



Future skills for  
our UK business  
A whitepaper

**BAE SYSTEMS**



“It is important that we equip young people with a range of skills that allow them to find a fulfilling job in years to come, and engineering skills are very transferable and a critical part of our future. More broadly, too much of our existing skills system and training focuses on the job requirements of today, not the future. Failure to successfully prepare for the impact of technological disruption means we will put at risk our ability to benefit from the opportunities created by digital transformation and other waves of technological change.”

Dr Hayaatun Sillem, Chief Executive, Royal Academy of Engineering



“New agile employment opportunities offer a better work life balance, rethinking what people do, how, when and where they do it, and flexing start and finish times around their busy lives. Through such changes there is the potential to achieve Work 4.0 and to create more good work, where businesses can secure and share more success, through their people and an empowered workforce. Good work involves people in purposeful activity, providing meaning and social structure and allows space for people to continuously innovate in the workplace, including optimising new technology.”

Lesley Giles, Director, The Work Foundation

# Contents

- 4 Introduction**  
Nigel Whitehead, Chief Technology Officer, BAE Systems, outlines the UK's skills challenge and how it can be tackled.
- 5 Moving into a fourth industrial revolution**  
Technology will change employers' skills needs and the way that employees work.
- 6 A digital tomorrow – the technical skills we'll need**  
How will data, networked systems and other innovation impact skills needs?
- 8 The importance of soft skills**  
Creative, communicative and cognitive skills will be more important as digitisation opens workplace opportunities.
- 9 Developing tomorrow's talent – apprentices and graduates**  
The growing need for core engineering skills means industry and education must work together to train those entering work.
- 12 Team Tempest**  
The next generation combat aircraft system project shows a new approach to skills, design and manufacture.
- 14 Upskilling and retraining**  
Employers must support existing workforces with high-quality training to develop new skills.
- 16 Working with supply chains and SMEs**  
Resources and support are needed so smaller companies vital to the British economy can thrive in the next industrial era.
- 17 Working with the education sector and universities**  
Industry, Government and education providers must inspire and prepare young people for the vast range of careers in industry.
- 19 A different sort of workplace**  
Workplaces must be diverse and inclusive, with culture, working practices and technologies to facilitate this.
- 22 Conclusion and guiding principles**  
Nigel Whitehead, Chief Technology Officer, BAE Systems, suggests six guiding principles for the development of future skills.

## About BAE Systems

At BAE Systems our advanced defence technology protects people and national security, keeping critical information and infrastructure secure.

We search for new ways to provide our customers with a competitive edge across the air, sea, land and cyber domains.

We employ a skilled workforce of 85,800 people in more than 40 countries and work closely with local partners to support economic development by transferring knowledge, skills and technology.

In the UK we employ 34,000 people and spend £4 billion on goods and services with some 8,900 suppliers across the country. BAE Systems is one of the most productive companies in the UK, with labour productivity of £128,000 per employee, almost 80 per cent above the national average.



**Nigel Whitehead**  
*Chief Technology  
Officer,  
BAE Systems*

---

## ■ Introduction

At BAE Systems we are in the unusual position of knowing the profile of who we will need to hire in 20 years or more. Some of the future employees in our plan haven't yet been born. And while we don't yet know all the technologies they'll work with, we do know they will have to be nimble – career paths are no longer predictable. Technology is changing fast and how we work is changing with it.

We already create some of the world's most sophisticated defence, aerospace and security products and our work in the digital environment will become more complex. Harnessing the benefits of our interconnected world will bring enormous opportunities. The digitisation of design and manufacturing allows us to do much more, more quickly and more cheaply. It will let us create a workspace where specialists can interact in highly complex environments. We will optimise designs in a way we never have before.

New ways of working demand new know-how – from data science to advanced systems engineering and machine learning – and an ability to communicate across boundaries. Historically, innovation has always been a disruptor and decider in the battlespace – and the defence sector must continue to provide a space for different disciplines to work together and creativity to flourish.

Businesses and employees can no longer believe that it is another business's responsibility to train and upskill the workforce of the future. We know this is a challenge for small and medium-sized businesses whose resources are already stretched. I believe personal and corporate responsibility, collaboration and sharing best practice are key to solving these issues.

I am personally really excited by the opportunities in today's highly interconnected world and the creativity of today's young people. My experience is that those at the start of their careers are motivated more than ever before to challenge the traditional norms of work culture and practices by looking to work in more inclusive and flexible environments where out-of-the-box thinking and imagination are encouraged and exploited. By capitalising on the ambition of young people coupled with the UK's traditions and advantages – education, strong legal frameworks, technical innovation and leadership – we can exploit the digital revolution to compete on the world stage.

I believe we have all the ingredients to act today and equip today's workers with the skills that they will need tomorrow.

