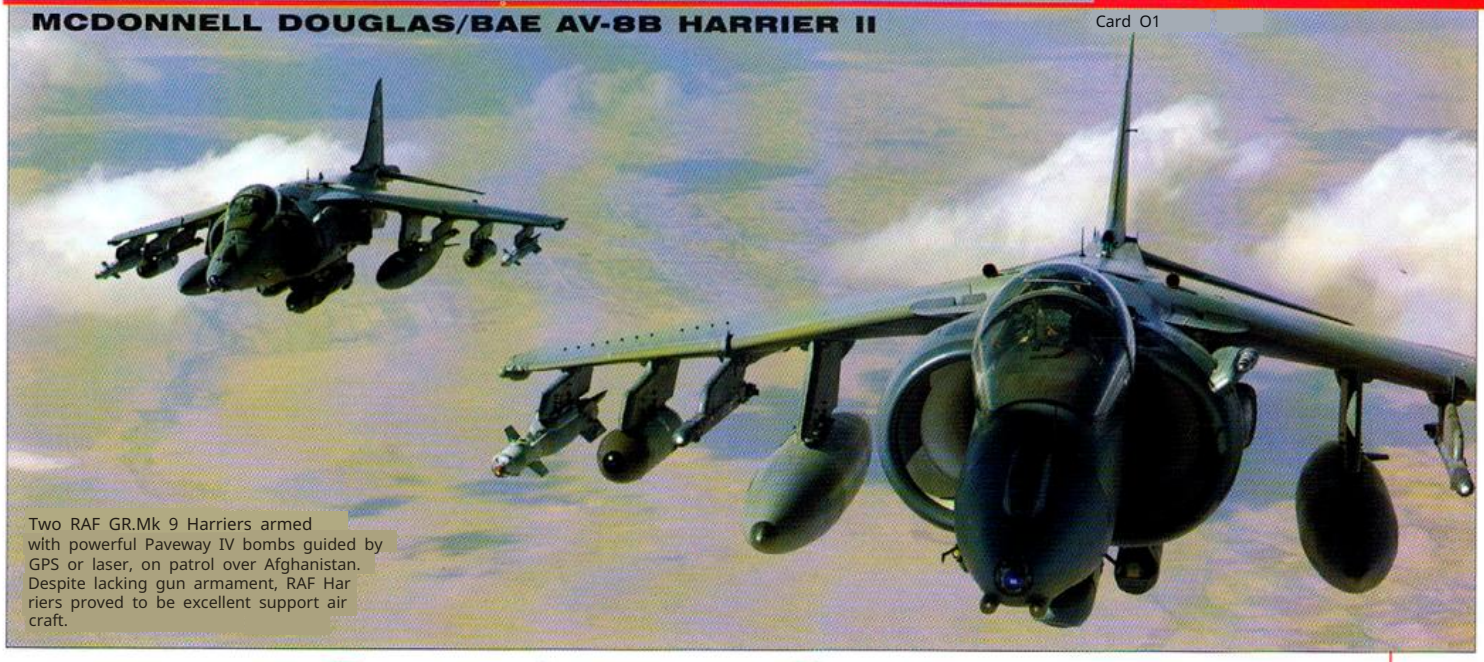
MCDONNELL DOUGLAS/BAE AV-8B HARRIER II



Two RAF GR.Mk 9 Harriers armed with powerful Paveway IV bombs guided by GPS or laser, on patrol over Afghanistan. Despite lacking gun armament, RAF Harriers proved to be excellent support aircraft.

GR.Mk 7 and T.Mk 10

The Harrier is probably the most important aircraft operated by the RAF in 2010. Versatile, flexible, not requiring airfields, and exceptionally effective, it played a key role in many modern conflicts, especially as the RAF's vanguard in operations in Afghanistan.

The Harrier GR.Mk 7 was the British equivalent of the American Night-Attack AV-8B; since then, these aircraft have been upgraded to the GR.Mk 9 standard. They are equipped with the same GEC Sensors FLIR thermal imaging cameras, mounted on the upper front part of the fuselage, as well as a "glass cockpit" compatible with NVG goggles, but lack the chaff and flare dispenser at the rear of the fuselage that was installed on later AV-8Bs. Instead, they are fitted with an excellent electronic warfare system.

