

Procurement, Science and Technology

During the timeframe of this newsletter, multiple conferences and symposiums occurred of interest to our community, including Air Force Association's (AFA) Air Warfare Symposium, IDEX, EUROPYRO, and NTREM. Clearly lots of munitions safety relevant information was shared at these venues. This issue of Procurements, Science and Technology begins with a number of mergers and agreements within the Munitions industries and then mentions some of the recent munitions related procurements awarded. France made front page news with both their intended sale of 24 Dassault Rafale fighter jets / MBDA missiles to Qatar as well as their likely non-sale of their two Mistral-class amphibious assault ships (Vladivostok and Sevastopol) to Russia. The procurements section concludes with references to the planned sales of Hellfire II as well as Orbital ATK contract to add strike capability to Cessna C-208 aircraft utilizing Hellfire missiles.

The technology section then highlights multiple programs completing significant milestones, including development tests, weapon launchers from new platforms or lifetime achievements, as well as other technology accomplishments. The section begins with two different helicopter protection systems to counter missiles or incoming RPGs, as well as recent tests firing APKWS and TOW 2A (RF) from helicopter platforms. It also mentions a hypersonic program intending weapons that will exceed Mach 5 at altitudes of nearly 200,000 feet "designed to skip across the inside of Earth's upper atmosphere before descending on their targets". For high altitude missions, read about the test currently going on with the objective of a stable 110,000 feet altitude with a suspended two-and-one-half-ton payload for up to 100 days. That's persistence! Our technology section concludes with a highlight from a DARPA accomplishment on their Extreme Accuracy Tasked Ordnance (EXACTO) program, which developed a self-steering bullet for difficult, long-distance shots. The project recently completed a live-fire demonstration repeatedly hitting moving and evading targets.

Procurements / International agreements

Diehl and Orbital ATK cooperate on AARGM in Germany

03-2015 Diehl Defence signed an exclusive teaming agreement with the US company Orbital ATK on marketing and manufacturing the Advanced Anti-Radar Guided Missile (AARGM) in Germany.

AARGM, with the international designation AGM-88E, is based on tactically significant improvements to the High Speed Anti-Radiation Missile (HARM). AARGM provides the legacy HARMs with a new guidance unit featuring GPS as well as an upgraded anti-radiation homing (ARH) antenna and digital signal processor. AARGM is also equipped with a millimeter wave end game terminal seeker providing substantially improved guidance solutions in the GPS-denied environments.

In case the AARGM is procured by the Bundeswehr, the agreement between Diehl and Orbital ATK provides for the transfer of essential workshares to Germany covering production and service during operative use. Diehl already participated in the production of the HARM guided missile currently in the German Air Force's inventory. Moreover, Diehl took part in studies and development programs aimed at improving the guidance section.

By cooperating with Orbital ATK, Diehl is supporting the procurement of modern equipment, available on the market, for the Bundeswehr.

<http://www.diehl.com/en/nc/diehl-defence/press/diehl-and-orbital-atk-cooperate-on-aargm-in-germany/6.html>

Nammo has established an office in Abu Dhabi

21 April 2015 Nammo has opened an office in Abu Dhabi in the United Arab Emirates (UAE). With a growing business in UAE and the region, Nammo decided to establish an office to support local and regional customers.

"We have a strategic ambition to grow in parts of the Middle East. Our business in the region is growing, and we need to be present where the customers are", said Kjell Kringsjå, Senior Vice President Business Development, Nammo Group.

The new establishment reflects Nammo's commitment to provide consistent services to our customers in the region.

<http://www.nammo.com/news-and-events/news/nammo-has-established-an-office-in-abu-dhabi>

Poland's MESKO and Raytheon sign second Letter of Intent - to collaborate on Excalibur, TALON LGR and other systems

TUCSON, Ariz., March 26, 2015 In a move designed to collaborate and share advanced defense technologies, Raytheon Company's Missile Systems business signed a Letter of Intent with MESKO, Poland's leading missile and ammunition manufacturer. Areas of cooperation focus on Raytheon's solutions for the KRAB howitzer precision fires and new Polish Attack Helicopter, including offset proposals and opportunities for MESKO.

The agreement focuses on the production and future capabilities codevelopment of Raytheon's Excalibur 155 mm precision projectile and the TALON laser guided rocket, which was co-developed with United Arab Emirates industry. Additionally, Raytheon and MESKO will explore the potential for collaboration on a next generation anti-armor weapon and a very short range air defense weapon.

<http://raytheon.mediaroom.com/2015-03-26-Polands-MESKO-and-Raytheon-sign-second-Letter-of-Intent>

Rheinmetall and MKEK sign memorandum of understanding for joint cooperation

05 May 2015 Rheinmetall and Turkish defence contractor MKEK have signed a memorandum of understanding paving the way for extensive cooperation between the two groups. The partners plan to establish a joint venture in Turkey whose mission will be the development of new forward-looking products in the field of weapons systems and munitions.

Operational management of the new company, to be known as "Rheinmetall MKEK Technologies", will be organized by Rheinmetall. Besides joint development of new products, MKEK will be in charge of manufacturing.

Both companies, globally leading suppliers of defence technology systems and top players in the field of weapons and munitions, bring to this cooperation pact their comprehensive range of experience and expertise. This will create a unique competency centre in Turkey, systematically oriented to the needs of the markets and evolving customer requirements. During the initial phase, work will focus on the development of protection systems and medium-calibre ammunition products.

http://www.rheinmetalldefence.com/en/rheinmetall_defence/public_relations/news/latest_news/details_7488.php

Raytheon awarded more than \$2 billion for an International Patriot Air and Missile Defense System

April 17, 2015 Raytheon Company announced today it has been awarded a contract worth over \$2.0 billion to deliver Patriot Air and Missile Defense System to an undisclosed international customer (see next article for more information)

The contract, awarded on April 2, 2015 and booked in the second quarter as a direct commercial sale, includes fully digitized new-production Patriot fire units with the latest technology for improved threat detection, identification and engagement. The contract also includes a full training package and support equipment.

"In the past five months Qatar, Korea and now this international partner have all chosen Raytheon's Global Patriot solution," said Daniel J. Crowley, president of Raytheon Integrated Defense Systems.

"Including this most recent contract, Raytheon has booked more than \$5 billion in international Patriot orders since late December 2014."

