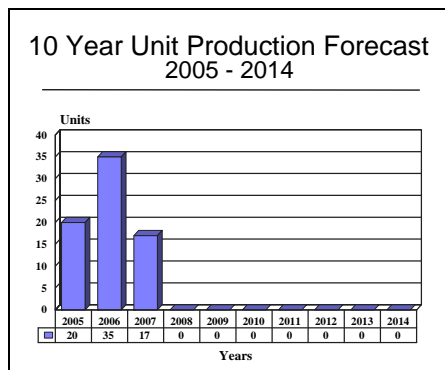


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Blindado Medio de Ruedas 600 – Archived 8/2006



Outlook

- BMR 600 and VEC production lines remain dormant; GDSBS continues to market both vehicles for export sales
- Moderate modernization and retrofit potential; upgraded BMR 600-2 (or BMR2) is now the production-standard model
- Production forecast (at right) reflects *potential* for at least some BMR 600-2 sales in the near-term of the forecast period

Orientation

Description. A wheeled infantry fighting vehicle.

Sponsor. The Spanish Ministry of Defense, through the Spanish Army, sponsored the development and Spanish Army procurement of the BMR 600 and VEC vehicles.

Licensees. None

Status. Development through serial production. The production line is currently dormant.

Total Produced. Through 2004, the contractor produced 1,504 BMR-600 and 345 VEC vehicles.

Application. The BMR 600 is a wheeled infantry combat vehicle, optimized for transporting infantry during offensive and defensive operations. The VEC is a dedicated scout and reconnaissance vehicle.

Price Range. In 2005 U.S. dollars, the basic unarmed BMR carries a unit price of \$323,600; the VEC costs \$335,400.

Contractors

General Dynamics Santa Barbara Sistemas, <http://www.gdsbs.com>, Manuel Cortina, 2, Madrid, 28010 Spain, Tel: + 34 915850200, Fax: + 34 915850218, Email: comunicacion@gdsbs.com, Prime

Alliant Techsystems - ATK Ordnance and Ground Systems, <http://www.atk.com>, 3309 North Reseda Cir, Mesa, AZ 85215 United States, Tel: + 1 (480) 324-8600, Fax: + 1 (480) 324-8758 (25mm M242 Bushmaster Automatic Cannon)

Giat Industries - Armored Systems Division, <http://www.giat-industries.fr>, 11 Allée des Marronniers, Versailles, 78022 France, Tel: + 33 1 39 49 30 00, Fax: + 33 1 39 49 34 89 (TS90 90 Millimeter Turret)

Hutchinson, <http://www.hutchinsonrubber.com>, 124 Avenue Des Champs-Elysees, Paris, F-75360 France, Tel: + 33 1 40 74 83 00, Fax: + 33 1 43 59 97 11, Email: marketing@hutchinson.fr (Run-Flat Tire Inserts)

Michelin, <http://www.michelin.com>, Places Des Carmes Dechaux, Clermont-Ferrand, 63040 Cedex 1, France, Fax: + 33 1 45 66 15 53 (13.00x20 Tires)

Oto Melara SpA, <http://www.otomelara.it>, Via Valdilocchi 15, La Spezia, 19136 Italy, Tel: + 39 0187 5811 11, Fax: + 39 0187 58266, Email: info@otomelara.it (T25 & T20 Turret)

Rheinmetall DeTec AG, <http://www.rheinmetall-detec.com>, Rheinmetall Allee 1, Düsseldorf, 40476 Germany, Tel: + 93 211 473 01, Fax: + 93 211 473 4746, Email: detec-info@rheinmetall-detec.com (Rh 202 20 Millimeter Cannon)

Zahnradfabrik Friedrichshafen AG, ZF-Friedrichshafen AG, <http://www.zf.com>, Graf von Soden Platz 1, Friedrichshafen, 88046 Germany, Tel: + 93 07541 77 0, Fax: + 93 07541 77 908000, Email: postoffice@zf.com (6 HP 500 Automatic Gearbox)

Technical Data

Blindado Medio de Ruedas 600 (BMR-600)

Crew. Two: commander and driver, plus 10 infantrymen.