Marconi Zeus electronic countermeasure (ECM), a British rear hemisphere threat warning radar (RWR), and a Northrop jamming device. This device can jam both continuous wave and pulse radars, and is also connected to the Plessey missile approach warning system, which automatically activates appropriate defensive measures upon detection of an incoming missile.

The Harrier GR.Mk 7 had six underwing pylons, a pylon under the fuselage, and two pylons for carrying Sidewinder missiles. It also featured an integral chaff dispenser.

The BOL foil in the Sidewinder missile pylons was installed in place of the standard Phimat dispenser, which required a separate suspension point.

After entering service in September 1990, the RAF's second-generation Harriers suffered from several "teething problems." Many of these were soon resolved; however, issues with the twin, pneumatically reloaded 25 mm ADEN cannon produced by the Royal Ordnance Factory could not be overcome. As a result, this armament was abandoned, making the Harrier the first RAF fighter-bomber without gun armament. This absence later significantly hindered the execution of close air support missions in Afghanistan. The Harrier GR.Mk 7s often flew with an empty gun pylon, which served as an "aerodynamic aid."

The first order from 1988 was for 34 Harrier GR.Mk 7 aircraft (the earlier GR.Mk 5s were quickly modified to the same standard). The GR.Mk 7 version of the aircraft made its first flight on November 20, 1989, and the first production model was delivered in May 1990. From September 1990, the 4th Army Cooperation Squadron (IV(AC)), which had previously operated first-generation Harrier GR.Mk 3s, received the production GR.Mk 7s, and from November 1990, this version replaced the GR.Mk 5 aircraft in the 3rd Squadron.

To facilitate the planned rearmament from the GR.Mk 5 to a later version, aircraft numbers 42-60 were built in the GR.Mk 5A version with provisions for avionics from the GR.Mk 7 version (including empty fairings for the FLIR camera and Zeus system antenna). They were delivered directly to storage, where they were to await further modification. The final conversion of these aircraft began in December 1990, and most

TOPIC INCLUDES

01 GR.Mk 7 and T.Mk 10
02 First generation for USMC Harrier II
03 Harrier II Plus Overview
04 Export versions
05 Harrier GR.Mk 7 in combat

RAF Harrier GR.Mk 9/9A The Harrier GR.Mk 9 remains the primary aircraft of the RAF and FAA, proving highly effective as a close air support and reconnaissance aircraft.



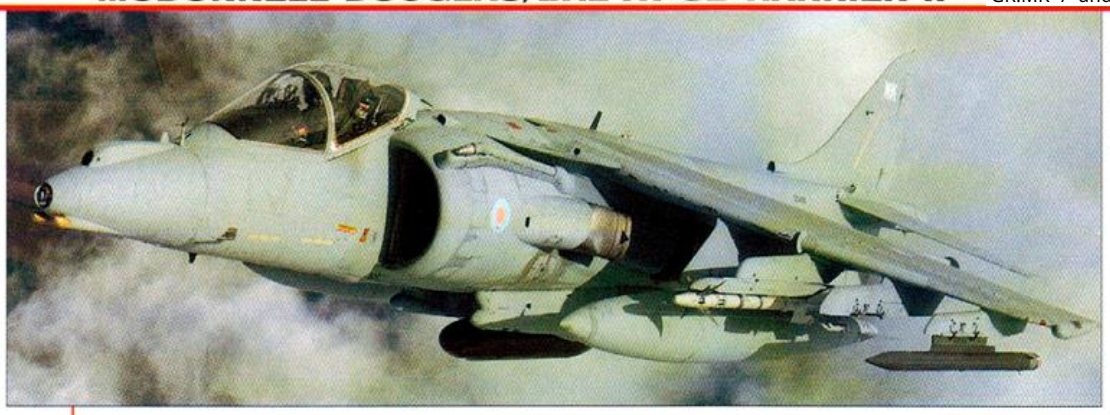
GR.Mk 9A (ZD435)

1. The Squadron (Fighter) is part of the Joint Force Harrier. The squadron operates from RAF Cottesmore as part of the 122nd Expeditionary Wing.

