

Lincad, a leader in the design and manufacture of bespoke batteries and charging systems.

WINTER 2020



WELCOME TO THE WINTER EDITION OF CONTACT

Lincad's quarterly newsletter.

As an essential supplier to the defence industries we have remained fully operational throughout the Coronavirus pandemic supporting our customers with critical defence and medical battery production.

The Lincad team have been keeping busy throughout the lockdowns. We have updated our lithium-ion power system battery range with the evolution of LIPS 16 (see page 4). Our Quality team have invested in new cutting edge battery testing facilities at our HQ (see page 12).

We continue to grow internationally (read about our Asia-Pacific footprint on page 2) and win new exciting contracts.

We have participated in several virtual industry events over the past few months and we look forward to meeting all our industry friends very soon at a live event – when they open.

Janet Rowe and Peter Slade
Joint Managing Directors



Janet Rowe



Peter Slade

IN THIS ISSUE



INTRODUCTION TO LIPS 16

[SEE PAGE 6](#)



FUTURE MILITARY PROGRAMMES

[SEE PAGE 8](#)



LEARNING AT LINCAD

[SEE PAGE 16](#)

LINCAD FURTHER STRENGTHENS ITS ASIA-PACIFIC FOOTPRINT



Lincad, UK designer and manufacturer of bespoke batteries and charging systems, is seeing increased demand from the Asia-Pacific defence sector for its Battery Power Management Systems (BPMS) Mk2 for military applications and deployment. Lincad is supplying into the territory through Leonardo.

Lincad's BPMS Mk2 is a 120Ah lithium-ion battery system that contains the battery charge management and power routing electronics required for self-contained UPS functionality.

The system has been designed to support a 24V DC power supply, as well as to act as a stand-alone 24V DC power source, offering maximum versatility in demanding military environments. It can be carried by soldiers, weighing just 25kg, and can be mounted to a mobile or static platform once in situ.

The BPMS Mk2 has been designed to upgrade and replace Lincad's original BPMS, which has been in continuous use with military forces

around the world for more than 12 years. As well as including the very latest in battery and charger technology and design, additional features on the Mk2 version include the functionality to update operating software via PC, laptop or mobile app as required, as well as the ability to store periodic data for diagnostic and maintenance purposes.

Peter Slade, Joint Managing Director of Lincad, says of the new business: **"We are delighted to continue our long-standing relationship with Leonardo to supply the Asian market with our battery power management systems. This partnership further strengthens Lincad's Asia-Pacific footprint."**

Lincad is at the forefront of lithium-ion battery technology, taking product performance to new limits and producing lighter, more energetic and powerful batteries than ever before. Alongside its range of bespoke batteries, Lincad's range of custom chargers offer fast, flexible charging solutions for military and other sectors around the world. ●



The Armada is designed for the state of charge management of all battery types.

It delivers significant logistical and operational benefits to anyone involved in the transport and management of batteries.



LINCAD UPDATES ITS LITHIUM-ION POWER SYSTEM BATTERY RANGE WITH THE EVOLUTION OF LIPS 16

An interview with Mike Hendey, Lincad's Senior Systems Engineer



Mike Hendey

Q. Why has Lincad manufactured the LIPS 16?

A. Lincad's current range of LIPS batteries are the result of continued improvements in specific energy through the integration of new cell technology and enhanced mechanical and electronic design. The Lincad R&D team continue to evolve our LIPS (lithium-ion power system) battery range and we identified a need for an upgrade to a previous model. One of our international defence customers had also specifically requested this model be developed, so the timing seemed right.

Q. What sets the LIPS 16 apart from Lincad's previous LIPS models?

A. This is the next step in modernising our LIPS range. The LIPS 16 is lighter and has more functionality than the previous model. We have updated the electronics and updated the internal construction to keep it current and cost effective. We constantly research cell technology to ensure the cells we use are the best in the world.

