DEFEND OR DEPEND

THE BATTLE FOR DEFENCE SOVEREIGNTY

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LABOUR TECH

THE YIMBY INITIATIVE

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About Labour Tech

We are a group of professionals with experience in the technology sector and members of the Labour Party, working together to help shape forward-looking policies. We collaborate with experts from industry, academia, and politics to support ideas that drive progress. Britain needs growth now more than ever, and by supporting our homegrown technology sector, we can help deliver the economic renewal our country urgently needs.

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All experts featured in this report are independent of the Labour Party.

THE YIMBY INITIATIVE

About the YIMBY Initiative

The YIMBY Initiative is a research centre and stakeholder management partner dedicated to creating a UK with higher living standards and a strengthened British industrial base.

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Defence Sovereignty: Laying the Groundwork for Defence?

Lewis Bailey
Founder and Chair, Labour Tech

When Britain's technological Crown Jewel, ARM Holdings, was acquired by SoftBank in 2016, Britain departed with its sovereign capability in chip design. It has long been the story of successful British businesses – built with British tools, by British brains, in British sheds, only to be snapped up and shipped off to far-away realms. Now our defence sector faces the same fate. Lord Palmerston, who twice served as Prime Minister in the middle of the 1800s, said "that with every British Minister the interests of England ought to be the shibboleth of his policy" – slick venture capital based in Zurich, Singapore, or Silicon Valley, may be rich enough to acquire every defence company in the realm, but they do not have the interests of protecting our realm at heart.

In our previous report, Powering A Sovereign Quantum Britain, the message was clear: Britain risks becoming the place where quantum has been developed but not commercialised. This is not a challenge specific to quantum, but applies to British defence start-ups too.

Labour Tech was founded to promote what British tech companies do best – innovate, ground-break, and elevate the world to a better era. Defence is one of those sectors where technology presents both an opportunity and a threat. Two days after the launch of our report, another British quantum company - Oxford Ionics - was bought by an American firm, IonQ. It is one of many cases. British defence companies - such as Cobham and Amor Group - have been acquired by US-based firms too. Our globally-renowned companies, such as Rolls-Royce, are a constant target for foreign acquisition. And leading lights across the Pond, such as Anduril have demonstrated a clear interest in buying up the British defence space. All this commercial interest shows that a British flag on a defence company is a defining mark of quality, and thus value, which we should be proud of.

However, if our companies are no longer sovereign, the task of defending Great Britain becomes much more difficult, even if their ownership lay with our strongest and closest partners, such as the United States. Imagine HMS Queen Elizabeth having its navigation being turned off at the whim of a foreign power. This is a clear and present risk if we do not invest in and protect our defence industry.

Our contributors are renowned thought-leaders in their fields and witnessing our slipping sovereign capability at the coal face. Their companies are British-based and British-owned, employing thousands of people in high-quality, well-paid roles, expanding apprenticeships, and keeping Britain safe.

Executive Summary

This report presents a series of policy recommendations aimed at strengthening the UK's defence sovereignty. The proposals address the critical challenges of foreign acquisition of UK defence firms, over-reliance on international supply chains, and a procurement culture that stifles domestic innovation. By implementing these recommendations, the UK can protect its technological crown jewels, foster a resilient industrial base, and ensure that our nation can act independently and decisively in an increasingly volatile world. These steps are vital not only for national security and global credibility but also for driving economic growth and creating high-quality, high-skilled jobs across the country.

1. Conduct a Sovereign Capability Audit: The UK should perform an audit to define and strengthen its domestic defence industrial base. This audit would determine which capabilities the UK should "own," "collaborate" on, or simply "access". This ensures that for critical capabilities, the UK maintains operational independence.

2. Reform Procurement and make Government a better customer: Procurement processes should be reformed to prioritise long-term resilience over short-term, lowest-cost bids. This involves shifting toward strategic partnerships that guarantee demand and provide UK suppliers with the certainty needed to invest and scale. Ministry of Defence procurement professionals should have more freedom to make quick decisions within a procurement framework, subject to them meeting higher professional standards with more performance related pay (e.g. on time and to budget, successful supporting of UK sovereign tech capabilities, taking an opportunity that involves some risk but high potential benefits).

3. Increase and Diversify Public Investment: The government should increase public investment through the National Security Strategic Investment Fund and the British Business Bank to aid defence innovation and encourage greater risk appetite among UK investors. This would help reduce reliance on foreign capital, which often leads to the acquisition of promising British companies.

4. Strengthen Industry Collaboration: Collaboration between the government, industry, and the military is crucial. This includes joint planning and partnerships with UK-based contractors and SMEs to build resilience and foster dual-use innovation, ensuring the industry aligns with defence needs.

5. Prioritise Emerging Technologies: The UK must prioritise emerging technologies such as quantum, AI, and advanced manufacturing for defence. Investment in these areas is crucial to maintaining a strategic edge and modernising the armed forces.

6. Develop Robust Guidelines for International Collaboration: The UK needs to establish a framework for working with foreign partners that balances the benefits of collaboration with the need to maintain strategic control and avoid overdependence.

7. Support Small and Medium-sized Enterprises (SMEs): Some large contracts should be broken into smaller, faster competitions (e.g., £250k–£2m with 12-month delivery cycles) to allow SMEs to deliver prototypes and create visible constituency wins with Government as the customer, not just the funder. This helps innovative SMEs, which are often "starved of capital" to survive and thrive.

8. Sharpen the National Security and Investment Act: The government should enforce and expand the National Security and Investment Act (2021) to explicitly cover key areas like robotics, ISR, energy resilience, and dual-use AI. This would signal that the UK intends to protect its "crown jewels" and not be an intellectual property farm.

9. Invest in Dual-Use Technology: The UK should leverage dual-use technologies, which have both civilian and military applications. This approach, exemplified by the Aerospace Technology Institute (ATI), allows for faster commercialisation, provides a wider market, and helps control costs for the defence sector.

10. Establish a Sovereign Defence Quantum Test & Evaluation (T&E) Hub: The government should create a T&E hub to conduct physical trials and benchmark quantum technologies, such as sensors, navigation systems, and communications. This would help unlock the full potential of quantum for the nation and secure long-term sovereign capability.

Securing the Future: The Trifecta of AI, Advanced Manufacturing and Defence

Naushabah Khan MP
Member of Parliament for Gillingham and Rainham

For over a century, Britain has been a global leader in defence innovation - from radar in the Second World War to more recent developments in quantum navigation and cyber warfare. The research and development of defence equipment and military technologies is something that this nation has, historically, excelled in.

However, the 21st century presents new challenges. The UK's historic reliance on international partners for key technologies is rapidly becoming increasingly untenable in a world of shifting alliances, supply chain fragility, and technological protectionism. As the Member of Parliament for Gillingham and Rainham, a constituency with a proud and rich military history, many of my constituents are serving in our armed forces or contributing to the local defence economy. I know, both from my conversations with residents, and the normalised volatility of present-day geopolitics, that the need to reinforce, modernise, and strategically realign our sovereign national defence capabilities has never been more pressing.

Leading from the front

This government has responded decisively and seriously to the urgent call from both our defence sector and the general public to significantly strengthen the nation's sovereign technology capabilities. Our ability to independently develop, produce, and maintain critical defence systems and equipment fundamentally shapes Britain's economic growth, national employment rates, regional supply chains and most significantly, our capacity to defend ourselves. Through this framing, the stakes couldn't be much higher.

The Prime Minister recently addressed a BAE Systems shipyard in Glasgow, and emphasised the importance of making Britain "battle-ready", through record investment in our defensive sector. As global circumstances change, so too does our requirement to better protect ourselves – and being self-sufficient producers of advanced defence technologies remains at the core of our economic and actual security. In an increasingly uncertain world, a strong defence sector is not optional - it's essential for national resilience and global credibility.

The recently published Strategic Defence Review outlines the growing realities of an increasingly dangerous world, and the need to realign and expand the UK defence sector. Evolving conflict across Europe, growing Russian aggression, new nuclear risks, and regularised cyber-attacks makes the decision to raise defence spending to 2.5% of GDP by 2027, (3% in the next Parliament when fiscal conditions allow), a vital intervention by a government serious about the realities of the modern world. Although the reality is it does not go far enough, fast enough. Preventative investment, through this lens, is both a means of economic advancement and national security. Peace, and prosperity, through strength.

The strategic review critically outlines five essential elements driving this shift in approach, two of which appear particularly relevant when focusing on British sovereign capability. By harnessing our defensive industries as an 'engine for growth', the Government will secure jobs and boost prosperity through new productive partnerships with industry, achieved through radical procurement reforms and by backing UK businesses and our manufacturing base. Secondly, through prioritising UK innovation and research as a pioneering tool across the sector, we utilise and build on our technological expertise whilst creating new avenues for future development, especially when it comes to the growth potential of artificial intelligence and its integration with other areas of public life, including public services, education or health.

Hand in glove: growth and defence

In 2023/24, the UK defence industry directly and indirectly supported 463,000 jobs. The Joint Economic Data Hub (JEDHub), a collaboration between academia, government and industry on defence economic data, estimates that the industry contributed £9.5 billion to the economy in 2022. Many of these roles, and much of this output, is inherently linked to our national manufacturing capability, ensuring that the UK can produce vital equipment without relying on foreign suppliers, which is especially significant in times of crisis or conflict.

Beyond the national picture, for regional growth this is significant. The defence sector bucks the trend in providing major employment hubs which are external from London, with employment in each of the South West, South East, North West and Scotland all reaching over the tens of thousands. Thus, investment in our manufacturing capability through the defence industries sustains high-skilled technical manufacturing jobs, drives innovation across advanced engineering and technology sectors, and contributes significantly to regional economies. With growth at the heart of this government's agenda for rebuilding Britain, the defence sector is a key part of this process.

