

# ARCHIVED REPORT

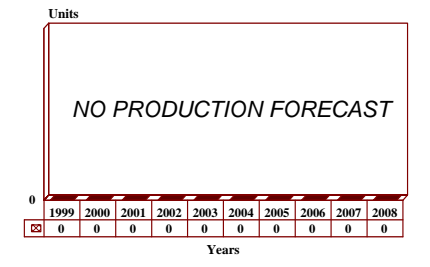
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## Swingfire - Archived 9/2000

### Outlook

- Production completed in both the United Kingdom and Egypt; systems remain in active service with nation's armed forces; additional new unit production is not anticipated, although out-of-service systems could be re-exported to new clients
- System upgrades are being performed; the United Kingdom plans to keep its Swingfire system operational beyond the turn of the century
- Swingfire may be eventually replaced by the next-generation TRIGAT anti-armor missile system

10 Year Unit Production Forecast  
1999-2008



### Orientation

**Description.** Wire-guided, heavy anti-tank missile.

**Sponsor.** The United Kingdom Ministry of Defence through the British army, Artillery Division.

**Contractors.** Developed and produced by British Aerospace Dynamics Group, Stevenage, Hertfordshire, UK. British Aerospace Dynamics was formerly Army Weapons Division. British Aerospace merged its missile unit with Matra's to form Matra BAe Dynamics.

**Major Subcontractors.** Alvis, Barr & Stroud, Dowty Weapon Systems, Pylon Industries, Royal Ordnance/Imperial Metal Industries, Somerton Rayner, Sterling Metals, Thorn-EMI Electronics Ltd and Wallop Industries.

**Licensee.** Arab-British Dynamics, Cairo, Egypt. The missile is manufactured in the Cairo suburb of Heliopolis. In mid-1992, British Aerospace withdrew from Arab-British Dynamics, which had a 30 percent stake in the joint venture firm. British Aerospace's partner was the Arab Organization for Industrialization (AOI). The withdrawal was due to British government pressure brought to bear due to the joint venture's plans to manufacture components for the SS-1 Scud missile. Arab-British Dynamics will be dissolved.

**Status.** Production has been concluded. Missile fabrication in the United Kingdom was completed in early 1991, followed by Egypt in 1992-1993. System upgrades are continuing. Swingfire units equipped with an automatic command to line-of-sight guidance system, known as Swingfire Improved Guidance (SWIG), have been deployed. The UK Ministry of Defence plans to reduce the number of Swingfire-equipped Armored Reconnaissance Regiments from five to two.

**Total Produced.** Approximately 46,650 Swingfire missiles were completed or in production as of the end of 1992. This total includes missiles produced in Egypt.

**Application.** Anti-tank missile employed on various military vehicles. Swingfire Pallet is a crew-portable variant of Swingfire which can be deployed on a greater variety of military vehicles as well as from stationary land-based emplacements.

**Price Range.** Based on a buy of 2,500 missiles, \$15,440 per unit in fiscal 1992 dollars. The price for Swingfire missiles manufactured in Egypt is believed to be somewhat higher.

## Technical Data

	<u>Metric</u>	<u>US</u>
<b>Dimensions</b>		
Missile Length	107 cm	3.51 ft
Missile Diameter	17 cm	6.69 in
Missile Weight	27 kg	59.4 lb
Wingspan	39 cm	1.28 ft
<b>Performance</b>		
Speed	185 m/s	359.61 kt
Altitude	Line of sight	Line of sight
Range	150-4,000 m	164.04-4,374.44 yd
Armor Penetration (40°) <sup>(a)</sup>	12.7 cm at 4,000 m	5 in at 4,374.44 yd

<sup>(a)</sup>This is the figure quoted by the manufacturer; the application of our standardized formula for HEAT warheads yields a figure of 94.5 centimeters (37.2 inches) at 90 degrees.

