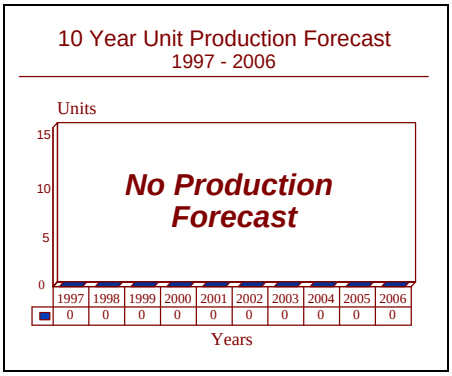
MB-3 Tamoyo - Archived 2/98

Outlook

- The Tamoyo program has yet to enter serial production.
- A total of ten prototype and developmental Tamoyo tanks has been manufactured.
- The Tamoyo is still being marketed.
- Due to the glutted market conditions, and Brazil receiving Leopard 1 and M60 tanks, no serial production of the Tamoyo is forecast.



Orientation

Description. A tank.

Sponsor. The Tamoyo is a private development program with the majority of the development funding having been provided by the contractor for a Brazilian Army requirement; a minimal level of financial support from the Brazilian government was provided.

Contractors. This tank was developed and, if ever ordered, will be manufactured by Bernardini SA, Industria e Comercio Sao Paulo, Brazil. Major subcontractors include Ferranti, General Motors Corporation/Allison Transmission Division, Martin Marietta/Defense Systems Operations, Detroit Diesel Corporation and Royal Ordnance.

Licensees. None

Status. The development of the Tamoyo is complete. This tank has been evaluated by at least three nations and is available for production orders.

Total Produced. As of January 1, 1997, ten prototype and pre-production tanks had been manufactured.

Application. A tank for the projection of power as well as defensive operations.

Price Range. The Tamoyo has a unit price of $2.805 million in equivalent 1995 United States dollars; this figure is essentially the same in 1997.

Technical Data

Crew. Four: commander, gunner, loader and driver.

Armor. Modern composite/spaced type armor is used on this tank.

Dimensions. The following data are for the Tamoyo III, the latest prototype.

	SI units	US units
Length	8.76 meters	28.74 feet
Width	3.22 meters	10.56 feet
Height	2.48 meters	8.13 feet
Combat weight	29.12 tonnes	32.10 tons
Fuel capacity	700 liters	186.17 gallons

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

	SI units	US units
Maximum speed	70 kilometers per hour	43.47 miles per hour
Maximum range	550 kilometers	341.55 statute miles
Step	71 centimeters	2.33 feet
Trench	2.4 meters	7.87 feet
Slope	30%	30%
Gradient	60%	60%
Fording	1.3 meters	4.27 feet

Engine. Two engine options have been offered for this tank. The primary engine offering is the Detroit Diesel Corporation 8V-92TA two stroke supercharged diesel rated at 549 kilowatts (735.92 horsepower) at 38.34 revolutions per second (2,300 revolutions per minute). The power-to-weight ratio for the Tamoyo with this engine is 18.85 kilowatts per tonne (22.93 horsepower per ton). Alternately, a Saab-Scania Do Brasil DSI-14 diesel rated at 373 kilowatts (500 horsepower) at 35 revolutions per second (2,100 revolutions per minute) is offered. The power-to-weight ratio with this engine is 12.81 kilowatts per tonne (15.58 horsepower per ton). It is hoped to increase the power output of the DSI-14 engine sufficiently to attain a power-to-weight ratio similar to that attained with the Detroit Diesel engine. A 24 volt electrical system with four 12 volt batteries is the standard electrical fit.

Gearbox. A General Dynamics (formerly Lockheed Martin) HMPT-500 hydromechanical gearbox was specified to be used on serially produced tanks using the Saab-Scania Do Brasil engine. This infinitely variable gearbox is considered to have three forward and one reverse gear ratios. The Saab-Scania Do Brasil engine can also be fitted with the Allison Transmission Division of General Motors Corporation CD-500-3 gearbox with one forward and one reverse gear ratios. Tanks with the Detroit Diesel engine will use the CD-850-A gearbox from the same firm.

