

Defense Systems

NEWS DIGEST

18 July 2017 - THE LATEST IN DEFENSE SYSTEM NEWS



Why Every Research Portfolio Should Include Basic Science

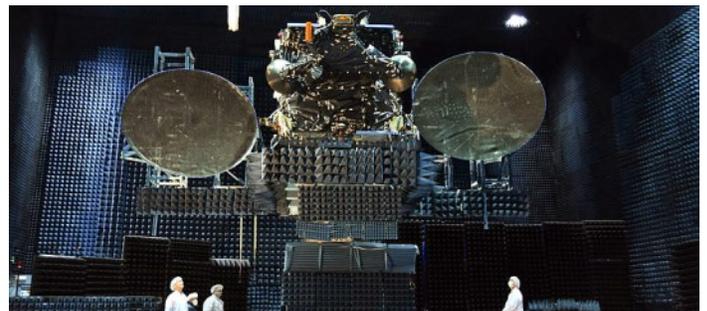
Like all aspects of the military, the research and development sector thrives on a foundation of cause and effect. Basic science has a more indirect connection to operational outcomes, which often makes its utility easier to overlook. This oversight, however, creates a critical vulnerability in the military R&D structure that can leave operational units performing below their maximal potential...

Advanced Materials



World's First Operational 3D Printed Excavator

For the past two years a conglomerate of trade associations, industry, government and academia have been collaborating on the world's first operational 3D printed excavator. That project made a giant leap forward with the recent printing of a prototype that leveraged large-scale additive manufacturing technologies and further...



3D Printing Saving Satellite Builders Time and Money

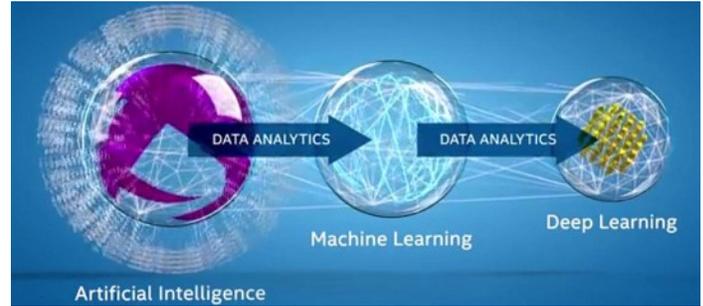
Satellite manufacturers are turning increasingly to additive manufacturing to reduce the cost and time required to design and build spacecraft. Space Systems Loral announced March 7 that its most complex additively manufactured part, an antenna tower with 37 printed titanium nodes and more than 80 graphite struts, is performing...

Autonomous Systems



Tilt-Rotor Hexacopter Puts a New Twist on Drone Orientation

Multicopter drones no longer need to hover parallel with the ground. The Voliro prototype's six props can tilt 360 degrees, allowing a staggering 12 degrees of freedom in the air. Designed and built in nine months, the Voliro prototype is a regular-shaped hexacopter, but each of its six props can tilt a full 360 degrees, allowing a staggering 12 degrees of freedom in the air. That means it can...



Intel's New AI Group a Challenge to IBM and NVIDIA

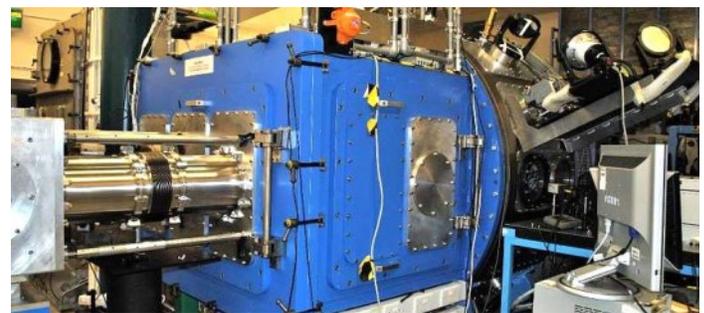
Intel announced late last week that it has formed a new AI group to consolidate a number of its programs and acquisitions. It's headed by Naveen Rao, the former head of Intel acquisition Nervana. This means Intel is making sure it has a major seat at the table as artificial intelligence and machine learning branch out to touch virtually everything -from autonomous driving to IoT to...

