

Topic: N131-016

Triton Systems, Inc.

Life improvement of Plain Airframe Bearings by Preventing Contamination

Liner wear in spherical bearings can be accelerated by liquid and solid contamination. Preliminary testing has demonstrated that this contamination-resistant bearing reduces contamination without significant additional friction or cost, increasing bearing life, and reducing scheduled maintenance. The modification will not impact bearing installation time, procedures or required equipment. This patent-pending solution is targeted to the V-22 Osprey and other military rotorcraft being fielded in contaminant-rich environments, but has applications in construction equipment and motor vehicles. It can be adapted to custom and standard spherical bearing sizes, and is being developed and tested with a major bearing manufacturer. This advanced technology firm seeks program funding from program managers and prime contractors for implementation with other equipment operational in contaminant-rich environments.

Technology Category Alignment:

Satellite Communications (SATCOM)

Robotics/Automated Material Handling Equipment

Shipyards/Shipbuilding

Supply; Storage

Satellite Communications (SATCOM)

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Supply; Storage

Supply; Storage

Satellite Communications (SATCOM)

Shipyards/Shipbuilding

Robotics/Automated Material Handling Equipment

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Robotics/Automated Material Handling Equipment

Protection, Sustainment, and Warfighter Performance

Medical Chem-Bio Defense

Military Infectious Diseases

Propulsion and Extreme Environments

Fixed Wing Vehicles (includes UAS)

Survivability

Maintainability/Sustainability

Unmanned Ground and Sea Vehicles

Corrosion

Advanced Computing/Software Development

Networks and Communications

Modular/Open/Reconfigurable Architectures

RF Components for sensing, transmission and communication

Electronics Integration

Broadband/Multispectral Components and Systems

Sensors, Electronics and Photonics

Radio Frequency (RF) (non-EW)

Survivability

Broadband/Multispectral Components and Systems

RF Components for sensing, transmission and communication

Radio Frequency (RF) (non-EW)

Networks and Communications

Guidance, Navigation & Control (GN&C) and Data Links

RF Components for sensing, transmission and communication
Networks and Communications
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Personalized Assessment, Education, and Training
System Interfaces & Cognitive Processes
Aircraft Propulsion, Power and Thermal
Modeling, Simulation & Test Infrastructure
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Fixed Wing Vehicles (includes UAS)
Fixed Wing Vehicles (includes UAS)
Acoustic, Seismic and Magnetic
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Human/Autonomous System Interaction and Collaboration
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Power Generation/Energy Conversion
High Energy Lasers (HEL)

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RF Components for sensing, transmission and communication
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EO/IR Components for sensing, transmission and communication

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Rotary Wing Vehicles
EO/IR Components for sensing, transmission and communication
Satellite Communications (SATCOM)
Networks and Communications
Trust Foundations
Electro-Optical/Infrared (EO/IR)
Unmanned Ground and Sea Vehicles
Maintainability/Sustainability
Modularity
Survivability
Electro-Optical/Infrared (EO/IR)
Sensors, Electronics and Photonics
EO/IR Components for sensing, transmission and communication
RF Components for sensing, transmission and communication
Networks and Communications
Broadband/Multispectral Components and Systems
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Clinical & Rehabilitative Medicine
Combat Casualty Care
Medical Chem-Bio Defense
Energy storage
Protection, Sustainment, and Warfighter Performance
Human Computer Interfaces (HCI) for Decision Making
Synthesis/Analytics/Decision Tools
Undersea Weapons
Human Computer Interfaces (HCI) for Decision Making
Information Collection/Management

Synthesis/Analytics/Decision Tools
Power and Energy
Propulsion and Extreme Environments
RF Components for sensing, transmission and communication
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Networks and Communications
Mobility
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Fixed Wing Vehicles (includes UAS)
Rotary Wing Vehicles
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Individual Warfighter
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RF Components for sensing, transmission and communication
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Power Generation/Energy Conversion
Electronics Integration
Energy storage
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Thermal Transport and Control
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EO/IR Components for sensing, transmission and communication
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Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2016-723

Topic # N131-016

Life improvement of Plain Airframe Bearings by Preventing Contamination

Triton Systems, Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-275

Transition Target: V-22 Osprey

TPOC:

(301)342-3212

Other transition opportunities:

Other fielded aircraft and especially rotorcraft, that operate in desert environments could benefit from this bearing.



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WHAT

Operational Need and Improvement: Spherical bearings are used in a variety of aerospace applications. Contamination is a common issue that significantly diminishes the operational life of bearings. The presence of both solid and liquid contamination in bearings exacerbates the wear rate, resulting in premature bearing degradation and failure. Operations conducted in environments rich with particle contaminant (e.g. the desert) wear at an even more accelerated rate, resulting in increased maintenance and operating costs and decreased aircraft availability.

Specifications Required: The new bearing must offer improved operational life in heavily contaminated environments, survive the required loading spectrum of the V-22 pitch link bearing, offer minimal impact to existing installation procedures, and not impede the motion of the surrounding system.

Technology Developed: Triton Systems is developing spherical rod-end bearings that resist the intrusion of contamination (such as dirt, sand, or water). These bearings will provide significantly improved service life in contaminant-heavy environments.

Warfighter Value: Incorporation of these bearings will significantly reduce maintenance and operating costs and increase aircraft reliability and readiness.

WHEN

Contract Number: N68335-15-C-0343 **Ending on:** September 29, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
In house testing to establish proof of concept	Low	Demonstration of ability to resist contamination	3	November 2013
Demonstration of service life of standard bearing (as opposed to V-22)	Low	Bearing survived longer than unmodified bearing in a scaled loading profile	4	February 2016
Demonstration of service life of V-22 bearing against simulated operational environment	Med	Bearing survived longer than unmodified bearing against loading profile specified by Bell Helicopter	5	September 2017
Qualification Testing	Med	Bearing survived longer than unmodified bearing in Qualification Test at Bell Helicopter	6	September 2018

HOW

Projected Business Model: Triton Systems plans to license the technology to a military aerospace bearing supplier for sales to NAVAIR and appropriate prime contractors.

Company Objectives: Triton Systems seeks Navy program managers and prime contractors involved with other rotorcraft that are operational in desert environments.

Potential Commercial Applications: Aircraft, military equipment, oil & gas equipment, and other critical commercial equipment with high cost of machine downtime has the greatest need for longer life. Heavily contaminated equipment such as construction and agricultural equipment has the greatest need for reduced maintenance requirements

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