

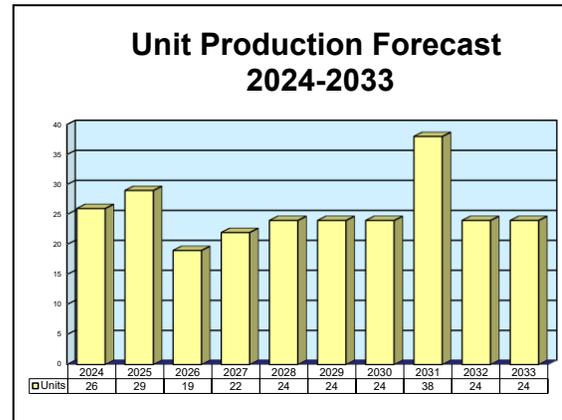
ARCHIVED REPORT

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B1 Centauro

Outlook

- Italian and Brazilian Centauro II successor procurement prompting major renewal of programmatic activity
- Italian Army procurement of specialized Freccia variants remains active; modernization drive in development
- Brazil will acquire 98 Centauro II VBC vehicles, tailored to its operational requirements, through 2038. Orders for an additional 123 vehicles will follow



Orientation

Description. Wheeled armored vehicles.

Sponsor. The prime contractor originally pursued the B1 and VBC programs as private ventures. Since 1985, the Italian Army has supported the Centauro programs.

Licensees. None.

Status. Development through serial production.

Total Produced. Through 2023, we estimate Iveco produced at least 557 B1 and 298 VBM Freccia vehicles.

Application. The B1 Centauro and Centauro II are dedicated tank destroyers, providing fire support to infantry units.

The Centauro VBM Freccia transports infantry during both offensive and defensive operations.

Price Range. In 2007 U.S. dollars, the B1 Centauro carried a unit price of \$1.401 million. The Centauro VBM Freccia reportedly carries a 2024 unit price of \$1.5 million.

The Centauro II carries an estimated 2024 unit price of \$16.5 million.

Contractors

Prime

Iveco SpA Defence Vehicles Division

<http://www.iveco.com>, Via Volta 6, Bolzano, Italy, Tel: + 39 0471 905111, Fax: + 39 0471 905444, Email: dvdvzcom@iveco.com, Prime

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Subcontractor

BAE Systems, Platforms & Services, Munitions	http://www.baesystems.com , Radway Green, Nr Crewe, Cheshire, Cumbria, United Kingdom, Tel: + 44 1270 882 261, Fax: + 44 1270 866 666, Email: media@baesystems.com (ROMAR-A Explosive Reactive Armor)
General Dynamics European Land Systems, Santa Bárbara Sistemas	http://www.gdels.com , Via de los Poblados 3, PE Cristalia Edificio 7/8, Madrid, Spain, Tel: + 34 91 585 04 55, Fax: + 34 91 585 02 18, Email: info.sbs@gdels.com (B1 Centauro Applique Armor)
Leonardo Defence Systems	http://www.leonardo.com , Via Valdilocchi 15, La Spezia, Italy, Tel: + 39 0187 5811 11, Fax: + 39 0187 58266, Email: pressoffice@leonardocompany.com (TC-25 Turret)

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

Technical Data



Centauro II

Source: Italian Army

B1 Centauro

B1 Centauro

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

projectiles over the rest of the hull and turret. The Spanish B1 Centauro vehicles also feature appliqué armor by General Dynamics Santa Barbara Sistemas.

Configuration. 8x8.

Armor. Steel alloy armor providing protection against 20mm projectiles over the frontal arc and 12.7mm

Dimensions. The following data reflect the definitive production vehicle. Length includes the 105mm cannon.

