Fiscal Year:	FY 2009	**Task Last Updated:**	FY 08/27/2009
PI Name:	Perchonok, Michele Ph.D.		
Project Title:	Packaged Food Mass Reduction Trade Study		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Space Human Factors Engineering		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SHFH**:Space Human Factors & Habitability (archival in 2017)		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	michele.h.perchonok@nasa.gov	**Fax:**	FY 281-483-1847
PI Organization Type:	NASA CENTER	**Phone:**	281-483-7632
Organization Name:	NASA Johnson Space Center		
PI Address 1:	Program Science Management Office		
PI Address 2:	2101 NASA Road 1, Mail Code SF411		
PI Web Page:	http://hefd.jsc.nasa.gov/		
City:	Houston	**State:**	TX
Zip Code:	77058	**Congressional District:**	22
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	Directed Research
Start Date:	10/01/2008	**End Date:**	09/30/2009
No. of Post Docs:	0	**No. of PhD Degrees:**	0
No. of PhD Candidates:	0	**No. of Master' Degrees:**	0
No. of Master's Candidates:	0	**No. of Bachelor's Degrees:**	0
No. of Bachelor's Candidates:	0	**Monitoring Center:**	NASA JSC
Contact Monitor:	Woolford, Barbara	**Contact Phone:**	218-483-3701
Contact Email:	barbara.j.woolford@nasa.gov		
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:	Adam Stoklosa was Principal Investigator from May-August 2009.		
COI Name (Institution):	Stoklosa, Adam (LZ Technology, Alvin, TX)		
Grant/Contract No.:			
Performance Goal No.:			
Performance Goal Text:			
	Future long duration manned space flights beyond low earth orbit will require the food system to remain safe, acceptable and nutritious while efficiently balancing appropriate vehicle resources such as mass, volume, power, water, and crewtime. Often this presents a challenge since maintaining the quality of the food system can result in a higher mass and volume. The objective of this project is to determine how the mass and volume of the packaged food can be reduced while maintaining caloric and hydration requirements. The Orion vehicle is significantly smaller than the Shuttle vehicle and the International Space Station and the mass and volume available for food is limited. Therefore the food team has been challenged to reduce the mass of the packaged food from 4 pounds per person per day to 2.5 pounds per person per day. The following tasks are the key elements to this project:		

Task Description:	• Conduct further analysis of the ISS Standard Menu to determine moisture, protein, carbohydrate, and fat levels • Conduct trade studies to determine how to bring the mass down. Trade studies may include removing the water of the total food system and/or increasing the fat content • Determine the preferred method for delivery of the new food (e.g., bars, or beverages) and the degree of replacement • Determine whether there are commercially available products that meet the requirements By the end of this study, an estimate of the mass and volume savings will be provided to the Constellation Program. In addition, if new technologies need to be developed to achieve the mass savings, the technologies, timeline, and budget will be identified at the end of the project.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	Overall, this study found that significant reductions in food system mass are possible with further menu development. With the reduction of moisture and increase in calories from fat, the system mass decreased by 321 g per crew member per day, or 22%. With the substitution of standard menu items with meal replacement bars, the mass can be reduced by 240 g, or 17%, and is limited to one bar per crew member per day. If both approaches were combined, the mass of the food system can be reduced by as much as 529 g, or 36%. Combining the meal replacement option with the reducing the moisture and increasing fat would have a net reduction from 1.81 kg to 1.28 kg per crew member per day which approaches the overall reduction goal of 1.18 kg.
Bibliography Type:	Description: (Last Updated: 01/30/2012)