

ARCHIVED REPORT

For data and forecasts on current programs please visit

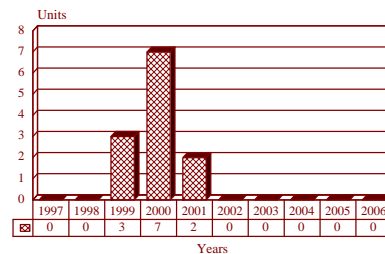
www.forecastinternational.com or call +1 203.426.0800

Automitrailleuse Légère - Archived 8/98

Outlook

- Production of the wheeled Automitrailleuse Légère is dormant but expected to resume for export
- Over 6,270 manufactured to date
- These vehicles represent a significant potential for modernization and retrofit

10 Year Unit Production Forecast
1997-2006



Orientation

Description. A wheeled vehicle

Sponsor. The development and French procurement of the Automitrailleuse Légère has been sponsored by the French Ministry of Defense, Délégation Générale pour l'Armement and Direction des Armements Terrestres through the Direction Centrale du Matériel de l'Armée de Terre and French Army.

Contractors. The Automitrailleuse Légère vehicle was developed and is manufactured by Societe de Constructions Mecaniques Panhard et Levassor; Paris, France. Major subcontractors include Hispano Suiza, Peugeot, Societe d'Applications des Machines Motrices and Thomson-DASA Armements (Thomson-Brandt).

Licensee. Reumech OMC (formerly Reumech Sandock Limited and earlier Sandock Austral Beperk) of Benoni, Republic of South Africa, has manufactured the Automitrailleuse Légère under license as the Eland.

Status. This vehicle is in widespread service in France and in at least 37 other nations; it remains in production on an as needed basis for the export market.

Total Produced. As of January 1, 1997, a total of 6,237 Automitrailleuse Légère and Eland vehicles had been manufactured.

Application. A light multipurpose armored vehicle mainly designed for armed scout and reconnaissance missions, but also applicable to a number of other mission areas.

Price Range. In equivalent 1997 United States dollars, the Automitrailleuse Légère 90 vehicle has a unit price of \$373,700. This price can be significantly different if differing weapon systems or other options are selected. This vehicle has been extensively traded on the export market by international arms merchants.

Technical Data

Crew. Three: commander, gunner and driver

Configuration. 4x4

Armor. The Automitrailleuse Légère is fabricated from steel alloy armor eight to twelve millimeters in

thickness affording protection from small arms fire and ballistic fragments.

Design Features. The Automitrailleuse Légère is an especially rugged design easily adapted to a wide variety of mission areas.

Dimensions. The following data are for the basic vehicle fitted with the XD 3T diesel engine and H 90 turret.

| | <u>SI units</u> | <u>US units</u> |
|---------------|-----------------|-----------------|
| Length | 5.11 meters | 16.76 feet |
| Width | 1.97 meters | 6.46 feet |
| Height | 2.07 meters | 6.79 feet |
| Combat weight | 5.5 tonnes | 6.06 tons |
| Fuel capacity | 156 liters | 41.49 gal |

Performance. The maximum speed and range figures are on a metalled road. The Automitrailleuse Légère is amphibious with a kit.

| | | |
|---------------|------------------------|---------------------|
| Maximum speed | 90 kilometers per hour | 55.9 miles per hour |
| Maximum range | 600 kilometers | 372.6 statute miles |
| Step | 30 centimeters | 11.81 inches |
| Trench | 80 centimeters | 2.62 feet |
| Slope | 30% | 30% |
| Gradient | 60% | 60% |
| Fording | 1.1 meters | 3.61 feet |

Engine. Up to the mid-1980s, Panhard supplied the Model 4 HD air cooled four cylinder spark ignition engine for this vehicle. This engine, which is no longer manufactured, is rated at 67.14 kilowatts (90 horsepower) at 78.34 revolutions per second (4,700 revolutions per minute). The power-to-weight ratio with this engine is 12.21 kilowatts per tonne (14.85 horsepower per ton). Peugeot supplies the diesel engine for the later production vehicles. Designated XD 3T, this liquid cooled engine is rated at 73.11 kilowatts (98 horsepower) at 69.17 revolutions per second (4,150 revolutions per minute). The power-to-weight ratio of the above-described vehicle with this engine is 13.29 kilowatts per tonne (16.17 horsepower per ton). A 24 volt electrical system with two 12 volt batteries is the standard electrical fit.

