

Eurofighter

REVIEW

- Making International Programmes Work
- Export Delivery
- Powering an Industry

RAF goes Multi-Role

Preparing for War



**Eurofighter
Typhoon**



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Cover picture shows a Royal Air Force 17(R) Sqn Eurofighter Typhoon loaded with six Paveway II four AMRAAMs and two ASRAAMs

Photography: Jamie Hunter

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The Royal Air Force gets ready for world-wide deployment



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Tel: +49 (0) 811-80 1587

Editorial representative
Wolfdietrich Hoeweler
VP PR & Communications

Editor
Phillip Lee

Photography
Eurofighter GmbH, Eurofighter Partner Companies,
Geoffrey Lee Planefocus,
Jamie Hunter

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Aloysius Rauen
CEO Eurofighter GmbH



Dear Friends of Eurofighter Typhoon,

The Eurofighter Typhoon programme is in a phase of major transition. No longer just an industrial project, the progress of the weapon system is being driven now by both Industry and the Air Forces. On the consortium side, we are pushing ahead for the advanced capabilities that will allow our Partner Air Forces to fulfil their operational obligations.

This notion is wholly reflected in the current programme status. 2007 has seen deliveries begin to all Nations of the Block 5 multi-role capable Eurofighter Typhoon. This industrial confirmation of growth in the weapon system's capabilities has led to both the Italian Air Force and the Royal Air Force assigning Eurofighter Typhoon to Quick Reaction Alert duties, with Germany and Spain to follow in 2008.

In export, the Republic of Austria took delivery of their first two aircraft at Zeltweg, coming after a satisfactory conclusion of re-baselining the contract. The July handover of AS001 to the Austrian Air Force was just one of a number of successes achieved over the Summer months. The recent signature of the Governmental agreement for Eurofighter Typhoon between the United Kingdom and the Kingdom of Saudi Arabia represents another major milestone for us all.

In June, the programme shareholders agreed the Eurofighter Typhoon Strategic Co-operative Arrangement with the primary objective of improvements in all aspects of programme performance, now and in the future.

The programme future is a clear reference to Tranche 3. After having been asked to deliver a comprehensive proposal for Tranche 3 based on the facts of the umbrella contract by year end, this commitment to the programme throughout the Eurofighter community comes as a valuable enabler.

This two-pronged drive within the Eurofighter Typhoon programme will continue. The first flight of IPA6, our first Instrumented Production Aircraft for the Tranche 2 weapon system testing, is imminent. While we throughout industry look to develop new capabilities for our customer, they themselves are preparing their aircraft and aircrews for worldwide deployment.

2007 is drawing to a close and the Eurofighter Typhoon team faces demanding challenges that will keep us all busy for the rest of the year and beyond.

Enjoy the issue!



XII Gruppo welcomes the aircraft to Gioia del Colle

Italy forms their second Eurofighter Typhoon unit

To the Power of Ten



On Monday 01 October, the first four Eurofighter Typhoon aircraft assigned to 36^o Stormo of the Italian Air Force's XII Gruppo (Squadron)

touched down at their new operating base of Gioia del Colle, near Bari in Southern Italy. Accompanying them on their journey from Grosseto were two Eurofighter Typhoons from 4^o Stormo while, as they approached Gioia del Colle airspace, a collection of their new stable mates, four Aermacchi MB339CD aircraft, provided the official welcome from XII Gruppo.

To enable the unit to fully exploit the operational benefits of Eurofighter Typhoon, the Gioia del Colle Air Base infrastructure has undergone a substantial investment and rebuilding programme, completed on time and on budget. At the ceremony to mark the arrival of the new weapon system, the Commanding Officer of 36^o Stormo, Colonel Antonio Conserva, briefed an assembly of high-ranking military and local authority officials, including General Daniele Tei, Commander of Air Force Command.

The ceremony was concluded with an aerobatic display of Eurofighter Typhoon, performed by the Pratica die Mare Experimental Flight Test team, demonstrating the combination of power and agility that stands the aircraft out against the international competition. The Italian Air Force is to receive 121 Eurofighter Typhoon aircraft.

36^o Stormo History

The Gioia del Colle Air Base was built in 1915 and its aeronautical traditions date back to the First World War when, during operations, many combat aircraft were deployed there. 36^o Stormo was founded on Borgo Panigale Airfield, near Bologna, on 01 February 1938 and, during the Second World War, the Wing operated over Albania, Yugoslavia, Malta, Tunisia and the Central Mediterranean. For their heroic actions displayed throughout the Second World War, the Wing's flag has been decorated with two silver medals, and are first in the Italian Air Force to be decorated with a Gold Medal.

After the war, 36^o Stormo became an air-lift unit, followed by operations as a missile Brigade before finally, on 01 June 1966, becoming a Fighter Wing with two combat-ready squadrons, 12th Fighter Interceptor Squadron and 156th Fighter Bomber Attack Squadron. This is the only Italian Wing with both air-to-air and air-to-ground capability.

01 March 1999 saw 21st Fighter Interceptor Squadron assigned to Gioia del Colle from Cameri Air base but, due to the programme of renewal of the Italian Air Force structure, 21st Fighter Interceptor Squadron was closed. By 01 March 2001, all the personnel of the 21st Squadron had been integrated into 12th Squadron (XII Gruppo) which is, at present, the biggest Fighter Squadron of the Italian Air Force.

They can now boast the capabilities of the world's most advanced swing-/multi-role combat aircraft, Eurofighter Typhoon.

General flight test

Stieglitz Pilots IPA3

The Chief of Staff of the German Air Force, Lieutenant General Klaus-Peter Stieglitz, took the opportunity to fly the latest Eurofighter Typhoon software version on IPA3 in Manching. He participated in a test flight which is part of the qualification programme for the Final Operational Capability



of Tranche 1. General Stieglitz himself executed a significant part of the test items from the front seat, supported by Eurofighter Typhoon Project Test Pilot Chris Worning, and thus got a comprehensive and personal picture of the weapon system performance.

He was impressed by the new functionalities and the system stability and stated after the flight: "I am extremely pleased with the Eurofighter and its capabilities as a weapon system! This aircraft is exactly what the German Air Force needs to master the challenges to come in the next decades."

With the qualification of the latest software, Eurofighter Typhoon will achieve the contractually agreed Final Operational Capability of Tranche 1. This is a key milestone in the conversion of the Partner Air Forces to the type.



The 9-ship formation heads for Buckingham Palace

First flight of the next generation engine

Tranche 2 Power

In mid-July, the Eurojet consortium announced the delivery of the first Tranche 2 standard EJ200 engine. Officially accepted by the Italian Air Force, the advanced engine was to be installed into Instrumented Production Aircraft two (IPA2) and ground tested before going for full flight. On 14 September, IPA2 lifted off from Alenia Aeronautica's Caselle plant, Italy, powered, at least on one side, by the upgraded EJ200 (the other engine was of Tranche 1 designation).

During the flight, lasting approximately 50 minutes, dry and reheat engine handling cycles were performed at various subsonic and supersonic flight conditions. The first engine relight on a Tranche 2 EJ200 was also successfully carried out as part of the test schedule. Mario Mutti, Project Test Pilot for Alenia Aeronautica, reported that the engine behaviour was problem-free throughout the duration of the flight and was equally enthusiastic in his description of the "excellent" engine handling.

A second EJ200 engine of Tranche 2 capability is to be integrated into IPA2 during



The Tranche 2 EJ200 ready for installation into IPA2

the aircraft's lay-up phase over the next few weeks. This will also require full connectivity of the new Digital Engine Control Monitoring Unit (DECMU) to the weapon system's Interface Processor Unit (IPU). The DECMU will be incorporated into all Tranche 2 standard engines, integrating the engine control and monitoring system into a single unit, providing benefits in terms of cost, mass and functionality. 519 Tranche 2 engines are to be delivered over the next five years.

Nine-ship flypast for HRH Queen Elizabeth II

By Royal Appointment

The annual festivities that mark the British Monarch's birthday provide a platform for the United Kingdom's Armed Forces to demonstrate the pomp and pageantry that makes

them instantly recognisable from any other of the world's fighting forces.

