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Volker Schwichtenberg,
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Mönch Verlagsgesellschaft mbH,
wondering if he can take a
Eurofighter for a test drive.



(Photo: Stefan Nitschke)

Mönch Verlagsgesellschaft mbH

(Mönch Publishing Group)



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Theodor Benien

FCAS: Failure or Success? Germany and France Differ on Nature of Cooperation



The system architecture of FCAS is based on a system-of-systems approach of manned combat aircraft, UAS, satellites, remote carriers, and more. Unfortunately, Europe is not united. Two programmes are competing against each other. (Graphics: Airbus Defence)

The negotiations between Airbus Defence and Dassault Aviation concerning the contract for the Demonstrator Phase (Phase 1B) have stalled. For over a year, the two aerospace companies in Germany and France have been unable to agree a number of details regarding the development of the Future Combat Aircraft System (FCAS). While the

governments in Paris and Berlin support FCAS as a next-generation air defence system for Europe – and consider it as a lighthouse project for their bilateral cooperation – both companies have reached a basic agreement about the six pillars of the FCAS programme which are ready for contract signature.

Dr Theodor Benien is the Principal of BENCO Communications & More in Bavaria, and is a regular contributor to Mönch publications.

However, there is one pillar left wherein Airbus and Dassault have different views about their cooperation: the workshare for the Electronic Flight Control System (EFCS). In an interview with the French daily newspaper *Les Echos*, the CEO of Airbus Defence and Space, Michael Schöllhorn, talked about these differences in an astonishingly open manner. According to the top manager, the two companies have a completely different understanding about the nature of their cooperation. While Dassault is used to developing and manufacturing aircraft alone, depending on only a small number of suppliers who have to deliver, Airbus Defence is used to cooperating with partners in industrial partnerships – indeed, it considers cooperation with partners as part of its essential DNA. In an interview with *Der Spiegel*, Schöllhorn addressed this different understanding frankly, identifying what he termed a ‘command and control’ culture at Dassault – something, he suggests, not particularly helpful for a European cooperation programme.

What, exactly is the problem? The issue is that Dassault demands it should be the sole prime contractor, and expects to have the lead for the flight controls, whereas all other companies should be called upon to deliver as normal suppliers. Dassault believes that Airbus Defence has no clue – or at least lacks sufficient experience with flight controls, which are the central nervous system for any commercial or military aircraft. It is scarcely a surprise that such French demands are not acceptable at all to Airbus Defence, which refers to its Military Air Systems Centre in Manching, where an experienced team is responsible for the advanced flight control system of the Eurofighter.

The difference in understanding of the meaning of cooperation, the different degrees of willingness to share information, and Airbus’ reluctance to be treated by Dassault as a supplier, prove that FCAS is flying through heavy turbulence. The CEO of Dassault Aviation, Eric Trappier, even blamed Airbus for blocking negotiations, calling on the

French government to provide political support and find a way out of the impasse. Frustration seems to be at an all-time-high. Senior managers returning from joint meetings had the impression that they must have attended different events, because the agreed results and their perception have been quite different. Previous issues, such as intellectual property rights (IPR), or the question as to whether one or two technology demonstrators should be built, seem no longer to be points of discussion at the negotiating table.

Whatever happens, these problems are extant on the industrial level. At the political level, Germany and France both want the FCAS programme to become a success. French President Emmanuel Macron and German Chancellor Olaf Scholz fully support the programme, and both governments are convinced that FCAS and the future main battle tank (Main Ground Combat System, MGCS), will stimulate the European defence industry. The political goals in Paris and Berlin envision the introduction of advanced defence capabilities, new technologies, new jobs and the creation of strategic sovereignty for Europe.

Is FCAS already at the crossroads? Not just yet. It is still possible to resolve the remaining issues. However, in case the companies are unable to reach a definitive final agreement, both sides have an emergency option: Plan B for Dassault is to do it alone, whereas for Airbus, Plan B is to join the Tempest programme, together with BAE Systems and Leonardo. In this case, the four Eurofighter nations could demonstrate again that honest cooperation among equal partners can work.

Could FCAS and Tempest be merged into a single European defence programme? Everyone knows that it would make much more sense to have one instead of two programmes. Europe should not procure two or even three different combat aircraft systems (Eurofighter, Rafale, Gripen) again. Hopes are high: in reality, the probability is moving towards zero.

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Critical Technologies of Great Importance for Europe's Sovereignty



An Interview with Thomas Müller, CEO of Hensoldt AG

Show Daily: Hensoldt has become one of the largest platform-independent sensor suppliers in Europe. Where do you currently stand in an international industry comparison?

Thomas Müller: We are already one of the European technology leaders for defence and security solutions.

Of course, we have the ambition to expand this position, step by step. This is not just about volume, but is, above all, about technology leadership in our core business of sensor technology, and also about innovative offerings in future arenas, such as AI, cyber and big data. Here, we supply critical technologies that are of great importance for Europe's sovereignty. The involvement of the German government and Leonardo underline our importance to the European security and defence industry.

SD: How important is platform independence in this context?

Thomas Müller: It is crucial for our business. Our platform independence gives us customer access to major platform OEMs, such as Boeing, Lockheed Martin and Leonardo. This gives us business opportunities in all domains - air, land, and naval. And for large equipment programmes, our capabilities are fully available for collaborative projects, which our customers very often ask for.

SD: Germany and many other Western countries are supplying weapons to Ukraine. Is Hensoldt involved in this?

Thomas Müller: Hensoldt has the necessary key technologies and fully supports the efforts of the German government to meet demand as

quickly as possible. Among other things, we have submitted proposals to the Ministry of Defence and the BAAINBw for new products, available immediately and in the short- to medium-term, as well as proposals for additional spare parts supplies and maintenance services.

We are prepared to rapidly increase production rates, especially for systems already introduced in the Bundeswehr. Should additional production capacity become necessary, we can also draw on the worldwide manufacturing network in the Hensoldt Group.

However, it is clear that the federal government is in the lead here.

SD: European armed forces have identified a backlog demand for modern equipment in many areas. Where do you see particular opportunities for Hensoldt?

Thomas Müller: In addition to radar and optronics, spectrum dominance - that is, everything to do with control of the electromagnetic and cyber spectra - is a core business for Hensoldt. In addition, we can contribute special skills in the field of sensor fusion. Both are essential for the successful deployment of our armed forces, for their protection against attacks and also for air defence. The conflict in Ukraine has once again highlighted the importance of electromagnetic spectrum control and the use of networked sensors. These capabilities are also essential for future European cooperation programmes, such as FCAS or MGCS.

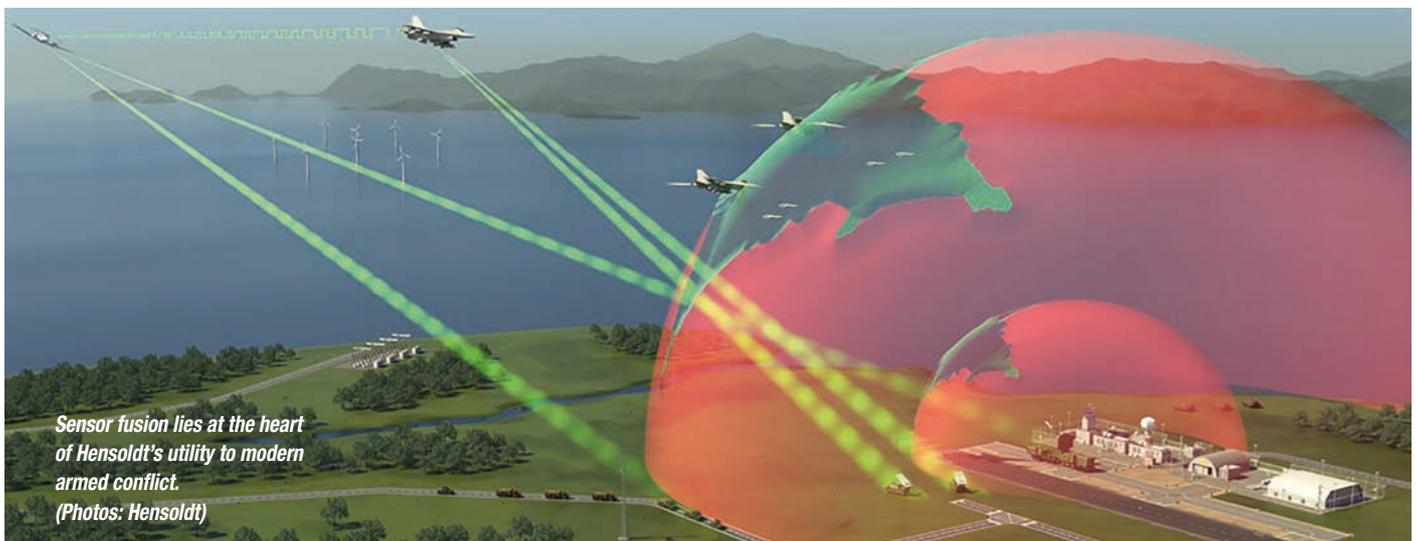
SD: You speak of spectrum dominance: what role do you see for Hensoldt in discussions on airborne electronic warfare?

Thomas Müller: The survivability and assertiveness of air forces must be ensured against new air defence capabilities through state-of-the-art airborne EloKa [Elektronische Kampfführung - electronic warfare] capabilities in national sovereignty as a prerequisite for freedom of movement. This capability is also essential for the NATO commitments Germany has already entered into, and for Germany's positioning and ability to contribute to future European cooperation programmes, such as FCAS. This capability was therefore rightly included in the German government's strategy paper on strengthening the security and defence industry in Germany.

For these reasons, we see great potential in the field of airborne electronic attack, and have made significant investments in our airborne EloKa capabilities. Core technological elements for airborne EloKa are available nationally with the Hensoldt Kalætron product family, and are universally applicable for all airborne EloKa solutions.

SD: What are your focal points here at ILA?

