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Dear visitors, ladies and gentlemen,

in 2025, the world is still facing major security challenges. The current Middle East conflict shows us once again how important a stable security architecture is for protecting our citizens. Such conflicts, with all their potential for tension, are not only purely foreign policy problems and issues, but also affect our community and the security in our country in a direct way. It is therefore extremely important that our security forces are prepared for a wide range of threats and are equipped in the best possible way.

I therefore welcome the fact that the renowned "Enforce Tac" trade show is once again providing an ideal platform for presenting the latest security and defense technologies, exchanging information on current developments, and developing innovative solutions for the challenges of internal and external security.

The fact, that more than 700 exhibitors are showing what is currently possible in terms of security technology, has contributed to the great success of this trade show in

recent years. With its targeted focus on authorities and organizations with security responsibilities, the trade show has been providing important impetus for the technical equipment and tactical development of our security forces for years.

Our Bavarian police also benefits from this. Because only with the best possible equipment our police officers can do a great job and ensure the safety of our citizens every single day. To this end, we are continuously investing in modern training facilities and optimal equipment. Enforce Tac is an indispensable part of this process. Due to this I am once again pleased to take on the patronage of Enforce Tac this year.

I wish you a successful event in Nuremberg, as well as profitable discussions and innovative impulses.

Joachim Herrmann,
*Minister of the Interior
of the state of Bavaria*



Dear readers,

This is the second special edition of the CPM FORUM ENFORCE TAC. Last year we published a special edition for the first time. As we received consistently positive feedback, we are proud to be the editorial partner of ENFORCE TAC again this year - it is an honour for us. In keeping with the spirit of Germany's largest media company, in the triad of Defence. Security. Military Medicine. we unite the major topics in one magazine. This is also with a view to this year's Enforcetac, which continues its breathtaking development. Because not only the police forces and their special commandos, but also the special military units and specialised forces of the world's armies will be offered an extraordinary place-to-be. In the spirit of the CPM media house, medicine also plays an important role in operations - both psychologically and physically! Here too, the ENFORCE TAC stands will be offering top solutions.

The men and women at CPM are convinced that we need strong emergency services for a safe world. That is why we would like to express our thanks and appreciation to all those active on the ground.

THANK YOU FOR YOUR SERVICE! You will find a broad portfolio of topics in this magazine. We write about police equipment, which needs to be robust enough for increasingly complex operations. Tactical principles and equipment for police and military special forces are also included. Nowadays, we also need to talk about critical infrastructures. In this context, the focus is on spying on them on NATO territory, especially using drones.

Just like the ENFORCE TAC, our aim with this special edition is to highlight the broad and demanding range of police and military forces. In my opinion, we have succeeded quite well. However, if you have any suggestions for improvement, please feel free to contact us via the various contact options. For now, I hope you enjoy reading and browsing.

Yours

Tobias Ehlke

*Owner and Managing Director
CPM GmbH*



Dear visitors, exhibitors, comrades and friends,

As the anticipation mounts and excitement fills the air, I am delighted to extend a heartfelt welcome to Enforce Tac 2024. It is an honor to have you join us as we embark on this journey towards advancing security and cooperation within the realms of law enforcement and defence.

I am filled with immense anticipation for the Enforce Tac 2024 that lies ahead. Alongside my dedicated team, we have spared no effort in curating an experience that surpasses expectations, offering you an unparalleled opportunity to explore, connect, and engage.

With your visit, you have already made Enforce Tac history together with us: for the first time, our exhibition will take place over three days - and, how could it be otherwise, in three halls for the first time. With more space and more time, I invite you to immerse yourself in the wealth of premieres, highlights, and innovations that await. From the inaugural Scandinavian-German Defence Symposium to the diverse array of exhibitors spanning our expanded space, there is no shortage of inspiration to be found.

With Norway and Germany maintaining one of the largest partnerships for defence and economic projects in Europe, and the recent inclusion of Sweden and Finland in NATO, the symposium's thematic focus gains added relevance. The collaboration between these nations is integral to strengthening the NATO alliance and addressing common security challenges. Over the next three days, our program of events promises to ignite meaningful dialogue, foster collaboration, and provide invaluable insights into the ever-evolving landscape of law enforcement and defence. Whether you are participating in insightful discussions on international procurement processes or engaging meet-and-greets and our major premiere Enforce Tac Village, each moment offers a chance to deepen your understanding and forge lasting connections.

The special premiere at Enforce Tac 2024 is the Enforce Tac Village, a realistic outdoor training ground where exhibitor products are presented in various law with three strong partners in line with the motto "dynamic.tangible. live". The project team is made up of former and current members of military special forces and police tactical units.

Their wealth of experience in special and customized training and expertise in scenario building guarantee a great experience. PRORETA Tactical GmbH is responsible for the infrastructure, while OF Operative Fähigkeiten GmbH and the Airborne Medical Group will oversee the planning and execution of the tactical scenarios. Visitors to Enforce Tac 2024 can look forward to the various scenarios four times a day. The on-site experience will also be live-streamed, allowing the action to be followed inside the exhibitions halls as well.

As we cast our gaze towards the future, our vision for Enforce Tac is one of growth, relevance, and quality. Building upon the foundation laid last year, where we underscored the inseparable nature of internal and external security, we are committed to elevating every aspect of our event. From increasing the caliber of our visitors to expanding platforms for qualitative exchange, our aim is to drive this meaningful progress.

As we embark on this journey together, I encourage you to seize every opportunity to engage, collaborate, and inspire. Your presence here today is a testament to your dedication to our shared mission, and I am truly grateful for your participation.

Thank you for being a part of Enforce Tac 2024.
Warm regards,

Isabelle Teufert
Director Enforce Tac





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Our special thanks go to our partners for their cooperation on this special edition:

NÜRNBERG MESSE





Author: Rainer Wendt,
Chairman of the German Police Trade Union (DPoIG)

“ The police of the future need the best equipment, clever strategies and the latest technologies to be at the forefront of developments ”

Violence has become an everyday occurrence

Police work is hard work, who would dispute that. For some police officers, for example in a mobile squad with a wide range of tasks, even putting on the special equipment is not for weaklings. The “body armor”, for example, which is essential in situations involving the potential for violence, weighs 10.6 kg, with an additional 3.3 kg for the modular belt and 2.2 kg for the protective helmet. The protective vest, at 5.3 kg, turns even everyday duty into a sports and fitness program. The protection of our response forces is given high priority in the

Violence has become an everyday occurrence

That has changed. When it comes to the smallest operations, harmless noise disturbances, accident scenes or simply cordoning off the scene of an accident, some fellow citizens feel the need to challenge the state, if necessary with force. The natural authority of state officials that used to exist in the past is melting like ice in the sun, and the process seems unstoppable, fueled by groups interest. As is well known, it is not only the police who suffers from this. The annual “Federal Situation Report on Violence against Police Officers” compiled by the BKA describes 46,218 violent crimes against individual officers, an increase of 8 percent in 2023 compared to 2022. In total, 105,708 officers were victims of violent attacks, an increase of 9.9 percent. Some “police scientists” primarily blame the police themselves, but this is only a valid argument from the comfort zone of universities and professors’ rooms. The operational forces experience direct confrontation with violent criminals. An experience that some “researchers” only know from books. The situation will not improve in the short

procurement of uniforms and equipment, which is unfortunately sorely needed. Of course, being a police officer has always been a dangerous job, but the violence has changed, it has become more commonplace. Even if there were attacks on closed units or police cars in previous decades, the predictions were more precise and the danger more noticeable. “Violence out of nowhere” was the exception; the most brutal attacks with weapons were reserved for a few serious criminals or the terrorists of the “RAF”.

term; rather, the opposite is to be expected. Social tensions will increase as the gap between interests widens and the accompanying battles for budgetary resources intensify. Political discourse will become more aggressive and dogmatic, and the struggle for dominance in the public sphere will continue unabated. Terror and anti-Semitism have already led to terrible riots in our neighboring countries; there is no reason to believe that these developments will end at Germany’s borders. On the contrary.

The police will therefore have to prepare themselves for even more violence and aggressive confrontations in public spaces. Depending on the result of the ballot box, the upcoming elections in Germany could be the starting signal for a dramatic increase in attacks on state officials, especially the police, in left-wing milieus. The protection of the forces must therefore continue to be given high priority in the future if the fulfillment of the legal mandate is to continue to be ensured.



▲ Response forces of the police need more and more protective equipment in order to face increasing violence.

Photo: German Federal Police (BPol)

Modern protective equipment is on its way

The police is already reacting, and that is the right approach. The state of Rhineland-Palatinate, for example, is providing additional funds to stabilize and modernize the protective equipment, which is already at a high level, to keep it up to date. In other states and at the federal level, too, decision-makers are trying to purchase the best possible equipment and the most functional clothing for their police forces within the limits of their budgets. This must be done literally “from head to toe”. In other words, from ballistic helmets to combat boots with “stable heel caps” and “flexible footbeds”, to name just two examples. And the fact that the clothing “underneath” is not a superfluous accessory is shown by the example from our capital, where the emergency services are currently arguing with the budget legislator about “flame-retardant underwear” to protect them from the effects of exploding pyrotechnics during New Year’s Eve operations. It is not unusual that in Berlin alone, more than 60 percent of law enforcement officers have added to their equipment privately. Many employees struggle with their personal equipment and consider it unsuitable, of inadequate quality, or simply insufficient for their personal requirements. As a result, gloves, restraints, bags, or various types of lighting are procured because the official equipment is not considered sufficient. This finding is likely to be the reality not only in the capital city and should alert public employers.

The European Union has so far been setting the pace only slightly

The fact that budgetary resources are limited has been a challenge for the police over the past decades. However, a glance at other European countries shows that the situation in Germany is far better than in our neighboring countries. This is unacceptable, because if we want to establish an “area of security, freedom and justice” in the EU, we must at least ensure that the forces have similar standards of protection. Unfortunately, we are far from achieving this.

Years ago, the European Police Union (EPU) conducted a study that found major differences in the equipment of police forces in Europe, with some of it being disastrous. Long waiting times for uniforms and protective equipment, missing protective vests and ballistic helmets, boots with holes and control points infested with rats: These findings were confirmed just a few months ago during a visit by the EPU board to the border control point between Bosnia and Herzegovina and Montenegro.

“The natural authority of state officials that used to exist in the past is melting like ice in the sun”



▲ Police officers are experiencing violence even during routine operations now.

Photos: Bavarian Police

“ Mannheim has shown how knife violence is used in a targeted manner and that the killing of law enforcement officers is not just accepted, but is directly intended ”

Cooperation is both right and necessary

The fact that individual federal states in Germany have been practicing cooperation for several years in order to organize procurement together, as far as possible, is exemplary and logical. Wearing tests and pilot projects do not have to be carried out 17 times in every single police force. Incidentally, this also applies to the “distance electroimpulse device”, often called TASER. When individual interior ministries “gain their own experience” and therefore launch pilot projects that take years, instead of using existing knowledge from other countries, they waste unnecessary resources and do not improve the knowledge gain in any way. The cooperation of the federal states of Hamburg, Lower Saxony, Schleswig-Holstein, Mecklenburg-Western Pomerania, Bremen and Thuringia has been successful for several years in the joint procurement of suitable clothing. The industry has developed a huge range of functional clothing and excellent protective equipment, and the police themselves are defining new requirements. The development of stab- and cut-resistant clothing has progressed very quickly, and the dramatic increase in “knife crime” is certainly one reason for this. Mannheim has shown how knife violence is used in a targeted manner and that the killing of law enforcement officers is not just accepted, but is directly intended. The police would do well to take the situation as an opportunity to recognize the risks as a widespread phenomenon and to equip all forces comprehensively. Years ago, the need for protected transport vehicles, modern water cannons as an effective means of keeping people at a distance, new types of boats for the federal police and an adequate helicopter fleet for the rapid and precise transport of operational forces was already recognized. Several million euros have been invested in this area, meaning that the forces have excellent operational resources at their disposal. In particular, the federal police have begun to adapt to very specific operational situations by developing self-sufficient supply solutions. This is all right and good, because the protective measures for our critical infrastructure are anything but reassuring.



Without training, dangerous gaps in capabilities arise

Just as important as the availability of good equipment is the provision of training for the forces. If, as a result of austerity measures, our special forces are unable to complete their training adequately, dangerous capability gaps may arise that could have fatal consequences in the event of an operation. Skydiving, exercises on the high seas or diving operations are highly specialized skills that require regular training and optimization in order to maintain the high level of training of our operational units, which operate in conjunction with other special forces, at all times. At their meeting in Hannover on November 30, 2024, the interior spokesmen of the CDU state parliamentary groups adopted a paper of demands that deals with the expansion of civil protection and provides for extensive measures to improve resilience in the event of war or other crises. The NRW spokesperson Christos Katzidis emphasized that the aim is not to spread panic. However, the population is poorly prepared; which is why the federal, state and local governments must work together to expand civil protection and defense. Shelters, comprehensive warning systems and equipment for disaster protection sound threatening. Nevertheless, the interior politicians are right to call for improvements.



▲ Border control must be ensured throughout Europe.
Photos: German Federal Police (BPol)

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Modern technology for the future of the police

The work of the security authorities will change in the future and the change processes will accelerate. The fact that the police uses drones has long since become established in various areas. This also applies to remote-controlled technology, which is used to optimize the protection of security forces. Video technology is also being gradually optimized, although legislators are still debating the use of video technology that respects fundamental rights. For years, the use of biometric facial recognition and intelligent software for the early detection of threatening situations in public places have been the subject of political discussion; without any solutions being found. The threat situation is dramatic and will not change, quite the opposite. The armed conflicts in many regions of the world alone hardly suggest that the movements of refugees will decrease. Migration to Europe, for whatever motives, will always require not only sufficient legal powers but also the use of the latest technology to regain control over what is happening.

Getting ahead of the situation with artificial intelligence

The use of artificial intelligence in police work will play a prominent role and will thoroughly change work in almost all areas. Even now, it is essential to use modern analysis technology to process unstructured mass data in order to achieve results that can be used in court and to minimize the error rate. The autumn conference of the BKA in November 2024 highlighted the complexity of the ethical issues surrounding the use of AI alone. The police are tackling this challenge head-on, because it is important to make sufficient use of the possibilities of AI while at the same time protecting fundamental rights and being effective. For the police, it will not be a question of whether or not

to use AI. If it wants to keep pace with those who do not hesitate for a second to direct all their criminal energy towards optimizing their filthy trade, optimizing profits or achieving other goals, it must use every opportunity within the limits of the EU's "Digital Service Act" (DSA) to get ahead of the situation in all areas of work.

Politics and trade unions: challenge and opportunity

Politicians must no longer hesitate to strengthen their security authorities. This applies not only to procurement, but also and above all to personnel development in the security and law enforcement authorities. It is obvious that occupational profiles will change and perhaps some will even disappear. The pace of change has increased and will continue to do so. Therefore, the structures of our authorities will also have to evolve. The changes will also affect the existing structures for the public service as a whole. It seems very questionable whether the rapid development of occupational roles and the consistent implementation of artificial intelligence in the work processes of crime fighting, counterterrorism or traffic accident response will be sustainable in the traditional paths of career, salary and pension law in the long term. The police cannot choose whether or not to face these challenges; they are obliged by law to do everything in their power to constantly optimize their work in the best interests of the public. This challenge will also and especially be a great opportunity for future generations of police officers to discover previously unknown personal development opportunities with new qualifications. So the public service unions would be well advised not to be left out in the cold, but to take the lead in this movement with their ideas, strategies and action-guiding programs.