Q. Is the LIPS 16 for the defence market only?

A. The LIPS 16 is primarily a military battery in the sense that it is ruggedised and has been specifically designed to be suitable for demanding military and field-based defence environments. It offers a cutting-edge upgrade to the more traditional lead acid batteries that have predominantly been used on applications such as the Hostile Artillery Locating (HALO) system. However, it lends itself well to a range of applications in different sectors that require that kind of performance.

Q. When will the LIPS 16 be launched to market?

A. The LIPS 16 will be available for purchase in 2021. We already have strong interest from existing customers, and we expect to see global demand. Due to its in-built heating system, the LIPS 16 works well across a wide temperature range. Therefore, it is suitable for use in a broad range of environmental conditions, both hot and cold.

Q. Why would customers choose the LIPS 16 over lead acid alternatives?

A. The LIPS 16's fully metallic enclosure has been sealed to IP55 to offer superior physical protection and electromagnetic screening for internal components, while other advantages can be found in the lighter weight, flexible design and an enhanced two-year storage life when in a completely discharged state.



Q. Does the LIPS 16 satisfy current regulations for transportation of lithium-ion batteries?

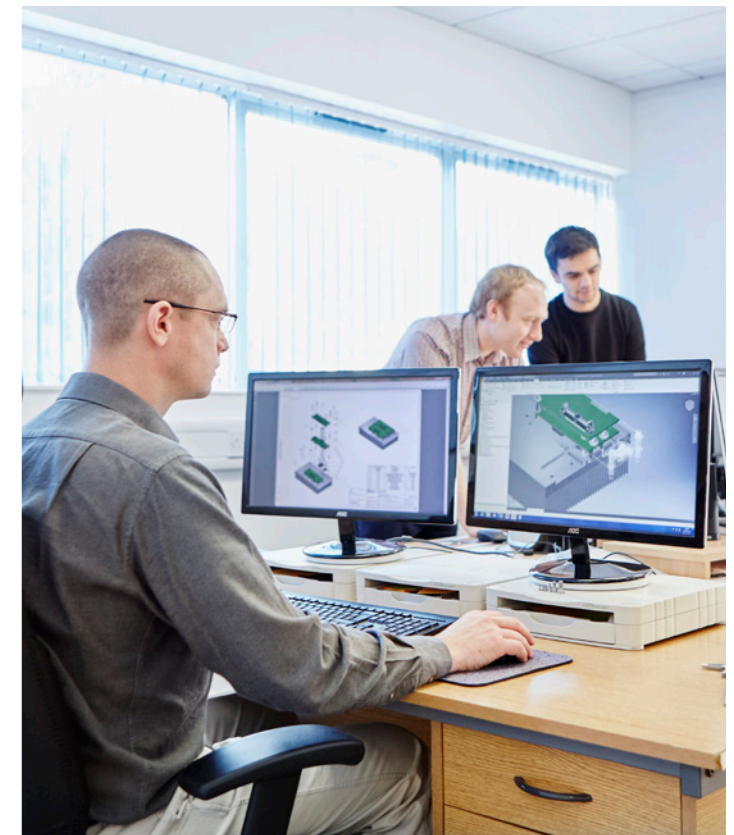
A. The LIPS 16 is versatile and offers an internal discharge feature that allows stand-alone discharge of the internal cell stack – a vital aspect for transporting lithium ion battery equipment. This feature allows the user to discharge the cell stack to levels optimised for long term storage or for transport by air in compliance with IATA regulations without the need for external equipment.

Q. What new features sets the LIPS 16 apart from previous LIPS models?

A. Lincad continues to take battery performance to new levels. Additional new LIPS 16 features include the ability to update the operational software and interrogate the battery memory using a mobile, tablet or PC, as well as the ability for the internal battery management system (BMS) to store periodic operational data for use in maintenance activities.

Q. What are the storage capabilities of the LIPS 16?

A. The step change in the electronic management systems used in the LIPS 16 offers the advantage of a two-year storage life when in a completely discharged state. The risk of an over-discharge condition, even when the battery is left on equipment is thus greatly reduced.