Suspension and Running Gear. A torsion bar type suspension with six dual rubber-tired road wheels on each side is used for this tank. Three track return rollers are used and the first, second and sixth road wheel stations mount hydraulic shock dampers.

Armament. A Bernardini-developed 90 millimeter cannon designated 76/40 M32 BR3 is the standard armament for the Tamoyo. Elevation with this cannon is +18° and depression is -6°. A total of 68 rounds of Armor Piercing Fin Stabilized Discarding Sabot ammunition is carried. Alternatively, the ubiquitous L7 105 millimeter tank cannon from Royal Ordnance can be fitted; 40 rounds of 105 millimeter ammunition are carried. Secondary armament options include a 12.7 millimeter M2 or 7.62 millimeter Fabrique Nationale Nouvelle Herstal MAG machine gun coaxially mounted, and a 7.62 millimeter MAG machine gun on the turret roof. Eight smoke dischargers are mounted four to a turret side.

Fire Control. The names and manufacturers of the fire control components of the first two variants remain unknown, but the fire control fit is known to include primary two axis stabilization, a ballistic computer, day/night sights for the gunner and commander, a laser rangefinder either separately mounted or integral with the commander's and gunner's sights, and a coaxially mounted telescope as the gunner's secondary sight. Vision blocks and/or periscopes are provided for all positions. The Tamoyo III is fitted out in a similar manner although the components are enhanced; it is known that the fire control system in this latest model is the Falcon from Ferranti.

Variants/Upgrades

Variants. Not applicable at this time, although an armored recovery vehicle and a self-propelled antiaircraft artillery system, using twin Bofors L/70 cannon, have been developed on paper.

Program Review

Background. The MB-3 Tamoyo's design stemmed from Bernardini's X-30 tank designed in the late seventies. This tank was based on the M41 chassis but weighed about seven tonnes more than the M41. The X-30 did not reach prototype stage and design was initiated on a new 30 tonne tank to meet a Brazilian Army requirement that was circulated in the early eighties; this requirement was also addressed (albeit in a more sophisticated manner) by the

EE-T1 Osorio (see separate report). The new tank began fabrication in prototype form in 1982 with trials of the all-up prototype beginning in late 1984. By April of 1985, ten prototypes had been fabricated; these tanks have undergone extensive tests and evaluations.

Description. The design of the Tamoyo tank follows the conventional practice of driver's compartment forward with the driver seated to the left; fighting compartment in the center with the commander and gunner seated in the turret to the right and the loader seated to the left. The powerpack is located to the rear. The driver is provided with a single piece hatch cover and three periscopes; the center one can be replaced with a night vision device if required.

The hull and turret are of all welded steel construction with spaced armor in critical areas such as turret sides and glacis. It is possible that some form of stratified or laminated armor has been in development for the production vehicles. The suspension is a torsion bar type with six dual rubber-tired road wheels on each side. The drive sprocket is at the rear and the idler forward. Hydraulic shock absorbers are fitted to the first, second and sixth road wheels.

Standard equipment on the Tamoyo includes eight electrically operated smoke dischargers, fire extinguishing apparatus, bilge pump, radios, inter-communication system, heater, and a hull escape hatch.

Three different prototype vehicles have been developed and run through a long term testing program. The first prototype, armed with the 90 millimeter 76/40 M32 BR3 cannon, was partially funded by the Brazilian Army. The Tamoyo II integrated improved components, and the further improved Tamoyo III is considered the best of all the designs. This tank mounts the M68 105 millimeter tank cannon, has a much more sophisticated fire control suite and employs spaced and composite armor. Due to this, the weight has increased by one tonne over the original Tamoyo.

Funding

The Tamoyo was privately developed by the contractor, although some small amount of financial support came from the Brazilian Army.

Recent Contracts

Not available as contractual information is not released.

Timetable

The following timetable is applicable to the Tamoyo program only.

