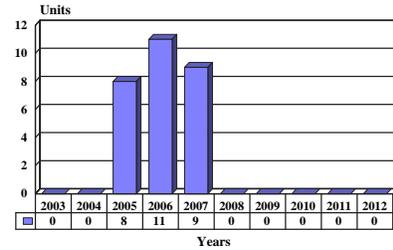


V-300/V-600 Commando - Archived 8/2004

Outlook

- Production of the V-300 vehicle is on an as-needed basis
- The long dormant V-600 program is still available for orders
- All forecast production is for export
- The V-300 will continue to be enhanced in order to maintain marketability
- These vehicles have only a minimal modernization or retrofit potential

10 Year Unit Production Forecast
2003 - 2012



Orientation

Description. Wheeled armored vehicles.

Sponsor. These vehicles were developed on a private basis with funding supplied by the contractor, Textron Systems/Cadillac Gage.

Contractors. The V-300 and V-600 were developed and are manufactured by Textron Systems/Cadillac Gage, New Orleans, Louisiana, United States of America (formerly Cadillac Gage Textron Incorporated of Warren, Michigan). Major subcontractors include the Allison Transmission Division of General Motors Corporation, BAE Systems, Cummins Engine Company, Optic Electronic, and RO Defence (Royal Ordnance).

Special Note

In 1994, when the manufacturer's corporate structure was reorganized, the name was changed and production moved to New Orleans, the V-300 and V-600 programs were renamed the LAV-300 and LAV-600. However, since the V-300 and V-600 Commando vehicles are still known worldwide by those names, we will continue using the original names. Also, since the Cadillac Gage

company name is still used and so well known worldwide, we shall continue to use that name as well.

Licensees. None

Status. The V-300 production is dormant following the completion of the latest export sale; development continues. The long dormant V-600 program is awaiting its first production order as marketing continues; production can be started at any time.

Total Produced. As of January 1, 2003, a total of 103 V-300 and one V-600 Commando vehicles had been manufactured.

Application. Armored personnel carriers that are designed to meet a variety of requirements associated with various military missions, including armed reconnaissance, convoy escort, combat support, security patrol, anti-tank, recovery, and mortar carrier.

Unit Price. The basic version of the V-300 has a unit price of \$562,900 in 2003 United States dollars. If it were ordered, the V-600 would have a unit price of \$1,519,000 in those same dollars.

Technical Data

V-300

Crew. Commander, driver, and gunner plus 10 infantrymen.

Configuration. 6x6

Armor. The V-300 is fabricated from a Cadillac Gage-developed steel alloy armor that is proof against 7.62 millimeter projectiles and ballistic fragments.

Design Features. The V-300 is amphibious.

Dimensions. The following data are for the V-300 Mark I basic vehicle fitted with the Cadillac Gage one-man machine gun turret. Where different, data for the enhanced Mark II version (the presently standard) are given in parentheses.

	<u>SI units</u>	<u>US units</u>
Length:	6.40 meters	20.99 feet
Width:	2.54 meters	8.33 feet
Height:	2.59 meters	8.5 feet
Combat weight:	14.97 tonnes	16.5 tons
Fuel capacity:	302 (435) liters	80.32 (115.7) gallons

Performance. The maximum speed and range figures are on a metaled road. The water speed is 3.0 kilometers per hour (1.86 miles per hour).

	<u>SI units</u>	<u>US units</u>
Maximum speed:	100 (105) kilometers per hour	62.1 (65.2) miles per hour
Maximum range:	700 (925) kilometers	434.7 (574.4) statute miles
Step:	61 centimeters	2.00 feet
Trench:	90 centimeters	2.95 feet
Slope:	30%	30%
Gradient:	60%	60%
Fording:	amphibious	amphibious

Engine. The earlier production V-300 vehicle (the Mark I) uses the Cummins VT-504 supercharged V-8 diesel engine, which develops 201.42 kilowatts (270 horsepower) at 50 revolutions per second (3,000 revolutions per minute). The power-to-weight ratio with this engine (at the earlier vehicle weight) is 14.08 kilowatts per tonne (17.12 horsepower per ton).

