

MOWAG

The **PIRANHA** 10 x 10

A new deal in the
wheel-versus-track
debate

by Raymond Surlémont



ARMORED CAR

THE WHEELED FIGHTING VEHICLE NEWSLETTER

Issue #25

September-October 1994

\$3.00

At EuroSatory 94, held at Le Bourget, France, late in June 1994, the Mowag Motorwagenfabrick AG company (located in Kreuzlingen, Switzerland); unveiled the brand new Piranha 10 x 10 wheeled armored vehicle. With its weight of 18 tons in combat order, and its crew of four, this machine is a ten wheeler that can be considered a true "tank on wheels". In fact the Piranha 10 x 10 is essentially an outgrowth of the former 8 x 8 variant of the well known MOWAG range of wheeled armored vehicles which have been produced in great numbers and exported world wide. It is intended as the backbone of a mobile combat force, capable of rapid deployment and quick strike offensive operations.

General Concept.

To date, the Piranha range of wheeled armored vehicles had been developed in three basic configurations: 4 x 4, 6 x 6 and 8 x 8. While retaining the same high mobility level, the new ten wheel variant provides for an increased payload, greater internal volume and better ballistic armor protection. It is an ideal carrier for the heaviest weapon systems, such as a 105mm gun turret.

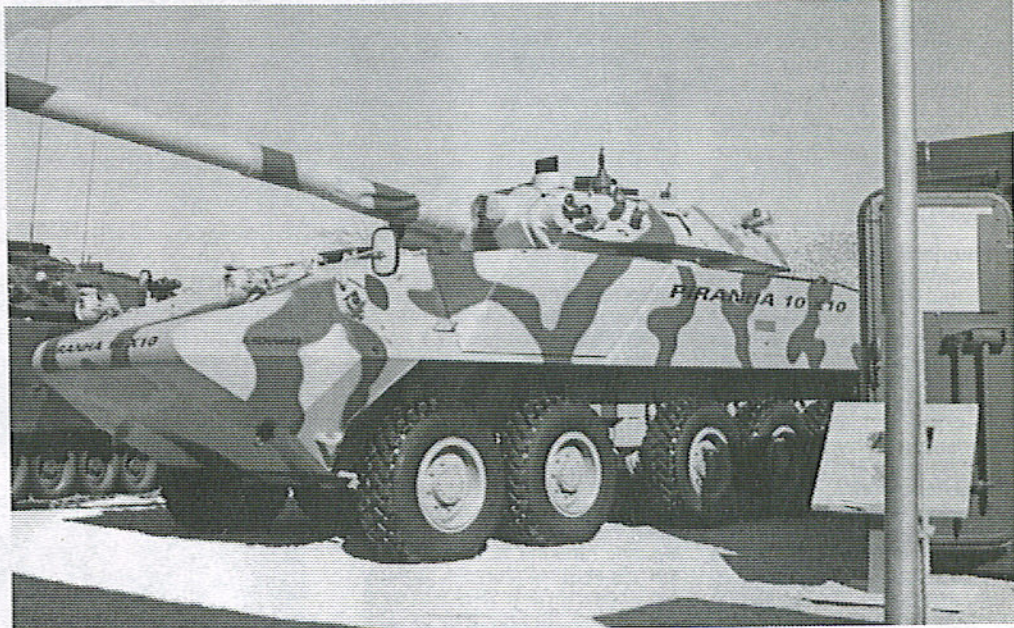
The extra internal space provided by the increased length makes it more easily adapted to various applications. The fuel tank is located in the rear, right hand section of the hull and its capacity can be selected to suit specific range requirements. All efforts have been made since the development phase to uphold the logistic commonality with the already existing 6 x 6 and 8 x 8 versions. As an example, the well proven suspension components of these former vehicles are utilized.

The Five Axle Configuration.

The ten-wheel formula can trace its ancestry back to the ZRW (Zehn Rad Wagen) prototype of an amphibious armored car chassis, built and issued in disguise by the German Büssing-NAG company in 1927-29. On the new Piranha, the additional axle is required not only to bear the heaviest weapon systems and the the 825mm stretch of length, but also to ensure optimum traction on rough terrain and better stability for the vehicle when firing.

The five-axle configuration offers different advantages that can be summarized as follows:

-a high cross-country mobility and an increased crew comfort provided by independently suspended wheels, each provided with a large spring movement.



Prototype MOWAG Piranha 10 x 10 at EuroSatory 1994. Photo: R. Surlémont

-a minimal vehicle width for an easier air transportability.

-enhanced crew protection against direct fire and mine explosions.

Weapon System.

