

# ARCHIVED REPORT

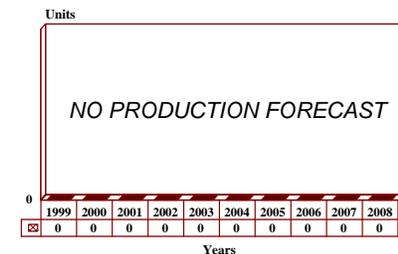
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## Blowpipe/Javelin - Archived 4/2000

### Outlook

- Blowpipe production concluded. The system is available for export, with the units provided to overseas customers coming from UK military stocks
- Serial production of Javelin also terminated. The missile is being replaced in UK service by Starburst
- Last major export orders for Javelin were placed by Peru

10 Year Unit Production Forecast  
1999-2008



### Orientation

**Description.** Portable anti-aircraft missiles.

**Sponsor.** The United Kingdom Ministry of Defence through the Royal Army. The research and development was managed by the Royal Radar Establishment for the Royal Army.

**Contractors.** Developed and manufactured by Short Brothers Ltd, Missile Systems Division, Castlereagh, Belfast, Northern Ireland. Bombardier Incorporated, Montreal, Canada, now owns Short Brothers. Short Brothers was selected as prime contractor for design, supply, and integration of the basic missile rounds with the launcher equipment, and has additionally been responsible for marketing the system in its several configurations.

**Major Subcontractor.** GEC Avionics (TV tracking equipment, initially Marconi Avionics), IMI Summerfield (solid-propellant rocket motors), Marconi Defense Systems Ltd (fuzing equipment), Royal Ordnance/Imperial Metal Industries (ignition system, safety/arming unit, warhead and K2A1 breakup unit), Thorn-EMI Electronics Ltd (proximity fuse equipment and ADAD development), Wallop Industries Ltd (tracking flare) and Ward Engineering Services (GRP missile containers).

**Licensee.** There has been some indication that the Republic of (South) Korea may be allowed to license

produce (assemble) the Javelin system. There has been no confirmation of this statement.

**Status.** Blowpipe production has been concluded; it is in service with at least eight customers. However, the system is said to be available for production to fill export orders. The serial production of the Javelin has also been completed. The missile has been replaced in operational service with the United Kingdom by the Starburst. However, the Javelin remains in service with at least two overseas nations. Javelin entered service with the British Army in the winter of 1984-85.

**Total Produced.** Approximately 34,382 Blowpipe missiles (including RDT&E units) have been produced. Javelin totals had been placed at 10,226 missiles (including RDT&E units) completed or in production by the end of 1993. Blowpipe/Javelin has been sold to at least 15 countries to equip about 20 armed services, accounting for sales of about 36,500 missile rounds (usually with one aiming unit per 5-10 rounds). Production of Javelin missile rounds replaced fabrication of Blowpipe. UK Territorial Army units began a conversion program to the Javelin missile during 1988, although the fate of the Blowpipe rounds remains unknown. These could either be held in inventories for spares and training or may be released for export at reduced prices.

**Application.** Man-portable surface-to-air missile systems for use against close-range, low-level hostile aircraft attacking or egressing from the target area. The missiles are equally effective against helicopters.

**Price Range.** A Blowpipe missile costs some \$55,570 dollars. The aiming unit, with identification friend or

foe equipment, costs approximately \$94,000. The Javelin missile costs about \$88,980, while the new semi-automatic command-to-line-of-sight launcher is estimated to cost about \$120,000; all prices are in Fiscal 1994 dollars.

