NASA SBIR 2014 Phase I Solicitation

H12.04 Advanced Food Technology

Lead Center: JSC

The purpose of the NASA Advanced Food Technology Project is to develop, evaluate and deliver food technologies for human centered spacecraft that will support crews on long duration missions beyond low-Earth orbit. Safe, nutritious, acceptable, and varied foods with a shelf life of five years will be required to support the crew. Concurrently, the food system requirements must efficiently balance with their use of vehicle resources such as mass, volume, water, air, waste, power, and crew time.

NASA provisions currently consist solely of shelf stable foods due to vehicle resource limitations preventing food refrigeration or freezing. Stability is achieved by thermal, irradiative processing, or drying to kill or prevent microorganism growth in the food. These methods coupled with environmental factors (such as moisture ingress and oxidation) impact the micronutrients within the food. Since the food system is the sole source of nutrition to the crew, a significant loss in nutrient availability could jeopardize the health and performance of the crew.

This subtopic requests methods or technologies that enable development of an acceptable and safe food system to deliver appropriate amounts of bioavailable nutrients to crewmembers throughout a five year mission with no resupply. Vitamin content in NASA foods, such as vitamin C, vitamin K, thiamin, and folic acid, are key nutrients degraded during processing and storage. NASA is seeking novel food ingredients, protective or stabilizing technologies (e.g., encapsulation), controlled-release systems, or novel processing technologies that allow the delivery of key nutrients at the time of consumption. Consideration must be given to food safety as well as acceptability, as under-consumption will similarly lead to nutritional deficiencies.

Deliverables - Feasibility demonstration of a novel food system approach with the potential to enable vitamin stability in an acceptable and safe food system for extended duration missions. Phase I should include a comprehensive report detailing the system feasibility, and show a clear path to Phase II development and analyses, with the expectation that Phase II will demonstrate that the food system will retain 70% of original content of vitamin C, vitamin K, thiamin, or folic acid over five years of ambient temperature storage. Phase II should deliver the innovation in a form that can be tested in NASA’s food system.

HRP IRP Risk - Risk of Inadequate Food System.

Technology Readiness Levels (TRL) of 4 to 5 or higher are sought.