To date, the weapon system fitted and thoroughly tested on the Piranha 10 x 10 is composed of two GIAT Industries' products, namely the TML 105 (TML = Tourelle Modulaire Légère) turret, combined with the 105mm G2 gun. Derived from the TK 105 turret which has been successfully combat proven on several occasions, as in Chad and in the Gulf War. The TML 105 has been designed to upgrade the French AMX-10RC heavy armored car. It is fitted with all the equipment necessary for night and day firing, at either fixed or moving targets. Its modern digital fire control system comprises a thermal sight, a Neodyme-YAG laser range-finder, a ballistic computer and video monitor. Both traverse and laying are electro-hydraulically driven and the revolving speed is controlled by a digital computer. As the gunner's sight is fixed directly into the gun mantlet, the effectiveness of the fire control system is significantly enhanced. The design of the latter is modular around a basic core of components, making it adaptable to various specifications. Additional options include either stabilization of the cannon for firing on the move, or stabilization of only the optical equipment, permitting rapid firing as soon as the vehicle halts.

The observation devices available include nine episcopes giving 360° vision for the commander, two for the gunner, and three for the loader. Total weight of the turret in combat order rises to 4780kg with a crew of three. The turret's overall length is 7.94m including the gun barrel and its height above the upper hull level is 1.13m.

The 105mm G2 cannon fires all NATO standard ammunition as well as the very effective French OFL105.F1 APFSDS round. Fired at a muzzle velocity (V^0) of 1,525 m/s, the latter can perforate a NATO triple layer heavy tank target at a useful range of 2,000m. The twelve rounds of ammunition stored in the turret are completed by twenty-six other rounds stowed within the hull. The secondary armament is a co-axial 7.62mm machinegun with 1,600 rounds.

Mobility.

The Piranha 10 x 10 is powered by a six-cylinder Detroit Diesel model 6V53 TA engine developing 251 kW (350 hp). It is coupled to an Allison automatic transmission, with six forward and one reverse gear, coupled with a MOWAG two-speed transfer case. The suspension of the four front wheels is of the McPherson type (combining a telescopic strut with a lower wish-bone spring), while the six rear wheels are mounted on trailing arms sprung by torsion bars. This allows a vertical travel of 320mm for the front wheels and about 340mm for the six rear wheels. Only the three rear axles

are permanently driven, although the two front steering axles can be separately engaged as required. The differentials are pneumatically controlled. The auxiliary transfer case allows the machine to travel at a speed clocked up to 65 kmph in low off-road range. The motive power in reverse is sufficient to cope with all types of terrain. The ten wheels are mounted with large section Michelin types with run flat inner tubes.

To further enhance the vehicle mobility on very round terrain, two options are in their development stage, namely a height-adjustable hydropneumatic suspension system and a central tire-inflation/deflation system.

Protection.

The Piranha 10 x 10's body is made of high-hardness steel armor, its front section being protected by spaced armor layers which protect the crew against heavy machinegun armor piercing bullets. The hull has been designed with sloped (but flat) surfaces which facilitate the application of add-on armor to meet a customer requirement for higher levels of protection. Extra protection can be provided by adding spall liners within the crew compartment.

The TML turret is fitted with storage bins which provide the main shell with an additional shield made of composite material. The shield is so designed that it improves stealth

by decreasing radar and infrared signatures. All the optical devices used offer protection to the eyes of the crew against the blinding effect from laser beams. There is also a centralized, manually operated fire extinguisher that can be optionally replaced by an automatic, ultra-fast fire detection and extinction system.

The vehicle is equipped with an NBC overpressure device but a collective ventilated face mask system can be installed as an alternative. Close in external protection is insured by fourteen GALIX dischargers fitted on the turret: eight of these are smoke cartridge launchers, while the remaining six are for anti-personnel grenades.

Communication Equipment.

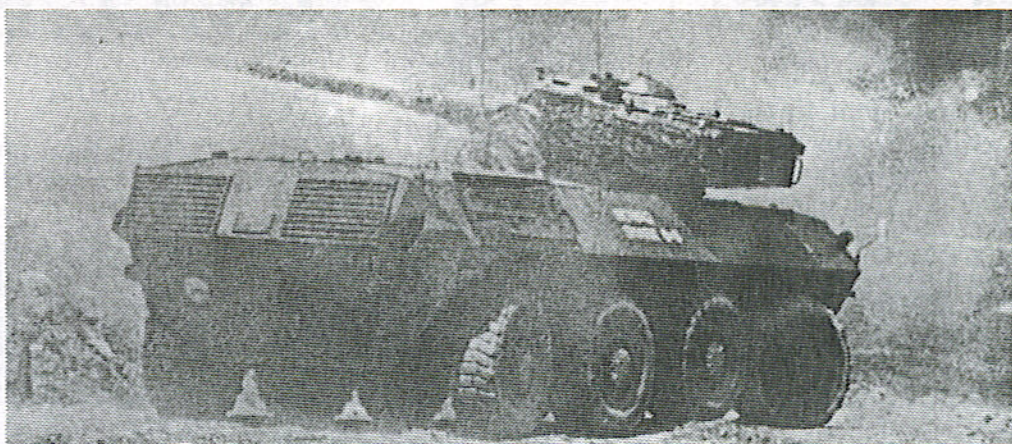
The vehicle's communication equipment is a sophisticated 50 Watt, VHF, frequency hopping (Transmitter/Receiver) vehicle radio, provided with selective communication facilities and integral secure speech capability. There is also an intercom system for the four crew members.

