
Defense Technology Symposium
in conjunction with the AUSA Warfighter Summit & Exposition
July 26, 2022 * Fayetteville, NC

Defense Technology Symposium

Session – Military Technology Needs and Trends

Lieutenant Colonel (Ret) Rob Robinson, North Carolina Defense Technology Transition Office (DEFTECH)

Y. Sammy Choi, MD, Chief, Department of Research, Womack Army Medical Center

Tom Earnhardt, J7 – Technology Innovation & Information Operations, Joint Special Operations Command

Justin Helton, Office of Naval Research Global Science Advisor to II Marine Expeditionary Force

John Whitetaker, Strategic Engagement Director - North Carolina, National Security Innovation Network

SSG Kyndal Lievano, Chief of Innovation / Gryphon Spark, SPARK Cell, AFWERX Fellow, 43d Air Mobility Operations Group

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Womack Army Medical Center

Military Technology Needs and Trends

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Disclosure

The views expressed herein are those of the author and do not necessarily reflect the official policy of the Department of the Army, Department of Defense, Defense Health Agency, or the US Government.

Physician Training Programs

- Family Medicine
- Family Medicine Hospitalist
- General Surgery
- Internal Medicine
- Obstetrics & Gynecology
- Orthopedic Surgery (starts July 2023)

Other Graduate Training Programs

- Nurse Anesthesia
- Nurse Practitioner
- Dentistry
- Endodontic Dentistry
- Oral and Maxillofacial Surgery
- Neuro-Optometry
- Optometry
- Healthcare Administration
- Nutrition
- Clinical Pharmacy
- Clinical Psychology
- Clinical Social Work
- Veterinary Medicine

Needs

- Objective diagnosis of mild traumatic brain injury (mTBI)
- Early detection of pending vascular collapse, heat injury, or muscle failure
- Prevention and treatment of post-traumatic stress
- Suicide prevention
- Early detection of environmental and infectious hazards
- Human performance optimization via nutrition and training

Types of Collaborations

- Industry-sponsored, e.g., Novavax COVID vaccine diseases-fully funded
- Investigator-initiated with small business or universities (requires intramural or extramural funding):
  - Single nucleotide polymorphism predicting exertional rhabdomyolysis
  - PCSK9 inhibitors and statin use
  - High-relational, resonance-based electroencephalic mirroring for mTBI
  - 3D imaging for facial reconstruction
  - Cadaveric augmented reality simulation training
  - Proteomics to predict human performance in SOF Soldiers
- Womack internally funded projects

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II MARINE EXPEDITIONARY FORCE

Science and Technology Priorities / Opportunities

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ONR Global Science Advisor

Science and Technology Priorities

- Mobile, resilient, Beyond Line of Sight (BLOS) communications capabilities that are Low Probability of Detection (LPD).
- Applications that share and analyze relevant logistics information that minimize reporting burden.
- Ability to distribute all classes of supply to distributed forces using unmanned/autonomous, expendable air/ground/surface/subsurface platforms that minimize operator interaction.
- Ability to detect and localize surface and subsurface targets Beyond Line of Sight (BLOS).
- Expeditionary, low signature power generation.
- Improve power storage and generation systems in cold environments while reducing their signature.

S &T Opportunities

Technology Operational Experimentation Exercise (TOEE)

FY23 exercise funded by ONR to inform decision making for S&T investments. Solicitation will be released through a Commercial Solutions Offering (CSO) in the next few weeks. (https://sam.gov)

NIWC LANT Advanced Naval Technology Exercises (ANTX):

Multiple Exercises & Solicitations available on (https://sam.gov) and (https://www.theiwrp.org/)

S&T Observations & Constraints

- Doing demonstrations on Camp Lejeune ranges will get the most participation/interest but the lead times can be long. Start Planning early.
- Be mindful of your subcomponents. If you have an Unmanned Aerial System (UAS) with foreign computational parts (flight controllers), we won't be able to fly it on our ranges.
- If your schedule or system precludes you from demonstrating on our ranges, please reach out because we may be able to send observers to your facility.
- If a solution is going to touch tactical networks or data feeds, we would like to eventually link it to Tactical Services Oriented Architecture (TSOA) because its streamline Authority To Operate (ATO). No ATO -> No integrated demonstrations.
- Artificial Intelligence is great and we would love to see your AI solutions, but we request that you come ready to talk about training data and performance. (more than just the platform to do the AI task)

II MEF

COME TO FIGHT. COME TO WIN.

FLEET MARINE FORCE

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NC Defense Technology Symposium

Military Technology & Needs Panel 07/26/22

AFWERX / NSIN / Gryphon Spark Cell

Mission:

AFWERX - Innovation arm of the Department of the Air Force and powered by the Air Force Research Laboratory, AFWERX accelerates agile and affordable capability transitions by teaming innovative technology developers with Airman and Guardian talent.

NSIN - Our mission is to build networks of innovators that generate new solutions to national security problems.

Gryphon Spark - Create transformative opportunities & foster a culture of innovation in order to solve problems & enhance mission effectiveness.