On Saturday 16 June, Her Royal Highness Queen Elizabeth II celebrated her official birthday with a little help from the Royal Air Force's newest weapon system. A nine-ship formation of Eurofighter Typhoons, led by No.3(F) Squadron chief, Wing Commander Lol Bennett, made its way from RAF Coningsby to Buckingham Palace for an eye-catching flypast over the onlooking Royal Family and members of the public who'd gathered in their thousands to join in the celebrations.

The aircraft returned to their Main Operating Base on completion of their Royal duties.

Eurofighter Typhoon scrambles to meet Russian bomber

High Profile Intercept

In an incident which made headlines around the world, Friday 17 August witnessed the Royal Air Force launch two Eurofighter Typhoon weapon systems from their Main Operating Base at RAF Coningsby to shadow a Russian Bear-H bomber aircraft that was reportedly heading for the United Kingdom.

Armed with four AMRAAMs and four ASRAAMs, the newest weapon in the Royal Air Force's inventory escorted the approaching bomber for a short period until identification was established. The Russian aircraft turned back before reaching UK airspace.

An official Ministry of Defence statement confirmed: "RAF Typhoons from Numbers 3(F) and XI Squadrons launched to shadow a Russian Bear-H aircraft over the North Atlantic Ocean."

The Royal Air Force had only placed

Eurofighter Typhoon on Quick Reaction Alert (QRA) duties in July, and their responsiveness to this high profile incident justifies fully their decision.

For more information on Eurofighter Typhoon in the Royal Air Force, turn to page 12.

EADS CASA receives Spain's Minister of Defence

MoD VIP

Marking the milestone of the delivery of the final Tranche 1 Eurofighter Typhoon to the Spanish Air Force, the Spanish Minister of Defence, José Antonio Alonso, made a high-profile visit to EADS Military Air Systems' Getafe site on 18 September.

The Eurofighter Typhoon programme holds particular importance politically in Spain with around 22,000 jobs created domestically due to Europe's largest defence collaboration. Señor Alonso expressed his enthusiasm at having received the last Tranche 1 aircraft, a twin-seat variant designated 11-77, and confirmed his overall satisfaction with the programme.

The key points of the Minister's statement during his visit include:

"A very prolific investment, that meets the Air Forces' and national defence requirements, creates jobs and provides technological transfer."

"To respond to the national defence requirements represents a mayor constitutional responsibility and therefore Spain is obliged to maintain its forces on an up-to-date level."

"The Eurofighter programme leads to growth in terms of net profits and technology for the national aeronautic industry."

"Spain has got a strong interest in this truly European programme that contributes to building and consolidating - also from an industrial point of view - common

European defence and security politics and furthermore to establish links with the Atlantic Alliance."

Spain's Minister of Defence takes in the Eurofighter Typhoon Cockpit



Key Industrial, political and military figures convene at Morón Air Base

Señor Alonso was accompanied throughout his stay by Carlos Suárez Pérez, Chairman EADS CASA, Pablo de Bergia, Head Defence & Security Spain and President Military Air Systems Spain and by the Spanish Air Force's Chief of the Air Staff, José Francisco García de la Vega.

Austria takes first Eurofighter Typhoon

Export Delivery

The sun was trying to break through the clouds, when the first Eurofighter Typhoon AS001 for Austria approached its new home base Zeltweg in Styria on Thursday morning 12 July. Escorted by two F-5E Tiger of the Austrian Armed Forces, Martin Angerer, test pilot at EADS Military Air Systems in Manching, took AS001 over the runway and then landed the aircraft at 1045.



Top: AS001 air to air over its new home base of Zeltweg
Above: EADS pilot Martin Angerer lines up with Austrian Air Force pilots next to the new aircraft

Captain Springer, one of the first Austrian Eurofighter Typhoon pilots and leading through the event, welcomed the aircraft: "This is a memorable day for Austria's Air Force. AS001, a hearty welcome in Austria."

Martin Angerer in the meantime taxied the aircraft towards the ceremonial area, where political and military leadership waited for the arrival. He took the fighter with the Austrian registration 7L WA through a water cascade, a traditional welcome for new aircraft of the base's fire department. And then the aircraft came to a stop in front of the soldiers and civilian employees of the Überwachungsgeschwader (Surveillance Wing), who cheered the aircraft.

After an introduction of the guests by Brigadier Rupert Stadlhofer, Commander Air Surveillance Command, Lieutenant General Günter Höfler, Commander Armed Forces Command, officially welcomed the aircraft. With Eurofighter Typhoon, the Nation will have one of the world's best fighter aircraft in operation and the focus now shall be to guarantee an optimum air surveillance and defence for Austria. He called for an end of the negative public debate in the country and was convinced that Austria's population in a few years would be as proud of their Eurofighter Typhoon as they had been with the Draken. The Draken had been retired two years ago and leased F-5 from Switzerland are currently being used to guarantee the sovereignty of Austria's air space.

Wirtschaftsminister Wolfgang Bartenstein welcomed the aircraft on behalf of the government. He reassured he would make the same decision in favour of Eurofighter Typhoon as five years ago.

AS002 is welcomed to Zeltweg



The aircraft is the best available and the right one to serve Austria's requirements. The cost for procuring and operating the Eurofighter Typhoon would be high, but a rich Nation like Austria certainly can afford to safeguard its neutrality with this system.

Eurofighter's Austria Programme Director Peter Maute replied: "We have worked four years to achieve this handover. This is a very important day for the Eurofighter consortium of Alenia Aeronautica, BAE Systems, EADS CASA and EADS in Germany, as we now can say: Five Nations fly Eurofighter Typhoon!" AS001 was the 125th aircraft delivered to the five Nations that have ordered the system.

Immediately after the short ceremony had ended the handover formalities were conducted between the Eurofighter consortium representatives and the Austrian authorities, while in the meantime the ground crew of EADS Military Air Systems and the wing's maintenance squadron turned the aircraft around. After 30 minutes the aircraft was cleared to fly again.

With signature of the so-called F1 document the aircraft finally was owned by the Austrian Armed Forces. And they took ownership. Briefed by experts from EADS operation of the Ground Support System started almost at once, as the wing intended to fly the aircraft within a few days and start the initial flying operation out of Zeltweg air base.

Based on the June 2007 agreement between the Austrian Ministry of Defence and the Eurofighter consortium, Austria will receive 15 aircraft out of Tranche 1 to reduce costs for the procurement and operation of their Eurofighter Typhoon fleet. The aircraft will be delivered up until 2009, with AS002 delivered in early September, A003 and AS004 to follow in October and December 2007.

Eurofighter Typhoon production gathers pace

3-Tranche Planning

Every piece of the Eurofighter Typhoon production puzzle is now receiving industrial attention. With aircraft deliveries exceeding 130, the Partner Air Forces' Tranche 1 fleets are reaching full capacity. This includes all Block 1, Block 2 and Block 2B weapon systems, meaning that the Nations will, from Summer 2007, only be receiving the multi-role capable Block 5 Eurofighter Typhoon.

The Tranche 1 production programme passed another milestone in August through the completion of Tranche 1 deliveries to the Spanish Air Force. ST008 was handed over to the aircrew at Morón Air Base, becoming the 19th Eurofighter Typhoon to enter service in Spain. It is also the first twin-seat variant at the Block 5 standard.

As deliveries of the first Tranche draw to a conclusion, production work on Tranche 2 is ramping up with almost 20 aircraft in final assembly. First flight of the first Tranche 2 standard Eurofighter Typhoon IPA6 is scheduled for Autumn this year. The third Tranche of aircraft, although not on the production line, is very much in the industrial focus. The four Partner Nations, Germany, Italy, Spain and the United Kingdom, have, through NETMA, requested that the Eurofighter consortium deliver a comprehensive bid for Tranche 3 by the end of 2007. This bid will be based on the umbrella contract for the original 236 Tranche 3 standard aircraft.



ST008, the final Tranche 1 weapon system for the Spanish Air Force

Eurofighter Typhoon Strategic Cooperative Agreement

Joint Visionaries

Achieving success in a quadri-national programme is dependant on effective co-operation between all parties. In June, during the Paris Air Show at Le Bourget, representatives of the four Ministries of Defence, the four Heads of the Eurofighter Supervisory Board, the General Manager of NETMA and the Eurofighter GmbH Chief Executive Officer, together developed a joint vision:

"Working in partnership to excel in the joint delivery and support of Eurofighter Typhoon capability through life to our Air Forces whilst supporting our industries."