Special Accessories.

A powerful 8-ton winch is fitted in the rear, left-hand section of the hull. An air conditioning system delivers fresh and cooled air to each crew member through special air ducts.

Present status.

The Piranha 10 x 10 pilot model



Above: The FL-12 turreted MOWAG Shark with 105mm cannon. Photo: MOWAG Motorwagenfabrik AG.

rolled out of the MOWAG factory in March 1994, while the manufacturer's trials began on 1 April. Firing tests of the main gun were carried out in May at the Swiss Army's gunnery range at Hinterehein. More than seventy 105mm rounds were fired with very satisfactory results; thanks to the excellent stability of the vehicle and the effectiveness of both the main weapon and its fire control system. After the exhibition of the vehicle at EuroSatory 94, mobility tests began in July 1994 and were completed in October on the company's 110,000 m² vehicle test circuit at Bürglen.



Above: 8 x 8 D with 90mm Cockrill turret. Photo: MOWAG AG.

Below: Piranha with AAI 75mm turret. Photo: MOWAG AG.



MOWAG PIRANHA 10 x 10

Specifications

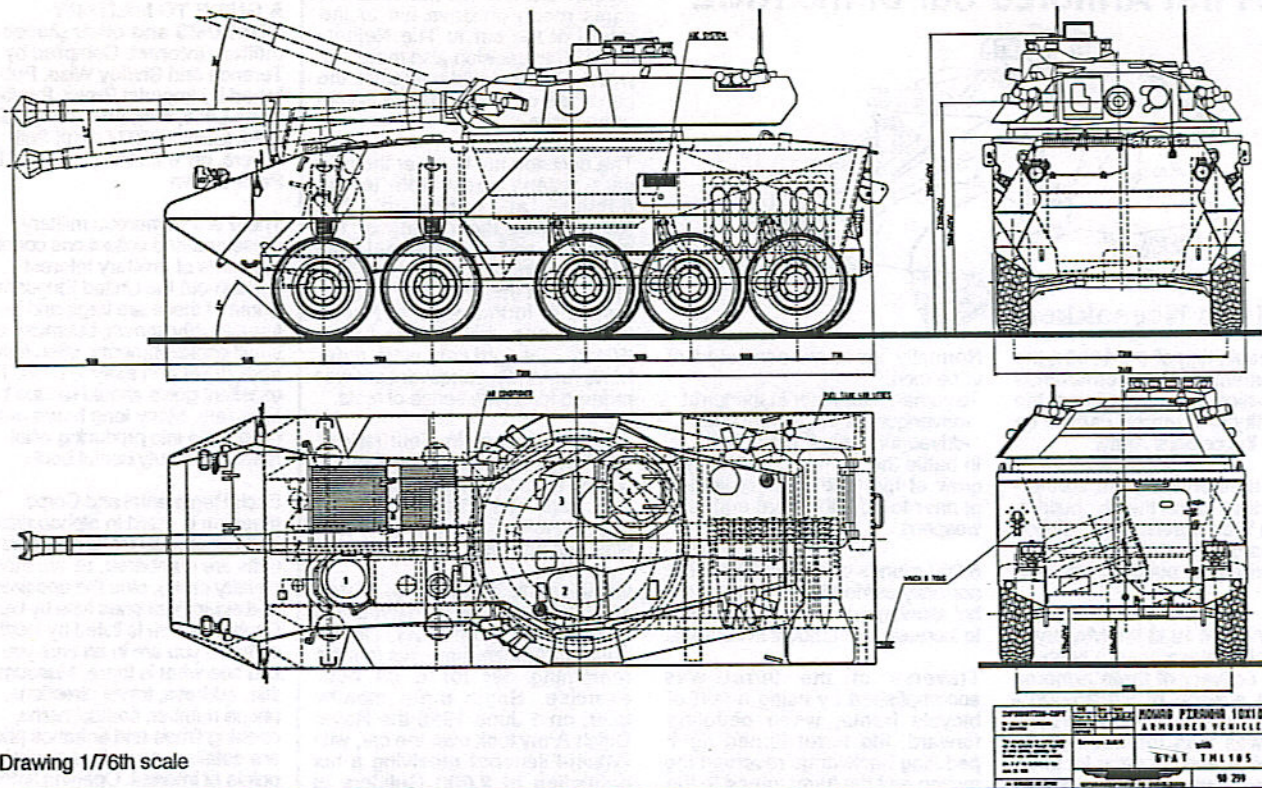
Weight, in combat order	18,000kg
Crew	4
Dimensions:	
Length (hull)	7.20m
Length (including gun)	8.75m
Width	2.60m
Height (turret)	3.09m
Height (hull)	1.96m
Ground clearance	0.57m
Track	2.20m/2.22m
Armament	(1) 105mm G2 cannon (1) 7.62mm FNNH machinegun (14) GALIX launchers
Ammunition	105mm 38 rounds 7.62mm 2,000 rounds GALIX 14 grenades
Motor	Manufacturer Detroit Diesel Model 6V53 TA Cylinders Six Power 261 kW/350 hp
Power-to-weight ratio	14.5 kW - 19.4 hp/ton
Transmission	Allison, auto with 6 fwd and 1 reverse gears MOWAG, 2-speed transfer case
Suspension	(10) wheel independent suspension (1st and 2nd axles) coil springs with wishbone (3rd, 4th & 5th axles) torsion bars
Max road spd	100 km/h
Range, on road	800 km
Gradient	0.6
Side slope	0.3
Trench cross	2.0m
Ford depth	1.4m

