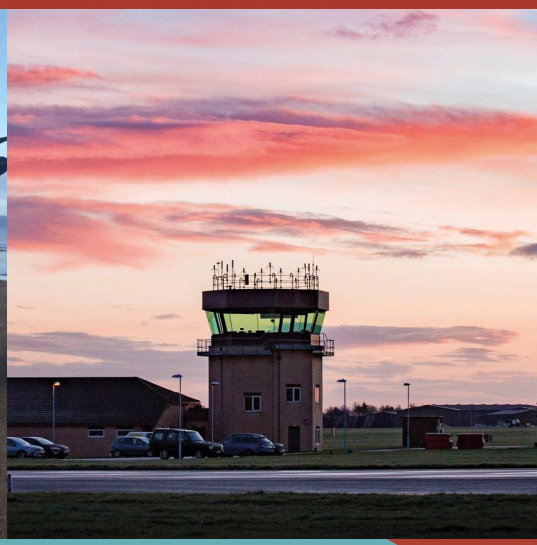
Lincolnshire UK

The Defence & Security Sector Investment Opportunity



Lincolnshire COUNTY COUNCIL
Working for a better future

Image Credit: © BAE Systems

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The UK Defence & Security Sector Market Opportunity

The defence and security sector is undergoing rapid transformation, in the UK and internationally. Better information, enabled by digitalisation, holds the potential to revolutionise performance – both in the military operating environment and throughout the industry value chain.

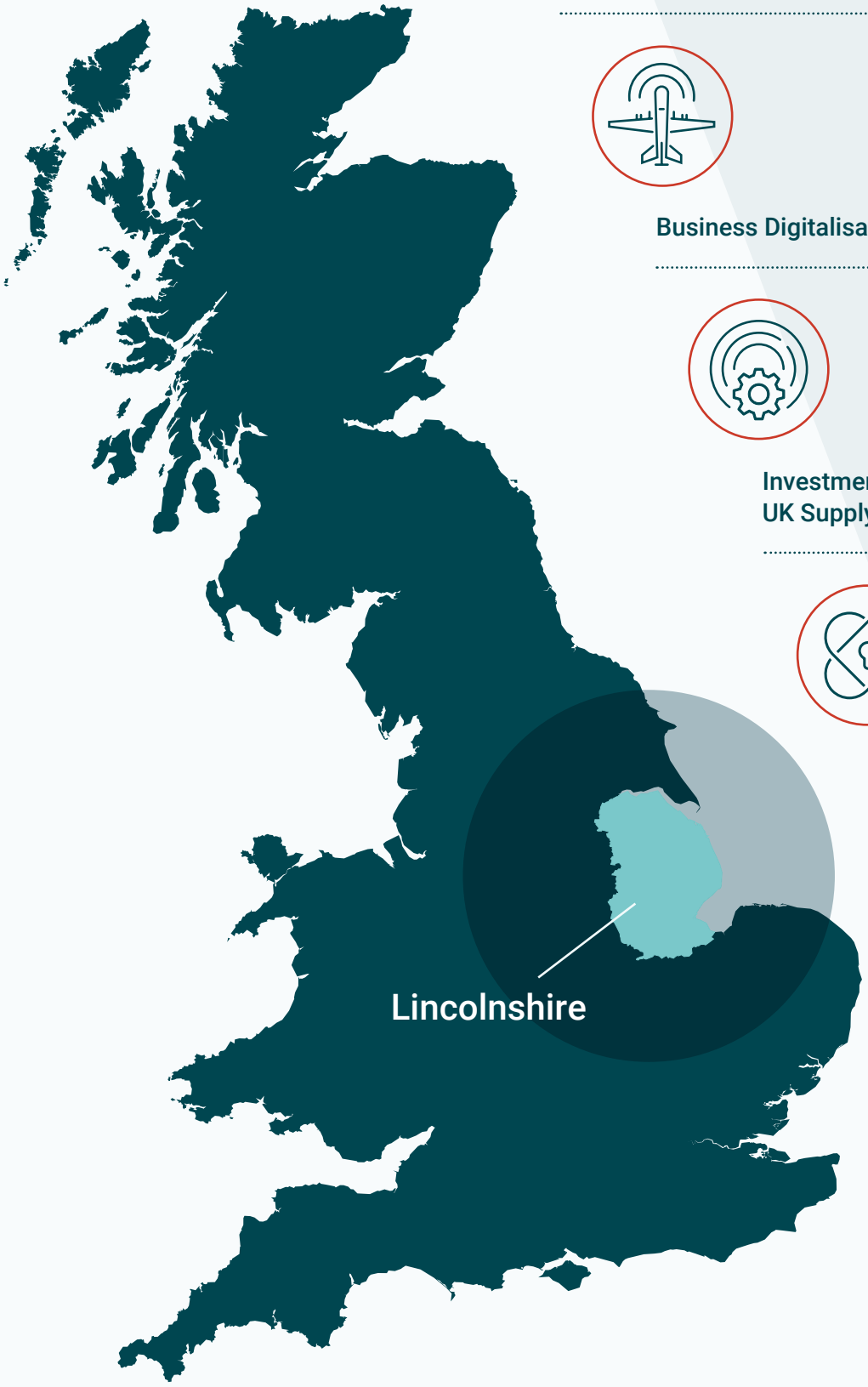
In ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance), rapid digitalisation is essential, to keep pace with developments across the entire electromagnetic domain and to harness the power of autonomy and synthetics. To support rapid and accurate decision-making, ever-increasing quantities of data must be managed, stored, analysed, manipulated and clearly represented. This requires fast, networked communications, big data analytics, AI, and the optimisation of human-machine interaction.[1] As ISTAR systems become more highly digitalised, we can expect a significant rebalancing in investment towards the data services that platforms rely on.