<http://raytheon.mediaroom.com/2015-04-17-Raytheon-awarded-more-than-2-billion-for-an-International-Patriot-Air-and-Missile-Defense-System>

Poland selects Patriot for missile defense

04/21/2015 Poland could become the sixth NATO nation to field Patriot. From the Raytheon statement: "Raytheon appreciates Poland's selection of Patriot for their missile defense requirements. We are prepared to fully address Polish government, industry, and military expectations to meet Poland's long-term objectives for this important program, which is vital to the country's national security interests." http://www.raytheon.com/news/feature/poland_patriot.html

BAE Systems contributes to Joint Strike Missile program

26 FEBRUARY 2015 Avalon Airshow, Australia: Today's announcement of an agreement between Australia and Norway for the Joint Strike Missile (JSM) has been welcomed by BAE Systems as a positive step for international collaboration.

BAE Systems Australia will deliver a pre-production passive RF sensor in April 2015 for the JSM program. This will involve fit checks, system integration and flight testing for a development-standard missile in order to demonstrate it provides enhanced operational capability.

http://www.baesystems.com/article/BAES_180389

Raytheon, Kongsberg team on Naval Strike Missile

April 9, 2015 Raytheon Company and Kongsberg have formed a teaming agreement for the Naval Strike Missile (NSM). The pact represents a second step in the companies' efforts to offer world-class Offensive Anti-Surface Warfare (OASuW) solutions to the many governments interested in this warfare mission. Raytheon and Kongsberg formed a similar agreement last year to develop the Joint Strike Missile, the air-launched version of the NSM.

NSM, in operation today, provides superior strike capability against land and sea targets with a range in excess of 200 kilometers. It is the main weapon for Norway's new frigates and corvettes, Poland's land-based coastal defense, and an NSM was successfully test-fired from the U.S.S. Coronado littoral combat ship in September 2014. NSM was also a highlight of the 2014 Rim of the Pacific exercises when it was fired from the Royal Norwegian Navy's Fridtjof Nansen frigate and scored a direct hit on a target ship.

<http://raytheon.mediaroom.com/2015-04-09-Raytheon-Kongsberg-team-on-Naval-Strike-Missile>

Small Diameter Bomb II completes System Verification Review

April 9, 2015 / Raytheon Company and the U.S. Air Force completed three successful Small Diameter Bomb II (SDB II) program reviews prior to a mid-May Milestone C decision.

During March and April, the SDB II team successfully completed a functional configuration audit (FCA), a production readiness review (PRR) and a system verification review (SVR). The functional configuration audit, which took place at Raytheon Missile Systems' Tucson facility, assessed SDB II's functionality. The production readiness review successfully proved that the current design of SDB II is ready for production, and the SVR was a product and process assessment to determine that SDB II is ready for LRIP. A successful Milestone C brief and decision clears the way for low rate initial production (LRIP) in 2015 for SDB II.

SDB II employs Raytheon's tri-mode seeker that operates in multi-attack modes: millimeter-wave radar, uncooled imaging infrared and semi-active laser. SDB II can strike targets from a range of more than 40 nautical miles, with a dynamic warhead that can destroy both soft and armored targets, while keeping collateral damage to a minimum through a small explosive footprint. The highly accurate SDB II offers

warfighters the flexibility to change targets after release through a secure datalink that passes in-flight updates to the weapon. The Department of Defense has validated SDB II as a weapon that meets a critical warfighter need and has invested more than \$700 million in the SDB II program. <http://raytheon.mediaroom.com/2015-04-09-Small-Diameter-Bomb-II-completes-System-Verification-Review>

Raytheon awarded \$559 million for SM-3 Block IB

May 4, 2015 / The Missile Defense Agency awarded Raytheon Company an undefinitized contract action for a fiscal year 2015 contract valued at \$559,206,957 million for Standard Missile-3 Block IBs, which are guided missiles used by the U.S. Navy to provide regional defense against short- to intermediate-range ballistic missile threats.

Under this contract action, which was announced April 30 by the Department of Defense, Raytheon will deliver an initial quantity of 44 Standard Missile-3 Block IB all-up rounds and provide the work required to produce and deliver the third stage rocket motor reliability growth and design enhancements. The government expressed its intention to purchase additional missiles up to a total quantity of 52.

<http://raytheon.mediaroom.com/2015-05-04-Raytheon-awarded-559-million-for-SM-3-Block-IB>

BAE Systems Receives \$53 Million U.S. Navy Contract for Vertical Launching System Canisters

Monday 13 April 2015 VLS Mk 41 missile canisters provide a sealed storage, transportation, and launch container for a wide range of system-compatible weapons. BAE Systems has received a \$52.9 million contract modification from the U.S. Navy to provide additional canisters for the Mk 41 Vertical Launching System (VLS).

BAE Systems has more than 30 years of experience in the development, production, and support of the VLS system for naval forces throughout the world. The canister contract — originally awarded during a June 2013 competition — is a five-year, base plus options contract covering fiscal years 2013 through 2017 to meet canister requirements for the Navy. Additional option awards are expected in fiscal years 2016 and 2017.



The canisters are positioned within the Mk 41 VLS, which is located below a ship's armored deck for maximum protection. The system easily accommodates the latest weapon types to meet new mission requirements. VLS canisters serve as missile shipping and storage containers, and, once employed on the ship, have many additional functions. The canisters contain rocket motor exhaust, serve as a launch rail to support flyout during missile firings, and provide identification and firing support to multiple missile types,

including Tomahawks, Standard Missile-3, Standard Missile-6, and SeaSparrow. http://www.baesystems.com/article/BAES_180604/

Orbital ATK Awarded \$120 Million in Contracts for Medium Caliber and Large Caliber Ammunition

14 April, 2015 – Orbital ATK a global leader in aerospace and defense technologies, announced today that the company recently received domestic and international contracts for tactical and target practice medium- and large-caliber ammunition valued at \$120 million.

Medium caliber orders included a broad range of purchases for 20mm, 25mm, 30mm and LW30mm ammunition for multiple services for use with air, sea and land weapons platforms. These contracts are awarded through the U.S. Army Maneuver Ammunition Systems in its role as the Single Manager for Conventional Ammunition.

International medium caliber orders span a range of 25mm cartridges, including the M791 Armor Piercing Discarding Sabot with Tracer and its ballistically-matched, target practice counterpart M793 which provides realistic training at a low cost. The large-caliber ammunition contracts are for the 120mm, M1002 Multi-Purpose Anti-Tank, Target Practice with Tracer, and M865 Target Practice Cone Stabilized Discarding Sabot with Tracer designed for use with the Abrams main battle tank.