Thomas Müller: We have three focal points: first, sensor fusion - especially in applications for combat aircraft, UAS and in air defence; secondly, airborne electronic warfare; and thirdly, signals intelligence - all highly topical issues that play a major role in upgrading the Bundeswehr. (stn)

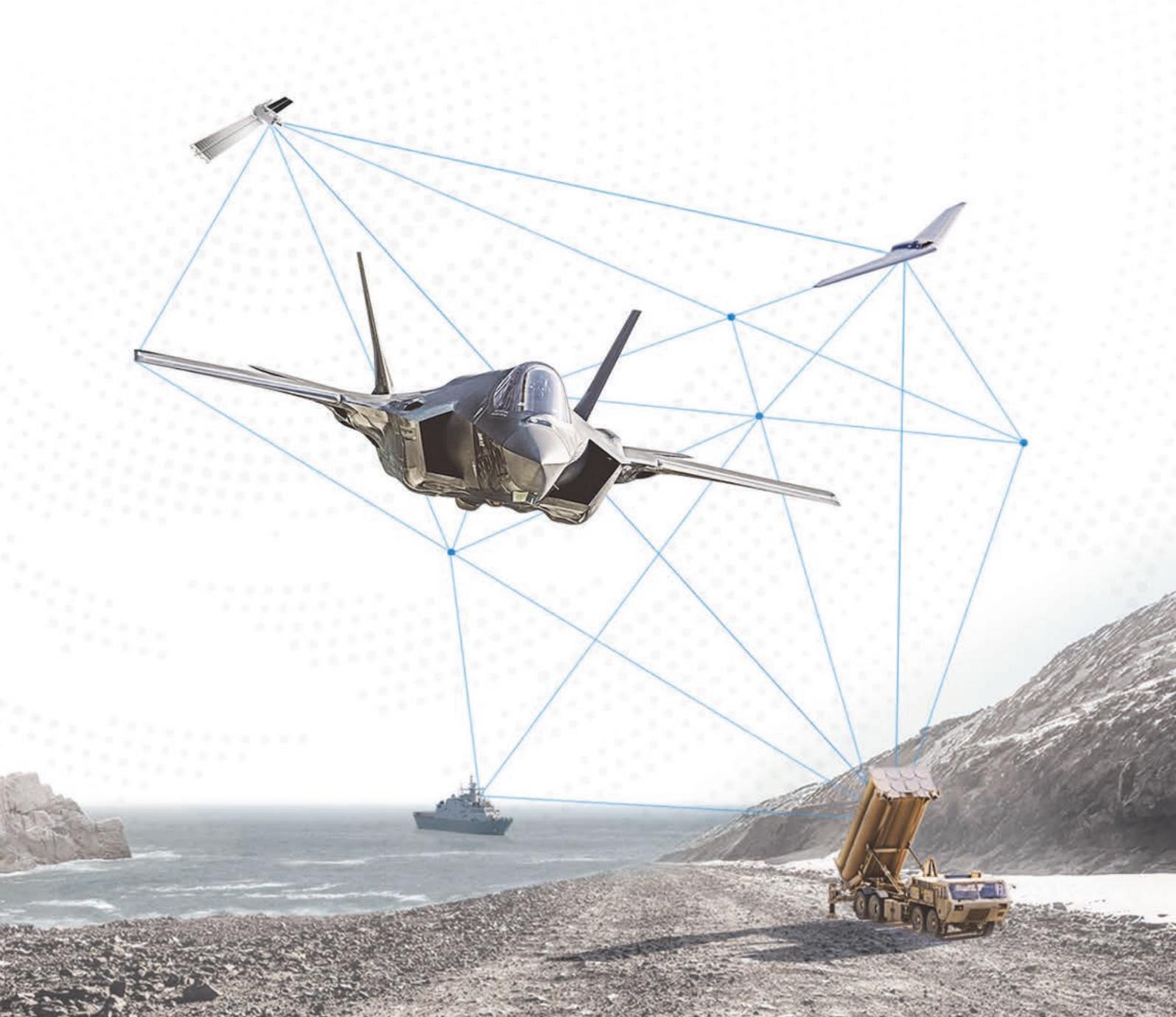


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Unparalleled Missile Defense Solutions

An Interview with Bob Delgado, Director of International Business Development, Integrated Air and Missile Defense (IAMD) at Lockheed Martin



The Ukraine war has brought the issue of missile defence powerfully back into the communal consciousness of both politicians and citizens. Again and again, Russian President Vladimir Putin and his henchmen have threatened the possible use of nuclear missiles. And Bob Delgado thinks his company has at least some of the answers.

MT: In your opinion, what is the greatest challenge facing the global missile defence industry?

Delgado: Threats are continuing to evolve, and they are doing so at faster and faster rates. That's why we continue to make significant investments in advancements to ensure we outpace rapid and emerging air and missile threats and provide the warfighter with unmatched capability in a joint all-domain environment.

MT: What can you tell us about the capabilities of PAC-3 and THAAD?

Delgado: PAC-3 and THAAD offer unparalleled missile defense solutions to the US and allies around the world. Building on the combat-proven PAC-3 Cost Reduction Initiative (CRI), the PAC-3 Missile Segment Enhancement (MSE) expands the lethal battlespace with a two-pulse solid rocket motor, providing increased performance in altitude and range.

THAAD is a highly effective, combat-proven defense against short, medium and intermediate-range ballistic missile threats. It is designed for endo- and exo-battlespace in addition to providing significant mass raid capability, using Hit-to-Kill technology to execute its lethal aim-point accuracy.

MT: What is the latest information about the integration of these two missile defense systems?

Delgado: During a test earlier this year, the THAAD weapon system successfully launched a PAC-3 MSE to intercept a tactical ballistic missile

◁ PAC-3 MSE features a two-pulse rocket motor, offering increases in both altitude and range.

▽ The integration of THAAD and PAC-3 MSE offers commanders more options for selecting the optimum interceptor. (Images Lockheed Martin)

target using proven hit-to-kill technology. With this successful demonstration, the THAAD weapon system can now be deployed anywhere with minimal Patriot equipment required and limited to PAC-3 MSE M903 launchers and PAC-3 MSE interceptors. Integration into the THAAD weapon system also allows the PAC-3 MSE to launch earlier, enabling a longer flyout and the full use of the MSE's kinematic capability.

The next integration flight test is FTT-25 that will include THAAD and MSE interceptors in one flight test. In addition, follow-on development for the THAAD system has started, which will continue to evolve the PAC-3 MSE capability within the THAAD weapon system against additional threats.

MT: Lockheed Martin constantly develops new technologies and improves the performance of existing products. What is the company's philosophy that drives innovation? What next steps can we expect?

Delgado: Our philosophy is driven by our commitment to servicemen and women around the world. We are transforming

with urgency to deliver the speed, agility and insights our customers need to stay ahead of rapidly evolving threats. PAC-3 is a great example of Lockheed Martin's commitment to technology and innovation and meeting the needs of our customers. The program started back in 1994 with a combat-proven interceptor, the PAC-3 CRI. Then we took that missile and evolved to be even better to the point where it is currently considered the world's most advanced air defense missile. Additionally, Lockheed Martin routinely participates in demonstrations and exercises alongside of our customers, directly advancing capabilities while building shared mission understanding. As an example, we're integrating systems (that were never designed to operate together) under the 21st Century Security Demos & Prototypes initiative to enable an integrated multi-domain operations kill web. By demonstrating this in a realistic operational environment, gaps, obstacles and improvements can be identified and refined such that the capabilities have a credible path to program insertion.

MT: How is Lockheed Martin's integrated air and missile defense contributing to multi-domain operations around the world?

Delgado: Going back to the integration of PAC-3 and THAAD, this is a key example of Lockheed Martin's contribution to multi-domain operations, offering a critical capability in 21st century security that gives the warfighter more options with existing equipment so they can choose the best interceptor for any threat they face. Another great example is the integration of PAC-3 and F-35. During a flight test in July 2021, a PAC-3 intercepted a surrogate cruise missile threat using F-35 - the most lethal, survivable and connected fighter jet in the world, as an elevated sensor.

By evolving technologies that connect, share and learn, we empower warfighters with the information needed to quickly make decisions that drive action and enable multi-domain operations. (apf)

SIGINT – SEEING THE INVISIBLE

All military units emit a distinctive signature that can be picked up by visual sensors, radar, and electronic surveillance. In many instances, for example, when maneuvering forces exploit geography to achieve deep cover, electronic surveillance or SIGINT, is the sole means by which they can be detected and identified. SIGINT is thus of crucial importance in achieving effective situational awareness, gaining the tactical advantage, and avoiding unwanted surprise.

SIGINT, essentially the detection, collection and analysis of Radio-Frequency (RF) signals, encompasses two main areas: Electronic Intelligence (ELINT), which focuses on emissions from radars and weapons systems; and COMINT, which is concerned with radio, data link, satellite and cellular communications. Today's advanced ELINT and COMINT systems offer capabilities that were unimaginable in the not too distant past. They facilitate accurate geolocation of enemy units, identify specific combat formations, and relate the activities of individual actors. These powerful tools are instrumental in understanding enemy strength and intentions, even predicting conflict before the onset of actual hostilities.

At the forefront of the SIGINT field, Israel Aerospace Industries (IAI), Israel's largest aerospace and defense company, is uniquely positioned to exploit this powerful technology. As a pioneer and world leader in the design and development of high performance Unmanned Aerial Systems (UAS), IAI offers ideal platforms to deploy advanced SIGINT capabilities. For example, the payload and endurance capabilities of the combat proven Heron UAS family enable them to deploy multi-sensor payloads, including SIGINT, radar, and EO/IR systems to the required distances and remain on station for extended periods. The data from the various sensors is combined to form an integrated picture. When deployed together from the same platform these sensors are especially effective. For example, once SIGINT detects and geolocates hidden hostile forces, the radar and EO/IR sensors can then be focused on the relevant area for further investigation, obtaining additional intelligence data and verifying targets. Heron UAS are equipped with wideband, high speed data link to relay information to C2 centers, providing immediate and up to date actionable intelligence that is of infinite value.

The provision of a range of platforms from the same UAS family offers substantial advantages. Commonality greatly simplifies logistics while the availability of different sized platforms affords the flexibility to tailor configurations best suited to specific mission scenarios. With advanced multi-sensor capability and onboard data processing, the Heron family will reveal strategic intentions, unmask hidden threats, and identify short-lived target opportunities often missed by more conventional means of collection.

A Game of Cat and Mouse

As threats evolve and increase in sophistication, so too must the sensors that are tasked with countering them. Embracing the latest digital technology, radars and radars employ rapid fast frequency hopping, low power, and efficient antennae to maintain Low probability of Intercept (LPI). For example, digital burst transmissions of short packets assist in evading detection. On the opposing side, ultra-fast wideband digital receivers can 'hold' even the shortest and weakest signals, enabling modern SIGINT to scan, detect and track signals from: agile emitters employed by digital LPI radars; encrypted, frequency hopping software-defined radios; cellular systems; and satellite communications. Increasing miniaturization has enabled IAI to incorporate these powerful multi-spectral, multi-modal capabilities into compact SIGINT systems that are deployable from smaller, less costly UAS platforms in place of larger systems carried by manned aircraft.

IAI's new generation compact SIGINT systems feature the latest real-time data processing capabilities, including Artificial Intelligence and Machine Learning (AI/ML) to process, filter, and extract the most valuable and meaningful information. They cover the entire relevant spectrum, and implement robust, advanced processing algorithms to ensure that focus is maintained on the most important signals.

