

ESD SPOTLIGHT

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Air Superiority 2030

Interview with General Herbert J. Carlisle, Commander U.S. Air Combat Command (ACC)

ESD: Could you please explain the background of the ACC and its creation after the second Gulf War?

– you can download it from af.mil – considers how to respond.

Carlisle: The ACC was created because in the early 1990s tactical and strategic tasks increasingly overlapped. Today, with more than 90,000 active and civilian personnel, it is the largest of the ten Commands in the USAF. We approximately operate 1,300 airplanes in 34 squadrons on 19 bases and about 70 locations around the world.

ESD: Is it in that context that you recently mentioned new Chinese and Russian developments?



Carlisle: What I have said was that potential or future opponents have seen how successful and efficient we are. They have observed what happened over the last 25 years and they know that we will win any conflict if we dominate the airspace. They know that and they try to counter it – Russia, for example, with the T-50.

ESD: There is a new USAF air war doctrine out. What does it say about required future skills, or F-35 and the related fleet mix?

But China especially is trying hard to close the capability gap between its aircraft and the USAF and U.S. Navy: indeed the Chinese FC-31 has a striking outward resemblance to the F-35.

Carlisle: You are talking about the “Air Superiority 2030” document, presented just three months ago. It highlights the problem of threat capabilities that will grow over the next 15 years along two vectors: On the one hand “traditional” enemy systems will evolve, like new combat aircraft and their sensors and weapons: while nations developing them already have these skills or means, those assets – like sophisticated air- and air-defence systems – will be exported and thus made available to other or third countries. On the other hand, it deals with opposing capabilities in spectra which are less predictable, like in space, cyber-warfare, hypersonic weapons, stealth cruise-missiles, new ballistic missiles and so on.

They know or anticipate what you can do with it and so they are trying with anything in their power – reasonable from their point of view – to copy and obtain such capabilities. Therefore we simply cannot afford to remain even at the current state of technology. That’s why there is a fifth generation fielded and why considerations on the sixth generation now come into play.

ESD: This fielded fifth generation of course includes the F-22A, here flying shoulder-to-shoulder with the F-35. What is your approach to the congressional push to resume production of the RAPTOR?

In 2030 our own air superiority forces will have to face these threats, over a wide range of locations and scenarios. The document

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MASTHEAD

ESD Spotlight
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Carlisle: Here you have your answer regarding the future fleet mix. By 2019 F-35 deliveries will achieve 17 per month, but it could any time be even more, the final number of 1,763 [for the USAF] is up-right.

Not to misunderstand, I admire and appreciate the RAPTOR today as unbeatable and as an awesome spearhead. But I think it is better to spend taxpayer dollars for a higher F-35 production rate to achieve an ever lower unit cost. A comparable "RAPTOR 2.0" would mean all the computers, the on-board equipment and the sensors would need to be made new; they were out of production some time before the last one was handed over in 2012. And when would such a first one be delivered? 2020+?

In addition, we are meanwhile already spending money to research the sixth-generation fighter aircraft, its sensors, if optionally manned or unmanned and so on. So, there is a drawn line....

But all that is my personal opinion, these are ultimately decisions of the Congress and the responsible Senators.

ESD: *The USMC has stated that its F-35Bs have been ready for war since last summer, so how exactly will the USAF demonstrate or validate IOC?*

Carlisle: The same case as with our Marine brothers. Between 12 and 24 F-35s and their crews have to prove the ability to successfully fire missiles against and drop PGM bombs onto targets and destroy them. All sensors have to be fully functional and their software packages in the latest version have to be stable.

Also the challenging logistics 'cloud' that manages the maintenance must be connected and functioning to sustain daily operations.

This is an excerpt; please read the full article in ESD No 4, 2016. Order your free copy here: info@mittler-report.de



ESD: *Isn't there a need for a new BVR missile to replace the AIM-120 AMRAAM family? New Chinese or Russian missiles are out while AMRAAM's basics are on the pylons since 1992.*

Carlisle: Definitely. To arm the next generation, we need armament of the next generation as well. While the last version of the AMRAAM [AIM-120D] has "bought" us some time, yes there is a foreseeable end of the system.