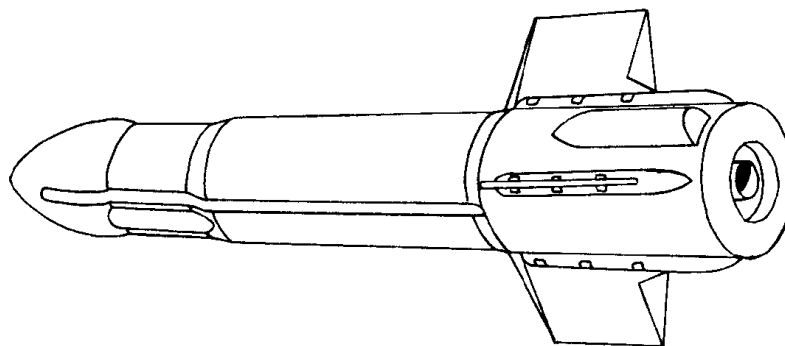
**Propulsion.** Royal Ordnance/Imperial Metal Industries provides the solid-propellant, single-chamber booster/sustainer designated Pointer. The direction of the motor's thrust can be varied for changes in course.

**Control & Guidance.** Wire-guided manual command to line-of-sight with optical sighting. Pitch and yaw commands are transmitted to the missile via the trailing wires. They are converted into command data by roll and heading stabilization units within the missile's autopilot. The rocket motor incorporates thrust deflectors to change heading, as required, to intercept the sighted target.

**Launcher Mode.** Ground-launched from a variety of light armored vehicles ranging from the Land Rover to the Scorpion. Both versions are also infantry-

transportable and can be launched from a portable trolley rail. Of the three Swingfire ground-based launch platforms – FV438, FV712 Ferret and FV102 Striker – only the Striker remains in service: 43 with the Belgian army and 87 with the British Royal Army. The Hawkswing variant was designed for launch from a helicopter airborne platform.

**Warhead.** Hollow charge, weighing 7 kilograms (15.4 pounds) total, produced by Thorn-EMI Electronics Ltd, Haynes, England. This warhead is said to be sufficient to destroy all known types of armor, with the exception of vehicles equipped with reactive armor. There is presently no plan to equip Swingfire with a reactive armor-defeating warhead. Arab-British Dynamics developed a Mk 2 HEAT warhead for its Swingfire production missiles.



Swingfire

Source: Forecast International

## Variants/Upgrades

The Swingfire is being offered in various configurations, including the original Swingfire ACLOS, an automatic tracking and targeting version also known as Swingfire Improved Guidance (SWIG); Swingfire Pallet, also known as Beeswing (this is a crew-portable version which uses a four-round launcher); Light Air-Transportable Swingfire (the Swingfire has been integrated with Somerton Rayner's Saboteur eight-wheeled cross-country amphibious vehicle which can handle four Swingfire missiles in canister/launchers); Hawkswing, a helicopter-mounted variant of Swingfire; and MM Swingfire, a new version which is significantly smaller and lighter. Upgrades include the following:

New Optical/Infrared Sight. British Aerospace (now Matra BAe Dynamics), in collaboration with Barr & Stroud, has developed a combination optical/infrared

sighting device for use with the Swingfire missile. The British army evaluated this equipment in 1982 and placed orders for 3,500 units in February 1984.

New Thermal Imaging Unit. British Aerospace (Matra BAe Dynamics) and Thorn-EMI Electronics have developed a new thermal imaging unit which can be used with the standard Swingfire day sight. This extends the operation of the system to times of poor visibility due to weather or other conditions, as well as night. The shelf life of the missile has been improved and the missile modified to improve its ability to cope with hot desert climates; this latter effort may have been in conjunction with AOI (within Arab-British Dynamics).

For additional information on these systems, please see the pertinent entries in the **Program Review** section.

## Program Review

**Background.** The original research and development associated with Swingfire was accomplished by Fairey Engineering Ltd. British Aerospace (now Matra BAe Dynamics) predicated its development and production programs on Fairey's expertise.

Swingfire was publicly announced in 1962. Engineering development continued, and prototype flight testing was initiated in early 1967. The system reached its operational capability with the British army in 1969. Since its initial deployment with the army, several variants have been introduced. A brief description of the basic system and variants follows:

Sequence of Operation. Swingfire can be operated by infantrymen on ground-mounted launchers or light vehicles. The usual deployment mode is on light vehicles as detailed below. The vehicle can be placed in a concealed position with the operator up to 100 meters (328 feet) away. Targets 45 degrees to each side and 20 degrees above or below the horizontal axis can be engaged. The missile is fired from its environmentally sealed launch box which is elevated 35 degrees before launch. Immediately after launch, the wire-guided missile is automatically gathered by the operator in the sight via a program generator.

