

BOLD AVENGER 2007

Public Information Cell



Fact Sheet

BAE Harrier II



The BAE Systems/Boeing Harrier II (GR5, GR7, and GR9 series) is a second generation vertical/short takeoff and landing (V/STOL) jet aircraft used by the Royal Air Force (RAF) and, since 2006, the Royal Navy. It was developed from the earlier Hawker Siddeley Harrier and is very closely related to the US built AV-8B Harrier II. Both are primarily used for light attack or multi-role tasks, and are often operated from small aircraft carriers.

Overview

Development of a successor to the first Harrier began as a cooperative effort between McDonnell Douglas (US) and Hawker Siddeley (UK). Cost overruns eventually led Hawker to withdraw from the project, but work continued due to US interest in the aircraft. Britain re-entered development in the late 1970's, producing their own version of the Harrier II based on the US design. For UK variants, BAE Systems is the prime contractor and Boeing a sub-contractor.

The Harrier II is an extensively modified version of the first generation Hawker Siddeley Harrier GR1/GR3 series which first flew in December 1967. The original aluminium alloy fuselage was replaced by a fuselage which makes extensive use of composites, providing significant weight reduction and increased payload/range. An all-new one piece wing provides around 14 per cent more area and increased thickness.

Operational service



GR-7 displaying at the Farnborough Air Show; hovering with smoke from vectored jet visible

In RAF service, Harriers are used in the ground attack and reconnaissance role. Unlike the Harrier AV8B+ upgrade, the RAF have chosen not to integrate a radar into its aircraft, although the aircraft retains an Inertial Navigation System. The primary air-to-air missile (AAM) of the Harrier is the AIM-9 Sidewinder using its infrared homing device (the combination of Harrier and Sidewinder proved effective against Argentinian Mirages in the Falklands conflict), but does not carry the medium range AIM-120 AMRAAM missile.

With the retirement of the Sea Harrier it had been suggested that its Blue Vixen radar could be transferred to the GR9 fleet. However, the Ministry of Defence has rejected this as risky and too expensive. The Armed Forces Minister Adam Ingram estimated the cost would be in excess of £600m.

Future

With the withdrawal of the Royal Navy's Sea Harrier in 2006 the RAF's Harrier fleet is tasked with the missions it used to share with those aircraft. In 2006, the GR9 also entered service with the Fleet Air Arm when the first former Sea Harrier squadron reformed. The GR9 is expected to stay in service at least until 2015, when the first F-35s are due. At this point the JSF force should be gaining an initial operational capability (IOC).

Variants

GR5

The GR5 was the RAF's first 2nd generation Harrier with development beginning in 1976. Two AV-8As were modified to Harrier II standard in 1979 and operated as development aircraft. The first BAE built development GR5 flew for the first time on April 30, 1985 and the aircraft entered service in July 1987. The GR5 differed from the USMC AV-8B in many subtle ways, for example avionics fit, weapons and countermeasures. Forty one GR5s were built.

GR5A

The GR5A was a minor variant of the Harrier which incorporated changes in the design in anticipation of the GR7 upgrade. Twenty-one GR5As were built.

GR7

The GR7 had its maiden flight in May 1990 and made its first operational deployment in August 1995 over the former Yugoslavia. While the GR7 deployed on Invincible class aircraft carriers during testing as early as June 1994, the first operational deployments at sea began in 1997. This arrangement was formalised with the Joint Force Harrier, operating with the Royal Navy's Sea Harrier.

The GR7 formed the spearhead of the RAF's contribution to Operation Allied Force, the NATO mission in Kosovo. During this campaign the RAF identified significant shortcomings in its current arsenal. As a result the service ordered the AGM-65 Maverick stand off missile and the Enhanced Paveway which incorporates GPS guidance which would negate the effects of smoke and bad weather. Using the more updated ordnance as well as unguided iron and cluster munitions, RAF GR7's played a prominent role in Operation Telic, the UK contribution to the U.S.-led war against Iraq in 2003. RAF GR7's participated in strike and close air support missions throughout the conflict.

