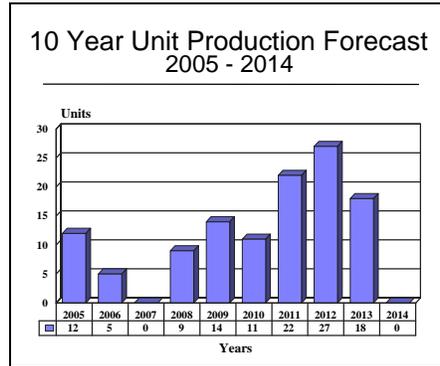


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M3 and Buffalo – Archived 8/2006



Outlook

- M3 production complete; Buffalo production continues on an as-needed basis for export sales
- Panhard promotes Buffalo as the successor to the M3, albeit with relatively little success thus far
- Production forecast (at right) reflects anticipated export sales of Buffalo in Africa and the Middle East to Panhard's established M3 customer base

Orientation

Description. Wheeled armored 4x4 vehicles.

Sponsor. The prime contractor, Panhard et Levassor, sponsored the M3 and Buffalo programs as private ventures.

Licensees. None

Status. Development through serial production (as needed).

Total Produced. Through 2004, Panhard produced 1,180 M3 vehicles and 57 Buffalo vehicles.

Application. Light wheeled armored personnel carriers, optimized for transporting infantry during offensive and defensive operations.

Price Range. In 2005 U.S. dollars, the basic new-production Buffalo carries a unit price of \$221,800. M3 vehicles are commonly available with a unit price of about \$166,000.

Contractors

Panhard et Levassor SA, <http://www.panhard.fr>, 18 Avenue d'Ivry, Paris, France, Tel: + 93 40 77 40 00, Fax: + 93 40 77 40 06, Email: marketing@panhard.fr, Prime

Automobiles Peugeot, <http://www.peugeot.com>, 75 Avenue de la Grande-Armee, Paris, 75116 France, Tel: + 93 40 66 55 11 (XD 3T Diesel Engine)

Euromissile GIE, 12 Rue De La Redoute, Fontenay Aux Roses, 92260 France, Tel: + 33 1 4187 1414, Fax: + 33 1 4661 6467 (UTM 800 Turret)

Giat Industries, <http://www.giat-industries.fr>, 13, rue de la Minière, Versailles, 78034 France, Tel: + 33 1 30 97 37 37, Fax: + 33 1 30 97 39 00, Email: ccr@giat-industries.fr (TL2i Turret)

Hispano-Suiza, <http://www.hispano-suiza-sa.com>, Rond Point René Ravaud, B.P. 42, Moissy-Cramayel, 77551 France, Tel: + 33 1 60 59 71 23, Fax: + 33 1 60 59 71 36 (VDA Turret)

Michelin, <http://www.michelin.com>, Places Des Carmes Dechaux, Clermont-Ferrand, 63040 Cedex 1, France, Fax: + 33 1 45 66 15 53 (11.00x16 Run-Flat Tires)

Technical Data

M3

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

Configuration. 4x4

Armor. All-welded steel armor, 8 to 12mm (0.31 to 0.47 in) thick, providing protection against 7.62mm ball projectiles and ballistic fragments.

Dimensions. The following data reflect the basic 4x4 M3 armored personnel carrier with the TL2i turret.

	<u>SI units</u>	<u>U.S. units</u>
Length:	4.45 meters	14.59 feet
Width:	2.40 meters	7.87 feet
Height:	2.48 meters	8.13 feet
Combat weight:	6.10 tonnes	6.72 tons
Fuel capacity:	165 liters	43.88 gallons

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

	<u>SI units</u>	<u>U.S. units</u>
Maximum speed:	90 kilometers per hour	55.89 miles per hour
Maximum range:	600 kilometers	373 statute miles
Step:	30 centimeters	11.81 inches
Trench:	80 centimeters	2.63 feet
Slope:	30%	30%
Gradient:	60%	60%
Fording:	amphibious	amphibious

Engine. Panhard model 4 HD four-cylinder, liquid-cooled spark ignition engine. This powerplant generates 67.14 kilowatts (90 horsepower) with a power-to-weight ratio of 11 kilowatts per tonne (13.39 horsepower per ton). The 24-volt electrical system features two 12-volt batteries.