“For years, the use of biometric facial recognition and intelligent software for the early detection of threatening situations in public places have been the subject of political discussion; without any solutions being found”



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Author: André Forkert

Equipment and procurement for special forces

The Russian assault on Ukraine and the consequent shift back to national and alliance defence have significantly transformed the operational focus for Special Forces. Counter-terrorism missions have now been superseded by operations behind enemy lines against peer adversaries. This represents a pivot from core capabilities in counter-insurgency (COIN) and counter-terrorism (CT) to a more pronounced focus on high-intensity warfare against near-peer competitors such as China, Iran, North Korea, or Russia. This shift entails substantial changes in tactics, techniques, procedures (TTPs), and technology, necessitating corresponding adaptations in equipment. The Ukrainian conflict has highlighted the accelerating pace of military innovation. Adaptations that previously required years or months are now achieved within days or hours. The new proving ground for technology is direct deployment on the frontlines. Many nations have deployed Special Forces to Ukraine and the Baltic states. The U.S. Army has procured Switchblade loitering munitions from AeroVironment, as announced by the Pentagon in August 2024. These include the Switchblade 300 and Switchblade 600 variants. The Switchblade 300 has been in service for some time with the U.S. Army, U.S. Special Forces, and in Ukraine. Additionally, Lithuania, Romania, and Sweden placed orders for Switchblade systems by the end of 2024. Moreover, USSOCOM awarded a contract in May 2024 for the acquisition of the Echelon II / GOLAM-II loitering munition, as part of the Ground Organic Loitering Aerial Munition programme. The manufacturer, Mistral Inc., aims to deliver enhanced precision and range compared to existing systems. While many system parameters remain undisclosed, GOLAM-II is speculated to be based on the Hero family of loitering munitions developed by Israeli manufacturer UVision, specifically the Hero-120. The HERO-120 is classified as an anti-armour asset by the U.S. Marine Corps, and in Europe, the Hero family is distributed by Rheinmetall. The GOLAM-II can be launched from a container, either from the ground or light vehicles. Its stated range exceeds 20 km, with flight times of more than 60 minutes. However, the objective is a range of 120 km and a two-hour flight endurance. Its targeting precision is claimed to be within 0.5 metres. The munition features a multi-purpose warhead with high fragmentation effects and an integrated shaped charge.

to observe and integrate these rapid developments. One key area of focus is the employment of armed drones and loitering munitions. An example is the Ground Organic Precision Strike System (GOPSS) developed by the US Special Operations Command (USSOCOM) and Program Executive Office-SOF Warrior. This system is currently selecting a range of short-, medium-, and long-range munitions for both rotary and fixed-wing platforms, capable of delivering a variety of hard- and soft-kill payloads. In May 2024, Teledyne FLIR introduced the Rouge 1, a next-generation, optionally-lethal vertical takeoff and landing (VTOL) small unmanned aerial system (sUAS). Designed to enhance the capabilities of small units, the Rouge 1 delivers a combination of speed, endurance, and lethality. With burst speeds exceeding 113 kph, a 30-minute endurance, and a range over 10 km, this system integrates cutting-edge survivability and standoff engagement capabilities. Although not loitering munitions, the Teledyne FLIR Black Hornet 4 is a nano-drone designed for reconnaissance missions. The Black Hornet 4 represents the next generation of lightweight nano-drones, building on the success of its predecessor, the Black Hornet 3. Introduced in early 2024, it features a new 12-megapixel daytime camera with superior low-light performance and a high-resolution thermal imaging sensor, providing operators with sharp video and still images. Weighing only 70 grams, the latest iteration boasts a flight time exceeding 30 minutes and a range of more than two kilometres. It is operational within less than 30 seconds and can withstand wind speeds up to 46 kph (gusts up to 55 kph). The upgraded version offers users improved wind resistance due to its increased size, extended flight duration, enhanced payload capacity, multiple advanced cameras, and an obstacle warning system. The Black Hornet 4 is equipped with four cameras and lateral sensors. The high-resolution thermal imaging camera (650 x 512 pixels), the 12-megapixel electro-optical camera with excellent low-light capabilities, and the powerful Qualcomm processor, in combination with three navigation cameras, ensure outstanding performance both day and night. Integrated collision avoidance enables precise detection and autonomous evasion of obstacles, whether indoors or outdoors. This not only enhances the system's safety but also optimises mission efficiency. Its range is specified as over two kilometres.



◀ The weaponizable Rouge 1 drone from Teledyne FLIR.
(Photo: Teledyne FLIR)

In late December 2024, the BAAINBw ordered both the Teledyne FLIR Black Hornet 3 and 4 models. Previously, the Kommando Spezialkräfte (KSK) utilised version 2, and the GSG 9 special forces of the German Federal Police is also a user of the Black Hornet. In Germany, consulting, support, and sales are managed by ELP GmbH European Logistic Partners, while Precision Technic Defence handles distribution in other parts of Europe. In addition to this nano-drone, the German Special Forces have been employing the MIKADO (Micro Reconnaissance Drone for Local Operations; German: Mikroaufklärungsdrohne für den Ortsbereich) since 2005. A contract for the procurement of 145 systems, including a Category 2 type certification, initiated the regeneration of these systems in May 2022. The contract for the innovative and modular AR100-H drone systems was signed with Airrobot GmbH & Co. KG, part of the Nordic Unmanned Group. The AR100-H MIKADO will primarily replace its predecessor, the AR100-B, still in service with the Bundeswehr. Since December 2024, the Air Robot AR100-H has also been available as a tethered-UAS. This tethered quadcopter solution includes a ground station, cabling by ValoFly, and a digital radio gimbal. As a tethered-UAS, the drone remains continuously connected to the ground control station via fibre optic cable (FOC), which provides power, control, and data transmission. This configuration allows the drone to maintain persistent aerial surveillance. Additionally, the system is immune to jamming, making it particularly suited for static missions, such as monitoring specific areas or protecting forward operating bases. Its operational duration is limited only by maintenance intervals and high wind speeds. In addition to the MIKADO, German Special Forces have also acquired the FALKE (Remote Airborne Reconnaissance System for Short Distances; German: Ferngeführtes Aufklärungssystem, luftgestützt, kurze Entfernung). A corresponding contract was signed between the BAAINBw and Quantum Systems GmbH in September 2023. The FALKE is based on the commercially available "Vector VTOL" This

system is optimised for the operational spectrum of Special Forces, meeting requirements for range, flight time, and sensor capability. According to the manufacturer, the system has a reconnaissance range of up to 30 km or up to three hours of flight time. The integrated multi-sensor system, equipped with optical and infrared cameras, enables operations day and night across all climate zones. The Vector weighs 7.4 kg (maximum take-off weight) and can be mission-ready within three minutes by a single operator without tools. Combined with the QBase Tactical mission planning and monitoring software, the Vector executes missions highly autonomously, with the autopilot reliably making critical decisions independently. According to the manufacturer, the Vector's batteries maximise operational performance and safety. The stabilised cameras for day and night vision, along with thermal imaging devices mounted on a gimbal, transmit images to the ground station at a rate of 5 Mb/s. AI-supported image analysis allows for geolocation (GeoLock) or object tracking. The ground system, integrated into a tablet computer, enables full control of the UAV, data storage from sensors, and initial data analysis. In December 2024, the manufacturer announced that FALKE would be upgraded with MUM-T (Manned-Unmanned Teaming) capability. This enhancement enables data exchange with the Airbus Helicopter H145M light attack helicopter currently being introduced. The Luftwaffe Special Forces have long utilised this helicopter in the H145M LUH SOF variant. The mesh-IP data link allows the helicopter crew to receive reconnaissance data from the FALKE drone directly and, if necessary, control the drone from the cockpit. Additionally, the data link enables the helicopter's sensor data to be transmitted to the FALKE drone operator, such as ground-based commando soldiers. This configuration also supports a relay function, allowing the helicopter crew to deploy the drone as an advanced reconnaissance asset to detect obstacles or identify targets early, subsequently engaging them with onboard weaponry. According to Quantum Systems, the helicopter could eventually serve as a mothership for a swarm of drones.



▲ Video of the Teledyne FLIR Rouge 1 drone:



▲ PD-100 Black Hornet
Photo: André Forkert



▲ Vector VTOL from German Quantum Systems GmbH will be the platform for FALKE.

(Photo: Quantum Systems)

Clothing

One of the most critical mid-term projects for the Special Forces is the clothing system, internally referred to as BDU 2.0 (Battle Dress Uniform). This initiative aims to introduce an entirely new clothing concept with a holistic approach tailored for the Bundeswehr's Special Forces. The medium-term objective is to develop a multi-layered and highly compatible clothing system that incorporates technological advancements, resulting in ergonomic and modular garments with functional and physical interfaces. All existing individual components will be harmonised to ensure weight considerations across all subsystems. The system must allow soldiers to select garments based on mission profile, activity level, and weather conditions. It consists of four distinct modules: the base module, a cold-weather protection module, an accessory module, and a specialised module. Initial discussions also included a waterproof protection module. The specialised module encompasses clothing elements for free-fall operations, jungle warfare, and sniper missions. Currently, the Special Forces utilise a combat uniform comprising a combat shirt, blouse, and trousers, available in camouflage patterns such as three-colour camouflage print, five-colour camouflage print, snow camouflage, and Multicam (MTD). However, only a heavy variant has been fielded to date. After years of stagnation, progress appears to be resuming in procurement. The system will be designated as the "Special Forces Operational Combat Clothing 2.0." (German: Einsatzkampfbekleidung Spezialkräfte 2.0). One of its goals is to improve the compatibility of the uniform with the rest of the personal equipment. According to the KSK's development

roadmap, the new combat clothing is expected to deliver enhancements in comfort, functionality, protection against heat, cold, and moisture, flame resistance, and vector protection. Delivery is anticipated starting in 2027. However, many aspects remain unresolved. Originally, it was planned for all rights to the clothing system to rest with the Bundeswehr, allowing it to independently manage manufacturing and modifications. This was reviewed in early 2025 to determine how this could be implemented legally and procurement-wise. Until now, individual components like uniforms, socks, vests, helmets, etc., have been tendered separately rather than as a comprehensive system. In contrast, Austria's Jagdkommando already ordered the new "Special Operations Command Combat Suit" (German: Kampfanzug Spezialeinsatzkommando) from CARINTHIA, a brand of Goldeck Textil GmbH, in April 2024. In addition to the clothing system, the Bundeswehr's Special Forces will also receive a specialised rucksack system, with deliveries scheduled between June 2025 and May 2029. The system comprises four distinct types: the Base Rucksack, WT Rucksack (Weapons/Sniper), Specialist Rucksack (Communications), and PFC Rucksack (Medic). The base rucksack features a heavy-duty carrying system with 60- and 110-litre packsack options, complemented by a daypack. When the project was initially introduced, additional versions were proposed, such as for mortar teams. At the time, the favoured design was a system from the U.S.-based manufacturer Mystery Ranch, which also equips U.S. Special Forces.

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DND fields two distinct shoulder-fired weapon concepts: The **RGW** (Recoilless Grenade Weapon) system and the iconic **Panzerfaust 3** family. Both concepts encompass a variety of Davis Gun principle, recoilless, shoulder-launched, single-soldier operated, disposable weapons for anti-tank, anti-structure and multipurpose uses. Our munitions are designed to be operated against a wide spectrum of targets and offer different firing modes for maximum flexibility.

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Command and Control

Under the brand „DND-Digital“, Dynamit Nobel Defence offers solutions for the provision of broadband communication together with intelligent software systems such as sensor-to-decider or automated sensor-to-shooter networks. In the area of tactical communications, the **BNET-SDR** platform comprises market-available and globally proven broadband network platforms that allow the greatest possible interoperability and, with their extremely high data throughput and network size, provide a strong basis for tactical collaboration. DND-Digital's **Fire Weaver** sensor-to-decider network offers a revolutionary fire control system that intelligently connects sensors, effectors and command posts across platforms and in real time.

Weapons & Weapon Accessories

The Bundeswehr's small arms projects are covered in a separate article within this publication and will not be addressed here. Optoelectronic specialists B.E. Meyers, under contract from the U.S. Special Operations Command (USSOCOM), supply the Squad Aiming Laser – Ultra High Power (SAL-UHP) as part of the "Miniature Aiming Systems – Laser" (MAS-L) programme. This system is reportedly based on B.E. Meyers' DAGIR aiming laser for small arms. According to the manufacturer, the system incorporates a new Vertical-Cavity Surface Emitting Laser (VCSEL) for improved beam quality. Additionally, it features the proprietary Wakizashi interface, which can be modularly adapted to user requirements using a Unity Tactical-designed switch and trigger system. The system is also notable for its lightweight and compact design. The visible red or green laser operates at Class 3B/3R, with power outputs ranging from 1 mW to 165 mW and 47 mW, respectively. It also includes a scalable aiming laser for night vision devices, operating in the near-infrared spectrum at 860 nm with power levels between 0.2 mW and 40 mW. Another feature is the illumination mode, providing 350 mW of power. The laser aiming module can be mounted on assault rifles and light to medium machine guns

for close-quarters to medium-range engagements. In Germany, B.E. Meyers is represented by JK Defence. The Austrian Jagdkommando is currently procuring the Strasser EX17, a new multi-calibre sniper rifle. Manufactured by HMS Präzisionstechnik GmbH, the Strasser brand is distributed in Germany by 1MOA GmbH. This straight-pull bolt-action rifle offers exceptional precision and the ability to quickly and consistently change calibres to match mission requirements. Its linear bolt system reduces the time between shots, allowing the shooter to maintain target acquisition. This enables faster follow-up shots and extends the weapon's operational flexibility. The rifle is currently available in .338 Lapua Magnum (8.6x70 mm) and .308 Winchester (7.62x51 mm) calibres, with interchangeable barrels. To switch calibres, the bolt head, magazine well, and quick-change barrel must be replaced using a hex key torque wrench. According to the manufacturer, other calibres, such as 6.5 Creedmoor, can be customised upon request. The overall weight is listed as 7.1 kg for the 7.62x51 mm variant and 7.0 kg for the .338 Lapua Magnum version (excluding ammunition, suppressor, and optics). The rifle length is specified as 1.24 m and 1.27 m, respectively.



▲ Multi-Platform Advanced Laser System DAGIR V2 from B.E. Meyers.

(Photo: B.E. Meyers)

Communications

One of the most critical aspects of modernising the armed forces is digitisation, particularly in communications. For the Bundeswehr, this focus is especially pronounced in the realm of tactical radio systems. Without secure, broadband, and resilient communication networks, implementing a sensor-to-shooter cycle or gaining an information advantage is impossible.

Unlike the general-purpose troops of the Bundeswehr, the Special Forces have long maintained a modern communications infrastructure. Among the systems in use are the Falcon III AN/PRC-117 F/G and AN/PRC-160 radios, manufactured by the U.S.-based L3Harris Technologies. The L3Harris AN/PRC-160(V) is a tactical high-frequency (HF) and very high-frequency (VHF) manpack radio that supports communication up to the highest levels of classification. Covering a frequency range of 1.5 to 60 MHz, it provides HF power output of 20 W and VHF power output of 10 W, along with broadband data rates of up to 120 kbit/s. This manpack radio offers the tactical advantage of robust communication in SATCOM-denied environments. Furthermore, it is the world's first and only HF manpack that

meets all NSA cryptographic modernisation standards, supporting up to Top Secret classifications, according to L3Harris. Its software-defined architecture allows encryption updates without hardware modifications, ensuring the security of mission-critical information both now and in the future. The device already meets future requirements for Software Defined Defence.

In addition to these radios, the Special Forces have expressed interest in the AN/PRC-167 vehicle-mounted encrypted radio from the Falcon IV series. The AN/PRC-167 operates across a frequency range of 5 kHz to 40 MHz and 764 MHz to 2400 MHz within a MANET-like network using the TSM-X waveform. It is NSA-certified for Top Secret communications and features an integrated SAASM L1/L2 encryption module. Under the Netherlands' tactical digitisation programme, Foxtrot, L3Harris Technologies is supplying radios to meet combat net communications requirements, equipping the entire Dutch armed forces. In Germany, L3Harris' tactical radios are represented by JK Defence & Security Products GmbH.

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Vertical Deployment

After years of delays, OxyJump NG (New Generation) by Collins Aerospace/Raytheon Technologies has finally been introduced for widespread use. The previous model was retired in 2009, rendering freefall operations above Flight Level (FL) 120 (12,000 feet or 3,658 metres) technically unfeasible. With the comprehensive introduction of this new oxygen supply system, freefall operations at high altitudes are once again possible. Delays in procuring a replacement system caused significant setbacks, and interim solutions from the U.S. Armed Forces were employed to ensure operational capability for Special Forces in critical scenarios. Jumpers are equipped with a specially designed oxygen mask available in three sizes under the OxyJump NG system, tailored to fit various face shapes. This mask compensates for the decreasing oxygen levels at high altitudes, countering oxygen desaturation in the body. Oxygen is carried in a separate steel cylinder. The OxyJump NG system employs two cylinders: the "ascent cylinder" (green) and the "descent cylinder" (white). The ascent cylinder is used inside the aircraft when the rear ramp is opened, causing a pressure drop. The descent cylinder is integrated into the parachuting system and provides a continuous oxygen supply between jump and landing. Certain aircraft are equipped with built-in oxygen systems, allowing jumpers to connect directly, thus eliminating the need for the ascent cylinder. These integrated systems

ensure a longer oxygen supply, which is inherently limited in cylinder-based systems. British Special Forces are also replacing their outdated Parachutist Oxygen Supply System (POSS). In December 2024, the UK Ministry of Defence announced that Airborne Systems had been awarded the contract to supply the SOLR oxygen system for British forces. Paratroopers rely on safe and reliable oxygen supply systems when exiting aircraft. Under a new contract awarded by the DE&S Airborne Equipment Team to Airborne Systems, British soldiers will benefit from a significantly improved oxygen system for parachute operations (POSS). The existing High-Altitude Parachute Life Support System (HAPLSS), introduced in 1994 in response to an urgent operational requirement, now requires an updated replacement. Like its predecessor, the POSS system features a pre-breathing console, supported by a new high-pressure pre-breathing cylinder. The system employs a demand-driven oxygen supply rather than a continuous flow, reducing aircraft preparation time and pre-breathing requirements for jumpers. The new gas cylinder technology offers higher pressure and a greater oxygen supply for pre-breathing and in-flight use. Airborne Systems' new POSS enables higher parachute deployment altitudes, longer oxygen durations for extended flights and glides, and globally deployable maintenance capabilities.



