Leader of Forces

Typhoon: Operational with six air forces, the aircraft offers total role dominance. Eurofighter Typhoon delivers unparalleled fleet effectiveness. Designed with an established technology insertion programme - from AESA radar and innovative latest generation helmet mounted symbology system to advanced air-to-air and air-to-ground weapon systems - the Typhoon is able to counter effectively all current and evolving threats and will continue at the forefront of combat aircraft for future decades.
Welcome to another edition of the Eurofighter World magazine, our third of 2010. The magazine has been a real success since its launch at the start of this year and has not only included all the latest Eurofighter news but has been making the headlines too. Our ‘What is a 5th Generation fighter?’ feature caused much debate across aerospace and defence forums prompting a presentation by the brains behind the article to a selection of trade media at Farnborough International Air Show in July. As you can see from the picture to the side, even the Indian Defence Minister Pallam Ragu took some time to read the magazine during a visit to our impressive pavilion and full scale replica at Farnborough. The success of the magazine reflects the success of the Eurofighter programme over the course of the year. We attended both I.A. Berlin and Farnborough International in the summer months with a wide variety of expected and unexpected visitors showing an interest in the aircraft. We have achieved many significant milestones over the past few months, including the delivery of the 300th right Typhoon wing in Spain, two new Typhoon squadrons were introduced at RAF Leuchars and Gioia del Colle, there has been a steady flow of aircraft deliveries to customers (over 236 at going to press) and we were able to announce exciting news for the programme. The hotly anticipated Helmet Mounted Symbology System (HMSS) was introduced to all four core nation Air Forces who began taking delivery of the new equipment in July. To celebrate this fact, Eurofighter test pilot Nat Makepeace flew the newly in-service helmet daily in his ‘fully loaded' air display during Farnborough. Nat has provided Eurofighter World with an interview reviewing the performance of the HMSS in this edition. Vitaly, Eurofighter and its Partner Nations announced the launch of full scale development of a latest generation Active Electronically Scanned Array (AESA) radar during Farnborough. The programme is working towards a 2015 in-service release date and will build on the exceptional capabilities of our current Mechanically Scanned (M-Scan) radar.

Enzo Casolini
CEO Eurofighter GmbH

After these successes, it is important that I mention the first fatal accident of a Eurofighter Typhoon which occurred at Morón Air Base in August. I speak not only for myself but on behalf of everyone working on the Eurofighter programme when I send our deepest sympathies to the family and friends of the pilot that lost his life. Eurofighter will continue to offer every support to the Spanish Ministry of Defence as the investigation continues into the crash. Please enjoy the magazine and here’s to a very successful rest of 2010.

Enzo Casolini
CEO Eurofighter GmbH
EUROFIGHTER CELEBRATE THE 50TH ANNIVERSARY OF THE FRECCE TRICOLORI

EUROfighter Typhoon celebrated the 50th anniversary of the Freccia Tricolore at Rivolto airshow which took place on the 11th - 12th of September in the Northeastern Italian Air Force Base. Rivolto was not only a massive event (around 500.000 visitors in 2 days), but also a successful one, as lots of acrobatic national teams, such as Patrouille Suisse, Patrouille de France, Frecce Tricolori, and many others, performed their best formation actions, including the best performance of the day by the Frecce Tricolori, who also presented the new Typhoon to the audience.

The Italian Air Force’s Eurofighter Typhoon from the “Reparto Sperimentale di Volo” of Pratica di Mare, was on flying display over both days of the event, just before the Frecce Tricolori and therefore almost everybody was on the side of the runway to witness the impressive and much acclaimed show.

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EUROFIGHTER AND JUNKERS LAUNCH A NEW WATCH

EUROfighter joined forces with the famous watch makers Junkers, to create a limited edition EUROfighter Typhoon watch. Junkers is known for high tech, high performance, affordability and excellent quality which are characteristics associated closely with the Eurofighter Typhoon.

The limited series of the Eurofighter - Junkers watch will be engraved with the edition, the Eurofighter Typhoon logo and the Junkers symbol on the back of the encasement.

300TH EUROFIGHTER WING MANUFACTURED IN SPAIN

Another keystone in the life of the largest European industrial collaborative programme was accomplished in July when EADS Defence & Security’s facilities in Getafe, Spain, delivered the 300th Typhoon.

