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desider

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the magazine for defence equipment and support

Innovation – join the journey

Innovation Edition

INNOVATION at DE&S

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Foreword

Welcome to our second special edition of Desider, celebrating the amazing innovation taking place across DE&S as we strive to inspire fresh thinking across the Defence community.

"The world of Defence is a rapidly changing landscape and inside you will find cutting-edge projects from across the business"

By Sir Simon Bollom, CEO

Since the seminal 'Innovation' edition last year, our teams have been encouraged to push the boundaries and be confident in championing ways of doing things better, faster and more dynamically as we seek to deliver the very best capability to the front line.

More than ever, the world of Defence is a rapidly changing landscape and inside you will find cutting-edge projects from across the business – including ingenious drones, high-tech jammers and simulation technology inspired by online gaming - that demonstrate DE&S has both the ability and desire to be at the centre of the innovation initiative.

There are also contributions from key people across the MOD who are involved in making sure innovation is at the heart of everything the department does, both now and into the future.

These include Vice Chief of Defence Staff Admiral Timothy Fraser CB ACD and DE&S' very own Tim Rowntree, Director Engineering and Safety, who shares his thoughts around the importance of embracing risk to ensure the armed forces maintain a battle-winning edge.

In addition, there are case studies from the recently formed Future Capability Group, highlighting the wonderful opportunities available in our organisation.

It is an incredibly busy time elsewhere. We are already working hard to support defence transformation and the Defence Industrial Strategy, as well as preparing and contributing to the imminent Defence Review, procurement review and defence support transformation.

I view all of these as an opportunity, not a threat, as we have much to offer and will thrive on change as an agile and dynamic organisation always must.

I saw many of those qualities first-hand recently when I paid a visit to our Maritime Combat Systems team and saw how they were leveraging the art of collaboration alongside technology and autonomy to produce some stunning results about which you can read on page 18.

Sharing knowledge and ideas with our friends and allies is, of course, vital.

I have found great value in having board-to-board meetings with the front-line commands and our Executive Committee lead for each domain.

These frank and open discussions around challenges faced in the complex world of programme delivery have been invaluable.

And finally, I must mention National Apprenticeship Week. I am incredibly proud of our apprenticeship scheme and the excellent people we have recruited into the DE&S scheme. I have met many of them and I am delighted by the commitment and enthusiasm shown as they set out on their new career path.

Our apprentices received a lot of excellent coverage in regional media, so thank you to all of those who contributed.

Contents

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On the cover

Innovation illustration

Contents

Tim Rowntree, Director Engineering and Safety, on why it is crucial that DE&S remains at the very heart of the Defence Innovation Initiative

Following on from our March 2019 Innovation Desider special, this edition once again showcases some of the amazing innovation happening right across DE&S. It is quite striking that, in just a year, innovative routes to bring step-changes in military capability are becoming embedded in the way we think and the way we work right across the business.

The small, experimental projects remain critical to exploring new technologies and ways of working, but we are now also seeing programmes of real substance coming through. The Type 31 frigate (page 12), for example, is a substantial project en-route to providing rapid step-change improvements in military capability. With the alarm bells around cyber, drones and artificial intelligence ringing ever louder the 'rapid' element of procurement is key and DE&S must seek, indeed insist, on remaining at the very heart of the Defence Innovation Initiative.

We must embrace risk to ensure our armed forces maintain a battle-winning edge, have the tools and technology to do their job and be courageous enough to put a halt to work that is proving unproductive.

DE&S' Future Capability Group (FCG) is key to this and is evolving to become the central hub for DE&S, linking out to the domains and front-line commands (FLCs), placing acquisition advisers in capability development areas to support the FLCs and provide DE&S with early insight into the emerging requirements. We will be running a pilot for this alongside Ships and the Navy's Nemesis programme, which brings together the Navy innovation projects. FCG already has a key role in wider Defence innovation working to the Director of Defence Innovation to run the Spearhead Programmes portfolio management office, which will test our new innovative approaches; and plays a key role in the Exploitation Working Group, which aims to ensure that emerging technology gets pulled through into capability.

FCG has successfully launched its first framework agreement to create an industry community in the field of Nano Unmanned Air Systems (Nano UAS). This is a pilot for the Buy and Try at Scale (BATS) commercial process that the team developed to enable rapid experimentation into capability of novel technologies.

We must embrace risk to ensure our armed forces maintain a battle-winning edge and have the tools and technology to do their job

This is a great example; pointing to the fact that innovation and the exploration of technology are thriving at DE&S and we are continuing to develop the organisational interfaces and relationships. This ensures that new ideas and projects can be developed at pace, with the FLCs, DE&S, head office in London, the Defence Science and Technology Laboratory (Dstl) and industry all working as one seamless team.

We already have a strong capability to build on and are perfectly placed to support both head office and the FLCs. We also already have a key role at the centre of the innovation programme, extending to all areas of DE&S through the many initiatives outlined in this issue, including rapid development of FCG. DE&S is ready for the innovation challenge and open for business.

Defence Innovation - views from the key players

Vice Chief of Defence Staff Admiral Tim Fraser CB ADC

It is a pleasure to share the progress DE&S has made towards the modernisation of Defence, being such an intrinsic part of our Defence Innovation Network.

As we enter a new decade, the global landscape continues to shift. Rapid technological, social and cultural changes are providing huge opportunities to maintain our military advantage – however, these also pose threats as our adversaries seek to use them against us. We must continue to adapt, and we need to be innovative. With the Integrated Review now upon us, the Defence Innovation Unit are leading work to consider how the Network contributes to maintaining and enhancing our strategic edge.

Innovation cannot be enabled without the right appetite for risk. We must be agile in our delivery approach and not be afraid to fail, harnessing valuable lessons to deliver future projects. DE&S are rising to the challenge and have been fully engaged with the Acquisition Review. The DE&S Future Capabilities Group led a piece of work to inform a guide for programme SROs to assess the risk and complexity of their programmes. This will be developed and rolled out as part of the Acquisition Transformation workstream and will support wider conversations on appropriate risk appetite. With processes like this being brought in, now is the time to ignite our innovative instincts to create a culture that will rise to the competition of the ever-changing threats of the 21st century and deliver a safer future.

DE&S are already adopting these novel approaches, the first Type 31 ship will be in the water in 2023. All five will be delivered off-contract by the end of 2028. Type 31 will play a pivotal role in the future fleet. The fast-paced competition has given industry flexibility to propose more innovative solutions that meet the Royal Navy's capability requirements. It has also empowered new and closer ways of working between the authority and the customer in the process, to deliver the best possible solution.

DE&S also plays a key role in supporting the delivery of the Spearhead portfolio, with the portfolio office in the Future Capabilities Group. Head Office, Defence Science and Technology Laboratory, and the front-line commands as the capability customer, and of course industry all also have critical parts to play. This innovative portfolio captures the ambition of Defence to both pursue step-changes in operational capability, and to lead the way in how we acquire these capabilities. This has proved to be more testing than we first imagined – especially where the financial context of Defence has limited our ability to fully implement these programmes. Yet innovation is rarely straight forward. Excitement is mixed with frustration, requiring persistence – a very human characteristic. And I know DE&S and the people involved in this initiative remain committed to the vision exemplified by the Spearheads, as am I. These are exciting times and I am confident that, in this case, persistence will reap its reward.

Clare Cameron, Director Defence Innovation

"Both the upcoming spending review and integrated review present us with an exciting opportunity to build upon the momentum we have already gained through the Defence Innovation Initiative. We should use this opportunity to build upon these foundations and the amazing work going on across the department. We should also consider where we should focus the innovation portfolio to enable Defence to maintain its strategic edge and deliver on HMG's priorities. Our work to create a culture that is 'innovative by instinct' will remain at the heart of these efforts."

Deputy Chief of Defence Staff (Military Capability) Air Marshal Richard Knighton

"In my role as DCDS(MilCap) I am responsible for the innovation portfolio within head office, this includes Defence Innovation Unit (DIU) and Defence and Security Accelerator (DASA).

The DE&S Future Capabilities Group (FCG) has strong links with defence innovation unit, playing a key role in managing the Spearheads portfolio and helping evaluate bids for the Defence Innovation fund. DASA also work closely with FCG, who are now managing the Defence Growth Partnership projects- which originated as a DASA challenge. The link between DASA and DE&S will be key in making sure new agile ways of delivering capability to the front-line are achieved."

Dame Professor Angela McLean, MOD Chief Scientific Advisor

"The department's investment in science, technology and innovation is in many ways our insurance policy against the accelerating pace of technological change and the opportunities and threats this presents: helping to understand the technological landscape and mitigate strategic shocks. DE&S is opening doors to invite innovative and hi-tech commercial industries to contribute to providing new military capability. I look forward to their future successes."

RAF submarine hunter touches down on UK soil

Pictured: The P-8A Poseidon arrives at Kinloss (Picture by Sgt Ashley Keates RAF)

Poseidon's first landing on UK soil was a proud day for everyone involved in delivering the new submarine-hunting maritime patrol aircraft (MPA).

ZP801 – known as the Pride of Moray – is the first in a fleet of nine state-of-the-art jets which will improve the RAF's ability to track hostile targets below and above the waves.