Looking ahead, to significantly enhance our defence manufacturing capability, the UK should establish a network of advanced manufacturing hubs strategically located across key regions. These hubs would be equipped with cutting-edge technologies such as additive manufacturing (3D printing), robotics, and AI-driven production systems, enabling rapid prototyping, precision engineering, and scalable production of critical defence components. This investment would not only modernise our industrial base but also dramatically increase supply chain resilience. By strengthening domestic capabilities and reducing reliance on foreign suppliers, we can ensure greater national sovereignty, protect against global supply disruptions, and respond more swiftly and effectively to emerging threats or crises. Again, these hubs would serve as engines of regional economic growth, fostering innovation, creating high-skilled jobs, and positioning the UK as a global leader in advanced defence manufacturing.

The potential of artificial intelligence

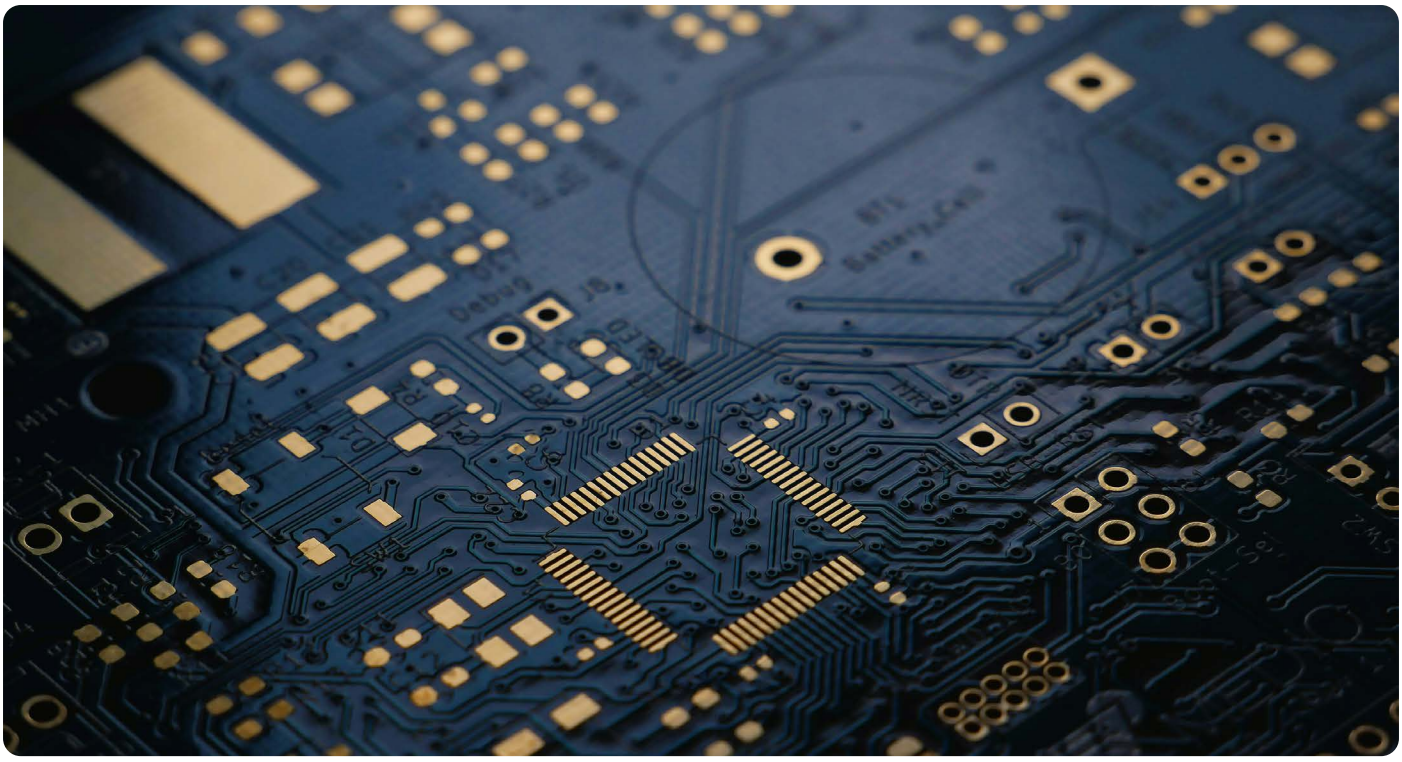
Harnessing the productive potential of AI is one of the great questions of our age and using it as an efficient tool to benefit the UK is critical. Investing in AI within the defence sector is crucial for the UK to maintain a strategic edge, enhance national security, and modernise our armed forces. The technological uplift could be truly game changing. AI enables faster decision-making, improved threat detection, autonomous systems, and more efficient logistics and maintenance, also strengthening cyber defence and supporting intelligence analysis. Britain should be at the forefront of utilising this transformative tool to strengthen both our national security, economic growth and sovereign capability.

With the government seeking to capture the opportunities of AI to enhance growth and productivity, this applies pivotally to the defence sector. By significantly increasing funding for AI research focused on defence applications—such as autonomous vehicles, threat detection, and cyber defence—the government can foster innovation that enhances operational efficiency and strategic advantage. Partnerships with universities and private technology firms will also accelerate the development and deployment of cutting-edge AI solutions. A key example of this is the Oxford and Cambridge growth corridor, which is predicted to add up to £78 billion to the UK economy by 2035.

To sustain technological leadership, the government should invest in education and training programs that build a talent pipeline skilled in AI, data science, and advanced manufacturing techniques. Encouraging collaboration between defence, academia, and industry will create a dynamic ecosystem that drives innovation and maintains British sovereignty in defence technology for the long term. This also fundamentally aligns with the Strategic Defence Review's objective to shift the national effort to a whole of society approach.

Conclusion

Investing in sovereign defence technology—particularly through AI and advanced manufacturing—is not just a strategic necessity but a vital driver of economic growth, regional development, and national security. In an era defined by geopolitical instability and technological acceleration, the UK must take bold, forward-looking steps to secure its independence and resilience. By building domestic capability, fostering innovation, and aligning our industrial strategy with defence priorities, we can safeguard our future, strengthen our global position, and ensure that Britain remains a leader in both security and technological excellence for generations to come.



Defence SMEs and Britain's Sovereign Future

John Blamire
Founder, Grey Zone
Survivability Infrastructure

The sovereignty gap

Britain's ability to defend itself increasingly rests on technologies we no longer fully own. In the past year, several UK defence and security firms of real promise have been approached for acquisition by overseas primes and major technology companies. At the same time, American venture-backed defence companies have been active in the UK market, running aggressive acquisition campaigns across robotics, sensing and autonomy.

This is not opportunism. It is structural. As a former Army officer with nearly two decades in the defence and security sector since leaving service, I have seen first-hand both the risks of over-reliance on foreign suppliers and the extraordinary value our domestic innovators bring.

British defence SMEs are rich in intellectual property but starved of capital. The United States protects its crown jewels with CFIUS and ITAR. Britain has the National Security and Investment Act (2021), but enforcement has been hesitant. In the vacuum, our firms are soft targets.

Beyond acquisition, there is the quieter erosion of IP leakage. Current UK practice exposes our best innovators to foreign observation. To patent in the West is to protect at home, but it too often exposes designs abroad, where enforcement is weak or absent. What was intended as protection has become a conduit, gifting competitors access to discoveries they could not have made themselves. The system no longer works equitably.

The Defence Select Committee has already warned that over-reliance on foreign primes risks hollowing out sovereign capability. Once core IP is owned abroad — or quietly replicated through leakage, even the British Government can face re-export controls. What appears as capital inflow too often masks the erosion of sovereign choice.

Why SMEs matter

Defence SMEs are not peripheral. They are the front edge of innovation. Britain's most promising companies are developing:

- Sovereign edge intelligence systems that operate autonomously and securely without reliance on foreign cloud. These systems are not only vital for contested military environments but also pivotal to the coming Cambrian explosion of robotics in industry, logistics and healthcare.
- Next-generation ISR (intelligence, surveillance, reconnaissance) sensors capable of surviving in contested spectrum. The same sensing and data-fusion technologies are critical for agriculture, energy infrastructure, environmental monitoring and disaster response.
- Autonomous platforms in the maritime and air domains. Autonomy born in defence will directly translate into civilian uses: autonomous taxis, cargo drones, and logistics vehicles across air, sea and land.

These are precisely the technologies that will define survivability in future conflict and competitiveness in the wider economy. Yet they are also the firms least able to survive three-year procurement cycles. Without scaffolding, they will either be acquired or fail and with them Britain loses both its sovereign defence options and its chance to lead the next wave of global industrial transformation.

What Britain still has

Despite the risks, Britain retains three decisive assets:

1. Sovereign edge capability — UK innovators are already demonstrating that intelligence can be pushed to the edge: systems that can act in the field without fragile external dependencies.
2. Industrial scaffolding potential — Other nations act swiftly to consolidate their most promising SMEs before they are lost. Britain has the opportunity to build similar scaffolding. A national mechanism that brings firms together, creates critical mass, and keeps intellectual property under UK control.
3. Institutional ballast — Britain's global advantage lies in our institutions. Just as we have historically set standards in finance and law, we can now set the standard in AI safety and defence governance. We may not outspend the US or China, but we can make AI and defence technology trustworthy under pressure.

Over-the-Horizon Signals: AI

Looking ahead, two trends stand out:

- Consensus overlays: US and EU systems are leaning on blockchain-style consensus to guarantee trust. These are slow, costly and fragile.
- Mimic substrates: adversaries will attempt to develop "false languages" of AI that look safe but lack moral ballast.

Britain can lead by establishing a Trusted AI Kite-mark for defence and dual-use SMEs. Backed by the Alan Turing Institute and the AI Safety Summit at Bletchley (2023), this could be in place within 18 months. A kite-mark would allow MPs to point to SMEs in their constituencies exporting AI systems stamped as trusted under pressure, made in Britain.

Over-the-Horizon Signals: Defence Hard Tech

The hardware horizon is equally clear:

- Robotics proliferation: unmanned systems will be ubiquitous across land, sea and air. UK SMEs already lead in maritime robotics and ISR.
- Energy resilience: future forces will depend on novel power systems, hybrid cells, directed energy, deployable micro-reactors.
- Space ISR: sovereign micro-satellites and dual-use constellations could anchor UK autonomy but require capital and protection.