Q. What recharge capabilities does the LIPS 16 have?

A. Like our entire LIPS range of batteries, LIPS 16 can be recharged to return many hundreds of discharge cycles. They have been optimized to charge from our in-service range of charging systems but can be adapted to accept charge from alternative sources if required.

Q. What make the LIPS 16 particularly suitable for military environments?

A. The LIPS 16 is a solid robust battery ideally suited for military environments and has a long battery life of over 80 AMP hours. It is flexible and can be used for numerous applications from powering military radio equipment to field hospital ventilation systems. It can even be used as a generic power supply for multiple applications at the same time. ●



LINCAD LAUNCHES LIPS 16 BATTERY

Lincad is pleased to announce the launch of its LIPS 16 (lithium-ion power system) battery.

The LIPS 16 represents the latest in lithium-ion battery technology and design and is suited for use in the most demanding environments, with a fully metallic enclosure (sealed to IP55) offering excellent physical protection and electromagnetic screening.

Originally designed as replacement for a lead acid battery used for an acoustic weapon locating system, the LIPS 16 offers performance characteristics suitable for a range of military applications and uses in other sectors that require military grade performance.

The versatile LIPS 16 battery offers an internal discharge feature that allows stand-alone discharge of the internal cell stack to below 30%, a vital requirement for transport by air, in accordance with IATA regulations.

Additional features include the ability to update the operational software and interrogate the battery memory using a mobile device, as well as the ability for the internal battery management system to store operational data for user analysis and maintenance activities.

Peter Slade, Lincad's Joint Managing Director, commented:

"Lincad's current range of LIPS batteries are the result of continued improvements through the integration of new cell technology and enhanced mechanical and electronic design. The ruggedised LIPS 16 offers a next generation product for use across a wide range of applications."

Lincad is at the forefront of lithium-ion battery technology, taking product performance to new limits and producing lighter, more energetic and more powerful batteries than ever before. ●



Lincad's LIPS range of batteries are ruggedised to meet the most demanding operational requirements. They are available in a variety of capacity options and alternative communication protocols to suit a range of different applications.



BATTERIES AND CHARGERS FOR MODERNISING FUTURE GLOBAL DEFENCE PROGRAMMES

An interview with Peter Coplestone, Lincad's Operations Director



Peter Coplestone

Q. Why is Lincad currently investing in a large-scale upgrade programme of its UK facilities?

A. These improvements are all part of our programme of preparing for future demand and growth. Over the past few months, we have invested in upgrading our manufacturing and engineering facilities and head office building. Additionally, we have purchased new automated cell testing equipment to ensure the performance and quality of batteries supplied to our customers. We are doing all this so that we remain ready to meet increased global demand for our military batteries and chargers for all types of defence missions such as on the battlefield, peacekeeping operations and dealing with natural and environmental disasters.

Q. As Defence modernises, how will Lincad evolve to keep up with future military battery requirements?

A. The Lincad team are constantly updating and evolving our range of military batteries and chargers to meet the requirements of today and the future. At Lincad we can

use any cell technology, which means we can adapt to meet future requirements. We see our batteries as mission centric and playing a key part in future technology-connected defence forces. There are many developing technology advances in the defence arena particularly within autonomous systems.

Q. Why do you continue to see demand from the defence sector for lithium-ion batteries?

A. Lithium-ion batteries are currently the most cost effective and most suitable cell type for the defence market. In our view lithium-ion batteries are the most energy and power efficient option for defence applications. In the future that could well change as new cell types come to market and we stand ready to adapt to meet any such changes.



Q. How is Lincad working towards meeting the challenges of future soldier needs?

A. We continue to make lighter, more energetic and more powerful batteries for man-portable soldier equipment. All our batteries and chargers are designed to be suitably ruggedised and simple to use. The Lincad R&D team are currently working on battery solutions for integrated man-worn batteries and are also looking at developing a single power source for soldiers in the field.

