= BAE Systems Nimrod MRA4 =

The BAE Systems Nimrod MRA4 was a maritime patrol and attack aircraft intended to replace the Hawker Siddeley Nimrod MR2 . The rebuilt aircraft would have extended the operating life of the Nimrod fleet by several decades and significantly improved the aircraft by installing more efficient Rolls @-@ Royce BR700 turbofan jet engines to almost double the flight range . The conversion of the flight deck to a digital glass cockpit would have simplified control operations and reduced crew requirements . New detection systems were to be installed , as well as additional weapons for anti @-@ submarine warfare .

However the project was subject to significant delays due to cost over @-@ runs and contract re @-@ negotiations . This was partly due to difficulties combining refurbished Nimrod MR2 fuselages , which had not been built to a common standard , with newly built wings . The numbers of aircraft to be procured fell from 21 to nine over a course of years , while costs continued to climb .

The MRA4 was ultimately cancelled in 2010 as a result of the Strategic Defence and Security Review , at which point it was £ 789 million over @-@ budget and over nine years late . There is no direct replacement under development . The roles intended for the MRA4 are filled by existing assets such as the Type 23 Frigate and the Merlin helicopter . Ultimately , On 23 November 2015 , the UK announced its intention to order nine P @-@ 8 Poseidon ASW aircraft as part of the Strategic Defense and Security Review 2015 , effectively replacing the Nimrod .

= = Development = =

= = = Background and origins = = =

In 1988 , the Royal Air Force started a Replacement Maritime Patrol Aircraft (RMPA) procurement programme to replace the Nimrod MR2 aircraft . To meet the requirement British Aerospace proposed rebuilding each Nimrod MR2 with new engines and electronics which it called Nimrod 2000 . The RAF considered bids from Lockheed with its P @-@ 3 Orion , Loral Corporation with rebuilt ex @-@ US Navy Orions , and Dassault with the Atlantique 3 . In December 1996 the $ US3.5 @-@ billion contract was awarded to British Aerospace for the Nimrod 2000 , under the designation Nimrod MRA4 . British Aerospace became BAE Systems in 1999 and continued development on the Nimrod MRA4 .

The MRA4 was to be essentially a new aircraft . Significant changes included the installation of current @-@ generation Rolls @-@ Royce BR710 turbofan engines , a larger and more efficient wing , and a fully refurbished fuselage . Much larger air intakes were required on the MRA4 because the airflow requirements of the BR710 engine are significantly higher than that of the original Spey 250 powering the original Nimrods . The MRA4 also borrowed heavily from Airbus technology ; the glass cockpit was derived from the Airbus A340 .

According to BAE Systems , the Nimrod MRA4 systems was to enable the crews to gather , process and display up to 20 times more technical and strategic data than the MR2 . The Searchwater 2000 radar was stated to have been capable over land as well as water ; with the ability to have swept an area the size of the UK every 10 seconds . The Aircraft Synthetic Training Aids (ASTA) provided by Thales Training & Simulation was an electronic training suite to allow the training of crew members to transfer from active MRA4 aircraft to ground @-@ based training systems ; this change was made to increase the availability of the aircraft for operational missions and allow for more intensive training exercises .

= = = Delays and development problems = = =

The original scheduled date of entry into service for the MRA4 was April 2003 ; however , development proved far more protracted than anticipated . An independent company , Flight Refuelling Ltd . , was contracted to undertake the conversions to MRA4 standard , however BAE

discovered that the Nimrod airframes supplied by the RAF were not built to a common standard and this considerably complicated the refurbishment process . The task of converting the existing airframes was transferred in @-@ house to BAE Systems Woodford . The BAE team at Woodford then found that the new wing was flawed , which resulted in the project being put on hold while another wing design was developed .

BAE Systems issued a shock profit warning in December 2002 due to cost overruns of the Nimrod MRA4 and the Astute class submarine projects . On 19 February 2003 BAE took a charge of £ 500 million against the MRA4 contract . The company had previously taken a £ 300 million " loss charge " in 2000 , which was expected to cover " all the costs of completion of the current contract " . The contract was renegotiated for the second time in 2002 , where the aircraft requirement was reduced from 21 to 18 .

Announcing plans for the future of the British military on 21 July 2004 , the Defence Secretary Geoff Hoon detailed plans to reduce the upgrade programme to cover only 16 MRA4 aircraft , and suggested that an eventual fleet of 12 might suffice . PA02 , the second development MRA4 , achieved its first flight in December 2004 and was used to test elements of the mission system and the air vehicle . BAE Systems received a contract worth £ 1 @.@ 1 billion for 12 MRA4s on 18 July 2006 ; three were to be development aircraft and nine more converted to production standard . The Nimrod MRA4 successfully released the Sting Ray torpedo for the first time on 30 July 2007 .

Further disputes over cost meant that the number of MRA4s to be delivered was further reduced to nine by Spring 2008 . The first production aircraft took its maiden flight on 10 September 2009 . At the time of the flight , each MRA4 was to cost at least £ 400 million . The Ministry of Defence announced in December 2009 that the introduction of the MRA4 would be delayed until 2012 as part of defence spending cuts . The first Nimrod MRA4 was delivered in March 2010 to the RAF for acceptance testing ; initial operational capability was expected to be reached in October 2012 . The MRA4 was to operate out from its main base at RAF Kinloss , Scotland ; all nine aircraft were due to be delivered by 2012 .

