

When the South African Defense Force (SADF) faced Cuban and MPLA(1) Katyusha rocket launchers and 130mm guns in Angola (1975-76), their 25 pounder (87.6mm) and 5.5 inch (139.7mm) guns were seriously out-ranged. The only option was to beat a hasty and somewhat humiliating withdrawal under fire.

Subsequent tactics called for the rapid emplacement, firing and displacement of these short ranged weapons, but the long term solution demanded a better gun. This idea evolved as the G5, a premium towed 155mm weapon created by the well known (in ordnance circles) designer Gerald Bull (who may have been later terminated by the Israeli Mossad for working with Iraq's Saddam Hussein) and an evolution of the GC45 made by Bull's Canadian Space Research Corporation of Quebec.

Rather than abandon the successful rapid tactics developed for the older guns, the SADF developed a self-propelled vehicle (the G-6 'Rhino') to exploit both the range of the G-5 as well as the speed and maintenance advantages inherent in a wheeled vehicle. Huge and unconventional by European standards, it was in keeping with the wheels-over-tracks requirements for the African plains.

The G6 series is more reminiscent of the futuristic APC in the movie "Aliens 2" or heavy strip mining machinery than conventional weaponry. The leading 'wedge' is designed for bush-clearing and holding 16 projectiles, followed by the driver's compartment (which sits between the front pair of wheels) is armored, and the front wheels which have been left open to divert any mine explosion away from the driver; followed by the engine compartment, with the turret at the rear which has a double bottom to harden it against land mines. The turret is limited to 180 degrees of traverse, though only the front 80 degrees are used for elevation and firing; curiously, there is not turret basket.

The G6 carries a fully integrated land navigation system decreasing reaction time and simplifying gun laying. Eight smoke launchers are mounted as well as a .50 caliber HMG. The main gun is essentially identical to the towed G5 and employs a hydraulic "flick rammer(2)". The gun barrel itself was produced using an autofretting(3) system to reduce weight but maintain strength.

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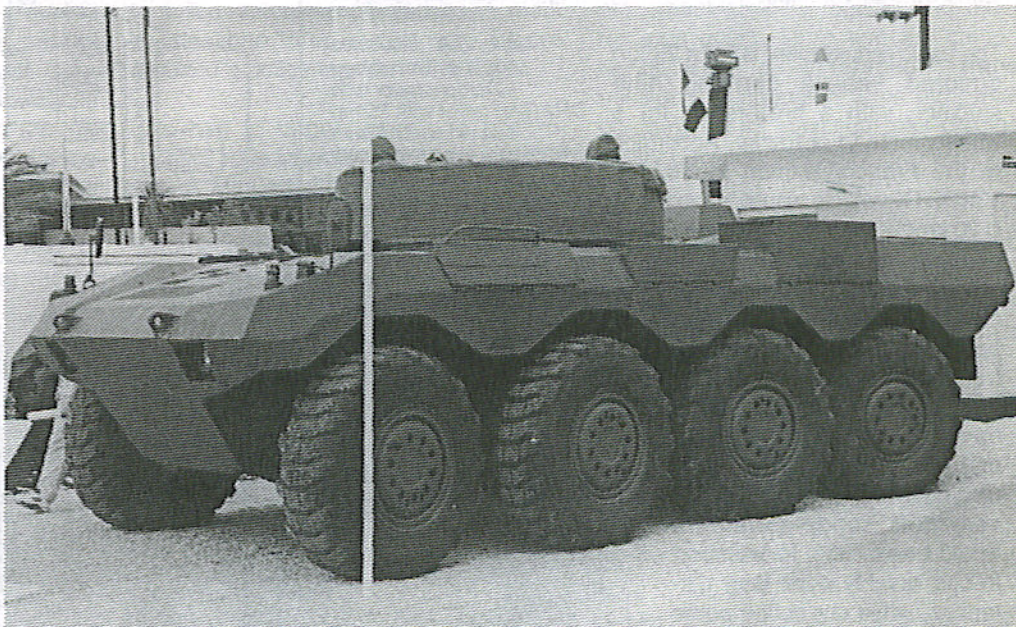
## The Search for a Franco-German Wheeled Armored Vehicle

by Raymond Surlémont

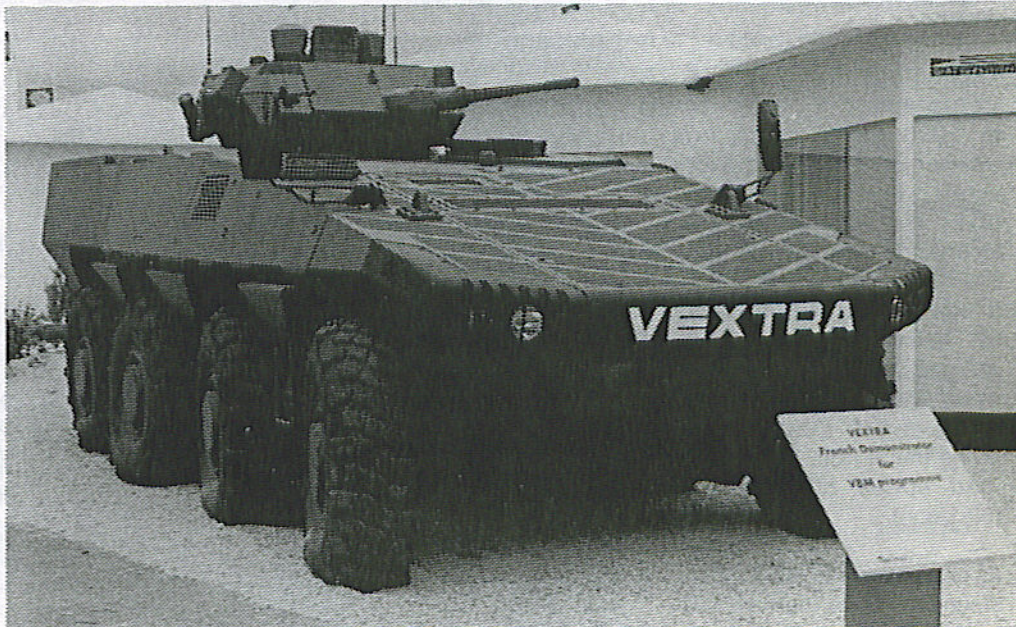
### The Program

Opening in France on the 20th of June 1994 at Le Bourget, near Paris, the International Land Forces Armament Show Euro-Satory 94, presented the