Gearbox. Unspecified manual unit, with one reverse and six forward gear ratios in two operating ranges. The gearbox features fitted an electromagnetically operated centrifugal clutch.

Suspension and Running Gear. Coil spring suspension, with hydro-pneumatic shock dampers on each roadwheel station. The vehicle mounts Michelin 11.00x16 run-flat tires.

Armament. The vehicle can mount various 7.62mm and 12.7mm machine guns, as well as 20mm cannon, in a variety of turrets and mountings.

The M3 can also mount various mortars (60mm or 120mm) and anti-tank guided missile launchers (MILAN or HOT) as options.

Buffalo

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

Configuration. 4x4

Armor. Same as M3.

Dimensions. The following data reflect the production-standard Buffalo.

	<u>SI units</u>	<u>U.S. units</u>
Length:	4.59 meters	15.06 feet
Width:	2.41 meters	7.91 feet

	<u>SI units</u>	<u>U.S. units</u>
Height:	2.01 meters	6.59 feet
Combat weight:	6.60 tonnes	7.28 tons
Fuel capacity:	176 liters	48.88 gallons

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

	<u>SI units</u>	<u>U.S. units</u>
Maximum speed:	90 kilometers per hour	55.9 miles per hour
Maximum range:	600 kilometers	372.6 statute miles
Step:	40 centimeters	1.31 feet
Trench:	85 centimeters	2.79 feet
Slope:	30%	30%
Gradient:	60%	60%
Fording:	amphibious	amphibious
Water speed:	3.6 kilometers per hour	2.23 miles per hour

Engine. Peugeot Model PRV liquid-cooled V6 spark ignition engine. This powerplant generates 106 kilowatts (142.09 horsepower) with a power-to-weight ratio of 17.09 kilowatts per tonne (20.80 horsepower per ton).

An optional Peugeot XD 3T liquid-cooled, super-charged diesel engine is also available. This powerplant generates 70 kilowatts (93.83 horsepower) with a power-to-weight ratio of 11.29 kilowatts per tonne (13.74 horsepower per ton).

Gearbox. Same as M3.

Suspension and Running Gear. Independently sprung suspension, with coil springs and hydro-pneumatic shock dampers at each wheel station. Components act through the trailing arms of each wheel's suspension. The vehicle mounts 11.00x16 tires with Hutchinson run-flat inserts.

Armament. The vehicle can mount various 7.62mm and 12.7mm machine guns, as well as 20mm cannon, in a variety of turrets (such as the Hispano-Suiza Puma) and mountings. The contractor continues integrating armament options.

Variants/Upgrades

Variants. The M3/Buffalo is one of the most versatile vehicles in its class. While there were only two basic vehicle options, the turret and armament combinations resulted in myriad variants, as follows:

<u>Designation</u>	<u>Description</u>
M3	Basic 4x4 armored vehicle. See Technical Data , above.
M3 VDA	Anti-aircraft vehicle, mounting Örlikon-Contraves 20mm 820SL cannon in Hispano-Suiza turret. Features Officine Galileo P56T sight and Electronique Serge Dassault coherent pulse Doppler radar with track-while-scan capability.
M3/VTS	Ambulance vehicle.
M3/VPC	Armored command and control vehicle, with 7.62mm machine gun in STB mount.
M3/VAT	Repair variant.
M3/VLA	Engineer variant.
M3/VPM	Mortar vehicle with 60mm or 81mm mortar; carries 60 rounds.
M3/VSF	Electronic warfare vehicle with surveillance radars, including RASIT or RA 20S.
VCR/TH	6x6 anti-tank variant. Euromissile UTM 800 turret features four HOT missiles loaded; 10 reserve. Can also accommodate MCT turret and MILAN missiles.
M3 (Toucan I)	Toucan I turret with 20mm cannon and 7.62mm machine gun.
M3 (STB)	Creusot-Loire STB rotary support shield with 7.62mm machine gun.
M3 (CB)	Creusot-Loire CB rotating gun ring with 7.62mm machine gun.