Inputs are generated from the relative positions of the target, the missile launcher and the operator. This allows the launcher to be concealed, and no direct optical line-of-sight from the launcher to the target is required. The manual command to line-of-sight guidance system incorporates two gyroscopes in the

autopilot on the missile: one for pitch and one for yaw. Thrust-vector control maintains the missile heading or corrects it to the target.

UK Operation. Swingfire was employed by the UK Royal Army on the Ferret Mk 5 Scout Car (FV712), which holds four ready rounds and four spares. Additionally, it was carried on the FV438 (armored personnel carrier) with two ready rounds and 12 spares. However, the only remaining in-service Swingfire ground vehicle launchers are the 43 Strikers (FV102), which carry five ready rounds and five spares. The Royal Army deploys the Strikers (in squadrons) within its five Armored Reconnaissance Regiments. However, this number is expected to be reduced from five to two regiments.

Combat Successes. While Swingfire was used in the 1982 Falklands War. As of this writing, the success rate of the missile remains classified information. Swingfire may have been used by the Sudanese army against the rebels located in the southern part of the country.

**Missile Models.** The Swingfire is being offered in a number of different configurations, and upgraded versions. Below is a brief listing of these programs.

Swingfire ACLOS. Royal Armament R&D Establishment, under a British Aerospace (now Matra BAe Dynamics) contract, has demonstrated automatic tracking and targeting of armored vehicle targets by anti-tank missiles. The experimental system used

standard Swingfire ground control gear modified to employ the thermal/optical sight developed in 1980 for the Swingfire as a sensor for automatic command to line-of-sight (ACLOS) guidance via a signal processing unit, the multiple target and missile tracker (MTMT). This unit acquires the thermal signature of the outgoing missile and generates control signals to bring to zero the angular displacement between missile and target. MTMT can handle four thermal sources at once, two missiles and two targets. In tests, two Swingfire missiles were fired in rapid succession against two separate targets from an FV432 armored personnel vehicle and were simultaneously, automatically and independently guided to hits on each.

In May 1988, during several trials, two Swingfire missiles were ripple-fired from an FV438 armored personnel carrier, and were simultaneously, automatically and independently guided to hit two separate targets. These firings were part of the proof-of-principle research program, aimed at demonstrating that representative armored vehicle targets could be tracked and anti-tank missiles accurately guided to intercept them at long range completely and automatically.

In 1989, the UK Ministry of Defence asked then-British Aerospace to provide a proposal for upgrading the armed forces inventory of Swingfire missile systems. The upgrade program would involve the installation of an improved guidance system on some of its Alvis FV102 Striker Swingfire tracked launch vehicles. This improvement package is expected to enable Swingfire to remain effective until a replacement can be procured, possibly the TRIGAT-LR (see separate PARS-3/TRIGAT report). However, the UK decision to focus its procurement energies on the air-launched version will likely remain an additional extension in the service duration of the Swingfire/Striker systems.

British Aerospace Dynamics was awarded such a Swingfire Improved Guidance (SWIG) upgrade contract in June 1990. The award was worth £35 million, to take place over five years. The British army was the first to deploy the automatic command to line-of-sight guidance system. BAe Dynamics' main subcontractor for the SWIG program is British Aerospace Systems and Equipment (BASE), which is responsible for the auto-tracker and scan converter. The Swingfire/Striker units will be rebuilt at Stevenage. Dowty Weapon

Systems will provide the high-pressure air generators (HiPPAG) for the SWIG upgrade. The cryogenic pressure system will replace the existing gas bottle system. The HiPPAG is already in service with the Warrior observation post vehicle and the Lynx (FITOW) anti-tank helicopter.

Swingfire Pallet or Beeswing. This is a crew-portable version which uses a four-round launcher. The composite pallet can be mounted on a Land Rover, or a similar vehicle, and the four-missile system can be controlled, fired and reloaded by one man. The Egyptian army is believed to have received Matra BAe Dynamics' new lightweight sighting and guidance system.

