



NASA SBIR 2009 Phase I Solicitation

X13.03 Advanced Food Technologies

Lead Center: JSC

The purpose of the Advanced Food Technology Project is to develop, evaluate and deliver food technologies for human centered spacecraft that will support crews on missions to the Moon, Mars, and beyond. Safe, nutritious, acceptable, and varied shelf-stable foods with a shelf life of 3 - 5 years will be required to support the crew during future exploration missions to the Moon or Mars. Concurrently, the food system must efficiently balance appropriate vehicle resources such as mass, volume, water, air, waste, power, and crew time. One of the objectives during the lunar outpost missions is to test technologies that can be used during the Mars missions.

It will require approximately 10,000 kg of packaged food for a 6-crew, 1000 day mission to Mars. The packaged food will require that the safety, nutrition, and acceptability are maintained at reasonable levels for the entire 5-year shelf life. Therefore, this subtopic request will concentrate on technologies that use a systems approach to provide food in remote locations with limited mass, volume, power, and waste is required.

It has been proposed to use a food system which incorporates processing of raw ingredients into edible ingredients and uses these edible ingredients in recipes in the galley to produce meals. This type of food system will require technologies that will allow these raw ingredients to maintain their functionality and nutrition for 5-years. This food system would also require food processing and food preparation equipment. The equipment should be miniaturized, multipurpose and efficiently use vehicle resources such as mass, volume, water, and power.

There are some unique parameters that need to be considered when developing the technologies. The Moon's gravity is 1/6 of Earth's gravity. In addition, it is being proposed that the habitat will have a reduced atmospheric pressure of 8 psia which is equivalent to a 16,000 foot mountain top. These two factors will affect the heat and mass transfer during food processing and food preparation of the food. In addition, there also will not be any significant refrigerator or freezer available.

The response to this subtopic should include a plan to develop a technology that will enable safe and timely food processing and food preparation in reduced cabin pressure and reduced gravity.

Phase 1 Requirements: Phase 1 should concentrate on the scientific, technical, and commercial merit and

feasibility of the proposed innovation resulting in a feasibility report and concept, complete with analyses and top-level drawings.