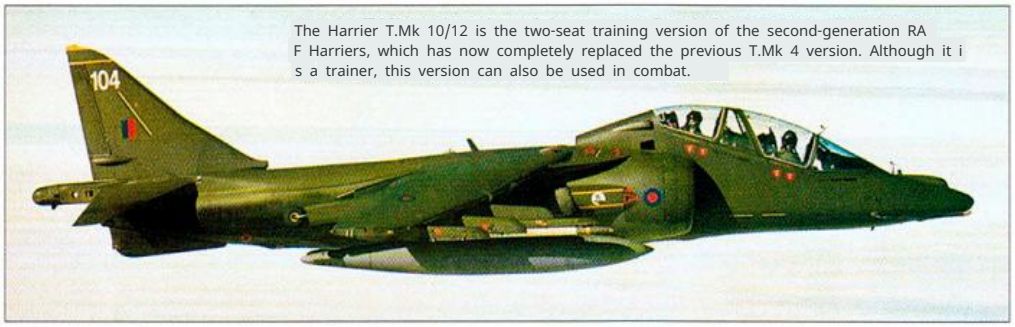
Harrier GR.Mk 9 (ZG502)

20th Squadron (Reserve) provided operational training for the combined Harrier forces RAF and Royal Navy do March 2010

The unit was stationed at the base RAF Wittering.



The Harrier GR.Mk 7s appeared too late to take part in Operation Granby, so they were first used during Operation Warden—a mission monitoring northern Iraq from Incirlik Air Base.



The Harrier T.Mk 10/12 is the two-seat training version of the second-generation RAF Harriers, which has now completely replaced the previous T.Mk 4 version. Although it is a trainer, this version can also be used in combat.

SEE ALSO
043 Sea Harrier FA.Mk 2
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195 SEPECAT Jaguar
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The former GR.Mk 5A aircraft were assigned to No. 1 and No. 20 Squadrons.

After the closure of RAF base in Gütersloh in 1993, No. 3 and IV (AC) Squadrons were relocated to Laarbruch and subordinated to NATO's Rapid Reaction Force. In 1999, these squadrons finally returned to the British Isles at RAF Cottesmore.

Starting from aircraft number 77 (ZG506), the Harrier GR.Mk 7s were equipped with larger, so-called 100-percent wing root extensions (LERX, Leading Edge Root Extension) at the fuselage. These were intended to delay the onset of lateral roll at high angles of attack and improve turning performance. The program to replace the smaller, compromise LERXs with larger ones on earlier aircraft was suspended. The reason was as the need for standardization and reports of problems with large LERXs during carrier operations. In some later GR.Mk 7s, the large LERXs were even removed and replaced with the original assemblies!

To enable the GR.Mk 7 aircraft to perform reconnaissance missions for Operation Warden, at least nine aircraft were modified so that they could carry the reconnaissance pod from the GR.Mk 3 version. This interim solution proved effective and was used until the Harriers were equipped with Vinten Vicon 18 Series 601 GP(1) and Series 603 LOROP pods. These aircraft were also modified to carry the TIALD laser designator.

At the end of 2003, the GR.Mk 7A version was developed as an intermediate step towards the full Harrier GR.Mk 9 standard. Aircraft of this version were equipped with a more powerful Rolls-Royce Pegasus 107 engine, which had 13.34 kN more thrust, a feature particularly important during operations in thin air conditions (hot or high altitude), such as in Afghanistan. These aircraft were eventually designated as GR.Mk 9A, where the letter "A" indicated the new engine; aircraft with the earlier engine were designated as GR.Mk 9.

After the publication in 1997 of the government document called the Strategic Defence Review (SDR), which was intended to outline British defense policy for the coming years, the Sea Harrier and Harrier forces were grouped into the Joint Force Harrier (JFH). Fleet Air Arm pilots were transferred to land and flew Harriers after the Sea Harrier FA.Mk 2s were withdrawn from frontline service.

GR.Mk 9

The Harrier GR.Mk 9 can carry various types of smart weaponry, including MBDA's Brimstone missiles, precision-guided Paveway IV bombs, AGM-65D/G Maverick missiles, and AIM-9L/BOL Sidewinder missiles. This, in turn, means that the probability of destroying the target has increased—thanks to improved weapon performance and accuracy—while the risk of being shot down is reduced due to the greater distance from which the weapons can be released from the target.

