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ALFED
ALUMINIUM FEDERATION

Defence Report

Sovereign Aluminium for UK Defence: Capability, Resilience and Readiness

Prepared by: Aluminium Federation (ALFED)

0333 240 9735

alfed@alfed.org.uk

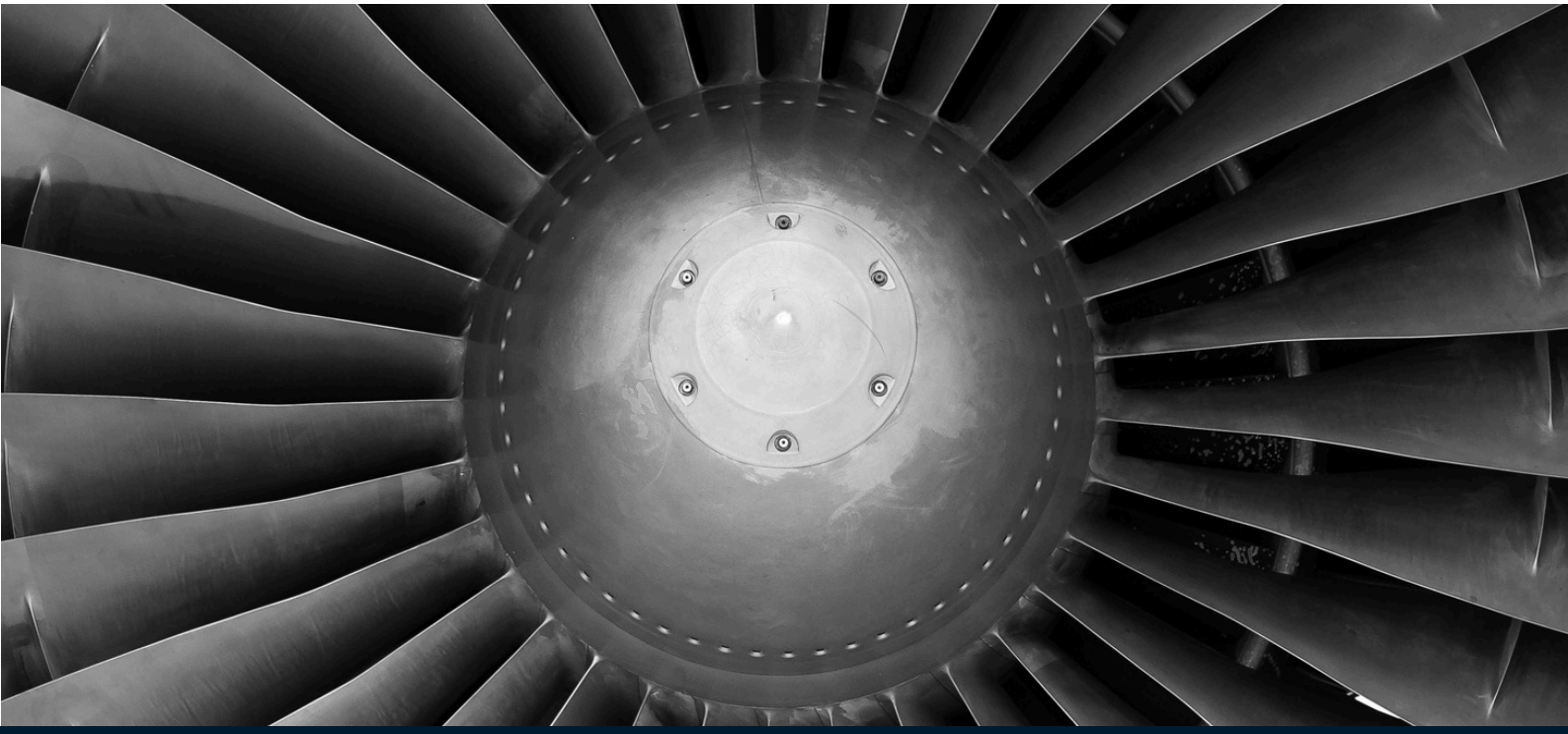
www.alfed.org.uk

Executive Summary

Aluminium for UK Defence, Now

This update follows DSEI 2025 (9–12 Sept 2025) and comes ahead of the updated UK Critical Minerals Strategy, in which aluminium is set to be recognised as both a Growth and a Critical mineral.

The two events align: defence programmes are signalling the need for modularity, speed and resilience, and aluminium is central to delivering all three – across air, sea and land systems.



Why Aluminium?

Aluminium is lightweight, strong, formable, corrosion-resistant, thermally conductive and endlessly recyclable. It underpins airframes and mission systems, naval superstructures and fast craft, protected mobility and deployable infrastructure, and C4ISR/power electronics.

The UK can convert these properties into assured domestic capability: sourcing, processing and recycling high-grade material with predictable quality and timelines.

Contents

What aluminium enables for defence:

- **Readiness and range:** lighter structures and components increase payload, endurance and manoeuvrability.
- **Survivability and resilience:** proven alloys and tempers perform across harsh, corrosive and high-temperature environments.
- **Pace and repairability:** extrusion, plate, sheet, casting and additive routes support modular build, remanufacture and in-theatre sustainment.
- **Secure circularity:** on-shore re-melting and sorting/de-coating reclaim high-grade scrap quickly and predictably.

The UK Opportunity

- **On-shore capability:** upgrade defence-grade extrusion/casting, heat-treatment and finishing to shorten supply chains and increase assurance.
- **Energy & costs:** deliver predictable, competitive site-level energy to unlock electrification, low-carbon heat and efficiency upgrades.
- **Circular feedstock:** retain more high-grade scrap in the UK with better classification and traceability, while sustaining efficient European loops that some UK producers depend on.
- **Skills & standards:** align training, testing and qualification so new alloys/processes enter programmes at pace

What needs to happen now?