Additional large caliber awards are for further development and low-rate production of the M829E4, which is the U.S. Army's fifth generation, 120mm kinetic energy anti-tank cartridge. The cartridge incorporates an advanced design, long-rod penetrator and proprietary, three-petal composite sabot that facilitates the most efficient transfer of energy to maximize the rod's penetrating power.

<http://www.orbitalatk.com/news-room/release.asp?prid=29>

Rheinmetall supplies Bundeswehr with newly qualified 40mm airburst ammunition technology

18 Feb 2015 The German Bundeswehr has awarded Rheinmetall a multimillion-euro contract to supply it with several thousand cartridges of 40mm x 53 airburst ammunition, together with accessories. This is the first time that the German armed forces have procured this state-of-the-art ammunition technology, which Rheinmetall developed and continues to enhance. The Group's 40mm x 53 Airburst Munition (ABM) has now been fully qualified for use by the Bundeswehr and Dutch armed forces. Officially dubbed the DM131, the pilot lot ordered by the German procurement authorities is already being delivered.

The time of detonation of each airburst round is electronically programmable. In line with the Rheinmetall



approach, this takes place via an infrared signal from the fire control/aiming unit once the projectile has left the barrel. The round explodes at an exactly calculated distance above its target, even if it is located behind cover. As a result, this innovative ammunition substantially enhances the combat effectiveness of the Bundeswehr's battle-proven 40mm automatic grenade launcher. With the right

fire control technology, the DM131 attains a maximum effective range of 2,200 metres.

Rheinmetall supplies a multifaceted array of 40mm low-velocity (LV), medium-velocity (MV) and high-velocity (HV) ammunition, together with weapon systems like the Cerberus mountable grenade launcher and the Hydra automatic grenade machine gun. Thanks to built-in hydraulic shock absorbers, both weapons are suitable for MV and LV ammunition. Fire control/aiming units from the Vingmate family of products round out the Group's 40mm portfolio.

http://www.rheinmetalldefence.com/en/rheinmetall_defence/public_relations/news/latest_news/details_7104.php

Saab Signs Contract with Brazil on Weapon Acquisition for Gripen NG

24 April 2015 Defence and security company Saab and the Brazilian Ministry of Defence, through the Aeronautics Command (COMAER), have signed a contract for Gripen NG weapon acquisition. The total order value is approximately USD 245 million. The order is expected to be booked by Saab during the second half of 2015.

The weapon acquisition contract includes weapon deliveries by Saab and suppliers which have been selected by the customer, for the Brazilian Gripen aircraft. The weapon deliveries will be made in relation to deliveries of the Gripen NG aircraft to the Brazilian Air Force.

The contract supplements the existing contract with Brazil concerning development and production of 36 Gripen NG, which was announced on 27 October 2014.

The effectiveness of the weapon acquisition contract is subject to fulfillment of certain conditions. These include, among others, necessary export control-related authorisations. All conditions are expected to be fulfilled during the second half of 2015.

<http://saabgroup.com/Media/news-press/news/2015-04/saab-signs-contract-with-brazil-on-weapon-acquisition-for-gripen-ng/>

Aerojet Rocketdyne to Research Next Generation Green Propellants

Feb. 24, 2015 – Aerojet Rocketdyne, was awarded a contract to research and develop environmentally sustainable monopropellants and gas generators for rocket and missile propulsion and Divert Attitude Control Systems. The company is working with the U.S. Army Aviation and Missile Research, Development and Engineering Center; the U.S. Air Force Research Laboratory at Edwards Air Force Base; and the U.S. Army Medical Command to develop a new family of high-performing liquid propellants. The effort is funded through the Strategic Environmental Research and Development Program, an office of the Department of Defense.

Under the three-year contract, Aerojet Rocketdyne's Redmond, Washington team will lead the effort to conduct small-scale testing of potential monopropellant candidates in the laboratory, scaling up likely candidates in the Sacramento Chemical Synthesis Laboratory, then performing subscale thruster testing to select the most promising ones for future research. Parallel efforts will ensure that these compositions are safe to handle and leave a minimal environmental footprint. The green propellants developed through this new contract would provide options for future spiral upgrades to the technology being flown next year. Aerojet Rocketdyne is also a leader in green bipropellant, solid and gelled propellants.

<http://www.rocket.com/article/aerojet-rocketdyne-research-next-generation-green-propellants>

Orbital ATK and US Army Sign \$120 Million Precision Guidance Fuze Production Contract

9 March 2015 -- Orbital ATK, Inc. announced today that the company has signed a contract with the U.S. Army for additional production of the Precision Guidance Kit (PGK) for 155mm artillery. Once fielded to the warfighter, PGK will transform conventional 155mm artillery projectiles into a near precision weapon reliably reducing normal artillery dispersion of more than 200 meters to less than 30 meters. This transformation allows highly responsive and precise use of artillery on the modern battlefield.

The \$120 million (USD), contract calls for the production, lot acceptance testing and delivery of the guidance fuzes for fielding to U.S. and select allied armies. Deliveries are scheduled to begin in early 2016 without a production break from the Low Rate Initial Production which began in January 2015.

PGK is a guidance fuze that fits within the fuze well of 155mm high-explosive artillery projectiles, performing in-flight course corrections to greatly reduce artillery dispersion. The Orbital ATK design features a fixed-canard guidance and control approach with gun-hardened electronics and a self-generated power supply. PGK performs all standard fuze functions while also incorporating a "fail-safe" option, preventing a PGK-equipped artillery round from detonating if it does not get close enough to the target.

Orbital ATK supplied PGK for use in Afghanistan for training and tactical operations via an urgent materiel release in March 2013. In December 2014, PGK passed First Article Acceptance Testing. <http://www.orbitalatk.com/news-room/release.asp?prid=1>

Australia, Iraq, Qatar, Saudi Arabia, Jordan, Indonesia, Egypt and Lebanon Order Hellfire II Missiles

Hellfire Systems LLC, Orlando, Florida, was awarded a \$150,002,546 modification to an existing Foreign Military Sales contract (Australia, Iraq, Qatar, Saudi Arabia, Jordan, Indonesia, Egypt, Lebanon) to manufacture and deliver 2,109 Hellfire II missile models, air-to-ground missiles models AGM-114R, AGM-114R-3, AGM-114P4-A, training guided missile TGM M36E7, and air-training-missile ATM-114Q-6. Estimated completion date is Nov. 30, 2016.