The document sets out the values that embody the spirit of partnership and that will work to secure the Primary Business

Objective of improving delivery of programme performance, cost and time, including support and availability through life.

A comprehensive set of enabling objectives were formed and agreed upon, including establishing a joint planning process, improvements in decision-making as well as increased efficiency throughout the supply chain and in payment schedules.

As the programme approaches the next major milestone, namely Tranche 3, effective cooperation from all sides will help to deliver the best solution and ultimately provide the Partner Air Forces with the world-beating weapon system that they deserve.

Multi-national co-operator

Making International Programmes Work



The Panavia Tornado project and the Eurofighter Typhoon programme have proved to be major successes in terms of international collaboration. Erwin Obermeier, former Production Director

of the Eurofighter consortium, has had the good fortune of being able to witness the mechanics of multi-national projects from the inside, having played a key role in bringing both of the aforementioned multi-role weapon systems off the drawing board and into operational service. In an interview with Eurofighter REVIEW, Mr Obermeier described the challenge of international co-operation.

For four decades, your working environment has been in international partnerships. What is the key to making them a success?

Having joined Messerschmidt in April 1966, I began working internationally from 1970 as the Tornado programme commenced. I took a small break to complete the Test Pilot school at Patuxent River, Maryland, in the United States but, after a one-year break, I returned in 1974 and was immediately heavily involved in the Flight Testing of the Tornado. This really was my initial foray into an international working environment and, from then on, it has been international all the way.

Looking back to that time, that really was a step into the unknown and we were basically the pioneers in forming international teams and projects. Crucially, at that time, I think we were much more focused on the project and not on political issues. Over time, politics came more and more into the picture and, just reflecting on the last two years of the Eurofighter programme, 100% dedication was not afforded to the product, with man-hours instead focused on political objectives and national interests, consequently slowing the progress.

I believe this has changed for the better, with the aircraft capability now at the

forefront of peoples thinking. Nevertheless, certainly we had more advantages by working in a team, working in international projects, because the internationality can be a stabilising influence. If we remember way back in 1992, when the Germans were unsure as to whether they should continue with Eurofighter Typhoon, the industrial consortium were backed by the other Partner Nations, especially by the United Kingdom, and finally we recovered in unity and were able to continue the programme. These issues do crop up, but dealing with them in the right manner is critical. So, all in all, I think an international programme offers stability when all concerned are motivating one another to reach the ultimate target, but lessons can still be learned on maintaining the product focus as opposed to wasting resources on political and national interests.

You mentioned the German uncertainty in the programme. How challenging was the re-orientation phase of the early 1990s?

That was indeed a real problem. The change was actually required by the then Minister of Defence in Germany, however, when he requested industry to carry out a study and evaluate the programme again, the result was that the aircraft was still the right solution. At the end of the evaluation in 1994, in December I think it was, the new Defence Minister in Germany agreed that the programme should continue, but with some slight modifications as far as the aircraft and the development system was concerned. Those two or three years when we conducted this international study were indeed extremely tough, but the outcome i.e. proving that Eurofighter Typhoon is the right aircraft for Europe and for crisis areas, was immensely satisfying.

You started life in aerospace as a Flight Control Systems engineer on the VJ101. How was the shift from mechanical flight controls to computer-based flight controls?

It was a progression of course, an evolution, but it was also quite different as far as the work on the aircraft was concerned. When I came into this business, and we had

mechanical flight control systems that required adjustment, it was carried out with some mechanical tooling and we could calculate exactly that if we turn one screw on the left hand side it had a definite effect on the other side of the aircraft. With the electronic flight control system, there were some initial problems because you weren't able to operate with the older mechanical tools. Computers became the driving force behind all the testing.



At Tanagra in Greece, Erwin Obermeier spreads the word in his role as Greek Campaign Director

The troubleshooting on the aircraft was not as easy as with mechanical systems, but nevertheless the flight control system was more precise and we could allow for more aerodynamic instability with an electric system in comparison to mechanical systems.

In terms of your involvement, what have been your personal milestones over the course of the programme?

My personal milestones on whichever project I have contributed to were simply to always try to complete the programme. I was never satisfied if somebody asked me to move on from a programme and I was not totally finished. But, in reality, it has turned out pretty well. When I managed the Vertical Take-off and Landing aircraft business, we had actually finished all of our development to a point where we had flying prototypes. We even achieved some world records, such



**Above: Mr. Obermeier is always happy to talk about the programme to the media
Left: Talking with General Stieglitz of the German Air Force at RIAT, UK**



such as the colleagues from Industry and the Nations who delivered to Austria and who are working hard to achieve success in Saudi Arabia. I am still involved in Greece, so maybe I will have my chance to be successful there.

How is the Greek campaign progressing?

Too slow. I made my first presentation on Eurofighter Typhoon to the Greek authorities in September 1997. At that point, it was looking good and actually turned positive quite rapidly. We removed some other competitors out of the competition and, in January 2001, we initialled the contract for the procurement of 60 Eurofighter Typhoons for the Hellenic Air Force plus 30 options. Unfortunately, for us at least, the Greeks successfully bid to host the 2004 Olympic Games which meant that tremendous pressure was placed on the national budget. This was a problem and we were required by the Greek Government to stop the Eurofighter Typhoon procurement process for a couple of years, which we did.

In 2005, they announced that there would be a new process for the purchase of a modern fighter and we were again invited to submit proposals. This is where we are today and I would expect it again to go very slow as far as a decision is concerned. After the recent Parliamentary elections in Greece we will be required to start negotiations on Eurofighter Typhoon but, again, I would expect that we only start these talks before the end of 2007.

With the new "empowered Eurofighter", what do you foresee for the future of the programme? Is it shaped now to meet future challenges in your opinion?

I firmly believe that, with the small but very powerful organisation that Eurofighter GmbH has become, it is ideally set up for the future. Of course, there is room I think for even more strengthening of the organisation at the first and second level, but this will take time. However, with the small management team in place, I really believe that the organisation's strength lies in its

efficiency and ability to make decisions quicker than in the past. The organisation as a programme is of course an evolutionary process which needs to be tackled, but I think Eurofighter GmbH is in very very good shape to maintain progress and improve as a powerful company.

When your role with the Greek campaign finishes, do you think you can ever switch off from Eurofighter?

It will be very difficult. I'm officially retired now for almost six months, but you can see that I'm still sitting in the office here! I do it actually because my heart is with the Eurofighter programme, my heart is with this business. I never want to be totally switched off. I will follow the programme via internet, via newspapers, and I'll find some time for personal tasks and targets to be able to contribute to the programme, by perhaps writing an article for one or another newspaper or something along those lines.

Interview by Phillip Lee

International Aerospace Summer School competitors, RAF Coningsby 15 August 2007



Swiss Team wins Eurofighter Typhoon Trophy

Engineers of the Future

The students from Team Switzerland won the Eurofighter Typhoon Trophy at the second International Aerospace Summer School competition. Teams from 12 countries competed in this unique event supported, for the second year running, by the four Nation Eurofighter consortium.

These budding engineers will, in years to come, be the driving force in the aerospace industry. The Eurofighter-sponsored International Aerospace Summer School, and the experiences gained from their participation in it, will help to set them up for managing the challenging tasks that lie ahead of them.



Left: The winning swiss team
Below: The group receive a briefing on the aircraft



After submission of a presentation to define an "environmentally friendly transport aircraft", the teams had to prove who is best during one week full of aerospace activities at Cranfield University, England. They flew small aircraft and helicopters, took a first hand glance at wind tunnel testing, flew in a test bed and were briefed in many areas of aerospace. The highlight of the week was the visit to the Royal Air Force Eurofighter Typhoon base at RAF Coningsby, where they received first hand information from the pilots.

Each team consisted of three students aged 16 to 18 advised by a teacher. They came from the four Eurofighter Nations Germany, Italy, Spain and the United Kingdom, plus representation from Austria, Denmark, Greece, Norway, Singapore, South Africa, Switzerland, and Turkey.



Eurofighter Typhoon: the outcome of successful European collaboration

Lewis Hamilton visits Eurofighter Typhoon

From Pole to Swing-Role

The hottest property in world sport, Lewis Hamilton, breezed into the Paris airshow at Le Bourget in June. As part of his commitments as an ambassador for the Bombardier Learjet brand, the McLaren Mercedes Formula One championship challenger attended the show to publicise his new link-up with Learjet.



