

# ARCHIVED REPORT

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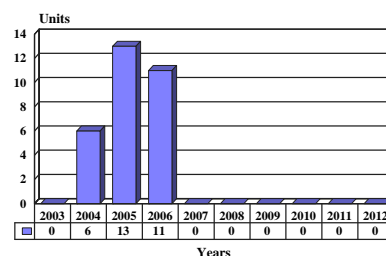
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## Saxon - Archived 8/2004

### Outlook

- Production has been on an as-needed basis since the British procurement objective has been met
- Marketing effort continues
- Continued uneven production for export forecast
- A moderate level of modernization and retrofit for the Saxon is forecast

10 Year Unit Production Forecast  
2003 - 2012



### Orientation

**Description.** A wheeled vehicle.

**Sponsor.** The Saxon is a private development program funded by the contractor.

**Contractors.** The Saxon was originally developed and manufactured by GKN Defence - Land Systems; Telford, Shropshire, England, United Kingdom. In 1998, the military vehicles business of GKN Defence was acquired by Alvis Vickers, the present prime contractor. Major subcontractors to the Saxon include AWD Bedford, Allison Transmission Division of General Motors Corporation, Cummins Engine Company, and Perkins Engines.

**Licensees.** None

**Status.** The Saxon is in production on an as-needed basis. It is in service in the United Kingdom and several other nations; further development continues.

**Total Produced.** As of January 1, 2003, a total of 1,054 Saxon vehicles had been manufactured.

**Application.** A multipurpose light wheeled vehicle that can be used as an armored personnel carrier, a light engineer vehicle, a mortar or missile carrier, and a command/control vehicle.

**Unit Price.** The unit price of the Saxon is, of course, dependent upon the options that are chosen; in equivalent 2003 United States dollars, the basic military-pattern vehicle has a unit price of \$292,000. The unit price of the initial 57 vehicles delivered to the British Army in 1984 was just under \$125,000. This contract included spares, training, and other support costs.

### Technical Data

**Crew.** Two: commander and driver, plus eight to 10 infantrymen depending on the internal layout of the vehicle.

**Configuration.** 4x4

**Armor.** The Saxon is fabricated from conventional steel alloy armor that is proof against 7.62 millimeter armor piercing projectiles as well as ballistic fragments.

**Design Features.** The Saxon is designed to be fitted for a wide variety of military and paramilitary missions. Right- or left-hand drive is available.

**Dimensions.** The following data are for the latest production standard military pattern armored personnel carrier.

	<u><b>SI units</b></u>	<u><b>US units</b></u>
Length:	5.17 meters	16.96 feet
Width:	2.49 meters	8.16 feet
Height:	2.63 meters	8.62 feet
Combat weight:	11.66 tonnes	12.85 tons
Fuel capacity:	153 liters	40.69 gallons

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

	<u><b>SI units</b></u>	<u><b>US units</b></u>
Maximum speed:	96 kilometers per hour	59.61 miles per hour
Maximum range:	480 kilometers	298.08 statute miles
Step:	41 centimeters	1.35 feet
Trench:	41 centimeters	1.35 feet
Slope:	36%	36%
Gradient:	66%	66%
Fording:	1.12 meters	3.67 feet

**Engine.** The basic engine fit of the Saxon is the AWD Bedford Model 500 six-cylinder, liquid-cooled diesel engine. This engine develops 122.34 kilowatts (164 horsepower) at 46.67 revolutions per second (2,800 revolutions per minute). The power-to-weight ratio with this engine is 10.48 kilowatts per tonne (12.75 horsepower per ton). A 24 volt electrical system with two 12 volt, 100 ampere hour batteries is fitted. Two alternative powerplants have been integrated with the Saxon; these are now offered as options or for retrofit. One engine is from Perkins, the T6-3544 diesel rated at 145.47 kilowatts (195 horsepower) at 41.67 revolutions per second (2,500 revolutions per minute). The other engine is the Cummins 6BT six-cylinder diesel engine, which is rated at 119.36 kilowatts (160 horsepower); this engine is the standard fit on the latest production vehicles for the British Army.

**Gearbox.** The Allison Transmission Division of General Motors Corporation provides the AT-545 automatic gearbox with one reverse and four forward gear ratios. A two-speed transfer case offering a choice of two- or four-wheel drive is standard, and steering is power assisted.

**Suspension and Running Gear.** The 4x4 Saxon has semi-elliptical springs and a hydropneumatic shock damper at each wheel station. The tires are 14.00x20, with Hutchinson run-flat inserts an option.

**Armament.** A 7.62 millimeter machine gun on a pintle mount is provided. However, the vehicle is usually fitted out to the specific customer's request; various turrets and mounts can be fitted. British Army Saxons have two banks of 66 millimeter L8 electrically operated smoke grenade launchers.

