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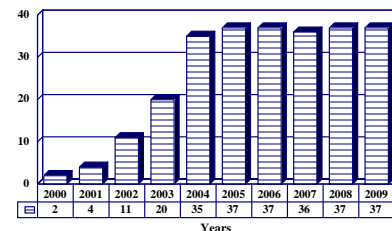
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Artillery System 90 155 mm Self-Propelled Howitzer - Archived 4/2000

Outlook

- Production complete for domestic requirement
- Forecast production is for first export sale
- Additional interest on export market
- Several modernization and retrofit programs are in various stages of development and integration

10 Year Unit Production Forecast
2000 - 2009



Orientation

Description. A tracked 155 millimeter self-propelled artillery system.

Sponsor. Initially the Artillery System 90 was a private development effort funded by the contractor BAE Systems Limited (originally Vickers Shipbuilding and Engineering Limited). Subsequently, the Artillery System 90 has been supported for procurement and further development by the United Kingdom Ministry of Defence, Ministry of Defence Procurement Executive, through the Ordnance Board and the Ministry of Defence Army Department, the British Army.

Contractors. The development and manufacturing of the Artillery System 90 has been undertaken by BAE Systems (originally and prior to several name changes, the Armaments Division of Vickers Shipbuilding and Engineering Limited) located in Barrow-in-Furness, Cumbria, United Kingdom. Major subcontractors include Air Log, Avimo, Cummins Engine Company, Diehl Group/Tracks and Suspension Division, Marconi Radar and Command Systems, Royal Ordnance and Zahnradfabrik Friedrichshafen.

Licensees. Although the initial development of this self-propelled artillery system involved the Verolme Estaleiros Reunidos do Brazil organization in Brazil, that relationship was terminated early on in the program.

In 1998, in order to address the Polish requirement for a Western standard 155 millimeter self-propelled howitzer, the Polish firm Huta Stalowa Wola entered into a license marketing and production agreement with the prime contractor. If India selects the Artillery System 90 turret, a license agreement is expected.

In late 1997, it was revealed that Denel of South Africa was engaged in talks with the prime contractor (then Vickers Shipbuilding and Engineering) regarding the possibility of a joint venture in the artillery market. As of this writing, nothing additional had been heard regarding this development.

Status. The initial prototype testing and evaluation is complete, as is the serial production program for the British Army. Development and marketing of the Artillery System 90 continues. In mid-1999, the preparations for production to address the Polish requirement were ongoing in the United Kingdom and Poland.

Total Produced. As of January 1, 2000, two prototypes and 179 production Artillery System 90 systems had been manufactured.

Application. Mobile fire support at the battalion and division levels.

Price Range. In equivalent 2000 United States dollars, if production of the original version were resumed today, the unit price of the serially produced Artillery System 90 would be \$4.017 million in ten unit buys; the price can range higher or lower depending on the build

standard. For the 52 caliber version, the unit price in those same dollars is \$4.219 million. One source puts the unit price of the Artillery System 90 turret with the 52 caliber cannon at the equivalent of slightly over two million 2000 United States dollars.

Technical Data

Design Features. Modular design incorporating an automatic loading system and advanced fire control components including an automatic laying system.

Crew. Four plus driver.

Muzzle Brake. Double baffle.

Recoil Mechanism. Hydropneumatic.

Breech Mechanism. Split block with Crossley pad.

Ammunition. The Artillery System 90 can fire all NATO standard 155 millimeter rounds plus Extended Range Full Bore types.

Dimensions. The following data are for the Artillery System 90B version that was selected by the British Army; this is considered the standard or baseline system.

SPECIAL NOTE

As the Polish systems are to be integrated with an as-yet-unspecified chassis (albeit possibly based on the chassis of the T-72 tank) the technical data for this application have yet to be released.

	<u>SI units</u>	<u>US units</u>
Length overall	9.89 meters	32.45 feet
Width	3.40 meters	11.15 feet
Height	3.0 meters	9.84 feet
Combat weight	45.0 tonnes	49.6 tons
Fuel capacity	746 liters	198.4 gallons
Ordnance caliber	155 millimeters	6.10 inches
Ordnance length	39 calibers/6.05 meters	39 calibers/19.83 feet

NOTE: The Artillery System 90A has a weight of 36 tonnes (39.68 tons) and a fuel capacity of 600 liters (159.57 gallons).

