

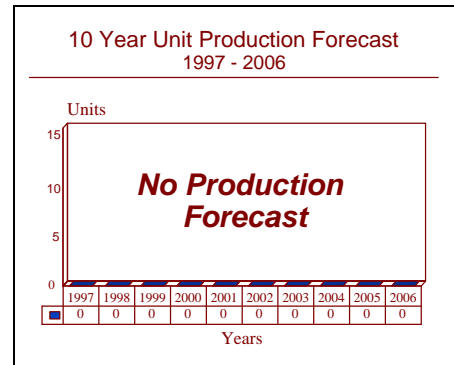
ARCHIVED REPORT

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TH 300 (TAM - Tanque Argentino Mediano) and TH 301 - Archived 2/98

Outlook

- Serial production of the TAM for Argentina is complete.
- TH 301 is available for production orders in both 105 and 120 millimeter versions.
- This tank has been developed into several variants.
- At present, there are no significant modernization or retrofit programs for this tank.



Orientation

Description. Tanks.

Sponsor. The initial developmental work on the chassis that is the base of the TAM was undertaken by the contractor. The specific development of the TAM (Tanque Argentino Mediano) tank was supported by the Argentina Ministry of Defense through the Argentine Army. The further development of the TAM as the TH 301 has been funded on a private basis by the contractor Thyssen-Henschel.

Contractors. These tanks are manufactured by Thyssen-Henschel; Kassel, Federal Republic of Germany. The TAM was assembled in Argentina by Tanque Argentino Mediano Sociedad del Estado at facilities located at Buenos Aires; this latter firm is considered the prime contractor for the TAM program. The TH 301 is essentially the same tank further developed by Thyssen-Henschel for export. Major subcontractors include Carl Zeiss Oberkochen, Diehl Group/Tracks and Suspension Division, Direccion General de Fabricaciones Militares, Motoren-und Turbinen-Union, Rheinmetall Industrie, Steinhall Lear Siegler, Telefunken Systemtechnik and Renk.

Licenseses. None

Status. The Argentine TAM program, as far as the tank portion is concerned, is complete. Some of the original production, approximately 63 incomplete tanks plus components for the partial assembly of a hundred more or so, are held in storage in Argentina and were never delivered to the Argentine Army. Development of the TH 301 tank is complete in the Federal Republic of Germany; it is available for orders.

Total Produced. As of January 1, 1997, a total of 193 TAM tanks (including two prototype/developmental tanks) had been delivered to the Argentine Army. By the same date, three TH 301 prototypes had been manufactured.

Application. Tanks for the projection of power as well as defensive operations.

Price Range. Before its termination, the TAM tank had a unit price of \$1.47 million in equivalent 1986 United States dollars. In equivalent 1997 United States dollars, the unit price of the TH 301 with the Rh 105-30 cannon is \$3.211 million; with the Rh 120 cannon, it is \$3.321 million.

Technical Data

TAM

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

Armor. Conventional steel alloy armor is used in the fabrication of the TAM.

Dimensions. The following data are for the TAM tank as used by Argentina.

	SI units	US units
Length	8.23 meters	27.0 feet
Width	3.25 meters	10.66 feet
Height	2.42 meters	7.93 feet
Combat weight	30.01 tonnes	33.08 tons
Fuel capacity	650 liters	172.87 gallons

Performance. The maximum speed and range figures are on a metalled road. The range can be extended by the fitting of two 200 liter (53.19 gallon) fuel tanks on the rear of the tank. The fording figure is with no preparation; four meters (13.12 feet) can be forded by the fitting of a snorkel.

Maximum speed	75 kilometers per hour	46.57 miles per hour
Maximum range	550 kilometers	341.55 statute miles
Step	100 centimeters	3.28 feet
Trench	2.5 meters	8.20 feet
Slope	30%	30%
Gradient	68%	68%
Fording	1.4 meters	4.59 feet

Engine. The TAM uses the Motoren- und Turbinen-Union MB 833 Ka 500 six-cylinder supercharged diesel engine developing 536.90 kilowatts (720 horsepower) at 36.67 revolutions per second (2,200 revolutions per minute). This engine gives a power-to-weight ratio of 17.89 kilowatts per tonne (21.77 horsepower per ton). A 24 volt electrical system with eight 12 volt 100 ampere hour batteries is the standard electrical fit.

Gearbox. Renk supplies the HSWL 204 automatic planetary gearbox with torque converter and four forward/four reverse gear ratios. A stepless hydrostatic steering system is used.