Configuration. 6x6

Armor. Aluminum alloy armor, with spaced armor over the frontal arc, providing protection against 7.62mm armor piercing (AP) projectiles over frontal arc and 7.62mm ball projectiles over rest of the vehicle.

Dimensions. The following data reflect the basic BMR 600 vehicle, mounting an M2HB machine gun.

	<u>SI units</u>	<u>U.S. units</u>
Length:	6.15 m	20.17 ft
Width:	2.50 m	8.20 ft
Height:	2.36 m	7.74 ft
Combat weight:	14 tonnes	15.43 tons
Fuel capacity:	400 liters	106.38 gal

Performance. The speed and range data reflect use on a paved road.

	<u>SI units</u>	<u>U.S. units</u>
Maximum speed:	103 kmph	63.96 mph
Maximum range:	1,000 km	621 statute mi
Step:	60 cm	1.97 ft
Trench:	1.50 m	4.92 ft
Slope:	30%	30%
Gradient:	61%	61%
Fording:	amphibious	Amphibious
Water speed (waterjets):	9 kmph	5.60 mph

Engine. Pegaso 9157/8 six-cylinder in-line diesel engine. This powerplant generates 231.26 kilowatts (310 hp) with a power-to-weight ratio of 16.51 kilowatts per tonne (20.09 hp/ton). The 24-volt electrical system features a 95-ampere alternator and two 12-volt/140-ampere-hour batteries.

Gearbox. Zahnradfabrik Friedrichshafen 6 HP 500 automatic transmission, with one reverse and six forward gear ratios. Steering is hydraulic on the front and rear axles.

Suspension and Running Gear. MacPherson hydro-pneumatic, independently sprung suspension by Zahnradfabrik Friedrichshafen. This system allows raising or lowering of each wheel station up to 27.5 centimeters (10.83 inches). The vehicle mounts Michelin 13.00x20 tires with Hutchinson run-flat inserts.

Armament. One 12.7x99mm (.50 caliber) M2HB machine gun. The vehicle can accommodate a variety of other cupola mounts, turrets, and ordnance (7.62mm machine guns to a 90mm gun).

Vehiculo de Exploracion de Caballeria (VEC)

Crew. Two: commander and driver, plus two weapons operators.

Configuration. 6x6

Armor. Same as the BMR 600.

Dimensions. The following data reflect the basic VEC, mounting the Oto Melara T25 turret and 25mm M242 Bushmaster cannon.

	SI units	U.S. units
Length:	6.10 m	20.01 ft
Width:	2.5 m	8.2 ft
Height:	2.46 m	8.07 ft
Combat weight:	13.75 tonnes	15.15 tons
Fuel capacity:	400 liters	106.38 gal

Performance. The speed and range data reflect use on a paved road.

	SI units	U.S. units
Maximum speed:	103 kmph	63.96 mph
Maximum range:	807 km	501.2 statute mi
Step:	60 cm	1.97 ft
Trench:	1.5 m	4.92 ft
Slope:	30%	30%
Gradient:	61%	61%
Fording:	amphibious	amphibious
Water speed (waterjets):	9 kmph	5.60 mph

Engine. Same as BMR-600.

Gearbox. Same as BMR-600.

Suspension and Running Gear. Same as BMR-600.

Armament. One Alliant Techsystems 25mm M242 Bushmaster automatic cannon, mounted in a license-produced (by Santa Barbara) version of the Oto Melara T25 two-man turret. The VEC can also mount a variety of other turrets and armament, from machine guns to a 90mm cannon.

Variants/Upgrades

Variants. The prime contractor has developed the basic BMR 600 design into a number of variants, the most significant being the VEC. The following table summarizes the currently available variants.

