

# Protected Wheeled Vehicles of the Bundeswehr

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As from the mid 90s, Bundeswehr missions abroad have shown that it is mandatory to take increasing account of the massive threats posed to the employed vehicles and their crews by direct fire and mines. In a first approach the available unprotected vehicles are temporarily equipped with retrofittable protective modules, the so-called modular protective equipment (MPE). Although the MPE, which was developed under considerable time pressure, represented a downright suitable solution for a period of transition, it has, as a retrofitting solution, its limits in respect to the protection level to be achieved with it. There were interface problems between the heavyweight protective elements and the basic structure of the vehicles, which were not designed for that. The high procurement and in-service costs of MPE retrofitting solutions presented another problem. These disadvantages can be avoided by integrated protection solutions with the protective elements being taken account of in the construction of the vehicles from the very beginning. An integrated protection solution was consistently realized for the first time with the vehicle protective equipment (VPE) in the MULTI VPE (German abbreviation: MULTI FSA) protected transport vehicle.

An enhancement of the integrated protection solution is that vehicles, which are already fitted out with a basic shielding, can be improved in a threat-related way by additionally adaptable protective elements.

A protected vehicle has the following protective components:

- Anti-mine protection
- Protection against IEDs (so-called Improvised Explosive Devices, i.e. home-made blasting compositions produced with simple means)
- Anti-ballistic protection
- Weapon systems that can be operated under protection
- NBC overpressure system
- High mobility.

The components are to be realized in a synchronized and sys-

tem-compatible manner. To be noted here is that the vehicles in question are not combat vehicles, but patrol vehicles, multi-function platforms or transport vehicles that, in addition to personnel, have to transport, equipment, adaptation/conversion kits or loads.

## Protection Classes

According to their main tasks the protected vehicles are classified in:

- Protected command and multi-function vehicles (PCMFV)
- Protected transport vehicles (PTV)
- Protected special vehicles (PSV).

As to the protected command and multi-function vehicle, the entire vehicle, i.e. the crew and the respective functionality, is all-round protected. In contrast, the protected transport vehicle provides protection for the driver's cab only and thus for the crew, but not for the cargo. This applies also to the protected special vehicles such as recovery and crane vehicles, which are designed for special tasks. Because of the particular urgency of the need for protected vehicles, some "off-the-shelf" vehicles available on the market were procured and fielded within the scope of immediate mission requirements.

In service now are the protected vehicles of the types DINGO 1, DINGO 2, MULTI A3 FSA, DURO/YAK, and EAGLE IV. The DIN-

GO and EAGLE IV vehicles are primarily used as patrol vehicles. The DURO/YAK is employed for transporting high-volume adaptation/conversion kits, e.g. as mobile medical officer's team. In future, the individual DINGO, DURO and MULTI A4 FSA projects will be grouped along with the contemplated overall approaches of the PCMFVs and PTVs.

## Protected Command and Multi-Function Vehicles

The "Protected Command and Multi-Function Vehicle" (PCMFV) project is subdivided into four classes, which are differentiated by the air transportability, the system-compatibility of the protection, the payload, and the useable volume. When selecting the vehicles it was, as far as possible, resorted to vehicles that were readily available on the market.

Categorized under Class 1 are the smallest vehicles of the PCMFV family. First studies have shown that the combination of the requirements for air transportability, high mobility, high payload, and a respective protection level are particularly difficult to realize in this class of small vehicles. At present, two demonstrator types are being tested:

The MUNGO – Large Capacity of the Krauss-Maffei-Wegmann (KMW) Company belongs to the MUNGO vehicle family, which includes other variants that are not illustrated



DINGO 2.

Picture: KMW



MUNGO Large-Capacity.

Picture: KMW



Protected Command and Multi-Function Vehicle (PCMFV) (GFF 4) 6x6.

Picture: KMW



ENOC of the ACS Company Picture:

ACS Armcars

here. The MUNGO – Large Capacity represents the adaptation kit platform, which is air transportable in the CH-53 helicopter.

The ACS ENOK, a vehicle of the Daimler AG with protection equipment of the ACS Company, is to be employed as a command and liaison vehicle. In addition, light conversion kits are said to be possible to be integrated. Air

transportability in the CH-53 is not a requirement here.

The vehicles of Class 2 also serve the execution of command and control tasks. Two vehicles each are said to be air portable in a C-160 TRANSALL. Due to the larger dimensions and the higher total permissible weight as compared to Class 1, it is much easier to realize a better protection in these vehicles.

Following an intensive comparative test of the vehicles of the PCMFV Class 2, a decision



YAK Mobile Medical Officer's Team.

Picture: FMoD DINGO 2 Large-Capacity.

Picture: KMW





MULTI FSA with Medical Container.

Picture: WTD 51

project. One vehicle each is said to be transportable in the C-160 TRANSALL. The “DINGO 2 family” consists of the DINGO 2 with a long wheelbase, the DINGO 2 Large Capacity as well as the DINGO 2 Pick-Up. The DINGO 2 with the long wheelbase has already been in service in large numbers and in numerous variants for several years.

The DURO 3 and YAK vehicles, an upgrade of the DURO, are designed for loads and transports of those adaptation/conversion kits which have a high volume requirement, as e.g. for the mobile medical officer’s team.

Two vehicles of Class 4 were procured from the RLS Company (WISENT) and the KMW Company (PCMFV 4 6x6) and are presently subjected to a technical compliance demonstration test. The vehicles offer the biggest payload and the best protection of all PCMFVs.

### Protected Transport Vehicles

In the “Protected Transport Vehicle” (PTV) project it is about the development and procurement of cargo vehicles (trucks) which, with regard to construction, are commercially available if so possible and which will get a protected driver’s cabin instead of the series driver’s cab. The goal is to enable the Bundeswehr in the areas of operation to fulfill its multiple transport tasks with a threat-related shielding for the vehicle crew. These tasks comprise the transport of very different loads on platform trucks (pick-ups) and containers as well as the transport of hazardous goods and of conversion kits in cabins and containers.



Protected Transport Vehicles (PTV).

Picture: WTD 41

over long distances, the vehicles are designed in a way to make them suited for rail, air and sea transports.

The project is presently in the planning phase, which serves to systematically limit the realization risk. Procured for this purpose were different prototypes of the Daimler and Iveco companies. The vehicles have meanwhile been delivered and are subjected to protection and vehicle-technical tests at the Bundeswehr Technical Center for Weapons and Ammunition in Meppen/Germany and the Bundeswehr Technical Center for Automotive and Armored Vehicles in Trier/Germany, respectively; in addition, they must prove useful in tactical and logistical troops tests. The start of a series production is scheduled for 2011 following the selection decision to be made.

Already in the process of procurement is the MULTI A4 FSA truck which was hitherto realized as a separate project, but which, even as a variant, could fall in the category of the 15-

ton PTVs. The MULTI A4 FSA has a payload of up to 16 tons and is, for the first time, capable of also transporting up to 20-ft ISO containers without alternating load platform aside from the known interchangeable load platforms and MULTI-capable containers. With the combination of MULTI A4 FSA and the protected containers for personnel transports, it is possible to transport 20 personnel with the presently highest system-compatible protection. The container is equipped with a self-contained air condition and NBC overpressure system. ■

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WISENT.

Picture: RLS

PTVs are subdivided into five payload classes (maximum permitted loads) – 2 tons, 5 tons, 9 tons, 15 tons, and 25 tons (semi trailer truck) and are, as far as possible, to be realized as a vehicle family. An all-wheel drive, individual tires, a tire pressure control system, and respective chassis geometry aim for mobility in line with the requirement. For deployments of PTVs