Notes on the MOWAG 105mm armed Piranha 10 x 10 by David Haugh

There is a logical extension for a longer, heavier armed version of the Piranha to be introduced by MOWAG. The emphasis today in

both the U.S. as well as European and ex-Soviet block military on Rapid Deployment Forces to all parts of the world have clearly shown the need for an airportable, wheeled fighting vehicle capable of delivering tank like firepower, if not protection.

Cadillac Gage - Textron along with GM of Canada Ltd. (builder's of ...continued on page 3



Drawing 1/76th scale

Notes on the MOWAG continued from page 2

the LAV and Bison series of vehicles) have already proposed a 105mm armed LAV for the U.S. Marine Corps. Whether or not the U.S. economy will allow a large enough budget to continue development remains to be seen. But, the requirement for such a vehicle is still there. The sight of 30 plus year old M551 Sheridans in the streets of Haiti's capital only point out the need for a new vehicle.

Other proposals for MOWAG based vehicles have included the MOWAG (Mobile Protected Weapons System) MPWS Piranha 8 x 8 armed with a 75mm automatic cannon in an AAI Corporation developed turret; as well as the Piranha 8 x 8D (Assault Gun variant) mounting a Cockerill CSE 90mm turret with a 90mm Cockerill MkIII cannon. Finally, a lengthened Piranha 8 x 8 with the engine moved to the rear (called the Shark), has been offered with a 105mm cannon and either the French FL-12 (as mounted on the AMX-13 light tank among other vehicles) or the new FL-15 turret from Fives-Cail Babcock.

For Your Information

SOME WORDS FROM YOUR EDITOR. Welcome to a smaller, but I hope better newsletter. As it came time to start the first issue of the fifth year of *ARMORED CAR*, I found that the newsletter had strayed away from its original intent and purpose. The issues and grown in size until postage (particularly for overseas addresses) had escalated, just mailing an issue

run three times what it cost to print. Also AC had wandered farther into modeling than was my intention. As of this issue, aside from a brief paragraph to acknowledge a new kit, I won't be running any model or kit reviews. My intent is to do a newsletter that deals with actual vehicles and their history and development. In order to keep AC going I have had to cut the number of pages, it was a choice of either bringing costs under control, or calling quits to the publication. I have tried to make up by using a smaller type size and squeezing as much space as possible out of each page. For those of you like myself who wear bifocal glasses, I'm sorry guys, you'll just have to squint. Over the next few months to all of those who have helped and encouraged AC over the past four years, I want to send a heartfelt THANKS, I appreciate hearing from you all.

MORE ON FREE GREEK ARMORED VEHICLES (see AC #24 pgs 4 & 5). I'd like to point out a couple of things concerning the markings of the Greek armored cars in the photographs last issue. On the Humbers, the formation sign was carried to the left of the driver's visor, the rear view mirror being below this sign.

On some M3 White armored cars, the same sign is carried on the right front fender, just inboard of the headlights. Also if you look closely at photo #2 on page 4, you will see the Greek Army initials EΣ on the right top corner of the windscreen.

The truck following the Otter on page 5, photo #4 is probably an Austin K5 ex-portee, towing a 17

pdr anti-tank gun. T. Metsovitis, 11 Polemonos Str, 116 35 Athens, GREECE.

NEW BOOK Mick Miller of Marco Polo Import, Inc., send a note that a new book by Steven Zaloga and George Balin; *D-Day Tank Warfare* will be released by Concord Publishing this October. "This book features all armored combat vehicles involved from the Normandy Campaign to the liberation of Paris: German, American, British, Canadian, French and Polish. Includes eight pages in color".