<http://www.defense.gov/contracts/contract.aspx?contractid=5440&source=GovDelivery>

Orbital ATK to Incorporate Gunship Capabilities on Cessna Caravan Aircraft

12 March 2015 -- Orbital ATK, Inc. has received a U.S. Department of Defense Foreign Military Sale contract to modify existing Cessna C-208B Caravan Intelligence Surveillance and Reconnaissance aircraft for the Lebanese Air Force. Orbital ATK originally incorporated electro-optical sensor, communications and aircraft self-protection equipment into the aircraft and will now add strike capability utilizing Hellfire missiles. Following aircraft modification, Orbital ATK will provide contractor logistics support for one year.



The gunship capability package is part of Orbital ATK's Special Mission Aircraft product portfolio, which provides affordable, responsive and advanced capabilities to customer-preferred platforms, including a roll-on, roll-off palletized approach. Orbital ATK's expertise includes outfitting various aircraft -- including the Alenia C-27J, CASA CN-235/295, Lockheed C-130, Bombardier Dash-8, Hawker Beechcraft King Air, Cessna Caravan and others -- with integrated intelligence, surveillance and reconnaissance, and weapons employment capabilities.

Orbital ATK's solution offers networked observation and over-watch, border security and counterinsurgency capabilities that is low-cost and

highly reliable and requires minimal personnel and facilities to operate and maintain.
<http://www.orbitalatk.com/news-room/release.asp?prid=17>

Technology

Laser-based Missile Protection System for Aircraft (ATIRCM) Approved for International Sale

MONDAY 2 MARCH 2015 BAE Systems, Inc. today announced that its Advanced Threat Infrared Countermeasures (ATIRCM) system has been approved for export by the U.S. Department of Defense. The export approval paves the way for sales to allied nations around the world, giving them access to this life-saving technology.



Advanced Threat Infrared Countermeasures (ATIRCM) system shines laser light to defeat infrared missile threats. (artist rendering)

ATIRCM utilizes BAE Systems' Common Missile Warning System (CMWS) to detect an incoming missile and communicate the missile's position relative to the aircraft. ATIRCM then locates and tracks the incoming threat and emits a high-energy laser beam to defeat the missile's infrared seeker, effectively blinding its guidance system and preventing it from homing in on the aircraft.

Developed in partnership with the U.S. Army and currently deployed on military helicopters, ATIRCM has proven to be highly effective in protecting both rotary and fixed wing aircraft. Deployed on mission critical U.S. Army helicopters in Iraq and Afghanistan since 2009, the latest Army report states that ATIRCM's reliability surpasses the Army requirement several times over. This reliable performance significantly reduces the total ownership cost of the system while ensuring mission readiness. http://www.baesystems.com/article/BAES_179595/

Orbital ATK Completes Key Test of Helicopter Active Protection System - Live-Fire Tests Prove Capabilities of Small Counter-RPG Kill Vehicle

Dulles, Virginia, 24 February 2015 -- Orbital ATK, Inc. performed a live-fire demonstration of a key element of its Helicopter Active Protection System (HAPS). The HAPS Kill Vehicle (KV) was able to launch, perform pitch maneuvers and fly to a detonation point that simulated the location of an incoming rocket-propelled grenade (RPG). The demonstration is a valuable step toward a solution for the RPG threat to helicopters flying missions in dangerous areas.

Helicopters are vulnerable to damage from RPGs because the aircraft often hovers in position at low altitude, making it easy to target by an enemy on the ground. HAPS is designed to identify an incoming threat, launch and guide a KV to a precise location and detonate a warhead at a point where the RPG is rendered ineffective. All of this is designed to occur within a fraction of a second and far enough away from the helicopter to ensure the crew and aircraft are not harmed by metal fragments from the destroyed RPG.

The live-fire demonstration was designed to prove-out launch from a fixed ALE-47 Countermeasures Dispense System, off-axis pitch maneuvers of the KV and controlled flight of the KV to an impact point. The test flights successfully demonstrated these attributes and validated a number of HAPS components, including the KV launch cartridge, KV divert and attitude thrusters, non-linear guidance and control algorithms, and the fast-sync wireless command guidance link.

The HAPS system consists of an Engagement Management Module, a slightly-modified Counter Measures Dispense System, such as the ALE-47, and the KVs that launch from the counter-measures dispenser. The KVs fit within the envelope of the standard flare and chaff launch tubes. In addition to

countering RPGs, HAPS can serve as a last line of defense against advanced man-portable air-defense systems, or MANPADS.

The live-fire test was conducted in Socorro, New Mexico, and witnessed by personnel from the Rapid Reaction Technology Office of the Office of the Secretary of Defense. The Technology Office sponsored the testing of Orbital ATK's internally-developed active countermeasure.

Orbital ATK's aircraft survivability product portfolio includes the AAR-47 missile, laser and hostile-fire threat warning sensor and the ShotFinder acoustic hostile-fire detection system. The AAR-47 missile warning system is installed on more than 3,200 fixed and rotary-wing aircraft and is flown by the U.S. and its allies in more than 16 countries.

<http://www.orbitalatk.com/news-room/release.asp?prid=4>

APKWS laser-guided rocket fired off Tiger platform for Australian Defence Force

13 APRIL 2015 The Australian Defence Force demonstrated the precision strike capability of BAE Systems' Advanced Precision Kill Weapon System (APKWS™) laser-guided rocket, firing the system from an Airbus Tiger Armed Reconnaissance Helicopter (ARH) for the first time. Using a Forges de Zeebrugge (FZ) rocket motor, warhead, and launcher. The APKWS rocket was 10 for 10 in the live fire flight trials.



Tiger Armed Reconnaissance Helicopter fires an APKWS laser-guided rocket (artist rendering)

The successful live fire flight trials, which were preceded by a ground-based live fire event in August 2014, took place in November 2014 in Australia's Northern Territory. The 10 test shots were conducted in extreme heat conditions at ranges from 1,500 meters to 4,500 meters, at altitudes from 200 feet to 1,500 feet, and at

speeds of up to 140 knots. All 10 shots hit the target within one meter of the laser spot.

An integrated test team from the Defence Materiel Organisation and Royal Australian Air Force, in conjunction with operational units from 16 Aviation Brigade, conducted these tests to examine the potential for APKWS rocket use by the Australian Army. With the successful results, the APKWS rocket is now being taken to the next stage of the trial process.

