TODS Technology
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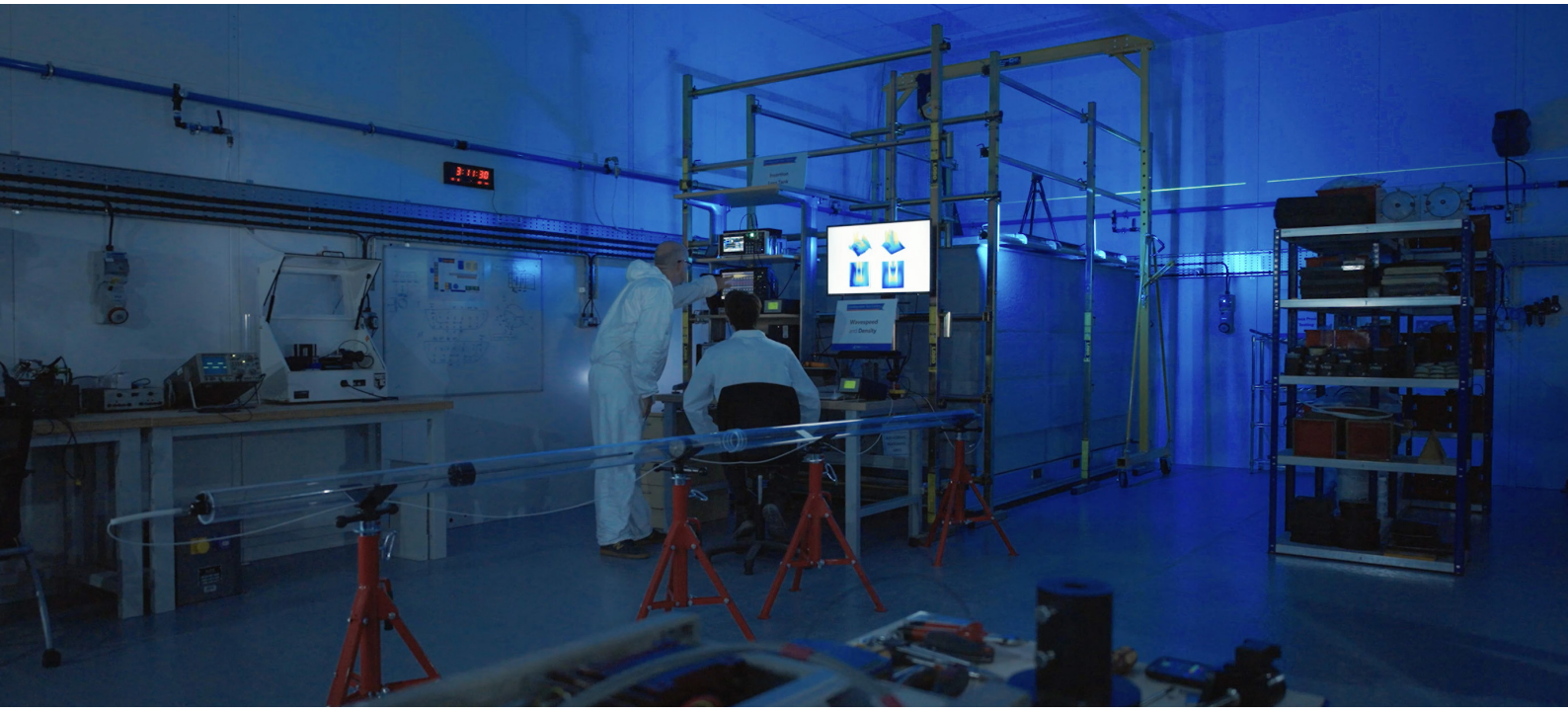
A world leader in the bespoke design, testing and manufacture of advanced composite structures and acoustic materials, protecting the most advanced sensors in the world for the marine defence sector.



Tods Technology has been in existence for more than 90 years, and is a preferred choice for the Royal Navy for the production of sonar domes, acoustic windows, acoustic coatings and other complex structures for surface warships and submarines.

The company has also built an impeccable reputation for quality and delivery to over 25 navies worldwide, from Europe to USA and Asia.