## Technical Data

	<u>Metric</u> Blowpipe	<u>Metric</u> Javelin	<u>US</u> Blowpipe	<u>US</u> Javelin
<b>Dimensions<sup>(a)</sup></b>				
Missile Length	139 cm	139 cm	4.56 ft	4.56 ft
Missile Diameter	7.6 cm	7.6 cm	2.99 in	2.99 in
Missile Weight (Basic) <sup>(a)</sup>	14 kg	11.1 kg	30.80 lb	24.47 lb
System Weight (with IFF)	21.67 kg	24.1 kg	47.67 lb	53 lb
Missile Finspan	27.5 cm	27.5 cm	10.82 in	10.82 in
<b>Performance</b>				
Speed	Mach 1.5	Mach 1.5-2	Mach 1.5	Mach 1.5-2
Altitude <sup>(a)</sup>	2,000 m	2,000 m	6,561.66 ft	6,561.66 ft
Range (min)	1,000 m	500 m	3,280 ft	1,640 ft
Range (max)	3,000 m	4,000 m	9,840 ft	13,120 ft

<sup>(a)</sup>Estimated

**Propulsion.** Royal Ordnance/Imperial Metal Industries provides the tandem double base solid-propellant booster and sustainer, the latter motor designated Crake. The Javelin uses similar but enhanced-performance propulsion components. Upon triggering by the operator, thermal batteries in the aiming unit charge up and after about one second, initiate the first stage motor to eject the missile from the tube. Motor burn duration is 0.2 seconds, ensuring that ignition is complete before the missile leaves the tube, and at a safe distance from the operator, the second-stage booster motor ignites, accelerating the missile to supersonic speed. A self-destruct facility is incorporated.

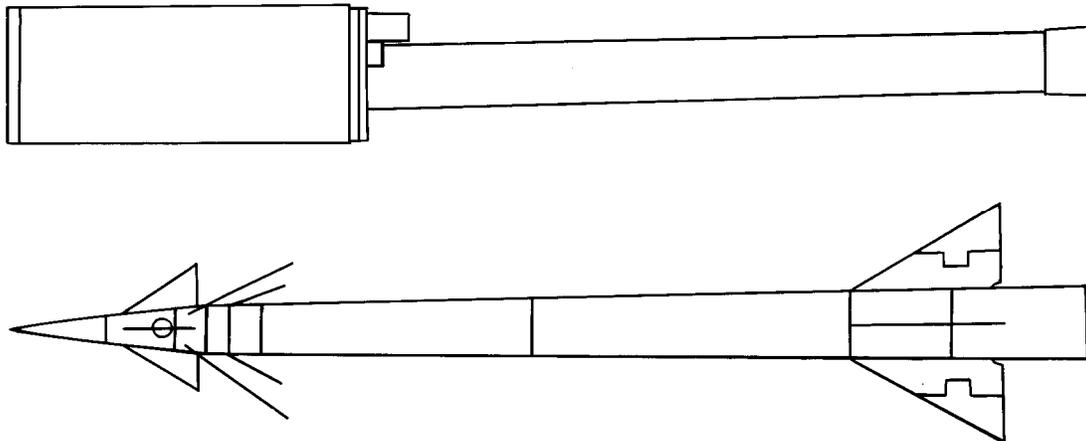
**Control & Guidance.** Blowpipe is equipped with command-to-line-of-sight control. Short has equipped Javelin with a semi-automatic command-to-line-of-sight (SACLOS) guidance which allows the aimer to track the target only, while the missile automatically tracks to the sighted target. In the initial flight stage, Blowpipe is automatically gathered into the operator's line of sight by infrared (IR) tracking of exhaust flares. The operator guides the missile by tracking the target and steering the missile via a thumb control, flight instructions being transmitted to the missile by radio link. Steering and stabilization control is via four canard fins, with one pair providing roll control and the other pair providing yaw and pitch. For Javelin, SACLOS guidance means that the operator does not

have to steer the missile in flight using the thumb-stick control, but simply retains the target within the aiming sight (red circular reticula) and the missile is tracked onto its target by automatic commands. In the event of a sighting failure, the integral TV camera system tracks the missile flares and sends an 'error signal' by command link to the missile, adjusting its flight trajectory as required. SACLOS also increases Javelin's accuracy and reduces its minimum intercept range from 700 m to 300 m.