ESD: *This brings us to another "construction-site" under your command; the continued refusal of some Congress members to withdraw the A-10A. Where do you stand in this sometimes heated debate?*

Carlisle: This is all about CAS [close-air-support] for ground troops. Yes, there are politicians that with their supporters have good reasons to do support the A-10 in front of the legislature, because the "WARTHOG" is a great asset, with its big gun. Which is partly true, in fact.

But a look at the next generation of CAS is needed: you cannot keep the A-10 alive indefinitely. The F-35 has already proven that it can do this job, and it will do so more often in more robust future scenarios. There

the WARTHOGs' would likely not survive in their traditional role, or would be decimated. The same also applies by the way to F-15s and F-16s. We still have hundreds of them, but in 2030 they will dominate nothing anymore.

ESD: *What is your quote of current and future levels regarding networking or collaborative linking?*

Carlisle: Huge subject. It is a constant challenge around the advantages of the high-end platforms we are fielding, to note that we are behind in bringing up our network-integration at the same pace.

Each of the new assets like the F-22 – but this also hits TYPHOON or WEDGETAIL [AEW&C] as well - have performed well. They have once again proven that if you get new assets into the hands of those young men and women, amazing and prior un-guessed things can happen. But their performance and that of the entire force is highlighting the need for more effective combat multi-domain integration.

That is a constant key work in progress, as these new platforms are driving us further down the road to achieve it - the more so when we get to the link architecture and the "translators" that allow us to truly achieve fifth-to-fourth and fourth-to-fifth integration. We struggle but work to bring these disparate parts together in a collaborative, honeycombed environment.

The interview was conducted by ESD contributor Georg Mader.

Defence

Machines fighting hackers

(df) Mayhem won this year's Cyber Grand Challenge (CGC), which is organized by the U.S. Defense Advanced Research Projects Agency (DARPA). The special point of this CBC is, that for the first time ever computers were fighting the hackers, not humans. The teams had to develop machines that had to cope with the challenges.

"The need for automated, scalable, machine-speed vulnerability detection and patching is large and growing fast as more and more systems—from household appliances to major military platforms—get connected to and become dependent upon the internet," DARPA explained the background for this new focus. "Today, the process of finding and countering bugs, hacks, and other cyber infection vectors is still effectively ar-

tisanal. Professional bug hunters, security coders, and other security pros work tremendous hours, searching millions of lines of code to find and fix vulnerabilities that could be taken advantage of by users with ulterior motives."

The first place was won by the machine Mayhem, which was developed by team ForAllSecure of Pittsburgh. Second place was formally awarded to Xandra, a cyber reasoning system developed by TECHx of Ithaca, N.Y., and Charlottesville, Va. Following an extended verification process by the Cyber Grand Challenge Competition Framework Team and the DARPA Verification Team, third place was awarded on Sunday, August 7, to Mechanical Phish, developed by Shellphish of Santa Barbara, Calif.



(Photo: DARPA)

"DARPA was created nearly 60 years ago to prevent technological surprise, and I can think of no better way of doing that in today's networked world than by developing automated, scalable systems able to find and fix software vulnerabilities at machine speed," DARPA Director Arati Prabhakar said. "Our goal in cyber is to break past the reactive patch cycle we're living in today, and unleash the positive power and creative potential of the information revolution."

www.darpa.mil



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Special Theme Tracks:

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- Serious Gaming becoming Professional
- Tactical Networking in the Mobile Domain
- Cyber, what else?

For questions on sponsorship & exhibit opportunities, contact Mandy Rizzo at mrizzo@afcea.org or +32 2 705 4384

Registration and hotel booking are now open. Event updates on www.afceaeurope.org

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Technology

Saab equips Leopard 2 with vehicle electronics

(df) Saab has received an order from Krauss-Maffei Wegmann regarding development of new vehicle electronics for the Leopard 2 tank valued about €14 million. Deliveries are expected between 2018 and 2022. Krauss-Maffei Wegmann is a primary supplier of the Leopard 2 tank to the Swedish Defence Materiel Administration and the Swedish Army, where the tank is designated as Stridsvagn 122.