# Moving into a fourth industrial revolution

It's called industry 4.0 – the fourth industrial revolution – and it could change people's working lives beyond recognition. As disruptive innovation and new technologies create radically different ways of thinking and working, the impact – and potential gains – are enormous.

Most employers, however, have yet to take advantage of these possibilities or understand their consequences. The UK has a persistent problem with low productivity, and opportunity does not flow equally to everyone. Too many businesses underperform. Too many small businesses focus on the 'here and now' and investment in skills is falling<sup>i</sup>. We do not get the most out of our people. UK businesses lag behind their EU peers in adopting technology.

Our economy is increasingly polarised. A long-term shift to more high and low-skilled jobs has created an 'hourglass' effect, hollowing out the middle. As jobs become more precarious, about a fifth of workers are stuck on low pay<sup>ii</sup>. The UK has the fifth most unequal economy in Europe, according to the Institute for Public Policy Research<sup>iii</sup>.

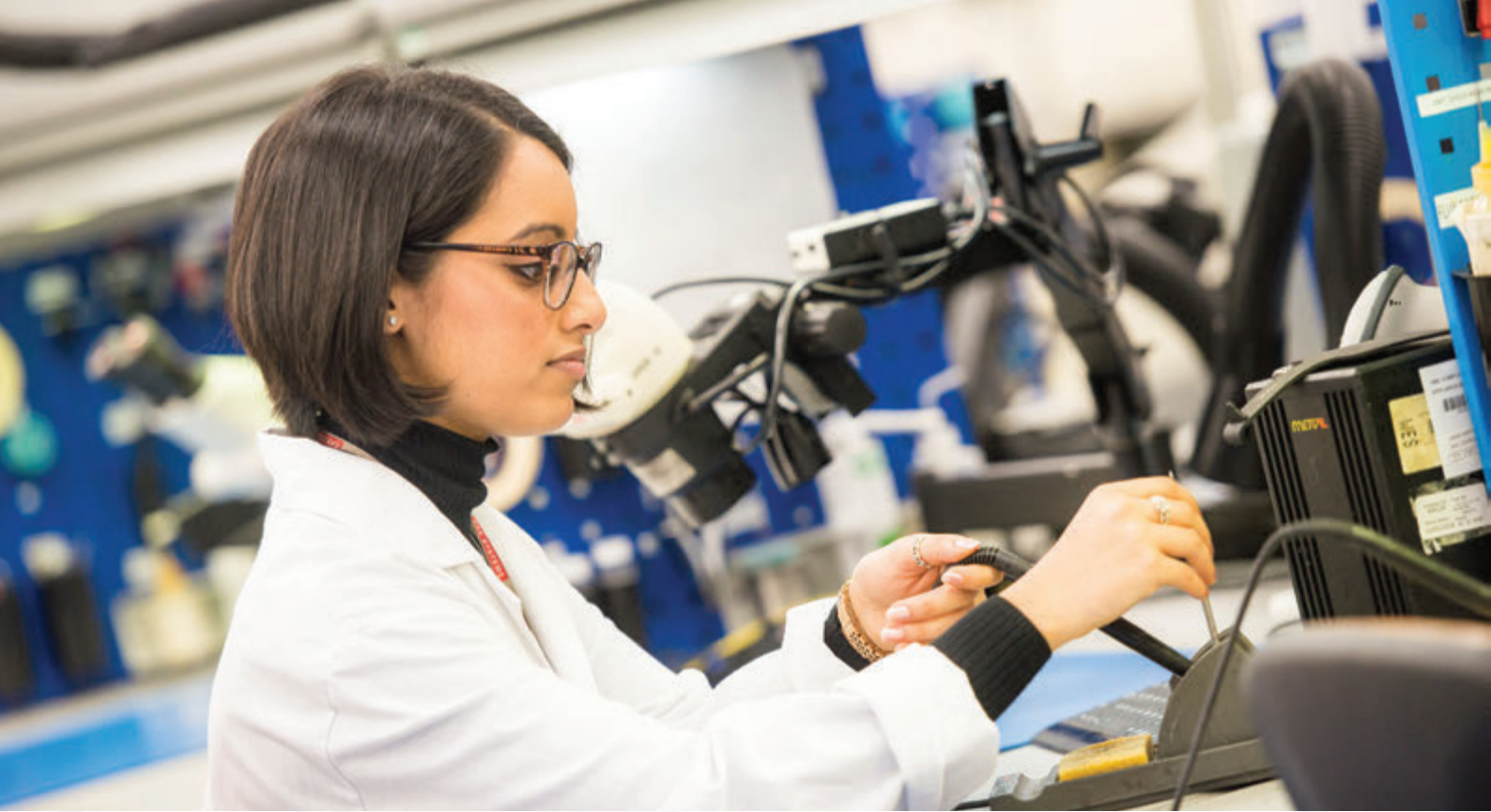
At the bottom are a large number of people who either never progressed beyond GCSEs or have gained only low-level qualifications. Too often they end up in low-skilled, low-wage jobs. Indeed, the UK has a growing proportion of low-skilled jobs. The Organisation for Economic Co-operation and Development (OECD) Survey of Adult Skills shows that the UK is second from the top (only behind Spain) in terms of jobs that require lower-level qualifications<sup>iv</sup>. In the UK 22 per cent of jobs require education below upper secondary level<sup>v</sup>, whereas in all other G7 countries this share is less than 10 per cent<sup>vi</sup>.

