

# WORLD



## SHOW MAN

FLT LT NOEL REES

IS THIS YEAR'S EUROFIGHTER TYPHOON DISPLAY PILOT  
FOR THE UK ROYAL AIR FORCE





Title:  
Eurofighter Typhoon taking  
off with full reheat at  
Farnborough Air Show 2014

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October 2014

### 03 Editorial

### 04 Eurofighter News

10



#### The Changing Man

Alberto Gutierrez has just one thing on his mind – change.

14



#### Making connections

We spoke to **Luis Rodriguez Salinder** who manages the IWSSC to find out more.

### 16 Show Man

**Fit Lt Noel Rees** is this year's Eurofighter Typhoon Display pilot for the UK Royal Air Force



22



#### Winning the export battle

**Export Director Joe Parker** has spent the last four years honing the message to make sure the world understands exactly what the Eurofighter brand stands for.

### 26 The perfect platform. The perfect weapon

With work ongoing to bring the likes of Meteor, Storm Shadow and Brimstone to Typhoon there's a great focus in the Eurofighter World on weapon integration. But what exactly does that mean and what's involved?



### 32 My Eurofighter World...

Interviews:

**Major Nils Anders**, Head of Training in Laage  
**Oberst Bernhard Teicke**, Training Base Commodore Laage  
**Erik Lorch**, Manager Weapon System, Pre Development  
**David Case**, Vice President ILS

36



#### The Power behind Typhoon

We speak to **Wolfgang Sterr**, Deputy Technical Director and Export Manager at Eurojet, about the significance of these achievements and what makes the EJ200 so special.

### 39 Social Media: Growing Social Support

IN OUR NEXT ISSUE...

## WELCOME



I know I am perhaps a little biased but one of the wonderful things about leading an organisation like Eurofighter is the chance to work with so many talented individuals.

In Eurofighter World we often celebrate the many technical wonders that Typhoon represents but I guess sometimes we don't always acknowledge the people behind these stories. Well I am delighted to say that in this issue

of the magazine we have gone some way to addressing that situation.

So for example, as well as hearing from the team behind the integration of the Brimstone weapon about what the process entails, you'll get to meet some of the pilots, engineers and back-office people who help make Eurofighter such a powerful force.

Take Nils Anders, Head of Training at the Luftwaffe's Laage Air Base. He paints a very clear picture of what it's like to handle the power of Typhoon. Then there's Noel Rees the UK RAF's Typhoon Display pilot who has spent the summer wowing air show crowds with his incredible displays. The views and insights from our customers are always valuable to us and we're grateful they were able to share them.

We all recognise that the future of Eurofighter Typhoon will depend on how we perform in the export market and there's a very insightful look from Export Director Joe Parker at what it takes to be successful.

As planning for this issue coincided with the first anniversary of me being in my post I was interviewed about my vision. I hope you find it an interesting read.

With this issue of Eurofighter World we have attempted to bring our community to life, to reflect on the progress we are making and the journey we are on. We've tried to shine a light on a wider Eurofighter family and look at what it means to be part of it.

I hope you enjoy it and, as always, I'd welcome any feedback you may have.

**Alberto Gutierrez**  
CEO Eurofighter Jagdflugzeug GmbH

## STORM SHADOW ADDS TO STRENGTH



▲ Perfect storm: The Storm Shadow integration signing ceremony at Farnborough Air Show 2014

>> In July at the Farnborough International Air Show NETMA, the NATO Eurofighter and Tornado Management Agency, placed an order with Eurofighter Jagdflugzeug GmbH to integrate the Storm Shadow long range attack missile onto the Eurofighter Typhoon.

A contract signing ceremony took place in the Eurofighter Pavilion at the show witnessed by representatives from NETMA, Eurofighter, and the four core nations of the Eurofighter Programme (the United Kingdom, Italy, Spain and Germany).

This announcement forms part of the P2E enhancement package. Flight trials with Storm Shadow on Typhoon have been progressing since late 2013 and, working with Eurofighter operators, Eurofighter expect to deliver an operational capability in line with their requirements.

Storm Shadow is a long range, all-weather, high precision, stand-off weapon already in service on Royal Air Force Tornados. It has been proven in operations to great effect in Iraq and Libya neutralising hardened command bunkers and other high value targets. The stealthy weapon design allows it to penetrate layered air defences whilst the long range of Storm Shadow allows it to be launched outside those defences increasing the launch aircraft survivability.

Under the terms of what is known as a 'Contract 4' order from NETMA, Eurofighter will work with the three Eurofighter Partner Companies (BAE Systems, Airbus Space and Defence, and Alenia Aermacchi) and their supply base - including MBDA, the makers of the Storm Shadow missile - to integrate the weapon on the aircraft.

In the deep attack role Eurofighter Typhoon will carry two Storm Shadow missiles whilst maintaining the ability to carry 8 air to air missiles. This will enable Eurofighter Typhoon to fight its way in and out of the combat area.

Graham Farnell, General Manager of NETMA said: "We are delighted to be able to place this contract with Eurofighter and we look forward to still further enhancements as the Programme progresses."

Alberto Gutierrez, Chief Executive Officer of Eurofighter, said the news provided further evidence of a solid roll-out of capability from Eurofighter.

"It also demonstrates the value of forward investment by industry to ensure a progressive and pro-active approach to weapons systems enhancement." <<

### MISSILE INTEGRATION ON TARGET

Italy's Alenia Aermacchi has completed the first phase of tests for the integration of the Storm Shadow long-range missile onto the Eurofighter Typhoon.

Alenia Aermacchi, one of the three Eurofighter Partner Companies behind the Eurofighter Programme, confirmed details behind the tests which first began in December 2013 with development aircraft IPA2.

The tests have already covered a number of aspects of aeromechanical missile integration onto the aircraft and further flight trials are planned as the programme moves through to full integration.



The next step in the Programme is due to be 'inert drop-tests' followed by environmental data gathering tests. Avionic flights will then be performed to test functional integration including dedicated missile release tests.

"After these flight tests and the completion of the qualification process Storm Shadow will enter into the list of available payloads. This will see the realisation of a further consolidation of the Eurofighter Typhoon's air-to-ground capabilities. It is another significant step on the capability enhancement routemap," said Alberto Gutierrez, Chief Executive Officer of Eurofighter.

## FIRST LOOK AT MSPO

>> Eurofighter Typhoon's full range of new capabilities were showcased at MSPO in Poland - the first time they had been seen in the Baltic Countries.

Delegates from Eurofighter Jagdflugzeug GmbH, including a test pilot, were on hand to explain the latest range of capability enhancements that are already singling out the Eurofighter Typhoon as the most advanced new generation swing-role combat aircraft currently available.

"Our aim at MSPO was to raise awareness of the value of this European asset and increase understanding around the incredible capabilities it has now - and those that are planned for it in the future," said Alberto Gutierrez, the CEO of Eurofighter GmbH.

"We know how important flexible and robust airpower is for Poland and we are convinced that Eurofighter, as an option for Poland, can offer real benefits to the Polish nation on a number of levels."

The show took place at a time when the Eurofighter Typhoon was already playing a major part in operational deployments in Lithuania, with the Italian Air Force and the UK Royal Air Force with the German Air Force to follow.

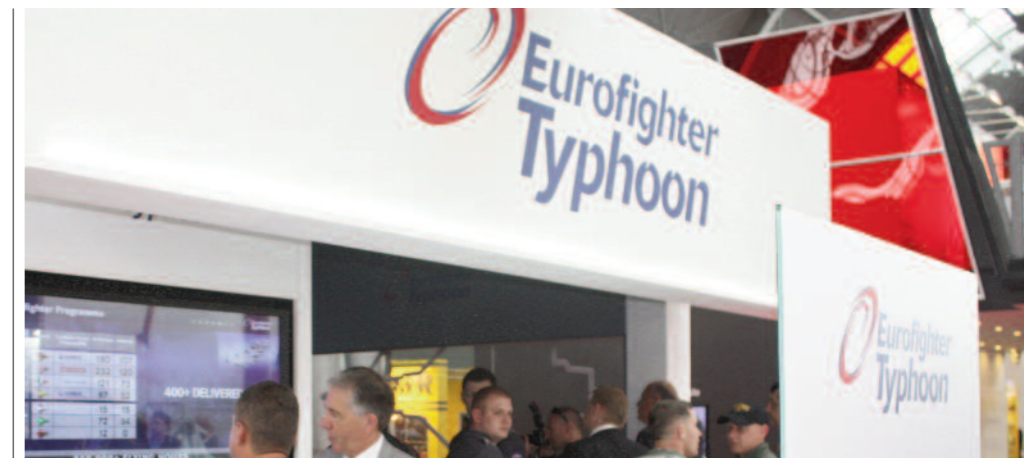
There were in-depth briefings on the new E-scan radar system and software upgrades which give the Eurofighter Typhoon genuine and rapid swing-role capability mid-mission.