1. A bankable energy pathway for energy-intensive sites (with clarity for SMEs) to green-light near-term plant upgrades.

2. A targeted Defence Aluminium Capability Audit to map current capacity and priority gaps (extrusions, castings, heat-treat, coatings).

3. A circular CAPEX pipeline (re-melting, sorting, de-coating) with a simple digital "scrap passport" to reward quality and provenance.

4. Procurement signals that recognise resilience and (where appropriate) low-carbon/recycled content, to crowd-in private investment.

Foreword

Aluminium is a material of strategic importance. From jet fighters to naval vessels, secure communications to energy-efficient infrastructure, the UK's ability to produce, process and recycle aluminium domestically is integral to our defence resilience and industrial sovereignty. This report sets out aluminium's role in enabling national security and the actions required to secure its future in the UK.

Independent defence analysis by the Hague Centre for Strategic Studies (Strategic Raw Materials for Defence, 2023) classifies aluminium as "very high risk (HH)" because it is used across air, sea and land platforms and faces a high likelihood of supply disruption. HCSS also notes the concentration of primary aluminium production in China (≈46%) and Russia (≈7%), underscoring strategic exposure for UK and European defence supply chains.

While in December 2024, NATO formally recognised aluminium as one of twelve defence-critical raw materials essential for advanced military systems. Aluminium is also listed as a Strategic Raw Material under the EU Critical Raw Materials Act (CRMA), underscoring its indispensable role across aerospace, defence and dual-use technologies. As we go to press, the UK's updated Critical Minerals Strategy is expected to recognise aluminium as both a Critical and a Growth mineral. That shift closes a strategic gap and, more importantly, creates a platform for delivery: translating recognition into bankable energy at site level, targeted upgrades in defence-grade capability, and a circular feedstock system that keeps more high-grade material onshore while sustaining efficient European flows.

This edition follows DSEI 2025, where themes of modularity, pace and resilience were front and centre. The message from programmes and primes is clear: shorten lead times, assure supply, and lower embedded carbon, without compromising performance. Meeting that demand requires practical measures: predictable energy costs, a defence aluminium capability audit to map and close gaps in extrusions, castings and heat-treat, investment in re-melting, sorting and de-coating, and procurement signals that recognise resilience and, where appropriate, low-carbon and recycled content.

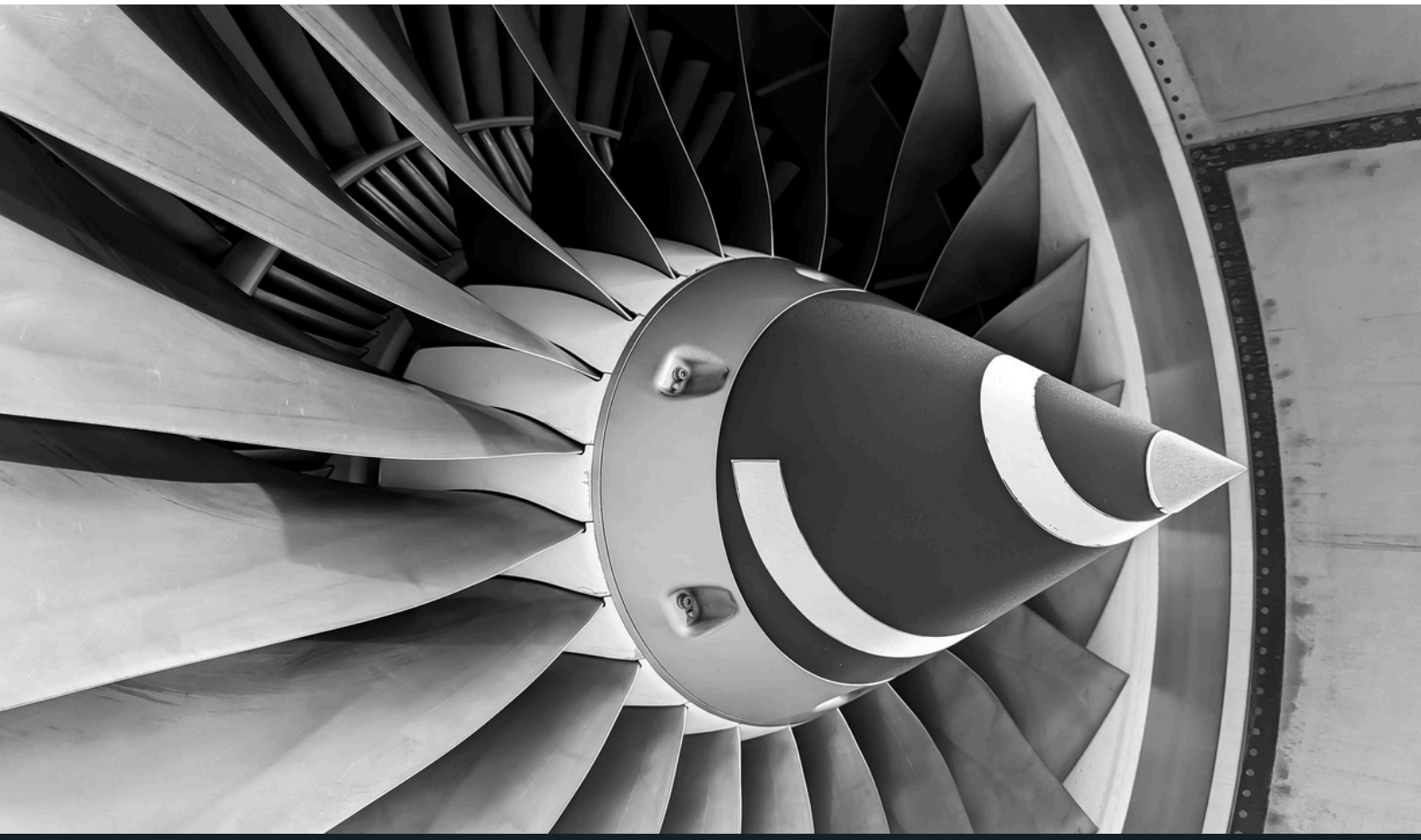
Recognition is the start line; building real, on-shore capability is the finish line.