joint Franco-German response to the French VBM (*Véhicule Blindé Modulaire*) and the German GTK (*Gepanzerten Transport Kraft-fahrzeug*) programs. At the request of the Paris and Bonn



Above: The Daimler-Benz 1986 EXF Technology Demonstrator at EuroSatory 94. Photo: R. Surlémont  
Below: The GIAT Industries VEXTRA (1994) Technology Demonstrator. Photo: R. Surlémont





...Franco-German from page 1  
governments, two French industrial firms (GIAT Industries and Panhard) linked up with two German industrial concerns (Krauss Maffei and Mercedes-Benz) to design, develop and manufacture a new type of wheeled armored vehicle based on military specifications defined and agreed to by Germany and France in March 1993.

This joint program envisions the progressive replacement after the year 2000 of the French AMX-10RC, VAB and ERC-90 Sagaie, as well as the Spähpanzer Luchs, TPz1 Fuchs, M113 and Marder of the German Bundeswehr. According to marketing studies the world wide potential, including the equipment for the Eurocorps, is for some 50,000 vehicles.

The basic requirement is for a 25 ton armored vehicle carrying nine soldiers, with a preference for a wheels instead of tracks. According to the Franco/German staffs, the VBM/GTK vehicle would be very fast (120 km/h - 74.5 mph on roads), and capable of maneuvering in difficult terrain almost as well as tracked vehicles. This is to be made possible by a centralized variable pressure system for the tires, ranging from 4 (58.78 psi) to 0.8 (11.75 psi) bar. With the low pressures allowing the crossing of very soft sandy terrain, it would be possible to transport troops quickly over long distances, while correcting some of the weaknesses that had shown up in the Middle East deserts.

### Technology Testbed Vehicles

In 1986 the German firm Daimler-Benz unveiled a privately developed wheeled (8x8) testbed vehicle (or technology demonstrator), the EXF (*Experimentalfahrzeug*). It was shown at EuroSaturny 92. Its engine is a supercharged Daimler-Benz diesel, model OM444 LA, with a power rating of 610 kW (830 hp); giving the vehicle a maximum road speed of 110 km/h (68.3mph).

All eight wheels of the EXF are steerable, while the new suspension has been patented: it

consists of a lower transverse wishbone, an upper control arm and two flexible elements in-between the suspension and the hull. An electronically controlled damping system is designed to cope with the high dynamic wheel loads, which are often much higher than the static loads, preventing damage to the bump stops. This system also reduces the strain to the flexible elements connecting the suspension to the hull. The wheels are CTS (Conti Tire System) with tire pressure control, control valve, tensioning rings and run-flat tires. An electronic system controls the reduction of pressure from 5.5 (80.82 psi) bar to 2.5 (36.73 psi) bar, or from 2.5 (36.73 psi) bar to 1.1 (16.16 psi) bar.

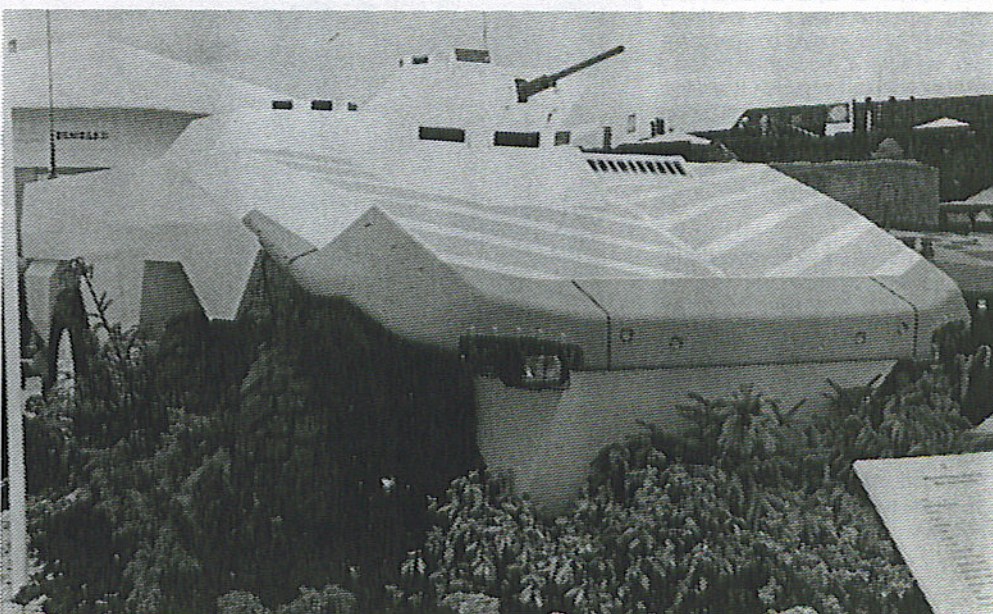
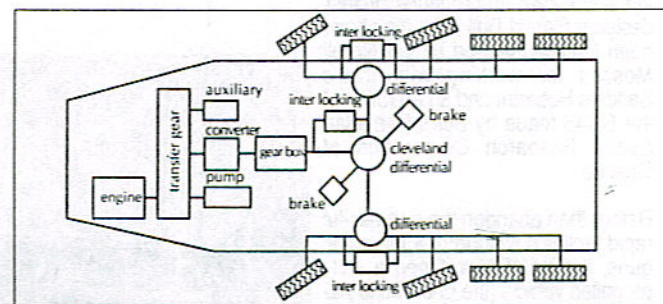
The pressure can also be increased for travel on harder terrain, using a compressor coupled to the engine.