The order encompasses design and development of vehicle electronics, delivery

of vehicle electronics units and cables, as well as training and documentation. The order also enables the tank to be integrated with the Swedish Battalion Combat Management System.

“This order shows that we are a long-term supplier in the field of vehicle electronics,” says Jonas Hjelm, head of Saab business area Support and Services.

“It’s important that the tank is integrated into the Swedish Battalion Combat Management System,” says Jonas Hjelm, head of Saab business area Support and Services.

“The order reinforces our role both as a



(Photo: Saab)

supplier for the Battalion Combat Management System and as a supplier and partner of the Swedish Army and the international defence industry.”

www.saabgroup.com

Upgrade of the British Army’s Challenger 2 tanks

(df) More and more bidders are entering the race for the upgrade of the British Army’s Challenger 2 tanks. Now Lockheed Martin UK also is to bid for the Ministry of Defence’s contract. In collaboration with Elbit Systems UK, Lockheed Martin UK will submit a proposal to undertake the Life Extension Project (LEP) that will see the main battle tanks in service until 2035.

Lockheed Martin UK is the prime contractor for the Warrior Capability Sustainment Programme, which is upgrading a minimum of 380 armoured fighting vehicles for the Army. The company is also design-



ing and delivering 245 turrets for the AJAX vehicles that are being produced by GD UK.

“We have a proven track record of designing and delivering turrets for armoured fighting vehicles through the Warrior and AJAX programmes,” said Richard Muir, Bu-

siness Development Director from Lockheed Martin UK. “By teaming with Elbit Systems UK, and using our established and predominantly UK-based supply chain, we’re confident we can offer an innovative solution to extend the life of Challenger 2 and deliver improved capability to the British Army.”

The team brings together Lockheed Martin’s experience in armoured fighting vehicles with Elbit System’s expertise and experience in LEPs and obsolescence management across more than 3,000 platforms.

www.lockheedmartin.co.uk

www.elbitsystems.com

Rheinmetall’s bid for the Challenger 2 programme

(df) The other “new” bidder for the British Challenger 2 life extension programme



is Rheinmetall. The German company has quite some new technologies especially for main battle tanks in its portfolio and operates several demonstrator systems solely for the development of tank systems.

“Our team has put together an innovative proposal to solve not only the obsolescence issues of the Challenger 2 but to also cost effectively enhance the capabilities of the MBT,” Ben Hudson, Head of Rheinmetall’s Vehicle Systems Division, said.

“One example of this is that our solution can integrate either the existing 120mm L30 rifled gun or our proven 120mm L55 smooth bore system that is in service with the German Army and can fire the latest generation kinetic energy rounds and our unique 120mm air-burst ammunition. When combined with the new optronics, situational awareness and fire control systems our solution will allow the Challenger 2 to fight, survive and win on the battlefields of today and tomorrow.”

www.rheinmetall.com

Kuwait Ministry of Defence orders 30 H225M Caracal helicopters

(wb) Airbus Helicopters has signed a contract with the Kuwait Ministry of Defence for the purchase of 30 H225M Caracal multirole utility helicopters as well as an associated support and services package, during the visit of the French Defence Minister Jean-Yves Le Drian to Kuwait begin August. During the visit, Airbus Helicopters representatives recognized the key role played by French Minister of Defence Jean-Yves Le Drian who provided his continued support to the realization of this project, in line with the existing France-Kuwait strategic relationship.



(Photo: Airbus Helicopters)

Kuwait's fleet of H225M Caracal will be used for a wide variety of missions such as combat search-and-rescue, naval operations, medical evacuation and military transportation.

The helicopters will be operated by the Kuwait Air Force and the Kuwait National Guard. A combat-proven platform

with exceptional payload, a world-class automatic flight control system and long endurance, the H225M Caracal has demonstrated its versatility and performance even in the harshest operational environments.

The H225M Caracal is the latest evolution of the successful Super Puma/Cougar family of military helicopters, with more than 500 units delivered worldwide. Kuwait is the latest nation to join the community of Caracal users with 138 H225M Caracal having been ordered so far by France, Brazil, Mexico, Malaysia, Indonesia, Thailand, and Kuwait.

www.airbushelicopters.com

Security scanner for the German Federal Police Force

(df) The German Ministry of Interior signed a framework agreement with Rohde & Schwarz for 300 R&S QPS200 security scanners. The new instruments can now be used everywhere that the German Federal Police Force performs security checks. The primary application will be for security at German airports.

