At the beginning of November, the three Eurofighter Typhoon squadrons of the Royal Air Force took to the skies from the Main Operating Base of RAF Coningsby for a spectacular “Diamond Nine” formation flight. It was the first time that all the aircraft included in the formation were single-seat type.

The lead Eurofighter Typhoon was piloted by Group Captain Bob Judson, with aircraft from 3(F), 17(R) and 29 Squadrons making up the formation.
On 13 November, the BAE Systems-built development aircraft, Eurofighter Typhoon DA2, celebrated its illustrious twelve year contribution to the Eurofighter development programme with a flypast of the company’s Warton and Samlesbury sites watched by hundreds of proud employees.

The aircraft is due to be transferred to RAF Coningsby next year where it will initially be used as a ground training rig for the Royal Air Force. The aspiration of the Ministry of Defence is for the aircraft to eventually be donated to the RAF Museum at Hendon.

Trevor King, BAE Systems Typhoon Weapon System Capability Director said: “DA2 has achieved 650 flights - a stunning achievement for a development aircraft. Today marks an historic milestone as the aircraft completes its work here at Warton. It is gratifying to see that all hard work and dedication transferred into today’s production aircraft. Investment in the programme has ensured effective delivery to the Royal Air Force and the Partner Air Forces of an aircraft at the cutting edge of technology, capability and quality.”

The remaining development aircraft are to complete their final flying tasks over the course of the coming weeks, bringing to an end the Main Development Programme. See pages 20-21 for more details on the DA retirements and achievements.

Dear Friends of Eurofighter Typhoon,

2006 marked a significant change in the Eurofighter Typhoon programme. With more than 160 aircraft delivered, the four Partner Air Forces have taken full ownership of the programme. Seven units are already operating the aircraft and, with operational conversion ramping up across the four Nations, Eurofighter Typhoon is becoming increasingly responsible for more and more tasks within the squadrons. The four Partner Nations have accumulated more than 12,000 flight hours.

The end of our work based on the Main Development Contract is approaching. This is a remarkable fact, but it certainly does not mean industry now steps aside. On the contrary, we are as dedicated as before to meet the upcoming challenges the system will be facing in real operations.

This year, the aircraft has flown three air-to-ground configurations with six missiles, six laser guided bombs and an external fuel tank. Final assembly for Block 5 aircraft, as well as for the first Tranche 2 aircraft, is well underway, and 2007 will see the first delivery to the Austrian Air Force. Under the terms of the “custody capability” contract, we will also prepare to deliver the integration of the laser designator pod on Block 5 aircraft on schedule for service with the Royal Air Force in 2008.

Delivering value to the customer is our major objective for 2007. We aim to terminate the main development of our weapon system and, at the same time, continue meeting the increasing requirements by our customer. This will ensure that Eurofighter Typhoon’s superiority in the international competition is maintained.

May I take this opportunity to wish you and your families a very Merry Christmas and a Happy New Year, and all the best for 2007?

Your sincerely,

Aloysius Rauen
CEO Eurofighter GmbH
As 2006 dawned, the Italian Air Force demonstrated their confidence in Eurofighter Typhoon as a capable air superiority platform through the deployment of the weapon system as part of their Quick Reaction Alert force (SSAA). The high profile role of safeguarding Turin during the Winter Olympics soon followed and, in September, the Air Force announced the successful outcome of a series of missile firing tests using the Aim-9L short range air-to-air missile.

Held between 24-29 September, aircraft from 4° Stormo at Grosseto participated in five days of operations culminating in the live launch, scoring a direct hit against a remotely-operated Mirach-100 drone target. Italian Air Force pilots, Mark Ismort and Max Fedorico, took the aircraft through the operation, under the guidance of Lieutenant Colonel Daniele Piero. Afterwards, the Air Force heralded the success of the firings, in that they demonstrated the increasing operational and combat readiness of Eurofighter Typhoon, and represent an important step towards full capability.

Throughout the duration of the selection process, Denmark’s Minister of Defence, Søren Gade, has been keen to maintain a transparency and fairness to his Nation’s procurement competition. Therefore, following similar trips to the United States and Sweden, Minister Gade and a delegation of Parliamentarians and military experts including Allan Nielbohr, Chairman of the Defence Committee, embarked on a two-day fact-finding mission of the Eurofighter Typhoon programme at EADS Military Air Systems Manching facility.

Welcomed by Dr. Stefan Zoller, CEO of EADS Defence and Security Systems, and Johann Heitzmann, CEO of EADS Military Air Systems, the representatives from Denmark were briefed on all aspects of the Eurofighter programme, with special emphasis given to the spirit of industrial partnership and low cost of ownership. “When it comes to successful collaboration in technology as well as in economical terms, the Eurofighter programme is second to none” stated Johann Heitzmann, adding that “Our programme satisfies not only the Royal Danish Air Force requirements but also offers ample opportunities for Danish industry.”

Minister Gade and his entourage took a hands-on approach during their tour and were allowed the opportunity to test-fly the aircraft in the simulators installed at Manching. In addition, EADS test pilot, Chris Werner, took to the skies in Eurofighter Typhoon and treated the visitors to a flying demonstration of breathtaking power and agility, attributes that have made the aircraft the best-selling next generation combat fighter.

On their departure, the Danish guests praised their EADS hosts for providing them with important information for the evaluation process. A decision from the Danish Government for the replacement of the F-16 is expected in 2008, with deliveries scheduled to begin in 2016. Eurofighter Typhoon is competing against the F-35 and Saab’s Gripen.

For more information on export opportunities for Eurofighter Typhoon, see page 7.

