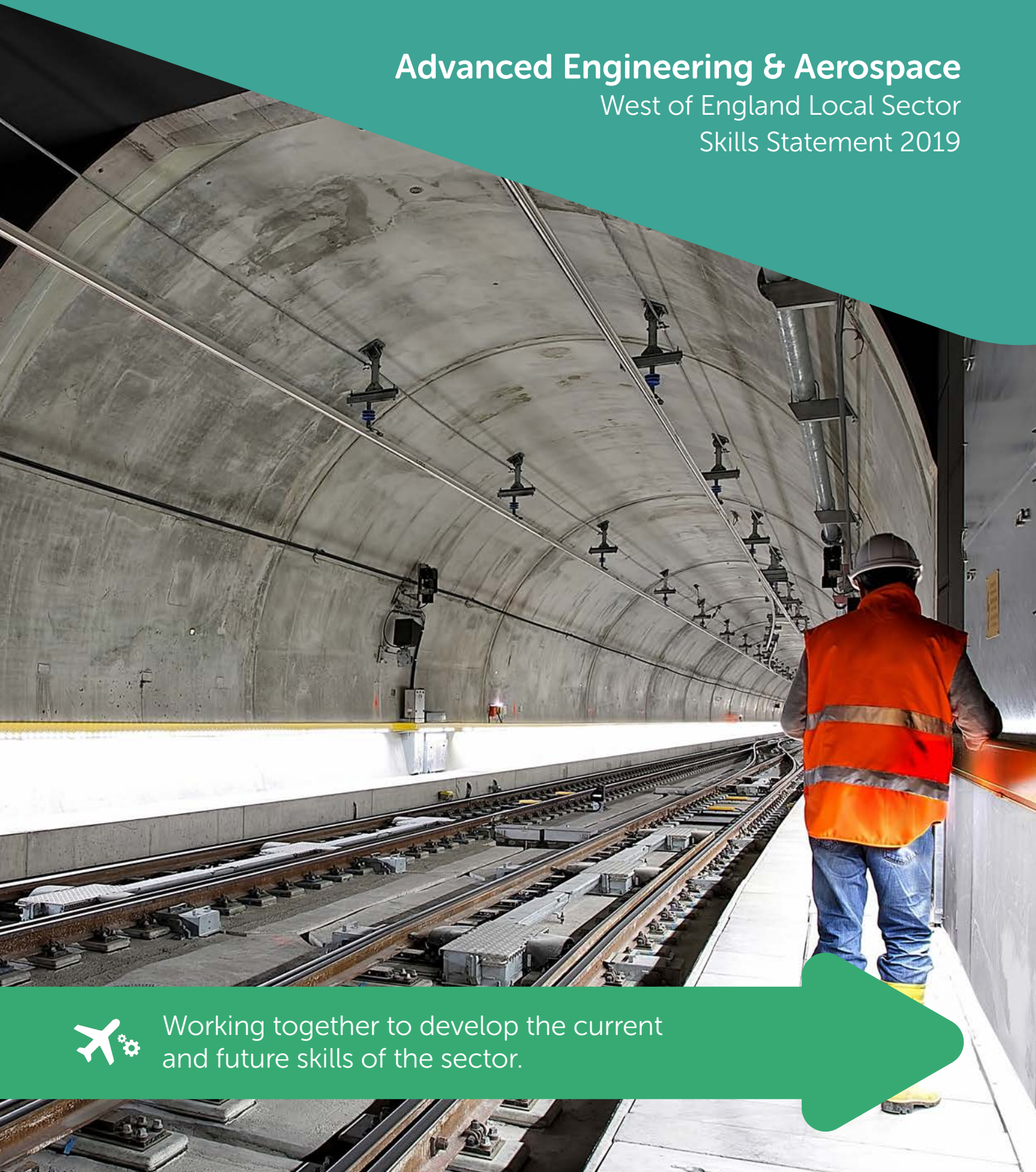



## Advanced Engineering & Aerospace

West of England Local Sector  
Skills Statement 2019



Working together to develop the current  
and future skills of the sector.



