

“Developing & Industrializing Advanced Composite Aerostructure Components in Scotland”

Nicola Spence
Director, Business Development & Strategy
October 26th 2017



Topics Covered

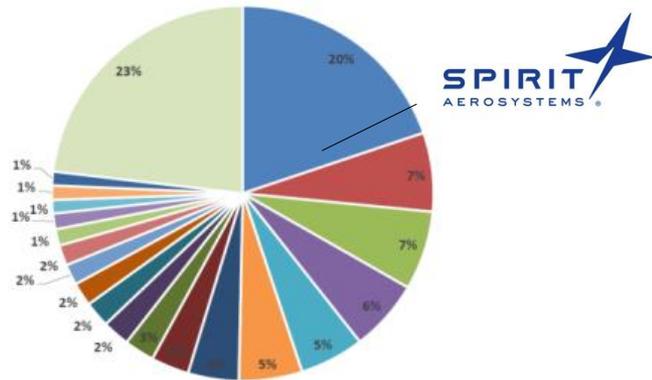
- Spirit AeroSystems Overview
- Spirit AeroSystems in the UK
- Trends in the Aerospace market
 - Increasing market demand
 - Increasing use of composite materials
 - Drive for cost & weight reduction
- A320 Spoiler Case Study
- Government – Industry Partnership
- Building on the success through

AGP / Scottish Cluster initiatives

Spirit Is the Leading Global Aerostructures Tier 1 Supplier

Global aerostructures leader - \$6.8B

With a balanced aerostructures portfolio



Source: Counterpoint



Fuselage
(52%)



Propulsion
(26%)



Wing
(22%)