Adversaries are already moving to acquire in these areas. Without support, Britain will become a buyer rather than a maker.

MPs can act now by backing regional sovereign testbeds: robotics in Devonport, energy in Barrow, and space in Harwell and Glasgow. These would be visible within one Parliament. Jobs created, demonstrators delivered.

Policy imperatives (12–24 months)

Labour MPs need measures that show results before the next election. Four stand out:

1. **SME fast-track procurement**
   Break large contracts into smaller, faster competitions (£250k–£2m) with 12-month delivery cycles. SMEs can deliver prototypes in one year, creating visible constituency wins. (NAO reports on MoD procurement delays provide the anchor).
2. **Regional defence hubs**
   Fund modest innovation hubs in defence towns such as Portsmouth, Barrow, and Bristol. Ribbon-cutting within months, local jobs secured. (DSIS 2021 emphasised regional fairness).
3. **Patient capital fund**
   Ringfence a pool to back defence SMEs at seed and scale. The British Business Bank already intervenes in other sectors; defence should not be excluded.
4. **Sharpen the NSI Act**
   Enforce and expand NSI to cover robotics, ISR, energy resilience, and dual-use AI explicitly. This would signal that Britain will defend its crown jewels. (BEIS reviews provide the citation).

The bigger prize

Beyond the immediate fixes lies the larger opportunity: Britain can become the world's standard-setter for trusted defence technology.

- Sovereignty: Protecting IP means preserving freedom of action.
- Jobs: Defence SMEs are regional employers. With scaffolding, they can scale.
- Global role: By binding AI to safety and protecting hard-tech IP, Britain can shape how the world uses defence technology.
- Exports: Dual-use spillovers in robotics, sensors, and autonomy position Britain not just to defend sovereignty but to capture global markets in next-generation industries.

Closing Note

Britain has a choice. We can drift into dependency, our brightest firms sold abroad and our Armed Forces reliant on systems we do not own. Or we can seize this moment: protect our SMEs, scaffold them into scale, and claim a global role as the nation that makes AI and defence technology trusted under pressure.

The payoff goes beyond defence. Edge intelligence will underpin the robotics industries of the next decade. Next-generation sensors will drive agri-tech, energy, and environmental monitoring. Defence-born autonomy will spill into civilian transport — taxis, cargo drones, and logistics fleets. By backing these firms, Labour is not only protecting sovereignty but also securing the next wave of industrial growth.

For Labour, this is not abstract strategy. It is jobs in constituencies, SMEs winning contracts, new industries taking root and Britain regaining sovereign resilience. All within this Parliament. The window is open. The question is whether we take it.

Brief for MPs

Britain's defence SMEs are being hollowed out. Sold abroad or stripped through patent leakage that protects us in the West but hands our discoveries to rivals in the East. By backing them now, Labour can defend sovereignty and deliver jobs and exports in robotics, energy and autonomous transport within this Parliament.

Britain the Lab, the World the Landlord

Calvin Bailey MBE MP
Member of Parliament for
Leyton and Wanstead

The UK sits at the cutting edge of innovation. Powered by world-class universities, the UK ranks first globally for the quality of academic publications and fourth for publication volume.[1] From the physics that gave us nuclear weapons to advances in robotics and computer science that are now driving autonomous systems, the UK's research leadership has fuelled our innovation in defence tech and cemented our position as Europe's tech powerhouse for decades.

But to lead the pack requires keeping pace; UK defence innovation struggles with pull-through, reduced and fragmented funding, and a dangerous void where dual-use technologies, like those in the space sector, too often slip through the cracks between civil and military priorities.[2]

The Scale-Up Gap

Compared to our European neighbours, the UK leads in commercialising university research, spawning nearly 2,000 spinouts since 2011.[3] But we face a persistent scale-up problem across our economy. Startups abound, but few grow into large, globally competitive businesses.[4] This problem cuts even deeper in defence, where dependency on government contracts routed through prime contractors, coupled with a lack of sustained demand signals, strangles small companies before they can scale.[5]

The result? When UK defence companies seek capital, even for basic things like business loans and working capital, they turn to US lenders.[6] This overreliance has fuelled a steady exodus of our most promising companies. Today, one in ten investments from US investors results in a UK company relocating abroad.[7] The UK risks becoming what I call an 'IP Farm', brilliant at inventing early-stage ideas and producing intellectual property (IP), but powerless as those innovations get plucked and scaled overseas. This dependence curtails our ability to harness our innovation for economic benefit and build a sovereign defence industrial base.

Why is our defence industry so hooked on foreign cash? While the UK venture capital system is similar in volume to the US, relative to our size, it is deployed slowly and cautiously.[8] Our big investors, pensions and insurers, favour safe bets on government bonds and have been reticent to spend on defence, often divesting from the industry altogether.[9] In contrast, US investors have broad portfolios and take risks.

So it's time to change our risk appetite. We must rally major UK investors to back defence innovation. This means increasing the resources and scope of public investment vehicles like the National Security Strategic Investment Fund and British Business Bank to leverage their leadership role in the market.[10]

We must also think about our priorities. The strategic top line is to deter and prevent a full-scale war with Russia by being ready to fight and win, alongside our NATO allies.[11] But with a weakening US commitment to European security, we need to grow the European defence industrial base at a scale and speed to match a fully mobilised Russian war economy. So, decisive choices on sovereign defence capabilities are urgently needed.[12]

We must draw our red lines on defence technology: what should be fully sovereign, what needs sovereign options, and which partners, allies, and investors we are comfortable sharing with, procuring alongside, and relying on. Core sovereign capabilities, such as the Dreadnought-class submarine and strategic nuclear strike, remain untouchable.[13] Examples of technologies needing sovereign options include AI, software and digital capabilities.

AI: Lessons for Sovereignty and Risk Management

The UK's current overreliance on a handful of large US software firms, Palantir being the prime example, poses two critical risks. The first is the cybersecurity risk of putting all your eggs in one basket. The company holds longstanding contracts with the NHS to analyse vast amounts of public health data. AI and digital systems are fragile cybersecurity assets, vulnerable to threats such as ransomware attacks and manipulation.[14] Health data, with its potential to shame and expose, has proven particularly lucrative for cybercriminals.[15]

Second is the issue of technological sovereignty, exemplified by founder Peter Thiel. Thiel's divisive political priorities - including a rather loose regard for democratic principles - mean the company's ethos may not align with UK interests.[16] This concern is far from theoretical. Ukraine's reliance on Elon Musk's Starlink network starkly demonstrates the risks of depending on tech moguls: national security can become hostage to the unpredictable whims and political agendas of individuals and their companies.[17] Shockingly, despite

the wealth of capable UK AI firms, it was Thiel's Palantir that won the contract to review the Strategic Defence Review submissions.[18]

A UK Attitude Problem?

We also need to face the reality of vastly different attitudes that our allies and partners have toward innovation and defence technology. The US treats almost all technology as dual-use, quickly leveraging defence innovation for civilian applications and remains highly extractive. It has proven willing to employ export controls to maximise its security and economic advantage.[19] On AI, both the US and China have been investing heavily to secure control over the entire value chain, from compute to models and applications.[20]

The UK, by contrast, is held back by a risk-averse, short-term MoD procurement culture that sidelines UK SMEs (small and medium enterprises) in favour of large US companies able to absorb risk and cut costs.[21] The likes of Palantir, Google, IBM, and Microsoft are reliably chosen over smaller UK AI companies, even when UK companies have led in the early stages of defence projects.[22] Once an SME is out of the race for a MoD project, they cannot take the lead once a procured capability has been demonstrated, meaning the MoD is locked in with a - large, often US based - service provider. These dynamics fuel the perception of the MoD as unfit for changing geopolitical requirements.

While this collaboration can have short term benefits, it limits UK innovation potential. Speaking with UK defence AI companies, the view is that the Defence AI Centre has yet to create meaningful opportunities for innovative UK SMEs, while Defence Digital and the Front-Line Command AI Centres have not delivered the critical 'Digital Backbone' infrastructure necessary for effective AI integration across Defence.

This contrasts with our ally France, whose long-standing strategic culture - while yes, making interoperability more challenging - has benefited from preserving key sovereign options. Rejecting Palantir, France built its own sovereign AI capabilities, notably ARTEMIS.IA. France has successfully integrated AI into nearly every French defence technology programme function, from signals intelligence to cybersecurity, spanning development and deployment.[23]

Balancing Risk and Collaboration

When it comes to defence tech, whether AI, quantum computing, robotics, autonomous systems, or directed energy weapons, we need to make choices. We cannot replicate the US model; the taxpayer cannot shoulder the cost. Nor can we mirror France entirely; NATO interoperability and the need for European defence cooperation are too important. But we can prioritise: what must be fully sovereign, and what requires sovereign options?

Even where there is no need for full UK-tech sovereignty, we must always ask the further question: does it need to be Europe-sovereign? Doing so will open opportunities for joint procurement and exports alongside deeper strategic alignment, making industry both more efficient and more resilient.

The nature of the technologies themselves can simplify these decisions. For example, do we want just one sovereign drone company? The experience in Ukraine suggests otherwise. Having a diverse range of drones from multiple manufacturers is essential to staying operationally effective as anti-drone capabilities evolve.

In the case of the infrastructure behind AI, we may have to use American semiconductor chips to enable AI processing. While the chips themselves do not need to be sovereign—and few countries possess sovereign chip design and fabrication capabilities—the control and use of AI systems, particularly where sensitive and secret data is stored, must remain under full UK sovereign control.

Likewise, prioritisation must be matched by a robust approach to intellectual property and commercialisation. When an SME creates IP, that IP should always remain the SME's own, even if a contract transfers to a prime. IP ownership should not switch to the primes, as is currently the case with digital tech. Without addressing the 'IP farm' problem, the UK risks perpetually outsourcing its innovation and tech leadership. Our approach to date has been too driven by short-termism. Maximising the 'defence dividend' means replacing this limited focus with long-term government support, enabling UK-based defence companies to grow and thrive.