## Variants/Upgrades

**Variants.** The Saxon is offered in left- or right-hand drive. The vehicle can be fitted with a variety of armaments; the most common fit is a 7.62 or 12.7 millimeter machine gun in an Alvis turret. Another option is a cannon up to 37 millimeters in caliber.

**Saxon Patrol Vehicle.** This is the latest version of the Saxon to enter service. It is the original vehicle fitted with improved armor, the Cummins engine and automatic gearbox, the ability to select two- or four-wheel drive, barrier removal devices, wire net covers for the windscreen and other windows, standard run-flat tires, and other survivability features. The British Army has procured around 100 Saxon patrol vehicles.

**Saxon IS.** The Saxon IS was announced in early 1984, the IS meaning Internal Security. This vehicle has an Alvis one-man turret that is normally fitted with the ARWEN 37V 37 millimeter riot gun or a water cannon.

In addition, it carries specialized internal security equipment such as riot screens, barricade pushers, smoke and tear gas dispensers, and electro-optic monitoring equipment.

**Saxon Recovery Vehicle.** The Saxon recovery vehicle is the standard vehicle modified to recover other vehicles. A five tonne (5.51 ton) winch can handle, with the aid of a block and tackle, vehicles up to 16 tonnes (17.64 tons). Other equipment normally associated with recovery missions is also standard; this variant has been procured by the British Army.

**Saxon Incident Control Vehicle.** This version of the Saxon is fitted with a low-light-level electro-optic surveillance system, wire mesh protection for the windscreen, smoke grenade launchers, and a dozer blade mounted on the front of the vehicle.

Saxon Command Vehicle. This version of the Saxon can be fitted with several different cupolas or turrets with differing armament. The interior is built for command missions and includes staff positions, map board, and communications equipment.

Saxon Ambulance. This version of the Saxon is modified to mount four stretchers or two stretchers and five sitting patients. A crew of two plus a medical orderly is carried.

Other proposed versions of the Saxon include an engineer vehicle, missile carrier, and mortar carrier.

Modernization and Retrofit Overview. No significant modernization or retrofit programs have yet been developed for the Saxon. As a result of the British Army's operations in Bosnia-Herzegovina, the Saxons were retrofitted in 1994 with 7.62 millimeter general purpose machine gun turrets from the FV432 armored personnel carrier. This action reduced the exposure of the vehicle commander to hostile fire. The retrofitted Saxon is referred to as the Saxon Mark 2, while the original configuration vehicle is designated Saxon Mark 1.

## Program Review

Background. The AT-105 series of vehicles was developed by GKN Sankey (subsequently GKN Defence) from its predecessor AT-104 family of vehicles, about 30 of which were built between 1972 and 1976, and exported to the Netherlands and Brunei. The AT-105 was subsequently renamed the Saxon. In 1998, the armored vehicles business of GKN Defence was acquired by Alvis Limited, now Alvis Vickers.

The Saxon offers a variety of improvements over the AT-104. Specifically, the engine power rating has been increased and the powerpack is now installed within the hull for improved protection. The hull floor was redesigned to a V-shape in order to offset the effects of anti-tank mine detonations while providing more effective crew protection and comfort. Equipped with an automatic gearbox and power steering, the Saxon is much easier to drive and control than the AT-104, and visibility has been significantly improved.

Deliveries of the Saxon to the British Army were completed in early 1995. The Army originally planned to buy 1,024 Saxon vehicles but opted to reduce the procurement objective to 664 because of the major geopolitical changes in Europe.

Description. While the Saxon comes standard with right-hand drive, a left-hand drive version is also available. The Saxon uses off-the-shelf, heavy-duty automotive components of proven design and reliability. The hull is of all-welded steel construction, affording full protection from 7.62 millimeter armor piercing rounds as well as ballistic fragments. The driver is seated to the front of the vehicle on the right; he can access his position either through the vehicle or by a circular hatch. Bulletproof windscreens are provided. As an added protection from the effects of land mines, all the automotive components except the axles are enclosed within the armored compartment. The

commander sits in the middle slightly above the driver and is provided with a cupola with four vision blocks.

The personnel are seated four on each side of the hull. Entry and exit are via two doors at the rear and a single one on each side of the vehicle. Each door is equipped with a firing port and vision block. Additional firing ports are placed in the sides of the hull. The hull interior is lined with 2.6 centimeters (a little over 1 inch) of thermal insulation, and a forced air circulation system and two fire extinguishers are standard.

Optional equipment includes air conditioning, an auxiliary power unit, searchlights, a heating system for both the crew compartment and the engine, a front-mounted winch, and other specialized internal security equipment.