Gutierrez added: "Eurofighter Typhoon provides Europe with genuine indigenous capability and helps maintain and foster a high level of skills and technology transfer across the community. Through our supply base we collectively employ over 100,000 people and any nation that opts to join the Eurofighter Programme gets the benefit of access to that skillbase, those people - and the chance to join the community."

Eurofighter Typhoon already provides 'backbone air power' for a number of European countries, including Germany, Italy, Spain, the United Kingdom and Austria. Customer aircraft from the four-nation consortium (Italy, Spain, Germany and the United Kingdom) provide protection for Europe with Quick Reaction Alert capability and are regularly deployed on operational duties - including Icelandic patrols.

More than 414 Eurofighter aircraft have been delivered to a spread of six customers, and earlier this year the fleet accumulated more than 250,000 flying hours with no uncontained failures. <<

Eurofighter Typhoon's full range of new capabilities were showcased at MSPO in Poland - the first time they had been seen in the Baltic Countries.



Raising awareness: Pilots Raffale O. and Paul Smith at MSPO

## HOW TO DO AN AIR DISPLAY

>> Eurofighter had a presence at the Belgian Air Force Days at the Kleine Brogel airbase which, this year, celebrated 100 years of Military Air Power and 40 years of the aircraft many see the Eurofighter Typhoon as the natural successor to – the F-16 Fighting Falcon.

Passionate and well-informed 'spotters' enjoyed a unique air display in which the Belgian Armed Forces put on a spectacular display replicating Peace Support Operations in theatres such as Afghanistan.

Two Luftwaffe Eurofighter Typhoons flew into the event lining up on the static display line along side the full range of competitors for the Belgian Government's F-16 replacement programme.

At the time of going to press Eurofighter WORLD is able to confirm that in response to the Belgium F-16 replacement team's request for information, the UK Government has provided information on Eurofighter Typhoon and the programme. This was based on established operational data, production and commercial information from Eurofighter GmbH. The information will assist the Belgian Government in shaping the potential scope and scale of their future combat air requirements. <<



## GOING LARGE IN LAAGE

>> On the Baltic Coast near Rostock in Northern Germany, the Luftwaffe's Laage Air Base is a real meeting point where east meets west. You can still see the legacy of re-unification as parts of the air force of the former German Democratic Republic – a part of the National People's Army – remain on base, including a collection of imposing but elderly SU-22 and MIG-23.



Younger, but more than equally imposing, are the current fleet of Eurofighter Typhoon aircraft based at Laage which, this year, are celebrating their 10th anniversary of operations with the Luftwaffe. Laage is the national train-

ing base for Eurofighter Typhoon pilots and has a proud history of turning out A-grade 'top gun' students.

On 23rd August this year the Tactical Air Force Wing 73 "Steinhoff" hosted one of the best flying displays of the year amid perfect weather conditions and in front of a massive crowd. The Eurofighter Typhoon provided the backbone of the display work – a carefully crafted event designed to show German taxpayers exactly why they can sleep safe in their beds.

You can read more about some of the key players at Laage elsewhere in this issue. <<



## MOST ADVANCED JETS TAKE OFF

>> The UK Royal Air Force's (RAF) most advanced fighters ever are now in operational service following the largest fighter upgrade programme.

Known as Phase 1 Enhancements (P1E), the upgrade package delivers a range of enhancements to the Typhoon aircraft. Developed and delivered by BAE Systems working together with its Eurofighter Partner companies, the RAF and UK Ministry of Defence, (MOD), the capabilities introduced have been developed on the back of operations in Libya, and cement Typhoon's place as a world class multi-role fighter.

The aircraft upgrades include enhanced computing power, weapons systems integration advancements and improved sensor suites, making Typhoon even more potent whether tasked with air-to-air work, air-to-sur-

face or a combination of both during a single mission. The P1E enhancements package delivers much more flexibility in mission planning. It allows a single pilot, in a single aircraft to simultaneously attack six different targets in one pass.

Divided into two elements, Phase 1 Enhancements (a) and Phase 1 Enhancements (b), the latter takes the multi-role concept to a new level. Typhoon Requirements Manager, Wing Commander Stephen Williams said: "P1Eb allows Typhoon to begin realising its air-to-surface capability while also delivering in the air-to-air arena. Our ability to switch between air-to-air and air-to-surface modes is a big step, providing great flexibility for our pilots on Operations. This is a key step to delivering capability for the UK's Interim Force 15."

The PE1b package also brings upgrades for

the aircraft's Defensive Aids Sub System (DASS) and the latest interoperability updates for the Multifunction Information and Distribution Systems (MIDS), which together ensure the Typhoon remains one of the most effective aircraft in the skies.

Testing of the P1E package was conducted through a combined industry and MOD team. Martin Taylor, Director for Combat Air at BAE Systems added: "P1E is a massive leap forward in capability and by working jointly as one team, we've ensured that there are no surprises when it enters service. We have delivered a capability with all the necessary training and support to make sure it is ready and usable from day one."

The first 15 P1E standard aircraft are now in service with the RAF with a further 18 to be delivered by 1st April 2015. <<

## TYPHOON PHASE 1 ENHANCEMENTS

### TAKING MULTI-ROLE CAPABILITY TO A WHOLE NEW LEVEL

#### PHASE 1 ENHANCEMENTS (P1E): DELIVERING FULL EFFECT

Typhoon is now even more potent, standing ready for air-to-air or air-to-surface tasks, or both within a single mission

#### IMPROVED PERFORMANCE

- A range of "Under the skin" upgrades
- Radar and sensor system enhancements
- Improved ability to identify threats and/or friendly forces
- Avionics upgrades including improved reliability through systems which can take over the functionality of others in the event of failure
- Better protection: Upgrades to the Defensive Aids Sub System (DASS)
- Improved communications: Upgrades to the Multifunction Information and Distribution System (MIDS) allowing realtime networking with allied forces
- Improved Maintainability: An enhanced maintenance data system to improve availability

#### SEAMLESS INTEGRATION OF MAN AND MACHINE

- Improved cockpit displays making the right information available at the right time for the pilot
- A range of Navigation, Autopilot and Voice Input system improvements reducing pilot workload
- Using the HMSS helmet, the pilot can look at multiple air and surface targets, lock onto them, and then, by voice command, prioritise them



#### PRECISION ATTACK

The Litening III Laser Designator Pod (LDP) provides high resolution targeting imagery and precision targeting information to the aircraft, pilot and weapon

#### ENHANCED AIR-TO-SURFACE CAPABILITY

Integration of the Paveway IV weapon provides enhanced Air-to-Surface capability with the ability to attack up to six separate targets in one pass using GPS guidance

#### FUTUREPROOFED...

The improvements delivered through P1E also help facilitate further capabilities over the next decade

## GUARDING ISLAND IN THE SUN

>> Consisting of over 17,500 islands, the Indonesian Archipelago is home to over 252 million people and looking after these islands requires a special defence capability.

Not surprisingly, every year the tri-service Indo-Defense Exposition attracts huge attention as Indonesians take stock of what's on offer to give them the protection they need.

With Airbus Group already supplying military hardware to Indonesia in the form of helicopters and transport aircraft, this year, as the nation assesses its future air power requirements, Eurofighter will have a presence at the Exposition showcasing the Eurofighter Typhoon's capabilities as never before.

Joe Parker, Export Director for Eurofighter Jagdflugzeug GmbH said: "We understand that the Indonesians have a strong requirement for air power able to patrol and safeguard a massive spread of islands across a wide expanse of ocean.

"We know they are in the midst of a significant acquisition programme and that they also want to develop their own indigenous capability further. We believe we can help. We can provide a multi-role fighter that can fly high and fast, and remaining on station to provide the nation's security insurance. We can also



provide access to the knowledge transfer and skills needed to help meet both their immediate and long-term requirements.