Despite his tight schedule, the fastest man on four wheels found time to try out a high-speed machine of a different nature when he dropped into the Eurofighter Typhoon pavilion for a flight in the cockpit demonstrator.

Under the guidance of Craig Penrice, BAE Systems' former Eurofighter Typhoon test pilot, Lewis Hamilton showed the sort of abilities that have taken him to the top of his sporting profession, successfully taking the aircraft through a simulated sortie before executing a near-perfect landing.

Aloysius Rauen, Eurofighter GmbH Chief Executive Officer, was on hand to greet the British racing star and to congratulate him on his meteoric success in his debut season.

RAF Gear Up for Deployed Operations

Preparing for War

29 June 2007. Two Eurofighter Typhoon aircraft from No.3 (F) Squadron at RAF Coningsby are assigned to Quick Reaction Alert (QRA) duties for Southern United Kingdom airspace. Put simply, the most capable weapon system in the Royal Air Force inventory is on 24-hour readiness to respond to any threat entering United Kingdom skies, armed with a fearsome air superiority package of four advanced medium range air-to-air missiles (AMRAAM) and four advanced short range air-to-air missiles (ASRAAM). This milestone announcement from the Royal Air Force comes just over a year since No.3 (F) Squadron received their first aircraft. Eurofighter REVIEW visited RAF Coningsby for a behind-the-scenes look at how a raw aircraft is ramped up into the most feared multi-role platform in the world.

The build-up to QRA

31 March 2006. No.3 (F) Squadron is declared the first frontline Eurofighter Typhoon unit in a Stand-Up ceremony at RAF Coningsby. At this point in time, they had just one pilot who'd completed the Operational Conversion Unit (OCU) training. Over the next three months, No.3 (F) Squadron would increase its ranks enough to be able to break away from the OCU in June and start to shape the unit independently.

A little over 12 months later and No.3 (F) Squadron are at battle strength with 16 pilots, 14 of which are ready to deploy in the air-to-air role. According to

Squadron Leader Paul "Mufti" Smith: "Eurofighter Typhoon is good to go to war as a fighter right now. There is nothing I fear out there in Typhoon and that's taking into account both Western and Eastern jets."

The build-up to QRA is the first major milestone as the Royal Air Force seeks to achieve a ready-to-deploy status in January 2008. All work immediately after the formation of No.3 (F) Squadron was closely tied in with the Operational Evaluation Unit (OEU), 29 (R) Squadron, and was focused on initial trials of tactical operations with the weapon system. Since November 2006, however, the independency of the squadron has begun to show through with increased participation in exercises involving not only other national Air Force assets, but also internationally-operated aircraft.

The Combined Qualified Weapons Instructor (CQWI) Course, a United Kingdom-

led tactical exercise, was the first such assignment. "It's a course that we put together for two weeks to train our tactical leaders, at a Captain/Flight Lieutenant level" commented Squadron Leader Smith, adding: "These are the guys who are going to be the tactics and formation directors in the air." The No.3 (F) Squadron Eurofighter Typhoons, working closely with the Royal Air Force's other fighter, the Tornado F-3, went up as a combined force and the results were, according to Squadron Leader Smith, extremely satisfying. Reflecting on the event, he commented: "The Typhoons did very well."

The November CQWI Course proved that, even at an early stage in its frontline devel-



Top: 3(F) Sqn jet in full QRA configuration

Left: Flight Lieutenant Mark "Flunk" Flewin

opment, Eurofighter Typhoon is able to hold its own in a combat environment. In March of this year, the pilots of No.3 (F) Squadron unleashed the aircraft at the multi-national Night Tactical Leadership Training (TLT) exercise. Other Nations were invited to participate, including the Americans with F-15C

jets, flying both as team mates and opposition fighters, and once again Eurofighter Typhoon emerged largely unscathed. "We achieved a very high kill ratio" declared Squadron Leader Smith, adding: "we have a very close working relationship with the U.S. and we do a lot of work with the F-15C guys at Lakenheath. There's a lot of mutual respect between us and they respect the capabilities of Typhoon."

As the QRA deadline drew nearer, No.3 (F) Squadron sent a detachment to RAF Marham under the banner "Southern Guardian". Operating in a similar set-up to RAF Coningsby, the week-long deployment served to fine tune the aircrews for the demands of QRA scrambles while also allowing them to familiarise themselves with RAF Marham operations should the need arise to bolster Southern Q. Reflecting on the

deployment, Flight Lieutenant Mark "Flunk" Flewin commented: "We didn't know what we were going to get, so we manned Q down there for a week and they just scrambled us, and we always made the time limit." Although reluctant to discuss the officially-set time requirements for QRA scrambles, practice runs have recorded times under six minutes, from the pilot receiving a phone call notification to the aircraft getting airborne.

Air-to-air deployability

Achieving the required levels of readiness to start QRA duties is, as far as No.3 (F) Squadron are concerned, only the first operational milestone for Eurofighter Typhoon. Being prepared for deployment as an air-to-air fighter anywhere around the world as part of a coalition force is the next objective. January 2008 is the planned deadline and both Squadron Leader Smith and Flight Lieutenant Flewin remain confident that the aircraft is on track. Eurofighter Typhoon's performances at both the CQWI and Night TLT exercises have proven that the jet has the capability to war fight air-to-air, however, although the aircraft is meeting combat expectations, the Squadron, as a whole, are working hard on reducing the logistical footprint of a full deployment. This is one of the biggest challenges facing the engineering and maintenance crews of No.3 (F) Squadron. "We're still refining the deployment procedures" explained Squadron Leader Smith, adding: "Initially, the aircraft left quite a big logistical footprint, in terms of engineering manpower and spares. With each Exercise away from Coningsby we've been able to refine and lean our requirements."

On the first exercise, CQWI, around 80 engineers accompanied the aircraft and were able to achieve the planned four sorties a day with five aircraft. The second



Pilots of the Royal Air Force and the Spanish Air Force all praised the success of "Lone Eider"

visit, Night TLT, saw No.3 (F) Squadron take six aircraft flying ten sorties in three waves each day. Crucially, this was achieved using just a 60-man ground crew, proving the trials to be a success in terms of leaning down the footprint. "The engineers were working very hard to maintain that flying rate" stated Squadron Leader Smith "but it worked out pretty well and proved the progress we're making!" he added.

Up until April of this year, all of No.3 (F) Squadron's ramping-up exercises had been conducted at other Royal Air Force bases within the United Kingdom. What followed was exercise "Lone Eider" at Morón Air Base, Spain. The deployment of seven aircraft to Morón was the first squadron-strength overseas exercise undertaken without tanker support, with each Eurofighter Typhoon making the journey in a three tank configuration. Backed with full support from both the Spanish Air Force and industrial colleagues from EADS CASA, the Squadron were able to execute some complex missions including an eight-ship multi-national Eurofighter Typhoon fleet against a 16-strong "enemy force" made up of 12 F/A-18 Hornets and Mirage F-1s out of the Spanish inventory. The result? "No problem" confirmed Squadron Leader Smith. "Typhoon did well, and we put in a good performance out there."

In July, the Indian Air Force deployed the Su-30 MKI to the United Kingdom in a high-profile exercise codenamed "Indra Dhanush 2007". Over the two weeks, both the Operational Evaluation Unit and No.3 (F) Squadron went up against the powerful fighters from the East in a series of combat exercises. The irony that Eurofighter Typhoon pilots are honing their air combat skills against the calibre of aircraft that the initial design requirement suggested they would face in real wartime scenarios is not lost on the Royal Air Force, but any mention of the worn out "cold war relic"



3(F) Sqn on deployment in Spain as part of Exercise "Lone Eider"



Squadron Leader Paul "Mufti" Smith

accusation is quickly dismissed by them. "It's just total nonsense" says Squadron Leader Smith. "You have to dominate the air as a pre-requisite to any operation before you can project your strike capability. This air dominance is not automatically given to you and sometimes people forget that. The fact that Typhoon can own the air and still carry six 1,000lb precision weapons to put in an effective air-to-ground performance in a hostile environment gives you a good indication of the capabilities of the jet." Flight Lieutenant Flewin adds: "If you look at the initial design requirement for just an air-to-air platform, it's been developed massively. Now we are staring down the barrel of being multi-role by July 2008, so I don't think that "cold war" line holds anymore at all, and certainly everyone here would argue that."

