Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2018-693

Topic # N162-090

ATTICUS: Attentional Trainer To Improve Control of Unmanned Systems

TiER1 Performance Solutions LLC

WHO

SYSCOM: NAVAIR

Sponsoring Program: NAWCTSD

Transition Target: MQ-4C Triton and other Unmanned Aerial Systems (UASs), PMA-205

TPOC:
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Other transition opportunities: Air Force UASs, Army UASs, Distributed Common Ground System – Navy (DCGS-N) and other services system, Air Traffic Control and Aircraft Dispatchers, Industries in which operators have high visual attentional demands and a fixed workstation (e.g., control room operators, mission control, dispatchers).

Image courtesy of TiER1 Performance Solutions, Copyright 2018. Includes U.S Navy Photo 140918-N-UZ648-008

Notes: This figure shows the MQ-4C Triton, an unmanned aerial system for monitoring geographical regions. It also shows a screenshot of the Attentional Trainer to Improve Control of Unmanned Systems (ATTICUS). ATTICUS will enable UAS sensor operators to more effectively and safely perform their missions by training the operators how to handle the many competing tasks and demands on their attention.

WHAT

Operational Need and Improvement: Unmanned aerial systems are key to our national security and military advantage but they are notoriously difficult to control. This research aims to develop tailored adaptive training techniques to minimize the issue of channelized attention. Channelized attention occurs when all of an individual's cognitive resources are focused on one aspect of the environment, causing other equally important cues to be missed. Training techniques capable of presenting long term mission requirements need to be developed, as no such technology currently exists.

Specifications Required: Research on attentional training has indicated that it is possible to train attentional performance and create effects that transfer to tasks after training. Further, a recent meta-analysis found that attentional training may be more effective if it is adaptive. Adaptive training is broadly defined as any instruction that is tailored to an individual trainee's strengths and weaknesses so that the training experience varies from one individual to another based on either task performance, aptitudes, or test scores.

Technology Developed: ATTICUS will train operators to better manage their attention. ATTICUS offers scenario-based, adaptive training to help operators develop the visual scanning, task prioritization, and interruption management skills needed to perform their jobs more effectively. This training program will be used by operators on their own time. It will be engaging and entertaining to use, as well as challenging and providing a noticeable performance benefit. The effects of ATTICUS training on performance will be evaluated in an experimental study.

Warfighter Value: ATTICUS adds value to the Navy's UAS training program by preparing UAS operators to better handle the multiple, concurrent, conflicting demands on their attention. The training results in improved ability to attend to multiple elements in the dynamic UAS operating environment, thus reducing mishaps and increasing mission success.

WHEN

Contract Number: N68335-18-C-0138 **Ending on:** April 30, 2020

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Identification and verification of requirements	Low	Overall requirements for the design of ATTICUS have been vetted and approved by relevant subject matter experts (SMEs).	2	October 2017
Development and validation of a static prototype	Low	Specific design requirements for the static prototype have been vetted and approved by SMEs.	3	January 2018
Implementation of a dynamic prototype	Med	A dynamic, interactive prototype allows users to work with a limited scope version of the ATTICUS tool and training.	4	July 2018
Testing of the dynamic prototype	Med	A robust version of the tool, with data collection capabilities and scoring algorithms, has been implemented and evaluated with potential experimental participants.	5	March 2019
Human-in-the-loop experimentation and validation	Med	An empirical study was conducted to compare ATTICUS attentional skills training with simulated current-day Navy UAS operator training, and with adaptively increasing difficulty training	6	April 2020

HOW

Projected Business Model: In 2005, TiER1 Performance Solutions (TiER1) began its government-based business. TiER1 combined behavioral science, instructional design theory, and social game mechanics to create a exciting, measurable, and integrated approach that gamifies training program development. This approach generates high engagement and participation while also proving robust, constant insight into training metrics. TiER1 will develop the technology and then license the tool to the customer.

Company Objectives: TiER1 seeks to use our operational experience and technical skills to address challenging problems in defense training tools and provide solutions that enable the warfighter to improve their operational abilities. We will leverage our relationships and experience in developing engaging training products for DoD, other Government agencies, and dozens of Fortune 500 companies to identify additional potential users.

Potential Commercial Applications: TiER1 envisions multiple potential commercial customers for an attentional skills trainer such as ATTICUS. One example is in aviation, where Delta Air Lines has a large number of aircraft dispatchers who manage the release of approximately 3,000 daily flights, monitor and support flight operations, and continually watch and forecast the effect of weather. They work in the Operations Control Center, dealing with large amounts of visual information and complex decision making requirements. Their operational context appears similar to that of UAS sensor operators. Airlines need to offer economical, efficient, and effective training, and attentional management is clearly an important part of the dispatcher's skill set. Also, air traffic controllers deal with multiple competing demands and could benefit from attentional training. The Department of Homeland Security Transportation Security Administration (TSA) agents watch surveillance monitors for extended periods of time, offering the opportunity for attentional training benefits.

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