The composite material wing (more than 80% of Eurofighter is made in composite materials), will be integrated in the twin-seat Eurofighter Typhoon, which already flying in the European fighter fleet.

A benefit to the Luftwaffe’s operations in “Dec” was the large area of free space that allowed supersonic flight and unlimited manoeuvres to take place over the Tyrohannian Sea, which is within the vicinity of the “Viper” to “Typhoon”. The large base area of Getafe, situated on Italy’s coast, close to the town of Bari, was used to host a band made up of two squadrons. In the “40s” and “50s” the 26th Stormo was equipped with F-104 aircraft. Following the F-104 came the Tornado in the recent past equipped both squadrons with two versions of the attack variant, IDS and the air defense variant, ADV. The Tornado group will join the XVI Group’s jets in air policing and air defense missions, 24 hours a day, 7 days a week, including the role of protecting the air space over the skies of Albania.

The symbolic new start of the “Prancing Horse”, took place during a ceremony in Gioia del Colle that saw a fly past of a mixed formation of Eurofighter and F-16’s, marking the handover from “Viper” to “Typhoon”. The large base area of Gioia del Colle, situated on Italy’s coast, close to the town of Bari, was used to host a band made up of two squadrons. In the “40s” and “50s” the 26th Stormo was equipped with F-104 aircraft.

The new Typhoon squadron is the first of three planned at the base and will take over QRA duties in March 2011. 6 Squadron will now spend the next few months training and reaching combat readiness in preparation for the handover of responsibilities of the German detachment - It is better to be prepared for all potential scenarios”.

Andrea Truppe, Chief of Operations from the 4th Stormo, said: “During the exercise we flew four Eurofighters, supporting the Luftwaffe aircraft that were ‘playing’ all possible scenarios. We were flying ‘with’ them and ‘against’ them so that it was possible to validate all tactics and procedures. The final result we obtained was a very high degree of standardisation and of operational integration”. This is certainly one of the benefits that the Eurofighter has brought to the air forces in Europe. A common platform, common systems, common training, common logistics and ground support so the costs are reduced but the efficiency and effectiveness increases.

NEW EUROWIGHTER VIDEO:

THE BEST EXAMPLE OF PARTNERSHIP BETWEEN EUROPEAN NATIONS

EUROfighter Typhoon commemorated the 70th anniversary of the Battle of Britain with a short film of the Typhoon and its classic British counterparts, the Spitfire and Hurricane.

The Eurofighter Typhoon represents the perfect example of what can be achieved through European cooperation and the partnership between Germany, Italy, Spain and the United Kingdom today produces the world’s most advanced new generation fighter jet.

Watch the film online now at:

http://www.eurofighter.com/media/video-library

6 SQUADRON TYPHOONS ARRIVE AT RAF LEUCHARS

EUROfighter Typhoon arrived operating at an 11th Air Force base as 6 Squadron settled into its new home at RAF Leuchars in Fife, Scotland.

The new Typhoon Squadron landed at an 11th Air Force base as 6 Squadron settled into their new home at RAF Leuchars in Fife, Scotland.

The new Typhoon squadron will be the backbone of Britain’s Northern Air Policing Quick Reaction Alert (QRA) force, replacing the Tornado F3 of 111 Squadron.

The Typhoon is the heartland of Europe to attend the fourth Piestany National Air Days, officially called ‘Narodne Letecke Dni’ in Slovakian. This year saw Eurofighter Typhoon’s debut at the show which is located 90 kilometres north east from the Czech capital of Bratislava. Eurofighter Typhoon’s arrival marked the power and agility of the Typhoon at this special air show which is surrounded by the beautiful scenery of the old spa town, home to the country’s historical aeronautical museum. Piestany boasts a proud history of aviation and this year’s show was the final leg of the Slovak aviation legacy on the weekend of the 29th and 30th of May with an overview to the future.

The Italian Air Force’s Eurofighter Typhoon celebrated the 50th anniversary of the Frecce Tricolori at Rivolto airshow which took place on the 11th - 12th of September in the Northeastern Italian Air Force Base. Rivolto was not only a massive event (around 500,000 visitors in 2 days), but also a successful one, as lots of acrobatic national teams, such as Patrouille Suisse, Patrouille de France, Frecce Tricolori, and many others, performed their best formation actions, including the best performance of the day by the Frecce Tricolori, who also presented the new Typhoon to the audience.