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Overview

Wide Street, Portland

Kings Point House, Dorchester

Having UK facilities in Portland and Dorchester, Dorset, UK, Tods has been designing and manufacturing technical acoustic and structural composite components for over 50 years. With a long pedigree in supplying into defence departments and defence prime contractors, Tods benefits from years of experience catering for different equipment fit and acoustic performance requirements across a huge range of the world's naval platforms including Frigates, Destroyers, Attack Submarines, Patrol Submarines and others. Tods holds accreditations in major Quality, Environmental and Cyber security areas and this assures our customers of on time, on quality and secure deliveries time after time.

Positioned on a wholly owned 33,500sqm site, Tods is in a strong position to grow its business capabilities in line with the increased demand being seen in the naval defence markets and already has plans to increase its manufacturing floor space by a combination of acquisition and organic expansion.

Being able to provide a comprehensive through-life solution for customers, Tods can take an Outline Control Drawing (OCD) and using its in house design team, develop a structurally compliant and, if necessary, acoustically transparent component that will be fully optimised for performance against the supplied requirements before being proven through in-house structural and acoustic test verification. Tasks range from material selection and testing, through structural design, stress analysis and acoustic design/analysis as needed.

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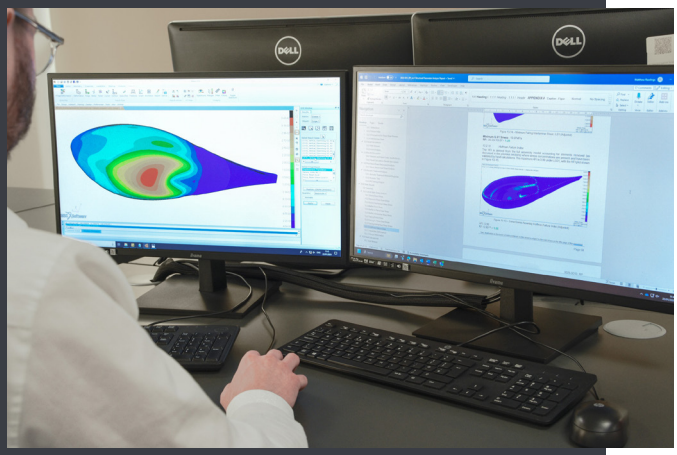
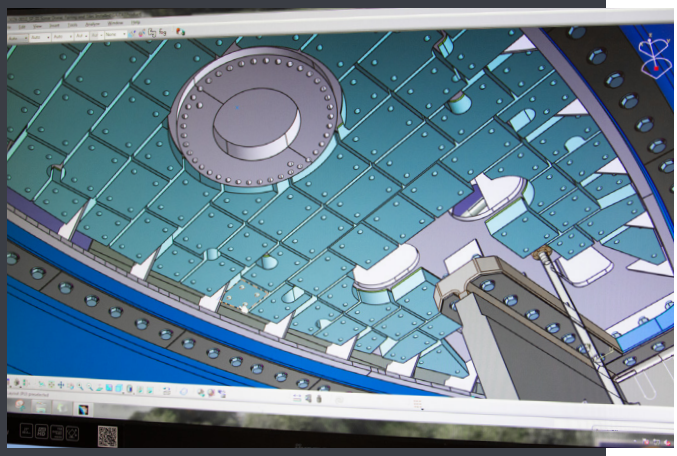
Main Capability Areas

Engineering Design Hub





The Tods engineering team has two PhD level engineers (materials and acoustics) and many other very experienced staff.