Nadine Bloxsome
Chief Executive Officer
Aluminium Federation (ALFED)

Why This Matters Now

DSEI (ExCeL London, 9–12 Sept) brought together programme teams, primes, SMEs and suppliers around a common theme: prepare the future force. The clear imperatives were modularity, pace and resilience – build and refit faster; integrate more capability into lighter platforms; and secure material supply that is robust, traceable and lower-carbon.

For aluminium, the signal is unambiguous. Programmes need assured domestic pathways, from high-grade scrap capture and re-melting, through defence-grade extrusion/casting and heat-treatment, to precision fabrication and qualification. They also need energy visibility and predictable costs at site level so investment decisions are made now, not deferred. This report translates DSEI-week signals into a UK delivery checklist: bankable energy, targeted capability upgrades, circular feedstock with better data, and procurement signals that reward resilience and UK value-add.

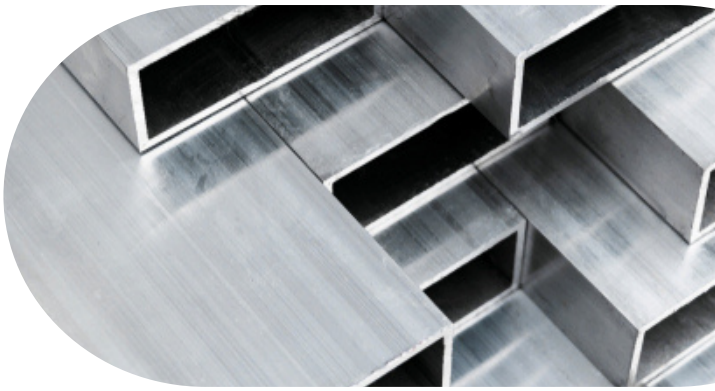


1. Why Aluminium Matters for Defence

Aluminium is a vital strategic material in defence due to its lightweight strength, corrosion resistance, formability and excellent conductivity. It is used across virtually every modern military platform and is instrumental in reducing weight, increasing fuel efficiency, and enhancing manoeuvrability in combat and support vehicles.

From aircraft fuselages and heat-resistant engine parts, to the superstructures of warships, bridge systems, field shelters and mobile command centres, aluminium ensures both resilience and agility in deployment. Its role in high-frequency communications and electronic equipment also underpins the cyber and data security capacities of modern forces.

In the UK, companies such as Bridgnorth Aluminium, Arconic Kitts Green, Amari Metals Ltd and Aero Metals Alliance, produce a broad spectrum of materials, from castings and rolled sheet to seamless tubing, all feeding into defence and aerospace platforms.



Key Defence Applications

Aluminium's use in defence extends beyond structural components:

Aerospace	Aircraft, drones, missiles, satellites - benefiting from aluminium's high strength-to-weight ratio and fuel efficiency.
Naval & Armoured Vehicles	Corrosion-resistant alloys used in amphibious transport, shipbuilding, and blast-resistant structures.
Command, Control & Communications (C3)	Aluminium enclosures and components critical to modern battlefield communication and surveillance.
Energy & Logistics	Lightweight power systems, containers and portable infrastructure for rapid deployment.
Space	Aluminium structures and components for launch vehicles, satellites, and scientific payloads.
Dual-Use Technologies	Enabling innovations in robotics, additive manufacturing, and unmanned platforms.

2. Strategic Context

The UK Government's Defence Industrial Strategy: Making Defence an Engine for Growth (2025) confirms defence spending will rise to **2.6% of GDP by 2027**, with an ambition to reach 3% in the next Parliament and a historic commitment to **5% of GDP on national security by 2035**, creating clearer demand signals for sovereign materials capability.

European defence expenditure is also rising sharply this decade, reinforcing the need for resilient, on-shore aluminium supply that can support UK and allied programmes.

This commitment coincides with growing NATO emphasis on supply chain resilience, as well as the EU's mobilisation of a **€150bn SAFE fund** to support cross-border defence industrial capability.

On the international front, several major trade agreements have shifted the conversation around strategic materials like aluminium. The UK-EU Carbon Market Linkage announced in May 2025 signals an intention to align emissions trading systems, potentially exempting UK exporters from EU CBAM liabilities and creating a level playing field for carbon costs across Europe.

These agreements represent a rare moment of strategic convergence. With the right industrial planning, the UK can reassert itself as a hub for low-carbon, secure, and sovereign aluminium capability.

In parallel, the European Commission's recent White Paper for European Defence – Readiness 2030 sets out a roadmap to strengthen Europe's defence base, including strategic raw material access. As a NATO member with strong defence trade ties to Europe, the UK must mirror this ambition through coordinated aluminium capability planning.

Aluminium is central to these efforts, with dedicated investment, material resilience planning and raw material safeguards.

Supply risk for critical raw materials in military applications

**Aluminium is one of the most commonly used materials across military applications and has been named by NATO as one of the 12 defence-critical raw materials essential for the Allied defence industry as shown in the image above.*