The good news is that the UK compares well internationally with the proportion of people qualified at higher skills levels through tertiary education appearing in the OECD top ten of countries<sup>vii</sup>.

Nonetheless as the economy picks up, skill shortages in science, technology, engineering and mathematics (STEM) – and managerial expertise – become more apparent, raising questions about the development and deployment of people at work. Employers report a lack of digital and complex analytical skills. Spending on training fell in the second half of the past decade according to research by the Centre for Learning and Life Chances in Knowledge Economies and Societies<sup>viii</sup> and this risks widening the gap between those rich in skills and those poor in them.

As career pathways become more diverse, the UK must embrace continuous learning –

**Continued on page 6**



which requires high-quality work-based training that develops ahead of the demand of work. The OECD highlights the need for new systems in the UK to validate skills and 'on the job' and informal learning at work or beyond traditional education – as seen in the Netherlands and elsewhere.

Work-based learning must be flexible, digitally-enabled and connected to developments in the workplace. The UK needs an implementation approach to its industrial strategy in which more businesses work together with other partners to support lifelong investment in skills. We believe both employers and Government need to play a key role here.

## A digital tomorrow – the technical skills we'll need

**Systems Farmer:** *someone who harnesses the revolution in synthetic biology and chemical engineering to 'grow' parts for aerospace.*

The jobs of the future may have names we don't recognise today. Although nobody can predict exactly how technologies will change our society and working environment, we are certain that the ability to analyse and use data will be fundamental in our business. As Juergen Maier, CEO of Siemens UK, said in the Made Smarter Review<sup>ix</sup>, an independent review of industrial digitalisation, not only are breakthroughs like these significant in their own right, but their combined impact could be vast.

In the next 20 years, technology will significantly change how the armed forces operate. We will need increasing numbers of people who can work with our armed forces to

understand how equipment, platforms and systems can work together across air, land, sea and cyber and how they will be used in interconnected ways on the battlefield.

Kevin McLeod, Chief Engineer, BAE Systems Maritime, says: “We need to be clear what we mean by digital skills. This is about how to use big data, the internet of things and, in our case, the military internet of things to improve what – and how – we deliver to the UK’s armed forces. An ability to constantly think in a networked way is critical.”

We believe that analysis and exploitation of big data and the internet of things will continue to improve design, manufacture and diagnostics. We will require more artificial intelligence (AI) and robotics specialists at BAE Systems and throughout the defence, security and aerospace sector.

More integrated thinking or ‘systems thinking’ and process engineering using AI will make us better at designing, manufacturing, testing and future-proofing systems on time and to cost. Engineers will focus far less on one narrow element of design or manufacture than in the past.

We also expect BAE Systems to tap further into the vibrant and creative thinking of sectors such as gaming, retail and motorsport, working more collaboratively with specialists in universities, start-ups and SMEs.

The unprecedented impact of the internet and mobile communications has fundamentally altered traditional R&D in the defence sector. Now, defence-orientated technologies produced by organisations such as BAE Systems benefit as much from disruptive innovations in the commercial world as from those from in-house and university research. This approach to ‘open innovation’ has wider implications for skills as organisations source ideas and resources from a wider base.

Dr Julia Sutcliffe, Chief Technologist, BAE Systems Air, explains: “There’s never been a better time to work in this field. Our industrial base, our fantastic universities and our education system can feed this dynamic, but we need to do things differently and seek out creativity and innovation from unusual places through new and agile partnerships across a much wider ecosystem.”

Rapid technological development will require employers and employees to deepen subject matter expertise throughout careers informed by constantly looking outwards. This environment scanning is itself an important capability, allowing us to predict and rapidly adapt to the changing environmental context, in which skills development will be crucial.

## Putting UK skills into context

**In the UK, 22 per cent of jobs require only education below upper secondary level<sup>i</sup>. In all other G7 countries, it is under 10 per cent<sup>ii</sup>. England is the only OECD country where younger people do not have stronger basic skills than the generation approaching retirement<sup>iii</sup>. The average salary for digital roles is just under £50,000<sup>iv</sup> – 36 per cent above the national average. One million industrial workers need to learn digital skills<sup>v</sup>.**

# ■ The importance of soft skills

*“For one person who is blessed with the power of invention, many will always be found who have the capacity of applying principles.”*

These words of the father of computing, Charles Babbage, written in 1830, still ring true today. As advanced robotics, automation and AI take on routine work, staff will have to apply the principles of the technological revolution instead. Mental dexterity will overtake manual dexterity. Being responsive, adaptable and agile will be vital for employees as traditional career routes change.