How to Contact / Do Business With

POC: **Darshan Divakaran**
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Top 5 Gaps/Needs

- Unit education/training
- Communication Pipeline
- Strategic Partnerships
- Leadership Engagement
- Incentivization Structure

Key Problem(s) that needs addressed

- **Connecting right partners with right solutions at the right time**
- **Prioritization by Units to support and utilize organizations focused on innovation and modernization**

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Session – Military Technology Needs and Trends Business Briefs

SaberTooth Solutions AHTC

Mesur.io

Cymantix

SCOUT CARD

NCDEFTECH

Light-Weight Armor

Advanced Hydrogen Technologies Corporation

POC: Pete Lohr, (828) 448-5905 pete.lohr@sabertoothSolutions.com

Problem

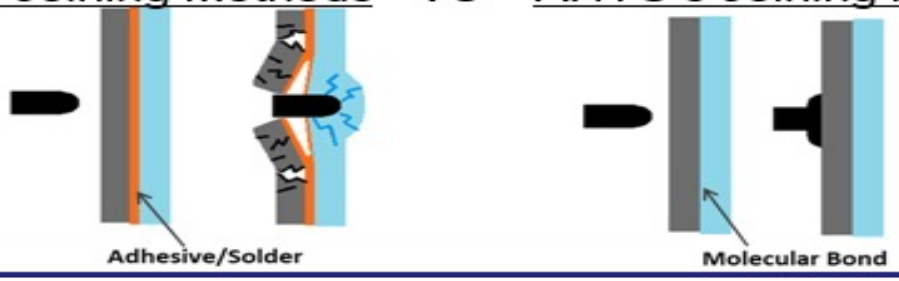
- Armor has historically been a trade off of weight versus level of protection. Ceramics are brittle when struck with a projectile. Ceramics are glued to aluminum substraights to create strong light-weight vehicle armor however, the effectiveness is poor because the ceramic breaks and pulls away from the aluminum.
- AHTC solves this problem by creating a molecular bond between the ceramic and the aluminum such that the armor is stronger than the sum of its parts.

Solution Specifics

The hardness properties of carbide deforms a projectile, expanding its impact area, then the malleability of Aluminum dissipates the impact energy.

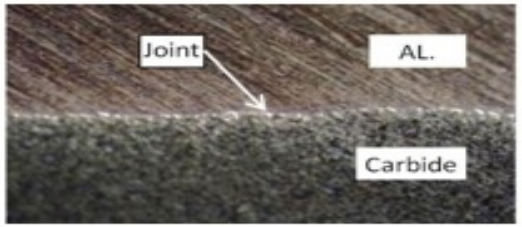
Projectile Striking:

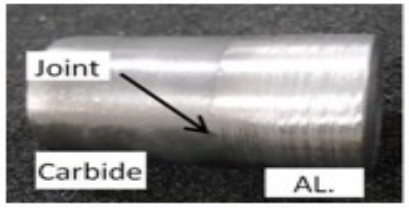
Other Joining Methods - VS - AHTC's Joining Method

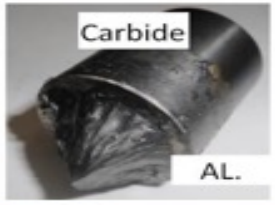


Impact and Technical Approach

TRL: 4







The weaker of the two bonded materials fails before the joint separates.

Performance

AHTC's armor can provide better performance-to-weight ratios than these materials individually; reduced weight translates to vehicles that can carry more fuel, ammo, personnel, supplies, and/or travel faster with less fuel consumption.

AHTC can bond a magnitude of dissimilar metals and has been awarded nearly two million dollars from the NSF towards developing bonding of Ceramics to Metals.

Revision Date: 03/04/2022

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SaberTooth Solutions AHTC

Mesur.io

Cymantix

SCOUT CARD

DEFTECH

EARTHSTREAM

Mesur.io
POC: Tom Rump
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Problem

Too much data not enough actionable information
Structured vs. Non-Structured (OSINT)
Public vs. Private | Formats & Languages
Trustworthy? Veracity vs. Validity

Today's solutions require extraordinarily large volumes of data
i.e. ~ 500+ GB
175B Parameters

Solution Specifics

Earthstream autoML & AI Solution
Autonomous discovery
Deconflicting cleansing and normalizing
Link & model preserving lineage

Output/s
Real-time geospatial analysis
Prescriptive actionable decisions

Impact and Technical Approach

Platform deployed: Government & Commercial
TRL 6/7 (NASA scale)
Continued capability and expansion underway

Active models in use
Disease risk (human, plant, livestock)
Climate and environmental issues
Supply chain observability
Forced labor

Performance

Business Case
Instantaneous model creation (Monkey Pox)
Resource focused on outcomes not inputs
Answers to questions you did not know you had

Dual-Use (Commercial / Military) applications
US Customs
DHS NBIC
Bayer/Cotton Inc/Syngenta

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Cymantix

SCOUT CARD

DEFTECH

Visual & Dynamic Information Retrieval

Cymantix

POC:
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Problem

High-velocity, and highly diverse, unstructured data (text) channels contain potentially valuable and actionable information. Information that may be relevant to people or groups of interest, tactics, techniques, or procedures of advanced persistent threats in cyberspace, or general thematics of intercepted audio transcription data from POIs. Our technology enables analysts to operationalize various open source intelligence (OSINT) and/or highly sensitive intelligence through a visual and interactive approach.

Solution Specifics

Our platform PATTIE is a highly dynamic and visual information retrieval platform that was built initially for the biomedical research community. Recently, by working with our DOD and academic partners, our team is developing variants of this platform that are relevant to national security, energy, and cybersecurity. The platform contains significant unstructured data processing by a combination of supervised and unsupervised machine learning methodologies that provide analysts a point-and-click search engine like experience through a visual information seeking paradigm.

Impact and Technical Approach

Technology Readiness Level (TRL)

TRL: 6 (Representative of the deliverable demonstrated in relevant environments)

What is the Impact of your Solution?

Reduced time spent aggregating and synthesizing high-dimensional unstructured data and increased time making decisions.

Performance

End-user payoff/expected operational value/new capability:

Cluster, classify, automatically curate, and discover insights across multiple streams of unstructured data that are considered OSINT or sensitive while interacting with one intuitive human-computer interface.

Dual-Use (Commercial / Military) applications for the technology solution:

Enterprise search & retrieval platform for government, academia, and private sector.


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