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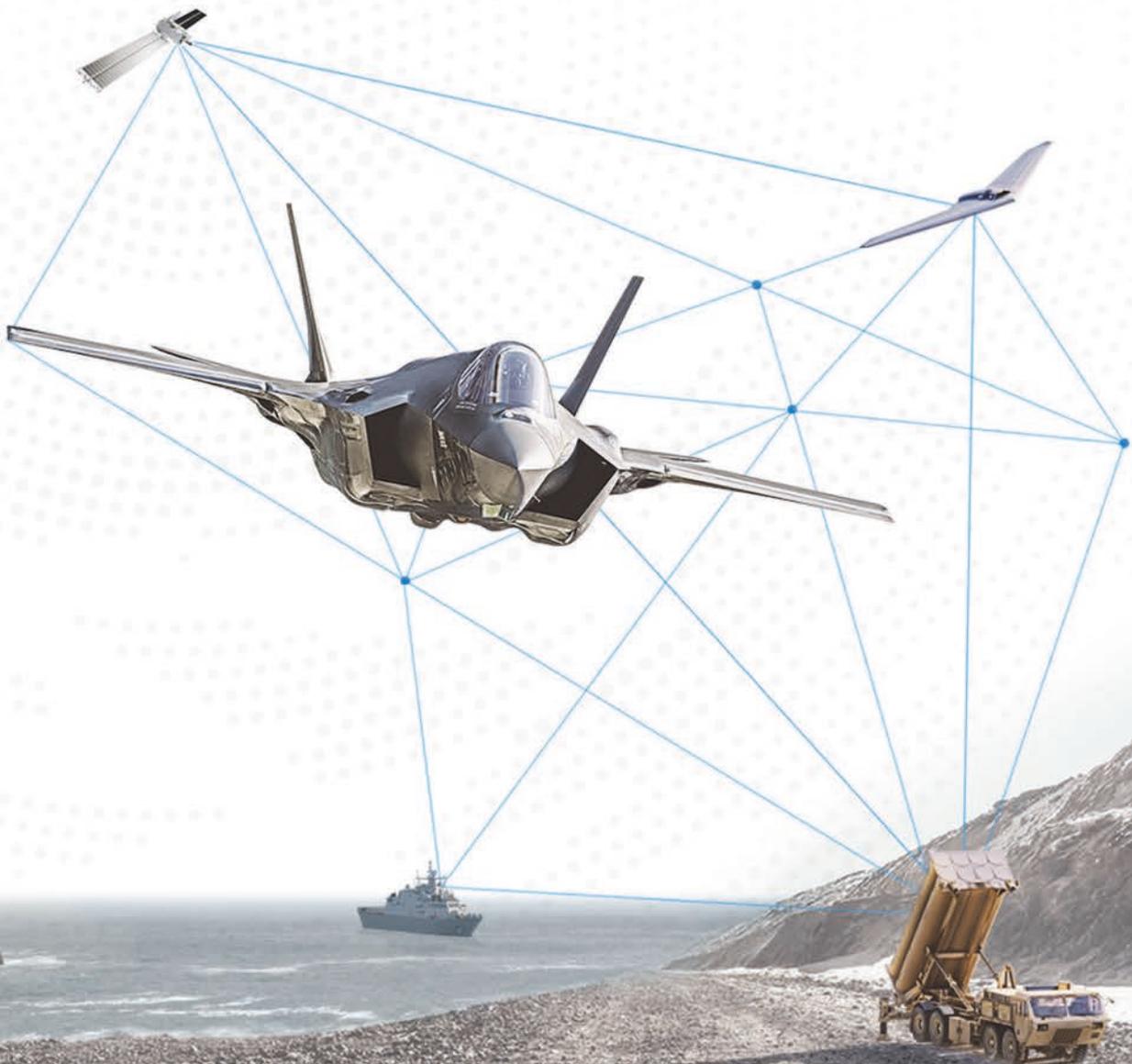


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Even if this iteration of ILA was not the first 'live' event after a pandemic-inspired absence, it would have been a meeting prompting joy (well – pleasure, then...), confidence and uncertainty in equal measure. Even if it was traditionally an annual rather than biennial event, this week would have marked an extremely busy flurry of renewed greetings, evolving plans and – inevitably – questions.

For ILA 2022 is a strange animal. It is, of course, an entirely international show but – by virtue of its location, support and philosophy, has an identifiably German flavour. The 'Bratwurst und Bier' of the international aerospace and defence show calendar, rather than the 'Croque Monsieur et vin rouge' of Eurosatory just last week or the 'fish'n'chips and (warm) beer' of Farnborough next month – ILA 2022 will be at least strongly characterized by discussion of German intentions and capabilities – perhaps even dominated by them.

And that is a perfectly understandable, legitimate and sensible result of the extent to which the German defence landscape – in particular – has changed since the last ILA. And, more importantly, since February.

Germany stunned its NATO and EU partners in the sudden and whole-hearted move to a more supportive, more holistic and more cooperative demeanour as far as collective defence is concerned. From being an important, committed and deliberate partner, Germany is emerging as a leader in thought, and deed, in issues ranging from collaborative capability development to even more active support for missions and – of course – in terms of money.

Of course? Hindsight is, of course, 20/20, but Germany is taking note of everything that is going on around it and processing that information – turning into actionable intelligence, if you like – far faster and with far greater verve than has traditionally been the case. For proof that the pudding is, indeed, of a superior flavour, just look at General Gerhartz' insightful commentary on pages 6-7. The commitment to providing an additional €100 billion in funding for the national defence enterprise was another stunning about turn – one that took a lot of people by surprise but one that has been almost universally welcomed. Dr Theo Benien examines some of the implications of this colossal windfall on pages 10-12.



Please Sir, May I Have Some More?

As a shining example of the 'even more' collegial and collaborative attitude characterizing German behaviour in the defence domain, Berlin's was the first government to make an active commitment to the NATO initiative which intends to place pre-assigned forces in a number of Eastern European countries, acting as a threshold containment force and a tripwire against possible aggression from further east. Other nations will undoubtedly do so in the coming days – and these words may be out of date by ILA – but Germany was the first. And it was unequivocal.

But there are chinks in the armour. None directly of Germany's making, and none that the nation can fix unilaterally. But its more serious leadership role will be invaluable in finding and defining multilateral solutions to some of the intractable problems. Many of these lie in the thorny issues that surround those of sovereignty, security of national supply and operational secrecy. The fact that they have been issues of debate for so long does not mean they should be ignored. And Germany will have as big a role in seeking to resolve them as any other nation – and a bigger role than most. The same applies to the other glaring issue that is big, amorphous, difficult to define (though the European Defence Agency has made a very good start at trying to) and even more difficult to resolve: the capability gaps in the panoply of means the Alliance and the EU seek to establish to defence life, limb and property. The recognition has at last become wider spread that defence is, indeed, an insurance policy. And we appear to have decided that we can afford the premiums after all. There will come a question – and soon – that will require very

grown-up thinking as we try to prioritise the sequence in which the identified shortfalls are addressed. And Germany will have a leading role to play in that, too, having worked hard in recent years to establish networked, joined-up and competent capabilities across most of the Bundeswehr.

It is always gratifying to visit Berlin, a city with a vibrancy and a history that inspires and fascinates. It is also an unalloyed pleasure to see ILA staged once more and raising its head to provide the facility to discuss, debate and decide the answers to some of today's more difficult problems. But more than short-term gratification and transient pleasure, ILA is one of the bastions of hope that we – as a society, as members of an Alliance, as serious observers of the way in which previous certainties are being called into question – dare harbour for the future. Putin's ill-conceived invasion of Ukraine has already had unintended and unexpected consequences. Maybe one of the most catastrophic for his plans and the long term societal resilience of Russia will be the effect it has had as a catalyst for joined-up thinking and constructive, well-timed action. Something, it seems, that Germany is far more comfortable with than it was only six months ago.

Tim Mahon
Editor-in-Chief of MilTech

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War in Ukraine – The Role and Importance of Air Forces



German and American aircraft training side by side in the Blue Flag exercise. (Photo: Bundeswehr)

A unique commentary for *MilTech* on the occasion of the ILA 2022 Berlin Air Show, from Generalleutnant Ingo Gerhartz, Inspector of the German Air Force since 2018.

All over Europe, we are currently experiencing a turning point in history. We are deeply appalled by the brutality of Russia's invasion and the horrible pictures of the suffering of the Ukrainian population fighting for independence and democracy. The failure of the conquest of Kiev, the fighting in urban areas, the massive employment of cruise missiles, drones, MANPADS and anti-tank rockets, the importance of logistics, morale and combat power and, last but not least, the tactical skills of small units – all these aspects will have to be analysed. Since the beginning of the second phase, the war has been characterised by a strategy of attrition pursued with great brutality, and the interaction of artillery, tanks and infantry. The importance of airpower has been evident in all phases since the beginning of the war. Despite the massive superiority in numbers and the use of state-of-the-art fighter jets by the Russian Air Force, the striking power of the Ukrainian air defence, and the bravery and determination of the Ukrainian pilots, are already defining elements of this war. As a matter of fact, the most pressing question for us is: to what extent does the war in Ukraine not only shape our future but – above all – our present as well? And further: what are the consequences of how are we going to apply airpower within NATO, especially with regard to the future of European security?

Air Force - Ready to Take Responsibility

The return of the war of aggression in Europe clearly shows that the very same core qualities that have always characterised air forces will continue to be required in the future, in order to meet the challenges arising at this turning point.

Air Force – Operational, Fast and Flexible

The security situation in Europe requires responsive armed forces. We proved our flexibility and responsiveness, by deploying additional Eurofighters to Romania only a few hours after the beginning of the Russian attack, and are still doing so today.

We patrol NATO airspace side by side with our partners, monitor the closure of German airspace to Russian aircraft with our radar systems, perform reconnaissance flights with our ECR Tornados over the Baltic Sea, and refuel allied combat aircraft with our A400M and A330 of the MMU at Eindhoven. In Slovakia, our ground-based air defence forces also make an important contribution to the security of the Alliance on NATO's eastern flank.

Our Future – Modern, Interoperable and Multinational

Our security is based on credible deterrence. Precisely for this reason, the decision in favour of the F-35 is logical. By procuring the most powerful combat aircraft in the world, we will implement the modernisation of our Air Force even faster and more consistently.

Thus, we will cooperate even more closely with the other F-35 nations in Europe, and in the Alliance, in terms of training, logistics and operations. Common weapon systems are the best basis for interoperability. In addition to the introduction of the F-35, we will enable our Eurofighter for electronic combat in cooperation with industry. State-of-the-art technology is required to survive in current and future scenarios. Besides the replacement of our Tornado fleet, other priorities, such as the heavy transport helicopter, short-range and very short-range air defence system, territorial missile defence and the Next-Generation Weapon System have already been defined, and rapid decisions have been announced.



*German air defence systems protect allies, too.
(Photo: Bundeswehr)*



*Generalleutnant Ingo Gerhartz, Inspector of the German Air Force, visiting the NATO enhanced Air Policing Mission.
(Photo: Bundeswehr Public Affairs Office)*

Multi-Domain Operations

Our concept of highly complex multi-domain operations does not seem to reflect the reality of the war in Ukraine. This war did not begin with hybrid warfare methods, nor did cyber campaigns have any priority. However, it is especially the failure of the Russian Army in the first phase that underlines the importance of air and space superiority in the future, multi-domain battlespace.

Command and control, as well as coordinated interaction of all assets, are the key to success or failure of a military operation. In our opinion,

this confirms the fact that the effects of all dimensions – airspace, outer space, cyberspace, sea and land – must be combined in order to create the prerequisites for Joint All-Domain Operations (JADO).

The reality of the war in Ukraine determines our present and shapes our future. The characteristics of airpower – speed, reach and height – have proven to be valid and decisive. Being rapidly deployable, over long distances, easily scalable and thus excellently suited to sending political signals indicative of escalation and de-escalation, the Air Force will continue to be in great demand.



*Arrival of a medevac flight in Cologne.
(Photo: Bundeswehr/Maus)*

Germany Gears Up for Collaborative Eurodrone Project

The demand for unmanned aircraft is growing exponentially. Maximum consideration is given to the use of long-range – MALE (Medium-Altitude, Long-Endurance) – drones that offer sufficient capacity for carrying advanced sensors to provide robust, all-weather, 7/24 ISR capability over a geographically wide area.

On 14 April 2021 the German parliament's budget committee approved the pan-European Eurodrone contract for development. This paves the way for Europe's premier unmanned aircraft programme in the 2020s, a collaborative project undertaken by Airbus, Dassault Aviation and Leonardo. Additionally, former German Chancellor Angela Merkel and French President Emmanuel Macron gave the programme the 'green light' on 5 February 2021 during a meeting of the Franco-German Defence and Security Council. The approval frees an amount of €3.1 billion (\$3.7 billion) for development of the UAS, according to the Ministry of Defence (MoD). The go-ahead by the then ruling Grand Coalition provided significant momentum, since the cooperative programme by the three European partner nations – France, Italy and Spain – is faced with delays. Setbacks were experienced since the programme's initiation in 2015, some of which go back to disagreements over costs, design aspects and industrial responsibilities. The contract signature was originally expected before the end of 2020.