They will protect the UK's continuous at-sea nuclear deterrent and be central to NATO missions across the North Atlantic, co-operating closely with the US and Norwegian Poseidon fleets.

From getting the green light in mid-2016 it took DE&S less than three-and-a-half years to get to the exciting point last October when the first Boeing-developed Poseidon was handed over to the RAF in Jacksonville, Florida.

Last month, members of DE&S' P-8A delivery team – including team leader Michelle Sanders, senior commercial officer Stuart Whiting and infrastructure project manager Nick Marshall – had the honour of witnessing the Pride of Moray land at Kinloss Barracks.

Michelle, said: "The day provided an opportunity for us to take time to celebrate all of the hard work the team at DE&S has undertaken over the past five years.

Seeing the aircraft arrive into Kinloss Barracks escorted by two Typhoons was a moment I will never forget and the feeling of excitement from those around me continued throughout the rest of the day

Michelle Sanders, team leader

"Seeing the aircraft arrive into Kinloss Barracks escorted by two Typhoons was a moment I will never forget and the feeling of excitement from those around me continued throughout the rest of the day including a smaller celebration at RAF Lossiemouth, the eventual home of the Poseidon fleet.

"Being able to see a programme from its very start through to delivery has been a fantastic opportunity.

"It was less than a year earlier that I was at Spirit Aerospace in Wichita witnessing the laying of the keel of ZP801 as that first fuselage entered production."

Poseidon is designed to carry out extended surveillance missions at high and low altitudes and is equipped with cutting-edge sensors which use high-resolution area mapping to find both submarines and surface vessels.

Each aircraft carries sonobuoys, which are dropped into the sea to search for enemy submarines, survey the battlespace under the sea, and relay data back to the aircraft.

Poseidon is also planned to be armed with Harpoon anti-surface ship missiles and Mk54 torpedoes capable of attacking both surface and sub-surface targets.

Stephen Horrocks, head of Multi-Mission Aircraft at DE&S, said: "We're getting back into the maritime patrol game, which we got out of with the demise of Nimrod in 2010.

"It means a lot for the RAF and it's a good news story for DE&S in terms of delivery from approval in mid-2016, to accepting our first aircraft last October in Jacksonville, Florida.

"That's some going. There was a lot of excitement accepting our first P-8A Poseidon aircraft in Jacksonville. There was even more excitement when she came home."

All nine Poseidons will be delivered to the RAF by the end of 2021 and achieve full operational capability from RAF Lossiemouth – where a new £132 million strategic facility is being built – in 2024.

DE&S investigate technology with life-saving potential

Pictured: DE&S are looking at the potential of unmanned air systems (Picture submitted)

The Future Capability Group (FCG) at DE&S are investigating whether unmanned air systems (UAS) could be used to rescue personnel who fall overboard from the Royal Navy's largest ships, including the two new aircraft carriers.

In a 'man-over-board' (MOB) situation, the largest warships do not have the necessary manoeuvrability to reposition quickly enough to affect a recovery. In addition, dependent on how rough the sea is, their boats cannot always be launched.

With the rapid onset of hypothermia in cold waters, resulting in a very real risk to life, there is a pressing need to get the person out of the water and into some form of shelter whilst either the ship, sea boat or helicopter are actioned to make a recovery.

Now FCG is working with companies in the UK and US to combine a GFX UAS with an autonomous flight system, a person-in-water detection system and raft deployment to create a fully autonomous man overboard recovery system.

It is hoped the system will be able to deploy automatically in tune to an alarm, locate the person, deploy a life raft and then maintain position over the MOB so they can be easily located in the water by the appropriate rescue craft.

Being able to exploit technologies in the pre-concept space requires a greater risk appetite and being comfortable to work in an area of technological uncertainty. This is how innovative solutions are generated

FCG portfolio manager, Rakesh Takooree

The investigation, which is being funded through the Royal Navy Discovery Assessment and Rapid Exploitation (DARE) Innovation fund, falls under Project Minerva and is an example of small or medium-sized enterprises working collaboratively to carry out research and development activities to inform how Defence could benefit from technologies and discover innovative ways of working.

FCG project manager, Jamie Jarman, said: "Mitigating the risk to life is really important. UAS technology is growing exponentially and we need to better understand how this can be applied in Defence. This type of investigation has not been done before within the MOD and, as such, carries a high level of risk but with a high level of benefits."

FCG portfolio manager, Rakesh Takooree, added: "Being able to exploit technologies in the pre-concept space requires a greater risk appetite and being comfortable to work in an area of technological uncertainty. This is how innovative solutions are generated."

FCG were given the task to investigate technology by Lieutenant Commander Peter Whitehead, who is the innovation commander within the Navy.

Special covers keep RAF Chinooks in tip-top condition

RAF Chinooks are deployed in a wide range of conditions – from sandstorm-ridden deserts to jungles and inhospitable seas. When the aircraft are not being used, the 60-strong fleet need to be taken care of to ensure they are always ready for deployment in any condition. This is where Fine Group come in.

The firm, based in London, has been awarded a contract to make and supply the MOD with a range of 48 different protective covers and accessories for each helicopter. The all-weather items provided by Fine Group for the 30-metre-long aircraft vary from larger covers for parts such as the cockpit and engines, to smaller ones for flare dispensers and escape hatches.

Mark Geoghegan, DE&S' Chinook team leader, said:

"The aircraft cover sets are unique to, and have been designed specifically for, the UK Chinook fleet. As such, it was necessary to undertake a bespoke procurement.

"The aircraft must be able to operate in the most challenging weather conditions, from the Arctic Circle to the deserts of the Middle East."

The Queen visits RAF Marham

In her first official engagement of 2020, the Queen visited RAF Marham to see the base's new training facilities and watch the new F-35B fighter jets land vertically.

As Her Majesty arrived at the station, children from local school Cherry Tree Academy and the Rainbow Centre – a day nursery neighbouring the base – along with families and members of the local community lined the roads cheering and waving flags, welcoming her as the Royal car passed by.

Her Majesty is the Honorary Air Commodore of the Norfolk base, home to more than 3,600 working personnel. During her visit, the Queen met trainee pilots from the RAF and Royal Navy, listening to why technicians learn their trade at a £6.4 million life-sized model of an F-35B fighter jet in the new Integrated Training Centre, and watched a demonstration of virtual training in the Air System Maintenance Trainer classroom.

CEO shares ideas with Dutch counterpart

DE&S CEO Sir Simon Bollom met with Holland's director of the Defence Materiel Organisation (DMO) during a visit to industry.

Sir Simon took the opportunity to discuss a number of topics with his Dutch counterpart, Vice Admiral Arie Jan de Waard, including the potential of collaboration on ships, land, air and cyber domains.

Both Sir Simon and Vice Admiral de Waard had visited Thales' Turnchapel Wharf site in Plymouth to see an autonomous mine countermeasures system developed by Thales with SAAB and ASV for the Royal Navy and French Navy.

Based on surface and submarine robots and drones, this solution aims to keep sailors away from the threat. This system is also based on artificial intelligence technologies the company says will significantly improve the detection and identification of the threat.

Unveiling the new F-35 reprogramming lab

The Lightning Delivery Team recently helped deliver a new £140 million facility for the F-35 Lightning II at Eglin Air Force Base in Florida, US.

The Australia and United Kingdom reprogramming lab will be used to input intelligence data, as well as generate and test a wide range of mission data files (MDF), for Australian and UK F-35 jets.

Minister for Defence Procurement Jeremy Quin said: "The F-35 is one of the most advanced pieces of technology ever created. This new lab will allow British and Australian jets to constantly evolve and upgrade with every new piece of information they absorb, thus maintaining their dominant position as the world's pre-eminent warfighting aircraft."

Described as the brains of the aircraft, the MDF are extensive on-board data systems compiling information on geography, air space and potential threats. They optimise the Lightning's sensors to reflect the environment in which it is being flown. Data prepared at the lab can be sent electronically to F-35s anywhere across the globe.

Director Combat Air at DE&S, Air Vice-Marshal Keith Bethell, who was at Eglin for the opening ceremony, said: "DE&S worked closely with our partners and industry to deliver this important facility, which will unleash the full potential of the formidable F-35 aircraft."

The UK contributed £70 million to the reprogramming lab which, although based in the US, remains under the command and control of the UK and Australian governments.

RAF take part in Exercise Red Flag

The UK F-35 Lightning II jets recently took part in Exercise Red Flag, which saw them flying in the company of a variety of aircraft from other nations.

Exercise Red Flag is an advanced multi-national combat training exercise which takes place at one of the largest fighter bases in the world, on the expansive bombing ranges of the Nevada Test and Training Area, USA.

This is the first time the UK's F-35B took part in the annual exercise, which provided the aircrews with experience of multiple realistic and intensive air combat offensives whilst in the safety of a training area, maximising combat readiness, capability and interoperability.

Jeremy Quin is new Min DP

Jeremy Quin has been appointed Minister for Defence Procurement.

Jeremy, the MP for Horsham since 2015, succeeds James Heappey, who is now Minister for the Armed Forces.

