

# TECHNICAL SERVICES

# FOCUSED ON DESIGN

At Portsmouth Aviation, technical services are an integral part of our business model. Our approach is bespoke and can be a game changer for your project.



TECHNICAL  
SERVICES



CNC  
MACHINING



METAL  
FINISHING



QUALIFICATION,  
INSPECTION  
& TESTING



METAL  
FABRICATION



PAINT  
& FINISHING



Designed to support and complement our traditional manufacturing capabilities, we have a wide range of core technical service competencies to ensure that we remain at the forefront of precision engineering industries.

These services include project management, post-design support, technical publications, simulation and analysis, training, and testing, amongst others. Portsmouth Aviation offers a concept-to-disposal service for precision engineered products, catered to your needs. If required, our bespoke technical department can be utilised to support the customer's needs.



# OUR TECHNICAL SERVICES

We deliver our services in-house,  
optimising quality and control.

ZERO-POINT CLAMPING  
SYSTEMS

LIGHTS-OUT  
MANUFACTURING

IN-PROCESS  
INSPECTION

QUALIFICATION,  
INSPECTION AND TESTING



## Product Development

At Portsmouth Aviation, we maintain teams of experienced and qualified engineers who work closely with our customers to develop new products for sectors including the aviation, marine and CBRN industries.

Historically, we've worked with a variety of sectors, both commercial and military, to create fresh, successful solutions to contemporary engineering challenges. This is made possible by a tested and refined product development process that relies heavily on close collaboration with each customer.

### **Bespoke Solutions That Meet Your Needs**

Our product development strategy places a heavy emphasis on establishing your parameters for success. Initial meetings will be used to determine the specific nature of your challenge, as well as your financial and time requirements, so that we can plan and deliver a fully compliant product.

### **New Product Development**

Once our engineers have assessed the feasibility of the project within the agreed parameters, work will begin on the designing of prototypes. At Portsmouth Aviation, we retain a wide spectrum of in-house experts, ensuring we're able to handle the entire product development. This allows us to cut both development times and costs – savings which greatly benefits our customers. From initial designs to releasing a fully qualified product, we'll ensure that the entire product development lifecycle is handled by a dedicated team of design professionals. You're in safe, experienced hands with Portsmouth Aviation.

### **Project Management**

From build to print projects, through to complex new product introductions (NPIs), every programme we complete is managed by one of our skilled project managers, who are responsible for managing the three cornerstones of the project – cost, time, and scope.



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### Project Management Services

We specialise in developing bespoke solutions to complex manufacturing challenges and project management plays an important role in what we do. All customers who require this support are assigned a project manager at the start of the product development process. This individual is responsible for liaising with the customer and ensuring that the project and product development lifecycle follows the pre-agreed plan. Project management can also be provided as an independent service. As well as managing the projects we deliver in-house, our highly experienced project managers can manage external projects, ranging from system integration, through to safety and reliability projects.

### Project Managers

Your project manager will be accountable for delivering the agreed project objectives. They will act as your point of contact, providing regular progress updates, while also setting objectives, determining success factors, managing risks, updating KPIs and maintaining the project schedule. All our project managers have considerable experience in the role and have worked with a diverse set of customers. They understand what it takes to manage complex projects within strict budgetary and time constraints and recognise the importance of close communication.

## Design Engineering

### Engineering Computer Aided Design (CAD) Services

Here at Portsmouth Aviation, engineering CAD is key to our technical services offering. Our in-house team of design engineers work on every new project to ensure our products and engineering solutions meet your precise requirements and specifications.

### SolidWorks Design

Our design process has matured, improved, and validated itself over several decades. It's a process that we're always updating and reshaping to accommodate new technologies, techniques, and processes. Today, it's based heavily on advanced CAD software, allowing us to create concepts in a quicker, more efficient, and cost-friendly manner than ever before.

## Simulation and Analysis

### Skilled and Experienced Engineers

Our engineering analysis team are highly qualified and considered to be subject matter experts (SMEs) in areas such as static stressing (linear/non-linear), structural dynamics, fatigue analysis, material selection and fluid dynamics.

Our engineering analysis team also provide the guidance and specifications to complete physical and environmental testing to develop and qualify the design solution.

### Advanced Simulation and Analysis Tools

Our highly experienced engineering analysis team's toolkit includes Ansys UK Ltd Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) applications in addition to classical analytical methods.



## Product Data Management

We use a product data management (PDM) system to manage product data and process-related information in a single central system.