The results of Exercise Indra Dhanush?

"Outstanding!" declares Squadron Leader Smith, adding: "This is an Su-30 MKI, the very latest Russian technology with thrust vectoring, probably the pinnacle of Eastern European weaponry currently fielded and from the results we've seen this week, not a problem!"

Austere operations

An increased significance was placed on the success of "Lone Eider" in terms of deployability with it coming so soon after the Stand-Up Parade of No.XI (F) Squadron, the first truly multi-role squadron of the Royal Air Force, on 30 March. Commenting on the plans for the newly formed unit, Wing Commander, Gavin Parker, iterated his intention



Two 3(F) Sqn jets are on 24-hour standby at RAF Coningsby

to lead Eurofighter Typhoon into the war zone of Afghanistan from July 2008. This has shifted the focus of the entire station in terms of their operational ambitions.

At the end of June, the crews of No.3 (F) Squadron began their "austere" preparations. In order to build up a checklist of what needs to be considered in supporting a full deployment, the squadron took to living in tents just outside the airfield at RAF

"Mufti" on a QRA scramble



Coningsby, with two aircraft stationed on the pan in a mission-ready condition. Over the two days, the entire operation, both engineering and flight-planning, was conducted out of this "tent city".

In September, No.3 (F) Squadron carried the tent city initiative one step further with a squadron-level deployment to RAF Fairford. This simulation of a combat territory theatre involved around 500 personnel, over 70 tents, eight aircraft, plus all the planning and maintenance equipment normally required for a full wartime scenario. This included the Engineering Support Systems (ESS) and the Mission Support Systems (MSS), as well as the generators to uphold the austere nature of the assignment. "The plan was to fly the jets two or three times a day for two weeks, totally austere" confirmed Squadron Leader Smith, adding: "Everything was set up as if it was in the middle of a field somewhere, albeit a field with a bit of runway!"

Multi-role development

The push towards full combat deployment is being driven, at varying degrees, by all four of the Royal Air Force's Eurofighter Typhoon squadrons. The Block 5 standard aircraft, the first of which was accepted by the United Kingdom in June, contains the multi-role capability required for realising the aspirations of action in Afghanistan. Delivered into the hands of the Operational Evaluation Unit at RAF Coningsby, Flight Lieutenant Flewin and his team are putting the Block 5 weapon system through a rigorous schedule of assessment in order to develop tactics to maximise the multi-role capabilities of the aircraft. On the other side of flight ops, the Operational Conversion Unit (OCU) are charged with moulding the pilots to a capability level suitable to mission-flying the aircraft. This often involves the OCU instructors spending time integrated into the frontline squadrons to gain an exposure to the sort of tactical flying that is expected of their aircrews. This experience helps the instructors to tweak the

pilot training courses to match up to front-line demands.

With four squadrons at RAF Coningsby all geared towards achieving multi-role status for Eurofighter Typhoon, a healthy rivalry between them ensures that a focus on the common objective is maintained. According to Flight Lieutenant Flewin: "We need to work together very closely as we haven't got time to repeat the same work."

This close cooperation is exemplified on a regular basis through the lending of assets and people across the airfield. While pilot swapping is part and parcel of general operations, the exchange of aircraft, although more of a complication, is not too uncommon. "If we need to, to achieve a task, then we'll make it happen" states Flight Lieutenant Flewin, adding: "At the moment, there's so much work to get done. The OEU are busy, the frontline squadrons are so busy, but we generally work it so that we're not stepping on each other's toes."

Co-operation with industry

With the publicly stated deadline for multi-role looming on the horizon, there is huge pressure to deliver on both sides of the programme, from a consortium perspective and on the side of the Royal Air Force. The biggest challenge for industry is the integration of the laser designator pod (LDP) onto the weapon system, one being taken on by the Flight Test engineers at BAE Systems' Warton site. Because of the risk involved with the advanced software being used with the LDP, all initial integration work is carried out by industry, but for two weeks each month, aircrew from the Operational Evaluation Unit are assigned to Warton to get an inside look at the multi-role trials.

In support of the Development, Test and Evaluation (DTE) work, the Royal Air Force loaned what was to be their fifth twin-seat aircraft, BT005 (or Instrumented Series Production Aircraft (ISPA) one, as it is known to the consortium), back to industry to maintain the progress of the Flight Test programme. "What this means is that as upgrades go through industry development Flight Test, our OEU get a limited access to BT005 and it's a really useful exchange of information" comments Flight Lieutenant Flewin. "I go up there and fly with an industry test pilot on a test aircraft under the guidance of the test programme, so it's a great example of the co-operation with industry to keep things moving along."

The highly advantageous aspect for the frontline squadrons is that all the pre-work normally associated with validating new tactics is carried out before the equipment in question even reaches RAF Coningsby. "We want to be there once the pod works



The high profile summer visit of the Indian Air Force's Su-30 MKI aircraft, shown here being escorted by 17(R) Sqn Typhoon

on the aircraft" states Flight Lieutenant Flewin. "It's a really good bit of co-operation that's going on, the joint team going through all the pre-work as opposed to what could have happened where we're just handed the system and no-one has flown with it and we'd have to square away all the pre-work before we can even work on the tactical use of it."

Industrial representation on-base at RAF Coningsby is also proving to be a valuable asset. The constant upgrades to the aircraft, including the arrival and beginning of operations with Block 5 aircraft, mean that both the pilots and the engineers continuously call upon the outstanding system knowledge of the industry liaisons. Squadron Leader Smith states: "The support is very good I think. We understand that industry has to make a profit but, at the same time, we get good support from the on-site representatives." This is echoed by Flight Lieutenant Flewin. "We find that we need these guys here all the time and, as we move into air-to-surface, we'll have guys from the Avionics team here giving the OEU a heads-up on what's coming in. We do use that link with industry to keep an eye on what's going on so that we can maintain the progress on the frontline, not wasting the products they deliver."

Preparing for war

There isn't much flex in the pre-deployment schedule. There is an intent to see a much talked about weapon system being put to use operationally. The software for the LDP will arrive on the squadron in early 2008, so all tactics and expertise as well as all tutoring of the frontline pilots must be completed. Within three or four months of the software installation, it is planned that the frontline squadrons will go to the United States on heavy weapons deployment. Initially, No.3 (F) Squadron were pencilled in for participation in the Red Flag air combat trials in the U.S. in January next year, but the shift in focus to multi-role operations has altered preparations slightly. "That was intended to be Typhoon's demonstration of air-to-air capability" confirms Squadron Leader Smith. "But, instead, next Spring, once we get the clearance to drop bombs, we'll prove that capability on a detachment."

The anticipation is building ahead of the multi-role capability and the excitement amongst the pilots is plain to see. "We'll get a massive amount in the deployment to drop" adds Flight Lieutenant Flewin. "The annual training allowance for weapons is large. It's going to be a Wing event as well, so we'll be dropping a large number of

bombs. We need to get everyone up to speed because there's a lot of people who've never dropped weapons, and we'll also need to get people working with the pods!"

By the time the first jets head off to Afghanistan, it will have been a little over two years since the formation of the Royal Air Force's first frontline Eurofighter Typhoon squadron. Such is the flexibility of the weapon system that the decision of military chiefs to bring forward the expansion into multi-role capability has not been at the expense of its Quick Reaction Alert responsibilities, but will be achieved as well as. The enthusiasm for Eurofighter Typhoon throughout the squadrons is contagious, as is the determination from pilots and engineers to have the aircraft ready for a deployment where it can justify its existence. "We'll send Typhoon when it's ready to go" declares Flight Lieutenant Flewin. That time is coming.

Interviews by Phillip Lee

COBHAM Air Refuelling & Auxiliary Mission Equipment

Multi-Role Supplier

The world-leading weapon system, Eurofighter Typhoon, is built on a foundation of engineering excellence. The supplier network from across Europe delivers cutting-edge technologies that combine to give Eurofighter Typhoon its unrivalled capability. A leading light in the supply of aircraft equipment is Cobham plc, an international company engaged in the development, delivery and support of advanced aerospace and defence systems in the air, on land, at sea and in space. The company specialises in the provision of components, sub-systems and services that work to keep people safe, improve communications and enhance the performance of aerospace and defence platforms.