The Eurodrone has reached three important milestones during the first half of this year. Airbus and the European procurement agency OCCAR have agreed on the overall contract for the new drone. The contract covers the development and manufacture of 20 systems, as well as in-service support (ISS) for five years after commissioning. In addition, the second implementation agreement (IA2) was signed at the German MoD in Berlin, and the development of the ambitious four-nation programme officially began on 1 March. At the signing of the contract with OCCAR, Mike Schöllhorn, CEO of Airbus Defence and Space, stated: "The signing of the contract is the starting signal for the development of one of the most ambitious defence programmes in Europe. Eurodrone is the result of close collaboration between industry, OCCAR and the four starting nations. The

programme will produce the most advanced UAS in its segment, create more than 7,000 high-tech jobs and strengthen Europe's industrial independence, competence and collaboration."

Unmanned Pathway Cleared

Also known as the European MALE Remotely Piloted System (RPAS), the Eurodrone project calls for the joint development to be completed by the end of this decade. Its layout is for a twin-engine aircraft in two configurations: a version for ISR and a variant that can be weaponised. The ability to undertake ISR missions over long distances with extreme precision is testament to an orientation to best adapt to the emerging joint character and the increasingly symmetric nature of warfare. The Eurodrone programme will influence the future roadmap of another important European programme undertaken by France, Germany and Spain – the Future Combat Air System (FCAS), with the Eurodrone forming a key part of this 'systems-of-systems' approach. Former Airbus Defence and Space CEO, Dirk Hoke, noted that with the signing of the official contract between the four partner nations and industry as well as OCCAR, the four participating nations are going to achieve fully-fledged sovereignty in unmanned capabilities. OCCAR is now managing the Eurodrone programme on behalf of the four European partners.

Airbus' specifications indicate that the air vehicle has a wingspan of 26m and a flight endurance of 27 hours. It will be an all-weather-capable UAV design, with a physical configuration comparable to the Talarion reconnaissance UAV (also known as MALE UAV), development of which was begun by Airbus (then known as EADS) in the 2000s. The turbo-prop engine offers the Eurodrone a greater maximum take-off weight and

France, Germany, Italy and Spain have set out a roadmap for procuring the Eurodrone UAS, with deliveries expected to commence by 2028. (Photo: Airbus Defence and Space)



increased ceiling (13,700m), with a corresponding increase in payload capacity. Airbus Defence and Space has disclosed this to be in the region of 2.3 tonnes.

At the end of this decade, the drone system will replace several unmanned air platforms of American and Israeli origin, used primarily in the surveillance and reconnaissance roles. The new drone will be fitted with subsystems and components to offer user countries a capability to conduct ground support and strike missions – except for Germany which did not opt for this facility. There is an ongoing debate in the German Parliament whether drones of this kind will be technically capable of carrying weapons. Large parts of the left-leaning partner in the Grand Coalition, the Social Democratic Party (SPD), criticised the possible procurement and use of autonomous weapon systems like the Eurodrone. The coalition partner's opposition in 2020 resulted in the government not weaponising the Heron TP drones on order from Israel. There are many arguments to support the idea of armed drones in Bundeswehr service, however, one of which is to protect forces on the ground. As the coalition partner is part of the German Parliament's Budget Committee that approved the multinational Eurodrone project, the statement about the drone's development included a clause that says that the programme "should initially only be about the development of an unarmed drone system."

The four partner nations have set out a roadmap for procuring 63 Eurodrone UAVs, plus ground control equipment and simulators, for a total amount of €7.1 billion, each system costing approximately €160 million. By comparison, General Atomics' Reaper strike-capable reconnaissance UAS in use with Germany's three Eurodrone partner nations costs around €200 million per unit. It is understood that Germany will procure 21 aircraft, in addition to twelve ground control stations and four transpor-

table flight simulators. According to Bundeswehr sources, the new drone could replace the inventory of Heron drones by 2025.

The current contract is for 20 Eurodrone systems, each of which will consist of three aircraft. As such, Germany – the programme's lead nation – is on contract for seven systems, while Italy has committed to five systems. Spain and France are each targeting four systems. Final assembly and ground testing of the UAV will be undertaken at Airbus' premises in Manching, Bavaria. Airbus anticipates Eurodrone's first flight in 2025, and deliveries to commence during 2028-2029.

Bridging the gap, two Eurodrone partner nations opted for interim solutions: Spain for four MQ-9 Reaper Block 5 aircraft and two mobile ground control stations, valued at €158.35 million; France ordered a third Reaper Block 1 aircraft plus two ground control stations for delivery in 2019, and has received since 2020 Block 5 aircraft, comprising three airframes and one ground control station. Italy already operates Predator MQ-1C and Reaper drones from Amendola Air Base, home of the 32nd Stormo 'Armando Boetto'. Germany has favoured leasing three to five Israel Aerospace Industries (IAI) Heron TP systems in 2018, at a cost of about €580 million. The lease contract with IAI (with Airbus Defence and Space operating and supporting the Heron 1 for the Bundeswehr, and likely to expand this arrangement to include the Heron TP), will provide an interim solution until 2025, when the Eurodrone is expected to enter service.

Rationale for a Costly Programme

There are four primary aspects in favour of the Eurodrone project: First, in favour of ISR applications, a MALE platform carrying highly sophisticated payloads consisting of imaging sensors can be employed as a reconnaissance platform, launched from secure bases that are more distant from the theatre of operations; second, the reconnaissance drone can operate in environments denied to manned platforms, such as altitudes both lower and higher than those typically occupied by manned reconnaissance aircraft; third, the long endurance of the MALE platform provides sustained support for more efficient time-critical targeting, and other missions requiring greater persistence than that provided by any manned aircraft; fourth, in peacekeeping operations, the endurance/strategic reconnaissance UAS can be employed within new forms of C4ISR networks, to provide some sort of reconnaissance-strike complex. Significantly, by taking advantage of the increased manoeuvrability, interoperability, survivability, sustainability and suitability anticipated for the Eurodrone platform, systems of this kind will be able to conduct missions more effectively and increase the effectiveness of manned platforms.

To conclude, the development of UAS in the category of the Eurodrone represents one of the most dynamic fields of air power, and harnesses a wide variety of enabling technology, according to Lt Gen **Friedrich Wilhelm Ploeger**, former Executive Director of the NATO Joint Air Power Competence Centre (JAPCC) in Kalkar, Germany. He suggested: "NATO and its constituent nations have long recognised the potential of UAS. An indicator is the growing number of potential mission scenarios from the classical information and data collection, decoying and weapons delivery to combat and combat support applications, as well as border and harbour patrol. The development of this capability offers a tremendous field of business. However, without coherent and comprehensive concept development, there is a risk for the nations – and NATO – of overstressing finite resources and money." Even so, Germany's Eurodrone partners – France and Italy – are pushing their own technology competencies and the development of demonstrators and prototypes by launching well-funded, large-scale programmes. Securing the competitiveness of German-built UAS necessitates close partnership between politics, industry and research facilities. Adding UAS technology to the list of indispensable national core competencies in militarily relevant technologies is an important basis for expanding competencies in Germany. In order to remain competitive in the world market with innovative unmanned technologies, the German aerospace industry needs a resilient framework. (stn)

Germany Pledges Additional €100 Billion in Defence Funding

Despite making such a strong commitment in the wake of the Russia invasion, criticism continues to be aimed at the German government over its policies vis-à-vis Ukraine.

The German government announced on 27 February – just three days after Russia's brutal invasion – that it will launch a special fund (*Sondervermögen*) of €100 billion for its defence. After years and years of significant defence reductions, the historic decision enables the urgently needed modernisation of the German armed forces. In addition, Germany plans to invest €50 billion from its annual defence budget 2022 for various defence and security programmes. Despite this strong political and financial commitment, the Berlin government is being criticised by several NATO partners for its cautious policy in delivering weapons to Ukraine. Some political observers wonder why Germany's Chancellor Olaf Scholz is so hesitant, reluctant and slow? A brief analysis enables a better understanding of Germany's approach to the situation in Ukraine, and how the country's policy is embedded in the overall policy of NATO and the EU.

In announcing the funding *volte-face*, Scholz describe the Russian invasion as "a turning point in [the] history" (*Zeitenwende*) of the European continent. Cool and controlled as always, he criticised President Vladimir Putin for his spiteful and illegal action, which is a clear violation of international law. After 77 years of peace in Central Europe, the Chancellor stated that something had now happened that had been completely unknown to the younger generation: War in Europe!



In his famous speech about the *Zeitenwende*, a buzzword which will be quoted by many historians in future history books, he stated that, after this war, the world will no longer be the same as it was before. The

key question for Scholz is whether the West will allow Putin to break the rule of law and let him turn back time to an era of the 19th century – or whether Europe and the US are strong enough to demonstrate to Putin that he has crossed the red line. Scholz was quite outspoken about Russia's geostrategic goals, stating that Putin seeks to establish a Russian empire. According to him, the Russian leader wants to restructure the political landscape in Europe and will not hesitate to use military power to achieve political goals.

Scholz' announcement of the investment, and President Volodymyr Zelensky's urgent call to support his country with modern equipment for its self-defence, triggered a major political controversy about the key question: Is Germany ready to deliver weapons, including ammunition and military equipment, etc. to Ukraine? While other NATO allies, such as the US, Canada, the UK and France, came



◁ *Germany's policy on Ukraine should be fully embedded into the overall policy of NATO and the EU. Chancellor Olaf Scholz (right) and NATO Secretary General Jens Stoltenberg fully agree that all 30 NATO members must stand united in rejecting Russia's ambition to change the security landscape in Europe. (Photo: NATO)*

The German government is still reluctant to deliver heavy weapons such as Leopard 1 or 2 tanks to Ukraine. (Photo: KMW)



up with proposals for all kinds of weapon systems, Germany was quite reluctant and hesitated to join its NATO partners, the main reason being the fact that German governments have a historical tendency to adhere to one of the most important principles in German foreign and security policy: Do not deliver weapons into areas of political tensions or military conflicts.

Germany's Special Fund: How Much – and for What?

After an intense debate on the necessity to modernise the Bundeswehr, and on Germany's deliveries of weapons to Ukraine, Defence Minister Christine Lambrecht announced that the planned expenditures will focus on two major goals of the German defence and security policy: defence of the country, and defence of the Alliance. She also addressed the ambition of the German armed forces to become a force multiplier within the EU and NATO. The investments should be implemented quickly, so that each soldier will have complete protection equipment by 2025 – six years earlier than planned.

In her speech to Parliament, the Defence Minister revealed on 3 June how Germany plans to invest the €100 billion over the next several years, in addition to the €50 billion approved in the annual defence budget. She structured the planned expenditure into four major 'Dimensions':

Dimension Air: The biggest chunk of the special fund will be invested to the air domain, comprising not only systems for the German Air Force but also the airborne capabilities of the Army and Navy, with about €41 billion. Major weapon systems in this domain will include 35 F-35 fighter jets, 15 Eurofighter ECR (Electronic Combat Role) and 60 Chinook CH-47F, the heavy transport helicopter (STH) which is urgently needed, after years of discussions.

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Dimension Communication Capability/Digitalisation: The second largest part (€20.7 billion) is dedicated to this dimension, with its focus on communications capabilities. The most important objective is to enable German soldiers to communicate via encrypted radio with each other and with their comrades in the other NATO member states.

Dimension Land: About €16.6 billion are reserved for the land dimension, which will enhance the armed forces with upgraded Puma IFVs and the successors to Marder and Fuchs. A part of the budget will be spent for the development of the new German-French main battle tank, the Main Ground Combat System (MGCS).

Dimension Sea: This dimension will get about €8.8 billion for the K130 corvette, the F-126 frigate and the new U212 CD submarine, which is still under development.

Respect and Criticism from NATO Allies

Germany's political commitment to allocate such sums for its defence has been praised by NATO Secretary General, Jens Stoltenberg, on behalf of the Atlantic Alliance. Despite this acknowledgement and respect, several NATO allies criticise Germany for its slow and hesitant manner in delivering urgently-needed weapons to Ukraine, to enable that nation to survive in its fight against Russian troops. Why is Germany behaving like this? There are five reasons which explain why Berlin decided to follow a cautious and controlled approach for the delivery of arms.

Security and foreign policy: one of the key principles of the Scholz government in its policy towards Ukraine is its permanent effort to avoid Germany and Europe becoming involved in the war. Although Scholz clearly condemned Putin for pursuing political goals with military means, and accused him of trying to establish a Russian empire, the Chancellor seeks to avoid Germany and Europe becoming a party to the war and thereby becoming a potential target for Russia. Evidence for this is his constant refusal to deliver 'heavy weapons,' such as combat aircraft or tanks to Ukraine.

Alliance policy: another important principle for Scholz is the integration of German policy into the overall policy of NATO and the EU. Everything Germany does must be in line with NATO and the EU. Therefore, it is an absolute 'no go' for him that Germany might take its own path (*Sonderweg*).

