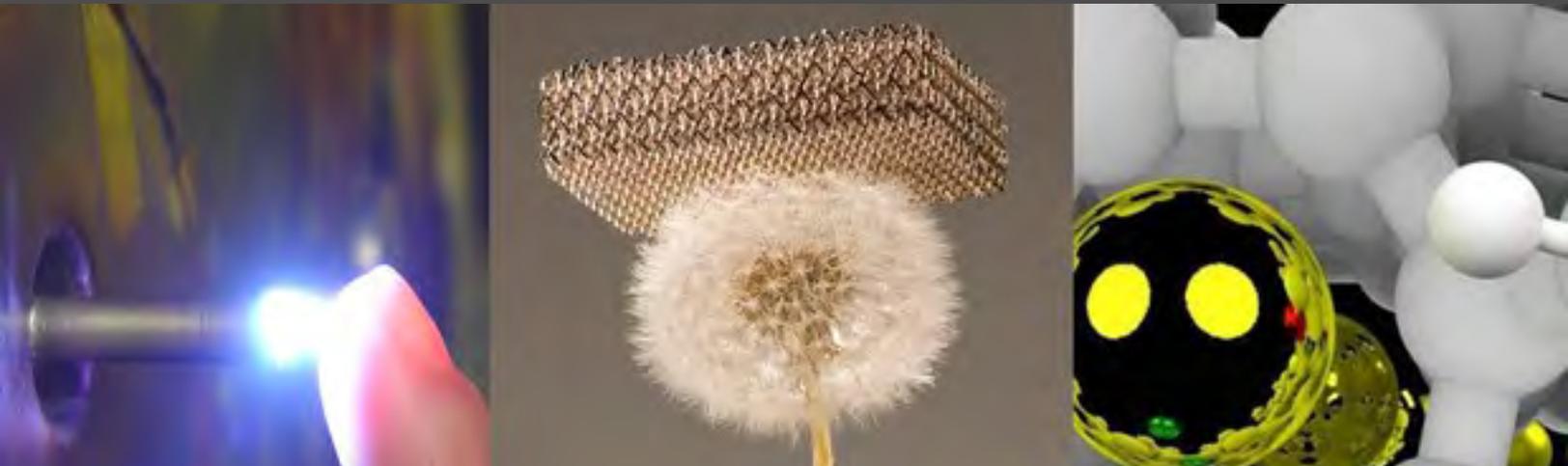


# Defense Systems

## NEWS DIGEST

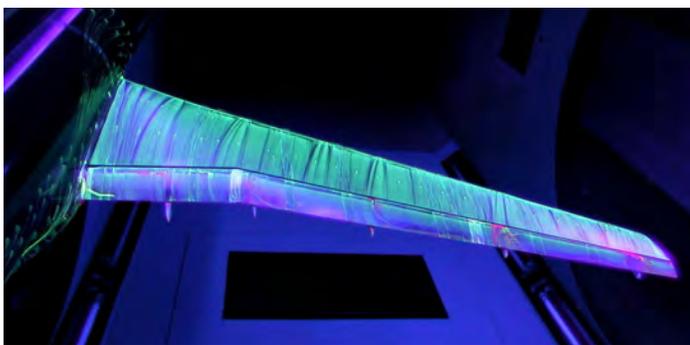
13 September 2016 - THE LATEST IN DEFENSE SYSTEM NEWS



## Materials Science: Advancing the Next Revolution of “Stuff”

For millennia, materials have mattered—so much so that entire eras have been named for them. From the Stone Age to the Bronze Age to the Iron Age and beyond, breakthroughs in materials have defined what was technologically possible and fueled revolutions in fields as diverse as electronics...

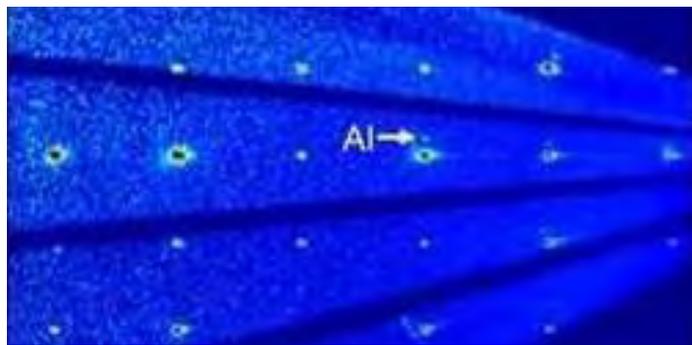
### Advanced Materials



#### Flying with the Fourth State of Matter

A scaled-down gale blows over a flat plate set inside the tabletop wind tunnel. Despite the low lighting and hazy Plexiglas view portals, we can clearly see the frenzied fluttering of streamer ribbons, called telltales, in the field of little wind vanes that carpets the exposed test surface inside.