<u>Designation</u>	<u>Description</u>
M3 (CAFL.38)	Creusot-Loire CAFL.38 turret with 7.62mm machine gun.
M3 (TLiG)	Creusot-Loire TLiG turret with 7.62mm machine gun and 40mm smoke grenade launcher.
M3 (CB.127)	Creusot-Loire CB.127 gun ring shield armed with 12.7mm machine gun.
M3 (CB.20)	Creusot-Loire CG.20 gun ring shield with 20mm cannon.
M3 (TDA)	Creusot-Loire gun ring shield with 60mm TDA (Hotchkiss-Brandt) mortar.
Buffalo	Standard armored personnel carrier. See Technical Data , above.
Buffalo Internal Security Vehicle	Internal security variant of Buffalo, with hydraulic dozer blade.
Buffalo Command Vehicle	Command vehicle, with radio equipment per customer specification.
Buffalo Mortar Vehicle	81mm mortar carrier.
Buffalo Armored Workshop Vehicle	Engineering/maintenance vehicle.
Buffalo Ambulance	Ambulance variant.

Modernization and Retrofit Overview. Not applicable at this time.

Program Review

Background. Panhard developed the M3 family of vehicles from its highly successful line of Automitrailleuse Légère light armored cars, many of which are still in service in the armies and internal security forces of over 37 nations. The M3 vehicle family shares over 95 percent commonality of mechanical parts with the Panhard Automitrailleuse Légère vehicle, enabling Panhard to capitalize on the user confidence in the Automitrailleuse Légère line. These factors yielded an established worldwide parts and repair network for the M3. After a production run lasting 17 years and totaling nearly 1,200 vehicles, Panhard replaced the M3 with the Buffalo.

The Buffalo embodies all the attributes of the M3, adds some new features, and rectifies the occasional design problems encountered in the M3 over its years of widespread use. Panhard unveiled the Buffalo in June 1985. In March 1986, the contractor announced that the Buffalo would replace the M3 in production.

Description. In the M3, the driver sits at the front of the vehicle. The driver's station features a hatch and three periscopes; the center periscope is interchangeable with an infrared or passive night vision periscope. The engine mounts behind the driver, with ducting for the cooling and combustion air on each side of the roof and an exhaust pipe running along each side of the roof to the rear.

The M3 provides four doors for access/egress – one on each side and two in the rear. The rear doors feature

firing ports. Eight hatch covers mount on the roof – three on each side and two circular hatches in-line behind the engine compartment – for secondary access/egress. Overall, the M3 exhibits a box-like structure, which is larger than the Automitrailleuse Légère vehicle in order to accommodate two crewmembers and 10 passengers. In addition, the M3 requires no special preparation in order to be amphibious, as the wheels provide water propulsion.

Buffalo. The Buffalo shares the basic design and interior layout of the M3. In a significant enhancement over the M3, the Buffalo features an extensive amount of external storage in boxes above the wheels. These act as a safety feature in the event the vehicle detonates a mine; the storage compartments blow off, preserving the hull integrity.

The Buffalo also offers the option of either a spark-ignition or diesel engine.

The M3 and Buffalo accommodate a wide variety of light weapon stations, cupolas, or turrets. The contractor continues to integrate the vehicle design with additional weapon systems, such as anti-tank and anti-aircraft missiles.

Optional equipment for the Buffalo includes air conditioning, a front-mounted winch, and a dozer blade used for obstacle clearing. Other options are in development.

Funding

The prime contractor – Panhard et Levassor – has funded the M3 and Buffalo programs as private ventures.

Recent Contracts

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

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1967	M3 design conception
August	1969	First M3 prototype rolled out
	1969-1971	M3 developmental testing
April	1971	M3 production commences
	1978	Initial foreign military sale of M3
June	1979	Contractor introduces M3/VDA
	1983	Development of follow-on for the M3 begins
June	1985	Contractor unveils Buffalo
March	1986	Contractor terminates M3 program in favor of Buffalo
	2005	Production of Buffalo on as-needed basis; M3 remains in service

Worldwide Distribution

Export Potential. The M3 is no longer in production; the Buffalo is now the production-standard vehicle. However, the M3 and the Automitrailleuse Légère are largely responsible for France's position in the international light wheeled vehicle market. Given the glut of new and used light wheeled vehicles, the well-known success of Panhard in the light wheeled vehicle market is even more remarkable. Panhard has built one of the world's most extensive customer bases; the contractor sold the M3 alone to at least 33 (possibly over 40) nations.

