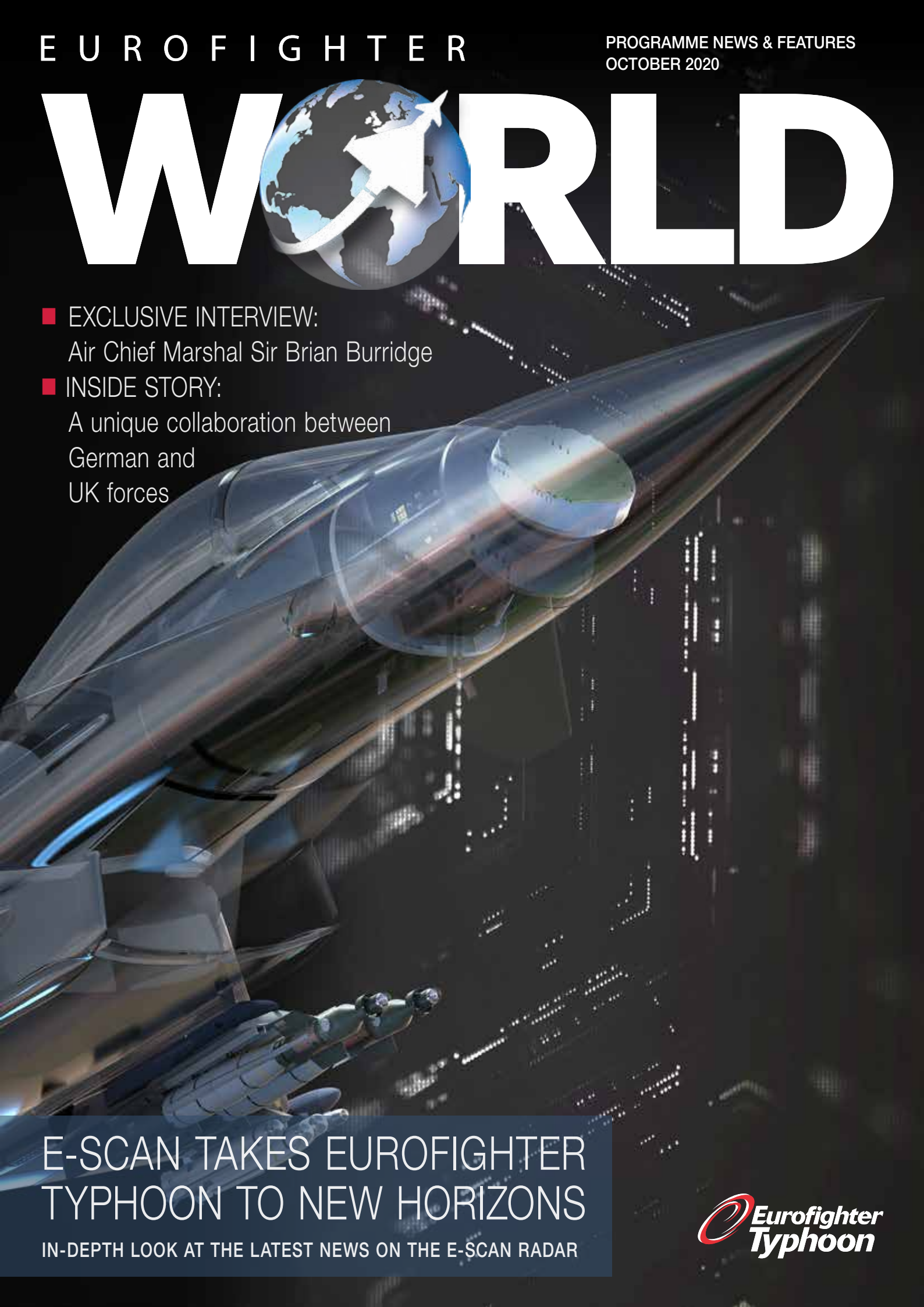
EUROFIGHTER

PROGRAMME NEWS & FEATURES
OCTOBER 2020

WORLD

- EXCLUSIVE INTERVIEW:
  Air Chief Marshal Sir Brian Burridge
- INSIDE STORY:
  A unique collaboration between German and UK forces



E-SCAN TAKES EUROFIGHTER TYPHOON TO NEW HORIZONS

IN-DEPTH LOOK AT THE LATEST NEWS ON THE E-SCAN RADAR

Eurofighter Typhoon

2020 · EUROFIGHTER **WORLD**

Cover: We take a detailed look at the latest developments on the E-Scan radar

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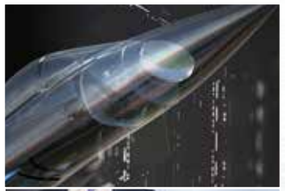

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PROGRAMME NEWS & FEATURES
SEPTEMBER 2020

EDITORIAL

WELCOME

Every single one of us will remember 2020 as a challenging year. The global Covid-19 pandemic has had a massive impact on all our lives. The Eurofighter community is no different. Our air forces, industry partners and wider stakeholder groups, have each been forced to adapt to this new dynamic.

However, when I consider the landscape in which we operate, I am happy to report that we have made significant progress in a number of key areas.

Top of the list is the signing of the E-Scan Embodiment contract. It's a significant programme, which commits Germany and Spain to embody the E-Scan radar onto their respective fleets. The contract is worth around €2.8 billion, and supports further evolution and enhancements of the current E-Scan product to meet German and Spanish air force requirements.

This, combined with the recent UK investment announcement to enhance the Electronic Warfare capabilities of E-Scan, creates a formidable and highly capable family of Typhoon E-Scan solutions for our core nation and export customers.

Furthermore, these two contracts clearly demonstrate the Eurofighter core Nations' commitment to continue to invest in the development of Europe's biggest ever combat aircraft programme. That is why in this issue of Eurofighter World we focus on all things E-Scan.

For the Air Forces of the core Nations, 2020 has been business as usual despite the pandemic. Their commitment to 24/7 Quick Reaction Alert and Baltic Air Policing has been maintained without them missing a beat. In this issue we reflect on their tireless work.

And, in a feature called 'From flying suit to business suit', we speak to four former Eurofighter pilots who are now working for our respective industry partners: Airbus, Leonardo and BAE Systems. The four discuss their experiences and how they have adapted from flying a fighter jet to flying a desk. It's a fascinating read.

When you look across the magazine the message is clear. Yes, we're living through unprecedented times, but that has not diminished the professionalism and commitment of everyone concerned with the Eurofighter programme. In their collective hands Eurofighter has a strong future, delivering outstanding combat air capability, ready for the future.

Enjoy the read,

Herman Claesen
CEO
Eurofighter Jagdflugzeug GmbH

E-SCAN TAKES EUROFIGHTER TYPHOON TO NEW HORIZONS

Eurofighter Jagdflugzeug GmbH was recently awarded contracts for the development, supply and integration of the **Mk1 E-Scan radar** into 126 Eurofighter Typhoon aircraft across the German and Spanish fleets. This has represented the largest order to-date for the next generation electronically scanned array radar, CAPTOR-E.

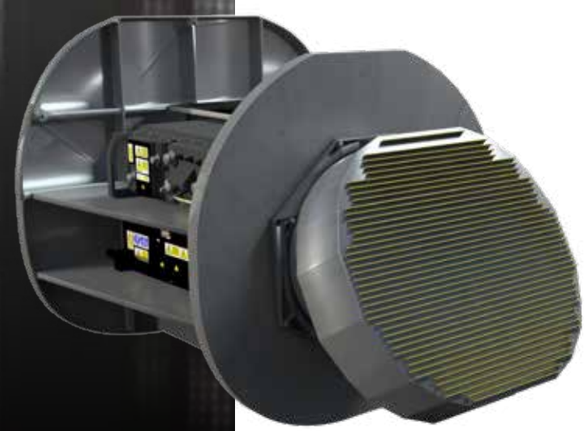
Soon after this announcement was made, the UK awarded a contract to develop the Mk2 variant of the radar for future embodiment into the Royal Air Force's (RAF) Eurofighter Typhoons.

Eurofighter World spoke to **David Hulme** who is responsible for the acquisition and delivery of the portfolio of E-Scan contracts, including the core development programme to integrate the E-Scan radar system into the aircraft. David's role also encompasses bid and campaign activity for future programmes, which includes the Eurofighter Common Radar System (ECRS) programme. The ECRS comprises the three variants of E-Scan radar: the Mk 0, Mk1 and Mk2, and also the potential upgrade of the MSCAN radar, currently in service.

Where are we now?

We've recently been successful in securing commitment to the German-Spanish retro-embodiment programme into 126 aircraft. This is in addition to our established production customer requirements in support of new-build aircraft deliveries into Kuwait and Qatar.

Moreover, the UK has recently committed a significant development programme to enhance the Electronic Warfare capabilities of ESCAN, through the Mk2 programme.



It means we now have five air forces planning to operate with E-Scan enabled Eurofighter Typhoon Aircraft, and four confirmed production programmes. In addition, there are significant ongoing discussions with current and future customers for both retro and new aircraft requirements, inclusive of E-Scan capabilities.

Additionally to the core development programme, which is well-advanced in delivering the ECRS Mk0 variant, there are also major development programmes underway to develop and integrate the future variants of ECRS; Mk1 and Mk2.

When you consider the future of the Eurofighter programme over the next decade, the continued evolution and enhancement of the aircraft primary sensor will form a major element of all our development programmes. Phased outputs with respect to radar variants and associated capability enhancements will continue to deliver in support of our increasing production commitments. This starts with our Kuwait and Qatar customers, with Germany and Spain following soon after.

What's the significance of E-Scan?

The integration of the baseline E-Scan capability or CAPTOR-E (Advanced Wide Field of Regard Active Electronic Scanned Array) is a fundamental enabler for capability growth across the Eurofighter platform. Yes, it is a significant capability uplift in its own right, but E-Scan is also the catalyst for the development of many of the other systems on the Eurofighter Typhoon platform. The integration of E-Scan radar has already triggered a range of enhancements across a number of other aircraft systems, particularly the avionics, power and cooling systems.

To fully exploit certain E-Scan capabilities, there are also a number of elements of the Long Term Evolution (LTE) programme that will be enabled and supported as a result of E-Scan integration. These include the potential for cockpit upgrades, enhanced mission computers and high speed networks.

For example, the E-Scan radar is capable of absorbing a lot more data from the environment. Of course, the aircraft therefore needs to be able to deal with that data in terms of what it processes, what it stores, what it offboards through data linking, et cetera.

