Topic: N162-077

TDA Research, Inc.

Suppressor Cleaning Method

Suppressed fire improves communication and operational tempo during a firefight. They also protect against hearing damage that can occur during routine training operations. Suppressors are expensive, and if not maintained, their performance can rapidly degrade. When this project started, there was no systematic method to clean a sealed firearm suppressor to both extend its lifetime and maintain its performance. TDA Research developed and patented a method to clean and maintain suppressors so that their lifetime can be extended and their performance sustained. The cleaning process does not damage or compromise suppressors, and it minimizes the creation of hazardous waste. Regular maintenance with our cleaner extends the lifetime of suppressors by reducing the accumulation of fouling and by cleaning the connection surfaces to the firearm. Cleaning the connection prevents poor alignment of the suppressor and carbon-welding to the barrel.

Technology Category Alignment:

Ground and Sea Platforms

None

Materials & Manufacturing Processes

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SYSCOM: MARCOR

Contract: M67854-18-C-6514

Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=M67854-18-C-6514

Department of the Navy SBIR/STTR Transition Program

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MCSC-PRR-3651

Topic # N162-077

Environmentally-Friendly Method for Cleaning Sealed Suppressors

TDA Research, Inc.

WHO

SYSCOM: MARCOR

Sponsoring Program:

Transition Target: Intermediate Maintenance Activities

TPOC:
sbir.admin@usmc.mil

Other transition opportunities: We have been in contact with the Individual Weapons group of the US Army Futures Command at Picatinny Arsenal. We conducted an hour-long technical demonstration of our cleaner and dryer over Microsoft Teams to over 25 members and employees of the US Army on Wednesday, July 29, 2020. We are currently finalizing a deal to build and sell a prototype suppressor cleaner and a suppressor dryer to the Army for evaluation. The US Army is beginning to evaluate suppressed fire on its small arms, and is interested in cleaning technology. When this sale goes through, it will be our first commercial sale. It will allow us to file for trademarks for names of both the suppressor cleaner and the dryer (The Baffle Cleaner 2020 and the Baffle Dryer 2020).



The Baffle Cleaner 2020 and the Baffle Dryer 2020 at TDA Research

WHAT

Operational Need and Improvement: The USMC is equipping all infantry Marines with rifle suppressors. Suppressors enable better communication between Marines during firefights, and they reduce the risk of hearing damage during training operations. Sealed suppressors are expensive and are difficult to clean. While they reduce the flash and sound produced by a rifle, they also collect a large amount of fouling. Excessive fouling reduces the performance of the suppressor and can also lead to failure. Suppressors that are used on automatic weapons can become fouled very quickly, particularly when they are exposed to a high rate of fire. A particular issue that occurs is known as "Carbon welding." When this occurs, carbon collects in the interface between the suppressor and the rifle, and the fouling glues the suppressor to the rifle. The suppressor and rifle can be damaged during removal of the suppressor, and the suppressor may not re-mount properly, which will lead to poor alignment and baffle strikes. It is essential that this carbon is cleaned off effectively.

Specifications Required: There are no current military specifications for suppressor cleaning. However, it is important to develop a system that is compatible with modern safety and environmental requirements. Firearm suppressors are contaminated with lead and copper, and reducing the contact hazard of these metals to the user while cleaning suppressors is imperative. We have designed a system that is self-contained, and that does not use any harsh chemicals or solvents to remove or dissolve the fouling. Oxidizing agents that dissolve heavy metals create hazardous waste. They also create an immediate hazard to the operator, who may not be well trained in handling hazardous chemicals. We use a mild detergent solution and ultrasonic energy to dislodge and remove fouling from suppressors. The fouling is collected as a solid in a waste reservoir where it quickly precipitates.

Technology Developed: Our cleaner uses ultrasonic energy to maintain small firearm suppressors. The Baffle Cleaner 2020 is fully automated. Our current prototype cleans one suppressor at a time. During the Phase II Option we designed an add-on that allows multiple suppressors to be cleaned at a time. Because wet suppressors take a long time to dry, we have also designed and built the Baffle Dryer 2020, a standalone unit that dries suppressors in ~5 minutes. Suppressors are stored on their weapon after maintenance, and if they are wet corrosion could occur both within the suppressor and the rifle barrel. Our suppressor dryer complements the cleaner and will allow the armorer to properly store suppressed weapons after maintenance.

WHEN

Contract Number: M67854-18-C-6514 **Ending on:** December 19, 2020

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Technical Demonstration of Prototype I at Quantico	Med	100%	4	2nd QTR FY19
Technical Demonstration of Prototype II at Quantico	Med	100%	5	4th QTR FY19
Online Technical Demonstration of Prototype III for Army	Med	100%	6	4th QTR FY20
Demonstration and Delivery of Multi-cleaner Prototype III			6	2nd QTR FY21

HOW

Projected Business Model: Our current plan is to manufacture single and multi-suppressor cleaners in house for initial sales. The initial models will be assembled by experienced engineers who have developed the machine, however to reduce costs we will codify the assembly so that lower pay-grade technicians can efficiently assemble the instruments. When orders increase from single digits per year to dozens per year, we will use a manufacturing partner to help streamline the production of both machines that we have developed (the cleaner and the dryer). We are currently contacting industry members to develop a partnership for manufacturing and distribution.

Company Objectives: Our objective is to introduce the first automated system for maintaining firearm suppressors to the market. Our initial sales will be to the U.S. Military, and we will then expand our marketing to include domestic law enforcement and firearm shops. Once we have established these sales, we will market our products to foreign militaries of friendly nations.

We have filed for patents for both the suppressor cleaner and the suppressor dryer. The dryer was not envisioned during the initial stages of development, however after we visited the Quantico armory and found out that suppressors are stored vertically on their matching rifle, it became clear that we needed to develop an efficient dryer alongside our cleaner.

Potential Commercial Applications: Our technology is targeted to firearm maintenance. The suppressor cleaner and dryer have been designed to be versatile. In a live demonstration at Quantico, we were able to clean and dry suppressors ranging from 5" in length (AAC Mini-5) to 14" in length (Knight's Armament M110 suppressor). Our cleaner and our dryer can be used on suppressors used by snipers as well as on suppressors used on infantry automatic rifles.

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