Arms export policy: when compared with American, British and French policies, German governments have followed a restrictive arms export policy, disallowing the export of weapons into areas of political tension. This fundamental policy guideline, valid for many decades, is now eroding. Even the general public is ready to accept that Germany should deliver weapons to Ukraine.

Party and domestic politics: Scholz is fully aware that his Social Democratic Party (SPD) doesn't like arms exports nor the permanent increase of defence budgets. The rejection of arms exports in his own party, its critical attitude towards nuclear weapons and the famous German 'angst' also have an influence on the government's policy.

Personal style: Scholz' personality is characterised by a very rationale, controlled and humble style. The Chancellor doesn't like to make a lot of noise. He is a quiet man. He prefers Hanseatic understatement. He also doesn't want to go down in history books as the Chancellor who led Germany into a new war.

Conclusions

Ukraine urgently needs modern weapon systems for its self-protection. The country's very existence is threatened, and it is fighting for survival. Germany's commitment to spend €150 billion on defence is unprecedented. But money alone will not be sufficient to create a better political perspective for Ukraine, for Europe and for Germany.

The Berlin government must be ready to bear more political responsibility, and should have the courage to act accordingly. Close coordination with NATO allies is the right approach. But now is the time to decide; now is time to deliver. In a mere half year, it may already be too late. (tb)

Secure communication as a prerequisite for mission success



At ILA, Elbit Systems Germany will be presenting the latest HF radios from the HRM 9000 series as a globally usable voice and data communication solution from domestic production. (Photo: Elbit)

In times of digital, highly complex situation images, AI-supported decision-making processes and augmented reality (AR) support for individual soldiers, reliable, secure communication between friendly and allied forces is crucial for mission success. At ILA, Elbit Systems Deutschland (H3 booth# 320) will present state-of-the-art HF/VHF as well as satellite communication systems that are available on the market and have often already proven themselves in the field.

These is, for example, the HRM 9000 integrated radio series, which enables secure, hard-to-reconnoitre communication over hundreds of kilometres between dismounted teams, mobile units and stationary command posts, thus providing a flexible state-of-the-art solution.

From the satellite communication product range, the Ulm-based company will be presenting the portable E-Lynx SAT, for example, which is ideal for reliable voice and data communication of mobile units over very long distances. (apf)

Rheinmetall Provides Friendly Forces With Best-Possible Protection

At ILA, Rheinmetall will be showcasing a wide range of systems and services offered by its various divisions and enterprises to protect people, equipment and infrastructure in the digital aviation age.

Among this year's highlights are:

Unmanned systems and robotics: the current product portfolio of unmanned systems, including the LUNA NG (Next Generation) UAS as the latest development for unmanned airborne reconnaissance, classification and recognition of objects in real time, and as a platform carrier for a wide range of payloads and missions. The company will demonstrate how its various Smart Multipurpose UAVs can enhance the sensor systems of vehicle platforms and improve situational awareness;

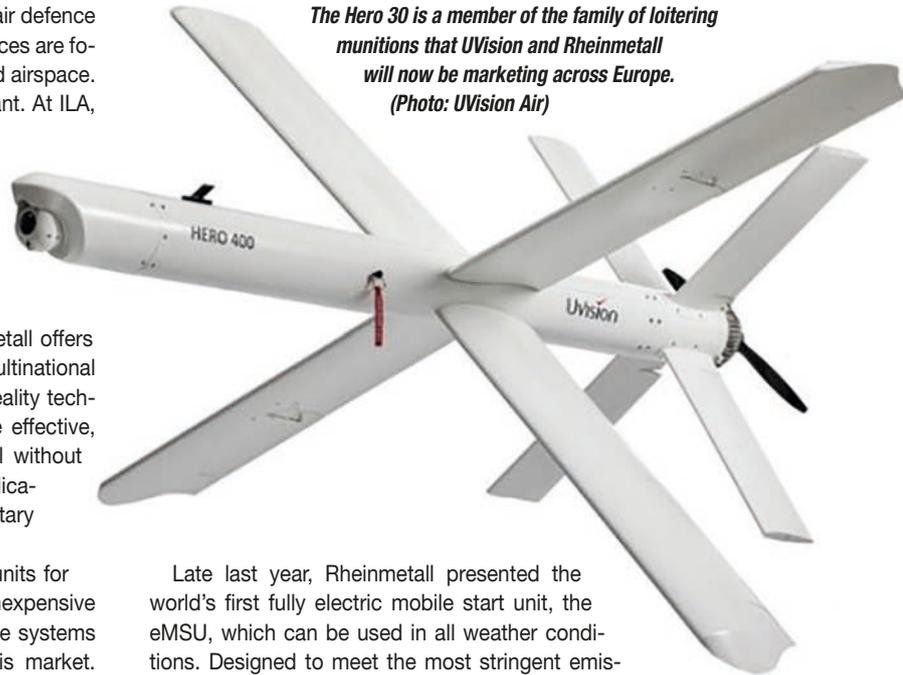
Loitering munitions: precision loitering munitions (LM) combine the characteristics of drones and guided missiles. They enhance the ability of even small units to reconnoitre target zones from above, as well as enabling high-precision standoff engagement of targets. Rheinmetall and its partner UVision have entered into a cooperation agreement to market UVision's Hero family of LM in Europe. At ILA, the two companies will be spotlighting possibilities for integrating various Hero LM systems into manned and unmanned vehicles;

Air defence: mobile, modular, and scalable, ground-based air defence systems are gaining new importance now that NATO armed forces are focusing once again on defending national and allied territory and airspace. Here, being able to engage UAS and LM is especially important. At ILA, Rheinmetall is displaying a Boxer 8x8 configured for an air defence role, topped with the Skyrainger30 turret with an integrated surface-to-air missile launcher, a combination particularly capable of performing this vital task;

Simulation: “Train to perform” – computer-supported technologies for the armed forces and their equipment and training needs are a decisive factor in national security. Wielding a wide spectrum of simulation skills, Rheinmetall offers optimum instruction systems for future joint operations and multinational scenarios. Furthermore, lifelike training rigs and augmented reality technologies, individually developed for the task at hand, enable effective, highly realistic training of repair and maintenance personnel without tying up the original aircraft. Moreover, augmented reality applications will foster innovation throughout the entire lifecycle of military assets.

Mobile starter units: Rheinmetall supplies mobile starter units for civilian and military aircraft engines. Compact, reliable, and inexpensive to operate, these high-performance, virtually maintenance-free systems have turned Rheinmetall into an established supplier in this market. Powered by a turbine, the devices not only help to start the engine, but also supply compressed air for the air-conditioning system onboard the aircraft. At this year's ILA, the MSU-GP 200T will be on show, a turbine-powered air start unit that can also supply the aircraft with 90 kVA of electric power.

*The Hero 30 is a member of the family of loitering munitions that UVision and Rheinmetall will now be marketing across Europe.
(Photo: UVision Air)*



Late last year, Rheinmetall presented the world's first fully electric mobile start unit, the eMSU, which can be used in all weather conditions. Designed to meet the most stringent emission requirements, it significantly cuts air pollution at airports, thus improving air quality. At ILA 2022, Rheinmetall will also be spotlighting its extensive expertise in counter-drone operations and protection systems, as well as in simulation and training, and technical documentation.

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AIRBORNE COMMUNICATIONS BY ROHDE & SCHWARZ

ILA 2022
Hall 3a, Booth 470

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Successfully installed in all kinds of platforms, SOVERON® SDRs for airborne communications are mission-proven and meet both, military and civil standards. SOVERON® stands for more than fully integrated, high performance and scalable trusted communications solutions. SOVERON® enables a customers' digital sovereignty, protects their information space and gives them the greatest possible independence from manufacturers.

With SOVERON® SDR for airborne communications, Rohde & Schwarz is the national German champion and is actively involved in the European Future Combat Mission System (FCMS) to enable air power in networked operations.

Visit us in hall 3a, booth 470 and learn more about the Rohde & Schwarz portfolio for secure and robust airborne communications.



Aimpoint Unveils New Fire Control Sight



Aimpoint's FCS 14 on show at Eurosatory last week. (Photo: André Forkert)

Aimpoint showed a mock-up of the new Fire Control Sight (FCS) 14, which was developed for the MBDA Enforcer, at Eurosatory in Paris last week for the first time ever. The decisive innovation compared to the current FCS 13 is that FCS 14 can both send and receive target information. This enables it to communicate with other FCS 14s or a battle management system and, for example, hand over targets to other troops.

FCS 14 is expected to be available as an optic, not necessarily with all features integrated by then, from 2024. It will also be able to take a thermal imaging attachment as a clip-on from a third-party supplier, thus also ensuring night combat capability. While Germany will use the Hensoldt DYNABAWK with the Enforcer, as with the Dynamid Nobel Defence Panzerfaust 3-IT and the RGW90-family, the Aimpoint FCS 14 will be offered for export clients for the Enforcer. The Aimpoint solution will be more cost effective than the DYNABAWK. The MBDA Enforcer is currently being introduced as Wirkmittel 1.800+ by the Special Forces of the German Army. MBDA Germany (booth# XXX) will show the Enforcer during ILA at their booth, where you will have the chance to shoot it in the simulator. (apf)

Rafael's High-Power Laser Air Defense System Iron Beam

Rafael's products on display at ILA include the Iron Beam high-power laser air defence system. This successfully completed a series of tests

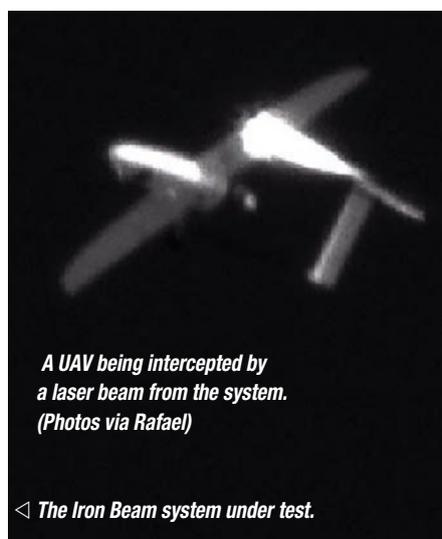
conducted by the Defence Research and Development Directorate (DDR&D) of the Israeli Ministry of Defence against hard-to-pursue threats in April 2022. The demonstrator successfully intercepted UAVs, mortars, rockets and anti-tank missiles in various scenarios.

"With Rafael's Iron Beam, Israel has a unique capability in the world by successfully developing a high-power laser technology that is operational and provides intercept capabilities. The tests are the first phase of a multi-year programme led by DDR&D and the defence industry. The programme aims to develop a high-powered laser system for ground and air use, capable of countering long-range, high-intensity threats. The laser will complement the 'Iron Dome' system and will be an effective and economical addition to Israel's multi-layered air defence system. The development plan for the system is being led by the Defence Research and Development Department (DDR&D)," the company said in its statement at the time.

CEO and President of Rafael Advanced Defense Systems, **Yoav Har Even**, said, *"Rafael is proud to have completed this first series of tests with the world's most innovative high-powered laser. The successful tests included intercepting a wide range of threats and have demonstrated the remarkable capabilities of the system. Our collaboration with DDR&D and the Ministry of Defence has resulted in this exceptional development, which represents an important milestone on the road to operational capability. I am confident that this technological breakthrough will lead to future capabilities in directed energy, including the high-power laser system. This achievement is the result of the tireless work of Rafael personnel who contribute to Israel's security while maintaining and developing technological capabilities to ensure Israel's qualitative edge."*

Daniel Gold, Head of DDR&D, added: *"DDR&D leads significant research and development programmes in various technology areas that support the IDF and the State of Israel. The high-power laser system will be an integral part of Israel's multistage air defence system. This technological breakthrough comes at a time when operational demand for this system is at an all-time high. These tests have been a great success thanks to the creativity, innovation and knowledge that went into the research and development processes. In recent years, the DDR&D has led the laser programme in cooperation with the IDF and the defence industry under the leadership of Brigadier General Yaniv Rotem, Head of the DDR&D Research and Development Department. It was they who turned the visions into reality. The DDR&D will continue to lead the research, knowledge and technological developments that form the basis for the groundbreaking systems that will be used to protect the State of Israel."*

Head of the DDR&D's Research and Development Department at the Ministry of Defence, Brig Gen **Yaniv Rotem**, added: *"The completion of these innovative tests with a high-powered laser is only the beginning of our vision. It is the first time we have succeeded in intercepting mortars, missiles and UAVs at such challenging distances and time intervals. The laser is a game changer thanks to its easy-to-use system and significant economic benefits. The next step is to continue development and deploy the system for the first time in Israel. Our plan is to deploy several laser effectors along Israel's borders over the next ten years. At the same time, we will continue to develop advanced capabilities, including the air laser."*



A UAV being intercepted by a laser beam from the system. (Photos via Rafael)

◀ **The Iron Beam system under test.**

(apf)

Scorpius - A Quantum Leap in Electronic Warfare Capabilities and Performance

As technology advances incessantly, so too do the deadly threats appearing on the multi-dimensional electronic battlefield. The challenges to forces on the ground, at sea, and in the air are daunting. Examples include the latest cruise missiles, powerful imaging radars deployed from aircraft, and long-range air surveillance and defense radars. The list is virtually endless, and to make matters worse; some of these systems are finding their way into the hands of dangerous, rogue nations and non-state actors.