Suspension and Running Gear. A torsion bar type suspension with six dual tired road wheels and three return rollers on each side is used on this tank. The first, second, fifth and sixth road wheel stations are provided with hydraulic shock dampers.

Armament. For the TAM tank, a modified version of the French G1 105 millimeter rifled tank cannon as used on the AMX 13 light tank. This cannon, designated the C.360-TAM L51 in Argentina, was developed and manufactured in Argentina by the government-owned and operated Direccion General de Fabricaciones Militares organization. This cannon is compatible with all standard

105 millimeter tank ammunition types and is stabilized in two planes. A total of fifty main armament rounds is carried in the TAM. The secondary armament consists of two MAG 7.62 millimeter machine guns, one coaxially mounted and one for anti-aircraft defense; these weapons are built under Fabrique Nationale Nouvelle Herstal license in Argentina. A total of 6,000 rounds of 7.62 millimeter ammunition is carried. The turret, manufactured in Argentina, has full power traverse and elevation. The main armament elevation is +18 degrees, the depression is -7 degrees; turret rotation is 360°. Four electrically operated smoke grenade launchers are mounted on each side of the turret.

Fire Control. The TAM fire control suite is somewhat austere although ideal for Argentina as well as the targeted export market. A non-stabilized Steinhall Lear Siegler TRP-2A panoramic sight is provided for the commander; it can be replaced by an infrared sight if desired. The commander also operates the coincidence type rangefinder; a neodymium yttrium-aluminum garnet laser rangefinder is also said by some sources to have more recently been fitted; this cannot be confirmed. The gunner is provided with an eight power Carl Zeiss TZF sight and an all-aspect telescope.

TH 301

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

Armor. Conventional steel alloy armor is used in the fabrication of this tank.

Dimensions. The following data are for the latest prototype TH 301 tank fitted with the Rh 105-30 tank cannon.

	SI units	US units
Length	8.46 meters	27.76 feet
Width	3.31 meters	10.85 feet
Height	2.44 meters	8.01 feet
Combat weight	31.01 tonnes	34.18 tons
Fuel capacity	650 liters	172.87 gallons

Performance. The maximum speed and range figures are on a metalled road. The range can be extended by the fitting of two 200 liter (53.19 gallon) fuel tanks on the rear of the tank. The fording figure is with no preparation; four meters (13.12 feet) can be forded by the fitting of a snorkel.

Maximum speed	72 kilometers per hour	44.71 miles per hour
Maximum range	500 kilometers	310.5 statute miles
Step	90 centimeters	2.95 feet
Trench	2.9 meters	9.51 feet
Slope	30%	30%
Gradient	60%	60%
Fording	1.4 meters	4.59 feet

Engine. The TH 301 is fitted with the Motoren- und Turbinen-Union MB 833 Ka 500, a six-cylinder supercharged diesel engine rated at 559.28 kilowatts (750 horsepower) at an engine speed of 40 revolutions per second (2,400 revolutions per minute). This engine gives a power-to-weight ratio of 18.04 kilowatts per tonne (21.94 horsepower per ton). A 24 volt electrical system with eight 12 volt 100 ampere hour batteries is the standard electrical fit.

Gearbox. Renk supplies the HSWL 204 automatic planetary gearbox with torque converter and four forward/four reverse gear ratios. A stepless hydrostatic steering system is used.

Suspension and Running Gear. A torsion bar type suspension with six dual tired road wheels and three return rollers on each side is used on this tank. The first, second, fifth and sixth road wheel stations are provided with hydraulic shock dampers.

Armament. For the TH 301, the Rheinmetall Industrie Rh 105-30 tank cannon is fitted; this tank cannon is a license manufactured version of the ubiquitous L7, a product of Royal Ordnance. The Rh 105-30 cannon is compatible with all NATO standard 105 millimeter tank ammunition types and is fully stabilized. A total of fifty

main armament rounds is carried. The secondary armament consists of two MG3 7.62 millimeter machine guns, one coaxially mounted and one for anti-aircraft defense. A total of 6,000 rounds of 7.62 millimeter ammunition is carried. The turret has full power traverse and elevation; turret rotation is 360°. Four electrically operated smoke grenade launchers are mounted on each side of the turret. Another version of the TH 301 mounts the Rh 120 millimeter smoothbore tank cannon; other details are below.