EXPLOSIVE REACTIVE ARMOR (ERA). At least some of the Italian Army 8 x 8 Centauro armored car (tank destroyers) being used with UN forces in Somalia have been fitted with ROMOR ERA to the hull sides and turret. ROMOR was developed by the Royal Ordnance Division of British Aerospace Defense. The Centauro's relatively thin armor required the addition of a backing plate between each block and the front of the hull armor.

8 x 8 PIRANHAS FOR OMAN. The Sultanate of Oman ordered Piranhas from the British company GKN Defense. A licensed version of the MOWAG vehicle, along with the personnel carrier version, command, ambulance, recovery and mortar carrier vehicles were purchased. If these vehicles are similar to those offered to Saudi Arabia by GKN, they will not be fitted for amphibious operations.

NEW SAXON VERSION. The UK magazine *SOLDIER* (which is a non-official publication devoted to the British Army) carried details in

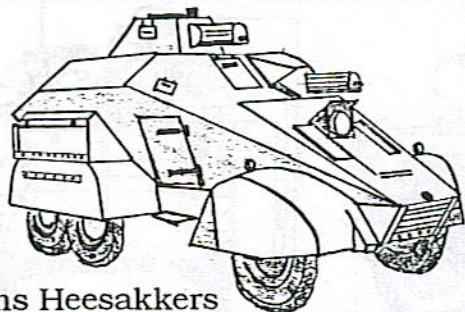
September 5, 1994 edition of 'Anti-sniper turrets for Saxons' which are now in service in Bosnia. While commercial versions of the AT105 series vehicle of which Saxon is one have various turret options offered, standard British Army ones have a fixed raised cupola. To use the GPMG on its DISA mount means the commander must be exposed, not the best of states when someone is shooting at or even near you. To improve protection Saxons in service in Bosnia, currently with 1st Battalion, The Duke of Wellington's Regiment, have had the cupola section removed and replaced with one fitted with a one-man turret. These are taken from old FV432 APCs withdrawn from service, apparently some were put into storage for possible future use. These one-man rounded turrets allow the commander full protection and enable the GPMG to be fired from under cover.

To counter the old trick of the rope or wire stretched across the road, a special wire cutter has been added. This takes the form of a shallow V shape pointing forward. Turrets and cutters were fitted by Army workshops in Bosnia, and other vehicles in the UK have been modified to allow training.

One possible use of the old L37 turrets was to have been with old Fox hulls whose turrets had been removed for use with old Scorpion light tank hulls to make Sabres which are now in service it seems. *TANK*, the Regimental Journal of the Royal Tank Regiment for August 1994 carried an article on Sabre. This mentioned that the plan

...continued on page 6

Armored Cars of the Royal Dutch Indies Army (KNIL) Part III The First Armored Car of the KNIL



by Hans Heesakkers

In the beginning of the 1930s, the government of the Netherlands East Indies was examining the possibility of armored cars to be used in the colonial Army.

In the motherland (The Netherlands), they found the shipbuilder, Dok-en Werf Maatschappij Wilton-Fijenoord N.V. (based at Schiedam) willing to build an armored car.

On 16 August 1933 the Ministry of Colonial Affairs signed a contract for the delivery of three armored cars at a price of Hfl 25,500 - (Dutch Guilders) a piece. This first order was intended to be followed by another order for three more cars a year later. These cars would be built on a six wheel truck chassis (the L2H43) of the Krupp factory. Motive power would be supplied by an aircooled Krupp built engine, the armored hull would be built by Wilton-Fijenoord.

The Wilton-Fijenoord armored superstructure was to withstand projectiles from machineguns fired at a distance of 30 meters. Beveled armor plates were used, with a thickness of from 3 to 10mm. The hull was as far as practical, totally enclosed except for some peepholes. Small lights were placed in the turret and hull to enable the crew to see. An electric ventilator was also built into the turret to remove the gases from the firing the weapons.

The car was armed with three machineguns, one in the turret, and one each in the front and rear face of the hull. Besides a machinegun, the turret was also equipped with a periscope which allowed for 360° of vision.

A special feature of the car was the ability to put a high voltage charge on the outside of the hull to prevent anyone climbing onto the vehicle.

Only the rear pair of wheels were driven (for a 6x4 vehicle), and a track could be placed around the rear wheels in a few minutes. The tires were either solid rubber, or of the run-flat variety. To facilitate withdrawals, the rear machine gunner also had a set of driving controls.

To aid with vision, powerful searchlights which could be controlled from inside the vehicle were mounted on the front and rear of the hull.

Normally the crew consisted of three men:

- commander/gunner in the turret
- driver/gunner in the front hull
- driver/gunner in the rear hull.

In battle the vehicle could carry a crew of five adding a dedicated gunner to both the front and rear weapons.

6,000 rounds of ammunition were normally carried for each weapon, but allowance was made in the hull to increase that amount in combat.