<u>Designation</u>	<u>Description</u>
BMR-600	Basic 6x6 configuration infantry fighting vehicle (See Technical Data , above).
VEC	Vehiculo de Exploracion de Caballeria. Also known as the Pegaso VEC 3562.03. Identical to BMR-600, but with enhanced armor, standardization of TC25 turret in newer productions, and movement of powerpack to vehicle's rear (See Technical Data , above).
VEC Variant (H 90 Turret)	H 90 turret with Giat D921 F1 gun. Placed in reserve in mid-1990s.
VEC Variant (Oto Melara TC 20)	Oto Melara TC20 turret with Rheinmetall 20mm Rh 202 cannon and 7.62mm machine gun. First 32 Spanish vehicles are of this variant.
VEC Variant (Oto Melara TC 25)	Oto Melara TC25 turret with 20mm or 25mm cannon (including 25mm M242 cannon) and 7.62mm machine gun. 208 vehicles in Spanish inventory are of this variant.
BMR-600 Variant (Toucan 1 turret)	Toucan 1 turret and MOWAG 7.62mm machine gun mount.
BMR-600 Variant (Anti-Aircraft)	Undisclosed anti-aircraft weaponry.

<u>Designation</u>	<u>Description</u>
BMR-600 Variant (Cargo)	Cargo vehicle.
Model 3560.51	BMR-600 command vehicle.
Model 3560.53	BMR-600 with mortar.
Model 3560.53E	BMR-600 with 81mm mortar.
Model 3560.54	BMR-600 ambulance.
Model 3560.55	BMR-600 maintenance/recovery vehicle.
Model 3560.56	BMR-600 radio vehicle.
Model 3560.57	BMR-600/HOT. MBDA (Euromissile) HCT (HAKO) turret.
Model 3560.59E	BMR-600 with 120mm mortar.
Model 3564	BMR-600 with Giat Industries TS90 turret with various 90mm cannon.

Modernization and Retrofit Overview. In 1994, the Spanish Army awarded Santa Barbara a contract to develop and fabricate several upgraded BMR 600 and VEC vehicles. The Spanish Army began evaluations of the upgraded configuration in 1995. By 1996, the program featured the following elements:

- The Saab-Scania DS-9 diesel engine. This powerplant generates 231 kilowatts (309.8 hp) with a power-to-weight ratio of 16.5 kilowatts per tonne (20.07 hp/ton) in the BMR 600 application.
- Retrofit of appliqué armor and spall liners.
- Installation of a fire detection and suppression system for the crew compartment.
- New heating and ventilation equipment.

- An upgraded braking system.
- New fault detecting and warning instruments at the driver's station.

The upgrade program also explored several armament enhancements, including a TC-13 turret with a 25mm cannon and a special mount for the 40mm SB 40LAG automatic grenade launcher.

The prime contractor completed this modernization and retrofit program in mid-2002, upgrading 642 BMR 600 and VEC vehicles. The upgraded Blindado Medio de Ruedas 600 vehicle – now the production standard – carries the designation Blindado Medio de Ruedas 600-2 (or BMR2).

Program Review

Background. In 1972, the Spanish Army commissioned Empresa Nacional de Autocamiones SA to develop a range of amphibious multimission vehicles. Following a competitive evaluation, the Spanish Army awarded Empresa Nacional de Autocamiones SA an initial contract to deliver 15 vehicles, known as the Model 3500-series, by late 1980. The Model 3560 armored personnel carrier became the basic Blindado Medio de Ruedas 600. The initial Spanish Army requirement was for 683 vehicles.

Later, in a countrywide reorganization of the defense industry, the reorganized Santa Barbara Blindados took over the entire program. In early 2002, Santa Barbara became a component of General Dynamics Land Systems, and now operates as General Dynamics Santa Barbara Sistemas.

Description. The hull exhibits an all-aluminum welded construction, with aluminum armor in varying

thicknesses over different parts of the hull. Spaced armor protects the front and underside of the hull.