The stakes are high – the loss of highly trained personnel and costly, difficult to replace platforms and equipment may result in failure or even defeat – so it is imperative that forces be equipped with the tools needed to survive and successfully complete their objectives. To this end, Israel Aerospace Industries (IAI), Israel's largest aerospace and defense company, has leveraged its decades rich technological heritage as the country's radar and electronic warfare house, and its culture of innovation, to field the Scorpius family of cutting-edge Electronic Warfare (EW) systems. Offering unmatched protection on land, at sea, and in the air, the Scorpius family redefines the state of the art in EW and Electronic Attack system performance.

AESA and GaN – Game Changing Technologies

The Scorpius product range is based on IAI-ELTA's Active Electronic Scanning Array (AESA) technology. AESA, built with a staring array of wide-band solid state transceivers, provides a dramatic increase both in receiver sensitivity and in Effective Radiated Power (ERP) – far exceeding legacy EW solutions. Furthermore, AESA technology allows narrow multi-beam operation for reception and transmission, enabling the system to detect and target multiple threats simultaneously, across the entire field of regard.

The Scorpius family also incorporates the latest Gallium Nitrate (GaN) technology, which provides much higher power density and efficiency than previous generation Gallium Arsenide (GaAs) transistors, maximizing power and reducing energy consumption.

Leveraging AESA's exceptional sensitivity, the Scorpius family is able to detect and track advanced threats such as low probability-of-intercept (LPI) radars and long-range targets. Furthermore, with its superior ERP, Scorpius disrupts and degrades enemy radars with unparalleled effect. Scorpius effectively protects assets against modern airborne, shipborne and land-based threats, including fire-control radars, search radars, active missile seekers, and imaging radars.

Meet the Family

The Scorpius family comprises the land-based **Scorpius-G** EW System and **Scorpius-T** Threat Emulator for EW training; the naval EW System, **Scorpius-N**; and two airborne systems – **Scorpius SP** for self-protection, and **Scorpius EJ** for escort jamming.

Scorpius-G (ELL-8256SB) is a powerful ground-based system designed for long-distance RF Electronic Countermeasures (ECM). Mounted on a rotating pedestal and deployable from a single rugged all-terrain vehicle, Scorpius-G performs accurate, multi-beam, multi-technique electronic attack against advanced fire control radars, search radars, AEW sensors and SAR over a wide geographic sector. Capable of simultaneously jamming numerous emitters over its entire frequency range, Scorpius-G protects ground forces from both airborne threats as well as ground-based threats within its line of sight. In addition, the system provides high performance Electronic Support Measures (ESM), continuously intercepting and tracking hostile electronic emissions, and building a detailed Electronic Order of Battle (EOB).

Mounted on a small truck or service vehicle, **Scorpius-T (ELL-8257SB)** is a multi-threat EW emulator designed to provide a realistic signal-dense, multi-threat training environment for aircrews and EW operators, and to support system testing and evaluation. Scorpius-T's capabilities are unprecedented, with diverse training



(Credit – IAI-ELTA)

scenarios to challenge fourth- and fifth generation fighter aircraft. With its multi-beam capability based on the Scorpius ESA technology, the system can simultaneously engage multiple trainee aircraft with an array of threat patterns, emulating the threat's full operational sequence: from search, acquisition and track, to launch.

Scorpius-N (ELL-8256SB) is IAI-ELTA's powerful shipborne EW suite combining advanced Electronic Countermeasures (ECM) and Electronic Support Measures (ESM) capabilities. It comprises four conformal antenna array panels, each housing transceiver arrays that cover a wide frequency range, a control unit for processing and managing operations, and an operator console that includes maintenance and training functions. Scorpius-N provides naval forces with the tools needed to contend with current and future threats.

Highly developed multi-beam, multi-technique power management capabilities enable Scorpius-N to efficiently jam multiple emitters, including all types of radars and RF missile seekers. The system detects and then tracks, engages and jams multiple threats over a wide geographic sector to create a protective hemisphere around naval forces. It will disrupt the operation of long-range, stealthy anti-ship missiles before they close range and lock on to the vessel. Moreover, the system will effectively attack the newest generation low probability-of-intercept radar systems used to provide weapons with target data. Finally, Scorpius-N is fully compatible with leading hard-kill systems. In fact, its advanced capabilities significantly reduce the burden on hard-kill systems, preserving their capabilities for further engagement.

Scorpius technology allows for exceptionally high EW performance in a small form factor – advantages that enabled the development of the **Scorpius-EJ (ELL-8251SB)** and **Scorpius-SP (ELL-8222SB)** systems. Designed for deployment from fighter and transport aircraft, these systems deliver unprecedented capabilities relative to their respective size and weight class thanks to AESA and GaN technologies.

IAI offers an extensive portfolio of high-performance and field-proven payloads and a wide range of platforms; from strategic ISR satellites, multi-mission aircraft and UAVs, to tactical drones and ground systems. System solutions cover integrated EW (ESM/ECM), Radar, EO/IR, IMINT, Launch Detection Systems (LDS), SAR/GMTI, SIGINT, and cyber. This ability to deliver game changing solutions such as the Scorpius EW family, at the strategic and tactical levels to customers worldwide, is a key factor in IAI's ability to maintain its position as a trailblazer in advanced defense electronics.



Photographic Recap of ILA 2022 Build-Up



(All photos: apf)



Boeing's AH-64 Apache: A Proven Game Changer



*An AH-64E in desert operations.
(all photos Boeing)*

The Boeing AH-64 Apache is the primary attack helicopter for the US Army and 17 partner nations, including NATO allies such as the United Kingdom, Netherlands and Greece. The US Army fleet of Apaches has amassed more than 1.3 million combat hours and 4.9 million total flight hours in support of operations worldwide, including in Poland and Eastern Europe in combined exercises and operations – making it a proven game changer that supports interoperability and regional security in Europe.

While the Apache was originally designed as a heavy attack helicopter, operations over the last two decades have seen it upgraded and modernised to meet reconnaissance demands. The AH-64E Apache version 6, or v6 – through a combination of software and hardware updates – has further improved the Apache's capabilities, making it an optimized scout and weapons system.

Show Daily spoke with Michael Hostetter, VP of Boeing Defense, Space & Security in Germany

Show Daily: *The AH-64 Apache has been flying since the 1970s. Why is it still the most relevant attack helicopter in the world?*

Michael Hostetter: In today's increasingly complex global security environment, providing pilots with the very best in terms of performance, connectivity and interoperability with allies is more important than ever. That's why the Apache is the attack aircraft of choice for the US Army and 17 partner nations around the globe.

By combining a battle-tested design with transformational technologies, the Apache delivers an unmatched mix of versatility, affordability and superior capabilities. Some of these superior capabilities include a Modernized Target Acquisition Destination System (M-TADS) and Pilot Night Vision Sensor (PNVS) for long-range precision engagement and pilotage capabilities day or night in adverse weather and obscure conditions. In addition, the Apache offers enhanced manned-unmanned

teaming (MUM-T) capability for real-time video streaming from unmanned aerial vehicles (UAVs) and transmission to ground systems. This enables non-line-of-sight communications, unprecedented situational awareness and next-level maneuverability. Link 16 is a key capability for unrivalled interoperability and information sharing on the battlefield — creating a joint common operating picture with other aircraft and sensors. Another key differentiator for the Apache is a mast-mounted Fire Control Radar (FCR) to locate hostile air defense units, and reduce exposure times for target acquisition and payload delivery in any environment, including maritime operations. Altogether, the Apache's modernizations and enhancements bring unmatched capability to the battlefield.

Show Daily: *MUM-T is a critical capability.*

Which UAVs are certified to work in a MUM-T manner with the AH-64?

Michael Hostetter: Apaches have been equipped with the critical MUM-T capability for more than a decade – providing two-way, high-bandwidth communication between the Apache and UAVs. This combat-proven Apache capability increases survivability by allowing for early detection and identification of threats on the battlefield. Apache has teamed Gray Eagle and Shadow, as well as Scan Eagle during demonstration, and is capable of teaming with others. It's also important to emphasize that Apache is the only attack or reconnaissance helicopter with MUM-T capabilities.

Show Daily: *Beyond introduction of v6 capabilities, what else is being done in terms of modernization to the AH-64 Apache?*

Michael Hostetter: The enduring goal of AH-64 modernization is to ensure the Apache's continued dominance on a perpetually evolving battlefield for decades to come. We'll accomplish that by embracing and integrating the future technology and capabilities needed to execute successful attack and reconnaissance missions in increasingly connected and contested joint all-domain/multi-domain environments.

While the AH-64E v6 Apache is one of the few aircraft in service today that already possesses an open systems architecture, a primary modernization focus for Boeing is the rapid adoption of a Modular Open Systems

A pair of AH-64E Apaches.



Approach (MOSA). This will enable the integration and fielding of advanced capabilities, such as cutting-edge communications, navigation, sensor and weapon systems, more quickly and affordably than ever before. The result will be the ability to zero out emerging operational gaps at the speed of relevance.

In addition, there are many efforts like the Improved Turbine Engine Program (ITEP) engine being integrated into the Apache for enhanced power, range, efficiency and speed.

Combined with the fact that the Apache will be upgraded and enhanced until the late 2040s under the US Army's planned Apache Modernization Program, that's how we'll ensure the platform remains the world's most advanced attack helicopter through 2050 and beyond.

Show Daily: *What other countries in Europe are interested in the Apache?*

Michael Hostetter: The Apache is currently operated by three NATO nations; the United Kingdom, Netherlands and Greece. We're currently engaged in Poland's KRUK attack helicopter competition, with several other countries demonstrating high interest in the Apache. It's also important to note that the Royal Netherlands Air Force is upgrading its 28 AH-64D Apaches to the most modernized configuration of the aircraft – the AH-64E v6. The Royal Netherlands Air Force has operated Apache helicopters for 24 years and the first delivery of the AH-64E v6 is targeted for late 2022, with all 28 expected to be delivered by early 2025.

Show Daily: *Germany will soon phase out its first Tiger attack helicopters, and the Apache could be a replacement option.*

Why would the Apache be a good fit for Germany from your point of view?

Michael Hostetter: For all the reasons listed above. The Apache is the preferred helicopter for the U.S. Army and 17 partner nations – and in today's increasingly complex global security environment, providing operators with the very best in terms of performance, connectivity and interoperability with allies is more important than ever. In addition, the Apache offers interoperability with NATO nations specifically, and it's an off-the-shelf solution immediately available for operations. Let me put it this way: the Apache is a proven game changer, modernized and available now. (apf)



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Horses for Courses – Choices in Air Transport

Franco-German C-130J Squadron Takes Shape

Intense collaboration with the French Air Force plays an important role for the German Air Force, as the establishment of a new transport aircraft unit stationed near Évreux/Fauville in Normandy is widely believed to bring additional benefits for the two nations. Both countries are deploying ten C-130J Super Hercules transport aircraft here to form a new binational squadron, with the airplanes being acquired from Lockheed Martin. The US manufacturer is famous for its C-130 Hercules transport aircraft, of which more than 500 examples are being used by the world's leading air forces. The Luftwaffe is now in the process of receiving six aircraft based on a Foreign Military Sales (FMS) agreement worth \$1.4 billion, consisting of three C-130J-30s and three KC-130J refuelers. All six aircraft are expected to be delivered by 2024.

According to the German Air Force, the new aircraft will fill an urgent capability gap that will emerge with the retirement of the ageing C-160 Transall transport aircraft, in constant use over the last several decades. The *Armée de l'Air et de l'Espace* received the first of four C-130J aircraft in December 2017. Two C-130J-30s and two KC-130Js were already delivered to *Escadre de Transport 2/61* 'Franche-Comté' (ET02.061) at Base Aérienne (BA105) in Orléans/Bricy, before moving to Évreux in the summer of 2021.

The project of a joint tactical transport squadron in Évreux was agreed by former Chancellor Angela Merkel and the then newly-elected French President Emmanuel Macron. The binational unit declared IOC (Initial Operational Capability) on 9 March 2022, following the inauguration, on 3 September 2021, of the French part of the squadron. The unit's Full Operational Capability (FOC) is expected to be achieved in the course of 2024, then operated by 130 French and 130 German airmen. A German Air Force representative stated that, based on this Franco-German collaboration, French pilots will be able to fly German aircraft and vice versa. Additionally, crews will be composed of both French and German pilots. This process is described as a unique development and a blueprint for other programmes in Europe. (stn)

Netherlands to Replace C-130H Hercules Fleet with Embraer C-390s



The C-390s could be flying out of Eindhoven from 2026. (Photo: Embraer)

In an unexpected – and therefore surprising – decision, the Dutch armed forces are to replace their four ageing Lockheed Martin C-130H Hercules with five Embraer C-390M Millennium aircraft. The Netherlands will thus become the third European NATO customer - after Hungary and Portugal



The first C-130J Super Hercules was received by the German Air Force in January 2022. (Photo: Lockheed Martin)



- for this tactical transport aircraft. The C-390M competed directly against the C-130J for this procurement, and the first aircraft is scheduled to be delivered in 2026. That the Royal Netherlands Air Force will now get five aircraft is also a response to the dramatically changed security situation on Europe's eastern flank, as well as the lessons learned from the Afghanistan evacuations in 2021. Secretary of State **Christophe van der Maat** stated *"These have underscored the importance of guaranteed availability of transport capacity for the armed forces. With the expansion from 2,400 to 4,000 flying hours, units can be supported more and more frequently. The Netherlands also contributes to filling a European shortfall. Furthermore, the additional transport capacity will benefit the speed of response in case of calamities."*

According to Dutch military sources, the C-390M offers higher availability, performs better on several operational and technical requirements, and requires less maintenance. Also, for the minimum requirement of 2,400 flight hours, the C-130J would need five aircraft, the C-390M only four. The fifth C-390M is a big added capability for the force.