Becoming the Master of Our Innovation Future

We cannot cut ourselves off from the world. Scaling European defence means embracing calculated risk in international collaboration and procurement, not defaulting to protectionism. So, we need to get better at managing risk. We must develop clear, proportionate guidelines for working with international partners, balancing openness with necessary safeguards.

True defence tech sovereignty demands more than control. It requires not only choosing what technologies to build sovereign but also building the right funding, industrial, and policy systems to make the UK master of its own future.

The UK must make decisive choices on what capabilities need to be sovereign. Clearly define what defence tech needs to be fully sovereign, what needs sovereign options, European-sovereign options and the acceptable level of collaboration with allies and partners.

Increase and diversify public investment in defence innovation. Expand the scope and resources of funds like the National Security Strategic Investment Fund and the British Business Bank. This would encourage greater risk appetite among UK investors and help reduce reliance on foreign capital.

Boost UK technological sovereignty for emerging and disruptive technologies. The UK needs sovereign options for critical technologies. Investing in indigenous capabilities and reducing overreliance on large US tech firms safeguards national security and technological independence, addressing key risks highlighted around AI and digital systems.

Strengthen support for UK defence SMEs by reforming procurement culture. Reforming risk-averse and fragmented procurement processes to generate sustained demand signals and meaningful opportunities for scaling. This also requires holding prime contractors accountable for late payment practices and moving away from a culture of reliance on large US tech firms, which often take away SME IP rights.

Develop robust guidelines for balancing international collaboration and risk management. Ensuring clear, proportionate frameworks for working with foreign partners enables the benefits of collaboration while maintaining strategic control and avoiding overdependence or exposure to external risks.

The Quantum Threat? Strategic Risks to UK Defence

Dr. Joe Spencer
Quantum Defence Research Association

Quantum technology is rapidly reshaping the global security landscape. From code-breaking threats to stealth-defeating sensors, the UK now faces an unprecedented technological arms race, and while in some areas the UK leads the way, in others, we lag behind.

As the Strategic Defence Review set out: "we are in a new era of threat, which demands a new era for UK Defence".

The UK frequently discusses the use cases and implications of quantum technology; conversations often led by its applications and the disruptive potential of quantum computing. This is a fair assertion: quantum computing is likely to be as transformative as artificial intelligence, serving as a foundation that amplifies AI's power and reach. Yet there are quantum threats emerging today that we can't afford to ignore.

We're seeing a surge of activity coming out of China, much of which is often dismissed. Admittedly, some of the claims, such as breaking secure data transmission like the RSA encryption, are limited and not possible with current quantum computers. But is that the only quantum threat we should be watching?

China leads the quantum arms race with claims of operational satellite-based quantum key distribution (QKD), mobile QKD drones, and long-range quantum communication experiments, creating unhackable networks across theatres of conflict. China is also making significant strides in quantum sensing. These advances could unlock new stealth-defeating sensing capabilities, such as the ability to pin-point submarines with magnetic sensors or gravity sensors.

China today is using kilo-quop era quantum computing to develop new hypersonic missiles by using computational fluid dynamics to optimise design and performance of these systems.

In all of these areas, the UK lags behind with the technology and the adoption of use-cases. This threat should not be underestimated.

The Quantum Solution? A Path to Sovereignty and Deterrence

The UK need not be a bystander. We are in a prime position to lead. Quantum technology offers critical national capabilities across multiple domains.

Quantum sensing, navigation and timing offers resilient alternatives to GPS, such as magnetic mapping, gravimetric geodesy, and next-generation quantum clocks, which are essential for operating in GNSS-denied environments, and monitoring and protection of critical national infrastructure (such as sub-surface cables). These capabilities are not just important for national defence; they're increasingly vital across the civilian sector in a world where signal denial and disruption are becoming the norm.

As the Strategic Defence Review also noted, the UK *"must be prepared for contested and degraded environments, including **GPS-denied battlespaces,** where access to reliable navigation and timing can be disrupted by adversaries."*

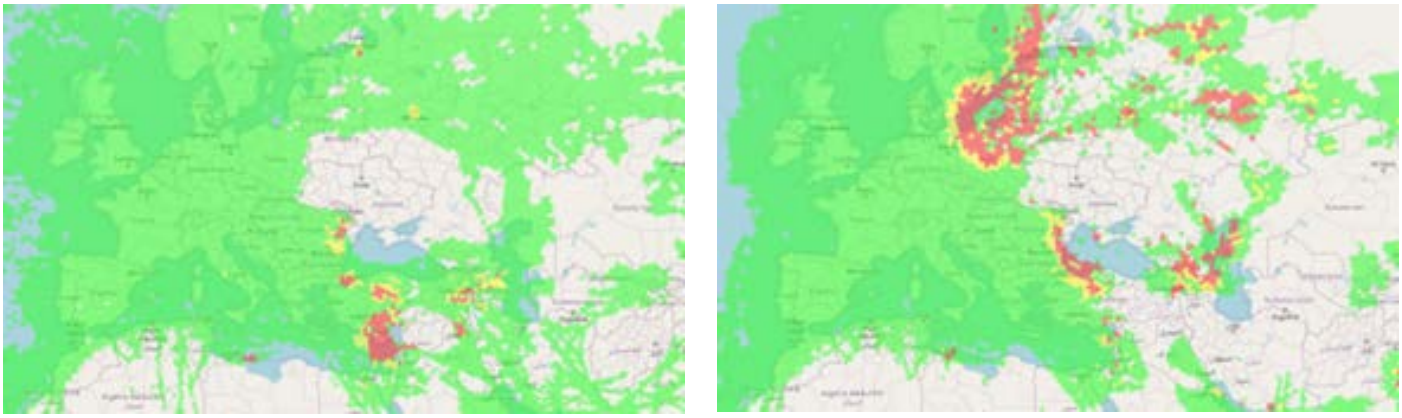


Figure 1

Figure 1 illustrates the growing prevalence of civilian aircraft GPS interruption through jamming or spoofing with a marked increase between 2022 (left image) and 2025 (right image).

In light of the Strategic Defence Review's recognition of GNSS-denied battlespace risks, the UK must prioritise sovereign alternatives to satellite-based navigation. Quantum navigation systems, leveraging atomic clocks and quantum inertial sensors, are already demonstrating viability in lab and limited field settings. This is a critical area where early investment can unlock significant resilience and operational superiority.

Protecting UK government, industry, and defence systems from future decryption is also possible through the implementation of Quantum Safe. But we must act now. Quantum Key Distribution offers a physics based encryption paradigm which is secure and valuable for communication across the battlefield. Post Quantum Cryptography allows us to encrypt data in a new way providing resilience to quantum attack, and this doesn't require significant hardware overhaul of existing critical national infrastructure. In fact, PQC remediation activity is one of the most valuable near-term wealth creating enterprises in quantum and highlights a market for defence to adopt quantum solutions.

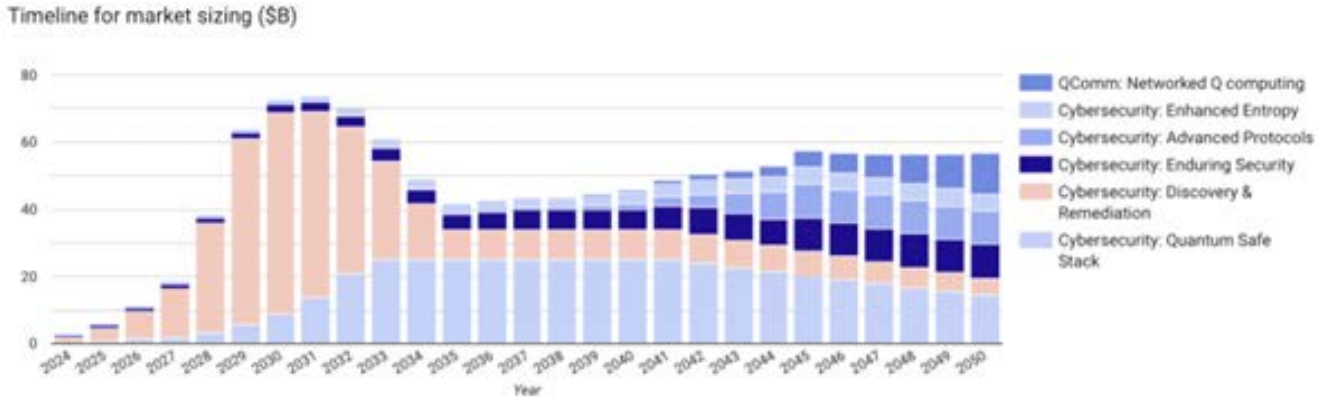


Figure 2: Timeline for market size ($ billion) for quantum communications. Source: Global Quantum Intelligence

Quantum computing offers transformative potential for defence operations by solving complex optimisation, simulation, and modelling problems that overwhelm classical systems. In logistics and operational planning, quantum algorithms can optimise supply chains, fleet routing, and battlefield resource allocation under highly dynamic constraints, ensuring faster, more efficient resupply and deployment in contested environments.

In cyber threat modelling, quantum-enhanced machine learning could accelerate anomaly detection and pattern recognition within vast, encrypted datasets, enabling real-time identification of sophisticated state-sponsored cyberattacks or insider threats. These techniques may also be used to model adversary tactics or simulate attack surfaces at speed.

What action must the UK take?

There are a number of actions the UK needs to take, and part of this is already being outlined in the industrial strategy, signalling long-term commitment to development of quantum capabilities. But commitment alone is not enough. We must continue to invest in research, whilst also ensuring that the Government - and specifically MoD - steps up as the first customer, pulling quantum technologies through to actionable use-cases.

Beyond funding, there are critical actions the UK must take to unlock the full potential of quantum for the nation, and secure long-term sovereign capability and strategic advantage.

First, the UK must prioritise quantum use-cases, and position defence as an early adopter of quantum technology. This must be underpinned by the analysis of use cases and timelines across the quantum technology eras. Use-cases need to be roadmapped and prioritised for deployment as and when the hardware and software matures. This means understanding the technology drivers, the scaling, and what can be actioned now. This will allow the UK to

Classify and sequence quantum use-cases across civil, defence, and dual-use domains. To develop a national *Quantum Advantage Roadmap,* aligning use-cases with technological milestones - from NISQ era capabilities to fault-tolerant systems. Target early wins (e.g., PQC adoption, quantum navigation) and accelerate path to scale.