The live fire test shots from the Tiger platform with the FZ equipment opens up new opportunities for the APKWS rocket, which is currently available to international customers through the U.S. Foreign Military Sales program.

http://www.baesystems.com/article/BAES_180859/

TOW 2A RF missiles successfully fired from helicopter

March 30, 2015 -- In the first of its kind launch, Raytheon Company fired tube-launched, optically-tracked, wireless-guided (TOW®) 2A radio frequency (RF) practice missiles from an AH-1W Cobra attack helicopter during a December exercise.

Raytheon, working with the Naval Air Systems Command, fired two TOW 2A RF practice missiles at ranges exceeding 2600 meters. The two tests verified the missile's capability to be fired from a hovering

aircraft and from an aircraft maneuvering to a threat. Both missiles hit their targets within inches of the aimpoints.

"Wire-guided TOW missiles have been fired from helicopters for years," said Michelle Lohmeier, vice president of Raytheon's Land Warfare Systems. "These shots demonstrate RF capability to be fired off platforms used with wired TOWs without modifications." The TOW 2A RF missile is designed to be compatible with all TOW launch systems with no changes to the gunner's actions. While TOW RF is routinely fired from ground platforms, it had not been fired from an airborne platform until now.

<http://raytheon.mediaroom.com/2015-03-30-TOW-2A-RF-missiles-successfully-fired-from-helicopter>

Airbus A400M Aircraft Crashes in Spain

SEVILLE, Spain — An Airbus A400M military transport aircraft, which had been ordered by Turkey, crashed Saturday near the Seville airport, killing four crew members and gravely injuring two other crew members, Airbus Defence and Space said.



(Photo: CRISTINA QUICLER/AFP/Getty Images)

The A400M aircraft crashed around 1 p.m. local time after taking off from Seville airport at 12:45 p.m. for a first production flight, the company said. Airbus had planned to deliver the MSN023 in June as the third A400M for Turkey.

Turkey signed in 2003 an order for 10 A400Ms, with the last of the units due to be delivered in 2018. Turkey has previously complained about a late delivery of the Airbus aircraft and expected to claim penalties.

Airbus handed over the first two aircraft for Turkey last year and a further two were due this year. Belgium, France, Germany, Luxembourg, Malaysia, Spain and Britain have also ordered the A400M. The orders total 174 of the units and 12 delivered and operating, said the Airbus website. <http://www.defensenews.com/story/breaking-news/2015/05/09/airbus-a400m-aircraft-crashes-in-spain/27038357/>

Raytheon's SM-6 moves from low-rate to full-rate production

May 6, 2015 Raytheon Company's Standard Missile-6 program has moved from low-rate to full-rate production, clearing the path for significantly increased production numbers and focus on further cost-reduction opportunities.

SM-6 is a surface-to-air supersonic missile capable of successfully engaging manned and unmanned aerial vehicles and fixed- and rotary-wing aircraft. It also defends against land-attack and anti-ship cruise missiles in flight.

<http://raytheon.mediaroom.com/2015-05-06-Raytheons-SM-6-moves-from-low-rate-to-full-rate-production>

Diehl Defence's IRIS-T Surface Launched (IRIS-T SL) demonstrated full performance during missile qualification

09-02-2015 Following system validation one year ago, Diehl Defence's IRIS-T Surface Launched (IRIS-T SL) demonstrated its full performance as the most advanced Short to Medium Range Surface-to-Air

Missile (SAM). During this final firing campaign, concluding guided missile qualification at the Overberg Test Range in South Africa in January 2015, three guided firings were executed in different short- to medium-range and very low- to high-altitude scenarios. All of them resulted in direct hits of the target drones. To prove the capabilities of IRIS-T SL, jet target drones of different sizes were used performing a large variety of realistic evasive maneuvers.

The first target was engaged at a distance of more than 30 km. The IRIS-T SL missile flight time was about one minute reaching an altitude above 12 km. Despite an evasive maneuver involving changing direction and altitude, a direct hit of the target was achieved proving the medium range capabilities of IRIS-T SL.

The second firing was at very close range to the launch point to prove the missile's short range engagement capabilities. During this firing, IRIS-T SL jettisoned its aerodynamic cover shortly after launch immediately initiating a hard turn-over maneuver towards the low flying target. The entire engagement lasted less than 10 seconds also ending with a direct hit.

The third firing was carried out against a very small, fast and agile target drone featuring high agility and extreme maneuvering capability. A direct hit was achieved at 12.5 km range and 1.5 km altitude even though the drone performed aggressive dive/pull-up evasive maneuvers.

The performance demonstration firings concluded a series of test firings as part of the IRIS-T SL system development. Having been contracted by the Federal Office of Bundeswehr for Equipment, Information Technology, and In-Service Support (BAAINBw), representatives of the BAAINBw as well as the German Air Force witnessed IRIS-T SL's impressive performance in full accordance with the requirements of the German Air Force. IRIS-T SL is planned to be a component of the future German Air and Missile Defence System (TLVS).

<http://www.diehl.com/en/nc/diehl-defence/press/diehl-demonstrates-full-performance-and-achieves-missile-qualification-with-three-successful-iris-t/6.html>

Lockheed Martin Delivers 1,000th Sniper Advanced Targeting Pod

April 30, 2015 – Lockheed Martin marked the 1,000th Sniper Advanced Targeting Pod (ATP) delivery during a ceremony held yesterday at its Missiles and Fire Control facility in Orlando, Florida.

The 1,000th pod, which was delivered to the U.S. Air Force, is a sensor-enhanced Sniper ATP that provides fighter and bomber aircraft with advanced modes for non-traditional intelligence, surveillance and reconnaissance (NTISR); enhanced target identification; maritime tracking; and two-way datalink communication.

<http://www.lockheedmartin.com/us/news/press-releases/2015/april/mfc-lm-delivers-1000-sniper-atp.html>

Successful first guided firing of Meteor from Rafale

30/04/2015 On 28th April 2015, teams from the French Ministry of Defence, Dassault Aviation and MBDA carried out the first guided firing of the long-range Meteor missile against an air target from a Rafale combat aircraft. The firing, from a Rafale prepared at the DGA's Cazaux Flight Test Centre (near Bordeaux, S.W. France), proceeded successfully within the secured zone of the DGA Essais de Missiles (previously Centre d'Essais des Landes) in Biscarosse. Following on from earlier missile separation trials carried out in 2013 and 2014, this firing represents an important milestone in the integration of Meteor onto the Rafale.