From 1992, the French company GIAT Industries, with private funding, launched another technology demonstrator, the VEXTRA, to explore and validate the feasibility of wheeled vehicles weighing between 20 and 30 tons. The VEXTRA is a 27 ton vehicle with a crew of two, transporting either a section of nine men, or six tons of cargo. The engine is a 600 hp, V-8 Scania, placed at the front and coupled to a Renk automatic gearbox with seven gears. The four front wheels are steerable. Each suspension elements consists of

Right: Transmission layout for the VEXTRA.

Middle: GIAT Industries VEXTRA Technology Demonstrator with DRAGAR turret with 25mm cannon and 7.62mm machinegun in separate pod. Photo: R. Surlémond.

Bottom: EVA full scale mock-up. Photo: R. Surlémond.





a double wishbone, with an oleopneumatic element between the upper wishbone and the hull. The four rear wheels are mounted on trailing suspension arms with oleopneumatic elements. The wheel rims are fitted with wide Michelin tires with flexible sides.

The transmission developed by the French company SESM for the VEXTRA is of the "H" type, with cardan shafts placed inside, along each side of the hull, with a reduction gear on each axle. This frees a lot of space within the hull for the interior arrangements. The transfer gear contains three differentials: one for splitting torque between the left and right side, and two for splitting torque between the front set of wheels and the three others. All three differentials can be locked for travel in difficult terrain. In addition the central differential drives two external disc-brakes by planetary gears. Braking results in skid-steering, with a smaller radius turn possible than that obtained with the four front steering wheels. The central differential is similar to that used in certain tracked vehicles ("Cletrac" or "Cleveland"). The vehicle can be parked by engaging the two disc-brakes.

On trials since the 7th of March 1994, the VEXTRA has already met some of the VBM/GTK program requirements: maximum speed on roads (120 km/h - 74.5mph), turning circle/radius (15m/7.5m - 49.2 ft/24.6 ft), acceleration, braking (24m - 78.7 ft at a speed of 60 km/h - 37.2mph) and the crossing of obstacles.

At present VEXTRA mounts a DRAGAR one-man turret fitted with the GIAT 25mm M811 auto-matic cannon with two rates of fire, and a 7.62mm NF1 machinegun mounted in an external pod. Like the Spanish BMR-600, the hull of the VEXTRA is of welded aluminum

alloy, which allows light, gives protection against 14.5mm armor piercing rounds. This protection can be enhanced by the addition of passive or explosive reactive (ERA) armor.

### The six-wheeled vehicle EVA

Both the EXF and VESTRA vehicles were exhibited at Euro-Satory 94 in a stand shared between the four companies involved in the program. They also showed a full size mock-up, which certain French publications have christened EVA (for European Vehicle, Armored). This is a visual realization of the layout, taking in some of the technical solutions to date in the VBM/GTK program. This mock-up is for a six-wheeled APC. It is a fairly large vehicle, with external dimensions that conform to police peacetime regulations. A width greater than three meters would have required a police escort on the road.

The hull is large enough to accommodate nine infantrymen and a crew of two. A Mercedes-Benz diesel engine of 368 kW (500 hp) linked to a Renk automatic transmission is placed to the left of the driver at the front of the vehicle. The transmission system includes some elements used in the EXF and the VEXTRA. Thus the steerable wheels have a lower wish-bone and an upper trailing arm, similar to that of the EXF prototype, but the flexible elements are two helicoidal springs with concentric dampers.

### Modularity and the Reduction of Costs

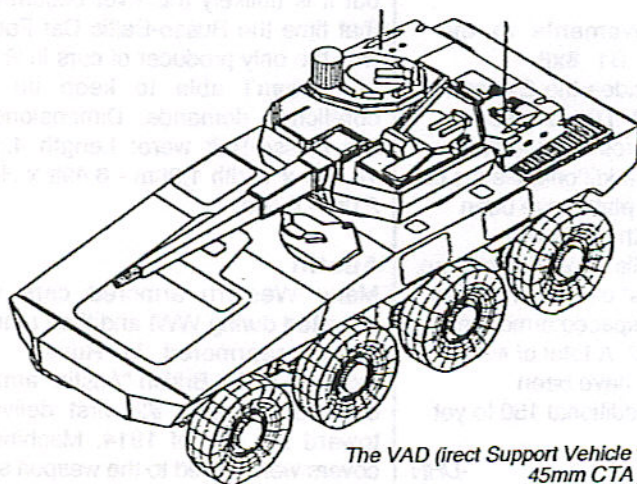
The vehicle studied and developed

within the VBM/GTK program must have the maximum modular flexibility to allow for an easy transition from 6x6 to 8x8 and even to 10x10 configurations. The use of different types of turret to suit operational needs must be possible without too many additional development studies. Protection should also be adaptable to respond to new developing threats and uses. Ergonomics are important, as the crew and passengers must be able to remain in the vehicle for 24 hours at a time in reasonable comfort. This constraint means an increase of 50% in the internal volume, by comparison with existing vehicles.

The use of commercially available components from the heavy vehicle industry, such as engines, gearboxes, etc., must simplify logistic and maintenance costs. More specific components, such as differentials, transmissions, suspension arms etc., must be designed for maximum inter-changeability between vehicles.