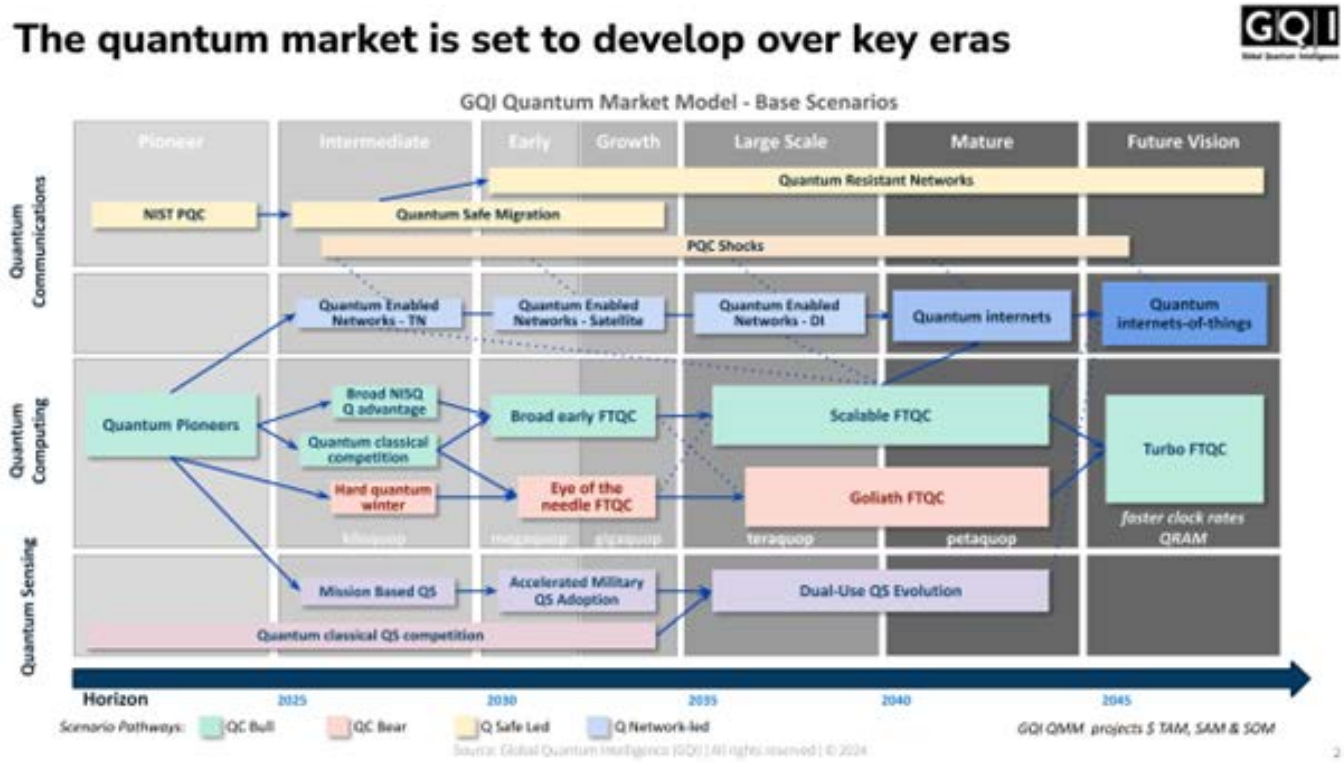


Figure 3: Quantum hardware eras and interconnection of modalities

It is also critical to assess UK sovereign capability, across both start-ups and established technology players, to build a clear, comprehensive and data-driven understanding of the technology areas in which the UK leads. This assessment should inform a detailed mapping of supply chain risks and dependencies, enabling targeted strategies to strengthen resilience and reduce exposure to geopolitical or commercial vulnerabilities.

This will be enabled by conducting a sovereign capability audit across the full quantum stack: hardware, software, materials, and control systems. Incentivising onshore and allied sourcing for critical components and investing in UK-owned IP and manufacturing capacity to reduce dependency on adversarial supply chains.

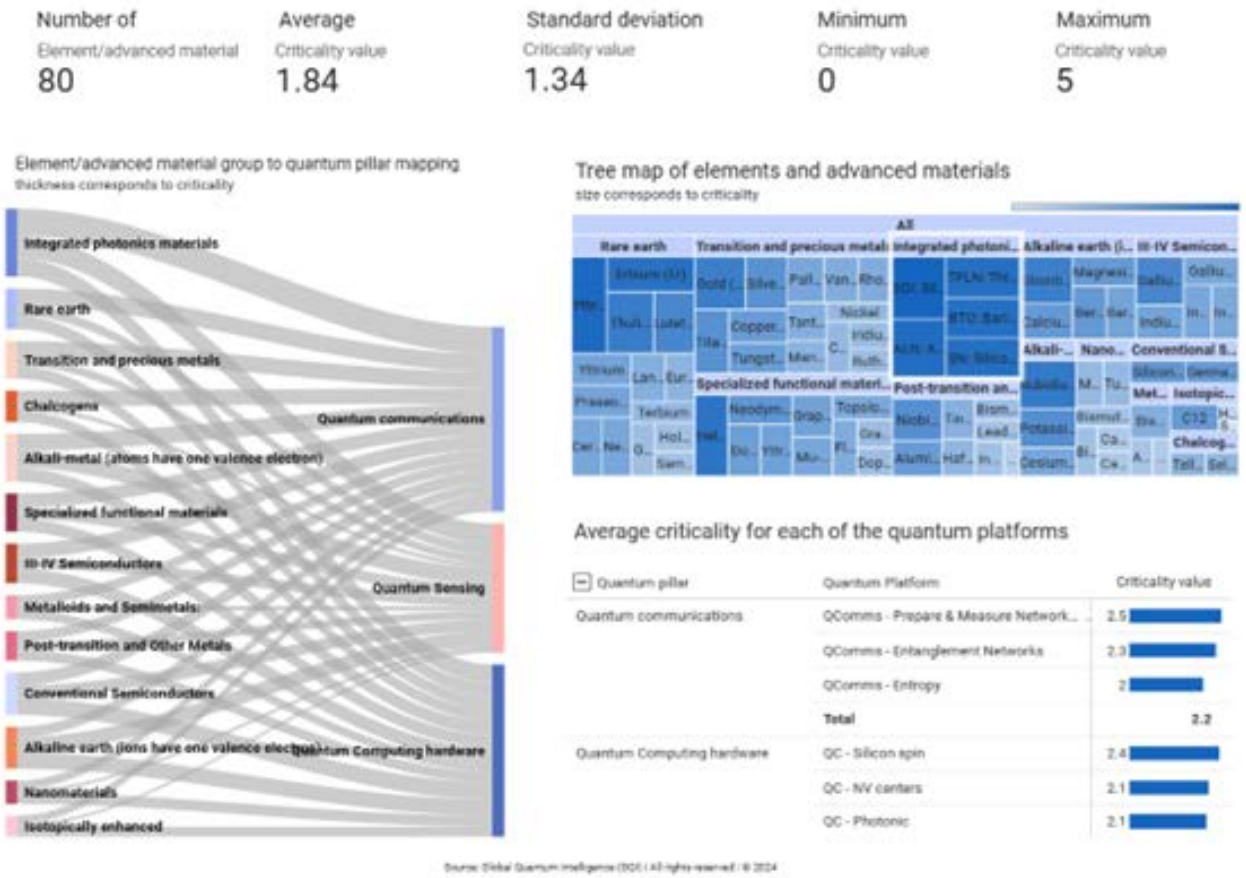


Figure 4: Supply chain map highlighting sub-component and element level materials mapping onto quantum domains (Source Global Quantum Intelligence)

Finally, the Government must create a Sovereign Defence Quantum Test & Evaluation (T&E) Hub. The commitment in the Industrial Strategy to the NQCC is welcomed, but defence requires the full capability of quantum beyond the compute domain. The NQCC provides a solid foundation, but field-deployable sensing and communications technologies require physical trials. Leveraging existing defence infrastructure (such as QinetiQ with the LTPA and Dstl) offers an opportunity to establish a UK Quantum Test and Evaluation (T&E) Hub.

A national investment of £100 million could enable the benchmarking of quantum sensors, navigation systems, and communications technologies against classical equivalents and competing quantum systems.

Conclusion – From Rhetoric to Readiness?

The UK's strategic inheritance is clear: we are in a volatile world shaped by technological acceleration. Quantum is not just a research topic, it is a defence imperative. Other players in the world are advanced in areas such as quantum communications and sensing, but the UK has the chance to keep up, through a combination of intelligence-gathering, investment and prioritisation of needs and use-cases.

Without urgent and co-ordinated action, we risk strategic irrelevance in a future defined by quantum capabilities. With the right investment, focus, and industrial strategy, the UK can become a secure, sovereign quantum power, and help lead NATO into the next era of deterrence.

The First Line of Defence: Made in Britain, Owned by Britain

Matt Albans
Chief Technical Officer, Roke

Alexi Bullen
Account Manager, Roke

The illegal invasion of Ukraine by Russia, escalating instability in the Middle East, and the systemic challenges posed by China, particularly in the Taiwan Strait, underline the urgent need for Britain to adopt an active posture of warfighting readiness.

Strategic deterrence relies on the UK and its allies' ability to continuously strengthen capability and harness technology at pace to operate effectively in increasingly contested environments – including cyberspace.

Roke welcomes the reforms set out by the Labour Government through reform to defence and the Strategic Defence Review (SDR). Significant change is required to place Britain on a war footing, and the SDR represents a positive catalyst for transformation.

Part of the Chemring Group, Roke is a UK-founded and owned company, trusted to deliver critical defence and security technologies that safeguard the UK and its allies. Roke enables the land tactical Digital Targeting Web, provides strategic cyber capabilities, develops and exports electronic warfare solutions, and contributes to the advancement of the next generation of UK missile defence.