Q. Is Lincad developing batteries for military robotics?

A. We already have lots of experience in manufacturing batteries for robots. For many years we made the battery system for the CUTLASS bomb disposal robot. So yes, robotics is an area we are watching closely and expect to see growth.



Q. Will there be increased demand for batteries for military autonomous vehicles?

A. We believe in the future that robots are likely to replace humans in a number of military scenarios. There will be remotely piloted military vehicles of all types as we enter the era of robotic warfare. This will in turn result in an increased requirement for mission critical batteries and chargers.

Q. Will Lincad see growth outside the UK in the future?

A. Although the majority of our work is here in the UK for the MOD and leading defence primes, we also currently provide batteries and chargers to defence organisations in a number of different countries globally. As armies modernise, we aim to match or exceed their requirements to continue to provide the best state-of-the-art batteries and chargers for their missions. ●





The Four Channel Caravel Mk2 is a multi-chemistry charger for charging batteries from 2 to 58V via interchangeable battery interface adaptors, including batteries not originally intended for use with a third-party charger.

With four USB ports, it also charges smartphones, tablets and other mobile devices, and can be configured for wireless or ethernet communication for central monitoring.



LINCAD DOUBLES CAPACITY AT HQ AS PART OF SIGNIFICANT INVESTMENT PROGRAMME

Lincad has doubled the capacity at its HQ and production facilities based at Ash Vale in Surrey, UK. The move comes as part of a significant investment programme carried out over the past twelve months and is designed to prepare the manufacturer of bespoke batteries and charging systems for successful and sustained long-term growth.

As part of the wider investment activity, Lincad has tripled its engineering, research and development facilities and increased its PCB manufacturing space. The company has also purchased additional automated cell testing equipment as well as equipment to provide specialist humidity testing, expanding its in-house testing provision and ensuring the continuation of its stringent quality assurance processes.

Janet Rowe, Joint Managing Director of Lincad, says of the investment:

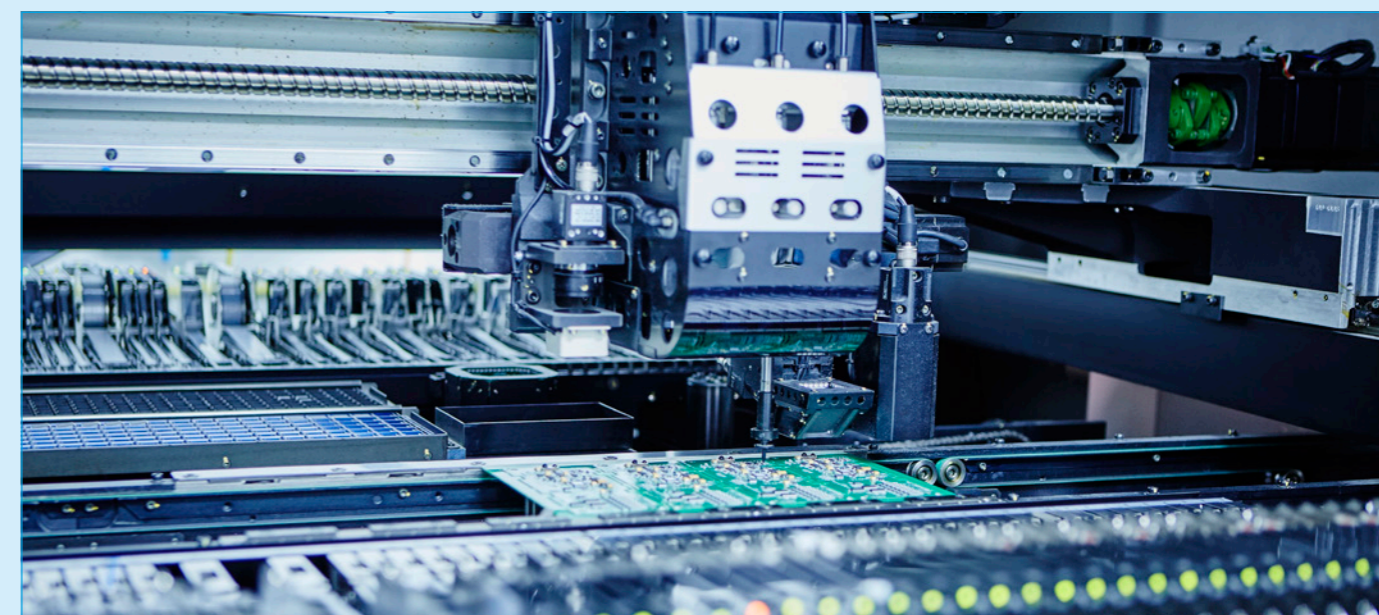
“Doubling the capacity of our Surrey premises and investing in our battery testing facilities is a significant achievement for Lincad, especially during these economically challenging times.