For both government and businesses, new digital and Industry 4.0 technologies are creating opportunities to transform the way defence products are developed, procured, manufactured and distributed. Technologies relating to workflow, intelligent inventory, data analytics and parts traceability are transforming production and supply chains, with the potential for step-change improvements in efficiency and productivity.[2, 3]

With the UK committed to Net Zero emissions by 2050, decarbonisation has become a critical issue for the defence sector. Both businesses and the military have a pressing need to access low carbon energy sources, potentially including electric and hydrogen power, and to develop new, sustainable products, processes, and supply chains.

Meanwhile, Covid-19, EU-exit, and security concerns related to international sourcing (now including the situation in Ukraine) have tested supply chain resilience and highlighted gaps in the UK's defence and technology industrial base. In response the government has specified that key defence industry capabilities must be UK-based, while committing to an investment of £85 billion in defence equipment and support to 2025. This includes £6.6 billion in UK R&D and commercialisation.[4, 5]

For investing defence and security sector organisations, this new and rapidly changing environment creates new location needs. To stay ahead, businesses require direct access to leading-edge digital, data and Industry 4.0/5.0 technologies and expertise. They need access to reliable, large-scale low carbon energy supplies; and they need space for growth in a secure environment that is conducive to defence innovation, testing and production. Lincolnshire's unique location proposition satisfies all these needs.



ISTAR Digitalisation

Business Digitalisation & Industry 4.0/5.0

Investment in Resilient UK Supply Chains

MoD Decarbonisation

Net Zero 2050

UK Defence Investment to 2025

£85 billion

Sources: (1) McKinsey 'Digital: The next horizon for global aerospace and defense' (2) Deloitte '2021 aerospace and defence industry outlook' (3) IBM: ibm.com/topics/industry-4-0 (4) UK Gov't Defence and Security Industrial Strategy', March 2021 (5) FT.com 19.11.20

Data is for the United Kingdom. Northern Ireland is not shown on the map.

The Lincolnshire Location Opportunity

For defence and security sector organisations seeking a competitive edge through the application of digital and information technologies, Lincolnshire presents a unique combination of location benefits.

The UK's ISTAR Hub

Lincolnshire is at the heart of ISTAR in the UK. RAF Waddington, near Lincoln, is described by the RAF as the "hub of UK ISTAR and the main operating base for airborne intelligence aircraft and systems." The base is also home to the RAF's Air and Space Warfare Centre (ASWC), and the Air Battlespace Training Centre.[6] RAF Digby is home to the MOD's Joint Cyber and Electromagnetic Activities Group (JCG), a UK StratCom organisation providing signals support to the three services on operations around the world. The JCG supports both strategic decision makers at the highest level and the front line on a 24/7 basis.

Other major RAF bases in the area specialise in aerospace protection, cyber, signals, and air crew training. RAF Wyton, in nearby Cambridgeshire, is home to Defence Intelligence and the National Centre for Geospatial Intelligence (NCGI). British Army bases in or close to Lincolnshire include Army Training Regiment Grantham and Kendrew Barracks, home to HQ 7th Infantry Brigade; 2nd Battalion, The Royal Anglian Regiment; and 7th Regiment, Royal Logistics Corps.