Traversal of the turret was accomplished by using a sort of bicycle frame, when peddling forward, the turret turned right, peddling backwards reversed the motion and the turret turned to the gunner's left.

The vehicles were tested in the two provinces Noord - Brabant and Limburg (the southern part of the Netherlands forming the border with Belgium). During these tests the design performed well, and the Dutch military authorities watching the exercises were overwhelmed by the cars performance.

Interest arose for a version with a 20mm Solothurn cannon and two 7.9mm machineguns. On 20 September 1934 W.F. gave an offer for producing three such cars at a price of 34,800 Guilders each.

During April of 1934, the first of the original cars was shipped to Java on the MS Kota Tjandi. The KNIL intended the cars for reconnaissance duties and for suppressing possible revolts among the native population.

The arrival of this first armored car in the Netherlands East Indies (NEI) became something of a disappointment when the gasoline used in the NEI was of too low an octane and resulted in engine trouble, only the use of better aircraft grade fuel gave the performance demonstrated in the Netherlands. This meant however, that the vehicle could only be operated in the hemisphere of an airfield, and this would effect its operational value.

A technical commission was formed to study if the engine could be modified to use the lower quality "normal" gasoline; but the commission wasn't successful. Finally the car was sold back to its manufacturer Wilton-Fijenoord.

The fact that the gasoline in the

NEI wasn't the same quality as that in used in Europe and the fact that the car was too heavy for the small roads on Java led to the return of the car to The Netherlands. This decision also made the Dutch Army decide against the purchase of the proposed 20mm armed cars.

The decision not to order the new cars wasn't really fair to the design; at home in The Netherlands the quality of the gasoline and the roadnet was much superior to those in the East Indies, and this was also demonstrated in further tests in Noord-Brabant and Limburg. No further Wilton-Fijenoord cars were ordered however, and a Landsverk car was ordered for a new series of tests.

Never the less, in February of 1935 the Brazilian government signed a contract to buy two of the W.F. cars. The third stayed in the possession of the company and was regularly used during trials.

On the 20th and 21st of March 1936 the Vrijwillige Burgerwacht of Amsterdam (Volunteer Home-guard of Amsterdam) was lent the remaining car for a 24 hour exercise. Some three months later, on 1 June 1936 the Royal Dutch Army took over the car, with Wilton-Fijenoord receiving a tax deduction of 2,000 Guilders in exchange.

As received transferred from the factory, the car was without armament and was intended for reconnaissance duties with the Korps Rijdende Artillerie (Mobile Artillery Corps - established in 1794). The car was used extensively during army exercises.

On 31 January 1940 a German invasion was threatening Dutch neutrality, and the commander of the Korps asked the Ministry of Defense for permission to let the Dutch firm D.A.F. build in some armament so the car could be used in the event of war. There was no reply and on 10 March 1940 Nazi Germany attacked the Netherlands. The W.F. car wasn't used in the battle, and the Germans captured the vehicle and placed it in a museum in Berlin. In April 1945 it was put back in service by the Germans to defend Berlin against the Russians. After the fall of the Third Reich the car was found in the Ehrenhof, the inner court of the Reichskanselerie. The vehicle was later removed and destroyed.

Specifications:

LxWxH	5.06 x 2.20 x 2.30m
Armor	3-10mm
Weight	4500kg
Max Speed	70 kmph (on Java 60 k mph)
Fuel tank	65 liters
Radius	250km
Engine	4 cyl aircooled 60hp gasoline

Hans Heesakkers, Akker str. 2, NL-5061 DE Oisterwijk, The Netherlands.

Book Review

A GUIDE TO MILITARY MUSEUMS and other places of military interest. Compiled by Terence and Shirley Wise. Published by Imperial Press, Pantiles, Garth Lane, Knighton, Powys LD7 1HH. ISBN 1 85674 020X Soft covers, price £3.95. Reviewed by Peter Brown

There are numerous military museums and collections containing items of military interest throughout the United Kingdom. Some of these are large and internationally known, but many are small establishments, often hard to track down and easy to miss. This excellent guide should reduce the miss rate. Many long hours must have gone into producing what results in a truly useful book.

Each Regimental and Corps museum is listed in alphabetical and numeric order (many infantry units are numbered, as are most cavalry ones), plus the specialist and equipment ones type by type. Each museum is listed by location, so that if you are in an area you can see what is there. Museum title, address, travel directions, phone number, contact name, opening times and entrance price are detailed, as well as major points of interest. Opening times are useful, many collections are only open by special appointment or else closed at unusual times.

Even if you do not visit them, you have here enough information to help you correspond in your never-ending quest for information. Always remember three things if you do this - enclose return postage with a stamped envelope or IRC, and say please and thank you. This will keep costs down and interest and response rate for us all up.

