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Our ref: FC/EAC/2552/85

3rd April 1985

Rt. Hon. Margaret Thatcher MP FRS
10 Downing Street,
Whitehall,
London. S.W.1.

Jean Pierre Arnoult

Indonesia - Alvis/Scorpion Project

We would be very grateful indeed for any help you can give us with this project during your forthcoming visit to Indonesia. Some information about Scorpions generally and a short background brief about Indonesian interests is enclosed.

Briefly, the project would be in three phases stretching from 1985 to 2001. The first phase would mainly be export of complete Scorpions built by Alvis in Coventry. The second phase would be mainly the import of kits and parts for assembly in Indonesia. The third phase would primarily be manufacture in Indonesia with supply of parts and spares from Coventry.

In terms of value we are talking of as much as £350m over the years dependent on the Indonesian specification for the exact type of Scorpion and numbers. A full financial package has been offered.

We have been dealing with Dr. Habibie, the Minister of Research and Technology, and his staff. We know that the President of Indonesia is being briefed today in preparation for your visit. Recently negotiations have speeded up and much greater enthusiasm and activity has been evident, no doubt because of your impending arrival. It now seems very possible that the President will endorse the project in principle this week. We have hopes that it might be possible for Dr. Habibie to sign a contract when he visits this country this summer.

The enclosed specially coloured Chart, which is in the hands of Indonesian Ministers and is being seen by the President, sets out the whole project.

cont....

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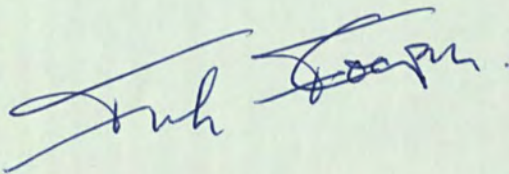
3rd April 1985

What would be of enormous help would be if you would raise the matter with the President and Dr. Habibie. We are told it would forward our cause if the enclosed chart could be shown to be in your hands in front of Indonesian Ministers so demonstrating that you are aware of, and informed about, the project.

It would also be extremely helpful if you could say that you know that Alvis has great experience of designing and building vehicles of this type; that they had built and sold in many different parts of the world some 4,000 aluminium vehicles; and they were very much in the forefront of world manufacturers in this field and very willing to transfer this technology and work with Indonesia.

We would be very grateful for help and this is by far the largest prospect for Alvis in the short term.

Yours sincerely,
UNITED SCIENTIFIC HOLDINGS PLC

A handwritten signature in blue ink, appearing to read 'Frank Cooper', with a large flourish extending to the left.

Frank Cooper
Chairman



6
Lee

10 DOWNING STREET

From the Private Secretary

3 April 1985

Indonesia - Alvis/Scorpion Project

I am writing to thank you for your letter of 3 April to the Prime Minister, which I will put in her briefing folder for reading on the aircraft on the way to South East Asia. I am sure that she will be willing to raise the project if the opportunity offers - and she is going to Bandung to see Dr. Habibie.

Charles Powell

The Rt Hon Sir Frank Cooper GCB CMG

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ALVIS SCORPION PROJECT

BACKGROUND

1. The Alvis Scorpion is a Light Armoured Fighting Vehicle of which over 4,000 have been built since 1972, which are in service with the British Army and a number of other armies throughout the world, including S.E. Asia, Thailand, Malaysia, Brunei and Philippines.
2. The Indonesian Army has a stated requirement for some 1,000 AFV's in the Scorpion class, and discussions have been taking place with BPP Teknologi, under the aegis of Dr. Habibie, regarding the manufacture under licence in Indonesia of the Scorpion family. The project is worth at least £350m in UK content over a 10 - 15 year period. ECGD have stated willingness to support credit for 80% of the project, if required. Agreement has been reached on the main commercial and technical principles of the project, and it is understood that both President Suharto and Dr. Habibie expect to raise the matter with the Prime Minister. Formal contract negotiations are expected to commence shortly, and the contract may be completed when Dr. Habibie visits the UK in July.

LINE TO TAKE

1. Scorpion is an excellent vehicle which has given good service to the British Army, particularly in the Falklands, and to many other armies throughout the world.
2. The United Scientific Group has been one of the fastest growing defence contractors in the UK, and has a good reputation for international collaboration in manufacture, as is shown by successful joint ventures with the Governments of Singapore and Egypt.
3. AFV technology transfer will enable Indonesia not only to assemble and, later, build Scorpion, but also to design, in collaboration with Alvis, other vehicles to meet further AFV requirements in Indonesia and other ASEAN countries.
4. Adoption of Scorpion by Indonesia will make it almost standard in ASEAN, and Indonesia will be able to service the ASEAN market for additional vehicles and spare parts.
5. HMG will provide 80% ECGD backing if required.



SCORPION



ALVIS LIMITED COVENTRY ENGLAND

Introduction to

SCORPION



The Scorpion family is probably the most exciting range of armoured fighting vehicles ever conceived.

Designed and developed by Alvis Limited of Coventry in conjunction with the British Ministry of Defence and the Military Vehicles and Engineering Establishment, to measure up to the military requirements of the 1970s and '80s, Scorpion fulfils the British Army Specification for a fast, highly manoeuvrable combat and

reconnaissance vehicle, capable of working day and night in any terrain, under all possible climatic conditions.

Scorpion, however, is just one vehicle. Out of one basic concept a whole family has been created, using the same engine, transmission and suspension. Its members include: Spartan — armoured personnel carrier; Striker — armoured guided weapon carrier; Sultan — armoured command vehicle; Samaritan — armoured ambulance; Samson — armoured recovery vehicle; Scimitar — armoured 30mm gun anti-APC

vehicle. Other variants are under consideration, and the company is always willing to consider customers' individual needs.

In addition to the low initial cost advantage, the Scorpion family offers even more important savings in terms of money and manpower. Because of the supreme versatility of the design, it is possible to put together armoured fighting units in virtually any configuration to suit a specific purpose — complete with all the necessary command and support vehicles — with spares and servicing facilities common throughout.



Design Philosophy

In the late 1950s the British Army started planning for a design to succeed the then current family of Saladin, Saracen and Ferret.

To enable the British Army to meet its tactical and strategic needs of the future there was a requirement for significant improvements in performance, mobility and fire power. Reductions in weight were also necessary, to ensure that the new vehicles would be truly air-portable. At first it was hoped to produce a single vehicle — the Combat Vehicle Reconnaissance (CVR) — capable of carrying out three major roles: reconnaissance, fire support and anti-tank. To achieve the desired strategic mobility the battle weight had to be sufficiently low to enable two of the new vehicles to be carried in a C130 Hercules transport — effectively one third less than the lightest existing vehicle. The weight limitation, however, made it impracticable to provide sufficient space in one vehicle, under armour, for all the weapons, equipment and crew necessary to carry out all three roles. As a result a range of fighting vehicles has been produced with compatible design characteristics, to satisfy the requirements, without compromise.

In contrast to its distinguished predecessors, which were wheeled reconnaissance vehicles, the Scorpion family has light steel tracks with rubber bushes and pads, to provide greatly improved cross country performance — just one of the benefits to accrue from the application of the most up-to-date and sophisticated techniques.