Later in the production run, the V-300 switched to the 6 CTA 8.3 liter supercharged diesel engine from Cummins. This six-cylinder liquid-cooled engine is rated at 205.06 kilowatts (275 horsepower) at 41.67 revolutions per second (2,500 revolutions per minute); the power-to-weight ratio for the Mark II version of the V-300 with this engine is 13.70 kilowatts per tonne (16.67 horsepower per ton).

The latest enhanced version of the Mark II is fitted with the Cummins QSC 8.3 supercharged, aftercooled diesel engine rated at 208 kilowatts (278.9 horsepower) at 33.34 revolutions per second (2,000 revolutions per minute). The power-to-weight ratio for the Mark II version of the V-300 with this engine is 13.89 kilowatts per tonne (16.90 horsepower per ton). A waterproof, 24 volt electrical system with two 12 volt, 100 ampere-hour batteries is the standard electrical fit.

Gearbox. The Allison Transmission Division of General Motors Corporation provides the MT-643 automatic

gearbox with four forward and two reverse gear ratios. A two-speed transfer case is fitted. The enhanced Mark II vehicle uses the MD3560 gearbox from the same firm; this automatic unit has six forward and two reverse gear ratios. A single speed transfer case is fitted.

Suspension and Running Gear. The 6x6 V-300 has a swing-mounted solid front axle, while the rear two axles are independently sprung. All wheel stations have coil springs and hydropneumatic shock dampers. The 14.5x20 (14R20 for the enhanced Mark II) radial tires are fitted with run-flat inserts. A central tire inflation system is optional.

Armament. Various turrets and weapons are offered. This vehicle has been armed with the Cockerill Mark III 90 millimeter gun, although for the Light Armored Vehicle competition, the V-300 vehicle was equipped with the Alliant Techsystems M242 25 millimeter Chain Gun®. (**Note:** As used in this report, the Chain Gun name is a registered trademark of Alliant Techsystems.) In addition to other options, the most common armament of this turret is an RO Defence (Royal Ordnance) 76 millimeter L23A1 gun and two 7.62 millimeter machine guns. In addition to least five different turret options, the V-300 Commando can mount an 81 millimeter mortar, a BGM-71 TOW missile launcher, or the 20 millimeter Vulcan M168 cannon.

V-600

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

Configuration. 6x6

Armor. The V-600 is fabricated from a Cadillac Gage-developed steel alloy armor that is proof against 7.62 millimeter projectiles and ballistic fragments.

Design Features. The wheeled V-600 mounts a 105 millimeter main armament and is amphibious.

Dimensions. The following data are for the initial prototype of the V-600. The length figure is for the hull and does not include the 105 millimeter cannon.

	<u>SI units</u>	<u>US units</u>
Length:	6.30 meters	20.67 feet
Width:	2.68 meters	8.79 feet
Height:	2.74 meters	9.01 feet
Combat weight:	18.5 tonnes	20.39 tons
Fuel capacity:	265 liters	70.48 gallons

Performance. The maximum speed and range figures are on a metaled road. The water speed is 4.8 kilometers per hour (2.98 miles per hour).

	<u>SI units</u>	<u>US units</u>
Maximum speed:	100 kilometers per hour	62.5 miles per hour
Maximum range:	600 kilometers	372.6 statute miles
Step:	61 centimeters	2.00 feet
Trench:	90 centimeters	2.95 feet
Slope:	30%	30%
Gradient:	60%	60%
Fording:	amphibious	amphibious

Engine. In the V-600, the Cummins 6 CTA 8.3 six-cylinder, supercharged diesel engine, rated at 205.06 kilowatts (275 horsepower) at 41.67 revolutions per second (2,500 revolutions per minute), is fitted. This engine provides a power-to-weight ratio of 11.08 kilowatts per tonne (13.48 horsepower per ton). A 24 volt electrical system with two 12 volt 100 ampere-hour batteries is the standard electrical fit.

stabilized in traverse and elevation. Elevation is +20 degrees, and depression is -7.5 degrees. While the recoil length of the L7A3LRF, at 76.2 centimeters (30 inches), is greater than the standard L7 recoil figure of 30 centimeters (11.81 inches), the trunnion pull, at 13.607 tonnes (15 tons), is 20.412 tonnes (22.5 tons) less than that of the standard L7.