TECH INTELL World War II US Army Technical Intelligence Reports and Summaries Volume 1 Compiled by Jeffrey D McKaughan. Published by Darlington Productions Inc, PO Box 5884, Darlington, MD 21034. US price \$13.95 plus \$3.50 overseas postage. Review P. Brown.

While not a guaranteed faultless source of data, original reports made at the time are very useful for anyone making a serious study of an armoured vehicle or weapon. Often equipment could not be recovered for detailed examination or was in a poor state when examined, and items were still likely to be so damaged in transit as to make them worthless when sent to proper technical establishments.

Two dozen reports are reproduced in this collection, presented as far as possible in their original format. Most repay careful study, as they can show what was known at the time without the benefit of modern hindsight.

You may find enough here to warrant the asking price even if your are strictly into wheeled subjects.

Salvadorian Army Cashuat 4 x 4 APC

Text - David Haugh

Photos - Maj John Lopez Jr

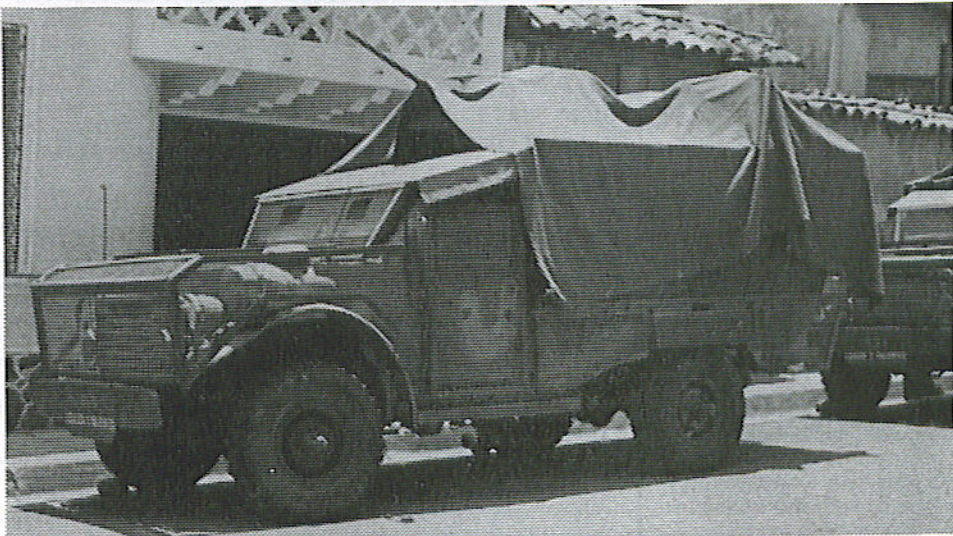
Faced with an armed insurgency that lasted for over twelve years (from 1980 to the peace agreement between the insurgents and central government in 1992), the Salvadorian Army found itself in a full scale insurrection, with very few assets to carry out military operations.

After a short war with Honduras the previous year (1969), they managed to acquire 12 Panhard AML-90 armored cars from France, and 10 UR-416 APCs from Germany, as well as a selection of field cars and trucks from various sources.

Sixteen years later, in 1985, the Salvadorian Army was still operating at least ten of the AMLs and eight of the UR-416s. Badly in need of replacement personnel carriers, the Salvadorian Army Cavalry Regiment requested new equipment and the U.S. government agreed to help. Unable to arrive at a consensus on the kind of vehicles needed and without sufficient funds to buy more overseas equipment (the \$3 million in aid offered by the U.S. didn't go very far), a project was developed for the production of a wheeled armored personnel carrier in El Salvador.

Called the *Vehiculo de Asalto Ligero Cashuat* (*Cashuat* being an indian word for horse), the proposed vehicle was basically a Dodge M37 3/4-ton cargo truck modified to an armored vehicle. Prepared as kits in the U.S. and sent to El Salvador, for conversion, the resulting vehicle was also fitted with a Detroit diesel.

