

Protection of Convoys and Objects

The protection of friendly forces in missions is a significant and permanent challenge for the Bundeswehr. It is a capability, which has to be considered at any time, which affects all aspects of military tasks, but which also has a share in the other capabilities fields of the Bundeswehr. The protection of the troops consists of a multitude of correlative sub-tasks, which begin in advance of a mission already and are executed during and after a mission. A special network of relations exists to the “effect” capability field. Protection and effect complement each other and contribute jointly and lastingly to the robustness and survivability of the own forces. For the ground forces, especially the Army as the mainstay of ground operations, special efforts are being made in the fields of “protected tactical mobility”, “individual protection”, “identification”, “protection of convoys”, and “protection of facilities and objects” in order to totally improve the protection in missions.

The protection of friendly troops is being geared to all types of missions and multiple forms of threat. In the currently ongoing stabilization operations, German service personnel are exposed to novel types of threat, which are primarily posed by asymmetrically fighting adversaries who compensate their military inferiority by unconventional actions. These include spying, radio reconnaissance, effects by small arms, mines or weapons up to the use of mortars and rockets. Frequently unforeseen terrorist attacks are central here. A special danger constitutes attacks with improvised explosive devices (IED) and suicide bombers. Insurgents and terrorists strike out of the blue with such means against a force, which wants to establish security for Afghanistan and contribute to the reconstruction of the functional capability of the government, including better living conditions for the population. This force is compelled to fight and exposed to a threat, which prevails always and at any place and which is barely calculable. Convoys and facilities of the stationed troops are preferred targets of asymmetric attacks. In the formerly quiet north of Afghanistan the troops operating under German command have been exposed to increasing attacks since 2006. Up to now nearly 30 German soldiers have lost their lives in the ISAF mission, more than half of them by ambushed attacks.

Numerous measures were taken in the past years to improve the protection of the German forces. This applies above all to the procurement of protected vehicles; part of them was made available rather quickly through the procurement procedure “immediate mission requirements” (e.g. DINGO 1/2 all-round protected transport vehicles, MUNGO specialized forces combat vehicles or WIESEL 2 armored mortars).



German ISAF Patrol near Kunduz.

Photo: ddp

The conceptual fundamentals for the capability category “survivability and protection” of the Bundeswehr were commonly determined by the Services in the sub-concept “Protection of Forces and Facilities of the Armed Forces in Missions” back in 2006. Different protective measures and means are to reduce the risks for the soldiers and to retain the own capacity to act and also the operational readiness. It is intended to provide, as far as possible, the same protection for the forces in an area of operations, even though a complete protection for all situations cannot be ensured. Protection is no end in itself. In missions, the soldiers cannot only act from a protected vehicle; they frequently have to dismount, establish contact and provide help. Winning confidence of the population as well as reconstruction are no combat actions, but can mostly be reached in direct contact only. Protective measures are therefore in the relationship of tension between the task situation and the threat and must be taken by the responsible leader at the scene under the aspect of the mission requirements. As an integral, holistic system it comprises a set of preventive, active and passive measures. They range from the training via operational doctrines, organizational and command control measures, technical provisions up to the equipment. Operational protective tasks encompass all measures and procedures for the protection of facilities and areas as well as operational methods for the protection of friendly forces on mission.

Protection of Convoys

Mobile forces are often more endangered than fixed objects. As for the latter, the protective and monitoring measures need to be designed more successfully. Troops on the move have a restricted overview of the situation and are easier to be surprised. This goes for all types of movements, from patrols via logistic operations up to a comprehensive convoy. Most of the attacks on international and German security forces in Afghanistan occurred during mobile mission when IEDs were used. This is also the reason why German troops conduct movements exclusively with protected vehicles since October 2008.