The BMR 600 exhibits a conventional interior layout. The driver sits in the left front of the hull; the powerpack occupies the right front of the hull. In the VEC, the powerpack mounts in the rear of the hull. The driver's station features a bulletproof windscreen with side windows and an additional armored cover; a periscope provides vision when the cover is in place.

The commander/gunner sits behind the driver. His station features a 360-degree traversing cupola with eight periscopes and a hatch. The machine gun mounts on top of the TC-3 cupola.

A downward-hinging ramp at the rear of the vehicle provides troop access/egress. The ramp also features a secondary access door. The troop compartment roof features two rearward-opening hatches. Depending on

the model, the vehicle can feature up to six firing ports with vision blocks.

The basic vehicle is available with the following standard equipment:

- Variable clearance hydro-pneumatic suspension
- Power-assisted steering

- Run-flat tires
- A 4.5-tonne capacity winch
- Crew/troop compartment fire extinguishers

Optional equipment includes various communications equipment and air conditioning. The vehicle is also available in a non-amphibious form.

Funding

The Spanish Ministry of Defense, through the Spanish Army, funds the BMR 600 and VEC development and procurement programs.

Recent Contracts

Not available, as the contractor does not release contractual information.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Mid	1973	BMR engineering development begins
	1974	Production prototypes rolled out
	1976	Operational testing and evaluation of BMR
January	1977	First VEC prototype rolled out
March	1978	BMR 600 production begins
	1979	Initial BMR 600 deliveries to the Spanish Army
October	1982	Egypt orders BMR 600
July	1983	Saudi Arabia orders BMR 600
	1990	Contractor completes Spanish Army's VEC order (291 vehicles)
	1994	Spanish modernization and retrofit program begins
Mid	2002	Spanish upgrade program complete
Mid	2005	Production of BMR 600 and VEC dormant; available for new orders

Worldwide Distribution

Export Potential. The large Egyptian and Saudi orders for the BMR 600 contributed significantly to Spain's reputation in the field of armored vehicles. Although we do not expect further export sales of this magnitude, the fact that this relative newcomer in the international market managed to best such formidable competitors as the French, Germans, and British in what is essentially a closed market is quite notable.

Countries. Through 2004, our BMR 600 holdings are as follows. Spain is the only known user of the VEC to date. **Egypt** (567); **Peru** (24); **Saudi Arabia** (140); and **Spain** (741 BMR 600, 340 VEC).

Forecast Rationale

The BMR 600 and VEC production lines remain dormant, available for new orders. Since mid-2002, when the prime contractor completed the Spanish Army upgrade program, there have been no significant developments in the BMR 600 or VEC programs. General Dynamics Santa Barbara Sistemas continues to

promote the BMR 600 and VEC on the international market, albeit with no reported recent sales.

Our ten-year production outlook (below) reflects only the possibility of at least some export sales of the BMR 600 or the upgraded BMR2 to regional or Middle Eastern customers in the near term of the forecast period. However, given the glutted condition of the

international market, the BMR design shows little potential for any market impact beyond what it has already achieved.

If General Dynamics Santa Barbara Sistemas fails to score any new sales of the BMR 600/BMR2 or the VEC

within the next year, the Forecast International Weapons Group will consider this program dead. We will then drop this report from the *Military Vehicles* Forecast; the report will remain available in our archives for future reference.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

		<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>			
<u>Vehicle</u>	<u>(Engine)</u>	<u>thru 04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>Total 05-14</u>
GD/SANTA BARBARA SISTEMAS													
BMR-600	9157/8	1504	20	35	17	0	0	0	0	0	0	0	72
VEC	9157/8	345	0	0	0	0	0	0	0	0	0	0	0
Total Production		1849	20	35	17	0	0	0	0	0	0	0	72



BMR Infantry Fighting Vehicle

Source: General Dynamics Santa Barbara Sistemas



VEC Armored Cavalry Vehicle

Source: General Dynamics Santa Barbara Sistemas