Performance. The maximum vehicle speed and range are for use on a metaled road. The cannon range performance is with the 39 caliber cannon firing non-assisted ammunition. The maximum rate of fire is for three minutes; a burst rate of three rounds in less than ten seconds is possible. For the 52 caliber cannon, a 30 kilometer (32,808 yard) range is achieved when firing non-assisted ammunition.

	<u>SI units</u>	<u>US units</u>
Maximum speed	55 kilometers per hour	34.15 miles per hour
Maximum range	373 kilometers	231.63 statute miles
Step	88 centimeters	2.88 feet
Trench	2.8 meters	9.18 feet
Slope	30%	30%
Gradient	60%	60%
Fording	1.5 meters	4.92 feet
Elevation	+70°	+70°
Depression	-5°	-5°
Traverse	360°	360°
Maximum ordnance range	24,700 meters	27,012 yards
Maximum rate of fire	6 rounds per minute	6 rounds per minute
Sustained rate of fire	2 rounds per minute	2 rounds per minute

Engine. Cummins Engine Company supplies the model VTA-903T-660 four stroke diesel engine for the Artillery System 90. This supercharged, liquid cooled engine is in the V-8 configuration; it is rated at 492.36 kilowatts (660 horsepower) at 46.67 revolutions per second (2,800 revolutions per minute). The power-to-weight ratio is 11.73 kilowatts per tonne (14.25 horsepower per ton). A 24 volt electrical system with four 12 volt/100 ampere hour batteries in the turret, and four more 12 volt/100 ampere hour batteries in the hull, is the standard electrical fit. For an auxiliary power unit, an unidentified two stroke diesel engine powers a generator located in the forward part of the hull interior.

Gearbox. Zahnradfabrik Friedrichshafen provides the LSG 2000 automatic gearbox with four forward and two reverse gear ratios.

Suspension and Running Gear. This artillery system uses a hydropneumatic type suspension with six dual tired roadwheels and three return rollers on each

side. The drive sprocket is at the front with the idler at the rear. An automatic track tensioner/overload protection device is incorporated in the idler gear. Diehl provides the double-pin track and sprockets to Air Log, which has the overall responsibility for the suspension and running gear.

Fire Control. The Artillery System 90 is normally employed for indirect fires with the targeting data provided by a forward observer through a fire direction center command post. The Artillery System 90 crew receives the data via the onboard radio and lays the cannon in the appropriate manner with the Autolay system. Aside from the receipt of the targeting data, the Artillery System 90 is completely autonomous in operation as it has a ring laser gyroscope-based internal navigation system and an automatic laying system using data from the system's onboard computer. Muzzle velocity measuring equipment is fitted. The DFS90 day/night direct fire telescope, provided by Avimo, is also fitted.

Variants/Upgrades

Variants. The Artillery System 90 has been developed in two basic versions, one (the complete system) for the British Army and export and the other (the turret) for export only.

Braveheart. This is the name given by the contractor to the latest version of the Artillery System 90 equipped with the 52 caliber cannon and the features of the Desert system described further on. The features can be added or deleted on an as-needed basis in order to address any potential customer requirement.

Artillery System 90/T-72. In a program that began in 1991, the prime contractor has integrated a slightly modified version of the complete turret of the system with the chassis of a T-72 tank in an effort to increase the marketability of the Artillery System 90. The integration was completed in mid-1992 and, following contractor trials, was displayed at Royal Navy/British Army Equipment Exhibition in September of 1993. An interface ring allows for the direct attachment of the turret to the T-72 chassis. All turret, ordnance and fire control functions remain the same; the system weighs about a tonne (2.204 tons) more than the standard Artillery System 90. The prime potential customer for this system is India, with a 600 unit requirement. However, India requires the 52 caliber cannon be fitted. The contractor has studied several other tank chassis for possible integration with the modified turret which is also called the Artillery System 90 Universal Turret.

