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March 2017

# Lancashire

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**The future has arrived at BAE Systems Samlesbury  
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# BAE Systems at Samlesbury – Where the future has arrived

The first of three reports by Andrew Harris about the work of BAE Systems in our region

Our region holds many surprises yet there is no greater surprise than what is on the A59 just 3 miles east of the M6 junction 31: the BAE Systems facility at Samlesbury which is one of the most advanced aerospace factories in the world. It provides 10% of the engineering and the entire rear section of all three variants of what is variously named the Joint Strike Fighter, Lockheed Martin F-35 and - in Britain – the Lightning II. The F-35 is the biggest defence programme of all time and BAE Systems' participation was achieved by standards of quality and precision we could only dream of a few years earlier.

The history of aircraft production

at Samlesbury is also full of surprises. For 10 years from 1939 the English Electric company achieved near anonymity by building aircraft branded by others. With a sister site at Strand Road in Preston – which closed in 1968 - it produced no fewer than 770 twin-engined Handley Page Hampden medium bombers in the first half of the Second World War – without which RAF Bomber Command would not have been able to launch its much-lauded 1,000 bomber raids against the Third Reich. Production of the 4-engined Handley Page Halifax heavy bomber was stepped up and nearly 2,500 contributed to the war effort. First flying in 1939 yet overshadowed by the

iconic Avro Lancaster from 1941 it was preferred by many crews: it was easier to escape from the Halifax when the aircraft was doomed.

Samlesbury moved into the jet age before the end of the war by starting production of 1,300 De Havilland Vampires under licence. It was followed by English Electric's own stunning Canberra – Britain's first jet bomber – which first flew in 1949 and could avoid being intercepted by flying higher than any opposing fighters. The iconic and futuristic English Electric Lightning followed in 1954 - flying at twice the speed of sound and providing the RAF's main fighter strength for much of the Cold War. By 1974 Samlesbury was



**LEFT: The BAE Systems complex at Samlesbury**

**BELOW: The English Electric Lightning is commemorated as the 'gate guardian' at the BAE Systems complex**

**BOTTOM: BAE Systems have invested in this new empennage line at Samlesbury**





involved in the production of the successful Hawk aircraft – of Red Arrows fame - although this was to be the last all-British military jet.

Due to high development costs the world of military aviation was changing. The big money was to be made by producing specialised parts or components of aircraft as merely assembling planes can involve as little as 5% of the cost. Samlesbury took to this role with the Anglo-French Jaguar, 4-nation Tornado and Eurofighter Typhoon in 1968, 1974 and 1994 respectively. During this process most of the British aircraft industry consolidated and became BAE Systems which went on to achieve the biggest coup of all – leading the UK participation in the F-35 programme as the only Level 1 Partner outside the USA. This involvement is hugely bigger than the UK's role as a purchaser as the Ministry of Defence is only committed to buying 138 – or just 4.3% - of the 3,200 or more F-35s to be produced. The role of BAE Systems' military aircraft business includes:

- Production of the rear fuselage with horizontal and vertical tails for £6.5m per plane
- Nozzle bay doors for the F-35B short take-off and vertical landing (STOVL) variant
- Design lead for the fuel system, life support and crew escape
- Integrating the aircraft with UK weapons and the new Queen Elizabeth Class aircraft carriers as well as readying RAF Marham for the F-35B jets arriving in 2018
- Leading the STOVL flight test programme for the F-35B being procured by all customers
- IT support to reduce costs and help the aircraft to achieve its full operational capability which will need more than 8 million



**TOP LEFT: The new form of production line for the F-35 at Samlesbury. BOTTOM LEFT: A factory of the future: the BAE facility at Samlesbury. ABOVE: The 5th generation fighter F-35B in RAF colours. BELOW: A BAE Systems employee working on the rear fuselage of the F-35. BOTTOM: BAE Systems Samlesbury Site Director Ian Wood and a Typhoon.**

