MARSHALL

Advanced Manufacturing Solutions

Your trusted manufacturing and assembly partner

marshallgroup.com

Contents

Introduction to Marshall

Established in 1909, Marshall is a British aerospace and defence company with a rich engineering heritage and an enduring commitment to serving governments and prime contractors.

We have developed a world-leading capability in precision manufacturing, designing and producing parts, components and complex subsystems for flagship defence programmes under long-term contracts for some of the world's largest OEMs.

As a global leader in military maintenance, repair and overhaul (MRO), we work closely with aircraft operators to keep their fleets mission-ready and mission-capable. We have supported the C-130 Hercules since 1966, earning multiple world-first accreditations, permissions and accolades for our excellence on the platform.

Drawing on decades of engineering expertise and wide-ranging design organisation approvals, we are able to plan, integrate and certify complex programmes from start to finish, from standard avionics upgrades to completely bespoke special mission conversions.

Our global network matches our diverse customer base. Wherever we operate, our people share a common sense of purpose and pride in our engineering excellence.

> As a trusted manufacturing and assembly partner, Marshall has built up decades of experience delivering scalable, end-to-end solutions underpinning some of the world's most critical platforms for leading defence and aerospace OEMs including Boeing and Lockheed Martin.

SUPPORTING 25 OPERATORS

- Complex machining and fabrication
- Surface treatments and coatings
- Nondestructive testing
- 5-axis CNC Machining
- Additive Manufacturing
- Multiple AFNOR and NADCAP Approvals
- Global Supply Chain
- Domain Agnostic Manufacturing Capability
- Final assembly
- Can accommodate aircraft up to Boeing 747 (Light Load)
- 14 Aircraft Maintenance Bays plus 2 x Paint Bays
- List X (FSC) Secure Site
- A 1,965m / 6,447 ft asphalt runway
- Ground test running facility and Flight Test
- CAT I ILS on runway
- 117,000m2 of Hangar Space

Advanced Manufacturing Solutions

As a trusted manufacturing and assembly partner, Marshall has built up decades of experience delivering scalable, end-to-end solutions underpinning some of the world's most critical platforms for leading defence and aerospace OEMs including Boeing and Lockheed Martin.

Our proven engineering capability and in-house manufacturing capabilities are backed by strong supply chain links and infrastructural capacity, enabling us to deliver complex, high-value programmes with consistency and confidence.

Thanks to our investment in facilities and emphasis on continuous improvement, we are able to adopt and apply advanced manufacturing and assembly techniques to produce individual parts and components or entire complex subsystems and aerostructures.

Complex Assembly

Globally respected, Marshall has decades of experience delivering advanced structures and complex sub systems that meet the toughest engineering challenges across civil and military applications.

Whether delivering build to print to meet the needs of customer programmes, or using our engineering capability to develop products to customer specifications, few companies can match Marshall's depth of expertise and breadth of capabilities.

Our state-of-the-art Advanced Manufacturing Solutions site in Cambridge has received supplier performance awards, recognising our ability to deliver on time and to the highest quality and safety standards.

We are able to flexibly scale to meet customer needs – whether producing a one-off prototype or thousands of units over a years-long production run.

Complex machining and fabrication

Production engineering
CNC programming
CNC milling and turning
Manual milling and turning
FDM additive manufacturing (3D printing)
Engraving
Tool making
Honing and grinding
Sheet metalwork
Pipework

Surface treatments and coatings

Heat treatment
Surface treatments
Chromate conversion coating
Chromic anodising
Sulphuric anodising
CRS passivation
Painting
Non-Destructive Testing

Final assembly

Assembly
Welding
Electrical wiring and looming
CMM inspection
Manual inspection

Testing

Ensuring products perform as designed, production acceptance testing is a critical part of our delivery process. Our teams are experienced in development and optimisation of production acceptance tests, or execution of customer specified test programmes.

Working alongside our partner engineering services business, we are able to deliver system verification and validation, supporting safe, reliable, entry into service.

Level 3 non-destructive testing

Radiographic

Ultrasonic

Surface and rotating eddy current

Magnetic particle

Dye penetrant

Quality Assurance & Through Life

Marshall is committed to delivering the highest levels of safety, quality and environmental management.

Developed through our aerospace heritage, and years of experience delivering safety and mission critical products and services for our customers, our systems and processes are approved to ISO9001, AS9100, AS9110 and ISO14001. We use our broad scope of quality approvals, and years of experience delivering to the highest quality standards as a foundation for delivery across adjacent markets.

Continuous improvement is a focus for our experienced workforce; investment in facilities and processes ensures we deliver the highest value for our customers.

We ensure our products perform as well at the end of their life as when entered into service. Supporting through life, we provide repair, maintenance, spares and obsolescence services.