Fire Control. The computerized fire control suite of the TH 301 is much more sophisticated than that of the TAM. The stabilized PERI-R12 dual magnification panoramic sight is provided for the commander. The gunner is provided with a fully stabilized eight power all-aspect periscope with integral neodymium yttrium-aluminum garnet laser rangefinder. For night engagements, a PZB 200 low light level electro-optic viewing system is mounted on the mantlet; both the commander and gunner are provided with monitors. These components are slaved to the fire control computer. The digital fire control computer receives target data manually through the gunner or automatically from the laser rangefinder; other data (cant, lead angle) is fed automatically while the ammunition type is entered manually.

Variants/Upgrades

Variants. Several variant vehicles based on the tank have been developed both by Thyssen Henschel and Tanque Argentino Mediano Sociedad del Estado. Some of these variants, as noted below, have been placed into production.

ARGENTINE VARIANTS

The Véhicule de Combate Transporte de Personal (sometimes called VCPT) is an infantry combat vehicle, very similar to the Marder. A two man turret with a single Rh 202 20 millimeter cannon and 7.62 millimeter machine gun is fitted. In addition, six firing ports are fitted to the vehicle. Finally, a remote controlled 7.62 millimeter machine gun is fitted to the vehicle's rear hull and four Wegmann smoke dischargers are fitted. As of early 1997, there were 216 Véhicule de Combate Transporte de Personal vehicles in the Argentine inventory.

The Véhiculo de Combate Transporte de Mortero (sometimes called VCTM) is essentially a Vehicule de Combate Transporte de Personal vehicle fitted to mount a 120 LR 120 millimeter mortar. This mortar is an Argentine development and is in serial production; 50 Véhiculo de Combate Transporte de Mortero vehicles were in service as of early 1997.

The Véhiculo de Combate Puesto de Comando (sometimes called VCPC) is a command vehicle based on the Véhicule de Combate Transporte de Personal. The turret has been removed and replaced with a single 7.62 millimeter machine gun mount. A crew of 10 (six communications officers plus the normal crew) is carried. As of early 1997, four vehicles of this type had been completed.

An armored recovery vehicle with components, specifically the recovery equipment and superstructure supplied by MaK System Gesellschaft, has been in development for some time. This variant is based on the Véhicule de Combate Transporte de Personal chassis. A rear-mounted dozer blade and 30 tonne (33.07 ton) winch are supplied. The hydraulically operated crane, located on the right side of the vehicle, has a lifting capacity of 22 tonnes (24.25 tons); it can traverse 214 degrees. The first prototype was completed in mid-1987 and as of late 1996, serial production had yet to commence.

An armored bridgelayer has been under development in conjunction with Maschinenfabrik Augsburg-Nurnberg; as of early 1997, the status of this program is not known. The Vehiculo de Combate Lanza Cohetes (sometimes called VCLC) is the basis of a multiple-launch rocket system using Israeli LARS 160 rockets and launcher. As of late 1996, two prototypes had been completed. This program is

covered in detail in the Munitions and Ordnance book that is a companion to this.

The VCamb is an armored ambulance of which one prototype had been completed as of early 1997.

In 1982, Argentina ordered another variant, the Vehiculo de Combate de Artilleria 155 (sometimes called the VCA 155 or the TAM/Palmara), which is a self-propelled howitzer integrating a modified TAM chassis with the OTOBREDA Palmara 155 millimeter self-propelled howitzer turret. The chassis is wider with an additional roadwheel station fitted. An initial production run of 25 vehicles is anticipated with a total inventory objective of about 70 units. With the demise of the TAM procurement program in mid-1986, it was felt that this particular effort would fall by the wayside. However, with the August 1987 announcement that the TAMSE organization was to be reactivated, this program had a new lease on its life. In mid-1988, we learned that the Vehiculo de Combate de Artilleria 155 program had been officially restarted; an order for 18 Palmara turrets was reported. As of late 1996, two prototypes had been completed and serial production had yet to commence.

THYSSEN HENSCHEL VARIANTS

Thyssen-Henschel has privately developed a more sophisticated version of the TAM tank for the export market; it is designated TH 301. This vehicle, the technical data for which is listed above, was originally designated the TAM-4; the first prototype was completed in 1978. While externally similar to the TAM, the TH 301 is vastly improved internally and is a much more sophisticated tank. A Motoren- und Turbinen-Union MB 833 Ka 500 diesel rated at 559.28 kilowatts (750 horsepower) at an engine speed of 40 revolutions per second (2,400 revolutions per minute), as is an improved Renk gearbox. The main armament is Rheinmetall's Rh 105-30 cannon. Improved sights, including the stabilized PERI R12, an integral neodymium yttrium-aluminum garnet laser rangefinder and other enhanced fire control components are fitted. A further development of the TH 301 uses Rheinmetall's Rh 120 millimeter smoothbore cannon.