This will mean finding people who can solve complex problems with critical thinking and creativity. Investment will be required to make this happen. In education, these needs must underpin the curriculum – forming the bedrock on which to overlay technical and STEM skills.

Dr Rhys Morgan, Director of Education at the Royal Academy of Engineering, says: “We need to nurture and develop the skills that artificial intelligence systems can’t replicate. These are the more nuanced meta-skills – how humans interface with machines for example. Here, we creative thinkers can play a key role.”

Donna Edwards is programme director of the Made Smarter North West pilot programme, which provides practical support and employee training to SMEs adopting new technologies such as robotics or data analytics. She believes companies will still need these ‘soft skills’ while digital skills evolve. “It is no longer viable that

## 2020: Top ten skills

**In 2016 the World Economic Forum asked global human resources and strategy leaders to identify the top ten work skills for 2020. This is their list:**

- Complex problem-solving
- Critical thinking
- Creativity
- People management
- Co-ordinating with others
- Emotional intelligence
- Judgment and decision-making
- Service orientation
- Negotiation
- Cognitive flexibility

we see technical and soft skills as separate paths. They are different sides of the same coin. In an economy where effective skills will be the differentiating factor, we need to develop talent with the option to use both as the work environment demands.”

Is there room for more lateral thinking when recruiting? Could aptitude for language or music translate into critical thinking? Liz Pollard, HR Director, Applied Intelligence, BAE Systems, says: “We’re trusted by some of the world’s most important organisations to create intelligence and insight from complex data. The threats governments, business and society face today are digital, the new battlefield is online. We help our clients to protect and enhance critical assets in a connected world. The ability to innovate and improve is essential to success, with problem-solving and creative thought valued as highly as technical capability in new recruits.”

Social skills will oil the wheels of partnerships and cross-cultural



collaboration, which are growing more prominent in the sector where BAE Systems works. We can build interpersonal skills by encouraging staff to participate in education outreach and STEM Ambassador programmes.

Employers must give employees broader opportunities to move across organisations, experience different disciplines and consider new ways to work and develop soft skills.

## Developing tomorrow's talent – apprentices and graduates

In the decade up to 2024, 1.24 million graduate and technician roles will arise through the replacement of existing personnel and expansion demand, says EngineeringUK's 2018 report<sup>x</sup>. In the future we see the defence, aerospace and security sector continuing its tradition of developing its own talent. This will be both through apprenticeships and continued collaboration with universities, designing degree programmes to deliver the skills industry needs. There will need to be a special focus on areas such as nuclear engineering, project management, software and systems engineering.

The growth of apprenticeships is to be applauded, but maintaining high standards is critical. BAE Systems works closely with a range of education and academic partners to develop

**Continued on page 10**



**“We need to nurture and develop the skills that AI systems can’t replicate. These are the more nuanced meta-skills – how humans interface with machines for example. Here, we creative thinkers can play a key role.”**

*Dr Rhys Morgan, Director of Education,  
Royal Academy of Engineering*

new Standards and Degree Apprenticeship Standards through our Apprenticeship Trailblazer Groups. Collaborations are similar to those we have in place with Blackpool & Fylde College and Lancaster University in delivering an Aerospace Engineer Standard. We have also been instrumental in working with the Government to help strengthen the Apprenticeship Levy so that it best encourages greater take-up and improves the quality of training on offer for all.

Key potential improvements include providing better support to SMEs to employ apprentices; piloting ways of pooling unspent Levy funds so that large employers can help SMEs; addressing specific digital skills needs and extending the lifetime of Apprenticeship Levy funds.

This year we have a record 3,000 young people in training in our UK business. We will recruit about 700 apprentices and 300 graduates. We have invested more than £50 million in training academies to introduce apprentices to new technologies.

Many of our young colleagues choose, in turn, to encourage others to consider careers in engineering. Andrew Smith, Employee Relations Director, BAE Systems, welcomes this:



“There is an opportunity to harness the enthusiasm of young people and their interest in technology by utilising schools and other academic institutions to help school-age people understand the breadth and variety of technology-based careers.

“We need to help furnish young people not only with the skills required for today’s jobs, but also, crucially, with those that will allow them to adapt over the course of a more agile career path than the generations before them.”

Beth Howard-Henry recently completed a Higher Apprentice Programme in our submarines business at Barrow-in-Furness. As well as being a STEM Ambassador and volunteering at local schools, she helped to create and run the G-Eng, a new engineering badge for the Girl Guides (Guides in Engineering). Since joining BAE Systems, Beth has been studying mechanical engineering part-time at Lancaster University and is working to become a Radiation Protection Adviser with the Society of Radiological Protection. She says: “My role at BAE Systems is varied and I’ve been fortunate to be able to work with colleagues to spread the word about engineering as a career, both in the UK and more recently in Singapore.”