	<u>SI Units</u>	<u>U.S. Units</u>
Length	8.56 m	28.08 ft
Width	3.05 m	10.01 ft
Height	2.74 m	8.99 ft
Combat weight	23.97 tonnes	26.42 tons
Fuel capacity	800 liters	212.77 gal

Performance. The speed and range data reflect use on a paved road.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	105 kmph	65.2 mph
Maximum range	800 km	496.8 stat mi
Step	55 cm	1.81 ft
Trench	1.85 m	6.07 ft
Slope	30%	30%
Gradient	60%	60%
Fording	1.2 m	3.94 ft

Engine. Iveco-Fiat Model 6V MTCA supercharged, liquid-cooled V-6 diesel engine. This powerplant generates 387.92 kilowatts (520 hp), with a power-to-weight ratio of 16.18 kilowatts per tonne (19.68 hp/ton). The 24-volt electrical system features two 12-volt/100-ampere-hour batteries.

main gun. This 45-caliber ordnance mounts in a newly designed turret

In most Italian Army B1 Centauro vehicles, elevation (+15°), depression (-6°), and turret traverse (360°) are electrohydraulic, with manual backup. The last production vehicles for Italy – as well as all Spanish and Omani vehicles – feature an all-electric system.

Gearbox. Iveco-Fiat 5 HP 1500 automatic power-shift gearbox, with five forward and two reverse gears. Iveco-Fiat builds this component under license from Zahnradfabrik Friedrichshafen. The vehicle employs a torque converter and transfer box, as well as a three-axle power steering system (two front axles and a rear axle).

Secondary Armament. One coaxially mounted 7.62x51mm NATO (.308 Winchester) M42/59 machine gun; one pintle-mounted M42/59 on the turret roof. Each side of the turret features four electrically operated smoke grenade launchers.

Suspension and Running Gear. McPherson-type independent hydropneumatic suspension. The 14.00x20 tires feature run-flat inserts; the vehicle employs a central tire inflation system.

Fire Control. Production models of the B1 Centauro employ the Galileo TURMS fire control system. TURMS consists of the following components:

Armament

Main Armament. Oto Melara stabilized 105mm high-pressure/long-recoil gun. The B1 Centauro was the first wheeled vehicle to mount this 52-caliber ordnance, which also mounts on the OF 40 tank. The ordnance features a muzzle brake and fume extractor. It fires all NATO-standard 105mm ammunition types, including Armor Piercing Fin Stabilized Discarding Sabot (APFSDS) rounds. The vehicle carries 40 rounds of 105mm ammunition.

- Commander's stabilized dual-magnification (2.5x and 10x) day sight
- Gunner's stabilized day/night (thermal) periscopic sight (5x for day use)
- A laser rangefinder
- A digital ballistic computer
- Appropriate sensors

The system also features integral test equipment. A separate monitor can display the gunner's thermal image at the commander's station. The gunner's station also features a Galileo OG C-102 coaxially mounted 8x telescope as a backup.

In August 2008, the Royal Guard of Oman ordered six (later reportedly reduced to three) upgraded B1 Centauro vehicles, featuring a low-recoil 120mm

B1 Centauro

Centauro VBM Freccia

Crew. Three: commander, gunner, and driver. The vehicle carries eight fully equipped infantrymen.

Configuration. 8x8.

Armor. Steel alloy armor, providing protection against 20mm projectiles over the frontal arc and 14.5mm projectiles over the rest of the hull and turret. The sides of the vehicle also feature spaced appliqué armor.

Dimensions. The following data reflect the initial prototype Centauro VBM vehicle.

	<u>SI Units</u>	<u>U.S. Units</u>
Length	7.93 m	26.02 ft
Width	3.28 m	10.76 ft
Height	2.87 m	9.42 ft
Combat weight	24.02 tonnes	26.48 tons
Fuel capacity	800 liters	212.77 gal

Performance. The speed and range data reflect use on a paved road.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	105 kmph	65.2 mph
Maximum range	800 km	496.8 stat mi
Step	55 cm	1.81 ft
Trench	1.85 m	6.07 ft
Slope	30%	30%
Gradient	60%	60%
Fording	1.2 m	3.94 ft



Centauro VBM Freccia

Source: Italian Army

B1 Centauro

Engine. Same as the B1 Centauro. The powerplant provides a power-to-weight ratio of 16.15 kilowatts per tonne (19.63 hp/ton) in the Centauro VBM Freccia application. The 24-volt electrical system features two 12-volt/100-ampere-hour batteries.

Gearbox. Same as the B1 Centauro.

Suspension and Running Gear. Same as the B1 Centauro.