Tactical SIGINT Operation

Deploying multiple sensors on smaller UAS, such as the Tactical Heron, adds a new dimension to tactical operations. Operating under ground forces as an organic element, the SIGINT equipped Tactical Heron provides a wider target acquisition and intelligence footprint than that of more common systems limited to radar and EO/IR sensors. Not only does SIGINT offer tactical ground forces a much broader view of the theater but it also enables them to detect camouflaged threats that the other sensors simply don't "see". Adding valuable SIGINT capabilities into their array of target acquisition tools thus gives ground forces a decisive advantage.

Summary

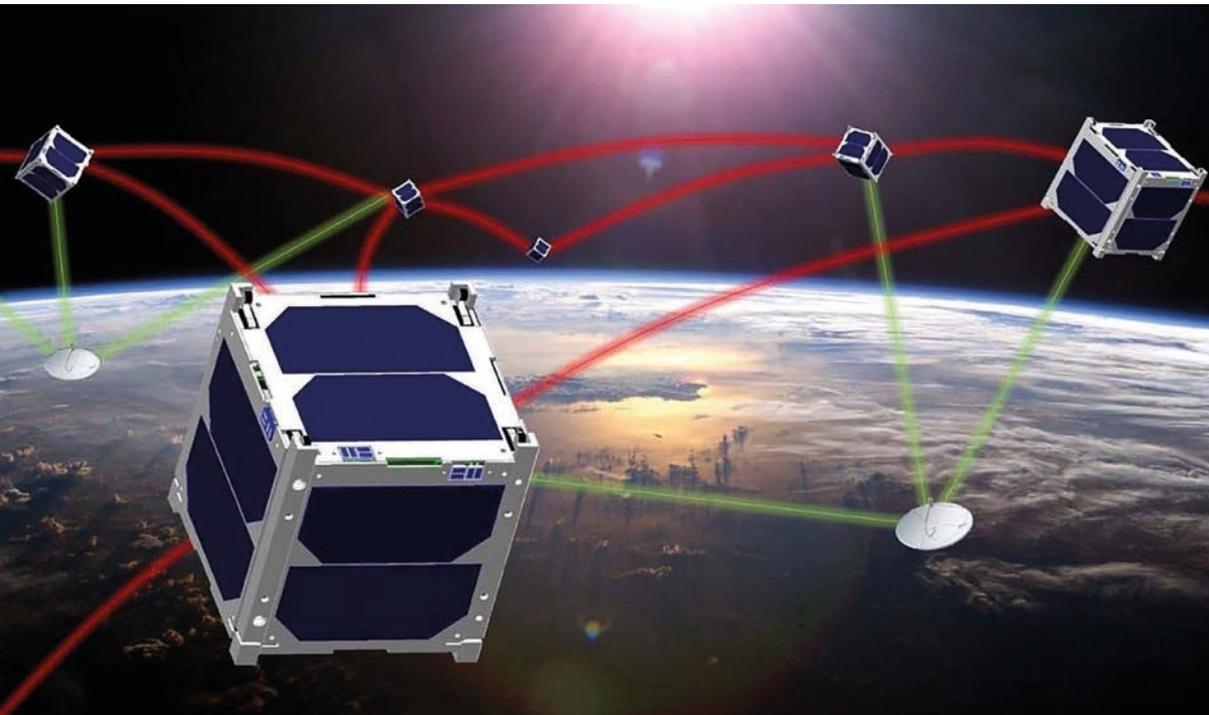
The deployment of multi-sensor payloads from UAS constitutes an extremely effective tool for achieving situational awareness and tactical supremacy. When SIGINT capabilities are included, the advantages are multiplied. Otherwise invisible forces can be detected and tracked, and important targets can be identified and verified. With the ability to deliver class leading, combat proven UAS platforms together with the most advanced multi-sensor payloads, including SIGINT, all designed and developed inhouse, IAI is uniquely positioned to ensure that friendly forces remain a step ahead of adversaries.



IAI's advanced Heron TP UAS



The Great Nanosatellite Run



◁ *The UWE-4 (Universität Würzburg Experimental-satellite) mission is to demonstrate and characterize an electric propulsion system for the 1 U CubeSat. (Photo: University of Würzburg)*

▽ *Nano-option: military forces will benefit from expendable LEO nanosatellites used for the provision of satellite communications, reconnaissance and other services, dependent upon payload carried. Pictured is a mock-up of a nanosatellite based on CubeSat technology with cryo-cooled mid-wave IR payload for a demonstration in 2022. (Photo: Stefan Nitschke)*

Small satellites facilitate much easier and cheaper mission execution – thus multiplying the number of commercial operators.

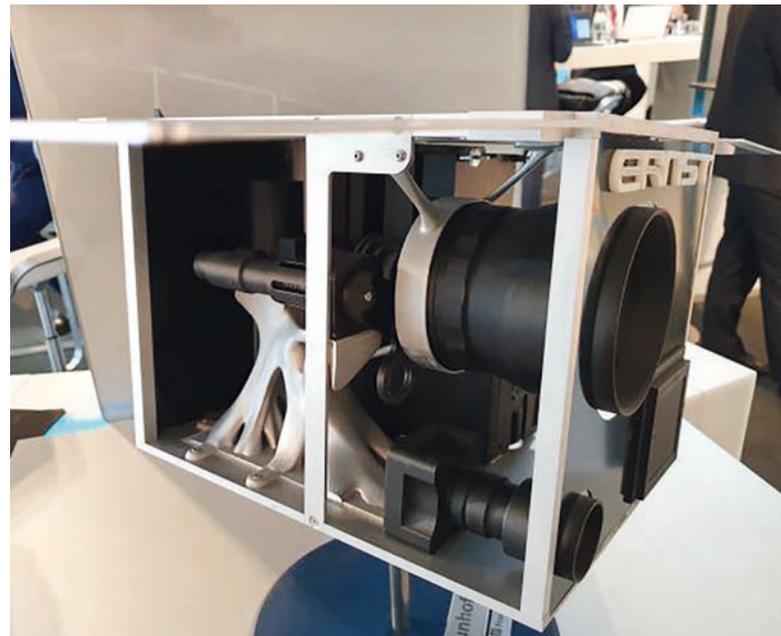
Space-Based Assets Have Not Had Their Day

During recent months, NATO has released, on several occasions, satellite images showing the extent of Russian military activities in Ukraine. Commercial satellite images offered proof that Russian troops and equipment had illegally crossed the border into Ukraine in February. Major military powers employ space-based assets as a major prerequisite for precise all-weather precision navigation, tracking and warfighting. Military satellite systems provide an enhanced capability to keep watch over ground objects, and to pick out objects by using sophisticated radars, optical, IR and other electronic sensors.

Several nations – such as Israel, Japan and South Africa – have been able to launch their own satellites for military or intelligence applications. When addressing this aspect at ILA Berlin this year, it is important to note that satellite functions suited for both military forces and non-military authorities are playing an increasingly important role, not only for navigational and coastal control tasks.

Explaining a Technological Revolution

Space-based intelligence assets are needed to help verify and predict dangerous developments between individual states. These also have a profound effect on military forces in the form of weather or meteorological satellites, providing accurate predictions and tracking (through IR and visible means) of large-scale atmospheric and weather phenomena. Nanosatellites are set to play a special role. The trend in the future market for space payloads continues upward and it is being driven largely by the introduction of hundreds of commercial small, nano- and pico-satellites, designed to provide everything from broadband and mobile communications to meteorological, imaging and position location and tracking services. More regionally, satellites of this kind are providing a viable remote sensing capability, enabling the force commander to implement a unique approach to monitoring his or her operational environment in support of



military operations. To be clear, microsats usually mass between 10-100kg, while nanosatellites weigh in at 10-1,000kg, often operating in swarms, with one parent satellite ensuring communication with a ground control station. For instance, Planet Labs, a leader in miniaturised satellites, has been able to deploy 351 spacecraft, in 26 launches, with over 100 satellites currently in orbit. Of these, 21 belong to the SkySat version, with a resolution of 70cm, flying at 400-600km altitude on different orbits. Another provider, BlackSky Global, currently operates five LEO (low earth orbit) satellites, with an additional nine systems that were to be added in 2021. Eventually, BlackSky aims to establish a constellation of 30 satellites capable of monitoring locations on Earth at high resolution every 30 minutes, day or night. What an exciting future for this segment of space technology. (stn)

REMOTE CARRIER MODULARER FÄHIGKEITSTRÄGER FÜR BREITES AUFGABEN-PORTFOLIO IN MULTIDIMENSIONALEN EINSATZSPEKTREN



Remote Carrier werden entscheidend zur Durchschlagskraft des Next Generation Weapon System (NGWS) in Multi-Domain Operationen beitragen. Die modularen und vernetzten Flugkörper stellen ein breites Fähigkeitsspektrum zum streitkräftegemeinsamen Einsatz bereit. Ihre volle Schlagkraft entfalten Remote Carrier im vernetzten, kollaborativen Verbund im Schwarm.



**SECURING
THE SKIES**



**PROTECTING
YOUR ASSETS**



**MASTERING
THE SEAS**



**COMMANDING
THE COMBAT ZONE**



Growth in GBAD Capability



Robust, responsive and flexible – these are just a few attributes of components of current and future air defence systems.

A Common Need

Diehl Defence and Hensoldt have agreed to intensify their cooperation in the field of ground-based air defence, with the acronym GBAD shifting both proven and new capability to a completely new dimension. Based on tried and tested components that are currently in production and available at short notice, the industrial partners want to offer product solutions to more effectively defend against new and emerging missile threats. Diehl Defence will integrate these components into an overall system: GBAD. The industrial partners assume that they can make available a contribution to dealing with the changed threat situation for Germany and Europe.

The coordinates of security are changing. The Russian war in Ukraine and Moscow's increasing military presence along NATO's eastern flank mean that Germany and many of its European neighbours feel exposed to an increasing threat potential. The lines of conflict between East and West have been increasingly evident along the border with the Baltic states for some time. A strong concentration of both airpower and land-based missile sites on Russian and Belarusian territory can be seen here. These include combat aircraft equipped with modern anti-radar guided missiles and cruise missiles, some of which can be grouped as hypersonic weapons. NATO views the deployment of newly-developed hypersonic weapons with concern. At the same time, the traditional threat scenarios – fixed-wing aircraft, rotorcraft, drones/swarms, anti-ship missiles, subsonic standoff weapons, long-range rocket artillery – are evolving, resulting in additional demands on existing GBAD architectures.