An Advanced Defence and Security Industry Cluster

RAF Waddington and the wider RAF presence is accompanied by a cluster of major defence and security technology businesses, providing operational support for ISTAR and digital systems. They are part of a wider regional industrial base with advanced digital, manufacturing and energy capabilities, including Industry 4.0 technologies, robotics and automation, automotive, and power systems.

An Ideal Environment for Defence and Security Innovation

With secure, large-scale military sites, extensive permitted air space, a low population density, and communities supportive of the military, Lincolnshire offers the ideal environment for businesses engaged in defence technology R&D, innovation, testing and evaluation, and distinct advantages over many established UK defence and security industry locations.

Research and Technology Capabilities

The University of Lincoln is a leader in digital and information technology research, in areas including sensors, big data analytics, AI and machine learning, robotics and automation, VAR (virtual and augmented reality), and internet of things. With its roots in industries including engineering, agri-tech and logistics, this unique expertise is directly transferable to key challenges facing the defence and security sector.[7]

A Skilled, Specialised Workforce

Lincolnshire's military, industrial, research and educational strengths mean that investing defence and security sector businesses can access a technically skilled, cost-effective workforce, as well as training solutions, in areas including digital technology, advanced manufacturing and net-zero energy. The area's substantial ex-military population is also a potential source of highly specialised expertise.

Sustainable Energy Solutions

With the world's largest offshore wind farms, a significant sustainable energy cluster on the Humber, and major collaborative projects to deliver low carbon energy including green hydrogen, Lincolnshire is at the heart of the UK's energy transition. For organisations across the defence and security sector, the area is ideally positioned to facilitate ambitious decarbonisation strategies.

Together, these regional capabilities can enable leading-edge collaborative innovation and the efficient, cost-effective delivery of business investment projects.

Sources: (6) RAF: raf.mod.uk (7) University of Lincoln: lincoln.ac.uk

Building the UK's ISTAR Centre of Excellence

In Lincolnshire, a regional board encompassing industry, academia and the military is working proactively to develop the Regional Defence and Security Cluster, with a focus on ISTAR technologies.

A Vision for the Regional Defence and Security Cluster

Development of the cluster is building on the established ISTAR capabilities at RAF Waddington and within businesses supporting the RAF, combined with the University of Lincoln's leading-edge digital and information technology expertise.

While platform and sensor technologies (for data acquisition) are of key importance, the cluster's vision is based on a more fundamental principle: that ISTAR's purpose is *enabling commanders to make better decisions*. The cluster's development focus will therefore be on information itself as a lever of military success.

In practice this means analytics technologies, encompassing the management, storage, manipulation, fusion, wrangling, analysis and visualisation of data for decision support. It also incorporates the communication technologies required to transmit data, decisions and orders (instructions) securely, and the synthetics and simulation capabilities needed to support the training and operation of complex information and intelligence systems. These technologies are applicable across all defence domains including space, which is of central importance in security and communications. The cluster's core objectives will include developing technologies to improve decision support, interoperability, and overall information advantage.

Business digitalisation and Industry 4.0 / 5.0 technologies are additional priorities, based on advanced expertise within both the University of Lincoln and local companies. These themes will enable performance improvements within defence businesses and supply chains, as well as their products and services.

Located alongside MoD ISTAR capabilities, the cluster provides access to defence users, opportunities to understand their challenges, and the potential for collaborative innovation.

Sites & Properties for Research & Business Growth

The defence and security industry is projected to grow at sites across Lincolnshire, enabling university R&D collaborations, secure product testing and evaluation, and full-scale commercial business operations.

The Innovation Hub: Lincoln Science & Innovation Park (LSIP)

LSIP is developing as the cluster's innovation hub, providing knowledge-intensive businesses and research teams with direct access to University of Lincoln expertise and facilities in a collaborative environment.

LSIP is already a thriving science park, providing 12,000 sq m (129,167 sq ft) of accommodation, R&D facilities and shared hub services for an established science and technology community. Phase 2 recently opened, offering 1,900 sq m (20,000 sq ft) of bespoke units for SME grow-on space and defence R&D, with more than 50% already occupied by defence and security firms.