How good is the Eurofighter E-Scan?

It's world-beating. The Eurofighter E-Scan is incredibly capable; it can carry out a wide range of functions concurrently and with higher degrees of autonomy. With a full suite of advanced Air-to-Air and Air-to-Surface modes, it delivers to Eurofighter Typhoon more capability and supports a wider range of operations, improving the utility and effectiveness of the platform.

A key point here is mission data, which, in accordance with many aspects of Eurofighter Typhoon, will make the E-Scan radar increasingly configurable. →

E-SCAN: THE OPERATIONAL RELEVANCE

By **Raffael Klaschka**
Eurofighter Strategic Marketing

The E-Scan Radar opens the door for Eurofighter Typhoon into the Future Operating Environment. That's because the radar is the main sensor of the aircraft, and improvements and insertions of new capabilities act as multiplier for the whole Mission Effectiveness of the weapon system.

A greater field of regard, more radar power and automated multi-mode operation are only some of the features. More detection range and smart incorporation with all sensors will help to reduce the pilot workload whilst enhancing Situational Awareness.

Multiple beams allow for extremely precise target tracking, giving the pilot maximum authority over engagement ranges and tactical decisions.

Thanks to the Wide Field of Regard, there's greater potential to reduce geometrical closure to an enemy while maintaining the full picture.

In short, while there is much more potential to explore with the Captor-E E-Scan, it is clearly a game changer.

It offers the Eurofighter pilot a significant tactical advantage and, when allied with the platform's inherent power and agility, means Typhoon will be a potent performer for the future.

In operational terms, it means the aircraft can be rapidly modified based on the prevailing mission and environment.

The aim is to maximize flexibility and end-user configurability. That's why there are a number of different radar variants, each with their own particular features and strengths. These can be further configured and refined through end-user mission-data.

Why the different variations?

Different customers have differing operational requirements and that's why we have different variants of the radar.

Whilst there are multiple variants of the ECRS radar, there is one common integration programme and weapon system solution. The common programme approach allows Eurofighter to cater for different customer requirements, without costs spiralling due to divergent requirements and stand-alone development programmes. This approach enables the flexibility we need to respond to multiple Customer requirements in terms of the specific capabilities they require, and the time in which they want them.

The weapon-system itself — the avionics, the cockpit, the power, the cooling, the structure, the support solution — is configured to support all of these different variants. It's a plug and play concept that Eurofighter is developing. One common interface and infrastructure within which multiple radar variants can be utilised.

Delivery of complex requirements and programmes through partnership and collaboration across the best of the European aerospace sector is fundamentally what Eurofighter Jagdflugzeug GmbH is here to do. We are supporting and enabling national requirements to be delivered, without compromising the benefits of international collaboration.

How do you define the different variants?

We can't go into too much detail, suffice to say each E-Scan variant is tailored for specific operational requirements.

ECRS Mk0 is the core product, the hardware standard and capabilities have been delivered through the core development contract.

ECRS Mk1 and ECRS Mk2 are enhanced products currently under development. These supplement the Mk0 product, with further hardware and software upgrades, enabling even more capability enhancements to be delivered.

What's the future for the E-Scan programme?

The E-Scan radar, and the technology it brings, delivers a significant capability improvement, but it can bring more. There's provision and growth potential in the ECRS solutions to do more, to be further exploited, and to add further operational capability to what the Eurofighter Typhoon can deliver.

The capabilities now under development, will help ensure the operational effectiveness of Eurofighter Typhoon for decades to come.

What about the existing radar?

The MSCAN radar, which is on the fleet today, will also be sustained and there will be a series of capability upgrades in the forward plan to ensure operational capabilities are maintained. The key point is that MSCAN will remain as an operational variant within the common weapon system solution developed through the ECRS programme.

What's happening with the core development programme?

The core development programme is delivering the integration of E-Scan capability into the Eurofighter Typhoon. The ECRS and future development programmes build on the product of this contract. The hardware standard resulting from the core development programme is designated as ECRS Mk0 and development is complete. Functional development is advanced in support of its initial Entry-Into-Service next year.

How significant are the new contracts with Germany, Spain and the UK?

It's a very positive step forward. Not only is it a major investment into the programme, but it also supports the capability growth plan for Eurofighter Typhoon. In particular, it reinforces the future role of Eurofighter Typhoon within the Core Nations air forces.

The contract is great news for everyone associated with the Eurofighter programme because it reflects continued confidence in the product and in the international collaboration and construct that makes it possible. All Partner Nations and their Industries benefit and receive a share of the work, and the whole Eurofighter endeavour takes another major step forward.

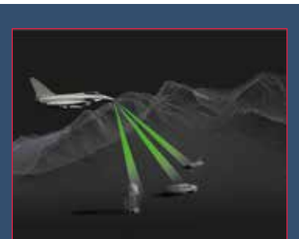
It's also a programme of significant scale. The upgrade programme will run from around 2022 to 2032 and will provide a backbone of ongoing work into the Eurofighter Partner Companies and Radar Suppliers. This is hugely important for the ongoing stability and continuity of our Industrial base.

Securing core nation customers for E-Scan is significant in another sense. It sends the message out from the German and Spanish customers that they're now confident in the E-Scan capability and are committed to the upgrade of their Eurofighter Typhoon fleets. Eurofighter Jagdflugzeug GmbH is similarly focused on bringing a corresponding upgrade programme with the UK and Italy into reality, and their significant ongoing investment into the ECRS development programme underpins this intent.

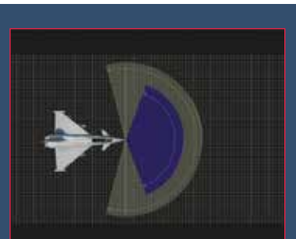
What is the current state of the E-Scan delivery programme?

We are focused on ensuring a successful Entry-into-Service programme with the Kuwait customer next year, and the development and production programmes remain on track.

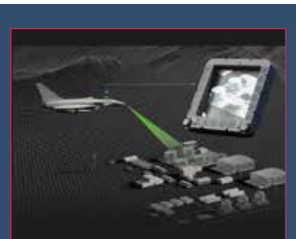
The production lines are fully mobilised, with deliveries of radar systems into aircraft final assembly well underway. We have a number of functional developments underway through our ongoing Flight Test programme, whilst the hardware is mature and stable. We are on track to hit all the key milestones for 2020. ←



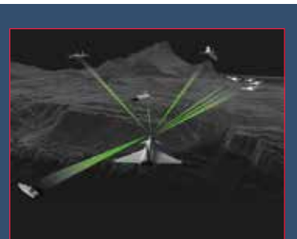
AIR-TO-SURFACE
- Detection and Tracking of moving ground targets
- Improving Situational Awareness over multiple domains
- Fully automated reducing pilot workload



WIDE FIELD OF REGARD
- +-100 Degrees "Look over the Shoulder" capability
- Adjustable antenna position reducing Radar Cross Section
- Increased Survivability



SAR (SYNTHETIC APERTURE RADAR)
- Creation of SAR images
- Available to all participants of Battlespace via Data-Link
- High Resolution Imagery



TRACKING TARGETS
- Multiple Target tracking
- Multi-Domain
- Mission Data configurable

QRA CREWS MAINTAINING SAFE SKIES

2020 has been a challenging year because of the Coronavirus pandemic, but for the Eurofighter air force crews of Spain, Germany, Italy and the UK who provide Quick Reaction Alert (QRA), it's been business as usual. QRA procedures entail aircraft and crews being held at continuous high readiness 24/7, so that they can take off within minutes to protect European airspace. In this picture we see an Italian Air Force pilot as he prepares to scramble.

FROM FLYING SUIT TO BUSINESS SUIT

In this edition of Eurofighter World we speak to four former Eurofighter Typhoon pilots about their **careers in industry** after flying.

With 23 years' service in the Royal Air Force, accumulating over 3,000 flight hours on fast jets including Typhoon and Tornado F3, **Paul Smith** enjoyed a distinguished career in the air force.

A graduate and later instructor at the UK's Fighter Weapons School, Paul taught fighter tactics and assessed the combat capabilities of his fellow pilots, before leaving the RAF and swapping his flying suit for a business suit. Today, he is BAE Systems' head of business development for European campaigns.

PAUL SMITH

RAF/BAE Systems

So how was it moving from your Eurofighter to a flying desk?

I actually finished work in the RAF one Friday and by the following Monday morning, I was sitting at my new desk in the export department of Eurofighter Jagdflugzeug GmbH. It was a rapid but exciting switch. Getting an insight into how the industry partners come together and produce the aircraft was fascinating. I'd had a taste of industry previously whilst working on operational test and evaluation with the RAF, but this was an up close and detailed view of how everyone works together. So that was fascinating.

Working with Italians, Germans and Spaniards day in, day out, was extremely enjoyable and rewarding. I loved the whole European dynamic and lifestyle in Bavaria that I found interesting from a cultural as well as professional perspective. Most importantly, I was lucky to make many friends and professional relationships from across the partner nations that I maintain to this day.

Were there any elements that you found difficult to adjust to?

Yes. For 23 years, my life was flying fast jets. It is an indescribably stimulating mental and physical challenge, so to leave the cockpit was a wrench. It was also an incredible privilege to be involved so early in the operational life of Typhoon. I was an executive officer on the first frontline squadron at its formation. At the same time, working in industry has presented a new and different challenge.

I'm fortunate now as I'm in the Air Force Reserve and get to impart the joys of flying to air cadets and RAF university students. I teach them the basics of flying. It's a different kind of raw flying and a real pleasure. And my role at BAE Systems means I jump in the back of Typhoon from time to time to maintain contact with the latest variant of the product.

How did your experience of being a pilot shape your interactions with your business colleagues?

I am able to pass on an understanding of how Typhoon is used, although that is less about the flying and more the operational use context. My colleagues at Eurofighter and BAE Systems ask questions like: why is this useful; why is this design feature important; when you're in the cockpit how do you interact with this information; what are your thought processes?

As a pilot, you are constantly making risk-benefit assessments and that is a useful perspective to bring to design and airworthiness discussions. Safety is paramount, but our warfighters need the latest capabilities when sent on operational missions in the Baltic or elsewhere. Maintaining that healthy tension between operational capability delivery and safety is essential for our users.

Has your view of industry changed?