**Launcher Mode.** Man-portable, shoulder-launched. In the man-portable mode the missile comprises a single ready-to-fire missile in a hermetically sealed fiberglass container plus an aiming unit consisting of a monocular sight, guidance and firing controls. The aiming unit is clipped to the missile container and the system is ready to be used. Targets normally are engaged head-on at a range of approximately 7 km (4.35 miles), with interception at 3 km (1.86 miles) after a 14 second missile flight. After a round is fired, the aiming unit is disconnected, and the launch tube is discarded. Short developed a quadruple launcher for fixed and semi-static low-level defense against aircraft; Blowpipe has also been configured to the Spartan and M113 armored vehicles with a four-round turret assembly. These programs were officially terminated by the United Kingdoms' Defence Review of June 1981, although they may have been continued privately by

Short. No procurement interest has been evidenced for these systems. The Javelin missile is interchangeable with Blowpipe launchers. The vehicle-mounted system is configured for most armored personnel carriers, and the proposed helicopter-launched system is operable on Gazelle and Lynx anti-tank aircraft. The Sea Javelin pedestal mounted naval system will be operable with most naval vessels.

**Warhead.** Blowpipe uses a high explosive warhead with an impact/proximity fuze. Two dual-purpose charges are used. One is shaped and one is blast type, each weighing approximately 1.81 kg (4 lb). The Javelin warhead is similar, albeit of a high explosive/fragmentation type, with a combination impact/proximity fuse.



BLOWPIPE/JAVELIN

Source: Short Brothers

## Variants/Upgrades

The Blowpipe and Javelin missiles are available in manportable and vehicle/ship-mounted launch configurations. For more information on these variants,

please see the pertinent entries under the Program Review section.

## Program Review

**Background.** Development of a shoulder-fired surface-to-air missile system by Short commenced in 1966 as a private venture. Eventually, the British Ministry of Defence (MoD) became interested in the program, which resulted in Royal Army and Royal Marine trials and government funding (followed by an order for 285 launchers). The system was tested in the US by Northrop under license. The missile was fitted with a laser seeker, the target being illuminated by the operator, and the system was offered as an alternative to the General Dynamics FIM-92 Stinger missile. However, the latter was eventually chosen. In June 1973, an order was received from the Canadian Armed Forces for 100 launchers, with offset being provided by the use of Pratt & Whitney Canada PT6 turboprop engines in the Short 330 commuter airliner, which was then under development.

**Falkland's Operations.** During the 1982 Falkland's War, Blowpipe operations (under the most extreme conditions) were credited with downing nine Argentine and three British aircraft (Harrier GR3 and two helicopters) since it was in use by both sides. Most of the targets were crossing and receding (not the optimum choice for the weapon), having approached at less than 100 ft and with minimum warning.

**Persian Gulf Operations.** In late 1986 the British Ministry of Defence confirmed that Royal Navy shipping in the Persian Gulf was receiving enhanced air defense protection from a detachment of three Commando Brigades equipped with Javelin missiles, probably in the Sea Javelin configuration.

During Operation Desert Storm (beginning with the invasion of Kuwait on August 2, 1990), Canadian and

British military units deployed to Saudi Arabia were equipped with the Blowpipe and Javelin systems, respectively. The UK has also confirmed that its forces in the area were armed with the new Starburst air defense weapon (see separate report).

High Velocity Missile System. Despite the fact that Javelin is greatly superior to Blowpipe and should remain a viable system for some time, the United Kingdom is already looking for a replacement. In early February 1985, Short and British Aerospace were each awarded £3 million contracts for 12-month project definition studies for a low cost Short Time of Flight Close Air Defense Weapon, also called the High Velocity Missile System. This concept envisions a missile with a speed of about Mach 4 and a range of five kilometers (2.69 nautical miles). The warhead may well be a kinetic energy type similar to the hitlle concept of Rapier. (See separate report.) In addition to shoulder launch, several launch options, including a lightweight multiple launcher, are under consideration. Following the completion of the original 12-month contract, Short was selected over British Aerospace to develop its Starstreak system for deployment with the Royal Armed Forces (see separate Starstreak report).

Missile Models. The Blowpipe and Javelin models discussed in the report are confined to the initial systems. The Starburst version of Javelin is included in its own report.