Directed Energy



SOCOM Prepares to Test Airborne Directed Energy Weapon

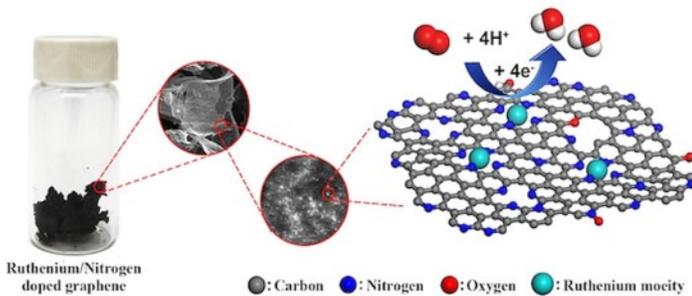
On a cloudy night in the future, special operators are conducting a nighttime raid on an enemy compound. A mission commander aboard an AC-130J Ghost Rider gunship sets his sights on a target. Using a high-energy laser, he aims and shoots at an electrical transformer, the engine of a pick-up truck, communication equipment stacked near the compound's front door, and a drone sitting in...



Researchers Develop World's Highest Gain High-Power Laser Amplifier

The world's highest gain high power laser amplifier - by many orders of magnitude - has been developed in research led at the University of Strathclyde. The researchers demonstrated the feasibility of using plasma to amplify short laser pulses of picojoule-level energy up to 100 millijoules, which is a 'gain' or amplification of more than eight orders of magnitude - which could be likened to...

Energetics



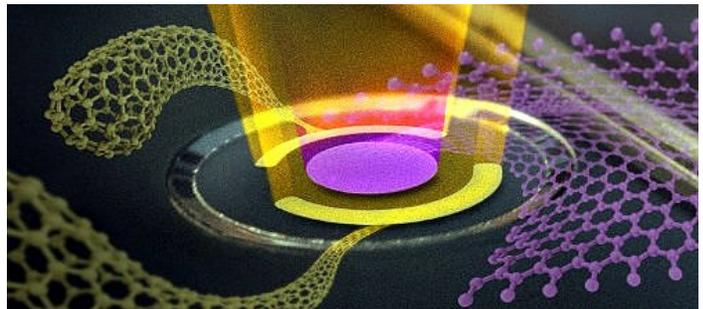
Ruthenium Rules for New Fuel Cells

Rice University scientists fabricated a durable catalyst for high-performance fuel cells by attaching single ruthenium atoms to graphene. Catalysts that drive the oxygen reduction reaction that lets fuel cells turn chemical energy into electricity are usually made of platinum, which stands up to the acidic nature of the cell's charge-carrying electrolyte. But platinum is expensive, and scientists have searched for decades for a suitable replacement. The ruthenium-graphene combination may fit the bill...

Earth to Orbit Using a Single-Stage Rocket

New Mexico-based ARCA Space Corporation has announced that it is developing the world's first Single Stage to Orbit (SSTO) launch vehicle that can deliver both a small payload and itself into low Earth orbit, at a cost of about US\$1 million per launch. Dubbed the Haas 2CA after the 16th century rocket pioneer Conrad Haas, the new booster uses a linear aerospike engine instead of conventional bell-shaped rocket engines to do away with multiple stages. What ACRA is trying with the...

Military Sensing



Drone Detection and Location Systems

There have been about 600 drone incidents that have been recorded by the U.S. Federal Aviation Administration over the previous six months. Civilian-operated UAVs are a problem that is getting worse. Microwave Journal presents contributed pieces from Rohde & Schwarz, Keysight Technologies and Aaronia AG about RF drone detection and location systems, including challenges to drone detection, advantages and disadvantages of these systems and some information about their systems...

Augmented Reality at Your Fingertips

A team from KAUST has found a way to take touch screen input devices into three dimensions with a sensor that tracks the position and speed of human fingers in free space. Thin films made from carbon nanotubes or graphene oxides have electrical properties that are highly sensitive to humidity. Dr. Yanlong Tai and Professor Gilles Lubineau realized that a combination of these tiny nanomaterials could be used to power a recognition system based on gestures rather than touch. These 3D...

Non-Lethal Weapons



How Can Cyber Contribute to Multi-Domain Battle?

The military is beginning to organize around a principle of multi-domain battle -the notion that effects, planning and operations will converge seamlessly among the five domains of warfare: land, sea, air, space and cyber. Rather than thinking about war from a domain-centric perspective, future battles will be fought with a combination of effects. The one thread connecting all domains is cyber...

Pentagon Better at Stopping Enemy Drones and Delivering Gear to the Battlefield

The US military and its partners are expanding their use of drones, turning to them for logistical purposes like re-supply while expanding their abilities to defend against enemy drones. The latest piece of drone-related equipment is a 5-pound radar-gun-like device used to jam drones in remote areas or during patrols. In April, the US Army's Rapid Equipment Force purchased 50 of the...