Delegation at EADS Manching

The programme status was presented to the Greek 4° Stormo of the Italian Air Force. On 19 August, Prime Minister Prodi made the first trip while on route to Trento and, during his stay, took the time for a guided tour of the base and in particular paid special attention to discussions surrounding operational logistics.

The second visit was made just five days later, on 24 August, and was coinciding with a meeting with Israeli Foreign Minister, Tzipi Livni, to discuss the ongoing conflict with Syria. After the meeting, Prime Minister Prodi took the opportunity to visit the flight line and to listen to pilot appraisals of the operational performance of Eurofighter Typhoon.

More details on the role of Eurofighter Typhoon in the Italian Air Force can be found on page 13.

As part of continuing campaign activities, the Norwegian State Secretary, Exon Barth Eide, was given a VIP privilege of a flight in Eurofighter Typhoon during a visit to EADS Military Air Systems’ Manching site. The flight lasted for more than two hours and included a supersonic run, air-to-air refuelling from a Tornado aircraft, as well as tests on the auto-pilot functions. On landing, State Secretary Eide commented that he was greatly impressed by the performance of the aircraft.

The State Secretary was accompanied by a Norwegian delegation which included the Deputy National Armament Director, the Defence Attaché in Berlin and a senior advisor from the Ministry of Defence. The German Government was represented by the Defence Attaché in Oslo. During the visit, the invited guests were also given a comprehensive briefing on activities at the Manching site and, in particular, on the Eurofighter Typhoon programme.

Norway is intending to procure 44 aircraft, which are scheduled for delivery between 2016 and 2019, with the country expected to make a decision on the procurement of the aircraft in 2008.
Following the decision of the Hellenic Authorities to support the procurement of additional modern fighter aircraft in the near future, the Defendory International 2006 exhibition provided the opportunity to reaffirm the industrial, technological and military benefits of participation in the Eurofighter programme.

Hellenic Air Force commanders, also visited the Eurofighter Typhoon exhibition, underlining the optimum communications of the campaign team with the key representatives of the Hellenic Air Force.

Politically, the Eurofighter team attracted key parliamentary attention. Following his exhibition opening commitments, the Minister of Defence, Evangelos Meimarakis, made his way to the Eurofighter stand to be greeted by Georgios Scarlatos, Head of Eurofighter Office for EADS in Athens, reaffirming the good relations between the Hellenic Government and campaign lead Eurofighter Partner Company EADS.

From the Hellenic Parliament, Panayotis Kammoun MP, Chairman of the Standing Committee for National Defence and Foreign Affairs, and Christos Pappoutsis MP, representing his political group, spent some time discussing programme issues with the Eurofighter Typhoon campaign team.

At the end of July, the Government Council for Foreign Affairs and Defence (KYSEA) reiterated the need for modern fighter aircraft, and that a decision by 2008/2009 would be acceptable. The Eurofighter Consortium is continuing campaign efforts for the export of Eurofighter Typhoon, and are convinced that the aircraft satisfies the requirements of the Hellenic Air Force.

As well as providing the Greek nation with unmatched air superiority, the industrial benefits that the Eurofighter Consortium can offer are truly unique. In addition, the possible industrial project cooperation with 30 of Europe’s leading defence companies, and not confined exclusively to aerospace companies, would provide a gateway to European companies. The campaign organisations will have the opportunity to fly the aircraft, and, on landing, state how impressed they were with the outstanding flight performance.

Representing one of the highest profile marketing events for the Eurofighter Typhoon in Greece, the Consortium representatives, under the coordination of Campaign Leader EADS, promoted the aircraft’s outstanding capabilities and critical programme achievements to the highly influential professional visitors who had made the trip to the Piraeus Exhibition Centre outside Athens. The Eurofighter presence featured the ever popular cockpit demonstrator, highlighting the Full Operational Capability (FOC) standard of the aircraft, an essential tool for performance demonstrations and briefings to interested Export Partners. The latest promotional film, “In An Uncertain World..”, showing Eurofighter Typhoon squadrons in an operational network centric environment, was screened for all guests wanting to gain the in-action viewpoint of front line life with the aircraft.

Exhibitions provide a crucial platform in demonstrating product capabilities to the end user, and at Defendory International, the Chief of the Hellenic Air Force General Staff, Lieutenant General Georgios Avlonitis, escorted by a number of flag officers and members of the Hellenic Air Force General Staff, was present. As the top man in the Hellenic Air Force hierarchy, Lieutenant General Avlonitis took some time with CEO EADS Military Systems, Johann Heitzmann, and with Campaign Director, Erwin Obermeier, to discuss the issues surrounding the Eurofighter Typhoon, and the Greek Fighter Procurement programme. Deputy Chief of the Hellenic Air Force General Staff, Major General Theologos Symeonidis, as well as other major Hellenic Air Force commanders, also visited the Eurofighter Typhoon exhibition, underlining the optimum communications of the campaign team with the key representatives of the Hellenic Air Force.

Defendory International 2006 in Athens

Export Expertise

Phillip Lee

Exhibitions are just one of many techniques used to engage in discussions with influential decision makers in potential export nations. The sales and marketing effort is undertaken by all stakeholders in the Eurofighter Consortium, each pushing to underline the claim of the American Analysts at Forecast International that the position of market leader is held by Eurofighter Typhoon. This statement, coupled with the increasingly laboured development of other rivals in the combat aircraft field, has pushed Eurofighter Typhoon firmly into the spotlight with many nations keen to learn of the capability, technological and industrial benefits of participating in the Eurofighter programme.