- Acoustic
- Manufacturing/Production
- Structural Design (Stress, CAD, FE, Materials)

Software

- CATIA V5
- MSC Software:
  Pre and Post Processors (Patran, Mentat)
  Solvers (Nastran, Marc, Dytran)
- PAFEC (Acoustic software)
- In-house RF and acoustic software (TRANS, TAPS)
- MatLab

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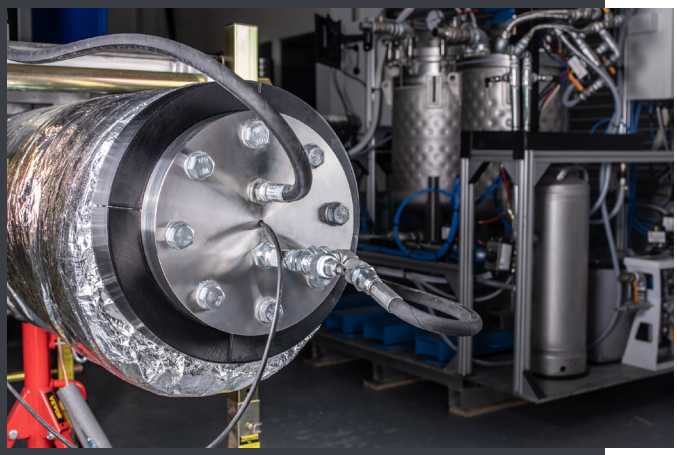

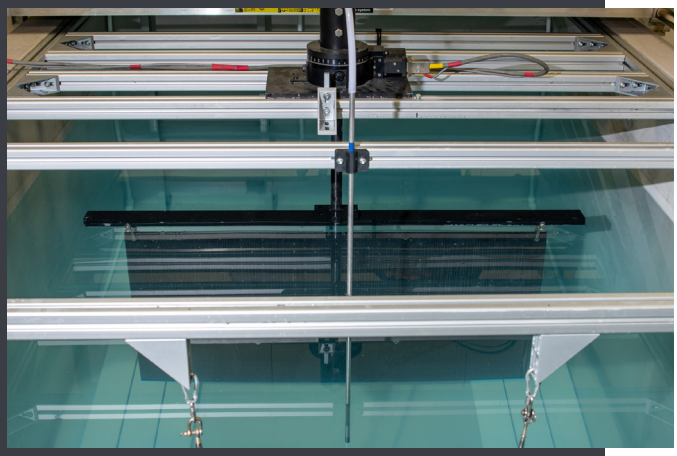

Main Capability Areas

Development Test Centre

Tods has invested heavily in an in-house test facility. This allows full control of material and some acoustic testing meaning there is no reliance on third party test houses at critical stages in the design and manufacture of parts. A further benefit of this test facility is that Tods is able to very effectively plan for, manage and overcome material obsolescence, an issue that is increasingly causing problems around the world.

Test Equipment

In order to combat obsolescence in the marketplace, Tods has created a Test Centre that allows the full suite of acoustic tests and development of new materials to be carried out. Facilities are as follows:

- Full size (7.6m long) Pulse Tube. 1-10 kHz. 5-30°C. Up to 40 bar.
- Insertion Loss Tank. 5-80 kHz. 10-30°C. -70° to +70° Angular range. 1000 x 750mm sample size.
- Wave Speed Tank. 1MHz pulse frequency, 5-30°C. -70° to +70° Angular range. 200 x 150mm sample size.
- DMTA. 0.001 – 200Hz. Dynamic deformation +/-0.005 to 10,000µm. Strain resolution 0.1nm. Modulus range 103 to 3x1012 Pa. Modulus precision +/- 0.1%. -100 to 600°C.
- Pressure Cycle Testing. Up to 100 bar, Cycle rate up to 1/min. Sample size 1015mm x Ø510mm.
- Material Structural Testing.
  - Static, Fatigue, Environmental
  - Tension, Compression, in-plane shear, interlaminar shear, flexure.
  - Fracture toughness, adhesion, bearing, open hole tension/compression.

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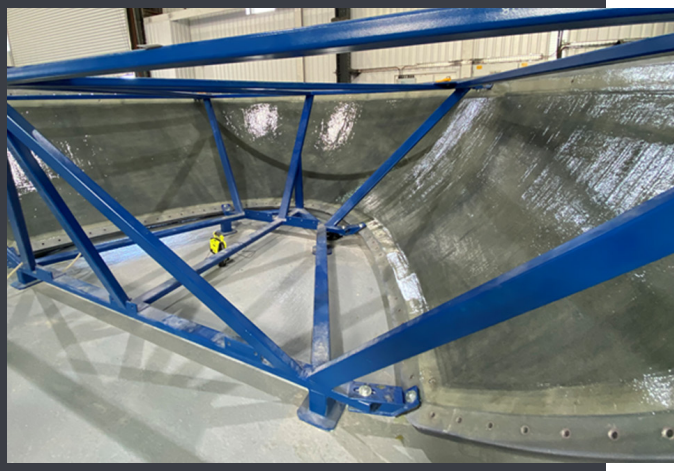
Main Capability Areas