Gearbox. Panhard supplies the manually operated unit (actually two gearboxes - a high range and a low range -

in a single casing) with a total of six forward and one reverse gear ratios in each range.

Suspension and Running Gear. The 4x4 Automitrailleuse Légère features an independently sprung suspension system with coil springs and hydro-pneumatic shock dampers at each wheel station. These latter components act through the trailing arms of each wheel's suspension. Radial pattern 11.00x16 tires with Hutchinson run flat inserts are standard.

Armament. This vehicle can be and has been fitted with a great variety of turret/armament combinations. The base configuration is the H 90 turret from Hispano Suiza; the armament fitted to this turret is a 90 millimeter D 921 F1 cannon. A 7.62 millimeter machine gun is coaxially mounted and a similar machine gun or a M2HB 12.7 millimeter machine gun can be mounted on the turret roof. Other turret and armament systems are described below.

Variants/Upgrades

Variants. The Automitrailleuse Légère has been integrated with a wide variety of turret/armament/fire control options to result in a number of production variants. Various radios, fire detection/suppression apparatus, night vision devices, air conditioning/heating, nuclear, biological and chemical defense systems, amphibious kits, track types and other options are available on any of these vehicles both when ordered or as retrofits to existing vehicles.

Note: Creusot-Loire Industrie has been absorbed by Giat Industries; however, for clarity, in the following data, the firm and its products are listed as they were before the acquisition.

AML/H 90. The original production model for which the technical data above are pertinent. This model was often fitted with SS-11 or ENTAC anti-tank guided missiles mounted on each side of the turret. This model is no longer offered.

AML/Lynx 90. This is the model that replaced the AML/H 90 in production; the armament is the same but the Lynx turret can be fitted with a greater variety of fire control equipment such as a laser rangefinder and night vision devices. The Lynx 90 turret also offers powered traverse.

AML/S 530. This model was designed specifically for export; it integrates the Societe d'Applications des Machines Motrices S 530 turret with the vehicle. The S

530 turret is armed with two M621 20 millimeter cannon; 600 rounds of 20 millimeter ammunition is carried. Elevation is +75 degrees and depression is -10 degrees; the turret can be traversed 360 degrees.

AML/TTB 120. This is another model of the Automitrailleuse Légère fitted with a turret from Societe d'Applications des Machines Motrices, originally designated the TG 120. The TTB 120 turret mounts a 20 millimeter cannon with a 7.62 millimeter machine gun coaxially mounted. Two-hundred-forty 20 millimeter rounds are carried for ready use. This model has yet to enter serial production.

AML 20 Scout Car. This model is fitted with a Creusot-Loire Industrie TL 20 SO turret mounting an M693 F2 20 millimeter cannon; 1,000 rounds of 20 millimeter ammunition are carried. A fixed 7.62 millimeter machine gun is also fitted; it is fired electrically. Two versions of this model are offered; the command version has two radios while the rank version is fitted with only one radio. Both versions feature additional fire control and night vision devices. After 1990, this model was no longer offered.

AML Eclairage. This model of the Automitrailleuse Légère is also known as the AML Scout Car; it was announced at the Satory Arms Fair of 1983. This model features a new two man turret from Panhard. The turret is an open design and is fitted with an M693 20 millimeter cannon and a 7.62 millimeter machine gun coaxially mounted. A total of 1,050 rounds of 20 millimeter ammunition and 2,000 rounds of 7.62 millimeter ammunition is carried. The weapons can be elevated +45 degrees and depressed -8 degrees and the turret can be traversed 360 degrees. This model, powered by the XD 3T diesel, can be optionally fitted with a Euromissile MILAN anti-tank guided missile system.

