A mock-up of the Tempest putting Typhoons in the background

TEMPEST –

A Vision of the Future from Lancashire

By Andrew Harris

The British Gloster Meteor first flew in March 1943 and was the first jet fighter produced by the allies. Using jet engines invented by Britain's Sir Frank Whittle it was underpowered but a groundbreaking concept in the sky. Later that year the De Havilland Vampire took to the sky and these two first generation jet fighters pioneered the jet age for the military. More than 2,000 were produced and, with the later Hawker Hunter, served many air forces well into the 1950s.

The English Electric Lightning first flew in August 1954 and was a gigantic leap forward. It was also the start of Lancashire dominating the UK jet fighter industry. The Lightning was probably the most iconic British jet fighter ever and could achieve Mach 2 - twice the speed of sound - but not for long! It entered service with the RAF in 1960 and was steadily improved. It was made in Lancashire and was operational until 1988. It is the best example of a second generation jet fighter.

The third age of jet fighters was dominated by the McDonnell Douglas Phantom made in the USA but the Anglo-French Jaguar kept Britain involved and expert as new technologies developed.

From the mid-1970s the fourth generation of jet fighters saw the UK and Lancashire become major players again albeit on the back of international partnerships because of the huge costs of developing and producing some of the most advanced engineering in the world. The Tornado first flew in August 1974. The F1 version was a single-role fighter but the GR4 became multi-role which was essential as a way of making the best use of an aircraft that was incredibly expensive to produce and operate. After sterling service it was retired by the RAF last year but still serves the air forces of Germany and Italy where it is being eclipsed by the Typhoon which first flew 20 years later – in 1994. The Typhoon is still a fourth generation fighter but has become multi-role and is expected to serve until 2040. It is assembled in Warton where many upgrades have been achieved. So why the need for a fifth generation of jet fighters?

The iconic Preston-built English Electric Lightning

Jet fighters have become flying computers which are more potent but also more vulnerable to new weaponry. The response was 'stealth' technology which makes a fighter hard to see. But this comes at a huge cost so most NATO countries agreed to jointly procure the F35 Joint Strike Fighter which offers three versions but with much commonality. Christened the Lightning 2, the F35A operates from airfields, the F35B is short take-off and vertical landing and the F35C is for aircraft carriers with catapults. The UK is the only level-one partner producing 15% of the F35 by value – including the tail section built with amazing technology by BAE Systems at Samlesbury in Lancashire. With expected orders for more than 3,000 aircraft - including 138 for the UK - this is a futuristic business. But where next?

As threats and capabilities evolve the future need – after 2035 - is for a sixth generation fighter which will be stealthy, able to fly unmanned, use swarming technology to control drones, incorporate artificial intelligence deep learning, possess directed-energy weapons and have a virtual cockpit which dispenses with conventional instruments and switches. The 'virtual cockpit ' will be shown on the pilot's helmet-mounted display. If some of these terms mean little to you, dear reader, it illustrates just how futuristic is this concept – called Tempest. It is being developed by Team Tempest - BAE Systems in Lancashire in partnership with Rolls Royce, Leonardo in the UK and MBDA UK – all reporting to the Rapid Capabilities Office of the Royal Air Force. These partners are expert in aircraft design, engines, defence electronics and weapons technology respectively.

The Tempest is also expected to feature a Co-operative Engagement Capability which is the ability to co-operate on the battlefield by sharing sensor data and messages to co-ordinate attack or defence.

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The UK Ministry of Defence explain that "The UK's new Tempest fighter jet will be a decidedly British affair. It will be developed almost exclusively on British soil. The Brits hope the airplane will exhibit the country's military prowess even as it exits the European Union and as its traditional defence partners and long-time ally the Unites Sates backs into isolationism."

During the unveiling of a mock-up of the Tempest the UK Defence Secretary said "We are entering a dangerous new era of warfare so our main focus has to be the future. Today we offer a glimpse of tomorrow. The Ministry has devoted $2.6 billion to developing the Tempest concept through 2025 and will then decide whether to roll out the final aircraft by 2035."

The Tempest project is currently a multi-national project between the UK, Sweden and Italy – hence the involvement of Leonardo and MBDA and two other Italian companies.

The amazing Typhoons flying from 1994-2040. Image courtesy of the MoD.

The Tempest concept explained.

Team Tempest says it has identified the opportunity to adopt a completely new way of working. Collaborating with key stakeholders from the outset enables the project to unlock a diverse, skilled and experience workforce, reducing barriers to development and thereby delivering a programme capable of moving quickly and meeting milestones in record time. We shall see!

The last word goes to BAE Systems Chief Executive Charles Woodburn who says "The UK's combat air capability, built by generations of committed and highly skilled people through a century-long partnership between the RAF and industry, is admired the world over. The UK Government's Combat Air Strategy is a powerful statement of intent to invest in next generation combat air systems. We're proud to play a key role in this important programme with our world leading technology, capability and skills which will contribute to the UK's defence and security for decades to come."

The Tempest project is exciting and hugely important to NATO, the United Kingdom, North West England and Lancashire. It is crucial to the success of our aircraft industry and to it remaining world-class. We wish it well and will report on its progress in the years ahead.

Andrew E. Harris is grateful to BAE Systems for the information and images (unless otherwise attributed) provided in support of this article.
Our previous aviation articles about BAE Systems and the Tornado can be seen at www.andreweharris.co.uk