Before entering politics, Jeremy worked in corporate finance for 25 years, latterly as Managing Director of Deutsche Bank.

In 2008/9, he served on secondment as senior corporate finance adviser to HM Treasury, assisting them on the UK's response to the financial crisis.

In July 2018, Jeremy accepted a role in the Government as a member of the Whips' Office and was promoted to serve as a senior Whip (as Comptroller of HM Household) in July 2019.

In December 2019, Jeremy became Parliamentary Secretary in the Cabinet Office with responsibilities for the Government Commercial Function and other cross-Government programmes.

As Min DP, Jeremy is responsible for the Defence Equipment Plan; relations with the defence industry; defence exports; defence science and technology; and defence estates and infrastructure.

Pictured top: CGI of Babcock's proposal for Type 31 and below; Christian Mclean-Mair, Anne-Marie Goodman, Kyla Isbell and Stephen Whitbread from the Type 31 project team (Pictures courtesy of Babcock and Jack Eckersley)

Procurement done differently: Type 31 team rise to the challenge

In September 2017, the National Shipbuilding Strategy gave DE&S an unprecedented challenge: design and build five general purpose frigates for just £250 million each.

The five ships will be delivered by the end of 2028; replacing the UK's Type 23 general purpose frigates, to deter aggression and maintain the security of the UK's interests around the globe.

Delivering the Type 31 frigate is an ongoing test that continues to bring out the best in DE&S; calling on world-leading expertise and experience to achieve the best results through competitive market engagement and an innovative build strategy.

Having signed a contract with the MOD on November 15, 2019, Babcock International has confirmed steel will be cut for the first ship in 2021 at Rosyth and that it will be in the water in 2023.

But how is the work being delivered in such a timescale?

Crucially, the DE&S team is working jointly with Navy Command, a truly unified approach which allows working at pace while speaking with one clear voice to suppliers.

This means team members feel empowered to go beyond the call of duty; diving into new skills and experiences to get the job done.

DE&S Head of Type 31, Commodore Paul Carroll, said: "I encourage our team to focus on what's important, strongly resist the unnecessary and present clear, timely choices to senior leaders across Defence and in the Treasury."

But what was unique about the way in which the Type 31 competition was run?

"We went to industry with an envelope of money that we had available. That's never usually done," said cost controller Anne-Marie Goodman.

Commercial lead Kyla Isbell added: "We basically set industry a very difficult puzzle to solve by setting a financial head mark they had to meet. It proved to be a good mechanism for driving competitive tension."

Time was of the essence too. Bidder engagement was conducted in parallel and approvals were streamlined.

"We pretty much nailed every single milestone and that was the thing which really built confidence," she said. "That was due to a whole team effort.

"Normally in big ship-building procurements you would have an assessment phase, design phase, then a manufacture phase.

"Rather than having things done sequentially, we paralleled up the activity which took out a huge amount of time. The choreography of all the engagements and the project management of that was immense.

"We've proved you could do something quicker and not only was the short timescale a really good way of us managing industry and the bid, it also helped us to manage our internal stakeholders as well."

Setting a budget of £250 million per frigate meant efficiencies had to be found. For example, the Type 31s did not have to be designed from scratch – Babcock's solution is based on and built upon the proven design of the Iver Huitfeldt frigate already in service with the Danish Navy.

The design's adaptability means it has the potential to evolve to meet future requirements while also being attractive enough for export.

Commercial manager Stephen Whitbread, said: "One of the key things was negotiating the terms and conditions during the tender phase.

"Because we maintained the competitive tension while we were negotiating in parallel with all three bidders – Babcock, BAE Systems and Atlas – it meant we got a much better outcome and we could proceed to contract rapidly. Critically, Industry rose to the challenge we set them and were in turn empowered to offer innovative solutions. This generated a momentum and enthusiasm for the project from all involved.

"Ordinarily, you would go onto a big programme and you might not see the end result of all your hard work.

"We all had a goal we were focused on and being there basically from the beginning to achieving the contract signing in 12-15 months was really satisfying. It kept our motivation high."

Stephen also enjoyed the tightness of the team and freedom to be involved in various aspects of the process.

He added: "It was more of a flat organisational structure rather than a traditional, hierarchical civil service structure.

"We all pulled together and I was able to get involved in pretty much everything rather than being stove-piped into one area.

"People may have thought: 'You can't do that, it's not achievable, it's never going to work'. We held firm and had confidence in our own abilities to actually deliver."

In line with the National Shipbuilding Strategy, DE&S worked with the Navy to minimise the amount of Government Furnished Equipment (GFE) earmarked for Type 31- supplying only that which is vital to deliver the right capability. This method, coupled with a more "hands off" approach has meant that together with industry, DE&S were able to deliver the best possible solution and real value for money.

Working on Type 31 was a dream come true for project management graduate Christian Mclean-Mair, who had previously worked on the A400M.

"I'd been angling to join Type 31 since I joined DE&S," he said.

"When the halting of the initial competition was announced it was about a week after I had been told I could come onto the team, so I was a bit worried, but I needn't have been. It was amazing to see how quickly people managed to turn it around and keep within the initial timetable.

"There aren't many people who have been able to come in on a graduate scheme and get to see a complex warship progress from an initial negotiation into a design and build contract within a year. I'd love to do something like this again."

When the contract with Babcock was signed it was a very proud moment for everyone involved.

Anne-Marie added: "We were definitely juggling a lot of balls, but the competition has delivered the right outcome and I can't wait to see the ships built."

Gladiator heralds a new dawn for fighter-jet training

Pictured: Typhoon pictured as part of Exercise Cobra Warrior (Picture by Cpl Lee Matthews RAF)

Innovative simulation technology inspired by online gaming will allow UK fighter jet pilots to train together virtually from various RAF bases.

The capability, known as Gladiator, was announced by the Minister for Defence Procurement in May 2019. Since then, work has ramped up on this innovative programme and the military are looking at how it could meet the synthetic training needs of various platforms. For example, Typhoon is aiming for a 50/50 blend of synthetic and live flying, and F-35 Lightning II is aiming to complete a large percentage of collective training using Gladiator.

Gladiator is provided by Boeing Defence UK (BDUK) and operated on an MOD network. The system allows multiple aircrew to experience the same battlefield environment and threats simultaneously. It will enable pilots to exercise capabilities, tactics and procedures that would be impossible in the live environment due to airspace, aircraft availability, or security constraints.

Through incremental acquisition, Gladiator will evolve allowing the UK to undertake synthetic training for air, land and maritime forces, all on a secure network and safe in the knowledge that the training cannot be observed by adversaries.

Stuart Lafferty, Flight Simulation and Synthetic Trainers (FsAST) team leader, said: "With Gladiator we can fly a large number of aircraft together at any one time, which in real-life training would be almost impossible and not cost effective. Gladiator is about allowing pilots to do things they couldn't normally practice in the real world. In addition, pilots won't be aging aircraft, burning jet fuel or firing expensive weapons – these are important environmental and financial benefits to the MOD."

Pilots won't be aging aircraft, burning jet fuel or firing expensive weapons – these are important environmental and financial benefits to the MOD

Stuart Lafferty, Flight Simulation and Synthetic Trainers team leader

INNOVATION at DE&S

Gladiator combines commercial, off-the-shelf software with some bespoke elements, providing a step change in synthetic training. It uses advanced technology to produce realistic mapping, terrain and weather effects.

Gary Williams, Defence Operational Training Capability Air (DOTC(A) Core System and Services (DCS&S) delivery manager, said: "Gladiator draws upon gaming technology but is much more advanced than that – for example, Xbox and PlayStation gamers get frustrated that they cannot join up on the same network. With Gladiator, you can be part of the same training exercise no matter what simulator you are sitting in."

Typhoon and Lightning II pilots based out of RAF Coningsby, RAF Lossiemouth and RAF Marham will be the first to fly virtual missions using Gladiator. There are opportunities for Maritime and Land platforms to use the system with Protector, Type 45, Type 26, Apache, Crowsnest, Poseidon, E-7 Wedgetail and other platforms expected to join. UK pilots will also use Gladiator to conduct synthetic training exercises with the US and NATO.

DOTC(A) DCS&S is the project team responsible for procuring the equipment needed for Gladiator, which will be housed at RAF Waddington. This includes the exercise management equipment, and hardware which hosts the capability.

The team have completed the system requirements review, preliminary design review and the critical design review – a DE&S Strategic Milestone – on time and within just nine months of contract award.

The first training exercise for Typhoon aircrew using Gladiator is due to take place in April 2021, which will signal the declaration of Initial Operating Capability for Air Command. The joint fires synthetic training and Lightning II connections are expected to be added later in 2021.

The contract with Boeing Defence UK includes the design and manufacture of the simulation systems and software, as well as the first five years of support – sustaining up to 40 highly-skilled UK jobs. The design and manufacture of the software will take place in Fleet in Hampshire, and Bristol.

The Institution of Engineering and Technology

Who do you know who deserves recognition?

Each year we seek out nominations for the world's top engineering and technology talent, honouring them with medals and trophies for their services to the industry at a glamorous and inspiring ceremony in London.