Other advantages are the reduced weight and increased immunity offered by the special aluminium alloy armour. Coupled with advances in armaments and ammunition, the overall result is a light, highly manoeuvrable, armoured reconnaissance weapon system with extremely impressive firepower.

Scorpion conforms to the British Ministry of Defence's most stringent quality standards. All aspects of the manufacture and testing of Scorpion fully conform with the requirements of the British Defence Standard 05-21 and NATO Standard AQAP-1.



Military Characteristics



Scorpion is a fast light tank, probably the fastest, smallest in the world. Its outstanding feature is its high cross-country speed, enabling it to move swiftly into and out of quickly selected and unprepared fire positions which, owing to the vehicle's small size, need only be small folds in the ground. This makes it an ideal vehicle for adopting hit-and-run delaying tactics. Its low profile reduces the risk of detection in such conditions.

A further measure of Scorpion's logistic strength is its airportability. As it is extremely light and compact any two members of the Scorpion family can be carried by a Hercules C130 and each can be air dropped with the aid of four parachutes and a shock absorber platform. Suitable helicopters can be used to lift single vehicles, with the operating crew travelling in the aircraft.

Scorpion's unique flexibility can be further extended by the addition of an optional wading screen which, when erected, permits the vehicle to float. Using track propulsion alone, a water speed of 6.5 km/h (4 mile/h) is achieved. Bolt-on propeller units, which are available as extra equipment, increase the speed of 9.65 km/h (6 mile/h), and considerably improve its manoeuvrability.

Because of its small size, width and weight, Scorpion easily negotiates narrow defiles and wooden bridges (down to classification 9) and can climb hills as steep as 1 in 2. Its low ground pressure is less than that of a walking man, so that it can tackle terrain such as bog land, paddy and soft sand.

No other vehicle or range of vehicles offers a commander such a high degree of tactical mobility with an almost limitless variety of ways in which to outflank enemy positions. In island and similar cross-water situations Scorpion comes into its own as a particularly valuable weapons system.

Scorpion operates efficiently through an ambient temperature range of minus 32°C to plus 52°C, and maintains a very low external noise level. It has a 76mm gun for use against tanks, armoured personnel carriers and other vehicles, and lends powerful support to

infantry when fired ahead of advancing troops; a 7.62mm co-axial machine gun is also mounted.

All these factors taken together produce the ideal combination for passive or aggressive reconnaissance, for convoy escorts and internal security duties, and for working with all manner of combat units and formations in theatres all over the world.

Roles

1. Reconnaissance:
 - Advance to contact
 - Battle reporting
 - Observation and surveillance
 - Rapid forward reconnaissance
2. Fire Support:
 - Counter insurgency
 - Armoured close support of infantry
 - Fire support in lieu of artillery and air cover
3. Escort:
 - Road Convoy support
 - Cross country support
 - Column support
 - Flank support
4. Tactical use as armour in advance and withdrawal
5. Internal Security:
 - Mobile patrols
 - Anti arms smuggling patrols
 - Airport security
 - Road blocks
 - Border patrols
 - Peace keeping duties
 - In support of police
6. Airborne attack and invasion
7. Anti airborne invasion
8. Anti seaborne invasion
9. Light seaborne invasion
10. Support of main armour



<i>Mobility</i>	
Max. speed	80.5km/h (50 mile/h)
Range on road	in excess of 644km (400 miles)
Vertical step	500mm (1ft 7.6in)
Angle of approach	26°
Angle of departure	21° 31'
Turning radii measured from centre line of vehicle	Pivot turn in neutral First gear 1.71m (5.6ft) Seventh gear 33.22m (109.0ft)
Angle of tilt	45°
Fording (screen stowed)	1067mm (42in)
Battle weight	7938kg (17500lb)

MLC	9
Airportability	Two vehicles/ aircraft (C130)
Power/Weight ratio	17.85kW/tonne (24.32bhp/ton) gross
Ground pressure	34.5kN/m ² (5lbf/in ²)

Sights and Day and Night Surveillance Equipment

Commander's sight
Binocular with both ×10 and ×1 optical systems. The instrument is capable of limited rotation allowing approximately an 85° horizontal field of view. Seven ×1 periscopes.

Gunner's sights

Daylight sight. Monocular ×10 with ×1 magnification. Capable of an elevation of between -10° and +35°. Two ×1 periscopes. Night sight. A passive night sight is available.

Driver's periscopes

Normal equipment is a wide field periscope for driving when closed down. A passive night driving sight periscope can be supplied in addition.

Servicing and Maintenance

Scorpion and its variants have been designed to keep maintenance to the minimum and to make those tasks which are necessary as simple as possible. The track life is dependent on the type of terrain in which the vehicle is used, but in normal circumstances can be expected to exceed 5000km (3000 miles) of mixed road and track running. The family has been designed to require major maintenance only every 5000km (3000 miles) or once per year and complete overhaul only after 32000km (20,000 miles). An organisation exists within the British Ministry of Defence working in conjunction with Alvis Limited to help establish all facilities including workshop and repair for maintaining vehicles locally. Further information may be obtained on request. Planning advice can also be given to meet any other specific customer requirements. Technical literature is available.

Spares

Spares scalings can be prepared tailored to suit individual customer requirements and further details are available on request. The British Ministry of Defence in conjunction with Alvis Limited maintain stocks of spares for home and overseas customers.

Training

The British Ministry of Defence and Alvis Limited may, subject to availability, be able to arrange courses in the United Kingdom and overseas for crew and technical personnel covering: gunnery; driving and vehicle maintenance; signals; courses for instructors.



Fire Power

Scorpion is armed with the lightened version of the well proven 76mm gun, mounted in a 360° traverse turret. A 7.62mm MG is mounted co-axially, both weapons having 10° depression and 35° elevation from the horizontal. Two multi-barrel smoke dischargers are also fitted, one on each side of the turret.

The 76mm gun fires five natures of ammunition – all fixed rounds. HESH – (High Explosive Squash Head) capable of defeating medium armour at a range of up to 3500 metres, and is also effective against tracks and side armour of most main battle tanks. HE – High Explosive. SMOKE – Base Ejection. CANISTER – anti infantry. ILLUMINATING. Practice and drill rounds are also available.

The vehicle can carry: 40 rounds of 76mm ammunition, 3000 rounds of 7.62mm ammunition in belts of 200 rounds each, and sixteen smoke grenades for local smoke screen protection.

The 76mm main armament has a maximum range of 5000 metres. The low muzzle velocity contributes to accuracy by light recoil and low barrel wear. The HESH round, although the main armour-defeating round, is also extremely effective against buildings and concrete emplacements. Its lethality against troops in the open is close to that of high explosive, and canister round is lethal against infantry at close quarters.

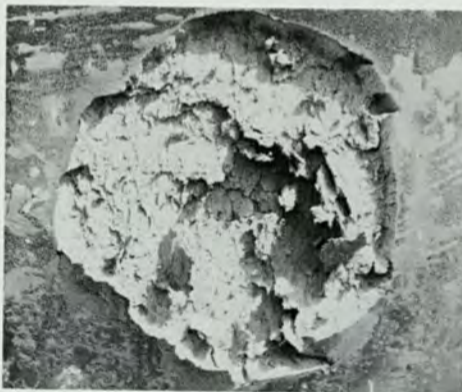
Scorpion can therefore deal with all types of target and inflict severe damage on main battle tanks.