Blowpipe: Missile Description. The Blowpipe has been designed for unit self-defense against aircraft in the forward edge of the battlefield area. The weapon system is light, compact and relatively easily operated. This supersonic anti-aircraft missile is sealed within its own launcher; after firing, the launch canister is discarded. The missile is treated as a round of ammunition. The aiming unit, which is clipped onto the missile launcher, comes in two variants. One version has identification, friend or foe (IFF) capability while the other variant does not. The IFF provision is essential for quick reaction and is probably the only aiming variant planned for operational usage.

Four delta-shaped aerofoils are mounted on the tip for aerodynamic control, with another four at the tail to provide basic stability. The missile's forward section is free to rotate independently of the missile's main body, to which it is attached by a low-friction bearing. The rear control fins are mounted on a sliding ring, which is mounted at the front of the container. At launch, the missile body passes through this ring until it locks into place at the rear of the missile, with the fin tips folding out and locking into position as it exits from the container. Twist and steer commands to the control fins guide the missile accordingly, resulting in rapid

maneuverability. At interception, the warhead is detonated by impact or proximity fuse.

Blowpipe: Missile Operation. The initial operation of both Blowpipe and the newer Javelin is similar. The operator clips the aiming unit to the sealed missile launcher. The complete system weighs approximately 22 kg (48 lb) and is easily lifted and fitted to the shoulders. Upon target acquisition, the trigger is squeezed which activates batteries in the missile and aimer. The missile is ejected from the canister by the first-stage motor, which shuts down before the missile is fully ejected. The missile coasts, momentarily, until it is clear of the operator. Thereafter, the second stage is ignited to accelerate the weapon to supersonic speed, and the missile automatically tracks to the manually-sighted target. With Blowpipe, the operator must retain the target within the aiming sight in addition to steering the missile throughout the engagement. With Javelin, the operator does not have to steer the missile; as he keeps the target in the cross hairs, command signals are generated and transmitted automatically. The aimer is disconnected upon impact, the missile launcher discarded, and a new round is clipped to the aimer. The operator is now ready to refire.

Javelin. Short began development of an improved Blowpipe missile system in 1980, the weapon incorporating a number of significant enhancements including a higher impulse rocket motor, which increases range to 5,500 meters and gives a higher terminal speed. An improved blast fragmentation warhead replaces Blowpipe's hollow charge warhead. An improved target surveillance system is being developed for Javelin in an effort to enhance operational capabilities against surprise aircraft strikes.

The Javelin was developed to ease the training and operational use of the original Blowpipe guidance system. The major feature of Javelin, other than increased performance, is the semi-automatic command-to-line-of-sight guidance. This feature should expand the export market already acquired by Blowpipe, although the Javelin is not designed to replace Blowpipe outright. Javelin began replacing the Blowpipe in British Army air defense regiments in 1985, and a Territorial Army conversion program was expected to commence in 1988.

Via an upgrade program designated S15, but also known as Starburst, Shorts and Marconi Defence Systems developed a new Javelin missile system version that combines existing capabilities with those of the new Starstreak. The new system is expected to be capable of firing both the Javelin (in its Starburst configuration) and the new Starstreak. For additional information on Starburst, see separate report.

**Launcher Configurations.** Both Blowpipe and Javelin are offered in a variety of launcher configurations ranging from manportable to vehicle mounted to shipborne systems.

**Lightweight Multiple Launchers.** Short has developed Lightweight Multiple Launchers (LML) to provide a multi-engagement capability for the Blowpipe/Javelin system for various deployment configurations. To suit the wide range of potential operational requirements, several versions of the LML are available. Each mounts, as clip-on equipment, three canistered missiles and a standard shoulder-launch aiming unit. The following configurations are available:

1. Man-portable with operator standing/seated; three missiles mounted. For man-portability, the traverse headlock is engaged at zero elevation, and the aiming unit support arm is folded under the left-hand canister support to provide a convenient carrying package. The three-round multiple launcher is supported on the ground by a support tube with a tripod base. The base may be adjusted to provide either a seated or a standing firing position.
2. Trench deployment; for this application, the tripod mounting slides up the supporting tube, enabling the tube end to be placed in a trench with two of the stabilizing legs fixed at ground level providing a firm base. This configuration is suitable for trenches and emplacements of up to one meter in depth.
3. Light vehicle-mounted (Land-Rover type) with seated operator; three missiles mounted. Short first exhibited its Shorland S53 vehicle equipped with the three-round Javelin LML(V) system during the Farnborough Air Show in 1984. The Shorland S53, an armored troop-carrier, was also fitted with Cossor 880 IFF equipment, and the complete system was mounted on the roof of the vehicle, thereby allowing for up to six spare rounds to be carried inside the vehicle for reloading.
4. Armored vehicle-mounted with a turret ring and integral hatch cover; three missiles mounted. This configuration is suitable for mounting on most armored personnel carriers, including the M113, Cadillac Gage V150, GKN FS100 and the Saviem 4x4. A turret ring is fitted over an existing hatch opening, being provided with its own integral hatch cover. It carries a pintle for mounting the traverse head and three-round launcher and is fitted with a hand grip and a frictional brake for ease of use. Thailand has developed a twin-launcher pedestal for its Blowpipe weapons.

5. Sea Javelin LML(N); a naval system mounted on a Laurence Scott stabilized LS30B platform weapons platform (in volume production for the Royal Navy); five missiles mounted. Sea Javelin was first exhibited at the Royal Navy Equipment Exhibition (RNEE) in 1985. This system is designed to provide close air-defense capabilities for warships, fleet auxiliary vessels and merchant vessels.
6. LML(N); a naval system of light weight mounting three missiles, can be used with the Blowpipe or Javelin missiles.
7. Helicopter installations; Short is considering development of a helicopter-launched version of Blowpipe/Javelin to provide an air defense capability initially for British Army Air Corps Gazelle helicopters. The missile, once launched, will be steered to its target using the Ferranti AF532 roof-mounted observation sight. Another use for this configuration would be the protection of British Army Lynx anti-tank helicopters.

All these launchers are able to fire either the Blowpipe or Javelin missiles.

**SLAM (Submarine-Launched Airflight Missile).** Six Blowpipes, in self-contained launch canisters, are clustered around a central aiming system. The entire missile assembly is configured on a hydraulically operated mast which retracts within the submarine's sail (conning tower). SLAM can interdict fast patrol boats and merchant shipping in addition to deterring anti-submarine warfare (ASW) attack helicopters. This system was developed by Vickers Shipbuilding Group Ltd, Barrow-in-Furness, UK, in the mid-1970s for the Brazilian and Israeli navies. However, this project was shelved soon afterwards. In addition to the Royal Navy, Israel and an unidentified South American navy are said to have purchased this system.

**Blowpipe Four-Round Turret Assembly.** This variant of Blowpipe has been funded by the British MoD. The aiming unit has been combined with the updated semi-automatic command-to-line-of-sight guidance; and Short also developed a launcher that would be easily accommodated on the Spartan and the M113 armored personnel carrier. Blowpipe, under armor, offers an attractive alternative for the deployment of portable anti-aircraft missiles. While it would reduce operator stress, it also increases vulnerability by presenting a larger target.

The element of surprise in a dynamic situation is another consideration. Regardless, it appears to have valid trade-offs, especially for mobile defense or fixed and semi-static resources. This system is compatible with Javelin.

Spartan-Javelin. This is the integration of the Javelin carrier. The launcher is mounted on the roof of the missile with the Alvis Spartan armored personnel vehicle.

## Funding

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Development and production costs of both Blowpipe and Javelin systems are believed to amount to £610 million (\$1,215 million). No specific information was released by Shorts or the UK government concerning annual domestic purchases of the Blowpipe or Javelin air defense system.

Deployment. After a successful introduction into service with the British Army in the United Kingdom and the Federal Republic of Germany, it was decided to equip the Territorial Army Volunteer Reserve (TAVR) with Blowpipe and to phase out the Bofors 40 mm L70 anti-aircraft gun. The first Air Defence Regiment so equipped was No. 102, based in Northern Ireland. After the changeover in July 1978, the first live firings by these troops took place a month later on the South Uist ranges in Scotland. In February 1980, a follow-on order was placed, valued at £20 million sterling, to increase Territorial Army Blowpipe detachments from 36 to 48; these detachments would be deployed to reinforce British army units in forward areas in Germany in wartime. Territorial Army units began to convert to Javelin in 1988.