Gearbox. The Allison Transmission Division of General Motors Corporation provides the MT-643 automatic gearbox with one reverse and six forward gear ratios. A two-speed transfer case is fitted.

The main ordnance is fitted into a Cadillac Gage turret, in which eight rounds are stored, three for immediate use. An additional 26 rounds of 105 millimeter ammunition are carried in the hull. Coaxially mounted to the main armament is a Fabrique Nationale Herstal M240 7.62 millimeter machine gun with 400 rounds of ready use ammunition and an additional 2,000 rounds in the hull. An additional 7.62 or 12.7 millimeter machine gun can be mounted at the commander's station on the turret roof. One electrically operated, four-barrel Peak Engineering Number 12 smoke grenade launcher is mounted on each side of the turret; 16 smoke grenades are carried.

Suspension and Running Gear. The 6x6 V-600 has a swing-mounted solid front axle, while the rear two axles are independently sprung. The front wheel stations have coil springs and hydropneumatic shock dampers, while the two rear axles use a torsion bar suspension. The 14.0x20 radial tires are fitted with run-flat inserts.

Armament. The v-600 is fitted with the same turret used on the commando stingray light tank. The main armament of the v-600 commando is the l7a3lrf, a low recoil force version of the ubiquitous l7 105 millimeter tank gun provided by ro defence (royal ordnance). All standard nato and united states pattern 105 millimeter ammunition can be fired by this piece, which is

Fire Control. On the V-600, the gunner's primary sight is the Optic-Electronic M36E1 day/night sight, which can be optionally replaced with the M36E1 SIRE day/night sight incorporating an integral laser rangefinder or an unspecified thermal sight. The

gunner's sight is linked to the BAE Systems (Marconi Command and Control Systems) Digital Fire Control System incorporating a digital ballistic computer with

inputs from a meteorological sensor. The commander is provided with seven periscopes and an NV52 day/night sight from Optic Electronic.

Variants/Upgrades

Variants. Aside from the various armament fits, the major variant of the V-300 is the V-300A1, which was redesignated V-600 in 1986. It is fitted with the new Cadillac Gage turret integrating the RO Defence (Royal Ordnance) low recoil force version of its 105 millimeter gun; this same turret is used in the Stingray tank, also from Cadillac Gage. The V-600 has a four-man crew and weighs 18.5 tonnes (20.39 tons). The automotive components remain unchanged. However, the V-600 never caught on in the market, and the program effectively went dormant by the mid-1990s, although it can be resurrected upon demand.

While any number of armament options are available for the V-300, the main turret options are listed below with their armament fits. The listing is by the turret manufacturer.

AAI Corporation. 75 millimeter universal turret with the ARES 75 millimeter gun and a 7.62 millimeter machine gun; this option is no longer available.

Cadillac Gage. Cadillac Gage is the manufacturer of the following turrets:

- Machine gun turret with twin 12.7 or 7.62 millimeter machine guns or a combination of these weapons.
- Twin/combination machine gun turret with twin 12.7 or 7.62 millimeter machine guns or a combination of these weapons.
- One-meter turret with a single 20 millimeter cannon and 7.62 millimeter machine gun.
- Two-man turret with the Mark 19 40 millimeter grenade launcher.
- Two-man turret with the Cockerill 90 millimeter Mark III gun.
- 76 millimeter turret with one L23A1 76 millimeter gun and two 7.62 millimeter machine guns.