With a throttleable ramjet motor and 'fire and forget' firing mode, Meteor is intended for very long BVR (Beyond Visual Range) air defence operations. Thanks to the performance of the RBE2 AESA (Active Electronically Scanned Array) radar which equips the Rafale (the only European combat aircraft currently equipped operationally with this kind of sensor), it is able to intercept targets at very long range thereby complementing the currently deployed MICA missile used for combat and self defence. The first Meteor missiles will be delivered as of 2018 to equip the Rafales of

the French Air Force and Navy.

The result of a cooperation between France, Germany, Italy, Spain, Sweden and the UK launched in 2003, Meteor is a federated programme enabling the consolidation of the European defence industry and technology base associated with the missile sector. The main industrial partners of MBDA UK, the industrial prime contractor for the programme, are MBDA France, MBDA Italy, SAAB (Sweden), Bayern-Chemie (a fully owned subsidiary of MBDA Deutschland) and Inmize (Spain). <http://www.mbda-systems.com/mediagallery/#/news/3489>

Second successful firing of MBDA's MMP land combat missile

16/02/2015 On 12th February, 2015, another test firing of the MMP missile took place at the French Procurement Agency DGA Techniques Terrestres site in Bourges central France.

This latest firing, against a steel target positioned at an intermediate range, was carried out in lock on before launch mode (fire-and-forget) using the missile seeker's colour TV channel channel. All aspects of the test, covering launch, flight trajectory and target impact, took place optimally and fully conformed to the simulations of MBDA's project teams. This firing took place a few days after the first MMP test firing during which the missile confirmed its excellent accuracy after locking on after launch against a target at a range of more than 4,000m and which was hidden from view at launch.



With this firing, another element in the analysis of MMP's deployment envelope has been accomplished, the major part of which has already been completed. The main features that have been demonstrated in flight to date involve firing at long and intermediate ranges and using two types of missile trajectory (high and intermediate), seeker guidance via both the visible TV and non-cooled infrared channels, target lock on before and after launch, the latter thanks to the fibre-optic data-link.

<http://www.mbda-systems.com/mediagallery/#/news/3465>

Development of 155 mm IM HE-ER completed

8 April 2015 In February 2013, Nammo started to develop a new family of conventional 155 mm artillery ammunition, specially designed for long range (40 km). On Wednesday March 25th 2015, the 155 mm Insensitive Munition High Explosive Extended Range (IM HE-ER) was successfully test fired at 32 km range, in Älvdalen, Sweden, and this test concluded the development phase of the first new Nammo 155 mm round!

The test was a demonstration for the Swedish Armed Forces, and the rounds were fired from the Swedish Archer Gun System. A total of 32 live rounds were fired, all functioned as intended with a low dispersion in the target – High Precision at Long Distance.



Nammo expects the development contract for the entire 155 mm family to be signed by the Norway Government by August, and the product qualification of IM HE-ER is planned to be completed by Q1 2016.

<http://www.nammo.com/news-and-events/news/development-of-155-mm-im-he-er-completed/>

Excalibur Ib fired from M109A2/A3 howitzer in first-time test

May 6, 2015 The U.S. Army and Raytheon Company successfully fired two Excalibur Ib projectiles from a M109A2/A3 howitzer during recent tests. Using the M185 cannon and M119A2 propelling charge with Excalibur for the first time, both rounds guided precisely to their targets more than 20 kilometers away. The M109A2/A3 is an early variant of the M109-series howitzer operated by armed forces around the world. Based on the test results, those forces are now able to use the extended range precision capability provided by Excalibur Ib.

<http://raytheon.mediaroom.com/2015-05-06-Excalibur-Ib-fired-from-M109A2-A3-howitzer-in-first-time-test>

Successful Demonstration of Rokar Silver Bullet Precision Guidance Kit for Artillery Shells to Support Ground Troops

11 MAY 2015 BAE Systems' live fire test demonstrated that its Rokar Silver Bullet precision guidance kit can transform a standard 155mm artillery shell into a highly accurate munition. The system's advanced ability to self-correct in flight greatly increases effectiveness while reducing collateral damage, allowing for more precise engagement in urban environments and against protected targets.



The most recent live fire event, held in February in Israel, was the latest in a series of demonstrations with several customers including a successful firing performed with South Korean defence contractor, Poongsan Corporation. In these tests, more than 150 Silver Bullet precision guidance kits have been tested over several years of development. Conducted in severe conditions over challenging terrains including land and sea, the firing tests highlight the system's mature design and resulting

high reliability. The majority of kits in these demonstrations hit within 10 meters of the target.

The Silver Bullet's in-flight high correction capability reduces the need for an aiming process as its enhanced accuracy greatly increases the ability to hit a target with the first shot fired. Compatible with existing inventories of conventional artillery shells, the GPS-based Silver Bullet can be assembled in the field by the soldiers as a standard artillery fuze to provide highly accurate, self-correcting capability.

The system has proven its versatility through successful firings from a number of artillery guns including the M109 and the K9 barrel and has been proven effective on several types of shells including the M795 and the K307. Additional information regarding this non-ITAR system can be found at www.baesystems.com/silverbullet.
http://www.baesystems.com/article/BAES_181627

Raytheon's newest JSOW variant enters operational testing

April 15, 2015 Raytheon Company and the U.S. Navy successfully completed the final free flight in the integrated testing phase for the Joint Standoff Weapon C-1. During the development test, JSOW C-1 demonstrated its effectiveness against moving maritime targets, a crucial capability against current and future surface warfare threats. The weapon is on track to start operational testing (OT) this spring and is slated for delivery to the fleet in 2016 after the successful completion of OT.

During the test, the aircrew executed a pre-launch handoff between two F/A-18E/F aircraft followed by the weapon's release at a distance of 35 nautical miles to the target. The two Super Hornets again transferred control of the weapon, then sent a post-launch retargeting command to reroute the JSOW C-1 from the initial target ship to a higher priority target. While en route to the target ship, the JSOW C-1 provided real time weapon in-flight track and bomb hit indication status messages back to the controlling aircraft via the link-16 network. The multiple communication exchanges between the aircraft and the weapon were seamless and culminated in a successful engagement of a small maneuvering ship target.