The Local Sector Skills Statements provide up-to-date market intelligence from industry sectors; celebrating the notable achievements and expertise of businesses and education in the region compared to regional and national policy and research.

They provide insights into: the skills challenges faced by businesses in 2018/19, possible solutions, and potential partnerships for stakeholders to collaborate in the region.

The reports inform key priorities for: investment in training, education, careers advice and professional development in the West of England.



Produced and written by Business West

Business West is working in partnership with the West of England Combined Authority, West of England LEP and the region's universities and colleges through the Western Training Provider Network. The intelligence gathered feeds into the West of England skills strategy.

# Advanced Engineering & Aerospace

## Local Sector Skills Statement 2019

Advanced Engineering & Aerospace is a dominant industry in the UK. Engineering employs 19% of the UK total workforce <sup>(1)</sup> and provides large scale quality employment. Its impact on employment extends beyond the sector and for every additional person employed through engineering, a further 1.74 jobs are created through the supply chain <sup>(1)</sup>. In the West of England, the sector employs 29,500 <sup>(3)</sup> people and is home to the UK's largest aerospace cluster, with key businesses such as Airbus, Rolls Royce, GKN, Renishaw, Rotork and BAE Systems.


Engineering has a crucial role in the UK's economy due to its strong multiplier effect. For every £1 GVA created by the engineering sector, £1.45 GVA is generated <sup>(1)</sup>. In addition, the engineering sector contributes to societal well-being and provides solutions to some of the world's major challenges. Despite the economic downturn, the advanced engineering & aerospace sector has seen consistent growth in recent years, and supports a growing number of high-skill, high-value jobs. In the West of England there was a 0.2% rise in the number of jobs within the sector between 2017-2018, only slightly lower than the national figure of 0.4%. <sup>(3)</sup>

The West of England cluster of global aerospace companies in the region is currently being supported by the rapid development of 'disruptive technology' facilities - including the University of Bath's new Institute of Advanced Automotive Propulsion Systems (IAAPS), which will support collaborative research and create 300 new engineering roles when it opens in the spring of 2020. GKN Aerospace plan to open a new £32 million Global Technology Centre in Bristol focusing on additive manufacturing and creating over 300 new engineering roles. In addition, the new Airbus Wing Integration Centre (AWIC), is currently being readied for commissioning in the spring of 2019 in Filton; employing 250 engineers and supporting supply-chain partners within the aerospace sector. Lastly, the National Composites Centre (NCC)

recently announced news of a further £36.7 million investment to further develop their existing facility.

These new investments and initiatives will encourage and consolidate the West of England's advanced engineering & aerospace firms and their supply-chain partners' place as a global centre of competence for the evolving aerospace sector. The blend of new innovative materials ('metal' to 'plastics', processes (3-D manufacturing) and especially propulsion technology will encourage the region to be at the forefront of the Third Technology Revolution (known as 'The Quiet Revolution', i.e. from jet engines to electric engines). It is anticipated that these developments will help to secure around 1,000 additional engineering jobs and given the strong impact the engineering sector has on the supply chain, this figure could reach just under 1,500 over the coming two to three years.

In addition to the existing education and training facilities in the region, Weston College is leading a bid to be one of the first Institutes of Technology to boost technical skills for 16 to 18 year olds in the area. Working alongside the region's colleges and universities, as well as a network of key local employers, including Airbus, GKN Aerospace, GE Aviation and Renishaw, this £14m bid will see the college's virtual learning environment extended with AR and VR technologies to support students across the region.



Despite the strength of the advanced engineering & aerospace sector in the West of England, there are still challenges to be faced. The recent Business West Skills and Training Survey 2018 revealed that 55% of respondents within the sector have recruited in the last 12 months and with demand for high skilled workers exceeding supply, salaries have had a positive knock-on effect. The average salary for someone working in the sector in the West of England is £37,802 compared to the UK's overall average salary of £28,195. <sup>(3)</sup> However, if the region and the UK in general want to remain competitive with improved productivity, this situation cannot be sustained.