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The Italian Ambassador in Slovakia, Bruno Barei Genczakos and the Alena test pilot Matteo Maurizi, welcomed 1,000 who came from across Europe to be part of the event.

Enduring the strong European focus at the show, two Eurofighter Typhoon aircraft participated, one from Italy, piloted by the Alena aeronautica test pilot Matteo Maurizi and the second from first export customer Austria. The Austrian Air Force jet delivered several high speed passes over the adjoining Piestany airport before climbing vertically to high altitude and returning to its home base at Zeltweg, around 350 kilometres from Piestany.

In Slovakia, the Eurofighter Typhoon is acknowledged as being the ideal solution for the replacement of the Slovak Air Force’s MiG-29 fleet which in the medium term has to be replaced with a more modern defence system. The European solution offered by Eurofighter would not only provide the Slovakian Air Force with a highly capable combat and defense aircraft, but it can also help to sustain and develop the capabilities of the Slovakian defence industry and its skilled workforce, including industrial partnerships, associated transfer of technology, and the offer of strong bilateral economic benefits across Europe.
September saw Eurofighter Typhoon venture to the Czech Republic to attend two key European air shows held in the country. With a potential requirement for a new, more capable and fully NATO compatible fighter to replace the Air Forces with leasing IAS 39 Gripen fleet, Eurofighter is keen to build a lasting relationship with the Czech Air Force and Czech industry as well as familiarise the public with the World’s most advanced new generation multirole combat aircraft.

Starting off the month was the Czech International Air Festival (CIAF) which is held over the weekend of the 4th and 5th September at Hradec Králové and saw an operational German Eurofighter Typhoon on static display.

Secondly, over the 18th-19th September was the International Air Festival (CIAF) which is held over the weekend of the 4th and 5th September at Hradec Králové and saw an operational German Eurofighter Typhoon on static display.

At Farnborough International, Typhoon made a rare demonstration of its unrivalled agility and engine power with a full weapon load air display. In total, two Typhoon jets took part in the show’s daily display of air capabilities, one from RAF’s 29 Squadron which flew ‘clean’ as with all display aircraft, and the second, a Warton based development jet (IP) 5 that took off immediately after the RAF aircraft display, flying with a full weapon configuration rarely seen at air shows.

IP 5 flew with all 13 hard points occupied in a full swing role configuration, including four Paveway II laser guided bombs, three fuel tanks, four AMRAAMs (Advanced Medium Range Air-to-Air Missiles) and two ASRAAMs (Advanced Short Range Air-to-Air Missiles). The display highlighted to both trade and public visitors that the Typhoon is agile regardless of weapon load, pulling up to an impressive 5.5g and in excess of a 20 degrees angle of attack. Most air displays are achieved by reducing fuel and weapon loads, however, with this display, IP 5 was able to demonstrate significant weapon carriage and manoeuvrability whilst still being able to demonstrate carefree handling for the pilot.

In addition to the air display, two more Eurofighter Typhoons were on the ground at the show. An Italian Air Force aircraft was on static display at the Francoceca stand and a mock-up Eurofighter was outside the Eurofighter pavilion for visitors to sit in the cockpit.

At centre stage of the large Eurofighter pavilion were the aircraft’s new capabilities, the newly-in-service Helmet Mounted Symbology System (HMSS) and the recently announced Active Electronically Scanned Array (AESA) Radar.

Eurofighter Typhoon: THE HEIR TO A CENTURY OF AIR POWER

Eurofighter Typhoon launched a series of heritage documentaries tracing the technological development of high-tech military aviation in Europe in July.

The films are available to watch online at www.eurofighter.com.

Four versions were launched simultaneously featuring the specific aviation histories from the core partner countries of the UK, Germany, Italy and Spain. All provide a 10 minute insight into these leading aviation nations and each in their native tongue. The documentaries explore the timeline from the first combat aircraft in the early 1900’s, culminating in the introduction into service of the World’s most advanced, multi-role combat aircraft: the Eurofighter Typhoon. The aircraft is the latest product in an evolutionary process of elite manufacturing, materials, equipment, capabilities and weapons.