JSOW C-1 is designed to provide fleet forces with robust and flexible battlefield effects against high value targets at launch ranges of up to 70 nautical miles from both fourth and fifth generation fighters. F-35A/C integration is currently funded for JSOW C-1, with external integration on the F-35B scheduled in Block 4.
<http://raytheon.mediaroom.com/2015-04-15-Raytheons-newest-JSOW-variant-enters-operational-testing>

X-47B Unmanned Aircraft Demonstrates the First Autonomous Aerial Refueling

April 22, 2015 – Northrop Grumman Corporation and the U.S. Navy successfully demonstrated fully autonomous aerial refueling (AAR) with the X-47B Unmanned Combat Air System Demonstration (UCAS-D) aircraft, marking the first time in history that an unmanned aircraft has refueled in-flight.



This is another historic aviation milestone for the X-47B, which in 2013 became the first unmanned aircraft to autonomously launch from and recover aboard an aircraft carrier. In combination, these landmark demonstrations constitute a major step forward in autonomy that has application in both manned and unmanned aircraft.

Autonomous launch, recovery and refueling have the potential for reducing operational costs in the future. During the probe and drogue (or "Navy-style") AAR demonstration, the X-47B performed a close formation flight rendezvous with an Omega K-707 tanker. Upon clearance from the tanker crew, the X-47B maneuvered into position behind the K-707 and successfully engaged the drogue. On completion of the refueling, the X-47B autonomously disengaged the drogue and maneuvered away from the tanker before returning to base.

Northrop Grumman began developing AAR technology for both Navy and Air Force application nearly a decade ago, pioneering a "hybrid" approach that integrates both GPS and infrared imaging to enhance navigational precision and hedge against GPS disruption. Initial UCAS-D flight testing began in 2012 using a manned Learjet as a surrogate for the X-47B. These successful proof-of-concept flights

demonstrated the overall feasibility of the X-47B AAR system and helped refine its navigation, command and control, and infrared sensor processing components.

http://www.globenewswire.com/newsarchive/noc/press/pages/news_releases.html?d=10130272

HMS Prince of Wales bridge sets sail today

The most iconic section of the second Queen Elizabeth Class aircraft carrier is setting sail today aboard a tug for its first sea voyage from Glasgow to Rosyth. The Forward Island has deck-to-deck windows, which are up to two metres tall to ensure a level of visibility far beyond previous aircraft carriers and are designed to withstand a significant impact, such as a helicopter's spinning rotor blade.

The tug delivering the Forward Island will blast its horn passing Ferguson Marine Engineering in Greenock as a final farewell to Glasgow and a salute to BAE Systems' fellow shipbuilders along the Clyde. Construction of the Forward Island began in December 2013. Due to stormy weather expected around the north coast of Scotland, the Forward Island will travel around the south coast of the UK on a



nine day voyage before entering the Firth of Forth. The public can follow the journey by visiting www.marinetraffic.com and searching for the tug, which is called Strathdon.

HMS Prince of Wales

The Queen Elizabeth Class are the first aircraft carriers to use an innovative twin island design. The second 'Aft Island' operates as an airport control tower to co-ordinate aircraft movements, but both islands are designed with the ability to incorporate the other's role in an emergency, thus

increasing the survivability of the ship. The 65,000 tonne Queen Elizabeth Class aircraft carriers will be the centre piece of the UK's military capability.

http://www.baesystems.com/article/BAES_181244/

Northrop Grumman Unveils the Scalable Agile Beam Radar -- Global Strike for the B-1B Bomber

May 6, 2015 – Northrop Grumman Corporation introduced its Scalable Agile Beam Radar – Global Strike (SABR-GS) for the U.S. Air Force's B-1B Lancer at the 30th Anniversary B-1 Reunion held at Dyess Air Force Base, Texas.

Northrop Grumman's SABR-GS is a full performance, multi-function, active electronically scanned array (AESA) radar for the B-1. Large synthetic aperture radar maps, advanced image processing and sensor integration provide a significant advantage in situational awareness and give the B-1 powerful new capabilities for intelligence, surveillance, reconnaissance and targeting. As a derivative of the AN/APG-83 SABR, SABR-GS takes advantage of hardware, legacy modes and advanced operating modes proven on the F-35, F-22 and F-16 aircraft. **Nearly three times the size of the F-16 SABR system**, SABR-GS offers unprecedented target area detail and digital maps under all weather conditions. SABR-GS will replace the APQ-164 radar antenna currently deployed on all B-1 bombers.

http://www.globenewswire.com/newsarchive/noc/press/pages/news_releases.html?d=10133106

Northrop Grumman LITENING Advanced Targeting System Achieves Two Million Operating Hour Milestone with greater than 98 percent availability

Feb. 24, 2015 – In the life cycle of every military system, some milestones stand out as signature achievements. One million operating hours is one of them – and Northrop Grumman Corporation's fielded AN/AAQ-28(V) LITENING pods have hit that number for the second time. (ok, for a moment imagine receiving a life cycle extension request for operational life of 2,000,000 hours!)

The AN/AAQ-28(V) LITENING pod is a self-contained, multisensor system that enables pilots to detect, acquire, auto-track and identify targets for highly accurate delivery of both conventional and precision-guided weapons. Through the use of a 24/7 worldwide support network, LITENING has maintained an availability rate greater than 98 percent. Of LITENING's two million flight hours, more than 770,000 took place under combat conditions. More than 700 LITENING pods have been delivered to date to the Marine Corps, all components of the Air Force and eight international customers.

http://www.globenewswire.com/newsarchive/noc/press/pages/news_releases.html?d=10121659

Raytheon receives \$20 million DARPA contract to continue hypersonic missile development

April 29, 2015 The Defense Advanced Research Projects Agency (DARPA) has awarded Raytheon Company a \$20 million contract modification for the Tactical Boost Glide program. Under the TBG program, Raytheon intends to develop and demonstrate the technology to enable air-launched hypersonic boost glide systems. "Hypersonics is the new frontier of missile design and development," said Tom Bussing, Raytheon vice president of Advanced Missile Systems. "The extreme environments where these advanced missiles must operate present significant engineering challenges." Once fielded, TBG could fly at speeds faster than Mach 5 and at altitudes of nearly 200,000 feet. To achieve the required speeds, the re-entry vehicles would be designed to skip across the inside of Earth's upper atmosphere before descending on their targets. The new missiles would have to withstand intense heat while remaining highly maneuverable, and would require sensor packages to engage moving or re-locatable targets.

Hypersonic weapons would be difficult to intercept, and would enable warfighters to strike targets at long range much more quickly than current missile technology allows.

