Fiscal Year:	FY 2018	**Task Last Updated:**	FY 06/25/2019
PI Name:	Hall, M. Kennedy M.D.		
Project Title:	Renal Stone Ureter Management Technology Development and Clinical Validation Study		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **ExMC**:Exploration Medical Capabilities		
Human Research Program Risks:	(1) **Medical**:Risk of Adverse Health Outcomes & Decrements in Performance due to Inflight Medical Conditions (IRP Rev I) (2) **Renal**:Risk of Renal Stone Formation		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	mkhall@uw.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	206-744-8469
Organization Name:	University of Washington		
PI Address 1:	Dept. of Emergency Medicine		
PI Address 2:			
PI Web Page:			
City:	Seattle	**State:**	WA
Zip Code:	98195	**Congressional District:**	7
Comments:			
Project Type:	GROUND	**Solicitation:**	Directed Research
Start Date:	04/02/2018	**End Date:**	04/23/2022
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:	Lehnhardt, Kris	**Contact Phone:**	281.244.0524
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Flight Program:			
Flight Assignment:	NOTE: Start date changed to 4/02/2018 (from 4/24/2019) per K. Lehnhardt/ExMC element scientist (Ed., 2/19/2020)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Wessells, Hunter M.D. (University of Washington) Bailey, Michael Ph.D. (University of Washington)		
Grant/Contract No.:	Directed Research		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Kidney stones have long been near the top of NASA’s list of medical concerns. With this proposal we are addressing the following gaps from NASA's Human Research Roadmap (https://): Med 12 We do not have the capability to mitigate select medical conditions and Med 13 We do not have the capability to implement medical resources that enhance operational innovation for medical needs. Med 12 and 13 "will: 'Develop the capability to diagnose or treat renal stones in an exploration missions.' and 'Develop the relevant medical capabilities to technical maturity." The risk is that a stone, while innocuous when still in the kidney, will cause debilitating pain as it passes or worse, become obstructing, which can lead to urinary tract infection, sepsis, renal failure, and death. We propose a clinical trial of a countermeasure for this urgent condition which we have developed together with NASA. Stones have plagued humans since ancient Egypt. One in eleven Americans has suffered from stones -- more than have diabetes or cardiovascular disease. Dehydration, stasis, and bone demineralization are strong contributors to kidney stones, and occur in microgravity, increasing the risk of stones in space. Stones are often debilitating, and pilots cannot fly with stones. Science, experience, and the negative medical consequences support concern for the risk of stones in space. NASA has focused considerable attention on stone mitigation and made progress. However, there are many types of stone disease, and it is unlikely that stone disease will ever be completely prevented on Earth or in space. The impact of this project will be to clinically validate the utility of a commercially viable disruptive medical technology for use during space exploration. Application to date has been on expelling stones from the kidney. The proposed work will expand the capabilities of the technology to meet the more advanced needs in space.
Rationale for HRP Directed Research:	This research is directed because it contains highly constrained research. Due to weightlessness in space, it is believed that astronauts have a higher than normal probability to develop kidney stones. Novel, unique ultrasound technology developed by the University of Washington has been demonstrated to identify and move small renal stones within the kidneys. The next challenge with kidney stones is that they can block the ureteropelvic junction (UPJ) and ureterovesical junction (UVJ) positions of the ureter. This study will demonstrate that the ultrasound technology developed by the University of Washington can move renal stones blocking the UPJ and UVJ junctions thus relieving pain associated with hydronephrosis.
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2018.
Bibliography Type:	Description: (Last Updated: 02/20/2020)