The protection of convoys thus involves a very high danger potential. In the recent past, there were not only some scattered attacks launched by the adversary, but tactically planned ambushes with multiple attacks and fire fights. This makes it imperative to adjust the own tactics to this new dimension of threat. The basics for the protection of convoys were therefore worked out exhaustively and jointly by the Services and are to serve as a model for mobile missions. It is considered to be a military operation and tactical task of the mission command. The execution of a convoy can be effected in different ways. Task, threat, and parametric conditions like scale and type of the convoy, length of the route, terrain, and weather need to be taken into consideration. Self-pro-

tection of the convoy is always required. When hazards are high, an escort protection is frequently provided by combat and combat support troops (e.g. reconnaissance, infantry, engineer, signal, and medical troops). The use of bases as additional active protective precautions may be required to cover and supply convoys in cases of threat. Augmentation forces are also possible to be held at disposal there. The most extensive protective operation for convoys is the so-called “tunnel operation”. It ensures a kind of shield and overwatch by ground-based and airborne troops during the entire movement. Reconnaissance in front and on the flanks, combat troops as escorts and at critical points, the surveillance from the third dimension, and reserves of the higher command level are some of the measures to get the “important good” – man, material and items of supply – unharmed to their destination.

The improvement of the multinational cooperation within the meaning of the interoperability in missions applies to the convoy missions as well. The aforementioned “tunnel operations” demand a smooth co-acting of all forces involved, i.e. of the different Services and, if necessary, also of the different nations. A good start was made here, but the comprehensive capabilities are yet to be produced. The same goes for the network enabled operations (NEO) where all available systems of reconnaissance and effect need to be networked under a unitary command. This new capability will also be applicable to important convoys with a promising prospect of success. But for that purpose it still needs to be further extended and improved.

Some of the principles and measures for the protection of convoys have already been implemented, others are additionally initiated. The operational procedures for the above described convoy missions are practiced in basic training in Germany. They are deepened in the preparatory mission training before a concrete mission in order to improve the collaboration of the parties involved in the operation. A training aid of the Army Office supports the troops and a training concept specifies the basics of this particularly important training. Central training activities are conducted at the Army Combat Maneuver Training Center and at the UN Training Center at the Infantry School. Basic behavior patterns such as general tasks in missions (observation, reconnaissance, liaison, covering and security operations), the behavior during attack with a sound mistrust of consequential effects or the self-help and buddy aid are also drilled there aside from the co-acting in convoys.

The increased fielding of protected command and multifunction, transport, and special vehicles will clearly improve the protected tactical mobility over the coming years – also for carrying out convoys. There is still a great backlog demand; many mission tasks must still be performed by use of wheeled vehicles without any protection or with only modular protective equipment, i.e. with insufficient protection. Up to 2015 it is still a long way to go until the so-



U.S. Soldiers Securing the Scene after a Suicide Attack on a U.S. Vehicle in Kabul.

Photo: dpa

called “corridor” of procurable vehicles for the operating forces will finally be available. It will consist of about 5,500 protected command and multifunction vehicles, i.e. only approximately 28 percent of the requirement, plus a few combat vehicles. With increasing enemy pressure in Afghanistan and suffering of higher losses a problem as it is presently in store for the British armed forces might be possible to arise here, too. More than 50 percent of the Britons are in favor of breaking off the mission in Afghanistan because of high losses among the own soldiers.

The field of the protected command and multifunction vehicles was subdivided into

four classes which differ in the air loading of the vehicles, the ballistic protection and protection against IEDs and mines, and payload volume. Protected mini vehicles for command and control, transport, and multifunction tasks belong to the Classes 1 and 2. The EAGLE IV of the Swiss MOWAG Company was chosen for Class 2. Two vehicles can be loaded into a C-160 TRANSALL. About half of the 1,200 vehicles of the initial allowance are supposed to be delivered by 2011. The first EAGLE IV were deployed to Afghanistan; the procurement of a first batch of 198 EAGLE IV for the Army and the Joint Support Service (JSS) is under way since late 2008. Other types of vehicles may be added in follow-on procurements. A selection decision was also made for the Class 3 vehicles. The YAK of “Rheinmetall Landsysteme” (RLS) and the DINGO 2 of “Krauss-Maffei Wegmann” (KMW) were chosen for that class. These vehicles serve primarily as conversion kit carriers, for the Army additionally as patrol vehicles. The DINGO 2 will be delivered in the three versions “short wheelbase”, “long wheelbase”, and “pick up”. It has the presently best protection of that class against modern small arms, artillery fragments, NBC munitions, and it has an improved anti-mine shielding. For the time being, about 200 DINGO 2 have already been procured for the missions, and additional variants are in the process of delivery since the end of 2008.