“Our financial commitment is helping us prepare for our longer-term future, keep pace with current demand and strengthen our position, not just in the military sector that we primarily serve, but across other key industries and areas in which we work.”

Lincad is classified as a ‘critical’ supplier to the defence sector and has therefore remained fully operational to support its customers with defence and medical battery production during the Coronavirus pandemic.

Lincad is at the forefront of lithium-ion battery technology, taking product performance to new limits and producing lighter, more powerful and more energetic batteries than ever before. Alongside its range of specialist batteries, Lincad’s product portfolio includes a range of robust chargers that offer faster, more flexible charging solutions for military and other applications, including those in the medical, industrial and commercial sectors. ●



QUALITY CONTROL

An interview with Stephen Jenkins Lincad's Quality and Health & Safety Manager about the impact of Covid-19



Stephen Jenkins

Q. What are the main challenges facing Lincad's quality team at the moment and how are you overcoming them?

A. Covid-19 has not had a massive impact although we have introduced several new health and safety procedures. It has somewhat restricted our ability to do training as we cannot bring in any training experts, due to a restriction on visitors to site.

Q. How have you adjusted Lincad's quality management systems over the last few months?

A. Well, we've identified that there is extra training that's needed within the business. Especially with regards to our sustainability plans. We are looking at accrediting our environmental management system so our recycling and disposal processes have changed slightly. For example, instead of putting all our recyclable waste inside one bin, we now break it down into different metals, paper/cardboard and plastics, so it's completely segregated.

Q. How important and effective has your business and quality management system been in dealing with Covid-19?

A. It's been very effective. Our health and safety systems were already in great shape as a result of the work we have done over the past few years. However, we have recently focused more on our business continuity plans and we did some further analysis of pandemic risk on our risk register last December, which has obviously proved very useful.



Q. How is quality structured within the business to meet Covid-19 guidelines?

A. So, quality always remains the same, it's the health and safety that's had to step up and we've had to put more processes in place to keep our employees and visitors safe. Due to Covid, we have had to look closer at deliveries to and from Lincad. We have also upped our cleaning process to multiple times a day just to make sure all surfaces are virus free.

Q. Why has Lincad recently invested in upgrading its testing facilities?

We have invested in some environmental chambers which can simulate jungle environments, they mimic the humidity and moisture in the air. This is to make sure that when our batteries go out in the field, they are capable of working in a range of extreme weather conditions and temperatures.

Lincad's new battery testing facilities allow tests to be done over a week or even over a year, there is no time scale on the tests. •

WORK SAFETY



LINCAD'S ARMADA SUPPORTS THE TRANSPORTATION OF MILITARY BATTERIES

Two years ago, UK battery and charging systems expert, Lincad, launched the Armada, its multi-chemistry, six-channel battery conditioning system onto the global market. Just like its historical namesake, the innovative system has paved the way for more effective transportation and deployment of resources in a military setting.

Due to changes to IATA regulations, lithium-ion batteries ubiquitous in military technology can only be flown by aircraft at 30 per cent or less state of charge (SoC). Without a specially designed battery conditioning system such as the Armada, achieving this can be an extremely difficult process.