At first, each unruly telltale flies every which way, clear evidence of unsteady air flows gusting within..



#### Defects, Electrons, and a Long-Standing Controversy

Faster, more energy-efficient electronics could be created with topological insulators, which carry an electrical charge on just the surface, while the interior acts as an insulator. Scientists are delving into how the material's structure and chemistry correlate with its unusual electronic properties. By carefully controlling and monitoring chemical changes in the topological insulator bulk...

**Autonomous Systems**



**Army Tests Manned-unmanned Teaming Capabilities in Pacific Initiative**

As the U.S. Army shrinks in size, military planners continue to assess strategic options to rapidly build and project effective combat power where needed.

The Army anticipates that unmanned capabilities will augment combat formations and, in complex and contested conditions, enable decisive action in unified land operations. The U.S. Army Tank Automotive Research, Development and Engineering Center participated in...



**Machines That Tell You When They're Sick**

In the future, machines will monitor their own health and request help, themselves, when something's wrong, predicts David Cirulli, engineering vice president and co-founder of CEMSol LLC.

"There's going to be an integrated system-health engine as part of every system out there, and it will be able to interface with other systems and components," says Cirulli. "That's what's missing today." He compares the capability to how sick human patients can verbalize...

**Directed Energy**



**High Powered Microwaves: The Non-Lethal Future of Warfare**

As the global arms race drives on into the 21st century, many countries have turned their attention towards the research and development of Directed Energy Weapons. Directed Energy Weapons, or DEWs, are defined as any weapon that emits focused energy and can transfer said energy to inflict damage upon a target.

DEWs are broken up into two distinct classifications—lasers and microwave weapons. Lasers, the more...



**Lasers Vs. Drones: Directed Energy Summit Emphasizes the Achievable**

When do laser weapons finally become real? The low-hanging fruit for a near-term application looks like it's shooting down enemy drones before they can target US forces. Both the Army and Marines are testing vehicle-mounted "counter-UAS" (Unmanned Aerial System) lasers, while the Navy already has a bulkier model aboard the USS Ponce in the Persian Gulf.

How's it going? Army Maj. Gen. Robert Dyess...

**Energetics**



**Iodine-Compatible Hall Effect Thruster**

The Hall effect thruster (HET) was designed for long-duration operation with gaseous iodine as the propellant. Iodine is an alternative to the state-of-the-art propellant xenon. Compared to xenon, iodine stores as a solid at much higher density and at a much lower pressure. Because iodine is a halogen, it is reactive with some of the materials with which a Hall thruster is typically constructed. Through research and testing, the new method allows for the HET to be used with iodine propellant for long periods of time. The thruster is distinguished from...



**Recycling Technology Converts Plastic Waste to Energy**

NASA's expertise in rocket engine improvement helps optimize plastic recycling process equipment.

As good as it feels to throw plastic items into the recycling bin, the fact is most of that plastic goes unrecycled, according to Jim Garrett, a veteran of the oil and gas industry. "It's a dirty little secret in America that 90 percent of our plastic ends up [in landfills], if not in our oceans." The reason for the low rate of recycling is that many...

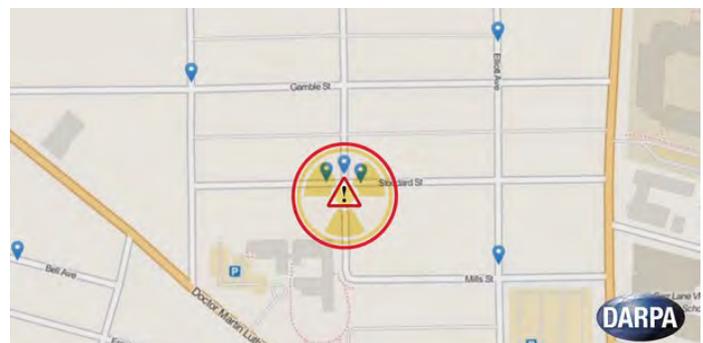
**Military Sensing**



**Carbon Nanotube-Based Sensor Detects Toxins With a Mobile Phone**

A little over four years ago, researchers at the University of California, Riverside, developed a sensor made from carbon nanotubes for detecting toxic chemicals. So enthusiastic were the researchers with the prospects of their technology that they launched a company, Nano Engineered Applications, that intends to add this sensor to people's mobile phones.

While the commercial prospects of a smartphone toxin...



**Ushering in a New Generation of Low-Cost, Networked, Nuclear-Radiation Detectors**

A DARPA program aimed at preventing attacks involving radiological "dirty bombs" and other nuclear threats has successfully developed and demonstrated a network of smartphone-sized mobile devices that can detect the tiniest traces of radioactive materials. Combined with larger detectors along major roadways, bridges, other fixed infrastructure, and in vehicles, the new networked devices promise significantly enhanced awareness of...

