

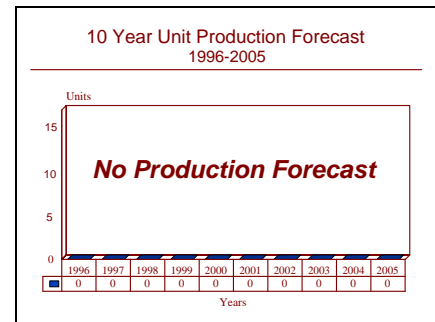
ARCHIVED REPORT

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FV721 Fox - Archived 8/98

Outlook

- Program terminated in 1993.
- No additional production is forecast .
- A total of 321 vehicles was manufactured.
- The Fox turret on retired British Army vehicles is being integrated with some FV101 chassis.



Orientation

Description. A wheeled vehicle.

Sponsor. The development and British Army procurement of the Fox was sponsored by the United Kingdom Ministry of Defence, Ministry of Defence Procurement Executive through the Ministry of Defence Army Department and the British Army.

Contractors. Based upon a design by the Daimler Company; Coventry, Warwickshire, England, the Fox was developed and previously manufactured by Royal Ordnance; Leeds, Yorkshire, England. In 1986, the marketing/production rights for the Fox were transferred to Vickers Defence Systems, Newcastle-upon-Tyne, England, United Kingdom. Major subcontractors include Alvis, Daimler, GEC Sensors, Jaguar, Rank Precision Industries and Royal Ordnance.

Licensees. None

Status. Production of the Fox has terminated; the vehicle remains in service in the United Kingdom and

several other nations. The British Army FV721 Fox vehicles are being retired but the turrets of some of the vehicles are being integrated with some of the FV101 inventory (see below).

Total Produced. A total of 321 Fox vehicles was manufactured.

Application. A designated follow-on to the Ferret family of light armored vehicles, the Fox is used for armed reconnaissance and scouting missions, or anti-tank roles.

Price Range. In equivalent 1993 United States dollars, the Fox had a unit price of \$192,000 for the base vehicle. The fitting of optional equipment, such as exemplified by the Fox/MILAN, could significantly raise this price.

Technical Data

Crew. Three: commander, gunner, driver

Configuration. 4x4

Dimensions. The following data are for the basic Fox vehicle with the L21 (RARDEN) 30 millimeter cannon.

	<u>SI units</u>	<u>US units</u>
Length	5.08 m	16.66 ft
Width	2.13 m	6.98 ft
Height	2.20 m	7.22 ft

Combat weight	6.12 tonnes	6.75 tons
Fuel capacity	145.47 liters	38.68 gal

Performance. The maximum speed and range are on a surfaced road; the vehicle is amphibious with preparation.

	<u>SI units</u>	<u>US units</u>
Maximum speed	104 km/h	64.58 mph
Maximum range	434 km	269.5 statute miles
Step	50 cm	1.64 ft
Trench	1.22 m	4.0 ft
Slope	35%	35%
Gradient	58%	58%
Fording	1.0 m	3.28 ft

Engine. The Fox uses the Jaguar model XK six-cylinder conventionally aspirated spark ignition engine rated at 141.74 kilowatts (190 horsepower) at 79.17 revolutions per second (4,750 revolutions per minute). The power-to-weight ratio is 23.16 kilowatts per tonne (28.15 horsepower per ton). The electrical system consists of a 140 ampere 24 volt generator and two model 6TN batteries with a total of 100 amperehour capacity; the entire system is waterproofed and electrically screened.

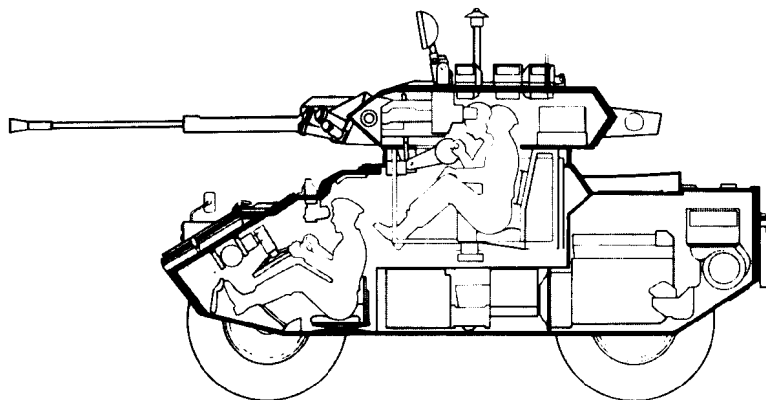
Gearbox. A Daimler gearbox connected to a Daimler transfer case and a fluid flywheel provides five forward and five reverse gear ratios. Steering is power assisted and all four wheels are independently suspended; the hydraulic disk brakes are supplied by Lockheed.

Suspension and Running Gear. The 4x4 Fox uses a wishbone type independent suspension with each wheel station having a coil spring and hydraulic shock damper. The 11.00x20 tires are the run flat type.