### Special Versions

At present there are only two types of vehicle common to both Germany and France in the 6x6 and 8x8 versions; namely the Armored Personnel Carrier (VTT - Véhicule Transport de Troupes)



The VAD (Direct Support Vehicle with 45mm CTA gun)

### Technical Data of the Technology Demonstrators

	EXF 8x8	VEXTRA 8x8	EVA 6x6
	1986	1994	Based on Mock-up
Weight (estimated):	22.3 tons	27 tons	22 tons
Crew:	?	2 + 9	2 + 9
Length:	6.95m/22.8ft	7.40m/24.3ft	6.70m/22ft
Width:	2.99m/9.8ft	3.00m/9.84ft	3.00m/9.84ft
Height (over hull):	1.74m/5.7ft	2.00m/6.56ft	2.00m/6.56ft
Ground clearance:	0.49m/1.6ft	0.50m/1.64ft	0.475m/1.55ft
1.7m	4.50m/14.76ft	?	?
Engine Make:	Daimler-Benz	Scania	Mercedes
Model:	OM444.LA	?	?
Cylinders:	?	V-8	?
Output:	610kW/819hp	?	380kW/509hp
Transmission make:	?	Renk	Renk
Type:	?	Automatic	Automatic
Gears:	?	7	?
Steering:	8 wheels	4 wheels	4 wheels
Suspension:	Mechanical	Oleopneumatic	Oleopneumatic
Range:	?	?	750km
Max. Speed:	110km/h - 68.3mph	120km/h - 74.5mph	120km/h - 74.5mph
Turning circle/radius:	?	15m/7.5m - 49.2ft/24.6ft	?
Vertical obstacle:	?	1.0m/3.28ft	1.0m/3.28ft
Gradient:	?	?	60.00%
Side slope:	?	?	30.00%
Trench:	?	?	1.7m



**Russian BTR-90 on the horizon.** The Russian GAZ company has shown a new 8x8 armored personnel carrier the BTR-90 (Gorky Auto Zavod (GAZ) Model 51). Larger and heavier than the previous BTR-80 (to which it bears a strong resemblance), this new vehicle mounts the 30mm cannon/missile armed turret from the BMP-2 infantry fighting vehicle, along with weapon's firing ports, and twin waterjet propulsion for amphibious operations.

**New Dragoon.** AV Technology is offering an Armored Security Vehicle version of their 4x4 Dragoon series of vehicles. Armed with what appears to be a version of the Cadillac Gage 40mm/12.7mm (.50 caliber) twin turret, this new version also offers a 300hp diesel engine, modular heating and air conditioning system, central tire inflation and improved armor protection. The Dragoon ASV dimensions are: Length 5.89m - 10.16ft x Width 2.49m - 8.16ft x Height 2.15m - 7.08ft.

**Swiss Eagle.** The Swiss company MOWAG has won a contract to supply 150+ versions of the 4x4 armored reconnaissance vehicle the "Eagle" to the Swiss Army. Based on the U.S. American Motors General Heavy HMMWV chassis, the new vehicle consists of an armored body and fighting compartment mounted to the existing chassis. A hatch for the vehicle commander, and fully rotating one-man turret are fitted to the roof. Dimensions for the Eagle are: Length: 4.9m - 16.07ft x Width 2.28m - 7.48ft x Height (Over hull) 1.75m - 5.74ft.

**LAV-105 one step closer.** Textron Marine & Land Systems (TMLS), which absorbed the former Cadillac Gage Textron, completed contractor testing of the last of three prototype LAV-105s for the U.S. Marine Corps. Using the same turret mounted on the tracked United Defense XM8 Armored Gun System, the vehicles will now begin government testing. The program to field a 105mm armed LAV for the U.S. Marine was canceled in 1991 when the project failed to be authorized additional development funding (the system still doesn't appear on the latest budget proposals). Since that time however, funding was released to allow the

completion and testing of all three prototypes. As originally proposed the U.S. Marines had a requirement for 154 LAV-105s, and it has been reported that Saudi Arabia had a requirement for 30+ assault gun versions of the LAV in their order with General Motors of Canada.

**Up-graded BTR-80.** A possible new version of the Russian BTR-80 8x8 APC has been shown. The major difference between the new vehicle and previous versions is the mounting of a new modular turret (Modular Weapons Station MWS) armed with a 30mm 2A42 cannon and 7.62mm PKT machinegun. Two different engine possibilities are also being offered with the new version.

Alvis Mamba



**Alvis Mamba.** Alvis Vehicles Limited is offering a new series of 4x4 armored vehicles based on the South African Reumech Sandock Mamba design. Using a Reumech Sandock designed and manufactured monocoque hull, and Mercedes-Benz Unimog running gear, the Alvis 4/8 (Mamba's) price of \$160,000-190,000 is very competitive and may prove attractive to possible buyers. At least one of these vehicles has been seen with British UN forces in Bosnia.

**Continued improvements in the Italian Centauro B1 8x8 Armored Car.** Besides the Explosive Reactive Armor (ERA) fitted to some Italian Army Centauros in issue #26, Vehicles fitted with additional pieces of conventional armor plate have been seen in Italy and with the Italian contingent in Somalia. Most evident are the additional "skirts" over the rear two sets of wheels and spaced armor on portions of the turret. A total of 400 vehicles Centauros have been delivered, with an additional 150 to yet be delivered.

## Russian Armored Cars of World War I

Text Slava Shpakovsky  
Drawings A. Kalashnik

### Russo-Balt

In World War I (WWI) the Imperial Russian Army was equipped with armored cars based on both indigenous and imported chassis, fitted with Russian designed armored hulls and turrets. But the first armored cars were built on a Russian chassis manufactured in 1912 by the Russian-Baltic Car Plant (Russo-Baltiskig Zavod - RBVZ) in Riga, Russia. These vehicles were known in the West as the Russo-Balt.