Manufacturing Centre



After design and material selection/testing is complete, Manufacturing and Production Engineers work closely with the Operations team to design and develop tooling and processes that will produce consistent and accurate components ensuring that quality control is strictly adhered to allowing repeatable production of parts.

Manufacturing

- Equipment. Three Ovens for curing of composite products – largest is 9m x 9m x 18m
- In house crane to support in-factory handling and movement of items up to 10 tonnes (20 tonnes externally)
- Environmentally controlled clean room for lamination
- In-house polyurethane casting capability for acoustic coatings
- Bespoke, computer-controlled coatings mixing equipment for precise dispensing
- In-house pattern making capability
- Range of in-house jigs, tools and machines (e.g. lathe/milling, complex drilling)
- Pattern and Mould manufacturing facility
- Welding facility

Processes:

- Hand Lay
- Prepreg
- RTM
- Infusion
- Casting
- Machining
- Painting/Coating application

The productionised design and tooling suite are handed over to the Operations department where a highly skilled team of operators further develop the process by using “learning from experience” (LFE) procedures that allow on job process improvements as a part of the embedded Continuous Improvement culture that is strongly championed within Tods.

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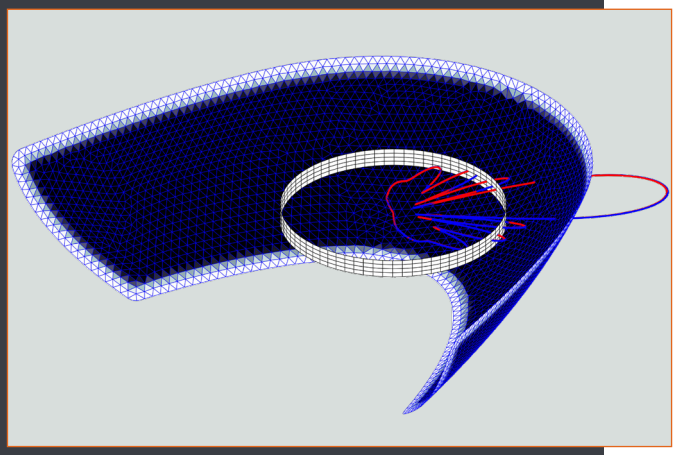
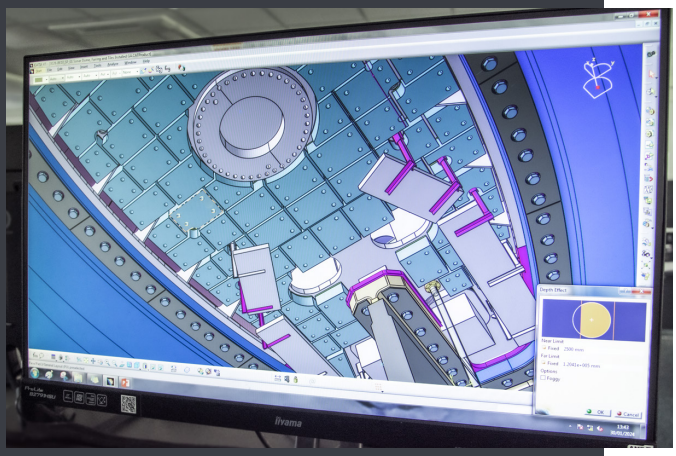
Products and Services





As has been mentioned, Tods has significant capabilities in Design, Engineering and Manufacture. The Portfolio of products and services that has been built over that last 50+ years is many and varied, below is a selection that Tods Technology is proud to be able to offer:

Conformal Acoustic Windows

Tods has designed and built suites of domes and other sensor covers for every type of submarine in the Royal Navy since the mid-1970s and has current contracts on several future platforms in the planning/design phase. Similar products have also been designed and built for a number of overseas submarine programmes, including Taiwan, Australia, Spain and The Netherlands.

