Fiscal Year:	FY 2004	**Task Last Updated:**	FY 06/03/2004
PI Name:	Sastry, Sudhir Ph.D.		
Project Title:	Reheating and Sterilization Technology for Food, Waste and Water		
Division Name:	Human Research		
Program/Discipline:	ADVANCED HUMAN SUPPORT TECHNOLOGIES		
Program/Discipline--Element/Subdiscipline:	ADVANCED HUMAN SUPPORT TECHNOLOGIES--Advanced life support		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	43210	**Congressional District:**	15
Comments:			
Project Type:	Ground	**Solicitation / Funding Source:**	2002 Space Biology 02-OBPR-01
Start Date:	07/01/2003	**End Date:**	09/30/2006
No. of Post Docs:	0	**No. of PhD Degrees:**	
No. of PhD Candidates:	1	**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
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Marcy, Joseph (Virginia Tech) Yousef, Ahmed (The Ohio State University) Perchonok, Michele (NASA JSC)		
Grant/Contract No.:	NAG9 – 1508		
Performance Goal No.:			
Performance Goal Text:			
	Long-duration space missions require high-quality, nutritious foods, which will need reheating to serving temperature, or sterilization on an evolved planetary base. The package is generally considered to pose a disposal problem after use. We propose herein the development of a dual-use package wherein the food may be rapidly reheated in situ using the technology of ohmic heating. We propose to make the container reusable, so that after food consumption, the package is reused to contain and sterilize waste. This approach will reduce Equivalent System Mass (ESM) by using a compact heating technology, and reducing mass requirements for waste storage. Our objectives are to 1) develop and optimize a reusable container and system for processing food and waste products by ohmic heating; 2) test the device for efficacy in sterilizing plant foods and waste products; 3) test the device for efficacy in reheating packaged shelf-stable foods; 4) test the heating system for efficacy in heating water for crew use,		

Task Description:	when not being used for heating food; 5) establish the oxygen and moisture barrier requirements for longer-term food storage; and 6) develop procedures and test methods to ensure hermetic seal for thermostabilized food containers. Our approach will involve the development of a package with two electrically conducting ends and an electrically insulating wall, which will serve as a combination package and ohmic heater. We propose to study properties of food and waste to ensure the appropriate process strategy; study the critical issues of elimination of electrolytic bubble formation and microgravity feasibility; verification via heat transfer and microbiological studies of the efficacy of sterilization; study the potential for using the same technology for heating water for personal use; and study the attributes of the container necessary for long shelf life.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	If a reusable package can be developed, which will serve as a sterilizing device, it will likely see earth-based applications long before its potential use in space applications. This may also have other spinoffs in terms of serving as a preheating technology for other earth-based food applications (e.g., high pressure processing).
Task Progress:	The major task of the past year has been the development of a package which will also serve as an ohmic heater for long-duration space missions. During the past year, we have tested various pouch concepts. A key challenge was the development of a lightweight, collapsible electrode at opposite ends of the pouch, separated by an insulating body, with the capability of expanding or collapsing with the pouch. A pouch package has been developed with electrodes built into the ends. The electrodes are made of metal foil, and are designed to collapse with the package when empty, but to open out when the package is filled. The electrodes communicate with the exterior world via tabs that protrude through seals. Details are presented in the annual report document.
Bibliography Type:	Description: (Last Updated: 08/08/2019)
Abstracts for Journals and Proceedings	Sastry, S.K.; Marcy, J.E.; Yousef, A.E.; Perchonok, M.H. "Reheating and sterilization technology for food, waste and water." Institute of Food Technologists' Annual Meeting, Las Vegas, NV, July 12-16, 2004. Abstract 90-3 , Jul-2004
Presentation	Sastry, S.K.; Marcy, J.E.; Yousef, A.E.; Perchonok, M. "Reheating and sterilization technology for food, waste and water." Habitation 2004 Conference, Orlando, FL, Jan 4-7, 2004. Jan-2004