

Fiscal Year:	FY 2006	Task Last Updated:	FY 04/23/2007
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:	07/01/2002	End Date:	10/01/2007
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:	Shuttle/ISS		
Flight Assignment:	ISS STS-115, STS-116, STS-117. STS-118, STS-120, STS-121		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Stetzenbach, Linda (Harry Reid Center for Environmental Studies) Ott, C. Mark (EASI/Wyle Laboratories)		
Grant/Contract No.:	None		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This study of microorganisms, allergens, and microbial toxins in the spacecraft environment was initiated to ensure the health, safety, and performance of crewmembers during flight. As all previous methods evaluating spacecraft ecology utilized culture-based methodology, this study focuses on techniques that can identify most of the previously omitted microorganisms, such as the pathogens <i>Legionella</i> and <i>Cryptosporidium</i>. 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 previous study has targeted microbial toxins. 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., <i>Cryptosporidium</i>), allergens (e.g., dust mites), and microbial toxins (e.g., endotoxin and volatile organic compounds).</p> <p>This study of the International Space Station (ISS) will include (1) sampling and analysis of ISS modules immediately prior to launch to develop baseline levels of contamination, (2) direct on-orbit sampling of the ISS and subsequent ground analysis.</p> <p>This study will reveal previously undetected microorganisms, allergens, and microbial toxins in the spacecraft environment, which we anticipate will result in a more comprehensive health assessment of spacecraft during extended missions.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	<p>The results of this study will provide insight into changes that occur in the microbial ecology of semi-closed systems. While this study is designed to predict trends in spacecraft, it can be applied to terrestrial systems such as office buildings and residential homes. The development of specific primers for bacterial enumeration and fungal identification during this study will also advance the ability of ground-based investigators to diagnose the potential sources of microbial contamination and give insight into the causes of "sick building syndrome."</p>
Task Progress:	See FY2007 report.
Bibliography Type:	Description: (Last Updated: 03/24/2020)