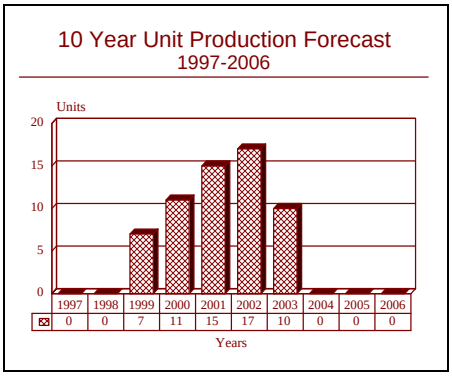
OTOMATIC 76 mm Self-Propelled Anti-Aircraft Artillery System - Archived 6/98

Outlook

- System available for order
- The OTOMATIC has been evaluated by the Italian Army and other unspecified nations



Orientation

Description. A tracked anti-aircraft artillery system

Sponsor. The OTOMATIC program is a private development program funded by the prime contractor OTOBREDA with some support from the Italian Ministry of Defense.

Contractors. The OTOMATIC has been developed and, if ordered, will be manufactured by OTOBREDA (formerly OTO Melara); La Spezia, Italy. Major subcontractors include IVECO FIAT, Motoren- und Turbinen-Union, Officine Galileo, Segnalamento Marittimo Aero SpA and Zahnradfabrik Friedrichshafen.

Licensees. None

Status. The development of this self-propelled anti-aircraft artillery system is complete; the fabrication of two complete prototypes has been completed and contractor and operational testing by the Italian Army has been undertaken.

Total Produced. As of January 1, 1997, two prototypes of the OTOMATIC had been manufactured.

Application. A mobile, armored anti-aircraft artillery system designed to operate in forward areas. The weapon system is primarily for defense against helicopters some missiles and low-flying aircraft. A secondary capability against armored targets is incorporated into the system.

Price Range. In equivalent 1997 United States dollars, the unit price for the serially produced OTOMATIC self-propelled anti-aircraft artillery system is $7.307 million.

Technical Data

Crew. Four: commander, gunner, driver, loader

Cannon Type. Modified 76 millimeter Compact

Caliber. 76 millimeter

Breech Mechanism. Vertical sliding block

Recoil System. Hydropneumatic

Ammunition. The 76 millimeter cannon as fitted to the OTOMATIC is chambered for High Explosive, High Explosive/Fragmentation, Armor Piercing Fin Stabilized Discarding Sabot ammunition.

Dimensions. The following data are for the latest revised prototype of the OTOMATIC system mounted on the Leopard 1 tank chassis.

	SI units	**US units**
Length	9.81 meters	32.18 feet
Width	3.25 meters	10.66 feet
Height	3.07 meters	10.07 feet
Combat weight	47.0 tonnes	51.81 tons
Fuel capacity	955 liters	253.98 gallons

Performance. The automotive performance is on a metalled road.

Maximum speed	60 kilometers per hour	37.26 miles per hour
Maximum range	500 kilometers	310.5 statute miles
Step	1.2 meters	3.94 feet
Trench	3.0 meters	9.84 feet
Slope	30%	30%
Gradient	60%	60%
Fording	1.2 meters	3.93 feet
Elevation	+60°	+60°
Depression	-5°	-5°
Traverse	360°	360°
Effective cannon range	1,000-5,000 meters	1,093.61-5,468.05 yards
Rate of fire	120 rounds per minute	120 rounds per minute

Engine. Motoren- und Turbinen-Union provides the MB 838 CA M 500 supercharged, liquid-cooled diesel engine for the OTOMATIC system. This engine has a power rating of 618.9 kilowatts (830 horsepower) at an engine speed of 36.67 revolutions per second (2,200 revolutions per minute). The power-to-weight ratio is 13.17 kilowatts per tonne (16.02 horsepower per ton). An unidentified gas turbine-powered auxiliary power unit provides electric power when the main engine is not operating.

Gearbox. Zahnradfabrik Friedrichshafen supplies the model 4 HP 250 gearbox with four forward and two reverse gear ratios. The gear selection mechanism is electro-hydraulic.

Suspension and Running Gear. The OTOMATIC self-propelled anti-aircraft artillery system is fitted with a trailing arm torsion bar type suspension system. The first three and last two road wheel stations on each side of the vehicle are provided with dual action hydraulic shock dampers. Seven double road wheels with rubber tires are mounted on each side of the OTOMATIC.