The TH 325 anti-aircraft artillery system was planned to integrate the TH 301 chassis with the Dragon twin 30 millimeter anti-aircraft artillery system. This project was a joint development of Thyssen-Henschel and Thomson-CSF of France. The modified TH 301 hull was to be fitted with a SAMM armored turret with twin 30 millimeter HSS-831A cannon. A SAGEM Vassyla gyroscope-stabilized sight with an integral laser rangefinder was to be fitted, or the Oeil Vert pulse Doppler radar could comprise

the fire control fit. In mid 1986, this paper program was terminated and is no longer offered.

Program Review

Background. The Schützenpanzer Marder, at its introduction to operational service, was the most advanced mechanized infantry combat vehicle in the world. This vehicle began its development in 1959, and was designed to complement the Leopard 1 tank in mobility and performance. Many of the components on the Marder share commonality with Kanone Jagdpanzer 4-5 and Rakete M-1966. These two vehicles (one carrying a self-propelled antitank gun and the other antitank missiles) were developed concurrently with and from the Marder and are the basis for the TAM design.

TAM (Tanque Argentino Mediano). In mid-1974, Thyssen-Henschel was awarded a contract to develop a new medium tank by the Argentinean Defense Ministry. Important design parameters were a 30 tonne weight limit and the ability to be manufactured in a variety of variants including a mechanized infantry combat vehicle. The reason that Argentina specified a 30 tonne tank is that heavier vehicles are incompatible with many of the roads and bridges of the country. An added logistical advantage is that the tank and mechanized infantry combat vehicle can share the same chassis. Argentina was reported by most sources to have a requirement for 215 TAM tanks, with major components shipped from the Federal Republic of Germany for assembly. Construction and integration of the indigenously developed C.360-TAM L51 tank cannon and turret took place at Rio Tercero, while final assembly and chassis construction was performed in Buenos Aires. Deliveries of the new tank as well as the Vehicule de Combate Transporte de Personal commenced in 1979. During the manufacturing program, over 1,450 engineering changes have been incorporated into the design.

Description. The TAM chassis is based on the one used for the Marder but it is strengthened for the increased

weight and stresses of a tank. The hull is of all welded steel construction which affords protection from ballistic fragments as well as from Armor Piercing projectiles of up to 20 millimeters caliber. The layout is somewhat unconventional for a tank. The driver is seated forward to the left; he is provided with a single-piece hatch and three periscopes. The powerpack is placed to the driver's right. The glacis plate is hinged to allow access. Diehl Group Tracks and Suspension Systems Division produces the tracks.

The all welded turret is mounted to the rear. The commander and gunner are seated to the right and the loader to the left. The commander has eight periscopes and a hatch. The loader is provided with a hatch and an ammunition loading port is placed on the left side of the turret.

Standard equipment includes a bilge pump, heater and fire extinguishing apparatus. Optional equipment includes a snorkel and two 200-liter (53.19 gallon) tanks which can be fitted at the vehicle's rear for extra range.

Program Terminated. In mid-1986, we learned that the TAM program had been halted after a production run of 193 tanks and 276 units of the other variants. At least 63 tanks were partially completed, but never delivered to the Argentinean Army; along with components for an additional hundred or so tanks, they were put in storage in Argentina. The available evidence indicates that a lack of funding was the reason for the halt. The Panamanian and Peruvian orders were not filled. However, the reactivation of TAMSE was expected to result in the continued development and production of several of the variants; this did not come to pass and in 1992, the facility was shut down.

Funding

Funding for TAM development was supported by the Argentine Ministry of Defense through the Argentinean army; the TH 301 is a private development.

Recent Contracts

Not available as contractual information is not released.

Timetable

These data are pertinent to the basic tanks only.