Aluminium Alloy Split Demand

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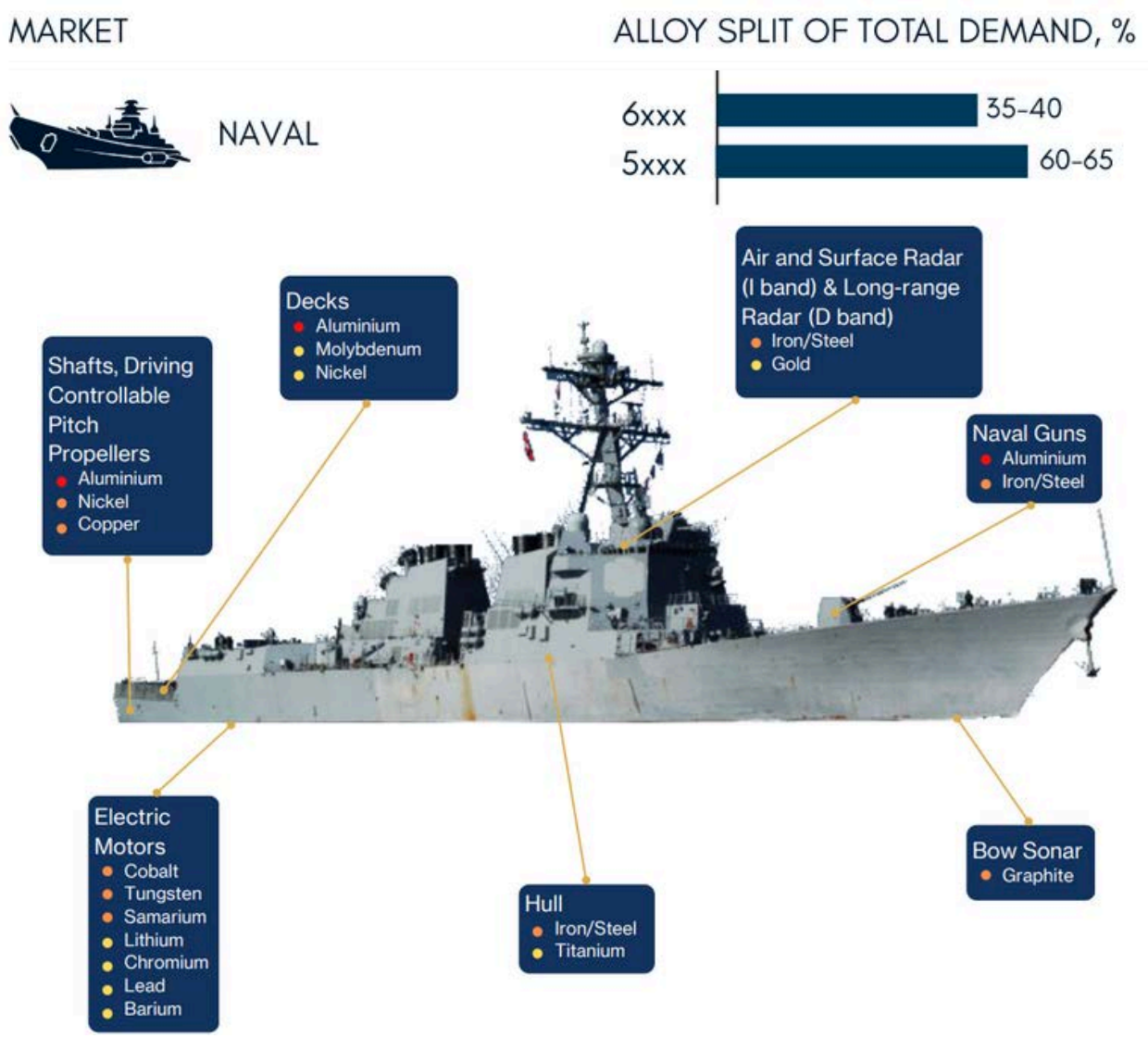
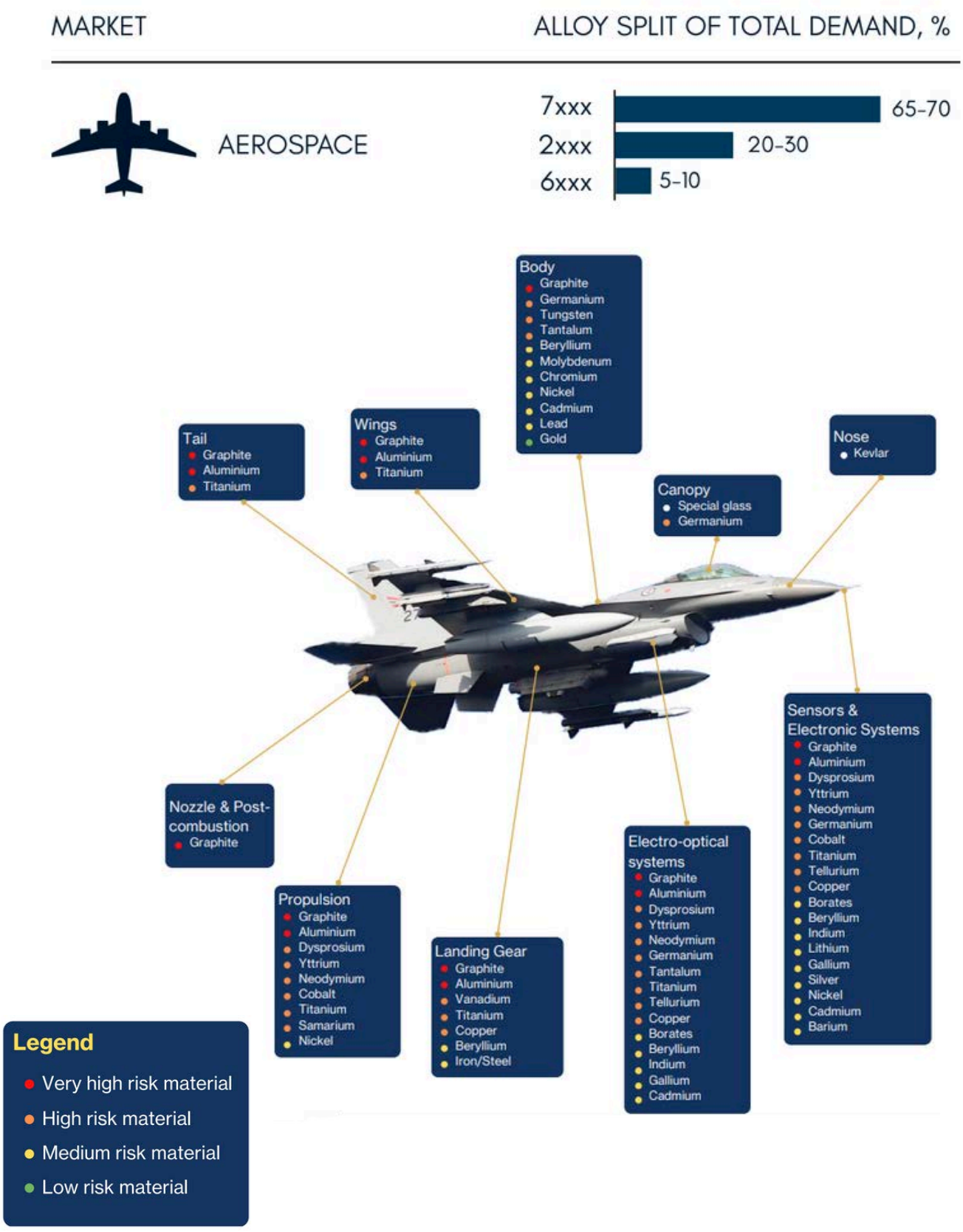