Supporting Britain, Delivering for Defence

Across four core hubs in Romsey, Gloucester, Woking and Manchester, more than 1,000 Roke employees deliver on the missions of defence and national security. The company stands at the forefront of innovation, providing cutting-edge intelligence and engineering solutions that protect the UK, its troops, borders and businesses.

At the heart of Roke is a team of pioneers – scientists, engineers and intelligence professionals – who not only imagine the future of warfare, national resilience and public safety, but actively build it. Roke operates at pace, tackling today's most urgent security challenges while shaping the battlespace of tomorrow. With a proud heritage as a British innovator, Roke remains steadfast in its commitment to sovereignty, security and progress, both in the UK and across the world.

Roke's supply chain reflects the best of UK innovation – from micro start-ups to established delivery partners – each contributing unique capability, energy and pace. In the last year alone, £27 million of Roke's turnover was delivered by UK defence partner suppliers.

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Since 2022, Roke has led a consortium of more than 15 defence suppliers to deliver Project ZODIAC, a major element of the British Army's Land ISTAR programme. The project integrates and digitises battlefield sensors to enhance tempo, precision and lethality. Proven in multinational exercises such as Warfighter 26, ZODIAC will support the implementation of the UK's tactical Digital Targeting Web (DTW).

From its Hampshire site, Roke designs and delivers Electromagnetic Warfare (EW) and Resilient Position, Navigation and Timing (RPNT) solutions to more than 16 allied nations, showcasing British innovation and enabling shared capability across NATO. Roke's recently launched tactical electronic attack system, EM VIS DECEIVE, is a NATO first for modularity and interoperability through open standards.

Roke is also a trusted partner to His Majesty's Government, delivering mission-critical cyber, digital and software-defined technologies that provide high-assurance, operational solutions and ensure the UK maintains a strategic advantage against emerging threats, both at home and overseas. We are part of a dedicated UK community of suppliers delivering classified, sovereign technology to MoD and HMG.

Protecting and strengthening UK defence

This capability cannot be outsourced, exported, or commercially replicated. If this community erodes, the UK's ability to respond to defence and national security threats would be severely impacted.

We experience the same challenges as other sovereign suppliers and the wider UK defence ecosystem. Funding is unpredictable, constraining suppliers' ability to plan and sustain capability, and venture capital-backed foreign suppliers are capturing market share - diverting funds, introducing vendor lock-in and undermining UK sovereignty.

We need policies that protect and prioritise sovereign suppliers. That means scoring contracts to reflect the strategic value of UK-only capability. Frameworks and partnerships that give sovereign suppliers clear, secure routes to market, enabling our customers to actively procure from UK suppliers when long-term sustainment is vital. And sustained investment aligned with long-term national security needs.

Our allies already do this. If we don't act now, we risk losing the competitive technical edge where it matters most. The Secretary of State for Defence must act - and fast.

Together, Roke can help the UK Government drive forward reform. Roke remains a steadfast partner to the MoD and the wider UK defence and security ecosystem, committed to enabling the transformation set out in Defence Reform, the Strategic Defence Review, and the upcoming Defence Investment Plan - delivering sovereign advantage with agility, precision, and purpose.

Defend or Decline: Britain's Industrial Imperative

Emma Baker
Defence Policy Adviser,
ADS Group

We currently stand at an apex of considerable global change: the rapid evolution and proliferation of new technologies is altering the threat landscape while also creating new areas of business growth.

Growing geo-political instability is causing countries to re-assess their national security priorities. Russia's invasion of Ukraine is demonstrating the need for scale and pace in industrial capability as a core element of resilience and therefore deterrence. The conflict has proven industry to be the foundational strategic enabler underpinning all military capability. Industrial contribution to deterrence lies in the ability to provide readiness, defence capacity, and the capability to reinforce our allies. As NATO Secretary-General Jens Stoltenberg has emphasised, "without industry there is no defence, no deterrence and no security".

In a world where supply chains are global by nature, there is very little in an end-to-end system that can be truly sovereign. International partnerships are therefore often vital to build capability and collective security. However, investing in UK supply chains and UK capability is essential to build the resilient industrial base that forms a core part of the national deterrent, and to secure the UK's position as a strategic partner of choice for our allies.

Determining UK Industrial Needs

Before we can strategically strengthen a defence industrial base that fully meets the UK's needs, the Government must articulate what we wish to "own" entirely dependently, what capabilities we wish to "collaborate" on with others, and what we are happy buying or "accessing" from strategic partners. This will ensure that for key capabilities, the UK maintains sovereign operational independence, whilst maximising strategic collaboration with allies. This should then result in a strategic plan for the growth of the areas of UK-based manufacturing we need to develop and sustain to meet these goals.

A key consideration when undertaking industrial planning of this kind is understanding whether the UK can sustain key capabilities today and into the future, and if not, what steps need to be taken to ensure this sustainment. Such a process requires long-term planning, given the lengthy lead times of defence projects, and necessity to invest in supply chains with areas of global demand. While leveraging the global supply chain is vital, the UK must also ensure that it can repatriate certain capabilities when needed, balancing immediate need and long-term development goals to build capacity in capability areas identified as being critical.

Building Resilience

To identify opportunities to strengthen and build resilience throughout our supply chains and promote UK-based businesses, it is important to understand the opportunities and vulnerabilities within our defence supply chains. The MoD must also provide a definition as to what it understands a "UK business" to be.

Building UK defence capabilities (including industrial capacity and fighting lethality) and in doing so, the UK supply chain, will bolster the UK's overall resilience and capacity to deliver on international programmes and to allies. Understanding fundamental dependencies in the supply chain (such as access to certain materials and minerals and particular skills shortages) is critical not only to identify where focus should be placed to bolster UK industrial resilience, but also to planning surge capacity and crisis response. Taking learnings from Wargaming activities, Industry and the MoD should work more closely together to create a mechanism whereby UK industry can ramp-up production as needed against agreed indicators that the UK is at a point of crisis. The MoD should also map where the UK currently has no option but to rely on global supply chains and conduct analysis to understand the associated risks and mitigations of this, particularly in areas such as rare earth and critical minerals.

Backing UK-Based Business

A lot of the delivery of how to back UK businesses comes down to how the MoD procures. Defence is a unique market, being a monopsony with Government as the primary customer. Therefore, the Government itself acts as a key enabler, and potential barrier, to growth for these sectors by virtue of the way it acts as a customer. The prevailing expectation of UK Government procurement has been that competition will always deliver the best value for money.

While competitive markets are vital for delivering well-priced and high-end products, a narrow focus on price points does not take the wider picture into account. This means that lifetime costs, sustainment, or the impact on the industrial base is not always factored in. Additionally, running a competition costs money, and may not always deliver the best, or most cost-effective solution, for example in procurement cases where there is only one viable supplier, or for long-term contracts that currently have frequent re-compete clauses. Competition also forces a focus on lowest cost rather than capability need – and sustainability of that capability and the associated industrial base through life.

Given the long-term nature of defence capabilities, and the time required to build industrial capability, expertise and resilience, a short-term, purely transactional understanding of value for money may not deliver the growth, security and defence capability the UK needs. Backing UK-based businesses therefore requires long-term partnerships and collaborative models to meet an evolving threat landscape at pace. Long-term strategic relationships require certainty of demand, not just in the pipeline of contracts but within delivery itself. Contracts that drip feed development, platform deployment, and then support often offer false savings and limited freedom of action. The UK defence industry requires confidence in the long-term outcomes and timelines to undertake the technical and financial burden of delivering concept to deployment capability quickly and collaboratively.

Enhancing Partnerships

Partnerships between Government and industry can provide confidence for both sides to invest, whilst increasing capacity at pace and driving long-term value for money.

Collaboration between Industry, Government and Front-Line Commands is crucial to strengthening UK industrial capability. The collaboration between Military Capability teams and industry through Planned Force Testing, the Industry War Gaming, and study days has been beneficial for industry to understand operational priorities, and to adjust R&D, capability, and investment to meet MoD needs. It also helps Front-Line Commands understand and test industrial assumptions that may be being made in military planning.

Backing UK-based businesses also requires activity across the supply chain – UK SMEs are key to our ability to innovate at the pace of threat, and to grow domestic production capability. Building enduring partnerships with SMEs and leveraging the ability of primes to help guide UK SMEs through the defence ecosystem is critical to the success of building the resilience and capability of the UK industrial base.

Sustaining Deterrence

The UK's deterrence is predicated in large part on our ability to demonstrate that the UK has the industrial capability, with suitable financial backing, that will not only sustain our Armed Forces in a time of war but do so with equipment and battle capabilities that are superior to any potential adversaries. The current security context highlights the urgent need to invest in our defence industrial base. The post-Cold War peace dividend can no longer be relied upon, and the UK must develop a fully resourced strategy to rise to the challenge of meeting increasing, and increasingly varied, threats.

Building UK industrial capability therefore must be actively demonstrated and practiced as a matter of national security, not just relied upon as a reaction when needed, or boiled down to a discussion about pounds and pence. UK industry stands by ready to ensure that the UK and NATO can strengthen our deterrence, and provide the best possible capabilities to our armed forces. After all, the UK's Armed Forces are only as strong as the industry that supports them.

Quantum Commercialisation: From Rhetoric to Readiness

Steven Vaile
Director of Quantum Security Defence

Context & position

Quantum technology is reshaping national security and economic competitiveness. The UK has been an effective catalyst for R&D, yet remains strategically disadvantaged against China, the United States, and leading European programmes, especially France and the Netherlands, which better mitigate national IP loss through acquisition.

Bottlenecks to commercialisation

Progress is checked by slow, performative grant and procurement cycles; brittle scale-up finance misaligned with commercial outcomes; and blunt export controls that over-classify dual-use technologies, constraining UK plc's competitiveness in overseas markets.

Capital effects

These frictions deter or divert private capital. By contrast, the US benefits from higher valuations, deeper liquidity, and clearer adoption pathways, enabling American firms to acquire international (including UK) IP at discounts and arbitrage value across markets.