**Beth Howard-Henry, BAE Systems Higher Apprentice Programme graduate**

# Team Tempest

An engineer stands at a smart workbench using visual and audio prompts to complete the assembly of a new product. She is aided by a 'cobotic' colleague – a machine that holds the components being joined together. An integrated camera gathers images of the assembly process, checking them against the design model for accuracy.

This vision for the future of combat aircraft capability, design and manufacturing is being considered by a consortium of BAE Systems, Leonardo, Rolls-Royce, MBDA and the UK Ministry of Defence. The Team Tempest project is working on proposals for a next-generation stealth combat jet to replace the Typhoon as it begins to leave Royal Air Force service from 2040.

The team is already convinced that a completely new approach to design and manufacture and to the skills needed to work on the project is required as they grapple with how best to adapt emerging technology throughout the design cycle.

Team Tempest must produce results faster and at half the cost of previous combat aircraft. Parts are made and assembled on site to maximise design and manufacturing integration. Engineers will use technologies such as augmented and virtual reality, 3D printing, AI, data analytics and cobotics.

The project will need more staff with specialist technical skills as well as people who can collaborate effectively with international organisations, across time zones and cultures, as well as with those from the vibrant UK technology sector.

Dave Holmes, Director of Manufacturing, BAE Systems Air, says: "To be successful we will need to embrace different cultures and working styles and avoid the 'not invented here' mind set – sharing expertise between senior specialist engineers, new colleagues and adjacent sectors. This will create new learning opportunities and diverse thinking."





**“Engaging employees and working effectively with their trade union representatives is always an important part of organisational change and this will be critical as businesses adopt increasing levels of technology.”**

Andrew Smith, Employee Relations Director, BAE Systems

## ■ Upskilling and retraining

The majority of those forming the workforce for the next decade are already in work. The OECD states that 32 per cent of jobs are set to change radically as a result of automation in the next 15 to 20 years<sup>xi</sup>. Yet a third of UK businesses do not offer any work-based training<sup>xii</sup>.

Engineering skills will remain the basic building blocks for our sector, but roles will change. We understand that this is of concern to many people. Yet while automation, including cobotics, will support the reduction in repetitive and mundane tasks, we see considerable opportunities for new types of roles in disruptive advanced manufacturing techniques such as additive layer manufacturing (3D printing) and the combination of subtractive, additive and novel joining technologies.

We believe that human judgement and creativity will always be required. We do not believe that our workplace will become entirely mechanised.

Anticipating resource needs is crucial for successfully delivering products and services on time and to cost for our military and commercial customers. At BAE Systems we use strategic workforce planning to understand what skills we will need, where and when. We will continue to identify our core skills needs and cross-reference these with our employees' capabilities to identify where retraining and upskilling are needed.

Dave Nuttall, HR Director, Future Combat Air Systems, BAE Systems Air, says: “In the past we’ve retrained people in-house to become systems engineers or structures engineers so we have a good track record of upskilling and the tools and knowledge in place to do this.”

We will also work with all our people to communicate technologically driven change and to help employees take control of their personal development. Our union



representatives are saying that we need to educate employees so they can see the benefits of new skills and working practices – which might include robotics doing some of the less attractive tasks – and also to show how the implementation of technology will give the company an advantage in attracting new work and offset any effects.

Andrew Smith, Employee Relations Director, BAE Systems, is in wholehearted agreement with this approach: “Engaging employees and working effectively with their trade union representatives is always an important part of enabling organisational change and this will be critical as businesses adopt increasing levels of technology. There are too many examples across businesses where change has been resisted. Consulting unions and employees early and transparently is always the best methodology for building trust and working together on the changes required.”

To support retraining requirements we see partnerships with existing training providers and academia as fundamental. Since 2015 we have worked with organisations in Humberside to retrain experienced employees at the purpose-built RJ Mitchell Academy for second career roles in aircraft maintenance. Successful candidates go on to work at RAF Coningsby in Lincolnshire or at overseas locations for BAE Systems.



## Working with supply chains and SMEs

We know smaller companies don't necessarily have the time or resources to embrace changing technology or to update manufacturing processes. Of the 687,575 engineering companies in the UK<sup>xiii</sup> the majority have fewer than ten employees. Many of these form the supply chain critical to BAE Systems, and it is vital that we support them.

Donna Edwards, from the Made Smarter North West pilot programme, says businesses that don't evolve staff skills alongside and in partnership with their larger customers will be left behind.