Aluminium in shipbuilding - OCEA, created in 1987, is an international company that specialises in the design, building and support of aluminium vessels. Aluminium is a key material for marine defence applications. Aluminium is lightweight and allows for smaller, lighter, and stealthier ships which can have higher payloads and reach greater speeds.

Ken Houlberg, CEO of OCEA UK highlighted the benefits of aluminium vessels; "Operating costs are a lot cheaper for OCEA aluminium ship solutions, in addition to this we see maintenance costs at 25-30% less, and CO2 emissions at 30-45% less than conventional vessel solutions." The OCEA UK team specialises in solutions for Naval and Defence customers globally. OCEA UK offers the following design ranges; Surface Combatants, Fast Attack Craft, Mine Countermeasure Vessels, Landing Craft, Autonomous Vessels. The use and benefits of aluminium will not mean the redundancy of large capital assets, but a reconfiguration of a traditional fleet to meet a modern threat.

Aluminium Alloy Split Demand



CASE STUDY

Arconic Kitts Green: Over 75 years producing aluminium for the defence industry

Arconic Kitts Green has been in business of casting and fabricating aluminium alloy products for over 75 years. It is the last aluminium plate mill in the UK producing plate in the gauge range 6.35mm to 400mm. Today we specialise in the manufacture of medium and high strength aluminium alloy plate which is supplied to the UK and international aerospace, defence, space and general engineering markets, and can produce between 36KMT to 40KMT per year.

Kitts Green supplies a number of different alloys into the Defence market. These range from the non-heat treatable 5XXX series which combine good blast resistance with good formability, corrosion resistance and weldability; through to the medium and high strength 7XXX series alloys which offer excellent ballistic protection and, when combined with various heat treatment tempers, can be optimised to give enhanced mechanical and corrosion properties. Kitts Green manufactured plate used in the building of the Spitfire, the iconic British fighter of WWII.

Since the days of the Spitfire through to the Harrier jet, we have supplied heat treated plate into various military aircraft programs and continue to be a major supplier for the latest and most advanced fighter aircraft. Kitts Green has also supplied defence plate into various armoured vehicle programmes including those sponsored by the British, French and German defence ministries and as the last UK aluminium plate mill, is strategic for the supply of aluminium plate for the UK defence market both now and for the foreseeable future.

We are also seeing increased interest in the Al/Li alloys for defence applications. Kitts Green is also the only producer in the UK of aluminium lithium alloy plate, which requires specialist technology due to the reactivity of lithium. The addition of 1% lithium gives the aluminium alloy a 3% density saving over conventional alloys and up to 10% increase in stiffness, making it a very strategic material for defence applications where weight saving is paramount.

Aluminium is one of the most recyclable metals in use. In a typical year, Kitts Green will cast around 70KMT of aluminium slab, which is fed by up to 90% recycled scrap, with the remainder coming from alloying elements such as copper, magnesium and zinc plus aluminium prime. We always maximise the use of recycled material, from our own processes and local outside sources, to maintain a sustainable process at the lowest cost.

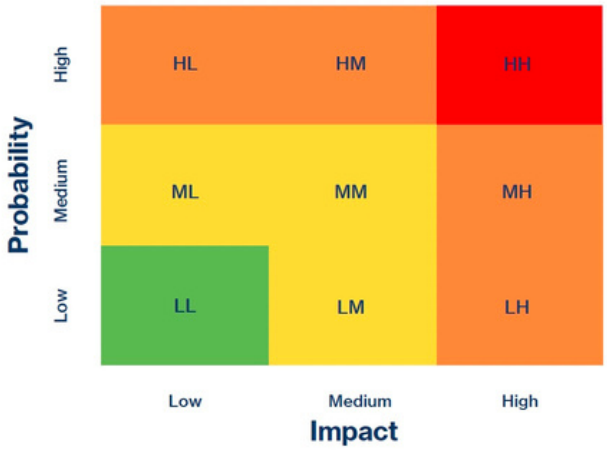
Aluminium alloys are approximately one third the density of steel and this, combined with their excellent strength to weight ratio, good fracture toughness and corrosion resistance make high and medium strength aluminium alloy plate a critical product for the defence industry. Its ease of fabrication means that it is the material of choice for a vast array of components in military aircraft, light weight armoured vehicles and space applications.

3. Risks Facing the UK Aluminium Defence Supply Chain

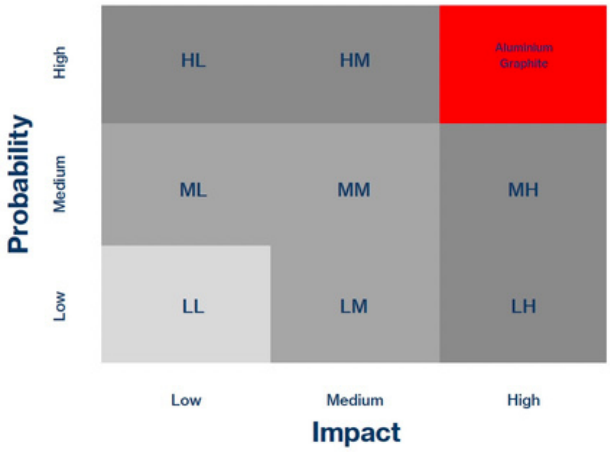
UK aluminium producers continue to face disproportionate electricity costs, which can be up to 60% higher than those paid by competitors in France or Germany. This undermines long-term investment, weakens competitiveness, and limits growth in defence-relevant production.