With high profile campaigns ongoing in Greece and Turkey; the Eurofighter consortium partners have entered into relationships with numerous European and international defence companies.

In Norway, the Eurofighter programme is the most important industrial programme as the country has released the Request for Information (RFI) in 2003, which is to be followed shortly by the Request for Proposal (RFP). As well as providing the Norwegian Air Force with a true gateway to European companies, the campaign organisation will have the opportunity to fly the aircraft, and, on landing, state how impressed they were with the outstanding flight performance.

Aided by the Eurofighter Typhoon, the competing aircraft for the Indian Air export contract are F-16, F/A-18, MiG-29 M2 and Rafale. With the present state of information received with regards to the impending Request for Proposal, the Eurofighter Consortium is confident that the Eurofighter Typhoon weapon system should fully meet the requirements of the Indian Air Force.

The campaign nations described above are followed closely by marketing efforts in Japan, Bulgaria and Romania. In these instances, the nations have been identified by Eurofighter Consortium members as having serious ambitions in the defence market, with pre-assigned budgets and the known intention to procure new combat aircraft.

With BAe Systems taking the lead in Japan, and EADS Military Systems and Alenia Aeronautica assuming responsibility for Bulgaria and Romania respectively, the designated campaign teams are working closely with their customer counterparts to gain a full understanding of the national requirement in anticipation of the receipt of the Request for Proposal in 2007.

In terms of future prospects, the Consortium analysts are constantly tracking the international combat aircraft market, and, with the global reach of the major European aerospace Eurofighter Partner Companies, Alenia Aeronautica, BAE Systems, EADS CASA in Spain and EADS Germany, are able to maintain an understanding of the national requirement in anticipation of the receipt of the Request for Proposal in 2007.

With opportunities on the horizon both in Europe and worldwide, and with rival defence projects shifting further to the right in terms of development schedules, Eurofighter Typhoon, supported by a network of Eurofighter Typhoon National Programmes, will continue to lead the combat aircraft market and deliver outstanding capability for years to come.

Phillip Lee
The Eurofighter Typhoon was moved into front line service by the Italian Air Force in December 2005, and this was the first operational deployment to be implemented since then, demonstrating the maturity of the weapon system, and the confidence in its performance by the customer.

On Tuesday, the competitors had an early start as they were talked through the process of wind tunnel testing, with a Rolls Royce lead briefing on jet engines and the 32000 following soon after. A Flight Safety Brief and lunch preceded the start of the flying exercises, one of the week’s main events, where the teams were given the opportunity to pilot a variety of fixed-wing and helicopter aircraft.

The undoubted highlight of the week came on Wednesday, with the students being granted special access to the three Royal Air Force Eurofighter Typhoon Squadrons (No.3, No.17, and No.29) based at RAF Coningsby. There they were given the chance to meet with the aircrew and ground personnel and get up close to one of the most technically advanced aircraft ever built, with their return to Cranfield in the afternoon allowing time to fit in some more flying of their own.

Thursday started early, with the morning programme focused entirely on Jetstream activities, beginning with a classroom brief on how to plot fuel burn in an engine, before taking their seats for a flight in the Jetstream Airborne Flight Test Teaching Aid. The students were given the chance to experience some unusual in-flight manoeuvres such as a dutch roll, pitch oscillation and the slow entry into a spiral dive. In the afternoon, the teams completed their final flying exercises of the week.

The final Design and Planning exercise kicked off Friday’s proceedings, with the students expected to plan a simulated supply drop mission from a military transport aircraft. Again, points were scored on the methodology as well as the outcome. EADS test pilot, Chris Worning, then took centre stage in discussing flight testing with the Eurofighter Typhoon. In the afternoon, Professor Riti Singh, Deputy Head at Cranfield School of Engineering, described “Innovation in the 21st Century”, followed by John Farley’s end-of-course debrief, and the long-awaited announcement of the winners and presentation of the “Eurofighter Typhoon Trophy.” The teams were judged on their initial entry design of the stealthy transport aircraft, on both Design and Planning Exercises, and on a task performed with the Royal Air Force. The Italians were deemed worthy overall winners.

Each team consisted of three students, aged 16 to 18, accompanied by a supporting teacher who worked with their team in an advisory capacity.

The Eurofighter Consortium, together with Alenia Aeronautica, BAE Systems, EADS CASA and EADS Germany, had announced in November 2005 that it would support the engineers of the future into the aerospace industry. It will continue this effort in 2007 and the years to follow.

The training was conducted employing the Autonomous Air-Combat Manoeuvring Instrumentation (AACMI), under the guidance of the Weapons Training Unit (RSSTA) at Decimomannu. Full logistics support was provided by the Italian Air Force throughout, fulfilling the promise laid down in the Decimomannu motto “training the aviators of the free world to maintain the peace.”

This support will be delivered in the future when further aircraft from both the Italian Air Force and the German Air Force line up for operational training at the base. Eurofighter Typhoon was moved into front line service by the Italian Air Force in December 2005, and this was the first operational deployment to be implemented since then, demonstrating the maturity of the weapon system, and the confidence in its performance by the customer.

The competitors line up on the wing of a 3 Sqn Typhoon during their visit to RAF Coningsby.
Second German Fighter Wing begins operations with Eurofighter Typhoon

A Growing Presence

The military presence of Eurofighter Typhoon in European Air Forces grew stronger in July when Fighter Wing 74 at Neuburg/Donaun took delivery of the first four, out of a planned 25, swing-role fighters, becoming the seventh Squadron in the Partner Air Forces to operate the aircraft.