Desert Artillery System 90. In response to the unique requirements of the Mideast region, where the Artillery System 90 has several potential customers, a desert version of the system has been developed. The enhancements are as follows:

- The engine cooling system is enhanced by changing the radiator material from copper-zinc to aluminum; the radiator also has an increased number of cooling fins, and higher efficiency fans are fitted. Modified design air inlet louvers are fitted, and components of the engine exhaust system are moved.
- The gearbox cooling is enhanced by the addition of an air to oil cooler.
- The gearbox has five forward gear ratios.
- The cooling for the auxiliary power unit has been enhanced by the integration of a larger coolant pump and improved self-sealing couplings for increased flow. The crew heater and silencer are removed.
- The vehicle's air conditioning system has been improved for the hot climate; a larger compressor and heat exchanger are fitted, and the design of the louvers has been changed to allow for improved air flow. An additional motor for the air circulation system is fitted.
- In order to reduce the ingress of sand into the vehicle and components, various covers are mounted in several positions.

- A Diehl type 940 track (fixed horn with a taller profile) is fitted for improved performance in sand.
- To reduce the heat buildup in the vehicle, solar reflective paint is applied to the vehicle, and an insulating cover is added in the roof of the turret.

Chrobry. This is the Polish name for the Artillery System 90/Braveheart that was selected in late July of 1999 for service in that nation. The Artillery System 90 turret, armed with the 52 caliber cannon is to be supplied for integration with an as yet unspecified chassis; our research indicates that this will be based on the domestically produced SUM/KALINA tracked chassis.

Other Variants. The prime contractor has completed an initial concept study for a family of vehicles based on the Artillery System 90 chassis. Among the vehicles envisioned are an armored repair and recovery vehicle, and an ammunition resupply vehicle. The base chassis of the Artillery System 90 has also been proposed as the basis for the British Army's proposed Future Engineer Tank, also called Terrier.

Modernization and Retrofit Overview. Even though the Artillery System 90 has only recently completed its production run for the British Army, one major modernization and retrofit program is already being funded for it.

52 Caliber Cannon Upgrade. Some years ago, Germany, Italy, the United Kingdom and the United States signed the Joint Ballistics memorandum of understanding, a document outlining the parameters of future artillery systems among the signing nations; subsequently, France has signed the document. Chief among its provisos is a 52 caliber length for 155 millimeter artillery.

The Artillery System 90 was developed around the 39 caliber ordnance which also conforms to the Quadrilateral Ballistics memorandum of understanding. Early on, the then-Vickers Shipbuilding and Engineering research indicated that future performance of such technology would be limited, especially in terms of firing the longer ranges expected to be required. Therefore, the Artillery System 90 was designed from the outset for its ability to integrate with a new 52 caliber cannon, then being developed by the Royal Armament Research and Development Establishment. This cannon, initially designated the EXP36, can (with assisted projectiles), achieve a range of 40 kilometers (43,744 yards) at a 921-meters-per-second (3,021.6 feet per second) muzzle velocity. The 52 caliber version of the Artillery System 90 can shoot 30 kilometers (32,808 yards) firing unassisted projectiles.

In officially addressing the future requirement for the 52 caliber cannon, the United Kingdom initiated the Extended Range Ordnance program in mid-1994. At that time, Royal Ordnance had already supplied some EXP36 52 caliber barrels, one of which had been integrated with the Artillery System 90 for initial trials. The new 52 caliber cannon uses the same breech assembly, muzzle brake and fume extractor used on the existing 39 caliber cannon on the Artillery System 90. A new propelling charge system was competitively developed under the Modular Charge System (formerly the Unimodular Propelling Charge System) program. In 1994, the then-designated prime contractor, Vickers Shipbuilding and Engineering, was selected as the prime contractor and systems integrator to develop this program to production level.

On December 15, 1998, the United Kingdom Ministry of Defence announced its final decision regarding the hotly contested contract for the Artillery System 90 upgrade, especially for the provision of the modular charge system for the extended range ordnance. The overall contract for the upgrade was awarded to the then prime contractor Marconi Marine, Land and Naval Systems. The prime contractor has awarded major subcontracts to Royal Ordnance for the provision of a new 52 caliber cannon, and to Somchem, a subsidiary of Denel of South Africa, for the provision of the modular charge system.

The decision to award the overall contract to the then Marconi represented mixed news to Royal Ordnance. The subcontract to provide the 52 caliber cannon was welcome, but the decision to go to the South African Somchem firm for the modular charge system represented a major setback to the British firm. With no major contracts expected, the future of the Royal Ordnance Bishopton propellant manufacturing facility appears dismal; it will be closed down by the end of 2000. The development and integration of the 52 caliber cannon and new charge system are ongoing. It has been demonstrated that the physical changing over from the 39 to the 52 caliber cannon can be accomplished in less than two hours.