Last year's IET Armed Forces Technician of the Year Award was won by Warrant Officer Class 2 (WO2) Kay Howells, an Army Ammunition Technician with over 15 years' experience in all aspects of ammunition, surveillance, repair and disposal.

She is one of the British Army's most highly skilled bomb disposal experts and has conducted bomb disposal operations in hostile environments; most notably in Afghanistan and during a recent Weapons Intelligence role in Iraq. She leads the Advanced Counter IED team at the Defence's Explosives, Munitions and Search School.

A keen promoter of Science Technology Engineering and Maths in the workplace, Kay actively seeks to inspire future generations into STEM trades within the military. On winning, she said: *"Promoting the ammunition technician trade means a great deal to me and I am thankful to the IET for inviting us to these awards. It is great to receive recognition for my work."*

The IET Achievement Awards exist to recognise individuals from all over the world who have made exceptional contributions to the advancement of engineering, technology and science in any sector, and therefore made demonstrable impact to society. This can be through research and development in their respective technical field or through their leadership of an enterprise.

Nominations close
15 May 2020

theiet.org/achievement

Help us shine a light on exceptional individuals, like Kay, by nominating them for an IET Achievement Medal, or IET Apprentice or Technician of the Year Award.

Picture: Charlie Perham

On inspiring innovation, football woes and about being more pirate

Kris Davies is project manager High Altitude Pseudo Satellite within the Future Capability Group (FCG), which is looking to capitalise on emerging technologies

What does your role involve?

I've worked within FCG (previously Tech Office) for the last five years and have been part of the Innovation Team for the majority of the last three years. The team's role continues to focus on placing innovation at the heart of DE&S business so that we can deliver our armed forces with innovative equipment that helps them maintain the battle-winning edge. I have now moved on within FCG to project manage High Altitude Pseudo Satellite (HAPS); a pre-concept project.

What about your role is exciting, rewarding or interesting?

I have enjoyed playing a leading role in organising the Inspiring Innovation days at Abbey Wood over the last three years; trying to push people outside of their comfort zones and doing something different within DE&S. I believe this is vital if you want to be a forward-thinking organisation. I enjoy working within a team where we accept that we have to increase our appetite for risk if DE&S is going to capitalise on emerging technologies and accept that failure also has a value, which can make you stronger moving forward.

How important to you is teamwork?

Teamwork is vital if you want to be effective. I've always enjoyed working in teams most when everyone (regardless of grade or stature) feels like they can have a say and influence decisions because the leadership is open to challenge. It's a healthy ethos to have. Too often ideas can be dismissed within the first three seconds by someone not giving it due consideration. A hallmark of any high-performing team is that they always invite challenge to ensure what they are doing is still the best possible way and mustn't be afraid to change. I've been inspired by studying the culture of the New Zealand All Blacks rugby team and would encourage everyone to look at the 15 core principles they introduced to be the best. It's a lesson in any walk of life.

How are you helping embed change in your area?

Over the last few years, I have been involved in many change initiatives, from the implementation of the MOD Innovation fund within DE&S where personnel are encouraged to submit ideas (mostly technical); to provide new or enhanced equipment to the front-line. As part of Inspiring Innovation 2019, I devised a 'Be More Pirate' workshop with a number of talented people from a broad range of grades and functions; encouraging people to have the courage to challenge the status quo so that we can be the best we can. The response we had was overwhelmingly positive and I loved working alongside new people. I hope to be part of something that builds on this workshop over the coming year because I honestly believe anything is possible with an open mind and I live by this.

Why did you choose to pursue a career in DE&S?

The chance to build a career and the vast amount of opportunities and experiences that exist makes a career here very appealing. I've also enjoyed working with so many good people over the last 15 years.

What do you most enjoy about your job?

The challenge and the feeling that I can make a difference. I'm not the kind of person who takes any satisfaction from doing something which is either easy or I don't believe in. I also love learning about new things and learning from new people along the way.

What do you enjoy doing in your spare time?

I like to travel and explore places that I have never been before with my other half, be that in this country or further afield. I love spending time with my 10-year-old son, who never fails to make me smile with his wacky sense of humour. I also enjoy going for long walks with our two dogs, who couldn't be more different if they tried but they complement each other's personalities perfectly. I'm also a huge Bristol Rovers fan, although that's been more of a chore of late.

What might surprise people about you?

I'm renovating a house with my girlfriend. Anyone who knows me will find this unbelievable.

Transforming Surface Ship Combat Systems

Pictured: Maritime Combat Systems are delivering a dynamic programme (Picture by LPhot Alex Ceolin)

Maritime Combat Systems (MCS) continue to forge ahead in delivering a dynamic programme of work that is transforming the way combat systems in surface warships operate in an ever-evolving battle-space.

The move from black box bespoke technologies to open architectures has signalled the dawn of a new agile era of delivery to the front-line warfighter and meets the Royal Navy's ever-growing and more complex operational needs.

Having an open architecture benefits the Royal Navy as those onboard warships can add, upgrade and even swap capabilities more quickly and just as safely. It also means DE&S has the ability to compete in a wider marketplace, which helps drive down costs, while increasing efficiency and effectiveness.

Central to this transformation has been the introduction of shared infrastructure (SI), providing a common hosting environment, enabling software-based applications to be rapidly deployed to the front-line.

HMS Queen Elizabeth has already deployed with the system and the next few years will see open architecture combat systems rolled-out to all surface warships.

Shared Infrastructure will enhance our ability to deliver capability faster, increase technology exploitation and bring about increased opportunities across our industrial base

Captain Kevin Noakes, the Combat System Design Authority within the MCS team at DE&S

Captain Kevin Noakes, the Combat System Design Authority within the MCS team at DE&S, said: "SI will enhance our ability to deliver capability faster, increase technology exploitation and bring about increased opportunities across our industrial base.

"In essence this is breaking the close coupling that has previously existed between hardware and software delivery, thus enabling bespoke capability to be delivered through individual applications that can be delivered and updated in a more efficient and agile manner, in the same way we can get new apps to our mobile phones."

In addition, an 'App Locker' has been developed to support the delivery of application-based capability to Royal Navy ships. It is supporting the future testing, development, assurance and the deployment of applications to front-line complex warships.

Captain Noakes added: "The App Locker has provided the framework to deliver new capabilities to the front-line in an agile way never envisaged in the past and transforms my ability as the Combat System Design Authority to react to an ever-changing threat."

A key part of the continuing success of this programme has been the Maritime Mission System Enterprise Board (MMSEB), a collaboration of DE&S, NCHQ, the Defence Science and Technology Laboratory and 12 of the prime maritime mission system suppliers.

Jo Osburn, head of MCS and Chair of the MMSEB, said: "The board is focused on delivering real benefit to the end customer through greater efficiency of delivery, exploitation of common good practice and innovation, and dealing with enterprise-wide issues in a collaborative and supportive way."

The work of MMSEB enjoyed success at DSEI 2019 where, for the first time, an autonomous vessel was able to transmit imagery and track data to a live operational combat system in a Type 23 frigate. Open architecture allowed this to be done in six weeks and at a fraction of the cost of normal integration.

Russell Brown, Director Ships Support, said: "This is great delivery, enabling a new era in combat systems to be delivered to the front-line warfighter, fully supporting one of the key themes of the Navy's transformation, that of embracing technology and innovation."

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Defence Growth Partnership – a way to innovate in both 'what' and 'how' we deliver

In 2018, around £10 million of funding was invested into the winners of the final phase of the Defence Growth Partnership (DGP) Innovation Challenge. The winning innovations were selected from more than 400 UK companies and given freedom to pursue and deliver innovative solutions from across future information capability priorities such as persistent surveillance, agile and immersive training, autonomy and 'big data'. They included shrewd navigation software, artificial intelligence driven autonomous vehicles, laser radar and mixed-reality training systems.

Interest in the challenge demonstrated industry's appetite to meet the complex challenges of modern warfare as well as underlining DE&S' intent to look at new ways of getting pioneering technology from concept to the battlefield to ensure our armed forces remain a step ahead of their adversaries. The successful companies received combined investment and support worth more than £4 million from the MOD and £6 million from industry partners to ensure their technologies are developed fully.

The investment from the MOD contributes as part of the wider £800 million Defence Innovation Initiative. Following the *'Dragon's Den'* selection of four of the most viable products, the DE&S Future Capability Group (FCG) helped negotiate contracts within four months. Over the past year, FCG has pledged support towards future capability exploitation, export opportunities and assurance to four companies. The DGP capability-proving programme encompasses MOD, DE&S FCG, UK Defence Solutions Centre (UKDSC), Defence Science and Technology Laboratory (Dstl), Defence and Security Accelerator (DASA), industry and front-line commands who will engage, collaborate and support the maturation of these technologies beyond the commercialisation phase.