HESH AMMUNITION

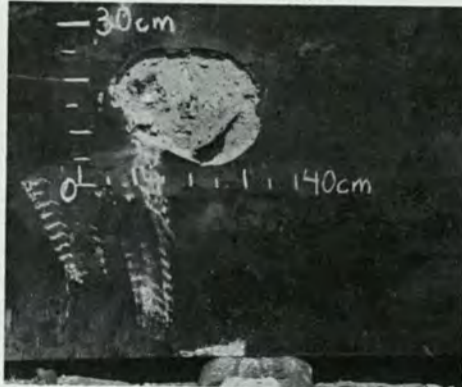
1. The HESH round consists of a high explosive filled head retained in a thin walled casing fitted with a base fuse. On striking a target the explosive flattens itself in a pool on to the surface of the target – so that the explosive is in direct contact with the target. It is then detonated from the base-fuse.

2. As the initiation is from the base fuse and the detonation wave travels towards the target, the main force acts at 90° (i.e. normal) to the target, presenting maximum effect directly through the minimum thickness of target material. This is true even if the round strikes at an acute angle of attack.

3. The effect of HESH is to produce a violent shock wave which travels through the target material. If this is armour plate over a certain thickness, the effect is to blow a large "scab" off the inner surface of the plate, together with a number of smaller fragments. These pieces fly off at high velocity and cause immense damage inside the vehicle, killing or severely wounding the occupants and destroying equipment. A secondary effect is to disrupt the welds and riveted or bolted joints, causing components and fittings to distort or become detached; and moving parts, such as turret rings and gun mountings and sights, can become jammed by distortion.



The effect of a 76mm HESH round on the front of thick armour plate. This round was fired at 90° to the target plate. Note the large scab blown off the rear of the same plate.



The front and rear of armour plate attacked by 76mm HESH at 45°. Note the size of scab.



A thick stone wall before and after attack by 76mm HESH.

4. Against thin armour (e.g. APCs), the effect is devastating. A large hole is blown in the armour, allowing the full force of the explosion, with blast gases and fragments, to enter the target vehicle.

5. Against concrete or brick the effect of HESH is dramatic, blowing the material apart in varying sizes of fragment, while the disruptive shock waves can cause complete collapse of structures.

6. Against soft targets and troops in the open HESH has a lethal effect from blast and fragments, comparable with conventional HE shell.

7. The performance of HESH is substantially unaffected by range. It is essentially as effective at long range as at point blank range and the spin stabilisation of the round is not detrimental to the effect of the charge. Equally, the velocity of the projectile has little bearing on its effectiveness at the target. These factors mean that HESH can be fired from medium velocity weapons in spin-stabilised rounds, giving:-

- (a) light recoil
- (b) low barrel wear
- (c) maximum effect at distant targets



General Description

General

Scorpion is a compact, fast light tank carrying a crew of three. It is also the basic vehicle of the range of seven vehicles in which all the automotive components have been tested and proved. Scorpion has a battle weight of 7938kg (17500lb) which enables two to be carried in a C130 Hercules aircraft for over 1600km (1000 miles).

Immunity

Despite its low weight, Scorpion has better protection than other light vehicles in its class; this is mainly due to the use of aluminium alloy armour.

Layout

The transmission is forward of the driver, who occupies a compartment in the front left. To his right is the engine. The radio sets are mounted at the back of the turret. The fuel tank, additional ammunition and the NBC pack (if fitted) are in the rear hull. This layout has meant that few changes are required for the other members of the CVR (T) family.

Driver's Compartment

The driver has standard type tracked vehicle controls and instrumentation. The hatch is a one-piece lift-and-turn type with a single periscope just forward in the hull. For night driving a passive image intensifier periscope can be fitted, the performance of which can be augmented by using the infra red masks on the headlamps.

The Engine

The Jaguar 4.2 litre engine gives 141.7kW (190bhp) in this its military form. It has been specially developed to give long life at high engine revolutions and the engine has been thoroughly proven in every type of terrain and climatic condition. It uses a single Solex carburettor and the compression ratio is 7.75:1 — which permits the use of military fuels and increases the life and reliability of the engine. It provides the vehicle with the high power/weight ratio of about 17.85kW/tonne (24.32bhp/ton).