And an emerging presence in Defense

On all of 12,500 Boeing/Airbus backlog



SPR backlog = \$47B



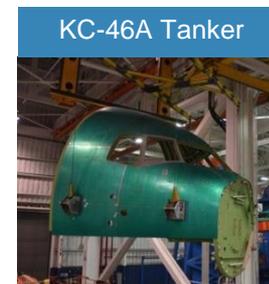
Sikorsky CH-53K



Bell V-280



P-8A, P-8I



KC-46A Tanker



Northrop Grumman B-21

Broad Presence on Many Programs Providing Breadth & Depth



Airbus A320



Airbus A350 XWB



Airbus A380



Bell V-280



Boeing 737/P-8



Boeing 747



Boeing 767/KC-46



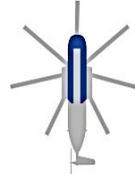
Boeing 777



Boeing 787



Bombardier CSeries



Sikorsky CH-53K



Gulfstream G650/Rolls Royce BR725



Mitsubishi MRJ



Northrop Grumman B-21



A350 XWB
FUSELAGE



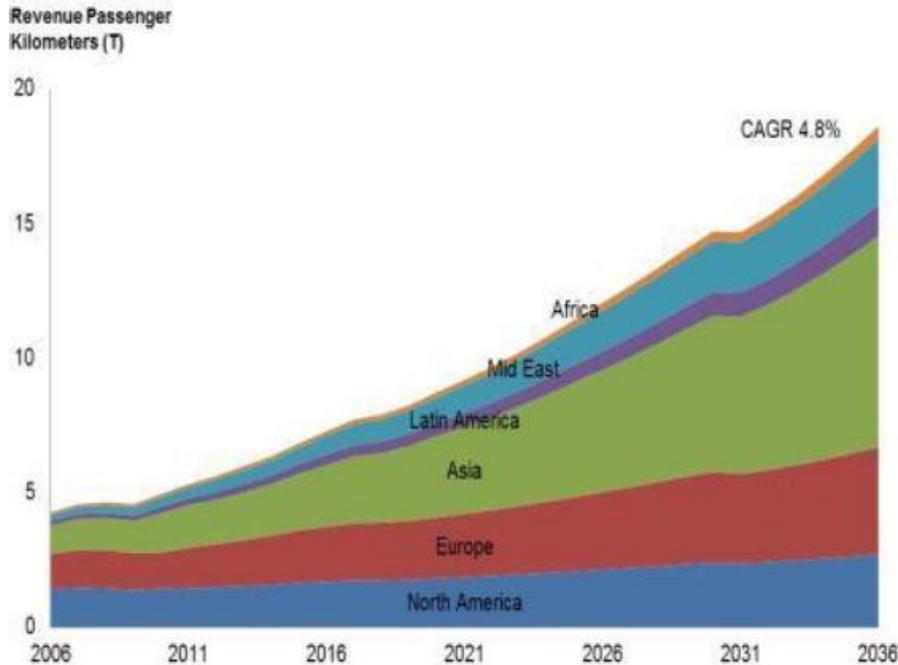
737MAX Thrust Reverser
PROPULSION



A350 XWB Wing Spar
WING

Traffic Growth Driving Strong Rates and Backlog

Air Traffic Growth Projected at ~5% for the next 20 years



Source - Airline Monitor, Spirit AeroSystems.

Today Announced



47 → 57

737



46 → 60

A320



12 → 14

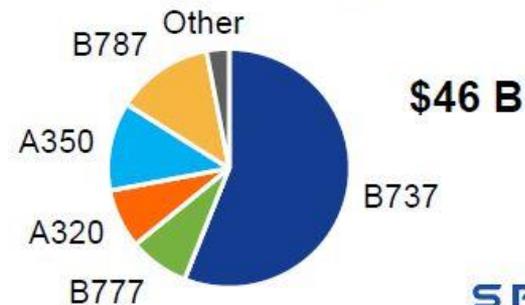
787



9 → 10

A350

2Q17 Backlog



Spirit Has a Global Footprint

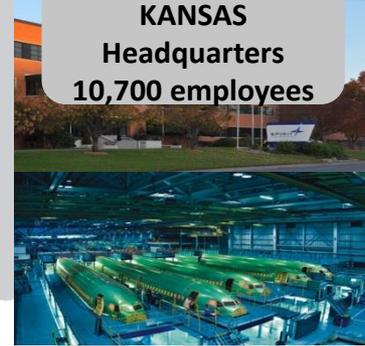
**KINSTON
NORTH CAROLINA
600 employees**