Company Heritage

Cobham is today a global leader in the defence and aerospace industry with six divisions - five in the technology sector and one in the service sector. Cobham has businesses on five continents, and employs some 11,000 people producing world class products, systems and services. All this stems from one man and his enthusiasm for aviation - Sir Alan Cobham.

The story begins when, in 1934, Sir Alan Cobham founded a company to investigate the use of air refuelling - Flight Refuelling Limited. In the subsequent years, many landmark events took place including the first non-stop air refuelling crossing of the Atlantic Ocean in 1939.

In 1949, Sir Alan Cobham's company invented the probe and drogue method of air refuelling. Today, his pioneering systems are used in both military and civil applications worldwide. The Air Refuelling products, although the symbols of Cobham's expertise, account for only a small part of the Group's annual £1bn turnover due to their continual expansion into other aerospace fields.

Sir Alan Cobham retired in 1969 at the age of 75, but the Cobham legacy continues as Cobham grows both acquisitively and organically to develop its global status in the world's defence and aerospace markets.

Air Refuelling & Auxiliary Mission Equipment Division

With operations in the United States and the United Kingdom, the Division is the market leader for air refuelling, providing innovative fourth generation nose to tail solutions to defence customers around the world. From tactical tanking for helicopters and buddy stores for fast jets, to strategic

tanking for deployment and sustainment of fixed and rotary wing aircraft, the Division has an enviable track record for solutions that people can trust. Specialising in wingtip to wingtip solutions, the Division offers weapon systems integration including safety critical interface electronics, pneumatic technologies and advanced lightweight designs for air to air and air to ground carriage.

Cobham and the Eurofighter Programme

Cobham is proud of the strong history of association with the Eurofighter consortium and supplies a full range of wingtip to wingtip products including air to air missile launchers, air to ground ejector release units, defensive aids (in partnership with SAAB) together with other aircraft systems.

Air to Air

- MRAAM Eject Launcher (MEL)
- AMRAAM/Meteor - Qty 4 off / A/C.

Air to Ground

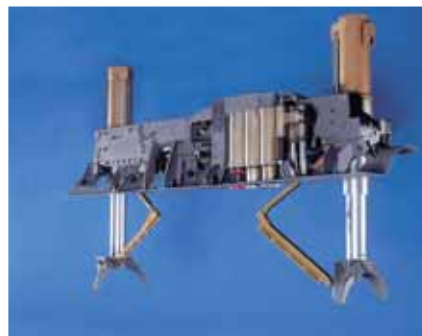
- Advanced Heavy Duty Ejector Release Unit (Gas System) - 2000lb Store Class - 2 off / A/C.
- Advanced Light Duty Ejector Release Unit (Gas System) - 1000lb Store Class - 2 off / A/C.

Defensive Aids

- Flare Dispenser - 2 off / A/C
- Chaff Dispenser - 2 off / A/C (SAAB BOL 510)

Aircraft System

- Tank Eject Unit (Gas System) up to 3off / A/C
- Brake Parachute Lock and Release Unit 1 off / A/C



Missile Eject Launcher provides rapid ejection and separation of AMRAAM missile

The partnership with the Eurofighter consortium has seen Cobham achieve many significant milestones, reinforcing its position as a world leader in weapons carriage and release systems

The programme saw entry into service of Cobham's Chaff and Flare Defensive Aids System following an extensive qualification process conforming to the highest industry specifications. Flight Refuelling, part of Cobham's Air Refuelling & Auxiliary Mission Equipment division, is contracted through Alenia Aeronautica and is the systems de-

Brake Parachute Lock and Release Unit: Small but vital



BRU 61/A: Four place pneumatic carriage system for Small Diameter Bomb

sign authority responsible for leading an international workshare partnership including Saab Avionics in Sweden, Fibretecnic in Spain and Elettronica Aster in Italy.

Cobham continues to develop its products working together with the Eurofighter partners to provide the ultimate in fighter capability. The programme has also supported service release for AMRAAM on the MRAAM Eject Launcher, as well as preliminary clearance for MRAAM Eject Launcher carriage and release of the Meteor missile, thus providing a dual mode system.

Inside the Eurofighter community, Cobham counts on and values the strong business relationships it has developed with the four Eurofighter Partner Companies Alenia Aeronautica, BAE Systems, EADS CASA and EADS Deutschland, as well as close ties with Aerea and Secondo Mona S.p.A amongst others.

Future Developments

Cobham's Air Refuelling & Auxiliary Mission Equipment Division is a technology business unit with the investment to match. Cobham will continue to invest in leading edge technology to support current and future Eurofighter Typhoon requirements.

Future Campaigns

Cobham is well placed to support the Eurofighter consortium in upcoming and future campaigns. The company has an established presence in key markets, such as India, where Cobham products are proven and in service. For example, Cobham ejector release units have more than 30 years' service on Indian Air Force platforms. Air Forces across the world benefit from high quality, reliable products whose design has been drawn from a rich Cobham heritage and expertise. Cobham is a proud member of the Eurofighter Typhoon team and looks forward to being a part of this exciting venture for many years to come.

Cobham's MEL takes the AMRAAM load

Supporting Eurofighter Typhoon Multi-Role Capability

Multi Store Pneumatic Carriage Systems

Investment in weapon system technologies is part of Cobham's core business. Within the private venture activities targeting the US Navy Multi-Purpose Bomb Rack (MPBR) competition, Cobham is developing a state-of-the-art multi store pneumatic carriage system, the BRU-XX. Their expertise in armaments carriage spans 50 years and includes the development of the BRU-61/A Small Diameter Bomb carriage system, the forerunner to the BRU-XX. It is recognised that a key requirement of modern Air Forces is the ability to maximise weapon load out, and Cobham's BRU-XX provides the solution.

Pneumatic Ejector Release Units

A world leader in the supply of integrated weapon systems, Cobham is developing new cold gas ejector systems for current and future combat aircraft requirements. Vastly reduced costs of ownership, increased accuracy in control of gas pressure and potential weight reductions are just a few of the key benefits of this technology.

Air to Ground Missile Launchers

Cobham's Triple Rail Air to Ground Missile Launcher is designed for carriage and release of air to ground stores such as Brimstone, Hellfire and next generation munitions such as JAGM. The system is currently in service with the Royal Air Force on the Tornado and AV-8 Harrier and has operational and proven combat performance. Unique features in this launcher include the fairing design which allows for supersonic carriage with a reduced drag and radar cross section. A twin store variant is also available.

Dual Mode Missile Eject Launcher (DMMEL)

An upgrade to Cobham's Missile Eject Launcher is currently under development. The dual mode will allow the launcher to adopt a true multi-role capability with the ability to carry not only the AMRAAM but the also the Meteor Beyond Visual Range missile dependent on operational requirements.



ITP: A European Success Story

Powering an Industry

A key political consequence of the pan-European Eurofighter Typhoon programme has been the generation of a massive supplier network maintaining some 100,000 jobs. In Spain, thanks to the Eurojet programme for the development of the EJ200 engine, an entire industry has been created and one which now plays a leading role in many major engine programmes, both in Europe and worldwide. Industria de Turbo Propulsores (ITP) is the successful result of Europe's premier defence collaboration.

Through the launch of the EJ200 engine programme, the Spanish aero-engine industry, ITP, was born. From the start, the participation of ITP in the project was of critical importance in view of the Spanish programme responsibility. The EJ200 programme enabled the creation of an industry and founding of factories, which did not exist in Spain before. It also provided an opportunity to develop the technical management expertise of a company as well as increasing its industrial capabilities in the areas of production, instrumentation, assembly of prototypes, logistics and testing. What was once a 12-man operation working out of small offices in Madrid and Bilbao is now able to boast a more than 2,500-strong workforce and is today the leading Spanish aero-engine manufacturer.

Historical Background

Prior to the creation of ITP, the Spanish Government had decided to participate in the feasibility phase of the aircraft that was to become the Eurofighter Typhoon. Representation in the aeronautic industry from Spain at that time was through Construcciones Aeronáuticas S.A. (today known as EADS CASA) focusing mainly on airframe manufacturing and, to a certain extent, electronics, but there was no easily recognisable Spanish presence in engine manufacture. Sener, an engineering group from the Spanish Private Sector, had signalled

their intentions to fill this void since the 1960s, a goal finally achieved by signing an agreement with the Ministry of Defence in May 1985. Since then, Sener has been invited as Spain's representative to the European meetings where the Eurofighter Typhoon engine studies were discussed.