AML/HE 60-7. Another model with a Hispano-Suiza turret, this time the 60-7 which mounts a Thomson Brandt 60 millimeter mortar to the right and two 7.62 millimeter machine guns to the left. Fifty-three mortar rounds and 3,800 rounds of 7.62 millimeter ammunition are carried. Originally, four ENTAC anti-tank guided missiles were offered with this turret; the missiles were mounted on each side to the rear. An option is to fit a 7.62 millimeter machine gun on the roof.

AML/HE 60-12. This model is essentially the same as the AML/HE 60-7 except that it mounts a M2HB 12.7 millimeter machine gun in addition to the HB 60 mortar. Forty-three mortar rounds and 1,300 12.7 millimeter rounds are carried. An option is to fit a 7.62 millimeter machine gun on the roof.

AML/HE 60-20. Another model of the Automitrailleuse Légère that is essentially the same as the HE 60-7, the HE 60-20 mounts a 20 millimeter cannon in addition to the 60 millimeter mortar. Thirty-one mortar rounds and 500 20 millimeter rounds are carried. An option is to fit a 7.62 millimeter machine gun on the roof.

AML/HE 60-20 Serval. This model of the Automitrailleuse Légère mounts the HE 60-20 Serval turret from Hispano-Suiza. The armament is essentially the same as the 60-20 turret described immediately above except that the HB 60 mortar can be replaced by a HB 60 LP long range mortar. The 20 millimeter cannon can either be the M693 or the KAD B16 from Örlikon-Contrares; in both cases, 300 rounds of ammunition are carried. A coaxially mounted 7.62 millimeter machine gun is optional as is a night vision periscope.

AML/EPR-ERA Scout Car. This model of the Automitrailleuse Légère replaces the turret with a ring mount fitted with a single MILAN anti-tank guided missile launcher or 20 millimeter cannon or 12.7 millimeter machine gun and two 7.62 millimeter machine guns. The MILAN version has six missiles. As of 1991, this model was no longer offered.

AML/EPR-EPF Scout Car. A border protection vehicle mounting a M2HB 12.7 millimeter machine gun and a searchlight or two 7.62 millimeter machine guns and a searchlight; 50 hand grenades are carried on both versions. After 1990, this model was no longer offered.

AML/EPR-EPA Scout Car. This is a dedicated airfield patrol/protection vehicle mounting three 7.62 millimeter machine guns, 50 hand grenades and a searchlight. After 1990, this model was no longer offered.

AML Jungle. Also known as the AML Scout Car Type BTM, this model mounts a Societe d'Applications des Machines Motrices one-man turret with a single M2HB 12.7 millimeter and 7.62 millimeter machine gun. A searchlight moves in conjunction with the M2HB machine gun and a bank of smoke/grenade launchers is mounted on the forward portion of the turret. After 1990, this model was no longer offered.

AML 40. This model, first shown in 1990, is the Automitrailleuse Légère/HE 60-7 with the turret modified to mount a 40 millimeter SB40 LAG automatic grenade launcher and a 7.62 millimeter machine gun. Storage is provided for 225 rounds of 40 millimeter ammunition.

AML/T.25. This version integrates the Creusot-Loire T.25 two man turret armed with any one of several 25 millimeter cannon and a 7.62 millimeter machine gun in a coaxial mount.

Eland. This is the license-manufactured version of the Automitrailleuse Légère, manufactured from mid-1962. The Eland Mark 1 is the version imported from France; it totals 100 units. The Marks 2, 3 and 4 all used the imported engine while the Mark 5 was the first version to use an indigenous spark ignition engine. The Mark 6 is the designation for 1,016 Marks 1 through 4 vehicles brought up to Mark 5 standard in 1974-1975 and the Mark 7 was the last version manufactured from 1979 to 1983. Almost all production is armed with the French 90 millimeter cannon or 60 millimeter mortar. An indigenous two man turret fitted with a 20 millimeter cannon and a coaxial 7.62 millimeter machine gun has also been developed for the Eland but has not been placed in production as of this writing.