Mission with German forces in Afghanistan.

Photo: dpa

PCMV 3



Protected Command and Multifunction Vehicles.

Graphic: FMoD

Time was lost in the two other classes of protected command and multifunction vehicles (PCMV). The first selection round with the PCMV Class 1 vehicles produced no results. It is now attempted to find suitable mini vehicles in the two type components "air transportable in CH-53 helicopters mandatory" and

"non-air transportable". The compliance tests on the remaining three types were made in 2009; procurement will be possible as of 2010 at the earliest. Considered in Class 4 are the large-capacity vehicles WISENT manufactured by RLS and the PCMV 4 6x6 of the KMW Company. The essential requirement for them

is the possible transport in the A400M with a maximum air loading mass of 30 tons. The protection is to correspond to that of the Class 3. The studies on these vehicles are under way; the selection decision was planned for 2009; first procurements are scheduled as of 2010.

Vehicles of the Armored Transport Vehicle (ATV) project are to enhance primarily the protection of the logistic troops on mission, which are also frequently part of convoys. Here, not the whole vehicle, but only the driver's cabin is protected. The ATVs are to be introduced in five classes with maximum permitted loads of 2 tons, 5 tons, 9 tons, 15 tons as well as the 25-ton tractor-trailer and are to serve as cross-functionally useable base vehicles of a family, which can be equipped with different conversion kits. The testing of the ATVs is presently carried out on the basis of demonstration models of the Daimler and Iveco companies. Following the selection decision, the introduction is planned to begin as of 2010.

Passive protective materials, i.e. from armor plates up to novel composite and composite ceramic systems, are part of the protection of platforms. Transparent materials made of synthetics or bulletproof glass (e.g. made by the Schott Company) play an important role in order to be able to provide better protection in the field of vision of the operator. As concerns the passive protection, research and developments are intensively pursued in respect

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Remote Controlled Light Weapon Station.

Photo: KMW

to saving weight by simultaneously providing high protection. The “EETEC” or “Verseidag Ballistic Protection” companies are, for instance, enterprises, which are working on this. The latter one offers also a reactive system. On impact of a projectile such systems develop a counterblast for destruction. The system of the “Dynamit Nobel” company was, for example, tested by “KMW” on the FENNEK scout vehicle. These reactive systems amount to a high increase of weight on the vehicle, however. Lighter standoff-active protection systems are planned for combat vehicles. The multifunctional self-defence system (MUSS) of the EADS/KMW/RLS companies is a so-called softkill system, which detects antitank weapons as well as guided artillery ammunition and generates a “protective wall” on the vehicle by means of multispectral cluster fog. It is supposed to be concomitantly procured for the PUMA armored infantry fighting vehicle (AIFV). Hardkill variants such as the AWISS of the “Diehl Defence” company or the AMAP-ADS of “IBD Deisenroth Engineering” destroy flying projectiles with precision by fragmentation and blast effects before impact. The PUMA could be retrofitted with them. The respective analysis phase is in progress and is to end in 2011. It is open whether such systems can also be retrofitted for the large number of motor vehicles. This is planned and technically possible, but the cost factor will play a role here. At least the security vehicles of convoys should have a high protection factor to be survivable for their protective task.

The capability for self-defence under protection is to be increased by adapting the weapon stations in new wheeled and part of the armored vehicles of the Bundeswehr in a way that they can be operated in a shielded environment. The base weapon station is to be equipped with MG 3 /4. The so-called Remote-Controlled Light Weapon Station (RLW) with night combat capability is available as RLW 100 for

weapons up to 12.7 caliber MG, the RLW 200 for higher calibers up to 40mm grenade machine guns with ranges up to 1,000 and 1,500 m, respectively. The 1st batch of 230 and 190 RLW 1/2, respectively, is currently being delivered by “KMW”; the installation in vehicles can be effected as of 2010.