GR7A



An RAF Harrier GR7A at RIAT 2005

The GR7A is the first stage in an upgrade to the Harrier GR9 standard. The GR7A is the GR7 with an uprated Rolls-Royce Pegasus 107 engine. When upgraded to GR9 standard the uprated engine variants will retain the A designation, becoming GR9As. Forty GR7s are due to receive this upgrade. The Mk 107 engine provides around 3,000 lbf (13 kN) extra thrust than the Mk 105's 21,750 lbf (98 kN) thrust, increasing aircraft performance during "hot and high" and carrier-borne operations.

GR9

The Harrier GR9 is an avionics and weapons upgrade of the standard GR7. This upgrade, known as the Integrated Weapons Programme (IWP), allows the carriage of the latest smart weapons, new inertial navigation and Global Positioning systems (INS/GPS). The new weapons being integrated are the Brimstone, Maverick, Paveway III LGB and Paveway IV PGB missiles. The planes will also be fitted with Sniper targeting pods. In July 2007, BAE Systems completed the final of seven Harrier GR9 replacement rear fuselages for the UK MoD. The fuselage components were designed and built as part of a three year £20 million programme.

GR9A

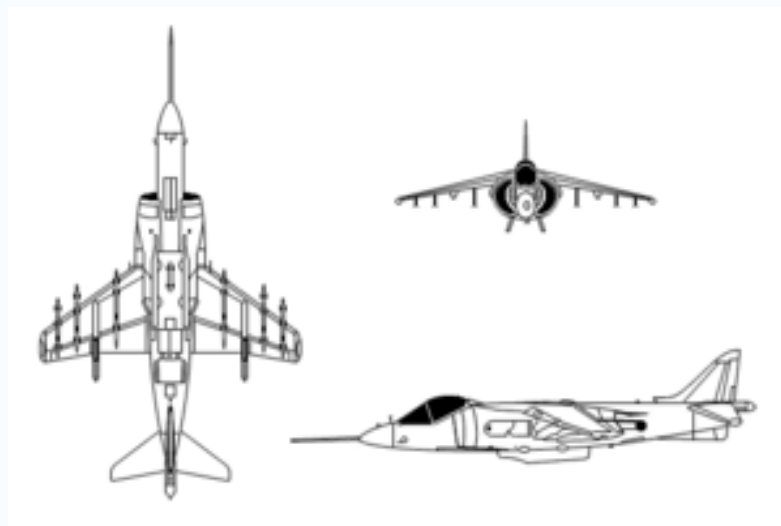
The Harrier GR9A is an avionics and weapons upgrade of the uprated engined GR7As.

T10

The Harrier T10 is the original two seat training variant of the second generation RAF Harrier. The RAF considered upgrading the first generation Harrier trainer, the T4, to Harrier II standard. However due to the age of the airframes and the level of modification required the service decided to order new build Harrier II trainers. The RAF used the USMC trainer, the TAV-8B, as the basis for the design. Unlike their American counterparts the T10s are fully combat capable. Thirteen aircraft were built.

T12

With the upgrades bringing the GR7s to GR9 standard, the RAF requires representative trainers. These aircraft will be the T12, the T10s with the IWP upgrade.



General characteristics

- **Crew:** 1 or 2
- **Length:** 46 ft 4 in (14.1 m)
- **Wingspan:** 30 ft 4 in (9.2 m)
- **Height:** 11 ft 9 in (3.5 m)
- **Wing area:** 230 ft² ()
- **Empty weight:** 12,500 lb (5,700 kg)
- **Loaded weight:** 15,703 lb (7,123 kg)
- **Max takeoff weight:** 18,950 lb VTO, 31,000 lb STO (8,595 kg VTO, 14,061 kg STO)
- **Powerplant:** 1× Rolls-Royce Pegasus 105 turbofan with four thrust vectored exhaust nozzles, 21,750 lb (23,800 lb (GR7A))

Performance

- **Maximum speed:** 662 mph (1,065 km/h)
- **Range:** 2015 mi (km)
- **Service ceiling:** 50,000 ft (15,000 m)
- **Rate of climb:** 40,000 ft/min (203.2 m/s)