RMQSI



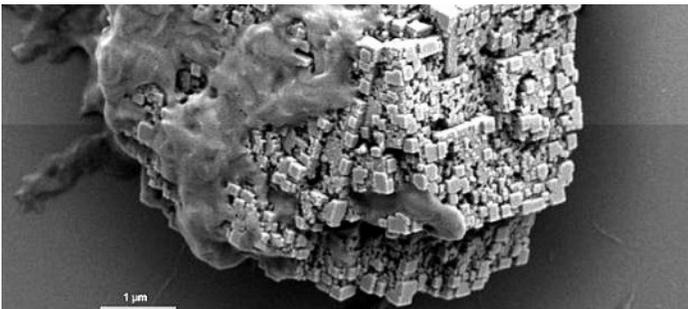
AFRL Lighting the Way for Military Air Crews

AFRL Materials and Manufacturing Directorate junior force researchers resolved an issue of critical importance to military pilots and aircrews—portable, reliable, and robust temporary landing zone lighting. Current portable landing zone lighting systems, used for temporary and semi-permanent airfields, are aging and quickly reaching the end of their functional lifetimes. The need for a quick solution was listed as one of the Joint Special Operations Command's top five safety of flight capability gaps...

Spectrum Collaboration Challenge (SC2) & Battle of the ModRecs

In SC2, competitors reimagine a more efficient wireless paradigm in which radio networks autonomously collaborate to dynamically determine how the spectrum should be used moment to moment. Teams develop breakthrough capabilities by taking advantage of recent advances in artificial intelligence, machine learning, and the expanding capacities of software-defined radios...

Survivability & Vulnerability



Sea Urchin Protein May Lead to Fracture Resistant Materials for Lightweight Armor

Researchers are investigating proteins found inside sea urchin embryos to understand what makes them such efficient calcium carbonate ‘brick organizers.’ The goal is to determine molecular properties of these proteins which allow matrices to assemble, and through that understanding, enable development of tunable fracture resistant materials for lightweight armor and dental composites...

New Soldier Armor Weighs Less, Offers More Options

The average generation II improved outer tactical vest weighs about 26 pounds. But the new torso and extremity protection system, or TEP, under development now at Program Executive Office Soldier, sheds about five pounds of weight and also adds a wide degree of scalability that commanders can make use of depending on threat level and mission. The TEP is part of the new...

Weapon Systems



Advanced VTOL Solutions Mature Aviation Fleet

Advanced Vertical Takeoff and Landing (VTOL) was a topic of discussion at the recent American Helicopter Society International's Annual Forum & Technology Display in Houston, Texas. VTOL refers to an aircraft's ability to takeoff, hover and land vertically. There are numerous advantages to advancing VTOL capabilities, particularly maneuverability in a combat situation. The special...

Technology to Meet Hypersonic Threats Requires Funding, National Sense of Urgency

As China and Russia continue to demonstrate rapid progress in development of hypersonic strike weapons, the U.S.'s largest guided-missile company says technology to counter the threat is already achievable but that fielding a system requires sustained funding and a national sense of urgency. "We are at a tipping point in hypersonics. It is the number one game changer today, and it's..."

Announcements & Events



4th Biennial Strike Challenge

Strike Challenge affords industry an opportunity to provide interactive demonstrations of domestic capability (DOMOPS) and specialized response systems. The focus is on man-pack and light mobility support equipment designed for light responder / specialized unit use in emergency response, survivability, security, search and rescue, and 'special' operations. DATE: August 15-17, 2017



Challenge.gov - Long-Term Corrosion Protection of Existing Hydraulic Steel Structures

The Bureau of Reclamation is seeking long term corrosion protection for large, hydraulic steel structures beyond that provided by available coatings and cathodic protection. Of interest are hydroelectric penstock pipes and gates that control or divert water. The goal is fifty years of corrosion protection. DATE: June 6-September 5, 2017



DI-TAC 2017 & SBIR/STTR Innovation Summit

The Defense Innovation Technology Acceleration Challenges and NSXTL present a new innovation acceleration model to rapidly prospect, vet and fund state-of-art technologies aligned with war-fighter needs (through a DOD IAC \$100M award to NSTXL). This unique process and ecosystem rapidly matches key DOD problems to best technology solutions. DATE: October 3-5, 2017

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