As a front line pilot you are far removed from the point of design or delivery, and because of that you have an incomplete picture of all the collaborative effort industry puts into capability delivery. Eurofighter is just a fantastic aircraft — easily the best thing I've ever flown. End of. But when you take the aircraft on operations or you are testing a new upgrade, there may be some aspects that you want to change. It then can be frustrating that it might take time to realise a design change for the frontline. As a fighter pilot you have to have a good engineering understanding of the various aircraft systems and their interactions. What you don't necessarily understand is all the intricate delivery interdependencies.

However, when you are in industry you understand how all the design elements feed into a particular change and the impact on all different areas of the system. It's a much deeper perspective.

We have built the safest multi-role fighter aircraft ever – that is backed up by any metric of the data. Why is that? Because between NETMA and industry we carry out a lot of work to make sure it's safe. There is a huge amount of background checking, rig testing qualification and flight tests before it gets anywhere close to the operational front lines. →

FROM FLYING SUIT TO BUSINESS SUIT

What can industry learn from incoming practitioners?

In my view, having an even broader pool of people to draw on with the right sort of operational experience would help make Eurofighter an even better weapons system. Incoming practitioners bring a unique understanding of the first, second, third order operational effects of design and engineering issues. That is true right across the operational spectrum from logistics to 'spanner turning' engineers as well as pilots.

What can our forces learn from industry processes?

Air forces are good at being decisive in an operational context. They make a decision move forward. In industry we're good at pulling in the data from a diverse range of areas and people and producing a measured and defined output.

What are key transferable skillsets?

Communication is one. It's essential for pilots to speak with clarity and brevity. Part of the role is about getting across large amounts of often complex information with absolute clarity. It's a critical skill, especially in the fog of war. Briefings get you used to speaking in front of the harshest audiences and you're not overwhelmed by speaking to large audiences. It's actually a very helpful skill in engineering and programme meetings too. It gives you the tools you need to piece together complex discussions, analyse and summarise the key elements. You are used to taking a step back and taking a broader strategic view.

What do you most enjoy about your industry role?

I love the international diversity of my colleagues and the intellectual challenge of working in the Eurofighter family; the variety of those challenges and the immediate changes in direction. One minute I can be working on the details of weapon integration or specific aircraft Mission Data values, the next directing a campaign strategy or supporting work trying to influence the UK's combat air strategy.

The other thing that gives me a particular buzz are the times when you're working through a particular issue that leads to a specific design enhancement. Knowing that a few months down the line my buddies in our partner air forces will be flying on operations and the aircraft will be doing a better job for them thanks to a discussion that I played a small part in. •

MARCO GUMBRECHT

German Air Force/Airbus

Before joining Airbus in 2018, **Marco Gumbrecht** was a Staff Officer and fighter pilot with the German Air Force. One of the first operational Eurofighter Typhoon pilots, Marco was a graduate of the German Air Force Academy and the German Armed Forces Staff College.
He went on to clock up more than 2,700 flight hours on fighter aircraft, including a decade on Eurofighter Typhoon. One of the first Eurofighter Typhoon Weapons Instructors, he was also deployed on a number of NATO operations throughout a highly distinguished career.

Today he is Head of Future Business Eurofighter and Military Relations in Combat Aircraft Systems for Airbus Defence and Space.

How was it moving from flying Eurofighter to flying a desk?

Nothing beats being in the cockpit. I left the Luftwaffe 20 years after I began my career and it was the most significant change in my professional life.

In my last Luftwaffe role, I reported directly to the Air Chief. As one of the first operational pilots, pretty much everybody in the air force knew me.

However, coming into industry while you are respected for what you've done, you're pretty much starting from scratch. It's a humbling experience.

Of course, I miss flying, but being a fighter pilot is a job and we know it is going to end sometime. I was lucky in that I had carried out desk jobs almost from the cockpit. For example, I was Director of Flying Operations while flying as well, and that was the beauty of it. Coming to Airbus I'd been involved in a lot of programmes and Project Management, but a lot of things were new to me, working with colleagues from finance, for instance. I started off initially in Business Development but I always wanted to get involved in the programmes. I'm just very grateful to have this department and to be able to contribute.

How has your experience flying Typhoon shaped your interaction with business colleagues when discussing programme issues?

The person in the cockpit doesn't care about how the consortium is set up, they care about the efficiency of the jet and we must never forget that. At the end of the day that is what it is all about, this is a weapon system.

I try to create a bridge between my past as an operational pilot and being the guy in a business suit, managing and setting up the contracts and making sure we address the right things.

That doesn't mean me playing the retired Lieutenant Colonel and telling everyone what a great pilot I was. It means looking at certain things in a positive way, asking, 'have we thought about that?'

And if I do think we need to explain things better, it is being the mediator that brings the two sides closer together.

I try to make myself go back in time and consider how would I explain something to my pilot self and what would I have said about the consequences? That's how I go about it.

How has your view of 'industry' changed over that time?

I'll be honest. When I was a pilot there were times when I was critical of industry. Now I'm in the mix and I can understand things better.

I could probably explain to my former self why some things aren't working the way I might have expected. That insight comes with the greater depth of understanding. The reality is this programme was solely set up not just with regard to operational capacity, but it was also as an industrial programme.

That makes it different to the way other programmes work. However, we must never use this as an excuse. I have a dual role and I'm responsible for military relations for combat aircraft systems for Germany and Spain and I try to educate both sides on why things are the way they are.

What can industry learn from 'incoming' practitioners?

There's not a higher feedback intense environment that I'm aware of than in the fighter pilot community. That is something industry could learn from.

We need to get better at meeting efficiency. One of the things I did as soon as I got more responsibility was try to give meaning to every meeting.

I question if we need a meeting? Would a phone call be sufficient? If we do have meetings, we need have some objectives. And more importantly, we need to reflect on those objectives. You can burn a lot of time and resource having meetings with no real outcome.

You get direct, quickly delivered feedback. If you do something badly in a jet you see it directly in the debriefing.

What leadership qualities have you been able to transfer from the military to industry?

When it comes to leading you have to take decisions and have the ability to leave your comfort zone and take responsibility. Those are basic traits that any military leader has to have.

There's also leading by example. There is a mantra that weapons officers and fighter pilot instructors share: 'Always be humble, credible, approachable'. These programmes are way too complex to even think that you can do anything by yourself, even just preparing the decision-making process.

There are a lot of people here that are better than me at certain things. And that's part of being a leader, recognising that and finding the right people to do the right job and enabling them to get on.

What can the military learn from 'industry' processes?

Industry is really good at creating the working environment and recognising that being efficient does matter. It is the little things, like when your computer isn't working. It gets fixed.

Obviously, inside the cockpit things matter and people move at speed and get things done. But once you left the cockpit that sense of urgency and who was in charge of what wasn't always that clear.

You need people to make your life easier so you can do your job. Getting things done in the military caused me many headaches. That is certainly not the case in industry.

What is the most satisfying part of your role?

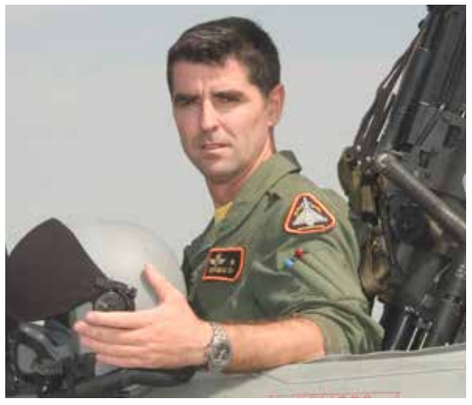
To be part of helping to shape the future of the Eurofighter Typhoon. It has been part of my life for so long.

I've loved the aircraft from day one and seeing it start to go through its Long Term Evolution and playing my part in shaping and delivering that, it is really gratifying to me. • →

FROM FLYING SUIT TO BUSINESS SUIT

JUAN RAMÓN GONZÁLEZ ESPADAS

Airbus Defence & Space (Spain)



How has your experience flying Typhoon shaped your interaction with business colleagues when discussing programme issues?

My main contribution is being able to share the vision of the user, not so much that of the customer. This is a fundamental difference. A pilot represents the last link in a long chain that began when a person outlined on a sheet of paper, long ago, the first design of this magnificent weapon system.

How has you view of industry changed over that time?

The change has been very positive. I learn new things every day and I have been enriched by the experience both as a person and as a professional.

I would export to the world of industry, values and behaviours from my military experience. And vice versa, I would export to the military world attitudes, ways of doing and thinking that I have learned in my professional life at Airbus and Eurofighter Jagdflugzeug GmbH.

What can industry learn from 'incoming' practitioners?

Industry has a chance to understand the world as seen by the end user of a product that thousands of people have worked on for years. Incoming professionals to some extent break patterns of thought and behaviours, and provide different potential approaches to existing problems.

What can the air forces learn from industry processes?

An understanding of the sheer complexity of a programme like this: the variety of factors, industrial, economic, social, political, legal, that define the playing field in which the industry has to operate.

I'd also add that they might appreciate that there are many people who do not wear the military uniform, but who are deeply aware of the importance of defence to safeguard the values of our society. •

How was it moving from flying Eurofighter to flying a desk?

It was a strange feeling, despite it being a decision I'd given a lot of consideration to. It meant I had to change the concept of space, the concept of time — because just imagine, going from flying at 50,000 feet, moving above the speed of sound and living in three dimensions, to shifting to a place where time, speed and the environment are completely different.

I needed a period of adaptation to get used to my new 'theatre of operations'. In industry the rules of the game are different; here other factors count and it's a place where multilateralism is a cornerstone.

The thing is, the role of a fighter pilot is individualistic. You fly alone, you evaluate things alone, you take the decisions alone. Now everything is different, because your relationships with other individuals are essential from beginning to end. Some parts of the military world are like this, but here in industry certain factors are accentuated.

GEN. SETTIMO CAPUTO

Italian Air Force/Leonardo

Lt. General (ret.) **Settimo Caputo** enjoyed an illustrious 45-year career in the Italian Air Force rising to Deputy Chief of Staff before retiring and joining Leonardo as a Senior Advisor for Marketing Strategic Campaigns in November last year. Known throughout the ITAF for his love of flying, General Caputo has almost 6,000 flying hours to his credit and was still flying just two days before leaving the Air Force. He has experienced flying more than 30 different fixed wing and rotary wing aircraft, including Eurofighter.

How was it moving from flying Eurofighter to flying a desk?