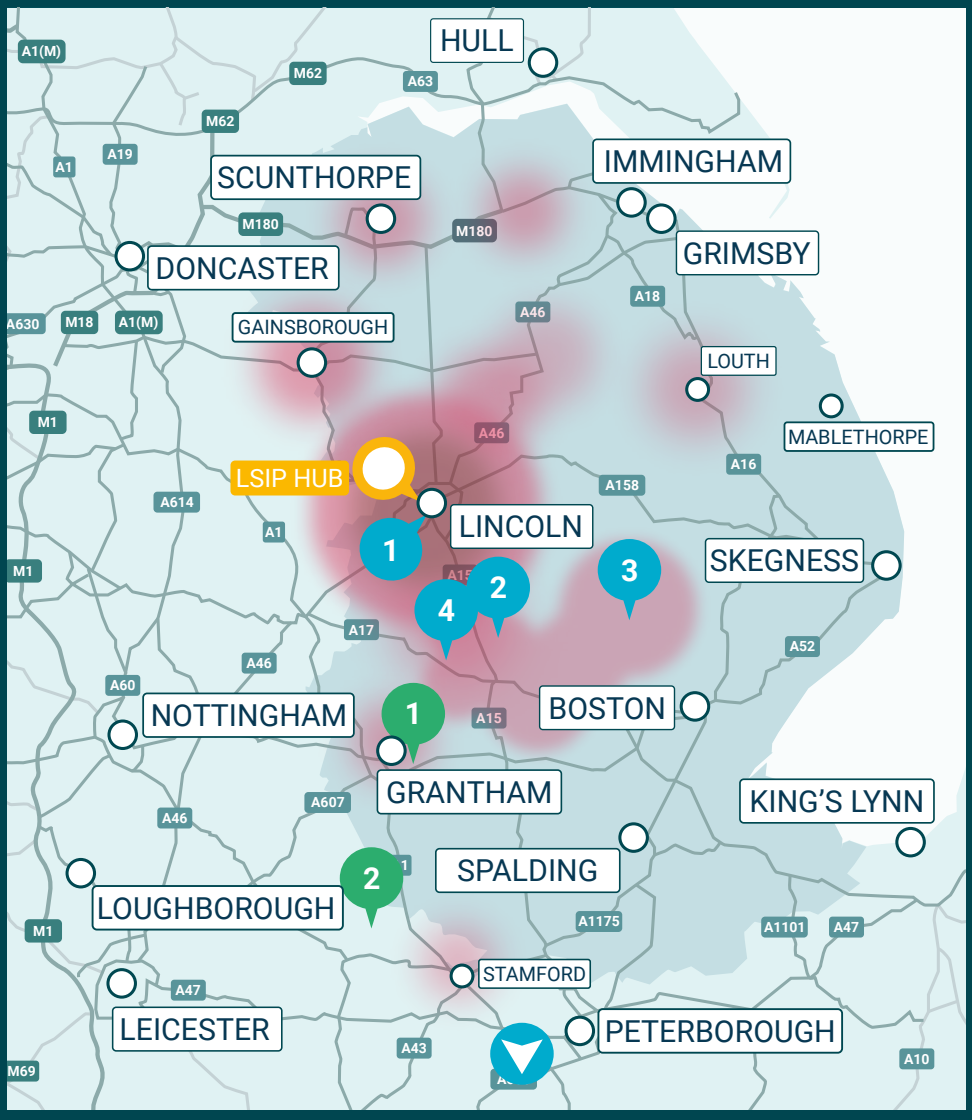
This kick starts a 6-acre landscaped extension of the park, with consent for more than 12,000 sq m (129,167 sq ft) of additional commercial space.

lincolnsciencepark.co.uk

Military Facilities & Commercial Sites Across Greater Lincolnshire

Lincolnshire offers a range of suitable sites for expanding defence and security sector businesses of all sizes and profiles. The area's secure military bases and facilities offer the potential for technology and product testing and evaluation in partnership with military customers. Sites are available with proximity to RAF Waddington and other bases, and, in locations including the South Humber bank, with benefits including Freeport incentives and access to sustainable industrial power supplies.

Lincolnshire's Military Presence



Lincolnshire's RAF bases are closely aligned with the area's defence and security industry concentrations, and located within around 30 minutes' drive time from Lincoln[8]. The bases potentially offer secure locations with permissive airspace for advanced technology development, testing, and evaluation.