Further on lies the potential for an upgrade of new 52 caliber cannon technology. Studies into the development and integration of a 52 caliber cannon utilizing liquid propellant technology are ongoing. However, as evidenced by the troubles in a similar program in the United States, this technology may be longer in coming than previously thought. Finally, the development and integration of a laser head to replace the percussion primer system now being used, is ongoing.

Other Enhancements. A number of other possible upgrades are already being investigated for integration with the Artillery System 90. These upgrades, collectively called the Artillery System 90 Capability Enhancement Program, are depicted in the illustration at the end of the text. Still another potential upgrade has been the rationalization of the system's command, control and communications components. In relation to this, the Ministry of Defence has funded the integration of the Battery Command Post automation component which eases the transfer of data within the vehicle's fire control system. This upgrade includes new interface equipment. Other research related to the further automation of the system as well as a more long-term goal of reducing the number of personnel required to operate the system is ongoing. These are now called Mid-Life Improvement A and Mid-Life Improve-

ment B. The A portion of the program involves the integration of an ammunition trailer mounting two load containers, new software for muzzle velocity measurement and measurement of barrel droop, the integration of Global Positioning System in the fire control suite, a centralized Commander's Display Unit, hot and cold weather operating enhancements, and a thermal warning device. All or part of the preceding upgrades could be incorporated in the A portion of the program which is expected to be implemented in the immediate future.

The Mid-Life Improvement B program is examining the integration of the automated primer loader, increased level of armor protection, automated ammunition handling system, thermal viewers for the commander and driver and an automated data collection system.

Program Review

Background. In 1982, then-Vickers Shipbuilding and Engineering Limited began development of the GBT 155 modular howitzer turret. The GBT 155 was designed with the export market in mind, specifically for rapid fitting to existing tank chassis. While this idea has its advantages, the drawbacks are also significant, not the least of which is the fact that the weight of the resulting vehicle can impose severe operating limitations in the less-developed nations for which the system was primarily designed. The bridges in such nations simply cannot hold the weight of such a vehicle. Also, the placing of an artillery turret in the central position on a tank reduces the amount of interior space for the crew and ammunition. As most tanks have the engine in the rear, using a tank chassis for the basis of a self-propelled artillery system has other consequences in relation to the efficient design and operation of the system.

Around 1984, Vickers' market research indicated that a specially built chassis, optimized for the self-propelled gun role and integrated with an enhanced variant of the GBT 155 turret, had a good deal of potential through the turn of the century; in fact, their study showed a potential of 3,500 units, a good portion of them replacements for the ubiquitous M109.

As the main market for this new system would be outside the United Kingdom, it was decided to set up a consortium to develop and market the new weapon. Cummins Engine Company was selected for the engine and auxiliary power unit since the firm had a worldwide customer and service base. The Brazilian firm Verolme Estaleiros Reunidos do Brazil was selected to develop the chassis for which Vickers would develop and integrate the new turret. As a result of this agreement,

for a time, the new self-propelled howitzer was called V²C.

Vickers completed the first prototype in early 1986, and publicly revealed the Artillery System 90A, as it was called, at the British Army Equipment Exhibition later the same year. The second chassis, with a new turret, was completed in 1987. This second prototype, referred to as the Artillery System 90B, was developed along the line of the British Army's requirements. More recently, the two programs have lost their distinctiveness and the system is referred to as the Artillery System 90, sometimes called AS-90. Beginning in 1998, Vickers Shipbuilding and Engineering Limited went through several acquisitions and name changes, and, as of this writing, wound up as BAE Systems Limited.

Description. The Artillery System 90 is a modular system, designed to be easily upgraded with new technology as needed; this is due to the fact that artillery systems tend to remain in operational service somewhat longer than other weapons. Because the Artillery System 90 was also designed for ease of manufacture, maintenance and operation, standard off-the-shelf components are widely used.

In the Artillery System 90, the engine and gearbox are mounted in the front of the vehicle to the right with the driver seated to the left. The fuel tank is located in the front of the fighting compartment to the right. In order to keep the vehicle height to a minimum, a hydro-pneumatic suspension is used, which saves the large amount of space required by a torsion bar system. The driver is provided with a rearward swinging hatch cover and three periscopes, the center one of which can be replaced by a passive night driving periscope; the driver

can also enter or leave his position through the fighting compartment. The engine compartment is provided with a Graviner fire detection and suppression system, which can be operated automatically or manually.