Transmission

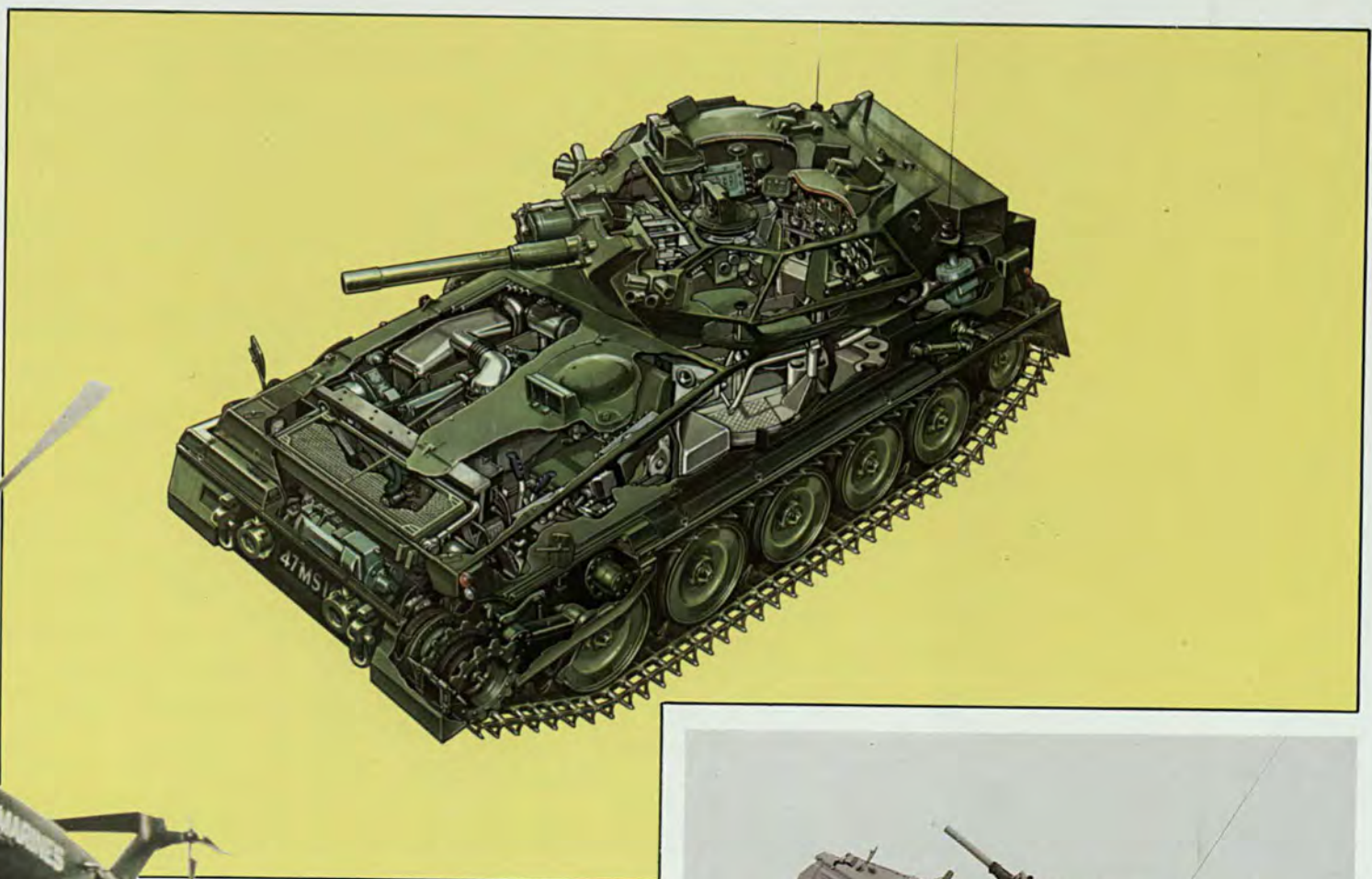
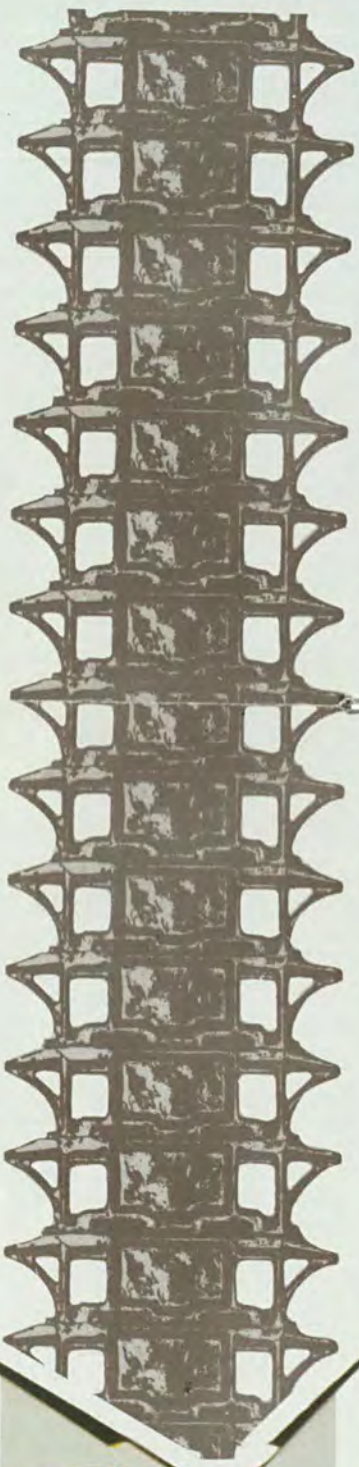
The transmission has been developed on the same principles as those used for the Chieftain main battle tank. It is a hot-shift, foot-operated, seven-speed gearbox with controlled differential steering system. Selection of forward or reverse provides the same speed in either direction. There is no clutch pedal and, as is normal in this type of box, the turning radii vary with the gear ratio; there is a neutral or pivot turn. The steering, and the main brakes are discs with a rim brake for parking.

Cooling

A newly developed single mixed flow fan draws air through the radiator situated over the gearbox, thence over the engine and out through the louvres. The exhaust is also cooled by some of this air.

Suspension

From the gearbox the drive goes to the front sprockets and then to the tracks, which are of the single horn type with rubber pads on the running surface, a rubber wheel path on the inside and rubber bushes. The sprocket has two rubber support rings which reduce track noise considerably. Suspension is by torsion bar with dampers on front and rear wheel stations. The wheels are of aluminium with improved hub seals for minimal servicing. Track adjustment is by hydraulic ram and hand pump.



Performance

The power/weight ratio of 17.85kW/tonne (24.32bhp/ton) gives a top speed of 80.5km/h (50 mile/h) and acceleration from 0 to 48.3km/h (0 to 30 mile/h) in 16 seconds. The ground pressure of 34.5kN/m² (5 lbf/in²) gives an outstanding soft ground performance. Road range exceeds 644km (400 miles) with the 423 litres (93 imperial gallons) carried under armour.





Water Crossing

A wading screen, which can be quickly erected, is available as optional equipment to enable the vehicle to swim. Using only track propulsion, a speed of about 6.5km/h (4 mile/h) is achieved. A propeller kit can also be fitted to the sprockets to give an increased water speed of 9.65km/h (6 mile/h) and considerably improve manoeuvrability. Because of Scorpion's low ground pressure, its bank exit capability is significantly better than that of other light armoured vehicles.

Fighting Compartment

The turret crew of two, a commander/loader and a gunner/operator, sit either side of the main armament. Elevation is 35° and depression is 10°. 40 rounds of 76mm ammunition are stowed in easily accessible bins. On the left of the main armament a 7.62mm machine gun is co-axially mounted. This is used as a ranging machine gun, giving a high first round hit probability. The gun controls include hand elevation and a mechanical two speed hand traverse. There is a clinometer and a traverse indicator. The loader's safety switch is readily accessible to the commander. A power traverse is available.

Optics

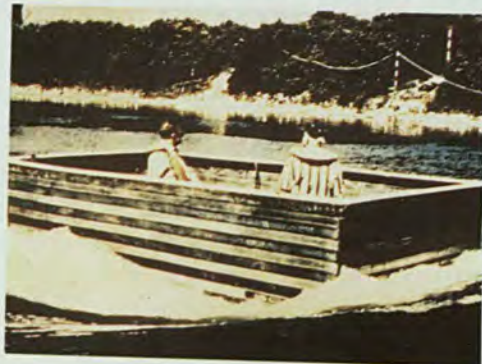
Scorpion has been designed to operate for 24 hours a day, and particular attention has been paid to vision devices. The commander has a periscopic binocular sight giving ×1 and ×10 magnification, plus seven ×1 magnification periscopes for all-round vision. The gunner has a monocular day sight ×1 and ×10 (plus two ×1 magnification periscopes). Vehicles are normally supplied to British Army standard specification in daylight trim. Additional equipment includes a gunner's passive night sight, giving ×1.6 or ×5.8 magnification which is armour protected and permanently mounted on the right-hand side of the main armament; a driver's passive night periscope is also available.

Nuclear, Biological and Chemical (NBC) Protection

An NBC filtration pack can be provided and is mounted at the rear of the fighting compartment and ensures clean air under pressure. It protects the crew from radio-active fallout, vapour and gases. Alternatively, an air-cooling or through-flow air circulation system can be fitted to suit customer requirements.

Electrics

The electrical system is 24 volt with a 140 ampere alternator and two sets of batteries. This provides ample capacity for silent radio watch and for the auxiliaries. Radios and communications equipment, being a matter of customer preference, are supplied as extra items.