The Russo-Balt vehicles were built on the "M" series car chassis, and in order to speed up production were built without turrets. Instead, three machineguns were mounted in the side boards of the fighting compartment and next to the driver's seat. The weapons themselves were protected with a movable rectangular shield that slid back and forth on small rollers (see drawing number 1). These cars were ready in October of 1914, and on the 19th of that month were sent to the North-Western Front as the 1st Automobile Machinegun Company.

It was proposed that each platoon of the armored car company would have four machinegun and one 37mm cannon armed cars (the cannon cars having their main weapon mounted in the front); but it is unlikely this ever occurred. At that time the Russo-Baltic Car Factory was the only producer of cars in Russia and wasn't able to keep up with conflicting demands. Dimensions for the Russo-Balt were: Length 4.5m - 14.76ft x Width 1.98m - 6.49ft x Height 2.0m - 6.56ft.

### Austin

Many Western armored cars were imported during WWI and then rearmed and/or rearmored in Russia. One example is the British "Austin" armored car (see drawing #2) first delivered toward the end of 1914. Machinegun covers were added to the weapon sides

-DRH



as armored shields, and the armor protection of the vehicle itself was increased up to 8mm on the turrets and hull. Some cars had a second driving position at the rear to aid in quick withdrawal. Dimensions for the re-armored Austin were: Length 4.87m - 15.97ft x Width 2.0m - 6.49ft x Height 2.39m - 7.84ft.

### Austin-Putilov

A heavier variant of the "Austin" was the "Austin-Putilov" produced at the Putilov Factory in Petrograd. These cars had turrets which allowed enough elevation of the machine guns to be used for anti-aircraft defense. The twin turrets were also arranged in a new diagonal pattern making it possible for both machine-guns to be fired toward the same side of the vehicle (drawing #3). Dimensions were: Length 4.9m 16.07ft x Width 1.9m - 6.23ft x Height 2.4m - 7.87ft.

### Mgebrov's armored cars

A series of armored cars were designed by Staff-Captain V.A. Mgebrov, a talented engineer, whose cars had well sloped armor and heavy armament. One of the most interesting among his designs was the "Mgebrov-White" (see drawing #4) also known as the Izhorsky-White. Built at the Izhorsky factory during the spring of 1915 on a 1.5 ton American White truck chassis, the best feature of this design was that the hull front and sides were very well sloped in order to offer the best protection. The wheels had solid rubber tires and were also protected by armored disks. The complicated shape of the Mgebrov main turret was mounted on the roof of the round fighting compartment and equipped with two Maxim machineguns. The machineguns were fitted in the turret on separate pedestal mountings under an armored shield. They also had an individual traverse of up to 90° on both sides of the turret, while the main turret could also revolve through 360° along with its' floor and the roof of the compartment.

The commander had a manual turret traverse wheel and was seated under the cupola which was pierced with observation slots. Each gunner was on his own bicycle saddle-style seat. This was a typical "Mgebrov" turret with 7mm armor protection, but was very heavy (the turret alone weighing in at up to two tons!), cars with such turrets were well over-loaded.

A second small cylindrical turret was mounted at the back of the hull and was equipped with one 37mm Hotchkiss naval quick-firing cannon. In spite of the heavy weight, the car had a top speed of 80km/h - 50mph on a good road. Only one car of this type was built (total Mgebrov production of all types was only 16), but the vehicle was actually used on the Caucasus Front. Dimensions for the Mgebrov-White were: Length 6.23m - 20.43ft x Width 2.26m - 7.41ft x Height 2.74m - 8.98ft.

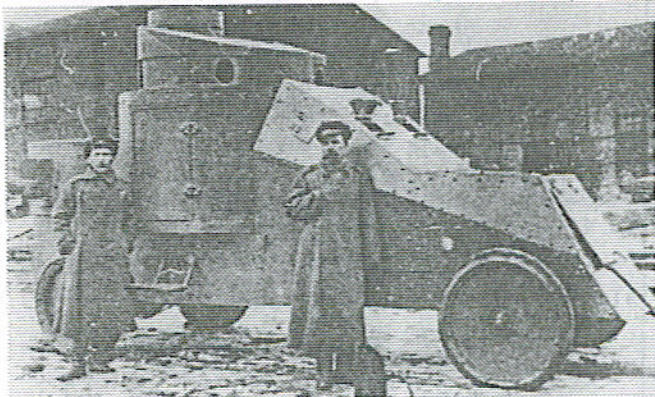
The well known Russian magazine "Modelist - Constructor" once published plans of the Mgebrov armored car based on the Renault chassis, but the "Big" turret from these plans was incorrect. It is a shame that some

Western model manufacturers used the drawings as a basis for kits.