"We are already in dialogue with Indonesian industry and we have met with a number of delegations. Our presence at Indo-Defence will help showcase more directly what we can offer to the world's fourth most populous country. It's an important event for us." <<

## 5 STAR AT KARUP AIR SHOW



>> Eurofighter Typhoon enjoyed a major presence at the Karup Airshow with no less than five aircraft starting. The quintet comprised two Luftwaffe, one Italian Air Force and two RAF aircraft. The latter three were used as part of a striking static display. In addition the full-scale replica attracted crowds throughout the show.

The Air Show attracted around 150,000 visitors and many of them had the chance to witness a very impressive air display by Airbus DS test pilot Geri Krähenbühl.

As well as showcasing the Eurofighter to the Danish public, the visitors to our exhibition space included the Danish Defence Chief and Air Force Chief, the New Fighter Programme director and her staff, and Defence Committee members.

The Danish media reacted positively to Eurofighter presence with the influential Danish fighter blog nytkampfly.dk even declaring Eurofighter the winner of this year's Danish Air Show! <<



## EUROFIGHTER LANDS IN COPENHAGEN

>> Eurofighter Typhoon was the talk of Denmark this summer when a flight simulator was set up at Højbro Plads, one of the busiest streets in the centre of Copenhagen, not far from the parliament building.

The two-day event, organised just ahead of the Danish Air Show in Karup, allowed members

of the public to try out the simulator. Outside the marquee a big screen relayed messages and the simulator video.

The purpose of the display was to showcase Eurofighter as a credible candidate in the Danish fighter competition to members of the public. That said, several stakeholders including

a party leader, Defence Committee members and civil servants from the Fighter Programme and other Ministries visited.

In fact, the marquee attracted more than 400 visitors and the general mood was positive. Official figures estimated that around 40,000 people passed the site during the two days.

The simulator also attracted plenty of news coverage, including a feature in a free newspaper read by nearly 2 million Danes every week. It was also featured by Danish National Radio in an early morning broadcast. <<



# THE CHANGING MAN



He's just completed his first year as CEO of Eurofighter and **Alberto Gutierrez** has just one thing on his mind – change. Alberto is guiding the organisation through a period of re-evaluation, giving it renewed focus and energy.

Gutierrez is a huge champion of Eurofighter, both its Typhoon aircraft and the combined achievements of the core partners, but he is also on a mission to set it on a new course. And he's doing so with strong determination.

"I am not looking for popularity, all I am focused on is results and securing a good future for the company," he says without fuss.

Quietly spoken, but with a steely glint in his eye, Gutierrez makes it clear he won't be diverted in his aims.

"I am passionate and extremely persistent about getting results."

Couple these ingredients with a natural drive and determination and Alberto has a very clear vision of where the Eurofighter project needs to get to. His priorities are two-fold. The first is concerned with helping to shape the internal structure with a focus on delivery and efficiency.

The second is banging the drum in the export world and doing everything possible to put Eurofighter Typhoon in the frame for new orders.

"Over time we have transitioned from a pure production organisation into one with far more focus on in-service activities. At the same time we are working hard for exports. It is not better or worse than what we have but it is different. But we have demonstrated that we can work well in a core nation environment and we have also demonstrated in Austria and the Kingdom of Saudi Arabia and Oman that we can produce exports too.

"But our market is much bigger. We have huge expectations in other markets but we know it is a competitive environment. "We are also delivering more and more capabilities – like AESA radar and weapons like Storm Shadow."

In terms of the goals Alberto, who spent several years away from Eurofighter before returning as CEO in 2013, couldn't be clearer.

A sailor in his spare time, Alberto is used to navigating choppy waters and it's a skill that may come in handy given the challenges he has set himself.

Says Gutierrez: "At the start of the programme life cycle there was a focus on work share and a healthy competition between the different companies to try to deliver the best, the first. But it's not like that anymore. Today there is a perfectly synchronised production system.

"So things have changed. And if you look at the purpose of Eurofighter when it was established we have achieved many of our goals many goals. The aim was to produce an aircraft but it was also to get the four industries in different nations up to a certain level of technology and to build up capabilities. Now the debate has shifted and it is centred on how to shape ourselves for the future. One key is to reduce costs.

"My view is that if there is an opportunity to reduce costs let's try to do it. That's the



▲ Alberto Gutierrez at the Farnborough Air Show this summer

kind of debate we are in. We have already carried out some analysis and produced certain scenarios and we have to keep working."

He makes it clear that production is only one aspect of what is being looked at as the future of Eurofighter evolves.

"The way we organised ourselves, the decision-making process, the certification process and so on, was all based on some key founding principles. But in an export market do these have to be the same? For me the answer is no. In my career I have seen up close where things can be done differently."

Optimistic and pragmatic by equal measure, Gutierrez believes Eurofighter has demonstrated through its unique four-nation way of working that it can deliver exactly what the export market is looking for.

"Of course there are ups and downs like there are in any business but we work well together and as we have shown the potential you can derive out of this arrangement is tremendous," he says.

"From a practical point of view this is a fantastic system. No other single company fighter producer in the world has been able to produce such a complex supply chain with all the constraints that exist.

"So yes, it is complex but the kind of learning that we get out of working like this is of tremendous value.

"Today any business selling a fighter into an export market is likely to be requested to also

deliver some form of customer participation. Nobody has the same level of experience as we have in transferring technology and managing complex supply chains, moving parts all around the world in an efficient manner.

"We can deliver. We have proved it. One of the fundamental aims of the Eurofighter programme was to transfer technology and get everyone up to the same level – in some cases from scratch. Now there is the same level of sovereign capability in the four nations. It needs to be that way in order for them to keep growing and maintaining their own fleets. What we have achieved is of tremendous value and if I look across the fighter aircraft world I don't see better examples of technology transfer and supply chain management."

As he reflects on his first year at the Eurofighter helm he is honest about what he has achieved and the amount of work still ahead of him and his team.

"One of my key tasks over the last 12 months has been trying to bring clarity to what Eurofighter is all about. Looking at what the main challenges are and what things need to be done. I have spent a lot of time with various stakeholders and we have already changed a great many things. Now across the different stakeholders there is no uncertainty or doubt. We know we need to adapt and we need to do something. So in that sense we have achieved what we have wanted to achieve. >>

## &gt;&gt; THE CHANGING MAN

“But I am from an operations background and that means I am very result-orientated, so I want to see outcomes quickly.”

Clearly it's a challenging role, there are daily demands on Alberto's time and trying to bring change to a pan-European organisation is almost bound to bring its share of frustrations but whenever he feels his energy being sapped he has an instant remedy.

“When I leave the office and go to air bases and see what a fantastic product we have in Typhoon and compare that to what else there is in the market it gives me a lot of energy,” he says.

“I truly believe that we have enormous opportunities. We are about to get an extremely capable aircraft in terms of a platform. It's a platform no-one else can compete with in

terms of capabilities. We will deliver something that is unbeatable. I am talking about E-scan, about integration of new weapons, as well as all the capability that exists already and that gives you a kind of energy. It allows you to forget about all the minor irritations.

“My job is about making people aware that there is a fantastic future in front of us if we do things properly.”

**POWER TO THE PEOPLE**

The CEO's drive for change and efficiencies is reflected in a new culture Alberto Gutierrez is trying to bring to Eurofighter and to all the people who work there. He wants to devolve power to people and create an atmosphere that allows decisions to be taken at grass-roots level.

“The bulk of my experience in this industry has been in streamlining and optimising processes and I have been identifying ways we can do that,” says the man who rejoined Eurofighter after spending six years as Head of Operations at Airbus Military in Madrid.

“As leaders it's part of our duty to turn a critical eye on what we are doing and see if

there are better ways of what we are doing that has to be part of our daily activities.”

Gutierrez isn't talking about a top down reform, rather he wants to give the teams who work at Eurofighter the power to make the changes they believe are needed.

“As important as the things you do, is the way you do it. Nobody wants to do things badly. Nobody wants to produce poor quality. Nobody wants to do something in a way that doesn't bring results.

“It is not up to me to tell everyone what they have to do. We have to give people the time and the framework for them to reflect. People are being asked to think if there are ways we can do things better. No-one knows

the answer better than the people who are actually doing the work.