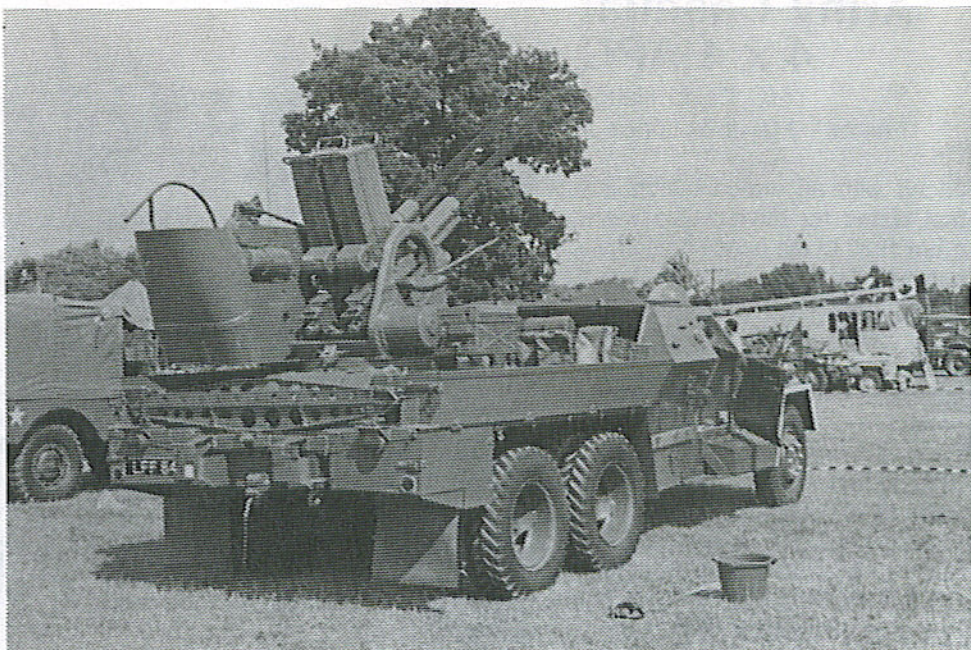
66 kits were supplied from the U.S. which were assembled over the following year (1986). Most of the resulting vehicles were assigned to the Cavalry Regiment and used as patrol vehicles on El Salvador's main road net. Relatively successful as patrol vehicles, they were less suited to the combat support role or off-road movement of troops. As of 1992 at least some of the Cashuat were still in service.



Photos - Top: Taken during 1986, this is the original design of the Cashuat, with .50 caliber HMG and two .30 caliber Brownings. Photo: Dept of Defense. Middle and Bottom: A pair of vehicles photographed in 1992, note the addition of screening (perhaps anti-grenade mesh) to the front and sides, as well as the use of canvas covers to keep the sun out while parked. Photos: Major John Lopez Jr.

... Saxon, continued from page 3 had been dropped after a feasibility study had shown the vehicle was unsuitable for its planned liaison role, and that Fox was being withdrawn from British Army service. What will become of the Fox hulls and Scorpion turrets I know not, one thing is sure though. As the Fox turret race is smaller than the Scorpion one, while an adapter can be fitted to allow a swap one way, it will not work the other way, so 76mm armed ex-Fox's do not seem a possible option. Maybe the good (old) Ferret will be around for a few more years yet? Peter Brown, 8 Saddle Close, Colehill Wimborne, Dorset BH21 2UN GREAT BRITAIN.

Below: Rear view of a Czech M53/59 SPAA vehicle taken during a vehicle rally in Great Britain during the summer of 1994. Photo: Ulrich Rohrbach.



Letters

Looking for model. Does anyone have any idea where I can find a Sovereign 1/35th scale SdKfz 231? Jeff Brewer, 118 Vendola Drive, San Rafael CA 94903 USA.

Another view (right) of the Czechoslovakian M53/59 SPAA vehicle. Ulrich took the photo at a vehicle rally in Great Britain during this summer. Ulrich Rohrbach, Mainstraße 14, 64546 Mörfelden, GERMANY.

U.S. Army T-4 Information. Can anyone supply me with, or refer me to a general arrangement drawing of the U.S. Army T-4 armored car? I have A.J. Clemens' *American Armored Cars*, which has an excellent side view, but no rear, front or top view. Martin Peterson, 3100 Santa Clara S.E., Albuquerque NM 87106 USA.

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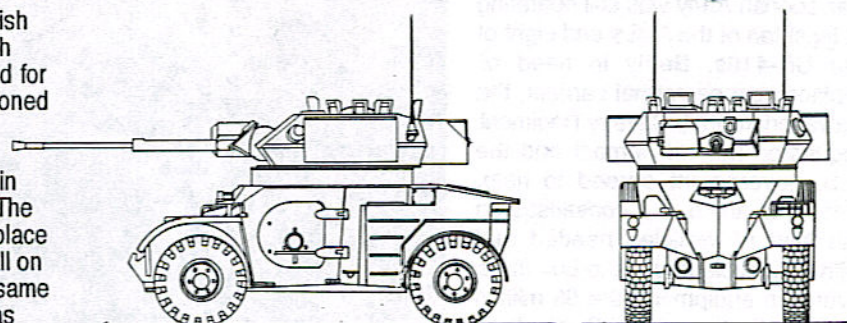
BACK ISSUES: Please write for list of available issues.

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

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Irish Army Rarden Turreted Panhard

Illustrated is the Irish Army Panhard with Rarden turret used for firing trials (mentioned in Peter Brown's article, "Wheeled Armor in Ireland" in issue #24 of *AC*). The actual trials took place in the Glen of Imall on 10 April 1987, the same date the photo was taken. Photo and drawing are Copyright © Dennis J. McCarthy, October 1994.



Dennis J. McCarthy, 4 Summerville Tce., Dalkey, Co. Dublin, IRELAND