▲ Soldiers of the Kommando Spezialkräfte in their multicam combat uniform.

(Photo: KSK)



► An L3Harris Falcon III AN/PRC-160 radio in use.

(Photo: L3Harris)

Equipment for Maritime Special Forces

In mid-2024, the German Navy's mine clearance divers were equipped with the Multi-Role Rebreather 100 (MCM100) from Avon Protection for military diving operations. Rebreathers allow for extended and quieter dives compared to open-circuit regulators. Notably, no bubbles are released, preserving the diver's concealment. Rebreathers recycle exhaled gas by filtering out carbon dioxide and reintroducing oxygen for subsequent breaths, making gas supplies more efficient and compact compared to traditional dive tanks. The MCM100 is a modern electronically controlled mixed-gas rebreather designed for military applications. Developed in collaboration with the UK's Defence Science & Technology Laboratory (Dstl) and the Royal Norwegian Navy, it is optimised for Explosive Ordnance Disposal (EOD), Mine Countermeasures (MCM), and Special Operations in both shallow and deep water. Depending on its configuration, the MCM100 supports maximum diving depths of up to 100 metres when using HELIOX or TRIMIX as a diluent gas, or 40 metres when using compressed air. Dive times range from four to six hours at a depth of 40 metres, depending on water temperature. The system weighs 27 kilograms and includes a control console, dive indicators, and other components. The "Amphibious Cache Container – Extensible Surface Stretcher" (ACCESS), developed by SECUMAR (a brand

of Bernhardt Apparatebau GmbH & Co.), was created specifically for and with German Special Forces. This waterproof transport and storage sack is intended for amphibious operations and brown-water missions. However, ACCESS is more than just a dive container. Multiple ACCESS units can be connected to form an improvised stretcher for transporting casualties on the water's surface. Additionally, the container can transport equipment during infiltration missions or be submerged to store weapons, supplies, medical equipment, or other gear underwater. It offers approximately 80 litres of dry storage space. The system's operational depth depends on payload weight, material compressibility, and trapped air. Typically, an operational depth of around 10 metres can be assumed. Retrieving the equipment does not require a diver to submerge. An electronic, remotely activated inflation device brings the container to the surface when needed. ACCESS is equipped with a 100-metre cable, extendable in 50-metre segments. Using the cable, the SecuTronic electronic control system can be triggered from shore, activating a CO2 cartridge to surface the container. The exterior is made of Cordura, while the inner bag is crafted from waterproof PU-coated nylon. The solution has also been tested by the Dutch Maritime Special Operations Forces (MARSOF).

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The advertisement features a large background image of a blue and white German police car at night, illuminated by streetlights. Below the car, there is a row of seven product images with their respective labels:

- Mobile Kontrollstelle**: A police officer in tactical gear.
- SPEEDSAFE BULLETPROOF 005-3-36**: A bulletproof vest.
- SPEEDSAFE 10.L**: A blue and white police car.
- atmungsaktiv superflexibel ultraleicht**: A close-up of a tire tread.
- NEU Auch LED**: A police car with a red LED light bar.
- BOLA WRAP SPEEDSAFE**: A yellow and black tactical bag.
- SPEEDSAFE Tower 42.L**: A police car with a tower light system.

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▲ German Minentaucher from Waterproof.
(Photo: AF)



▲ New quad-laminat dry suit for the German Minentaucher from Waterproof.
(Photo: AF)

The Floating Ladder from Skylotec does not sink, allowing for recovery and reuse, saving material and costs. It is narrower than previous models, making it easier to transport. Various lengths are available. In late 2023, Olympia Triumph introduced a new extendable Electric Carbon Pole in a dive configuration. Developed in response to user requirements, it can quickly extend to a height of 12 metres. Motors and stabiliser grips are mounted at the upper end of the lower section directly below the cuffs with floatation devices, with an additional stabiliser grip beneath the motor. The total length is 15 metres, weighing 26 kilograms. Two variants are available: aluminium and carbon, with the carbon version being six kilograms lighter. The Diver Handheld Tactical Observation Mast (TOM), developed

by Blueprint Subsea, serves as a periscope for combat divers. Its features include a low-light HD colour camera, longwave infrared thermal imaging camera, GPS, and a digital compass. The mast can be extended up to 2.5 metres, enabling divers to conduct reconnaissance, observation, and recording or establish their position without breaking the water's surface. The device includes a recording function. The Attitude Heading Reference System (AHRS) provides real-time directional information. TOM is dual-hand operable and can be used as a standalone system or in conjunction with the Artemis Diver Navigation System. Weighing two kilograms above water, the system is rated for depths of up to 200 metres. Its 16.8 V/2.2 Ah battery provides three hours of operation.

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The interview was conducted by [André Luhmer](#).

Interview with lieutenant (POK) Philipp Rücker, group leader of the evidence preservation and arrest unit (BFE) in the riot police force Saxony.

What challenges do you see for your BFE units in view of the current security situation?

In my view, the challenges lie in not only dealing with the large number of operational situations (gatherings, events such as football, support missions, state visits, securing election campaign events, etc.), but also in ensuring and carrying out training that is tailored to the situation. The issue of recruiting young talent is also playing an increasingly important role in times of declining numbers of applicants. I mean this for the police in general and for us as the evidence preservation and arrest unit (BFE) in particular. Of course, the current social conditions also have an impact on our operational situations. Here, it is important to constantly review the strategies and options for action and adapt them if necessary. In relation to operational situations, cooperation between the various organizational units - but also between the federal and state governments - is becoming increasingly important. In Saxony, for example, there is not only a very lively and distinctive culture of gatherings, but also a large number of high-risk soccer games in the 1st to 4th leagues. This results in a regular need for support from other federal and state BFEs in Saxony, so that direct cooperation between the units also involves harmonizing work processes. And common courses of action can only be called upon in operational situations if they have been intensively trained. In the long term, standardization should also be sought in the area of police equipment resources (dt.: FEM). In my view, the ongoing strained budget situation in particular represents a major challenge for the procurement of operationally relevant technology. One conceivable option here would be, for example, the procurement of additional non-lethal weapons that are used as distance gadgets. This makes it all the more important to me to continue and promote synergy effects in procurement, not only at state level. This includes testing new FEMs or concepts, some of which are lengthy but must be further advanced with the involvement of the relevant federal and state specialist departments. Working groups and competence centers with the involvement of the states and the federal government are becoming increasingly important in this area. International terrorism, with its many facets ranging from heavily armed perpetrators who work in a division of labor to radicalized individual perpetrators who can appear anywhere and at any time, certainly poses an unbroken high risk. This means, above all, for the emergency services of the BFHu Saxony, that in addition to the numerous missions, they must prepare for and adapt to the various operational situations and threats of today through intensive training and further education.



▲ Lieutenant (POK) Philipp Rücker, group leader of the evidence preservation and arrest unit (BFE) in the riot police force Saxony. Photo: Ministry of Interior, Saxony

“It is certainly a challenge to train colleagues”



▲ The police in Saxony, like other state police forces, has to deal with an increasingly aggressive population. Here, the clearing of Potsdamer Platz during a blockade by Extinction Rebellion.

Photo: Stefan Müller/ CC BY 2.0

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How do you align your training and further education to these challenges?

The training and further education is subject to constant changes and adjustments and is therefore a constant optimization process. As a standard, we carry out both operational preparation and post-operational evaluation in order to set priorities in the above-mentioned areas. With the help of qualified trainers for the respective priority areas and through adjustments to the required special basic training that all officers have to complete after being transferred to our association, we try to prepare ourselves as best as possible for the current challenges in operational situations. The level of training can also be enriched by the regular exchange of experiences between colleagues from other BFEs from the federal and state governments, as part of joint courses or events. Not least because we also carry out exercises and invite our colleagues from the federal and state governments,

or we are invited. Exercises vary from simple issues to complex large-scale situations that have to be dealt with from different perspectives. Due to the large number and range of operations in the Free State of Saxony described at the beginning, it is certainly a challenge to train colleagues at the required and necessary frequency. Thanks to many committed trainers from our own ranks and supporters from the respective locations, however, we are able to equip the BFHu Saxony for the challenges of today and to carry out high-quality training and further education. We are particularly experienced in Saxony when it comes to dealing with large-scale, unrest-related situations, regardless of whether they are related to soccer or gatherings. Our participation in numerous nationwide committees and working groups also means that innovations are incorporated.

How is the cooperation with the special forces and other units in action?

As BFHu we are part of the riot police and they only operate on request from other departments. Working with special units is not our absolute core business. In special areas, however, we are "exclusive partners" to a certain extent, as we can handle the tasks to be completed in a specialized manner that only a special unit can do, which is usually not formally responsible. The cooperation with other organizational units is varied and in most cases is effective. Starting with the preparation of the operation, the actual management of the situation through to the follow-up to the operation, we as BFHu are involved and a recognized partner. When working with other organizational units from the tactical operational area, the greatest challenge is always to proceed in a uniform manner, which can be made more difficult by different levels of training or equipment. The intention of the procedure must also be clearly agreed in advance. Of course, we also have overlaps with special units. Starting with the above-mentioned operations but also in the area of training. The cooperation with special units usually takes place during planned measures in the relevant areas of crime. There is good cooperation both in the area of preliminary investigation and the actual operational measure. For ad hoc situations, Saxony has a state-wide concept for dealing with life-threatening operational situations (dt.: lebEI). In the course of implementing this concept, the relevant police directorates (dt.: Polizeidirektionen, PD) were entrusted with this and in turn have forces from the respective Central Services Inspectorate (dt.: Inspektion Zentrale Dienste, IZD) available, which are permanently made available as an intervention component. We also have the appropriate equipment, except for the specially protected vehicle, and can also guarantee this task in an emergency. However, these IZD forces mentioned above are primarily intended for this purpose. The task of these units is to minimize damage and stabilize the situation until the special units arrive. This was the case several times in Dresden last year within a very short space of time, for example when a hostage-taking occurred in the Altmarkt-Galerie Dresden. The BFHu or individual BF units were not alerted at the time, but in my view it would have been conceivable in principle.



▲ Several players need to work together, just like the police dog Seiko with his handler.

Photo: Polizei Sachsen

What role does tactical operational medicine play in your association?

Tactical operational medicine naturally plays a large and, above all, increasing role in our association, which makes it an integral part of the training. The basic training is carried out by the police medical service (dt.: Polizeiärztlicher Dienst, PÄD) of the Saxon police and is then taken over by specially trained multipliers from the units. In addition, exercises with the emergency paramedics of the riot police take place on a regular basis, as well as train-the-trainer events to keep the training level of the unit's internal multipliers at a high and up-to-date level. In addition to the personal emergency equipment-individual first aid kit (IFAK) - the units are equipped with additional emergency backpacks to deal with major incidents such as mass casualties (dt.: MANV) and to carry out life-saving measures on site until the civilian rescue services can take over this task. The terrorist attacks in Paris in 2015 and subsequent attacks in particular have highlighted the high importance of tactical operational medicine in the context of police work. The increase in the use of cutting and stabbing weapons also means that colleagues are increasingly encountering life-threatening injury patterns that require immediate action - both for bystanders and suspects. The tactical approach always depends on the specific operational situation, but always with maximum personal safety and tactical aspects.



▲ Lieutenant (POK) Philipp Rücker in an exchange prior to a police operation.

Photo: Ministry of Interior, Saxony



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What do you think about future tasks and what message do you have for political decision-makers?

That is a very interesting question. We as BFHu are, in a figurative sense, a cog in the wheel of the police, which in turn is a cornerstone and at the same time guardian of our constitution and the Basic Law. Our entire approach is based on constitutional principles and is always geared towards proportionality. In my opinion, both populist demands and austerity measures – to name just two examples – are not very effective in relation to the police. My expectation of political decision-makers is that we will be provided with the necessary resources to implement our core police mission in the best possible way and thus be able to effectively combat crime and the challenges of the future. Especially in times of globalization and internationally operating criminal structures, the use of specialized forces that work together across state and federal borders is, in my opinion, becoming increasingly important and is already evident in large-scale operations such as in connection with the Encro-Chat procedure. It is not to be expected that the number of operations will decrease, which means that targeted action - especially against organized crime - will be an important building block (keyword: cybercrime). Accordingly, the legal framework must also allow police action against these structures.

Which technological aids and which vehicle technology have proven themselves in carrying out your tasks and what do you hope for in this regard in the future?

Technological developments have progressed at an enormous pace in recent years, making it difficult for authorities to keep up due to legal requirements. One example of this is tendering procedures. Nevertheless, we in the Free State of Saxony are in a very good position in terms of equipment. The BFHu Saxony has a large number of police smartphones. These devices have applications that enable coordination and communication in real time, which makes it easier to deal with of dynamic missions is essential. One of our core missions is already in the name - securing evidence. Accordingly, photo and video technology is of immense importance. This applies to both mobile camera technology, which should also include drones, and stationary technology that is permanently installed in evidence securing and documentation vehicles. The qualitative demands of evidence against the accused in the context of criminal proceedings have increased in recent years, so that objective evidence, such as film and photo recordings, is becoming increasingly important. This naturally also requires appropriate technology to meet these demands. The topic of "drones" in particular is becoming increasingly important. In the area of radio technology, for example, we have (digital) manpower, which is essential as part of the targeted and structured approach. In addition, there are currently efforts to acquire radio technology with which it is possible to operate



▲ Officers wearing a body camera are identified by a corresponding identification patch.

Photo: Polizei Sachsen

both the telephone and the radio via a control unit, which frees up capacity for other priorities. In the area of door opening technology, there are also considerations about equipping ourselves with hydraulic tools. With all the innovations, however, one must not forget that all command and operational resources also have to be trained accordingly, which takes a lot of time, and that there are also special units or specialized forces outside of the BFHu Saxony that have special technology for specific operations and can provide targeted support. The range of tasks demands a lot from our vehicles, with reliability being a crucial factor. Due to the increasing number of command and operational resources, a so-called rescue vehicle has been established. This contains a large part of the special technology that is carried on operations. The half-group vehicles are currently being converted from Mercedes Benz Sprinters to Ford Transits. Due to the fact that we as riot police not only operate in our own state, but also nationwide, we spend a lot of time in the vehicles, which is why it would be desirable if the requirements and needs of the end users were addressed even more intensively as part of the tender. Due to our mission to act at hotspots of unrest, I believe it is in the nature of things that we have modern technology and that our equipment is equipped with the appropriate protection classes. A current example of this is the new modular body protection equipment (dt.: KSA). This combines the classic protective equipment of the riot police with integrated ballistic protection. As stated at the beginning and with a view to the federal territory, we as BFHu Saxony are in a good position and are generally satisfied with our equipment and facilities.



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Dorothee Frank

Chinese drones in security-relevant forces



▲ DJI Mavic 2 Enterprise of the French special forces.

Photo: CPM/Dorothee Frank

The small drones are increasingly used not only by armed forces, but also by the police, fire brigades and, above all, special forces. Anyone who visited the demonstrations at Eurosatory in Paris last year saw them in action there en masse. Especially quadcopters, which can be equipped with sensors or effectors. However, these drones mostly come from China. One of the drone pilots of the French special forces proudly holds up his DJI Mavic 2 Enterprise. "Drones give us a comprehensive picture of the situation. They provide us with images, show us the dangers, enable us to assess the situation and follow developments. All without placing a single person in danger," the drone pilot describes the advantages. "That's why we're using them more and more." The French units also demonstrated this at Eurosatory. There was always a quadcopter in the sky somewhere, observing the action, reconnoitring the terrain, assigning targets, tracking its own units or observing enemy movements. The data collected by the drone, from GPS location to photo/video, would also be of interest to opponents – not only in combat, but also for analyzing standard military procedures. And the eyes in the sky come from China.