## Recent Contracts

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Short received two contracts in late 1989 for the Javelin missile valued at \$63.2 million. The orders were from the British Ministry of Defence and an unnamed export client (possibly the Republic of Korea).

By June 1984, Short Brothers had awarded production contracts of more than £5 million to Marconi Avionics (now GEC Avionics) for television (TV) guidance systems for the Javelin surface-to-air missile. The semi-active command-line-of-sight (SACLOS) system supplied by Marconi includes a mini-charge coupled device TV camera and zoom lens, signal processor and two-axis subminiature gyroscope assembly.

Also in June 1984, Short Brothers announced the receipt of a further production contract from the British Ministry of Defence for the Javelin air defense missile. The contract, worth in excess of £35 million, brought Javelin sales to £120 million.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Late	1950s <sup>(a)</sup>	Design conceived
	1962	Research initiated
	1964	Engineering development started
	1969 <sup>(a)</sup>	Initial prototype development started
	1973	Advanced engineering began
Late	1973	Flight evaluations began
Early	1975	Low-rate production initiated
Late	1975	Operating capability with UK, Canada
	1977	IFF aimer developed
	1977	Thermal night sight development initiated
Jul	1978	First British Territorial Army regiment received Blowpipe, replacing Bofors 40/70 anti-aircraft guns
	1978-79	IFF initial operating capability Trailer/APC Blowpipe configuration development started SACLOS guidance and control enhancement began
	1980	Thermal night sight capability
Jun	1980	Initial development contract awarded to Short by UK MoD for performance improvements to Blowpipe (i.e., Javelin)
Apr	1981	Full UK MoD development contract for Javelin

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1981	M113 APC variant became operational
	1982	Blowpipe proven in Falklands War
	1983	Javelin unveiled
Early	1985	Javelin in service
Sep	1985	Sea Javelin exhibited at RNEE 1985
Jul	1986	Acquisition of Blowpipe to Afghan Mujahideen reported
Nov	1986	Javelin operation by RN ships in Persian Gulf reported
	1987	Production of Blowpipe concluded
	1988	Javelin purchased by Malaysia
	1993	Production of Javelin concluded

<sup>(a)</sup>Estimated

## Worldwide Distribution

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Some 40,000+ Blowpipe and Javelin missiles have been sold to at least 14 countries. **Argentina** purchased a small batch of Blowpipe missiles (possibly eight), which were delivered for evaluation. These missiles were deployed during the Falklands War, at which time the country's inventory was exhausted.

**Abu Dubai**, part of the United Arab Emirates, after two formal requests, has acquired Blowpipe surface-to-air missiles. The country already operates the Bofors RBS70, but was said to run into problems. This led to the initial purchase of Blowpipe. However, the country is looking to upgrade its man-portable anti-aircraft systems. The two most likely candidates to fill this requirement are the RBS70 Mk 2 and Javelin, but Dubai is also looking at the Soviet SA-7 or the Egyptian Sakr Eye (a derivative of the SA-7), and possibly the Mistral (Dubai already operates a small number of Mistrals in a shipborne SADRAL launch system). The Soviet and Egyptian systems may not provide capabilities comparable to RBS70 or Javelin, but Dubai could purchase a considerable number of these less sophisticated and lower price missiles.

**Brazil** purchased two new manportable surface-to-air missile systems in 1994. Among the mentioned candidates was the United Kingdom's Shorts Javelin, as well as the French Mistral, the British Starburst, Sweden's RBS70 and possibly entrants from the United States (Stinger) and Russia (SA-18 Grouse). Brazil eventually selected the Matra Mistral and Russia's SA-18 Grouse. Another possible area for the sale of the Javelin is **Brunei**, which may commence a major program to upgrade its defense capabilities. The Short system is expected to compete against the Matra Mistral.