These products use Tods' bespoke acoustic coatings, combined with innovative composite construction and are backed by in-house testing and materials development.

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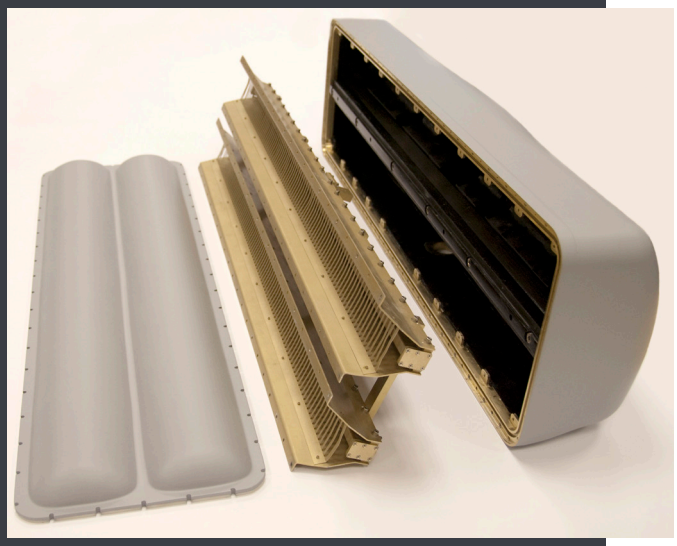
Products and Services

Sonar Domes

Tods has a 50-year pedigree in building both Bow and Keel sonar domes for surface ships, all designed within challenging hydrodynamic space envelopes provided by the Naval architects. All sonar domes in service with the Royal Navy are of Tods origin as are several bespoke, optimised domes for many overseas navies. This allows Tods to offer its customers robust and proven solutions to their new Frigate programme needs, thus lowering programme and performance risk for those platforms. Tods is unique in offering a whole life service – from concept and design, through manufacture and installation, and to eventual disposal.



Radomes

Tods produces many protective covers for radar systems – for both surface and submarine platforms. Using a range of materials, including high performance quartz glass, these radomes provide high performance protection that is fully tested and certified to operate to Submarine dive depths. These radomes are in service throughout UK and Europe.

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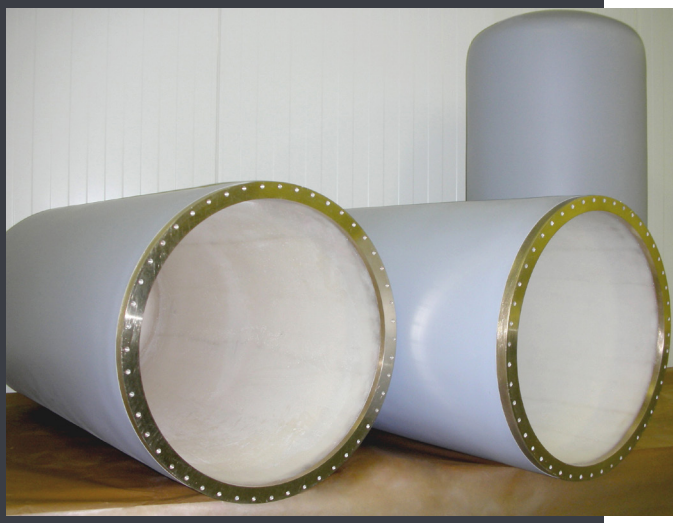
Products and Services

Conformal coating of platforms and individual sensors

Tods has the skills and equipment required to undertake the casting of acoustic coating materials either directly onto a platform or on to individual sensors for mounting at a later date.

This service utilises in-house materials development and testing teams to develop bespoke coatings formulated and tested to meet the design specifications laid down by customers.