Systems & Electronics Incorporated. Systems & Electronics Incorporated is the manufacturer of the following turrets:

- Improved TOW launcher with a two-round launcher for the BGM-71 TOW anti-tank missile and one 7.62 millimeter machine gun. An additional four missiles are stored in the hull.
- The ACV system equipped with various weapons from 20 to 30 millimeters in caliber.

United Defense (FMC Corporation). United Defense (FMC Corporation) is the manufacturer of the following turrets:

- Two-man turret with M242 cannon and BGM-71 TOW anti-tank launcher.
- 12.7 millimeter machine gun turret with a single 12.7 millimeter machine gun.
- Two-man turret with a single 20 millimeter cannon and a single 7.62 millimeter machine gun.
- One- and two-man turrets with 25 millimeter cannon and (in two-man) a TOW launcher.

Planned weapon integrations include a missile-based anti-aircraft system (the ADATS has been mentioned) and a cannon-based anti-aircraft system (the 20 millimeter Vulcan system has been mentioned).

Other variants of the V-300 include the following:

Mortar Carrier. This vehicle has an 81 millimeter mortar mounted on a turntable. Also mounted on this variant is a 7.62 millimeter machine gun. A total of 60 mortar rounds is carried.

Ambulance. This vehicle is unarmed; it has a higher roof and replaces the rear doors with a ramp.

Recovery Vehicle. This planned variant would mount a crane, winch, and other recovery equipment.

Command Vehicle. This version of the V-300 has a higher roof and is fitted with a variety of communications equipment.

Logistics Vehicle. This is another planned variant of the V-300 that would be modified for cargo transport.

Modernization and Retrofit Overview. As of mid-2003, no significant modernization or retrofit programs have been developed for the V-300. Replacing the earlier VT-504 diesel engine with the newer 6 CTA engine is not cost-effective, as there is only minimal gain in the power-to-weight ratio. There is some potential to retrofit the fully independent suspension of the M1117 vehicle (described in the V-150 report) to the V-300 in the future. Owing to the status of the V-600, no modernization or retrofit programs have yet been developed for the vehicle.

Program Review

Background. The V-300 was developed in the late 1970s to augment and broaden the market for the Commando range of armored vehicles, especially the V-150 (see separate report). The V-150 has been highly successful around the world since its market debut in 1962. The first two prototypes of the V-300 were completed in 1979, and serial production began in 1983. The subsequent production rate has been erratic, reflecting the glutted market conditions; the V-600 program has yet to gather a sale.

Description. The V-300 is somewhat larger in all dimensions than the V-150. The hull is of all-welded unitized steel construction affording protection from small arms fire as well as ballistic fragments. The driver is seated in the front to the left of the vehicle and is provided with a rearward opening hatch and three periscopes, one of which can be replaced by a night driving device. The engine is opposite the driver with the air inlet on top and the exhaust on the right side of the hull. On the left side of the hull is a small door with vision blocks and a firing port. The turret is in the center of the vehicle to the rear. The numerous turret/armament options are listed above.

The troop compartment is at the rear of the vehicle with three bulletproof vision blocks and firing ports on each side of the hull. Two hatches are provided in the roof.

The infantrymen enter and leave the V-300 via two doors at the rear, each provided with a vision block and firing port.

Standard equipment includes run-flat tires, an internally mounted hydraulically powered winch with a capacity

of 9.07 tonnes (10 tons), no-spin differentials, and hydraulic brakes on all wheels. The wide range of optional equipment includes night vision devices, heaters, air conditioning, various nuclear, biological, and chemical defense systems, and extra cable for the winch.

The V-600 was originally designated the V-300A1; it differs only in regard to the turret and armament and associated equipment. Despite the enhanced level of interest generated by the December 1999 trials for the US Army's Interim Armored Vehicle program, the V-600 program has yet to catch on in the market.

