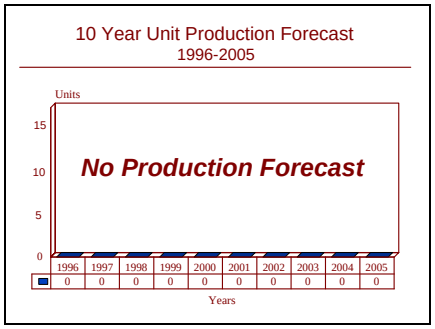
EE-11 Urutu - Archived 8/98

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-11 is a private development program funded by Engenheiros Especializados SA.

Contractors. The EE-11 was developed and is manufactured by Engenheiros Especializados SA (ENGESA); Sao Paulo, Brazil. Major subcontractors include Clark Equipment, Detroit Diesel Corporation, Mercedes Benz do Brazil and the Allison Transmission Division of General Motors Corporation.

Licensees. None

Status. As a result of Engenheiros Especializados ceasing operations in late 1993, the manufacture of the EE-11 is presently dormant.

Total Produced. As of January 1, 1995, a total of 1,719 EE-11 vehicles of all types and models had been manufactured.

Application. An armored personnel carrier for the rapid transport of infantry in combat zones.

Price Range. In equivalent 1993 United States dollars, the base model EE-11, armed with a 12.76 millimeter M2HB machine gun, had a unit price of $149,100.

Technical Data

Crew. One (driver) plus 13 infantrymen

Configuration. 6x6

Dimensions. The following data are for the Urutu Mark VII.

	SI units	US units
Length	6.1 m	20.01 ft
Width	2.65 m	8.69 ft
Height	2.9 m	9.51 ft
Combat weight	14 tonnes	15.43 tons
Fuel capacity	380 liters	101.06 gal

Performance. The maximum speed and range data are on surfaced roads.

Maximum speed	105 km/h	65.21 mph
Maximum range	850 km	527.85 statute miles
Step	60 cm	1.97 ft
Trench	1.03 m	3.38 ft

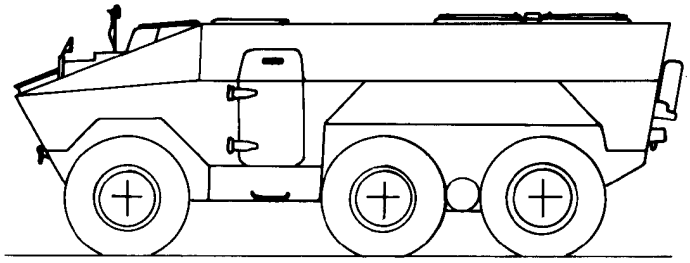
Slope	30%	30%
Gradient	60%	60%
Fording	amphibious	amphibious

Engine. The Mark I, II, IV, V and VI models of the Urutu use the Mercedes Benz do Brazil OM 352 A diesel engine which is rated at 126.82 kilowatts (170 horsepower) in the Marks I, II and IV and 141.74 kilowatts (190 horsepower) in the Marks V and VI. For the Mark III, Detroit Diesel Corporation provides the 6V-53 diesel engine rated at 158.2 kilowatts (212 horsepower) at 43.34 revolutions per second (2,600 revolutions per minute). The Mark VII uses the Detroit Diesel 6V-53T diesel engine. This supercharged engine is rated at 193.96 kilowatts (260 horsepower) at 46.67 revolutions per second (2,800 revolutions per minute). The power-to-weight ratio for the Mark VII is 13.85 kilowatts per tonne (16.85 horsepower per ton); the other models are similar. A 24 volt dual electrical system with four 12 volt batteries is standard.

Gearbox. The Mark III, VI and VII versions of the Urutu use the Allison Transmission Division of General Motors Corporation MT-643 automatic gearbox with five forward and one reverse gear ratios. The Mark IV uses the AT-540, gearbox, a similar unit from the same firm. A Clark manually operated gearbox with the same gear pattern is used in the Mark I and the Mark II uses the manually operated MB 63/40 gearbox from Mercedes Benz.

Suspension and Running Gear. The 6x6 Urutu has a double wishbone type independently sprung front suspension with coil springs and double action hydraulic shock dampers at each wheel station. The rear two axles use the ENGESA developed boomerang type walking beam suspension with semi-elliptical springs. A central tire inflation system is standard and the 14.5x20 tires are the run flat type.

Armament. A 12.7 millimeter M2HB machine gun is the standard armament fit, but a number of optional armament systems can be fitted as per the mission requirement; these are described in the variants section.



