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★ The Passing of the Lancashire-built Tornado from our Skies ★

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The Passing of the Lancashire-built Tornado from our Skies

by Andrew Harris



ABOVE: The bomber version of the Tornado was designated GR1-GR4A throughout its life. This one is with 13 Squadron. Weapons became smarter. LEFT: A Tornado flying over its base at RAF Lossiemouth in north east Scotland.

It was ambitious and had four unique features:

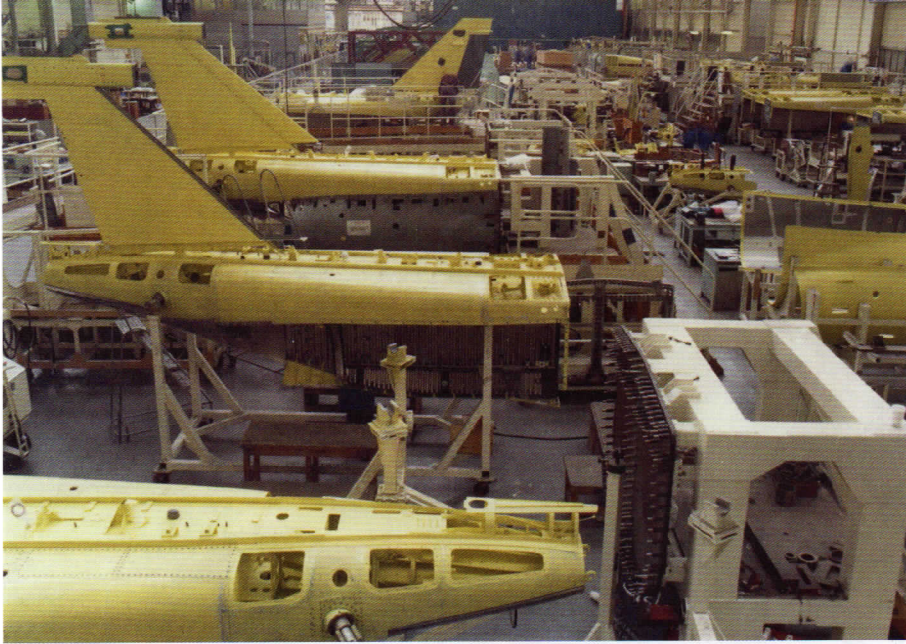
- It adapted and made practical the 'variable-geometry wing' conceived by Barnes Wallis who invented the bouncing bombs used by 617 Squadron of the RAF - the Dambusters in World War II. The prize was to minimise drag at high speed whilst enabling the aircraft to fly slowly for take-offs and landings and when loitering. The underwing pylons all pivot with the wings so that all weapons and stores remain in the direction of flight.

- Britain insisted on the aircraft being powered by two Rolls-Royce RB.199 turbofans rated at 16,000 lbs thrust taking the speed to 1.3 times the speed of sound with afterburning for an unprecedented thrust increase of nearly 50%. Unusually for fighter aircraft the RB.199 engines are fitted with thrust reversers to reduce the distance needed to land safely.

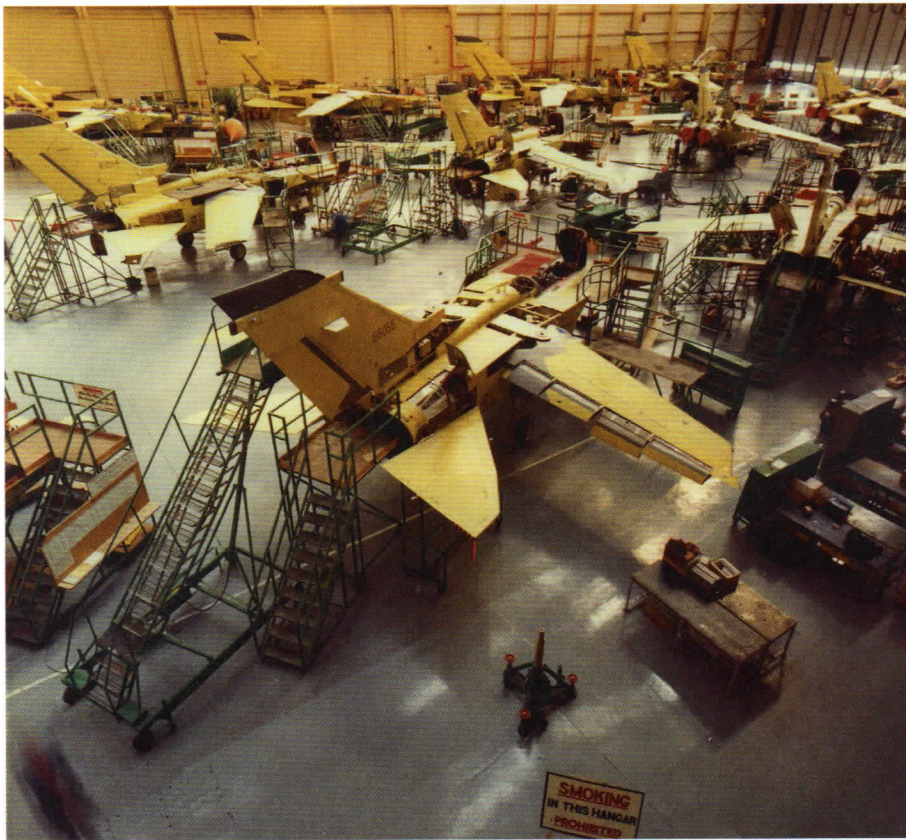
Another famous name can be added to the list of iconic aircraft – like the Wellington, Lancaster, Canberra and Lightning – that were constructed in pre-1974 Lancashire. It is the TORNADO which in March was retired from the RAF after 37 years of distinguished service.