Small businesses can ask colleges, industry bodies and growth hubs for support with training, she suggests. Often these companies don't have the resources to take young people on work experience and there is a nationwide lack of training at levels 4 and 5 – from the end of school through to degree level equivalent.

Working with local training providers will help develop specific programmes for their business and long-term solutions.

Within industries such as aerospace and automotive, many larger companies help their supply chains with best-practice innovation. BAE Systems is taking part in a Made Smarter-led scheme providing specialist advice to help 3,000 small manufacturing businesses in the north west of England adopt digital technology to reduce time to market and production costs.

We are a founding supporter of Productivity Through People, a unique collaboration between industry and academia that aims to address the finding that the UK's poor productivity record in business is inextricably linked to poor management and lacklustre leadership.

This year 2,000 managers from SMEs will be taking part in the Small Business Leadership Programme which offers leadership development and mentoring with partners including BAE Systems, Siemens and Rolls-Royce.

"If large companies can show what the future looks like as products are developed, this can drive changes in supply chains and reinforce the need to adopt digital technology solutions to increase productivity," says Edwards. "Momentum is building."



## Working with the education sector and universities

We know that our sector may not always have instant appeal for young people – particularly young women. As a company we must continue to work harder to communicate the enormously rich variety of technology careers we offer and how they relate to curriculum STEM subjects such as maths, physics and computer science.

The only way to do this is by partnering with educators and Government and trying to understand and alter perceptions of STEM careers among teachers and parents. We also need to reassure young people that their existing skills are relevant to our sector. Multitasking in gaming, problem-solving and design skills found in arts subjects, for example, are important in young people's lives but are not usually considered in discussions about traditional engineering skillsets.

With the Royal Air Force and Royal Navy, BAE Systems takes its schools roadshow to 420 schools a year reaching more than 100,000 pupils. We fund imaginative STEM resources created by experts such as the Royal Academy of Engineering. We meet tens of thousands of children, their parents and teachers at science fairs such as The Big Bang, which is organised by EngineeringUK, and promote apprenticeships to teenagers at the WorldSkills UK Live exhibition.

Up to 500 secondary school pupils every year complete work experience within BAE Systems. This helps them to make more informed career decisions. At the end of the week we invite parents to see what their children have achieved.

We also work with organisations such as STEM Learning to help give science teachers a taste of industry so they can inform and inspire pupils.

Some employers complain that school leavers aren't work-ready. There are differences of

**Continued on page 18**

**“There’s never been a better time to work in this field. Our industrial base, our fantastic universities and our education system can feed this dynamic, but we need to do things differently and seek out creativity and innovation in unusual places.”**

Dr Julia Sutcliffe, Chief Technologist, BAE Systems Air

opinion on how to combat this. Dr Rhys Morgan, of the Royal Academy of Engineering, says: “It’s perhaps a bit unfair of employers to expect the education system to produce absolutely work-ready graduates. This has to be a joint effort and employers need to recognise their role in developing individuals’ competencies and work-related skills.”

Work experience is one way to overcome prejudice about careers in industry, and business must be ready to train more of those who leave school following compulsory education. “Employers need to work with education providers to ensure teachers and tutors have a better knowledge of industry and the broad range of career opportunities available for their students,” Dr Morgan says. He suggests developing a new type of hybrid industry-teaching role for professionals, along with year-long industry placements for teachers. Made Smarter and the Royal Academy of Engineering ask whether professionals could switch between industry and schools.

There is a long-term shortage of science and maths teachers – and the Government is investing £406 million on maths, technical education and digital teaching<sup>xiv</sup>. At present only half of maths and physics teachers stay in their jobs five years after qualifying, compared with a 60 per cent average retention rate<sup>xv</sup>. By 2028 there will be almost 15 per cent more pupils in secondary schools than in 2018<sup>xvi</sup>, making the shortage even worse.

Pupils can already narrow their science options when they are 14, and too few girls take maths and physics at A Level and beyond. In addition many engineering and technology experts want broader education for longer – with students studying a mix of sciences and humanities until they are 18. This was a key recommendation of the Perkins Review Revisited<sup>xvii</sup> and is a view we endorse.

We also support efforts to ensure arts subjects are considered in the teaching and understanding of STEM and will be doing more in this area to ensure those studying arts subjects do not feel excluded. The STEAM (science, technology, engineering, arts and maths) movement has grown steadily in the past few years. Artists and scientists both use object-based learning in research, observation and analysis, and it is important to recognise this in a broad-based approach.



Yvonne Baker, Chief Executive, STEM Learning, says: “Supporting teachers – alongside students – is fundamental. Providing teachers with STEM-specific professional development, STEM Ambassadors, resources and STEM Clubs are all key ingredients in the world-leading STEM education every young person deserves and needs.”

To encourage young people to continue training in STEM, the Government is introducing vocationally-based T Levels as an alternative to traditional A Levels. With other engineering employers we are liaising with the Department for Education to develop the engineering T Level and to consider how industry placements will work. We also plan to run pilot placement programmes in 2020.