A ceremony marking the event began with two of the resident F-4F Phantom II aircraft escorting in to land a twin-seat Eurofighter Typhoon and a four-ship formation of single-seaters, the fins of each adorned with the Wing crest. Upon his arrival in the back of the twin-seat variant, Lieutenant General Aarne Kreuzinger-Janik, Commander-in-Chief, Air Force Command, handed over a symbolic logbook to the Wing Commander Colonel Uwe Klein and stated: “This fighter aircraft will be the backbone of the air force for decades. It will shape the air force like no other.”

The first four aircraft were flown in from Rostock-Laage, home to Fighter Wing 73 “Steinhoff”, and it was there that ground personnel from Fighter Wing 74 readied the aircraft for flight, before the Wing pilots ferried their new weapon system to the Neuburg Main Operating Base.

The personnel of Fighter Wing 74 welcome the arrival of the new aircraft

The attendance at the ceremony included key military and political figures, plus representatives from industry and media. Secretary of State, Christian Jung, accompanied by the Chief of the German Air Force, General Klaus Peter Stieglitz, praised the spirit of the Air Force personnel, and stated that “teamwork is the most successful guidance concept”. Completing with the anniversary event, Dr. Jung was also on hand for the opening of the Deployable Control and Reporting Centre, a highly-sophisticated mobile platform that guides the forces commanders with comprehensive tactical overview of the combat airspace, allowing them to guide the Air Force operations even when deployed outside German borders.

Although 1934 saw the publishing of plans for the intention of establishing a tactical Air Force, 09 January 1956 is considered the true birthday of the German Air Force. On this day, then Minister of Defence, Theodor Blank, officially welcomed the first pilots of the Air Force to the training division at the airbase in Nörvenich. Later the same year, further important agencies of the Air Force were set up in Cologne, Fürstenfeldbruck, Erding and Kaufbeuren.

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To mark these historic occasions, throughout 2006 the German Air Force have hosted several events celebrating their 50 years of operations. In August, the festivities landed in Rostock-Laage where, hosted by Fighter Wing 73 “Steinhoff”, the crews of squadrons from across the Air Force put on a dazzling air display featuring aircraft from the past, present and future right across the German Air Force.

In 1964, the squadron converted to the F-104 Starfighter weapon system, providing the wing with one of the most elegant aircraft types. In 1974, the F-104 was replaced by the F-4F Phantom II, thereby ensuring that, on the introduction into service of the F-4F, the German Air Force kept pace with the dynamics of technological and capability improvements, which is a must for an efficient and effective fighting force.

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Beginning with the F-86K, via the F-104G and, up till today, with the F-4F Phantom II, the programme of continual weapon system upgrades to keep abreast of modern technologies reflects the willpower to maintain control over the steadily increasing demand on capacity, staff, and material. This trend will be continued with the introduction into service of Eurofighter Typhoon, the next generation of aircraft to operate from Neuburg/Donaun.

The personnel of Fighter Wing 74 welcome the arrival of the new aircraft

Left: Star of the show, Eurofighter Typhoon thrills the crowd
Cornerstone of Air Force superiority

In Service

Four of Europe’s major European Air Forces are already operating Eurofighter Typhoon. Final assembly on the aircraft destined for the fifth is already in progress. With every accumulated in-service flight hour amassed by the Partner Air Force squadrons, this best-selling swing-role combat aircraft enhances its growing reputation as the cornerstone of European airpower for the 21st Century.

GERMANY

The German Air Force will take delivery of 180 aircraft, to be divided across five wings. Fighter Wing 73, based at Rostock-Laage, were first to accept aircraft and are the unit responsible for the operational conversion of Eurofighter Typhoon. All instructor pilot training for type for the German Air Force is conducted at Laage, which also includes the pilot training of the Austrian Air Force who will take first deliveries of aircraft in 2007.

Fighter Wing 74 began operations with Eurofighter Typhoon in July this year. Operating out of Neuburg/Donau, this unit is the first to be dedicated to tactical flying, and is responsible for the protection of the airspace over Southern Germany. It is interesting to note that two of the five wings that will operate Eurofighter Typhoon, Fighter Bomber Wing 31 and Fighter Bomber Wing 33, will be assigned to multi-role responsibilities, highlighting the confidence in the weapons system to deliver the full spectrum of combat capabilities. The third air defence wing equipped with Eurofighter Typhoon will be Fighter Wing 71 in Wittmund.

Armed with AMRAAM and IRS-T, Eurofighter Typhoon is set to replace the F-4F Phantom II, currently still in service with the German Air Force, and MG-29 aircraft, which have already been phased out, in the air-to-air role. By 2012, all legacy weapon systems will have been phased into retirement, leaving Eurofighter Typhoon as the only aircraft in German air defence.

The German Air Force is to adopt a single-type force structure, highlighting Eurofighter Typhoon’s versatility as a multi role platform. From 2007, work will begin within the Air Force to introduce a multi role variant into the fleet structure so that by 2015, when the Tornado fleet has been reduced to 85 aircraft, the ability of the German Air Force to deliver an air to surface stand off missions, will not be diminished. The Chief of Air Staff, General Siegfritz, has commented to Defense News (Sept. 2004) that: “The capabilities we put our clear emphasis on are stand-off range, precision effect...flexibility and...the ability to operate in a coalition.”

By 2025, the last of the Tornado aircraft will have been phased out, meaning that Eurofighter Typhoon will be the single fast jet type in the German Air Force. With the future integration of the Taurus weapons system, Eurofighter Typhoon has undertaken several high profile missions including the protection of air space over the 2006 Winter Olympics in Turin. More recently, in October, the Italian Air Force deployed four Eurofighter Typhoon aircraft to Guantanamo Air Base, in support of a two week operational training exercise.