Armament. Alvis Limited fabricates the turret, which is constructed of light alloy armor. The main weapon is the Royal Small Arms Factory's 30 millimeter L21 cannon which can fire Hispano 831L ammunition or a specially

developed Armor Piercing Discarding Sabot round that will destroy any light armored vehicle or damage the sides of a tank. The elevation of the main armament is +40° and depression is -14°. A 7.62 millimeter L37A2 machine gun is coaxially mounted with 2,600 rounds of ammunition available. The McDonnell Douglas Helicopter Company 25 millimeter M242 Chain Gun, which is license-manufactured by Royal Ordnance, is the standard armament on one Fox variant. Two four barreled smoke dischargers are fitted to most variants. (Note: As used in this report, Chain Gun is a registered trademark of McDonnell Douglas Helicopter Company.)

Fire Control. In the basic model, both the gunner and commander are provided with a Rank Precision Industries SS 100 day sight with a ten power magnification and an AFV number 68 periscopic sight with a one power magnification. In the one man turret of the Fox 25, an Opto-Electronic Limited M36 E3 periscopic sight with an integral imaging intensification device is fitted. The fire control of the Fox Scout is fitted to customer specification and the Fox MILAN is fitted with the MIRA thermal sight.



FV721 FOX INTERIOR LAYOUT

Source: Vickers Defense Systems

Variants/Upgrades

As of mid-1995, no known retrofit and modernization programs had been developed for the Fox.

Sabre. As the British Army retires its Fox inventory, the complete turret will be taken from some of the vehicles, refurbished and integrated with an as yet unspecified number of re-engined and upgraded chassis of the FV101 Scorpion. The new vehicle is called Sabre; further details will be found in the FV101 Scorpion report in Tab B of this book.

Variants. The Fox has been developed into a number of variants, differing mainly in their armament suites.

Panga and Vixen. Developed specifically for the export market, the Panga armored reconnaissance vehicle originally replaced the standard Fox turret with a Peak Engineering one man turret armed with a 12.7 millimeter M2HB machine gun. Of the total 1,000 rounds of ammunition carried, 100 are in the turret and 900 are stored in the hull. An option is to replace the single 12.7 millimeter weapon with one or two 7.62 millimeter machine guns. The Panga was subsequently redesigned with a new hull and a Helio Mirror FVT800 one-man turret with similar armament to the original Panga. The Panga also carries a spare wheel/tire on the outside of the hull, has additional storage, a self-recovery winch, improved lighting and fire extinguishing equipment, additional vision devices, dual-circuit brakes, and enhanced engine controls and components with trench crossing channels. The Panga weighs 0.55 tonne (0.6 ton) less than the Fox due to its shorter length and two man crew. A further variant, the FV722 Vixen liaison vehicle, was canceled in the December 1974 defense cuts.

At the 1982 British Army Equipment Exhibition, two additional Fox variants were first displayed:

Fox/25 millimeter CHAIN GUN. This is the basic vehicle fitted with an United Defense (FMC Corporation) 25

millimeter Electric Drive Turret and McDonnell Douglas Helicopters' 25 millimeter M242 Chain Gun. This one man turret is also fitted with a 7.62 millimeter machine gun which is coaxially mounted to the main armament. The turret weighs 1,409 kilograms (1.62 tons) and a minimum of 250 rounds of 25 millimeter ammunition is carried. Specifications of the vehicle remain the same except for the following:

Crew -	Two
Combat weight -	6.29 tonnes
Length -	4.22 m
Width -	2.13 m
Height -	2.23 m

Fox/MILAN. This variant is fitted with an all new turret developed by Royal Ordnance. It mounts either a 7.62 millimeter Chain Gun or a similar caliber machine gun in the forward part of the turret. On the left side of the roof is a twin MILAN anti-tank guided missile launcher; the MIRA thermal sight is also fitted. Two missiles are at the ready with eight in reserve.

Increased fuel capacity is also offered, as is additional cooling for the crew and a grenade launcher. Specifications are as for the Fox except:

Crew -	Two
Combat weight -	6.14 tonnes
Length -	4.22 m
Width -	2.13 m
Height -	2.40 m

Fox/Scout. This variant is the same as the Fox/MILAN but with the MILAN installation removed and the hole blanked out. The standard armament option is the McDonnell Douglas Helicopters 7.62 millimeter Chain Gun, although the standard British Army General Purpose Machine Gun can also be fitted.