In the higher education sector we have forged relationships with five strategically important universities to collaborate on technology and engineering developments. These partnerships help to develop skills within the UK defence, aerospace and security sector by focusing on the real-world application of emerging science – from quantum sensing to advanced manufacturing, AI and more. We spent £9 million in UK universities and £4 million in UK colleges in 2018.

## ■ A different sort of workplace

We are already seeing a change towards a more flexible and inclusive working culture in our organisation and sector. We believe this is important for attracting and retaining employees. These positive changes will continue. Andrew Smith says: “Employment models of the future will need to be more agile to allow for multiple career changes, and to be able to rapidly adapt and respond to technological change.”

**Continued on page 20**



Dave Nuttall, HR Director, Future Combat Air Systems, BAE Systems Air, adds: “We are looking to experiment with new ways of working and with technology that can facilitate teamwork. More flexible hours, collaborating nationally, internationally and working further afield will become our norms. While key elements of our workforce will still need to be based at fixed facilities, many more will need to be mobile. These changes will enable us to be more creative and to tap in to diversity of thought and experience in order to do things very differently.”

Evolving workplaces and working environments are a huge benefit to organisations that rely on technological developments to maintain their competitive edge and grow. Individuals in our business and young people could act as ‘change agents’, introducing new ways of thinking, working and challenging the status quo. But our experienced people will need to work with colleagues who respect and value their knowledge.

Discussing these issues openly, debating and problem-solving is the culture we aspire to. Working on our employer proposition and challenging traditional views of the defence, aerospace and security sector will also be critical to our future skills pipeline. As Mark Rutherford, Director of Recruitment and Resourcing, BAE Systems, explains: “When talking to people about BAE Systems’ value proposition, I come back to these cornerstones – the type of work they’ll be doing, how they are able to do that work, and what opportunities there are to develop. How exciting is it to them? Does it give them an opportunity to be creative in their fields?”

Natalie Sigona, Head of Diversity and Inclusion, BAE Systems, says: “We need introverts, extroverts, left-brain thinkers, right-brain thinkers, young minds, experienced minds and so on; true diversity in personality, attitude and approach. Young people can bring a different and fresh thinking mind set and experienced workers can bring knowledge and

**“We need introverts, extroverts, left-brain thinkers, right-brain thinkers, young minds, experienced minds and so on; true diversity in personality, attitude and approach.”**

Natalie Sigona, Head of Diversity and Inclusion, BAE Systems

expertise. Digital natives could give the rest of us more confidence to embrace new and unique technology.

“Our sector must also work hard to attract, hire, retain and leverage people from all minority groups. That includes men and women with different needs and disabilities, people from the LGBTQ+ [Lesbian, Gay, Bisexual and Transgender, Queer/Questioning and Others] community and people with black, Asian and multi-ethnicity [BAME] backgrounds.

“Importantly we should not expect people with difference to conform to the mainstream. Everybody needs to feel authentic at work and I think we need to do more to flex the business environment and culture to embrace difference. For example in the past anyone with autism or Asperger syndrome may have had to adapt to fit in at work. We need to turn things on their head and create a new – more inclusive – reality by finding ways to include and embrace any kind of difference without asking people to adapt or assimilate.

“Let’s build trust and collaborate so that declaring difference can be positive and people can be their best. We want to create a culture where difference thrives. It will be because of this that organisations of the future perform highly,” Sigona adds.

OutLinkUK is the UK-wide LGBTQ+ group founded by employees for employees. We know people are likely to reach their full potential only when they can be themselves in the workplace. Research shows this typically results in better employee engagement, improved health and wellbeing, and increased performance.

The OutlinkUK group also supports employees and works with the company to address specific LGBTQ+ issues, including the development of inclusive policies and supporting BAE Systems’ submission to the Stonewall Workplace Equality Index. It raises awareness of LGBTQ+ issues within BAE Systems and has established links with LGBTQ+ networks in other organisations to share best practice.

We are also starting to see improvement in the number of young women recruited, particularly on to our apprenticeships and

Continued on page 22

## Diversity and inclusion at BAE Systems

**In 2018, in our UK business, an above-sector average 26.3 per cent of apprentices and 28 per cent of graduates were female; 3.7 per cent of apprentices and 23 per cent of graduates were from BAME backgrounds; 15 per cent of apprentices had a disability or learning need. In 2017, 29 per cent came from the 20 poorest wards in England.**

graduate programmes. As part of our commitment to greater diversity, we were a founder signatory of the Women in Aviation & Aerospace Charter.

Karin Hoeing, Group Human Resources Director, BAE Systems, said at the launch in July 2018 at the Farnborough International Airshow: “We are very pleased to support the Charter as part of BAE Systems’ global efforts to increase diversity and inclusion in our business. Offering fair opportunities for all individuals to succeed regardless of race, gender or background will be a distinguishing feature for successful businesses in the future.”