The specific 'desk' I have at Leonardo is as their Senior Advisor for Marketing Strategic Campaigns. This is one of the most

challenging and exciting tasks of my career. It has been a particularly interesting time to make the switch when you consider the current technological evolution of the Eurofighter Programme, and the debate around the future combat fighter solutions. The Eurofighter is one of the best air superiority aircraft available on the market now, it was originally developed in response to Cold War requirements at the time. Since then, it has evolved to feel at home in networked war scenarios and it is further developing and improving its multirole combat capabilities, sensors and software in order to gradually bridge to the next generation of combat systems. I started my career in the programme as a pilot and I truly loved to fly this aircraft. Now, I am excited to be in a position where I can support the programme and contribute with my experience to shape Eurofighter's future operational development as well as supporting its marketing perspectives.

Tell us about the practical difference you can make in your role.

Promoting Eurofighter in foreign markets is a team effort led by an orchestra which includes the Country Systems, Programme Partners' Governments and of course the Partner Companies. However, even in this complex and integrated environment, there are still moments when the pilot to pilot interpersonal relationship is crucial because it provides reliable first-hand arguments to discussions. During these occasions, my previous career and experience enable me to bring a certain credibility to the table. An example of that was clearly illustrated when we were in a campaign meeting with a potential export nation. There was a large delegation from Leonardo on one side and on the other the Chief of Staff of the Air Force with his senior team. After the formal talks, the Chief of Staff came up to me directly and asked: "As a Eurofighter pilot, and as former Deputy Chief of Staff, what are elements of your operational experience you could mention to convince me to buy this aircraft?". The discussion then moved towards operational aspects in the current and in future scenarios with a very practical and solid focus: he listened to me because we were speaking the same language. We chatted together as two pilots and two officers and there was a real trust between us. He was very keen to hear what I had to say about the Eurofighter and very much focused on understanding what it is like to fly the aircraft, what its characteristics are, how it compares to rival aircraft and how I observe its evolution towards future operational scenarios. He was asking very detailed and specific questions.

This is one of the situations where I can add real value, thanks to a specific pilot-to-pilot language: he was not talking to me as a representative of Leonardo but as a former pilot. It is a question of trust and credibility.

How has your experience flying Eurofighter shaped your interaction with business colleagues when discussing programme issues?

That is probably a question for my colleagues — they are better placed to talk about our interaction!

However, from my perspective, as a long-term pilot, I am convinced that my colleagues can take advantage of my experience of flying a wide range of operational aircraft, including Typhoon, over →

FROM FLYING SUIT TO BUSINESS SUIT

the last 40 years. This experience means I can provide an additional value in support of the Eurofighter's Long Term Evolution plan that aims to evolve the Typhoon as a very flexible effective swing role new generation machine. I had the opportunity to fly in two different roles, air-to-ground and air-to-air, which are the two capabilities we will combine in the Eurofighters of the future. So the more I can draw on my varied operational experience, the greater the benefit to the business.

I think it is important to have someone who has the experience of flying working side-by-side with the commercial teams. This is the best way to present Eurofighter in the strategic campaigns. The cooperation here has been immediately mutually beneficial because it's helped shape a common mindset that is centred on effectiveness and on how best to respond to emerging challenges.

How has your view of industry changed over time?

For sure, it has changed a lot. In the first part of my career, my pilot's mindset was purely focused on my mission. Over the last decade, my view of industry has evolved. I observed a deeply changed relationship between air force and engineers. Nowadays that has been consolidated and is stable, which really helps the air force to transmit its requirements and receive feedback and solutions more efficiently.

This cooperation between air force and industry has led to the development of a new generation training system for future combat pilots, which is recognised worldwide as excellent. It also led to the advancement of the most reactive logistics support model for the fleets and the most effective technological development in the aeronautical programme at strategic level.

As Deputy Chief of Air Staff, I observed the development of a more and more integrated and strategic co-operation mindset with the industry. Today, this has helped to consolidate an outstanding level of teamwork: in Alessandro Profumo's Leonardo, the Air Force and industry constantly confront and share their visions for the future, making the knowledge exchange continuous and productive. It allows the industry to focus their technologies and investments to ensure particularly effective developments.

What can industry learn from 'incoming' practitioners?

One thing air forces share is a 'multinational cooperation' mindset. This is the most relevant value that industry can learn from the day by day work of Western Air Forces. They're used to it, under the NATO framework and more recently in the various operational coalitions.

Nowadays, being an airman demands a variety of skills which are transferable in important international commercial environments too. These competences are part of what 'incomers' bring, as well as an understating of the operational doctrines developed by the Air Forces. This kind of knowledge is a paramount when considering future operational scenarios and how to best direct huge investments in technologies.

In this sense, I believe that for this aircraft the best is yet to come. Typhoon remains resilient to emerging threats, while continuing to reinforce its advanced electronic warfare systems and the transmission and utilisation of ever-increasing amounts of both on-board and off-board data. Indeed, Eurofighter's weapon system is designed for constant evolution and enhancement. Industry can learn a lot from former operational pilots, and "incoming practitioners" can reinforce Industry / Air Force strategic cooperation. With joined forces, Eurofighter enhancements will improve and change the capabilities of the aircraft, further developing its potential and maintaining its ability to operate in the highly contested and congested future operating environment.

Did you ever anticipate you would end up working for Industry?

No, not really, I had never really given it much thought. It was only in my final months that both the Air Force and Leonardo started talking about the value of having someone with my profile and my experience to help both sides. It is a challenging role but I enjoy it.

During the last part of my career I was the Italian Air Force representative on the Eurofighter steering committee, and, having known the programme in detail, I'm one of the biggest supporters of its strong future path, thanks to the Long Term Evolution and its continuous ability to respond to the market. A solid second youth attends the Eurofighter programme — from both a capability and commercial perspective. ←

MOCK TEST

UK Royal Air Force Eurofighter Typhoons deployed in Lithuania carried out mock air attacks to test the defences of NATO warships operating in the Baltic Sea.
The training mission took place, when RAF Typhoons from 6 Sqn were based at Šiauliai Air Base in Lithuania, with 135 Expeditionary Air Wing, conducting the NATO Air Policing mission.

A PERFECT VALENTINE'S

Warton, 14th February 2003, and **Archie Neill** is in Flight Ops preparing to take to the skies in BT001, the first UK Eurofighter Typhoon.

"It was cold outside," recalls Archie, who at the time was BAE Systems' Entry-Into-Service Manager and Chief Flying Instructor. "We'd just been zipped into the full immersion suit and as I was pulling on the full-coverage anti-G suit I started to think.

"When the kit was being designed, I'd done a lot of work in the centrifuge to ensure it worked. It struck me, at that moment, how many thousands of hours of effort, from hundreds of different people, right across Europe, had gone into getting us to that point that Valentine's Day. In that instant I suddenly felt immensely privileged."

His only nerves centred on making sure he didn't let people down. "We all felt we were representing the wider team."

Following that successful flight Archie spent months working on the training syllabus for pilots, including their simulator work, as he built an impressive career.

Fast forward 17 years and Archie — who joined the RAF in 1983, gaining his wings in 1986 –remains heavily involved in the Eurofighter world. Today, he's BAE Systems' Director of Operational Training for the Air Sector.

His office, within earshot of the runway used by BT001, contains a whiteboard with a curious hand-drawn map. It's not immediately clear where it's supposed to feature.

"It's the UK flipped 90 degrees on its side," says Archie, noticing the puzzled looks. "It's done that way to demonstrate to people the threats that the RAF have to counter and that we are supporting."

Red blocks scattered across the map indicate high threat areas. Green blocks show where the Eurofighter simulators are based.

And it's the training element that's the focus of Archie's work. He runs Typhoon Future Synthetic Training making sure it meets the UK's synthetic training needs.

"The aircraft is a lot more complex today than the one I used to fly. We are asking young pilots to become swing-role pilots in swift order and it's a tall ask. They'll arrive on base as combat-ready pilots and progress through their squadron all the way up to mission commander and training is a fundamental focus. A lot of attention is given to the operational use of the aircraft but operational training, which sometimes gets overlooked, is hugely important.

"However, with satellites able to track every single move of these highly-capable aircraft, it's important that you don't show your tactics to adversaries who will be watching what you do."

So, just as in 2003 when Archie was at the cutting edge, today he is at the forefront of developing a synthetic training regime that's fit for the future.

JOINING THE DOTS

The security aspect is one thing. Fuel budgets are another but, there's also the fidelity of synthetic systems that these days allow pilots to train 'over Syria' for a range of scenarios without ever leaving terra firma. That said, there are elements that need to be addressed.

"If you go into a simulator everything is spot on — the radar, the communications and so on. But, everything's just a little too perfect. In the future we need to make it more real. We will include real people in the network. The concept is not new — it's called Defence Operational Training Capability (DOTC) and covers air, land and sea."

While the idea has been some time in coming, 2021 is set to see the launch of DOTC. It means pilots from RAF Coningsby will be able to train with pilots from RAF Lossiemouth and, in time, the environment will grow richer with more elements joining. The DOTC concept will ultimately join up maritime and land-based simulators to create an all-encompassing UK training capability, DOTC (Joint) – literally joining up the dots.

Of course, pilots will still get airborne to validate their radar, the DASS, the missile launch success and so on. Archie believes that this could one day lead to a 'live-virtual construct', where the two-dimensional DOTC training is mixed in the airborne environment. "Pilots would be able to validate the systems and training in the air where their bodies will suffer from G forces, but the most immersive fighter training would take place in the synthetic environment."

Archie says that for BAE Systems, who are closely aligned with the RAF, the future raises some interesting questions. For example, how will this switch to greater use of synthetics impact on day-to-day activity on the bases?

For Archie, the answer is for industry to get closer to support the military output. "For me, the real KPI is about capability; the trained pilots, trained battlespace managers, and the broad spectrum of highly-skilled personnel required to manage the air defence system. The fundamental change is that simulation used to be focused on the trainer. Now it's about the operational pilot developing skills.

"Focusing on the simulators misses the point. It needs to be a fully integrated environment focused on information advantage – getting information accurately, securely and quickly to allow operators to make critical decisions.

"This includes mission planning, data management, and effective programming, to make sense of this increasingly complex environment."

New simulators are on the horizon but for Archie the biggest challenge will be cultural. "We will need a different mind-set about how we collectively train. That will be a challenge."

It will be a first. A new test. However, for the man who stepped into the first UK Typhoon, it's just another day in the office. ←

THE BIG PICTURE
Two Eurofighters at RAF Coningsby in Lincolnshire during a routine training mission.

TAKING FLIGHT **WITH DATA**

With a full career in the RAF, Senior Vice President at Leonardo, and currently Chief Executive of the Royal Aeronautical Society, Air Chief Marshal **Sir Brian Burridge** has an extensive and multi-faceted view of the industry. Today, he talks of the role data will play in the future battlespace and analyses its historic contribution to the combat air world.