The documentaries were filmed at various locations across the four nations including air force bases and aviation museums with contributions from a selection of aviation experts. The catalogue of aircraft featured includes Typhoon, Panavia’s Tornado, Spitfire and Meteor – the first operational jet in RAF squadrons service, the Spad XIII which is in tandem with the Schneider Cup idiosyncrasy became symbols of pride and capability for the Italian airforce’s Ministry, the F-104 Starfighter from the Spanish Civil War is featured as well as the First World War fighter aircraft Fokker D.I and the BF-109 - the first modern German fighter of the 1930s - and the Me 262, all the first operational fighter jet, icons of fighter technology evolution.

All aircraft featured are representative of pushing back the frontiers of advanced aerospace technology, and the present-day Typhoon has been able to benefit from the evolution of manufacturing and technological processes in Europe that began with the first of its above named predecessors.

EUROFIGHTER NEWS

3/2010

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From left to right - Gerhard Plichtner, Erwin Oehmeier, Ludwig Dorn celebrate delivery of the new Radome

7

The Typhoon and Meteor jets fly above the British countryside.
It is now evident that the boundaries between the 4th and 5th generation classifications are sometimes too rigid and schematic to reflect the real capabilities of a weapon system. This was particularly the case for Eurofighter Typhoon, which exhibits all the qualities of a 5th generation fighter with the exception of Very Low Observability (VLO) yet is well above the legacy 4th generation platforms in all other measures of performance. (Eurofighter World 02/2010; pg 16)

It was also evident that, scoring Typhoon against the ‘admission criteria’ of the 5th generation club, would produce a much higher compliance than, let’s say, the Rafale as marketed as a 5th generation fighter but that in reality would be better defined ‘A-35’ (an attack aircraft, not a fighter).

Given the ‘surprising’ commonality of key design features highlighted by the 5th Generation Fighter Checklist (see table above right), it may be worth exploring further the Typhoon and Raptor design concepts and the philosophy behind their operational requirements.

During the Cold War, the NATO-Warshaw Pact confrontation was the most dominant threat in terms of the requirements driving the design of fighter aircraft. The genius of the Eurofighter Typhoon and of the F-22 Raptor can be traced back to a common conceptual thinking: quality vs. quantity; air dominance as the foundation and premise for overall military success; considerable margin of superiority vs. the highest threat.

Two different solutions were pursued: with many similarities, but also with some key differences. The end result: on one side the ultimate gold-plated solution with many features needed in the future, but also with some key penalties. On the other side, the balanced approach which ‘can do the job’, but with a forward looking plan to upgrade the initial superiority as the threat evolves, new technologies mature and their costs drop.

The key difference between the Eurofighter and the F-22 was in the approach to the survivability equation, which in the Raptor’s case was to go for a Very Low Observable (VLO) design and, consequently, for the internal carriage of the weapons load, but at what cost in terms of affordability, mass, complexity and inflexibility?

Significant to note however is the fact that where the Raptor needs 70,000 lb of thrust and has an empty weight of about 20t, Typhoon requires only 40,000 lb of thrust and weighs less than 12t. The extra weight means that more fuel (91 vs 51) is required to achieve similar fuel fractions (and similar mission performance results). This adds to the overall weight and feeds the vicious circle, where more weight in turn requires more thrust to achieve the desired thrust-to-weight ratio. More wing area is of course needed to achieve competitive wing loading, turning performance as
MARKET ANALYSIS

Taking as a starting reference a Typhoon with the mechanical scan radar, the Eurojet EJ200 engines and armed with 6 AMRAAM and 2 Short Range Missiles, a quantum leap in air combat capability will be achieved.

EUROFIGHTER VS F-22 CAPABILITIES

Taking as a starting reference a Typhoon with the mechanical scan radar, the Eurojet EJ200 engines and armed with 6 AMRAAM and 2 Short Range Missiles, a quantum leap in air combat capability will be achieved.

EUROFIGHTER TYPHOON & F-22 RAPTOR – CLOSING THE GAP COST EFFECTIVENESS

Technology Insertion Phased Approach:
- Capability is Threat-Justified
- The Technology is Mature
- At the Right Price Point

(Final cost effectiveness results are scenario dependant. Data shown versus non-VLO threat fighters)

EUROFIGHTER BEST IN CLASS

It is no exaggeration to characterise Eurofighter Typhoon as the best-in-class aerodynamic platform with the most powerful and advanced AESA radar, armed with the most lethal Meteor long range missiles, Iriss-T and ASRAAM short range missiles.