The fighting compartment with turret and ammunition storage occupies the remainder of the vehicle. Located at the rear of the hull is a large door for ammunition resupply. The hull and turret are fabricated from all steel armor with a maximum thickness of 1.7 cm (0.67 in). To the right in the turret are seated the commander and gun layer with the ammunition handlers on the left. The commander is provided with a hatch and a M2HB 12.7 millimeter or optionally, a 7.62 millimeter machine gun; he also controls all turret functions. A door is provided on each side of the turret and external storage capacity is provided at the rear of the turret. Turret traverse and cannon elevation are electric, with the only hydraulic components being those related to the ordnance balancing mechanism, loading tray and all electric ramming system.

Royal Ordnance Nottingham provides the 39 caliber cannon; it features a hydropneumatic recoil system with a maximum recoil length of 88 centimeters (34.64 in). A double-baffle muzzle brake and a fume extractor are fitted to this piece, which uses a split block breech mechanism; a Crossley pad obturation system is used. In the Artillery System 90B, a total of 40 155 millimeter projectiles are carried with 28 stowed in the turret bustle. The hydraulically operated loading system uses a flick rammer, and all turret operations have manual back-ups.

British Army Procurement. The B version of the Artillery System 90 was completed to the British Army's known requirement. Subsequently, it was officially stated as the British General Staff Requirement number 3399/1, which was issued following the demise of the Panzerhaubitze 155-1 (SP-70) program. In June 1989, the Artillery System 90B was selected to fill this requirement; 179 units were

ordered. The B version is greatly enhanced over the original A version. Among its features are: a more powerful version of the VTA-903 engine, rated at 492.36 kilowatts (660 horsepower); a combination nuclear, biological and chemical/air conditioning system; a single wide-angle periscope for the driver which replaces the three periscopes of the A model; a double thickness floor; and a crew heater and new tracks (with replaceable pads) from Diehl Group/Tracks and Suspension Division.

Inside the turret, the gun layer is seated to the right with the commander to his rear; both positions are provided with seats that rotate with the turret. The gun layer's display and control unit has been redesigned; the commander is able to see the display unit. The right side door on the turret has been eliminated and the left one reduced in size, and an additional hatch has been placed on top of the turret to the left for an air sentry; this position is provided with a 12.7 millimeter M2HB machine gun.

Ammunition storage capacity is 48 complete rounds with 31 projectiles stored in the turret bustle. A shell transfer arm has been added in order to reduce crew fatigue and increase the rate of fire. The system allows for one projectile to be in the breech, one on the flick ramming assembly and one ready to be placed on the flick ramming assembly; three rounds can be fired in less than ten seconds. A slight increase in fuel capacity is also provided. With a combat weight of 42 tonnes (46.3 tons), the power-to-weight ratio of the B (or definitive) model of the Artillery System 90 is 11.73 kilowatts per tonne (14.25 horsepower per ton).

A main feature of the Artillery System 90 is the inclusion of the Automatic Gun Laying System, which allows the Artillery System 90 to receive target information from the Battlefield Target Acquisition System, a product of Marconi Radar and Command Systems. A muzzle velocity system is standard equipment on the Artillery System 90.

Funding

Initially, the contractor provided funding for Artillery System 90 development; it is now being supported by the United Kingdom Ministry of Defence through the British Army.

Recent Contracts

The initial procurement contract, issued in June of 1989, was worth £300 million. More recent contracts, the details of which have not been announced, include one for the integration of the 52 caliber cannon, one for spares support, one for Artillery System 90 training devices development and production, and one related to the Artillery System 90 Capability Enhancement Program.

The details related to the late July 1999 contract for Poland have not been released.

Timetable

Timetable is for the Artillery System 90 only and does not relate to the M109 or the Panzerhaubitze 155-1 development.

