

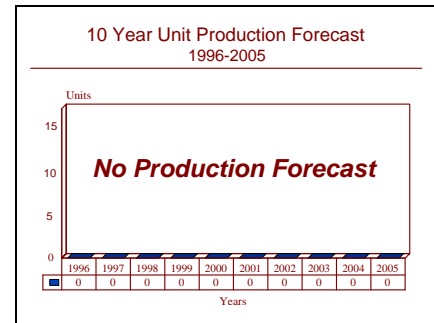
ARCHIVED REPORT

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EE-3 Jararaca - Archived 8/98

Outlook

- Program is no longer in production.
- Due to the demise of Engenheiros Especializados, no additional production is forecast .
- The technical data package is being offered by the creditors.
- This vehicle was widely sold on the international market.



Orientation

Description. A wheeled vehicle.

Sponsor. The EE-3 is a private development program funded by the contractor.

Contractors. This vehicle was developed and manufactured by Engenheiros Especializados SA (ENGESA); Sao Paulo, Brazil. Major subcontractors include Clark Equipment and Mercedes-Benz do Brazil.

Licensees. None

Status. As a result of Engenheiros Especializados ceasing operations in late 1993, the manufacture of the EE-3 Jararaca is dormant. It is in service with at least eight different nations.

Total Produced. As of January 1, 1995, a total of 458 EE-3 vehicles had been manufactured.

Application. A low-cost, light, armored vehicle (scout car) which is simple to operate and maintain, for internal security, riot control and counter-insurgence. The Jararaca is designed to bridge the gap between the requirement for the ubiquitous 1 1/4 ton jeep-class vehicles and heavier armored cars or tracked reconnaissance vehicles.

Price Range. In equivalent 1993 United States dollars, the EE-3 had a unit price of \$82,000. This was for the basic vehicle armed with a M2HB 12.7 millimeter machine gun.

Technical Data

Crew. Three. commander, driver, gunner

Configuration. 4x4

Dimensions. The following data are for the latest production standard of the basic vehicle armed with a M2HB machine gun.

	<u>SI units</u>	<u>US units</u>
Length	4.16 m	13.65 ft
Width	2.24 m	7.35 ft
Height	2.29 m	7.51 ft
Combat weight	5.8 tonnes	6.39 tons
Fuel capacity	140 liters	37.23 gal

Performance. The maximum speed and range figures are on a surfaced road.

Maximum speed	102 km/h	63.3 mph
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	<u>SI units</u>	<u>US units</u>
Maximum range	708 km	439.61 statute miles
Step	40 cm	1.31 ft
Trench	48 cm	1.57 ft
Slope	30%	30%
Gradient	60%	60%
Fording	60 cm	1.97 ft

Engine. This vehicle uses the Mercedes-Benz do Brazil OM 314 A, supercharged, four cylinder, liquid cooled diesel engine rated at 89.52 kilowatts (120 horsepower) at 46.67 revolutions per second (2,800 revolutions per minute). The power-to-weight ratio is 15.43 kilowatts per tonne (18.78 horsepower per ton). A dual 24 volt electrical system with four 12 volt 95 amperehour batteries is the standard electrical fit.

Gearbox. The Jararaca uses the Clark model 240V with five forward and one reverse gear ratios. The gearbox is manually operated and linked to ENGESA's two speed transfer box with power transmitted to both front and rear axles.

Suspension and Running Gear. The 4x4 Jararaca suspension uses semi-elliptical springs with a hydro-pneumatic shock damper at each wheel station. A central tire pressure regulation system is fitted and the 11.00x20 tires are the ENGESA run flat type.

Armament. The Jararaca is fitted with an open ring mount housing and a 12.7 millimeter M2HB machine gun. Other configurations include a single 20 millimeter cannon, dual 106 millimeter recoilless rifles and anti-tank missile systems such as Euromissile's MILAN.

Variants/Upgrades

The only variant of the Jararaca developed to date has been a reconnaissance vehicle for nuclear, biological and chemical missions. There are no known modernization and

retrofit programs in development or anticipated for this vehicle.

Program Review

Background. Engenheiros Especializados SA began the development of the Jararaca in 1977 to bridge the gap between the heavy armored vehicles of the 7.26-10.89 tonne (8-12 ton) class and the ubiquitous jeep class vehicle of one to two tons. This market, historically, had been dominated by Daimler's Ferret scout car. Unfortunately, the production of the Ferret was terminated in the early seventies as defense ministries demanded and received heavier armored vehicles. Ferret scout cars are still selling through international brokers because of their principal attributes of low cost, simplicity of operation, ease of maintenance, and rugged reliability and durability.