Source: (8) Google Maps

RAF Bases

1. **RAF WADDINGTON:** The UK's ISTAR Hub. Home to the Air & Space Warfare Centre (ASWC) & Air Battlespace Training Centre.
2. **RAF DIGBY:** A key RAF, Army and Navy signals site. Home to HQ Joint Cyber & Electromagnetic Activities Group (JCG).
3. **RAF CONINGSBY:** one of two RAF Quick Reaction Alert (QRA) stations protecting UK airspace.
4. **RAF COLLEGE CRANWELL:** Officer and aircrew training and selection. Home to the Air Warfare School.

RAF WYTON: (Cambridgeshire, off map). Easily accessible via the A1. Home to Defence Intelligence and the National Centre for Geospatial Intelligence (NCGI).

Significant Defence and Security industry concentrations.

British Army Bases

1. **ATR GRANTHAM:** Army Training
2. **KENDREW BARRACKS:** Infantry & Logistics

Lincolnshire's Defence & Security Cluster

For defence and security sector businesses investing in Lincolnshire, the area's established industry cluster ensures advanced technological expertise, a skilled workforce, and the potential for value-adding supply chain partnerships.

360iSR

Agincourt

360iSR | **Agincourt Consultancy**

BAE SYSTEMS

EWS

BAE Systems | **EW Solutions**

JD2E

LOCKHEED MARTIN

JD2E | **Lockheed Martin**

Metrea

METIS aerospace

Metrea Mission Data | **Metis Aerospace**

Lincolnshire is home to a highly developed cluster of defence and security sector businesses with advanced data, digital, communications and multi-domain ISTAR capabilities. As well as delivering operational support and training to the area's RAF and other military bases, the cluster's wide-ranging expertise encompasses the air, maritime and land ISTAR domains.

Global defence technology companies with a presence in the area include BAE Systems, Teledyne e2v, Raytheon UK, Thales, Leonardo, Northrop Grumman and Qinetiq. They are complemented by specialist companies including KryptoKloud, Metrea Mission Data, BT Defence, Eagle Eye Innovations, General Atomics and Inzpire, with capabilities across a range of technology areas including cyber-security, defence communications, mission support, data analytics, AI, unmanned aerial systems and virtual and augmented reality (VAR). Training, simulation and emulation services are provided by companies including SRC UK and MASS (Cohort Group).

Lincolnshire's wider business base includes a mature, cross-sector cluster of advanced digital and manufacturing companies with expertise in technology areas including sensors, robotics and automation, artificial intelligence, data analytics, communications, power generation and sustainable transport. Several businesses currently serving sectors including agri-tech and logistics offer transferable expertise of significant potential value to the defence and security sector, notably in the area of digitalisation, including big data and AI.

The cluster provides a solid basis for further development of Lincolnshire's defence and security industry capability, in areas including product development and manufacturing.

The University of Lincoln: Research Excellence

Combining advanced digital and engineering knowledge, the University of Lincoln has emerged as a leading UK hub for research and innovation in fields including data analytics, digitalisation, Industry 4.0, and the transition to Industry 5.0.

The University of Lincoln's dedicated research centres and groups apply AI, machine learning, big data analytics, robotics and automation, and internet of things technologies to key industry challenges including advanced product development and the transformation of business and supply chain productivity, efficiency and sustainability.

The University has close, collaborative relationships with organisations and companies in Lincolnshire's defence and wider advanced engineering cluster, delivering research that is at the forefront of understanding and shaping industry's response to the challenges of digitalisation. The university's Industry 5.0 research, focused on human-machine interaction and collaboration, is of particular relevance to ISTAR and the need for effective decision support. Much of the university's unique expertise has been honed in the agrifood, logistics, and manufacturing sectors, with direct transferability to defence and security applications.

Research into sustainable energy and power systems aligns with the defence industry's drive for low-carbon energy and propulsion technologies, as well as the core competencies of key local industry partners including Siemens. As an example of successful R&D relationships with world-class companies, Lincoln is one of very few UK universities to hold Siemens Global Principal Partner status.

Through the Regional Defence and Security Cluster, businesses in the sector can access University of Lincoln resources directly, collaborate with academic and supply chain partners, and share best practice to gain a technological advantage.