What became the Tornado started in 1969 with the formation of Panavia which was a tri-nation consortium of the UK, Germany and Italy led from the UK side by the British Aircraft Corporation – now BAE

Systems – which had its engineering base at Warton in Lancashire. The three partner nations gave Panavia the mission of creating a Multi-Role Combat Aircraft to replace a number of ageing aircraft types which in the UK included the RAF's Avro Vulcan and Blackburn Buccaneer that were becoming obsolete. The UK, Germany and Italy signed an 'Agreement to Proceed' in 1971 sharing the project 42.5, 42.5 and 15 per cent respectively. Although designed to be multi-role it was better at some roles than others.



LEFT: Tornados at the early stages of assembly at the Warton site of what is now BAE Systems. MIDDLE LEFT: The assembly of Tornados progresses. BOTTOM LEFT: Eric Bucklow who flew the Tornado as the chief production test pilot 1980-87. All 3 pictures and the fly-past images at the end of the article are courtesy of BAE Systems.



- The Multi-Role Combat Aircraft (MRCA) specification envisaged a 2-seat multi-role aircraft with provision for a range of air-to-air missiles but the first prototype was optimised for air-to-ground work.

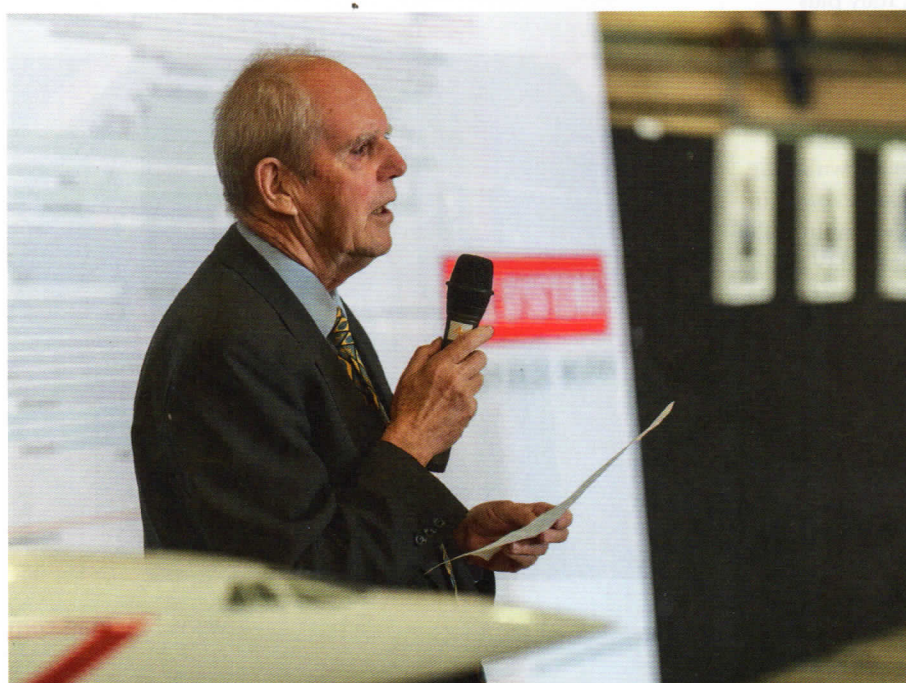
- The avionics – electronics for aviation – were cutting edge and included ground-hugging radar. They were subject to numerous upgrades throughout the life of the aircraft.