General Data

General

Crew	3, i.e. Commander/Loader, Gunner/Operator, Driver
Battle Weight	7938kg (17500lb)
Ground Pressure	34.5kN/m ² (5lbf/in ²)
Power/Weight Ratio	17.85kW/tonne (24.32bhp/ton)
Fuel Capacity	423 litres (93 gallons)
Airportability	Two vehicles/Aircraft (C.130)
Airdrop	1 vehicle (C.130) @ 15,500lb vehicle weight

Dimensions

Length, over rear stowage bin (gun forward)	4788mm (15ft 8½ in)
Length, over rear mudflap (gun forward)	4572mm (15ft 0in)
Height (top of commander's periscope)	2102mm (6ft 10¾ in)
Width, overall	2235mm (7ft 4in)
Width, over tracks	2134mm (7ft 0in)
Ground Clearance (approx)	356mm (1ft 2in)

Armament

Main Armament	Gun, 76mm, L23A1
Elevation	+35° to -10° (+622 to -178 mils)
Traverse	360° (6400 mils)
Auxiliary Armament	7.62mm Ranging Machine gun
Smoke Protection	2 multi-barrel Smoke Dischargers, mounted on turret
Coverage	160° (2844 mils)
Ammunition Stowage	
76mm (fixed)	40 rounds
7.62mm M.G.	3000 rounds
Smoke Grenades	16 rounds

Sighting

Gunner	Monocular ×10 and ×1 day sight and passive night sight with fixed eyepiece systems. Objective systems elevate and depress with gun.
Commander	Periscopic Binocular ×10, with lever introduced ×1. Limited traverse.

Vision

Gunner	2 periscopes ×1, with forward sloping windows.
Commander	7 periscopes ×1, with forward sloping windows.
Driver	'Head out' for opened up vision. Single wide angle periscope, with forward sloping window for closed down daylight vision. A passive night viewing periscope interchangeable with the day periscope is available.

Engine

Make	Jaguar 4.2 litre Gasoline
Type	J60 No 1 Mk 100B
No of cylinders	6 in line
Bore and stroke	92mm (3.63in) × 106mm (4.17in)
Capacity	4235cc (258.4 in ³)
Compression Ratio	7.75:1
Max Power (Gross)	141.7 kW (190bhp) at 4750 rev/min
Max Torque (Gross)	345.8Nm (255 lbf ft) at 3500 rev/min
Carburation	Twin Choke Solex Downdraught (48 NNIP)

Transmission

Gearbox	TN 15X Crossdrive, Semi-automatic hot-shift type, providing seven speeds in each direction and pivot turn
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Gear	Gearbox Drive	Final Drive Ratio	Theoretical Turning Circle Radii
1	28.8	3.667	1.71m (5.6ft)
2	12.8	3.667	3.84m (12.6ft)
3	9.2	3.667	5.33m (17.5ft)
4	5.52	3.667	8.9m (29.2ft)
5	3.08	3.667	16.06m (52.7ft)
6	2.31	3.667	21.28m (69.8ft)
7	1.47	3.667	33.22m (109.0ft)

Final Drive	Single Epicyclic Reduction 3.667:1
Steering	Merritt system incorporated in Gearbox
Steering Brakes	Caliper discs, hydraulically operated
Main Brakes	Caliper discs, hydraulically operated
Driving Sprocket	13 teeth



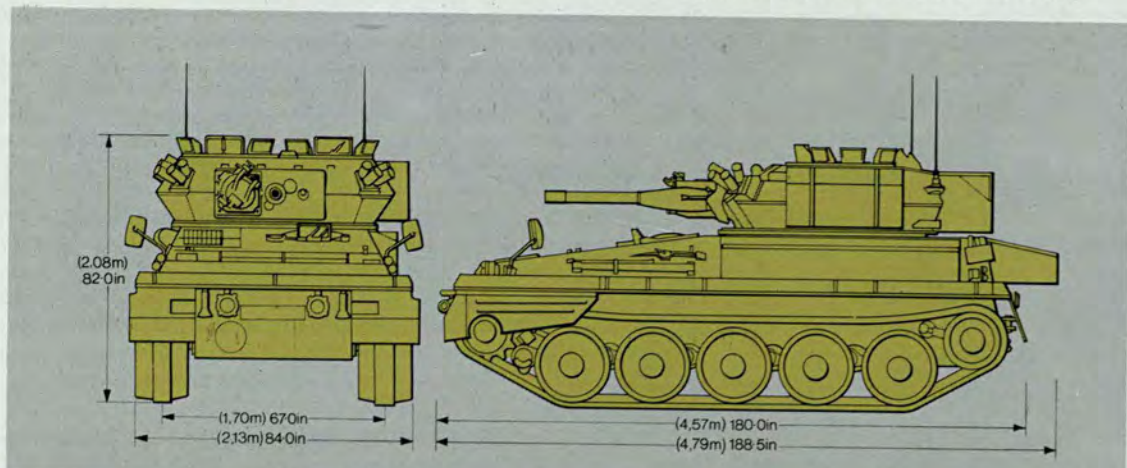


Controls

- Steering Levers Hydraulically connected to steering brakes
- Gear change Foot operated
- Forward and Reverse Lever Hand operated
- Hand Brakes Hand lever connected by cable to contracting bands operating on periphery of main brake discs
- Foot Brake Pedal Hydraulically connected to main brakes

Suspension

- Type Transverse Torsion Bar — 5 units per side
- Wheels 5 off 580mm (23in) diameter rubber tyred double aluminium alloy wheels per side
- Wheel Deflection 203mm (8in) bump; 102mm (4in) rebound
- Shock Absorbers On front and rear stations. Hydraulic lever type.
- Bump Stops Rubber. On front and rear stations.



Tracks

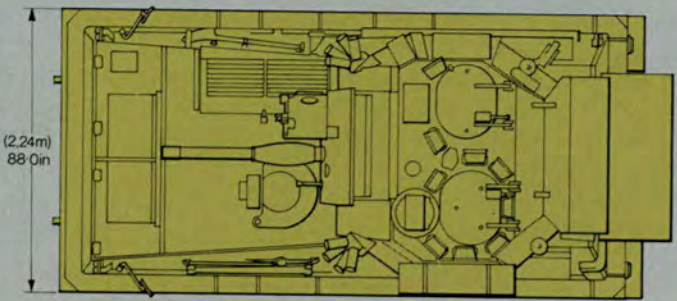
- Type Light steel links with rubber bushes and pads (single horn)
- Pitch 114mm (4.5in)
- Width 432mm (17in)
- No of links per Track 79 per side

Communications

Radio and Intercommunication
A variety of radio and internal communication equipment can be fitted as required

Electrical System

- Generator Type 8in diameter 3 ϕ Alternator with integral rectifying diodes
- Generator Output 140 amp at 28 volts at 3000/10,000 rev/min
- System Voltage 28.5 volts \pm 0.25 volts — normal
27.0 volts \pm 0.25 volts — tropical
- Batteries Lead acid type UK — 6TN, 100 Ah at 20 hour rate, two in hull for hull services, two in turret for radio and turret services
- Distribution and Charging System D.C. nominal 24 volt system with negative pole earth
- Headlamps With interchangeable I.R. lenses



Flotation

- Propulsion Tracks
An applique propeller kit is available
- Freeboard with raised screen 965mm (38in) in front
711mm (28in) in rear
- Attachment points for fixed line crossings.