Fire Control. A modified and further improved version of the LINCE naval fire control system is used in the OTOMATIC self-propelled anti-aircraft artillery system. This highly cost effective fire control system was originally developed by the contractor OTOBREDA for naval applications. Testing in the original as well as OTOMATIC applications has demonstrated that the LINCE is especially effective in inclement weather or heavy electronic countermeasures environments; it is completely autonomous in operation. The heart of the fire control system is an S (E/F) band search radar and a Ka (K) band monopulse tracking radar with both units from Segnalamento Marittimo Aero SpA. An integral identification friend or foe system from Italtel is also used. Also included are a coaxial electro-optic viewing system, laser rangefinder and a standard optic sight; these components are from Officine Galileo. Up to twenty targets can be tracked simultaneously, and tracking is automatic. A ballistic computer integrated with a gyroscope-stabilized navigation system addresses the fire control problem.

Variants/Upgrades

Variants. As of mid-1997, no specific variants of the OTOMATIC system had been developed although the OTOMATIC is in fact a variant of the OF 40 tank.

Modernization and Retrofit Overview. As it has yet to enter serial production, this is not applicable at this time.

Program Review

Background. The then OTO Melara, seeking to expand the usefulness of the basic OF 40 tank chassis, has integrated its successful OTO 76/62 compact naval cannon with a modified and improved version of the equally successful LINCE fire control system and the chassis of the Palmara 155 millimeter self-propelled artillery system (the Palmara is, in turn, based on the OF 40 tank). We refer readers to the Palmara report in Tab A of this book for further information on the Palmara base chassis; the OF 40 is covered in detail in the military vehicles book that is a companion volume to this. In late 1994, as part of a larger reorganization of the Italian defense industry, OTO Melara and the Breda firm were merged under the OTOBREDA name.

With the OTO 76/62 anti-aircraft artillery system, also called the OTO Main Anti-aircraft Tank for Intercept and Combat or OTOMATIC, OTOBREDA has designed an autonomous anti-aircraft artillery system with the ability to protect forward area units from helicopters and fixed-wing aircraft before they can launch stand-off missiles. A secondary anti-armor ability was also specified.

Description. The 76 millimeter cannon, derived from the OTO 76/62 naval cannon, has had the breech and loading mechanism modified so that the cycling rate has been increased from 85 to 120 rounds per minute. The feeding and loading mechanism is hydraulically powered and can operate at any elevation. Normally, four to five round bursts are fired. The cannon is independently stabilized to counter vehicle movements, and it employs a vertically sliding breech block which is fully automatic in operation. The turret drive is electrohydraulic for a high slew rate and stability. The turret is of all-welded steel armor construction; it contains three of the crew members. The left side of the turret holds 42 rounds of ammunition, while a further 28 are in the cannon's feeding and loading system. An additional 30 rounds are stored in the hull.

Additional equipment includes fire detection and suppression apparatus, four smoke dischargers and an optional 7.62 millimeter machine gun on the turret top.

HEFAS. The OTOMATIC turret can be mounted on any tank chassis that can support a 15 tonne (16.53 ton) weight. When mounted on the Leopard 1 tank chassis, the system is known as the HEFAS 76-L1. This is a joint effort between OTOBREDA and MaK System Geselschaft. This system, the second prototype, is the one evaluated by the Italian Army.

Options. Twin 35 or 40 millimeter cannon, from Örlikon Contraves, can be mounted in the turret as alternatives to the single 76/62 cannon. This option is still in low rate development.

Operational Analysis. While most mechanized anti-aircraft artillery systems feature multiple rapid firing 20-35 millimeter caliber cannon, they come in for some criticism due to relatively poor range performance. In this day of extended range precision stand-off missiles, long-range performance of anti-aircraft systems is becoming increasingly important. The OTOBREDA firm is being increasingly viewed as having taken the correct and far-sighted approach with the OTOMATIC and could well have a winner with this system; the logic of its development cannot be faulted.

Funding

The development of the OTOMATIC has been privately funded by the contractor OTOBREDA.

Recent Contracts

None.

Timetable

This timetable relates to the OTOMATIC system only, not to the Palmara, details of which are covered in the pertinent report.