The first flight of the first MRCA prototype was from Manching in Germany on the 14th August 1974 when the then BAC test pilot Paul Millett described the experience: *“Aircraft handling was delightful . . . and the actual flight went so smoothly that I did begin to wonder whether this was yet another simulation.”* Despite this two of the prototypes were lost and one was damaged.

A little over two months later, in October 1974, Paul Millett made the maiden flight of the UK prototype at Warton in front of thousands of employees at the site which to this day continues to be at the heart of experimental test flying as part of BAE Systems.

The first batch of what had now been christened as the Tornado was ordered in 1976 and deliveries to the RAF and Luftwaffe began 3 years later. Eric Bucklow was the Chief Production Test Pilot from 1980 to 1987. Each new Tornado had to be test flown 4 times and Eric usually undertook the first of these. He comments *“It was so new compared to the (Anglo-French) Jaguar. It was such an easy to fly aircraft and had the first fly-by-wire system, variable geometry wings, terrain following radar and reverse thrust engines.”* Eric added *“I have flown about 20 types of aircraft in the RAF and as a test pilot with British Aerospace (now BAE Systems) but the Tornado was my favourite.”*

In January 1981 the Trinational Tornado Training Establishment was created at RAF Cottesmore in Rutland to train Tornado aircrew from all three nations. They used dual-control aircraft





ABOVE: This Tornado of XV Squadron shows afterburning that increases thrust by an unprecedented 50%. RIGHT: The range and endurance of the Tornado was greatly extended by air-to-air refuelling. BOTTOM RIGHT: Arming Tornado bombers is dangerous work.

which were the same as operational Tornados in all other respects. Until March 1999 this Establishment continued to train aircrew from all air forces operating Tornados.

Eric Bucklow retired from test flying in 1987 but production of the Tornado continued until 1998 by when 992 had been supplied to the air forces of Britain, Germany, Italy plus Saudi Arabia which ordered 48 bomber and 24 fighter versions of the aircraft in 1985 and a further 48 Tornado bombers in 1993.

The Tornado became operational with the RAF in 1982 but didn't see active service until 1991. By then known as the 'Tonka', 60 GR1 bomber versions were deployed to bases in Bahrain and Saudi Arabia as part of Operation Granby – the British contribution to the first Gulf War. Several ADV fighter versions were deployed to provide air cover. The threat of their long range air-to-air missiles was a deterrent to Iraqi pilots who tended to avoid combat as a result.

As part of this war Tornado bombers attacked Iraqi military airfields using 1,000 lb unguided bombs and the RAF JP233 weapon designed to disable runways. Sadly, six Tornados were lost in this conflict but emergency arrangements saw many Tornado bombers being equipped with a laser system which achieved what has been described





ABOVE: This Tornado shows the weapons and stores that it can carry. LEFT: Planes need crews. This is the pilot. The navigator/weapons officer is in the rear seat.

as “probably the most accurate bombing in the history of the RAF.”

Following the first Gulf War about six Tornados were based in liberated Kuwait to help enforce the no-fly zone imposed over southern Iraq. A further 6 Tornados were based in northern Iraq for a similar purpose.

In 1993 a mid-life upgrade improved many GR1 Tornado bombers to the new GR4 standard. The effectiveness of this was proven by the 1998 Operation Desert Fox when the US and UK responded to the failure of Iraq to comply with UN resolutions. It was a military success but politically inconclusive. The improved Tornado GR4 bombers successfully destroyed 75% of their allotted targets

without loss.

Many of the Tornados deployed in the 1999 Kosovo War were still the GR1 version. As a result the Tornado fleet was equipped with Maverick missiles and Enhanced Paveway smart bombs. The GR1 Tornados were upgraded to GR4 standard by June 2003.

The improved Tornado bombers were used to good effect in the 2003 invasion of Iraq when 617 Squadron used new Storm Shadow precision cruise missiles for the first time. While only 25% of air-launched weapons were precision-guided in Kosovo this had increased to 85% in the 2003 Iraq conflict.

In early 2009 several Tornado bombers were deployed to Kandahar in Afghanistan to replace the RAF Harriers which had been there since 2004. Later that year Tornado bombers were equipped with Paveway guided bombs which had been used successfully by the Harrier fleet. In 2010 extra Tornado bombers were deployed for the duration of the Afghan elections that year. By the time they were withdrawn in November 2014 they had flown more than 5,000 paired missions, deterred about 600 Taliban attacks, used some 140 Brimstone missiles and Paveway bombs and fired more than 3,000 27 mm cannon shells.