Optional Installed Equipment

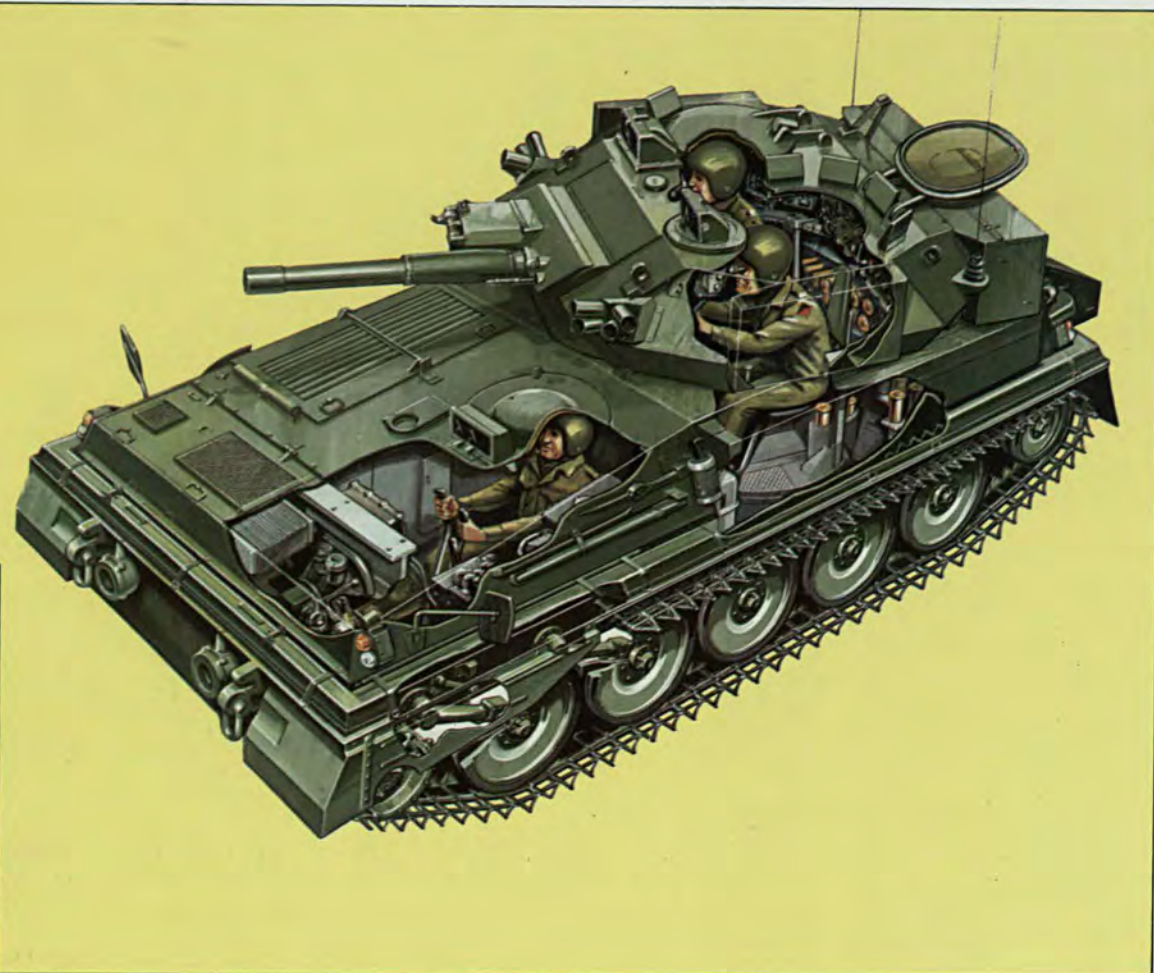
- Power traverse Air circulation equipments
- Night fighting equipments Nuclear, Biological & Chemical (NBC) protection equipments
- Swimming equipments Radio/communications equipments
- Laser range facilities



Performance (at 7938kg (17,500lb) GVW)

- Maximum road speed ... 80.5km/h (50 mile/h)
- Acceleration (i) thro' gears: 0-48.3km/h (0-30 mile/h) in 16 seconds
(ii) top gear: 32.2-64.4km/h (20-40 mile/h) in 27 seconds
- Range on roads In excess of 644km (400 miles)
- Road Fuel Consumption 1.6km/litre (4.5 mile/gal) at 48.3km/h (30 mile/h)
- Vertical Obstacle 500mm (1ft 7.6in)
- Max Gradient (Stop and Restart) 24° (45%)

- Brakes — Main 60% retardation (15.24m (50ft) stop from 48.3km/h (30 mile/h)
- Hand Hold on 18° (34%) slope
- Angle of Approach 26°
- Angle of Departure 21° 31'
- Turning Circle See TRANSMISSION
- Angle of Tilt 45°
- Fording (Screen Stowed) 1067mm (42in)
- Water Speed 6.44km/h (4 mile/h) approx with tracks
9.65km/h (6 mile/h) approx with tracks, propeller kit and washboard
- Military Load Classification 9





SCIMITAR
Rarden 30mm Gun Version



STRIKER
Anti Tank Guided Weapon Vehicle



SPARTAN
Armoured Personnel Carrier



SULTAN
Armoured Command Vehicle



SAMARITAN
Armoured Ambulance



SAMSON
Armoured Recovery Vehicle



Further information related to the Scorpion family of vehicles may be obtained on application to the following:

(a) *Commercial Director*
Alvis Limited, Holyhead Road,
Coventry CV5 8JH, England
Telephone: 0203 595501 Telex: 31459

(b) *Director of Sales*
The Defence Sales Organisation
Ministry of Defence, Stuart House
23-25 Soho Square, London W1V 5FJ,
England
Telephone: 01-632 3333 Telex: 825911

(c) *Military or Defence Attachés at
British Embassies overseas*

(d) *Office of the Military Attaché*
Belgian Embassy
103 Eaton Square, London SW1W 9AB,
England
Telephone: 01-235 4012
Telex: 22823

(e) *Ministère des Affaires Economiques*
Direction Générale de l'Industrie — bccd
Square de Meeûs 23, 1040 Bruxelles,
Belgique
Telephone: 02/126690 Telex: 21062

Also, for specific information on the
Swingfire missile system used by Striker,
please contact:

British Aerospace Dynamics Group
Stevenage-Bristol Division
PO Box 19, Six Hills Way
Stevenage SG1 2DA, England
Telephone: 0438 2422 Telex: 825125/6

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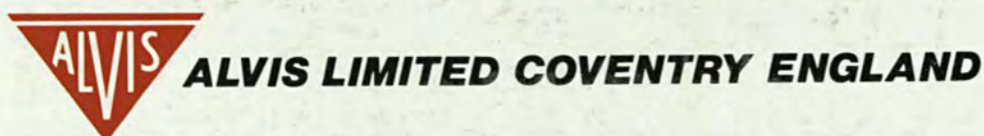
The Scorpion family of vehicles is now available with diesel engine power as an alternative to the petrol engine in current use. The diesel engine chosen is the Perkins turbocharged T6-3544 which is in quantity production and in use world-wide.

Engine Detail

Make Perkins Diesel
Type Turbocharged T6-3544
No of cylinders ... 6 in line
Bore and stroke ... 98.4mm (3.875in) x
127mm (5.0in)
Capacity 5.80 litres (354in³)
Max Power (Gross) 115.6kW (155bhp) at
2600 rev/min

Changes to the standard Scorpion vehicle specification as a result of the diesel engine installation are:

Battle weight 8260kg (18,214lb)
Ground pressure .. 38kN/m² (5.5lb/in²)
Range on road ... in excess of 866km
(600 miles)
Acceleration .(i) thro' gears: 0-48.3km/h
(0-30 mile/h) in
18.5 seconds.
(ii) top gear: 48.3-64km/h
(30-40 mile/h) in
26 seconds.