The equipping with electronic jammer systems against attacks with explosive devices (counter IED) has been advanced since early 2007. They are capable of suppressing the actuation of explosives triggered remotely by radio command. These include some jammers for the protection of convoys, which cover the area of several vehicles. A larger number of systems are suited for the protection of individual vehicles. In future, the destruction of IEDs is also to be made possible. The Taliban and other fighters in Afghanistan have meanwhile “got wind of it” and changed their mode of action. Now the actuation of the IEDs is not always performed with high-tech means, but more frequently with traditional methods such as pressure plates and trip wire. The spiral of threat and counter effectors is constantly changing here, too.

In future, the protection of convoys may also profit from the introduction of additional weapon systems the employment of which is thinkable in connection with convoys. Aside from the PUMA AIFV and the BOXER ATV these include also the TIGER support helicopter. The infantry units will be equipped with the new air transportable mortar combat system which would allow to rapidly support convoys, at least by sections, with high-angle fire. The mobile and protected KARS combat system, a reconnaissance and breacher vehicle, is planned to be acquired for the engineers. The system is to detect all types of effectors, to neutralize their functionality, and to initiate their activation. The effector will then be cleared by means of a “crane jib”. The procurement of the system is listed further down the Bundeswehr Plan and

is not anticipated before 2016/17. For the time in between, the purchase of other, already available systems is under study. Systems for the support could also be the protected engineer equipment as well as the digging equipment (included in the Plan for 2014). Due to their high self-protection and mobility they can clear obstacles, including those containing IEDs, for the convoy along a march route. Other engineer equipment, from mine detectors up to mine probes, or the protected BIBER armored recovery vehicle (ARV) can also be employed.

Other measures for the protection of convoys will also take more time until they can be helpful for the troops. Vehicle tracking and communication systems for constantly tracing the actual location of convoys or individual vehicles are helpful for all movements in missions. They will not be available on a grand scale until the command and weapon control systems of the branches have been introduced, beginning gradually; and for the individual vehicle it will ultimately be available only together with the projected “joint and combined interlinkable radio equipment” whose procurement is planned as of 2013. Friend/foe identification equipment in variants for different vehicles and for dismounted soldiers will not be procured until 2016. They are to be linked with command, control and information systems to allow data to be exchanged between sensors and effectors in near real time.

The protection of convoys can also be supported by the employment of unmanned land effectors. By their use it is possible to save forces and to avoid losses in personnel. First approaches were observed on the respective convoy concourse at the European Land Robot Trials (ELROB) in Hammelburg in July 2008. Reconnaissance sensors could, for example, be employed in the convoy not only on manned, but also on unmanned carrier systems. Unmanned transport vehicles in a convoy led by man could considerably reduce losses in personnel. The “Drehtainer” company is developing the “modular flexible drive” system, a quasi-autonomous transport system. A lead vehicle manned with a driver controls and guides several unmanned and unprotected transport vehicles by way of “drive by wire”. The manned vehicle is protected against attacks by the “zero shock system” of the “Drehtainer” company. But before an autonomous employment in convoys will be possible, many technical and also legal problems will have to be solved with the unmanned land systems that are still susceptible to interference. Also, high procurement costs could accrue and affect a slow-down. This looks different with drones such as the ALADIN and LUNA with their longer ranges of 5 and 40 km, respectively, and the KZO target locating remote controlled unmanned aerial vehicle (70 km), which are already employed in support of the Army and also helpful in the protection of convoys. This applies also to both the LEGAR battlefield reconnaissance system of the airborne troops and

the future ground surveillance radar system of the Army.

Protection of Facilities and Objects

Facilities and objects of the German armed forces in the areas of operation are imperiled due to their stationary, known location; it is possible, however, to take relatively good precautions by applying diverse protective measures. Particularly endangered and therefore in the center of the protection efforts are the camps and bivouacs of the German mission contingents, primarily those in North Afghanistan. The set of all possible protective measures linked with activities from other capability areas of the Bundeswehr or allies take effect here, too. This begins with respective operational procedures and the training, which is affected step by step in basic training and ends with the final preparation prior to a mission. The general tasks in missions such as security/safeguarding, dispersal or camouflage, the personal protection of the soldier, protected vehicles, and the passive protection of camps and bivouacs and mission infrastructure are also part of that.