By 1986, the Air Forces of the four Partner Nations had reached agreement on the operational requirements of the aircraft and nominated the National Representatives on the Management Committee. The four engine manufacturers, Avio (former Fiat Avio), ITP (represented by Sener until its creation in 1989), MTU Aero Engines (former Motoren und Turbinen-Union München GmbH) and Rolls-Royce, came together and founded the company Eurojet Turbo GmbH, the European military aero-engine consortium tasked with the responsibility of managing the entire international business of the new generation EJ200 engine for Eurofighter Typhoon.

ITP is involved in the following important engine programmes:

- EJ200 for Eurofighter Typhoon
- TP400 for the A400M
- MTR390 for the Tiger helicopter
- Trent900 for the Airbus 380
- Trent 1000 for the Boeing B787
- Trent500 for the Airbus A340
- Industrial turbines: TF50, LMS100 and LM2500.

ITP Today

An important factor of ITP's company development has been the success of Sener's decision in 1986 to include Rolls-Royce as a shareholder, allowing the Spaniards access to over 100 years of engineering experience. In the short period since they were founded, ITP has established twelve production facilities in Europe and America. They also own the subsidiary company Industria de Tuberías Aeronáuticas (ITA) and are able to call upon their expertise in pipe manufacturing. In addition, ITP is the major shareholder in Precicast Bilbao (PCB), an investment casting company, and Industria de Turboreactores (ITR) in Mexico who specialise in engine maintenance. ITP provides maintenance service for the world's leading engine manufacturers such as General Electric, Pratt & Whitney, Honeywell, Snecma,

ITP Technical workshare

ITP is responsible for five modules in the EJ200 project:

- Variable Exhaust Nozzle (VEN): Design and manufacturing
- Turbine Exhaust Cone (TEC): Design and manufacturing
- By-Pass Duct (BPD): Design only, manufactured by Rolls-Royce
- Front Jet Pipe casing (FJP): Design and manufacturing
- External dressings: Design and manufacturing Harnesses: Design only, supplied by Rolls-Royce
- Accessories: Main Fuel Measuring Unit (MFMU) and vibration transducers, Design and supplying



The main headquarters of ITP in Spain

Turbomeca and Rolls-Royce. The presence of ITP in these important European and international programmes demonstrates the high level of confidence that the global aero-engine industry invests in ITP and, because of this, how they can count themselves among the international elite in engine manufacture.

The main technical module supplied by ITP in the EJ200 project is the convergent-divergent nozzle. This component is optimised for multi-mission, subsonic and supersonic performance. The position of the nozzle is controlled by the Digital Engine Control and Monitoring Unit (DECMU) and adjusted constantly throughout the dry and wet range of engine operation. ITP has developed a thrust vectoring variant for the EJ200, successfully bench-tested in 1998. This thrust vectoring technology would offer advantages in terms of increased aircraft agility, range and reduced fuel burn. The significance of the industrial challenge for ITP, particularly with regard to the nozzle, was enormous. Never before had a nozzle of this nature been produced in Western Europe. This gave ITP the opportunity to develop the only European vectoring nozzle based on Spanish patents.



EJ200 engine on the testbed at ITP's facilities

The ITP success story is a demonstration of the European collaborative culture and sharing principles. It shows the ability of multi-national projects to integrate the best know-how and technology of each partner in one state-of-the-art high-tech product, the EJ200 engine.

For more information about the Spanish Eurojet Partner Company, please visit the official ITP homepage: www.itp.es

Katarina Elbogen



Eurofighter Typhoon takes Paris by storm

Exhibitions Review

Although the Le Bourget exposition is neither a home Nation nor a campaign market, the airshow in Paris is still a major event in the exhibition calendar for the Eurofighter programme. France's showcase aerospace jamboree attracts a wealth of key decision-makers, at a political, industrial and Air Force level, and it is therefore essential that the Eurofighter Typhoon presence carries the weight to elevate the programme above the competition.



The 47th Paris airshow was no different. The Eurofighter team was comprised of experts from across the four Partner Nations, both from the industrial consortium and the customer, fully reflecting the multinational driving force behind Eurofighter Typhoon. The exhibition presence featured all the key ingredients including: the Eurofighter Cockpit Demonstrator (at future capability standard); the CAESAR antenna replica model (carrying even more significance following the e-scan radar's first flight with Development Aircraft Five (DA5) in May); the Full Scale Replica Eurofighter Typhoon complete with weapons display; and a full scale EJ200 model engine.



Colonel Ali Al Gazlam, Saudi Arabian Air Attaché in London

The airshow itself presented a real mix of visitors to the Eurofighter exhibition. Representing the customer, in his final trip to Le Bourget before retirement, was the NETMA Deputy General Manager, Ernst

Dinter. His visit on the Monday was followed by the unexpected, but very welcome, arrival of the Commandant of the United States Marine Corps, General James Conway, who was able to gain an insight into the capabilities that have put European aerospace in the same technological bracket as the American products.

The importance of airshow attendance in terms of the opportunities to meet and brief influential figures from the global export arena was continuously highlighted through the tremendous list of visiting delegations with links to campaign markets. The Eurofighter hosts received: Colonel Ali Al Gazlam, the Saudi Arabian Air Attaché in London; from the Indian Ministry of Defence, Mr K. P. Singh, the Secretary of Defence Production and the Chief of the Indian Air Force, F. H. Major; Colonel E. Pannak of the



General James Conway checks out Eurofighter Typhoon in Paris

Turkish Air Force; General Chang of the Korean Air Force; and, visiting from Denmark, were Admiral Finn Hansen, Chief of Defence Acquisition and Logistics Organisation, and the Deputy Permanent Secretary of State for Defence, Bjorn Ingemann Bisserup.

Airshows are also critical for the programme in terms of demonstrating the continued political support for the weapon system from within the four Partner Nations. During the Le Bourget week, making their way through the Eurofighter Typhoon

exhibits were: the Italian Minister of Defence, Arturo Parisi; Peter Hintze, German State Secretary of Economics and Technology; Hermann Muntz, General of Air Force armaments and Deputy Commander of weapon system command of the German Air Force; and Dr. Peter Eickenboom, German Secretary of State from the Ministry of Defence.

Other significant occasions during Le Bourget included a joint BAE Systems-Alenia Aeronautica media briefing, held in the



Denmark's Deputy Permanent Secretary for State and Defence

Eurofighter pavilion, with regards to the status of the campaign efforts in Japan. There was a second media-related briefing in the middle of the week as Aloysius Rauen, Eurofighter GmbH CEO, and his management colleagues, hosted a group of around 30 members of the press allowing the assembled guests the chance to pose direct questions on current hot topics. Additionally, involvement on a supplier level was maintained as Rocco Ortuso, Programme Integration Director, hosted the Managing Directors from a broad cross-section of the supplier community. During the briefing, Mr Ortuso took the opportunity to highlight the need to maintain improvements in equipment delivery in order to meet the increasingly demanding production schedules of Tranche 2 and future export.

For the plane-spotters around the site, Eurofighter Typhoon delivered a powerful eye-catching aerobatics routine during the daily flying timetable. The participation in the flying schedule was orchestrated by the Italian Air Force, with Captains Matteo Maurizio and Alessandro Scaburri alternating cockpit duties over the course of the week. A second Italian Air Force aircraft was stationed on the static area of Finmeccanica.

Eurofighter Typhoon on the Turkish campaign trail

IDEF 2007 Ankara



VIP delegations at IDEF, Turkey

The IDEF defence exhibition in Ankara allowed the industrial consortium the opportunity to keep Eurofighter Typhoon firmly in the frame with regards to Turkey's future defence procurement strategy. As the lead Partner Company in Turkey, Alenia Aeronautica are, on behalf of the Eurofighter consortium, working to promote the mixed-fleet combination to Turkey mirroring that which will form the future of both the Italian Air Force and the Royal Air Force, namely a Eurofighter Typhoon and F-35 fleet structure.