Diversity within the sector still remains a challenge. In the West of England just 25% of the workforce are female. <sup>(3)</sup> The representation of female students on sector related courses remains a concern, with just 16% of first degree in engineering and technology entrants being female compared to 56.1% of entrants overall <sup>(1)</sup>. It is anticipated that nationally there will be an annual shortfall of up to 59,000 engineering graduates and technicians to fill engineering roles <sup>(1)</sup>, hence why the 'diversity agenda' encouraging more females into the engineering sector is key.

# Key Facts

A summary of key facts both locally and nationally in this sector

**55%** of respondents to the Business West Skills and Training Survey 2018 **have recruited over the last 12 months.** <sup>(2)</sup>



**63%** of respondents to the Business West Skills and Training Survey 2018 **found roles advertised in the last 12 months hard to fill.** <sup>(2)</sup>



There is an anticipated annual **shortfall of up to 59,000** engineering graduates and technicians to fill core engineering roles. <sup>(1)</sup>



**203,000** people with **Level 3+** engineering skills will be needed every year to meet demand through to 2024. <sup>(1)</sup>



**48.9%** of businesses say they have **no knowledge of the new apprenticeship standards.** <sup>(2)</sup>



**65%** of businesses reported **no knowledge of how to use apprenticeships to upskill existing members of staff.** <sup>(2)</sup>



Only **25%** of the advanced engineering & aerospace workforce in the West of England is made up of **female workers.** <sup>(3)</sup>



Median salaries for full-time engineering employees range from **£32,987 to £47,394**, with the overall average of **£28,195.** <sup>(1)</sup>



In the Business West Skills and Training Survey 2018 the **top three skills required by employees** in this sector were; **problem solving, communication skills and specific technical skills.** <sup>(2)</sup>



**83** apprenticeship standards in the engineering footprint were ready for delivery from summer 2017. <sup>(1)</sup>



In 2017/18 **the number of people starting apprenticeships in engineering and manufacturing technologies in the West of England fell overall.** However, the number of those starting advanced or higher apprenticeships increased. <sup>(4)</sup>



Ethnic minority groups are underrepresented in engineering: **8% working in engineering jobs are BAME**, compared with 12% of the UK workforce. <sup>(1)</sup>



# Notable Achievements

## Local Sector Skills Achievements in 2018

At the **University of Bath**, £60 million has been invested into an **Institute of Advanced Automotive Propulsion Systems (IAAPS)** to be opened in spring 2020. This will create 300 new jobs for Research PhD's, Engineers and Technicians. This institute will support collaborative research with the automotive industry to develop future generations of ultra-low emissions vehicles, (battery and electric) and also feed into the broader aerospace sector for electrically-powered personal aircraft vehicles.

**GKN Aerospace** plan to open a new £32 million Global Technology Centre in Bristol to focus on additive manufacturing (AM), advanced composites, assembly and industry 4.0 processes. This will enable the high-rate production of aircraft structures, creating over 300 new engineering roles..

The new **Airbus Wing Integration Centre (AWIC)**, is being readied for commissioning in the spring of 2019 in Filton; employing 250 engineers, supporting supply-chain partners within the aerospace sector. The AWIC facility will be an advanced testing centre for large structural components; and is integral to the creation of a streamlined wing engineering value-chain, enabling rapid and cost-effective development of mature aircraft wings.

The **National Composites Centre (NCC)** plans a further £36.7 million investment from the UK government via the Aerospace Technology Institute (ATI), the Local Enterprise Partnership (LEP) and High Value Manufacturing Catapult, to further develop their facility.

**Airbus UK** is actively supporting the recently launched **Women in Aerospace & Aviation (WiAA) Charter**, at the 2018 Farnborough International Airshow (FIA), by the UK Prime Minister.

**Cranfield University's Masterships®**, Master's level Apprenticeships (Level 7) was launched with their first cohort of 76 engineers from **BAE Systems plc**; successfully ensuring that our regional organisations can now utilise the apprenticeship levy to "upskill" their key staff, through enhancing their personal, business, and technical knowledge, via an online and blended learning programme.