All the C-390Ms will be operated by the European Airlift Command (ATC) in Eindhoven. Thanks to the pooling and sharing there, all seven member nations (Belgium, France, Germany, Italy, Luxemburg, Netherlands and Spain) might benefit from use of the C-390M.

The twin-jet STOL military transport, featuring a T-tail and rear loading ramp, is intended for the medium (5-10t payload) and heavy (10-20t) market sector, previously dominated by turboprops. It should also be able to operate in Antarctica and from semi-prepared airstrips. The aircraft's overall length is 35.20m, maximum take-off weight 80,978kg, and maximum payload of 26,000kg (13,400kg with max fuel). The maximum (ferry) range is 3,217 nautical miles. (apf)



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- 15:00 Quarantine solution with low pressure tent

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Defence Investment Gaps in Europe



During their high-level meeting in Versailles on 11 March, the 27 Heads of State and Government of the European Union (EU) agreed to “bolster European defence capabilities” as a political reaction to Russia’s military aggression against Ukraine. Europe’s top leaders called on all EU member states to increase their defence expenditures, step up cooperation through joint projects, close shortfalls and meet capability objectives, boost innovation including through civil/military synergies and to strengthen Europe’s defence industry, including small and medium-sized companies (SMEs).

This is the background to a new report published by the European Commission entitled *Defence Investment Gaps*, which has been compiled in cooperation with the European Defence Agency (EDA). The 14-page report, published on 18 May, identified three types of defence gaps and six areas to improve the defence capabilities of Europe’s armed forces. The document does not only contain a thorough analysis of the shortfalls and deficits, but also presents recommendations for concrete actions to close these gaps.

Commenting on the new report, the President of the EU Commission, **Ursula von der Leyen**, said: “*The European Union is stepping up its effort to build a stronger European defence industry. We need to spend more on defence and we need to do it in a coordinated way. We are proposing concrete measures to strengthen our defence capabilities and the military technological edge of our European industrial base, based on an analysis of the defence investment gaps. This action will ensure a more effective European contribution in NATO.*”

Her call was supported by the EU High Representative and Head of the (EDA), **Josep Borrell**: “*Russia’s aggression against Ukraine has changed the security landscape in Europe. Many are increasing their defence spending, but it is crucial that Member States invest better together to prevent further fragmentation and address existing shortfalls. This is also what the Strategic Compass calls for. The European Defence Agency will continue to play a key role in supporting Member States in identifying gaps, promoting cooperation and fostering defence innovation.*”

Main Types of Defence Gaps

Based on analysis of the current defence deficits in Europe (most of them are known for years), the EU Commission and EDA examine three major types of gaps: defence expenditure, defence industrial gaps, and defence capability gaps.

◀ *Europe’s defence not only needs more coordination and more consolidation but more trust among the 27 EU member states. (Photo: EU/Christian Creutz)*

Defence Expenditure: Due to Russia’s brutal attack on Ukraine, the EU Member States had decided to increase their defence budgets by an additional €200 billion in the next few years. While these increases are essential, they come after years of substantial cuts and severe under-investment. From 1999 to 2021, the EU’s combined defence spendings increased by 20% against 66% for the US, 292% for Russia and 592% for China.

Defence Industrial Gaps: The gaps in defence identified in this report exist for many years. Since the demand from the nations is fragmented due to their different defence requirements, the defence industry is also fragmented along national borders. Dependencies exist also for defence equipment, however, Europe’s defence industry is not offering indigenous defence solutions.

Capability Gaps: The EU’s Strategic Compass underlined the ambition to further develop “*full spectrum forces that are agile and mobile, interoperable, technologically advanced, energy efficient and resilient*”. It has also recalled the critical capability shortfalls indispensable to enable the Union to undertake the full range of Common Security and Defence Policy (CSDP) tasks. In order to develop priority projects in defence, the European Defence Fund (EDF) is providing financial support for the development of strategic enablers and operational capabilities.



Areas to improve Defence Capabilities

Beyond these capability gaps, the Commission and the High Representative propose to work on six areas that will significantly contribute to enhance Europe's defence capabilities in the face of growing threats:

Air Domain: The development of the new Eurodrone (MALE RPAS) has been launched and is gaining in importance. Upgrading air-to-air refuelling capabilities and existing aircraft fleets, building a multi-layer air defence as well as developing counter drone-capabilities and weaponised drones are also among the top priorities. In addition, the modernization of anti-access/area denial systems and the fleet of multi-role combat aircraft in the EU is another area where EU member states plan to invest.

Land Domain: The upgrade of main battle tanks and armoured fighting vehicles has become a matter of urgency in the EU due to the probability of a large-scale, high intensity warfare in Europe. The enhancement of land combat capabilities should therefore include combat support, a wide range of anti-tank and artillery systems with the capability of precision strike and counter-artillery.

Maritime Domain: Strengthening of naval forces remains critical in the light of increasingly contested Black, Baltic and Mediterranean Seas as well the need to reinforce power projection, anti-access denial and coastal defence capabilities. This should include frigates, submarines and patrol corvettes to ensure maritime security. ISR capabilities and the protection of sea lines of communication will benefit from high-end inter-connected ships augmented by unmanned platforms for surface and underwater electronic warfare.

Space (Connectivity, Surveillance, Protection): The war in Ukraine has demonstrated the importance of satellite-based secure connectivity, including a highly resilient European ultra-secured connectivity programme

including quantum encryption and space-based earth observation as critical enablers. Optimizing synergies with the EU's space-based connectivity programme is one of the advantages of a closer cooperation.

Cyber Defence: To counter the growing risk of cyber-attacks by state actors, the EU could launch projects to achieve a full-spectrum cyber defence capability. This includes capabilities for cyber situational awareness and information sharing, cyber resilient command and control for military operations, cyber exercises and training, etc.

Military Mobility: The war in Ukraine has demonstrated the importance of effective logistics including maintenance, sustainment and movement of forces, equipment and supplies. The Commission has therefore accelerated the implementation of the military mobility budget. Transport infrastructure also requires increased investments. The consultations with the member states on their dual-use transport infrastructure project pipelines and the oversubscription for co-funding demonstrate the need for a larger budget.

Actions to Close Defence Investment Gaps

The report does not only analyze the deficits but also presents proposals to close the existing defence gaps and to coordinate the joint procurement of defence equipment starting with replenishment as the most urgent step. As a first action, the EU calls for the establishment of a Defence Joint Procurement Task Force to coordinate urgent procurement needs. As a second action, the report suggests a short-term EU instrument to pursue joint procurement to fill the most urgent and critical gaps. Third, the document recommends to move forward towards an EU framework for joint defence procurement. Fourth, the authors suggest establishing more structured joint EU strategic defence programming and procurement. Fifth, a solid action plan is required to reinforce the capacity of Europe's defence industry. Sixth, since the EDF supports the R&D programme for Europe's defence, it should be able to respond to new and emerging needs. And seventh, the European Investment Bank must enhance its support for the European defence industry and joint procurement.

Evaluation: No Duplications Between EU and NATO

The EU and EDA call for an urgent closing of existing defence investment gaps, for developing a more efficient coordination among the different procurement programmes as well as for establishing a joint procurement task force. These are the right measures to solve the indisputable problems in Europe's defence landscape. However, much more needs to be done. The consolidation of the European defence industry must also be pushed forward. This industry is still too much fragmented. One of the main reasons for this fragmentation is the fact that Europe's nations have different national security interests, different defence requirements and Governments often consider national defence as a national matter.

What is urgently needed is not only more money, more coordination and more consolidation but more trust – trust among the 27 EU member states. This must be developed from day to day in an honest mind-set and in a transparent cooperation for the benefit of all.

NATO Secretary General Jens Stoltenberg supports the EU's commitment to invest more in defence and enhance Europe's defence posture, because it will also strengthen NATO. As long as EU intentions complement NATO's plans, Stoltenberg is ready to support that. All political actors must therefore pay attention not to create any duplications. This would be a disaster and backfire on the EU's reputation and credibility.

(tb)

◁ **NATO Secretary General Jens Stoltenberg, here speaking at the recent World Economic Forum (WEF) in Davos, supports the EU's defence initiatives as long as they complement NATO's own plans. (Photo: NATO)**





Heavyweight Performance

The New Generation of Anti-Surface Guided Weapons for Naval Helicopters

The big picture for helicopter-carried anti-ship missiles has clearly changed in recent years. Several new programmes are set to provide a potent surface strike capability and to address new kinds of threats.

Common Need

To maintain today's and tomorrow's anti-ship capabilities, naval forces need to find alternatives to avoid dramatic obsolescence. Replacing huge inventories of legacy systems – such as Exocet or Harpoon – seems high on naval agendas. Some of these are carried by shipboard helicopters, which themselves face new mission scenarios, including land attack and the engagement of fast in-shore attack craft.

Arguably, the biggest challenge is to replace the variety of weapons dating from the 1990s and 2000s that do not cope with present day needs: battlespace dominance (neutralisation of land and sea denial systems) and power projection ashore, directed at time-critical targets such as relocatable assets. For now, many weapon systems used by European, Asian and Latin American naval aviators must be upgraded, or replaced with new multi-role systems. Newer candidates, like the Kongsberg Defence & Aerospace NSM-HL, are set to cope with the extended mission roles of the next generation helicopter. A fifth-generation, high-subsonic anti-ship missile, NSM-HL will count India as its first export success. The stealthy weapon with a range of 100 nautical mile, is intended for use on 24 MH-60R helicopters of the Indian Navy. This variant of the NSM or Naval Strike Missile is Norway's answer to growing naval demand for a longer-range precision strike weapon for airborne launch. The new lethal variant of the NSM family is set to out-range many legacy systems: shipboard helicopters can now deploy the weapon to counter targets at sea and on land. It should increase the parent ship's potential Anti-Surface Warfare (ASuW) capability.

Invest in Better Weapons

Several modernisation efforts among European NATO partners appear to be promising. France and the United Kingdom are procuring a common design for their shipboard rotary-wing assets, named Sea Venom/ANL (*Anti-Navire Léger*). The 20km-range anti-ship weapon has completed the qualification process, ahead of the expected delivery to the Royal

Navy (RN) in 2022, equipping Leonardo AW159 Wildcat helicopters. Undergoing the first test launch in June 2017, the weapon is intended to replace obsolescent Sea Skua rounds in the RN and the AS-17 TT in French Navy service. The helicopter-launched weapon is a fire-and-forget system with a true re-attack capability. MBDA confirmed it has also started the integration process on the Lynx Mk88A, a shipboard helicopter in service in many naval fleets. It is interesting to note that a number of Sea Skua operators – Brazil, Germany, Kuwait, Malaysia, South Korea and



The Royal Navy declared IOC for the Sea Venom anti-ship missile in May 2021. (Photos: MBDA/Royal Navy)

◀ **The first successful firings of the Martlet lightweight multirole missile were undertaken from a Royal Navy Wildcat HMA2 helicopter in May 2020. (Photo: Thales UK)**

Turkey – need to replace their existing inventories with a newer helicopter-launched over-the-horizon anti-ship weapon system. Some of them are operating the Lynx Mk88A from frigate-sized warships.

Another recent development, called Martlet, is for a laser beam-riding version of the Lightweight Multi-role Missile (LMM) based on the airframe of the Starburst MANPAD (man-portable air defence) missile. Martlet is a new air-to-surface lightweight multi-role missile recently introduced into service for the RN's Wildcat helicopter and provides an offensive and defensive capability against small boats and maritime targets that may pose a threat to the navy's Carrier Strike Group (CSG). Initially designed to meet the UK's Future Anti-Surface Guided Weapon (Light) requirement, Martlet was first tested at sea by the RN in June 2019, during which the weapon was mounted on a modified 30mm canon. The first successful firings were made from a Wildcat helicopter in May 2020. This aircraft is able to carry up to 20 Martlet missiles on the Leonardo Weapon Wing, a shelf-like stub wing with ten containerised rounds on each side of the aircraft.