"When I came on the scene as Deputy Commander-in-Chief at Strike Command from early 2002, at a time when Case White [a project designed to support Eurofighter at BAE Systems Warton ahead of its move to RAF Coningsby] came into play, I had two principal concerns," says Sir Brian.

"The first was working up the air crews for the nascent Operational Conversion Unit and Operational Evaluation Unit ensuring that, each day, we got the flying that we needed out of this small fleet of Typhoons. And, there were still trials to be completed.

"Second, was transferring the knowledge from industry to RAF technicians about operating what was essentially our first ever digital combat aircraft. I had lived through the birth of Merlin, the first digital helicopter, and had seen how challenging it was to transfer this knowledge – I knew this would be no different."

Case White's remit was to deliver an innovative training package to strengthen the relationship between the RAF and BAE Systems, the industrial partner. It meant bringing together different cultures to ensure the fighter was ready to deploy to its main operating base of RAF Coningsby, on time, ahead of being deployed on air defence Quick Reaction Alert.

It would enable the creation of a cadre of 16 pilots and 190 RAF engineers all of whom, Sir Brian says, were focused on optimising the aircraft's data collection capabilities to improve availability and deliver this new capability at lower cost.

DIGITAL IN EVERY SENSE

"In any aircraft, the engine-airframe combination is what it is; you get the thing airborne no matter what," says Sir Brian. "But the Typhoon was a complex digital aeroplane, the performance of its software, systems and sensors would really have to be shaped and we would be continually learning from its mission system output and the data it provided.

"It was digital in every single respect, including the built-in test equipment, and it took us some time to harmonise our approach with that. I can remember getting 13,000 'events' downloaded onto the ground-crew laptop after a single sortie, because it was highly sensitive to things like alternators going on and offline.

"There is often a mentality that a complex aeroplane will do what it says in the brochure, from the minute you get it on your airfield. In the early stages of an aircraft's life, that is actually debatable.

"It was only when we eventually got it to Coningsby and started operating it in the squadron environment with an increased training programme, that we started to think about how we could climb up the learning curve to use its complex technology to optimise our ways of working and support solutions."

Sir Brian's experience in such a variety of roles gives him a unique perspective. He's able to analyse the combat air world from the view of the customer, from industry, and now, in an independent capacity. It is this experience which makes him as well-positioned as anyone to translate how data can be used to benefit every level in the quest for enhanced capability but also potentially to redefine the role of technicians and engineers working on the aircraft day in, day out.

SPIRAL DEVELOPMENT OF CAPABILITY

The three elements of his career give him a distinctive view on how technology can be used in a positive way.

"Collaboration is significant – particularly international collaboration – and we need to recognise that cooperative development of technology, with its inherent sharing of risk, puts a true value on that. Secondly, we must continue to focus on the customer–industry interface and the optimum division of activity. Thirdly, we must continually consider spiral development and the incremental insertion of technology in order to optimise capability.

"For example, in the UK, TyTAN [the support construct between industry, air force and MoD] drew on earlier lessons from introducing availability contracting for Tornado. That experience, at a time when there was limited investment available in the UK for capability development, has proved very useful. Project Centurion on the Typhoon, which transfers capability from Tornado to Eurofighter, in particular Meteor, Brimstone and Storm Shadow, owes much of its success to that early knowledge. →

THE BIG PICTURE

37th Wing / Trapani Air Base - After a training mission, the four Eurofighter F-2000 “Typhoon” assigned to 18° Gruppo returned to their home base. The first of the four jets landed a few minutes before, the other three can be seen just a few seconds before the formation break that will bring them to landing.

"Overall, by being smart over the use of data, we are able to demonstrate that we can reduce the cost of support, improve the supply chain, increase responsiveness and make sensible investment decisions on both sides of the customer–industry interface to alleviate pinch-points. It has become crucial to us to secure future funding and is thus an on-going challenge.

"To create innovation in this industry, you must first understand the risk-management significance of incremental capability improvement and spiral development," he says. "You can then undertake your research and development with some certainty that it will be pulled through. In the defence sector, it remains difficult to convince people that there is value in looking at the long-term, understanding the maturation of technology, to the point where you can safely – with a minimum of risk – say 'let's go forward and integrate this novel sensor, across our fleet', for example. We seemingly waste so much time in prevarication such that export competitors can steal a march on us.

"Litening 5 on the Typhoon is a perfect example. It does an enormous amount to improve the ISR capability, as well as the attack capability, which is obviously a very important aspect. But at one point it was the new kid on the block. It has had to prove itself."

A DIGITAL BACKBONE

"As we look to the future – and this is common to the civil sector – aircraft must be designed around a virtual through-life digital backbone. Given that we now design and develop aircraft using autonomy and AI, it is actually defined digitally, but so must every aspect of its operation and performance in service such that we can optimise the way in which we support it and upgrade it. But it is axiomatic that its systems must gather intuitive data and capture it in such a way that we can test, learn and improve. This is just one example of where increased numbers of data scientists will be involved in aerospace.

"Virtual research and development also has the virtue of reducing both the time to market and the sheer cost involved, an attractive proposition to shareholders. Also, the resulting data-rich environment allows for comparisons to be drawn across fleets and throughout the entire supply chain.

"Looking ahead, we need combat aeroplanes that are developed to ease digital analysis with the necessary tools embedded within their systems so we can plan missions effectively with optimum data. That's quite a challenge but there's no need to fear that: we have to embrace it and quickly learn how to harness data at every level. Here, there are advanced technologies in data analytics beginning to emerge that will help."

Is industry ready? Sir Brian thinks so.

"We are approaching an era where the data we capture, and how we use it, is pivotal to our future success. But, unless we learn quickly how to use it to our benefit, we're going to find ourselves absolutely flooded with too much data. And we'll end up ignoring it and that's something we can't afford to do. We must start to make better use of AI to help us scan data and pick out highlights that are of imminent importance, and deliver the right training to ensure that from that point, absolutely anyone who looks at the data is able to interpret it.

"The Eurofighter Typhoon, for example, is capable of gathering more than a terabyte of data per sortie. The problem comes when people on the ground lack either the motivation or the tools to mine that data. They will need the conceptual understanding to say, 'this is how we need to do it, and this is what we will get back from investing that time'.

"But that's all it is – a mindset. Engineers and technicians have been doing this in practice for decades, it just hasn't been wrapped up in technical and digital interfaces. We say dealing with data must be our bread and butter – many don't realise it always has been, only at a much slower rate." ←

GERMAN AIR FORCE EUROFIGHTERS CONNECT WITH **REMOTE CARRIERS**

Interconnectivity between remote carriers and Eurofighter Typhoons has been successfully proven during a live exercise for the first time.

The technology milestone was hit during the recent German Air Force Timber Express exercise over Northern Germany and the North Sea. It represents the first time the interconnectivity of the Airbus Defence and Space remote carrier technology in a multi-data link environment has been demonstrated with real fighter aircraft.

The communications, which also included Tornado fighters and NATO cooperative ESM Operations, were established within the framework of existing IT security regulations and NATO classification levels.

During the exercise, the remote carriers, which currently use the Compact Airborne Networking Data Link (CANDL), were successfully connected to Link16, the operational tactical data link of the armed forces.

The remote carriers were not only visible to all tactical combat aircraft of the Air Force but could also receive and execute orders without the need for technical modifications to the aircraft.

This marks a first in Europe and is a further milestone towards a future combat air system (FCAS).

A further step was the demonstration of interoperability with the NATO concept of Cooperative ESM Operations (CESMO), a reconnaissance network spanning several branches of the armed forces aimed at locating threat systems in the electromagnetic spectrum in real time.

Airbus has succeeded in integrating the remote carriers as a full component in the CESMO reconnaissance network. The simulated reconnaissance results of the remote carriers were made immediately available to the CESMO Fusion Element during the exercise and merged in real time with other reconnaissance results such as those of a flying Tornado ECR. ←

UK & GERMANY JOIN FORCES FOR UNIQUE MISSION

In a unique exercise this summer, a Luftwaffe Eurofighter detachment joined a UK Royal Air Force detachment as part of a **NATO Baltic Air Policing Mission** in Lithuania.

The exercise was the first time a German Air Force Eurofighter detachment became embedded within an operational RAF Expeditionary Air Wing. It was designed to prove a 'Plug & Fight' concept and allowed the two forces to carry out a sustained period of interoperability training.

Both Air Forces regularly carry out NATO Air Policing missions and they train together on a regular basis, but this was a unique situation because the training was conducted in an operational setting.

"It was an interesting and rewarding exercise working closely with our Luftwaffe colleagues while deployed to Lithuania," says Wing Commander Stu Gwinnutt, Commander, 135 Expeditionary Air Wing.

"We were able to demonstrate a high degree of interoperability with our Eurofighter Typhoon aircraft, while highlighting areas of potential for the future.

"We learned a lot from each other on a professional basis and made new friends as part of a combined UK–German Team; it's been one of the many highlights of the deployment."

The interoperability training involved the pilots from RAF Lossiemouth-based 6 Squadron flying for nearly two weeks with the pilots from the German Tactical Fighter Wing 71 'Richthofen'.

During the exercise, the pilots carried out an intensive package of sorties, with one German and one UK aircraft, flying as pairs to conduct practice intercepts and what is known as basic fighter manoeuvres.

The pilots then moved on to include 'scramble starts' and Quick Reaction Alert take-offs to then carry out further practice intercepts. These practice intercepts were conducted against one of the other 6 Squadron Typhoons which acted as the target aircraft.

Lieutenant Colonel Andy Beckmann, German Detachment Commanding Officer, says: "It is always very interesting to take part in a multi-national mission or exercise. To prove the 'Plug & Fight' concept made it an even more exciting task because we knew we had to form a bi-national team in just two weeks in order to be able to achieve our goals.

"I felt very privileged and honoured to have the opportunity to lead the Luftwaffe detachment for this challenging project. Besides the great hospitality and support of our Lithuanian friends, the biggest memories we took away were the strong team spirit which developed between us and the high motivation each RAF pilot and Luftwaffe soldier showed to build up trust and make things work."

The next stage in this training process will be a repeat exercise, but this time with the roles reversed. Later in the year a group of UK Eurofighter Typhoons will be embedded within a German Air Force detachment, when they conduct their next Baltic Air Policing rotation.