Alternative Satellite Navigation-ATLAS – HORIBA MIRA

ATLAS software is being developed by HORIBA MIRA in a bid to prove battlefield navigation is possible when global navigation satellite systems (GNSS) are compromised. The software uses cameras and on-board artificial intelligence processing to identify landmarks and compares them against a map to determine the user's location. The system uses only passive sensors, making it difficult to detect or jam and this enables vehicles to localise and navigate in contested battlefield environments when GNSS is expected to be unavailable. In 2018, £1.8 million of joint investment was invested for the development and production of prototype systems which are being integrated into military vehicles. FCG is working with platform teams in DE&S as well as engaging and collaborating with industry, Dstl, UKDSC and the Army and Defence Innovation Unit to identify and shape requirements and challenges in support of integration, trials and demonstration. An early prototype of the ATLAS GNSS-denied navigation system was used to support the autonomous operation of the Viking Unmanned Ground Vehicle on coalition assured autonomous resupply (CAAR) Capstone trials at Camp Grayling in the USA last year.

Software Defined Multifunction LIDAR - QinetiQ

As part of the persistent surveillance strand, software defined multi-function (SDML) Light Detection and Ranging (LIDAR) is being developed by QinetiQ and one of their key partners, Airbus, for use on high altitude pseudo satellites (HAPS) with a joint investment of £5 million. LIDAR is like radar but uses light instead of radio waves, enabling airborne intelligence, surveillance and reconnaissance (ISR) optical collection capabilities and secure, high bandwidth optical comms between land, air, sea and space platforms. QinetiQ believe SDML technology offers game-changing capabilities and delivers a range of unique benefits. During 2019, QinetiQ commenced testing, integration and system building of the payload with Airbus, who are one of their key partners. These include unprecedented versatility where users can swap between a number of intelligence surveillance and reconnaissance (ISR) and communications modes, including 3D mapping and target marking. Weighing just 4kg and with plans for it to be environmentally qualified to fly in the stratosphere, SDML is also expected to offer secure and high bandwidth while saving money through reduction of administrative costs.

Hyper Real Immersion –Close Air Solutions

Hyper real immersion (HRI), part of the agile and immersive training strand, has the potential to transform operational training landscape through mixed reality. A joint investment of around £2 million enables HRI to take all the established benefits of simulation and fuse it into a live environment where the use of mixed reality technology creates a fully-immersive training environment where the user cannot tell what is real and what is not. This allows complex and operationally-relevant training to be conducted without the need for costly live assets, such as fast jets and artillery rounds as these can be displayed synthetically in the 'live' scenario. During 2019, HRI had early user-level support from 1st Artillery Brigade, Joint Terminal Attack Controller (JTAC) and the Joint Air Land Liaison Organisation (JALO) cases demonstrated that complex training can be conducted using mixed reality. FCG support HRI in achieving its goals so they can develop and showcase the product, as well as supporting wider sales and exploitation. Potential savings of up to 70 per cent are attracting international interest as a revolutionary way to prepare for operational deployment. In addition, HRI enables immensely challenging and immersive training to be conducted safely within peace time safety constraints, thus improving the operational effectiveness of our war fighters across a broad spectrum of scenarios and environments.

Northstar –TP Group

Formally known as Ants on Deck (AOD), Northstar is part of the autonomy strand that enables or enhances unmanned surface platforms by producing real time, dynamic route management with collision avoidance in complex and constantly changing environments. The platform agnostic system autonomously generates optimal routes, considering environmental conditions and vessel dynamics, optimised against multiple user-defined constraints, for example performance, time and cost. Thought to have huge market and export potential, Northstar has received more than £1.8 million of invested funding to extend and demonstrate the innovative suite. TP Group is collaborating with key partners including FCG to support integration onto two distinct platforms to showcase the capability in the Defence domain. Later this year, plans to demonstrate this technology in a targeted mine counter measures (MCM) scenario are scheduled and hoped to showcase the product and its main capability.

Small arms trials under way aimed at giving British armed forces the edge

Pictured: Innovative MantisX system being trialled by DE&S for improved performance (Picture by Jack Eckersley)

DE&S are trialling an innovative tool to aid small arms marksmanship aimed at giving British armed forces the edge on the battlefield while reducing training costs.

Chris Chennell, a senior architect within the DE&S Chief Information Office, and Jamie Jones, of Defence General Munitions in the Weapons Operating Centre, started the trials with a system called MantisX after securing £150,000 from the Defence Innovation Fund.

The MantisX system analyses and evaluates each shot, identifies areas that need to be addressed and generates data the user can immediately use to improve their accuracy.

The system, which delivers via Bluetooth the information from a sensor fitted to your chosen firearm to your smartphone, can be used during live firing or 'dry' shooting – the practice of shooting a firearm without any ammunition in the chamber.

On the ground this means members of the armed forces are provided quickly and easily with scientific data that helps them immediately improve their performance.

Chris and Jamie estimate the ability to dry train will alone result in an annual saving of £1.2 million on the use of ammunition, with further savings available in reduced training hours.

I believe MantisX is the best coaching simulation system I have come across in 24 years' service and this will make massive improvements to marksmanship across all the forces

Warrant Officer 1 Brian Trainner of ITDU

INNOVATION at DE&S

Chris said: "Existing marksmanship training often comes down to someone watching the firer and trying to figure out where they are going wrong.

"This system takes away guesswork and provides immediate and accurate scientific data that identifies exactly what you need to do to improve your performance."

With their Defence Innovation Fund allocation Chris and Jamie bought 70 MantisX systems for £25,000 and spent a further £80,000 integrating existing MOD shooting practices into the software so that personnel can have the same experience during training as they would on a range with an instructor.

Jamie said: "We initially started with a small-scale trial which featured eight soldiers from my reserves unit taking part in a marksmanship competition and we saw a 20 per cent improvement in their scores using the MantisX system over just one week. This saw them finish in second place compared to a previous best position of 10th."

Since then, the system has been involved in wider trials with Army battalions in the UK and abroad after a 'train the trainer' event at the Infantry Trials & Development Unit in Warminster.

WO1 Brian Trainner of the unit, said: "I believe MantisX is the best coaching simulation system I have come across in 24 years' service and this will make massive improvements to marksmanship across all the forces."

Jamie said: "The trials are going very well and we now have a situation where instead of people trying to figure out what someone is doing wrong, we have a device not only telling them accurately what they are doing wrong but also telling them how to correct it."

Chris added: "We genuinely think this can have a big impact and will spend the remaining fund money on updated versions of MantisX that can analyse automatic fire, and on obtaining a secure home in the UK for the storage of the data we are generating."

If successful, it is hoped MantisX could be introduced in 2021.

Project Claustrum – a small initiative which is providing big benefits to prisoners

Pictured: A prisoner refurbishing flat racks at HMP Lindholme (Picture by Andrew Linnett)

A collaborative initiative between DE&S and Her Majesty's Prison and Probation Service (HMPPS) is helping to up-skill hundreds of prisoners, aiding their prospects of gaining employment on release and lowering the risk of re-offending.

Project Claustrum is a collaboration between the Operational Infrastructure (OI) team in the Land Equipment Operating Centre at DE&S and New Futures Network, HMPPS – part of the Ministry of Justice (MOJ). The two parties work together to deliver mutual benefits to the UK taxpayer, both in terms of savings to the MOD and reducing the risk of re-offending upon release.

Since its inception in 2014, Project Claustrum – Latin for prison – has been responsible for the upskilling of hundreds of prisoners at HMP Lindholme, near Doncaster, in engineering and woodwork. Individuals involved in the work are risk-assessed and they have spent around 190,000 man-hours refurbishing 1,540 flat racks for use with the Demountable Rack Offload and Pickup System (DROPS) and Enhanced Pallet Load System (EPLS) vehicles. DROPS and EPLS are used by the armed forces to supply equipment on operations both here and overseas. By refurbishing this equipment, rather than buying new, it's estimated that the MOD has saved the taxpayer more than £2 million to date.

Evidence shows that having sustainable work on release from prison significantly reduces re-offending and the aim is to give these men the confidence and technical skills to secure gainful employment and stay out of jail

Diana Allpress, project manager

Diana Allpress has been managing Project Claustrum from the very beginning and has seen first-hand the benefits of the project.

She said: "Evidence shows that having sustainable work on release from prison significantly reduces re-offending and the aim is to give these men the confidence and technical skills to secure gainful employment and stay out of jail.

"Through Claustrum, I've seen for myself that a lot of people end up in prison due to a lack of education, family support or by making poor life choices.

"With the right support and training many of them can go on to lead better lives and I'm proud that Claustrum can play a part in this rehabilitation."

The scheme is being run across 26 prisons in England and Wales and work includes the preparation and repair of toolkits, and the refurbishment of jacks that were previously deemed beyond economic repair, saving the MOD 50 per cent compared to buying new.

Prisoners taking part in the programme also manufacture camouflage nets, target boards, wooden pallets, hessian and polypropylene sandbags and a range of engineering products.

Next generation Explosive Ordnance Disposal (EOD) capability delivered to British Army

Pictured: Part of the Cambridge Consultant Limited project team who worked alongside the Special Projects Counter Measures and Exploitation delivery team (Picture by Suzanne Moss)

World-class hardware which jams radio frequency (RF) signals to prevent remote-controlled improvised explosive devices (RCIEDs) from being detonated is in service with the Explosive Ordnance Disposal and Search Regiment within the British Army.

Developed by DE&S in partnership with the Defence Science and Technology Laboratory (Dstl), REMIX can be used alongside other existing jamming capabilities to protect specialist EOD users in challenging operating conditions.