And last but not least as with all Eurofighters whose fundamental design choices are shaped by air superiority requirements, Typhoon is moving briskly into new surface attack roles by integrating an ever increasing array of air-to-surface weapons and expanding sensor functionalities.

Whatever the definition might be, it is quite evident that Typhoon is keeping ahead of the potential threat by inserting new capabilities when needed, in a cost-effective fashion. This is because the level of the F-22 air combat effectiveness band (see bar chart above)

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Eurofighter Test Pilot Nat Makepeace walks away from his Eurofighter at Farnborough Air Show wearing the new HMSS.
A Pillar of Growth for the Eurofighter Typhoon Platform

BY CRAIG PENRICE, TYPHOON TEST PILOT

EUROFIGHTER AND EURORADAR TO DEVELOP LATEST GENERATION AESA RADAR

A n innovative cutting edge AESA radar system, ensures Eurofighter as the most advanced aircraft available on the market. Eurofighter GmbH and Euroradar, together with their industrial partners, have begun full scale development of a future generation Active Electronically Scanned Array (AESA) radar. The target in service date for the new radar is 2015 to meet the requirements of Eurofighter Partner Nations and export customers.

The decision means that Eurofighter will further develop the capability of the Typhoon aircraft to enhance its radar performance: building on preliminary development and flight testing undertaken since 2007. Although the currently Mechanically Scanned (MiScan) radar is considered to be in best in class, AESA technology will allow the Typhoon’s radar capabilities developed even further. The planned AESA radar will offer a variety of benefits over MiScan, including increased detection and tracking range, advanced air to air surface capability and enhanced electronic protection measures.

The new radar will retain the key features of the existing Captor radar architecture and enhance the capability of the system and will use latest generation technology to provide a full complement of air to air and air to surface modes. The large array can be accommodated easily in the Typhoon’s radome and, being fitted on a repositioner, will provide an extremely wide field of regard. This will see Typhoon’s combat effectiveness enhanced even further, allowing the Typhoon to operate in a safer environment than other aircraft available on the market. The radar will offer the customers freedom to retrofit their existing Typhoons with AESA. The new radar will retain all the enhanced potential and both existing and new customers will be able to participate in tailoring the radar to meet their individual operational requirements.

Eurofighter is a multi-national consortium lead by SELEX Galileo, a Finmeccanica Company, alongside EADS Defence and Space, and ITPA. Eurofighter has delivered over 230 aircraft to several nations. The Typhoon programme in which the Typhoon radar programme to date and this experience will ensure a timely and smooth transition to AESA.

A PILOT’S PERSPECTIVE ON THE PROSPECT OF WIDE FIELD OF REGARD AESA RADAR

BY CRAIG PENRICE, TYPHOON TEST PILOT

This is an important step in the Eurofighter programme and will ensure that Typhoon continues to lead the way as the world’s best new generation multi role combat aircraft. In consultation with our Core Nation customers we can offer an AESA capability that far exceeds any other radar available. This capability will mean that Eurofighter is in the best possible position when effecting Typhoon to the export market. The in-service date marks we are perfectly positioned in to respond to the complex and demanding requirements of the air forces.

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The Euroradar consortium, (led by SELEX Galileo with partners EADS Defence & Security of Germany and Indra of Spain), has invested heavily in Active Electronically Scanned Array (AESA) radar technology over the last 16 years.

During that time a number of Technology Demonstrator Programmes have been executed, each one taking AESA capability on Typhoon to a new level. These programmes include the Dragonfly AESA Demonstrator which flew with great success on Eurofighter Typhoon DA-5 on May 2007.

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AIR FORCES TAKE DELIVERY OF A LATEST TECHNOLOGY HELMET MOUNTED SYMBOLOGY SYSTEM

HELMET MAKES HEADLINES

In July 2010 the Royal Air Force, Spanish Air Force, Italian Air Force and the German Luftwaffe began taking delivery of the most advanced Helmet Mounted Symbology System (HMSS) available for fighter pilots and forms a key component of their Eurofighter Typhoon weapon systems. The new HMSS was flown throughout the week of Farnborough Air Show in mid-July by Eurofighter test pilot Nat Makepeace in the air display.