Armament

Main Armament. The prototype Centauro VBC mounted the Oto Melara TC-25 turret, featuring a 25mm KBA cannon. However, research indicates that the production Centauro VBM Freccia mounts the

HITFIST turret of the Dardo tracked infantry fighting vehicle. This turret features the 25mm KBA main armament of the TC-25 turret. For more information on the Dardo HITFIST turret, see the "Dardo (Veicolo Corazzato da Combattimento-80)" report in *Military Vehicles Forecast*.

Secondary Armament. Includes an anti-tank guided missile launcher (either the Raytheon BGM-71 TOW or Rafael SPIKE) on each side of the turret.

Fire Control. The Centauro VBM gunner's station features a stabilized day/night sight with integral laser rangefinder that feeds data automatically into the fire control computer.

Variants/Upgrades

Variants. The prime contractor designed the B1 Centauro as the baseline for a family of vehicles.

Designation	Description
B1 Centauro	Basic 8x8 tank destroyer vehicle (See Technical Data , above).
Centauro VBM Freccia	Centauro infantry fighting vehicle (See Technical Data , above).
Centauro VBM Variants	Four variants of the Centauro VBM are currently in development: mortar carrier, armored command post (ACP), armored recovery vehicle (ARV), and ambulance.
Centauro 60/70	Design proposal to integrate Oto Melara 70/70A turret with 60mm rifled gun.
Centauro 120/45	Centauro with upgraded composite armor, a redesigned turret, and a 120mm main gun.
Centauro NBC Recon Vehicle	Proposed configuration of base vehicle for nuclear, biological, and chemical (NBC) reconnaissance.
Centauro 155mm SP Howitzer	Centauro prototype 155mm self-propelled artillery platform. Might never be procured due to cost and Italian Army procurement of Panzerhaubitze 2000.
Centauro Anti-Aircraft	Design proposal mounting various anti-aircraft gun and missile armament options.
Centauro Command Vehicle	Design proposal for armored command vehicle. Effort transitioned to development of Centauro VBC/ACP variant.
Centauro Recovery Vehicle	Paper study for Centauro recovery variant. Effort transitioned to development of Centauro VBC recovery variant.
Centauro AVLB	Design proposal for armored vehicle-launched bridge.
Centauro II	Significantly reconfigured evolutionary development of the B1 Centauro platform. The model features an improved new Iveco powerplant offering 536.9 kilowatts (720 hp), a digital tire pressure control (CTIS) framework with run-flat systems, improved armored protection from conventional threats and IEDs.

Modernization and Retrofit Overview. Over its life-cycle, Italy executed a number of modernization and retrofit programs for the B1 Centauro platform. With Italy now divesting many of these platforms in favor of new-production Centauro II models, the retrofit outlook for the original series has grown very marginal.

By contrast, the stabilization of state finances appears to be setting the stage for a renewed push to modernize the Italian Army's VBM Freccia inventories to meet the requirements of the modern battlefield.

B1 Centauro

Improving Protection

After a 1993 competition, the Italian Army selected the (then) RO Defence ROMAR-A explosive reactive armor (ERA) package for the B1 Centauro. The Italian Army subsequently purchased 20 ROMAR-A sets; the Italians installed 10 sets on Italian Army B1 Centauro vehicles, then deployed to Somalia.

The prime contractor has also developed a new passive appliqué armor package for the B1 Centauro under a \$24.2 million upgrade plan. Under the same plan, the contractor is also integrating a laser-warning device.

The Italian Army B1 Centauro vehicles that were deployed to the Balkans on peacekeeping duty featured the new passive appliqué armor, as well as two additional M42/59 machine guns with shields on the turret roof. The upgraded Centauro 120/45 vehicles

mount a low-recoil 120mm main gun in a redesigned turret. This upgraded variant also features the new passive appliqué armor suite.

The Italian Army also funded a program to modernize the B1 Centauro fire detection and suppression system. Martec was the prime contractor for the upgrade.

Freccia Evolution

In order for Italy's armored mobility inventories to remain viable in today's rapidly evolving battlefield environment, CIO began development of the upgraded Freccia EVO standard. The EVO standard, which has further evolved into the Combat PLUS framework, involves upgrades to a variety of segments, including optics, fire control, and communications. The Italian Army hopes to begin the integration of Combat PLUS upgrades across the fleet within the next five years.