Conclusion

Making use of the new generation of helicopter-launched anti-ship missiles requires a complete change in the way navies view ASuW. This is because new technologies, among them guidance/seeker concepts and low observable or stealth techniques, are about to transform the weapon into a deadly opponent. However, key decisions are to be taken into

consideration over large-scale procurement efforts aimed at improving navies' capabilities chiefly in the fields of anti-shipping and deep-strike needs. The latter received renewed urgency in recent years, which was due to the fact that engaging highly mobile forces and relocatable targets ashore often did not succeed. (stn)



The Indian Navy became the latest service to place an order for 24 MH-60R maritime helicopters in February 2020, with the weapons package expected to include the Naval Strike Missile in its helicopter-launched variant. (Photo: Naval Air Systems Command)

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The P-8A POSEIDON is a long-range, multi-mission maritime patrol aircraft capable of broad-area, maritime and littoral operations. (Image: The Boeing Company)



Germany's P-3C Successor

The role of the Maritime Patrol Aircraft (MPA) has diversified significantly over the past several decades. Recent estimates point at an \$80 billion (€66.33 billion) global spend on MPA assets in the period to 2035. Countries such as Germany need to replace the near-obsolescent P-3C Orion, in order to take advantage of new technologies, which are aimed at coping with completely new mission requirements.

The US State Department made a determination on 12 March approving a possible Foreign Military Sale (FMS) to Germany of five P-8A Poseidon MPA and associated support, as well as related mission equipment, for an estimated cost of approximately €1.65 billion (US\$1.77 billion). The US Defense Security Cooperation Agency (DSCA) delivered the required certification notifying Congress of this potential sale on the same day.

The Boeing P-8A has become the world's most common MPA, with the US Navy (USN) receiving its 98th aircraft in 2019. A modification of the Boeing 737-800 airframe, the P-8A carries out – in addition to traditional search, reconnaissance and surveillance missions, ASW and ASuW operations, and can also fulfil an EW role. A range of sensors on the aircraft contributes to a single fused tactical situation display that can be shared over data links to national and allied forces. The German government has requested five P-8A airframes, in addition to a bundle of subsystems and components, including: nine Multifunctional Distribution System Joint Tactical Radio Systems 5 (MIDS JTRS 5) and twelve LN-251 embedded Global Positioning Systems/Inertial Navigation Systems (GPS/INS). The LN-251 INS/GPS is the smallest, lightest navigation system with proven geo-location and velocity accuracy in its class, according to Northrop Grumman. It is a fully integrated, non-dithered navigation system, with an embedded 12/24 channel, all-in-view, Selective Availability/Anti-Spoofing Module (SAASM), P(Y) code or standard positioning service GPS.

Also included in the potential contract are: commercial engines; Tactical Open Mission Software (TOMS); WESCAM MX-20HD Electro-Optical/Infrared (EO/IR) sensors; AN/AAQ-2(V) I acoustic systems; AN/APY-10 radars; ALQ-240 Electronic Support Measures; next-generation missile warning sensors; AN/PRC-117G manpack radios (including

MPE-S type II with SAASM 3.7); GPS 524D precise positioning systems for APY-10 radars; AN/ALQ-213 electronic countermeasures; AN/ALE-47 countermeasures dispensing systems; AN/UPX identification friend-or-foe (IFF) interrogators; APX-123A(C) IFF digital transponders; CCM-701A cryptographic core modules; KIV-78 IFF Mode 5 cryptographic appliques; KY-100M, KY-58 and KYV-5 for HF-121C radios; and AN/PYQ-10 V3 simple key loaders with KOV-21 cryptographic appliques. In addition to this, the support package will include: aircraft spares; spare engines; support equipment; operational support systems; training and training devices; maintenance trainer/classrooms; publications; software; engineering technical assistance; logistics technical assistance; country liaison officer support; contractor engineering technical service; repair and return; and associated training and support.

According to the DSCA, this proposed sale will support the foreign policy and national security of the United States by improving the security of a NATO ally that is an important force for political and economic stability in Europe. The proposed sale will improve Germany's capability to meet current and future threats by providing critical capabilities to coalition maritime operations. The proposed sale will allow the country to modernize and sustain its Maritime Surveillance Aircraft (MSA) capability for the next 30 years. DSCA's 12 March announcement states that Germany will have no difficulty transitioning its MSA force to the P-8A, nor in absorbing these aircraft into its armed forces. Their introduction into the German Naval Air Arm (*Marineflieger*) could either be as a permanent replacement for the P-3Cs or, perhaps, as an interim solution, until the aircraft now being developed under the Maritime Airborne Warfare System (MAWS) becomes available. The MAWS project, launched late last year by France and Germany, is based on the Airbus A320M3A and is intended as *the* replacement for both Atlantiques and P-3Cs in the respective fleets.

Whichever solution is adopted, the German Ministry of Defence announced in June last year that it was ending the modernisation plan for the P-3C ahead of schedule, citing "*costs and technical difficulties*" as reasons leading to this decision. The aircraft are about to reach their end-of-life in about 2024, leaving a capability gap that needs to be closed by 2025. (stn)

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Inside the European Air Transport Command



◊ **A Centre of Expertise:**
Air-to-Air Refuelling (AAR) is pooling and sharing par excellence at EATC. Pictured here at Eindhoven Air Base (Netherlands) is an A330-200 Multi-Role Tanker Transport (MRTT) of the Royal Netherlands Air Force that achieved full AAR operational capability.
 (Photo: Stefan Nitschke)

The European Air Transport Command fleet comprises more than 170 assets that the seven member nations transferred to the command's authority. These assets are stationed on national bases in the member nations. They represent approximately 20 different types of aircraft and are divided into a tactical, widebody and narrowbody fleet.

The Tactical Fleet...

...comprises Airbus A400M Atlas, Lockheed C130 Hercules and C130J Super Hercules, Casa CN235, Casa C295, C27J SPARTAN and C160 TRANSALL aircraft. In 2020, the fleet conducted nearly 6,500 missions. The pandemic influenced the activity of the fleet. As such, missions were shortened in time or directed to single destinations. This was necessary to avoid, for example, double crews on board and to limit the risk of infections. Moreover, many training events and exercises were cancelled in the first year of the pandemic. While Germany and France are decommissioning their legacy transport aircraft (C160), Belgium and Spain are replacing the C130H. On the other hand, five EATC nations ramp up the A400M fleet: Belgium, France, Germany, Luxembourg and Spain. In 2021, ten additional A400M will be integrated into the fleet and, in the coming years, the tactical operational burden will rely mainly on the 102 A400M foreseen to be operational as of 2025.

Douglas KDC10, Airbus A330-200 and A330 MRTT (Multi Role Tanker Transport Aircraft). In 2020, the fleet executed more than 1,200 missions, including missions by assets not permanently under EATC's authority. Assets such as the German A340 and A350, Spanish A310 or French A330 MRTT may be under EATC's authority for a limited period of time or reduced number of missions. They are then fully integrated into EATC's processes. This offers EATC the possibility to fall back on a larger number of aircraft. The nations are given the opportunity to pool and share more extensively.

COVID-19 also influenced the activity of the widebody fleet. Many exercises were cancelled in the first year of the pandemic, whereas social distancing and mandatory buffer zones between the passengers and crews increased the number of missions, for instance, in the framework of the troop rotation from theatres of operations.

Two French A340s were decommissioned in 2020 and were replaced at the end of the year by A330-200s. Moreover, the German A310 fleet and the KDC10 were to be replaced in the second semester of 2021. On the other hand, the Multinational MRTT Unit (MMU) in Eindhoven will ramp up its fleet. The MMU comprises six nations: four EATC members (Belgium, Germany, Luxembourg and The Netherlands) plus Norway and the Czech Republic. In 2025, the MMU will operate nine aircraft, whereas in the long term, France will operate 15 A330 MRTT.





Complete coverage: EATC's fleet and bases.
(Graphic: EATC)

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Civilian Contracted Assets...

...enrich EATC's fleet for aeromedical evacuation and cargo transport. These assets are not under EATC's authority as such. However, the planning and tasking is done according to EATC's processes and the missions are executed under EATC's authority.

The AAR Focus...

...in 2020 was on the strategic tanker, including the German A310 MRTT, Italian KC767A, the Dutch KDC10 or A330MRTT, or tactical tankers such as the German A400M, French and Italian KC130J, or French C160NG. Spanish and French A400M are also AAR-capable. In 2020, EATC commanded 27 AAR assets. This number will increase further in the coming years when for instance the A400M and A330 reach full AAR operability.

Statistics

- ...from the day EATC was established in 2010 until the end 2020, the command has achieved the following milestones:
- nearly 500,000 flying hours achieved
 - over 80,000 missions flown
 - more than 11,000 patients managed
 - over 2 million passengers transported
 - nearly 950,000 paratroopers dropped
 - almost 3,500 AAR missions flown
 - nearly 200,000 tonnes of cargo transported

The Narrowbody Fleet...

...is the smallest of EATC's fleets, performing nearly 550 missions in 2020. It includes the Dutch Gulfstream, as well as the Belgian Airbus A321 and Dassault Falcon 7x, replacing the decommissioned Embraer ERJ135/145s. Moreover, the German (Bombardier BD700) and Spanish (Dassault Falcon 900) corporate assets are temporarily under EATC's authority. The narrowbody fleet remains a rare resource for the transportation of VIPs and small groups of passengers. The pandemic reduced the demand to transport VIPs or passengers as meetings, trainings or conferences were cancelled. This left more possibilities to deploy the assets for logistical missions.

The Future...

...looks ahead at a new-generation fleet centred on the A400M or the C130J, together with a solid pillar resting on the B767 and the A330 MRTT. These four platforms will constitute a robust backbone of the fleet for military air transport, air-to-air refuelling and aeromedical evacuation.

These state-of-the-art aircraft will enhance the capabilities of EATC, both from a quantitative and a qualitative point of view. New-generation assets will be operated under the framework of the European Military Airworthiness Requirements (EMAR), meaning that EATC member nations are to implement the EMAR into a national regulatory framework. As a consequence, it facilitates airworthiness recognition amongst member nations and paves the way for more interoperability.

The capacity of transport will rise considerably in terms of passengers, payload and volume. The A400M significantly improves the capability to deliver, faster and further, medium-weight forces, larger equipment and robust cargo. This is because of its strategic skills and tactical ability to operate from virtually any unpaved landing zone. Cargo or forces are delivered closer to the location of employment or need. At the same time, there will be a significant increase in the AAR capacity and the current capacity will be tripled with the ramp up of the A330 MRTT, as well as the use of central units or wing kits on both the A400M and the KC130J.

The A330 MRTT also provides a new real multi-mission capability. Whereas multi-role aircraft can be quickly configured to perform a specific role, a multi-mission asset can carry out more than one role in a single mission. For instance, a A330 MRTT transports German passengers and Dutch cargo from Cologne to Mali. Over the Mediterranean Sea, the aircraft air-to-air refuels French fighters and on the way back, the A330 MRTT boards two Italian heavy injured patients and transports them to Rome.

Source: European Air Transport Command



Luxembourg and Belgian A400M transport aircraft at their binational unit in Melsbroek (Belgium).
(Photo: Belgian Air Component/Kristof Moens)

Seeing the Invisible

Today, every military presence emits a distinctive signature that can be picked by visual sensors, radar, and electronic surveillance. It is crucial to have the necessary technology to pick up the various threats around, in order to see the invisible and stay one step ahead.

The collection activity, known as SIGINT (Signals Intelligence), monitors radio-frequency (RF) signals emitted by systems. Electronic Intelligence (ELINT) monitors emissions related to radars and weapon systems, assessing their mode of activity by analysing signal parameters. COMINT (Communications Intelligence) regards intelligence gathered by radios, data-links, satellite and cellular interception. COMINT geolocates in symmetric and asymmetric conflicts, and even before a conflict can predict each node, relate activities to known actors, identify players and combat formations, and enable analysts to prioritize targets and tracks obtained by other means.

Israel Aerospace Industries (IAI) is the pioneer of Unmanned Aerial Systems (UAS), which provide the solution to seeing the invisible. IAI's Heron UAS family, represented by the strategic Heron TP, medium-altitude long-endurance (MALE) Heron 1, Heron Mk II and Tactical T-Heron, enable users to employ multi-sensor payloads to support evolving user needs, from the tactical to the strategic levels. Providing commonality across the family, users can operate mission integrating Electro-Optical/Infrared (EO/IR) cameras, radars and SIGINT payloads enabling exciting new operational capabilities. With this multi-sensor surveillance, each UAS of the HERON family uncovers strategic intentions, hidden threats and short-lived targets often missed by conventional means of collection.

A Game of Cat and Mouse

As threats become sophisticated, so do the sensors that chase the ever-evolving threats, embracing digital technology, radars and radios use fast frequency hopping, low power and efficient antennae to maintain Low Probability of Intercept (LPI). Burst digital transmissions of short packets also help evade detection. On the other side, ultra-fast wideband digital receivers can 'hold' even the shortest and weakest signal with these capabilities, modern SIGINT to scan, detect and track signals of agile emitters such as digital LPI radars and encrypted and frequency hopping software-defined radios, as well as cellular and satellite communications.

As SIGINT becomes more compact, it can be deployed on airborne platforms such as UAS. Enhanced by powerful data processing capabilities, IAI's modern SIGINT systems produce actionable intelligence in real-time, employing Artificial Intelligence/Machine Learning (AI/ML) to process, filter, and extract the most valuable and meaningful information for the user. To deal with LPI, SIGINT must be able to cover the entire relevant spectrum, and implement robust, advanced processing algorithms to focus on the most important signals.