This information includes computer-aided design (CAD) data, models, parts information, manufacturing instructions, requirements, notes, and documents. Providing a one-stop solution for secure data management, process enablement and configuration management, the PDM system is accessible by multiple applications and multiple teams across our organisation and supports business-specific needs. PDM improves productivity, reduces development errors and costs, provides visibility for better business decision-making, and facilitates collaboration between our engineering teams.



## Qualification and Testing

At Portsmouth Aviation, we offer extensive testing and qualification services. Carried out in-house whenever possible and by trusted partners when the need arises, these processes ensure all our products meet the customers' precise needs and are suitable for use in high-stress environments.

From the very first step in the design process, our engineers use state-of-the-art technologies to ensure that our products meet customer requirements. Our CAD software is supported by Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) software and other analytical methods which allow us to assess and predict material and product performance. This ensures that all of our products, parts and components are being designed for peak performance from the moment we begin a project.



For us, understanding the customer's requirements is at the core of our service. It enables our knowledgeable team to develop a design strategy and provide a solution to create a product that is compliant with the customer's specific needs and benefits the end user.

**Rob Baker, Chief Engineer**



## State-of-the-art testing

### Structural Test Facility Test Rig

Our structural test facility includes a large, universal test rig with a capacity of 4 x 2 x 2 metres and capable of applying 500 kN in all directions. This is complemented by a smaller test rig with a capacity of 3 x 1 x 1.2 metres and 20 kN load. Both rigs are equipped with overhead cranes, rated at 2 tonne and 1 tonne, respectively, so test articles may be safely installed and configured and enabling us to conduct a comprehensive range of load testing programmes.

### Development and Qualification Load Testing

Our in-house testing facilities allow us to load structural components and assemblies to their design limits and beyond – to establish yield and failure criteria, for design development, analysis validation and product qualification. This is essential when it comes to the manufacture of components that will be exposed to extreme environmental conditions or that are utilised in potentially dangerous contexts.

### Proof Load Testing and Working Load Limit Certification

Our proof load testing capabilities ensure that the build quality of our finished products will sustain the required maximum payload in service without permanent deformation or failure. Similarly, lifting equipment is tested and certified to applicable industry standards to ensure safe operation within the prescribed working load limit. Our annex includes a 3 tonne overhead crane to assist with lifting and ballasting operations.

### Tensile Testing

Tensile testing allows us to provide accurate information as to a material or component's ultimate tensile strength, yield strength and ductility. Our in-house equipment allows us to safely establish these characteristics for components and for coupons of a variety materials, including metals, plastics, and composites, up to a maximum load of 150 kN.

### Pressure Testing

Our pressure testing capabilities allow us to test the integrity of protective shells and piping when exposed to pressure. A manufactured part can be pushed to its limits to determine a safe operating level that cannot be accurately predicted using FEA software. The service is also suitable for ensuring that piping or protective shells are entirely leak-proof.

### Vacuum Testing

Vacuum testing has an important role to play in industrial leak testing and detection. Failure of vacuum equipment can have an enormous effect on performance and cause major safety concerns. To ensure an air-tight seal we employ a variety of test methods, including vacuum box testing and on-stream leak testing.



# Product Safety and Management

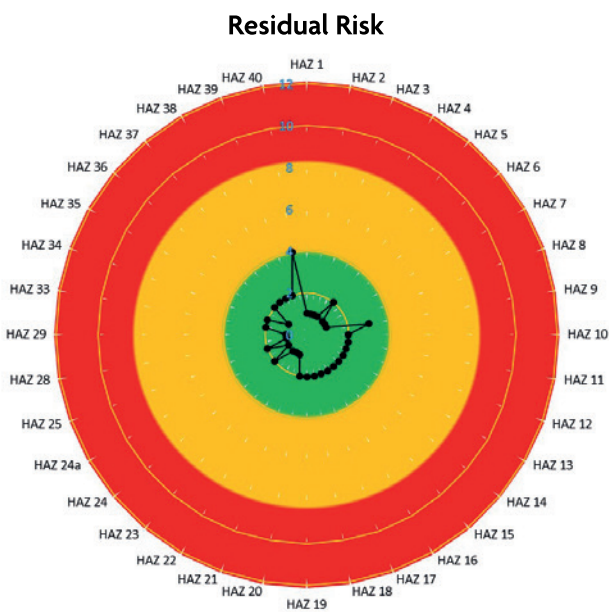
## Product Safety Management Systems

An efficient product safety management system encompasses the entire lifecycle of the product. With extensive expertise in safety management for land, sea, and aviation products, we ensure the physical and functional safety of your items. Drawing upon our vast experience in these industries, we can assist your organisation in creating a tailor-made safety management system that addresses your specific requirements. A robust safety management system establishes clear methods, processes, roles, responsibilities, and authorities, fostering a safety-conscious corporate culture that empowers the entire team to take ownership and pursue continuous improvement.

