. Lewandowski/GRC (Ed., 3/3/2020) NOTE: End date changed to 6/30/2017 per PI (Ed., 1/25/17) NOTE: Gap changes per IRP Rev E /(Ed., 1/30/14) NOTE: End date is now 09/30/2016 per HRP Master Task List dated 12/28/2012 (Ed., 3/14/2013)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	Directed Research		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	This task will identify current practices and develop controls, processes, and technical solutions to accurately track the inventory of medical consumables. When shuttle and International Space Station (ISS) medical kits are returned to Earth, fewer medical consumables remain in the medical kits than would be expected based on reported use by the astronauts. This is significant because the possibility exists that exploration missions could be undersupplied and run the risk of not being able to treat an ill or injured crewmember, particularly given the small volume available for the medical kits. This task will identify current practices and develop controls, processes, and technical solutions to accurately track the inventory of medical consumables. The Medical Consumables Tracking (MCT) system will utilize an electronic identification system comprised of a reader/scanner/interrogator and a transponder. The system will address insufficient tracking of medication and medical consumables usage on the International Space Station (ISS). An electronic tag will be placed on each package. Periodically the system will be powered and contents within the Resource Supply Rack (RSR) storage locker will be inventoried. The information in the MCT database will be downlinked to the Health Management System (HMS) Inventory Tracking Tool (HITT), which contains medical inventory information to be accessed on the ground. Results to date (Preliminary Design Review level) indicate that using an RFID tag (electronic tag) to read a highly dense population of medical items (including liquids, pharmaceuticals of a dielectric nature, and metal wrapped packaging) and achieve the minimum accuracy is feasible. Specific aims: 1. Track medical consumables and medications accessed with an accuracy of 95% or better 2. No additional scheduled crew time to access a medication or medical consumable 3.Work in a microgravity environment 4.Work in space vehicles that have electronically noisy environments 5. Encrypted data transfer 6. To know how much of a particular medication is available 7. Read the electronic ID tagged items inside of Convenience Medications Pack 8. Have the ability to scale; to track small quantities or large quantities of medicines and medical consumables.
Rationale for HRP Directed Research:	This research is directed because it contains highly constrained research, which requires focused and constrained data gathering and analysis that is more appropriately obtained through a non-competitive proposal.
Research Impact/Earth Benefits:	MCT will develop new antenna system that will allow a high density of tags in a low volume. This technology can be used in hospitals and pharmacies.
Task Progress:	The Medical Consumables Tracking (MCT) project was a demonstration of hardware capable of tracking medical consumables within the Crew Health Care System (CHeCS), allowing for autonomous CHeCS inventory. The MCT System is a battery-powered system that utilizes a Radio Frequency Identification (RFID) system comprised of a reader/scanner/interrogator, antennas, a transponder, and a single board computer. The system was designed to perform an automated inventory cycle every 720 hours and provided the capability to manually initiate an inventory cycle via a switch located on the exterior of the CHeCS locker door. When a cycle was completed an inventory report of RFID tagged items detected within the locker was transmitted wirelessly to the Joint Station Local Area Network. The system launched to the International Space Station (ISS) on HTV-6 (11/16/2016), was installed in CHeCS Rack Locker D2 (12/16/2016), and powered “ON” on 12/16/2016. MCT started autonomous operation on 12/16/2016 16:11:31 GMT. The inventory cycle established operation every 720 hours. A total of 9 inventory cycles were performed. The Medical Convenience Pack originally launched 11/16/2016 was removed from CHeCS locker on or about 8/1/2017. Final scan with the MCT hardware occurred July 12th, 2018 prior to the uninstall of the hardware. Significant Findings: With the exception of an anomalous tag read and missing scan, all inventory (resultant tag file) downlinks were received as designed. In addition, all health and status data from the MCT system, controls (manual reads, door open sensor, etc.), communication links, and configuration file uploads operated and were received as designed. The MCT system successfully demonstrated the ability to perform an autonomous inventory of CheCS medical consumables. Data File Content: - The data files resulted from the automated inventories (every 720 hours) and the manually initiated inventories - The data consists of the RFID tag information used to track medical consumables used on ISS - When a new medical consumable was added to the CHeCS it contained an RFID tag - Data collection included the date when the tag was first introduced into the CHeCS and the tag ID - Also collected was when the tag was no longer in the CHeCS - This information was collected in comma separated value (CSV) files.
Bibliography Type:	Description: (Last Updated:)