



**Bob Seltzer**

**Director, Research and Technology Programs**

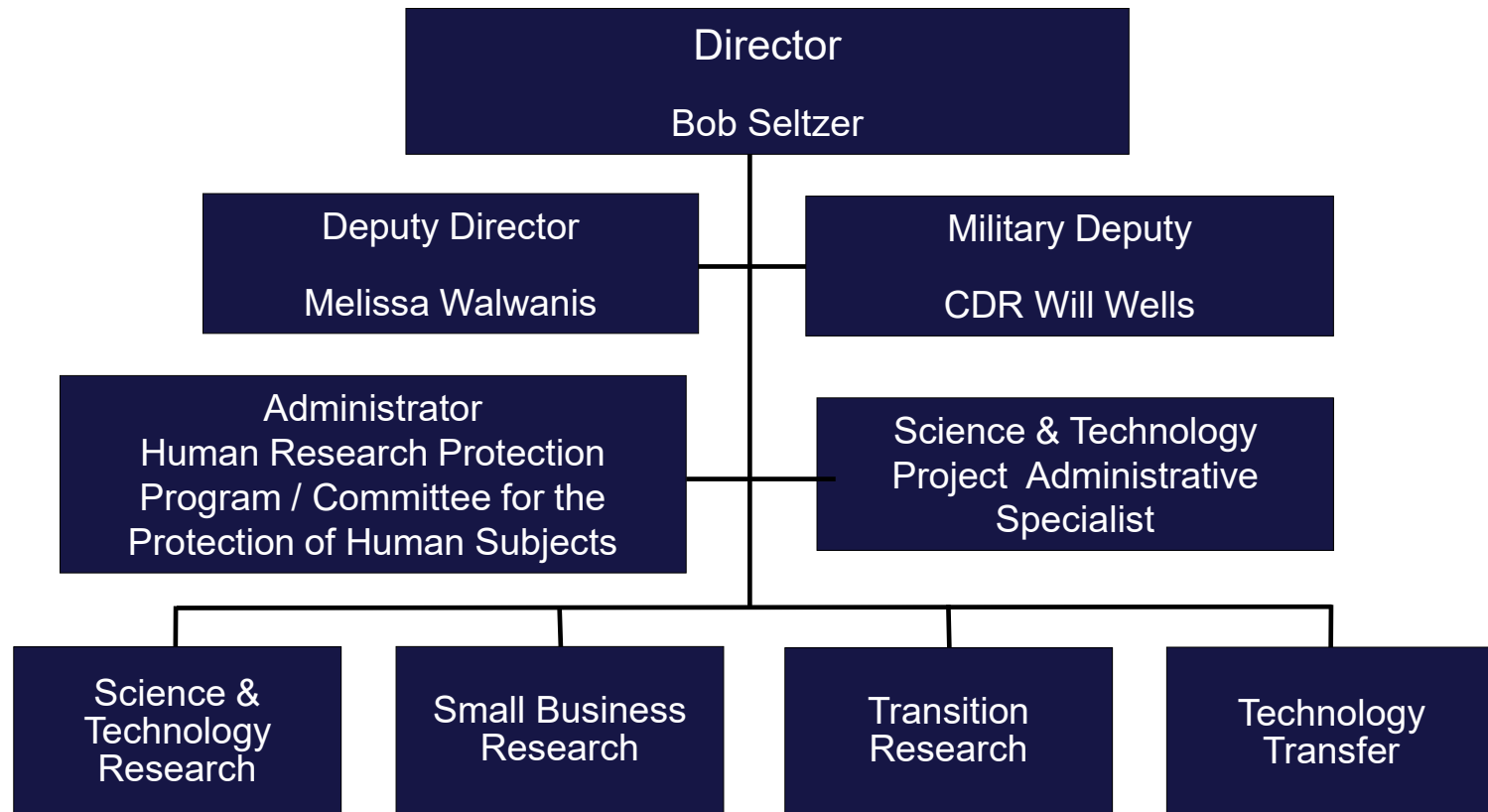
<https://www.navair.navy.mil/nawctsd/TSIS>