SCORPION 90



ALVIS LIMITED COVENTRY ENGLAND



SCORPION 90

Fire Power

Scorpion 90 is an addition to the CVR(T) family of vehicles.

Scorpion can be armed with the 90mm Cockerill gun, the breech and barrel of which are made from high quality forged alloy steel (ESR type). The barrel is rifled and the rounds are fin stabilised. The gun is mounted in the Scorpion 360° traverse turret which is similar to that used for the 76mm gun.

A 7.62mm MG is mounted co-axially, both weapons having 8° depression and 30° elevation from horizontal.

The 90mm gun has a range of 4000 metres and fires five natures of ammunition. HE – High Explosive. HEAT – High Explosive Anti-Tank. SMOKE – white phosphorous. HESH – High Explosive Squash Head. CANISTER – anti infantry. Practice and drill rounds are also available.

Scorpion with the AC90 turret can therefore deal with all types of target and inflict severe damage on main battle tanks.

Power traverse and elevation are fitted as standard.



General Description

General

Scorpion fitted with the AC90 turret is a compact, fast light tank carrying a crew of three. It has a battle weight of 8723kg (19,231lb) and two can be carried in a C130 aircraft.

Engine

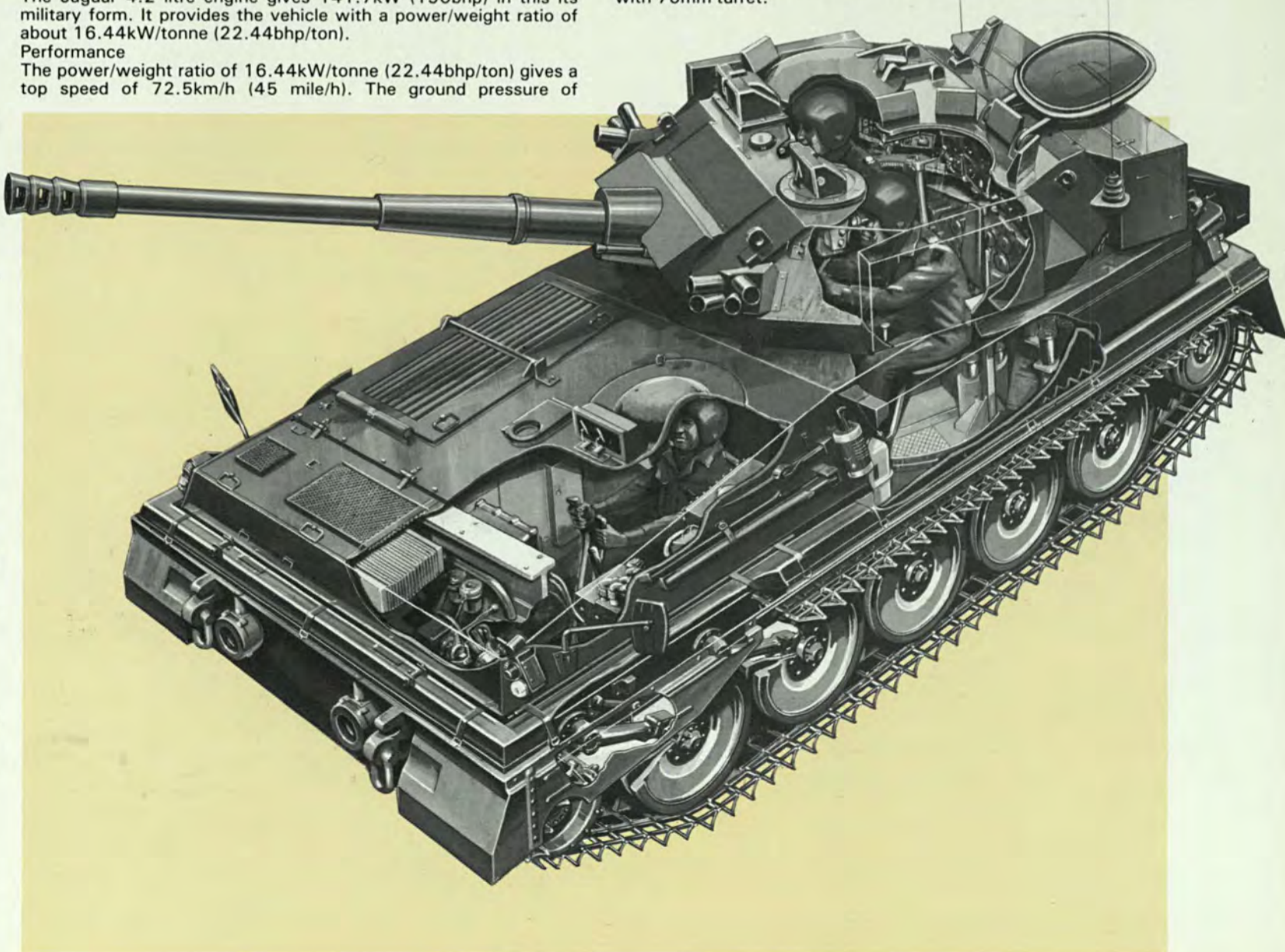
The Jaguar 4.2 litre engine gives 141.7kW (190bhp) in this its military form. It provides the vehicle with a power/weight ratio of about 16.44kW/tonne (22.44bhp/ton).

Performance

The power/weight ratio of 16.44kW/tonne (22.44bhp/ton) gives a top speed of 72.5km/h (45 mile/h). The ground pressure of

37.62kN/m² (5.41bf/in²) gives an outstanding soft ground performance. Road range exceeds 644km (400 miles) with the 391 litres (86 imperial gallons) carried under armour.

In other respects Scorpion with AC90 turret is similar to Scorpion with 76mm turret.