Supply Chain Management

We manage the global supply chain for our advanced structures and components, leveraging our long-term relationships with equipment and material OEMs to provide the required expertise at the right time in the right place.

Our supply chain processes operate to aerospace standards, and our extensive knowledge of export regulations, including ITAR, helps ensure we maintain a compliant, sustainable and socially responsible procurement process.

We offer extensive warehouse and distribution services, with our warehouse team undertaking all goods receipts, inspection, storage and handling of parts, including dangerous goods.

Benefiting from an in house manufacturing capability, Marshall completes make buy assessments to determine the best supply chain solution for our customer projects. Our vertically integrated facility houses every stage of the production process, including complex machining, sheet metalwork, assembly, inspection, testing, treatment and paint.

For our customers, working with Marshall from start to finish avoids the complexity, cost and risk associated with subcontracting. We also provide complete transparency throughout the process, from materials and supply chain to manufacture, inspection, treatment and delivery.

Capability Summary

Marshall's in-house parts and components manufacturing team produces high-quality, certified aerospace parts and components, backed by state-of-the-art equipment and decades of expertise.

Our Part 21G and NADCAP-accredited facility in Cambridge, UK, can undertake all aspects of high-complexity manufacturing for military and civil customers alike, serving as a single source for finished parts or turnkey sub-assemblies.

Our vertically integrated facility houses every stage of the production process, including complex machining, sheet metalwork, assembly, inspection, testing, treatment and paint.

For our customers, working with Marshall from start to finish avoids the complexity, cost and risk associated with subcontracting. We also provide complete transparency throughout the process, from materials and supply chain to manufacture, inspection, treatment and delivery.

Production Capability

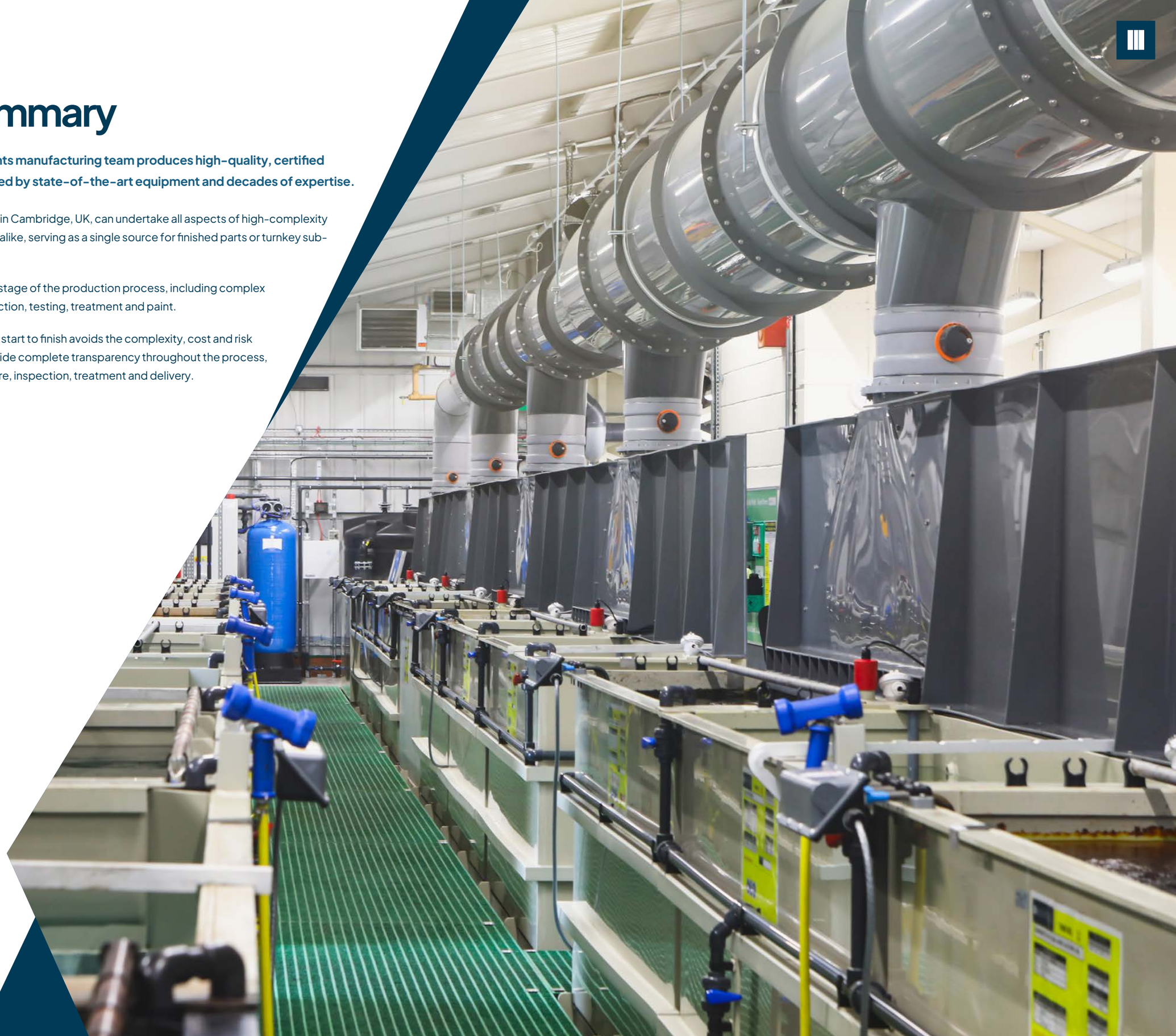
- Production engineering
- CNC programming
- CNC milling and turning
- Manual milling and turning
- FDM additive manufacturing (3D printing)
- Engraving
- Tool making
- Honing and grinding
- Sheet metalwork
- Pipework
- CMM inspection
- Manual inspection