Program Review

Background. The Fox armored car is the follow-on to the Ferret scout cars, which were developed from the 1940s vintage Daimler scout car. The Daimler vehicles were extensively used in a variety of roles (internal security, reconnaissance, patrol) and proved to have unmatched reliability in "brush fire" conflicts and wars of national liberation. Further, their role as an armored fighting vehicle, albeit small, has been documented as a global success, regardless of geography or climate. The Ferret Mark 1 and Mark 2 which were produced after 1945, equalled the success of their predecessor by proving their

mobility and easy maintainability in the field. The Ferret Mark 5 was designed as an anti-tank vehicle employing four Swingfire missiles. The vehicle's overall weight enabled air transport, and parachutes were employed to deliver combat ready vehicles to ongoing assault operations that traditionally required heavy tanks. Production of the Ferret ceased in 1972, after more than 4,400 units had been manufactured.

Fox Development. Daimler initiated design studies of a follow-on to the Ferret in 1965, and the first 15 prototypes were delivered in 1967-1968. After testing and evaluation

in the United Kingdom in 1970, a production contract was awarded to the then Royal Ordnance Factories. The FV721 Fox entered production in 1972 with the first deliveries being made in mid-1973.

Vehicle Description. The hull is of all-welded aluminum construction providing protection from 12.7 millimeter machine gun fire as well as ballistic fragments. The driver is seated to the front of the vehicle and is provided with a hatch cover which opens to the right. Integral with the hatch cover is a wide-angle periscope which can be replaced with a passive night vision device if desired.

The turret is positioned in the center of the vehicle with the commander, who also acts as the loader, seated to the left and the gunner on the right. Both these crew members are provided with periscopes and binocular sights. Mounted to the right of the main ordnance is a Rank Precision Industries SPAV L2A1 dual-magnification passive night sight; this equipment can be changed as per specific requirement. The standard Clansman radio system is located to the rear of the turret while the batteries are located externally on the left side.

The suspension is independently sprung by hydraulic and mechanical components, and run-flat tires are standard.

While the Fox can ford one meter of water, a flotation screen can be erected by the crew in two minutes. The vehicle is then amphibious, being propelled by its wheels which also steer the vehicle.

For the British Army, standard equipment includes a bilge pump, infrared filters for the headlights, a commander's spotlight, external storage boxes, an electric distribution box for the hull, heater and an inter-vehicle starting socket. In British Army service, the flotation screen is removed. Optional equipment includes navigation equipment, additional radios, nuclear, biological and chemical detection equipment and a ZB 298 surveillance radar which is mounted on the left side of the turret.

The Fox is best suited for use against other light combat vehicles. As such, this vehicle has not seen the commercial success of its predecessor, the Ferret. More than likely, this was a paramount factor in awarding the production contract to the then designated Royal Ordnance Factories after Daimler saw the "handwriting on the wall" that Fox would be much too heavy and carry armament that is not suited to internal security or reconnaissance. It appears that foreign military sales have proven this point, since sales have been limited to anti-tank roles in Third World nations facing less sophisticated armor threats.

Funding

The funding for the initial development of the Fox was provided by the British Ministry of Defence through the British Army. Royal Ordnance used private funds to develop a number of the variants before the line was sold to Vickers.

Analysis. Despite its high quality, proven reliability and well-known lineage, the Fox had a difficult time in the glutted light vehicle market. Even though a good deal of export market interest was generated by the Fox/MILAN

and Panga when they were introduced, that interest never translated into any known sales, although a few sales of the Panga may have been made to internal security and similar organizations.

Recent Contracts

None as contractual information is not released.

Timetable

The following timetable relates to the FV721 Fox program only and not to the Valkyr or any other Vickers vehicle.

	1965	Initial development of Fox began
	1967	First prototypes of Fox produced
	1967-1969	15 prototype vehicles delivered
	1970	Accepted for service by the British Army
Mar	1972	Serial production began
May	1973	First deliveries made
Jul	1973	Fox entered service in the United Kingdom
Feb	1982	Fox/MILAN and Fox/Scout first offered
	1986	Marketing/production rights sold to Vickers
	1993	Program terminated

Worldwide Distribution

Export Potential. The Fox line has been dormant for some years now and there has been minimal new interest in the vehicle. Based on these facts, we feel that any future export of new production vehicles is unlikely.

Countries. Some variant of the Fox is known to be in service in the following countries: Kenya (5), Malawi (20), Nigeria (55), Saudi Arabia (8) and the United Kingdom (215). Other customers, at least three in number, remain unidentified.

Forecast Rationale

The serial production of the FV721 Fox program went dormant some years ago; in 1993, it was terminated. The only activity in the program is the aforementioned removal, refurbishment and retrofit of some of the turrets

with some FV101 Scorpion vehicles. Other than for the possible transfer of some of the existing inventory to other nations, no further activity is forecast.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Vehicle	(Engine)	through 94	High Confidence Level				Good Confidence Level			Speculative			Total 95-04
			95	96	97	98	99	00	01	02	03	04	
VICKERS DEFENCE SYSTEMS LIMITED													
FV721(a)	MODEL XK	321	0	0	0	0	0	0	0	0	0	0	0
Total Production		321	0	0	0	0	0	0	0	0	0	0	0

(a)The historical production includes 15 prototype and development vehicles.