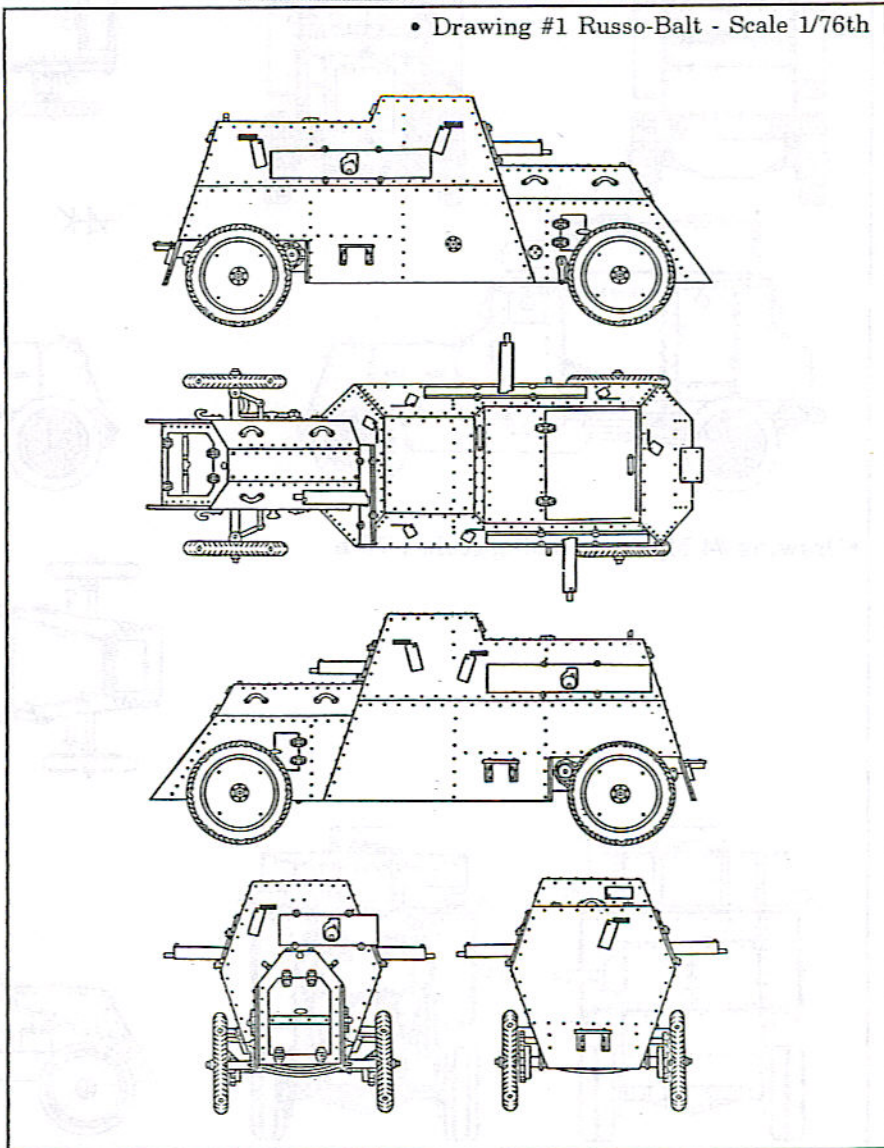
Typical colors for Russian armored cars during the WWI period were dark grey or dark green/salad green with a white winged wheel symbol on the vehicle doors.

**Note**  
Many thanks to P. Middleton of the UK Miniature Armoured Fighting Vehicle Association (MAFVA) who helped me to write in "correct" English, the part of this article dealing with the "Mgebrov" vehicles.

Below: Izhorsky-White



• Drawing #1 Russo-Balt - Scale 1/76th

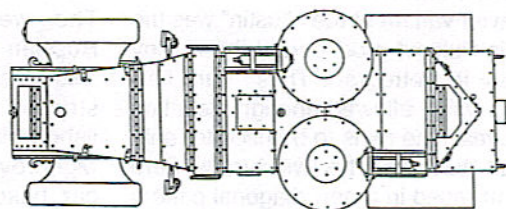
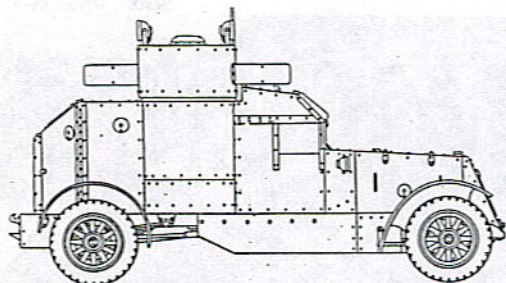
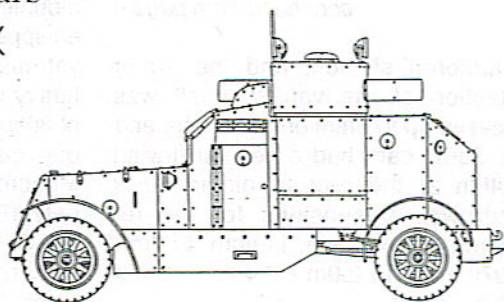
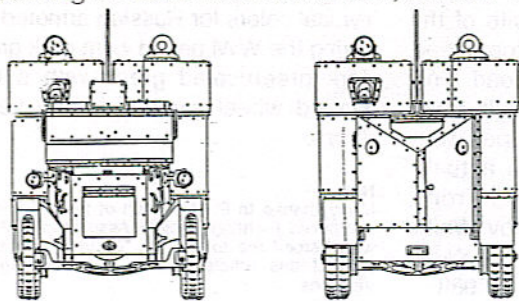