Special Processes

- Heat treatment
- Surface treatments
- Chromate conversion coating
- Chromic anodising
- Sulphuric anodising
- CRS passivation
- Painting
- Non-Destructive Testing
- Welding

Assembly

- Mechanical assembly
- Electrical assembly
- Systems assembly



Accreditations and Approvals

Delivering safe, compliant engineering solutions, our people and processes are approved to the highest standards.

Our approvals include:

Baseline quality approvals
AFAQ: ISO 9001 : 2015 : 2008/32550.17
AFAQ: AS9110:C / SJAC 9110:B / prEN9110:2018: 2013/57102.9
AFAQ: AS9100:D / JISQ 9100:2016 / EN 9100:2016: 2008/32551.17

Current customer & partner specific approvals
Boeing: Manufacturing Processes D1-4426
Boeing: Develop & Manufacture D6-82479
Lockheed Martin Heavy Maintenance Centre
Lockheed Martin Hercules Service Centre

Special process approvals
PRI NADCAP: Chemical Processing
PRI NADCAP: Heat Treating
PRI NADCAP: Non-Destructive Testing
PRI NADCAP: Welding

National level regulatory approvals
UK CAA: 21G Production Organisation: UK.21G.2078
UK CAA: 21J Design Organisation Approval: UK.21J.0181
UK CAA: 145 Maintenance Organisation: UK.145.0003
UK CAA: 147 Training Organisation: UK.147.0131
UK CAA: Aerodrome Certificate: UK - EGSC-001

UK military regulatory approvals
UK Military Aviation Authority: DAOS UK.MAA.DAOS.153
UK Military Aviation Authority: MRP Part 145 MAOS 145.1001

European military regulatory approvals
Various

CASE STUDY

Boeing – Design and Manufacture

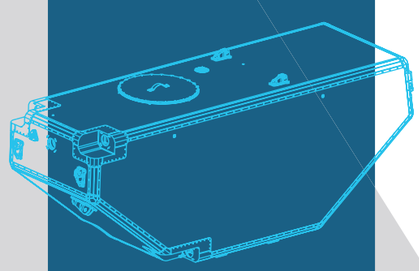
OVERVIEW

For over four decades, Marshall has produced auxiliary fuel tanks that have been retrofitted to 10 commercial and military aircraft types across five major OEMs including Airbus, Bombardier and Boeing. We offer a safe, reliable and certified solution needed to meet range-extension requirements, today and in the future.

We have been working extensively with Boeing since 1997, initially providing auxiliary fuel tanks for commercial airliner variants such as the 747-400ER and 777-220LR Worldliner. Since 2009, we have been Boeing's exclusive supplier of auxiliary fuel tanks for the globally successful

WE HAVE BEEN WORKING EXTENSIVELY WITH BOEING SINCE 1997.

P-8 Poseidon maritime patrol aircraft, end customers for which include the United Kingdom, United states, Australia, India, New Zealand and Norway.



1,200

P-8 POSEIDON FUEL TANKS DELIVERED TO DATE

CASE STUDY

Thales – Build to Print

OVERVIEW

Marshall has received a long-term contract from Thales UK to manufacture, maintain and support key components of anti-submarine sonar arrays that provide a critical edge for the UK's Royal Navy.

Under the contract, which will run from 2025 through 2039, Marshall will become a leading supplier for Sonar 2076 and Sonar 2087. Sonar 2076 is equipped on Astute class submarines in addition to the next-generation Dreadnought class, while Sonar 2087 is in use on existing Type 23 frigates and will also be equipped on their upcoming replacement, the Type 26, including variants for export.

HELPING TO PROVIDE THE EDGE FOR THE UK'S ROYAL NAVY FLEET FOR THE FORESEEABLE FUTURE.

PRODUCING SONAR MODULES FOR ROYAL NAVY UNTIL 2039

For more information please contact the Marshall sales team