The modernization, called the Integrated Weapons Programme (IWP), also includes the introduction of a new inertial navigation and GPS system (INS/GPS), a new communication set, and the Sniper targeting system, which is widely recognized as one of the best. The planned integration with AIM-132 ASRAAM missiles was canceled due to costs. JFH planned a modernization that was to provide them with 27 Harrier GR.Mk 9, 30 GR.Mk 9A, and 10 T.Mk 12 aircraft.

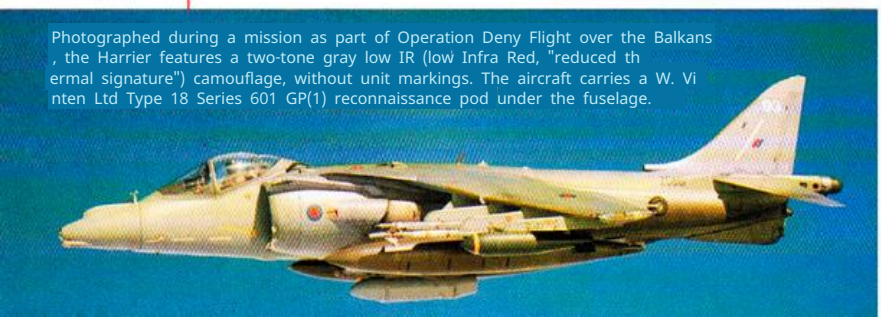
The first phase of modernization was agreed upon in January 2003, when a contract worth £150 million was signed with BAE Systems & Support. In July 2007, as part of a three-year program worth £20 million, BAE completed the construction of the last of seven new rear fuselages for the Harrier GR.Mk 9, which needed to be replaced due to fatigue cracks caused by emissions from the Pegasus engine. The entire modernization program was completed in phases or sub-phases, depending on feasibility, as part of the Harrier Modification Programme. In phases A, B, and C, three series of aircraft were rebuilt over a five-year period, which was completed as planned in 2008. Phase A was completed at the beginning of 2005; Phase B, which included the integration of the Brimstone and TIALD 500 targeting pods via an intelligent data management system with a 1760 bus, was carried out in the same year. In phase C1, starting in September 2006, the Enhanced Paveway III bomb was integrated. Phase C2, which originated from a £100 million contract awarded to BAE in January 2004, was completed in 2007, when, as part of phase C2/D, the AGM-65G2 Maverick IR/TV, Paveway IV, and the Mk 12 Successor IFF (SIFF) system were integrated, providing the Harrier with additional protection against friendly fire. The final stages of phase C of the Harrier GR.Mk 9 modernization program were completed in 2008, adding the Link-16 TIEC (Tactical Information Exchange Capability) data link and a ground proximity warning system.

The Harrier fleet is operated by two frontline squadrons and one Operational Conversion Unit (OCU), where new pilots are trained on this type of aircraft. RAF personnel staff No. 1(F) Squadron and 800 Squadron of the Royal Navy, stationed at RAF Cottesmore. The OCU and IV(R) Squadron at RAF Wittering are staffed by RAF and Fleet Air Arm (FAA) personnel.

The first operational use of the Harrier GR.Mk 9 took place in January 2007 in Afghanistan (from Kandahar Air Base).

T.Mk 10/12

The Harrier T.Mk 10 is a two-seat version of the GR.Mk 7; an order for 13 of these aircraft was placed at the beginning of 1992. Thanks to this, the RAF received a training aircraft fully matching the performance and capabilities of the second-generation Harrier GR.Mk 7s. Powered by the Pegasus Mk 105 engine, the Harrier T.Mk 10, which first flew on 7 April 1994, is fully capable of combat operations—unlike its American counterpart, which can only carry training armament. Aircraft of the T.Mk 10 version upgraded to the GR.Mk 9 standard are designated as T.Mk 12.



Photographed during a mission as part of Operation Deny Flight over the Balkans, the Harrier features a two-tone gray low IR (low Infra Red, "reduced thermal signature") camouflage, without unit markings. The aircraft carries a W. Vinten Ltd Type 18 Series 601 GP(1) reconnaissance pod under the fuselage.