University of Lincoln Research Centres & Groups

Lincoln Centre for Autonomous Systems (L-CAS)

L-CAS specialises in technologies for perception, learning, decision-making, control and interaction in autonomous systems. Key themes include mobile robots and robotic manipulators, and the integration of these capabilities in domains including intelligent transportation, nuclear robotics, space robotics and service robotics.

lcas.lincoln.ac.uk

Intelligent Systems Research Group

Group activities encompass fundamental and applied research in advanced control & diagnostics, dynamic system modelling, image & signal processing, system optimisation, and human-machine interaction. Applications include the automotive and aerospace sectors.

lincoln.ac.uk

Interactive Technologies Lab (intLab)

intLab researches human-computer interaction, including virtual reality, internet of things (including security risks), and brain/physiological data.

intlab.lincoln.ac.uk

Laboratory of Vision Engineering (LoVE)

LoVE specialises in the capture, transmission, processing and understanding of image, video and other high-dimensional data. Key areas of focus include scientific and security monitoring, developing novel processing algorithms and designing/supplying new imagers and systems.

visioneng.org.uk

The Machine Learning Group (mlearn)

mlearn focuses on designing, developing and studying the algorithms that learn from data. Models of learning try to follow the function of the human brain, creating machines with intelligent behaviour, which are able to reason, predict and adapt to changing environments, assisting humans in their activities & interactions.

mlearn.lincoln.ac.uk

The Power & Energy Group (PEG)

PEG's research areas include electric & hybrid vehicles, electromechanical actuation, complex system optimisation, vehicle drive by wire, aircraft power and actuation systems, monitoring, prognostics and diagnostics, and industrial applications of advanced & intelligent control.

lincoln.ac.uk

A Technically Skilled Workforce

Lincolnshire offers an available, technically skilled workforce aligned with the needs of expanding defence and security technology businesses.

Lincolnshire

66,000
Manufacturing Workers[9]

1.9x
Manufacturing Workers vs. GB Average (% of all workers)[9]

6%
Military Veteran Population[10]

Sector Workforce Concentrations vs. GB Averages (Lincoln)

10.3x
Electronics Manufacturing[11]

4.6x
Machinery & Equipment Manufacturing[12]

2.0x
Computer, Electronics & Optical Products Manufacturing[13]

Lincolnshire's technically skilled workforce reflects the presence in the area of leading advanced manufacturing companies serving sectors including defence, aerospace, automotive, power generation and agritech, and the extensive application of industrial digitalisation technologies.

With 66,000 manufacturing workers – 1.9X the Great Britain average as a percentage of the total workforce – the area is a UK manufacturing heartland. In Lincoln, the focal point of Lincolnshire's defence and advanced manufacturing capabilities, high workforce concentrations versus the national average indicate significant skills levels in key high-technology classifications: 10.3X for electronics manufacturing, 4.6X for machinery and equipment manufacturing, and 2.0X for computer, electronics and optical products manufacturing. Up to 6% of the population are ex-military, providing a further source of workers with specific relevant expertise.

For defence sector businesses investing in the area, this substantial, established skills base can enable recruitment, fast project delivery and ongoing productivity.

Sources: (9) ONS BRES 2022; (10) Greater Lincolnshire LEP; (11) ONS BRES 2022, Location Quotient (LQ) for SIC261; (12) ONS BRES 2022, LQ for SIC28; (13) ONS BRES 2022, LQ for SIC26

Industry-focused Education & Skills

Lincolnshire's technology-focused further and higher education institutions deliver the specific skills required by defence and security sector businesses. Providers across the area offer courses and apprenticeships in computer science and engineering, including Industry 4.0 technologies, digitalisation, sustainability and defence.

The University of Lincoln

- Undergraduate subjects include integrated engineering and mechatronics, mechanical, electrical and electronic engineering, engineering management, and logistics management.
- Postgraduate subjects include robotics and autonomous systems, advanced technologies and applications, analytical sciences, cloud computing, intelligent vision, nanoscience, and logistics management.
- Military postgraduate studies, specifically developed for military personnel, include innovation in intelligence, surveillance and reconnaissance, and intelligence systems.

Lincolnshire Institute of Technology (IoT)

The IoT is a collaboration between the University of Lincoln, further education colleges and employers to incubate future skills for technology-driven sectors including defence and security. Programmes delivered at centres across Lincolnshire encompass advanced manufacturing, engineering, energy and digital technologies, providing qualifications including Levels 4 and 5 (e.g. HNC/HND) and Level 6 (degree).

Lincoln College Group

- The **Air & Defence College** provides employer-led, career-focused education and technical training for 16 to 19 year olds. Study programmes have been developed with industry partners including RAF, Raytheon, Thales, AAR, Northrop Grumman, Leonardo and MASS, to create career paths into the RAF and aerospace industries.
- The **Air and Space Institute (ASI)** in Newark is an international centre of excellence to train people to enter the air and space industry. The ASI supports engineering, flight, and ground progression routes into the workplace from Level 3 to degree level.