IP safeguards & alliances

France's brevets regime keeps IP broadly accessible within the EU even post-acquisition; the UK lacks an equivalent cushion. Stronger domestic protections should be paired with strategic partnerships, Five Eyes and EU,to co-develop standards, secure interoperability, and bolster UK influence.

Why Government Must Act as a Catalytic Customer

A clear, public commitment that the state will buy (not merely subsidise) quantum systems would complete the investment loop: R&D support converts into revenue and scale. The UK should accelerate and demystify procurement, replace "start-up theatre" with competitions that end in purchase orders, and publish stable, yet accelerated, MOD buying plans with milestone-based awards. Without this shift, UK public money incubates firms only for foreign buyers with clearer routes to contracts to capture the value.

Export Controls & Funding Design

Because most quantum-related export controls are now aligned across allies and implemented nationally (e.g., the U.S. BIS 5 Sept 2024 IFR on quantum-computing items with a trusted-partner license exception; the EU Dual-Use regime; and the UK consolidated lists), treat quantum not as uniformly dual-use but as risk-graded within those shared lists.

Recast flat, lump-sum grants as staged funding tied to R&D, proof of concept, technology readiness, first customers, and growth; require demonstrable taxpayer value (revenue/exports) to curb grant dependence and lift valuations.

Domain Priorities and Near-Term Moves

Quantum cybersecurity

Quantum-safe adoption is the fastest near-term route to value. The NCSC timelines provide a national spine; publish, via the Crown Commercial Service, a Quantum Cybersecurity Vendor Directory & Buying Guide naming approved suppliers, typical components, contract routes, and indicative price bands so buyers can act now. Early adoption strengthens defence and offence and reduces tail-risk. UK government awareness remains thin, while US programmes (e.g., DARPA-backed work on on-chip quantum sensing for cyber protection) fund tangible projects that attract capital and talent.

Statements and Communications

Avoid blanket "not ready" messaging; frame guidance as conditional adoption tied to named milestones and contexts, coordinated across MOD, government, and industry.

Quantum sensing, navigation & timing (PNT)

GNSS-denied operations and critical-infrastructure monitoring require sovereign sensing, navigation, and clocks. Set explicit directives with timelines, budgets, and demand signals; match UK capability with committed domestic procurement action.

Quantum computing

Through the NQCC's long-term support and user programmes, convert proofs of concept into deployable services, provided procurement embraces spiral delivery and funds proof-of-utility, not technical reports. Tie demand signals to validated use cases to keep firms scaling at home rather than seeking growth abroad.

Consequence of inaction

Absent these reforms, the UK erodes competitiveness, weakens security and defence posture, and continues to see UK-backed IP acquired at a discount overseas. This is broadly evidenced.

Recommendations

1. Adapt grants to milestone-based contracts or pure research

   Recast a significant share of innovation spend as contracts for innovation: extended TRL 4–6 prototypes, with continuation only on demonstrated performance (accuracy, latency, power, cost, validation) against classical baselines, ensuring taxpayer value and speeding the research-to-market transition without limiting access to early stage companies that need time to develop technology.

   Deep technology R&D requires time, trial and repeated failure which grants are designed to support, many grant recipients are not involved in deep technology R&D but in services, software and product delivery and use grants as a subsidy or replacement for income.

   Use the Procurement Act's competitive flexible procedure; publish awards for transparency and disclose Subsidy Control assessments for recipients. Without deliverables-linked accountability, public funds risk disappearing into activity with little economic return. Founders need cash that follows milestones, not paperwork, directly addressing persistent feedback about slow, ineffective grants and "start-up theatre."

   Cut waste, remove bad actors and broaden availability with tighter controls.

2. Issue Clear Statement of Demand And Procurement Intent

   Issue a national buying signal now. Publish a clear, cross-government statement that the UK will buy quantum technologies, and align departmental messaging to remove investor ambiguity.

   Make Pathfinder the default. Use Pathfinder as the standard wrapper for cybersecurity and sensing pilots, with successful pilots graduating to multi-buyer frameworks for rapid adoption.

   Publish a UK Quantum Cyber Security Buyer's Guide. Mirror the US GSA model: supplier lists, categories, contract routes, and indicative price bands so buyers can act now.

   Mandate quantum cyber resilience plans from FY26/27. Require inventory and migration plans in all central procurements, aligned to NCSC milestones.

   Calibrate export controls to risk. Re-evaluate restrictions so they accurately reflect threat and maturity, allowing exportable technologies/components to generate revenue for UK plc.

   Run volume-committed challenges. Use the Integrated Procurement Model to deliver bankable orders (e.g., 10,000 clocks/frequency combs/NV sensors) with clear acceptance criteria, so firms secure contracts, not just listings and approvals

   Investors need business plans backed by committed demand and clear buying routes, precisely what the UK lacks and what the US PQC playbook provides and lifts valuations.

3. Retain IP and scale at home

   Significant 9/10 digit public co-investment (three years). Match private Series B and C in Technology readiness level 5–8 quantum on UK-anchor conditions, making the UK a compelling, durable investment destination.

   Lock in R&D relief through 2028, maintain the merged parameters and publish HMRC exemplars for quantum hardware, quantum cyber security investments, and collaborative claims to give firms certainty.

   Introduce procurement-linked HMRC rebates for quantum-technology purchases that demonstrably create UK value, revenue, supply-chain growth, and exports, accelerating adoption to attract and amplify private capital investment.

   Spin-outs & IP. Implement the University Spin-out Review norms to cut friction and improve founder economics. Create a Quantum IP Access Office, France brevets-style advisory/pooling, to help start-ups file, bundle, and license on fair terms, with no state ownership of IP.

   Why now? Better cap tables, predictable tax, patent support, and targeted visas lift UK valuations and reduce pressure to redomicile.

Conclusion – From Rhetoric to Throughput

Redirect funding to milestone-based contracts; establish a Pathfinder track with a Quantum Cyber Security Buyer's Guide and defence volume commitments; and repair the scale-up stack (capital, spin-outs, IP enablement, visas). Together, these steps will make the UK the easiest place to build quantum companies, keep IP onshore, and meet national-security needs in cyber, sensing, and PNT, via a rapid-adoption framework that protects our defence, technology, and IP sovereignty. The resulting spend and market demands helps to level valuations, reducing market arbitrage of UK IP, reduces capital and intellectual property flight and improves the UK attractiveness for Foreign Direct Investment.

This document was formulated based on considered input from senior level UK stakeholders at Finite Technology Ventures, Global Quantum Intelligence and Oxford Scientifica with thanks.

Civil Aerospace: Helping Defence Grow Faster

Richard Coates
Head of Government Relations,
Aerospace Technology Institute (ATI)

Civil aerospace in the UK is booming. With some of the world's most innovative companies, we're among the best places in the world to build aircraft and their components – providing 100,000 jobs and £13.6 billion in GVA to the UK economy.[1] Rolls Royce's shares have hit record levels, and Airbus has a 10-year order backlog. Civil aerospace already plays a key role in delivering the Government's ambitions for growth and for high-value jobs right across the UK.

One of the reasons for the UK's continuing success is the Aerospace Technology Institute (ATI).[2] Founded in 2014, we're independent and jointly funded by industry and government to support technological innovation that benefits aerospace companies in the UK, fulfilling some of the non-space roles NASA performs in the US. But whilst Donald Trump has cut NASA aeronautical funding by 37 per cent, the UK Government's industrial strategy has protected ATI funding for a further 10 years recognising the benefits a thriving civil aerospace sector brings.[3] That's a real vote of confidence in the sector and its power to create growth and jobs across the UK.

But why should the defence sector care? Well, there are lessons to be learnt from the ATI's approach to innovation that the Ministry of Defence (MoD) could copy, and more effective dual-use development offers real benefits to both sectors – and a better return still on the Government's groundbreaking decision to invest 10 per cent of the MoD equipment budget in innovation.

Perhaps the key consideration is our strategic support for innovation. The ATI publishes a national technology strategy for civil aerospace. That sets out the technologies the UK industry needs to develop for continuing success – and then we back their development with grants. Sending clear demand signals is particularly important in attracting smaller companies, or companies with technology in other sectors, to apply that in aerospace. This is distinct from the traditional MoD approach, where innovation has often been seen as a way to deliver specific programmes and harder to access.

Take Adaptix in Oxfordshire.[4] They developed a novel medical technology using lots of weak x-rays to build a complex 3D-picture with less radiation. We helped them develop the technology for non-destructive testing of aerostructures – meaning problems in composite and traditional structures can be identified much more quickly and cheaply. It's a technology we supported because of its application to civil aerospace – but which will work just as well in defence applications, or automotive and other sectors.

The ATI also offers consistency in funding. Because we support a published roadmap, companies know that they can access the sort of long-term funding necessary to develop innovative aerospace projects over time. This was a key factor in attracting aerospace start-up ZeroAvia from California in 2020, which announced plans to build their first production factory in Scotland earlier this year, creating 350 jobs.[5]

Unlike lots of grant funders, we work closely with potential applicants before they even apply, often making suggestions or helping collaboration with large defence companies - also known as 'primes' - or other potential applicants. In the case of iCOMAT in Bristol, the ATI didn't just provide grant funding, our expert technologists helped them introduce their unique curved fibre composite technology to prime customers.[6]

This is all easier said than done. It took the ATI 10 years of work to get where we are – and that is without some of the very real extra challenges of security and confidentiality defence faces.

Greater dual-use, however achieved, benefits both sectors and provides spillover benefits to other sectors too. In aerospace, dual-use offers the opportunity to sell technology faster. New airliner designs can take years to enter production and defence offers the opportunity to generate revenue. Drones can get technology flying even faster – generating data while doing so to support eventual manned certification. For defence, a strong civil aerospace sector and more dual-use can help control costs with wider markets. It can crowd in both innovation and competition. Civil aerospace manufacturing also provides national resilience – allowing for flexibility in times of crisis.