The millimeter-wave technology used in the R&S QPS security scanners is based on the company's expertise in developing test and measurement equipment. The security scanner automatically detects potentially dangerous objects under clothing or on the body, whether they are rigid, flexible, fluid, metallic or non-metallic. If the scanner reports an alarm, the location of the object is marked on an avatar, a symbolic graphic of the human body.

According to the company there is no health hazard associated with the R&S QPS transmit power, which is hundreds or even thousands of times lower than that of a mobile phone. It operates in the frequency range between 70 GHz and 80 GHz. A scan takes just a few milliseconds to complete. Scanning comfort is also improved and the neutral graphical display preserves privacy.

www.rohde-schwarz.com

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- Civil-Military Cooperation in Context of WMD/CBRN Defence Protection
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AIM-9X Block I successfully tested from an F-35A

The U.S. Air Force, U.S. Navy and Raytheon successfully test-fired three AIM-9X Block I missiles from an F-35A aircraft at airborne targets, resulting in direct hits. The weapon is the first short-range, air-to-air missile to be used on the F-35.

The AIM-9X entered operational service in 2003. The next generation, the AIM-9X

Block II, adds a datalink capability, successfully completed operational testing and began full rate production in 2015.

The F-35 can carry two AIM-9X missiles on its wings and four AIM-120s internally when configured for an air dominance mission. These test firings advances integration of the AIM-9X, with introduction across the F-35 fleet expected in 2017.

www.raytheon.com



Building smart batteries

Rob Phillips, managing director of UK battery solutions provider Accutronics, gives some thoughts on the process of embedding batteries.

Many design engineers believe that, as its power source, the battery is the very heart of the product. However, I would go even deeper into the core of the battery and argue that it is the cell that is the nucleus of the battery, determining the performance, lifecycle and durability of the application. As a result, the first thing the OEM and



(Photo: Accutronics)

battery developer should consider in each case is cell selection.

To select the most appropriate cell types one first needs to determine the power consumption of the application, the runtime requirements and environmental operating conditions. Feeding into this is

weight and volume budget and a requirement for the battery to meet cost targets.

The battery developer has a number of cell types available to them including Nickel Cadmium, Nickel-Metal Hydride, Lithium ion and Lithium ion Polymer. In recent years it is the Lithium ion chemistries that have dominated product development due to their high energy density and excellent safety record, but the older Nickel chemistries do still offer superior performance in certain applications.

www.accutronics.co.uk

Jenoptik Power for Patriot

(gwh) Jenoptik's Defense & Civil Systems division will supply components for the Patriot missile defence system within the scope of several contracts.

The overall order consists of several partial orders which the Jenoptik division received between June and August this year. Jenoptik will provide the power supply, the converter, the aluminium chassis as well



(Photo: Jenoptik)

as the spare part packages for the Patriot Advanced Capability-3 (PAC-3) systems.

The power generators will supply the radar and the carrier system of the missile defence system with electrical power. The components will be produced at the Altenstadt location in Germany.

Jenoptik is currently testing a hybrid power supply system which allows for reductions in previous fuel consumption of up to 50 percent.

www.jenoptik.com

Artillery precision guidance kits for the U.S. military

(df) Orbital ATK has received a €62 million contract that exercises a second option from the U.S. Government to produce artillery precision guidance kits (PGK).

PGK-fuzed projectiles allow battlefield commanders to more safely employ artillery with greater accuracy and less risk of collateral damage. Orbital ATK produced 4,779 PGK fuzes under the low-rate initial

production contract and has transitioned to full-rate production to support the current programme needs.

PGK combines guidance and fuze function for 155mm conventional artillery projectiles into one device. By simply replacing a standard fuze with Orbital ATK's guidance fuze, artillery projectiles are reliably delivered to within 30 meters (or closer) of the intended target. This degree of accuracy greatly reduces conventional artillery



(Photo: Orbital ATK)

dispersion which can be 200 metres or more.