ENGESA EE-11 URUTU

Source: Forecast International

Variants/Upgrades

As of mid-1995, there have been no major modernization and retrofit programs developed for the EE-11.

Variants. In addition to the basic production models described in the Program Review section, a number of variants of the Urutu have been developed.

EE-11 Ambulance. An unarmored ambulance with a capacity of eight walking wounded or six stretchers. Air conditioning and breathing equipment is standard, as is a refrigerator. The roof is raised in this variant.

EE-11 Cargo. This variant has a capacity of 2,000 kilograms (4,408 pounds).

EE-11 Command Vehicle. The Urutu Command Vehicle contains the communications gear needed for the command and control mission.

EE-11 Recovery Vehicle. This variant has roof hatches of a different design which allow mechanics to work upright. Also included as standard equipment on this variant are a hydraulic crane, towing winch, portable generator and various tools including electric and oxygen-acetylene welding equipment allowing for the maintenance and repair of vehicles in the field.

EE-11 Armored Fire Support Vehicle. In 1985, the first news was heard of a proposed Engenheiros Especializados program called Uruvel. This amphibious fire support vehicle is fitted with the ENGESA ET-90 turret and the ENGESA EC-90 90 millimeter cannon as fitted to the EE-9 Cascavel. A total of twelve 90 millimeter rounds is carried in the turret with an additional 36 rounds stored in the hull. As an option, the turret can be fitted with a

powered traverse mechanism and a gunner's sight with integral laser rangefinder. This vehicle has a eight man crew consisting of the driver, commander and gunner, along with four infantrymen who are seated to the rear.

This vehicle has also been proposed as a joint development program to meet a United States requirement for a vehicle of this type. An expected agreement between the then FMC Corporation and Engenheiros Especializados would have given FMC 51 percent of the production and Engenheiros Especializados the remainder, had the United States Army procured the vehicle. The United States Army had considered the potential procurement of up to 600 vehicles of this type for low intensity conflicts. As of early 1987, nothing more was heard about this program and if it did exist in the form described above, it has long been dead.

EE-11 Riot Control. This variant is basically the same as the armored personnel carrier but mounts a type of dozer blade for clearing obstacles.

EE-11 Mortar Vehicle. This version of the Urutu mounts an 81 millimeter mortar in the rear of the vehicle; the mortar fires through the roof. The elevation limits are +40° to +80° and the mortar can be dismounted if required. A 7.62 millimeter machine gun is mounted on the forward portion of the roof of the vehicle.

Other Armament Options. As noted above, Engenheiros Especializados has integrated a number of different missile and other armament systems with the EE-11. Among these are:

The MILAN anti-tank guided missile system

The Electronique Serge Dassault TA20 twin 20 millimeter Anti-Aircraft Artillery system

The Brandt 60 millimeter mortar turret

The Hagglunds Vehicle HS804 20 millimeter turret

Twin 7.62 millimeter machine guns in a ring mount

Twin 12.7 millimeter machine guns in a ring mount

Program Review

Background. Engenheiros Especializados SA, a well known producer of quality heavy trucks, decided in the late 1960s to break into the strictly military vehicle field. The first major program was the EE-11 Urutu. The Urutu is the basis for the design of the EE-9 Cascavel armored vehicle which is covered in a separate report in this section. The EE-11 entered service with the Brazilian Marines in late 1973 where it is called the Carro de Transporte Sobre Rodas Anfibio. As a result of longstanding financial problems, in late 1993, Engenheiros Especializados ceased operations.

Vehicle Description. The hull of the EE-11 is composed of bimetal dual layer plate, the outer layer being much harder; all-welded construction technique is used. This bimetallic plate affords the maximum ballistic protection for its thicknesses; it is stated by the contractor that the EE-11 armor gives complete protection from 7.62 millimeter Armor Piercing projectiles fired at point-blank range.

The driver is seated at the front to the left and is provided with a single piece hatch cover. Three periscopes are fitted in the glacis plate forward of the hatch. The powerpack is forward on the right side of the vehicle. The troop compartment is to the rear with a bench seat on each side and an additional seat behind the driver across the vehicle. A door is on the left side of the hull behind the first axle. An additional pneumatically operated door is located on the rear of the vehicle. Two arrangements of vision blocks and firing ports using ball or conventional type mounts are available for the troop compartment. Four roof hatches are positioned over the troop compartment. The main armament is positioned behind the driver and to the left. The gunner is provided with a Rank Pullin SS 170 day/night periscope with an integral image intensifier; magnification is five power. A stadiametric rangefinder is also provided.