During the show week, external high level discussions took place between Alenia Aeronautica management and Turkish Air Force Logistics figures in order to outline the proposals to integrate Eurofighter Typhoon into a two-type fleet. Throughout the exhibition itself, the Eurofighter team were able to receive and brief a wealth of VIP delegations. The explosion that ripped through downtown Ankara on the evening of Tuesday 22 May meant that tensions were raised, resulting in the non-appearance of the majority of high-ranking officers who were scheduled to visit IDEF the following day. Of those who did make the journey, a large delegation featuring the four Ambassadors representing the Partner Nations accompanied by the Italian and German

Undersecretaries toured the Eurofighter exhibition with the Italian and Spanish National Armament Directors, the United Kingdom Air Attaché and a representative from the German Ministry of Defence.

Representing the Turkish Air Force, six F-16 pilots were given a detailed 90-minute briefing at the Eurofighter Cockpit Demonstrator, each taking the opportunity to fly a simulated mission under the supervision of Partner Air Force pilots. The Turkish fliers were shown the aircraft's capabilities in manoeuvring and target tracking, and were all fully appreciative of the cockpit's excellent man-machine interface.

Although a member of the F-35 club, strong indications are coming out of Turkey suggesting a requirement for an adequate number of air superiority aircraft to counter the threat of the Sukhoi fighters operated by neighbouring countries. The F-35 stands little chance against fleets of this nature and, with four Nation political support firmly behind the export of Eurofighter Typhoon to Turkey, the industrial consortium remains convinced that the two-type fleet is the best solution for the Turkish Air Force.

Campaign activities heat up in India and Japan

Exporting East

Speculation on the timing of the Indian Request for Proposal (RFP) had been mounting even before the Aero India aerospace exhibition in February of this year. At the end of August, however, the Indian Ministry of Defence released the RFP for 126 Medium Multi-Role Combat Aircraft (MMRCA).

Receiving the RFP on behalf of the Eurofighter consortium, EADS Military Air Systems are in the process of analysing the requirements detailed within the document. The India campaign has attracted the world's leading combat aircraft manufacturers to bid for the contract, with Eurofighter Typhoon competing against Lockheed Martin's F-16, Boeing's F/A-18, the Saab Gripen, Dassault's Rafale and the Russian MiG-35.

While exact details on the content cannot be disclosed, EADS Military Air Systems are working in close co-operation with all Eurofighter shareholders in order to formulate the best response. Additionally, with political issues likely to be a major influence during the course of the negotiations with the Indian customer, the Governments of Germany, Italy, Spain and the United Kingdom have voiced their full support for Eurofighter Typhoon's participation in the competition.

Moving east from India, BAE Systems representatives are upping their efforts in Japan in a bid to establish the aircraft as a highly-capable solution to the Japanese Air Self-Defence Force's (JASDF) FX Programme. The Group Managing Director of BAE Systems' Military Air Solutions division, Nigel Whitehead, conducted a visit to Tokyo in early Summer pushing the case for

Eurofighter Typhoon and reinforcing the consortium's readiness to co-operate closely with all levels of Japanese Government, military and industry.

This openness was demonstrated earlier in the year as a nine-man team from Japan arrived in the United Kingdom on a "site survey visit" spending time in Warton, London and RAF Coningsby. Flights in Eurofighter Typhoon were also undertaken. Speaking after his trip, Nigel Whitehead commented: "Japan represents a significant opportunity for the company [BAE Systems] and the Typhoon consortium" adding that: "My trip to Japan reinforced my conviction that the Japan Air Self-Defence Force is genuinely interested in Typhoon."

A strong defence trade relationship between Japan and the United States means that the Eurofighter consortium will have its work cut out in trying to persuade Japanese officials on credible alternatives to American products. However, complications in the export of the F-22 "Raptor" aircraft unquestionably leave Eurofighter Typhoon as the most advanced weapon system available.

BAE Systems are leading campaign efforts in Japan, working closely with the Sumitomo Corporation locally, and with crucial support on the bid from Alenia Aeronautica. The FX Programme is expected to be worth in the region of 50 aircraft with a Japanese decision on which aircraft to order due by the turn of the year.

Eurofighter Typhoon blazes the campaign trail

European Summer Tour 2007

At the end of the final day in Plovdiv, Bulgaria, after a trip that had already taken in Air Bases in Denmark and Norway, the Eurofighter Typhoon fan base had swelled by a further 200,000 people. Orchestrated by EADS Military Air Systems, the team from the German Eurofighter Partner Company had, on behalf of the consortium, successfully waved the Eurofighter Typhoon flag across three European Nations in which they are the campaign lead. With a sizeable contribution from Eurojet throughout this tour, and combined with the efforts of the consortium in Ankara and Paris, Summer 2007 has been the year that Eurofighter Typhoon blazed a campaign trail through Europe.

The EADS-led tour opened in Aalborg, Denmark, through participation at a Royal Danish Air Force Open Day in mid-June. 75,000 visitors were given the opportunity to see the Eurofighter Typhoon exhibition, obtain information on the aircraft and its EJ200 engines, and to learn about Europe's largest defence procurement programme. Whilst an almost endless stream of people waited patiently to take a seat in the Full Scale Replica (FSR) aircraft, Danish pilots, high-ranking Air Force Generals, Ministry of Defence representatives, politicians and journalists were all invited for detailed briefings on the weapon system and the chance to "fly" the Eurofighter Cockpit Demonstrator.

A similar result was achieved during a two-day airshow at the Royal Norwegian Air Force Air Station at Rygge. For the duration of the event, the Eurofighter team was reinforced through the presence of two German Air Force Eurofighter Typhoons and their crews from Fighter Wing 73 "Steinhoff" at Laage. One of these aircraft was splendidly presented in the flying display programme on both days by EADS Project Pilot Chris Worning, visibly demonstrating the spirit of co-operation between the consortium and the customer, and impressing on the Scandinavians the breath-taking agility and power of the Eurofighter Typhoon. On the

ground, some 70,000 visitors swarmed around the FSR while the multi-role enabled Cockpit Demonstrator was available for invited guests. The highlight of the event was the visit of the Ambassadors of the four Partner Nations together with their military Attachés, and their presence clearly showed the strong support provided by the respective Governments for the Norwegian campaign efforts.

The last stop of the Summer tour was at Plovdiv in the heart of Bulgaria. At this base of the Bulgarian Air Force, roughly 50,000 people attended the two-day show including the Prime Minister, Sergej Stanev. Bulgaria's Head of State and the Chief of the Bulgarian Air Force were honoured guests in the Eurofighter exhibition area and were comprehensively briefed on the current programme activities. Whilst the flying programme was highlighted by the presence of the "Patrouille de France" and "Red Arrows" aerobatic teams, the static display was, according to the visitors and the media, clearly dominated by the Eurofighter Typhoon FSR. The Cockpit Demonstrator was not the only exhibit on show for the visiting delegations due to the presence of the Captor radar model and the EJ200 engine.

Overall, the Summer tour was deemed a resounding success. All three events showed a high degree of team spirit and professionalism from the parties concerned further improving the image and marketing perspective of the Eurofighter Typhoon in these Nations. The co-operation between EADS Military Air Systems and the German Air Force, as well as with BAE Systems and Eurojet, was excellent. The outcome of the road-show was that almost 200,000 more people in the North and South-East of Europe became acquainted with the Eurofighter Typhoon as an outstanding high-tech product, developed and produced on a European scale, ready to protect their national territories and increase their economic well-being.

Wolfram Wolff



Colonel Toru "Boxer" Ota of the JASDF takes a Typhoon flight at Warton



The Multi-Role Eurofighter Typhoon is generating a great deal of interest in the international export market



Top: First stop for the FSR was Aalborg, Denmark

Below: Visitors get aircraft information from the Eurofighter Typhoon hangar at Rygge, Norway



Above: Queues for the FSR at Plovdiv, Bulgaria



The two images demonstrate the growing presence of Eurofighter Typhoon in the Partner Nations' Air Forces. The image above features a nine-ship formation of Eurofighter Typhoons from the Royal Air Force en route to Buckingham Palace for a fly-over to mark Queen Elizabeth

II's official birthday. The image below was taken during operations at the Italian Air Force's Grosseto base, with six aircraft either prepared for, or taxiing to, take-off.