The 2010 UK Strategic Defence and Security Review considered retiring the Tornado fleet. It was decided to retire the remaining Harriers instead although Tornado numbers were to decline as the new Typhoon became more numerous and capable and new F-35 Lightning came into service. The

Harriers were a great loss but big problems would have resulted if the Tornados had been scrapped.

On the 18th March 2011 the British Government decided to deploy Tornados and the newer Typhoons to enforce a no-fly zone in Libya. Several Tornados then flew 3,000-mile strike missions against targets in Libya. The missions were described as *“the longest range bombing missions conducted by the RAF since the Falklands conflict.”* These Tornados successfully used Laser-guided bombs and Brimstone missiles.

A further need arose in 2014 when the British Government decided to deploy Tornado bombers to RAF Akrotiri in Cyprus so that support could be provided to refugees sheltering from so-called Islamic State militants in the Mount Sinjar region of Iraq. The surveillance capability of the Tornados was used to obtain much-needed information to support humanitarian efforts in the region. After the British Government approved air strikes against Islamic State militants, Tornados hit a heavy weapons post and an armoured

vehicle to support Kurdish forces in northwest Iraq. By March 2015 eight Tornado bombers had been deployed to Akrotiri from where they inflicted 159 strikes against Islamic State targets in Iraq. On the 2nd December 2015 the British Parliament voted to begin air strikes in Syria as well as Iraq to combat the growing threat of the Islamic State and such strikes began that day.

The capabilities of the Tornado were hugely improved during its service life. The main upgrade was from the GR1 to GR4 version which included a Forward Looking Infrared, a new Head-up Display for pilots, better cockpit displays, night vision devices, new avionics and a receiver for the Global Positioning System. New weapons and sensors included the Storm Shadow Cruise Missile, Brimstone anti-tank missile, Paveway III then IV laser-guided bombs, the Litening III targeting pod and the RAPTOR reconnaissance pod.

The last planned flights of RAF Tornados were on Thursday 14th March 2019 bringing to an end 37 years of operational service with the Royal Air Force. A disbandment parade and

LEFT: Leaving RAF Akrotiri in Cyprus bound for a war zone. BELOW: A Tornado at readiness in Afghanistan.





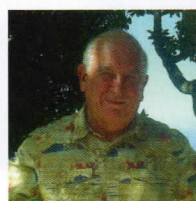
flypast at RAF Marham in Norfolk – the home of the RAF’s last two Tornado squadrons - marked the end of an era after a valedictory airborne tour of the UK which included a flypast over the BAE Systems sites at Warton and Samlesbury in Lancashire where the RAF Tornados were manufactured and assembled.

The last flight was flown by Squadron Leaders Ian Dornan and Stephen Beardmore who between them have more than 9,000 hours flying the Tornado.

The Head of the RAF, Air Chief Marshal Sir Stephen Hillier was himself a Tornado pilot and he paid tribute to the aircraft. He said *“We can all take immense pride in what the Tornado has achieved in defence of the nation over nearly four decades – and reflect on the courage, commitment and achievements of everyone who has contributed to the success of this extraordinary aircraft.”*

The Tornado is being replaced by the new F35 stealth jet which also has the capability to fly off the Royal Navy’s two new aircraft carriers. The RAF Typhoon fleet is operating over Iraq and Syria following upgrades to give it some of the Tornados capabilities including the ability to launch the advanced Brimstone missile.

The Tornados will continue to serve other air forces for up to 6 more years but they have passed from our skies. It is time to say thank you, well done and goodbye.



Andrew Harris gratefully acknowledges the help provided by David Coates and Rebecca

Edwards of BAE Systems at Warton in the preparation of this article. He is also grateful to former test pilot Eric Bucklow for sharing his memories. Unless otherwise attributed the images are Crown Copyright and reproduced by kind permission of the Ministry of Defence. Other articles about BAE Systems and the Royal Air Force can be seen at www.andreweharris.co.uk under ‘Published Articles’.



TOP: Three Tornado GR4 bombers fly toward the BAE site at Samlesbury on 19th February 2019. They also flew past the Warton site. ABOVE MIDDLE: The flypast by three Tornados from IX and 31 Squadrons of the RAF over the UK works and airfields where Tornados were made and based. ABOVE: Tornados are beautiful but lethal. We will remember them.