

Eurofighter UPDATE

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Eurofighter Typhoon Flies With Full Payload

FOC Testing Across The Four Partner Nations

Beginning in February, and set to continue throughout the Summer, the Eurofighter Typhoon Flight Test team are making rapid advances towards achieving the aircraft's Full Operational Capability (FOC).

With the Development Programme into its final stages, a heavy emphasis has been placed on air-to-ground capability and significant strides have already been made towards this aim. In February, Instrumented Production Aircraft Three (IPA3) took off from EADS' Manching facility in a heavy loads configuration weighing almost 24 tonnes. The stores included four Paveway II, three external 1,000l fuel tanks, plus an air-to-air fit of four Advanced Medium-Range Air-to-Air Missiles (AMRAAM) and two IRIS-T missiles. The flights looked at underwing loads testing as well as aircraft handling with asymmetric configurations.

In April, IPA1 lifted off from Warton in the first of a series of flights gathering data from flutter and vibration testing with six Paveway II. The team at BAE Systems will look to investigate envelope expansion with the Paveway II, before going for a full separation test during the Summer.

This was quickly followed in Spain where IPA4, having already undertaken electromagnetic compatibility (EMC) and

pit-drop tests with GBU-16s, began flight tests with the laser guided bombs with the focus on aircraft handling and vibration.

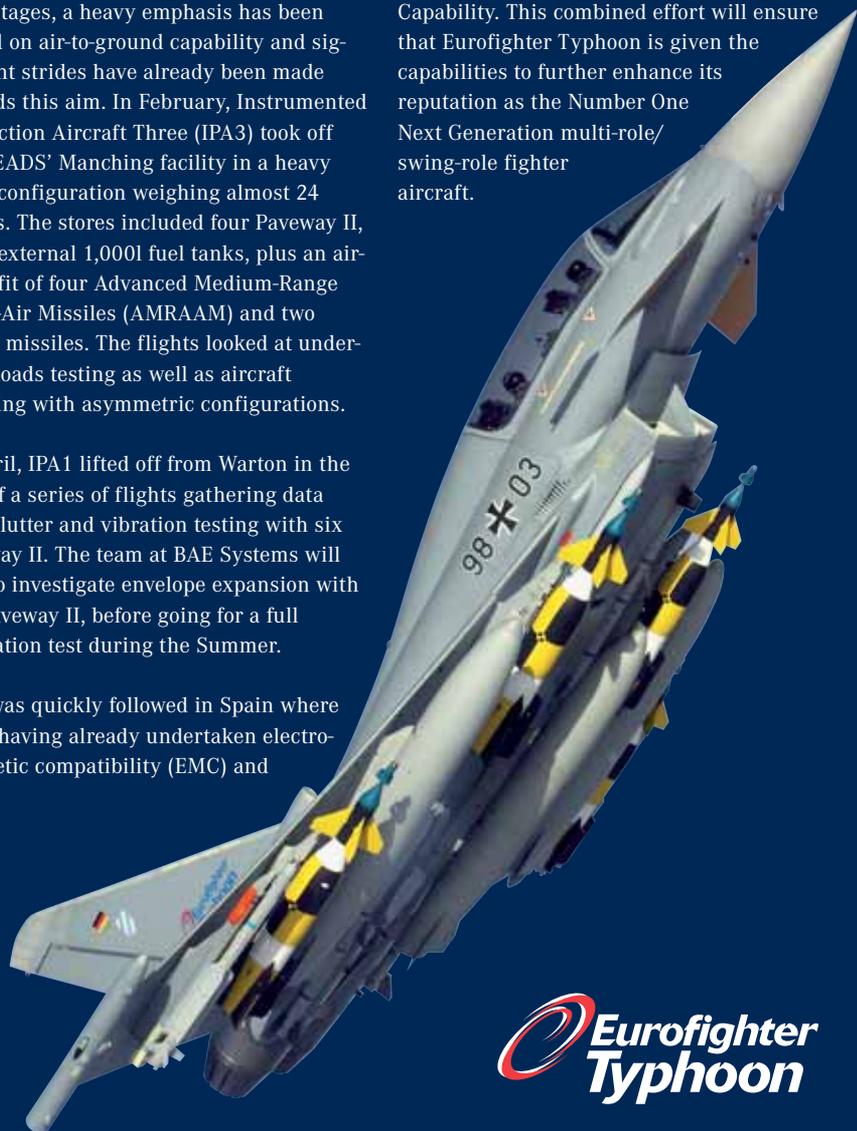
In total, six aircraft across the four Partner Nations will be heavily involved in the qualification trials for the Full Operational Capability. This combined effort will ensure that Eurofighter Typhoon is given the capabilities to further enhance its reputation as the Number One Next Generation multi-role/swing-role fighter aircraft.