# Research & Technology Program Directorate

## MISSION

Plan & Perform a Full Range of Directed Research and Development in Support of Naval and Other DOD Training Systems for All Warfare Areas and Platforms, to Maintain a Naval Critical Technology Base and Transition Technology Results to the Fleet and Other Customers





# NAWCTSD Research Portfolio

- NAWCAD/Office of Naval Research Science & Technology (\*BA1-3)
  - Basic Research
  - Applied Research
  - Advanced Development
- DoD Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) program
- Navy Demonstrations and Validation Research (BA4-7)
- DoD Research
  - Joint/OSD/DARPA
  - Army/USAF/USMC Research
- Technology Transfer (Gov/Non-DoD Research)

NAWCTSD is a R&D Performer and Partners with Industry and Academia on Proposals and Subsequent Research Efforts

\*BA = Budget Activity





# Small Business Innovation Research (SBIR) Opportunities

## Description/Summary of Program Requirements

- Process (2-3 SBIR solicitations per year)
- Phase I (1st yr): Scope problem & detail innovative solution (\$140K/\$100K option)
- Phase II (2nd-3rd yrs): Develop prototype, test & evaluate (up to \$1.6M)
- Phase III (thereafter): Further R&D development / acquisition transition (Government sole source)

### Next Broad Agency Announcement ([navysbir.com](http://navysbir.com)):

→ (21.2) Pre-release: 21 April 2021    Opens: 19 May 2021    Closes: 17 June 2021

ACQUISITION STRATEGY	PERIOD OF PERFORMANCE	MILESTONES	
<ul style="list-style-type: none"> <li>• STTR Phase I</li> </ul> Competitive SBSA All Contracts Processed at NAWCAD, Lakehurst	<ul style="list-style-type: none"> <li>• Phase I: 6 Month w/6 month Option</li> <li>• Phase II: Up to 24 Months</li> <li>• Phase III: Open</li> </ul>	19 May 2021  RFP Open	17 June 2021  RFP Closes
POINT OF CONTACT	FUNDING	CURRENT CONTRACT/ORIGINAL DEVELOPER/OEM (IF RECOMPETE)	
Name: Mr. Robert Seltzer Organization: R&T Program Office Phone: 407-380-4115 Email: <a href="mailto:Robert.seltzer@navy.mil">Robert.seltzer@navy.mil</a>	<ul style="list-style-type: none"> <li>• Year 1 RDT&amp;E \$140K/\$100K</li> <li>• Year 2-3 RDT&amp;E \$1.5M</li> <li>• Year 4+ Non-SBIR \$s; No Limit/ No Competition Required</li> </ul>	<ul style="list-style-type: none"> <li>• TBD-Up to 3 awards planned per topic</li> </ul>	





# Small Business Technology Transfer (STTR) Opportunities

## Description/Summary of Program Requirements

- Small business required to team with research or academic institution (non-Government)
- Phase 1(1st yr): Scope problem & detail innovative solution (\$140K/\$100K option)
- Phase II (2nd-3rd yrs): Develop prototype, test & evaluate (\$1.6M)
- Phase III (thereafter): Further R&D development/acquisition transition (Government sole source)
- Large businesses can partner with small businesses (for Phase III)

**Next Broad Agency Announcement ([navysbir.com](http://navysbir.com)):**

→ (21.2B) Pre-release: 21 April 2021 Opens: 19 May 2021 Closes: 17 June 2021

ACQUISITION STRATEGY	PERIOD OF PERFORMANCE	MILESTONES	
<ul style="list-style-type: none"> <li>• STTR Phase I</li> </ul> <p>Competitive</p> <p>SBSA</p> <p>All Contracts Processed at NAWCAD, Lakehurst</p>	<ul style="list-style-type: none"> <li>• Phase I: 6 Month w/6 month Option</li> <li>• Phase II: up to 24 Months</li> <li>• Phase III: Open</li> </ul>	19 May 21	17 June 21
			