The front suspension is independent while the rear suspension employs the ENGESA-developed Boomerang suspension/axle technology which allow for maximum vertical travel while the wheels remain on the ground. Both the front and rear axles can be pressurized for amphibious operations. Disc brakes are provided for all wheels while the tires are of a run-flat type with an automatic inflation system.

Standard equipment on the Urutu includes fire extinguishers, engine driven and manual bilge pumps, propellers for amphibious operations, and the automatic tire inflation system. Optional equipment includes radios, a six-tonne winch, a nuclear, biological and chemical protection system and night vision equipment.

Production Models. Seven models of the basic EE-11 designated Mark I through VII have been developed. The only differences among these models are the engine/gearbox combinations and the presence or absence of a tire pressure regulation system.

Mark I. The initial production model of the Urutu had the Mercedes engine, the Clark manually operated gearbox and no central tire pressure regulation system.

Mark II. The Mark II version of the Urutu had the Mercedes engine and manually operated Mercedes

gearbox. This model has no propellers; water propulsion is by the wheels. The central tire pressure regulation system was introduced with this model; it is standard on all subsequent models.

Mark III. This model introduced the Detroit Diesel engine and Allison MT-643 gearbox.

Mark IV. This model integrated the Mercedes OM 352 A engine with the Allison AT-540 automatic gearbox.

Mark V. This model has a slightly higher rated Mercedes engine and the Allison AT-545 automatic gearbox.

Mark VI. This model has a slightly higher rated Mercedes engine and the Allison MT-643 automatic gearbox.

Mark VII. This model features the supercharged version of the 6V-53 engine which has a higher power rating; the MT-643 automatic gearbox is used.

Funding

The EE-11 was developed with the contractor's private funds.

Analysis. Prior to the financial difficulties experienced by Engenheiros Especializados, the export market for the Urutu had been brisk. The EE-11 had been a main factor in establishing the firm as a world leader in the production and sale of military wheeled vehicles. The vehicle's reputation for rugged, solid construction and ease of maintenance in austere conditions made it popular in the developing nations.

Recent Contracts

Not available as contractual information is not released.

Timetable

This timetable relates to the EE-11 only and to no other program of

Late	1960s	Concept definition developed
Jan	1970	Development began
Jul	1970	First prototype completed
	1973	Serial production began
Late	1973	Initial operating capability in Brazil
	1977	First export sales made
Late	1993	Engenheiros Especializados ceased operations
Mid	1995	EE-11 remains in service

Worldwide Distribution

Export Potential. Our research leads us to believe that Libya did much for the success of Engenheiros Especializados in general and the EE-11 in particular. The evidence is rather clear that a good number of EE-11 vehicles have been sold or distributed through Libya to other nations, particularly Chad and Iran, as well as revolutionary factions friendly to those nations. Most of these transfers have gone unrecorded, as have some sales to nations which wish to remain unidentified. The only way they are confirmed is when the vehicles turn up in the service of previously unidentified users. Some of these nations are almost certainly in sub-Saharan Africa; the known transfers of Libya are indicative of this. Of course, sales of this type, essentially with no strings attached, were a main factor in ENGESA's meteoric rise in the armored fighting vehicle market. Prior to the demise of Engenheiros Especializados, Mozambique had expressed an interest in ordering the EE-11.

The available evidence related to the Urutu indicates that a good portion of the sales of the vehicle were to internal security or similar organizations. These sales are of such a level that they pass unnoticed by most military journals; such an occurrence is common in this class vehicle.

Countries. Identified customers of the EE-11 include Angola (8), Bolivia (24), Brazil (297), Chile (302), Colombia (76), Cyprus (10), Ecuador (20), Gabon (12), Guyana (2), Iraq (114), Jordan (24), Libya (108 - many more have been transferred to other nations), Morocco (60), Paraguay (10), Saudi Arabia (30), Suriname (15), Tunisia (18), United Arab Emirates (107), Uruguay (18) and Venezuela (138), with unconfirmed reports of sales to

several other countries. In addition, there are reported significant sales of the EE-11 to many police and other internal security units.

Forecast Rationale

As of early 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 Urutu, there are consistent rumors still circulating in industry that the company will 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.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level			Good Confidence Level			Speculative				
Vehicle	(Engine)	through 94	95	96	97	98	99	00	01	02	03	04	Total 95-04
ENGESA													
EE-11(a)	OM 352A	1719	0	0	0	0	0	0	0	0	0	0	0
Total Production		1719	0	0	0	0	0	0	0	0	0	0	0

(a)The historical production figure contains three prototype and five developmental vehicles.