DJI is the world market leader for small drones

"With its headquarters in Shenzhen, China's Silicon Valley, DJI benefits from direct access to suppliers, raw materials and young, creative talent for a lasting model of success," reports the drone manufacturer DJI on its German page. "Thanks to these favorable conditions, we were able to grow from a small office in 2006 to a global company with more than 6,000 employees. DJI now has offices in the United States, Germany, the Netherlands, Japan, Beijing and Hong Kong." Following the Chinese model, DJI offers its drones at bargain prices that European and American companies can hardly match. This has already created a dominant market position, both in the civilian and military sectors. But the data is by no means secure. In 2016, The New York Times reported on a press briefing at which Zhang Fanxi, a DJI spokesperson, said that DJI complies with the Chinese government's requests for data. However, the data is not automatically shared, but only released at the government's request. DJI would also grant the Chinese authorities direct access to the drones upon request. "If the government says they want this data, we will tell the user," the New York Times quoted the spokesperson as saying. "We communicate all of this."

Small, light, affordable, high-performance. There are certainly reasons ► to use DJI drones. Here is the case with a Mavic 2 Enterprise.

Photo: CPM/Dorothee Frank



More and more police forces are relying on drones. ▲

Photo: IM NRW/Tim Wegner

Investigation of DJI drones by the USA

In the wake of these official statements, the U.S. Army stopped using DJI drones, officially due to “cyber vulnerabilities associated with DJI products”. Until then, DJI quadcopters were the most widely used drones in the U.S. Army. The U.S. Air Force, on the other hand, continued to procure systems from the Chinese manufacturer to monitor the security of its airfields. So, at least at the beginning, the assessment in the U.S. armed forces was not uniform. But in early 2021, then-President Donald Trump, now back in office, instructed agencies to remove all government use of drones from manufacturers in China, Russia, Iran, and North Korea, where

possible, and to provide him with an assessment of potential security risks from Chinese-made drones. On June 14, 2024, the U.S. House of Representatives finally passed the Countering CCP Drones Act, which would ban DJI drones in the US. Once this bill becomes law, the use of DJI drones in the US will be de facto banned, whether by government, armed forces, or civilians. This new law would therefore be of interest to all those armies, special forces and police forces that are allied with the United States but use DJI drones. And the latter includes not only France, but also Germany.



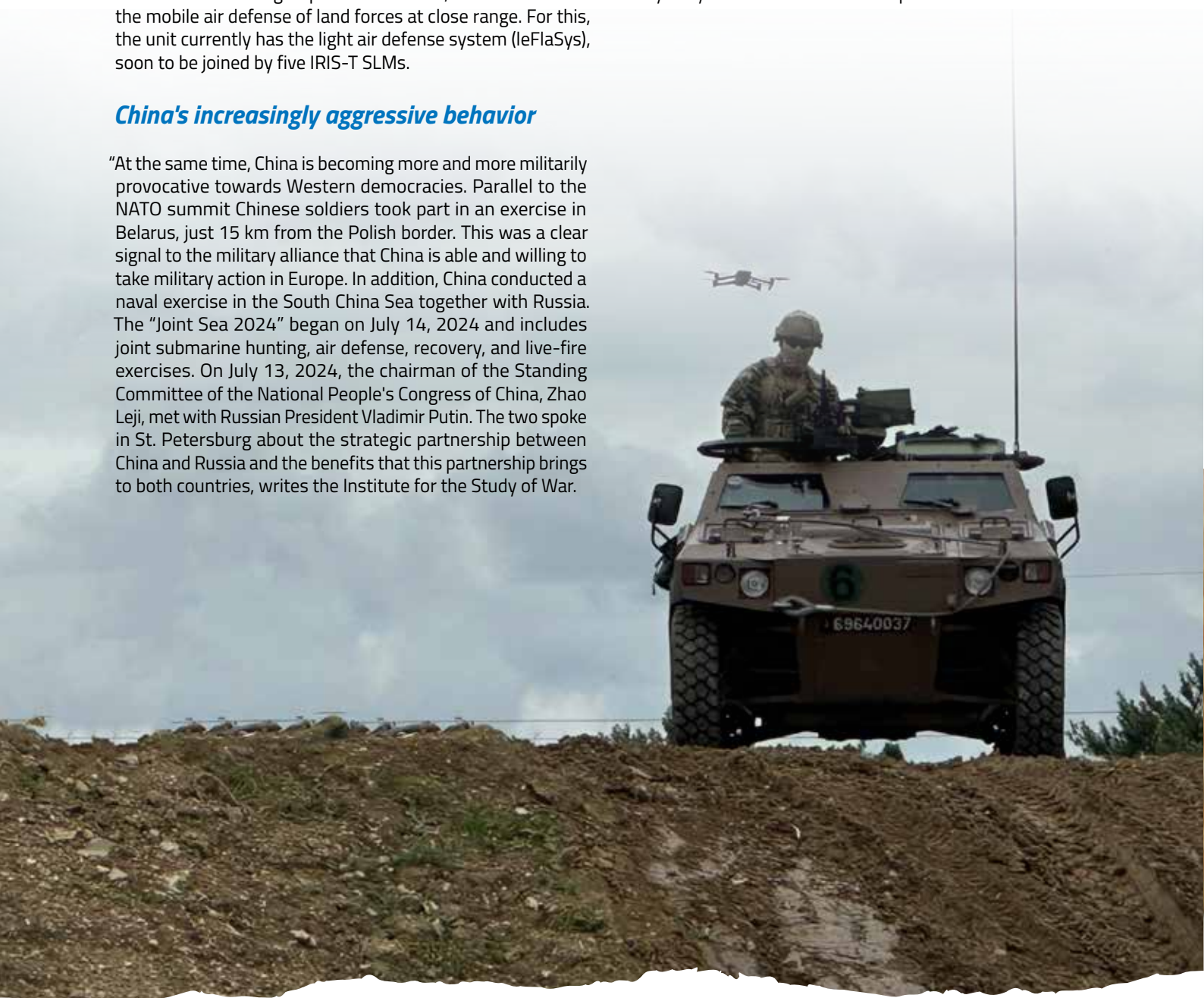
From explosive ordnance defense to air defense *Obtaining key technology*

Bundeswehr also uses drones from China, including the DJI Mavic 2 mentioned at the beginning. The systems are used even in the most sensitive units. In September 2022, for example, the Bundeswehr reported on a test by the explosive ordnance defense. "We now have the brand new DJI Matrice in our inventory," said Major Gregor K., head of the operational command center for explosive ordnance defense in Minden. "We also need this drone because it is already being used in Mali and we want to prepare our soldiers for this situation here at our home base." The drone used was on loan from the 61st anti-aircraft missile group from Todendorf, whose mission is the mobile air defense of land forces at close range. For this, the unit currently has the light air defense system (leFlaSys), soon to be joined by five IRIS-T SLMs.

China's increasingly aggressive behavior

"At the same time, China is becoming more and more militarily provocative towards Western democracies. Parallel to the NATO summit Chinese soldiers took part in an exercise in Belarus, just 15 km from the Polish border. This was a clear signal to the military alliance that China is able and willing to take military action in Europe. In addition, China conducted a naval exercise in the South China Sea together with Russia. The "Joint Sea 2024" began on July 14, 2024 and includes joint submarine hunting, air defense, recovery, and live-fire exercises. On July 13, 2024, the chairman of the Standing Committee of the National People's Congress of China, Zhao Leji, met with Russian President Vladimir Putin. The two spoke in St. Petersburg about the strategic partnership between China and Russia and the benefits that this partnership brings to both countries, writes the Institute for the Study of War.

So there are plenty of reasons not to view China as an absolutely reliable ally of Germany. In contrast to the U.S., with which Germany has close and reliable ties. This difference should actually be reflected in the choice of commercial systems, because information generated by exercises and the training can also be important – even if it is only the GPS coordinates. But this would mean deliberately breaking DJI's market-leading position. An endeavor that the U.S. is currently attempting with its bill. An endeavor that Europe could also attempt. But that would mean to invest money and to not always buy the most cost-effective product.



▲ For the French armed forces, the use of drones is part of normal military operations.

Photo: CPM/Dorothee Frank

Author: Pitt Marx,
Director Communications, Thales Deutschland

TRAIN AS YOU FIGHT,

Current solutions for small arms training still focus on shooting training and, to a certain extent, tactical training. However, their dynamics are limited in terms of behavioral training, exercise of rules of engagement and various firing positions in an interconnected team. These limitations are even more significant in highly dynamic training scenarios with obligatory physical interactions, such as close-quarter combat training. Today's virtual reality training systems provide only very limited tactical training and, more importantly, do not allow one of the main training objectives to be achieved: handling of firearms in stressful situations. Tactical Engagement Analysis (TEA) is a training solution from the Thales family of Small Arms Training Systems that overcomes these limitations. TEA provides an immersive training experience in which each weapon module is equipped with a camera and sensors that capture extensive training data to create emission-free training environments within critical infrastructures. The system's AI and machine learning algorithms enable accurate detection, identification, and analysis of objects, determining the distance, body part hit, and direction of fire (head-on or backward), regardless of posture, position, or cover. This results in comprehensive and individualized performance evaluations that ensure users

FIGHT AS YOU TRAINED

receive accurate and actionable feedback. TEA's advanced features include quick setup and deployment through its user-friendly design, minimizing downtime and allowing more focus to be placed on training. Its plug-and-play functionality enables seamless integration into existing training programs without complex installations. The system improves the efficiency of tactical training analysis without disrupting the training process, and provides objective data that improves performance evaluation. TEA supports versatile exercise plans and environments, enabling training whenever and wherever it is needed and under all conditions. TEA is user-friendly and affordable, making advanced training accessible to all. It can be scaled with the end user's growing requirements. TEA's instructor user interface displays real-time feedback and detailed analysis of each shot fired, with online and offline monitoring of critical training parameters. Target and shot behavior is analyzed during runtime and stored for a thorough debriefing, independent of the physical training area. Tactical Engagement Analysis significantly improves training effectiveness by providing detailed, objective feedback in real-world scenarios.



▲ Police forces need to train as close as possible to real situations.

Photo: Thales

Digitalization: a winning strategy

There is – fortunately – no more getting around the subject of digitalization in the Bundeswehr. More than anything else, comparisons and cooperation with other countries clearly indicate the challenges Germany's armed forces must sometimes still face. Mobile and/or highly mobile communication is a decisive factor, especially when national or collective defence is concerned. The ability to win will also depend on securing the information advantage. Digitalization plays a key role here, as in optimizing unit command and the factors of space, time and, above all, forces. With its specialized Mobile Networks (MN) department, steep GmbH as long-standing service provider and partner to the Bundeswehr rises to exactly these challenges for modern military communication media. A current MN project is refining the micro network 1 – military digital technology ensuring communication infrastructures where there are none (or no longer any). Micro network 2.0 facilitates setting up self-sufficient, platform-independent IT and communication infrastructures in any terrain, even at sub-battalion levels.

Solutions for networked operations architecture

The micro network 2.0 project – "User network, deployable, micro 2.0" is its slightly unwieldy name for "non-Bundeswehr ears" – is a communication system that corresponds well with the (new/old) role of the Bundeswehr in matters of national and collective defence. In simple terms, each micro network 2.0 can be transported in a rucksack, the accessories fitting in a second rucksack. This highly mobile communication infrastructure for in-field forces of up to 20 users (one user meaning one phone terminal [smartphone] and one adapter for connecting to a notebook/APC) per system is so designed and constructed that it can, by itself, quickly and flexibly create a self-sufficient network or engage with a higher level or an equal instance – potentially extendable to as many as 100 users. In today's digital battlefield, clear "added value" for the Bundeswehr. It can be set up and dismantled within 20 minutes, depending on the situation and parameters.

100 systems – to start with?!

This also motivated the relevant department in the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) to sign a contract at the end of 2023 for the delivery of 100 mobile and 22 stationary systems. Plans exist to purchase a larger quantity of further systems. The micro network 1 predecessor model referred to was also a product by steep, used, for example, for disaster operations in flood areas to create a communication infrastructure where the existing system had broken down since there was no power supply or the (radio) masts had been destroyed. Such a scenario can sadly also be expected and indeed anticipated in a defence situation. A refined version of the micro network therefore also needs to be (even) better prepared for just such a situation.



▼ The micro network allows real time transmission via mobile devices.

Photo: steep GmbH





Easy operability – even with gloves. ▲

Photo: steep GmbH

“Micro all-rounder”

This sounds slightly simpler than it is: Besides network access for users and a local supply, the micro network 2.0 must also ensure all functionalities of a converged network as well as the provision of IT services. And it must guarantee the wireless-based and wired networking of users, an IP wireless-based and wired meshing of several micro network 2.0s and connectivity to higher-level wide area networks via various media transmission systems. To do this, the micro network 2.0 must aid the connectivity of the operation units, provide suitable interfaces, and be able to connect to the central infrastructure in the Bundeswehr’s Information Technology Services Command, ensuring the project’s connected terminals (smartphones and admin notebook) receive updates. Roughly speaking: No matter where or how, the micro network 2.0 must make connection with each other and with the Bundeswehr infrastructure possible via computer or mobile phone.

Manoeuvrability a given

The at first seemingly abstract question of speed is (once more) gaining in importance for military equipment. In times of drone reconnaissance and attacks, the question of how quickly military equipment can be set up and/or dismantled is increasingly important. And the size of the technology also plays its part in reconnaissance – quite apart from the transport question. As already described, the system is available in “rucksack size”. And the half 19”-casing brings with it various installation options, for example in vehicles. Of course, the micro network is fully functional even without such integration, being fully operable independently of them and of other platforms. This includes its use with a rechargeable battery, so that while an external power supply may be helpful, it is not needed to operate the system. Fully in line with national and collective defence, the project planning is also fast and flexible. A substantial number of systems were already delivered in October 2024, with more to follow in Q1 2025. One way or another, there is much ado in mobile networks.

Contact

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TACTICAL MOBILITY ON LAND AND WATER

André Forkert

▲ LL UTV MRZR-4D and the EMU electric motorbike.
(Photo: Bundeswehr/Carl Schulze)

In the realm of tactical mobility for special forces and light infantry, there is a growing demand for small, agile vehicles. These vehicles must be air-transportable (as internal or external loads) and offer the highest possible payload capacity. Lessons learned from the Ukraine conflict highlight the need for simple and rapid camouflage options, as well as modularity to integrate a wide variety of armament configurations. Additionally, modern vehicles must be equipped with infrared (IR) camouflage lighting as a standard feature.

On Land

German special forces utilise various vehicles for land mobility, including the quad Yamaha Grizzly 450 EPS, the Polaris MV 850 quad, the air-deployable Utility Terrain Vehicle (LL UTV) Polaris MRZR-4D, the KTM 640 LS-E enduro motorcycle, the Yamaha WR450 enduro motorcycle, and the Rheinmetall Armoured Reconnaissance and Combat Vehicle (AGF) SERVAL. In France, similar roles are filled by vehicles such as the Masstech T6 6x6, the highly mobile tactical vehicle UNAC RIDER Fardier ATV, the FURIE, and the VPS 2 (Le Véhicule Patrouille SAS) manufactured by Technamm. Other vehicles in this category include the COMMANDO and the armoured T6 Armure (both from Masstech), as well as the VAM TL SOV and VAMTAC ST5 (Vehículo de Alta Movilidad Táctico/High Mobility Tactical Vehicle) produced by URO in Spain. The Fardier ATV is a compact, lightweight all-terrain vehicle weighing two tonnes, with exceptional off-road capability that allows it to traverse terrain inaccessible to conventional off-road vehicles. It is robust and reliable, having been designed without any electronic components to avoid irreparable malfunctions

during operations. The vehicle accommodates two soldiers and is capable of towing a 120 mm mortar or transporting multiple large items of equipment on its trailer. The total towing capacity is up to 750 kg. Additionally, the Fardier ATV enables the rapid evacuation of a casualty in a lying position. It is both air-transportable and air-droppable. The French FURIE is a buggy manufactured by Etendard. This highly modular vehicle is specifically designed and equipped to operate under challenging conditions, across all types of terrain, and in a variety of operational roles. It is very compact, with dimensions of 420 cm in length, 208 cm in width, and 189 cm in height. The wheelbase of 320 cm ensures excellent manoeuvrability, with adjustable ground clearance ranging between 35 cm and 40 cm. Powered by a 2.0-litre turbo-diesel engine delivering 220 horsepower, one of the vehicle's key advantages is its operational range, exceeding 1,000 km thanks to a 150-litre fuel tank and an engine compatible with both diesel and aviation fuels (F-34/F-63). The vehicle is rated for a payload of up to 1,200 kg and offers seating for four passengers in a modular configuration, with an additional three seats available. Fast, lightweight, and extremely capable in off-road conditions are the key attributes of the LL UTV MRZR-4D. Designed to accommodate four soldiers and their equipment, it features permanent rear-wheel drive with selectable all-wheel drive and is highly versatile. This vehicle is set to be complemented by a platform with greater payload capacity. On 4 September 2024, the Federal Office of Bundeswehr Equipment, Information Technology, and In-Service Support (BAAINBw) initiated a participation competition on the TED procurement platform for the acquisition of light, air-transportable (LL) mission/combat vehicles.