Light Armored Vehicle Competition. In November of 1981, Cadillac Gage was selected to submit contenders for the Light Armored Vehicle program. After some 10 months of testing and evaluation of contract data, the then General Motors Defense entrant, a version of the Motorwagenfabrik Piranha, was selected as the winner. See the "Piranha" report in this tab for a full description of this program.

Medium Armored Vehicle Evaluation. As a result of General Shinseki's redirection of the US Army toward a lighter, more deployable force, in December of 1999, Cadillac Gage submitted the V-600 and the infantry fighting vehicle version of the V-300 Mark II for evaluations held at Fort Knox. However, the Category III manifestation of the Piranha was selected to fill the requirement for the Interim Armored Vehicle – the Stryker. See the "Piranha" report in this tab for a full description of this program.

Funding

Funding for the development of the V-300 and V-600 Commando has been provided by the contractor. Other data are not available.

Recent Contracts

Although other details were not released, in April of 1993, the United States Army Tank and Automotive Command awarded a contract worth \$18.243 million to Cadillac Gage Textron for the production of 24 V-300 vehicles for the Republic of the Philippines. No subsequent contract information has been released.

Timetable

The following timetable is for the V-300 and V-600 Commando vehicles.

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1962	V-150 concept initiated
Late	1977	V-300 development initiated; two prototypes completed
November	1981	Cadillac Gage selected as contender for Light Armored Vehicle program
March	1982	Development completed; low-rate production begun
	1983	First export sale to Panama completed
July	1987	V-600 demonstrated in Egypt
	1994	Company and program name changes made
December	1999	V-300 Mark II and V-600 participate in medium armored vehicle trials
Mid	2003	V-300 and V-600 available for orders; development continues

Worldwide Distribution

Export Potential. While the V-300 Mark I was being evaluated for the Light Armored Vehicle contract, it was also being marketed abroad. Since then, this effort has continued with moderate success. Cadillac Gage products are in wide use around the world and enjoy a high level of customer satisfaction. In 1983, the first sale of the V-300, for 12 vehicles in four versions, was made to Panama; the 12-unit order was delivered in 1984. In late 1984, Kuwait ordered 62 V-300 vehicles with the 90 millimeter gun. In April of 1993, the Philippines ordered 24 V-300 Mark II vehicles. Although the V-600 prototype was extensively demonstrated in Egypt in mid-1987, no sales of this vehicle have been made. However, since the US Army evaluations in December of 1999, international interest in the V-600 has increased.

Countries. **Kuwait** (62 – the prewar inventory); **Panama** (12 – the prewar inventory); **Philippines** (24).

Forecast Rationale

While the lighter Commando vehicles continue to do rather well, the heavier members of the family, the V-300 and V-600, continue to struggle in what has become a glutted light wheeled vehicle market.

Despite its excellent lineage, the excellent reputation of the manufacturer, and a long-standing strong marketing effort, as of mid-2003, the V-300 has yet to even approach the success of the V-150 series, and the V-600 has yet to make its first sale. Our research can find no real reason for the lackluster sales performance of these vehicles; they are competitively priced, if a little on the high end of the light wheeled market, and the name is well known worldwide.

In any event, the historical trends plus our most recent research indicate that a sale of the V-300/LAV-300 of around 28 vehicles should come to pass in the coming five years. There is some evidence indicating that this sale will be to a sub-Saharan nation.