	1959-1960	Initial Marder mechanized infantry combat vehicle developed
Jun	1974	Contract awarded
	1974-1975	TAM variant designed for Argentina
Sep	1976	Prototype completed
	1978	Testing trials completed
	1978	TH 301 introduced with 120 millimeter smooth bore gun (prototype)
	1979	First production TAM vehicles completed
	1981	Field operational
Apr	1983	Peruvian order announced
Jul	1986	Production of original TAM complete for Argentina
Aug	1987	Announcement of the reactivation of TAMSE
Aug	1988	Sale of 56 TAM tanks to Ecuador announced
Oct	1988	Ecuadorian order canceled
	1992	TAMSE facilities shut down
Early	1997	TH 301 available for production order

Worldwide Distribution

Export Potential. In April of 1983, an order from Peru for 80 TAM vehicles was announced. While details of the order were not released, the announcement did mention the possibility of licensed production by Peru of a follow-on order. This would seem logical, as Peru's aging Russian tanks, some 350 in number, have long been due for replacement. Panama provided the second order with 60. Iran was reported by several sources to have ordered 100 TAM tanks in mid-1984. Although no contract for these hundred tanks is known to have been signed, research indicates that Iran did receive ten TAM tanks in 1986. Jordan was another reported customer, the 1985 procurement of 60 tanks being a secret deal that never came to pass. As noted above, these orders were not filled. In August of 1988, we learned that Ecuador was

to purchase 56 TAM tanks in addition to 18 VCTP vehicles, and two each of the Véhiculo de Combate Puesto de Comando and recovery vehicle variants. The deal, worth the equivalent of about 120 million United States dollars, fell through with the election of a new government in Ecuador a short time later.

Although Indonesia ordered 102 TH 301 vehicles in three versions in 1981, an export license could not be issued. In 1986, Thailand evaluated the TH 301 but no order was ever placed.

Countries. Argentina (193 with more incomplete tanks and components in storage); Federal Republic of Germany (three TH 301 prototypes with the contractor); Iran (seven TAM remaining from a ten unit evaluation lot).

Forecast Rationale

As of early 1997, our latest research on the TAM program indicates that the program is still dead and not expected to be revived. The best evidence still indicates that any additional development efforts in Argentina will be related to the development and completion of one or more of the variants. It is almost certain that any production of these variants will be on existing (albeit modified) chassis. While no additional new production activity for the TAM tank program or its variants is forecast, we will continue to monitor the program for any developments which could change this forecast.

In late 1995, for some as yet unexplained reason, an increased level of international interest in the TH 301

became apparent. We are at a loss to explain the reason for this increased interest in TH 301 tank; as of early 1997, no identified potential customer has yet been indicated by our research.

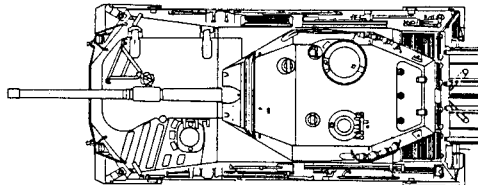
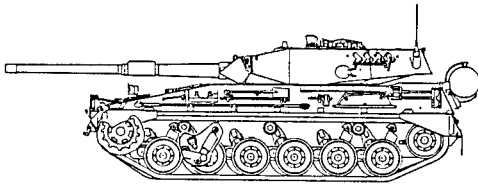
The fact that the German government has long promoted the export of Leopard 2 in lieu of the TH 301 has hurt the export of the tank; in fact no sales have ever been made. Also, Thyssen-Henschel has to contend with an increasingly crowded market saturated with both new and used/modernized tanks. Therefore, despite the afore-mentioned recent increased level of interest from some as yet unidentified sources in the TH 301, we are still forecasting no production of the tank.

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	
TAMSE													
TH 300(a)	MB 833 KA 500	193	0	0	0	0	0	0	0	0	0	0	0
Subtotal - TAMSE		193	0	0	0	0	0	0	0	0	0	0	0
THYSSEN HENSCHEL/DEFENSE DIVISION													
TH 301/RH 105(b)	MB 833 KA 500	2	0	0	0	0	0	0	0	0	0	0	0
TH 301/RH 120(c)	MB 833 KA 500	1	0	0	0	0	0	0	0	0	0	0	0
Subtotal - THYSSEN HENSCHEL/DEFENSE DIVISION		3	0	0	0	0	0	0	0	0	0	0	0
Total Production		196	0	0	0	0	0	0	0	0	0	0	0

- (a) roduction shown includes two prototypes fabricated in Germany. SPECIAL NOTE: An additional number of partially completed tanks as well as components for additional tanks are in storage.
- (b) roduction shown is for the initial prototype tanks only - no serial production is forecast.
- (c) roduction shown is for the initial prototype tanks only - no serial production is forecast.



TH 301 TAM

Source: Thyssen Henschel