▲ The Fardier ATV is used by the French special forces and paratroopers.
(Photo: AF)



▲ Mortar vehicle based on the FLYER 72
(Photo: AF)

The procurement plan includes 200 vehicles, divided into 150 LL mission/combat vehicles and 50 LL support vehicles. The designated users include the Kommando Spezialkräfte (KSK), the Kampfschwimmer (SEALs) of the Naval Special Forces Command (KSM), and the long-range reconnaissance units. The requirements specify a highly mobile, off-road capable, unprotected two-axle (4x4) vehicle with an open configuration featuring a roll cage. Additional requirements include a maximum gross vehicle weight of 3.2 tonnes, a payload of 1.5 tonnes, a single-fuel concept, and a minimum range of 300 km when fully loaded. The vehicle must be transportable both as an internal and external load on the Sikorsky CH-53 and Boeing CH-47 Chinook helicopters. A shortlist of potential candidates has since been drawn up, excluding the Polaris DAGOR A1 (via D.E.S. Defense) and the Search and Rescue Tactical Vehicle – Side by Vehicle (SRTV-SXV) by BC Customs, represented by Messer Waffenhandel und Sicherheits GmbH. Another potential contender could be the Defenture GRF, although reports suggest a Spanish solution is the current frontrunner. In 2021, the U.S. Air Force Special Forces procured the highly mobile, internally transportable SRTV-SXV, which is compatible with the MV-22, CH-47, and CH-53 helicopters and can also be airdropped via parachute. Based on a race buggy, the SRTV-SXV is characterised by its lightweight design and high mobility. Weighing approximately 1.5 tonnes (unladen), it is powered by a 170-horsepower diesel engine, with a gross vehicle weight of around 3 tonnes. The Polaris DAGOR (Deployable Advanced Ground Off-Road) builds on the MRZR series and ventures into a higher performance and weight class. The DAGOR A1 is an ultralight, high-speed combat vehicle with significant payload capacity, specifically developed for the needs of light infantry and special operations forces. Its chassis incorporates components from the off-road specialist Fox, with long suspension arms and a central frame allowing for extensive wheel travel. Exceptional off-road capability and high speed make it a difficult target to engage. An optional protection kit offers underbody and waist-high side protection against fragmentation and ballistic threats. The 4-cylinder turbo-diesel engine (approximately 250 horsepower) can run on JP8 fuel, with a range of 805 km

at full load. The DAGOR accommodates up to ten soldiers, and its payload capacity can be increased from 1.8 tonnes to 2.0 tonnes through chassis modifications. With an unladen weight of 2.1 tonnes and a narrow width of 1.88 m, the DAGOR can be transported as an internal load in CH-47 and CH-53 helicopters or as an external load under a UH-60 Blackhawk. It can also be airdropped using the Low Velocity Air Drop (LVAD) method. The vehicle has a gross weight of 3,856 kg and a towing capacity of 3 tonnes. The roll cage features a ring mount for heavy weapon systems, supporting up to .50 calibre machine guns (BMG). Official operators of the DAGOR include the U.S. Navy SEALs, Delta Force, Austria's Jagdkommando, and the armed forces of Australia, Canada, Romania, the United Arab Emirates, and Turkmenistan. For particularly challenging terrain, the DAGOR can be fitted with tracks. Polaris vehicles are marketed and supported by Rainer Diederich GmbH D.E.S. Defense. While the MRZR ALPHA 6x6, Rheinmetall CARACAL 6x6, and ACS Armoured Car Systems GmbH ENOK 6x6 may meet the performance criteria, they are excluded due to the requirement for a two-axle configuration. The contract for the light, air-transportable (LL) mission/ combat vehicles is expected to be awarded in March/April 2025. One significant challenge for many suppliers will be the "Germanisation" of the vehicles, including achieving road-legal certification in Germany. The Rheinmetall AGF SERVAL used by German Special Forces is being replaced by the AGF 2. For this purpose, the Dutch specialist in off-road vehicles, Defenture, is delivering a vehicle based on its MAMMOTH platform. This multi-purpose mobility platform, with a weight class of up to 8.8 tonnes, offers a payload capacity of up to 3,500 kg. It has been designed to meet the needs of multiple military users and utilises the same Central Spine Chassis Principle (CSCP) that is also employed in the battle-tested GRF platform from the same manufacturer. The smaller GRF (Groundforce) is currently in use or set for imminent deployment with the Dutch Special Forces (as VECTOR), the Swiss military (as LAUF 20), and the Austrian military. On 4 April 2024, the Dutch manufacturer handed over four prototype models of the AGF 2 to WTD41 in Trier for testing.

Defenture showcased its in-house development vehicle at the 9th KSK Symposium on Armaments. Notable among the published photographs in the accompanying brochure were images of the KSK platform, including its initial configurations. The vehicle is expected to feature a ZM_10-060 telescopic mast for reconnaissance sensors, an "Eggbeater" Tacsat antenna AV2091, and the PILAR V gunfire detection system by Metravib Defence. The "Eggbeater" antenna, for example, is typically used in conjunction with the L3 Harris PRC-117G for satellite communication. The PILAR V is the core sensor of the Vectronics system, enhancing situational awareness by enabling the exchange of data between "networked" vehicles, thereby maximising battlefield digitisation and information superiority. PILAR V can integrate with a Battlefield Management System (BMS) for friend-or-foe identification and data sharing between vehicles and command centres. According to the manufacturer, the PILAR V gunfire detection system can be easily integrated into a wide range of vehicle platforms, from light 4x4 vehicles to main battle tanks. Recent Bundeswehr images also show additional equipment, including a multi-functional camouflage lighting system (by D.E.S. Defense), the Rheinmetall ROSY rapid obscurant system, a motorised rotating turret by Sima Innovation, which can be armed with a heavy .50 BMG machine gun or the KNDS France P20 20 mm autocannon. Meanwhile, ACS Armoured Car Systems GmbH is working on ENOK-based

versions (4x4 and 6x6) to offer the platform for additional operational roles. It remains uncertain whether these vehicles will ultimately be marketed by ACS as ENOK or by Rheinmetall as CARACAL. Notably, up to 15 different vehicle variants were initially envisioned for the air-mobile platform now known as CARACAL. Precision Technic Defence (PTD) recently unveiled reconnaissance and mortar carrier variants based on the General Dynamics FLYER 72 Tactical Utility Vehicle (TUV). The mortar carrier, also referred to as the Flyer 72 Multi-Purpose Mobile Fire Support System (MPMFSS) or Flyer 72 Heavy Duty (HD), is equipped with the Alakran 120 mm mortar system integrated at the vehicle's rear. This system can fire up to eight mortar rounds within 90 seconds. In addition to the mortar system, the Flyer 72 can carry up to 180+24 (rear and bonnet-mounted) 81 mm mortar rounds or 70+6 120 mm rounds, alongside a three-person crew. Upon arrival at an operational site, the first round can be fired within 90 seconds. A rear-mounted automatic system ensures rapid deployment and retrieval of the weapon. Once stowed, only the baseplate remains visible outside the vehicle, with the rest securely housed internally. The reconnaissance variant of the Flyer 72 features a STS-6 mast by Tower Solutions mounted at the rear. The mast can accommodate a variety of sensors and extend to a height of 20 feet within 60 seconds. It is capable of withstanding wind speeds of up to 96 km/h.



▲ Defenture MAMMOTH as a company vehicle. The AGF 2 for the KSK is being developed on this platform.

(Photo: AF)



▲ The Search and Rescue Tactical Vehicle - Side by Vehicle (SRTV-SXV). Here is a picture from the KSK Armaments Symposium 2022

(Photo: AF)



▲ Polaris DAGOR at the KSK Armaments Symposium 2022, here for four soldiers and with a launch container for guided missiles at the rear. (Photo: AF)

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Motorcycles

Several units, particularly special forces and reconnaissance units, are already utilising the electric motorcycle produced by STRIX eMotors d.o.o. from Slovenia. STRIX highlights that the bike has a NATO supply number, enabling it to be easily and quickly procured by NATO member states through the NATO supply chain. The vehicle is entirely manufactured in Slovenia, with no components sourced from East Asia, thereby eliminating supply chain dependencies. The motorcycle delivers 95 hp, weighs 118 kg, and has a top speed of 125 km/h. Its 6.3 kWh battery provides a runtime of up to 80 minutes (with a range of 100 to 120 km). The payload capacity is rated at 150 kg. The battery can be replaced in seconds or charged from 20% to 80% within 10 minutes using a fast-charging system. STRIX emphasises that this is primarily an electric hard-enduro bike, designed for heavy loads and rugged terrain. The riding style can be adjusted in seconds using various pre-programmed riding modes via the intelligent dashboard and STRiX app. Available modes include: Stealth Mode (silent operation with minimal heat emission), Walk Mode, ECO Mode (power-saving), Rear Mode, and Sport (maximum performance to facilitate rapid disengagement from hostile forces). The Rear Mode is particularly noteworthy, as it transforms the electric motorcycle into a snowmobile. The front wheel is replaced with

a ski, and the rear wheel with a track drive, enabling special forces to deploy the vehicle year-round. The German Army 1st Reconnaissance Company in Schwarzenborn, Germany has been testing the EMU E-Bike, developed by the Bavarian-based ACS Armoured Car Systems (ACS). The EMU is based on a trial e-bike from the French manufacturer Electric Motion. The electric drive allows for silent movement, and operating the bike requires an A1 motorcycle licence. The EMU delivers 11 kW, has an unladen weight of 80 kg, and a payload capacity of 125 kg. A single battery charge provides a range of up to 40 km, with the battery being replaceable in seconds. Diederich Engineering Systeme (D.E.S.) Defense GmbH offers a similar solution with its e-boost vehicle. The e-boost blends the characteristics of a bicycle and an electric motorcycle. Weighing only 70 kg, it offers acceleration from 0 to 50 km/h in just 1.5 seconds. Equipped with robust off-road tyres and shock-absorbing suspension, the e-boost is designed for extreme terrain. Each braking action recharges the battery, providing up to 20% additional range. The battery offers a range of approximately 100 km and can be recharged from 20% to 80% in 45 minutes. This German-made enduro bike, which requires an A1 licence, is highly lightweight and mobile, offering excellent speed and performance in challenging terrains.

▼ FURIE buggy concept from manufacturer Etendard for the French special forces. (Photo: AF)





▲ STIRX electric motorbike from Slovenia. The entire supply chain is located in Europe. (Photo: AF)



▲ Enduro from KSK based on the Yamaha WR450, tare weight <130 kg, max. total weight approx. 300 kg. (Photo: AF)

Spare parts are easily accessible through German supply chains, ensuring availability even during crises. The manufacturer, e-boost GmbH, is based in Waldkirch near Freiburg. The French special forces rely on the FOU DRE from Etendard for tactical motorcycles. The FOU DRE is based on the Yamaha WR 250 F 2024 and features a 10.6-litre main fuel tank (with additional mounts for a total capacity of 19.8 litres, allowing for a range of 250 km). The bike includes an automated tactical clutch to prevent stalling, a high-performance filtration system, and underbody protection. The optimised exhaust system reduces thermal and acoustic signatures. Additional features include visible LED lighting and IR940 infrared lighting. Various riding modes are available, balancing performance with maximum range. The bike's 250 cc single-cylinder engine delivers 35 hp, with an unladen weight

of 120 kg. It is capable of running on a range of fuels, from RON 91 to RON 102. At Eurosatory 2024, Rheinmetall presented its lightweight ERMINE buggy hybrid vehicle family, exemplified by a 6x6 configuration. The ERMINE represents a next-generation mobility solution, combining tactical transport with a mobile energy source (microgrid) and full autonomy readiness. The modular ERMINE family currently consists of: an Unmanned Ground Vehicle (UGV), a Side-by-Side buggy, and a Quad. Various 4x4 and 6x6 variants are available, all sharing the same diesel-electric hybrid powertrain and base platform. Depending on the configuration, the hybrid technology supports a payload of up to one tonne, a range exceeding 1,000 km, and a top speed of 90 km/h. Up to four ERMINE vehicles can be transported in CH-47 or CH-53 helicopters.

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Amphibious Vehicles

The SHERP is a specialised amphibious vehicle with a large unprotected cabin. According to the manufacturer, a protected version is not feasible due to its swimming capability. The vehicle is developed and manufactured in Ukraine and is also marketed in Europe. The SHERP N 1200 has been on the market for four years. Key features of this amphibious all-wheel-drive vehicle with tubeless low-pressure tyres include its skid steering system, where the driving direction is controlled by braking the wheels on one side. The maximum speed is 40 km/h on land and 5–6 km/h in water. It is powered by a 1.5-litre Kubota diesel engine, delivering 45 hp. The tyre pressure can be reduced to as low as 0.5 bar, which enhances its off-road and amphibious performance. The fuel tank has a capacity of 80 litres, with optional 58-litre auxiliary tanks that can be installed in each of the four-wheel hubs. The vehicle offers a ground clearance of 0.6 m, meaning it begins floating automatically in water depths exceeding 70 cm. The payload capacity is 1.2 tonnes. Thanks to its unique capabilities, the SHERP is particularly suited for troop transport in extremely rugged terrain. "As the driver, you feel unstoppable!" remarked

one of the test drivers. The current variant is operated using levers, reminiscent of traditional tank controls. However, a new model is under development, which will feature a steering wheel instead. This new, smaller vehicle is designed as a multipurpose vehicle and is still in the prototype stage. It will include an automatic transmission and is expected to be available in early 2025. The SHERP N 1200 can overcome obstacles up to 1 metre in height and climb out of water onto ice sheets. It can also handle lateral inclines of up to 30°. Propulsion on both land and water is exclusively achieved through the tyres; there is no separate propulsion system for water, resulting in a relatively low speed of 5–6 km/h in aquatic environments. The SHERP accommodates up to nine passengers in addition to the driver. The SHERP The Ark is essentially a SHERP N 1200 equipped with a 6×6 trailer. Depending on the configuration of the trailer, the vehicle can transport large or heavy payloads (up to 2 tonnes) or up to 22 passengers. The total length of this combination is 9.7 metres. A flatbed variant of the SHERP has also been developed, which can be armed with weapon systems such as rocket launchers or remote-controlled weapon stations.

▼ The amphibious vehicle SHERP N 1200.
(Photo: AF)



GORE-TEX PROFESSIONAL FABRICS

A robust lightweight for combat boots: EXTRAGUARD technology

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New and innovative EXTRAGUARD upper technology

EXTRAGUARD upper technology consists of three layers - a highly abrasion-resistant, easy cleaning and flame-retardant outer protective layer, a functional layer that provides mechanical protection and an innovative construction inner layer with low water absorption properties. This 3-layer upper is sealed with GORE SEAM® Tape and integrated into the shoe along with the interior waterproof and breathable GORE-TEX lining (bootie construction). The seam sealing prevents moisture from entering the shoe through the seams between the upper material and the GORE-TEX lining. The EXTRAGUARD construction absorbs practically no moisture in

the outer material and the gaps from the outside even if the water-repellent treatment has worn off or the upper material is damaged. This keeps feet dry and warm at all times in wet or cold conditions. Thanks to this unique construction, the EXTRAGUARD upper is 40 percent lighter than equally strong and dry leather when dry. Because it absorbs less moisture from the outside, it remains lightweight even when wet and dries significantly faster. GORE-TEX EXTRAGUARD combat boots retain their functional properties even after long-term use and constant wear in wet environments.