In 1992, the licensee Reumech Sandock began the development of a further upgraded Eland designated the Mark 7DT; this program is covered in the Modernization and Retrofit Overview section following.

Modernization and Retrofit Overview. As of mid-1997, the principle modernization and retrofit program that has been developed for the Automitrailleuse Légère has been related to the engine. This program replaces the 4HD spark ignition engine with the XD 3T diesel engine. While Panhard has done a number of retrofits, by far the majority have been accomplished by the various users with the Panhard developed kit. The retrofit involves the addition of a new rear hull component, new or modified engine controls and

instruments, new clutch and related components, new suspension and exhaust system components and new mudguards for the rear of the vehicle. Optional components in the kit include a Citroen brake system and the installation of a more powerful air compressor. As of early 1997, eight countries (including Ireland, Morocco, Rwanda and Senegal) have ordered this retrofit package; France has examined it for possible procurement but the dramatic changes in the European geopolitical situation plus reductions in the defense budget will most likely preclude any procurement.

Other upgrades that are offered by Panhard include the replacement of infrared night vision equipment with imaging intensification devices; installation of a laser rangefinder and a modification of the muzzle brake of the D 921 F1 cannon to allow it to fire Armor Piercing Fin Stabilized Discarding Sabot ammunition.

In 1992, the licensee Reumech Sandock began the development of a further upgraded Eland designated the Mark 7DT. Designed for the export market, the Mark 7DT replaces the original spark ignition engine of the vehicle with an as yet unspecified four cylinder diesel engine rated at (103 horsepower) at 66.67 revolutions per second (4,000 revolutions per minute). Using this engine, the range of the vehicle is 450 kilometers (285.7 statute miles). A total of 200 Eland 60 and 90 vehicles was acquired by Reumech for conversion to the Mark 7DT standard; these are now being offered on the export market. In late 1994, the first reported sale of the Eland Mark 7DT was made; the customer was Congo.

Program Review

Background. The Automitrailleuse Légère is one of the principle reasons for the dominance of the French light vehicle industry in the world market in the last three decades or so. This hardy vehicle is also probably the best personification of the versatility of French light armored vehicles and one of the most successful light military vehicle programs in history. The success of the Automitrailleuse Légère is legendary; the vehicle's reputation of ruggedness, simplicity of operation and maintenance, contractor support and versatility has ensured its continued production for over three decades.

The advent of the Automitrailleuse Légère is a result of the successful use of the Daimler Ferret by French forces in North Africa in the mid-fifties. In 1956, the French Army issued a requirement for a similar vehicle but with more powerful armament. Panhard won the competition to produce such a vehicle and serial production commenced in 1960; a total of 760 were procured by the French Army and Gendarmerie. Panhard calls the vehicle the Model 245. Since the mid-

1960s, the Automitrailleuse Légère has been modified to a number of production models with a wide range of turret/armament options. Sales on the export market were brisk for a time and have only recently trailed off although the vehicle remains in production on an as needed basis for the export market. In the Republic of South Africa, Reumech OMC (formerly Reumech Sandock and earlier, Sandock Austral Beperk) license-manufactured this vehicle as the Eland.

Description. The all welded steel alloy hull has a maximum thickness of 1.2 centimeters (0.47 inch) affording protection from most small arms fire and ballistic fragments. The hull, manufactured by Hispano-Suiza, is divided into three compartments - the driver's compartment is to the front, the fighting compartment in the middle and the engine compartment to the rear. The driver is seated forward in the center. The driver is provided with a single piece hatch cover with three integral periscopes, the center of which can be replaced by an infrared or other night vision aid. The fighting

compartment with the two man turret is in the middle of the vehicle. In the turret, the commander is seated to the left and the gunner to the right. The vehicle is highly mobile with each wheel independently sprung; run flat tires are standard on the vehicle. As delivered,

the Automitrailleuse Légère is rather austere, Panhard apparently having decided that the best policy is to let the customer specify the exact level of equipment to be fitted.