**TULSA/MCALESTER
OKLAHOMA
1,580 employees**



**WICHITA
KANSAS
Headquarters
10,700 employees**



**SUBANG
MALAYSIA
680 employees**



**PRESTWICK
SCOTLAND
1,000 employees**

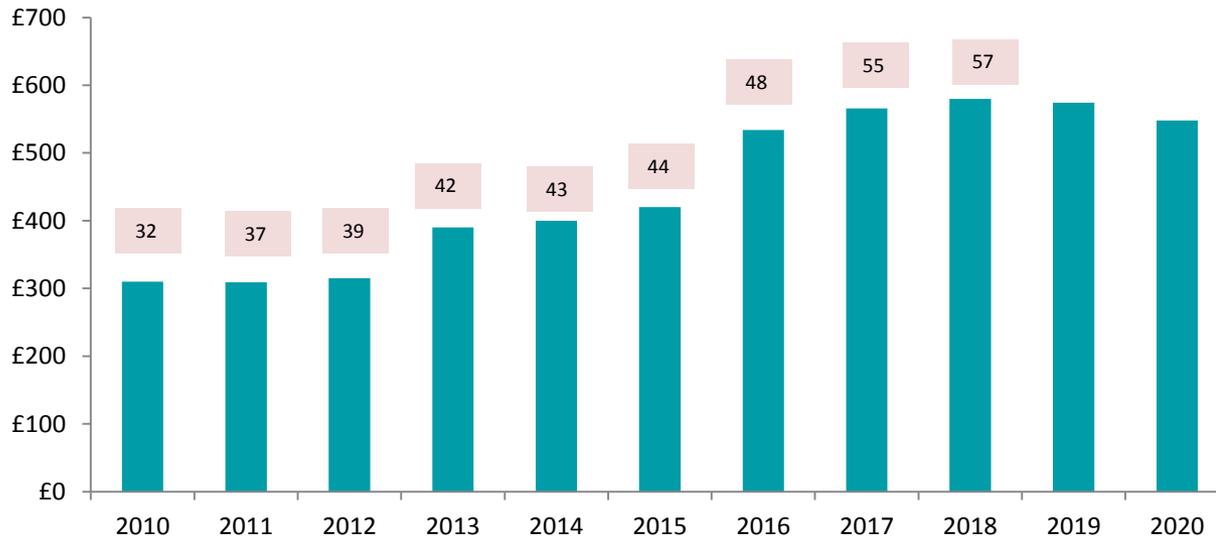


**SAINT-NAZAIRE
FRANCE
120 employees**



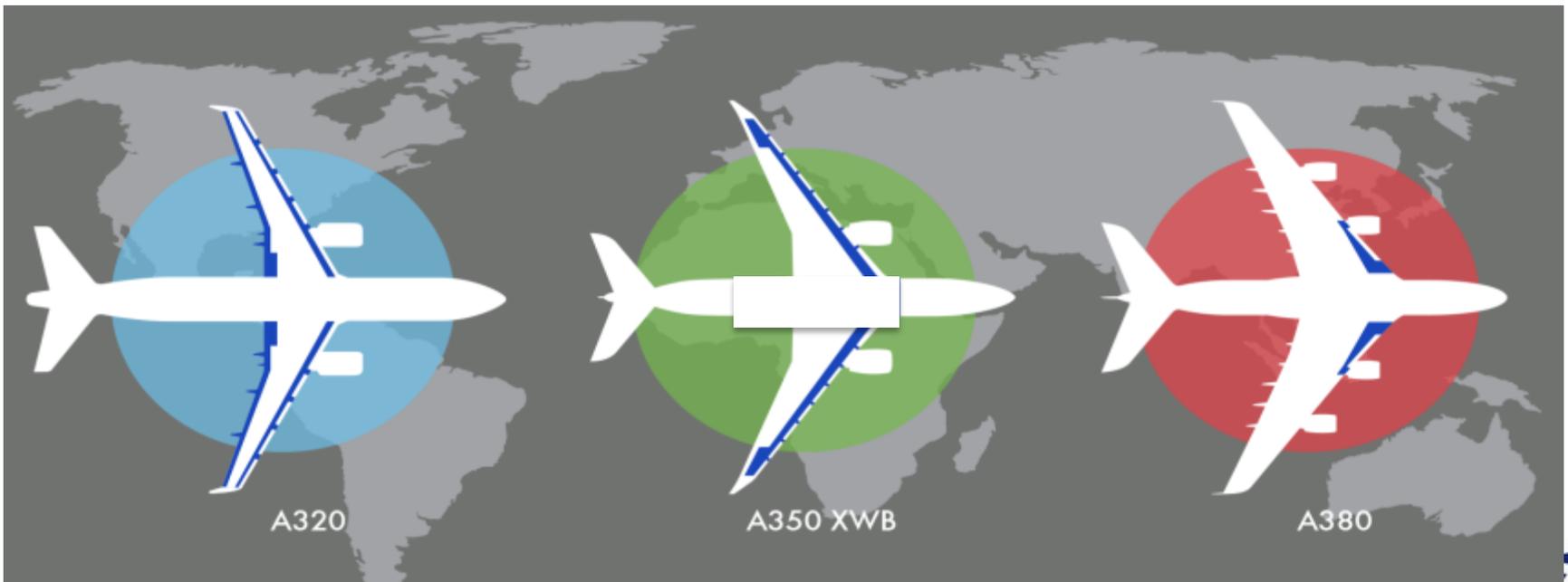
~15,000 Employees across 15M square feet of facilities