Comfortable fit, easy cleaning, robust protection

GORE-TEX combat boots with EXTRAGUARD upper technology are comfortable from the start, do not need to be worn in and retain their shape even after long-term use and constant wear in wet environments. Their robustness offers reliable protection against sharp objects, common chemicals, moisture and cold. Hosing with water is all that is needed for care and cleaning; specific care products are not necessary.

High performance and reduced environmental impact

EXTRAGUARD upper technology also sets new standards in terms of sustainability: according to the Higg MSI (Higg Materials Sustainability Index, [higg.com](https://www.higg.com)), the upper is manufactured with less water, CO2 emissions, chemicals and chrome-free. It is also produced by roll, so there is less material waste in the production of GORE-TEX EXTRAGUARD combat boots. In sum, all factors significantly minimize labor, material use and overall environmental impact.



Author: Navid Linnemann & Rainer Krug

Systematic combat clothing

The Bundeswehr Research Institute for Materials, Fuels and Lubricants (Wehrwissenschaftliche Institut für Werk- und Betriebsstoffe, WIWeB) of the German armed forces (Bundeswehr) in Erding is setting new standards. This can be taken quite literally when it comes to clothing, because the Bundeswehr is working on its own standard sizes for its soldiers. But that's not all: WIWeB is also putting new materials through their paces and developing robust and comfortable clothing for the soldiers. For possible future applications, smart solutions for textiles, such as the measurement of vital signs, are also being developed as prototypes so that these can be taken into consideration when drawing up requirements for future clothing items. Combat clothing for female and male soldiers in the Bundeswehr is subject to a constant change and adaptation process. The aim is to adapt the clothing and equipment to modern requirements and suitability for combat, while raising comfort, functionality and protection to a new level. The WIWeB in Erding plays a key role in this. Not only are new clothing systems tested here, but innovative approaches to the development and procurement of combat clothing and protective equipment are also developed, incorporating industry know-how.

▼ A soldier wears the new combat clothing set for the armed forces (personal equipment), MOBAST (modular ballistic protection and carrying equipment for soldiers) and the new modular backpack carrying system.

Specialisation in the combat clothing system

By the end of 2025, all soldiers in the Bundeswehr are to be equipped with the combat clothing set for the armed forces (Kampfbekleidungssatz Streitkräfte, KBS SK). In addition to the normal 'combat suit', this new combat clothing system also includes cold and wet weather protective clothing for extreme weather conditions. This equipment is based on high-performance textiles that use the latest technology to provide protection against reconnaissance, fire, infectious diseases, heat and cold. The WIWeB has comprehensively revised the design for follow-on procurements of the KBS SK from 2026 onwards in collaboration with users and based on their experiences in everyday military operations. Improvements include an extended size range, a revised combat shirt and – in collaboration with industry – the development of special women's cuts for individual items of the KBS SK, which was originally introduced as a unisex item.



Challenges of modern soldier clothing

Modern military clothing has to do much more than just fulfil a clothing function. It has to be robust, durable and weather-resistant in order to withstand the demands of training and combat operations. However, combat clothing must also be modular in design so that it can be adapted to different deployment scenarios. It should also be ergonomic and comfortable, as well as fitting the soldier snugly in order to support their performance. Of course, there are also specific requirements such as camouflage properties and mosquito repellent treatment. Combat clothing is more than just outdoor clothing – even if there are overlaps in the material, for example. In order to be prepared for possible future developments in the field of combat clothing, WIWeB generally applies a variety of approaches.

- **Material testing:** The WIWeB tests and assesses new textiles from the private sector that have been detected by market research, among other things, to determine their suitability for military use. This includes mechanical stress tests, weather exposure and chemical analyses.
- **Practical tests:** Soldiers test new equipment and clothing components in realistic deployment scenarios. Particular attention is paid to comfort, fit and functionality.
- **Research and development:** The WIWeB works with research institutions and industrial partners to develop and further develop innovative materials and technologies.
- **Feedback processes:** Products are optimised based on feedback from the troops. This iterative approach ensures that the equipment meets actual requirements.

Digitisation and anthropometric databases

One particularly forward-looking WIWeB project is the creation of a comprehensive anthropometric database based on serial measurement of the troops. Between 2022 and 2023, around 2,300 soldiers were measured at six military bases using modern 3D body scanners. WIWeB was able to draw on the expertise of a company that had already carried out a nationwide serial measurement. The aim of this Bundeswehr project is to obtain precise data on the body measurements and shapes of the soldiers in order to develop better-fitting and more functional combat clothing. Until now, the clothing sizes used for clothing development were based on civilian and often very old data sets, which could lead to fit problems. The soldiers were scanned in four different positions using the 3D body scanners. This allowed 160 body measurements to be taken for each person and saved as an anonymised data set. The 3D serial measurement in the Bundeswehr has now been completed. The data obtained is now being evaluated and will be incorporated into a special body dimension portal as a Bundeswehr-specific data set, among other things. Here, the data sets can also be compared with the body dimension data of the German civilian population and evaluated. From 2025, the data should then be available to WIWeB and, among other things, incorporated into the development of new size grids and patterns. The digitalisation of the entire process, from the development of the clothing to its provision to the soldiers, should also optimise logistics. In the future, this anthropometric database could also be used for other applications, such as the development of protective vests or the ergonomic improvement of vehicle interiors.

▼ The new combat clothing set Armed forces still in the previous spotted camouflage.



Smart textiles and innovative materials

Another exciting field is research into so-called smart textiles, i.e. intelligent textiles with integrated technology. These could, for example, record the wearer's vital signs and transmit them in real time or be used as charging stations or to distribute power and data for electronic devices. WIWeB is working closely with universities, civilian innovation laboratories and start-ups to make technologies from these fields usable for military purposes. Research is currently being conducted into the integration of sensor technology into combat uniforms that can provide real-time data on the physical condition of the wearer. This would enable group leaders on a mission, for example, to recognise by their soldiers' increased pulse or breathing rate who is currently under particular stress and may need to be taken out of the mission. This decision could be supported by a colour display that marks conspicuous vital signs in red, for example. Another smart textile currently being researched is a fabric that can conduct electricity and data. The electricity is conducted within the combat clothing in a network-like manner and electrical devices such as flashlights, GPS or radio devices can be attached to several connection points – for example on the shoulders, on the chest, in the hip area. One advantage of the network structure of the smart material is its resilience to damage. A severed cable is inoperable, but in the network of smart textiles, the electricity finds alternative routes.

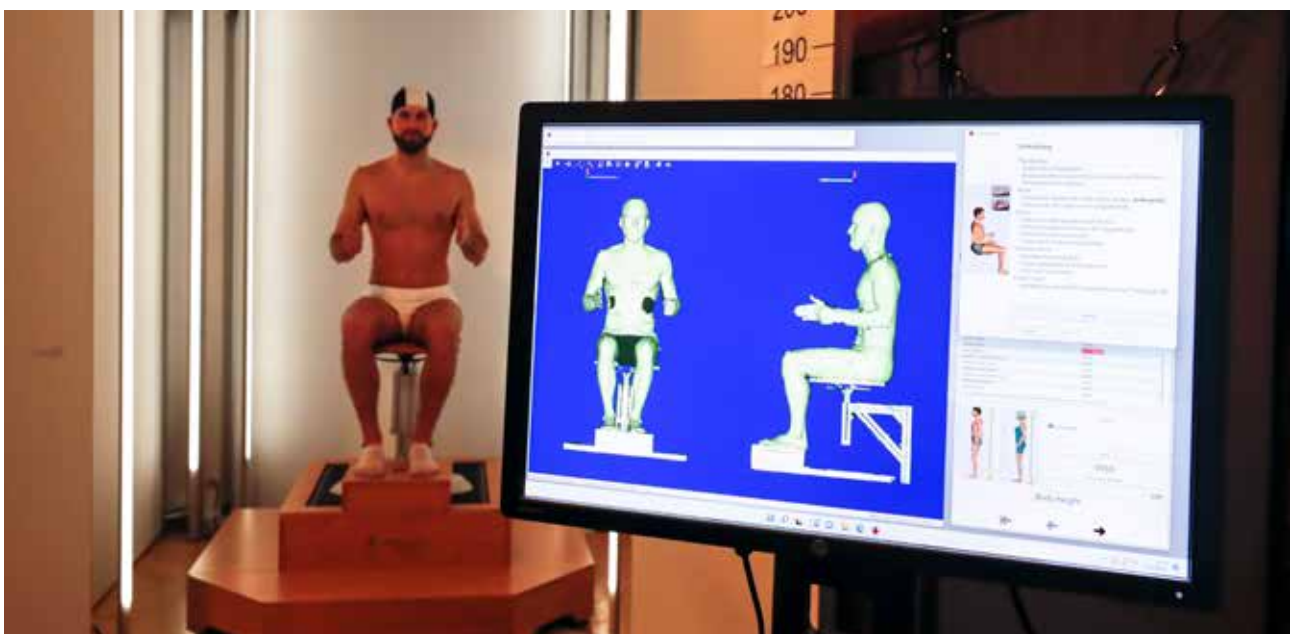
What soldiers will wear in the future

The work of WIWeB shows how important research and development are for equipping modern armed forces. Close cooperation with the troops and industry ensures that the Bundeswehr will continue to be very well equipped in the future. This is not only about efficiency, but also about the safety and well-being of the soldiers.

Example: Vector protection as an innovative material

With the development of clothing with a vector protection finish, in which the WIWeB played a major role, the Bundeswehr has already created a finished innovative material that sets new standards in protection against disease-transmitting insects and arachnids. The central feature here is the application of a biocide that is applied specifically to or in textiles. In contrast to conventional methods such as dipping or spraying, the active ingredient is embedded in a plastic matrix that releases it slowly and evenly onto the textile surface. This ensures that the protective effect is maintained even after up to 100 laboratory wash cycles and should thus cover the entire lifespan of the clothing. This approach ensures long-lasting protection against vectors (disease carriers) and thus reduces the potential health risks of combat clothing with vector protection. Studies conducted in collaboration with the German Federal Institute for Risk Assessment confirmed that there is no health risk to humans from contact with the biocide used. At the same time, this technology protects the troops from serious infectious diseases such as malaria, dengue fever or tick-borne encephalitis, which increases operational readiness and minimises absences due to illness.

With projects such as 3D serial measurement and research into smart textiles, as well as the development of specialised clothing systems, the Bundeswehr is well equipped to meet future requirements. The WIWeB in Erding will continue to play a central role in this.



▲ 3D serial measurement at a Bundeswehr property.
Photo: Bundeswehr



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WE THINK PRESSURE & FLOW

Author: André Forkert

EXTRAGUARD Combat boots: Always dry feet

Since December, four Bundeswehr comrades have been testing the prototype of a new combat boot developed by Lukas Meindl GmbH & Co. KG, experts in alpine, sports, outdoor, and combat footwear. This was an unofficial test, not sanctioned by the Bundeswehr. The focus of the test was not so much the boot itself but rather the new EXTRAGUARD upper material by W. L. Gore & Associates. This material aims to be an alternative to full leather or leather-textile hybrids, with Gore promising numerous advantages. These claims were rigorously evaluated through diverse tests, missions, climatic conditions, and daily service routines.

Low Water Absorption and Rapid Drying

A key aspect of modern combat boots is weight reduction. Gore promises a weight saving of approximately 40% for the leather components (in dry conditions). So, onto the scales: the EXTRAGUARD pair, in EU size 44.5, weighs 1,867 grams. The Bundeswehr issued combat boots (heavy variant) in the same size weigh 1,963 grams—just 100 grams more. However, to be fair, this comparison may be somewhat skewed as the EXTRAGUARD boots resemble the issued mountain boots in texture and appearance. These weigh 2,126 grams (+259 grams). Weight figures for all boots include identical orthopaedic insoles and may differ slightly from manufacturer specifications. A savings of nearly 300 grams is significant. Leather becomes very heavy when wet, but EXTRAGUARD remains virtually unaffected. The new multi-layered material has low water absorption due to its low-water-pick-up feature.

Seams are additionally sealed from the outside to prevent water ingress and keep feet dry. EXTRAGUARD combat boots dry significantly faster than boots made from conventional materials (leather, textiles, or their combinations). According to Gore, moisture penetrates only as far as the inner construction layer of the EXTRAGUARD upper, where it is halted. This reduces heat loss, ensuring that feet remain dry and warm even in cold, wet climates. The water absorption was tested in wet meadows, snowfields, and during a 4 km water march, ensuring no water entered from above. After nearly an hour in water, the socks remained dry. The boots were then submerged for an additional 1.5 hours in a water-filled basin, and still, no moisture penetrated the outer material. Regardless of the conditions, the feet remained dry. Leather boots require intensive cleaning and maintenance, particularly when frequently exposed to wet conditions. EXTRAGUARD does not require this level of care and can even be cleaned with a pressure washer, according to Gore. Additionally, they dry much faster, as confirmed during tests. Maintenance is minimal—just water and a sponge; no polishing is needed, reducing the need to carry polish on exercises or missions (weight savings). Another advantage: leather boots usually require extensive walking in. This is unnecessary with EXTRAGUARD. While leather boots tend to stretch significantly when wet and overused, EXTRAGUARD retains its shape and rigidity. Gore claims the boots are comfortable from the start, require no walking-in, and remain form-stable. After five months of testing, this was confirmed—no walking-in was required, no blisters or injuries occurred, and the boots showed no deformation after use.



▲ Whether it was wet meadow ground, snow or a water march, the foot always stayed dry.
(Photo: AF)

Neither Wet nor Cold Feet

Mountain tours in the Bavarian Alps further demonstrated the boots' waterproof qualities. A mountain infantryman summarised: "The craftsmanship of the boot is outstanding. Weaknesses of the Bundeswehr-issued mountain boot, such as the rand (rubber edging above the sole) separating when the boot flexes, are absent. Similarly, the padding on the heavy combat boot's collar eventually breaks down, exposing the foam. None of these issues were observed with the test boots." The boots are also very comfortable around the ankle—soft and flexible, avoiding pinching or constriction. This is particularly important during long and challenging mountain tours. Most importantly, they keep the feet dry! The boots were highly water-repellent from the start. Neither wet meadows nor snow in the mountains caused any issues. During the tests, the socks remained dry, provided water did not enter from above. The internal foot climate was also rated positively, both in mountainous regions and the jungle. Excessive sweating of the feet, which can be hazardous in cold conditions, was not an issue. Additionally, they cooled down less when stationary compared to full leather boots. "The feet were never cold, even during extended field exercises. There was also no unpleasant odour. The insole is of high quality, unlike some issued models," said the mountain infantryman. In Asia's hot and humid jungle climate, with monsoon-like downpours and temperatures above 30°C, the boots performed well. Contrary to expectations of hot feet during long stretches, the EXTRAGUARD boots provided a cooler and more comfortable climate compared to full leather boots. Despite the monsoonal rain, the interior remained dry. Interestingly, the material displayed a lotus effect: water droplets beaded off and rolled down the sides.

▼ Whether it was wet meadow ground, snow or a water march, the foot always stayed dry.
(Photo: AF)



Sustainability

Due to its shape stability and low maintenance requirements, Gore claims EXTRAGUARD has a reduced environmental impact compared to leather: Less chemicals, less water consumption and reduced CO₂ emissions. This was supported during the tests. However, infantry personnel noted one caveat: for them, the sole typically wears out faster than the upper material. After 12 to 18 months, soles are often worn down. Many issued and privately purchased boots cannot be resoled with original outsoles. Sustainability only makes sense if resoling is feasible. Manufacturer Meindl states: "All of Meindl's hiking, trekking, and mountaineering boots are resolvable." Perhaps other manufacturers and procurement authorities need to reconsider: combat boots must be resolvable. Why not include double the number of resoling services alongside boot procurement contracts? Resoling is usually cheaper than new boots, eliminates the need for walking-in, and enhances sustainability. Gore also considers sustainability during production. Less waste is generated compared to leather, as EXTRAGUARD is produced as sheet material. This reduces material waste. Additionally, its production requires 80% less water compared to leather tanning, generating 60% less CO₂.