The UK also lacks capacity in key process areas including high-specification aluminium extrusions, defence-grade castings, and heat-treated alloy processing. Legacy-grade materials, which remain essential to existing defence platforms, are at risk of being lost due to market exit or lack of support for low-volume specialist lines.

At the same time, more than 600,000 tonnes of aluminium scrap was exported in 2024, likely including strategic grades. Without targeted policy or financial incentives, the UK risks losing this closed-loop resource to countries with more competitive remelt infrastructure.



**Risk assessment matrix is shown in the image above, Aluminium has been classed as category HH (High probability, High impact, shown in red). It is very likely that the risk will materialise and its impact would be significant. Aluminium has been classed in this category for air, sea and land domains.*



** Very high-risk materials are identified as: High probability, High impact (HH), this means that these materials are the most used in defence applications, and the most likely to suffer from geopolitical and supply chain disruptions.*

Further, there is no UK-specific stockpile of defence-grade aluminium and limited strategic oversight of where and how aluminium is used across current MoD platforms. Without robust data or mapping of SME processors and downstream users, the UK cannot accurately assess the resilience of its aluminium supply chain.

HCSS highlights that aluminium is both ubiquitous in defence and highly exposed to geopolitical risk, strengthening the case for on-shore remelting, sorting and de-coating capacity and for higher-value retention of UK scrap (HS 7602) where feasible. With supply-security risks very likely to materialise under current tensions, a Defence Aluminium Capability Audit and stock-readiness planning are prudent measures to underpin resilience across priority platforms.

4. Strategic Opportunities

There is now a clear opportunity to reposition aluminium within defence and trade policy. The development of a **Defence Aluminium Capability Audit**, led by industry through ALFED and supported by government, would be a valuable first step in understanding the UK's aluminium footprint across defence, identifying gaps, and targeting investment where most needed.

The 2025 Defence Industrial Strategy introduces a segmented procurement approach with target timelines of under two years to first contract for major platforms, under 12 months for modular upgrades, and three-month cycles for rapid commercial exploitation, directly supporting faster adoption of UK aluminium innovations. The Strategy also launches an Office of Defence Exports and Defence Growth Deals (with initial deals in Plymouth and South Yorkshire), together with a strengthened five-year acquisition pipeline, leveraging exports and regional capability to back UK-based, resilient supply chains.

Participation in the EU SAFE fund must be pursued, with aluminium manufacturers and processors prioritised for investment in low-carbon production and defence-readiness capacity. Aluminium should also be explicitly listed in public procurement guidelines and UK Export Finance guarantees covering defence supply chains.

Support for legacy-grade production is essential, particularly in casting and precision extrusion. Government can assist through co-investment schemes or by recognising these materials as part of a national resilience strategy.

Reform of industrial energy pricing, specifically through the introduction of a Contract for Difference (CfD) for electro-intensive sectors like aluminium, would significantly improve competitiveness. This has already proved successful in other strategic energy sectors.

A circular approach to defence sourcing must also be supported, ensuring high-quality aluminium scrap remains onshore for remelt and reuse. Tax incentives or prioritised procurement awards for UK-processed circular material could stimulate investment in domestic recycling infrastructure.

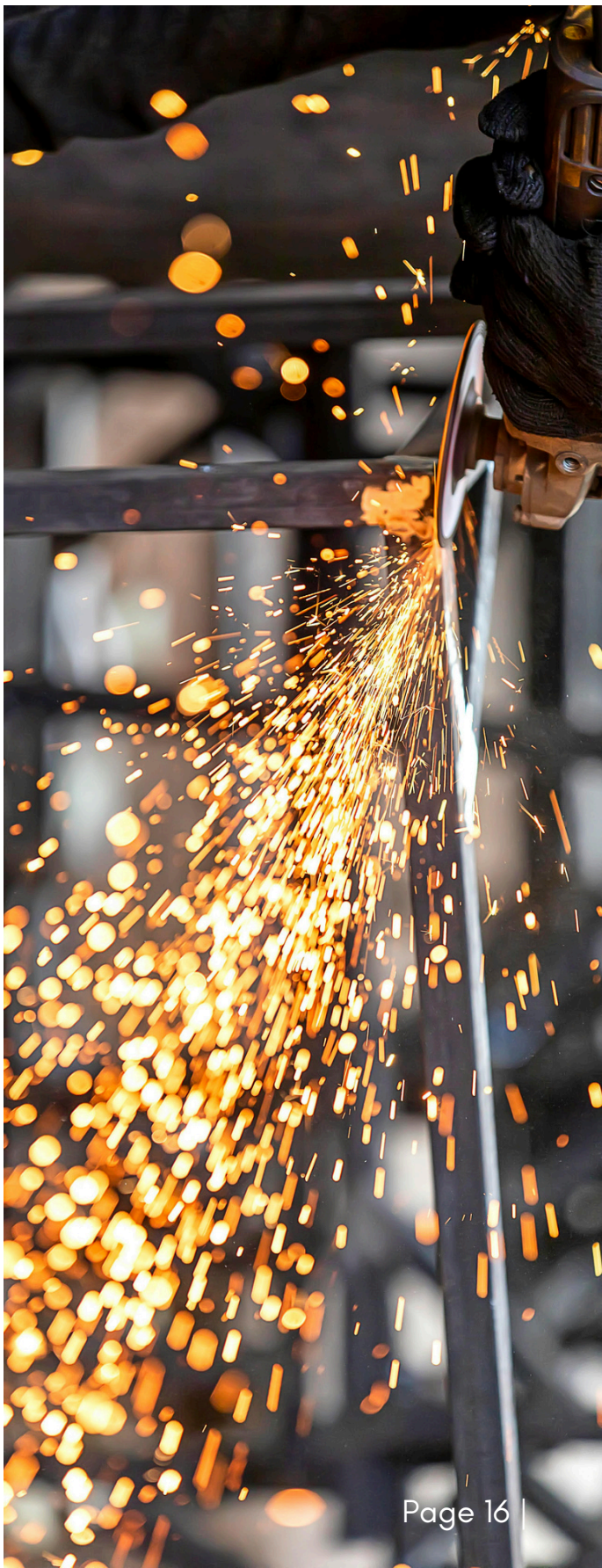
A new UK Defence Innovation (UKDI) entity carries a ring-fenced budget of at least £400m per year, and the MOD will allocate ⩾10% of equipment procurement to novel technologies, opening clear routes for low-carbon alloys, circular feedstocks and digital QA from the aluminium sector to enter programmes faster.