The HMSS passive and stealthy sensor system, developed and manufactured by BAE Systems Rochester, provides the Eurofighter pilot with significant operational advantages by reducing pilot workload and increasing the weapon envelop in combat situations. The Eurofighter pilot will be able to instantly designate targets with full head movement, reducing the need for in-cockpit switch selection and aircraft maneuvering. This exploit’s the full potential of both on-board restrained active/passive and semi-active/active/on-board/semi-active/active/bolt-on (IRIS-T and ASRAAM) and gives the pilot a clear and unobstructed view of all air-to-air and air-to-ground tasks.

The HMSS significantly improves tactical performance for Eurofighter pilots, by providing essential flight and weapon aiming information through the helmet to the pilot. Information imagery includes the aircraft’s flight parameters, weapon status and aiming which are all projected in real-time on the HMSS head-up display, thereby enabling the pilot to simultaneously look out in any direction (head out) and have all required flight and weapon aiming information always in his field of vision.

In combination, the Typhoon Helmet and HMSS provide world leading capabilities, giving the pilot, in conjuction with the rest of the Typhoon Human Machine Interface equipment, unrivalled situational awareness whether “head in” or “head out”. The HMSS is manufactured from carbon fibre and under 2 kg, its weight is similar to other contemporary non-HMSS helmets. Its modular design incorporates a pilot personal “inner” helmet, which fits into the standard “outer” avionic HMSS. This design allows both personal comfort and reduced ownership costs through the flexibility of an outer interchangeable HMSS. Ejection safety characteristics are built into the design. As well as providing non-avionic type helmet essential safety characteristics of pilot life support and communications functions, the HMSS has full integration with all Eurofighter attack and navigation systems. The new helmet can be used throughout the full aircraft envelope (up to 9g) for both air-to-air and air-to-ground day / night missions.

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NAT MAKEPEACE

Nat Makepeace is a Eurofighter test pilot for BAE Systems. Having flown in the RAF for 22 years, Nat’s experience varies; ranging from aircraft such as the Hawk, Tornado and Eurofighter Typhoon aircraft for the RAF, but also with the F-16 as an exchange pilot in the US Air Force. Now based at BAE Systems’ Warton site, Nat has been a Project pilot for Tornado GR4A upgrade and day/night HMSS development as well as a Project pilot on ASRAAM and smart weapon upgrades for the F-16. His flying hours total over 4,500 as of July 2010 when Nat flew the fully loaded Typhoon all week during the Farnborough International Air Show. Here he shares his thoughts on the HMSS which he wore during the display.

Nat, you flew the helmet daily during Farnborough in the air display. How did you find it?

The helmet was reliable all week. It performed well and enabled me to see key performance parameters clearly. Being almost as light and only slightly more complicated than a normal helmet, I had no problems with it.

Were there any other pilots wearing similar equipment?

Not to the best of my knowledge. The F-18 and F-16 both fly a similar system which is not quite as advanced as ours, but I don’t believe they flew with it at the show.

How long have you been flying with the helmet?

I have been flying with the Eurofighter Helmet Mounted Symbology System for some 18 months. In my previous experiences as a test pilot I have been flying with helmet mounted displays for about 10 years, which enables me to be very familiar with all the required elements of the helmet.

What is your experience flying the HMSS?

I have flown around 30 sorties over a varied length of time, ranging from a few minutes to several hours. The nature of these flights have varied between multi-ship tactical air-to-air scenarios to low level display aerobatics such as in Farnborough.

How does it affect the operational capability of the Eurofighter Typhoon?

The HMSS provides a significant increase in situational awareness, which in turn will reduce workload or increase the utility of the pilot aircraft combination. If the ability to see all around you, many combat and peacetime tasks will be simpler to conduct and will be completed quicker.

Does it increase capability for both air-to-air and air-to-ground roles?

It definitely improves both and has huge potential in the air-to-ground role. In particular CAS where the situation is fluid. Currently in Typhoon this capability is not yet enabled, but from other platforms this will really provide the edge for the pilot.

From a wearability point of view, is the helmet different to old non-avionic helmets?

In general, you will find that walk-out procedures will be influenced slightly. So far the production helmet has proved robust, working very well at Farnborough with only pilot servicing.

What aspect of the HMSS do you believe will be most useful to the Air Forces?