Civil aerospace approaches a critical inflection point, with both Boeing and Airbus expected to announce new narrow-bodied aircraft for entry into service in a decade. This will decide which technologies make it to production – and where production takes place - for the next generation of mass market aircraft. At the same time the defence sector sees the unique challenges and opportunities of European re-armament following the conflict in Ukraine.

Deepening dual-use cooperation and learning the lessons of civil aerospace innovation is a unique opportunity for the Government to meet both opportunities and to turbo-charge jobs and growth across the UK while doing so.

Harden First: Quantum Position, Navigation and Timing for Defence and Prosperity

Dr. Kieran N Bjergstrom
Director, Quantum Technologies Associates

Make resilient Position, Navigation and Timing the spine of the UK's quantum-enabled defence: scale standardised quantum timing and sensing using MoD first-customer buys, creating a sovereign supply chain of fieldable, valuable dual-use systems.

Across today's operating picture, the electromagnetic environment is contested by default. Satellite jamming and spoofing has emerged from being a niche capability to standard practice, with large spillover to the civilian domain. New attack vectors are being developed and deployed, with the first observations of pan-continental space-based jamming recently made; The UK and Europe's access to Global Navigation Satellite Systems (GNSS) can be taken out at the press of the button, from space. Without the position and timing information satellite signals provide, tempo, logistics and command degrade. The civil domain is affected even more, lacking baseline hardening. Today's attacks on civil aviation and maritime are already putting global trade at risk and hurting prosperity.[1]

A more complex world heightens risk. At sea, navigable space will narrow as offshore energy and blue economy infrastructure expand. By 2050, almost 25% of coastal North Sea waters will be filled by infrastructure and energy, funnelling traffic through tighter approaches.[2] Marine traffic density is increasing and becoming more varied, with a future promising a mixture of autonomous and crewed vessels and far more beneath the surface. In such waters, assured PNT and silent situational awareness are not luxuries; they are prerequisites for safe and sovereign operations. As a nation, over 95% of our volume of trade is transported by sea and through our ports,[3] an attack on these supply chains would be an adversary's first move, with severe effect.

These stakes run through our economy. Satellite navigation supports ~£13.6 billion of UK economic benefit each year. A nationwide loss would cost ~£1.42 billion per day, freezing financial systems and our emergency services alike.[4]

A new level of resilience must now be designed in, relying on local and terrestrial PNT systems for all domains. This is necessary to be fightable, for civil security and for national prosperity. Investment in resilience will drive growth and prosperity, with strong export value. The global GNSS downstream market is expected to more than double this decade, from ~£225 billion in 2023 to over £500 billion by 2033. This needs resilience, and solutions will have demand across critical infrastructure, telecoms, transport, finance and defence. This is the volume that drives down cost, raises reliability and can build a sovereign industry with global presence – a material engine for growth. **Resilient PNT is economic policy as much as defence policy.**

PNT-led pull to scale quantum

Resilience in Position, Navigation and Timing the national demand signal that pulls quantum sensing into the field: standardised, line-replaceable timing and inertial modules with clear electrical, mechanical and data interfaces. With MOD as first customer — and the UK shaping assurance and test — long-horizon research converts into near-term, certifiable capability at scale.

PNT resilience is the national demand signal that scales quantum sensing and defence is the first customer – gaining world leading capability for a more fightable force and unlocking downstream economic value for the nation. Investment should focus on *sensor primitives*: standardised, line-replaceable quantum modules, including compact rugged clocks, magnetometers, RF sensors, inertial and gravity.

Leading Assurance

Defence requires hardened systems that work in the most challenging environments. As an early customer, MoD can guide the industry towards stringent assurance and test processes, establishing the quality of engineering necessary to deliver into the most critical sectors. This adds value to the technology, enhancing UK competitiveness, and is an exportable service in an area where the UK has a globally recognised track record.

Quantum delivers for PNT

- Quantum clocks extend hold-over so networks, radios and sensors stay synchronised when satellites are denied, keeping operations coherent under electronic attack. They unlock future synchronised sensing, instrumental to combat drone swarms and fast-moving objects, which are now today's threats.
- Hybrid quantum–classical position and navigation using quantum magnetometers, gravity sensors, and next-generation inertial to sustain navigation for long durations without GNSS; ranging from matchbox-sized sensors for miniature platforms to strategic-grade capability.

- Passive quantum sensing widens what can be known without emitting: gravity and magnetic sensors enable new mapping and anomaly detection techniques; making the unseen seen, whether on land, through water, or at our borders. Quantum RF sensors may provide a generational change in signal intelligence, providing wideband spectrum awareness that is highly covert and highly miniature – removing the needs for large antenna entirely. This provides PNT situational awareness, our ability to manage attacks is key to our advantage.

These systems are at the cusp of field deployment, many in advanced stages tested on platforms and in realistic environments. Timing and Magnetometry lead in maturity, with early commercial products and prospectively the largest overall market signals; cold-atom inertial and gravity systems follow, providing bespoke strategic-grade prototypes; and RF sensing is maturing rapidly, with an investment race growing globally due its impact of intelligence and situational awareness.

We must **invest to move from craft builds to scalable products.** This requires different investment to early innovation, our limiting factors are manufacturability, system integration, and systems engineering. Many current systems are overly bespoke, reliant on a fragmented and only partially sovereign supply chain, which has not yet embedded the engineering processes needed for scalable, reliable, fabrication. The transition must be to qualified, line-replaceable modules that are highly standardised and known to be assurable. This is what defence and wider markets need, and **procurement signals can drive this industrial transition.** Two capability and procurement tracks could drive this, providing complementary technologies into the PNT, and wider sensing, system-of-systems.

1. **Near-term hardening:** Deploy portable quantum clocks and high-TRL quantum-classical hybrid navigation systems to priority platforms, C2 nodes and critical sites. Tie this to emerging resilient time distribution, including through eLoran. This is high-impact resilience improvement, preserving capability under electronic warfare and driving our most mature technologies to scale.

2. **Next-step strategic capability:** Mature cold-atom inertial systems and gravity sensors into deployable strategic-grade systems for our highest value assets. Simultaneously drive quantum RF for land, sea, air and space, opening up new capability in covert spectrum monitoring and PNT situational awareness.

How the UK wins

- **Procure-to-learn:** Place early multi-year orders for portable clocks and mature quantum sensors against defined defence use-cases, with spill-over into civil sectors. Use platform trials to drive supplier roadmaps, tie purchases to cross-government and national risk registers and use this to build the test and assurance infrastructure for the quantum industry.

- **Fund supply chain building and primitives:** Invest in filling gaps in the component and sub-system level sovereign supply chain to deliver truly sovereign capability and maximise supply chain value. Develop the advanced packaging and manufacturing methods needed to make devices fieldable across platforms and environments, creating an added value layer to the UK quantum industry.

- **Write the assurance playbook:** Define test, verification and assurance metrics and processes for quantum PNT and sensing and establish the testbeds necessary to achieve this – for our own capability, or configurable to international criteria to maximise export potential.

Prosperity through security

Without defence and security a nation cannot be prosperous; PNT vulnerability is a threat surface that profoundly affects our ability to fight, but also the gamut of our civil sectors. This is the area where quantum shows the greatest maturity, and the potential to transform resilience and capability. Defence investment and procurement can make our forces safer and more fightable, can enhance our strategic capability and ability to deter attack, and can unlock a global dual-use market that is doubling each decade. Conversely, the cost of inaction is counted in billions for each serious GNSS outage – what was once theoretical, is the enduring status quo in contested areas and large spill-over regions globally.

Backing Britain: Defence, Industry, and Union Strength

Kira Lewis
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In an increasingly unstable and unpredictable world, Britain's ability to defend itself rests not only on the skill of our Armed Forces and the strength of our diplomacy, but also on our sovereign capacity to design, build and sustain the tools of defence here at home. Sovereign defence capability is not a matter of nostalgia or economic protectionism; it is the bedrock of our national resilience. It gives us the assurance that, even in times of crisis, we can act independently and decisively, without waiting on vulnerable global supply chains that are too often stretched, disrupted, or vulnerable to political leverage.

The challenges of recent years have laid bare the fragility of international supply chains. Geopolitical tensions, pandemics, conflict and market disruptions have all highlighted the risks of relying too heavily on overseas suppliers for critical technologies and materials. Defence cannot be left exposed to such vulnerabilities. Sovereign capability gives us not only reliability but also adaptability: the ability to pivot production, innovate quickly and sustain operations at pace when the strategic environment shifts unexpectedly. It provides resilience in a world where shocks are increasingly common.

It is also a question of Britain's standing on the world stage. As one of NATO's leading members, the United Kingdom must demonstrate not only political commitment but credible, tangible capability. Allies look to Britain to provide leadership, not just through rhetoric, but through readiness and the strength of our industrial base. Our ability to sustain a sovereign defence sector underpins our credibility as a reliable security partner. Without a strong domestic foundation in engineering, shipbuilding, and advanced manufacturing, alongside new technology – in AI and Quantum - our influence within NATO would inevitably diminish.

Sovereign capability means more than having factories on British soil - it means retaining the skills, knowledge and innovation capacity that underpin those factories, so that we can respond to new threats with agility and confidence. It means giving real power to communities – real devolution. With already over two thirds of all defence spending being spent outside London and the South East, defence is the sector powering our regions, for our whole country. Britain's defence industry provides tens of thousands of high-quality, often unionised jobs, sustaining families and communities across the country. These jobs are rooted in tradition but also forward-looking, offering apprenticeships and training in cutting-edge skills that prepare the workforce for the industries of the future. When international companies aim to invest here, the Government should encourage permanent UK-arms with real long-term spending to give confidence to communities. Looking forward, the Government must prioritise British-built products in its forthcoming flagship tenders; from shipbuilding to gun manufacturing. In short, sovereign defence capability strengthens not just our Armed Forces but our economy and society.

This paper sets out why sovereign defence capability must remain a strategic priority for government, industry and the wider public. It demonstrates that retaining control over the critical industrial and technological assets of defence is central to our national security, our leadership within NATO, and our long-term economic strength. By investing in our sovereign defence capacity, we not only safeguard the nation today but also ensure that Britain remains confident, capable and secure in shaping its own future.

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