	1978	X-30 designed
Mar	1982	First Tamoyo prototype began construction
Late	1984	Trials with first prototype began
	1984-1985	Construction of ten prototype tanks
Early	1997	Awaiting production orders

Worldwide Distribution

Export Potential. Despite the fact that it is an ideal tank for Latin America, the Tamoyo has yet to receive its first order. In early 1989, it was learned that Paraguay was on the verge of ordering the Tamoyo; while no numbers have been officially announced, our research indicates that the procurement objective ranges around 34 units. However, as of early 1997, nothing had been heard of this potential order. Because of the unprecedented glut of used but still highly serviceable tanks on the world market, most of which are ideal as front line tanks in Brazil and other Latin American nations, it has become extremely difficult to sell this tank anywhere on the export market.

Countries. Brazil (ten prototype tanks with the contractor).

Forecast Rationale

Our latest review of the Tamoyo program finds that, as of early 1997, there is no potential for Brazil to purchase the Tamoyo. The reason for this is the fact that Brazil, long contemplating the purchase of used but still serviceable tanks on the open market, has finally implemented just such a program. The country is now going to purchase used Leopard 1 tanks as well as most likely long term lease the M60 in order to fill the requirement. Therefore, it is now extremely doubtful that the Tamoyo will ever be procured by Brazil.

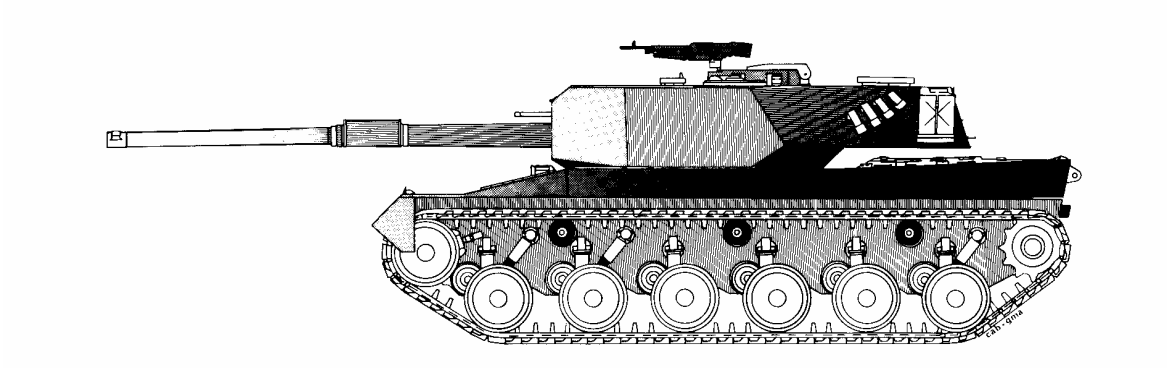
Tanks such as the Leopard 1, Challenger 1, AMX 30 and M60, available in the thousands, in overhauled and/or refurbished form, still represent front line equipment in many areas of the world, including Latin America. Considering that some of these aforementioned tanks have been given away for their transportation cost, it is hardly surprising that many lesser developed nations are opting for these tanks when they decide to upgrade their inventory. Therefore, we find that, with no sale to Brazil probable, the sale of the Tamoyo on the export market is even less likely. The nations that had previously expressed interest in this tank (Paraguay, Peru) still have little or no funding available to purchase a new tank, especially when many tanks are being offered at the aforementioned bargain basement prices. In consideration of all these points, we are now forecasting no production of the Tamoyo, although we will continue to monitor the program for further developments.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Vehicle	(Engine)	through 96	High Confidence Level 97	98	99	Good Confidence Level 00	01	02	Speculative 03	04	05	06	Total 97-06
BERNARDINI S.A.													
MB-3(a)	8V-92TA	10	0	0	0	0	0	0	0	0	0	0	0
Total Production		10	0	0	0	0	0	0	0	0	0	0	0

(a) The through 1996 production consists of the prototype and developmental tanks.



MB-3 TAMOYO

Source: Bernardini