In view of these threats, new GBAD systems will be required in the 2020s. These are intended to protect the territory of Germany and its allies within the framework of NATO's Integrated Air and Missile Defence (IAMD). It requires significantly improved equipment, with interceptor missiles capable of defeating airborne threats at a range of more than 40km up to an altitude of 20 kilometres. In addition, 360° all-round protection is to be implemented, which also takes into account attacks with cruise missiles. Full interoperability with existing NATO integrated air defence architecture is also essential.

◁ **Unrestricted access to key national technologies: components of the IRIS-T SLM GBAD at Diehl Defence's test and integration centre in Röthenbach an der Pegnitz (Bavaria) in April 2022. (Foto: Diehl Defence)**

Robust Components of a Networked Air Defence Architecture

Diehl Defence has integrated the combat standard software IBMS-FC from Airbus Defence and Space, as well as active and passive radar systems from Hensoldt into its medium-range air defence system (IRIS-T SLM), transferred it to series production and has already delivered it to an export customer. The IRIS-T SLM guided missiles are part of Diehl Defence's IRIS-T product family. IRIS-T SLM offers 360° protection of high value objects and areas against a wide range of threats. High firepower, ultra-fast reaction time and multiple, omnidirectional effects offer superior protection within an effective range of 40km and at an elevation coverage of 20 kilometres. High-resolution seeker technology combined with superior agility allow the

missile to intercept fast and highly manoeuvring targets. In addition, it is possible to intercept incoming anti-radar missiles.

The high degree of automation enables the system to be operated with minimal staff and allows rapid tactical relocations with short assembly and dismantling times. The starting devices, which are remotely operated from the command-and-control command post, can be used up to 20km away from the command post. This results in a significant increase of the protected area. A fire unit with four IRIS-T SLM launchers thus covers an area of around 10,000 square kilometres. The high tactical mobility and the possibility of air transport facilitate the rapid deployment of the system to the operational area.

IRIS-T SLM can be supplemented with elements of the short-range version IRIS-T SLS, which is already under contract for several European countries and operational in Sweden. IRIS-T SLS offers the possibility to combine all components (launch device with effector, sensor and fire control station) of an air defence system on just one protected carrier vehicle. This creates the third generation of the proven system: IRIS-T SLS Mk. III. With its high basic mobility and "fire-on-the-move" capability, this system is able to protect moving forces against all airborne threats within the shortest reaction times.

With both systems (SLS and SLM) it is also possible to meet the requirements for so-called close-range and very close-range protection (NNbS). To this end, Diehl Defence has presented a newly developed variant that is already under contract outside of NATO and is currently being implemented. This means that a product portfolio is available that can serve the needs of German air defence.

The cooperation of the German companies within the framework of IRIS-T SLM includes not only the launcher with guided missiles but also the command post – the Tactical Operation Centre Shelter (TOC Shelter). The TOC Shelter ordered for a first export customer includes several fire control computers from Diehl Defence and the Integrated Battle Management System (IBMS) software from Airbus. It was developed and built in just two and a half years according to the requirements of Diehl Defence. As an integral system component of IRIS-T SLM, the command centre networks sensors such as the mid-range radar with the launch devices thanks to "plug-and-fight" technology. If necessary, it also ensures data exchange and communication with higher-level command posts.

The TRML-4D active multifunction radar from Hensoldt acts as the main sensor of the IRIS-T SLM fire unit. By combining the AESA technology of electronic beam steering with antenna rotation, the radar is able to quickly and precisely detect targets with small to very small radar cross sections (RCS) and provides the target data in the quality required for combat. The radar is based on gallium nitride (GaN) technology. Compared to other semiconductor materials such as gallium arsenide (GaAs) or silicon, GaN is characterised by better high-frequency properties and lower energy consumption. Conventional radars based on GaAs technology do not have the bandwidth required to detect very small airborne targets. Compared to GaAs, GaN offers higher efficiency in relation to the area required and operates at significantly higher voltages. A comparison of the chip size ratios is helpful: GaAs chips are usually larger than 15mm², while the size of the GaN chips is 12 square millimetres. This fact allows for a greater packing density. In addition, GaN can be used at frequencies of several hundred GHz. This results in longer detection ranges and the ability to detect objects with very small radar cross sections.

As an AESA radar with active electronic beam steering, the TRML-4D radar enables the detection of an air target after just one rotation of the antenna. Earlier generations of radar systems required two to three rotations for this, leading to a shorter reaction time and delayed weapon training, especially under difficult environmental conditions with a high target density. The operational advantages of the TRML-4D radar are obvious: it is able to provide high-quality fire control data in difficult environmental conditions, even in the presence of targets with very small RCS. The TRML-4D radar is also equipped with an integrated secondary radar for automatic Identification of Friend or Foe (IFF). It supports the new military standard Mode-5, which is being introduced in all NATO countries.

The cooperation between the two industrial partners also includes the optional passive radar Twinvis. This makes it possible to detect air targets that have stealth properties at an early stage without the active main sensor having to be put into operation. The integration of passive radar capabilities into the IRIS-T SLM system thus offers a mobile and emission-free radar solution for airspace surveillance. This additional function enables omnidirectional 3D tracking of more than 180 objects up to a radius of 250 km (sensor target).

Imminent Use in Prospect

IRIS-T SLM already offers highly effective protection against fixed-wing aircraft, rotorcraft, missiles and drones. In contrast to alternative solutions, the effector fulfils all requirements in terms of range and performance.

Based on the cooperation in a joint export programme, Diehl Defence and Hensoldt are now intensifying the cooperation with a view to the threat situation in Germany. Joint projects for other Diehl Defence customers with other partners in other countries remain unaffected. An increase in the performance of the existing IRIS-T SLM system is under development at Diehl Defence and Hensoldt, such as the IRIS-T SLX in order to supplement the existing air defence system with greater range (up to 80km) and height coverage (up to 30km) against air targets and thus shorten reaction and warning times.

In a discussion with Mönch in April, Diehl Defence confirmed that the joint solutions of the two partner companies can be delivered to German customers from the third quarter of 2022 if a procurement decision is made soon. Diehl Defence made it clear that these are products that, as purely German systems, are not dependent on foreign technology and therefore offer the user the highest level of approval and certifiability for operation in Germany – with complete interoperability in NATO's IAMD architecture. This means that the highest possible security of supply can be offered. With IRIS-T SLM as general contractor, Diehl Defence offers a complete air defence system from a single source, which consists of the system components fire control centre, radar and missile launcher as well as a fully integrated logistics and support concept – Integrated Logistics Support Concept (ILSC). (stn)



Unrestricted access to key national technologies: components of the IRIS-T SLM GBAD on static display at ILA Berlin – on the left is HENSOLDT's TRML-4D active multifunction radar, on the right the IRIS-T SLM fire unit, all of which mounted on MAN SX44 heavy mobility trucks. (Photos: Stefan Nitschke)

Oerlikon's Skyranger 30: Air Defence On-the-Move

Rheinmetall is showcasing its Oerlikon Skyranger 30 weapon system at ILA 2022, designed for close air defence. The system uses the GTK Boxer chassis, mated to an integrated unmanned turret. The turret, designed and built by Slovenian manufacturer Valhalla, is an extremely flat profile and weighs in at under 2.5t, thus maintaining the native mobility of the Boxer vehicle. The overall gross vehicle weight is 38.5 tonnes.

Current conflicts, such as those in Ukraine, Syria or Nagorno-Karabakh, amply illustrate the complex nature of the threat from the air. Today, this also includes tactical micro and small drones. It is precisely in the defence against these that many armed forces have a real current capability gap. A particular challenge is added in the case of mobile units that have to detect, identify and, if necessary, combat them, even while on the move.

It is for these specific challenges that Rheinmetall has developed the Oerlikon Skyranger 30 weapon system, with its passive and active sensors paired with the 30 mm Oerlikon Revolver Cannon. Added to this is an appropriate self-protection system (Rapid Obscuring System ROSY). The vehicle shown at ILA is a concept demonstrator.

The first line of defence is the RAD active detection sensor, an S-band AESA radar capable of detecting even Class I UAS. Five modules are distributed around the tower, providing 360° coverage to a 20km range. A passive Fast InfraRed Search and Track (FIRST) system is also integrated, so that one's own position is not constantly revealed through the active radiation of the radar. This monitors and sounds an alarm when a target is detected, prompting use of the active sensor. Identification and tracking is then conducted by a combined sensor head with thermal imaging, video channel and two laser rangefinders. X-band radar can also be used.

Kinetic effect is provided by the 30x173mm revolver cannon, which can fire programmable airburst ammunition at a maximum rate of fire of 1,000 rpm, with the Ahead rounds each containing 160 tungsten projectiles. Programming releases the projectiles at an optimal distance from the target, creating a lethal fragmentation cone, at an effective combat range of up to 4,000m, according to Rheinmetall. Other types of ammunition that can be fired include HEI, HEI-T and TP-T – and air-to-surface missiles can be integrated into the turret, at the customer's request.

The Oerlikon Skyranger 30 can act against conventional and emerging air threats, including missiles, UAS, LSS (Low Slow and Small) threats and RAM (rocket, artillery and mortar rounds).
(apf)

*The Oerlikon Skyranger 30 concept demonstrator on display at ILA 2022.
(Photo: André Forkert)*





Five Minutes with Rohde & Schwarz

Show Daily sat down with Christian Reiter, VP Corporate Marketing & Communications, Rohde & Schwarz (R&S), talking about the communications specialist's mission at ILA Berlin, its products on offer for the military client, and its perspective. R&S plays a key role in the Bundeswehr's modernisation of its tactical communications, both in the air and on land, as well as in the naval/maritime security environment. Reiter noted that R&S is involved with several programmes, both nationally and internationally, that call for capability upgrades in various spheres, offering the military a unique opportunity to implement completely new capability and to proceed in line with allied partners. As for the spectrum of modern threats, Reiter also mentioned the R&S ARDRONIS counter-drone solution that, with the newly developed R&S ADD557SR direction-finding and monitoring antenna, can detect commercial drone activity across the complete frequency range. (stn)

◀ **Military procurement advances in Germany:**
Christian Reiter, R&S' Vice President Corporate Marketing & Communications, explaining the company's future objectives.
 (Photo: Stefan Nitschke)

The Eurofighter's EJ200 engine is one of the two programmes that are transforming MTU's capabilities and offering in MRO. (Foto: André Forkert)



MTU Creates Speedline for the German Air Force

Engine manufacturer MTU Aero Engines is prioritizing the maintenance of engines for Eurofighter and Sikorsky CH-53s, thus contributing to the operational readiness of the German Air Force and to Germany's ability to meet its security challenges together with its alliance partners.

The turning point in security policy is bringing about a rapid turnaround at MTU. The changed situation – coupled with the increased requirements of the armed forces – affect two engine programmes at MTU in particular: the T64, which powers the Sikorsky CH-53G heavy-lift transport helicopter, and the EJ200 of the Eurofighter. Since the transfer of many jets from home to NATO's eastern flank in the Baltics and Romania, their flying hours have increased.