Operational Analysis. The Saxon is an ideal light armored vehicle for civil authorities as well as for military units controlling border areas. While the Saxon can readily address internal security missions, it can also be equipped for use on armed reconnaissance missions, airfield defense, and as a convoy escort vehicle. These attributes account for the vehicle's popularity. The armor on the Saxon affords excellent crew and vehicle component protection. The hull sides are composed of 16 millimeter steel armor, and the special V-shaped sealed hull floor has no mine pockets. Further, the monocoque hull construction affords excellent protection against the effects of land mine detonations. This armored protection has brought the Saxon in at close to 12 tonnes weight, but it has quick acceleration and a top road speed of 96 kilometers per hour (60 miles per hour). While it was primarily designed to operate on prepared surfaces, the vehicle has impressive cross-country performance with four-wheel drive in high or low range.

## Funding

The funding for the development of the Saxon has been provided by the contractor.

## Recent Contracts

Not available, as contractual information is not released.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
September	1973	Design conceived
	1974	Engineering development; prototype fabricated
	1976	Production commenced
	1980	Middle East/African sales reported
July	1981	British Army orders three vehicles for evaluation
	1983	British Army orders first 47 vehicles
May	1984	First delivery to British Army
Mid	2003	Available for further production orders; marketing and development continue

## Worldwide Distribution

**Export Potential.** As is the norm with this type of vehicle, a good number of sales often go unrecorded because the units are acquired by police and other internal security units. The British are noted for their development and production of this type of vehicle, and their track record on the export market is also excellent. By the end of its production run, the Saxon should be no different.

**Countries.** Sales of the Saxon have been confirmed to **Abu Dhabi** (10), **Bahrain** (10), **Hong Kong** (7), **Kuwait** (5 – original procurement), **Malaysia** (140), **Nigeria** (75), and **Oman** (22); at least two other customers remain unidentified. The **United Kingdom** has 664 Saxons in several variants.

## Forecast Rationale

The rather successful Saxon program has seen no significant changes in the last year. Serial production remains dormant, but the vehicle is still being actively marketed, and the line is available for new orders.

The potential for a follow-on order by the British Ministry of Defence is very remote; indeed, it is not

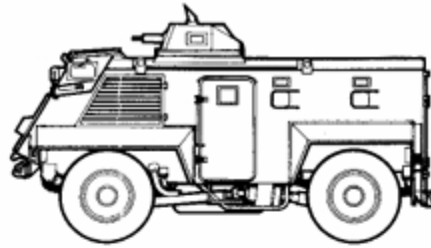
forecast due to the near-term advent of the Multi-Role Armored Vehicle. Therefore, the export market will account for the minimal forecast production of the Saxon as depicted in the chart below. This production will be for sales made based on the vehicle's fine reputation and the British Army's stamp of approval.

## Ten-Year Outlook

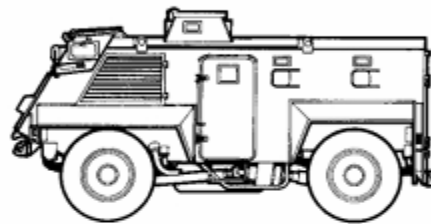
### ESTIMATED CALENDAR YEAR PRODUCTION

Vehicle	(Engine)	<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>			Total 03-12
		through 02	03	04	05	06	07	08	09	10	11	12	
ALVIS VICKERS LIMITED													
SAXON (a)	6BT	1054	0	6	13	11	0	0	0	0	0	0	30
Total Production		1054	0	6	13	11	0	0	0	0	0	0	30

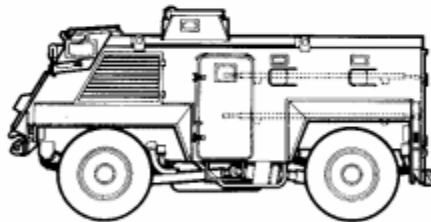
(a) The through 2002 production includes eight prototype and developmental vehicles. Production includes all export sales.



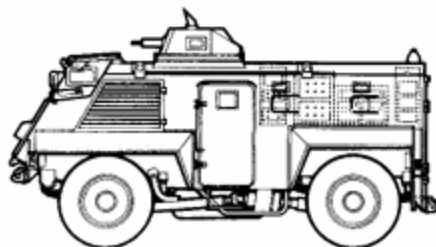
AT105-E  
Armoured  
Personnel Carrier



AT105-P  
Armoured  
Personnel Carrier



AT105-A  
Armoured  
Ambulance



AT105-Q  
Command/Signals  
Vehicle

SAXON

Source: Alvis Vickers