## Our Safety Management Capabilities

Our safety management methods identify and access legislation and other requirements applicable to your product and determine how these requirements apply. Techniques and processes applied then identify potential safety hazards, probabilities and residual risks ensuring they are properly documented, managed and reduced to a level that is at least tolerable and so far as is reasonably practicable (SFAIRP) prior to the product's exposure to end-users and maintainers.

Associations built over decades allow us to consult specialist safety organisations for advice, certification, regulation, and approval as appropriate. The competence of our team is regularly assessed, monitored, and recorded. Our safety management experience and capabilities will help your organisation to make more informed decisions during the design process and post-production, reducing the likelihood of your product initiating accidents or incidents.



**Risk Classification Matrix**

		SEVERITY			
		Death = 4	Specified Indury = 3	Over 7-Day Injury = 2	Non-Reportable = 1
PROBABILITY	Frequent = 5	20	15	10	5
	Probable = 4	16	12	8	4
	Occasional = 3	12	9	6	3
	Remote = 2	8	6	4	2
	Improbable = 1	4*	3	2	1

## Key Outputs

Key outputs of a safety management activities include hazard logs, summary reports and formal safety reports (safety cases/assessments). Based on comprehensive practical experience, we provide expertise in presenting a body of evidence and structured arguments that explore a product's level of safety and suitability. These reports demonstrate that adequate requirements have been set, testing and analysis have been undertaken, hazards and probabilities have been identified, and controls along with mitigations have been identified and are in place. Documentation control and configuration is correspondingly maintained by our processes.

## In-Service Support

We understand that many of our customers require in service support after we have created their bespoke products. Consequently, we've invested heavily in developing both the expertise and capacity to do so.

Our in-service support includes everything from spares provisioning and repairs, obsolescence management and modification, to engineering surveys, fault analysis and maintenance task analysis (MTA). We can also carry out level of repair analysis (LORA) and reliability centred maintenance analysis.

As with all our manufacturing work, we collaborate closely with customers to ensure these post-design services satisfy their needs. This means that support is a major consideration from the moment we begin the design process.

### Integrated Logistics Support (ILS)

Research has shown that over the whole life cycle of a product, cost of procurement is small compared to the in-service cost of support, both financially and in the availability, or lack of availability, of assets in-service. Integrated logistics support (ILS) can be applied to product acquisition. ILS is a disciplined approach that influences product design and develops a product's support solution to optimise supportability and Through life finance (TLF). It delivers the initial support package and ensures continued optimisation of the support solution considering product modifications and changes in operational use and requirements.

### Comprehensive Testing

We also specialise in in-house testing, allowing us to fine-tune, adapt and improve weapons integration. Our experienced engineers will provide a comprehensive analysis of all test results and work closely with the customer to ensure that the system meets your precise specifications.

### Developing Components to Support Weapons and Systems Integration

Our precision metal fabrication, 3D printing capabilities, and extensive design experience ensure that we're able to create, develop and manufacture components to support weapon integration activities within a relatively short timeframe and at a competitive cost.



## Technical Authoring and Illustration

### Technical Publications

Alongside our manufacturing capabilities, Portsmouth Aviation also provides through-life care for our products in the form of technical publications, such as user manuals, instructions and component maintenance manuals.

### In-House Service

Drafting such complex documents requires an in-depth knowledge of the components and experience of drafting text that's easy to interpret, comprehensible and relevant. Finding organisations or individuals who boast both qualities is remarkably difficult. That's why we have had the process in-house and developed our own technical publications service for decades.



## Cyber Security

Cyber-attacks pose an increasing threat to businesses in every industry.

While commercial aviation businesses have their customers' personal data to protect, they also have the safety of both employees and clients to consider. In the military sector, the potential ramifications of a breach of cyber security are enormous.

### Cyber Security Training

Alongside software solutions, we also offer cyber security training to those organisations that want to ensure that their employees have a good understanding of the threat they face and how they can protect customer data and their company's digital systems.



# CONTACT OUR TEAM

Whatever your engineering need, our expert design, build and manufacturing teams are on hand to help your business create a tailored solution. Find out how we can support you on your project.

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