These capabilities can be deployed on various UAS, with EO/IR and radars, on long-endurance missions, performing multi-spectral sensing and multi-modal sensor processing, integrating radar, SIGINT and EO/IR into a combined picture. Augmented with onboard processing and wideband data-link relaying sensor data to a processing centre, UAS operate at the lower altitude, giving users detailed imaging of targets. The SIGINT layer provides the broadest view of the mission environment, pointing EO/IR and radar to investigate targets, confirm identity – and verify targets.

Tactical SIGINT Operations

Deploying multiple sensors on small UAS, like the Tactical T-HERON, adds new dimensions to tactical operations. These operations may also use COMINT systems to analyse communications activity at the target vicinity. Small tactical UAS carrying such systems can operate as an organic element of ground forces.

UAS equipped with the common combination of EO/IR and radar cover a narrow footprint, but with SIGINT onboard, UAS broaden instantaneous coverage over hundreds of kilometres per second. Monitoring battlespace across the RF spectrum, they pick every change that may indicate the appearance of a new threat, even in areas that may seem empty for visual or radar scanning. Geolocating a signal, other sensors onboard UAS probe the area for evidence, which can detect camouflaged vehicles, people on foot or in moving vehicles, houses, or shaded movement hiding in underground facilities.

Target acquisition-based COMINT relies on analysis of the signal characteristic specific users/ device like radars or datalinks, emitting unique signals related to specific operational phases and states. In today's changing environment, it is crucial to have the necessary tools and solutions to stay a step ahead.

Source: Israel Aerospace Industries



*IAI's advanced multi-role HERON TP UAS is taking off for new missions.
(Photo: IAI)*



*The Multi-Function Rail Launcher is part of the Armament Carriage and Installation System of the Eurofighter.
(Photo: Jürgen Dannenberg, Alpensektor)*

ACMA: We Carry your Mission

More than 100,000 employees in four nations, at three leading aerospace and defence giants (Airbus, BAE Systems and Leonardo) as well as over 400 small and medium-sized companies (SMEs) are working hand in hand to develop, manufacture and deliver the Eurofighter Typhoon. International cooperation is a key feature and part of the successful DNA of one of the largest defence programmes 'Made in Europe.'

Among the 400 suppliers is a very small company called ACMA GmbH, a Joint Venture (JV) between Airbus Defence and Space in Germany and AEREA in Italy. The German-Italian JV (50:50) is small but beautiful. Why? The company has a workforce of 15 qualified employees only and a turnover of approximately €30 million. Although small in size, the Ottobrunn-based company has been a long-standing and qualified Eurofighter supplier since 1989.

ACMA considers itself as a management company which coordinates and steers the development, manufacture and delivery of the advanced role equipment for the Eurofighter Typhoon. ACMA's portfolio consists mainly of two major products: The Multi-Function Rail Launcher (MFRL) and the Tank Ejecting Unit (TEU).

Antonino Basone, the Italian Managing Director at ACMA, who looks back to more than 30 years of aerospace experience in Italy, the United



*The Tank Ejecting Unit is a sub-assembly of the Supersonic Fuel Tank.
(Photo: Ion Rother, Alpensektor)*

States and Germany, is proud of co-chairing the JV. "We are one of the most competent addresses to produce the role equipment for this excellent European combat aircraft. The performance of our company here in Ottobrunn is supported by the industrial capabilities and technological know-how of our two shareholders in Italy and Germany and our reliable partners."

Thomas Linkenbach, the German Managing Director at ACMA, who gained management experience at EADS, Cassidian, Eurofighter and in many defence programmes such as NATO AGS, etc. also enjoys working for the company. "We are indeed small but beautiful! In the day-to-day business this means that whenever we are faced with an unforeseen issue, we sit together with our team quickly, analyze the problem and in most cases, we find a rapid and efficient solution. I am impressed to see how our German-Italian JV is performing in the Eurofighter supply chain and at the end of the day, it is for the benefit of our customers."

The company's premises in Ottobrunn are located in close proximity to Airbus and the Ariane Group, showing how much ACMA is committed to manage fully integrated, highly complex and easily exchangeable sub-systems on costs, on quality and in time.

And what are the company's major goals? Basone and Linkenbach have a clear answer for this question. "With our two components, the MFRL and TEU, we make substantial contributions to ensure that the overall performance of the Eurofighter weapon system is second to none. In other words: We enable our customer to carry his mission! We facilitate faster and better weapon deployment and thus we improve Eurofighter's overall system capabilities."

Multi-Function Rail Launcher (MFRL)

The Multi-Function Rail Launcher (MFRL) is part of the Armament Carriage and Installation System (ACIS) of the Eurofighter. The MFRL is designed to carry and launch the missiles throughout all flight altitudes and environmental conditions. Modern air-to-air missiles such as the AIM9-L, ASRAAM, AMRAAM and IRIS-T can be released from the launcher. Today, the MFRL is a widely introduced rail system worldwide, which can support all current NATO air-to-air missiles.

Tank Ejecting Unit (TEU)

The Tank Ejecting Unit (TEU) is a sub-assembly of the Supersonic Fuel Tank (SFT). It is hard mounted into the pylon structure of the tank. The function of the TEU is to carry a fuel tank with a capacity of 1,000 litres. A pyrotechnical jettison system is integrated into the TEU to allow safe ejection of the tank. The advantage in comparison to the pylon and bomb rack-based tank jettison system which is normally used is that the aircraft is left clean after tank jettison.

If you are interested to know more about this Eurofighter supplier, come and see the German-Italian company at Booth 540 in Hall 3. (tb)

NEOS allows the connection of legacy platforms so that a Next Generation Weapon System (NGWS) can be introduced into a connected environment and the system-of-systems approach of FCAS can be realised across technology generations. (Graphic: ESG)



Connecting Platforms for Capability Boost

ESG Elektroniksystem- und Logistic-GmbH and Israel Aerospace Industries (IAI) inked an industrial partnership last year to enhance the technology of the Israeli OPAL network for the Bundeswehr. It is intended that Network Enabled Operations Support (NEOS) can pave the way to connect legacy platforms, so that a Next Generation Weapon System (NGWS), which is the main element of the forthcoming Future Combat Air System (FCAS), can be introduced into an already connected environment and that the system-of-systems approach of FCAS can be realised across technology generations. This is one of the key topics which ESG is presenting at ILA 2022.

During the Berlin Air Show, ESG wants to underline that, with the use of NEOS, each weapon system can benefit from the capabilities of other systems. Asking ESG about the main advantages for the customers, the company provides five convincing buzzwords: ad-hoc networking; real-time communications; masterless; self-healing; and open architecture.

In Israel, the OPAL network has been in use for many years in a wide range of combat fighters, AEW aircraft, tankers, trainers and UAVs, as well as in corvettes and C² centres. Now, other future platforms can also benefit from 5th-generation sensors – and they are combat proven.

NEOS is capable of decoupling the hardware from the capabilities of a weapon system.

This means that mission-specific applications provide real-time information superiority. Shorter innovation cycles (months instead of years) and substantially reduced upgrade costs are further advantages. In addition, NEOS enable information sharing for all participants in the network and will compensate in the event of low platform availability.

For the German customer, it is of paramount importance that NEOS is a Military Off-The-Shelf (MOTS) solution, one already available on the market. By comparison with completely new developments, MOTS solutions avoid unforeseen costs, unknown risks and long engineering timelines.

Advantages of NEOS for the German Navy

The intelligent and secure networking of the Bundeswehr's existing weapon systems offers the greatest increase in cross-system capabilities beyond new developments and procurements. The German Navy, for

instance, can achieve a significant increase in capability by networking its sea-going units, including their manned and unmanned air vehicles as well as the current and future maritime airborne warfare systems. Through real-time networking, weapon systems can benefit from the capabilities of other platforms, which in turn allows for new and more effective operational scenarios.

NEOS can network platforms of different technology generations and domains with each other, based on existing, field-tested open architecture technology. The smart ad-hoc network is developed for existing systems and allows all participants in the network - driving or flying - to benefit from superior situational awareness in the operational area.

The integration of future systems can also be realised with little effort. Multi-static deployment procedures and the reduction of the risk of blue-on-blue targeting are only made possible by the real-time networking of NEOS. The combat value of each individual operational platform can thus be significantly increased, which also helps to compensate for the limited availability of weapon systems.

Industrial Partnership between ESG and IAI

Last summer, when ESG and IAI launched their technology partnership, the former's CEO, **Christoph Otten**, highlighted the strategic significance of the cooperation with IAI on NEOS: "For us, as the national technology and innovation partner of the Bundeswehr, it is part of our philosophy to develop and to provide solutions and products that meet the needs and expectations of those who protect us every day in any domain. We must enable them to fulfil their challenging task with robust, reliable and high-performing technology."

Yosef Melamed, IAI's Executive VP and General Manager of the Aviation Group, added: "IAI's OPAL system is an open architecture platform and a significant force multiplier for the challenges on the modern battlefield. The cooperation with ESG will take this unique solution to a higher level of performance and flexibility that will benefit the customer and both companies."

Since NEOS can be considered as a real game-changer, ESG and IAI want to further develop diverse opportunities of comprehensively networked operations for the Bundeswehr. If you are interested to learn more about NEOS, come and see ESG in Hall 4 (Booth 321) or in the Military Support Center (MSC). (tb)

Patria Presents new C-UAS



◀ *The 55mm inert round on display. (André Forkert)*

Patria has developed a new type of Counter-small Unmanned Aerial System (C-sUAS). It is based on a completely new type of effector, which provides with effective short-range protection against Class1 drones and loitering ammunition. This is an effector capsule that can be used against fixed-wing UAVs or quadcopter drones. The smallest version can be fired from the hand and is disposable. The effector initially

works like a rocket, spreading a kind of arresting cloud or mist of material strips at the highest point of flight. These create a sort of curtain, into which the drone then flies. The strips wrap around the engine or are sucked into it, destroying it. The drone crashes. In the case of dense swarms of drones, this method can also be used against several aircraft simultaneously. The 'curtain' is made of highly stable threads – though Patria declined to give any details about the material – is light and also falls to the ground after a while, with no risk of injury or collateral damage to those nearby. The current, 55mm, version is optimised to work at distances of about 100m from the launcher.

According to Patria, this solution can be provided in different versions and calibres. The version shown uses a 55mm case and can be fired from the hand. But 76mm effectors are also conceivable, which can then be fired from vehicle-mounted grenade launchers, ships or even from fixed installations, such as forward operating bases. Depending on the calibre, the size of the cloud can also be adjusted, and the same goes for the effector range. Patria's C-sUAS solution can also be integrated into systems with automated launchers, using target tracking capabilities.

This C-AUS has been under development since 2017 and was shown to the public for the first time, after many tests, at Eurosatory in Paris last week. It is intended to be a cost-effective C-AUS solution that has a kinetic effect. (apf)

ACS and MBDA Show Protected Multifunction Platform

ACS Armoured Car Systems GmbH from Derching, Bavaria is showcasing its ENOK 14.8 protected vehicle at ILA. The new and large ENOK rounds off the top of the family, which includes the ENOKs Airborne (AB; 4.8), 5.4, 6.2, 9.5 and now 14.8. The Airborne (AB) is the ultra-light version for special forces and airborne troops. The 14.8 has a STANAG Level 2 protected cabin; Level 3 would be possible if desired, ACS said.

As a mobility platform, the ENOKs provide the foundation for multifunctional mission capabilities. In March, the ENOK AB was shown for the first time with a dual launcher on the roof that can, for example, carry two MBDA Enforcers or two Rafael/EuroSpike SPIKE anti-tank missiles. At ILA, MBDA will show the ENOK 14.8 as an extra-large effector launcher. A launcher with 18 guided missiles will be mounted on the roof. This is MBDA Germany's new Sky Warden NNbS weapon system for defence against drones at close range. The system has decisive features for protecting soldiers: Sky Warden NNbS relies on various effector solutions. A high-energy laser effector, the SADM (Small Anti Drone Missile) and

Mistral guided missiles are all used, characterised by precision and fire-power to ensure that soldiers are protected from aerial threats.

The laser system is for short-range protection, which uses technologies, components and knowledge of the laser system for the German Navy, and which will also be available to land and air forces applications in the future. The SADM guided missile is intended to combat small drones and uses the technology base of the Enforcer guided missile currently being introduced by the German Special Forces (Kommando Spezialkräfte). As a third close-range effector solution, MBDA relies on the fully qualified and market-available Mistral guided missile. Due to its range (Mistral 3 up to 7km), high agility and fast target engagement, the missile is particularly recommended for highly mobile operations, not only against larger drones, but also against a wide range of airborne threats.

The turret comes from Slovenian manufacturer Valhalla, which most recently also designed and built the turrets for the German LuWa (Luftbeweglicher Waffenträger; airmobile weapon carrier) and the Rheinmetall Skyranger mobile ground-based air defense (GBAD) system.