Constructional protective measures in the German camps and bivouacs are to limit the effect of attacks. Infrastructure experts of the military administration and armed forces are working on that, often supported by the Society for Technical Cooperation and local labor forces. These include, among other things, fences, fortified positions or watchtowers. Protected buildings of solid construction, bunkers, shelters, and protective containers used as accommodations as well as the functional areas are important measures. Reinforcements of buildings and containers by use of sandbags or other means and the erection of protective walls against weapon effects are additional possible measures. Guarding of the facilities is ensured by numerous technical and other means. The "Drehtainer" company has delivered shielded security control and operation centers as well as watch containers, which provide protection against fragmentation and small arms. Mobile monitoring technology, centrally controlled and computer-assisted, stems from "Thales Defence Deutschland". Other measures are: the use of guard dogs with specifically trained dog handlers, access devices, and non-lethal barrier systems, sensors for weapon control and detection of explosives. The guard and security mission was also a topic at the above-mentioned 2008 ELROB. In future, robots are to support the monitoring of objects, to control sectors, and also to perform identity checks. The different security systems are synchronized and connected with alert measures.

In addition to direct monitoring, effective object security includes also the area-wide control of the terrain around the own facilities. The prevention of attacks against camps and bivouacs from the ground or from the air com-



Air transportable light 120mm self-propelled mortar on WIESEL 2 chassis is the weapon carrier and thus the centerpiece of the mortar combat system consisting of different vehicle systems. Photo: Rheinmetall Defence

prises above all the employment of own or allied forces, including reserves. All available and suitable effectors can be employed for defence within the scope of NEO. Efforts are made to combine in a multistage concept all technical monitoring means, threat-related effectors, and operating forces in the area. Depending on the situation it is also possible to include allied forces to that end. It is intended to pool and employ all sensors and effectors through an "object security" command and control facility in the respective camp or other installation. By means of the so-called "Camp Protection Testbed" it is presently attempted to create all technological prerequisites for the coordination of the means. The phase document "Protection of Facilities and Objects" which was approved in June 2009 serves as a basis here. It is now possible to create a demonstrator as a testbed in order to manage in the coming two years the pre-

conditions for the procurement of five command and control centers as of 2011. The contract for the demonstrator was concluded; the delivery is scheduled for mid 2010. A consortium composed of the companies "Rheinmetall", "Thales Defence Deutschland", and "Diehl BGT Defence" was awarded the contract. The intention is thus to develop an optimal layout of the protection for a facility; suitable and available products are planned to be fielded as quickly as possible.

First measures were already initiated by the deployment of ground sensor equipment to Afghanistan. These sensors are capable of identifying vehicles up to a distance of 10 km. Ground radar systems as well as the fielded ALADIN and LUNA drones are also made use of. The KZO target locating remote controlled unmanned aerial vehicle has been successfully employed since August 2009; support by



Bundeswehr Camp Marmal at Mazar-i-Sharif in Afghanistan.

Photo: FMoD



Securing Mission at Airport and at Camp Marmal at Mazar-i-Sharif.

Photo: PressOffice Mazar-i-Sharif

own TORNADO reconnaissance aircraft is also possible. First fixed skirmisher detection systems have been in use with the German ISAF contingent since 2006. These and mobile devices detect snipers fully automatically by acoustic locating up to 1,500 m after firing of shots with small-caliber ammunition. In the near future it is planned to initiate the procurement, inter alia from the "Thales" company, of about 30 advanced stationary systems and of 18 systems for mobile employment, e.g. in convoys or patrols. The optical equipment for preventive detection of optical sights of snipers at ranges of 1,500 m is being examined. Mobile sniper detection devices are, of course, also of importance in the protection of convoys. It is, by the way, also essential to state that most of the means mentioned in connection with the protection of convoys can be successfully employed for the protection of objects as well. A particular aspect worth mentioning is that the remote controlled light weapon stations are also intended to be used in object security, e.g. as weapon stations on watch towers that can be operated in a shielded enclosure. The possibilities to counter electronic effects should not be forgotten either. There are means available to detect and identify electronic enemy attacks and to take respective countermeasures.