**West of England Aerospace Forum's (WEAF) iAero Initiative** - the development of the first of two iAero Centres (Filton and Yeovil), Future Supply Chain Clusters around High Value Design (HVD) Hubs, has been approved by Somerset County Council for the respective iAero (Yeovil) Centre. The centre will focus upon high-value rotary wing design and manufacture to support SMEs and enhance innovation.

**Skills West** facilitated a series of Future Skills Immersion events with advanced engineering & aerospace firms and regional training providers in order to examine challenges and solutions to support combating the regional engineering skills shortage.

# Skills Priorities for 2019

## Priority One

### Improve Careers Education Information Advice and Guidance (CEIAG)

- *Reflecting on how the objectives in this section can address equality and diversity.*



#### Issues

Despite great efforts to raise the profile of STEM subjects and the profile of the sector as a whole, there remains more to be done. GCSE entries over the last five years indicate declining numbers in STEM subjects. GCSE entries for biology, chemistry and physics between 2012-2017 decreased by 10% and entries for science, which was previously the second most popular subject, dropped by over 46% over the last five years. At A-Level, entry numbers into mathematics, chemistry and physics has increased but these STEM subjects continue to have pass rates that are significantly below average. However, young people's interest in engineering is growing. The proportion of people who would consider a career in engineering has risen from 40% in 2013 to 51% in 2017<sup>(5)</sup>. But the older these youngsters get, the less likely this is – 39% of 16-19 year olds compared to 59% of 11-14 year olds. This evidence highlights the need to promote STEM subject in the primary and early secondary years in order to influence GCSE choices and it is crucial to sustain interest in the sector as a career choice as young people progress throughout education.

#### Objectives

- ▶ Support a coordinated streamlined approach to engagement in schools, utilising existing initiatives
- ▶ Add value to existing careers activity by encouraging greater industry-led involvement and commitment, to ensure that interest in the sector is maintained throughout all stages of education
- ▶ Increase the supply and retention of STEM specialist teachers through targeted recruitment programmes and promotion
- ▶ Bring together businesses, schools, colleges and sector engagement specialists such as STEM Ambassadors, The Tech Partnership and EngineeringUK to help develop pathways to professions and community engagement programmes
- ▶ Work with the National Careers Service contract holder and Careers Enterprise Network Advisers to further develop and improve Labour Market Intelligence (LMI) and ensure that materials are available to support on-the-ground careers advice and guidance for practitioners as well as careers advisers

#### Local Response

Skills West facilitated a series of Future Skills Immersion events with advanced engineering & aerospace firms and regional training providers in order to examine challenges and solutions to support combating the regional engineering skills shortage.

Many West of England regional corporate and SME firms have embraced the "Year of the Engineer 2018". For example - Jacobs' Bristol STEM team successfully delivered activities at the Big Bang South West event at the University of the West of England. School children travelled from all over the South West of England to attend, with their team supporting these events.

Airbus UK and a growing number of West of England/South West organisations are actively supporting the recently launched Women in Aerospace & Aviation (WiAA) Charter, at the 2018 Farnborough International Airshow (FIA), by the UK Prime Minister.

Skills West has attended careers fairs and events throughout 2018 promoting opportunities in the advanced engineering & aerospace sector to young people.

Skills West has delivered over 24 Labour Market Intelligence and careers advice events across the region over the period of the programme. This has included dissemination events at the 4 local FE Colleges and Careers Network Advisers.

188 employability opportunities in the advanced engineering & aerospace sector have been received through the Skills West Pledge campaign.

Engagement with the RAF Careers & Outreach Team and the South West RAF Air Cadets.

#### Future Recommendations

The sector to support the objectives of the Careers Enterprise Company in the West of England as part of the Enterprise Adviser Network and Careers Hub. In addition, to partner with other CEIAG agencies to engage with schools, FE Colleges and Higher Education to promote the sector.