I would say that off-bore sight designation is key for the air forces and the helmet certainly offers excellent capability in this regard. Also, air-to-surface tasks are greatly facili-

Q.

In combination, the Typhoon Helmet and HMSS provide world leading capabilities, giving the pilot, in conjuction with the rest of the Typhoon Human Machine Interface equipment, unrivalled situational awareness whether “head in” or “head out”. The HMSS is manufactured from carbon fibre and under 2 kg, its weight is similar to other contemporary non-HMSS helmets. Its modular design incorporates a pilot personal “inner” helmet, which fits into the standard “outer” avionic HMSS. This design allows both personal comfort and reduced ownership costs through the flexibility of an outer interchangeable HMSS. Ejection safety characteristics are built into the design. As well as providing non-avionic type helmet essential safety characteristics of pilot life support and communications functions, the HMSS has full integration with all Eurofighter attack and navigation systems. The new helmet can be used throughout the full aircraft envelope (up to 9g) for both air-to-air and air-to-ground day / night missions.
Avio is one of four shareholders in the European consortium EUROJET, which was established in 1986 to develop and produce the EJ200 engine powering Eurofighter Typhoon. Avio’s workshare within the programme is 21 per cent and consists of the accessory drive gearbox, the low-pressure turbine stator and rotor modules, the afterburner and a large portion of the accessories.

Throughout the production phase of the EJ200, Avio have continued to develop technologies, which offer life cycle enhancements and also allow engine operation at increased levels of performance. Avio is also participating in the development of a thrust vectoring nozzle system, which could be integrated onto Eurofighter Typhoon. (Re: EF World issue 2/2010 pg. 18)

By the end of 2009, Avio achieved a significant production milestone, which involved the delivery of over 130 engines to the Italian Air Force and the production of some 750 engine modules. Achievement of this milestone involved three of Avio’s industrial plants: Rivolta di Torino, Pomigliano d’Arco and Acerra (Naples) and Brindisi.

Avio is in the process of establishing a military MRO division for technical and logistical customer support. The division, operating under “all inclusive” conditions, is based at the Brindisi industrial plant and interfaces with NETMA. A strong focus for this division is on the reusability of components. A similar team is already in operation in Cameri, Grosseto and Gioia del Colle, Italian Air Force air bases.

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In addition to product development, Avio also offers maintenance, repair & overhaul (MRO) activities for civil and military aero-engines and gas turbines. These activities are concentrated mainly in two certified centres of excellence: Brindisi for military engines and Pomigliano d’Arco (Naples) for civil engines. These two industrial plants provide first management services of the highest level to government and national customers as well as international civil airline companies. Avio also provides numerous engine support lines with logistics and training support.

In the military aviation sector, Avio designs and develops engine subsystems for national and international government programmes and is the national supplier for propulsion systems to the Italian Armed Forces.

Technology for the Best Performance and Skill for Complete Support

Founded in 1908, Avio plays a leading role in the European aero-engine business and is acknowledged worldwide as systems integrator in the most important international programmes in the aeronautical and space sectors. Avio is involved in the whole life cycle of products, from the design and development phase through to production and services. The company is a global leader in the design and production of low-pressure turbines, combustors, power transmissions, accessory drive trains, afterburner systems and auxiliary power units.

In the civil aviation sector, Avio is a partner with major worldwide Original Equipment Manufacturers (OEMs) such as Rolls Royce, General Electric, Pratt & Whitney (USA and Canada) and Honeywell. In the military aviation sector, Avio designs and develops engine subsystems for national and international government programmes and is the national supplier for propulsion systems to the Italian Armed Forces.
During the Cold War, the Arctic region’s importance was dominated by the strategic military balance between the Soviet Union and USA/NATO. Nuclear bombers and ballistic missiles were ready to cross the Arctic on their doomsday mission. Therefore, the USA and Canada established a common air defence command to defend the units in contact with North America. The Arctic consists of a chain of long range radars through Canada and Greenland, hundreds of interceptors and many air bases including the strategically important Thule Air Base, in Greenland. Equivalent means were deployed on the Soviet side. Despite the demise of the Cold War, the Arctic region has retained its strategic significance and the conflict potential has increased.