= = = Cancellation = = =

In the 2010 Strategic Defence and Security Review of the Armed Forces , the UK government announced the cancellation of the MRA4 on 19 October 2010 and consequently that RAF Kinloss , the intended base for the Nimrod fleet , would be closed . On 24 November 2010 , 382 sub @-@ contract workers previously working on the MRA4 were laid off at BAE Systems Warton and Woodford . After the airframes were stripped of electronic equipment , the remaining fuselages were scrapped at BAE Systems Woodford beginning on 26 January 2011 . Although the process was conducted behind screens intended to hide the process from the media , the BBC flew a helicopter over Woodford and broadcast footage of the scrapping in process .

Although late and over @-@ budget the decision to cancel the MRA4 was controversial as the remaining airframes had all been near completion . It has been reported that following the retirement of the Nimrod MR2 (in March 2010 .) , Russian submarines have been able to travel past the UK in international waters , but they could not be tracked because of the lack of suitable aircraft . In November and early December 2014 four maritime patrol aircraft operated by France , Canada and the United States were based at RAF Lossiemouth to attempt to locate a Russian submarine which had been spotted in British territorial waters off west Scotland .

The aircraft would also have been used in the civilian search and rescue role , the Nimrod MR2 had often been used in this role . In this respect the Strategic Defence and Security Review stated that the UK " will depend on other maritime assets to contribute to the tasks previously planned for [the Nimrod MRA4] " .

Following the cancellation , the Defence Secretary Liam Fox used the Nimrod MRA4 procurement as an example of the worst of MOD procurement performance : " The idea that we ever allow ourselves into a position where something that was originally Nimrod 2000 ? where we ordered [21] was reduced to nine , spent £ 3.8bn and we still weren 't close to getting the capability ? is not to happen again . "

In January 2011 it was reported by the Financial Times that when the decision was taken to scrap the aircraft , " [The MRA4] was still riddled with flaws .... Safety tests conducted [in 2010] found there were still ' several hundred design non @-@ compliances ' with the aircraft . It was unclear , for example , whether its bomb bay doors functioned properly , whether its landing gear worked and , most worryingly , whether its fuel pipe was safe . " According to Air Forces Monthly magazine , " significant aerodynamic issues and associated flying control concerns in certain regimes of flight meant that it was grounded at the time of cancellation and may not have been signed over as safe by the Military Aviation Authority . " The magazine also stated that the reason for the cancellation was that the RAF and Navy placed a higher priority on fast jets and frigates than on maritime patrol .

Nevertheless , six ex @-@ defence chiefs publicly criticised the decision to scrap the Nimrods in January 2011 and the Public Accounts Committee concluded in February 2012 that the decision had been made without a proper understanding of the cost implications and had wasted £ 3.4bn.

= = = Replacement = = =

Press reports in February 2011 claimed the Royal Navy 's Fleet Air Arm had established a committee to consider the acquisition of maritime patrol aircraft to replace the Nimrod in the anti @-@ submarine role , with an estimated budget of around £ 1 billion , contrasting with the MRA4 program 's cost of £ 3 @.@ 6 billion . Further reports in mid @-@ 2011 suggested that a purchase of up to five P @-@ 8 Poseidons was under consideration , while in January 2015 it was reported that attempts had been made to sell the Kawasaki P @-@ 1 as another possible replacement . In November 2015 , as part of the Strategic Defence and Security Review , the Ministry of Defence announced the procurement of nine P @-@ 8 Poseidons , which will undertake the range of tasks that were undertaken by the Nimrod MR.2 and intended for the MRA.4.

= = Specifications (MRA4) = =

Data from Flight Insight , armedforces.co.uk
General characteristics
Crew : 10
Length : 38 @.@ 6 m (126 ft 9 in)
Wingspan : 38 @.@ 71 m (127 ft)
Height : 9 @.@ 45 m (31 ft)
Wing area : 235 @.@ 8 m2 (2 @,@ 538 sq ft)
Empty weight : 51 @,@ 710 kg (114 @,@ 000 lb)
Max. takeoff weight : 105 @,@ 376 kg (232 @,@ 315 lb)
Powerplant : 4 × Rolls @-@ Royce BR710 turbofans , 68 @.@ 97 kN (15 @,@ 500 lbf) each
Performance
Maximum speed : Mach 0 @.@ 77 , 496 kn (571 mph , 918 km / h)
Range : 11 @,@ 119 km (6 @,@ 910 mi)
Service ceiling : 10 @,@ 972 m (36 @,@ 000 ft)
Armament
Guns : None
Hardpoints : 4 × under @-@ wing pylon stations and an internal bomb bay with a capacity of 22 @,@ 000 lb (10 @,@ 000 kg) and provisions to carry combinations of :
Rockets : None
Missiles : Air @-@ to @-@ air missile : 2 × AIM @-@ 9 Sidewinder
Air @-@ to @-@ surface missile : AGM @-@ 65 Maverick , AGM @-@ 84 Harpoon , Storm Shadow
Bombs : Depth charges
Other : Air @-@ dropped Mk.46 torpedoes , Sting Ray torpedoes
Naval mines

Sonobuoys
Avionics
Thales Searchwater 2000 multi @-@ mode search radar
CDC / Ultra UYS503 / AQS970 acoustic processor
Northrop Grumman Nighthunter Electro @-@ Optical Search and Detection System
Elta EL / L @-@ 8300UK ESM system