In 1973, the **Canadian armed forces** placed an order worth \$28 million for 100 Blowpipe launchers and an unknown number of missiles, with offset being provided by the selection of the Pratt & Whitney Canada PT6A turboprop engine for the Short 330 commuter airliner then under development. A follow-on order worth several million pounds was placed in April 1981. Canada is expected to replace its inventory of Blowpipe missiles with the Starburst (see separate report). **Chile** was considering the purchase of an unknown number of Javelin missiles and simulators as replacements for the nation's inventory of Blowpipes. However, Santiago decided to purchase the Matra Mistral, despite supposed funding problems.

A recently confirmed customer for Javelin was the **Republic of (South) Korea**, which spent an estimated \$30 million to purchase a significant number of systems (possibly over 100). This was at first contradicted by an apparent new competition for additional manportable SAMs. Korea has purchased the Javelin and is presently considering the procurement of additional manportable systems with candidates being the Shorts Starburst and the Matra Mistral.

**Malaysia** intends to purchase the Javelin missile systems, but is having funding allocation problems (disagreements have arisen between the army and navy). Previously, there was a possibility that the sale would be of either the Blowpipe or Javelin systems. Malaysia wanted to purchase Javelin, but could have opted for a less expensive interim of a Javelin launch system and Blowpipe missiles. However, Malaysia eventually decided on the purchase of 48 Javelin launchers and an undisclosed number of missiles (possibly 100 to 200). Javelin missiles are part of an overall £1,000 million (\$1.800 billion) arms deal between the UK and Malaysia. Funding difficulties supposedly have reduced the number of weapons systems to be procured from the original 48 to 12.

**Nigeria** placed an order worth \$28 million in late 1981 for the Blowpipe. **Oman** announced its intention to purchase the Javelin in May 1989. No specific figure has been provided pertaining to the total number of launchers and missiles to be procured. Previously, the Ministry of Defense of the Sultanate of Oman was reported to have placed a multimillion-pounds sterling order for the supply of Blowpipe missiles and support equipment. In addition to the air defense role, the missiles will carry out operations against surface targets such as armored personnel carriers and self-propelled guns.

In 1996, **Peru** became the last major customer for the Javelin missile system. Although details are unavailable, source say that Peru purchases a substantial quantity of Javelin missiles. The Peruvians may have purchased between 200-and-500 Javelin launchers.

**Spain** is said to be considering purchase of the Blowpipe to fulfill its low-level surface-to-air missile requirement. Other contenders include the General Dynamics FIM-92 Stinger, the Matra Mistral and the Bofors RBS70. The Spanish Army is expected to spend \$336 million for the acquisition of up to 500 missiles and an unknown number of launchers. **South Africa** has attempted to acquire examples of the Blowpipe missile illegally, and may be trying to establish an indigenous production capability in this area.

**Thailand** is also considered as a good potential customer for the Lightweight Multiple Launcher version of Javelin (the Royal Thai Air Force already operates Blowpipe in an airfield defense role). Other contending systems include the Mistral and China's HN-5A. In June 1982, Short announced that Thailand had placed its third order for Blowpipe, for airfield defense, although the previous orders had not been announced. Earlier in 1982, it had been thought that the sale of the US FIM-43 Redeye missile to Thailand, after the reversal of a US ban, had excluded Blowpipe, which had been promoted as favorite during this time. The Royal Thailand Air Force (RTAF) duly has developed its own vehicle-mounted twin-launcher pedestal.

**Zimbabwe** is also believed to be seeking to purchase Javelin missiles, as part of a British military assistance program.

Middle East Customer For Javelin. During 1985, Short received an order for Javelin from an undisclosed Middle East customer, now believed to have been Jordan, although details remain sparse and unconfirmed. It is understood that deliveries of the first missile rounds were to commence in late 1985, although no figures and dates have been specified.