Program Review

Background. In 1984, the Italian Army issued its requirement for a new tank destroyer to replace the obsolete M47 tanks still in service.

Shortly thereafter, the Iveco-Fiat-Oto Melara consortium announced that it was developing a new range of wheeled armored personnel carriers. The vehicle family includes light 4x4, medium 6x6, and heavy 8x8 vehicles. All vehicles could be adapted to meet special mission needs.

In 1985, the Italian Army selected a version of the Iveco-Fiat-Oto Melara 8x8 vehicle as the basis for a new tank destroyer, designated B1 Centauro. The contract team completed the initial prototype in January 1987. In 1989, Iveco-Fiat-Oto Melara began building 10 preproduction vehicles; initial deliveries occurred in early 1990. Full-scale serial production started shortly thereafter, with initial vehicle deliveries in 1991.

Description. The Centauro is essentially the Iveco-Fiat Model 6638 vehicle. It exhibits a conventional interior layout.

The driver sits to the left-front of the vehicle; the engine compartment occupies the right-front. The driver's station features a single-piece hatch cover and three periscopes; the center periscope is interchangeable with a VG/DIL passive night driving periscope. A fireproof bulkhead separates the engine compartment from the rest of the vehicle.

The three-man turret mounts at the rear of the vehicle. The commander sits to the left of the main armament;

the gunner sits to the right, with the loader immediately forward and below the gunner. The commander's station features a hatch and four periscopes, as well as the stabilized day sight. The gunner and loader share a hatch with five periscopes.

Additional Features

The turret design features a bulge in the roof to allow for adequate depression of the main armament. The H-type design of the gearbox and drivetrain features dual drive shafts running along the sides of the vehicle, providing maximum internal space and freedom for crew movement.

Standard equipment on the Centauro includes an Aero Sekur overpressure nuclear, biological, and chemical (NBC) protective suite; an integrated air-conditioning system; a fire detection and suppression system; and a front-mounted winch.

Centauro VBM Freccia

The VBM (Veicolo Blindato Medio) is the infantry fighting vehicle derivative of the base B1 Centauro vehicle. The VBM exhibits the following features:

- An increased internal capacity to accommodate the infantry squad it carries
- The HITFIST turret, mounting the 25mm KBA cannon and two anti-tank guided missile launchers
- Enhanced mine blast protection to withstand an 8-kilogram (17.6-lb) blast of high explosives under each wheel well

B1 Centauro

- Appliqué composite/ceramic armor panels along the vehicle hull for enhanced ballistic protection

The Centauro VBM Freccia entered low-rate initial production in 2007 for the Italian Army's anticipated

initial order of 250 vehicles. In 2009, the Italian Army accepted the first 54 Centauro VBMs into service. Procurement is ongoing.

Funding

Since 1985, the Italian Ministry of Defense, through the Italian Army, has funded the B1 Centauro and Centauro VBM Freccia programs.

Worldwide Distribution/Inventories

Export History. Since its debut in 1987, the B1 Centauro has generated significant interest on the international market, albeit without any export sales beyond Spain and Oman. The Spanish Army placed the first export order, for 22 vehicles, in September 1999, with deliveries occurring in 2000 and 2001. Spain placed a follow-on order for 62 vehicles in January 2002.

In August 2008, the Royal Guard of Oman placed an order of undisclosed value for six upgraded B1 Centauro vehicles. These vehicles feature an upgraded chassis and mount a 120mm main gun. The order reportedly included an option for 24 vehicles. By the time of final deliveries in February 2011, the order consisted of six standard 105mm B1 Centauro vehicles and three upgraded B1 Centauro 120/45 vehicles mounting a 120mm main gun in a redesigned turret.

In December 2010, the Italian defense minister announced that Russia had expressed an interest in both the B1 Centauro and Centauro VBM Freccia. However, in January 2013, the commander in chief of the Russian Ground Forces publicly stated that Russia would not purchase Italian-made Centauro wheeled vehicles.

Countries. **Italy** (255 B1 Centauros, 298 VBM Freccias); **Jordan** (89 Ex-Italian B1 Centauros, more in storage) **Oman** (6 B1 Centauros, 3 B1 Centauro 120/45s); **Spain** (84 B1 Centauros).