„We are ready to contribute whatever is necessary to increase the operational readiness of the air force,“ says **Michael Schreyögg**, MTU's chief programme officer, summing up the new requirements. „If the Air Force has to fly more, then we have to significantly shorten the turnaround time in our military maintenance.“ For the EJ200 and T64, MTU has set up cross-site and cross-departmental task forces. This is because the disassembly and assembly of the engines takes place at MTU in Erding, whereas spare parts management, damage investigations, product monitoring and quality assurance are handled at the Munich site.

MTU also draws its technological knowledge from the fact that it has been manufacturing and repairing engines for both the commercial and military sectors for many decades. For example, it initially developed its compressor technology for the Eurofighter engine, then refined it in the A400M engine and finally brought it to the large-volume commercial market with the geared turbofan. „This mutual appreciation of the commercial and military sectors has helped us as MTU to establish a fast lane for the engines of the German armed forces in record time. Because the big challenge for us is to succeed in this without slowing down the civilian programmes,“ Schreyögg explains.

By mid-May 2022, MTU had delivered nearly as many repaired T64 engines to the German Air Force as it did in the entire calendar year 2021 – meeting increased customer demand. And the frequency of deliveries has also increased for the EJ200. The parts needed for the military programmes have since been repaired with priority, maximum flexibility and greater personnel resources. Thanks to intensified coordination, the other partners in the EJ200 consortium also send urgently needed spare parts to MTU more quickly. (apf)

Photographic Recap of ILA 2022 Day One



(All photos: apf)



NAMMO Lighter .50 BMG Ammunition for Longer Ranges with LUH



◀ **NAMMO's new .50cal BMG round.**
(André Forkert)

comes in combination with a new polymer link, which saves another 7% in weight compared to the standard metal strap link. This weight reduction is particularly noticeable when used on board light aircraft platforms such as the AH-6 Little Bird or Airbus H145M LUH SOF (Light Utility Helicopter Special Operation Forces). Thanks to the lower weight, more fuel can be carried for longer operation times without sacrificing firepower.

Other advantages are the constant internal volume and a higher accuracy. Since the new material also absorbs and transfers less heat from the outside (e.g. sunlight) and from the inside – when firing – the barrel heats up significantly less,

Norway's NAMMO has developed 'Polymer Cased .50 BMG ammunition,' fully compliant with MIL-DTL-10190F. The special feature of this new ammunition is that about two thirds of the cartridge is replaced by a polymer case body, with only the brass head remaining conventional brass. Both parts are mechanically connected to each other. By replacing the material, the cartridge becomes 27% lighter overall. The cartridge

thus reducing wear. This also means that 5% less powder is needed for the same velocity. Otherwise, the conventional projectiles continue to be used, which are available in different versions (ball, tracer, API, API-T, multi-purpose or reduced range).

The launch customer is the US Marine Corps (USMC), which is currently using the new cartridge in the final stages of tactical testing. (apf)

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Air Transport Solutions for the Toughest Applications



20.10 Equipment can be well protected thanks to automatic pressure equalisation valve and humidity control window. (Photo: Maibach IPG)

For the insertion of special forces – or to shift tactical priorities – air transport, by helicopter or fixed-wing aircraft, is a fast and preferred option. Weapons, sensors and other sensitive material must be packed and transported accordingly. In addition to pure air transport, vertical transport by parachute is, of course, always another option. MAIBACH Industrie-Plastic GmbH (IPG; hall 3, stand 220) from Eislingen/Fils offers appropriate solutions, constructed from glass fibre reinforced plastics.

For transport and storage containers (TuLB), the customer can rely on 35 standard sizes that are immediately available in accordance with standard VG 95613. These are also drop-proof and break-proof according to MIL-STD and VG 95613, corrosion-resistant, pressure- and vapour-tight up to 100 mbar and air-loadable according to LTR 8145.

Holger Ambacher, COO of Maibach IPG, observes that *“Basically, all our containers are air-transportable. They meet the qualification and type certification according to VG 95613. They are qualified for packing levels A and B and meet the requirements of MIL-STD-810. The containers have a pressure equalisation valve and are pressure- and vapour-tight up to 100 mbar.”*

The MAIBACH MILTAINER-RM are reusable, available in seven standard sizes (alternatively customised), fully inter-stackable unlike-sized cases, outfitted with special corrosion-proof recoil spring levers, fasteners and snap-back grip handles, and are impact-proof and (optionally) water-vapor proof. They feature versatile application possibilities, and are designed to withstand any amount of wear and tear. They protect against impact and stress, e.g. when dropped. Sensitive equipment is protected against vibration, humidity, moisture and dust, in all climate zones and under harsh environmental conditions. All MILTAINER-RM are certified for air transport.

Since not all military equipment is created equal, the transport solutions are customisable. MAIBACH is not only a supplier for special solutions here, but also accompanies the customer from the very beginning by providing appropriate advice on the implementation of military packaging requirements, including concept development. Subsequently, the necessary packaging data sheets are built, including required technical documentation. This customer support also includes the necessary in-house load testing. Transport containers with similar properties as the above-mentioned TuLBs are also available. Depending on the requirements, light, standard or heavy-duty versions of the transport containers can be designed. As management assistant **Lena Liebetrau** comments, *“All transport solutions from Maibach IPG fully adapt to specific customer requirements. Together with them, we develop high-quality solutions for numerous areas of application. This enables Maibach IPG to offer the ideal packaging solution for specific customer requirements. Approach us with your capability requirements and we’ll help quickly and easily with one of our field-proven standard solutions or customisation development.”*

1960

seen the first development of airborne radar systems by HENSOLDT's predecessor companies. Since then, significant R&D resources ensure our radar systems stay top notch.

56,450 m²

laboratory and production space are maintained by HENSOLDT in Germany.

851

patents are held by HENSOLDT. A sign of our ongoing spirit of innovation which we apply for the armed forces.

More than 6,400 HENSOLDTians worldwide help to equip armed forces with state-of-the-art solutions and products to meet the demands of a new era in security policy. As a leading technology company in the defence industry, we provide sensor solutions, electronic warfare technologies and competencies in data analytics and cyber security, enabling armed forces to detect and combat threats in both the analogue and virtual space.

HENSOLDT – Innovations for a safer world

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HENSOLDT

Detect and Protect.

Leonardo Focus on Innovation, Digitisation and Sustainability

With European Defence once again central to international debate, Leonardo (Hall 3 – 475) is attending ILA to highlight how advanced technology can play a key role in the security of nations and their citizens. The company will also be promoting its innovative digital aerospace solutions and demonstrating how the company can play a role in the sector's economic and environmental sustainability. Leonardo invests almost 13% of its annual revenue in R&D, to enhance its enabling technologies, such as high resolution infrared detectors or the underpinning elements of multi-functional AESA radars, as well as developing new products and innovative solutions across domains. Through the so-called Leonardo Labs, a network of laboratories dedicated to the development of frontier and breakthrough technologies for the digital world, the company, in collaboration with more than 90 universities and research centres worldwide, is developing its skills and capabilities in many fields, including Artificial Intelligence, Future Aircraft Technologies and Electronics Sensing, Future Rotorcraft Technologies and Quantum Technologies. Thanks to the acquisition of a 25.1% of the shares in Hensoldt AG, Leonardo has established a strategic long-term partnership with the company, allowing development of cooperation and pursuit of joint opportunities in the field of sensors, data management and robotics, establishing the two companies as leading players in the European defence electronics market. In this sector, Leonardo presents its EW products for the protection of airborne platforms at ILA, including the Miysis DIRCM (Directed InfraRed CounterMeasure), MAIR missile warning system and BriteCloud countermeasure.

Leonardo is the only European company able to offer the full range of uncrewed solutions for civil and military customers, including providing security for a customer's airspace. As member of leading international uncrewed programmes such as EuroDrone, Leonardo's portfolio includes fixed-wing and rotary-wing platforms, sensors, mission and ground control systems, drone navigation and traffic management, CounterUAS and training services. In Berlin, Leonardo will be highlighting its Falco EVO uncrewed airborne surveillance system, as well as the Mirach 40 (M-40) target drone. Developed in-house by Leonardo, the M-40 is a readily

exportable solution that supports armed forces training by convincingly mimicking a variety of aircraft and missiles including radar, infrared (IR) and visual threats.

In combat air training, the International Flight Training School (IFTS), a partnership between the Italian Air Force and Leonardo, recently awarded the first Phase IV (Advanced/Lead-In to Fighter Training) diploma to two Luftwaffe pilots, following their completion of nine months training. The IFTS, based on Leonardo's M-346 advanced jet trainer, represents an international centre of excellence, with the aim of training pilots to operate the latest generation fighters, providing them with the technical and procedural skills necessary for deployment in modern, increasingly complex operational scenarios.

Also in German combat air, the country's decision to purchase 38 brand-new Eurofighter Typhoon aircraft represents a clear commitment to Europe's defence industry and its largest collaborative industrial project.

A number of upcoming technological and programme development opportunities that will ensure that the Typhoon continues to play a leading role within customer air forces as they move into the future. By successfully delivering operational advantage through continued capability developments, Eurofighter will be as vital to Europe's defence in the future as it is today.

In the helicopter sector, the latest generation AW169M (4.8t) and AW139M (7t) multirole helicopters are perfectly suited to meet evolving military training requirements, preparing crews for transition to advanced frontline models for operations over land and sea. The AW169 has also found growing success for law enforcement and versatile public service operations in Europe and worldwide, including homeland security and special ops, SAR/MEDEVAC, surveillance and firefighting. Telespazio (a Leonardo/Thales joint venture), through its subsidiary Telespazio Germany, will also be present at ILA. The company will showcase its innovative solutions in ground segments for space missions. These include the EASE suite and its latest training and simulation offerings for the defence and aviation sectors.