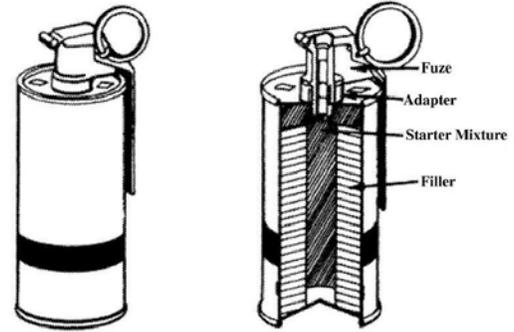
## Non-Lethal Weapons



### BE Meyers to Support USMC's Ocular Interruption Programme

BE Meyers has been selected by the US Marine Corps (USMC) Systems Command to serve as the sole source provider for the Ocular Interruption (OI) programme. The Ocular Interruption system will provide a weapons-mounted or hand-held dazzling laser employed during Escalation of Force (EoF) situations.

It is set to replace the Glare Mout 532P-M and LA-9/P Green Beam Dazzling Laser Systems employed by...



### Army Files for Patent on Non-Pyrotechnic, Non-Lethal Gas Grenade

A non-pyrotechnic disseminator includes a body portion with a cover; a first compartment adjacent to the cover that is configured to hold disseminating materials; a chamber adjacent to the first compartment; a disk within the chamber and adjacent to the first compartment; a flow control device adjacent to the chamber opposite the disk; a second compartment adjacent to the flow control device and including a pin; an actuating mechanism...

## RMSQI



### AF Lab Investigating Microscopic Crack Formations, Metal Fatigue

The B-52 Stratofortress is one of the oldest legacy aircraft in the Air Force. Since the 1950s, the B-52 has led the force in its dominance as the world's best; however, just as humans begin to age, so do aircraft.

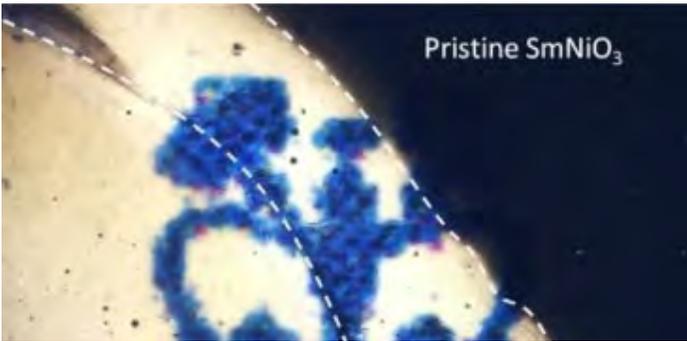
Repeated loading and unloading, changes in air pressure, exposure to altitude and more, contribute to what is referred to as "metal fatigue," resulting in small, microscopic cracks in engine, wing or tail structures that can...



### Fueling the Future: Air Force Working to "Home-Grow" Biofuels for DOD, Industry

Creating, maintaining, protecting and expanding critical technology and technology resources is paramount to national security. A need to address increases in petroleum costs with an environmentally-friendly fuel source has led to a new way of looking at production—and the Defense Production Act Title III Program Office, part of the Air Force Research Laboratory, is playing a critical role in commercializing this technology...

**Survivability & Vulnerability**



**New Optical Material Offers Promise of Intelligent IR Camouflage Coatings**

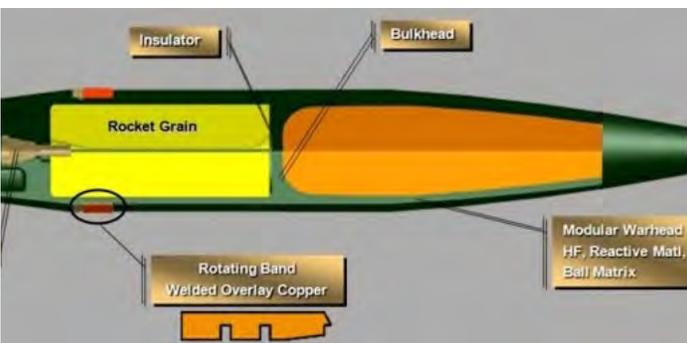
A team led by Nanfang Yu, assistant professor of applied physics at Columbia Engineering, has discovered a new phase-transition optical material and demonstrated novel devices that dynamically control light over a much broader wavelength range and with larger modulation amplitude than what has currently been possible. The team, including researchers from Purdue, Harvard, Drexel, and Brookhaven National Laboratory, found that samarium...