Prestwick is growing on the back of global demand



>£600m Revenue -
Growth based on A320
& A350 rate growth

A320 Rate Per Month



Challenges facing the Prestwick site

- Attraction and retention of key skills
- **Cost competitiveness** – increasing competition from lower cost countries and ability to win new work
- **Increasing production rates** – need to introduce “Factory of the Future” technologies
- Next new aircraft (Single Aisle Replacement) will be a step change in technology – estimated EIS 2025 (TRL 6 by 2020). Significant investment in;
 1. Technology development,
 2. Demonstration of that technology and the industrialisation process
 3. **Composite manufacturing capacity** required to ensure that UK captures additional work share

Government Partnerships Securing the Future of the UK Aerospace Market



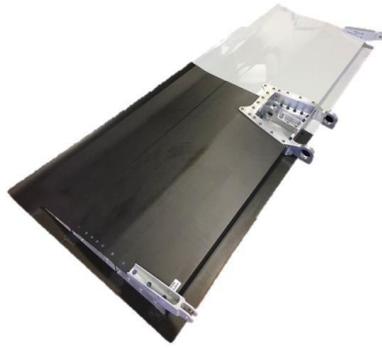
The AGP is a collaborative partnership between Industry and Government that represents a long-term commitment to maintain and grow the second largest aerospace economy in the world

The AGP was established in 2010 as a vehicle to tackle barriers to growth, boost exports and grow the number of high value jobs in the UK;

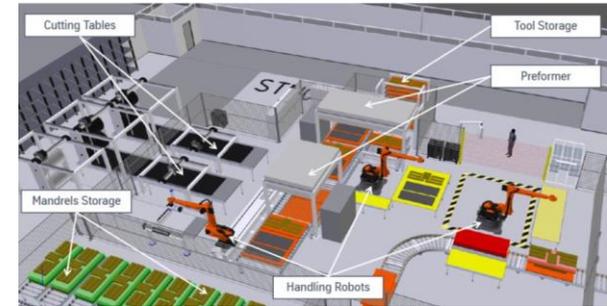
Five work streams were identified and continue to develop initiatives that achieve these objectives;

- Strategy
- Manufacturing
- Supply Chain
- Skills
- Technology (now led by the Aerospace Technology Institute)

Government Partnership In Action to Secure Growth – Spoiler Case Study



Accelerated innovative technology development match funded by ATI / Innovate UK = ~ £0.5M



Industrial development & training funded by Scottish Government / Scottish Enterprise = £2.1M



First Minister Announces Spoiler Award

- Securing the spoiler project is a critical milestone for Spirit and robustly demonstrates our ability to develop cost-effective new technologies and manufacturing processes that will play a central role in the development of the next generation of aircraft.
- While this project is a first for the Prestwick site, it also significantly strengthens Spirit's ability to protect and secure additional work packages.
- It is also the first industrialization of this new composite technology in the U.K. aerospace sector.
- >£20M investment to secure the work package at Prestwick



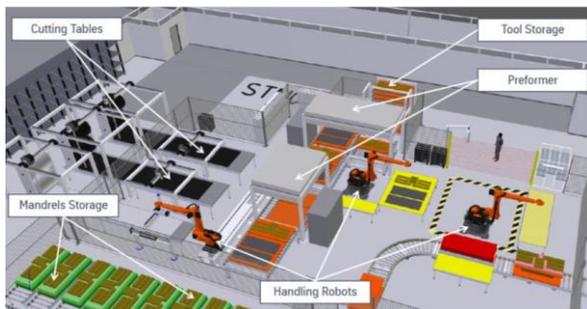
Government Partnership In Action to Secure Growth – Spoiler Case Study

Strong partnership with Government enabled the repatriation of the A320 Spoiler from a Low Cost Country to Spirit's Prestwick facility.