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1982	GBT 155 turret development begins
	1984	Artillery System 90 development begins under name of V ² C
June	1986	Artillery System 90 prototype revealed at British Army Equipment Exhibition
Late	1987	Fabrication of second prototype begins
	1988	Firing and mobility trials with 39 and 52 caliber cannon
September	1990	Operational trials and development completed
	1991-1993	Integration of Artillery System 90 turret with T.72 tank chassis
Early	1993	Artillery System 90 undergoes trials with United States Army
May	1993	British Army accepts first four Artillery System 90 systems
Early	1995	Production for the British Army completed
July	1999	Poland places first export order
Mid	1999	Preparations for serial production of the turret ongoing in United Kingdom, of complete system in Poland. Awaiting further production orders; development, continues

Worldwide Distribution

Export Potential. It seems that the market research staff of Vickers Shipbuilding and Engineering did their homework in developing the Artillery System 90. The modular design using off-the-shelf proven automotive and other components is a significant marketing advantage. This system, while technologically advanced, is competitive in terms of price. The facts in favor of some export of the Artillery System 90 are the perceived obsolescence of the M109, even in the A6 Paladin version and the modular concept, designed to accept the new 52 caliber cannon without major modification. It is apparent that 45 or greater caliber ordnance is now mandatory for new production 155 millimeter artillery systems of all types. Another factor which should aid in the marketing of this system is the excellent overall performance of artillery, especially in self-propelled form, in the recent Second Gulf War and, most recently, in Bosnia-Herzegovina.

As this research was being completed, the Artillery System 90 was still being promoted for an often delayed order from Saudi Arabia. The system is also being promoted in Southeast Asia (possibly in Malaysia and Indonesia). And of course, the Artillery System 90 turret is still under consideration by India in its long and drawn-out effort to field a new 155 millimeter self-propelled artillery system.

Some officials have been promoting the Artillery System 90 as an alternative to the long-troubled Advanced Field Artillery System-Cannon (now called Crusader) program. In early 1993, a production example of the Artillery System 90 was sent to the United States for trials at Aberdeen Proving Ground. For these trials, the system was made fully autonomous by the integration of the Magnavox Howitzer Fire Control Computer. The Artillery System 90 demonstrated an excellent performance in a variety of fire missions, receiving fire control data from several sources. While the 39 caliber version was used for the fire missions, the 52 caliber conversion was also demonstrated. Following the trials, proponents of the program noted that the US Army could save millions of dollars and development time if the Artillery System 90 were procured as a complement to, or even in lieu of, the Crusader.

Despite the fact that the Artillery System 90 appears to be a highly effective and useful system, it still has to contend with the Russians, now competing in the market with bargain-basement unit prices, and with the omnipresent M109, which is sure to be around for at least another decade. Our research also indicates significant potential for the export of the Artillery System 90 turret as a retrofit to existing chassis.

First Export Order From Poland. On July 26, 1999, it was announced that the then Marconi Land and Naval Systems had won the hotly contested requirement to provide Poland with a new Western standard self-propelled artillery system. The contract was won by the 52 caliber version of the Artillery System 90, called Braveheart.

While most of the details regarding the contract were not yet available when this research was being prepared, the initial contract is for 78 turrets, the first six of which will come from the United Kingdom and will be integrated with an as-yet-unspecified chassis by the Polish licensee Huta Stalowa Wola. Under the plan, Huta Stalowa Wola will manufacture a steadily increasing share of the turret in Poland.

Countries. **United Kingdom** (two prototypes and 179 production systems).

Forecast Rationale

As of early 2000, preparations for the serial production of the Artillery System 90 turret in the United Kingdom are again active; a result of the award of the Polish contract. In addition, even though the last of the 179-unit order from the British Army was completed some years ago, the contractor is now engaged in the major retrofit program for the 52 caliber cannon for the British Army systems. The system, in its Braveheart manifestation, is still being heavily promoted on the international market, especially in Asia.

The Artillery System 90 program received a shot in the arm when it won the hard-fought Polish competition. Although a good portion of the details regarding this contract had yet to be released at the time of this writing, sufficient information is available for us to

generate the revised forecast chart below. Despite the higher numbers cited by other sources, our research indicates that the total Polish requirement will run to 300 systems.

For some time, our research into the Indian requirement indicated that the British system had the lead for this procurement, put at 600 units. (The requirement is for the turret only.) However, more recent information indicates that the Russians (2S19) or the South Africans (T-6) will most likely win this long-delayed procurement.

Due to the uncertainty in the ongoing competition in India and elsewhere, this report is subject to be updated on an interim basis.