Funding

The funding for the initial development of the Automitrailleuse Légère was provided by the French Ministry of Defense through the French Army. Additional development funding in the later years of the program has been provided by the prime contractor. Reumech OMC (formerly Reumech Sandock and earlier, Sandock Austral Beperk), the South African licensee, has funded the development of the Eland Mark 7DT.

Recent Contracts

Not available, as contractual information is not released.

Timetable

This timetable is for the Automitrailleuse Légère only and for no other Panhard light wheeled vehicle program.

| | | |
|---------|-----------|--|
| Early | 1956 | Requirement for heavily armed scout car issued by the French Army |
| | 1959 | First prototypes of Model 245 completed |
| | 1959-1960 | Competitive evaluations for the Automitrailleuse Légère requirement |
| | 1960 | Panhard Model 245 accepted for the Automitrailleuse Légère requirement |
| Mid | 1961 | First production deliveries |
| Nov | 1961 | Contract for sale and license-manufacture in South Africa made |
| Jul | 1963 | License-manufacture underway in the Republic of South Africa |
| Through | 1980s | Extensive development and export |
| | 1994 | Mark 7DT became available |
| Mid | 1997 | Production continues on an as needed basis |

Worldwide Distribution

Export Potential. The success of this hardy and versatile light armored vehicle is almost unparalleled in terms of total production as well as distribution. The aforementioned reputation of the Automitrailleuse Légère is its best marketing asset.

Countries. The following data are accurate as of early 1997.

| | | |
|------------------------|---------------------|-----------------------------|
| <u>Africa</u> | Algeria | 52 AML 60-7 |
| | Benin | 6 AML 60-7, 6 AML 90 |
| | Burkina Faso | 2 AML 60-7, 13 AML 90 |
| | Burundi | 6 AML 60-12, 12 AML 90 Lynx |
| | Chad | 34 AML 60-7, 16 AML 90 |
| | Congo | 20 Eland Mark 7 DT |
| | Djibouti | 4 AML 60-7, 20 AML 90 |
| | Gabon | 15 AML 60-7, 9 AML 90 |
| | Guinea | 2 AML 90 |
| | Ivory Coast | 6 AML 60-7, 10 AML 90 |
| <u>Africa (cont'd)</u> | Kenya | 50 AML 60-7, 22 AML 90 |
| | Malawi | 13 Eland |
| | Mauritania | 20 AML 60-7, 40 AML 90 |
| | Morocco | 40 AML 60-7, 190 AML 90 |

| | | |
|----------------------|---------------------------------|--|
| | Niger | 18 AML 60-7, 35 AML 60-20 Serval, 90 AML 90 |
| | Nigeria | 60 AML 60-7, 120 AML 90 |
| | Republic of South Africa | 923 Eland Mark 6, 256 Eland Mark 7, 180 Mark 7DT |
| | Rwanda | 12 AML 60-7, 2 AML 90 |
| | Senegal | 30 AML 60-7, 27 AML 90 |
| | Somali Republic | 16 AML 60-7, 12 AML 90 |
| | Sudan | 6 AML 90 |
| | Togo | 3 AML 60-7, 7 AML 90 |
| | Tunisia | 35 AML 90 |
| | Zaire | 30 AML 60-7, 30 AML 90 |
| | Zimbabwe | 20 Eland |
| <u>Asia</u> | Malaysia | 60 AML 60-7, 80 AML 90 |
| <u>Europe</u> | France | 454 AML 60-7, 255 AML 90 |
| | Ireland | 32 AML 60-7, 19 AML 90 |
| | Portugal | 40 AML 60-7 |
| | Spain | 103 AML 60-7, 100 AML 90 |
| <u>Middle East</u> | Bahrain | 22 AML 90 |
| | Iraq | 211 AML 60-7, 68 AML 90 |
| | Israel | 10 AML 60-12, 27 AML 90 |
| | Lebanon | 20 AML 60-7, 22 AML 60-12, 28 AML 90 |
| | Saudi Arabia | 60 AML 60-7, 24 AML 60-12, 168 AML 90 |
| | United Arab Emirates | 90 AML 90 |
| | Yemen Arab Republic | 60 AML 60-7, 125 AML 90 |
| <u>North America</u> | Dominican Republic | 7 AML 60-7 |
| | El Salvador | 5 AML 90 |
| <u>South America</u> | Argentina | 4 AML 60-7, 50 AML 90) |
| | Ecuador | 10 AML 60-12, 12 AML 60-7, 12 AML 90 |
| | Venezuela | 10 AML 60-7, 2 AML 90, 12 AML/S5301 |