The initial research work was followed by proof of concept demonstrators using software manipulation of commercial hardware. Following the success of field trials, the DE&S Special Projects Counter Measures and Exploitation (SPCME) delivery team joined the project to develop and advance the system for deployment within the user community.

The EOD teams needed the capability to quickly identify potential explosive threats and detect chemical weapons to make safe and informed decisions upfront. Now in the field, REMIX is used on EOD operations, using a special algorithm to prevent the initiation of RCIEDs.

Designing REMIX called for some intuitive thinking and bold engineering. The finished product will have lasting benefits, not only for us but the wider Defence community

Major Andrew Boyce, requirements manager

INNOVATION at DE&S

The safety of the EOD operator is paramount on these operations. The RCIED threat landscape is constantly evolving and DE&S and its partners worked together to counter this threat.

EOD electronic counter measure and survivability requirements manager at DE&S, Major Andrew Boyce RLC, said: "Designing REMIX called for some intuitive thinking and bold engineering. The finished product will have lasting benefits, not only for us but the wider Defence community."

SPCME project manager Matt Fowler added: "REMIX is a shining example of SPCME's commitment to collaborating with its stakeholder community to deliver innovative next-generation capability to the front-line."

Warrant officer class II (Yeoman of Signals Electronic Warfare) Rebecca Taylor, said: "REMIX has enabled us to think differently about the way in which we counter RCIEDs as well as filling a training gap. It is simple to use and fits in seamlessly alongside other electronic counter measure (ECM) equipment, keeping the ECM operator safe and allowing them to concentrate on other tasks."

She added: "Fitting the equipment is very user friendly, with only a few simple steps. If a fault occurred and you required further information on the system, you are able to connect REMIX to a general user interface and follow the relevant information easily. The equipment has been key in helping EOD teams protect against emerging threats within the radio frequency spectrum."

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Innovation across DE&S

Innovation has been high on the agenda at DE&S. Desider's Louisa Keefe picks out some of her favourite stories over the past year

£100 million boost for cutting-edge Protector aircraft

In October 2019, DE&S awarded a £100 million contract to test the performance of the UK's ground-breaking Protector aircraft: the first remotely controlled aircraft capable of attacking targets anywhere in the world while being operated from their home base in RAF Waddington. The report said Protector will be the world's first certified remotely piloted air system (RPAS), meaning it can operate in civilian airspace. This is possible due to the aircraft's advanced Detect and Avoid system, which draws on enhanced sensors to avoid other aircraft.

Ration packs

Last month, Desider reported that DE&S negotiated a deal with charity FareShare to make use of thousands of unused ration packs and donate them to charity. The deal was agreed between the headquarters and commissioning and managing organisation within the Logistic Delivery Operating Centre with support from the front-line commands and Defence logistics. The unused packs are distributed to nearly 10,000 UK charities and include items for breakfast, lunch and dinner such as porridge, sausages, baked beans, pasta and rice.

Cutting-edge suspension seats reduce physical toll

An absorbing way to reduce the physical toll experienced by boat crews was announced in March 2019. Desider reported that Commercially Supported Shipping (CSS) discovered new ways to upgrade hundreds of in-service boats, making them safer for operators on the front-line by creating state-of-the-art suspension seats. The boats team put their expertise to work, leveraging knowledge of the market to seek to buy and fit state-of-the-art suspension seats for a range of different craft. The team developed an entirely new testing protocol, attracting interest from several partner nations, including Canada and Holland.

Apache fleet support deal

In February last year we welcomed the news that DE&S had signed a £293 million deal for the support of 50 Apache attack helicopters used by the British Army. The new Apache model, AH-64E, has improved sensors and avionics, in combination with greater performance that will enable the Army to sustain its battle-winning capabilities.

Cutting-edge fast-jet trainer opened at RAF Cranwell

March 2019 saw Desider report on the opening of a state-of-the-art High-G fast-jet trainer at RAF Cranwell. The £44 million project, delivered by DE&S, allows pilots to experience up to 9G – nine times the gravitational pull of the earth. The cutting-edge trainer is used in the Royal Navy and Royal Air Force to simulate flight in aircraft such as the Typhoon, Hawk and F-35 Lightning II.

Hi-tech bomb disposal

February 2019 saw the first cutting-edge bomb disposal production models delivered to the British Army under Project Starter. The Harris Corporation's T7 unmanned ground vehicle is equipped with high-definition cameras, lightning fast datalinks, an adjustable manipulation arm and tough all-terrain treads, allowing them to neutralise a wide range of threats. The robots use 'advanced haptic feedback', designed to provide operators with human-like dexterity while they operate the robot's arm using the remote-control handgrip.

UK F-35 fighter jets first-time on-board HMS Queen Elizabeth

In November 2019, Desider reported on UK F-35 fighter jets landing, taking off and hovering onboard HMS Queen Elizabeth for the first time. Flown by Royal Navy and Royal Air Force pilots, the Lightning II jets embarked on the 65,000-tonne carrier to conduct operational trials off the east coast of the USA. The F-35 Lightning II aircraft operates with cutting-edge design and is the first jet to combine radar evading stealth technology with supersonic speed, as well as the ability to land vertically.

Brilliant BriteCloud

RAF Typhoon jets trialling of a state-of-the-art missile decoy device called BriteCloud was showcased in June's edition. The device uses extremely powerful radar emissions to disrupt the targeting system within radar guided missiles, drawing them away to a safe location. Sir Simon Bollom, DE&S CEO, said: "The trials of BriteCloud on Typhoon demonstrate how we are constantly striving to find a technological edge and protect our service personnel."

DE&S secure £177m military boat support deal

In October 2019, Desider reported that DE&S had signed a new £177 million deal to support thousands of UK military boats, safeguarding more than 100 jobs. The deal means essential equipment will be ready for use wherever and whenever it is needed, supporting the Continuous at Sea Deterrent and Queen Elizabeth-class carriers.

First two Ares vehicles delivered

In March 2019, we reported that the first two cutting-edge Ares armoured vehicles – variants of the Ajax family – had been delivered to the British Army. The vehicles will be the 'eyes and ears' of the Army on the battlefields of the future. Former Director Land Equipment, Major General Colin McClean, said: "It is an exciting time for our soldiers, who will now begin training with this world-class, next generation capability".

CEO Commendations

Former DE&S winners recall what it was like to win and explain where they are now

QEC Class

In recognition of the maritime and air delivery teams' role in introducing HMS Queen Elizabeth into service and achieving success in first class flying trials

Why was your team nominated for this award?

DE&S personnel working in delivery teams in Ships and Air were awarded a CEO commendation for their contribution to the QEC Aircraft Carrier Programme. The aircraft carriers are the Royal Navy's largest ever ships and this was one of the most complex engineering programmes ever for Defence. The commendation marked the achievement of commissioning HMS Queen Elizabeth into service with the Royal Navy, initial operating capability (landing platform helicopter) and first of class flying trials (Fixed Wing).

The QEC programme has been hailed as a great success. It was re-baselined in 2013 and has met every milestone ever since. The QEC class assembly began in 2010 when the first pre-fabricated block arrived in the Rosyth shipyard. HMS Queen Elizabeth set sail for contractor sea trials in 2017 and was formally handed over to the Royal Navy later that year.

This is the highest accolade a team can achieve within DE&S, how did it feel?

We were thrilled to have received the award, which recognises the dedication and professionalism of staff working on the aircraft carrier programme. Captain Steve McCarthy, capital ships team leader in Naval Ships Support, said: "The complexity of this project cannot be underestimated. The teams across DE&S had an aggressive and highly-ambitious schedule of trials and training after vessel acceptance of HMS Queen Elizabeth, and the execution of this was exemplary."

Those working in the Lightning team and maritime delivery teams in ship acquisition and naval ships support had to insert new capabilities, integrate equipment for flying trials and certify the ship and aviation systems for helicopters, littoral operations and Lightning II. During this, the team worked around the clock and with immense dedication to get this all achieved.

What are your memories of the awards ceremony?

Personnel from each of the delivery teams were selected to attend the award ceremony. Steve Coates, QEC Transition Group leader, said: "It was a great honour to be selected to attend the ceremony along with my colleagues. I have worked on the QEC carrier programme for three years, supporting various aspects of the build, support and trials. The awards ceremony enables you to see the impact of what working on such a programme has for the armed forces as a whole and how we have contributed to that."

What would you say to other teams hoping to be awarded a CEO Commendation?

To think creatively when it comes to the CEO commendation. Ours is an example of cross-working across DE&S, specialist skills and professionals coming together to deliver a complex and demanding project.

Have the team/team members built on their success?

Following the achievement of the award, further success has been achieved with the first UK F35 operational testing during the USA deployment in the autumn of 2019 and the first carrier qualification sorties for UK F35 in UK territorial waters in February.

DE&S scientists target exciting technology to deliver savings and make missiles more effective

Pictured: Multi-axis shaker laboratory tests (Picture courtesy of MBDA)

A group of scientists at DE&S have been exploiting the use of commercial technology to improve safety, deliver significant cost savings and enhance performance in the world of missiles.