Javelin Proposed For US Army. In response to the US Army's request for proposals (RFP) for a combined air defense missile/gun system to provide air defense capabilities for divisions of its ground forces (DIVADS), Javelin was proposed as a suitable missile to be configured with General Electric's GAU-12 25 mm Gatling-type gun system, and mounted upon a vehicle. When the US DIVADS program was replaced by the Forward Area Air Defense System (FAADS), Javelin was proposed for the Line-Of-Sight-Rear (LOSR) requirement, but the Pedestal Mounted Stinger (PMS) was selected in its stead.

Other Orders. Blowpipe missiles have been delivered also to Chile, Ecuador, Malawi, Portugal and Qatar. In addition, the Afghan Mujahideen guerrillas have reportedly received numbers of the Blowpipe system by the careful arrangement of 'end-user' certificates by the CIA with the British SIS. There is no implication that Short was involved in any improper or illegal activity. The Mujahideen also has taken delivery of other such systems, like the General Dynamics FIM-92 Stinger and the Soviet SA-7, and the increased air defense capability appears to have necessitated a change in tactics of Soviet/Afghan air forces. Already, Blowpipe is accredited with having downed several aircraft and helicopters. Also reported was the US intention to supply Blowpipe to the Nicaraguan Contra rebels. The deal, which apparently never materialized, would have involved about 20 launchers.

User Country(s). In addition to the Royal Army, Territorial Army and Royal Marines, Blowpipe is in service with the Canadian Armed Forces and at least 10 other nations. Since the 1982 Falklands War, where both sides used Blowpipe and the system was credited with 12 to 14 aircraft downings, a great deal of interest has been generated

by the missile. Identified users of *Blowpipe* include: **Angola** (rebel-operated), **Argentina** (army, marine corps, special forces), **Canada** (army - 111 systems and 31 in Europe), **Chile** (air force, marines - 50), **Ecuador** (army - 240), **Malawi** (army - 14), **Nicaragua** (rebels), **Nigeria** (army), **Oman** (army), **Pakistan** (army, acquired from shipments to Afghan resistance), **Portugal** (army - 16), **Qatar** (army), **Saudi Arabia**, **Thailand** (army and air force - the latter fields four air defense battalions) and the **United Kingdom**. In late 1986, it was learned that the Mujahideen rebel forces operating in Afghanistan had been supplied with the Blowpipe system. The missiles were said to be either part of the lot sold to Nigeria or Saudi Arabia. Short is said to have shipped 36,500+ Blowpipe and Javelin missiles to 20 armed services in 14 countries as of the end of 1986.

The prime *Javelin* users are the **British Army** and the **Royal Marines**, although the **Royal Navy** has placed an order. Current operators of Javelin outside of the United Kingdom include two undisclosed countries, one in **Africa** and one in the Middle East (believed to be **Jordan**), the **Republic of Korea**, **Malaysia** and **Peru**.

## Forecast Rationale

No further purchases of either the Blowpipe or Javelin are anticipated due to the availability of more modern alternatives. The chances of one or two countries purchasing these weapons cannot be completely ruled out, although they do remain remote. Even if such orders are placed, it will not result in a restart of the Javelin production line. Any new export buys would probably be filled with units taken from UK military stocks.

For now, Shorts' marketing efforts will focus on the Starburst and Starstreak air defense systems. Both the Blowpipe and Javelin are expected to be slowly superseded in front-line use with the major powers. However, they will remain in active service, somewhere around the world, well into the next century.

**NOTE:** Production figures include all variants for all applications.

## Ten-Year Outlook

### ESTIMATED CALENDAR YEAR PRODUCTION

Missile	(Engine)	thru 98	High Confidence Level				Good Confidence Level				Speculative			Total 99-08
			99	00	01	02	03	04	05	06	07	08		
SHORT BROTHERS LIMITED														
BLOWPIPE(a)	CRAKE	34382	0	0	0	0	0	0	0	0	0	0	0	0
JAVELIN(b)	CRAKE	10226	0	0	0	0	0	0	0	0	0	0	0	0
Total Production		44608	0	0	0	0	0	0	0	0	0	0	0	0

(a)Thru years do not include RDT&E prototypes, contractor and operational test/demonstration missiles.

(b)Thru years include all RDT&E prototypes, contractor and operational test/demonstration missiles.