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POINT OF CONTACT	FUNDING	CURRENT CONTRACT/ORIGINAL DEVELOPER/OEM (IF RECOMPETE)	
<p>Name: Mr. Robert Seltzer</p> <p>Organization: R&amp;T Program Office</p> <p>Phone: 407-380-4115</p> <p>Email: <a href="mailto:Robert.Seltzer@navy.mil">Robert.Seltzer@navy.mil</a></p>	<ul style="list-style-type: none"> <li>• Year 1 R&amp;D \$140K/\$100K Option</li> <li>• Year 2-3 R&amp;D \$1.5M (Total)</li> <li>• Year 4+ Non-SBIR/STTR \$s; No Limit No Competition Required</li> </ul>	<ul style="list-style-type: none"> <li>• TBD-Up to 3 awards planned per topic</li> </ul>	



# NAVAIR SBIR/STTR Proposal Solicitation Topics

## • N21B-T024: Predictive Data Analytics to Refine Aircrew Training and Operations

- ➔ OBJECTIVE: Research and develop a technology that supports ingesting large and disparate data sets from naval aviation aircraft and uses data science to provide outputs that increase enterprise level knowledge of aviator performance, safety, and effectiveness through data-driven predictive analytics to influence training and operations.

PHASE II Product: Develop a working prototype to include high-level requirements, design, initial testing, and demonstration the prototype in a lab or live environment.

DoD 21.2(SBIR) / B (STTR) Solicitation Opens: 19 May 21 Closes: 17 Jun 21 ([www.navysbir.com](http://www.navysbir.com))

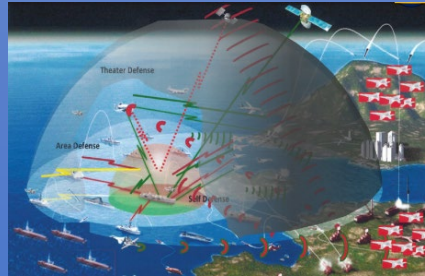


# Continuing Areas of Research



## Emerging Instructional Methods

- ♦ Adaptive Training Techniques
- ♦ AI Enabled Instructor/Crew
- ♦ Scenario Based Trg Methods
- ♦ Multi-level Performance Measurement & Assessment
- ♦ Human Performance Measurement Approaches



## Challenge Areas Supported

- ♦ Denied & Degraded Environments
- ♦ Electronic Maneuver Warfare
- ♦ Integrated Warfighting Capability
- ♦ Cyber Warfare
- ♦ Manned-Unmanned Teaming