IPA3 flying with maximum weight of 24 tonnes



IPA1 performs handling manoeuvres loaded with Paveway II



**Eurofighter
Typhoon**

Eurofighter Typhoon's Air-to-Air Performance

NOTHING COMES CLOSE

The Eurofighter Typhoon is the Number One best-selling Next Generation Fighter aircraft today. With an order book of 638 aircraft contracted to five Nations, it is established as the credible European alternative to aircraft in-service or under development. With more than 80 aircraft delivered to the Air Forces and in service since April 2004, the Eurofighter Typhoon is a reality, and a significant presence in the global combat aircraft arena, leaving the competition trailing in its wake. The Air Force fleet has logged around 8,000 flying hours which, when added to the more than 4,300 hours of flight achieved by the Test Fleet, amounts to more than 12,000 hours in the air.

There is a clear reason for this success. Eurofighter Typhoon is at the leading edge of performance when it comes to air superiority and multi-role. The inherent design features of this ultra modern fighter guarantee operational commanders air superiority - controlling the skies is a necessity in modern warfare. The unique combination of

sensors, air vehicle and weapons leads to a performance standard that not only outstrips the competition, but demands respect from the newest American aircraft currently in development. Simulations by the US Air Force and in the customer Nations have demonstrated a definite edge of the Eurofighter Typhoon against the rest of the competition. Both the Eurofighter Typhoon and the F-22 scored a victory rate in excess of 80% against an updated Su-27 fighter model. Rafale follows with 50%, F-15 with 43%, F-16 and F-18 with 21%.

The differentiating factor in these simulations is the airframe design. Avionics and systems can and will be upgraded, but the airframe dictates the achievable level of performance from the outset. A main factor is

the thrust to weight ratio. The aircraft is light due to the extensive use of composites and other advanced material, while its aerodynamically unstable design requires 20% less engine thrust than in legacy aircraft. These factors, combined with the power of a high thrust to weight engine like the EJ200, puts the aircraft at the top-of-the-class with an overall 1:1.10 thrust to weight ratio.

The delta wing is ideal for high speed, but also provides a big wing surface. This contributes to a high wing loading of 325 kg/m², in the class of the F-22 and unsurpassed by every other competitor. The low drag, clean design enables the Eurofighter Typhoon to fly at supersonic speeds without the use of afterburners, with the delta wing/canard configuration delivering superb supersonic agility, making the Eurofighter Typhoon the only aircraft capable of rivaling the F-22.

Left:
The partner Air Force fleet has logged more than 8,000 flying hours

Right:
Aerodynamically unstable design provides tremendous agility

General Jumper, Chief of Staff US Air Force confirmed this close relation between F-22 and Eurofighter after flying both of them in 2004: "The Eurofighter is certainly, as far as smoothness of controls and the ability to pull (and sustain high G forces), very impressive," he said. "That is what it was designed to do, especially the version I flew, with the avionics, the color moving map displays, etc. - all absolutely top notch.



USAF General Jumper praised the "Top Notch" Cockpit Displays

The maneuverability of the airplane in close-in combat was also very impressive."

General Jumper said, he believes the two aircraft are running neck-and-neck. "You can see the technology that is out there compared with ours," he said. "You see the avionics and all of the great progress that has been made. You make sure you are not too complacent, because the technology that they have is very competitive with technology that we have."

In air combat, Eurofighter Typhoon is the unquestioned Number One in Europe, an Air Force capability-multiplier benefiting the five Nations on the order book.

In Beyond Visual Range (BVR) air defence engagements, performance in radar and weapons capability is the determining factor for mission success. Eurofighter Typhoon is designed for high speed: Mach 1.6 with a full weapons load of four BVRAAM (Beyond Visual Range Air-to-Air Missile) and two SRAAM (Short Range Air-to-Air Missile). The aircraft's ability to rapidly accelerate to top speed, combined with advanced sensors and armaments, secure its dominant tactical position in a BVR engagement, ahead of the European and US competitors.