“If we do it differently, empower people to make decisions themselves, without having to go back through the hierarchy we will improve. Of course there has to be a framework for these initiatives to thrive. What we can't have is anarchy.” <<





**LUIS RODRIGUEZ  
SALINDER**  
MANAGER IWSSC

## MAKING CONNECTIONS

The International Weapon System Support Centre (IWSSC) based at Munich opened for business in March 2003 shortly before Eurofighter Typhoon entered into service. It provides and undertakes technical In-Service Support for all Eurofighter Typhoon Weapon System products. We spoke to Luis Rodriguez Salinder who manages the IWSSC to find out more.



### **Can you explain the role of the team there?**

It's a very broad spectrum but our focus is on providing a service for our customers. We reply to a wide variety of questions via our helpdesk. These can be related to maintenance or the actual operation of the aircraft. Or it could be they are investigating problems, maybe they experienced something while flying or an unexpected behaviour. So they may ask us to take a look and analyse if it could be an issue that needs to be addressed.

### **Why is the IWSSC important?**

To understand that, you have to put yourself in the shoes of the customers. If you can do that for a minute then you can understand why this role matters. Typhoon's new capabilities grab a lot of headlines – it's the cool stuff – but the in-service performance of the aircraft is equally important to our customers and our organisation recognises this. That's the reason we exist and why we are important. We provide that constant support.

### **How does the process work on a day to day basis?**

One of our key tools is the Request and Response tool. It's an IT channel that connects us with the nations in their national support centres and with the partner companies. It allows us to exchange information, solutions, produce short-term mitigations. It also helps us record problems, present results from investigations, and outline the solutions.

### **So how close are you to the customers?**

Very. We deal directly with air forces – our core customers – and we have representation from them here in our offices in Munich. They each have their own small teams and they mix in the offices with our guys, who are engineers with Air Force experience, and national representatives.

They sit and work together, deal with each other as colleagues but of course at the same time we are contracted to provide services to them. Of course working this closely makes a difference, you get that direct human contact. As well as the day-to-day contact we also hold an In-Service Panel several times a year. This gives us a chance to come face to face with the customer involving people from outside of the IWSSC. We review, present how we are solving things and agree on a joint course of action.

### **What makes this special?**

We are trying to do something that big organisations often find very difficult to do. In essence we take the problems faced by our customers on the frontline while operating the aircraft and connect them directly to our engineers back at the Partner Companies. So they become closer to the people who have the technical knowledge to solve their problem. If you think of it as a chain we try to make that chain shorter and to ease the communication.

### **Are there other benefits?**

One of the benefits is that we share information. So if, for example, an issue is raised from Germany it could be that another nation has already found a solution. The system is set up to make that happen. Another positive is that when we are investigating a problem we don't get feedback from

just one customer – which gives you limited information in terms of the conditions or timing around a particular issue – but from several. So we have more to go on when looking for solutions.

### **Why is the IWSSC needed?**

Eurofighter Typhoon is a complex product and naturally ongoing support and service is important and, like any other rival platform, issues occur from time to time. That said, over the 11 years it has been in service what we have seen is a rise in the level of sophistication of requests we receive from customers. Initially when we started and when the platform was new the typical requests we received centred on learning how to use the platform. Now you have a different set of questions, aimed at getting the most out of this fantastic aircraft.

### **Is the service well used?**

Yes. We have a large volume of demands through the helpdesk system. We deal with more than 600 each year, from the simple to the complex. Consequently we need a team that can respond on time and satisfy the needs of our customers as expediently as possible. Of course if there's an operational requirement we make that a priority and talk to the nations to understand how quickly they need it and talk to the Partner Companies to get that message across. As I said before, working closely to each other makes the difference.

### **What would have happened if the IWSSC didn't exist?**

The individual companies would have been producing solutions – some with more success than others – but undoubtedly there would have been a degree of duplication. Sharing knowledge saves costs and leads to a quicker resolution of issues. Communication and collaboration are key and that's what the IWSSC provides. If you have a problem you just raise your hand and three or four people will come to help.

### **So what does the future hold for the IWSSC?**

I see the centre growing by bringing in additional export customers. That way we can have a wider exchange of knowledge, experience and solutions. I also see the centre increasing the sophistication in terms of the services we offer to help customers achieve that and make sure our customers get the best out of the aircraft.

And finally, I want to get closer still to our customers on the front line. I think the chain is still long and I want to increase awareness among the guys on the front line, at the bases, so they know we are there to help them. We need to short circuit the process further.



# SHOW MAN



FLT LT **NOEL REES**  
IS THIS YEAR'S  
EUROFIGHTER  
TYPHOON DISPLAY  
PILOT FOR THE  
UK ROYAL AIR  
FORCE



▲ Final checks: RAF Pilot Noel Rees prepares for one of his display flights

Throughout 2014 complete strangers have been coming up to **Noel Rees** telling him that he's got 'The Best Job in the World'. That's because Fit Lt Rees is this year's Eurofighter Typhoon Display pilot for the UK Royal Air Force and it's his job to showcase the aircraft's capabilities at airshows across the world.

So what does the man himself think? "Well, it's a job and, like any job, you can sometimes find yourself consumed by the day-to-day detail but when I do get a chance to sit back and reflect then 'yes', they're probably right – it really is the best job in the world."

There's no question that Noel's job description has the wow factor but the world perhaps doesn't quite appreciate it is a hugely demanding role too. Not only does he have to harness Eurofighter's incredible power by putting on displays that will dazzle the watching crowds, but he's also got to be part PR man, salesman and team leader.

Take the Farnborough Air Show in July, for example, where Rees was an incredibly busy man. During the week he put on six displays – three during the public days and three during the trade days. And when he stepped out of the cockpit there was plenty more work to do. An affable and capable communicator, Noel is blessed with great people skills which is partly why he was selected for the role. These skills are a definite plus in a role which means one

minute he could be asked to meet a leading politician and a moment later a member of the public.

"The three trade day displays were very well received and we also played our part for industry – we appreciate we have a role to play there," he says.

In practice, supporting industry meant Noel was asked to join the dignitaries at Eurofighter's pavilion where he was introduced to a number of delegations as the man in the Typhoon cockpit.

"I guess it just adds a certain bit of something if there is a visiting delegation, just to put a face to the aircraft that has just been flown. There's not too much more asked of me than to be the voice of the RAF for Typhoon, but actually the aircraft speaks for itself. Naturally you're aware of how important that part of the job is and working with industry throughout this year has actually been quite smooth going.

"The display doesn't change much from venue to venue so from that point of view a big trade show like Farnborough is just another venue. On the ground it is a little easier because there is usually a very structured plan from the likes of BAE Systems and Eurofighter of where you may be needed and when."

The displays represent eight minutes of intense physical and mental effort for Noel but he's also in charge of a lot the public don't see. Indeed the biggest surprise for him this >>

Blue sky thinking: Noel Rees puts the Eurofighter Typhoon through its paces

## >> SHOW MAN

year has been the level of responsibility his role entails.

“You don’t fly the display in isolation. I have to make sure everything runs smoothly. There is a lot of planning and logistics, plus I have to look after my team – that’s engineering officers, computer engineers, drivers and the PR team. A lot of the planning is done a few weeks in advance of shows but inevitably there is a lot of thinking on your feet to be done too.”

As pilot, Noel is naturally the centre of media and public attention, which brings us to the whole point of the display.

“Talking to the public is a very important role and the whole of the engineering and PR teams get involved and it means we can get a great deal more out of it. It gives you a chance to explain what the aircraft does in its day-to-day role.

Some people may question the need for or the cost of the displays but Noel says they help play a very valuable role.

“In the UK a lot of people don’t understand what the RAF’s primary role is – defending the UK. The interception of a Qatar Airways jet by a Typhoon at Manchester Airport this summer was a good thing to show what our core business is. When an airline pilot needs help we send an aircraft out to assist. Everyone was able to see that in action and since then we have had a lot of questions.

“What the displays do is capture the imagination of the public about what the Eurofighter Typhoon can do and through that draw people into what we do on a day-to-day basis. This is the aircraft and this is what it is physically capable of. It opens the door to conversations about QRA at a moment’s notice or supporting NATO in the Balkans or similar operations around the world.

“All of these messages are what we try to put across but we use a very noisy, fabulous-looking aircraft to get people’s attention.”

As you can imagine the role of the RAF display pilot is a very select one. Only one pilot gets the nod each season and the decision is only made after a rigorous selection process.