lines of code. 89% was achieved in summer 2016

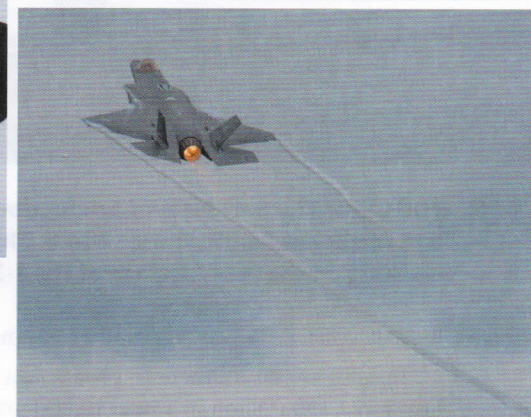
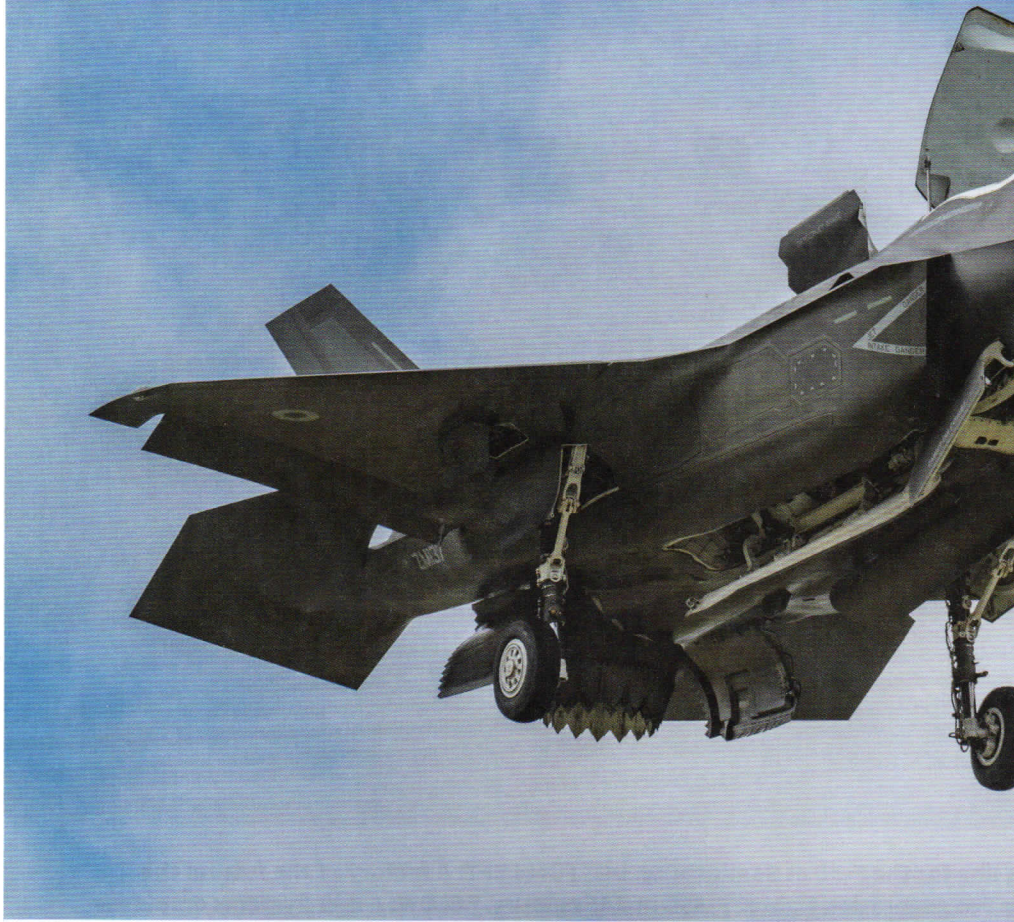
To fulfil its commitment to production BAE Systems has invested £150 million in a new 10,000 m<sup>2</sup> production facility at Samlesbury which is being made 50% larger by Summer 2017 so that the rate of production can be stepped up to a jet a day eventually. The key challenge is precision as the F-35 is a stealth aircraft virtually invisible to enemy radar. This depends upon almost incredible precision to two or three 1000ths of an inch – or a third the thickness of a human hair. It is this accuracy that helps the low observability stealth covering on the skin of the aircraft.

BAE Systems mills out of super-strong titanium. Eight automated milling machines currently grind up to 3mm of titanium to produce parts with just three operators monitoring them with another two setting up the specialised tools to remove any excess material. It can take 90 hours to produce a single part. As titanium is so hard each cutter lasts just one hour!

Samlesbury Site Director Ian Wood explains “BAE Systems concentrates on high end manufacturing which depends upon very demanding standards of precision. By staying in front of the technology curve we are well-placed to secure further work in the aerospace sector.” Ian added “We are extremely pleased with the skills and standards of our employees at Samlesbury. They compare extremely well with Lockheed Martin’s workforce in the US.”

As if to confirm the confidence of Ian Wood the BAE Systems F-35 Team has just received the first ‘Zero Defect Champion Award’ from Lockheed Martin Aeronautics – the prime contractor. It is the first time that the award has been





**ABOVE: The iconic F-35B in hover / vertical landing mode with bomb doors open  
RIGHT: The F-35 has now taken to the skies**

made by Lockheed Martin and – as they have more than 2,000 suppliers – it is an amazing achievement by the BAE Systems F-35 Team. The award is described as being ‘for consistent performance in achieving a zero defect product and recognises the team’s mind-set, behaviours, culture and performance.’ Lockheed Martin’s Vice President for Quality Assurance and Mission Success – Dr Alex Exsir – congratulated BAE Systems on being the ‘best athlete’ on the program(me) for quality and expressed his thanks to the whole BAE Systems team.

The BAE Systems facility at Samesbury employs about 4,500 people and probably supports double that number in the Lancashire economy. Wider employment in the UK supply chain is estimated to sustain about 25,000 jobs. It continues to produce parts for the Hawk and Eurofighter Typhoons which are both assembled by BAE Systems at Warton. The resources and techniques developed for the F-35 programme – such as the empennage

line as pictured to stabilise surfaces at the tail of an aircraft - mean the company and facility are well-placed to secure further work at the ‘cutting edge’ of the aerospace industry as international partnerships are the future in this sector.

The end product of the F-35 programme is impressive. A, B and C variants are designed for runways, hovering when needed and ‘cats & traps’ on carriers respectively. The UK is acquiring F-35Bs as the RAF and Royal Navy are creating a joint force which can operate from airfields and the new carriers when it is better to stop and land rather than land and stop. 617 Squadron – the famous Dambusters - of the RAF is now forming in the US and will relocate to RAF Marham next year.

For the technically minded the F-35 engine gives 40,000 lbs thrust, has a maximum speed of 1.6 x the speed of sound, a maximum declared altitude of 50,000 ft and can carry a range of missiles and bombs on wing pods or in its bomb-bay. A helmet head-up display

relays data to the pilot. In many roles the F-35 makes all other combat aircraft obsolete.

Participation in the F-35 programme ensures that BAE Systems and their facility at Samesbury will remain world-class.

**Andrew Harris ([www.andrewharris.co.uk](http://www.andrewharris.co.uk)) gratefully acknowledges the help provided by BAE Systems Senior Communications Advisor David Coates and Samesbury Site Director Ian Wood in the preparation of this article. Except for the original Lightning – by your columnist - the pictures are courtesy of BAE Systems. The next in this trilogy will feature BAE Systems at Warton.**