Another key advantage is that the effectors can be deployed on the move with highly mobile tactical platforms – such as the ENOK.

Guido Brendler, Head of Sales and Business Development for MBDA Germany, stated *"The Ukraine war shows how important local- and short-range protection is for Germany and what threats we have to reckon with. Protection against threats from the air is a decisive factor in mission success and the protection of soldiers in the field. With Sky Warden NNbS, we offer the Bundeswehr an effective weapon system for defence against unmanned aerial systems."*

ENOK 14.8 as a protected mobility platform

The ENOK 14.8 has dimensions of (LxWxH) 6,000x2,340x2,500mm, with a wheelbase of 3,850mm and ground clearance of 501mm. The number 14.8 stands for the maximum permissible gross weight of 14,800kg. The vehicle is built on the Mercedes-Benz FGA 14.8 special chassis, which is also used for the Dingo and Unimog – both proven combat vehicles in use worldwide. The 260kW engine can accelerate the vehicle up to 110 km/h and the payload for a double-cab for a crew of up to 4+2 soldiers is 6,000kg. Other possible variants are the Single-Cab with flatbed (2+1 soldiers) or Triple Cab crew vehicle (up to 10 troops).

The protection concept of STANAG Level 2 is derived from the proven and established ENOK 5.4 and ENOK 6.2 vehicles. It is an armoured steel monocoque cell with splinter protection. Thanks to the use of the Mercedes-Benz chassis, a proven and worldwide service network can be accessed. The body has also been approved and qualified by Mercedes-Benz. (apf)



The ENOK shown at ILA will demonstrate how large a punch so small a vehicle can pack! (Photo: ACS)

Counter-Drone Solutions Mature

The R&S ARDRONIS counter-drone solution and the new R&S ADD557SR direction finding and monitoring antenna from Rohde & Schwarz can detect commercial drone activity across the complete frequency range.

Inexpensive and easy to operate, over the past ten to 15 years commercially available drones have flooded global markets. A mature technology, asymmetrical battlefield and terrorist uses for these platforms are emerging as active airborne improvised explosive devices. Conventional

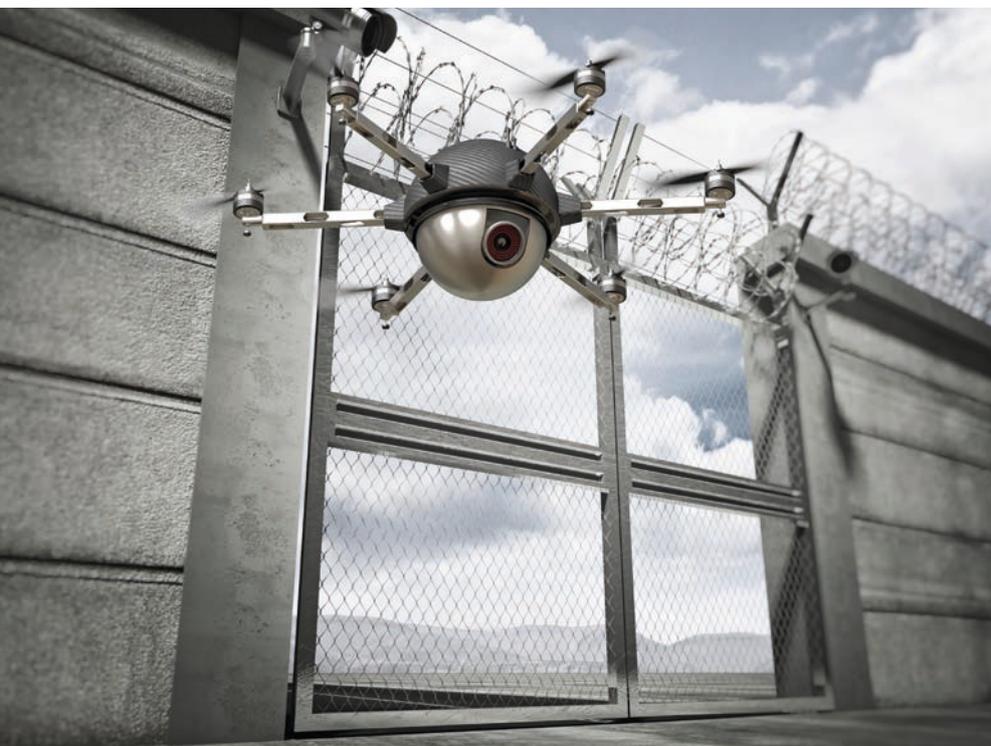
military formations are adopting commercially available drones for a number of uses, particularly for on-demand, immediate real-time battlefield intelligence. Drone use by terror groups and criminals is now only in early stages, however.

Rapid commercial drone development is inspiring a number of firms to develop and market concepts and products to detect and stop drone flights. Most apply passive or active (hard and soft kill) means depending on system used. Classified as a 'Low-Slow-Small' target set, detection and discrimination of smallish air vehicles remain problematic for current military radar systems, leading to a new market niche for purpose-designed solutions.

To combat the scourge, Rohde & Schwarz has developed the R&S ARDRONIS counter-drone solution – an operationally proven and successful system, which can cover the frequency range from 20MHz to 6GHz with a single antenna – the new high-performance R&S ADD557SR direction finding and monitoring antenna. The system is operated by various customers around the world. It displays a comprehensive list of all active remote control signals detected in the above-mentioned frequency range. Thanks to the R&S ADD557SR, its range covers all frequency bands for commercial, off-the-shelf drones and/or do-it-yourself drone data links.

The antenna helps focus on signals in the spectrum, has a longer range and more coverage. Although RC drones systematically change their radio frequency (frequency hopping to avoid interception), R&S ARDRONIS can separate a selected RC drone signal from others with a reliable profile-based auto-separation algorithm that detects and locates the signal.

R&S ADD557SR incorporates the latest technologies, making it a high-end, versatile device in stationary and mobile applications. The separate receiving antenna can be used with dedicated receivers. Important features include higher sensitivity (especially in 5.8GHz), easy deployment, a more compact design, an optional integrated lightning rod and an integrated compass with optional GPS. The antenna makes deployments for R&S ARDRONIS operators quicker and easier while also increasing operational coverage. (stn)



Above:

Counter-drone technologies are a matter of interest for homeland security, police and even private security.

Pictured is the R&S ARDRONIS counter-drone solution with the new R&S ADD557SR direction finding and monitoring antenna.

(Photo: Rohde & Schwarz)

◀ **Easy-to-control and readily available drones are becoming the tool of choice for those wishing to do harm.**

**(Photo: InPublicSafety.com/
American Military University)**

Ground Support Vehicle for Helicopters and SOF



As early as 2019, Airbus Helicopters, together with Rainer Diederich GmbH/DES (Diederich Engineering Systems), developed a ground support vehicle (GSV) to facilitate and accelerate the deployment of helicopters such as the Airbus H145M SOF LUH in forward mission areas.

The GSV can play an essential role in the work on the helicopter. It uses the air-transportable Polaris Defence MRZR D-4 as a mobility platform and can be equipped with either a hydraulic forklift or a small cargo crane at the front of the vehicle. It is also equipped with a 28V ground power unit and, thanks to its towing device and coupling systems, it can 'hook' machines on the airfield. The GSV is modularly expandable and can perform refuelling tasks, (combat) loading, maintenance and repair tasks without additional infrastructure. Diederich and Airbus Helicopters have developed special scaffolding sets for the MRZR, which can be attached to and removed from the vehicle in just a few steps by means of a quick-release coupling. This way the GSV can flexibly perform its various tasks and save time and personnel.

In the MRZR loading bay, the GSV is equipped with a hydraulically operated 230VAC power generator, which can be extended by a 28VDC element, thus serving as a ground power unit. Additional modules for refuelling or maintenance of a light support helicopter can be operated additionally. Thanks to the trailer hitch, the helicopter with towing equipment can be „hooked up“ on the airfield for towing. Furthermore, either a forklift or a cargo crane can be attached to the front of the vehicle. The flange crane can not only mount rotor blades thanks to a lifting capacity of 300 kg, main gearboxes or engines of light support helicopters for replacement. In addition, mission equipment such as a recovery winch or fast-rope frame can be mounted overhead on the side of the helicopter more easily and safer. The forklift attachment allows weapon systems (e.g. Dillion Aero M134 (MG6), 70 mm rocket pods, etc.) to be positioned and mounted or ammunition boxes can be lifted on board. The GSV can also easily move heavy and bulky equipment and material off-road in the mission area and to the helicopter. To this end, the MRZR D-4 must be equipped with mounts for attachments, lines and quick couplers, control valves, and a ProManPTO hydraulic pump with tank, filter and cooler.

The GSV in combination with the A400M transport aircraft and the internationally widely used H145M helicopter, forms a symbiotic, logistical footprint, for the deployment of special forces in remote locations, DES points out. In the context of loading and unloading, the GSV can be used as a logistical 'Schweizer Messer' thanks to its range of tools, as well as in the course of mission preparation. After unloading the modules, the GSV is available again as a special forces vehicle.

This way the GSV helps to equip the forces even more flexibly and keep the contingents small, even in remote locations and without large contingents or infrastructure. (apf)

Mission Possible: First Successful UAV Flight in German Military Airspace

PLATH GmbH & Co KG and Czech company Primoco UAV have just demonstrated the first successful beyond-visual-line-of-sight (BVLOS) flight of a UAS while regular air traffic was operating in Bundeswehr military airspace at Manching.

The flight was made possible under an all-European LUC [light UAS operator certificate] by a Primoco 'One 150' UAS, a versatile fixed-wing platform perfectly suited to a wide range of tasks and featuring a take-off weight of 150kg, a 30kg payload capacity and non-stop operational endurance of some 15 hours. Multi-sensor technologies from PLATH, and an airborne radio and transponder, allowed for safe, simple air traffic management and enabled collection of all the necessary data for future mission success.

The Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) in Koblenz tasked WTD 61 Geschäftsfeld 470 (one of the Bundeswehr's several testing centres) in Manching with the conduct of flight demonstrations to assess the Primoco One 150's capabilities. The unit's location – Ingolstadt-Manching airport – made an LUC available for the flight, which was the first occasion on with the One 150 flew in German airspace under a LUC. Using the LUC, there was no need for further approval to be sought from the LBA (Luftfahrt Bundesamt – Germany's national civil aviation authority) and frequencies for the flight were allocated by the BNA (Bundesnetzagentur – federal network agency).

Three successful flights were conducted by the end of April. After ensuring seamless communication and procedures in a test conducted in visual-line-of-sight (VLOS), the airspace was opened to all other aircraft. A subsequent BVLOS flight and then a BVLOS endurance flight were then conducted, with a focus on flight parameters and navigational accuracy, among other aspects. PLATH's onboard multisensory technologies and multi-platform connectivity helped the system pass all the Bundeswehr's required testing with flying colours.

For safety reasons, the UAS was equipped with a ballistic recovery parachute to minimize the impact of any potential forced emergency landing. The Primoco flight crew holds both civil and military drone pilots licenses and the series of flights proved the UAS can be easily integrated into the structure of modern armed forces, conducting its missions safely and effectively, in compliance with the very latest aviation regulations.

Heiko Fimpel, Director of Presales at PLATH, commented on the "great partnership with Primoco, enabling us with their competence and engagement to bring our high-tech sensor systems over the area of interest and make this success possible". He also thanked the Bundeswehr for "the competent, friendly and fruitful cooperation leading to this milestone in military aviation in Germany. As the UAV can be easily adapted to different types of sensor operation and integrated into the modern army structure, this new vehicle category will have a great future ahead."

"I also would like to thank the whole Bundeswehr team and base command, who provided exceptional support for making this evaluation possible," added Primoco CEO, **Ladislav Semetkovský**. "Although the operation took place under a [LUC], the plane is designed for full compliance with military STANAG 4703 standards as well. The LUC was selected because it allowed us to perform the activities freely within the frame of our approval, and with no delays or additional approvals needed". (stn)



The flight test team and aircraft at Manching.
(Photo:PLATH)

Luftwaffe C-130J Super Hercules in Germany for First Time

On Monday, 20 June, the German Air Force's first C-130J Super Hercules landed on German soil, in Berlin, for the first time. The occasion is the ILA 2022 air show, which officially opens on 22 June.

Currently, the Luftwaffe's newest tactical transport aircraft is still in the test phase and is not yet operational. This aircraft, as well as the five German C-130J/KC-130Js still to follow, will all be stationed with the French-German Rhein Squadron in Evreux, France. An additional four aircraft from France will then constitute the squadron. The second German aircraft is expected to arrive in August. The C-130J that now in

Berlin was handed over to the Luftwaffe in February. According to the service, the transfer flight was the first since the handover.

The aircraft are flown by entirely German or mixed German-French crews. The operational missions are controlled and managed by European Air Transport Command (EATC) in Eindhoven, Netherlands. Thus, all seven participating nations can benefit from this new squadron, thanks to pooling and sharing arrangements.

The aircraft can be seen in the Bundeswehr's outdoor static display: the Bundeswehr is the largest exhibitor at ILA 2022. (apf)



Germany's first C-130J. (Photos: André Forkert)

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