The Leonardo booth at ILA showcases a wide range of capabilities and innovative technology. (Photo: Leonardo)

Airbus Supports German Air Force Sustainable Aviation Goals



Mike Schöllhorn, Airbus Defence and Space CEO, handing over a bottle of water to Lt Gen Ingo Gerhartz, Chief of the German Air Force, as a symbolic gesture of the Airbus agreement supporting the Luftwaffe's long-term transformation to increase sustainability of its aircraft fleet. (Photo: Airbus/Max Leitmeier – Schwarzbild)

Airbus is supporting the German Air Force in its long-term transformation to increase the sustainability of its aircraft fleet, and is working towards providing the Luftwaffe with a technical allowance to commence national A400M flight trials with loads of up to 50% sustainable aviation fuel (SAF) in the near term. SAF is a proven alternative fuel that can reduce life cycle CO₂ emissions by up to 85%, compared to conventional fuel. Germany is thus set to become the first operator to launch a gradual transformation to SAF for its A400M transporters, of which it has 53 on order. *"The Luftwaffe's objective is to launch a transformation towards sustainability of [its] fleet. Their mission is ours. We are gladly supporting these important efforts, not only for the A400M but [for its] entire fleet of Airbus aircraft, ranging from VIP transports to fighter jets,"* explained **Mike Schöllhorn**, CEO of Airbus Defence and Space

"Moving towards a more sustainable future is the fundamental duty of everybody. Switching from petroleum-based kerosene to sustainable fuels plays a big part in aviation's efforts to cut CO₂ emissions. Our government aircraft are already cleared for SAF. Working closely with the industry, we are eager to finally certify the A400M as well. Looking into the future, we are supporting all activities to introduce SAF for our entire fleet, including fast jet aircraft", stated **Lt Gen Ingo Gerhartz**, Chief of the German Air Force. Besides supporting national customer activities, Airbus has embarked on establishing a long-term roadmap towards achieving 100% SAF readiness and certification for the A400M. As a first step,

in 2022, Airbus plans a test flight of an A400M with a fuel load of up to 50% SAF. This initial flight will be conducted with one engine to better assess the aircraft's overall behaviour – the company expects to continue with four engine trials in 2023, after which, the A400M will be formally allowed for customers with access to 50% SAF. Once testing activities are completed on the basis of four engines, the A400M platform will formally be allowed for customers with access to 50% SAF. In addition, OCCAR and Airbus are in discussion with the A400M community regarding further development of the roadmap towards the certification and operational use of 100% SAF. *"This is clearly something that will not happen overnight. This type of fuel first needs to be assessed technically by the engine manufacturer before we can commence with flight tests to certify the TP 400M engines for 100% SAF. Today, this type of fuel is not yet fully standardised nor tested. We are in the preliminary stages for an initial feasibility check,"* Schöllhorn added. *"This engine-level plan would be integrated with the required flight test activities at Airbus level for final A400M certification."*

Earlier in 2022, Airbus Defence and Space conducted the first flight of its C295 Flight Test Bed, an R&D project of European Clean Sky 2, which aims at using new technologies and materials to achieve noise, CO₂ and NO_x reductions. With the C295, Airbus also aims to conduct a test campaign for flights with 50% SAF in 2022 and 100% SAF in 2023.

Next German and Netherlands Luftlandeplattform?

Under the name of Caracal, Rheinmetall is presenting (together with partners Mercedes-Benz and ACS) a new airborne vehicle family. The partnership has tailored the new versatile and highly mobile 4x4 vehicle family to the requirements of platforms for airborne or special operations units. Now the new vehicle system, designed to the highest standards, will be presented to a wider circle of professionals.

The new family is based on the latest G-class chassis for rescue and special operations. The Caracal features maximum mobility, a lightweight design and optionally mountable protection elements for countering ballistic and landmine threats. Its 249hp, six-cylinder Euro III diesel engine gives the 4,900kg vehicle a 140km/h top speed. Furthermore, its compact design makes it possible to airlift up to two vehicles in the cargo hold of a CH-53K King Stallion or CH-47F Chinook transport helicopter, which can also carry it as underslung cargo.

Thanks to its unique modular design and two available wheelbases, the Caracal can be employed in a variety of roles during airborne operations – as a basic troop carrier or medical support vehicle, for example, or as supply vehicle – all on one automotive platform. The Caracal will be ready for full-scale production starting in 2023. Rheinmetall offers full lifecycle support for a period exceeding twenty years.

Caracal uses the special chassis from Mercedes-Benz, including the propulsion system and drive train. The components used are from the latest Mercedes G 464 model, which also forms the basis for the current G models. The vehicle platform will later be able to accommodate up to 15 different sets of equipment kits.

The bodywork for the Caracal is being provided by the Bavarian specialist for protected off-road vehicles, ACS Armoured Car Systems GmbH (ACS). ACS has already delivered this vehicle, as the ENOK AB



There is a high priority requirement for airborne vehicles for the German and Dutch armed forces, possibly rising to as many as 3,000 vehicles.
(Photo: André Forkert)

(Airborne), to three European states for their special forces and airborne forces – Czech Republic, Cyprus and Hungary. The vehicle has a maximum weight of 4.8t and can carry four soldiers in its basic configuration. With the Project Luftlandeplattform, Germany is looking for a successor to the aged airborne G-Wagons. Together with the airborne forces of the Netherlands, there could be a need for up to 3,000 vehicles. And the priority for these vehicles is very high. (apf)

Germany's Search for Next Police Helicopter

The German Federal Police (Bundespolizei) urgently needs to replace its aging fleet of medium transport helicopters. Their availability is sometimes too low, which presents a problem, because they are also intended primarily for the rapid deployment of the Federal Police special forces – the GSG9.

The search is on for a COTS product in which both the aircraft and all attachment and installation parts are certified according to EASE when the offer is submitted. The mission equipment and profiles include the fast and safe air transport of people and materiel. This also includes special tasks. These requirements must be guaranteed worldwide and in almost all climatic zones, as well as under difficult weather and visibility conditions, both day and night. Deck landing capability on the Federal Police's sea-going vessels, as well as the helicopter's air mobility in an Antonov AN-124, must also be guaranteed. The latter is an important aspect for worldwide deployment. In addition, there are simulators at the Sankt Augustin and Fuhlendorf locations. The mission profiles required are: Special Forces, Troop (personnel transport) Maritime Operations, VIP Transport as well as Fire Fighting. Just how important the latter requirement is became crystal clear in the past few days in Brandenburg. To

accommodate this role, the selected aircraft should also have fast roping capabilities, a rescue winch and ballistic protection.

The tender also includes logistics and user support services, as well as technical and flight training. Interested companies must submit their indicative bids for the Medium Transport Helicopter (MTH) Bundespolizei project by 30 June. A flight demonstration is scheduled for the end of July, with a decision at the end of this year or the beginning of next. The Federal Police plans to procure 38 + 6 aircraft and operate them out of six locations. The influx is to take place 2024-2032, with a useful life of 15 years. The plan is for 250 flight hours per aircraft per year.

As we heard, Sikorsky will enter the race with the S-92 helicopter – a twin-engine medium-lift aircraft used for civil and military helicopter applications. The military version H-92 Superhawk is capable of carrying 22 troops and can also be configured for specific missions, including SAR and executive transport. The CH-148 Cyclone is a shipboard maritime helicopter variant developed for the Royal Canadian Air Force to support naval operations of the Royal Canadian Navy. The Sikorsky VH-92 is a variant under development to replace the USMC's Marine One the US Presidential transport fleet. It can be assumed with a high degree of probability that Lockheed Martin/Sikorsky will again form a team with Rheinmetall, as was the case with the offer of the Sikorsky CH-53K for the Bundeswehr. And Rheinmetall would be the preferred partner for logistics and training.

Airbus will enter the race with the H-225 Super Puma, which will be extensively presented by Airbus at ILA. More on this in the next issue. (apf)

◀ **The VH-92 will act as the US presidential transport helicopter.**
(Photo: USN)



A New Strategic Concept for NATO



NATO Secretary General Jens Stoltenberg and Dutch Prime Minister Mark Rutte - here in a bilateral meeting – inaugurated the third NATO seminar on the development of the new strategic concept in the Hague. (Photo: NATO)

At the summit meeting in June, the Alliance will decide on the agenda NATO 2030.

NATO plans to make far-reaching political decisions on two top defence issues during its next summit meeting in Madrid, scheduled from 28-30 June. The Heads of State and Government representing the 30 member nations will discuss the implementation of the 'NATO 2030' reform agenda and the launch of a new strategic concept for the Atlantic Alliance. Political observers assume that Putin's brutal war against the Ukraine and Russia's strategic goal of changing the political landscape in Europe will have a significant impact on the reform agenda and the strategic concept.

Commenting on the preparations for the forthcoming summit, NATO Secretary General **Jens Stoltenberg** said: *"The strategic concept of Madrid will reflect the new security environment (...) and ensure that our alliance is fit for the future."* According to Stoltenberg, Russia is obviously acting more aggressively than in recent years, and China deliberately uses its economic and military power to intimidate other nations. He also warned of several political instabilities and terrorist threats in the Middle East and Northern Africa.

The strategic concept is NATO's key programmatic document, from which the western alliance derives its political, strategic and military goals. NATO's current strategic concept, entitled *Active Engagement, Modern Defence*, essentially addresses three main tasks: collective defence, crisis management and cooperative security. However, the current concept dates back to 2010 and is based on the analysis and assessment of the security environment at the beginning of that decade.

For this reason, NATO's Heads of State and Government decided in June 2021 that the document needs to be updated. With the new strategic concept, the Alliance wants to react to the changes in the defence and security environment which have taken place since 2010. Twelve years ago, NATO member states were still hopeful that there could be an end in sight to the period of great political and military tensions with

Russia. Then, however, unforeseeable developments followed, such as Russia's annexation of the Crimean Peninsula in 2014, the Russian attack on Ukraine and the growing ambitions of China to become a political, technological and military world power.

The decision to update the strategic concept goes hand in hand with a process to review the current state and future perspectives of the Alliance. A corresponding report, entitled *NATO 2030 - United in a New Era*, which was prepared by a group of experts co-chaired by Germany's former Defence Minister Lothar de Maizière, was presented in December 2020. 'NATO 2030' will be launched as a reform agenda for the Atlantic Alliance, which will influence the update of the new strategic concept.

Although the concept has not been published yet, the following political trends are becoming clear: NATO will start to focus more on its traditional core tasks of deterrence and defence. Topics such as resilience, disruptive technologies and the context between climate change and international security are very likely to gain in importance. New challenges, such as cyber attacks, space weapons and hybrid warfare will probably also receive greater attention. In addition, the alliance will have to consider how it will respond to violations of the rule-based order around the globe, and whether it wants to play a more active role in international crisis management in the next few years. The forthcoming launch of the strategic concept has been in the focus of a recent NATO seminar inaugurated by Stoltenberg and Dutch Prime Minister Mark Rutte in the Hague on 23 February. It was the third of four seminars which have been organized to collect ideas and proposals from the 30 member nations to be considered in the development process of this concept.

The dramatic developments in Ukraine, the potential danger of a further escalation and the increasing casualties among the civilian population had already influenced the Alliance to hold a special NATO summit on 24 March. The summit's final declaration in Brussel anticipated what will happen in Madrid: in the face of a *"more dangerous strategic reality"*, the necessary transformation from the current Alliance to 'NATO 2030' will be adopted, and a new strategic concept will be launched. (tb)

Chinook Will Bring Improved Operational Capability to the Bundeswehr

An Interview with Michael Hostetter, VP Boeing Defense Deutschland



*To boldly go where no Luftwaffe heavy-lift helicopter has gone before.
(Images Boeing)*

MT: Looking at the STH competition. Boeing said that the Chinook will be delivered with air-to-air refueling capability. Can you clarify?