Late	1979	Development of OTOMATIC initiated
Jun	1981	OTOMATIC program revealed at Paris Air Show

	1981-1985	First prototype fabricated
Jun	1987	First prototype displayed at Paris Air Show
	1987	Second prototype fabricated
	1985-1989	Prototype testing took place
	1991-1992	Operational evaluation of system mounted on Leopard 1 chassis
Mid	1997	Contractor testing complete; system available for orders

Worldwide Distribution

Export Potential. OTOBREDA's marketing tactic of taking the relatively inexpensive and proven OF 40 tank chassis/running gear, and using it as the basis for both the OTOMATIC system and the Palmara self-propelled artillery system could eventually pay off with a fair level of orders for all three systems. The $7.307 million unit price of the OTOMATIC makes the system highly competitive among the new heavy tracked self-propelled anti-aircraft artillery systems available today and the only one of its specific type and capability. The price should remain highly competitive with similar systems from the competition. It could come to pass that the unique range performance of the OTOMATIC may be just the ticket for at least a portion of several front-line nations' armies.

Libya, which ordered 200 Palmara systems in 1983, has expressed interest in the new system. Other than Italy, Greece, Egypt, Libya, Morocco, Saudi Arabia, Nigeria and Cameroon, among others, are seen as potential customers. In March of 1987, the OTOMATIC was offered for the United States Army's Line-of-Sight Forward-Heavy component of its Forward Area Air Defense System.

Countries. Italy (one prototype with the contractor and one with the Italian Army for evaluations).

Forecast Rationale

As of mid-1997, our latest research into the OTOMATIC program finds that it has yet to find its first order. This is despite the good level of interest generated by this still unique system on the international market. It is also despite the fact that, even though the main operational testing of the OTOMATIC by the Italian Army was completed several years ago, no order has yet been placed by the Italian Army; this may be due to the fact that several other major procurement programs (the C1 Ariete tank and other armored vehicles) are ongoing. However, all reports indicate that the OTOMATIC performed as advertised in the Italian Army evaluations.

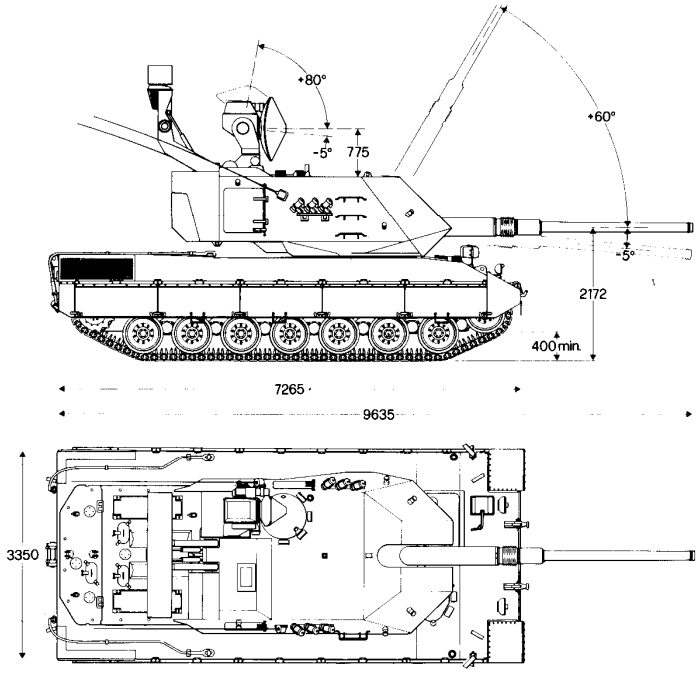
Our forecast envisions that the serial production of the OTOMATIC system should begin in 1998 to meet the still projected Italian demand. Production should run into the early years of the next century. For the present we are forecasting no export of this system, although we will continue to monitor events in the program and will update this report on an interim basis if warranted.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level			Good Confidence Level			Speculative				
Ordnance	(Engine)	through 97	98	99	00	01	02	03	04	05	06	07	Total 98-07
OTOBREDA													
OTOMATICa	MB 838 CA M 500	2	0	7	11	15	17	10	0	0	0	0	60
Total Production		2	0	7	11	15	17	10	0	0	0	0	60

a The through 1997 production is for the initial prototypes, one of which has been evaluated by the Italian Army.



OTOMATIC

Source: OTO Breda