The Italian Air Force became the first of the partner Air Forces to undertake operational missions with Eurofighter Typhoon. Source: Italian Air Force, Troupe Azzurra



Radar detection range and engine power are clear advantages of Eurofighter Typhoon over the Rafale, Gripen and other competitors. These attributes, complemented by a complex automatic electronic self-protection system (DASS Defensive Aids Subsystem) including the use of Towed Decoys, simultaneously offers both the next level in performance while guaranteeing survival in the BVR fight. Eurofighter Typhoon is first to see, first to shoot, first to kill. Systems with less radar range, less engine power fall behind.



In-Service since 2004

Eurofighter Typhoon has fired all the air-to-air missiles available: AMRAAM, ASRAAM, AIM-9L and IRIS-T. Additionally, the Meteor missile was flight-tested on Eurofighter Typhoon in December 2005. The aircraft currently in service have been delivered to Initial Operating Capability (IOC) standard, featuring the inaugural DASS, Direct Voice Input and Sensor Fusion. Eurofighter Typhoon operates using

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the MIDS (Multifunction Information and Distribution System) datalink, enabling them to play a prominent role in network centric operations. In Italy and the United Kingdom, the first operational squadrons have been formed, armed with air-to-air missiles and on stand-by for air defence tasks. Full air-to-air carefree handling will be available in the near future.



German Air Force Eurofighter with air-to-air configuration including IRIS-T

But Eurofighter Typhoon Air Forces get more than air superiority. They also have a platform with a large built-in potential for air-to-surface weapons. The core Nations have already ordered air-to-ground capability with the first Tranche of 148 aircraft, in the form of Paveway II and GBU-16. The Royal Air Force intends to further broaden their capability with the use of Enhanced Paveway II and a Laser Designator Pod on

aircraft from Block 5 of Tranche One. These aircraft will possess the Full Operational Capability (FOC) under contract with the four Partner Nations, set to be achieved by the end of 2006.

FOC performance to be achieved end 2006

Air data gathering for the carriage of air-to-surface weapons will continue throughout the Summer in all four Nations. Flutter testing and other aerodynamic tests were undertaken early last year with configurations holding up to four Paveway II and GBU-10/16 precision guided bombs. Flights with four and six Paveways, and with four GBU-16, have taken place in the first few months of 2006, with store separation tests scheduled for during the Summer.

Currently, negotiations between the Nations and industry are underway with the aim of mapping out the Future Capability Plan (FCP) with Phase 1 & 2 Enhancements. The focus is on the integration of more air to surface weapons, including Storm Shadow and Taurus standoff weapons, but also the introduction of Meteor as the standard BVRAAM for Eurofighter Typhoon.

This FCP will transform discussions on Enhanced Operational Capabilities into contracts with schedules, costs and specifications.

Test and evaluation continues to run concurrently to the negotiations. Flights with Full Operational Capability avionics have already started, the purpose of which is to validate the systems' performance in air-to-air and air-to-ground missions.

At BAE Systems' Warton facility, there is a major focus on two key elements for Eurofighter Typhoon. Rigorous testing is underway on the new Helmet Mounted Sight, alongside the Defensive Aids Sub-System (DASS) evaluations being held in a purpose-built Electronic Warfare Testing Facility. This dedicated test bay enables DASS simulations to be conducted in an environment free of any other electro-magnetic emissions.

These capabilities will keep Eurofighter Typhoon, and the Air Forces that operate the aircraft, at the forefront of air defence capability, setting the standard for other European Air Forces, and on a par with the very best.

Success In HEA Trials

The Next Level In Helmet Technology

Development trials of the Head Equipment Assembly (HEA) reached a new high when the avionics Mk 1 helmet was fully tracked for the first time into Eurofighter Typhoon's computer systems.

In reaching this development stage, the HEA has been subjected to a variety of tests by the team at BAE Systems. These have included detailed prototyping of the intended weapon system, mass and balance optimisation through extensive rig, centrifuge and flight testing of the physical system, and testing to ensure that the necessary protection levels are provided by the helmet to the pilot. As part of these activities, the HEA has also completed high-speed windblast and ejection trials.

Trevor King, Typhoon Weapons System Delivery Director at BAE Systems, said: "This is the first time the full avionics capa-

bility has been exercised with this standard of helmet. The HEA is now at a relatively advanced stage of development and these trials will ultimately support acceptance, by the customer, of the production standard helmet. This is a major milestone on the Typhoon programme."

The Eurofighter Typhoon HEA is a technologically advanced helmet display system which, when integrated into the overall weapon system, enables the pilot to slave weapons and sensors to high off-boresight angles and maintain situational awareness, whilst looking outside or even "through" the cockpit.



The HEA was fully tracked for the first time into the aircraft computers

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