# Skills Priorities for 2019

## Priority Two

### Improve the quality and responsiveness of local education and training provision



#### Issues

The West of England is home to excellent engineering skills provision from colleges, universities and industry recognised independent training providers, with levels varying from entry level up to degree level. In addition to the existing education and training facilities in the region, Weston College is leading a bid to be one of the first Institutes of Technology to boost technical skills for 16 to 18 year olds. Working alongside the region's colleges and universities, as well as a network of key local employers including Airbus, GKN Aerospace, GE Aviation and Renishaw, this £14 million bid will see the college's virtual learning environment extended, with AR and VR technologies to support students across the region.

However, STEM teacher recruitment and retention still remains a long-standing problem. In 2017/18 there was an estimated shortfall of 2,188 STEM trainee teachers against DfE targets <sup>(1)</sup>. It is crucial that the government, the engineering industry and the education sector work together on innovative approaches to incentivise talent into the STEM teaching profession and to improve retention.

#### Objectives

- ▶ Increase the supply and retention of STEM specialist teachers through targeted recruitment programmes and promotion
- ▶ Business to provide CPD opportunities for education staff to understand and see the workplace and how skills are applied in practice, to enhance the quality of careers advice and raise motivations of staff and students
- ▶ Create and support more engagement and interaction between education and business to bring the latest technical developments into the classroom and produce engineering students with relevant technical skills
- ▶ Maintain constant and relevant dialogue between local training providers and the industry to ensure provision is up-to-date, relevant, accessible and cost effective
- ▶ Ensure a quality range of STEM related subjects are on offer across all post-16 provision including short course provision
- ▶ Support bids for the establishment of an Institute of Technology within the West of England

#### Local Response

The University of Bristol is one of 21 universities from 11 countries that is part of the Airbus Global University Partner Programme. This initiative brings together education and industry to develop engineering and technology specialists of the future. Airbus partners with universities through strategic programmes to engage, educate, attract and inspire the engineer and digital professionals of tomorrow.

Skills West, at Business West, hosted a number of events bringing together industry and education and training providers to explore the future skills required by the sector.

During the lifetime of the Skills West programme three sets of Local Sector Skills Statements and Provider Action Planning analysis have been produced for each industry sector, offering up-to-date insight and data analysis within the region to support education with curriculum development.

Understand the engagement opportunities between the RAF Air Cadet organisations, Bristol & Glos Wing, South West Region, as a supplementary training provider with local employers.

#### Future Recommendations

Ensure local businesses, education providers and stakeholders work together to ensure continued co-design of curriculum.

# Skills Priorities for 2019

## Priority Three

### Increase apprenticeship starts and availability of higher apprenticeships

- *Reflecting on how the objectives in this section can address diversity and equality.*



#### Issues

Colleges and universities within the West of England are looking to grow engineering and aerospace apprenticeships. However, in 2017/18 the number of people starting apprenticeships in engineering and manufacturing technologies in the West of England fell overall, yet the number of those starting advanced or higher apprenticeships increased.<sup>(4)</sup>

Despite the national push behind apprenticeships, the Engineering Brand Monitor 2017 Survey revealed that 58% of 11-14 year olds indicated that they knew almost nothing or just a little bit about what apprentices do and the different type of apprenticeships available. Understanding was similarly low amongst parents with only 46% indicating knowledge of what apprentices do and 55% about the different types of apprenticeship available<sup>(1)</sup>. There is a similar picture within industry, with 48.9% of advanced engineering and aerospace businesses reporting to have no knowledge of the new apprenticeship standards and 65% reporting no knowledge of how to use apprenticeships to upskill existing members of staff.

It is clear work is required to raise awareness of apprenticeships across all stakeholders. With levy payers now able to distribute some of their levy payment down to supply chains, further support is required to ensure best possible use is made of these national initiatives.