ITALY

Adopting the approach used by the United States, the Italian Air Force will operate two types of complementary multi-role fighters. Eurofighter Typhoon, in-service with 4° Stormo at Grosseto, with its optimisation for air superiority, will replace both the F-104 “Starfighter” and F-16 as the single type in the air defence role. Such is the belief of the Italian Air Force in the maturity of the weapons system that they deployed two aircraft on Quick Reaction Alert (SSA) at the start of 2006. Additionally, Eurofighter Typhoon has undertaken several high profile missions including the protection of air space over the 2006 Winter Olympics in Turin. More recently, in October, the Italian Air Force deployed four Eurofighter Typhoon aircraft to Guantanamo Air Base, in support of a two week operational training exercise.

Out of the 620 aircraft ordered in the Umbrella Contract, 121 are destined for the Italian Air Force. These are to be split between four Wings. 4° Stormo, acting as the operational conversion unit, was the first to receive Eurofighter Typhoon and, with 5° Stormo, 36° Stormo and 37° Stormi, based respectively at Cervia, Gioia del Colle and Trapani, soon to follow, will give the Italian Air Force an air superiority capability above and beyond all perceived threats.

The two-type strategy will see F-35 replace the AM-X and Tornado as the designated air-to-surface bomber aircraft of the Italian Air Force. Operating both Eurofighter Typhoon and F-35 has been deemed the most cost-effective solution by Italy in covering the two main aspects of future conflicts and threats. Although the role of Eurofighter Typhoon is air dominance, its capacity for expansion into a versatile multi-role fighter means that the Italian Air Force will have the option of deploying Eurofighter Typhoon on strike missions. Additionally, F-35 is not due to enter into service with Italy until 2015 at the earliest, by which point Eurofighter Typhoon will be fully integrated into the Air Force structures and will be able to offer air-to-ground capability should development schedules of F-35 encounter any difficulty.

SPAIN

Mirroring the strategy of the Luftwaffe, the Spanish Air Force will move from a force structure of two multi-role fighters, the Mirage F-1M and the F/A-18A “Hornet”, to a single-type approach capable of covering all air combat operations.

The Spanish Air Force will take delivery of 87 Eurofighter Typhoon weapon systems, to be directed to Wings Ala 11 and Ala 14 based at Morón and Albacete respectively. Ala 11 is the dedicated operational evaluation unit, as well as bearing the responsibility for pilot training and conversion to type. Ala 14 is the dedicated operational evaluation unit, with both Ala 11 and Ala 14 scheduled for delivery to the Spanish Air Force in 2009, leaving Eurofighter Typhoon as the only custodian of Spanish air superiority capability. The aircraft’s built-in growth potential will see it develop into a full multi role fighter and, with the F/A-18A projected to be phased out shortly after 2020, may well see its role within the Spanish Air Force increased to cover air-to-surface strike missions.
UNITED KINGDOM

On appearances, the Royal Air Force is set to follow a two-type approach for their force mix. Eurofighter Typhoon, already in operation with 17 Sqn, 29 Sqn, 3 Sqn and soon 11 Sqn, will be the primary air defence platform, to be joined by F-35 for its optimised strike capability.

17 Sqn and 29 Sqn are the units responsible for bringing the aircraft into full operational service, the results of which are already evident with the formation of 3 Sqn as the first operational Eurofighter Typhoon squadron. All aircraft conversion and pilot training is conducted from the Main Operating Base at RAF Coningsby, with RAF Leuchars also scheduled to receive aircraft following the future formation of 6 Sqn.

The front fuselage of BS037 has been delivered to the Warton final assembly site, UK. The aircraft of 17 Sqn, seen here taking off from BAE Systems Warton, are responsible for bringing Eurofighter Typhoon into full operational service.

From 2008 onwards, Eurofighter Typhoon is set to be the sole air defence aircraft in the fleet with the Tornado ADV gradually being phased out of service. All 232 aircraft bound for the Royal Air Force are to have multi role capability, and the recently signed “Austere capability” contract between the Eurofighter Consortium and NETMA, over the integration of the laser designator pod, will ensure that air to surface mission availability is delivered.

Royal Air Force planning indicates that the role of Eurofighter Typhoon is to be increased more than initially envisaged. As well as the air-to-air roles, the flexibility of the weapon system will see a far greater operational overlap with the F-35. In reality, this would leave just two exclusively F-35 front line squadrons in the Royal Air Force. In numerical terms, this means just 16 F-35 aircraft to operate in the deep strike role, a compression due to the versatile capabilities of Eurofighter Typhoon on one side and the increasing trend towards potentially deploying UCAVs (unmanned combat aerial vehicles) in the strike role on the other side.

As Eurofighter Typhoon moves to the front line, the aircraft will play an increasingly more important part in combined operations and, with its full swing role capability, will be at the forefront of European and NATO security policy well into the 21st Century.

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The front and centre fuselages of BS037, a British single-seat aircraft and the first from the second Tranche that will be handed over to a Partner Air Force, have been delivered to BAE Systems’ Warton final assembly site from Marching and Salisbury respectively. BS037 will fly for the first time in 2008 and will be handed over to the Royal Air Force in the same year.

Before this, however, the first Tranche 2 standard Eurofighter Typhoon aircraft will be Instrumented Production Aircraft Seven (IPA7), which is scheduled to be moved to the final assembly rig at EADS Military Air Systems’ Marching facility at the end of the year. The first flight of IPA7 is due in 2008 with the aircraft to be used for testing the Block 8 capabilities together with IPA6 (British single-seat BS031), a Tranche 1 aircraft that will be upgraded to receive the Tranche 2 standard avionics.

