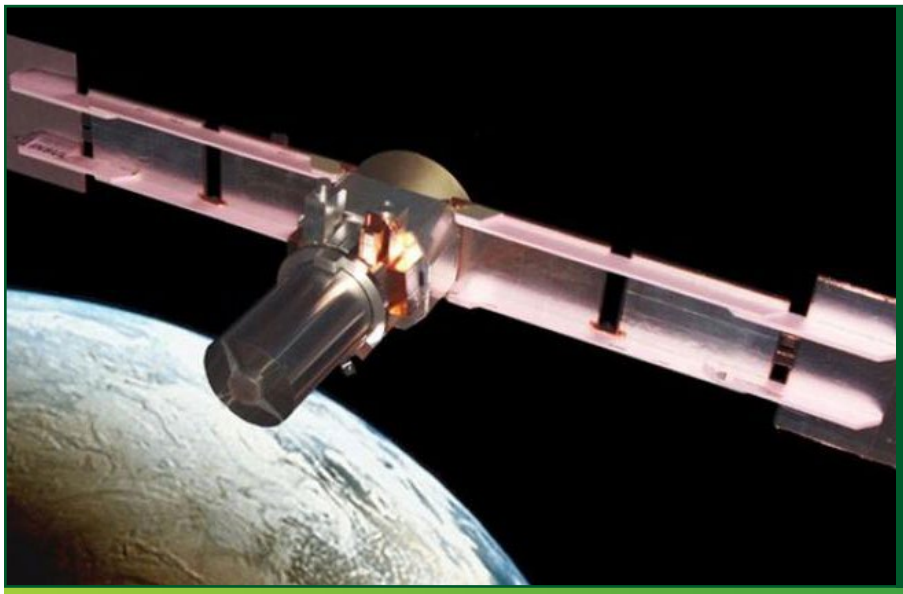
Defense Systems DIGEST

14 JANUARY 2020 – THE LATEST FROM DEFENSE SYSTEMS INFORMATION ANALYSIS CENTER



NOTABLE TECHNICAL INQUIRY

What is the status of a Joint Munitions Effectiveness Manual (JMEM)-like capability for directed-energy effects to satellites?

A DSIAC subject matter expert (SME) participated in a phone conversation to describe JMEM and the state of modeling and simulation to develop a comparable tool for directed-energy effects to satellites. The DSIAC SME identified SMEs within the U.S. Air Force who can provide more detail on the status of efforts incorporating space-based systems into JMEM... Read More

▶ SUBMIT YOUR TECHNICAL INQUIRY – 4 hours of research service for FREE

FEATURED NEWS

Neuro-Symbolic A.I. Is the Future of Artificial Intelligence

Picture a tray. On the tray is an assortment of shapes: some cubes, others spheres. The shapes are made from a variety of different materials and represent an assortment of sizes. In total, there are, perhaps, eight objects. My question: "Looking at the objects, are there an equal number of large things and metal spheres?"

It's not a trick question. The fact that it sounds as if it is is proof positive of just how simple it actually is. It's the kind of question that a preschooler could most likely answer with ease. But it's next to impossible for today's state-of-the-art neural networks. This needs to change. And it needs to happen by reinventing artificial intelligence as we know it.

That's not my opinion; it's the opinion of David Cox, director of the MIT-IBM Watson A.I. Lab in Cambridge, MA. In a previous life, Cox was a professor at Harvard University, where his team used insights from neuroscience to help build better brain-inspired machine-learning computer systems. In his current role at IBM, he oversees a unique partnership between MIT and IBM that is advancing A.I. research, including IBM's Watson A.I. platform. Watson, for those who don't know, was the A.I. which famously defeated two of the top game show players in history at TV quiz show Jeopardy. Watson also happens to be a primarily machine-learning system, trained using masses of data as opposed to human-derived rules. **Read More**

VOICE FROM THE COMMUNITY

Arje Nachman, *Ph.D., Program Manager, Air Force Office of Scientific Research (AFOSR)*

I hold a B.S. in applied mathematics from Washington University and a Ph.D. in mathematics from New York University. My academic training was always oriented toward mathematics, which accompanied the study of physics and engineering. Thus, in graduate school, I studied linear/nonlinear differential equations (ordinary and partial) together with various techniques for finding or approximating their solutions. My publications reflect this orientation in that they examine problems arising in fluid mechanics, combustion, elastic/viscoelastic mechanics (including fracture), electromagnetics, and a few other topics. Following a decade in academia and a segue into commercial research, I joined AFOSR as a program officer, first managing a portfolio in physical math and later a portfolio in electromagnetics, which I continue to do.