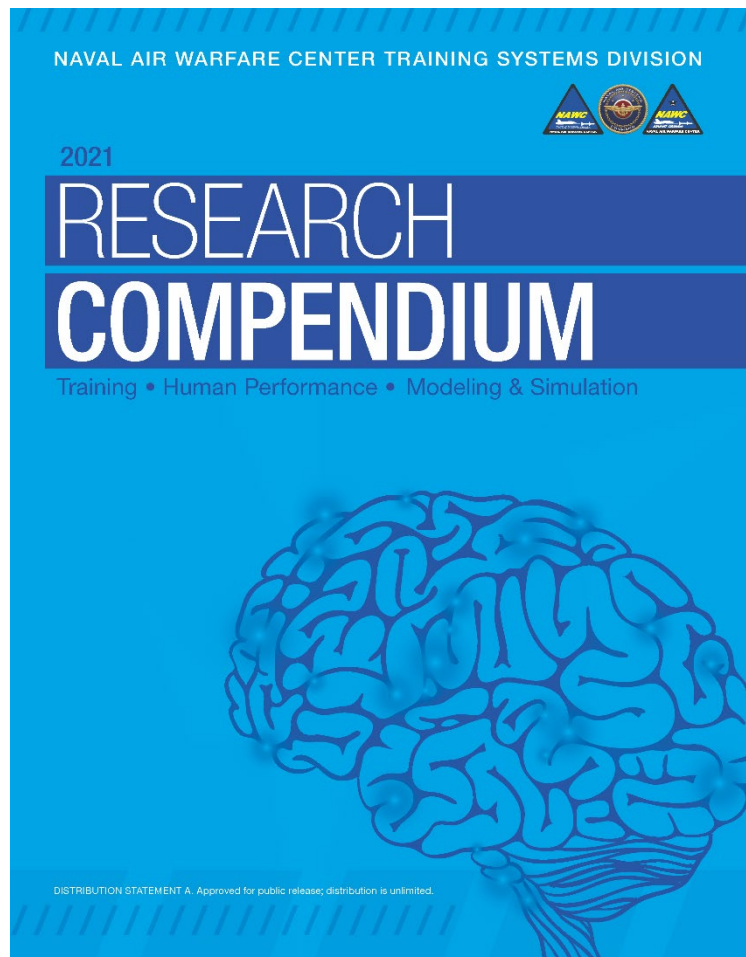
## Training Technology & Environments

- ♦ Data Science (AI/ML)
- ♦ eXtended Reality Visual & Input Enhancements
- ♦ Live, Virtual, Constructive
- ♦ Distributed Mission Training
- ♦ Effects Modeling
- ♦ Mobile Learning/Deployable
- ♦ Cybersecurity & Cloud-based

**Instructional Strategy**



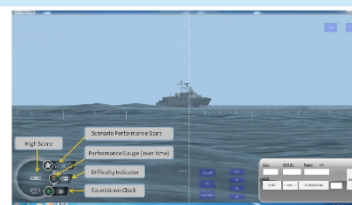
# NAWCTSD Research Compendium



## EXAMINING THE EFFECTS OF GAME FEATURES ON LEARNING IN SCENARIO-BASED TRAINING

### OBJECTIVE

The objective of this research is to systematically test the impact of two game features on performance and motivation: score/performance gauges and competition. To date, there is no previous research that suggests adding game gauges increases motivation or enhances performance, and likewise, little research has examined the effect of competition on learner performance and motivation in game-based training.



The Periscope Operator Adaptive Trainer (POAT) user interface with game gauges included (bottom left).

**PROJECT DURATION**  
OCT 2015 - SEP 2018

**FUNDING SPONSOR**  
Naval Air Systems Command (NAVAIR) | Section 219

**POINTS OF CONTACT**  
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### DESCRIPTION

Previous research has shown mixed results on the efficacy of game features to promote learning outcomes and motivation, and the majority of these studies have not systematically investigated game features to determine which ones are most effective. Based on Cognitive Load Theory, we hypothesized that adding both competition and game features would increase motivation and enhance performance in a simulation-based training task. In a set of experiments, we explored whether the presence of game features (performance gauges and score) and competition features (a leaderboard) affected motivation and learning outcomes within the Periscope Operator Adaptive Trainer (POAT).

### NEED

In light of budget declines, there has been a strong push across the DoD for low-cost training techniques that are engaging, realistic, and can be delivered anytime, anywhere. Game-based training techniques hold promise to meet this demand as they are purported to enhance player motivation. However, existing research on the effectiveness of game-based training is mixed and often nonsystematic, resulting in a failure to identify specific game features that lead to better learning and performance outcomes.

### BENEFITS

Game-based training may be well-suited to meet the Navy's education objectives, given the popularity of computer games with today's young adults. This research seeks to examine the effects of incorporating game features into simulation-based training, a topic that has not been systematically investigated in the training literature. Previous studies have assessed the value of game-based training over traditional methods of instruction, but few have investigated individual game features and their impact on performance and motivation. The findings of these experiments may have a broad impact on future training systems by offering empirically-based guidance for designing game features to enhance effectiveness.