“It is a very sought after post and it has been an absolute highlight of my career,” says Noel, whose full-time role is as an instructor with 29 Squadron based at RAF Coningsby. “It takes you right back to the roots of why you wanted to join the RAF. I can still recall when I went to RIAT in 1996 and saw display pilots and fast jets doing their thing and thinking ‘I’d love to do that’. Then you go through a career and get this job – it’s great.

“Once I found it was going to be me [in September 2013] the work started straight-away. Firstly I shadowed last year’s display pilot, Jamie Norris, through his last couple of airshows in order to look at how the planning aspects of the role work.”

Photo: Geoffrey Lee, Planefocus



The actual display offers the pilot an opportunity to put their own stamp on it.

“It’s up to each pilot. The development of the sequence people saw at airshows came from quite a few hours of research. I watched every Typhoon display sequence that the RAF had done, worked out what they’d done, worked out what I could do and what would look good. I also received some feedback from colleagues about what looked good and tried to cover everything that the aircraft can do and show it off as best you can. That means a bit of high speed, low speed, high g, negative g and so on.

“There is a list of around 15 approved moves so you have to piece it together in a way that is balanced. You want to make sure that everyone on the crowd line has the chance to see the best of the display.”

Timings, safety aspects, weighting and fuel are all analysed and worked through on a simulator, with BAE Systems at Warton helping out at that stage. Once the display sequence is worked out then it’s time to take to the skies.

“I started actually flying the display in the second week of January,” says Noel. “The first few sorties are carried out at 5,000 feet and

at that stage you are simply learning the sequence in the air and making sure there was nothing out of the ordinary. Then you get cleared for low level acrobatics down to 1,500 feet, then all the way down, in stages, to 100 feet.”

It’s a spectacular, dazzling job, probably the best in the world. But there’s clearly more to it than meets the eye. <<



► Photo: Gareth Stringer, Global Aviation





**JOE PARKER**  
EXPORT DIRECTOR  
EUROFIGHTER



▼ Show business: The Eurofighter presence at the Dubai Air Show in 2013.

# WINNING THE EXPORT BATTLE

The market for fast jet sales around the world is a hugely competitive one but the man tasked with marketing the Eurofighter firmly believes it has more than a fighting chance of success in the years ahead. Export Director Joe Parker has spent the last four years honing the message to make sure the world understands exactly what the Eurofighter brand stands for.

So what exactly does it take to be a winner on a global stage? Parker says there are four key elements that make nations and air forces sit up and take notice: an aircraft's ability to do a job; the budget; the jobs element and finally, the politics. In this edition of Eurofighter World he describes how the Eurofighter Typhoon stacks up against each of the key measures.

## 1 THE AIRCRAFT

For me the starting point is that the aircraft does exactly what it is supposed to do. I don't care which country comes to us, there is absolutely no doubt that our product will be able to satisfy their requirements. We can do anything with the aircraft that anyone wants. We can carry out QRA, deployed missions and coalition force missions and our interoperability is excellent.

It is already a hugely robust aircraft and can take on all the capabilities currently that

anyone would need. It also has capacity to take on future capability in the years ahead which is truly exciting.

Of course, a lot of rivals will be able to claim the same but we have a couple of things no-one else in the world has and that's two mighty powerful and reliable engines. They are unbelievably dependable power plants.

So the basic platform has performance and agility that's loved by pilots the world over, and coupled with the reliability of the engines, it's second to none.

Let's talk facts. Who has got the most customers? Who has got more aircraft? Who has got most flying hours? Who has the best operational performance – reliability, availability and a track record in actually doing the job? Typhoon.

Take Libya for example. On the evening of Thursday March 17 2011 the UK decided it was going on operations and by the Sunday evening they had 10 aircraft ready on an air

base in Italy. The speed with which the operation was put together was phenomenal but that's not the most jaw dropping aspect. The most amazing part is that they were away for 6 months, flew more than 3000 hours, over 600 missions and in that time we never changed an engine. That kind of reliability under extreme pressure is unheard of.

In fact, during the operation the fleet was available 97 per cent of the time. That's the highest statistic of all NATO coalition forces and that was the first time Eurofighter Typhoon had gone into service. An air force can be well drilled, prepped and trained but the equipment they use has to be able to do the job they need it to, when they need it. Typhoon stepped up.

It can get up higher and faster than anybody. It has greater persistence than anybody and can deliver effects faster than anybody. So platform kinematic plus weapon kinematics equals dominance. >>

## 2 THE BUDGET

Budget is not as simple as a headline cost. When you are buying an aircraft like Eurofighter Typhoon you are essentially buying an insurance policy for your national security and therefore you want to be able to rely on it being available to do the job. You also need it to be reliable and available over the entire lifespan of the platform.

So to measure us purely on the original purchase price and not the life cycle cost is more than just a little bit short sighted.

If you take engines out of the equation what you're left with is a lot of electronics systems and these are probably as reliable as the rivals. So let's talk about engines. In Libya we never had to change an engine in over 3,000 hours of operational flying.

So if you look at it like that then it is more than probable that the life cycle cost of Typhoon is at least as good as, if not better than, its rivals.

Of course the Eurofighter concept is complex but if you take our initial statement of intent through to in service date and compare us to other programmes it is no better or worse in delivery or costs – indeed some of our rivals are worse. Interestingly all the rest are single nation, one supplier.

## 3 JOB CREATION AND INDUSTRIAL PARTNERSHIPS

When nation X comes along to buy a fast jet fighter they often point to three things they need. The first is to provide the military effect the air force requires. As I said, we can tick that box. The second is to fit in with a budget. Again we are in the fight. The next thing on their list is jobs. It's always in the mix.

On this front we have proven without doubt we can perform. Eurofighter is an international programme that crosses borders. It is



a great example of co-development, co-production, co-design. No one else in the market comes close to demonstrating the impact we almost take for granted.

So what we can say to the export market is that Eurofighter is a big industrial international project and, if you want to be part of it, we can show we have done it. Not only that we can show you how you too can be a part of it.

People can use this programme as a conduit to gain technologies they can spin off for use elsewhere. This message is one of the keys to our sales campaign in several countries where they don't have anything like this

level of technology. We can show them a great product and they can see how this project can help them deliver wider benefits to their economy for decades to come.

With Eurofighter you have four nations and a multitude of suppliers who are joined in a complex web, and what we also have is a management methodology that gets us through that complexity and delivers. You can see this in the fact that we have 100 per cent availability for the aircraft.

## 4 THE POLITICAL PICTURE

No matter how we stack up in the other three areas what the export market often boils down to is one simple question: Does Nation A want to form a relationship with Nation B?

From that point there is a whole set of other influences: geo-political issues, security and so on. These factors are in the mix for all the prospects we look at.

One of my key roles is to check out whether or not certain countries will go to market within the next decade and then determine if Eurofighter Typhoon really has an opportunity. We look at what the drivers for each country are. We examine questions about whether it is a purely military-led request or if it's a political one. Of course, it is usually an amalgam.

The good news is that wherever there is an opportunity, and there are several across the world, we are in the race. We are not necessarily in pole position in each and every one of them but we are in there fighting. And we are optimistic, because today we have more evidence to back up our product than ever before.

When it comes to export I know that Eurofighter Typhoon is going to be hard to beat. And I am confident that we have what it takes to be a winner. <<



# THE PERFECT PLATFORM THE PERFECT WEAPON

With work ongoing to bring Meteor, Storm Shadow and Brimstone to Typhoon there's a great focus in the Eurofighter World on weapon integration. But what exactly does that mean and what's involved? >>



**W**hen it comes to aircraft weapons Andy Lumb is the man in the know. As Head of Typhoon Weapon Systems Architecture Engineering at BAE Systems he knows the process better than most.

"It is quite a big undertaking to bring a new weapon to any aircraft. If you're talking about an adaptation of an existing weapon then it makes it a bit easier," says Lumb.

The reason we are talking weapons at this point in time is because this is an important

period in the history of Typhoon. Its capability is getting a significant boost.

For much of this year Lumb's own focus has been on evaluating the chances of integrating of MBDA's Brimstone 2 which is a low-collateral damage air-to-ground precision guided weapon. It's work that's being funded by the UK Ministry of Defence, who agreed an initial study contract, valued at £5 million in January.

And, in a separate but related move, at the Farnborough Air Show in July Eurofighter

GmbH confirmed that NETMA had placed an order with it to integrate the Storm Shadow long range attack missile onto the Typhoon. Work on that had already started in anticipation of the contract signature.

