Fiscal Year:	FY 2004	**Task Last Updated:**	FY 03/31/2006
PI Name:	Pierson, Duane L Ph.D.		
Project Title:	Flight-Induced Changes in Immune Defenses-DSO 498		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Operational and clinical research		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Immune**:Risk of Adverse Health Event Due to Altered Immune Response		
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:**	96-OLMSA-01
Start Date:	12/01/1997	**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:	Pre/Post Flight		
Flight Assignment:	STS-96, 95, 93, 107		
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	None		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	Space flight may affect the delicate host-parasite relationship, thus increasing susceptibility to infectious disease. Changes in the human immune response during space flight suggest that the ability to meet infectious challenges may be attenuated. The early phases of the host response to infection depend on innate immunity in which a variety of innate resistance mechanisms recognize and respond to the presence of a pathogen. Innate immunity is present in all individuals at all times, does not increase with repeated exposure to a given pathogen, and does not discriminate between pathogens. Our hypothesis is: essential functions of neutrophils, monocytes, and natural killer (NK) cells will be altered during space flight. The constraints inherent in space flight (e.g., few subjects) mandated the use of ground-based models to supplement flight investigations. These models included a closed population in a closed environmental chamber and Antarctic expeditioners. These studies evaluated quantitative and functional data from		

	important components of the immune response such as: neutrophils, monocytes, platelets, and natural killer cells. Our objectives are to determine the effects of space flight on: (1) neutrophil and monocyte functions such as phagocytosis, degranulation, oxidative burst capacity, and expression of surface molecules (including adhesion molecules), and (2) natural-killer cell and lymphokine-activated killer cell cytotoxicity against target cells, and cytokine production. Results from these studies provide essential data complementing other ongoing space immunology investigations. Realization of our specific aims will increase our understanding of the host-parasite relationship and the risk of infectious disease during space flight.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	The reductions in neutrophil, monocyte, and NK-cell functions are most probably the result of stress associated with space flight. We believe that space flight is a unique stress model, and new insight into the physiological effects of stress will result from these immunological studies. Perhaps, the asymptomatic changes in immune function observed in these studies may be helpful in determining clinically relevant thresholds in the human immune response.
Task Progress:	No progress report this period.
Bibliography Type:	Description: (Last Updated: 03/24/2020)