#### Objectives

- ▶ Work to promote apprenticeships as a high-quality entry route into the sector as well as a vehicle to upskill, retrain and repurpose the existing workforce
- ▶ Work with larger levy payers to ensure they are making best use of their apprenticeship levy and are aware of how any unused payments can be dispersed through supply chains
- ▶ Raise awareness of apprenticeships and the profile of higher-level apprenticeships amongst young people and their influencers using case studies from within industry
- ▶ Work with SMEs to encourage the use of apprenticeships in the recruitment of new employees and in the development of the existing workforce
- ▶ Provide clear, accessible apprenticeship advice and guidance to individuals and employers with clear pathways and entry points

#### Local Response

Skills West continues to provide impartial support to businesses in the sector, giving advice about the benefits of apprenticeships to business.

Careers fairs and events have been held throughout 2018 promoting apprenticeship opportunities within the sector.

South West Apprenticeship Ambassador Network is building a strong cohort of business ambassadors and encouraging apprentices to become young ambassadors.

#### Future Recommendations

Local businesses, education providers and stakeholders to continue to work together to ensure ongoing introduction of apprenticeships into business of the correct quality and level.

# Skills Priorities for 2019

## Priority Four

### Engage SMEs in the active retention of staff through programmes of skills development and training to ensure increased productivity and sustainable growth

- *Encouraging SMEs to consider best practice in staff welfare.*



### Issues

With the advancement of technology and automation within the advanced engineering and aerospace sector and the shift towards an hourglass economy, the skills sets required within industry are changing. In order to increase the productivity of the sector and the wider economy, it is crucial to upskill, retrain and repurpose those already working in the industry. By 2030, according to a recent McKinsey Global Institute report, as many as 375 million workers (14% of the global workforce) may need to switch occupational categories such as digitisation and automation, as advances in artificial intelligence disrupt the world of work. In order for SMEs to remain competitive they must look to retrain and upskill workers who may be mid-career, middle-age workers, as opposed to replacing the existing workforce with new entrants.

With 73.5% of businesses offering training to employees in the last 12 months <sup>(2)</sup> and 51% of businesses in the West of England having a staff training and development plan, training in the sector is embedded. However, it's imperative to explore best practice in the upskilling of existing staff to retain and improve productivity and maintain staff welfare.

### Objectives

- ▶ Support and promote West of England initiative and funded programmes seeking to develop the workforce, including the recently launched Future Bright programme
- ▶ Encourage SMEs to consider how best to use apprenticeships to retrain or upskill existing employees
- ▶ Encourage more SMEs to invest in training in order to future proof their business and increase productivity
- ▶ Encourage growth amongst SMEs through the work of the West of England Growth Hub and regional scale-up funding and support
- ▶ Education providers to work in partnership with businesses to raise the awareness of apprenticeship reforms and the financial support available for new starts and upskilling existing staff

### Local Response

Future Bright, an upskilling government funded programme, provides financial support for in-work training.

Skills West teamed up with experts Atoll HR to deliver interactive workshops for SMEs, focusing on talent management and succession planning. Attendees gained knowledge, insight and

basic tools to help improve their people planning processes and employee retention, to aid growth and productivity.

The South West Apprenticeship Company worked with Skills West to deliver advice and guidance to SMEs about how apprenticeships can be used to recruit new staff and upskill the existing workforce.

### Future Recommendations

Ensure businesses are informed of the support for in-work training and apprenticeships to upskill their existing workforce and support in-work progression for all employees. Ensure best practice and learning is shared between businesses.

# Skills Priorities for 2019

## Priority Five

### Support SMEs to be inclusive and effective in staff recruitment

- *Reflecting on how the objectives in this section can address equality and diversity.*
- *How to build the talent pipeline in the region.*



### Issues

Diversity within the advanced engineering and aerospace sector remains a challenge. In the West of England just 25% of the workforce are female, <sup>(3)</sup> which is slightly higher than the national picture, where just 20.5% are female. <sup>(1)</sup>

The BAME community are also under-represented in the sector. With competition for high skilled workers increasing, employers need to expand their traditional recruitment methods in order to increase the talent pool available to them. In the Business West Skills and Training Survey 2018, 55% of businesses used word of mouth to promote roles. It is important to explore a wide variety of platforms to promote vacancies to attract a more diverse talent pool.