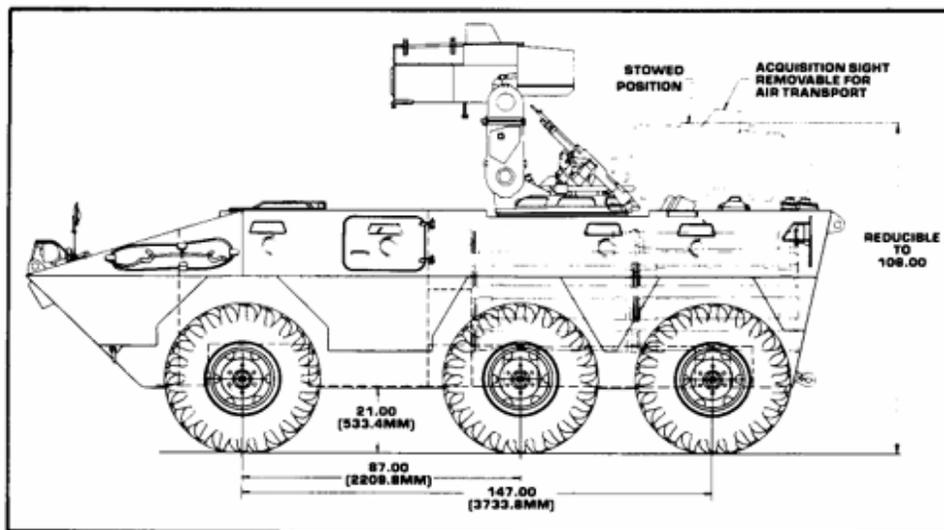
Despite the enhanced level of interest generated by the December 1999 trials for the US Army's new Interim Armored Vehicle, the V-600 program has yet to catch on in the market, hence our forecast for zero production. We will continue to monitor developments for both vehicles.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

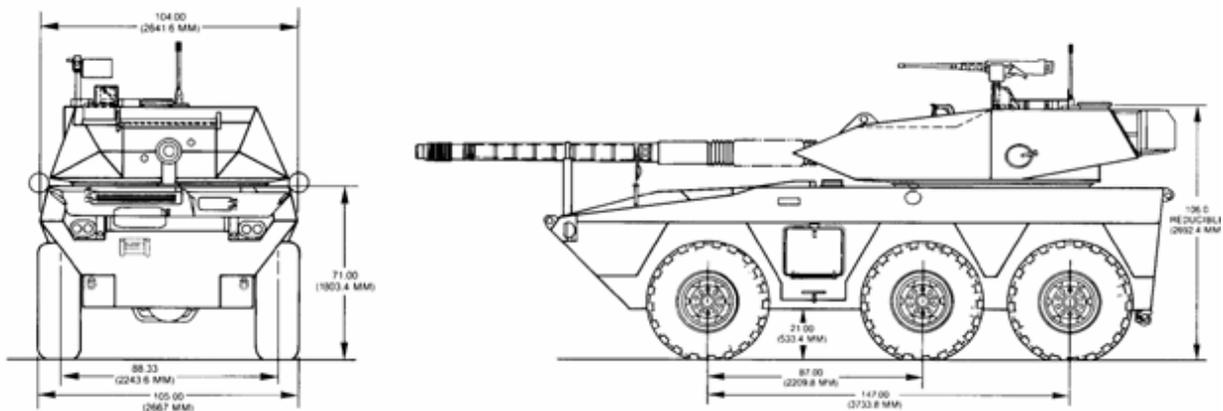
Vehicle	(Engine)	High Confidence Level				Good Confidence Level				Speculative				Total 03-12
		through 02	03	04	05	06	07	08	09	10	11	12		
TEXTRON SYSTEMS/CADILLAC GAGE														
V-600 (a)	6 CTA 8.3	1	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal - TEXTRON MARINE & LAND SYSTEMS		1	0	0	0	0	0	0	0	0	0	0	0	0
TEXTRON SYSTEMS/CADILLAC GAGE														
V-300 (b)	6 CTA 8.3	103	0	0	8	11	9	0	0	0	0	0	0	28
Subtotal - TEXTRON SYSTEMS/CADILLAC GAGE		103	0	0	8	11	9	0	0	0	0	0	0	28
Total Production		104	0	0	8	11	9	0	0	0	0	0	0	28

- (a) The through 2002 production is the prototype/developmental vehicle.
- (b) The through 2002 production includes two prototype and development vehicles and three vehicles submitted for the Light Armored Vehicle competition. Production includes all versions including the redesignated LAV-300.



V-300/TUA

Source: Cadillac Gage/Textron



V-600 COMMANDO

Source: Cadillac Gage/Textron