Hostetter: Sure. We have delivered Chinooks with air-to-air refueling since the late 1980s and we estimate the number of aerial refueling contacts since then to be more than 10,000. This simply shows the long history of AAR capability in the Chinook program. The Bundeswehr will receive its CH-47F Chinooks with US Airworthiness Release Certification directly off the production line. This will not be a retrofit. The AAR capability will be installed during production.

MT: Is it correct that no Block II F-model Chinook is yet in use anywhere?

Hostetter: No, not yet. But the AAR capability that we will install during production is a proven kit, that we have delivered to customers already in the past, and we have additional aircraft on order with the same capability. Chinooks have been conducting worldwide operations with air-to-air refueling [AAR] for decades - it is a proven and reliable system. AAR has been steadily incorporated over the last 30 years, appearing on more advanced models of the Chinook. The integration and installation of AAR will be the same as on previous versions of the Chinook and will come directly off the production line with that capability. And allow me to emphasize here again: at the time of delivery to Germany, the CH-47F Block II Chinooks will come with US airworthiness certification.

MT: A kit normally means less payload. How much less payload does integration mean for the Chinook?

Hostetter: While there is some weight associated with the AAR system, the impact of that is not a measurable change to the overall payload capability of F-model Chinooks.

MT: You have established a strong German industry team to support maintenance, training, and other activities indigenously here in Germany. Can you talk more about your team?

Hostetter: Our German industrial team – AERO-Bildung, Airbus Helicopters, CAE, ESG, Honeywell, Lufthansa Technik and Rolls-Royce Deutschland – combines decades of experience in the operation of heavy transport helicopters. Together, we will support the requirements of the Luftwaffe and create more than 500 highly qualified jobs in Germany. That's an important aspect of our commitment to Germany. We have committed to an indigenous local sustainment system that will directly benefit the local economy as well. This growth is just one example of how we partner as a company across the globe and how we are planning to grow our established presence in Germany. In addition, our industrial partners are already conducting maintenance and sustainment of the German Air Force's current CH-53G fleet, and have been familiar with them for many decades. This important experience in the operation, maintenance and sustainment of heavy-lift helicopters will enable a smooth transition to the CH-47F Chinook.

MT: How will you partner with your industry team on delivering – as you say – maximum operational availability?

Hostetter: On top of delivering a highly capable and reliable heavy-lift helicopter, we have always been committed to bring a platform to Germany that comes with the most affordable, reliable and high-quality in-service solutions and training systems. To deliver on this commitment, we will not only transfer 'know how' to our German industry partners, but more critically, 'know why'. It is really important for us to transfer deep knowledge of all the relevant systems of the Chinook to our local partners. We have always said we will jointly deliver maximum operational availability as a team. This will only be possible by bringing an in-depth expertise and understanding of the Chinook to Germany. This will allow us to build an indigenous sustainment program for the CH-47F Chinook for the Bundeswehr. Together with our partners, we will tailor support solutions to meet the requirements of the Luftwaffe and to building meaningful industrial partnerships in Germany. All of this will include, sharing



◀ *The Chinook Deutschland team will ensure high quality support at all stages of the CH-47F Block II's procurement, induction and operational life.*

it has served as the workhorse of numerous NATO missions. In addition, the Chinook offers mission profiles that include cargo and troop transport, MedEvac, search and rescue, firefighting, humanitarian and disaster relief response. Interoperability is a key differentiator for the Chinook as well. Germany will have direct access to a global supply base for around the clock parts avail-

our domain knowledge, help creating comprehensive national sustainment capabilities and transferring relevant know how and know why such as demand forecasting, warehousing, distribution services ... and many things more.

MT: *Why is the CH-47F Block II Chinook the optimal solution for the Bundeswehr?*

Hostetter: There are many reasons. First and maybe foremost, the Chinook is a proven and extremely capable multi-role helicopter. For many years

ability and streamlined aircraft maintenance procedures. In addition, with 950+ aircraft and 20 international operators, Germany will have access to joint support infrastructure, maintenance and training. And I think the German government decided for the Chinook because of its technical maturity and proven operational efficiency. The Chinook provides the Bundeswehr with security in terms of delivery time, costs and capabilities. And as Federal Minister of Defense, Christine Lambrecht said, Germany will get a larger heavy-lift fleet, while at the same time gaining significantly more mission flexibility at a lower long-term lifecycle cost. (apf)

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At rest, the C-130J prepares for flight. (Photos: Luftwaffe)



C-130J – the Tactical Multi-Role Transport Tanker (MRTT) Aircraft

The Lockheed Martin C-130 Hercules is a tactical aircraft, used worldwide in 22 nations. The newest version is the C-130J, which made its maiden flight in 1998. Compared to its predecessor, it needs two fewer crew members. Also, thanks to its longer cabin, the 'J' can now carry 96 instead of 64 fully equipped paratroopers, or 128 passengers, or two standard pallets more than the H version. The equipment also includes a winch system to allow material to be taken on board without external assistance. A winch can move 6,500lbs on a single rope, increasing to 20,000lbs using multiple ropes. Germany lately has ordered three C-130J Hercules plus three KC-130J, and will form a squadron jointly with France. The first aircraft has already arrived in Germany and is currently undergoing certification at BAANBw. Tactical availability is expected from the end of the year. This project, also known in Germany as the *kleine Fläche* (small aircraft), is primarily intended to provide special forces with tactical options at a level below the Airbus A400M.

In general, the Lockheed Martin C-130 Hercules is a medium tactical transport aircraft, powered by four Rolls-Royce AE 2100D3 turboprop engines, with a six-blade rotor on the J variant. The design centres on a high-wing aircraft, and the large pressurised transport cabin can be adapted according to mission requirements.

A Bomber – and Much, Much More!

To call the C-130J just a transport aircraft is an understatement. This tactical aircraft has much more to offer. If you look a little closer, you can



see that the multifunctional, multi-mission aircraft has hardpoints for auxiliary tanks under each wing to extend its range. These can also be fitted with air-to-air refuelling pods. And if the option for armament was selected when ordering, these (outer) hardpoints can also be equipped with weapons (bombs). As an auxiliary fuel tank, each can hold 1,400 US gallons. The C-130J has a hardpoint in the outer wing that was used by the US government for weapons, while the hardpoint in the centre wing was not used for this purpose.

In addition to the armament option on the wings, there is of course the legendary AC-130H/U gunship configuration. This features, among other things, two 30mm Bushmaster cannons with a rate of fire of 200 rpm – and a 105mm gun. The integration of AGM-114 Hellfire missiles was considered but not confirmed. Weapons can be linked to the on-board and digital fire control radars to be effective against ground targets at night and in limited visibility.

Sensor Carrier

In 2009, Airborne developed a multifunctional sensor carrier for the C-130 on behalf of the US Air Force (USAF). The system consists of the AS-6 BKS door, the AS-7 Strut/Arm and the AS-4 Multi-Mission Pod and RF variants. Optionally, the AS-T4 Tactical Workstation - including AS-5S Seat and AS-20S Avionics Rack - can be added. Everything can be assembled and used in a modular manner. The original door remains and is simply folded upwards. The AS-6 BKS is placed in the door space,

but no changes have to be made to the airframe. The AS-6 has a fixed part in the lower area that serves as an attachment point for the AS-7 arm. Nevertheless, the door can be opened normally, for instance, to drop paratroopers through the side door, while using the sensor pod at the same time. The arm can be swivelled and is raised for take-off and landing; in flight it folds down completely. Sensors or a multifunctional sensor pod can be attached directly to the AS-7 arm. A NATO 14-inch BRU-12 is integrated as a link. The pod can integrate radars, maritime radars, TV sensors, digital radio transmitters, MicroWave, hyperspectral cameras, LIDAR, and more

◀ The first Luftwaffe C-130J takes to the air.

– up to a 600lbs payload weight. As an alternative to the pod, sensors such as the L3Harris MX-20/15 or a targeting or Litening pod can also be connected directly. Most recently, the Open Skies project developed and tested a detection pod to carry a nuclear particles sensor. The door weight is 130lbs, the arm 500.

In addition, the AS-22 ejector is installed in the AS-6 BKS door. This allows various payloads to be dropped in flight without having to open the door or the ramp. The ejector can be used to launch sonar buoys, markers, tactical drones, loitering munitions or missiles – basically, anything that can be launched manually, by hand or from a launch tube.

Users so far are the USAF, US Marine Corps (USMC), Denmark, the Philippines and France. For deployment to the theatre of operations, the system can also be packed into three transport crates and flown inside the aircraft. In addition, the system can be easily swapped between aircraft and the various C-130 versions in a fleet solution.

