Fiscal Year:	FY 2023	**Task Last Updated:**	FY 05/18/2023
PI Name:	Lynch, Kennda Ph.D.		
Project Title:	Plant Trek: Investigating Strategies for Regolith Pre-Conditioning to Support the Establishment of Plant-Microbe Systems in Martian Habitats		
Division Name:	Space Biology		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:			
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	(1) Microbiology (2) Plant Biology		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	(1) Bioregenerative Life Support		
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PI Organization Type:	NON-PROFIT	**Phone:**	281-486-2149
Organization Name:	Universities Space Research Association		
PI Address 1:	Lunar and Planetary Institute		
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PI Web Page:			
City:	Houston	**State:**	TX
Zip Code:	77058-1113	**Congressional District:**	36
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2021 Space Biology NNH21ZDA001N-SBPS E.9: Plant Studies
Start Date:	01/10/2023	**End Date:**	01/09/2024
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 KSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Loureiro, Rafael Ph.D. (Winston-Salem State University (Inc)) Simpson, Anna Ph.D. (Jet Propulsion Laboratory) Venkateswaran, Kasthuri Ph.D. (Jet Propulsion Laboratory)		
Grant/Contract No.:	80NSSC23K0400		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	A critical component to long-duration deep space exploration, specifically on Mars, is developing self-sustainable in situ food production and life support systems. To accomplish this task, it will be necessary to understand how to integrate plant-microbe systems optimally with planetary in situ resources. The overarching goal of this proposed Early Career pilot study is to develop and assess an integrated system approach for pre-conditioning and structing Martian regolith into agriculturally stable and usable soil to support plant growth, sustain microbe-plant interactions, minimize plant stress, and optimize food production and life support. As a part of this study, we will test a microbial consortium derived from a natural perchlorate-reducing system as a pre-inoculant for mitigating perchlorate toxins in Martian regolith simulant. We will also evaluate the phased approach of introducing pioneer species and plant-beneficial micro-organisms as an intermediate structure building step for transforming Martian regolith into a viable agricultural substrate that will reduce plant stress and increase seed germination rates and overall biomass production. The results of this study will pave the way for long-term sustainable crop production in a Martian habitat.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2023.
Bibliography Type:	Description: (Last Updated:)