Fiscal Year:	FY 2004	**Task Last Updated:**	FY 03/31/2006
PI Name:	Pierson, Duane L Ph.D.		
Project Title:	A Comprehensive Characterization of Microorganisms and Allergens in Spacecraft Environment		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Environmental health		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SHFH**:Space Human Factors & Habitability (archival in 2017)		
Human Research Program Risks:	(1) **Microhost**:Risk of Adverse Health Effects Due to Host-Microorganism Interactions		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	77058	**Congressional District:**	22
Comments:			
Project Type:	FLIGHT	**Solicitation / Funding Source:**	99-HEDS-03
Start Date:	12/01/2001	**End Date:**	12/01/2004
No. of Post Docs:	0	**No. of PhD Degrees:**	
No. of PhD Candidates:	0	**No. of Master' Degrees:**	
No. of Master's Candidates:	0	**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:	0	**Monitoring Center:**	NASA JSC
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	None		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	The preliminary work for analysis of microorganisms, allergens, and microbial toxins in the spacecraft environment has begun to ensure the health, safety, and performance of crewmembers over extended periods. As all previous methods evaluating spacecraft utilized culture-based methodology, this study will focus on techniques that can identify most of the previously omitted microorganisms, including the pathogens Legionella and Cryptosporidium. Likewise, culturable bacteria and fungi have been the only potential allergens studied; the more potent allergens, such as dust mites, have never been analyzed in spacecraft environments. No attempts to monitor microbial toxins have been made. This study utilizes modern molecular biology, advanced microscopy, and immunochemical techniques to examine air, surface, and water samples for bacteria and fungi (total composition and specific pathogens), pathogenic protozoa (e.g., Cryptosporidium), allergens (e.g., dust mites), and microbial toxins (e.g., endotoxin and volatile organic compounds). This analysis of long duration space craft will included: (1) monitoring the International Space Station (ISS) modules immediately prior to launch to develop baseline levels of contamination, (2) monitoring the space shuttle to evaluate		

	sources of new contamination, and (3) direct on-orbit sampling of the ISS. This analysis will reveal previously undetected microorganisms, allergens, and microbial toxins in the spacecraft environment. We anticipate that the new data will result in a more comprehensive health assessment of spacecraft during extended missions.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	The results of this study will provide insight into the progression of the microbial ecology and potential problems in terrestrial systems such as office buildings and residential homes. The development of specific primers for bacterial enumeration and fungal identification will advance the ability of ground-based investigators to diagnose the potential sources of microbial volatile organic compounds and give insight into the causes of "sick building syndrome."
Task Progress:	No progress report this period.
Bibliography Type:	Description: (Last Updated: 03/24/2020)