Protection of vital objects against threats from the air has gained in importance. In missions conducted under asymmetric threats the adversary applies rather unconventional means or techniques. Attacks with small, cheap and mass-produced means such as unguided rockets, artillery ammunition, and mortar shells (RAM), but also by use of civilian airplanes have to be reckoned with. The future Air Defence System of the Army (ADSA) will therefore be geared to the protection of objects and facilities within the scope of countering these novel threats. It will consist of several fixed and mobile gun and rocket components. Among other things, these are to be enabled to engage the above-mentioned small targets with a high

probability of destruction. The buildup of the ADSA is both cost and time-intensive, which is the reason why the stationary system for the protection of own camps/bivouacs is addressed with priority. Components of the system, like sensors and effectors, are then to be utilized in other system elements. The stationary component is planned as of 2010; the other components of the ADSA are to be projected as of 2012 and are planned to be procured from 2015 on.

One priority pattern project is the development of the "Close-in Range Protection Counter-RAM (CRP-C-RAM) on the basis of the "Skyshield" system of the "Rheinmetall Air Defence" company. This system is to detect mini targets with a radar cross-section of 0,001 sqm, to automatically lock on to them, and to engage them by use of the computer-assisted employment of air defence gun systems. An impenetrable fire curtain is fired with 52 rounds per target. The 35mm ahead programmable airburst ammunition is individually programmed during the firing process and dispenses about 150 sub-projectiles per shell near the target. In addition, the system is capable of warning and calculating the launching site and target location of RAM. The first two systems for camp protection, probably at Mazar-i-Sharif in Afghanistan, will be procured by early 2011. A system consists of a fire control center, two sensor and six-gun components.

Here is yet another special aspect. From all accounts it is learned that artillery systems are employed in missions in the south of Afghanistan. The Dutch Army is successfully employing type 2000 armored self-propelled howitzers ("KMW" company with "Rheinmetall") with 155mm caliber ammunition in individual missions from protected camps for the purpose of surveillance and fire support of own mobile forces. The U.S. forces are fighting comparably with individual missile systems with precision GLMRS ammunition. The question arises here why this is not also realized with the German ISAF force in the no longer

quiet north of the country, in order to combat insurgents at a distance and to purposefully support German convoys, patrols as well as besieged bivouacs and camps. Type 2000 self-propelled armored howitzers of German production might also be very helpful for German troops. Should there still be a lack of precision, one could temporarily work with auxiliaries as the fellow soldiers of the Netherlands Army are doing. Respective retrofitting and novel ammunition should be made available quickly and vigorously. The fear to use effectors that are regarded as too aggressive must stop where it is about the security in the country and about the protection of own soldiers. This holds true even if the events in connection with the air strike against Taliban forces as requested by German troops in early September 2009 have caused stir and are subject to further examination.

The protection of friendly troops on mission is highly significant and this applies also and especially to convoy operations as well as to the protection and security of own facilities. Protection does not only contribute considerably to the success of the own forces on mission. It is also a guarantor for the survivability and sustainability of the own forces. There were numerous measures and procurement projects initiated to ensure the protection of the ground forces and the Army. It will take many years yet to be able to completely implement all planned measures. The significance of the "protection" capability will not lessen in the missions, as the threats are also changing or adapting to the pro-



Guns of the "Skyfield" System. Photo: Rheinmetall

tective measures. The Bundeswehr will therefore advance this capability in a mission-oriented way. Ample funds will have to be appropriated in this field in future, too. To us, life and freedom from bodily harm as well as success in missions must be worth it. The responsible political and military figures have an obligation to send our soldiers to the missions both well prepared and well equipped. The chance to get back home successfully and unhurt is part of it. ■

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