We expect the Buffalo will inherit this popularity on the international market, although sales are unlikely to approach the level of the M3 and the Automitrailleuse Légère.

Countries. Our holdings reflect sales of the M3 to the following countries: **Algeria** (44 VTT, 5 VPC, 2 VAT, 2 VLA, 2 VTS); **Angola** (8 VTT); **Bahrain** (3 VTS, 8 PC, 3 VLA, 87 VTT, 5 VAT, 7 PM81); **Burkina Faso** (1 PC, 17 VTT, 1 VAT); **Burundi** (9 VTT); **Chad** (15 VTT); **Congo** (9 VTT); **Democratic Republic of Congo** (86, including 60 VTT); **Ivory Coast** (4 VPC, 10 VTT, 2 VAT, 6 VDA); **Gabon** (2 PC, 4 VTT, 1 VAT); **Iraq** (161 VTT); **Ireland** (60 VTT); **Kenya** (3 VPC, 3 VTT, 6 VAT); **Lebanon** (57 VTT); **Malaysia** (44 VTT); **Mauritania** (4 VPC, 4 VTT, 4 VAT); **Morocco** (4 VPC, 36 VTT, 14 VAT); **Niger** (4 PC, 12 VTT, 10 VDA); **Nigeria** (4 VTS, 6 VPC, 4 VSB [RASIT], 4 VAT); **Paraguay** (3 VTT); **Portugal** (6 VTT); **Rwanda** (16 VTT); **Saudi Arabia** (5 VPC, 165 VTT); **Senegal** (1 PC, 9 VTT); **Somali Republic** (9 VTT); **Spain** (23 VTT); **Sudan** (13 VTT, 1 VAT, 2 VSB [RASIT], 2 VSB [RA 20]); **Togo** (5 VTT); **Tunisia** (24 VTT); **United Arab Emirates** (13 VTS, 30 PC, 150 VTT, 5 VAT, 48 VDA); **Venezuela** (4 VTT); and **Yemen** (2 VTT). A number of other customers, mainly internal security and similar units, remain unidentified.

The first recorded sale of the Buffalo was a single command post vehicle to **Benin**. **Colombia** has purchased eight Buffalo vehicles, and **Rwanda** has purchased 18 to replace some Automitrailleuse Légère vehicles. Most sales of the Buffalo have gone unrecorded.

Forecast Rationale

Serial production of the Buffalo continues on an as-needed basis, exclusively for export sales. Although the long-lived and highly successful M3 program finally ended in 1987, the vehicle remains in widespread service around the world. Indeed, as almost 1,200 of these hardy vehicles rolled off the Panhard production line, they should be around for many more years.

While officially inheriting the M3's mantle, the Buffalo has yet to catch on in the glutted international light wheeled vehicle market. As export customers eventually retire their existing Automitrailleuse Légère and M3

vehicles, the Buffalo will likely score sales as the logical replacement vehicle.

Our ten-year production outlook (below) reflects a moderate, albeit uneven, Buffalo production run for export sales. In a glutted international market, the greatest opportunity for the Buffalo lies with France's traditional client states in Africa and the Middle East. We expect the need to replace aging Automitrailleuse Légère and M3 vehicles will lead to a moderate upturn in demand for the Buffalo among Panhard's established customer base.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Vehicle	(Engine)	<u>High Confidence Level</u>					<u>Good Confidence Level</u>				<u>Speculative</u>		Total 05-14	
		thru 04	05	06	07	08	09	10	11	12	13	14		
PANHARD & LEVASSOR SA														
BUFFALO (a)	XD 3T	57	12	5	0	9	14	11	22	27	18	0	118	
M3	MODEL 4 HD	1180	0	0	0	0	0	0	0	0	0	0	0	
Total Production		1237	12	5	0	9	14	11	22	27	18	0	118	

(a) The through 2004 production includes seven prototype and developmental vehicles.



Panhard M3 with TL-2i Turret

Source: www.svsm.org