At least two other users remain unidentified. In addition, approximately 371 units of the Automitrailleuse Légère, in several versions, have been sold to police and other similar internal security units; these sales have gone unrecorded in the open literature. Also, as of early 1997, international arms merchants had about 400 units of the Automitrailleuse Légère, again in several versions, in their stocks.

Forecast Rationale

The best testament to the Automitrailleuse Légère's ruggedness, versatility and general appeal to a variety of customers is the fact that the vehicle is still around. In point of fact, the Automitrailleuse Légère, still being marketed well over three decades since the first prototype was fabricated, is among the longest lived (in terms of continuous production) armored vehicle programs going. As of mid-1997, the vehicle is still being offered for sale and is being manufactured on an as needed basis.

While France phased out its inventory from front-line service in early 1990, the vehicles are still in the ready reserves; an increasing number of these vehicles are

expected to be sold on the export market. The same can be said for the South African Eland, which, in the latest Mark 7 DT version, is a quite attractive buy

Our latest review of the Automitrailleuse Légère program supports our forecast that assumes that a very moderate and mercurial level of production of the vehicle will continue through most of the forecast period. We then project that the serial production of this long-lived vehicle will finally be terminated in favor of a more modern design. We do hold out the caveat that this robust vehicle could have a sufficient following to keep the lines active in a mercurial manner past the time indicated below. Of course we will continue to monitor

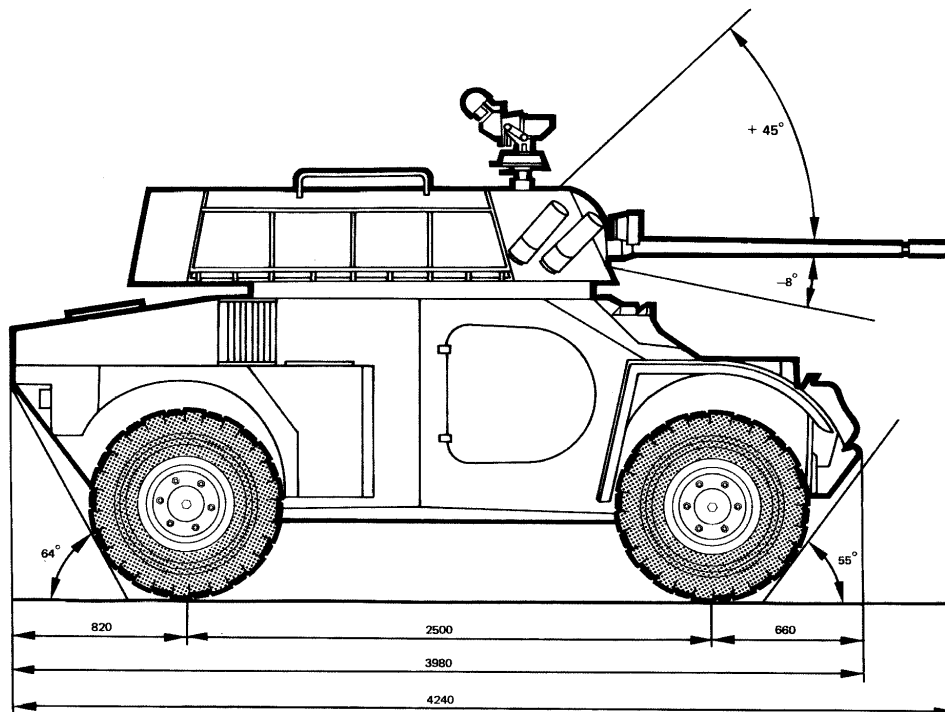
this important program for new developments and update this report accordingly.

