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 1,000 litre 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 under-wing 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.

Eurofighter Typhoon Flies With Full Payload

FOC Testing Across The Four Partner Nations
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 its role to be that of a commander’s 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 in 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.

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, your weapon of choice. The F-22 has 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.

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

The delta wing is ideal for high speed, but also provides a big wing surface. This contributes to a high wing loadings 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.

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 Tweed Decays, 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 in 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 conventional or extended range air refueling methods, and is designed for a combat radius of 2,000 km.

Not only is the Typhoon an air superiority weapon, but also a very capable support role aircraft. The aircraft is designed to carry up to 8,000 liters of fuel on internal weapons stations in both the 2420 or 2700 liters version, and up to 12,000 liters on external stores. This enables it to provide the crew with a multitude of capabilities. The aircraft can carry long range air to ground attack missions, as well as short range ground attack missions. This enables it to carry out a wide variety of missions in a single sortie, and to be a valuable assets to the air force operations.
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.

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 capabili-
ty 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.

Air data gathering for the carriage of air-
to-surface weapons will continue throughout
the Summer in all four Nations. Flutter test-
ing and other aerodynamic tests were
undertaken early last year with configura-
tions holding up to four Paveway II and
GBU-16/16 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 Na-
tions 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 Shad-
ow and Taurus standoff weapons, but also
the introduction of Meteor as the standard
BVRAAM for Eurofighter Typhoon.

Success In HEA Trials

The Next Level In Helmet Technology

Development trials of the Head Equip-
ment Assembly (HEA) reached a new high
when the avionics Mk 1 helmet was fully
tracked for the first time into Eurofighter
Typhoon’s computer syst-
em.

In reaching this development stage, the
HEA has been subjected to a variety of tests
by the team at BAE Systems. These have in-
cluded detailed prototyping of the intended
weapon system, mass and balance optimiza-
tion through extensive rig, centrefire and
flight testing of the physical system, and
testing to ensure that the necessary protec-
tion 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 exer-
cised with this stan-
dard of helmet. The
HEA is now at a rela-
tively advanced stage of development
and these trials will
ultimately support
acceptance, by the
customer, of the pro-
duction standard helmet. This is a major
milestone on the Typhoon programme.”

The Eurofighter Typhoon HEA is a tech-
nologically 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.

This FCP will transform discussions on
Enhanced Operational Capabilities into con-
tracts with schedules, costs and specifica-
tions.

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
Night, 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.

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

Success In HEA Trials