NASA SBIR/STTR Technologies

Non-Thermal Sanitation by Atmospheric Pressure Plasma (SAPP)

Orbital Technologies Corporation – Madison WI

PI: Yonghui Ma Proposal No.: X14.02-9524

Identification and Significance of Innovation

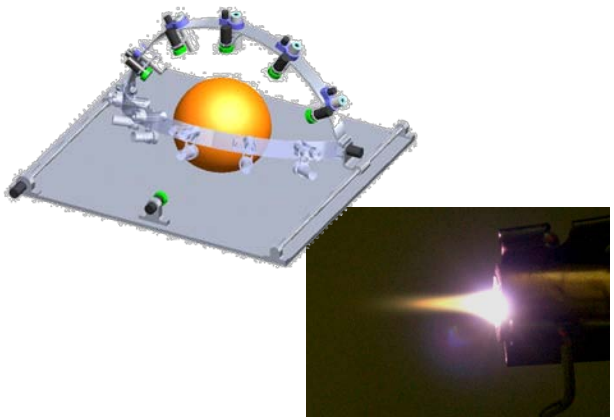
Non-thermal Sanitation by Atmospheric Pressure Plasma (SAPP) uses non-thermal, atmospheric pressure plasma to produce reactive oxidizing species to sanitize fresh foods, food preparation areas, or instruments.

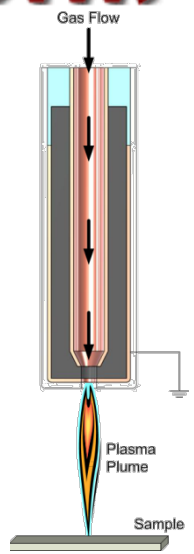
SAPP is a configurable and scalable technology that can be applied in different ways to maximize the sanitation effectiveness and efficiency of target materials of different size and shape.

The technology can function in reduced gravity and pressure environments, and is efficient in terms of mass, volume, waste, and resource use.

The technology may also have applications in air and water purification, allowing some sharing of component spares and training procedures.

Expected TRL Range (1-9) at beginning and end of contract: 2/4.





Technical Objectives and Work Plan

Objective

To design and test two SAPP designs, and to determine the feasability of non-thermal sanitation of contaminated foods and surfaces by atmospheric pressure plasma.

Work Plan

1. Establish system level sanitation requirements for space exploration applications and develop protocols that will be used for testing SAPP.
2. Design, build, and test a SAPP reactor utilizing plasma jet concept based on dielectric barrier discharges (DBD).
3. Design, build, and test a second SAPP reactor by extracting a plasma plume from an Atmospheric Pressure Glow Discharge (APGD) device.
4. Compare advantages and disadvantages of each design and their sanitation performance. Select the best concept for pursuing in a Phase II.

NASA and Non-NASA Applications

SAPP technology can be used for NASA preflight food sanitation, decontamination of food preparation areas, or sanitation of common use surfaces such as instrumentation. Outside of NASA applications, SAPP technology can be used for decontamination of fresh foods or food preparation areas and may be preferred over current technology due to its scalability, portability, lack of consumables, and opportunity for automation.

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