"I am looking forward to our next steps," says Lieutenant Colonel Beckmann. "The RAF will deploy to Amari in Estonia with us in September, where we will build on our experiences from Siauliai for the 'plug & fight' concept."

We were able to demonstrate a high degree of interoperability with our Eurofighter Typhoon aircraft, while highlighting areas of potential for the future.

Wing Commander Stu Gwinnutt

WHAT IS PLUG AND FIGHT?

The German Air Force and UK RAF mutual participation in Baltic Air Policing in both Siauliai and Ämari was planned to prove what's been dubbed 'Plug and Fight' capability. In practical terms it sees an existing deployment from one of the two nations, supplemented by the second nation for two weeks with a minimal technical and logistical footprint. The docking nation uses as many of the host nation's resources as possible, including personnel support and ground support equipment.

The objective behind is to establish the capability to deploy, command and control Eurofighter contingents. In addition it allows air forces to complement each other during exercises and operational commitments through short-notice provision of small detachments — hence Plug and Fight capability.

WHAT ARE THE BENEFITS?

Plug and Fight provides additional capacity. It's rapid too. Within a few days multinational military operations can be conducted, thus giving a strong sign of consistent European security and defence. It offers:

- High flexibility
- Quicker reaction times
- Less costs
- Less logistical resources

ARE THERE CHALLENGES?

There are concerns over respective engineering documentation, recording methods and legal framework. For example, who is responsible if a UK engineer repairs a German aircraft? But the two parties are developing solutions and are currently validating them.

HOW DO THE RESPECTIVE TEAMS LEARN FROM ONE ANOTHER?

It is a bottom up approach. The exchange is developed at unit and squadron level. They aim to do the following:

- Get to know to the different ground equipment;
- Monitor the working procedures;
- Accomplish maintenance tasks on respective aircraft under supervision and vice versa.

The future aim is that an engineer would be able to carry out maintenance work on a Eurofighter Typhoon from the other nation without supervision and record it, according to that nation's standards.

DOES PLUG AND FIGHT BRING OTHER BENEFITS BEYOND THE ROTATION ITSELF?

Because both parties work very closely together during the partnership, each nation gets very detailed insight of how the other nation handles different situations. Both forces constantly question their own procedures and, for example, the German Air Force has already adapted some working and ground equipment solutions from the UK. ←

SEEING RED

80 aircraft – including 24 Eurofighters – took part in the world's most important air combat training exercise: **Red Flag**. Learn how it all came together. Aircraft representing the air forces of more than 10 countries took part in the Red Flag combat training exercise at Nellis Air Force Base in Nevada, US, between 8 and 20 March.

WHAT IS RED FLAG?

- Red Flag is the world's most important air combat training exercise. Established in 1975, Red Flag is held between four and six times per year in the Nevada desert in the US, sometimes with the participation of foreign air forces.
- Together with the US as host nation, NATO partners such as Germany, Italy, Spain and UK perform realistic combat exercises in the air, on the ground and in cyberspace. Bombers carry out low-altitude air strikes on simulated positions, vehicle convoys and mock airfields, which are armed with military equipment to create a realistic scenario. Early-warning and target acquisition radar, as well as electronic countermeasures (jammers), make the training environment as true to life as possible.
- The 'Blue' forces of the NATO partner nations fly missions against the 'Red' forces, a simulated enemy.
- The test and training range at Nellis Air Force Base in Nevada measures around 270 km by 90 km, providing unique training conditions for multinational pilots.

The German, Italian and Spanish Eurofighters involved flew almost around the clock, completing missions in two shifts and conducting a total of 20 exercises. These challenging missions simulated combat in the air, on the ground and in cyberspace. The Eurofighters flew together with other combat aircraft such as the Tornado, F-35A and F-16, and completed their tasks to the satisfaction of those directing the exercise.

EUROFIGHTER RED FLAG ONE YEAR IN THE MAKING

Planning for the German Eurofighters' participation in the event had already begun one year earlier. The units started filling the first containers with materials back in November 2019. Ships and cargo aircraft transported just under 150 containers to the US.

"During the journey, the Eurofighters were refuelled in mid-air by A330 MRTTs from the Royal Air Force and A310 MRTTs from the German Air Force, meaning they only had one stopover," explains Marco Gumbrecht, Head of Eurofighter Future Business Germany and Head of Military Relations Combat Aircraft Systems at Airbus – a former Eurofighter pilot himself.

"MRTTs can be used for transport as well as refuelling purposes, which meant the number of additional transport aircraft required could be reduced. This made the plan for getting the Eurofighters to the US much easier."

PRACTICE MAKES PERFECT

It's no coincidence that the Eurofighters performed so well: the air forces started practising their approach and take-off manoeuvres at Nellis Air Force Base long before the exercise began; that way, they could familiarise themselves with the Red Flag scenarios and quickly adjust to the new conditions.

"The German Air Force in particular has been a pioneer with its Mission Readiness Training," says Marco. "Our Airbus colleagues and experts from the German Air Force adopted a flexible and agile approach in coordinating these preparations, and the training sessions in our Airbus simulators allowed us to realistically reproduce the scenarios."

The Spanish Air Force was also ready for the exercise: "The flying wings units prepared by selecting and suiting up the aircraft beforehand," explains Squadron Leader David Neira, Eurofighter pilot and Commander of 111th Squadron. "Some two months before relocating to the US, we performed specific training for the aircrews. This training plan for the pilots included hundreds of flying missions in different roles. Furthermore, we conducted important simulator training at our ASTA [Aircrew Synthetic Training Aids] here in Morón, as well as other activities like sea survival training or medical check-ups."

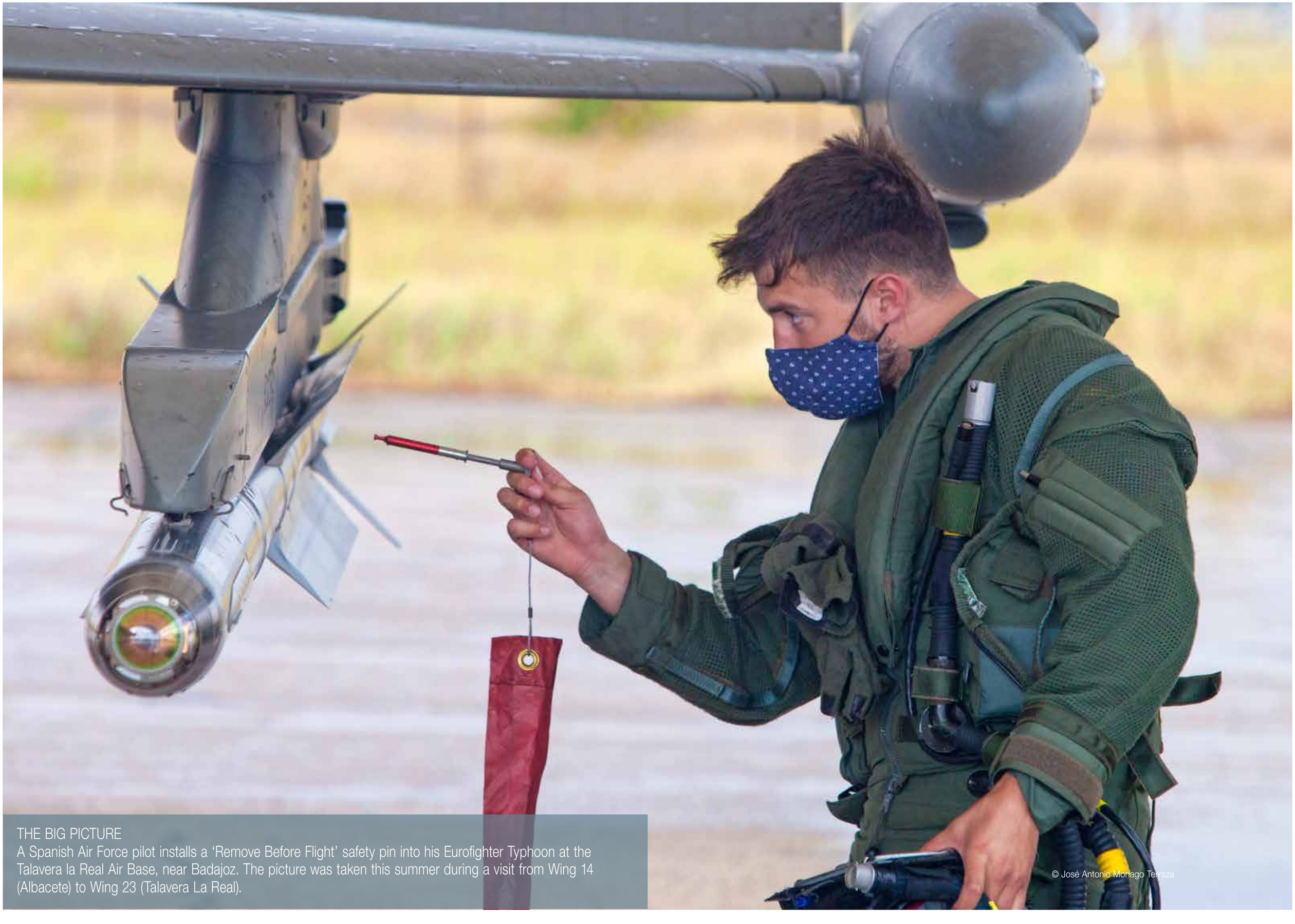
EUROFIGHTER RED FLAG TIME TO GET STARTED!

The days in Nellis were long for the entire team. Preparations for a single mission took up to 10 hours – with two exercise phases per day. "A Red Flag exercise is typically divided into two shifts: day and night," says David. "The day shift starts at 10am and the night shift at 6pm The routine is to plan the mission the day beforehand and execute it the following day."

Most missions flown involve the 'Blue' forces of NATO partners engaging the 'Red' forces, an advancing, simulated enemy, in what are known as offensive counter air operations. The Eurofighters took on several roles here: with their 500-kilogram GBU-48 bombs and cannons, they can be deployed against ground targets – during close air support or against high-value enemy targets, for example to destroy fuel storage facilities on the ground. At the same time, the Eurofighters can also adopt an air-to-air role against hostile aircraft to fight their way into a target area or support other important allies. The Eurofighters performed all of their manoeuvres excellently.