Hendrik Engelhardt & André Forkert

CURRENT SMALL ARMS PROJECTS OF THE GERMAN ARMED FORCES

The concept of Small Arms and Light Weapons of the Bundeswehr (KonzHFWa/leWaBw; Konzept Handfeuerwaffen und leichte Waffen der Bundeswehr) "outlines the conceptual requirements for a capability-oriented, mission-specific provision of small arms (HFWa) and light weapons (leWa) for the operational spectrum of the Bundeswehr as a comprehensive and continually updated foundation for adequate equipment." Various categories are derived and detailed accordingly. This concept serves as the foundation for the following excerpted overview of current small arms projects

Pistols

The pistols currently in use by the Bundeswehr are to be replaced by two new pistol systems. These are the Special Forces Pistol System (System Pistole Spezialkräfte) and the Cross-Sectional New Pistol System (System Neue Pistole, querschnittlich). The Special Forces Pistol System will replace all previously used sidearms within the Bundeswehr's Special Forces. The new system not only provides the Special Forces with the firearm but also includes all supplementary components to ensure the required capabilities in line with the latest technical and ergonomic standards. It is particularly characterised by a high degree of adaptability to various Special Forces missions. The Special Forces have selected the Walther PDP pistol for their system, which will be introduced into the Bundeswehr as the P14 (standard model) and P14K (compact model). The system includes or will include an extensive pool of accessories, notably the Aimpoint ACRO P2 sight and the two-part B&T Impuls-XM suppressor. The suppressor, made of titanium using 3D printing, can be employed with or without its additional module. With the module attached, suppression

performance is enhanced. The suppressor weighs 205 g; the additional module adds a further 48 g. Without the module, it is 156 mm long and achieves a noise reduction of 22 dBA; with the module, it measures 195 mm and achieves a reduction of 28 dBA. The Cross-Sectional New Pistol System will completely replace the Heckler & Koch P8 pistol in the Bundeswehr due to technical and ergonomic considerations. The new system, designated as P13, provides the armed forces with a scalable secondary weapon aligned to modern technical standards. The elimination of an external, mechanical safety mechanism operated by the user enhances both usability and operational safety by reducing the number of fine motor actions required. Safety is ensured by a combination of internal mechanisms such as trigger safety, firing pin safety, drop safety, and strike safety. A participation competition for the "cross-sectional pistol" commenced in early November, with applications due by 4 December 2024. The calibre will remain 9 x 19 mm NATO, as with the P8. The tender did not specify accessory requirements, but it is expected that the pistol will at least be optical-ready (OR).

▼ Walther P14 (left) and P14K, on top the Aimpoint ACRO P2 Red Dot weapon sight.
(Photo: Walther)



Submachine Guns

The Bundeswehr continues to equip select personnel, such as vehicle crews and operators of heavy weapons/systems, with the MP7A1 submachine gun. Procurement is ongoing to meet the forces' requirements, which include the base weapon and various accessory kits. These kits mainly differ in their sighting options, enabling the MP7A1 to be employed in specialised roles.

Rifles

The Bundeswehr differentiates between assault rifles, designated marksman rifles, and sniper rifles. The Bundeswehr Assault Rifle System project (G95A1 and G95A1K) is in progress, with integrated verification currently underway, including operational testing. Following the subsequent declaration of operational readiness by the organisational branches/components and additional process measures, delivery of the first series weapons is expected in 2026. The system will include both long-barrel and short-barrel variants, complemented by modern sighting systems and aiming aids. Special Forces have already received a precursor variant, the G95K. This is an early version of the G95A1/A1K Bundeswehr Assault Rifle System. The optics selection for the G95A1 remains a key question. While it has long been established that the G95A1 will use the ELCAN Specter DR 1-4x as its primary combat sight (Hauptkampfvizier, HKV), supplied by Leonardo Germany GmbH, recent criticisms and demands for alternatives have emerged. During testing, the

manufacturer was requested to make improvements. There are therefore various scenarios: Use of the ELCAN Specter DR 1-4x as an HKV for all weapons to be procured, or acceptance of a contractually agreed minimum quantity and search for a procurement alternative. The minimum quantity could then be stored in the depots as a reserve, for example, or donated to friendly armed forces, in particular Ukraine or Lithuania. Alternatives include the weapon sight Hensoldt ZF4 MKO. This is a further development of the 4x30i optic, which has long been used cross-sectionally in the Bundeswehr. Variants are used, for example, in the Infanterist der Zukunft system or on the MG4/MG5 weapons. According to the manufacturer, the new ZF4 MKO is optimised for the HK416, which forms the basis for the Bundeswehr's new G95A1 assault rifle. The ZF4 MKO can, or rather should, be combined with a red dot sight with single magnification. Hensoldt recently demonstrated the combination with the Aimpoint ACRO P-2, a genuine red dot sight with single magnification that is permanently mounted on the ZF4 MKO. This means that the shooter does not have to operate a switch to change from 1x to 4x magnification or vice versa. He simply moves his eye a few centimetres. The ACRO P-2 is used because it is a true reflex sight, so the eye relief does not matter and the shooter does not have to search for the red dot first. In addition, the housing of the ZF4 MKO has already been designed in such a way that the ACRO P-2 is mounted firmly and directly in the housing of the ZF4 MKO. This minimises the overall height. The use of various attachments, for example the IRV-MR or the HENSOLDT NSV-600, makes it suitable for night combat.

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Special Forces have made significant progress by selecting the G39 (an HK437), which will replace the obsolescent HK MP5SD. The new system aims to improve range and lethality compared to the MP5SD, achieved by adopting the 7.62 mm x 35 (.300 BLK) cartridge instead of the previously used 9 mm x 19 cartridge. Signature suppression performance will be maintained. The decision on optics is still pending. For short-range engagements, the EoTech/Magnifier combination will be used, with potential augmentation by a telescopic sight yet to be determined. Designated marksman rifles already in service include the G27P and G28. Initially procured for Special Forces, the G27P was later introduced as part of the interim G36 replacement for general use. The ongoing Designated Marksman Rifle project is deploying the G27P across Bundeswehr units, with plans to upgrade its sighting systems using existing solutions to meet functional requirements. The G27 currently uses Schmidt & Bender's 3-12x50 PMII and Hensoldt's 4x30I RD, while the G27P version employs the 1.5-6x20 PMII ShortDot. A transition to an existing 1-4x or 1-8x telescopic sight is planned, depending on obsolescence considerations. The G28 rifle was introduced for deployment as a replacement for the G3 designated marksman rifle. As part of an ongoing project, it is being integrated as a support weapon for sniper teams. Adjustments to accessory kits aim to harmonise sighting systems using established technical solutions. Currently, the G28 employs the Schmidt & Bender 3-20x50 PMII for standard configurations and the Schmidt & Bender 1-8x24 PMII ShortDot Dual CC for patrol configurations. Future upgrades may include optics from the G22A2, such as the Steiner M5Xi 5-25x56. The sniper rifles G22A2 and G29A1 have recently been upgraded to current technical standards. Sniper rifles are categorised into short, medium, and long-range bands. The Medium-Range Sniper Rifle project is conceptually developing a solution to combine short- and medium-range capabilities into a single platform. A bolt-action rifle with calibre-switching capability is being designed to eventually replace the current systems. Similar systems are already being introduced by other nations. The G22, originally equipped with the Hensoldt 3-12x56, now utilises the Steiner M5Xi 5-25x56 in the A2 version. The limited G23 rifles use the Schmidt & Bender 3-12x50 PMII, while the G24 uses the Schmidt & Bender 5-25x56 PMII. The G29 was delivered with the Steiner M5Xi 5-25x56, which remains in use on the G29A1 version. Special Forces are introducing the G210 (an HK308 A6), a semi-automatic short-range sniper rifle offering high precision while remaining lightweight for enhanced mobility. In 2020, Schmidt & Bender secured a separate optics contract for its 5-20x50 PMII Ultra Short. The G82A1 long-range rifle covers distances up to 2,000 metres. Plans are underway to upgrade the entire G82A1 fleet to a modern configuration, including improved functionality such as signature suppression. The need for high firepower at extended ranges remains a priority.



▲ G95K as it is currently used by the Kommando Spezialkräfte (KSK). The cross-sectional variants G95A1/A1K will differ in weapon and accessories. (Photo: Bundeswehr/Neumann)



▲ G95K as it is already being used by the Special Forces Command. Here during shooting training.
(Photo: Bendig/Bundeswehr)



Machine Guns

The machine guns MG3, MG4, MG5, MG6 (Dillon Aero M134D), and M2 QCB will continue to be used, with additional procurement as needed. MG3 stocks are gradually being reduced, while inventories of all MG5 variants are increasing. The MG4 is being upgraded to the MG4A3 standard to align its operation with the MG5. The MG6, a high-rate-of-fire machine gun, is being integrated into additional platforms and utilised jointly by the armed forces. The heavy M2 QCB machine gun is also being procured for integration into various, including new, platforms to meet requirements. Suppressors and flash hiders are being integrated into machine guns to enhance night combat capability and self-protection. The MG5's tripod mount, originating from the 1930s, is being replaced with a modern successor for ground operations.



▲ MG5 on tripod. The old tripod needs to be replaced in the near future. (Photo: AF)



▲ The MG6, shown here on board an Airbus H145M LUH SOF. The weapon can be used on board of helicopters, the AGF SERVAL of the KSK or on tripods. Further platforms are now to be added. (Photo: Bundeswehr/Heyn)

Light Weapons

In addition to rifles, infantry and infantry-operational units of the Bundeswehr have 40 mm grenade launchers. Currently, an underslung launcher for the G36 and a standalone grenade pistol are in use. Both are being replaced by a weapon that can function as both an underslung launcher and a standalone weapon. In the Special Forces project, the Steyr GL40 was selected. Given the comparable functional requirements of both projects, the product selection from the Special Forces project is being considered for the cross-sectional project. The grenade machine gun remains available as a support weapon, firing a more powerful 40 mm round than the launchers. The introduction of so-called programmable ammunition is underway, enabling automated detonation points to be set as the projectile exits the barrel, enhancing effects behind cover. The so-called Light Indirect Fire Capability is being introduced. This consists of a 60 mm mortar in handheld and bipod-mounted versions, significantly increasing the firepower of Special Forces and general forces at ranges up to 2,000 metres. Various ammunition types for lethality, obscuration, and illumination can be used.



▲ Der GL40 in der Stand-Alone Variant. (Photo: Steyr Arms)

Conclusion

The Bundeswehr is steadfastly pursuing a capability-oriented and mission-specific approach to equipping its forces with small arms and light weapons. This approach incorporates the latest national and international insights from training and operational deployments. Measures are comprehensive and encompass all categories of small arms and light weapons, with an emphasis on treating them as systems comprising the weapon, sighting devices, ammunition, and accessories.



Photo: Securiton Germany

Securiton Germany

High-tech security: Standards with drone and robotic security systems

Securiton Germany, a leading provider of customized security solutions, is known for innovation and expertise. As part of the Swiss Securitas Group, the company offers a wide-ranging portfolio of solutions that includes both classic and state-of-the-art technologies to ensure maximum security. One particularly innovative area is drone and robotic security - a segment that is becoming increasingly important.

The challenge of modern security

As digitalization and automation progress, the requirements for security solutions are increasing. Drones and autonomous systems offer new opportunities, but also pose considerable security risks. Unauthorized drone overflights can have devastating consequences in sensitive areas such as airports, industrial plants or government buildings. Equally important is the protection provided by autonomous robotic systems, which are used in logistics or surveillance, for example.

Drone defense systems: protection from the air

Securiton Germany specializes in the development of systems that make the use of drones safe and efficient - both through defence and through integration into existing security concepts. One of its flagship products is the SecuriDrone drone detection system. This highly developed system combines various sensor systems, such as cRF or radar and camera technology, to detect and identify drones at an early stage. SecuriDrone also enables active defense measures. As soon as a drone is identified as a threat, countermeasures such as a controlled takeover with safe landing, signal jamming or targeted drone interception systems can be activated. These technologies are particularly valuable for critical infrastructure, major events and military installations.

Robotics for the security industry

Another innovative field in which Securiton Germany is successfully represented on the market is the integration of robotics into security concepts. Autonomous robots are increasingly taking on tasks that were previously reserved exclusively for human personnel. These include: Surveillance of premises, automatic reconnaissance following alarm situations, the inspection of areas that are difficult to access or the transportation of security-critical materials. Securiton's robotic systems are equipped with state-of-the-art sensor technology that enables 360-degree surveillance. They can detect and analyze threats in real time. Thanks to AI-supported software, the systems are able to differentiate between real threats and false alarms. The data is transmitted via secure networks to central control centers, where it can be further evaluated.

Integration solutions

A particular strength of Securiton Germany lies in the seamless integration of drone and robotic security systems into existing infrastructures. In combination, these technologies can provide a comprehensive security network. These synergies not only create maximum security, but also efficiency.

Future prospects

Looking to the future, Securiton Germany remains a pioneer in the field of security innovations. The company continuously invests in research and development in order to further optimize its systems. Particular emphasis is placed on the integration of artificial intelligence, the further development of sensor technology and the strengthening of cyber security.

UNFILMED AND UNEQUALLED: THE POWER OF L3HARRIS NIGHT VISION TUBE TECHNOLOGY

Nighttime operations for soldiers at the tactical edge has changed dramatically over the past two decades. Today's warfighter, facing increasingly sophisticated adversaries, requires the tools to succeed in various mission sets, in conditions that can change from fog to clear moonlit skies, in area of heavy foliage or drenched in urban light. Night vision systems with advanced image intensifier tube technology delivers amplified visibility in low-light environments so troops can see targets first and engage them before being seen. Night vision technology has also advanced

A History of Innovation

Image intensifier technology began to emerge before World War II, but the first "generation" (Gen I) tube wasn't invented until the 1960s. Since then, technology improvements have led to the introduction of several generations of image intensifier tubes, based on U.S. military definitions. Gen II tubes emerged in the late 1970s and expanded mission options while increasing tube resolution and lifespan through improved photocathodes and introducing microchannel plates. Gen III tubes, now widely used in U.S./NATO militaries with enhanced sensitivity for tactical operations, introduced a gallium arsenide photocathode and an ion barrier to the microchannel plates

significantly over the years, including enhanced image quality, sensitivity and overall performance to keep up with emerging challenges they face on the battlefield. "Much of the night vision system's performance a user receives depends on the type – and quality – of the tube technology it leverages," said Sven Rowley, Account Management Director, L3Harris Technologies. "The challenge for defense organizations today is that there are few meaningful industry-wide testing standards that objectively evaluate tubes against each other with quantitative data about important characteristics."

in the 1980s, dramatically increasing resolution, brightness and lifespan. "As the Trusted Disruptor in the defense industry, L3Harris Technologies goes a step further than competitors to deliver an unfilmed Gen III tube to provide exceptional resolution, even in low light, and a longer lifespan," said Jon Burnsed, Senior Systems Engineering Scientist, L3Harris. "The removal of the ion barrier and inclusion of auto-gating to manage bright light conditions facilitates higher-end tactical mission sets." As there is no military specification to define a "Gen IV" designation, such a tube generation does not currently exist, added Rowley.

▼ Soldier at night.
Photo: L3Harris



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GENERATION	INTRODUCTION PERIOD	TECHNOLOGY	PERFORMANCE CHARACTERISTIC	APPLICATIONS
MILITARY - SPECIFIED GENERATIONS				
GEN I	EARLY 1960s	-Single-stage image intensifier tube -Utilized S-20 photocathode	-Low resolution -Short range (75-100 yards) -Requires external infrared (IR) light -Lifespan: ~1,000 hours	-Surveillance and limited military use
GEN II	LATE 1970s	-Microchannel plate (MCP) introduced -Improved photocathode (S-25)	-Better resolution than Gen I -Greater range and clarity -Can operate without IR in moonlight -Lifespan: ~2,500-5,000 hours	-Military applications -Law enforcement -Surveillance
GEN III	1980s	-Gallium arsenide (GaAs) photocathode -Ion barrier in MCP	-Superior resolution and brightness -Very low light sensitivity -Lifespan: ~10,000+ hours -Reduced halo effect	-Widely used in western militaries -Advanced surveillance -Tactical operations
UNFILMED GEN III FROM L3HARRIS	1990 to EARLY 2000s	-Removal of ion barrier (filmless MCP) -Auto-gating introduced to manage bright light conditions	-Exceptional resolution -Works in extremely low light -Reduced blooming in bright light -Long lifespan	-Military special forces -High-end tactical use -Low-light surveillance
GEN IV	An agreed-upon set of military specifications to define a Gen IV designation does not yet exist. L3Harris adheres to U.S. Army's stance that there is no Gen IV tube.			