During a speech made at a meeting in London last year, American Admiral James Stavridis, Supreme Allied NATO Commander for Europe, clearly stated: “The Far North may become an area of conflict, an area of probable competition. Nobody can say what will happen in the next 10 years and in the Arctic, the pre-conditions therefore exist for force escalation. With an international consensus and no bilateral settlement in sight, the nations know that they can only claim their rights if they are present in the Arctic with visible and credible means, and as the Canadians say “Use it or lose it”. Russia already made the point very clear: The North Pole is Russia!

The melting of the sea ice has opened the Northeast and Northwest Passages, which economically is of enormous importance: the distance between Rotterdam and Yokohama is reduced from 11,200 to 6,500 nautical miles. An open Northwest Passage around Canada will shorten the route between Rotterdam and Seattle to within 2,000 nautical miles. These are routes that connect the Atlantic with the Pacific, an issue which will also attract the interest of China and therefore of South Korea and Japan.

Due to the increasingly scarce availability of natural resources, the Arctic has become an important region for World Powers due to its abundance of resources which until recently were uneconomical to obtain. If we take water and hydrocarbons as an example which will become a decreasing resource in some areas – and therefore a contentious issue – it is easy to see how problems will arise.

It is highly unlikely that the Western nations will confront each other outside the courtrooms. But the freeing up of the ice-caps over at least half of Greenland (today 80 per cent covered by ice), which is pressuring to become more autonomous, will give Denmark a greater importance within the ambit of the European Union, whilst at the same time loading it up with enormous strategic problems in relation to the management of the new competencies which flow from this situation.

Norway will have a future role in the light of increased commercial and military shipping around its territorial waters and owing to possible disputes in respect of oil deposits around the Svalbard islands. Canada is one of the onlookers most affected. The melting of the ice-caps opens up the possibility of exploiting the bituminous sands of the Far North.
In the medium term it is envisaged that Canada will purchase 60 aircraft to replace its Hornets and it appears that this will complement the British delivery of the Seahawk in F-35 Lightning II Joint Strike Fighter programme. But is the F-35 (or the A-35 as many consider in the right choice for Canada, the Canadian political ground?) Would not the vast size of the country and the challenging future needs discussed earlier require a twin engine, multi-role fighter with real and credible air defence capabilities without the capabilities to fly far and high enough? (ESM does not have the climb speed required nor is it able to supercruise). Without a reasonable weapon load and with its radar low observability capabilites, changing technology in the domain, would ISF be a good choice for Canada or for Norway? In the difficult Canadian context, a fighter aircraft such as the Eurofighter Typhoon that is 16 ft 18” through accidents, while to date Norway has lost quite a large number of its light, single engine F-16s. What might happen in the timing issues with the single engine aircraft? Would it be possible to recover a pilot that has ejected, on time, in a harsh Arctic environment? What would be the attrition rate? These are questions which many in Canada, Denmark and Norway are starting to ask. But the most important question is why these three nations should have an attack aircraft that will not be able to defend the country’s strategic assets in the future: the ISF has been designed for ground attack as its main mission.

Today, a fighter aircraft is one of the world’s most powerful means to show presence and deterrence. Their sensors make them ideally suited to detect, track and monitor air targets over vast distances and, in most cases, their presence alone would force the penetrators – airborne as well as seaborn – to leave. The fighter is also able to engage the target, either in contact mode or from much further away, to protect itself and the fighter pilot from enemy fire. The Eurofighter is an attack aircraft that is designed to perform in extreme weather, day and night. It is able to carry out missions in all kind of weather conditions, including high temperatures and over extremely rough terrain.

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The Eurofighter Typhoon is one of the leading global military programmes in production, and in our presence this programme has enabled OMA to grow our market share within the military segment. “Approximately 5 to 10 per cent of their annual sales turnover is made up by Eurofighter work.

Eurofighter has made a similar impact on the Canadian and American markets as well as essential APU and oxygen systems. Although most contracts are managed through the partner companies and not the Eurofighter consortium itself, CSA is proud to be one of the suppliers for the Eurofighter Typhoon programme.

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Leader of Forces

Typhoon: Operational with six air forces, the aircraft offers total multi role dominance. Eurofighter Typhoon delivers unparalleled fleet effectiveness. Designed with an established technology insertion programme - from AESA radar and innovative latest generation helmet mounted symbology system to advanced air-to-air and air-to-ground weapon systems - the Typhoon is able to counter effectively all current and evolving threats and will continue at the forefront of combat aircraft for future decades.