Firstly, members of the Defence Ordnance Safety Group (DOSG) team at Abbey Wood worked alongside Defence Science and Technology Laboratory (Dstl) scientists to develop a new way to mix energetic materials for use in warheads and rocket propulsion.

Resonant Acoustic Mixing (RAM) was a technique originally developed for big pharmaceutical and cosmetics companies, but the team realised there was an exciting opportunity to be had.

Phil Cheese, of DOSG, said: "The way we mix energetic materials for use in warheads and rocket propulsion hasn't changed a great deal in the last 200 years. Imagine a great big cake mixer, like you might see on *Great British Bake Off*, and you wouldn't be too far from the truth.

"Dstl and DOSG are constantly looking for ways to make energetics safer, cheaper and with greater performance, and RAM is really exciting technology, allowing you to mix together difficult ingredients, creating a really smooth, well-mixed energetic material for class-leading performance.

"And that's the key to why it is so exciting."

> **The world is changing at an unprecedented rate and the threat we face is evolving fast. Discovering better ways to do things is only part of the challenge. We need to be able to get them into the hands of the user faster than ever before**
>
> Nat Reglar, weapons scientific adviser

Having identified that RAM might be a promising technology, they worked with small and medium enterprises, large primes and academia to build a community known as RAM Club where members work collaboratively to create a world-class, advanced energetics capability in the UK.

Their efforts have seen industry invest in a new RAM facility to start turning out new-and-improved products, helping to keep the armed forces equipped with battle-winning systems.

Elsewhere, it was acknowledged that strapping an air-launched missile to the wing of a jet to put it through its paces carries risk and would be expensive. So Dr Chris Roberts of DOSG set about identifying a better way of evaluating this in the laboratory.

Current laboratory tests can take a long time and can dictate how quickly the design, manufacture and fielding of a new missile can take so Chris undertook a PhD to explore how existing multi-axis shakers could revolutionise how testing is done.

Multi-axis shakers are widely used in the automotive industry to test how vibration affects the vehicle. F1 drivers are known to use them in simulators to experience any race track from around the world.

His research led to him discovering how he could create a vastly more accurate test to represent air carriage vibration – a discovery that could save more than £200,000 for a typical test sequence.

Chris' research culminated with MBDA undertaking a successful weapon science and technology Centre study on accelerated qualification through a novel multi-axis test strategy, building a full-scale test rig that will be used during air carriage performance demonstration and qualification of Brimstone 3. The research has also attracted interest from the wider weapons science and technology community, and seen both MOD and MBDA host visits from US and Australian government officials interested in implementing the technology.

Nat Reglar, weapons scientific adviser, said: "The world is changing at an unprecedented rate and the threat we face is evolving fast. To keep up with that change requires DE&S to look at how it works and continuously look for improvements. Discovering better ways to do things is only part of the challenge. We need to be able to get them into the hands of the user faster than ever before."

60 second spotlight

"I was cast as an extra in a Bollywood film"

Jim Barlow

Job:

Project manager for the Army Warfighting Experiment. It's the Army's largest live-action experiment. Following the successful model of AWEs that came before it, 2020 is working with more than 80 companies to showcase some of the latest technology currently being produced.

Your route into DE&S?

I was looking for a change from events and hospitality and took a chance on the DE&S apprenticeship scheme. It was an interesting move as the majority of entrants were 10 years younger than me. But, I have to say, if I was half as switched on at their age as most of them are, I would be in a much better position for it now. I lucked out and was placed into what was, at the time, the Tech Office and is now evolving into the Future Capabilities Group.

Your claim to fame?

I spent 10 years working in some of the best cocktail bars and restaurants Bristol has to offer, and in 2015, I was awarded Bristol's Best Cocktail Bartender. It involved a series of peer-judged competitions. It was all a bit of fun, but I do miss being behind the bar.

Your advice to anyone?

Get outside your comfort zone, do things that scare you and push yourself. Many of my favourite memories were doing things I didn't know I'd be able to complete when I started. You discover you're capable of much more than you thought and, with that, your self-belief grows.

What do you do when you're away from work?

I spend a lot of my free time training or recovering from training-related injuries. This year, when I've recovered from my latest knee operation, I plan to do a lot of bouldering. I also like cooking great food and spend a good amount of time in the kitchen.

What are you most proud of?

In my spare time, I spent the last 10 years building and growing a grassroots festival with a group of friends. It started as a BBQ for a few of us. We grew it little by little each year and, by 2019, we hosted 1,500 people and 300 artists over three days and five stages. It never made any money, but we also never sold out to make it work. It was essentially a massive, three-day garden party for friends and friends of friends.

If you were sent to a desert island, what three things would you take with you?

It would all be pretty basic. I'm assuming I'd want to survive so I'd take a hammock, a cast iron frying pan and a knife. I'd be alright with that.

What irritates you most?

People who talk really quietly. After years of working in hospitality, it's embarrassing and frustrating for everyone involved asking someone to repeat themselves multiple times. Project people and be confident in what you have to say.

What is your favourite place in the world?

I grew up in the middle of the countryside and many of my friends also lived out in the sticks. So, I'd have to say a proper country pub. In winter, with an open fire, friends and family.

What would surprise people about you?

At 18, I was living and working in Mumbai when I was cast as an extra in a Bollywood film. After 10 years, when I finally tracked down a copy, I discovered it was the Indian version of The Usual Suspects. The original, I still think, is one of the greatest films ever made.

Do you or someone you know deserve their 60 seconds in the spotlight?

Email
Louisa.Keefe101@mod.gov.uk

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Defence nominations, women's rugby and a successful conference

Nominations for the Women in Defence UK Awards 2020 have now opened and staff are encouraged to nominate colleagues who go the extra mile for DE&S.

The awards celebrate incredible work, provide inspiration and promote the value of women in the sector.

Since the launch in 2016, more than 1,400 nominations have been made – that's more than 300 stand-out individuals and teams a year.

Last year, DE&S had staff shortlisted in four categories. Ross Hill (Joint Enablers) and Jan Riches (Warship Support) in Unsung Heroines, head of Maritime Combat Systems Jo Osburn in Most Collaborative, Sue Temple, pictured above, (QEC Warship Support) in Outstanding Contribution and Emily Newton (British Embassy Nuclear & Strategic Deterrent and Threat Reduction) in Emerging Talent.

Angela Owen, founder of Women in Defence UK, said: "The Women in Defence UK Awards are an opportunity each year to celebrate the incredible people who work to defend our nation.

"I have the immense privilege of reading all of the citations and continue to be amazed and humbled by the achievements, dedication and courage of our nominees."

Nominations will close on Friday, April 17, with winners and Woman of the Year announced at an awards dinner and ceremony in November.

To nominate, or to learn more about the Women in Defence UK 2020 Awards, go to www.womenindefenceuk.com/awards-2020.

Two rugby-loving DE&S employees are setting up the very first women's rugby team at Abbey Wood.

Jessica Case-Morris (pictured right) and Phoebe Hall (left) both enjoy playing for Thornbury RFC and wanted to see if there was appetite at DE&S to form a team.

After establishing there was a demand ,the sporting duo decided their plan to set up the trailblazing club was a goer.

They train alongside the men, have specialist coaches to help develop all aspects of their game and are currently in the process of arranging their first fixture.

Jessica said: "I was hooked on rugby from my first training session. For me, it is a fun way to improve my fitness and there is a great social side to the sport. It's also been a great way to meet new people as well and there's nothing quite like the bond of a rugby team."

Phoebe added: "As far as anyone currently involved in the club is aware, there hasn't been a women's rugby team at Abbey Wood before, so why not get involved in a pretty ground-breaking club?"

Anyone interested should email either Jessica or Phoebe.

DE&S Infrastructure have held the 4th Heads of Establishment (HoE) conference at DM Kineton.

The conference is held biannually and affords HoEs the opportunity to hear from a diverse range of speakers across the infrastructure domain, including Defence Infrastructure Organisation (DIO) and Defence Fire and Rescue.

The conference supports HoEs and enables them to network, share best practice and continue to articulate the challenges faced at site level through improving governance processes and working with the DIO as they move through their own organisational transformation.

Delegates appreciated the time and encouragement given by senior figures within the DIO in particular and the honesty of the current position with all parties keen to build on the positive work over the last six months.

The DE&S Infrastructure team would like to pass on their thanks to colleagues at DM Kineton for supporting the team and for hosting the conference.

LGBT history month and DE&S apprentices

The annual LGBT History Month was marked across the UK and other countries; giving an opportunity to raise awareness and educate around prejudice and discrimination against the LGBT community. The DE&S Pride Network held an event at MOD Abbey Wood with the aim to develop an understanding of the issues facing LGBT in the workplace so that individuals are better placed to challenge inappropriate behaviour and attitudes, should they arise. The event celebrated the progress made so far, and, through role play looked at real-life work situations, identifying what we can all do to make a reasonable challenge. Pride Network Chair Mark Cartwright said: "Events like this help develop an understanding of the issues facing some LGBT people in the workplace and help build knowledge and confidence to support colleagues facing harassment or discrimination. This is only one of many events that the network will be running this year to help raise awareness of the importance of LGBT acceptance and inclusion."

