

Topic: N171-064

TRITON SYSTEMS, INC.

Oil-less Deep Fryer

Triton is developing an oil-free “frying” technology to replace the deep fat fryer currently used on Navy submarines. It uses controlled dynamic radiant heating to produce the same heat flux profile that occurs in deep frying, resulting in sensory acceptability equal to deep frying. This technology will replace the deep fat fryer currently used in submarine galleys including the Ohio and Virginia classes and the new Columbia class. It is a drop-in replacement with the same footprint and power requirement. Several generations of developmental prototypes have been built to incrementally build confidence in our technical approach, component selections and control strategy. Triton Systems is a developer of breakthrough technologies and products supporting DoD and commercial requirements. We conceptualize, research, and develop ideas that provide market-driven solutions.

Technology Category Alignment:

Protection, Sustainment, and Warfighter Performance

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SYSCOM: NAVSEA

Contract: N68335-19-C-0111

Booth: 1101

Room: FST at NSL

Presenting: Nov 6th at 4:45 PM

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2019-0566

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Oil-less Deep Fryer

TRITON SYSTEMS, INC.

WHO

SYSCOM: NAVSEA

Sponsoring Program: PMS 397

Transition Target: Columbia Class Submarine

TPOC:
(202)781-3350

Other transition opportunities:

- Ohio & Virginia Class submarines
- Navy surface ships
- Shore-based mess halls and Quick-Serve food outlets



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Notes: Two Oil-Free Fryer units are shown stacked on a cabinet. Each unit has the capacity to cook 1-1.5 lb batches of food. A stack of 2 units replaces 1 deep fat fryer and fits in the legacy 15" wide x 25" deep footprint. The height as-shown is 48". The cabinet provides a storage capability not present with the current deep fat fryer. Cabinet height is adjustable to provide an ergonomic working height for the Oil-Free Fryer units.

WHAT

Operational Need and Improvement: Replace the Deep Fat Fryer (DFF) currently used in submarine galleys with an oil-free alternative cooking technology. This eliminates the use of large quantities of cooking oil from the galley. Benefits include:

- Eliminates Aqueous Potassium Carbonate (APC) fire suppression system (cost and space saving).
- Reduced food preparation cost (no need to buy oil).
- Eliminates need to store new and used cooking oil.
- Improved nutrition by reducing fat content of fried food.

Specifications Required:

- Must be drop-in replacement for existing DFF.
- Use no more than 30kW.
- Must fit through submarine hatch.
- Must cook all "fried" items on the submarine meal card.
- Food quality must be equal to legacy deep-fried foods.
- Prepare, in one hour, enough food to feed two-thirds of the crew. (Benchmark 80 lbs/hr of French fries.)
- MIL-S-901D shock Grade B, Class II
- Operate safely at extreme pitch and roll angles.
- Comply with NSF (National Sanitation Foundation) Standards for food equipment.

Technology Developed:

Controlled dynamic radiant oil-free "frying" that matches the quality of deep-fried foods. Triton's oil-free cooking system dynamically matches the heat flux profile characteristic of deep frying.

Warfighter Value:

- High quality & healthier food with comparable sensory appeal.
- Freed up storage space in the galley.
- Improved safety in the galley.

WHEN

Contract Number: N68335-19-C-0111 **Ending on:** November 28, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Gen 1 Prototype Demonstration (End Phase II Base)	Low	Successfully cook French fries	3	October 2019
Gen 2 Prototype Demonstration (End Phase II Option I)	Low	Successfully cook all foods on meal card	4	October 2020
Gen 3 Prototype Demonstration (End Phase II Option 2)	Low	Successful demonstration in simulated galley	5	October 2021

HOW

Projected Business Model:

Triton's commercialization strategy includes a) licensing IP previously developed by our technology collaborator, as required, b) filing new IP for the oil-less fryer design, pending an assessment of novelty and value of filing IP vs treating as a trade secret, c) negotiating a supply agreement with an established appliance manufacturer to contract manufacture our final design, and d) establish a supply agreement with PMS397, General Dynamics Electric Boat, or their galley system supplier for the Columbia Class submarine. We believe this approach will simplify the acquisition process for the oil-less fryer as a Phase III purchase, and we believe the same strategy can be used to meet the larger DON demand for other submarines and surface ships. The larger commercial market will require a different business model and we anticipate licensing the technology developed to one or more food service equipment manufacturers. Using these models, revenue from commercial sales is anticipated shortly after completion of a successful Phase II.

Company Objectives:

Triton intends to become the supplier of oil-free fryers to the DON and other DOD components for both land and sea based operation. We plan to license the technology for non-military use. Our contract manufacturer for military uses may be a licensee for non-military uses.

Potential Commercial Applications:

We expect Triton's oil-free fryer to find initial commercial use in Quick-Serve food venues where the need for oil storage, ventilation and fire suppression requirements do not currently permit the preparation of fried foods. Successful adoption in these venues will lead to use in conventional restaurants as either new equipment or replacements for deep fat fryers.

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