Together these activities add to work that's already ongoing around the integration of both Meteor and Paveway IV.

For anyone who blithely assumed that you could simply take virtually any weapon off the shelf and make it work on any aircraft with a minimum of fuss then it's time to think again.

## &gt;&gt; THE PERFECT PLATFORM THE PERFECT WEAPON

## WEAPONS INTEGRATION: CHILD'S PLAY?

## HOW ABOUT...

### Airframe Design

- Mechanical interfaces
- Electrical Interfaces
- Pylons, Launchers, ERUs

### Structures

- Environmental - vibration
- Fatigue/SHM
- Strength
- Bird strike
- Role Equipment (pylons)

### Avionics

- Armament Control
- Displays/Controls
- Attack & Ident.
- Role Equipment
- Communications
- Navigation
- Monitoring/Recording

### Wpn. Integration Mgmt.

- Weapons expertise
- Customer interface
- Supplier interface
- Safety analysis

### General Systems

- Fuel (drop tanks)
- Engine - plume ingestion
- Icing
- Power Generation
- UCS/MDP

### Hardening

- EMC
- Tempest

### FCS/Aerodynamics

- Store Release/Jettison
- Flutter
- Loads
- Performance modelling
- Structural Coupling
- Mass/CG/Inertia
- Store configurations
- FCS
- Plume modelling



Each weapon behaves differently when released from the aircraft and that behaviour has to be fully understood. In addition pilots have to be able to use them in a way that's actually useful to them.

"The point is that not all weapons act the same way on all platforms," explains the patient Lumb.

"As you might imagine Typhoon's particular characteristics - it's a hugely powerful and agile platform - present their own unique challenges. The weapons might come off the jet but what you really need to establish is whether you can support the weapon in an operating envelope that actually makes it useful to the RAF or an export customer. So your weapon of choice might be brilliant as a development demo but unless you can do something that's operationally worthwhile then it's useless."

These are the top level questions the Brimstone study contract is designed to answer. Essentially the Ministry of Defence want to be satisfied that if they move on to the next stage - a contract for full integration of the weapon - they are going to buy something that's useable on Typhoon.

Brimstone integration will be a key step on the Typhoon capability journey. It's a weapon that's currently used on Tornado, one that was used extensively during the Libyan crisis and has an excellent reputation for use against fixed and ground moving targets.

With Tornado heading out of service towards the end of the decade the RAF would like to have the weapon available on Typhoon in the not too distant future.

For the export market Brimstone is regarded as an excellent option for anyone needing to defend against attacks from enemies in fast boats because the missile is very good at picking out targets and seeing exactly where the threat is. It is designed with what's called a Millimetre Wave Radar in the missile itself and a Semi Active Laser. The pilot 'paints' the target with a laser and the missile switches to its Millimetre Wave Radar as it gets closer to the target.

says Lumb. "Now Typhoon is a highly agile aircraft so our first concern is understanding the impact of putting what is essentially two large crates, each carrying 3 Brimstone missiles on the outboard weapon stations of the aircraft would have. In particular, we need to look at what it means for the aircraft's Flight Control System."

Another major consideration for Brimstone in particular is the launchers and the possible need to get rid of them if the pilot needs to make a quick get-away.

"Typhoon needs to be able to protect itself and in a ground attack scenario the pilot may need to be able to leave quickly and that in turn means they may well need to be able to jettison the launchers. Jettisoning a 3-pack

The case for Brimstone is clearly a strong one. There's no question that it's a desirable piece of hardware to carry. So the question that remains is - can it work on the aircraft?

"Brimstone is a weapon that's fired off a launcher and effectively that's like hanging two crates off the aircraft,"

launcher from Typhoon, even at sub sonic speeds, means looking at a series of other questions - top of the list is 'Where does the launcher go when it comes off the jet?'"

So when it comes to the exam question about integrating a weapon there are quite a few boxes that need to be ticked before you can add it to your arsenal. It's the same process for every weapon and every aircraft.

"There are a whole host of different factors you have to look at. Even something like plume modelling. The thing is Brimstone is fired as a rocket off the aircraft so you have to work out what will happen if the plume from the missile is ingested into the intake."

Then there's the other potential impacts: flutter, avionics, general systems, icing on the launcher, fatigue and structural health, the airframe and how it fits into the overall weapon system. Every aspect needs to be considered.

Lumb and the rest of the Typhoon team started work on Brimstone in the wind tunnel at Warton in early 2014 when a baseline 'art of the possible' assessment was carried out. The results: well it's a work in progress but the early signs for Brimstone are 'positive'.

See I was right, child's play!



>> THE PERFECT PLATFORM THE PERFECT WEAPON

## WORKING TO HELP THE PILOT

As Typhoon evolves with greater capacity for different weapons then the job of the pilot changes dramatically too.

That's why, in parallel with weapons integration there are a series of enhancements going on under the skin at the same time – within the Phase 1 Enhancement packages.

The most recent element, known as 'P1Eb', it takes Typhoon multi-role capability to a whole new level.

The enhancement package enables a single pilot, in a single aircraft to simultaneously attack six different targets in one pass. This paradigm shift in capability also presents a new workload challenge for a pilot and that's something that's being tackled.

The work draws on lessons learned from the operations that took place in Libya, and the new enhancements have been designed to significantly increase Typhoon's air-surface capabilities and completely revise the Human

Machine interface for multirole operations. "The austere integration of air to surface capability onto Tranche One aircraft was the first step and that worked well in Operation Ellamy in Libya. But this is very much more integrated into the weapons system," says Luke Dickson who has managed the programme for BAE Systems.

"P1Eb is all about integration of the Paveway 4 weapon onto Typhoon. In particular it allows us to get the integrated swing role capability onto the aircraft, using a targeting device - the Litening Lighting 3 laser designator pod and making sure the pod, the weapon

and the aircraft all talk to one another. A good example of the advantages brought by the new integration is that it enables the pilot to direct where the LDP points by looking at the target, utilising the helmet system that was previously employed to good effect in Air-to-air scenarios. That gives the pilot air-to-surface precision attack capability.

"In doing this we addressed the workload issues for the pilot. We wanted to make sure that a single pilot could carry out a swing role mission where he might be called on to prosecute an air-to-surface attack and can deal with an air-to-air threat at the same time and

therefore we addressed the man machine interface aspects.

"So we are trying to make the pilot's job as simple as possible by looking at the navigation, auto pilot changes, defensive aids and so on."

The P1Eb enhancement package also brings a suite of upgrades for the aircraft's Defensive Aids Sub System (DASS), and the latest interoperability updates for the fighter's Multifunction and Distribution Systems (MIDS), which together ensure the Typhoon is ahead of the pack.

Work has moved on apace this year. In July 2014 the RAF put two aircraft into operational

evaluation and in August the first two squadron jets flew from RAF Coningsby to RAF Leuchars, where the pilots were able to carry out work ups for front line operations.

"The weapons system has to be able to do its job and we have to make sure that the interface between the aircraft and the weapon works. But it is also really important that we optimise the pilots' workload at the same time. So for each weapon we have to make sure that the information is properly displayed and understood by the pilot. Particularly when that pilot could well be operating in a high threat, high workload scenario." <<







# MY EUROFIGHTER WORLD...



Laage is the home of Eurofighter Training. Here Head of Training Major Nils Anders currently has 10 B Course students on the line, a cohort of more experienced pilots, and 18 Instructor Pilots under his wing. Major Anders started his air force career in 1996, spending time in both Germany and the United States. He graduated in 2000 and spent five years on an operational Tornado squadron in Nörvenich, before moving on to become an instructor pilot. He moved to Laage in August 2009.



**MAJOR NILS ANDERS**  
HEAD OF TRAINING

## *How does it feel to step from a Tornado into a Typhoon?*

It's a major change. The Eurofighter is built for a pilot so it's a carefree environment. I don't have to worry about limits, G's or anything. It feels like I can do anything I want to with the jet. On a Tornado, the main limiting factor was the airframe, not so much the pilot. With the Eurofighter it is usually the pilot that is the limiting factor. With all the avionics involved and the high dynamic capability of the airframe itself, you have to be really on top of things.