Members of DE&S staff in Gosport attended a special celebratory reception at the Houses of Parliament after the apprenticeship scheme at the Defence Munitions (DM) base was announced as a finalist in a prestigious competition.

The Further Education Week and AELP AAC Apprenticeship Awards are a celebration of excellence in apprenticeship delivery in the UK and provide an opportunity to give the recognition employers and providers deserve.

Apprentice training officer Melanie-Anne Sandford, head of establishment Gary Tuff and apprentice training administrator Christine Colthart travelled to London after DM Gosport was announced as a finalist in the category for Apprentice Employer of the Year alongside Amazon, Bentley Motors, Coca-Cola European Partners and Hays Travel.

The Apprentice Employer of the Year award recognises outstanding commitment to apprentices and apprenticeships within an organisation.

Melanie said: "I could not be prouder of our apprenticeship; small in size but massive on success, opportunity and determination. There were more than 350 entries and to be nominated as a finalist is just outstanding."

The winners will be announced at the Apprenticeship Conference Gala in Birmingham this month.

MOTTO the MOD Lottery October winners

£10,000	Michael Stanley, Middle Wallop
£2,500	Helen Webb, Helston
£1,000	Louise Holliday, York
£500	Marc Kenyon, Porton Down
£250	Denise Jones, Tidworth
£100	Robin Jennings, Shrivenham
	Barry Gibb, Bristol
	Tim Gibb, Helston
	Philip Betson, Bristol
	Georgie Seddon, Bulford
	Jo Mckeegan-Brown, Lyneham
	Nigel Rummey, Andover
	Ben Wynne, Bovington
	Gail Macdonald, Bristol
	Colin Clarke, Gosport
	Alison Dodd, Portsmouth
	Ian Hills, London
	Matthew Garnett, Bristol
	Dawn Graham, Bristol
	Robert Sutherland, Plymouth
	James Bellingham, Feltham
	Adam Snow, Bristol
	Rachael Thomas, Lincoln
	Elizabeth Peck, Henlow
	George Coleman, Yeovilton

Case Study

Gemma Smith, Future Capability Group commercial department head within DE&S, gives her insight into some of the benefits of working for the organisation

Name:
Gemma Smith

Job title:
Future Capability Group (FCG) commercial department head

How long have you worked for DE&S?
14 years

Why did you choose to pursue a career in DE&S?
I joined DE&S because I wanted a job that matters. There is no better job than ensuring our military have the best technology to do their job. I love the challenge of developing innovative commercial strategies that can exploit cutting-edge technology rapidly. I have worked across MOD, but DE&S are critical to the actual delivery of technology innovation into capability for the front-line commands (FLCs).

What does your role entail?
I lead a commercial team delivering cutting-edge technology projects in areas such as space, robotics and autonomy. In an acquisition world where technology is developing quicker than we generate requirements in the traditional way, we must find innovative ways to exploit new technology being developed for commercial markets. My team provide commercial solutions to deliver pre-concept experimentation projects across all FLCs, so users can understand new technology and analyse the evidence in order to make informed capability investment decisions. We also provide acquisition advice across all FLCs and innovation hubs to maximise opportunities for technology exploitation. We manage a complex and diverse portfolio of novel technology contracts circa £350 million.

What are the opportunities to develop and progress within your function?
I joined as a commercial graduate in 2006 and have enjoyed a diverse and challenging career. I have worked on many interesting projects from aircraft carriers to cutting-edge space-based technology in numerous locations, from RNAS Yeovilton to the Falkland Islands. I see the commercial function as being front and centre of innovation, acquisition transformation and the need to exploit novel technology has helped me to create an environment to do things differently. FCG Commercial are piloting new commercial models which can hopefully be used across the wider DE&S in the future.

What do you most enjoy about your job?
Developing innovative end-to-end commercial strategies from initial technology idea (e.g. Defence and Science Technology Laboratory, Defence and Security Accelerator) through to DE&S capability delivery to ensure the best chance of pulling through novel technology into service. There is a perception that commercial policy and process can be blockers to innovation. But, in fact, we hold the key to exploiting it.

What's your ambition?
For Defence customers to see FCG as the 'go-to team' for cross-cutting acquisition advice and to help build DE&S' reputation as acquisition leaders in the delivery and exploitation of novel technology.

What's your greatest achievement to date?
Creating a new commercial model - Buy And Try at Scale (BATS) - to buy and experiment with new technology rapidly to develop the customer's requirement. The pilot project delivered an 'experimentation buy' of 30 unmanned aerial vehicle systems within three weeks of the Secretary of State's Transformation Fund announcement. Once we received approval we travelled to Norway and within 36 hours negotiated, drafted and signed the £2 million contract. We demonstrated it is possible to 'do things differently' if you take an innovative approach.

Why would you recommend DE&S to others as a great place to work?
DE&S is full of opportunities to develop and feel like you are making a different to front-line capability. The variety of projects and enabling roles combined with the transformational change across Defence and technology means there are always new and exciting roles to challenge you.

What are the social benefits of working for DE&S?
DE&S has been very supportive of my needs to balance work and a young family, allowing me to change my working patterns and use smart working. Whilst I have a very busy and challenging role, the support DE&S gives me to manage my time enables me to thoroughly enjoy my work.

Picture: Jack Eckersley

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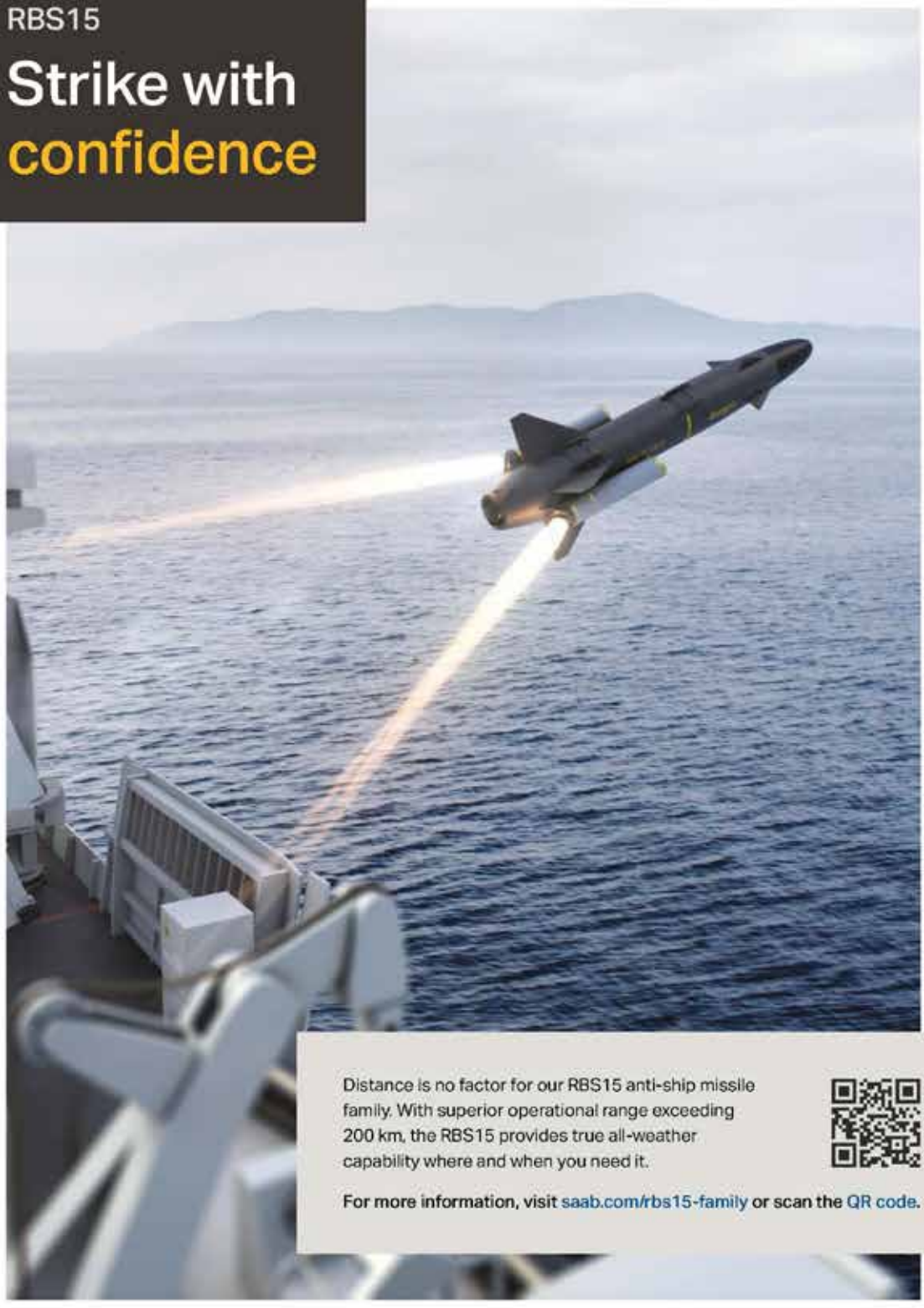

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