COVID-19 BRINGS THE EVENT TO A PREMATURE END

The exercise had to finish earlier than planned due to the spread of the coronavirus. Participants and materials from the event were quickly taken back home by Airbus A400Ms and a number of government aircraft from the German Federal Ministry of Defence. The Eurofighters were also able to return quickly thanks to additional fuel tanks, stopovers in the US and air-to-air refuelling by the US Air Force. ←



THE BIG PICTURE
A Spanish Air Force pilot installs a ‘Remove Before Flight’ safety pin into his Eurofighter Typhoon at the Talavera la Real Air Base, near Badajoz. The picture was taken this summer during a visit from Wing 14 (Albacete) to Wing 23 (Talavera La Real).

PROJECT **HALCON** TO BRING NEW EUROFIGHTERS TO SPAIN

Eurofighter has submitted proposals for the replacement of the Spanish Air Force's F-18s which are based on the Canary Islands.

Spain is looking to secure 20 new Eurofighter Typhoon aircraft to boost its existing fleet under what is called Project Halcon.

Airbus is in the process of negotiations with the Spanish government to mature the proposal and a contract for the 20 aircraft is expected to be signed in 2021.

The 20 latest-standard Eurofighter Typhoon aircraft would feature the E-Scan radar, which is currently under development. The Spanish Air Force Eurofighter fleet is 73-strong.

Project Halcon is Spain's wider plan to retire its F-18 Hornets and replace them with the latest-standard Eurofighters between 2025 and 2030.

The final Spanish Air Force Eurofighter from original orders was delivered earlier this year. Once Project Halcon is agreed it will secure Eurofighter manufacturing and final assembly work at the Airbus facility at Getafe until at least 2030.

Spain has been a supporter of the Eurofighter programme from its inception. In return it has used the programme to develop a robust aeronautical industry, and that in turn has provided Spain with technological independence.

DREAM COME TRUE

As part of our regular series of interviews with Eurofighter pilots we talk to Italian Air Force pilot Major Ilaria R., who gives us a real insight into her work with the 37th Wing in Trapani.

WHO INSPIRED YOU TO JOIN THE AIR FORCE?
Joining the Air Force has been a dream of mine since I was a child. From my childhood home I could see fighter jets flying and this inspired my passion for flying — it just grew and grew. Seeing the jets, I could only imagine what it would be like doing such a challenging and beautiful job.
I kept this dream alive in my imagination because back then the armed forces were not yet open to females. In 2000 when they finally opened up to women, I saw a chance to make my dream come true. During my last year of High School I decided to try to join the Air Force, and applied for the Academy. This is how I took my first steps into the job I always wanted to do since I was a child.

WHAT IS YOUR CAREER BACKGROUND?
I joined the Air Force Academy in 2002. My pilot training started in the 70th Wing in Latina, close to Rome. Then I went to the Shepard Air Force Base in Texas as part of the Euro-NATO Joint Jet Pilot Training Programme. From there I attended the Eurofighter Operational Conversion Unit in Italy before moving onto an Operational Squadron as a Eurofighter combat ready pilot.

WHAT ARE THE MAJOR CHALLENGES YOU FACE?
The challenges can be looked at from two aspects — the office role and the pilot one.

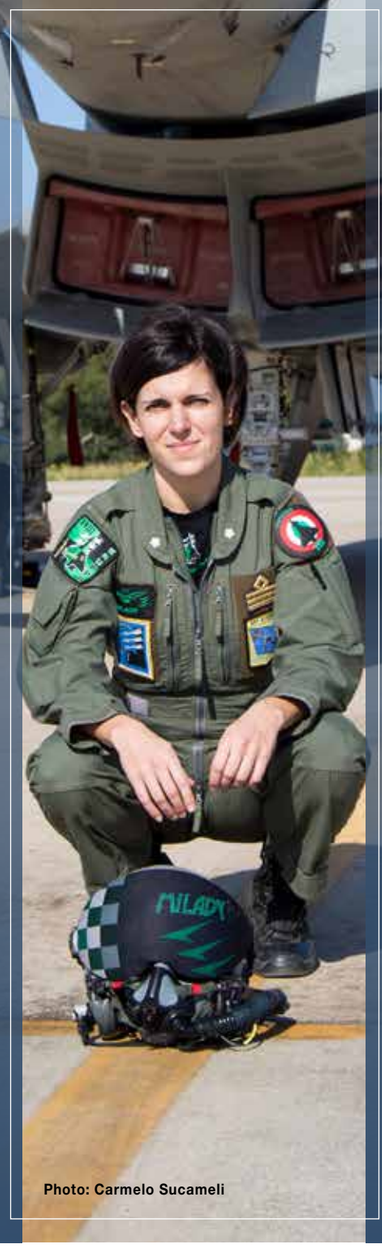


Photo: Carmelo Sucameli

As a pilot, the challenge is to ensure you keep up with a platform that's evolving and improving daily, with the implementation of new software and new armament types to get familiar with.

WHAT IS THE EUROFIGHTER TYPHOON LIKE TO FLY?
Typhoon is one of the most advanced platforms in the world. The challenge is centred on maximising the platform's performance in order to accomplish the mission in the best possible manner. From a performance perspective, it's one of the most powerful aircraft available. It can deliver tremendous power, making it hard to compete with in dogfight scenarios.

WHAT ATTRIBUTES DOES EUROFIGHTER POSSESS THAT MAKES IT SUITED TO MULTIROLE AND SWING-ROLE MISSIONS?
Eurofighter can perform these roles thanks to its avionics. The basic handling of the aircraft is taken care of by the autopilot and auto-throttles: the flight computers take information from the pilot and take care of most of the basic flying tasks. The pilot's duty consists of crosschecking that parameters are set and are being followed in the correct manner.
This allows the pilot to dedicate the majority of their attention on the on-board systems. This is one of the features that makes the platform capable of both swing-role and multi-role missions. The attention of the pilot is almost completely dedicated to the systems and to the task. In addition, the technology makes it easier, compared to some legacy platforms, to perform different types of missions within a single flight.

ISRAELI FIGHTERS LAND IN GERMANY FOR FIRST TIME

Some 75 years after the liberation of the Auschwitz extermination camp, six Israeli F-16 aircraft landed at the Nörvenich air base southwest of Cologne. It was the first time Israeli fighters had ever touched down on German soil.

For two weeks, German Eurofighters and Israeli F-16s trained side by side in joint air operations. They were at the home of the Tactical Air Force Squadron 31 "Boelcke" for this year's Blue Wings exercises.

The exercises marked another milestone in the ever-closer military cooperation between the two countries.

Both air forces practised joint air operations during the first week, in the second, the Israeli soldiers took part in the Multinational Air Group Days (MAG Days), which take place several times a year. The operation allowed the Israeli pilots to get to know German airspace, which is a real contrast to the topography in Israel.

The German Air Force has twice previously participated in the Israeli-based multinational exercise Blue Flag, most recently in November 2019. In addition, the two air forces have been working closely together for years in the Heron training programme.

German Air Force Inspector General, Lieutenant General Ingo Gerhartz said: "After the crime of the Shoah against humanity, it is a moving sign of our friendship today that we are flying side by side with the Israeli Air Force for the first time in our history. Following the darkest chapter in German history, it is our mission today to fight anti-Semitism with consistency."

A formation of two Eurofighters officially welcomed the Lieutenant General's Israeli counterpart, Major General Amikam Norkin.

"On behalf of the German Air Force it was honour for me to welcome the Israeli Air Force into German airspace for the first time in history."

During the visit, a historic joint flight over Fürstenfeldbruck, the site of the 1972 Olympic bombing, took place. Defence Minister Annegret Kramp-Karrenbauer also laid wreaths with the two Air Force Chiefs and the Israeli Ambassador at the Dachau concentration camp memorial site to commemorate the atrocities committed by the Nazi regime.

THE BIG PICTURE
Israeli and German aircraft flying over Fürstenfeldbruck, the site of the 1972 Olympic bombing, during a historic joint commemorative flight.

EUROFIGHTER

With more than 450 aircraft, the Eurofighter fleet is the backbone of European Air Power, securing the NATO territory from the Baltics to the Black Sea. And, throughout 2020 the air forces have continued to maintain mission readiness, with each taking part in a series of exercises. In this issue of Eurofighter World we look at the activity of Italian Air Force and German Air Force.

EUROFIGHTER TYPHOON AIRCRAFT WERE USED BY THE **ITALIAN AIR FORCE** IN THE FOLLOWING EXERCISES:

APEX INDIA February 19
(2 Eurofighter aircraft)
Apex India is a periodic aerial combat training exercise. It aims to train on Air Policing procedures for the tactical management of a hijacked aircraft, in bilateral cooperation with Allied countries.

RED FLAG March 9-20
(6 Eurofighter aircraft)
Red Flag is a two-week advanced aerial combat training exercise held several times a year by the United States Air Force. It aims to offer realistic air-combat training for military pilots and other flight crew members from the United States and Allied countries.

COMAO June 25
(12 Eurofighter aircraft)
COMAO involved 12 Eurofighter F2000 from the 36th Wing of Gioia del Colle, a KC130 of the 46th Air Brigade of Pisa and one G550 CAEW of the 14th Wing of Pratica di Mare. A team of the 16th Wing PF supported the assets by providing JTAC (Joint Terminal Attack Controller) capabilities.
During the mission, the Eurofighter is used in air-air, air-to-ground and swing-role configuration. This type of combined advanced training allows the youngest pilots to face scenarios that are difficult to simulate using assets from one single Wing.

PLANNED ACTIVITY

INTEGRATION TRAINING / NOTTE SCURA (2 Eurofighter aircraft)
September 14 – October 8
Force Integration Training and Notte Scura are exercises held by the Special Forces Command to integrate ground troops and aerial forces through the use of digital communications to coordinate Close Air Support (DCAS) and Surveillance and Reconnaissance (SR).

RAMSTEIN GUARD
(6 Eurofighter aircraft)
November 16-20
Exercise Ramstein Guard is held by the NATO Electronic Warfare Force Integration Programme to provide high level training to the NATO air and missile integrated defence system.