Light Air-Transportable Swingfire (LATS). The Swingfire has been integrated with Somerton Rayner's Saboteur eight-wheeled cross-country amphibious vehicle. This multipurpose vehicle can handle four Swingfire missiles in canister/launchers. More significantly, it can create anti-tank defense points where other tracked vehicles could not be positioned. The vehicle can be air-dropped by parachute or transported by helicopter to a potentially hostile zone.

The combination of a small, multipurpose vehicle with a proven anti-tank weapon has good potential for increased missile production. The Saboteur is particularly suited for sand, mud and what might be considered impassable terrain for heavier, tracked vehicles. It would seem to be an ideal weapons carrier for numerous nations with limited defense budgets and serious insurgency problems.

Hawkswing. This helicopter-mounted variant of Swingfire did not compete effectively against Hughes' BGM-71 TOW and Euromissile's HOT, and it is not being offered by Matra BAe Dynamics at this time.

MM Swingfire. In late 1984, development was completed of a new version of the Swingfire system with a significantly smaller and lighter guidance and control unit as well as a lighter launcher. The new unit relies heavily on advanced microcircuitry to achieve a reduction in both size and weight over the standard unit; weight of the entire system is reduced to 170 kilograms (374 pounds), enabling it to be fitted to an even wider range of military vehicles. It is designated MM Swingfire.

## Funding

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There are no details available concerning Swingfire funding in either the United Kingdom or Egypt.

## Recent Contracts

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British Aerospace Dynamics (now Matra BAe Dynamics) has been awarded a prime contract by the British Ministry of Defence to upgrade its inventory of Swingfire missiles. The contract, worth £35 million, will include the addition of an auto-tracking system. As part of the SWIG upgrade program, Dowty Weapon Systems was awarded a £2 million contract to provide high-pressure air generators (HiPPAG). The cryogenic pressure system will replace the existing gas bottle system.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1958	Conceptual design studies initiated
	1960 <sup>(a)</sup>	Engineering development started
	1962	Prototype manufacturing
	1964-66	Flight evaluations
	1966	Low-rate production
	1968	Production contract let by MoD
	1969	Operational capability
	1972	Belgian buy
	1977	Swingfire thermal night sight development
	1977	Arab-British Dynamics formed
Mar	1979	Sale of Swingfire to Kenyan army
	1979	First UK production delivery of Egyptian Swingfire
	1980	Thermal night sight introduced
Apr	1981	Transfer of Egyptian missiles to Sudan
	1981-82	Swingfire all-weather capability
	1982	Egyptian coproduction begun
May/Jun	1982	Swingfire in action in Falklands
	1984-86	Work on enhanced Swingfire
Oct	1987	BAe tenders to supply 1,200 Swingfires
	1988	Production in the United Kingdom and Egypt continued
	1989	British begin to consider ACLOS Swingfire guidance upgrade
	1990	British award ACLOS Swingfire upgrade contract
	1990-91	Production of Swingfire missiles concluded in the UK
	1991	Production continuing in Egypt
	1992	Dissolution of Arab-British Dynamics commenced
	1992-93	Production stopped in Egypt

<sup>(a)</sup>estimate

## Worldwide Distribution

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Among the most recent customers for the Swingfire have been **Qatar, Saudi Arabia** and the **United Arab Emirates**. These countries are believed to have acquired the missile system from Egypt. Swingfire is expected to remain in Belgian service for the near future, since defense budget cuts will not enable Brussels to replace the system. The Belgians deploy Swingfire on 43 Striker (FV102) armored personnel carriers (their missile inventory exceeds 2,000 rounds). Various Swingfire operators could opt for the SWIG automatic command to line-of-sight guidance upgrade.