Alongside this, a "Destination Defence" skills mission (including Defence Technical Excellence Colleges and a UCAS-style entry route) complements ALFED's Aluminium Allies and a UK aluminium skills pathway focused on defence-grade capability and mid-career transitions.

Recommendations

Considering the risks and opportunities outlined above, ALFED recommends that the UK Government:

- Officially recognises aluminium and its alloys as strategic defence materials.
- Introduce non-price criteria (e.g. resilience, UK-sourced material) in defence procurement.
- Integrates aluminium supply chain mapping into the UK Defence Industrial Strategy.
- Launches a UK Defence Aluminium Capability Audit in partnership with ALFED and ADS (the UK's aerospace, defence, security and space Association).
- Prioritises aluminium in UK Export Finance and EU SAFE defence funding programmes.
- Establishes a National Aluminium Stockpile Programme for critical defence grades.
- Reforms industrial electricity pricing through Contracts for Difference for aluminium producers.
- Ensures aluminium producers and recyclers are included in net zero defence planning and circular procurement frameworks.



Data Snapshot

METRIC	VALUE
UK ALUMINIUM HS 7602 SCRAP EXPORTED (2024)	612,000 TONNES
ALUMINIUM INDUSTRY ENERGY PRICE GAP VS EU AVERAGE	~+60%
GLOBAL ALUMINIUM DEFENCE MARKET (2030 FORECAST)	£24BN+
UK DEFENCE SPENDING BY 2027	£100BN+ ANNUALLY
NUMBER OF UK DEFENCE PROGRAMMES USING ALUMINIUM	>30 CONFIRMED
DEFENCE CRITICALITY RATING (ALUMINIUM)	VERY HIGH RISK (HH) - HIGH PROBABILITY AND HIGH IMPACT FOR DEFENCE
GLOBAL PRIMARY ALUMINIUM PRODUCTION CONCENTRATION (CRU REPORT)	CHINA ~46% OF WORLD OUTPUT; RUSSIA ~7%
GLOBAL ALUMINIUM SEMIS DEMAND	102.2 MT (2024) → 118.1 MT (2029)
EU DEFENCE SPENDING	$457BN (2024) → $580BN (2030)
NAVAL ALUMINIUM PERFORMANCE CASE AS PRESENTED BY OCEA UK	-30-45% CO_2 AND -25-30% MAINTENANCE VS CONVENTIONAL BUILDS

Primary sources: HCSS, Strategic Raw Materials for Defence (2023); UK Government, Defence Industrial Strategy: Making Defence an Engine for Growth (2025); CRU, Trade Data Monitor Ltd.

Conclusion –
From Recognition to Delivery

The signal is clear. Coming out of DSEI 2025 and ahead of the UK's updated Critical Minerals Strategy, the UK has a window to convert recognition into capability.

Defence programmes are asking for modularity, pace and resilience; aluminium already enables these outcomes across air, sea, land and C4ISR. What's needed now is delivery at site level and across the supply chain.

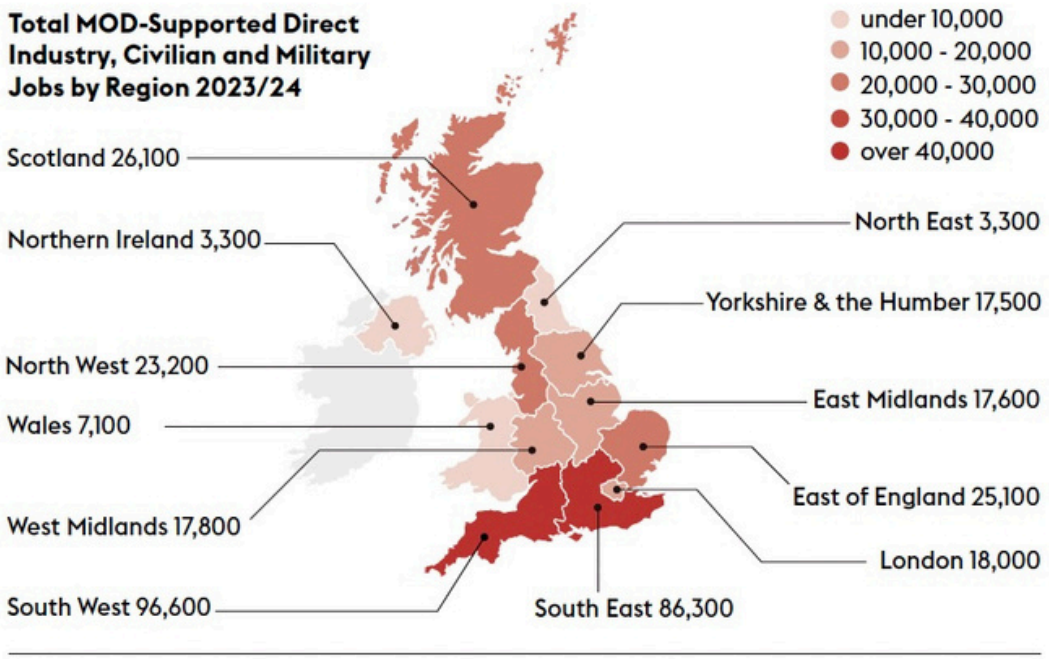
This report sets out a practical path: bankable energy so plants can commit to upgrades; a targeted Defence Aluminium Capability Audit to map and close priority gaps (extrusions, castings, heat-treat, coatings); investment in circular capacity (re-melting, sorting, de-coating) with simple data standards to reward quality and provenance; and procurement signals that recognise resilience and, where appropriate, low-carbon and recycled content, crowding in private capital while improving readiness.