IN ACTION

EUROFIGHTER TYPHOON AIRCRAFT WERE USED BY THE **GERMAN AIR FORCE** IN THE FOLLOWING EXERCISES:

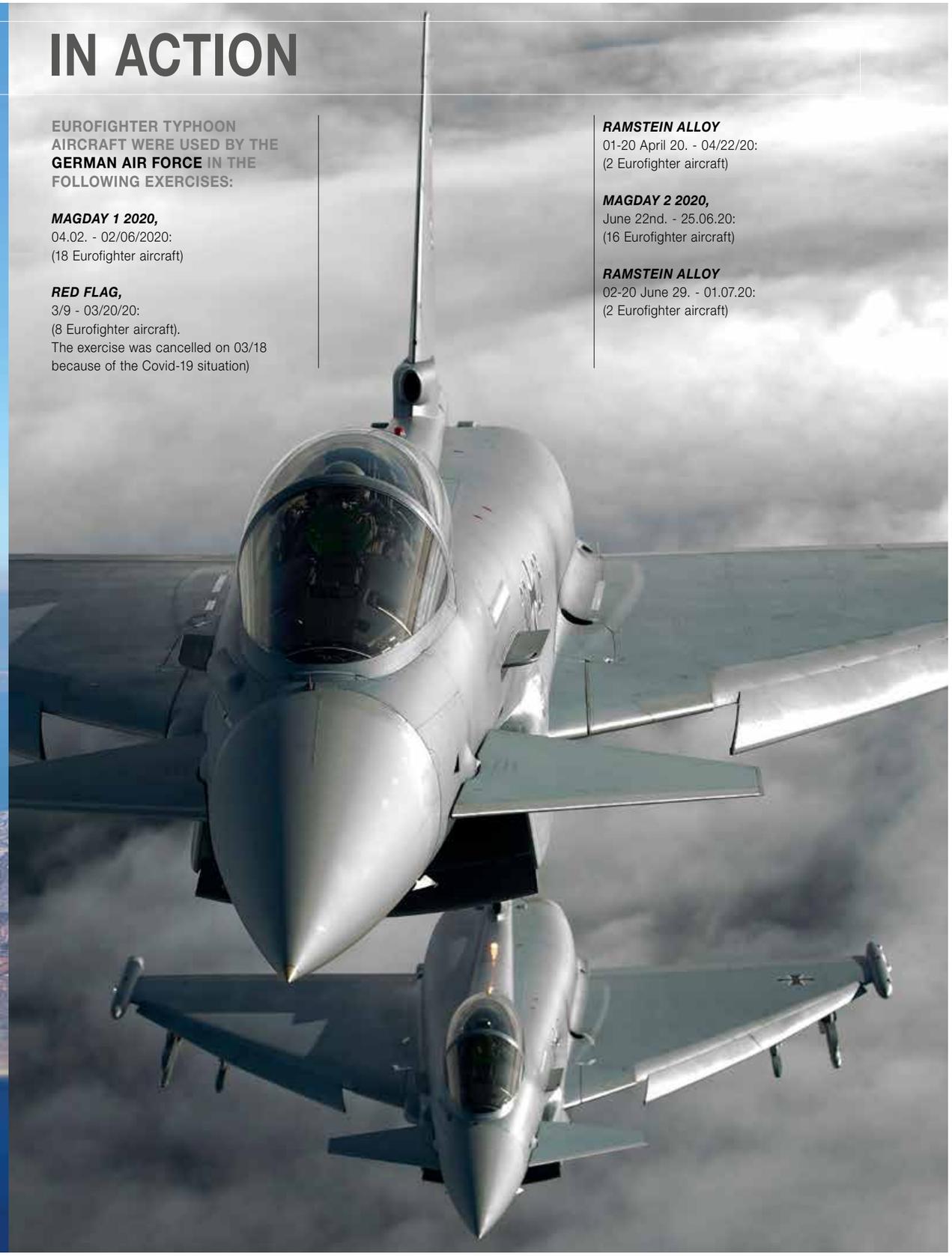
MAGDAY 1 2020,
04.02. - 02/06/2020:
(18 Eurofighter aircraft)

RED FLAG,
3/9 - 03/20/20:
(8 Eurofighter aircraft).
The exercise was cancelled on 03/18 because of the Covid-19 situation)

RAMSTEIN ALLOY
01-20 April 20. - 04/22/20:
(2 Eurofighter aircraft)

MAGDAY 2 2020,
June 22nd. - 25.06.20:
(16 Eurofighter aircraft)

RAMSTEIN ALLOY
02-20 June 29. - 01.07.20:
(2 Eurofighter aircraft)



SOCIAL DISTANCE NO BARRIER FOR RAF NATO DEPLOYMENT

A 150-strong expeditionary force from UK Royal Air Force proved their resilience in spite of Covid-19, to take part in their latest NATO Baltic Air Policing deployment.

Operating from the Siauliai Air Base in Lithuania between May 1st and August 31st, the 135th Expeditionary Air Wing carried out their preparation for the rotation in unfamiliar circumstances.

"The pandemic has had an impact on everyone around the globe and it affected us too," says Wing Commander Stu Gwinnutt.

"We all self-isolated and were tested before we deployed because at that time, the UK was in the thick of the corona virus restrictions."

The force included Eurofighter Typhoon jets and pilots from the VI Squadron normally based in RAF Lossiemouth. Wing Commander Gwinnutt said the timing of Operation AZOTIZES — the UK name of the operation that supports NATO air policing in the Baltic Sea region — was a good test of the RAF's contingency planning.

He said: "Before we deployed, like everyone else, we were working from home and social distancing. But we used technology for briefings and carrying out all the preparation. It proved our training is proficient because when we all came together everyone knew their individual roles and everything clicked."

When the force arrived at Siauliai, it had to cope with the constraints of working while social distancing, with everyone also required to wear masks in compliance with national guidelines. Subsequently those restrictions have been lifted.

"In the Baltic states, and in Lithuania in particular, the number of Covid-19 cases has been relatively low. The country has started to come out of the restricted phase and life is beginning to return to normal."

Despite the unusual circumstances surrounding the launch of the deployment it's been business as usual for the RAF, says Wing Commander Gwinnutt.

"The operation so far has been very successful. We've been involved in a number of live QRA launches and conducted the training engagements with different NATO partners that we had planned.

"Getting in, getting established and delivering on operations, has been a great distraction (from Covid-19) for us."

EUROFIGHTER SCORES FOR INTEROPERABILITY

Throughout the four-month deployment, the RAF is working with other NATO nations, notably the Spanish Air Force, who are also based at Siauliai Air Base, Lithuania, and the French Air Force, who are based in Amari in Estonia. The presence of three nations, different aircraft and a range of mission sets has meant strong interoperability has been key.

The lead RAF Pilot at Siauliai said: "We have been routinely flying alongside the Spanish detachment of F-18s and the French Air Force with the Mirage 2000. We need to be interoperable with all the different types of aircraft that are scattered across all the different nations. Of course, that doesn't just apply in this operation, but to NATO roles in general. This detachment is no different in that respect.

"Typhoon is a very agile modern aircraft and as you'd expect it's very easy to interoperate and to operate with other jets of other nations and we've done that very successfully here during this detachment."

The core activity is Baltic Air Policing and the Eurofighter role is Quick Reaction Alert (QRA). This type of activity has been stepped up following Russia's annexation of Crimea in 2014.

"That's a good example of why we're here," says Wing Commander Gwinnutt. "NATO air policing is all about us giving a credible, layered defence of that airspace to prevent that kind of aggressive act from happening in the future."

SUCCESSFULLY JOINING FORCES

There are two key aspects to the deployment. Beyond the air policing task, the force has the ability to carry out other training missions as well.

"It's a fantastic part of the world to be working with all three participating nations," says the lead pilot. "We're working closely with the Spanish Air Force here in Lithuania and the training with them has gone really well. You're fighting against a different type of aircraft, which we don't get to do very often, so that's very valuable training."

"We have carried out a lot of other missions outside of the core QRA task. We've been working on NATO maritime exercises and Counter Helicopter Training in Poland and throughout the Typhoon has performed very well."

During the Counter Helicopter sorties, the Eurofighter Typhoons operated with UK and Polish JTAXs (Joint Terminal Attack Controllers) on the ground as well as Polish W-3 Attack Helicopters. This particular training scenario gave the Typhoons a chance to practice counter-helicopter tactics whilst defending a NATO convoy.

The RAF lead pilot said: "During the training missions there were a lot of NATO soldiers on the ground and they were under simulated attacks from an enemy helicopter. Our role was to protect the troops. It's a quite a difficult task to spot a helicopter, it requires a good radar, but luckily on the Typhoon we've got a good radar.

"So far, they've been really successful missions. It's been particularly good in terms of interoperability with the NATO forces: we're flying in Poland, speaking with Polish air traffic control, and working with Polish helicopters. From our point of view, it's really valuable training. The feedback from the JTAXs on the ground has been good as well."

GROWING UP TOGETHER

There's a human aspect to this activity too as Wing Commander Gwinnutt points out. "The UK commitment to NATO is obviously very important to us. But in addition to the core task, we also have the opportunity to work with our allies while we're deployed on operations.

"Normally we come together for an exercise for a week or two and we establish some relationships and learn from each other, but then we go our separate ways. In this deployment, we're here for four months, we can establish relationships, develop, share where appropriate, learn from each other and take that through.

"Those relationships will follow people through their careers. A junior pilot now will meet his opposite number in the Spanish detachment today. Then in a few years' time, who knows where their careers will have taken them. The deployment is really important for building relationships and sharing experiences.

FOR PILOTS THE EXPERIENCE IS UNRIVALLED

"Obviously, the core task here is QRA," says the lead pilot. "And back in the UK we have two bases carrying out QRA 24/7 and a detachment 24/7 in the Falklands. So for us, QRA is something all pilots do routinely.

"However, coming out to somewhere like the Baltic States or Romania or Iceland, which we've done as well, means working in a different area and with different constraints. There's a really good benefit for us in doing that.

"At the individual level not all the pilots that have been in the Baltic before, so an operation like this represents an opportunity to do something different. That has really good training benefits because there's exposure to different types of intercepts and so on. Already this deployment has been a very good learning experience for all of us.

"While we are here we're trying to train with as many different NATO partners and as many different assets as we can to get more from that learning experience."

LIFE THROUGH THE LENS

Giovanni Colla

Giovanni Colla is a photographer and freelance journalist specialising in military aviation with more than 18 years' experience. He's worked with over 40 armed forces worldwide. One of the highlights include a flight in the back seat of an Italian Air Force Typhoon in 2019. He's a regular contributor to Eurofighter World as well as Combat Aircraft, Air Force Monthly, Aerospace and Defence, Global Aviatior, Rivista Aeronautica and many more. He says planning is the key to getting the perfect picture.

About this image:
I was in the back seat of a TF-2000 assigned to 37th Wing at Trapani Air Base and this was the 8th event of the shoot. In order to get the shot I briefed the pilots to fly with heading 340° (for the sun position). Our jet took the lead while the other three were in echelon formation all at same level helmet line up. Via a radio call my pilot ordered a simultaneous three-ship break with the #1 crossing the tail, #2 pulling up and #3 peeling off.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