Ten-Year Outlook

| ESTIMATED CALENDAR YEAR PRODUCTION | | | | | | | | | | | | | |
|------------------------------------|----------|------------|-----------------------|----|----|----|-----------------------|----|----|----|-------------|----|----------------|
| Vehicle | (Engine) | through 96 | High Confidence Level | | | | Good Confidence Level | | | | Speculative | | Total 97-06 |
| | | | 97 | 98 | 99 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | |
| PANHARD & LEVASSOR S.A. | | | | | | | | | | | | | |
| AUTOMITRAILLEUSE | XD 3T | | | | | | | | | | | | |
| LEGERE(a) | | 4965 | 0 | 0 | 3 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| Subtotal - PANHARD & LEVASSOR S.A. | | 4965 | 0 | 0 | 3 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| REUMECH OMC (Licensee) | | | | | | | | | | | | | |
| ELAND(b) | UNKNOWN | 1272 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal - REUMECH OMC (Licensee) | | 1272 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Production | | 6237 | 0 | 0 | 3 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |

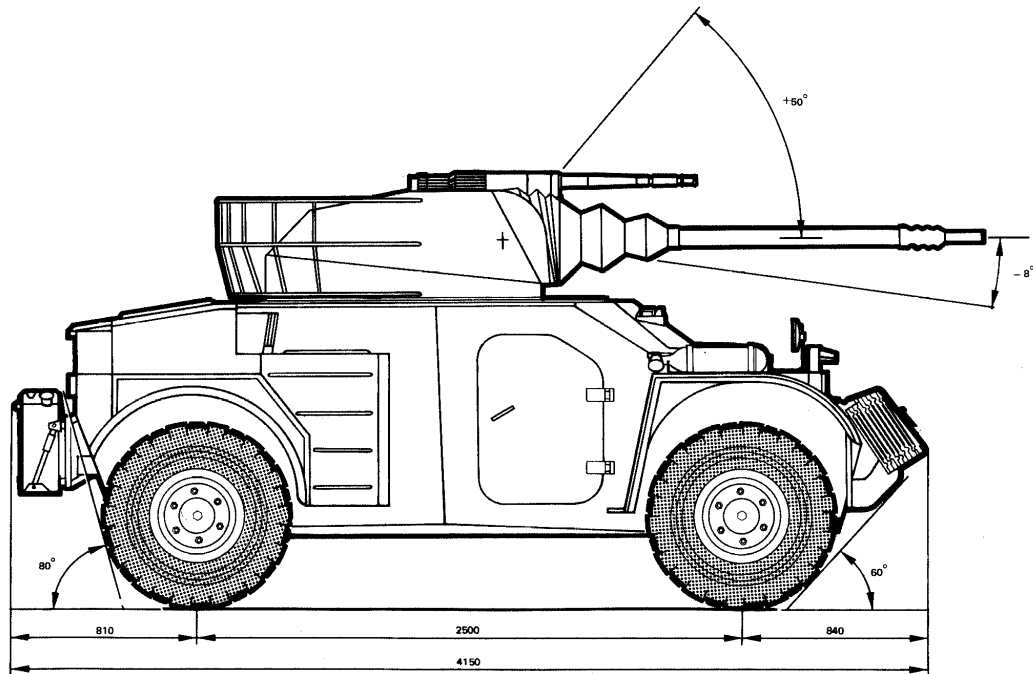
(a) The historical production figure includes all prototype and follow-on development vehicles. The production DOES NOT include the license production program in the Republic of South Africa.

(b) No prototype vehicles were manufactured. An additional one hundred vehicles were purchased directly from France.



AML 20 SCOUT-CAR

Source: Panhard



AML SCOUT-CAR TL 20 SO

Source: Panhard