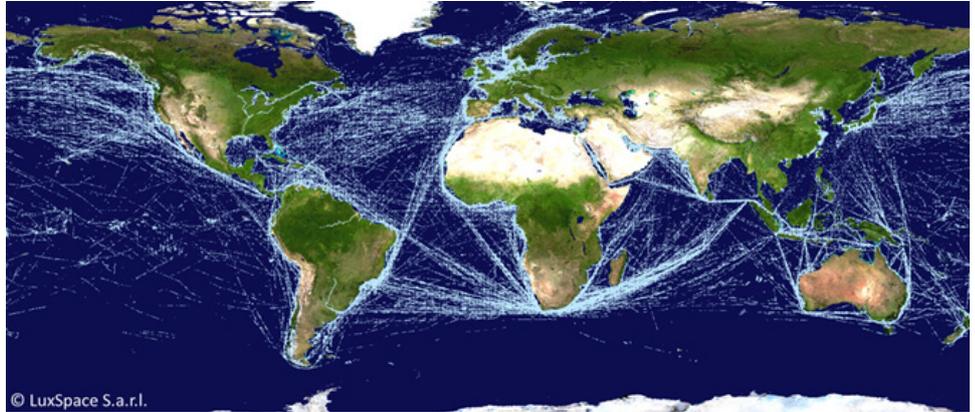
www.orbitalatk.com

Industry & Trade

EMSA awards contract for AIS

(df) The European Maritime Safety Agency (EMSA) has awarded a framework contract for a four-year satellite Automatic Identification System (AIS) data service to LuxSpace Sàrl (an affiliate of OHB SE) and its partner ORBCOMM Inc. Headquartered in Lisbon, Portugal, EMSA is one of the largest consolidators of AIS data and is responsible for maritime safety, pollution-by-ship monitoring and ship security for the European Union and its Member States.

LuxSpace will provide ORBCOMM's global real-time data feed of satellite-based AIS (SAT-AIS) data, which will be used by EMSA, other EU agencies and EU Member States for ship tracking and other maritime navigational, safety and security applications.



“ORBCOMM's AIS service delivers comprehensive and reliable global coverage with high refresh rates, which provides a complete situational picture of vessel activity worldwide”, said Marc Eisenberg, ORBCOMM's Chief Executive Officer.

Thomas Görlach, Managing Director of LuxSpace, added: “This achievement is an

important step in our roadmap to establish further innovative services based on our next generation micro satellite product line, Triton-X.”

www.emsa.europa.eu

www.luxspace.lu

www.orbcomm.com

www.ohb.de

Option in Hanwha Thales

The jointly-owned company Hanwha Thales was created in 2000 by Samsung and Thales to develop the defence electronics in Korea. In June 2015, Samsung sold its de-

fence related businesses to Hanwha. In this context, Hanwha and Thales negotiated a put/call option on Thales' shares in their jointly owned company. Considering Hanwha and Thales respective ambitions in the Ko-

rean market today, Thales has decided to exercise its put option, for all of its shares, amounting to 50% of Hanwha Thales equity, at the price of €230 million.

www.thalesgroup.com

IFS Applications number one in aerospace and defence EAM

(gwh) IFS, the global enterprise applications company, has for the 8th year in a row been identified as global number one vendor of enterprise asset management (EAM) software for aerospace and defence (A&D) industries by ARC Advisory Group, the information technology research and advisory firm for industry and infrastructure.

ARC Advisory Group has recognized IFS as the leading supplier to the global aerospace and defense industry in its most recent “Enterprise Asset Management Global Market Research Study.”

According to the most recent “Enterprise Asset Management Global Market Research Study”, IFS has gained market share in the aerospace and defense industry in each of the last four years, growing approximately 25 percent since 2012 and is the leading supplier to this industry sector.

IFS has a strong and growing customer base in aerospace and defense including Affinity, BAE Systems, Lockheed Martin, General Dynamics, SAAB Group, GE Aviation, Royal Thai Airforce, TAE and the Emirates.

www.ARCWeb.com

www.IFSWorld.com



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