Forecast Rationale

Over the past decade, fiscal and political complications impeded the capacity of the Italian armed forces to pursue long-required modernization and procurement initiatives. Beginning in 2019, this stage of impasse began to be ameliorated, unleashing a wave of new activity in this domain. The center of gravity for the Centauro program has now shifted to the more advanced successor platform, the Centauro II. First unveiled in 2016, serial production of the vehicle for the Italian Army is underway and the platform has secured a large export and industrial cooperation order from Brazil.

In 2018, the Italian Army began setting the stage for a program aimed at comprehensively modernizing its wheeled armored vehicle inventories, with the Centauro II selected to take center stage in this process. A small pilot batch ordered that same year was delivered into Italian service in 2021. Significant quantities of original B1 Centauro vehicles have been divested from Italian service to clear space for new capabilities. Some divested assets remain in local storage but over 100 others were procured by Jordan.

Over the next four years, larger batch orders were placed by the Italian government, with Iveco - Oto Melara (CIO) reporting the ramp up of serial production circa 2022. The Italian Army has formally ordered 122 Centauro II's through the time of publication but has outlined an intermediate term procurement requirement for 147 vehicles. This level of procurement will be sufficient to address the Italian Army's most critical readiness and force structure requirements, but over the longer term additional Italian orders may emerge in order to continue the divestment of remaining Centauro B1s.

Armored Mobility in the Amazon

Over the past two decades, the Brazilian government has taken considerable strides toward the modernization of its military force structure and the development of a robust domestic defense-industrial base. The Centauro II platform will soon have a role to play in the fulfillment of both these long-term state objectives.

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In 2021-2022, the Brazilian Army launched the Cavalry Fighting Vehicle (VBC). A revision of a previous effort, the VBC project calls for the acquisition of an 8x8 configuration mobile fire support vehicle. In 2022, the Brazilian Army selected the Centauro II to serve as the basis for its VBC platform, which will feature performance and technical specifications distinct from the base model, uniquely tailored to the operational and geographical requirements of Brazil.

The Brazilian Army envisions the program as reaching developmental maturation by the mid-2020s. Brazilian plans call for the Army to acquire 98 vehicles by 2037-2038 and 221 in total. In 2023, the Brazilian Army received the first pilot-developmental batch of two vehicles. Critically for the Brazilian government's industrial goals, Brazilian contractors will participate in both the assembly and provision of components for the VBC. Reports indicate that Iveco Brasil, manufacturer of the Army's VBTP-MR Guarani platform, and state-supported armaments entity IMBEL will participate in the project.

Freccia Procurement Experiencing Revival

Italy's tenuous fiscal situation during the 2010s significantly undermined the fulfillment of the Army's Freccia procurement objectives. A 2020 document released by the Italian Office of the Deputy Chief of the General Staff of the Army revealed that only 276 Freccia vehicles had been delivered to date, placing

procurement well behind the service's originally envisioned schedule.

However, the emergence of a more favorable fiscal climate and strategic pressures arising from the Russian Federation's invasion of Ukraine have facilitated the resumption of Freccia procurement activity. The Italian Army is currently focusing on the acquisition of specialized variants of the platform under the Freccia Phase 2 procurement framework. In 2021 for example, the Army formally signed for the acquisition of an additional 46 Freccia vehicles, with the order consisting of 26 command vehicles in two variants, 14 mortar carriers, and six recovery vehicles per press reports.

In the longer term, the Italian Army intends to revive procurement of combat and reconnaissance variants as well. Per 2020 Army documentation, the service still maintains a lifetime procurement objective of over 600 Freccias in varied configurations. Recent statements by Italian officials to the defense press indicate that Freccia EVO series vehicle procurement could resume circa the early 2030s. Fiscal considerations may still shape the pace and scope of this effort however, as the Army is also beginning to initiate a process for the integration of Combat PLUS standard midlife upgrades on its existing Freccia stocks.

The future **Forecast Outlook** below combines prospective Centauro II and Freccia procurement.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
Iveco SpA Defence Vehicles Division												
Centauro VBC												
	557	26	29	19	22	24	24	24	38	24	24	254
Total	557	26	29	19	22	24	24	24	38	24	24	254