### Objectives

- ▶ Through the support offered by the Skills West programme, advise and connect SMEs to non-traditional methods of recruitment and local initiatives to expand their talent pool
- ▶ Work with community groups and pre-recruitment initiatives to provide those who are detached from the labour market with the skill-sets to enter the advanced engineering and aerospace sector
- ▶ Explore the development of regional apprenticeship role models to act as ambassadors, particularly around the recruitment of BAME candidates
- ▶ Work with SMEs to promote the opportunities of varied work patterns and encourage opportunities for work experience and internships as a route into the industry
- ▶ Support national campaigns to encourage women and other under-represented groups into engineering, including Tomorrow's Engineers Week, International Women in Engineering Day and the Big Bang Fair

### Local Response

The Skills West team, supported by Flexology, delivered a workshop focussing on flexible working. During the workshop, attendees learned about the benefits of a diverse talent pool and how to appeal to different groups through job descriptions. Signposting to diverse groups within the region was also provided to encourage employer collaboration and engagement opportunities.

Bristol University has established a Women in Engineering Society to provide opportunities for young girls and women already at the university.

The University of the West of England (UWE Bristol) recently launched their Women Like Me engineering outreach programme - a peer mentoring and outreach project aimed at boosting female representation in engineering.

Women in Aviation & Aerospace Charter, gaining rapid traction in the South West region.

### Future Recommendations

Partners to continue working collaboratively to support businesses to be more inclusive in staff recruitment and recruitment practices.

## Regional Centres of Excellence and Research

The Advanced Composites Collaboration for Innovation and Science

Aerospace Engineering Research Centre, UWE Bristol

Bristol Robotics Laboratory, UWE Bristol

Centre for Nanoscience and Quantum Computing, University of Bristol

Centre for Quantum Engineering

National Composites Centre

Engineering, Modelling and Simulation Group, UWE Bristol

Integrated Research and Advanced Test Facility (IRATF)

Airbus Wing Integration Centre (AWIC)

## Key Training Providers

City of Bristol College, Advanced Engineering Centre (ACE)

Weston College, Engineering Centre

University of West England (UWE), Engineering Faculty

University of Bristol, Faculty of Engineering, School of Civil, Aerospace & Mechanical Engineering (CAME)

Bristol Groundschool, Commercial Pilot Training (ATPL)

## Professional Networks and Organisations

Engineering Employers Federation (EEF)

West of England Aerospace Forum (WEAF)

iAero (Innovation Aerospace), a South West collaborative partnership

South West Manufacturing Advisory Service (SWMAS)

Aerospace Growth Partnership (The AGP Skills Working Group)

Science Engineering and Manufacturing Technologies Alliance (SEMTA)

EngineeringUK

Tomorrow's Engineer's

Aerospace Technology Institute (ATI)

Royal Aeronautical Society (Careers & Education Department & South West regional branches)

Innovate UK, UK Aerospace Research and Technology (UKART) programme

## Endorsed by

West of England LEP & West of England Combined Authority

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- 4) FE Data Library – Dec 2018
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- 8) Tomorrow's Engineers – [www.tomorrowsengineers.org.uk](http://www.tomorrowsengineers.org.uk)
- 9) Working Futures 2014 – 2024 – UKCES
- 10) McKinsey Global Institute report, Jobs lost, jobs gained: Workforce transitions in a time of automation
- 11) Industrial Strategy – Building a Britain fit for the Future. Nov 2017

## Supporting Research Documents

- a) West of England Combined Authority Business Plan, 2018/19
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- c) Industrial Strategy: building a Britain fit for the future, November 2017
- d) The Grand Challenges, Policy paper, May 2018  
<https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges>
- e) Careers strategy: making the most of everyone's skills and talents, December 2017
- f) Careers guidance: for further education colleges and sixth-form colleges, February 2018

## Get in touch today



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