General Data

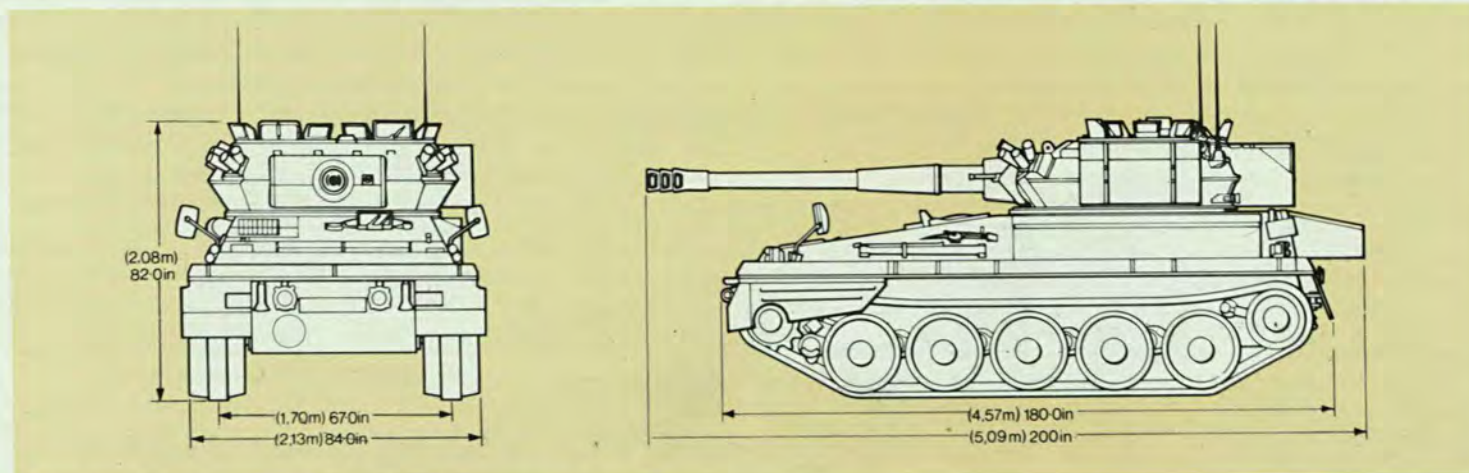
General

Crew 3, i.e. Commander/Loader,
Gunner/Radio Operator, Driver
Battle Weight 8723kg (19,231lb)
Ground pressure 37.26kN/m² (5.4lbf/in²)
Power/Weight Ratio .. 16.44kW/tonne (22.44bhp/ton)
Fuel Capacity 391 litres (86 gallons)
Airportability Two vehicles/aircraft C130
Airdrop 1 vehicle (C130) @7030kg
(15,500lb) vehicle weight

Dimensions

Length, over rear stowage bin (gun forward)
..... 5288mm (17ft 4 1/4 in)
Length, over rear mud flap (gun forward)
..... 5080mm (16ft 8 in)

Length, centre of turret to end of gun
..... 3485mm (11ft 5 1/4 in)
Height (top of commander's periscope)
..... 2102mm (6ft 10 3/4 in)
Width, overall 2235mm (7ft 4 in)
Width, over tracks 2134mm (7ft 0 in)
Ground clearance (approx) 356mm (1ft 2 in)
Armament
Main Armament Gun 90mm Mk III Cockerill
Elevation .. +30° to -8° (+533 mils to -142 mils)
Traverse 360° (6400 mils)
Auxiliary Armament 7.62mm co-axial machine gun
Smoke Protection 2 multi-barrel smoke
dischargers mounted on turret
Coverage 160° (2844 mils)



Additional Information

Further information relating to Stormer and the Scorpion CVR(T) range of vehicles may be obtained on application to the following:

- (a) Alvis Limited,
10 Fitzroy Square, London,
W1P 6AB, England.
Telephone: (01) 387-7224. Telex: 262748, 265403
- (b) Military or Defence Attachés at British Embassies Overseas.

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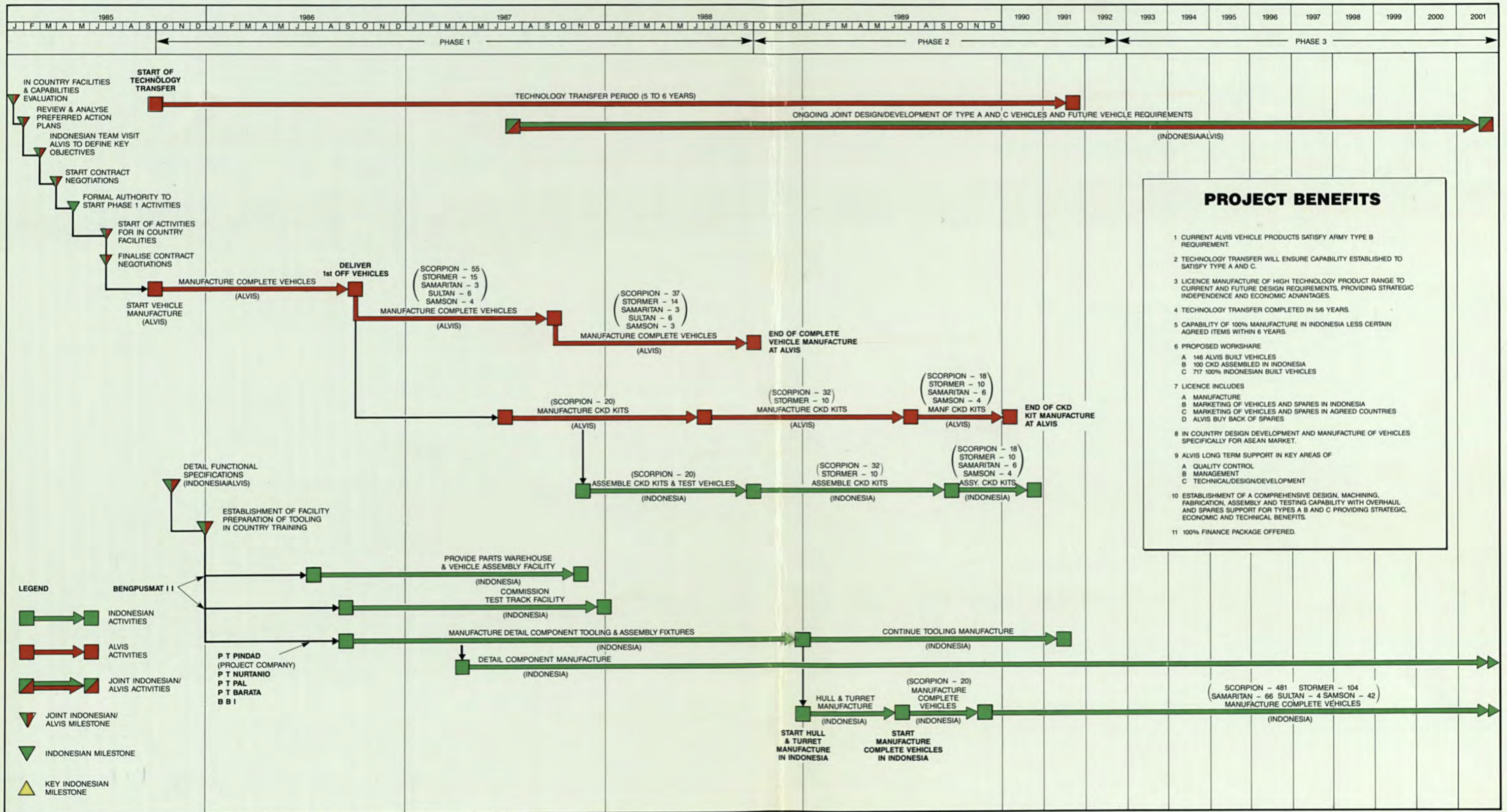


ALVIS LIMITED COVENTRY ENGLAND

A member of the United Scientific Group



INDONESIAN ALVIS SCORPION PROJECT



VEHICLE PRODUCTION	INDONESIA		ALVIS		CUMULATIVE TOTAL	
	CKD KIT ASSEMBLY	COMPLETE VEHICLE	COMPLETE VEHICLE	COMPLETE VEHICLE	COMPLETE VEHICLE	COMPLETE VEHICLE
			83	63	83	166
					20	186
					42	228
					38	266
					20	286
					65	351
					64	415
					63	478
					63	541
					62	603
					63	666
					64	730
					65	795
					64	859
					61	920
					63	983