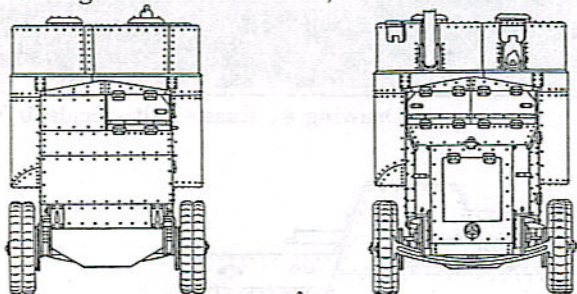
• Russian Armored Cars •

• Drawing #2 Austin Armored Car, scale 1/76th

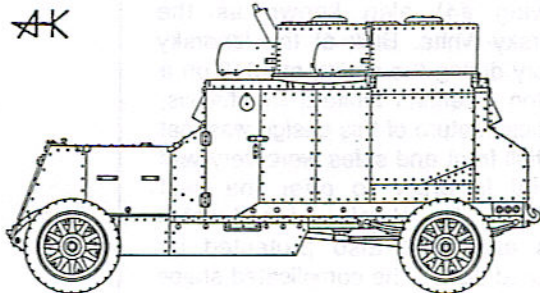
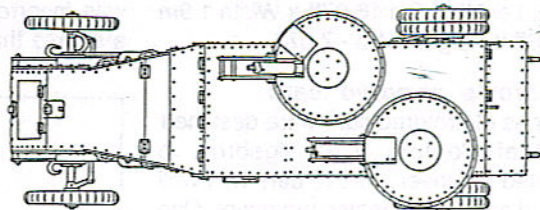
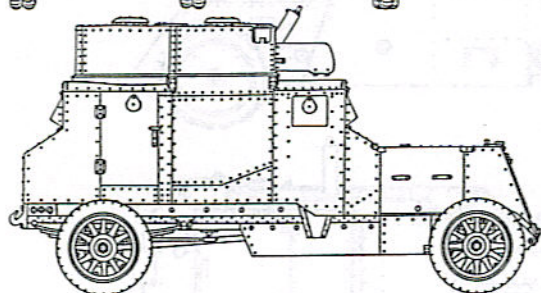
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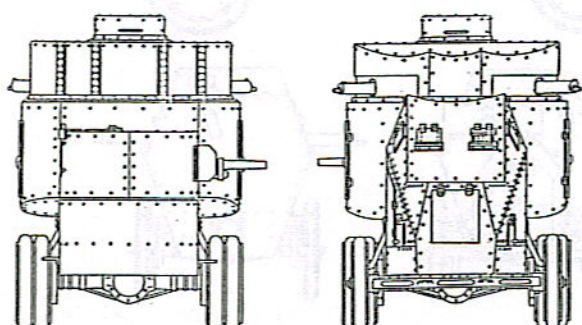
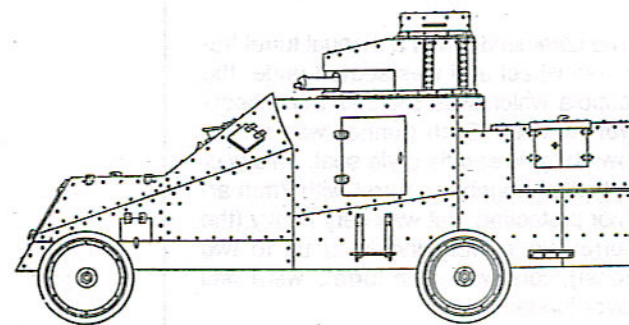
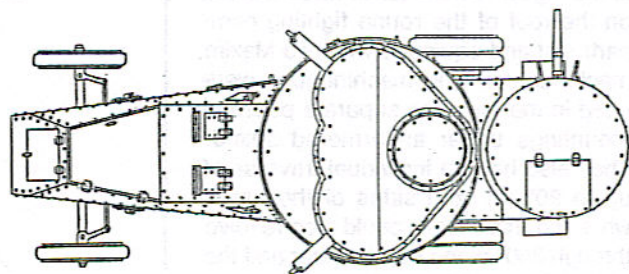
• Drawing #3 Austin-Putilov, scale 1/76th



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• Drawing #4 Mgebrov-White, scale 1/76th





...Franco-German from page 3  
 and Command Post Vehicle (VPC - *Véhicule Poste de Commandement*). Other special versions are proposed by both countries. Thus France requires a Direct Support Vehicle (VAD - *Véhicule d'Appui Direct*) armed with a 45mm cannon firing telescoped ammunition (which is being developed in conjunction with Great Britain); as well as an Armored Weapon System (VPSA - *Véhicule Porteur de Système d'Arme*), mounting a 105mm gun turret (and ultimately a 120mm gun turret), and for an Electronic Warfare Counter Measures (VPSA - *Véhicule de Détection et de Contre-Mesures*). Germany's proposals are for an Ambulance, Communications, Supply, Recovery, 120mm Mortar Carrier, Artillery, Observation, E.W. Counter Measures, Radar, NBC Detection, and Forward Air Control vehicles.

To sum up, the VBM/GTK must not only have great strategic mobility (in terms of speed and range), but must also adapt to all the operational needs of the modern battlefield.

### The Next Stage

The planned program envisions that four firms will have to sign a joint venture agreement in 1994, before the creation, in June of 1995 of a Franco-German subsidiary sharing the cost of development equally between the two countries.

A prototype should be ready in mid-1996, followed by several vehicles to be available for user tests in 1997. In 1998 Krauss-Maffei and GIAT Industries should each have set up production lines to start rolling in 1999. Panhard would be responsible for vehicles built to clients special requirements, while Mercedes-Benz would furnish the mechanical components available from its commercial range. The associated companies hope to get 20 to 30% of the potential market for the period from the years 2000-2020.

...G-6 continued from page 1  
 The first three prototypes were completed in 1981 and were followed by a series of six Advanced Development prototype and pre-production vehicles built and field tested in Angola. Cuban supported FAPLA(4) (the military wing of the MPLA) units were making a drive on

UNITA(5) and main force SADF units had been committed to the fight. Three G6s and fifteen G5s crossed the border on 20 October 1987, fired their first shots on 9 November and left the area on 28 November 1987.

Using observers infiltrated deep into enemy territory the G6s were able to keep the Cuito Cuanavale airport closed with a tremendous economy of force. Using two or three shells to crater the runway and one or two to cut the supply road, the supplies that would have been flown in to FAPLA forces never arrived.