Thanks to Lincad's effective battery management solution, batteries of any chemistry can now be conditioned and discharged or charged as required for safe transport and long-term storage to extend useful life. This versatility is crucial for the defence sector. Many key applications must be ready to deploy at any time, and being able to condition, discharge or charge as required may make that crucial difference between a successful mission and a failure.

The Armada is one in a long line of innovations introduced by Lincad to the military sector. It has been designed to safely manage the SoC of its own batteries, as well as other lithium-ion batteries and batteries of other chemistries. Six completely independent channels enable the automatic charging and discharging of more than 250 different battery types. This allows the user to maintain an entire fleet of batteries using one single system. The batteries are attached to the Armada through battery interface adaptors that connect via locking military-standard circular connectors. The Armada is compatible with IrDA and SMBus smart batteries, as well as those with no communications interface.



Above all, the Armada has been designed with military use in mind, although it can also be deployed across other sectors, including aerospace, maritime, medical and petrochemical. It is robustly built to cope with a demanding environment and powered from a universal AC mains supply for mounting on a bench or a 19" rack. Charge and discharge functions are controlled by the system software and are largely automatic, once initiated by the user through a simple push-button interface. LED displays provide detailed status indication during operation. It accepts field software upgrades from a mobile app, laptop or PC. Additionally, it optimises the conditioning process through active thermal management of the internal heatsinks to maintain a safe operating temperature and to optimise the conditioning process: key elements for field-based military equipment that must remain at optimal performance at all times.

Peter Copplestone, Operations Director at Lincad, says: **"As far as I am aware, the Armada is a unique product; no-one else is producing anything equivalent. Due to the fact that it has six ports, all of which can take a different battery type, you can set a lot of batteries to the state-of-charge you need. It's also not that big, 180mm by 440mm by 355mm, and it only weighs about 16 kilos. So, it's soldier portable too, making it extremely flexible in more ways than one."**

Lincad has been a key supplier of power management solutions to the UK MOD and defence prime contractors since 1986. The company now supplies a number of armed forces around the world with batteries and chargers for applications ranging in size from man-portable kit to large artillery systems. As well as securing the UK MOD as a major customer, interest in the Armada has also been expressed by major European defence forces and defence primes. The system can be used anywhere in the world due to its broad power requirement range from 90 to 264V.

Lincad places an emphasis on supplying to industries that rely on functionality, reliability, quality performance and longevity of useful life. With its own research and development department, Lincad is at the cutting edge of new and emerging battery and charging technologies to integrate into its portfolio of products. With more than 30 years' experience in the field, Lincad takes product performance to new limits, producing longer lasting, more powerful and more energetic batteries, and faster, more flexible charging solutions. The Armada is one of the company's flagship products, combining innovation and design with performance and resilience in the field. ●



Leaders in battery and charger technology and design

Lincad designs and manufactures bespoke batteries and chargers for defence companies and armed forces around the world.



5 QUESTIONS WITH...

Gemma Bland, an engineer undergraduate at The University of Surrey, who has joined Lincad for a 12 month internship.

LEARNING AT LINCAD



Gemma Bland

1 What is Lincad's connection with The University of Surrey ?

Lincad has partnered with The University of Surrey engineering faculty for a number of years now for its in-house internship scheme. I have completed the first two years of my electronic engineering degree and for my third year work placement I applied for this opportunity at Lincad. I have an interest in software engineering and the defence sector. Lincad specialises in the manufacture of defence batteries, chargers and power management systems, so I felt it was a good fit.

2 How long is your Lincad internship and what will it involve?

The internship is for 12 months within the Lincad engineering department. I will be working on real software engineering projects with the Lincad engineering team. This is what is so exciting for me, I am actually doing real work and learning every day.

3 Were you always interested in STEM subjects?

Yes, at school I excelled in STEM subjects and I knew from an early age that I wanted to be an engineer. After my A-levels I accepted a place at The University of Surrey.

4 Would you say that you are a firm advocate for greater diversity in engineering and want to encourage more women into engineering careers?