Manufactured to the world-wide highest standards

There are several factors that position Gen III tubes – and more specifically, unfiled Gen III tubes – well above other options in the market. For instance, the gallium arsenide photocathode significantly enhances low-light sensitivity, providing the higher gain needed to covertly operate in ultra-dark conditions without active illumination. The advantage of unfiled Gen III tubes starts at the advanced microchannel plate, allowing for the elimination of the input ion barrier film which greatly increases durability while reducing risk of shock damage and decreasing halo size. This, combined with the higher-performing Gen III photocathode and the ultra-fine microchannel plate leads to a higher signal-to-noise ratio – a main driver for an increased Figure Of Merit (FOM) – resulting in clearer and more detailed images. There are many interlocking factors that contribute to longer operations life in Gen III night vision goggles, beginning with the ion barrier film. L3Harris' advanced technology eliminates it completely, while simultaneously extending gain life by years. Other contributors to extended operational life are thermal management, auto-gating and advanced manufacturing techniques.

FOM doesn't tell the whole story

NVG performance is a result of multiple interconnected components, which means that basing purchase decisions exclusively on FOM - which only roughly correlates to visible range in certain conditions - may result in a mismatch between the chosen NVG and real-world mission needs. "L3Harris has developed and patented technology to suppress halo effects due to bright light sources, effectively sharpening the image by reducing the 'smearing' effect on bright/dark boundaries in the scene," said Burns. "We have also developed a superior process to eliminate reduced gain life when delivering increased tube brightness. This means the user no longer has to choose between performance and reliability." This is not the case with Gen II NVGs. Purchasers may be led to believe their Special Forces users can compete in the more challenging operational conditions by only investing in Gen II based on FoM alone. The truth is more complicated, and they will be missing out on key Gen III capabilities that can be difference-makers in complex Special Forces missions.

Why L3Harris

There is only a certain amount of light any tube can be exposed to before it degrades. L3Harris tubes are lab-proven to be able to withstand higher volumes of light for far longer due to the combined use of gallium arsenide photocathode material, improved tube manufacturing processes and better internal tube components, according to Burns. The advantages of unfiled Gen III tubes also deliver extreme shock resistance when compared to filmed Gen III tubes. "They can operate at a gain over 100,000, roughly double the industry standard, while remaining the most stable image intensifier tubes available," added Rowley. "Only Gen III tubes from L3Harris – designed to the most advanced requirements and manufactured to the most stringent conditions in the industry – provide the necessary tactical advantage in the darkest real-world environments," L3Harris tests Gen III reliability using the U.S. government's required military specification accelerated reliability testing method. Through this methodology, the company estimates its tubes can last for at least 10 years or 10,000 hours of service life without degradation.



Author: Navid Linnemann

Fighting drones but how?



It is not only in the Russian war against Ukraine that drones are being used more and more frequently; homeland security forces are dealing with unmanned systems. Whether they are used for espionage or to transport drugs, the use of drones is constantly increasing. The defensive measures against them are just as diverse as the drones themselves. This article presents six options from the field of counter unmanned aircraft systems (C-UAS). However, every counter-drone measure also has its drawbacks.

An important first step in combating drones is reconnaissance. Various technologies are available for detecting drones, including radar, optical sensors, acoustic detectors and radio frequency analysis. Once a drone has been detected, there are many different ways to bring it down.

Jamming

Jammers are probably among the best-known methods of combating drones. These are small and large devices that can disrupt a drone's communication or orientation. Both can cause the drone to lose its course or spiral out of control. The jamming signals surround the object to be protected like a kind of protective dome – vehicles, infantry units, but also buildings and entire military camps. All signals on certain frequencies are then disrupted in the jamming sphere of influence. However, there are also more targeted solutions, such as the AD G-6 anti-drone rifles from Kvertus, developed in Ukraine. These 'shoot' the jamming signals directly at the enemy system as a pulse. If the signal hits the target, the drone's electronics are overloaded and it crashes.

Hacking – taking over enemy drones

Companies like Sentrycs (stand number 7A-236) also use electronic means to counter drones. There are different approaches to hacking a drone. GPS spoofing, for example, involves sending false coordinates to the opposing drone pilot, leading him to believe that he is in the target area when in fact he is not. It is also possible to hack directly into the drone via radio communication in order to make it crash or – even better – to make it land in one's own area in a controlled manner and thus capture it. However, such electronic attacks can be thwarted by changing frequencies or by not communicating at all (by feeding the drone with target data beforehand).

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Kinetic anti-drone weapons

The German armed forces also occasionally use assault rifles to combat drones. A targeting assistance system makes it easier to launch a kinetic strike against smaller drones. The system, which is attached to the rifle, only allows the marksman to fire when the calculated lead angle is hit. A system like this is also conceivable for use by the police.

The other physical variant: nets

Compared to shooting, nets are used at a lower level. However, they are also only intended for use against smaller UAS. There are several ways to use nets to hunt drones. Either the nets can be shot from the ground using special launchers, or they can be attached to other drones, which then go on a 'catch flight' like a fishing net.

Fighting drones with laser defence systems

Lasers can also be used to repel drones. Such laser defence systems work at different distances by applying a point source of energy or heat – weather and visibility conditions permitting. When the conditions are right, lasers are a precise and effective way of repelling unwanted drones. Laser weapons do not require ammunition, but energy, with which a beam of light is generated that is bundled several times. Light itself, as electromagnetic radiation, transports this energy, which is emitted when it comes into contact with an object. If the strength of the laser and the time it spends on the object are long enough, it can be heated, melted and destroyed in this way. However, precautions can also be taken against laser beams: Mirrors attached to the outer shell simply deflect a large part of the energy introduced.

Ramming with other drones

The sixth way of combating drones is to use a drone defence drone to apply kinetic energy. The US company Andruil, among others, has brought such a system onto the market. The vertically launching drone Roadrunner, which is equipped with turbojet engines and a missile design, can reach high subsonic speeds and simply swoops down on enemy drones. In its Roadrunner-M version, the interceptor drone is equipped with an additional explosive charge to lend more 'emphasis' to its mission. The various approaches to drone defence show that there is no ultimate solution in the field of C-UAS and that many paths lead to the goal. Similar to the entire spectrum of air defence, which ranges from short and very short range to territorial missile defence in height, range and firepower, a diversified approach to drone defence also leads to success.





Launch at EnforceTac: Presidia gel

The U.S. brand Reflex Protect has launched a new spray, Presidia Gel, on the market. This product is not a pepper spray but an innovative, target-specific, sticky, and rapid-onset reformulation of the CS agent trusted by law enforcement.

Key Features and Advantages **Stopping Power:**

Presidia Gel delivers extreme stopping power. Its immediate effects, such as involuntary eye closure and disorientation, incapacitate violent subjects upon contact. The gel is available in regular cans for individual use and in refillable large RP-76 canisters for extended applications.

Hit and Stick:

Presidia Gel adheres to what it hits, preventing side splatter or collateral effects. This allows officers to isolate specific subjects within a group without affecting bystanders. Additionally, the gel cannot be removed by the subject or thrown back at the officer.

Indoor Use:

Presidia Gel was specifically developed for security officers working in hospitals. As a result, it is a non-contaminating, non-atomizing, and non-flammable product. It can be safely deployed indoors, in vehicles, on trains or boats, or in crowded areas without harming innocent bystanders. Presidia Gel is also compatible with Electronic Restraint Devices (ERDs) such as Tasers.

Easy Decontamination:

The highly effective Reflex Remove® decontaminant neutralizes Presidia Gel and provides relief from chemical agent symptoms within two minutes, compared to the 15-minute relief time of competing products.

Easy to Clean:

Presidia Gel is easy and quick to clean up. While Reflex Remove® is ideal, regular water can also be used to clean surfaces. Since Presidia Gel does not combine with oxygen, cleaning surfaces such as car seats is straightforward and does not pollute the air.

Less Harmful

Globally, there is growing concern about police use of force. As a result, there is increasing demand for less-lethal force options. Reflex Protect's Presidia Gel has been proven to cause less injury than impact weapons, ERDs, restraint techniques, or traditional O.C. sprays. This makes it suitable for earlier deployment in confrontational scenarios, potentially de-escalating situations more effectively.

Reflex Protect is offering free trial kits. Trainings led by certified instructors for proper use and handling of the product are available.

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Your expert partner in every sector

We see ourselves as problem-solvers, generators of ideas and true partners to our customers. Flexibility, a love of innovation and a service-oriented mindset are the hallmarks of our approach. We can tackle any challenge, no matter how complex your needs. You can always count on HALFAR®. Our expertise in technical bags and textile solutions is second to none. Together, we can make your deployments safer, more efficient and more successful.



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O-PLAN DEUTSCHLAND: INTERCONNECTIONS BETWEEN MILITARY, POLICE AND CIVIL AUTHORITIES

The O-Plan Deutschland – Organizational Plan for Germany – is currently being drawn up to demonstrate Germany's and NATO's defense capability. Above all, this readiness to defend is intended to send a strong signal to Russia that any Russian attack on NATO has no prospect of success. Deterrence to prevent war. The O-Plan Germany will, however, by no means only affect the Bundeswehr, but will also challenge all civilian actors, especially the police. At the symposium "Perspectives of the Defense Industry" of the German Society for Defense Technology (DWT), the speakers made it clear how complex the establishment of the defense capability is and how deeply the civilian side is involved.

Germany as a hub

Lieutenant General Gerald Funke, Commander of the Bundeswehr Support Command, made it clear that the "Hub Germany" does not just refer to the controlled, announced and plannable military influx – which is already impressive in its probable size – but also to the more uncontrolled movement of people and material from the war zone to Germany that is to be expected. "We are talking about refugees, we are talking about wounded, we are talking about soldiers killed in action. We are certainly also talking about prisoners of war and we are talking about the removal of material," describes Lieutenant General Funke. On the one hand, there is the movement of material and armed forces through Germany, from the Dutch ports towards the eastern flank, which can be planned to a certain extent but is expected to be on an enormous scale. On the other hand, however, there is the movement of people from the eastern flank to and through Germany, which can only be planned to a limited extent. A second momentum is added in the event of an alliance: the soldiers are needed at the front. Even if the "Zeitenwende" has brought significant improvements, rebuilding capabilities takes time and personnel, especially the latter being the major scarce resource everywhere. Accordingly, Lieutenant General Funke and his support command need to support the military movement and the combat of Bundeswehr soldiers in the event of war. So in the best case, everything that is needed in Germany should be provided by civilian companies, institutions and stakeholders, "because my forces are needed at the front," emphasizes Lieutenant General Funke. "Any military forces I have to deploy in Germany are forces I lack at the front." But the involvement of civilian actors is not a given. "70 percent of all truck drivers in Germany do not have a German passport," explains Lieutenant General André Bodemann, Deputy Commander of the Bundeswehr's Operational Command. "In the event of war, they will probably – just like the Ukrainians back then – go back to their own country to defend it."

Implementation by the civilian sectors

Lieutenant General Funke therefore urges that the civilian sectors need to be prepared for the implementation. After all, the demand of units at war should not be underestimated. "To give you an idea," says Lieutenant General Funke, "if they have to supply a brigade of the army at a normal combat intensity, we are talking about about 100 20-foot containers per day." This is, of course, only a rough estimate, because it also depends on the unit itself and the actual intensity of the fight, but you have to imagine 100 standard containers per day for a brigade to grasp the scale of the support running through Germany. General (retired) Jörg Vollmer, Commander of NATO's Allied Joint Forces Command in Brunssum until June 2022, also raised the question of what it actually means if the necessary equipment cannot be procured or delivered on time. "If our Inspector General of the Bundeswehr rightly says," said General (retired) Vollmer, "we have to be ready for defense by 2029. And then it is said that if we do not achieve this, the troops will go with what they have. Someone has to go through what that means. That means that the troops will then go without 30 days' worth of ammunition, without full equipment, without full medical support – which can only be provided for one division." If, on the one hand, network-centric operations and multi-domain operations are discussed, "but then it is said in a sentence, but not until 2033, then something here does not fit together!"



▲ Due to Russian misinformation campaigns German police forces might be engaged to control riot outbreaks in the event of war.

Photo: Leonhard Lenz

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Russia's hybrid war

In addition, it should not be forgotten that Russia is already waging a hybrid war – also against Germany. “We are in a hybrid situation between war and peace,” said Lieutenant General Bodemann, describing the assessment of the Bundeswehr. And one thing is certain: in the event of war, Russia will try to prevent the deployment of NATO troops, using sabotage and disinformation campaigns to spread fear among the population. All this would then have to be countered ‘in the legal situation of peace’. That is precisely why Germany's preparation also requires legislative changes. However, these legislative changes must not only strengthen the Bundeswehr, but also the federal government. “Where the federal government can issue instructions to local authorities, we do not yet have that,” explains Dr. Christoph Hübner, Deputy Director General of Crisis Management and Civil Protection at the Federal Ministry of the Interior (BMI), and emphasizes: “But security is provided locally!”

Police forces at their limits

The O-Plan Deutschland is now forcing the many civilian actors on the ground to deal with this issue at all, because “we as BMI have very few units on the road”. Although the Federal Ministry of the Interior has the federal police at its disposal, their tasks and strength are clearly defined. The main work is done by the state police forces, and these are subordinate to the 16 interior ministries of the federal states, with all the political diversity behind them. In addition, Hübner raised a point of concern: “The police will have their hands full in the event of tension, because it is not certain that the population will remain peaceful. There may be riots.” Civil protection is organized even more communally, with, for example, 1.7 million firefighters. Here it should be considered that there are not even retrievable communication channels. “Classified communication is not possible across departments,” said Hübner. “That's bleak. And it's not a question of non-existing resources, but of setting priorities.”

▼ To cross the major rivers in Europe needs to be secured, but Russian sabotage has to be expected.
Photo: Bundeswehr/Marko Greitschus



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The O-Plan for Germany and the mastery of complexity

The O-Plan Deutschland now shows all district administrators and state ministers that they have an important role. Precisely because, in the worst case, the Bundeswehr needs its resources to defend Germany's security and freedom on the war front, instead of guarding critical infrastructure at home. At the same time, however, the O-Plan Deutschland also provides insights into existing capabilities, such as the bridges mentioned at the beginning. In this regard, the Bundeswehr and THW have only limited capabilities, but Autobahn GmbH, which is under the control of the Federal Ministry of Transport, has a large supply. How quickly and effectively Autobahn GmbH can build its replacement bridges can be seen, for example, from the Leverkusen motorway bridge, "where parts of the replacement bridges are still in place," explains Lieutenant General Bodemann. "We should now start to consider – and we are doing so at some major rivers – whether we should not lay the foundations now, cast them and let them harden, and then lay a replacement bridge when the other one is no longer there." The Autobahn GmbH's bridge bearings are so well stocked that "they could even compensate for the missing bridge on the A540 right now," said Lieutenant General Bodemann. "If all the bridges in Germany were destroyed right now, they probably wouldn't be able to handle it, but they have capabilities and we have to use them. We are therefore talking to the Autobahn GmbH and concluding a framework agreement to get their support, including the autobahn maintenance depots, because they have the support capabilities. Right down to depots that can still refuel without electricity." The O-Plan Deutschland now

shows all district administrators and state ministers that they have an important role. Precisely because, in the worst case, the Bundeswehr needs its resources to defend Germany's security and freedom on the war front, instead of guarding critical infrastructure at home. At the same time, however, the O-Plan Deutschland also provides insights into existing capabilities, such as the bridges mentioned at the beginning. In this regard, the Bundeswehr and THW have only limited capabilities, but Autobahn GmbH, which is under the control of the Federal Ministry of Transport, has a large supply. How quickly and effectively Autobahn GmbH can build its replacement bridges can be seen, for example, from the Leverkusen motorway bridge, "where parts of the replacement bridges are still in place," explains Lieutenant General Bodemann. "We should now start to consider – and we are doing so at some major rivers – whether we should not lay the foundations now, cast them and let them harden, and then lay a replacement bridge when the other one is no longer there." The Autobahn GmbH's bridge bearings are so well stocked that "they could even compensate for the missing bridge on the A540 right now," said Lieutenant General Bodemann. "If all the bridges in Germany were destroyed right now, they probably wouldn't be able to handle it, but they have capabilities and we have to use them. We are therefore talking to the Autobahn GmbH and concluding a framework agreement to get their support, including the autobahn maintenance depots, because they have the support capabilities. Right down to depots that can still refuel without electricity."

The O-Plan for Germany and the mastery of complexity

CPM is addressing the topic of O-Plan Deutschland in a separate two-day event to be held in Munich on March 26 and 27, 2025. Further information about this conference can be found at www.cpm-verlag.com

▼ The O-Plan for Germany is intended to prepare the Federal Republic – in all areas – for an emergency. This is because the soldiers of the Bundeswehr, who often bear the brunt of disasters, are then needed at the front.
Photo: Bundeswehr



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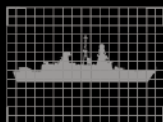
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