The development of the Jararaca followed ENGESA's initial two armored vehicle programs, the EE-11 Urutu and the EE-9 Cascavel. In 1977, the development of the Jararaca began, based on a number of the same components as used in the EE-9.

Vehicle Description. Engenheiros Especializados marketed the Jararaca as a light, low cost, simple but robust vehicle. Cost-effectiveness was maintained by basing the vehicle chassis on the company's EE-15 1 1/2-ton 4x4 truck. The same front and rear beam axles are

fitted with semi-elliptic leaf springs. The hull is of Electro-Slag-Refined armor with a simple, integral

construction with a conventional hull layout. The driver's position is at the front slightly off the center line of the vehicle; this position is provided with a single piece hatch cover. A compartment for two personnel is located in the center of the vehicle with the engine compartment to the rear.

The three man crew enters and exits the vehicle via a forward opening door on the right side. The commander is seated on the left side of the vehicle to the rear and is provided with a rearward opening hatch cover and periscopes/vision blocks. The standard M2HB 12.7 millimeter machine gun can be replaced with a 20 millimeter cannon or a MILAN missile launcher. More recently, Engenheiros Especializados integrated two other turrets with the EE-3. The ET-MD turret has two machine guns of 12.7 and 7.62 millimeter caliber; both are internally operated by one man. The ET-20 turret has a single 20 millimeter cannon and a single 7.62 millimeter machine gun also operated internally by one man. Optional equipment includes passive night vision equipment, radios and a vehicle intercommunication

system. A nuclear, biological and chemical defense system can also be fitted. While the Jararaca is not amphibious, it can ford water up to 60 centimeters (1.97 feet) in depth.

The engine and gearbox are standard production items produced by Mercedes-Benz do Brazil. All four wheels

are fitted with 33 centimeter (13 inch) diameter drum brakes and 11.00x16 or more recently, 11.00x20 run flat tires. An automatic tire inflation regulation system is standard. Hydraulic steering is standard for the four wheel drive in forward and reverse.

Funding

The Jararaca is a privately funded program.

Analysis. While the Jararaca has not had the success of the Cascavel or Urutu, it has unique attributes that find a continued demand in several areas of the world. The

Jararaca is a very simple vehicle to operate and maintain; a vehicle that is ideal for lesser developed nations.

Recent Contracts

Not available, as contractual information is not released.

Timetable

The following timetable is for the EE-3 only and no other Engenheiros Especializados armored vehicles.

	1977	Design and concept defined
	1979	Prototype fabrication and testing
	1980-1981	Operational testing, Brazil
Early	1981	EE-3 Jararaca officially introduced
	1982	Serial production began
Late	1993	Engenheiros Especializados ceased operations
Mid	1995	EE-3 Jararaca remains in service

Worldwide Distribution

Export Potential. Before Engenheiros Especializados ceased operations in late 1993, potential customers for the Jararaca included Bolivia, Chile, Iraq and Iran (follow-on orders) and Saudi Arabia. Through 1985, reports circulated that Mexico wanted to purchase the ENGESA family of vehicles although that country's economic condition almost certainly postponed the decision. The success of the company's Urutu armored personnel carrier and the Cascavel reconnaissance vehicle is also based on quality and low unit price. The Jararaca had to compete in the present glut of vehicles in the lightweight (3-6 tonne) class of armored vehicles through the decade.

The evidence indicates that some of the sales of the Jararaca were to internal security or similar organizations and are of such a level that they passed unnoticed by most military journals; such an occurrence is common in this class vehicle.

Countries. **Brazil** (86), **Cyprus** (38), **Ecuador** (10), **Gabon** (12), **Iran** (67), **Iraq** (162), **Tunisia** (20), **Uruguay** (25) and **Venezuela** (12) have been identified as users of the Jararaca. Other clients (Guinea?, Libya?) remain unidentified.

Forecast Rationale

As of mid-1995, production at Engenheiros Especializados remains dormant as a result of the firm ceasing operations due to bankruptcy in late 1993.

While we are presently forecasting no additional production of the Jararaca, there are consistent rumors circulating in industry that the company will still come out

of its financial problems, probably through the aid of some other firm. In relation to the latter, Vickers Defense Systems has been mentioned. However, as of mid-1995, nothing had been heard of this possible effort to revive the firm or its products. However, we will continue to monitor both the EE-3 program as well as Engenheiros Especializados.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION													
Vehicle	(Engine)	through 94	High Confidence Level				Good Confidence Level			Speculative			Total 95-04
			95	96	97	98	99	00	01	02	03	04	
ENGESA													
EE-3(a)	OM 314A	458	0	0	0	0	0	0	0	0	0	0	0
Total Production		458	0	0	0	0	0	0	0	0	0	0	0

(a)The historical production includes three prototype/development vehicles.