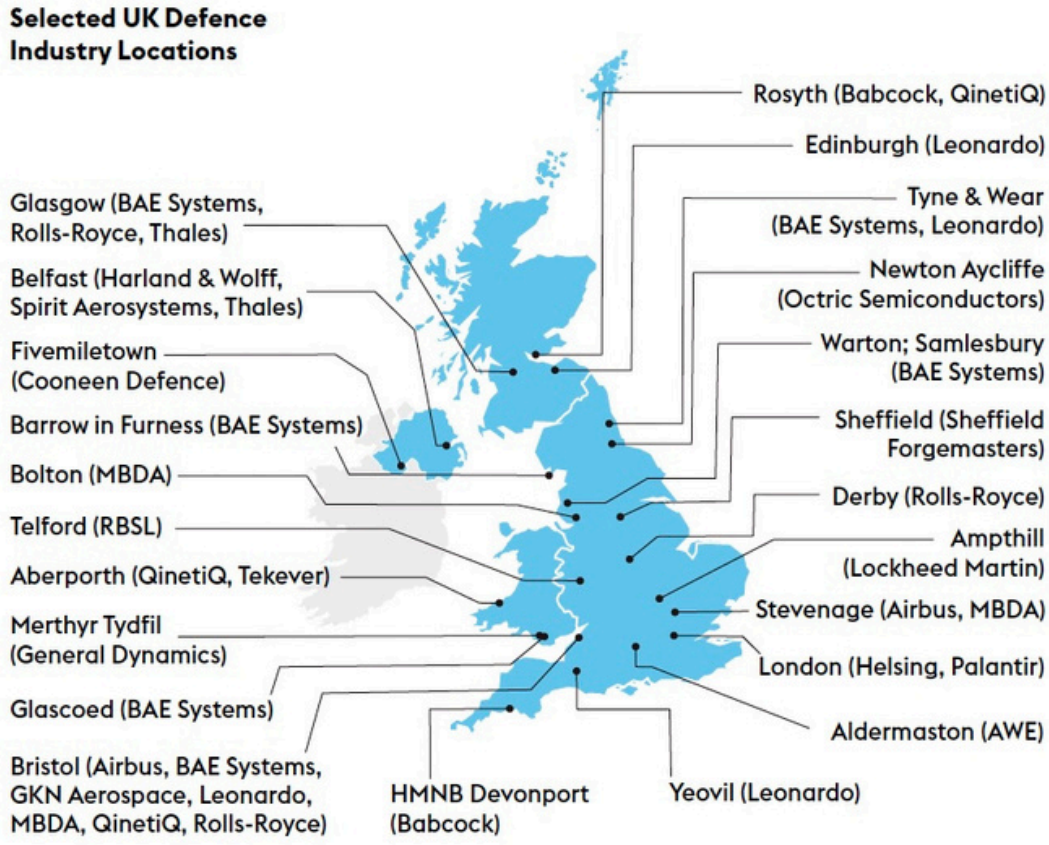
ALFED will work with government (MOD, DE&S, DBT, DESNZ, HMT), primes, Tier-1s and SMEs to move these actions forward at pace, using the UK Aluminium Alliance as the platform to align workstreams and track progress.

We invite programme teams and suppliers to engage with us on the capability audit, circular feedstock pilots, and qualification pathways so that the UK's defence requirements translate rapidly into investable projects and onshore capacity.

Appendix

Here are more details about the Defence industry in the UK. The defence industry is widespread across the UK supporting jobs in all areas across various locations and businesses.





About ALFED

The Aluminium Federation (ALFED) is the UK trade association for the entire aluminium value chain, covering primary and secondary production, rolling, extrusion, casting, recycling, fabrication, distribution and end-use applications. Our mission is to ensure a strong, competitive and sustainable aluminium industry in the UK by turning policy signals into investable reality for sites and supply chains.

ALFED provides policy leadership and technical support across industrial competitiveness, energy and decarbonisation, trade and market access, standards and compliance (including HSE/REACH), circularity and skills. We convene specialist communities (HSE & Environmental Groups, technical forums and training including ESG-C) and deliver evidence-based advocacy grounded in member data and operational insight.

The UK Aluminium Alliance is an industry-led platform convened by ALFED to build the evidence, alliances and mechanisms so UK aluminium can compete, grow and decarbonise, without distorting markets or directing individual investments. UKAA brings producers, recyclers, processors, OEMs and partners together around a short, practical work plan focused on eight themes (energy, data, skills, perception, material supply/HS 7602, processing capability, industrial product drive and policy).

Current delivery includes an "AS-IS" baseline (a validated, anonymised picture of UK flows, scrap grades, processing assets, regional capacity and typical lead times), compliance-safe dashboards, and pilots in energy, circularity and trade. In parallel, Aluminium Allies – our next-generation network – ensures talent, skills and fresh perspectives feed directly into UKAA activity.

Our aim is simple: to help the UK build resilient, lower-carbon aluminium capability that strengthens national security, supports high-value jobs, and underpins growth in defence, aerospace, energy, transport and construction.

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Contact Us

0333 240 9735

alfed@alfed.org.uk

www.alfed.org.uk

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