Communist efforts to counter these weapons were stymied; the guns were positioned far beyond any logical range, but sometimes were as close as 15 kilometers to FAPLA lines. They were highly mobile, often long gone before the enemy had a clue to their last firing position. Also of note, both the G5 and G6 became ad hoc anti-tank weapons; competent observers using only a few shells to shatter individual T-54/55s.

For the curious the G6 has been sold to Abu Dhabi (78 weapons) and Qatar, as well as serving as the inspiration for the Iraqi 155mm 'Majnoon' and 210mm 'Al Fao' SPGs. At least one prototype variant mounted the Kentron HVM.

### Notes:

- (1) Popular Movement for the Liberation of Angola.
- (2) A flick rammer gives a very short, quick intense impulse to "flick" the projectile through the chamber into the gun rifling. The rammer head then immediately folds out of the way of the recoil mechanism. This system allows increased rates of fire over conventional rammers.
- (3) Autofretting is a system of gun tube manufacture in which the gun barrel is placed in a hydraulic container, filled with liquid and then subjected to much higher pressure than it is expected to withstand in service. The inner layers of metal are expanded beyond their elastic limit and take on a permanent set, while the outer layers are not expanded beyond their elastic limits. Thus, the outer layers of metal contract when the inner pressure is removed. This gives the same effect as adding an extra outer band of metal to the gun tube. This method allows for a light gun tube as strong as a much heavier one.
- (4) People's Armed Forces for the Liberation of Angola.
- (5) National Union for the Total Independence of Angola.

### DATA

Main Weapon	
Caliber:	155mm
Rate of fire:	3 rds/min
Max. Standard	30km
Base bleed	39km
Direct fire	0-5km
Elevation:	-5° to +70°
Max. speed: CC	30km/h
Road	85km/h
Max. Grade:	50%
Length:	10.4m
Width:	3.3m
Height:	3.2m
Ground clearance:	0.45m
Track width:	2.8m
Engine:	Aircooled, diesel
Tires:	21.00x25
Brakes:	Power assisted
(See drawing page 8)	

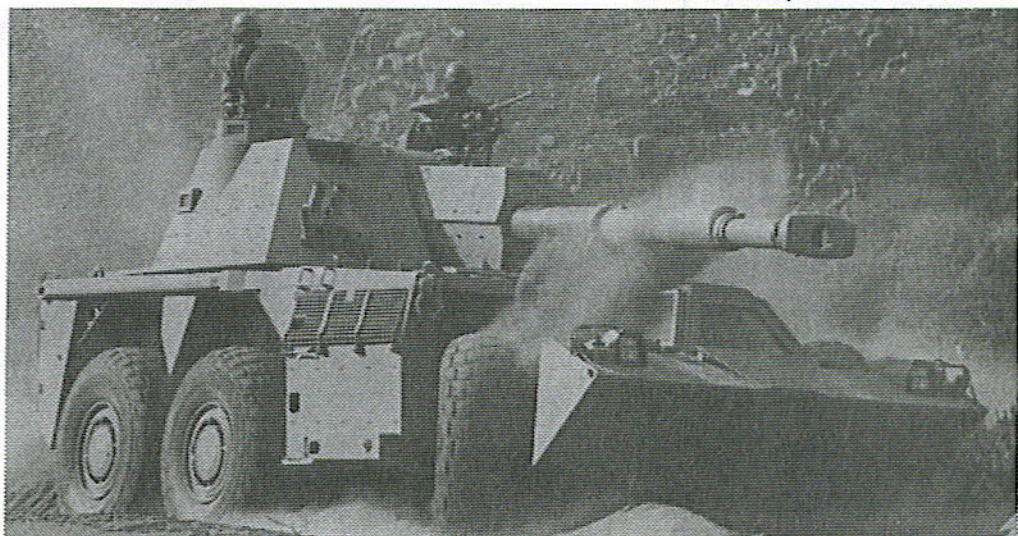
### Letters

**Looking for information.** Does anyone know of photographic evidence of add-on armor plating being used on the front of BTR-70/80s serving in Afghanistan? Sean McAndrews, 706 Hillborn Avenue, Swarthmore PA 19081 USA.

**New resin model.** Just released by the Russian resin model manufacturer A. Pivkin (Major Models) is a very good kit of the "Mgebrov-White" armored car in 1/35th scale. The price of the kit is \$44 (US). The kit is available from "TANKMASTER", V.O. Shpakovsky, P.O. Box 546, Penza-61, RUSSIA.

**SdKfz 231 help needed.** While on a visit to Koblenz to the "Wehrtechnisches Studienamt" to have a look at the various vehicles there, I came across an early eight wheeled armored car, the Büssing NAG SdKfz 231. Unfortunately the vehicle is without any interior, so the curator is looking for any information to help with restoration of the interior details. Does anyone have any drawings, sketches, photographs of the inside of this series of vehicles? Please write: Ulrich Rohrbach, Mainstraße 14, 64546 Mörfelden, GERMANY.

Below G-6 at speed. Photo: DENEL.





Model trade. Willing to trade model kits, including rare and new, made in the ex-USSR in any quantities. Guaranteed workmanship and you have a good bargain. New Soviet kits: T-18 light tank, SU-76 SPG, BA-20 armored car, BA-20M armored car, T-38 amphibious tank, "Komsomolez" tractor, SU-122 SPG and many others. Also books and magazines. Send your address for a large free list. Please write: Eduard Katschico, 340048 Donetsk P.O. Box 800, UKRAINE.

Scale drawings available. Copies of Hubert Cance's fine scale drawings are now available in 1/35th - 1/76th scale (over a 100 different vehicles are either finished or nearing completion) from Trux Models. For more information write: Trux Models, 156 High Street, Yeadon, Leeds LS19 7AB, GREAT BRITAIN.

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• David R. Haugh, Editor  
• Bryce Haugh, Circulation

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