IPA6 has been undergoing initial tests at Warton, including the Stage One build test (B-test). The engineers at Warton achieve ‘power on’ with IPA6 in late October, aimed at mitigating aircraft related build issues such as hydraulics or fuel leakages. The Stage One test will be followed up by the Stage Two testing early next year, as the team at Warton move to ensure equipment functionality ahead of the commencement of the Tranche 2 certification programme.
Company Profile

Their story begins in 1903 when Mr Secondo Mona opened a shop for the sale and repair of bicycles and motorcycles. Attracted by the rising adventure of modern aviation, he expanded into the repair and overhaul of aero-engines installed on the first aircraft flying out of the nearby Malpensa airfield.

In 1923, Secondo Mona was awarded the Albert Moutet quality certification for the design & production of on-board fuel equipment. The company would go on to make important contributions to the famous long-distance flights achieved during the following years.

Following his graduation in Aeronautical Engineering from Zurich Polytechnic in 1931, Dipl. Ing. Bruno Mona, Secondo’s son, joined the company and immediately began establishing cooperative agreements within the European aerospace community, which helped them achieve maximum production capacity in 1942 with over 1,000 people employed.

A post-war production suspension, from the aftermath of World War II, was lifted in 1950 and Secondo Mona was allowed to restart aerospace operations. The launch of the F104 Starfighter programme in 1956 led the company to establish close connections with U.S. companies, and to the acquisition of production licences and agencies.

During the 1970s, Bruno Mona’s sons, Dr. Roberto and Dr. Renato, entered the company and worked for the development of important contributions to the newly-born Tornado MRCA programme. It is during the 1980s that they grew into developing applications for Land and Naval programmes, while the 1990s played witness to Secondo Mona stepping up to meet the challenges of the Eurofighter Typhoon programme, while acquiring new technical competences in hydraulics and electronics.

At the turn of the Millennium, the fourth generation of Mona joined the family business, with Dr. Riccardo and Dr. Claudia ready to lead Secondo Mona into its new role of systems supplier. Enduring support has been granted to Alenia Aeronautica for the entire fuel system and fuel rig of the advanced jet trainer M346, as well as to National Aerospace Laboratories for the fuel system of the Indian commuter LTA Saras, both systems are now being refined to production configuration.

2003 was a very important year for the entire Aerospace world with the Celebrations of the Wright Brothers’ First Flight and so it was for Secondo Mona with their own celebrations for their First Centennial.

Over the last five years Secondo Mona has been implementing a “continuous improvement” programme to drive down costs, remove waste and increase efficiency and is now implementing since January this year a “lean supply chain project” in which it will help, with the support also of the British Industry Forum, its top 12 suppliers improve their working practices and become more competitive. The knowhow will further support the company’s improvement process contributing to its success in the global market.

Secondo Mona’s strategy of cutting costs and increasing efficiency was rewarded with Eurofighter’s nomination as Best Supplier with 100% schedule adherence on the deliveries of Tranche 1. Academically, the company recently received a special trial leader for years to come in support of the Aerospace industry.

Secondo Mona intends to be a key industrial partner for years to come in support of the Aerospace industry.

Messer-Deyr, a SAFAR Group company, the prime contractor for the Landing Gear for the Boeing 787 Dreamliner, has selected Secondo Mona for the production of the Dual System Landing Gear Link Assemblies. In order to meet the forecasted production rate and to adequately support the Program, Secondo Mona is investing in human resources as well as dedicated CNC machine tools and software.

Secondo Mona has also been awarded a contract by Goodrich Actuation Systems for the production of an Hydraulic Actuator for the F-35 programme and the first units have already started being shipped to the US.

On top of a variety of fuel, hydraulic and electromechanical equipment previously won on the NH90 helicopter, Secondo Mona can now equip the NH90 with a pressure refuelling system for the Internal and External auxiliary tanks.

The AgustaWestland Helicopters all fly with Secondo Mona products and the most recent achievements are a Fuel Manifold (ready been delivered), an umbilical engine shut-off and cross-feed valves and pressure transducers), designed and qualified for the AW139 helicopter, and the Flow Wheel Actuator, designed and qualified for the AW149 helicopter.

Secondo Mona intends to be a key industrial partner for years to come in support of the Aerospace industry.

The most recent contracts won by Secondo Mona can be found in fixed wing or rotary wing configurations both for military and civil applications.

Located in Somma Lombardo, Italy, Secondo Mona S.p.A. are firmly established as an industry leader in the design and manufacture of aerospace equipments and systems, and are recognised for their consistently high levels of performance as a key supplier to the Eurofighter Typhoon programme.

The fuel transfer pumps are a reliable and efficient part of the fuel system.

The Eurofighter Typhoon - Equipment Supplied

The Afterburner fuel control unit features components designed by Secondo Mona.

Engine equipment

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The EJ200 engine powering the Eurofighter Typhoon features from Tranche II a further step in engine control and monitoring technology, integrating all elements necessary for Digital Engine Control and Monitoring into a single unit (known as DECMU) as well as incorporating potential for future enhancements. The EJ200 DECMU combines the functionality of the engine mounted Digital Engine Control Unit (DECU) and the aircraft mounted Engine Monitoring Unit (EMU).

Control System element

The full authority Digital Engine Control and Monitoring Unit is engine-mounted for accessibility and is a twin-lane, fault tolerant system linked to the aircraft flight control system. It constantly monitors the functional status of the engine and allows precise, responsive and safe control at all times.