Decarbonisation & Sustainability Solutions

Lincolnshire is at the forefront of the UK's Green Industrial Revolution, creating potential opportunities for defence and security sector businesses to access low carbon energy sources and implement ambitious decarbonisation strategies.

For military operations and defence companies rising to the challenge of decarbonisation, Lincolnshire is pioneering investment in the infrastructure and technologies required for the energy transition.

Lincolnshire is at the heart of renewable and low carbon energy generation in the UK. From the world's largest offshore wind farms, located off the coast in the North Sea, through to biofuels and cutting edge anaerobic digestion, the potential exists for energy-intensive businesses and organisations, including defence manufacturers and military facilities, to access reliable sources of cost-effective, low carbon power across the area.

Lincolnshire's Humber Energy Estuary is home to world-leading industrial decarbonisation projects including Humber Zero. Major investments in infrastructure and technologies including Carbon Capture and Storage (CCS) will enable low carbon energy generation and the production and distribution of blue hydrogen as a low carbon fuel. Utilising renewable electricity generated by North Sea wind farms, the Gigastack project will demonstrate the production of green hydrogen by electrolysis – a potentially key future source of renewable energy for large-scale industry.

humberzero.co.uk

Fast UK & Global Market Access

Lincolnshire provides defence sector businesses with fast, multimodal access to UK and international markets.

By Road

Lincolnshire's central Great Britain location (north-south) means that key Midlands defence and advanced manufacturing centres, including Derby, Coventry and Birmingham, are accessible within 2 hours' HGV drive time.

More than 75% of the UK's population and all of England's major defence and advanced manufacturing centres can be reached within 4 hours' HGV drive time – less than one driver shift.[14]

By Sea

The South Humber ports (Immingham and Grimsby) are the UK's largest by tonnage,[15] offering deep water facilities, frequent lo-lo (container) and ro-ro services to European ports, deep-sea feeder services for global market access, and extensive warehousing facilities.[16]

The Port of Felixstowe, the UK's busiest container port, is accessible in less than 3 ½ hours' HGV drive time.[14]

By Air

Airports accessible within 2 hours' drive time[17] include East Midlands (EMA), the UK's no.2 air cargo hub,[18] and Birmingham (BHX).

Within Lincolnshire, Humberside Airport (HUY) offers frequent 'hub-feeder' services to Amsterdam Schiphol (AMS) and onward connections to 800 global destinations with KLM and SkyTeam partners.[19]

By Rail

The Lincolnshire ports of Immingham, Grimsby and Boston are all freight rail connected. For business travellers, the area also offers fast connectivity to UK destinations including London, which is accessible from Lincoln in less than 2 hours.[20]

Rail system upgrades are currently in progress to further improve passenger and freight capacity and service speeds.

Sources: (14) Google Maps, drive times from Lincoln adjusted for max. HGV speeds; (15) DfT 2019 [16] ABP; (17) Google Maps, car drive times from Lincoln; (18) CAA, 2019; (19) Humberside Airport; (20) thetrainline.com, 2021