## *What's the difference when you're training someone?*

The most obvious difference is Typhoon is a single seat airframe, whereas Tornado is a two-seat cockpit and therefore you have a second guy who can do something in case of

emergencies. Of course eventually in Eurofighter you will be all by yourself so we pay special attention in our training to make sure the young pilots can handle anything. Eurofighter is a wonderfully designed airframe. The ergonomics of the cockpit are excellent, very well designed. It is easy to understand. Of course, there's a lot of information for you to deal with and that's the hard part, but, from the first second you sit in this airframe, you feel at home. It feels like it's tailor-made for any pilot. Even when it is relatively new, you feel at home.

## *What about the next 10 years?*

I think the Eurofighter, especially for the GAF, is a major milestone in terms of power and capability. We're not at the end of the capability journey either, it is a continuous process to evolve more and more capability on the airframe.

## *What do you think about the new potency that comes with AESA and stand-off missiles?*

It is a huge leap.

## *If you are a small child and you are reading this?*

It's a dream and you have to do everything to fulfil your dream. You have to stay focused to what you want and never forget what you really want. I started off with model kits and then glider flying - flying was always my fascination.

## *Do you ever have to pinch yourself?*

Oh absolutely. There are so many aspects when you climb into this jet and you find yourself at 30, 40 or 50,000 feet and you are always amazed at how this airplane feels, behaves and flies. You just feel on top of the world. That's a feeling you don't want taken away from you.



**OBERST BERNHARD TEICKE**  
TRAINING BASE COMMODORE  
LAAGE

## *How well received has the Eurofighter been in the GAF?*

It's now 10 years since the introduction of the Eurofighter into the German Air Force and the aircraft means a lot to us. I personally believe it has been the most successful introduction of a new fighter into the GAF.

## *How easy is it to train pilots on the aircraft?*

Well, we are the training base for the German and Austrian Air Forces and to date we have had 200 students through the system. This is not simply because our training instructors are good (they are by the way) but also because I believe this is a very pilot-friendly aircraft.

## *How important is it to European airpower?*

In my view air power has become more and more important after recent ground heavy operations. For example in Afghanistan and Iraq it was important to have boots on the ground. But I believe the appetite to get engaged with ground troops has decreased significantly. Good air power offers you the chance to very quickly show a deterrent effect.

## *What's your view on the significance of sovereign capability?*

I believe it is always important to have an independent armament industry and not to be dependent on other nations.

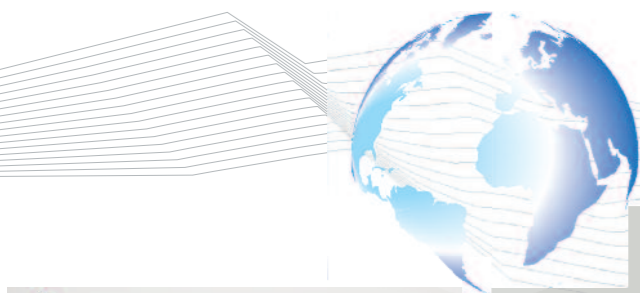
## *Looking to the future how do you see Eurofighter in the next 10 years?*

Well, in the next 10 years we can celebrate a full multi-role/swing-role aircraft.

## *What would you say to anyone considering a career in Eurofighter Typhoon?*

It should be an interesting one because it will continue to be very attractive to be involved either in the engineering or the design side because the aircraft still has significant potential to further improve its capabilities in the future. >>





# MY EUROFIGHTER WORLD...



## ERIK LORCH MANAGER WEAPON SYSTEM PRE DEVELOPMENT

### *What's your specific job title?*

Manager Weapon System Pre Development

### *Tell me a bit about yourself, and what your specific job role is?*

It's our job to look at the first phase of any enhancement, or any capability development with the Front End Development Team (FEDT). We are right at the front end of the product life cycle, that said, we are very solution-focused.

Effectively the team is the first port of call when any customer raises a new requirement. We look at everything starting with a very early analysis of the requirement to ensure we have really understood it.

We then go through a feasibility assessment, understanding what impacts any implementation would have; looking at the implementation options that are open to us; what possible solutions are there. All this activity is part of the engineering life cycle. However, in parallel to this activity we are also providing support to enhancement proposal preparation activity.

### *Tell me a bit more about the integrated engineering programme?*

In short it's a capability road map. It combines all potential requirements from customers into one forward-looking enhancement programme. It defines a possible way forward looking at how we integrate and implement all the requirements from all the different customers into one single integrated

programme. It also defines a time line for implementation dates, or in-service dates.

### *How much do the customer requests vary?*

Sometimes a request is along the lines of something as simple as, 'I want weapon x'. But in other cases the requirement comes with a long list of sub-requirements such as, I want weapon x, I want to fly with it at that speed, I want to launch the weapon in this area of, for example minimum speed to maximum speed, minimum altitude to maximum altitude, this kind of thing. So they can be very detailed.

Whatever way requests come the key is customer interaction. We need to understand what they really want. We like to talk directly with the customer to smooth the process. Together we can come to a joint understanding about what is required in detail and what solution is best to pursue so there are no nasty surprises and nothing is lost in translation.

### *What's the most challenging aspect of your job?*

The word 'challenge' can sound negative but to me it's a good thing. I really enjoy managing lots of different people and all the relations with the different people. Everybody involved has a different view or specific understanding and to get each of them on the same road so we can go where we want to can be challenging but it's what I like about this job.

### *What gives you the biggest satisfaction?*

Easy. When the front end team defines an enhancement which then gets implemented and over time is flying on the aircraft.

### *How would you assess the capability of Eurofighter?*

In my view we are the best when it comes air-to-air combat and that's widely accepted. That gives us a good baseline for taking the aircraft forward and becoming an excellent air to surface platform too. We already have good air to surface capability and we are going to focus more on that and specific ammunitions going forwards. The first important thing is a longer range strike capability, which Storm Shadow will give us. Then we will look at smaller type of ammunitions like

Brimstone which has precision strike capabilities, specifically in close air support missions. This will give the user more flexibility in the missions they face.

### *What advantages are there of having 4 partners involved in this?*

The four partners bring us four types of experience, four types of opinion on how a requirement should be worked out, and four types of industry experience. We take the best out of all of that knowledge and bring it to the product.

### *What do you see as the single most exciting thing that is going to happen to Eurofighter in the next 5 to 10 years?*

The enhancements that will come for air to surface capability is one thing we've touched on, another will for example be further enhancements of defensive aids capability and the integration of the E-Scan Radar. Taken together these will take Eurofighter to the next level.

### *So how did you get into all of this? What was your route to this job?*

I studied Aerospace Engineering at the University of Munich, with a focus on flight mechanics and aerospace systems and while there started working for what was EADS (now Airbus). I started my career as a system engineer for weapon integration, then worked a few years in programme management at Airbus, which also related to future enhancements. I'm now in my second year at Eurofighter.

### *What does your typical day consist of?*

A large part of my job is a coordination role working towards a common goal. There's a great deal of interaction with people who have different backgrounds or responsibilities and the aim is to get them all working together. The other part of my job is more engineering related and involves work on technical and requirements documentation, as well as the integrated engineering programme.

### *What are your interests outside of work?*

Sport is the best way to come down from a hard day at the office. I enjoy snowboarding, skateboarding and I also play the guitar.



## DAVID CASE VICE PRESIDENT ILS - INTEGRATED LOGISTIC SUPPORT

### *So what does the role involve?*

Essentially we're responsible for the non-recurring part of support of the weapon system and principally associated with technical governance of all the support products and services we provide to the customer. Basically the things that they need to operate the aircraft. That covers a whole range of things from aerospace ground equipment through to technical publications and so on. By the very nature of the programme, Eurofighter Typhoon is complex and there are lots of players. Part of the key role we play is pulling everything together so we get a coherent approach.

### *Why I like my job:*

I have responsibilities that cut across all of the nations, including all of the export nations, so I'm interacting daily with people from different backgrounds and different cultures, who speak different languages, and basically it's a joy.

### *What is a typical day in the life of David Case like:*

There's no such thing but meetings, both physical as well as telephone and video conferences figure a lot. The key thing for me is engaging with the various stakeholders because it is through people that we get things done. A lot of what we do is by persuasion, by personality and by engaging and ensuring that logic applies, and trying to keep focused

on the end game which is to give the customers, the end users, the best possible outcomes.

### *What's the biggest achievement you have been involved in as part of the Eurofighter programme?*

That's an interesting one. We've just celebrated 250,000 flying hours for the programme for the fleet of aircraft across six nations and I think the biggest achievement is we've been able to provide products and services to enable that to happen. To be part of such a significant achievement is really heart-warming. I don't think we celebrate the things that have gone well often enough. We've got a wonderful aircraft, and if you talk to any of the pilots they'll tell you they love flying it.