<http://raytheon.mediaroom.com/2015-04-29-Raytheon-receives-20-million-DARPA-contract-to-continue-hypersonic-missile-development>

Orbital ATK Successfully Launches Its First Scientific Balloon Flight Since Recent Contract Award - aims for New Balloon Duration Record

27 March 2015 – Orbital ATK, Inc. today announced the successful launch of its first scientific balloon flight as the operator of NASA's balloon program. The company supported NASA's super pressure balloon (SPB) launch from New Zealand, marking the first achievement for Orbital ATK in scientific balloon operations since NASA awarded the contract in November 2014. The contract is administered by the Goddard Space Flight Center's Wallops Flight Facility in Wallops Island, Virginia and managed from the Columbia Scientific Balloon Facility (CSBF) in Palestine, Texas. The Columbia team has launched more than 1,700 scientific balloons from seven countries in the past 35 years.

Under NASA's direction, Orbital ATK's team of mission specialists from CSBF launched the balloon from Wanaka Airport in New Zealand at 5:12 p.m. EDT on March 26. The team provided program management, mission planning, engineering services and field operations for the launch. Flight managers will now monitor the balloon's ability to achieve **a stable altitude of 110,000 feet with a suspended two-and-one-half-ton payload for up to 100 days**. The payload consists of tracking and communication instruments that are needed for the test flight.

A key goal of the mission is to exceed the current SPB record of 54 days in flight and demonstrate the ability to maintain a constant altitude for extended durations. The balloons have the potential to stay afloat for up to 100 days depending on favorable conditions. Filled with helium, the pumpkin-shaped SPB is

made from 22 acres of polyethylene film and equipped to carry several tons of payloads. Since scientific research using high-altitude balloons began over five decades ago, there has been a dramatic increase in balloon size, payload mass and electronics support.

The NASA scientific balloon program offers low-cost, near-space access for payloads weighing up to 8,000 pounds that include science experiments and flight support equipment. These payloads provide critical scientific data in fields such as X-ray, ultra-violet, optical and infrared astronomy. The SPB technology, under development at NASA for the last 15 years, has the potential to revolutionize near-space access, providing an inexpensive platform for long-duration research at a stable altitude.

As the balloon travels around the Earth, it may be visible from the ground, particularly at sunrise and sunset, to those who live in the southern hemisphere's mid-latitudes, such as Argentina and South Africa. Interested observers can track the progress of the flight and view a map showing the balloon's real-time location at:

<http://www.csbf.nasa.gov/newzealand/wanaka.htm>

Orbital ATK will conduct balloon missions in the U.S. and around the world with flight rates of approximately 15 per year.

<http://www.orbitalatk.com/news-room/release.asp?prid=22>

Northrop Grumman Wins 2015 CLEO/Laser Focus World Innovation Award for Lasers

May 5, 2015 – Cutting Edge Optronics, a Northrop Grumman company, was honored with the CLEO/Laser Focus World Innovation Award in the Lasers and Sources category for their Gigashot(TM) High Energy Diode Pumped Solid State laser system. The system is the first Joule class, all diode-pumped, commercially available laser, ideally suited for use in scientific, industrial and medical applications.

The CLEO 2015 recognizes companies that have made major contributions to advancing the field of optics and photonics through recently launched products and services. American Physical Society, IEEE Photonics Society and The Optical Society, with Laser Focus World co-sponsor the award.

Cutting Edge Optronics' Gigashot(TM)-HE laser is a high energy, short pulse diode-pumped solid-state (DPSS) Nd:YAG laser system. The injection-seeded DPSS laser delivers more than two Joules of 532 nm energy in each sub-10 ns pulse at 10 Hz with a near field flat top beam, offering a new level of efficiency for scientific research. With the overall need for higher repetition rates in scientific experiments and the number of worldwide Terawatt and Petawatt laser installations increasing, the introduction of an all diode-pumped high energy laser system is an important step in the advancement of high repetition rate / high energy scientific research. The laser uses a Master Oscillator-Power Amplifier (MOPA) configuration, with technology that is scalable to operate at more than 100 Hz. A four Joule 1064 nm version is also standard, and the Gigashot(TM)-HE is configurable to other customized applications.

Diode Pump Solid State (DPSS) lasers, including the Gigashot(TM)-HE, offer several advantages over flashlamp-pumped systems, including: increased electrical-to-optical efficiency, reduced thermal lens strength, improved energy stability and reduced depolarization losses. In addition, DPSS laser modules can be operated at much higher repetition rates (10s of Hz to 1 kHz). The lifetime of the laser diode bars in these systems is > 10 billion pulses which equates to years or decades in many applications, making the laser modules nearly maintenance-free.

http://www.globenewswire.com/newsarchive/noc/press/pages/news_releases.html?d=10132788

EXACTO Guided Bullet Demonstrates Repeatable Performance against Moving Targets

April 27, 2015 DARPA's Extreme Accuracy Tasked Ordnance (EXACTO) program, which developed a self-steering bullet to increase hit rates for difficult, long-distance shots, completed in February its most successful round of live-fire tests to date. An experienced shooter using the technology demonstration system repeatedly hit moving and evading targets. Additionally, a novice shooter using the system for the first time hit a moving target.

This video shows EXACTO rounds maneuvering in flight to hit targets that are moving and accelerating. EXACTO's specially designed ammunition and real-time optical guidance system help track and direct projectiles to their targets by compensating for weather, wind, target movement and other factors that can impede successful hits.

"True to DARPA's mission, EXACTO has demonstrated what was once thought impossible: the continuous guidance of a small-caliber bullet to target," said Jerome Dunn, DARPA program manager. "This live-fire demonstration from a standard rifle showed that EXACTO is able to hit moving and evading targets with extreme accuracy at sniper ranges unachievable with traditional rounds. Fitting EXACTO's guidance capabilities into a small .50-caliber size is a major breakthrough and opens the door to what could be possible in future guided projectiles across all calibers."

The EXACTO program developed new approaches and advanced capabilities to improve the range and accuracy of sniper systems beyond the current state of the art. The program sought to improve sniper effectiveness and enhance troop safety by allowing greater shooter standoff range and reduction in target engagement timelines.

<http://www.darpa.mil/NewsEvents/Releases/2015/04/27.aspx>

http://www.darpa.mil/Our_Work/TTO/Programs/Extreme_Accuracy_Tasked_Ordnance_%28EXACTO%29.aspx