**Self-Healing Wire Insulation**

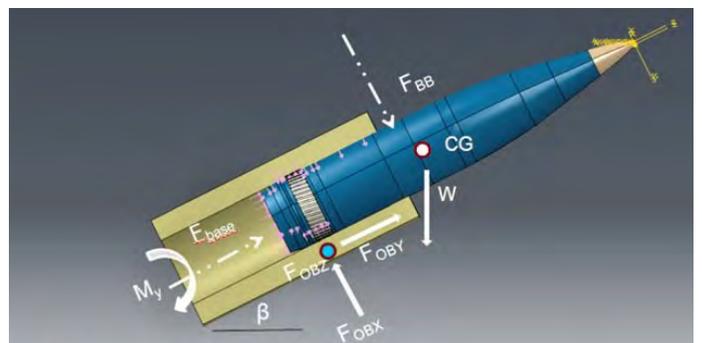
NASA's Kennedy Space Center is seeking commercial partners for licensing or further development of a novel high performance, flexible, low-melt polyimide film with self-healing properties. The self-healing properties of the film are provided by embedded microcapsules containing a solvent soluble polyimide. When cut or otherwise damaged, these capsules release their contents which dissolve and heal the damaged area. Aerospace and ground vehicles often contain miles of high performance electrical wire insulation which are prone to damage...

**Weapons Systems**



**Army Developing Safer, Extended Range Rocket-assisted Artillery Round**

The Army is developing a new 155 mm artillery round that will extend cannon range to more than 24 miles (40km), with the added benefits of greater safety for service members and the ability to deliver near-precision strike capability. The XM1113 Insensitive Munition High Explosive Rocket Assisted Projectile, or XM1113 RAP, will replace the aging M549A1 rounds produced in the 1970s and 1980s and help U.S. Soldiers and Marines...



**Picatinny Statistics Group Pioneers New Mathematical Method to Aid Weapon M&S**

In case you've forgotten the adage that "uncertainty is the only certainty," Picatinny Arsenal's Statistics Group is prepared to remind you. Its latest initiative known as "Uncertainty Quantification" focuses on studying engineering modeling and simulation uncertainty from a statistical standpoint and leveraging it as a more credible approach to weapon and munition product development. Uncertainty Quantification, or UQ, is a family of...

**Announcements**

**DSIAC Is Pleased to Announce the Completion and Release of the New Joint Aircraft Survivability Program Office (JASPO) Website Located at [jasp-online.org](http://jasp-online.org).**



The website was developed under a DSIAC Core Analysis Task (CAT) and product & resource requests made through the site are designed to operate synergistically with the DSIAC website. The JAS website features the latest in aircraft survivability news, events & announcements, projects & success stories, and the latest & past issues of the Aircraft Survivability Journal.

**DSIAC Is Also Pleased to Announce that Registration is Now Open for the Introduction to Brawler Training Course (U.S. Only).**



Photo courtesy of U.S. Air Force

Brawler is a U.S. Government owned M&S tool that simulates air-to-air combat between multiple flights of aircraft in both the visual and beyond-visual-range arenas. Such simulations of air combat are considered to render realistic behaviors by Air Force pilots. This modeling and simulation tool incorporates value-driven and information-oriented principles in its structure to provide a Monte Carlo, event-driven simulation of air combat between multiple flights of aircraft with real-world stochastic features.

The course will be offered by ManTech on 18-21 October 2016 located at 46610 Expedition Drive, Lexington Park, MD. The course includes instruction and hands-on experience with performing simulations.

## Doolittle Institute SOFWERX Ecosystem Registration

The Doolittle Institute SOFWERX, in collaboration with DSIAC, is encouraging DoD, industry, and academia to sign up for and participate in the SOFWERX ecosystem.

### About the SOFWERX Ecosystem:

Some of our nation's toughest challenges are only one or two connections away from being solved. By joining the Doolittle Institute SOFWERX ecosystem, you are committing to being part of the networked solution. You will occasionally receive e-mails informing you of current challenges and how you can participate.

To register for the SOFWERX Ecosystem and to receive announcements regarding upcoming challenges, please visit: <http://www.sofwerx.org/ecosystem-explanation/>.

## DoD CBRN Survivability Conference

### Date:

16 – 17 Nov. 2016

### Location:

Omni Orlando Resort  
ChampionsGate,  
Orlando, Florida



### Registration:

Please [register](#) no later than COB Tuesday, 25 October 2016.

The DoD CBRN Survivability Conference is an intensely educational two-day symposium for those that support programs with CBRN survivability requirements and want to learn more. This conference aims to leverage DoD and industry resources by forming strategic collaborative partnerships. Your participation will lead to specific solutions to challenges for each of the operational environments to be discussed and allow stakeholders to share the path forward to establishing and implementing CBRN survivability initiatives.

For more information, please visit: <http://tinyurl.com/hjhgswa>

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