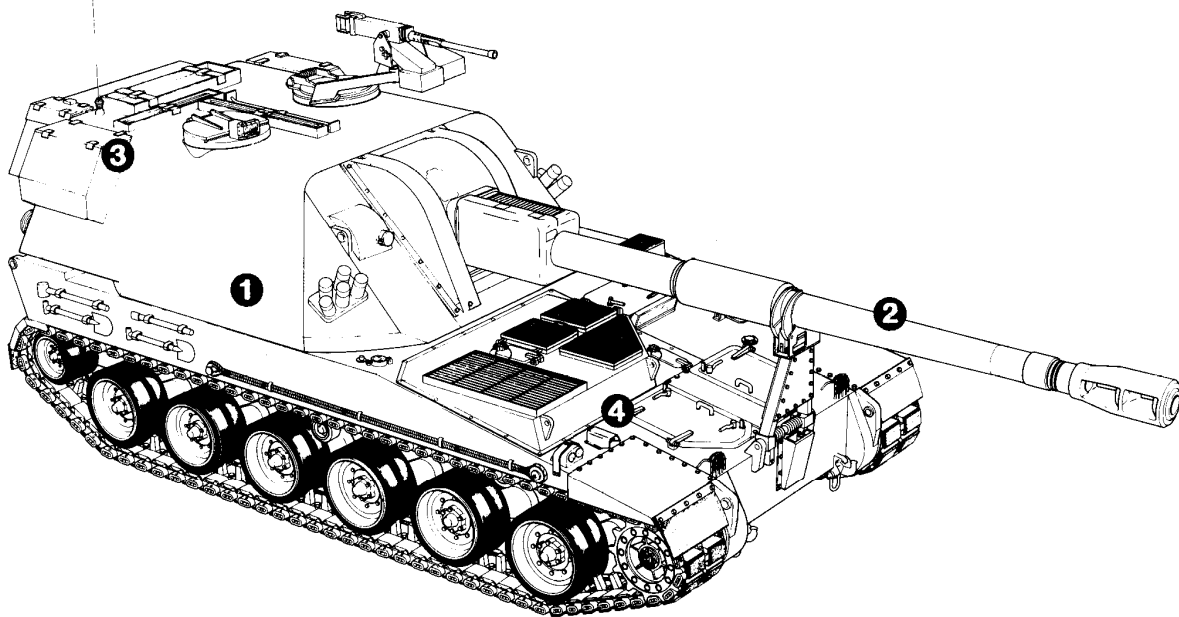
Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Ordnance	(Engine)	through 99	High Confidence Level				Good Confidence Level				Speculative			Total 00-09
			00	01	02	03	04	05	06	07	08	09		
BAE SYSTEMS														
(a)	ARTILLERY SYSTEM 90 VTA-903	181	0	0	0	0	0	0	0	0	0	0	0	
Subtotal - BAE SYSTEMS		181	0	0	0	0	0	0	0	0	0	0	0	
BAE SYSTEMS/HUTA STALOWA WOLA (Co-Production)														
(b)	ARTILLERY SYSTEM 90 UNKNOWN	0	2	4	11	20	35	37	37	36	37	37	256	
Subtotal - BAE SYSTEMS/HUTA STALOWA WOLA (Co-Production)		0	2	4	11	20	35	37	37	36	37	37	256	
Total Production		181	2	4	11	20	35	37	37	36	37	37	256	

(a) The through 1999 production includes two prototype/developmental systems. Production in this line is for the British Army only and does not include any production of the Artillery System 90 or the associated turret for any other application.

(b) Production in this line is for the Polish requirement only. The first six turrets are being supplied complete to Huta Stalowa Wola for integration with an indigenous tracked chassis. Thereafter, an increasing proportion of the production will be undertaken by Huta Stalowa Wola.



There are several possible upgrade paths including:

- 1 Spare slots in the Turret Control Computer and Multibus architecture allow for considerable expansion in tactical software.
- 2 It is a simple rebarrelling task to install the future NATO standard 52 calibre barrel for increased range without compromising AS90's inherent stability.
- 3 Increased automation for ammunition handling and using advanced propellants, will reduce crew fatigue and improve the fire power of the vehicle.
- 4 The engine compartment is of sufficient size to accommodate larger power packs. Quick release couplings allow the power pack to be exchanged in less than an hour.

ARTILLERY SYSTEM 90

Source: BAE Systems