I hope more women look to follow engineering careers. I encourage more young women to consider engineering careers and all the different types of engineering roles out there. I truly believe that the schools need to do engineering career talks earlier in the curriculum. In my school we had various engineering career advice talks around our A-levels and by that time most students already have an idea of what career path they want to follow.

5 What advice would you give young women looking to pursue a career in engineering?

I would suggest they look to do an internship or a work placement of some kind. This way they can experience engineering and perhaps get exposure to the variety of opportunities within engineering. There are many forums and talks available on the internet whereby you can get lots of information about engineering careers. Women should feel confident to apply for any engineering job they wish to pursue. ●



Lincad wins new contract from Team Leidos to supply a range of cells and batteries for ultimate use by British armed forces.

“We’re pleased to have won an additional contract from Team Leidos. We have been supplying products to military customers, including the UK MOD, for more than 30 years. This win highlights the confidence that defence customers have in Lincad to supply high performance product, often in very large volumes, at a competitive price.”

Peter Slade
Joint Managing Director



2020 - VIRTUAL EVENTS



Over the past few months the Lincad team have attended a number of industry virtual events. Although it has been an opportunity to meet our industry friends and engage in conversations, we look forward to attending industry exhibitions in person! ●



MEET US IN 2021



22 April 2021



23 June 2021



14-17 September 2021

WOMEN IN DEFENCE

Janet Rowe, Lincad's Joint Managing Director continues to champion more women working at all levels across the UK defence industry



Q. Are we seeing more job opportunities for women in the UK defence industry?

A. Yes, I believe we are seeing more women at all levels of management across the UK defence sector but we still have some way to go. Equality will not happen by chance. We all need to work together to inspire, challenge and develop and build a better working environment for both men and women to work and thrive. There is still a long way to go to reach gender equality.

Q. How can we encourage more women to work in the UK defence industry?

A. It all starts with education, with STEM subjects. If we can encourage more young girls at school to consider careers such as engineering - that will help progression into jobs in the defence sector. Also, internships are a fantastic way for students to see the vast

number of exciting jobs within the defence sector. Here at Lincad, for a number of years now we have run a placement scheme partnering with our local university.

Q. Do role models help to encourage more women into defence?

A. There are so many inspiring women in the field of defence, yet so often they are overlooked. In the last few years, several networking groups have formed, especially on social media such as Women In Defence UK which hosts yearly awards to promote the value of women in defence and celebrates the incredible work of women in our sector. I attend and support a number of these networking group events.



Q. How will the Prime Minister's investment injection of £16.5 billion into the UK's Armed Forces help more women into Defence jobs?

A. The funds will help to modernise the Armed Forces and will in turn stimulate thousands of highly skilled

jobs across the UK. A radical program of innovation and modernisation will create circa 10,000 jobs a year, and support thousands more livelihoods. I sincerely hope a number of these positions will be taken up by women, bolstering female participation in the military.



Q. How can we build back better?

A. It's no secret that the defence industry has more men than women, particularly in senior positions. Things are changing. After coronavirus, we must 'build back better'. More and more organisations, companies and the Armed Forces understand the need to increase the number of women working in defence because of the benefit of added diversity of thought.

At Lincad we are committed to promoting equality in all aspects of our work and we continue to employ women across our defence battery business. ●

LET US SALUTE THE STRONG, BRAVE MEN AND WOMEN OF OUR NATION, WHO ARE ALWAYS THERE, GUARDING US AND KEEPING US SAFE.

This year for Armed Forces Day, the Lincad team supported two charities including Combat Stress which is the UK's leading charity for veterans' mental health.

For over a century Combat Stress has been helping former servicemen and women deal with issues like post-traumatic stress

disorder (PTSD), anxiety and depression. Today it provides specialist treatment and support for veterans from every service and conflict, focusing on those with complex mental health issues.

We have also made a donation to local charity Aerobility who offers disabled veterans the opportunity to fly an aeroplane. ●



**is proud
to support**