Lincolnshire's Location & Connectivity

Lincolnshire

Humber Freeport Area

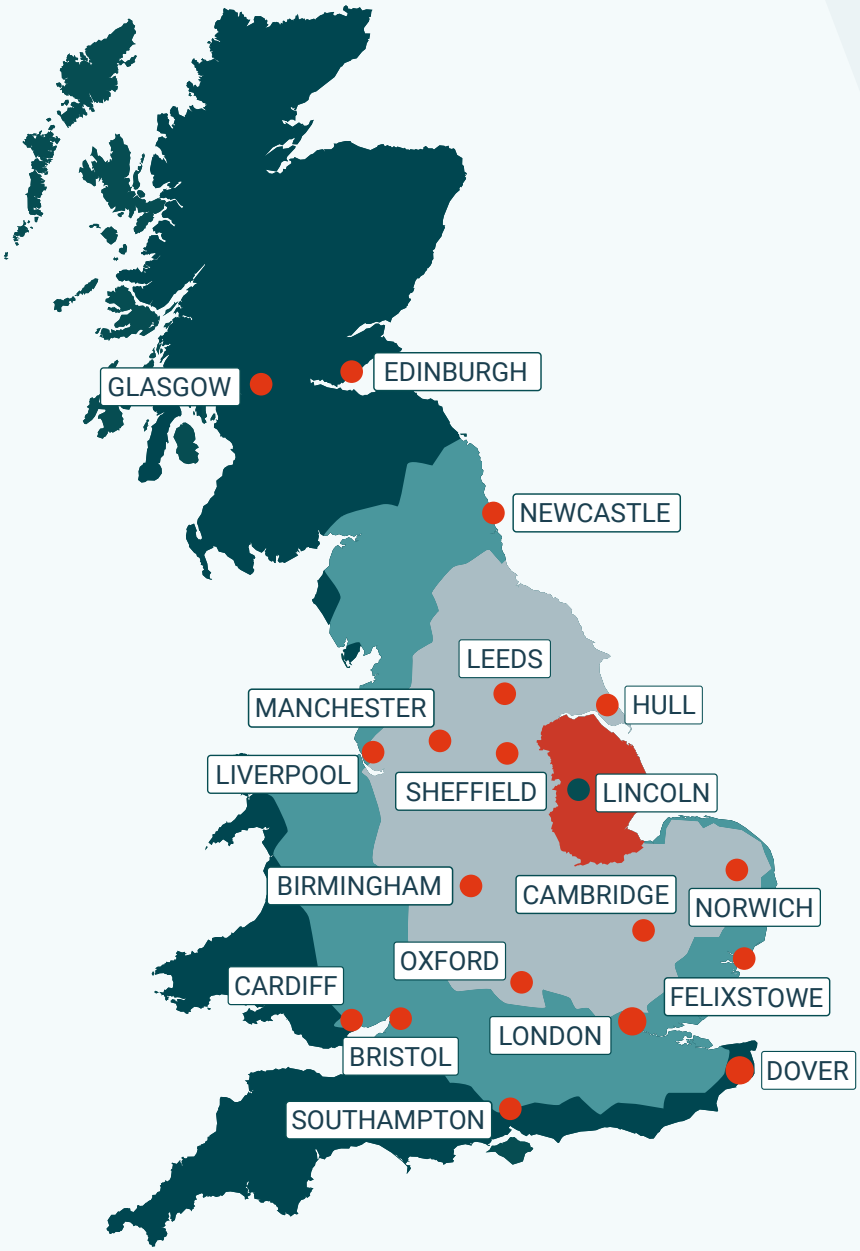
Lincolnshire RAF Bases

LSIP Innovation Hub

Ports

Airports

UK Market Access



Map shows Great Britain only (Northern Ireland not shown).

HGV Drive Times
(from Lincoln)

- Lincolnshire
- 3 Hour HGV Drive Time
- 4.5 Hour HGV Drive Time (1 Driver Shift)

Internet Connectivity

As of 2022, Lincolnshire offers good broadband connectivity overall, with coverage of 94.7% and rising. In larger urban areas, upgrades to full fibre are either in progress or planned, and the area's military bases are all well served. Through the UK Government's Project Gigabit, internet connectivity in smaller settlements and rural areas is set to be upgraded between 2022 and 2025.[21]

Source: OpenStreetMap data (isochrones); (21) Lincolnshire CC

Support for Your Defence & Security Sector Business Investment

Contact us to find out how we can support your business relocation or expansion project.

Support for Investors from the Lincolnshire Partnership

Working together, Invest Lincolnshire and our partner organisations, including local authorities, education providers and businesses, provide dedicated support to ensure a 'soft landing' for companies investing in Lincolnshire.

Our services to business include:

- Support in finding the right site or property
- Planning application support and guidance
- Location, economic and market intelligence
- Access to workforce recruitment, education and training solutions
- Access to sector specialists
- Access to sector-specific support programmes
- Access to local supply chains and business networks
- Access to funding for business investment

Contact Us

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Image Credit: © BAE Systems

Lincolnshire COUNTY COUNCIL
Working for a better future

TEAM LINCOLNSHIRE

North Lincolnshire Council

NORTH EAST LINCOLNSHIRE COUNCIL

SOUTH HOLLAND DISTRICT COUNCIL

BOSTON BOROUGH COUNCIL

East Lindsey DISTRICT COUNCIL

West Lindsey DISTRICT COUNCIL

served by One Team

CITY OF Lincoln COUNCIL

North Kesteven DISTRICT COUNCIL

SOUTH KESTEVEN DISTRICT COUNCIL