The digital electronic control system, as part of the electronic sub system, processes all inputs from the engine sensor data and aircraft inputs, in order to control the hydro-mechanical elements of the system. All signal conditioning of the engine sensors used for control purposes is carried out by the DECMU.

DECMU Benefits

- Reduction in mass by 3 kg, volume by 5 litres (equivalent per engine)
- Increased computing power by 20% using advanced computer technology
- Improvement in Reliability, Maintainability, Logistics by using fewer line replaceable units
- Increased component standardisation, higher utilisation of digital technologies, reduced obsolescence risk
- Simplification of aircraft interface (single aircraft/engine interface)
- Simplified handling of engine health monitoring data (EMU becomes integral to DECMU)
- Production solution for thrust vector control and future enhancements
- Increased functionality

The EJ200 engine enhancement for Tranche 2 in the form of the Digital Engine Control and Monitoring Unit provides benefits in terms of cost, mass and reliability. Fulfilling at least the same control system design requirements, the DECMU provides the following system benefits:

- The digital electronic control system processes all inputs from the engine sensor data and aircraft inputs, in order to control the hydro-mechanical elements of the system. All signal conditioning of the engine sensors used for control purposes is carried out by the DECMU.
- The whole engine is designed for on-condition maintenance and low life cycle costs, which is supported by this technology.
- Data is collected, stored and processed on-aircraft within the DECMU to produce information on the status of engine life usage, condition, incident status and testability. The data is downloaded to a Ground Support System (GSS) after flight for further detailed analysis.
- The full authority Digital Engine Control and Monitoring Unit is engine-mounted for accessibility and is a twin-lane, fault tolerant system linked to the aircraft flight control system. It constantly monitors the functional status of the engine and allows precise, responsive and safe control at all times.

The DECMU system has been developed by the European Military Engine Consortium EUROJET Turbo GmbH, led by the German company MTU Aero Engines in partnership with AVIO, ITP, Rolls-Royce and European hardware suppliers.

The EUROJET Technical Director, Mark Thomas, stated that "DECMU is an exciting development in engine control and health monitoring technology, offering considerable benefits over other systems and ensuring that the EJ200 remains at the leading edge of military aircraft propulsion".

With this advanced and innovative Control and Monitoring System, the EJ200 powerplant sets new standards in military engine technology, supporting both current and future capabilities of the Eurofighter Typhoon.
It was announced at the start of 2006 that the final chapter of the Main Development Contract had commenced. As we reach yearend, the fleet of Development Aircraft is approaching its final flight activities, which, when completed, will move the aircraft into retirement status, and bring to an end a major chapter in the life of Eurofighter Typhoon. Development Aircraft One (DA1) was retired in December 2005 and, with four more of the test fleet to finish their assigned tasks by the end of the year, the maturity of the weapon system in terms of certified capability, and also programme maturity, is unquestionable.

**Major Programme Milestone**

**DA2**

The third Development Aircraft, the Alenia Aeronautica-operated DA3 was at the forefront of armament activities. Since achieving lift-off in June 1996, the aircraft racked up over 500 flying hours and, as the only single-seat development aircraft to be fitted with the Mauser cannon, DA3 was utilised for many firing clearance tasks. With all pre-assigned tasks complete, DA3 is awaiting final approval before settling in to a well-earned retirement.

**Achievements**

- First supersonic flight with EJ200 engines
- First EJ200 re-light flight
- First supersonic flight with external stores (2 x 1,000l tanks)
- First in-flight gun firing
- First pit-drop tests with air-to-ground weapons
- Completion of Automatic Low Speed Recovery testing

**DA3**

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**Achievements**

- First ‘carefree handling’ flight
- First Eurofighter Typhoon to achieve Mach 2.0
- First supersonic flight to deploy towed decoy
- First aircraft to reach 55,000ft (contracted envelope ceiling)
- Completion of Automatic Low Speed Recovery testing

**DA4**

The first of two twin-seat aircraft, this BAE Systems-based Eurofighter Typhoon was actually the last of the Development Aircraft to take flight. However, as the first test aircraft to be fitted with the Captor radar, DA4 has been the leader in the development of the avionics suite in Tranche 1 and at the leading edge of Tranche 2 avionics testing. Over 450 flights later, plus the highest average flight time of the development fleet, DA4 will go into retirement at the end of the year, with the acknowledgement of its priceless contribution to the Tranche 2 and the future capabilities programmes assured.

**Achievements**

- First supercruise flight
- First AMRAAM guided firing
- First in-flight DASS operation
- Longest flight for a Development Aircraft - 262 minutes
- First night air-to-air refuelling with external tanks
- First flight with an active IRIS-T
- First aircraft to visit potential customer Nation - Norway

**DA5**

The second of the two German Development Aircraft, the single-seat DA5, having also been fitted with the Captor radar, assisted DA4 in the field of avionics testing. This Eurofighter Typhoon also underwent upgrades to be able to develop the Tranche 2 avionics capabilities and, with around 600 flying hours to its credit, will join DA1 in retirement at EADS Military Air Systems’ Manching site towards the end of the year.

**Achievements**

- Aircraft flies 1,000th flight for the Eurofighter Typhoon fleet
- Radar assessment flight against 20 targets
- First High Velocity Vector Roll completed during aerial display for ILA Berlin airshow
- First flight with an active IRIS-T
- First aircraft to visit potential customer Nation - Norway

**DA7**

The seventh Development Aircraft is a key player in armaments clearances having carried out the majority of firing exercises. With retirement scheduled for mid-2007, DA7 is still playing a significant role in navigation and avionics testing and, before eventually completing its final flight next year, will potentially claim the flights-achieved record off DA2.