BAE Systems also works with Maritime UK on equality and diversity issues and we are committed to signing the Women in Maritime Charter and a parallel Women in Defence Charter.

## Conclusion

**Nigel Whitehead** *Chief Technology Officer, BAE Systems*

I have often described BAE Systems as being a custodian of sovereign skills. By this I mean that our people are able to design and build defence, aerospace and security products, equipment and services that keep our nation safe. It is a responsibility we take extremely seriously and we are determined to do everything we can to help maintain these nationally important skills.

We have set out six guiding principles for our business and sector that we consider helpful for delivering this responsibility. Fundamentally, we believe that successful action requires a concerted and co-ordinated effort across Government, industry and the education sector.

Skill shortages are real – we need to act now, but we can’t act alone.

### SOURCES

Page 7: Putting UK skills into context: ‘Getting Skills Right: United Kingdom, published by OECD, November 2017

<sup>i</sup>ibid

<sup>ii</sup>Building Skills for All: A Review of England, published by OECD, January 2016

<sup>iii</sup>Made Smarter Review, published by Government Digital Service, November 2017

<sup>iv</sup>ibid

Page 8: 2020: Top Ten Skills. The Future of Jobs, published by The World Economic Forum, January 2016

<sup>v</sup>UK Employers Skills Survey, 2017, published by Department for Education, August 2018

<sup>vi</sup>The Great Escape? published by Social Mobility Commission, October 2017

<sup>vii</sup>Prosperity and Justice: A Plan for the New Economy, published by the Institute for Public Policy Research, August 2018

<sup>viii</sup>Getting Skills Right: United Kingdom, published by OECD, November 2017

<sup>ix</sup>ibid

<sup>x</sup>ibid

<sup>xi</sup>Education at a Glance 2018, published by OECD, September 2018

<sup>xii</sup>What Has Been Happening to the Training of Workers in Britain? published by LLAKES, September 2013

<sup>xiii</sup>Made Smarter Review, published by Government Digital Service, November 2017

<sup>xiv</sup>EngineeringUK Report 2018, published by EngineeringUK, January 2018

<sup>xv</sup>The Future of Work: OECD Employment Outlook 2019, published by OECD, April 2019

<sup>xvi</sup>UK employer skills survey 2017, published by Government Digital Service, August 2018

<sup>xvii</sup>EngineeringUK Report 2018, published by EngineeringUK, January 2018

<sup>xviii</sup>Industrial Strategy: building a Britain fit for the future, published by Government Digital Service, November 2017

<sup>xix</sup>The teacher labour market in England: shortages, subject expertise and incentives, published by Education Policy Institute, August 2018

<sup>xx</sup>National pupil projections – future trends in pupil numbers: July 2018, published by Department for Education, July 2018

<sup>xxi</sup>Engineering Skills for the Future – the 2013 Perkins review revisited, published by EngineeringUK, January 2019

# Six guiding principles for the development of future skills

**1 Create a more diverse, inclusive and flexible workplace.** BAE Systems and others in our sector must create a more attractive place to work by reflecting different working preferences and lifestyles – helping all employees be themselves at work and perform at their best.


**2 Commit to retraining and upskilling.** We will need to continue working with our employees to understand our existing capabilities and our specific future skills requirements, and to ensure continuous professional development programmes are in place.

**3 Prioritise investment in digital, soft and behavioural skills** for our existing and future workforce to meet the needs of our military and commercial customers and capitalise on the fourth industrial revolution.

**4 Continue to support our suppliers and SMEs** so that they can develop skills in the digitally-enabled workplace. Our sector must learn from successful partnership activities like Productivity Through People and the Made Smarter programme, to identify which endeavours best support SMEs.

**5 Continue to improve the perception of STEM subjects and careers** in a joint programme of nationwide activity with Government, education, professional bodies and fellow employers. We must consider how to incorporate the design and problem-solving elements of arts subjects in the more traditional approach to STEM careers.

**6 Continue to champion vocational training** and support Government endeavours to improve effective application of the Apprentice Levy.



**“I believe we have all the ingredients  
to act today and equip today’s workers  
with the skills that they will need  
tomorrow.”**

Nigel Whitehead, Chief Technology Officer, BAE Systems

For more information  
[www.baesystems.com/skillsandeducation](http://www.baesystems.com/skillsandeducation)

BAE Systems plc  
6 Carlton Gardens, London SW1Y 5AD  
United Kingdom  
Telephone: +44 (0)1252 373232  
[baesystems.com](http://baesystems.com)

Registered in England and Wales, No. 1470151

©BAE Systems plc 2019. All rights reserved.

BAE SYSTEMS is a registered trade mark of BAE Systems plc