### *What personally drives you to get out of bed in the morning and do your job?*

I've now been involved in the Eurofighter Typhoon programme since before first flight; I was part of the customer community at the time serving in the RAF. Having worn the uniform and been there operating and supporting aircraft, I'm really delighted that I'm able to offer something that will ultimately feed back to those who are doing the job today at the sharp end. I also enjoy the fact there is going to be something new and unexpected that comes along which acts as a challenge and we as a team have to solve it.

### *What excites you most about the future of the programme?*

In a nutshell there's lots of work to be done and significant opportunities. Further success in the export market will involve us in supporting new requirements. Overall I think we are in a position where we can't rest on our laurels, we have to be proactive as we engage to do the best we can for the weapons system in the future.

### *How does working in industry compare to being at the sharp end?*

There are some clear differences. In the military things are clearly laid out in terms of chains of command and objectives. There is always one clear focus: to be prepared to deal with difficult situations in dangerous

places, and to be as operationally effective as you can whilst at the same time being cost effective. In industry you are aiming to support your customers. There is a technical element, and also a business element, so it's different in that sense. However in both cases teamwork is crucial. If the team doesn't work when you are wearing military uniform then you'll fail badly. And the same applies when you are wearing civilian uniform. People in the team are therefore absolutely crucial and I'm pleased that having gained lots of experience from different roles and appointments in the past, I can give something back and do some coaching with those around me to help them.

### *It sounds like there are a lot of transferable skills?*

Absolutely. As it turns out one of the tasks I've got on at the moment is to pay some particular focus on how we as a company approach customer satisfaction so I'm leading a team on a project which is focused on that. And in many ways I'm well placed to help do that given my previous experiences.

### *How do you switch off away from work?*

I have a wife and two children so my family always keeps me busy. I also sing in a couple of choirs, a local church choir and the Munich English Choir, which is challenging but also very rewarding. Beyond that I read a fair bit when I can, generally paper rather than ebooks and we are lucky in the sense that we live in a lovely part of Europe and there are tremendous opportunities around us to enjoy the outdoors. <<



# THE POWER BEHIND TYPHOON



**WOLFGANG STERR**  
DEPUTY TECHNICAL  
DIRECTOR AND  
EXPORT MANAGER AT  
EUROJET

We speak to **Wolfgang Sterr**, Deputy Technical Director and Export Manager at Eurojet, about the significance of these achievements and what makes the EJ200 so special.

The Eurofighter Typhoon Programme has achieved a series of notable milestones recently with the aircraft racking up 250,000 flying hours, resulting in 500,000 engine flying hours for the Eurojet EJ200 engine, across six Air Force fleets. At the same time, the United Kingdom's Royal Air Force (UK RAF) has confirmed its Typhoon Fleet has now reached 100,000 Flying Hours.

The late Enzo Ferrari once famously remarked, "Aerodynamics are for people who can't build engines."

Although his design team might not have appreciated the comment, the point Ferrari was making was a profound one.

You can have the best looking car on the starting grid, but what ultimately differentiates it from its competitors is what lies under the bonnet.

The same is also true of jet-fighters.

One of the key factors in the success of the Eurofighter Typhoon is the engine that powers it.

Developed over a decade, the Eurojet EJ200 is revered throughout the world for its unprecedented performance record, its multi-role capability and its competitive life-cycle costs.

Now you can add reliability to that list too, after the Eurofighter Typhoon Programme clocked up 500,000 engine flying hours this summer, across six Air Force fleets.

"This is a very important milestone," says Wolfgang Sterr, Deputy Technical Director and Export Manager at Eurojet.

"Very often when we get involved in export campaigns our competitors can reference millions of flying hours.

"Our answer in the past was if you have the most modern product then you have to start somewhere because you can't start on five million flying hours.

"But now we have a latest technology engine that has achieved 500,000 flying hours, which is a good, solid base of evidence to demonstrate that we do have a product that is reliable and also mature so, in that respect, it's a very significant figure.

"There is no doubt this engine is proving to be extremely reliable. If you compare it to previous generations then we have fantastic on wing time - more than a thousand hours on average. Compare that to some of our main competitors and we come out favourably.

"If you look at the operations that took place in Libya, for example, we had fantastic engine reliability - close to 99% - so it's pretty evident this engine really works well and we have no issues with it."

## >> THE POWER BEHIND TYPHOON

Then in 1986 the Eurojet consortium, comprising Rolls-Royce (UK), MTU Aero Engines (Germany), ITP (Spain) and Avio Aero (Italy), was formed to co-ordinate and manage the development of what became the EJ200 engine system.

Since delivery of the first production engine in 2003, more than a thousand EJ200 engines have been supplied to the fleets of six nations, and the overwhelming feedback from the customer is it's the best in the world in its thrust class.

"My own personal view on why it has proved so successful, and the same is probably true of the airframe as well, is we started building jets in Europe in the 1970s as part of the Tornado programme and a lot of know-

edge and know-how was acquired from that programme," explains Wolfgang.

"Many of the people who worked on Tornado and RB199 then carried on working on the next generation fighter, which was Eurofighter featuring the Eurojet EJ200 engine.

"The fact we were able to transfer all of that knowledge and experience into the new programme is one of the reasons why Eurofighter and the Eurojet EJ200 engine has been so compatible. It's a continuation, if you like, of what we started in the 70s.

"I also think this consortium we have with the four partner companies is another major strength.

"If we discuss technical issues then you get the views of four chief engineers so the

outcome you get is of a higher quality because you get those different perspectives.

"For me, those are the two main reasons why we now have such a good and mature product.

"Whenever I talk to pilots in the air forces they all say the engine is awesome. They never raise any issues about it, they tend to say they just sit in and start it, it's easy to handle, carefree and highly reliable. That's the consistent feedback we get from the pilots who fly the jet, which is a really great endorsement.

"That doesn't mean to say we can afford to be complacent. On the contrary, we are constantly looking at ways in which we can develop the engine and make it better."

One of the areas Wolfgang and his team are paying particular attention to is the cost of ownership.

"This engine was designed for low life-cycle costs and that is the case, but with the experience we have gained up to now we feel we could go beyond that and reduce the life-cycle costs even further. That's certainly one area we are keen to focus on.

"What you have to bear in mind is today's engine is the first batch of the production engines. We never did an upgrade in any respect, since there was no requirement for it. This leaves lots of room for future enhancements

"To achieve both is a big challenge but that is why you always have to insert new technologies and keep developing your product. If you look at some of our competitors' engines, it's a bit like a family and they go back to the Seventies so in some instances they have already upgraded two or three times and eventually they will reach a point where it doesn't make sense to go any further.

"However that is not the case with us. We have a very sound base line right now and we've got great growth potential from this point onwards."

### FACTS ABOUT THE EJ200 ENGINE

- The Eurofighter Typhoon powered by two EJ200 engines can cruise at supersonic speeds without afterburner help.
- One of our EJ200 engines will help power BLOODHOUND SSC aiming to be the first 1,000 mph car. That's faster than a bullet and covers the length of four and a half football pitches in a single second.
- A single crystal turbine blade is designed to operate 200°C above its melting point. That's like trying to stop an ice cube from melting in an oven.
- At its heart, in the combustion chamber, the heat is nearly half the temperature of the surface of the sun - and the pressure is the same as half a kilometer down in the ocean.
- The force on the small first stage turbine blade at take-off is about 10 tons. That's equivalent to hanging a double-decker London bus on each blade.

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### GROWING SOCIAL SUPPORT

A big thank you to all our fans, followers, supporters and contributors. During Farnborough Air Show this year the Official Eurofighter Typhoon Twitter account reached 10,000 followers and almost at the same time the Official Eurofighter Typhoon Facebook account achieved the 25,000-like milestone.

In the coming months we're looking forward to growing our global fan base even further because we want to make sure that you receive the best and most up-to-date information and images of Eurofighter Typhoon.

If you're new to these channels this is how our landing pages on Social Media look. So please join in, follow and share your images with our growing fan base.

### IN OUR NEXT ISSUE...

Don't miss the very latest news on Eurofighter Typhoon updates

- Our special reports from Indonesia
- See what's in store for Typhoon at IDEX and Aero India
- Plus the results of our readers' Photography Competition





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