**Achievements**

- First missile firings – AIM-9L, AMRAAM, ASRAAM, IRIS-T
- First external tank jettison
- First supersonic weapon firing with AIM-9L
- First external tank jettison
- First supersonic weapon firing with AIM-9L
- First in-flight refuelling from Italian B-707 tanker
- First aircraft to visit potential customer Nation - Norway

With their place in Eurofighter Typhoon folklore assured, the Development Aircraft fleet, although a different animal in comparison to the Series Production Aircraft, will go into retirement having helped shape the capabilities that have made Eurofighter Typhoon the world’s best-selling swing role combat aircraft.
Ensuring a fleet-wide Block 5 Final Operational Capability (FOC) standard for the Eurofighter Typhoon operators, in combination with the step-by-step capability insertion philosophy that drives the Eurofighter Typhoon programme, requires a pre-planned retrofit and upgrade timetable for the early Tranche 1 aircraft. In November, the first of the 115 aircraft that constitute Blocks 1, 2 and Block 2 of Tranche 1, entered the Retrofit Programme R2 in order to upgrade them to the Block 5 standard and maximise Eurofighter Typhoon capability at a fleet level.

An upgrade management philosophy is in place to combine Eurofighter Typhoon capability upgrades with routine scheduled maintenance to enhance overall fleet availability. With ongoing development on Tranche 1 and Tranche 2 aircraft, maintenance philosophies and Capability Insertion Upgrade planning will need to be integrated to keep all aircraft to the same standard, whilst retaining high fleet availability.

Following on from Block 2B aircraft, Block 2 Eurofighter Typhoon aircraft, currently operating with the initial air-to-air capability, will be upgraded. Finally, early Block 1 aircraft (all of them twin seaters) will enter retrofit, after which the Return to Workshops Programmes in place with the Eurofighter Partner Companies will deliver a ratio of single seat and twin seat aircraft to satisfy each Nation’s operational requirement. R2 is scheduled to upgrade all Tranche 1 aircraft to the Block 5 FOC standard by early 2012.

The R2 programme is paving the way for future upgrades to Tranche 1 and Tranche 2 aircraft with an option in the medium term to upgrade Tranche 1 to Tranche 2 capability standards as required by the Partner Air Forces and Austria.

The Eurofighter Typhoon flight control system is fully-equipped to aid the pilot should the aircraft depart from safe controlled flight. The flight control system will take over, recovering the aircraft to stable flight, before handing control back to the pilot.

Another important automatic safety feature of Typhoon is the Disorientation Recovery Facility (DRF). Should the pilot become spatially disoriented, he simply presses the DRF button, whereby the flight control system will take over the aircraft, bringing it to a wings level, slightly climbing, medium speed position, until such time as the pilot is spatially re-aware. The FCS releases control as soon as the pilot recom-mences aircraft manoeuvres.

The system health of Eurofighter Typhoon is continuously monitored on the pilot’s behalf using C-BIT (continuous built-in test) technology. It is a form of aircraft “housekeeping” that will only alert the pilot should a problem be recognised and, even then, only if he either needs to know about it, or if he needs to take action. No alert = no problem! This means that the pilot can fly Eurofighter Typhoon with total focus on the mission.

For a weapon system with such a complex flight control system, it should come as no surprise that some onlookers have described Eurofighter Typhoon as being “fully automatic with manual override!” The design of Eurofighter Typhoon is such that it enables the pilot to concentrate on the tactical tasks, safe in the knowledge that the weapon system itself provides a safety net to recover the aircraft should the flight envelope be breached.

There are a number of automatic recovery features within the Eurofighter Typhoon flight control computers that restore the aircraft to stable flight in the unlikely event of pilot disorientation. Perhaps the most prominent feature is the Automatic Low Speed Recovery (ALSRe) system. This was introduced as a safety feature to eradicate any “too slow” worries. Should the aircraft decelerate to undesirably low speeds, the flight control system will initiate a warning to the pilot and wait for a manual recovery action or manoeuvre. In the event of a no response, the flight control system will take over, recovering the aircraft to stable flight, before handing control back to the pilot.

But there is more than just safety automation on Eurofighter Typhoon. There is automation of a kind that actually increases the flying performance of the aircraft. The Carefree Handling capability of Eurofighter Typhoon translates from automation in the flight control system. For example, a pilot will attempt a manoeuvre in the form of a movement of the stick, which the flight control system translates into optimum control surface movements, always ensuring the aircraft is kept within the flight limits without the need for the pilot to consider the majority flight limitations for himself.

Additionally, there is the Autopilot function. Similar to most fighter aircraft, the autopilot allows for “hands-off” flying, so that the pilot can devote increased amounts of time to other tasks, such as data analysis. The autopilot system also has the ability to be continuously reprogrammed as the situation changes in-flight.

These systems combine to give maximum performance with maximum safety. The high workload situations of the single-seat pilot demand total confidence in the aircraft systems, and Eurofighter Typhoon delivers.

The Retrofit 2 work will coincide with scheduled maintenance timetables.
At the beginning of November, the three Eurofighter Typhoon squadrons of the Royal Air Force took to the skies from the Main Operating Base of RAF Coningsby for a spectacular “Diamond Nine” formation flight. It was the first time that all the aircraft included in the formation were single-seat type.

The lead Eurofighter Typhoon was piloted by Group Captain Bob Judson, with aircraft from 3(F), 17(R) and 29 Squadrons making up the formation.