### STATUS

In FY18, the research team conducted two experiments. Experiment 1 was conducted with approximately 120 college students, and the results showed that incorporating game features into training did not improve trainee performance on the task or their motivation to play the game. Experiment 2 was conducted with approximately 70 submarine officer students at NAVSUBASE New London, utilizing a simpler experimental design. Experiment 2 replicated the results of Experiment 1.

### MILESTONES

- Completed data collections for Experiment 1 with a college student population and Experiment 2 with Submarine Officer Basic Course (SOBC) students.
- Developed experimental testbed for systematically evaluating game features, such as scores, leaderboards, and performance gauges in the Periscope Operator Adaptive Trainer (POAT).
- Presentation: Mercado, A. D., Johnson, C. I., Landsberg, C. R., & Bailey, S. K. T. (2018, August). A systematic evaluation of game features in simulation-based training. Poster presented at the International Ergonomic Association conference.
- Analyzed data and wrote report of results from SOBC experiment, concluding that game features do not increase motivation nor improve the accuracy of periscope calls. Adaptive training increased call accuracy regardless of inclusion of game features.

BASIC AND APPLIED RESEARCH • CORE CAPABILITY 2

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Research Compendium can be found at the bottom of the NAWCTSD Web site Home page:  
<https://www.navair.navy.mil/nawctsd/sites/g/files/jejdrs596/files/2020-12/NAWCTSD%20Research%20Compendium%202021.pdf>





# Technology Transfer: Partnering with Industry, Academia, State/Local

## Cooperative Research and Development Agreement (CRADA)

- Allows R&D collaboration between NAWCTSD and non-federal partners.
- Provides the means to offer intellectual property (IP) rights to a non-federal partner.
- NAWCTSD can provide:
  - Personnel
  - Facilities/Equipment
  - Intellectual Property (IP)
  - **NO funds**
- Non-federal party can provide:
  - Personnel
  - Facilities/Equipment
  - Intellectual Property (IP)
  - **Funds**

## Commercial Service Agreements (CSA)

- Allows the sale of defense articles and/or services that are not available from any United States commercial source.
- Makes services of any government laboratory, center, range or other testing facility available for testing purposes on a reimbursable basis.
- Relies on existing capabilities and expertise
- Requires full reimbursement of Government costs
- Cannot compete with United States private industry



# Technology Transfer: Partnering with Industry, Academia, State/Local

## Software License Agreement (SLA)

- Agreement between NAWCTSD and an Industry partner which allows them to make, use and sell federally developed software with the assurance that we will not sue for infringement.
- NAWCTSD retains rights to use the software for government purposes.
- Industry partner pays royalties to NAWCTSD.

## Patent License Agreement (PLA)

- Agreement between NAWCTSD and an Industry partner which allows them to make, use and sell federally owned inventions with the assurance that we will not sue for infringement.
- NAWCTSD retains rights to use the technology for government purposes.
- Industry partner pays royalties to NAWCTSD.

**Search for us on <https://www.federallabs.org/flcbusiness> for more information on available technologies.**



# How to Participate in NAWCTSD Research?

- Tell us about your Independent Research and Development (IRAD) efforts
  - Respond to SBIR/STTR Solicitations
    - Small Business – Large Business Partnering, Academia can be included
  - Pursue Cooperative Research and Development Agreements (CRADAs) with NAWCTSD when we find an area of common interest
  - Partner on Joint Proposals (Scientist to Scientist/Engineer to Engineer)
    - If successful w/joint proposals several contract vehicle options available:
      - SBIR Phase III
      - NAWCTSD R&D Broad Agency Announcement (S&T projects only)
      - ONR/DoD/funding agency contracting
- <https://www.onr.navy.mil/en/work-with-us/funding-opportunities>
- Consider new opportunities available through the Tech Grove

## Research & Technology Program Office POC

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