Apply to be part of our network of over 1,000 subject matter experts.

UPCOMING EVENTS

Autonomous Vehicles 2020

26 February 2020 to 28 February 2020

2020 IEEE Conference on Virtual Reality (VR) and 3-D User Interfaces

22 March 2020 to 26 March 2020

SPIE Defense Commercial Sensing (DCS) 2020 Expo

26 April 2020 to 30 April 2020

2020 AIAA Aviation and Aeronautics Forum and Exposition

15 June 2020 to 19 June 2020

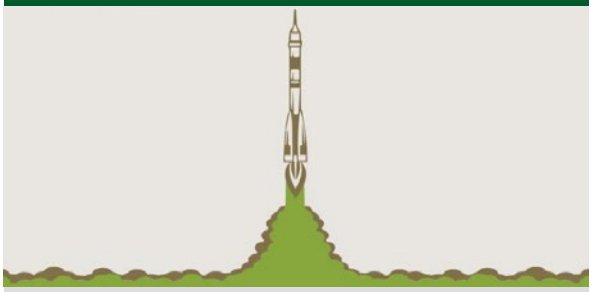
Want your event listed here? Let us know!

HIGHLIGHT

66th Annual Reliability & Maintainability Symposium (RAMS)

On 27–30 January 2020, DSIAC will participate in the 66th Annual Reliability & Maintainability Symposium (RAMS) in Palm Springs, CA. Read More

DSIAC JOURNAL FALL 2019



The Green Monopropellant: Developing and Flight Testing AF-M315E, a Hydrazine Replacement

Also in This Issue:

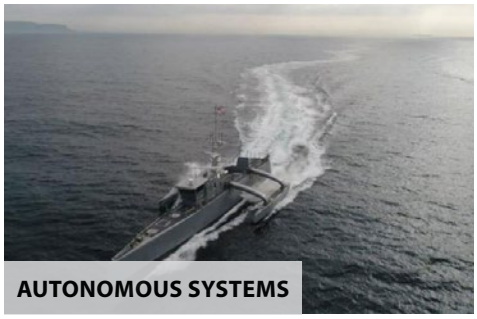
- Effects of Material Properties on ISR for Synthetic Aperture Radar
- High-Strength, Corrosion-Resistant Steel Over Titanium Alloy for Aircraft Critical Components
- Vehicle Protection: Underpinning Advanced Armor Research and Impact on Survivability
- Zero-Bias Broadband Ultraviolet Photoconductor Based on Ultrananocrystalline Diamond Nanowire Arrays
- Change Detection in Satellite Imagery With Region Proposal Networks

Have an idea for a topic? Please contact us to write an article!

RECENT NEWS

ADVANCED MATERIALS

Army Introduces Weld Automation for Next Generation Combat Vehicles



AUTONOMOUS SYSTEMS

Fleet Commander Directs U.S. Navy's Surface Force to Develop Concepts for Unmanned Ships

DIRECTED ENERGY

Laser Pulse Creates Frequency Doubling in Amorphous Dielectric Material

ENERGETICS

China Tests Micro Propulsion Technology for Space-Based, Gravitational-Wave Detection

MILITARY SENSING

Air Force, Navy, and Army Conduct First "Real World" Test of Advanced Battle Management System

NON-LETHAL WEAPONS

Police to Consider Adding Tasers to Crime-Fighting Arsenal

RMQSI

AEDC T-3 Engine Test Cell Receives Upgrades for Future Tests

SURVIVABILITY AND VULNERABILITY

CCDC's Road Map to Modernizing the Army: Soldier Lethality

WEAPON SYSTEMS

New Weapons System Completes First Live Mission

Webinar: Lightweight Multifunctional Structural Composite With Integrated Electromagnetic Shielding

28 January 2020 – 12:00 p.m. to 12:45 p.m. EST

The ability to construct a multifunctional material that provides electromagnetic (EM) hardening on an aircraft structure integral to the material form has been demonstrated. The material's key attribute is the integration of a high level of EM shielding directly into a structural, fiber-reinforced graphite composite in a manner that has minimal-to-no impact on the mechanical characteristics of the host composite. The material form has demonstrated the EM shielding equivalency of an aluminum electronics enclosure structure on a composite alternative for 25% of the weight without impacting structural characteristics. This material form provides a lightweight alternative to traditional means of providing aircraft EM protection from existing and emerging threats, such as high-power microwaves and EM pulse (EMP)/high-altitude EMP, without incurring parasitic weight penalties. Its multifunctionality provides a weight-efficient means to address EM shielding in a composite while taking advantage of its strength-to-weight properties.

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