Accelerated innovative technology development match funded by ATI / Innovate UK

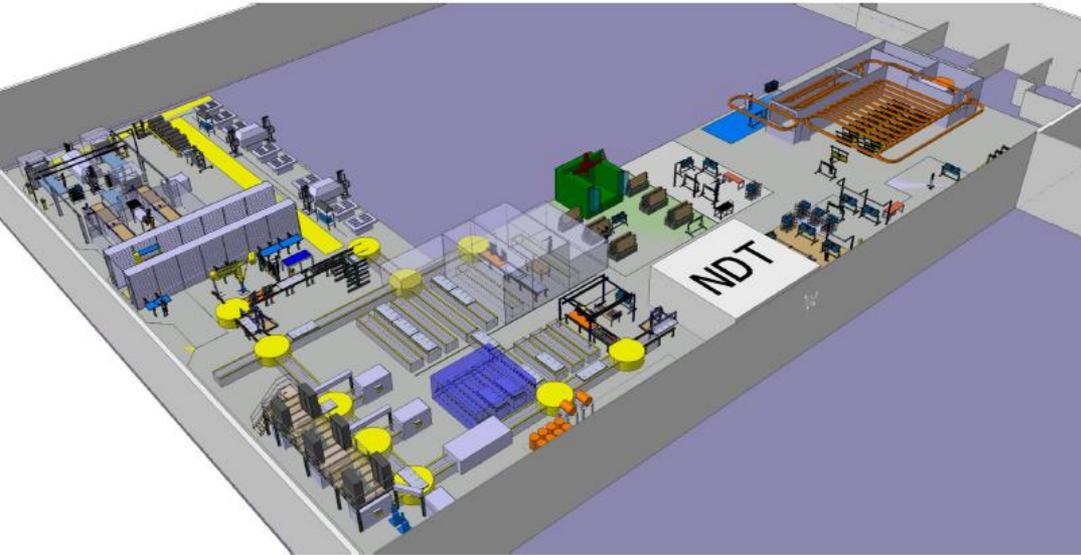
- Out of autoclave technology
- Stepping stone technology for larger components for the next new composite wing
- Significant cost reduction to the Customer



Industrial development & training funded by Scottish Government / Scottish Enterprise

- Advanced automation, factory of the future concept
- Automotive high production rate style environment
- Introduction of composite manufacture at Prestwick
- Creation of > 100 skilled jobs at Prestwick

Highly automated industrial solution



- Pick and place ply deposition system
- Human collaborative robots
- Automated conveyor distribution system
- NC Trim, Drill, NDT & Inspection systems.
- MES system
- Part to Part shim-less assembly
- Automated Paint facility with marshalling system

Highly automated turn key industrial solution; developed jointly with an integrated industrial provided and supported by ATI funding.

- Material lay up through to final assembly and paint
- First production in Q1'19 full rate within 9 months
- Rate 63+ per month, >630 spoilers per month / >7,200 spoilers per year
- 24/6 working pattern
- Spoiler produced every 42 minutes!

Innovation is the key to Growth & Job Creation

- The First Minister also chose this occasion to launch the Scottish government's economic growth policy, setting out key government actions to boost growth, create jobs and seize economic opportunities of the future.
- The First Minister cited Spirit as an **"excellent example of a company providing industry-leading expertise and investing in Scotland,"** and recognized the company as a leader in innovation.



A320 SPOILER REPATRIATION

Developed in Spirit AeroSystems, Prestwick with UK government funding which has led to the repatriation of the product back to the UK



BENEFITS

- Significant cost saving meeting OEM's expectation
- Mass neutral
- Maintains existing interfaces
- Step change from current manufacturing philosophies
- Enables repatriation to UK
- Strategically aligned to winning new work packages

SPOILER PURPOSE

- The spoiler has three main functions:
 - In-flight air braking for speed reduction
 - In-flight roll control
 - Air braking on the ground



WHERE FLIGHT BEGINS™

Win New Business: Leading Advanced Wing Technologies

Robots in Prestwick support rate increases



New Spoiler offered significant cost saving



Out-of-autoclave composites reduce capital cost



Technology Collaborations for Current and Next Platforms



THANK YOU
QUESTIONS???