Egyptian Licensed Production. British Aerospace joined Egypt, under the aegis of the Arab Organization for Industrialization (AOI), in late 1977 and formed the Arab-British Dynamics Company. This venture would have supplied Swingfire components and subassemblies to Egypt for final assembly for a period of two years. Thereafter, concurrent fabrication of a Swingfire production line within Egypt would establish a firm coproduction licensing agreement to assure Egypt self-sufficiency in arms. This agreement was substantially delayed when the late President Sadat of Egypt undertook the peace initiative through direct negotiations with Israel. This initiative

caused a virtual isolation of Egypt by other Arab countries, resulting in the withdrawal of financial backing, including from Saudi Arabia. Consequently, President Sadat formed the fledgling Egyptian Organization for Industrialization after the AOI was disbanded officially in March 1979 (only to be re-established later). Thereafter, Egypt devoted considerable resources to building up a military-industrial base on its own. However, with Egypt's readmittance to the Arab League and the Arab Organization of Industrialization, Cairo is once again seeking to exploit this renewed access to Arab markets.

This consortium is now involved with several coproduction agreements for weapon systems; Swingfire has proven to be one of the most successful of these programs. While information regarding Egypt's export of weapons is limited, it is known that Qatar, Saudi Arabia, Sudan (which received the missile in April 1981 from Egypt to counter increasing pressure from Libya), and the United Arab Emirates have been supplied with the system. Egypt desires to attain the goal of self-sufficiency in arms which would minimize the effect of future foreign arms embargoes. More significantly, it is allowing Egypt to build an industrial base which could help to establish a positive export-import balance. AOI has developed to production stage a new warhead for the Swingfire that is said to be further enhanced in armor penetration performance when compared with the original warhead.

In January 1988, a new 10-year agreement was reached between British Aerospace and the Arab Organization for Industrialization to continue the joint venture company, Arab-British Dynamics. At that time, Egyptian production of Swingfire was continuing, and AOI was planning to initiate a modification program for the missile. However, under pressure from London, British Aerospace has withdrawn from Arab-British Dynamics. The reason for this move was supposed plans by Arab-British Dynamics to manufacture components for the SS-1 Scud missile. Sources have indicated that Egyptian production of the Swingfire has stopped.

**User Country(s).** In addition to the **United Kingdom**, Swingfire versions are currently employed within **Belgian, Egyptian, Kenyan, Nigerian, Qatari, Saudi, Sudanese** and **United Arab Emirate** armies. A small number of units also are reported to have been received by Iraq from Egypt.

The missile has been deployed on the FV102 Striker Armored Fighting Vehicle (AFV), FV438 Armored Personnel Carrier (APC), FV712 Ferret Mk 5 armored car and Land Rovers by the United Kingdom; on the Striker AFV with Belgium; and on CJ6 Jeeps in the Egyptian and Sudanese armed forces.

## Forecast Rationale

No further production of the Swingfire anti-armor missile system is anticipated. The existing systems are expected to remain in service possibly well into the 21st century, especially due to delays in purchasing a successor. The United Kingdom had once intended to procure the TRIGAT-LR as a Swingfire replacement, but this is no longer the case. France has also decided to abandon the TRIGAT-LR program, leaving Germany as its only sponsor. Rumors are now circulating that this next-generation missile development effort could collapse altogether. If the TRIGAT-LR is terminated,

Europe would be left without a next-generation anti-tank missile in this class.

No matter what happens, the United Kingdom is not expected to restart production of the Swingfire. This situation does present an opportunity for further upgrades to be incorporated into Swingfire, allowing it to remain in service longer than once anticipated. Once the United Kingdom does acquire a Swingfire follow-on, surplus systems could be re-exported to interested overseas clients or placed in storage and eventually decommissioned completely.

## 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	
BRITISH AEROSPACE PLC/DYNAMICS													
SWINGFIRE (a)	POINTER	37482	0	0	0	0	0	0	0	0	0	0	0
Subtotal - BRITISH AEROSPACE PLC/DYNAMICS		37482	0	0	0	0	0	0	0	0	0	0	0
ARAB-BRITISH DYNAMICS (Licensee)													
SWINGFIRE (a)	POINTER	9168	0	0	0	0	0	0	0	0	0	0	0
Subtotal - ARAB-BRITISH DYNAMICS (Licensee)		9168	0	0	0	0	0	0	0	0	0	0	0
Total Production		46650	0	0	0	0	0	0	0	0	0	0	0

(a) Thru years include all RDT&E prototypes.