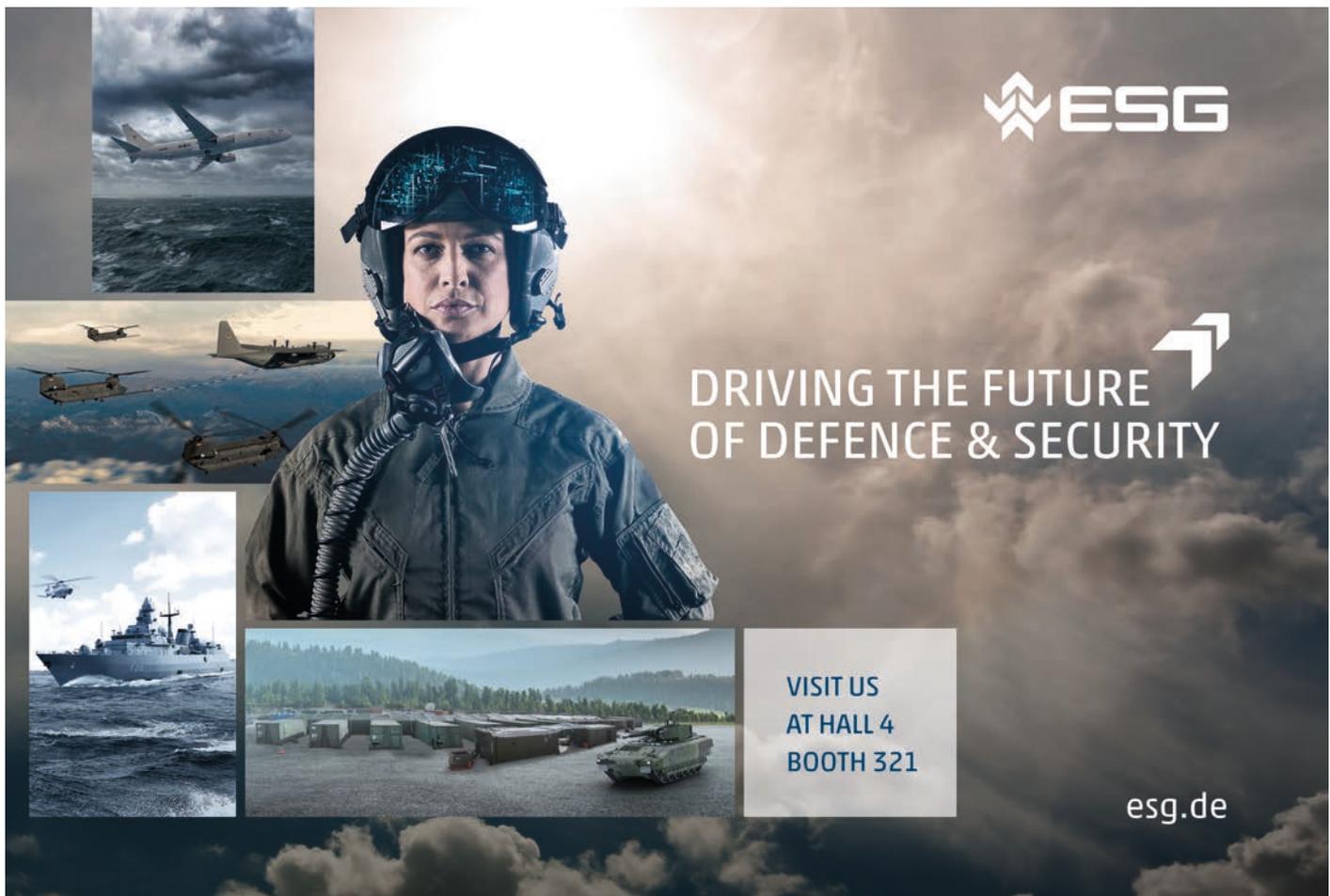
Firefighting from the Air

Thanks to appropriate kits, the C-130 can also be used as a very effective aerial firefighting platform. According to Lockheed Martin, there are several kit suppliers, the best known being the Modular Aerial Firefighting System (MAFFS), a palletised system that includes a pressurised firefighting tank. The tank has multiple cells, which in its original version could hold 2,700 US gallons of fire suppressant. The system was developed for the US Air National Guard and later adopted by Italy, Portugal, Greece, Tunisia, Turkey and Brazil. According to the manufacturer, the newer MAFFS II variant can be integrated into the aircraft within one hour. And with 11,356 litres, it can also hold more extinguishing agent. The tank is now made of carbon fibre and has an integrated compressor. This

should allow for a much shorter turnaround time between operations. MAFFS II from Aero Union (now the Maffs Corporation joint venture) is compatible with the C-130H and C-130J variants and distributes the fire suppressant through a flap in the parachute drop door in the side. This keeps the cargo door closed and maintains pressure in the cabin. MAFFS II can deliver up to eight separate sprays through one nozzle. MAFFS II can discharge up to 700 US gallons per second.

In addition, a modular air-spray system has been developed for Morocco. The system is self-contained and includes two palletised tanks of 6,813 litres each. These are mounted on the ramp and supply the hydraulic boom and spray module. The liquid is discharged into the ramp's airflow.

Another system on offer is the RADS from Coulson Aviation USA. It is a Gravity Drop Retardant Delivery System (RDS) and consists of mission-specific components that can be installed or removed in less than 30 minutes. According to the manufacturer, it is currently the most effective method of aerial firefighting delivery, making use of gravity and integrated altitude and airspeed compensation. It provides a constant flow for uniform flame retardant coverage up to Coverage Level (CL) 12. Covering the ground target from higher altitudes, to provide additional protection for the aircraft and crew, exists as an option, but the system has been optimised for conducting 'direct attack' firefighting operations, as well as low airspeed and low altitude firefighting operations. Tank capacity includes up to 5,000 US gallons of retardant which – thanks to a 1,600 gall/sec discharge rate – means the tank is empty in less than three seconds and the fire attack is over. The RADS does not require an additional crew member, and the control unit and cockpit interface provide the operator C-130J takes to the air.coverage and accuracy. The manufacturer says it is also cheaper and lighter than competing systems. (apf)



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The Best Choice: Germany to Buy F-35



◀ (Left to right) Test pilot Scott 'Shark' McLaren, VP F-35 Strategy and Business Development, J R McDonald, and Julian Wörner, Communications Manager Germany & South East Europe, at the 22 June F-35 press conference, "The F-35 is the centrepiece of 21st century security." (Photos: Stefan Nitschke)

Lockheed Martin has already delivered 800 F-35 stealth fighter aircraft to the US military and international customers.

Lockheed Martin has been a key supplier to German defence for decades, supplying helicopter platforms and multiple launch rocket systems, as well as ground-based surveillance and air defence radars. The next steps include the provision of transport aircraft – in the form of the mission-proven C-130J Super Hercules and, most recently, the F-35 stealth fighter. J R McDonald, VP F-35 Strategy and Business Development, responsible for a market that, according to him, offers "huge potential for future orders of this true European airplane," provided details of the F-35 situation with regard to a number of international customers – including Germany – at a 22 June press briefing.

With the F-35, Lockheed Martin clearly "opens the door" for customers like Germany, Finland and others for the "world's most modern combat aircraft". It is an "affordable platform," according to McDonald, and the most advanced node in 21st century security. With Finland as the latest country to join the F-35 programme, the Czech Republic is looking for a replacement for its JAS-39 Gripen fleet, he confirmed, with Lockheed Martin's offer consisting either of the F-35 or the F-16 (presumably Blk 70).

When talking about Lockheed Martin's F-35 offer to Germany, and its continuing deployment in other European nations, there is some optimism that the German Air Force could receive its first aircraft by 2026, depending

on the parliamentary process in Germany. There is much speculation, however, as to whether the necessary infrastructure will be available – at Büchel Air Force Base in Rhineland-Palatinate – to effectively handle the new aircraft. The same question exists over effective training, for which a clear concept may now be in the making. Although not a participant in the European F-35 programme until very recently, Germany has received all briefings and aircraft data over recent years. Even if France and Germany go ahead and

succeed with their next-generation combat aircraft (NGWS/FCAS), the F-35, in the case of Germany, will be able to fill in an emerging capability gap. The Franco-German programme could be another 10-15 years before providing an aircraft, and there have been several warnings in the past that "the capability gap with the ageing TORNADO should be seriously addressed". Now, as a vital step in the process, the German government sent a Letter of Request on 17 March 2022.

Also present at Wednesday's press conference was Scott 'Shark' McLaren, the manufacturer's F-35 test pilot, stating that some the test programme so far covers some 530,000 flight hours. Some 135 F-35s are in operational use today across Europe, with both Norway and Italy successfully conducted air policing operations with the aircraft over Iceland: as McDonald already noted, the F-35 is a European aircraft, and McLaren underlined that the target is for 550+ F-35s in European airspace by 2030.

Summing up, the F-35's performance characteristics are as follows: low observable; sensor fusion with advanced sensor suite; internal weapons capability (four to six weapons, depending on the version: TR3 Blk 3 or Blk 4); network-enabled operations; Electronic Warfare (EW) system; open systems architecture; joint domain operations; unmanned teaming; missile defence; extended range. McLaren commented further that "I used my mental capability when I was flying Gen 4 aircraft. But now [in the F-35], my mental picture can be seen on the displays [...] That increases my situational awareness [...] Anything I can see on my displays [in the F-35] transfers me to the real world around me." (stn)



The F-35 (an Italian aircraft pictured) is the ideal platform to deliver and meet the German Air Force's requirements, and supports Germany's aspiration to operate as a fully interoperable member of NATO and coalition operations.

MBDA Shows Flexible, Scalable and Mobile Air Defence Solution



*The ACS ENOK-based solution showing the SADM small anti-drone missile.
(Photo: André Forkert)*

MBDA Germany presents its concept of how troops on the move can be effectively protected against a variety of airborne threats. The concept is flexible and scalable. A 4x4 vehicle of the DINGO 2 or ACS ENOK 14.8 size is used as the mobility platform. But other platforms and manufacturers are also conceivable. Ideally, a vehicle can be used that has already been introduced to the troops and has sufficient space and roof load.

Stage 1 is a vehicle with a High Energy Laser (HEL). This is mainly used against small class 1 drones or RAM threats (rocket, artillery, and mortar). These threats can be combated cost-effectively at a range of one to two kilometres. The advantage of an HEL is that it can engage an infinite number of threats in succession without the need to replenish effectors such as rockets or missiles. Tests have already proven that the HEL can be used accordingly.

Stage two is the SKY WARDEN system. Here, the SADM (Small Anti Drone Missile) ground-to-air effector is used. SADM is based on MBDA's ENFORCER family and has similar weights and sizes. It can primarily operate further and against larger and faster flying threats. According to MBDA, the range is up to 5km and the target spectrum is specified as small to medium-sized drones and combat helicopters. The demonstrator vehicle at ILA carries two effector containers with nine missiles each. These are mounted facing in opposite directions, so the turret needs only to be rotated by a maximum of 90° for rough alignment – which is sufficient because, after launch, the missile seeker head takes over target

tracking. The vehicle uses an adapted or further developed version of the IAI ELTA ELM-2135 radar as its primary sensor, which offers more range and is used at around a 10km range. Four of the sensors provide 360° coverage. An optical sensor is added for identification, but this is mainly needed for the secondary armament, a remote-controlled weapon station with machinegun. According to MBDA, more than nine effectors per station are conceivable. The arrangement is flexible and simply adaptable. A weapon mix of SADM (against air targets) and ENFORCER (against land targets) is also possible. The turret is made by the Slovenian manufacturer Valhalla. In the future an automatic re-load option could be added.

Against even larger targets, and at greater distances, the third MPCS (Multi Purpose Combat System) vehicle can then act in concert. The MBDA MISTRAL or the CAMM-ER (Common Anti-Air Modular Missile Extended Range) are used as effectors. According to MBDA, CAMM-ER provides complete protection against all known and projected air targets. The CAMM-ER missile has a weight of 160kg, a length of 4.2m and a 40km range, flying at supersonic speed. The model of the demonstrator vehicle - also based on the DINGO 2 - carries four of these missiles and a .50 BMG MG as a secondary weapon. The CAMM-ER seeker has an active RF seeker providing excellent performance under all weather conditions, obviating the necessity for fore control radars. CAMM-ER is already selected by the Italian MoD for the replacement of SPADA, and by the UK MoD to replace Rapier and provide the core of the Royal Artillery's land-based air defence capability. (apf)



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