Examples of Tods structural composite product capabilities:

- Composite masts and superstructures for surface ships
- Composite Mast Raising Equipment
- Composite casings and covers for submarine applications
- Pressurized radomes
- Large composite structures, e.g. Phased array Radar array faces

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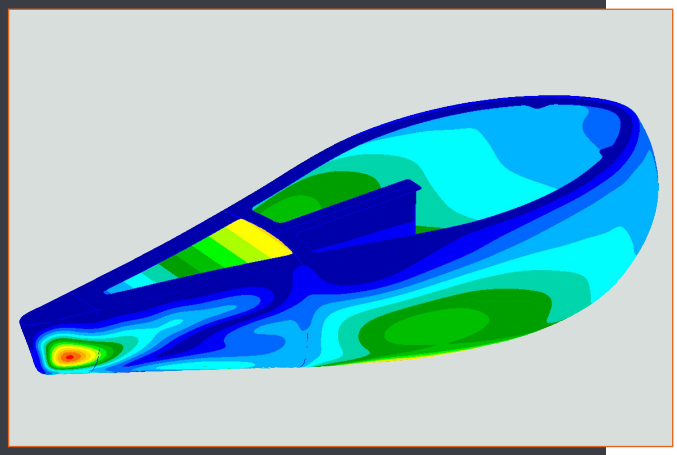
Products and Services



Design and Test

Tods has an experienced composites design team that can conduct stress/structural, acoustics and CAD activities. Proud to offer innovative designs for military platforms,

Tods has conducted cutting-edge trials that prove the through-life cost-effectiveness of Composite Casings for submarines and the benefits of using optimised carbon technologies for sonar domes.

- Structural Composite Design/Analysis
- Acoustic Design/Analysis
- Materials selection and Test
- Acoustic/Anechoic coating bespoke formulation and test

Maintenance, Repair and Overhaul (MRO)

Tods manufactures many of its products at the home factory but also supports many UK and overseas assets as they return to base for maintenance through life. We can either maintain in-situ or take components back to the factory when major work is required.

This service includes installation support/supervision, which is a vital part of the provision of any new equipment – skilled staff ensure that all components are installed correctly for optimum performance.

This service includes survey, repair, casting and tile bonding.

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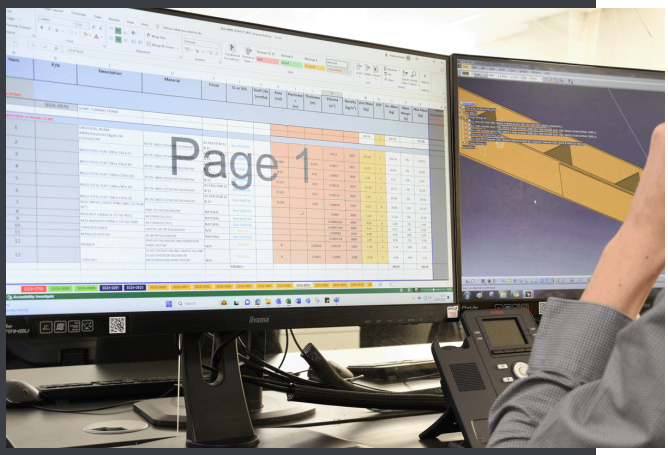
Support



Quality

The QA team is fully involved at each stage of the design/development process but generally has a greater input once the physical component starts to take shape.

Regular inspection stages help to reduce errors and the benefit to scrap and rework is tangible with total scrap and rework levels being consistently below 4%, allowing a high OTD performance that is consistently above 98%.

Programme Management

All programmes within Tods are technically challenging and are also demanding from a cost, time and quality standpoint.

Meeting these demands is achieved by using dedicated Project Managers (PM), each of whom are fully empowered to make necessary decisions whilst also being accountable for the performance of the project.

Following a structured PM procedure, our PMs maintain regular communication with both internal and external customers and report directly into the board allowing full visibility of progress and performance of each project.

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Freehold Production Facilities

Wide Street, Portland site

TOTAL SITE AREA

Current	8.2 acres
Planned addition	4.5 acres - Q3 2024
Total planned	**12.7 acres**

PRODUCTION SPACE

Current	56,000 sqft
Stage 1 expansion	31,000 sqft - Q3 2024
Stage 2 expansion	48,000 sqft - Q4 2025
Stage 3 expansion	100.000 sqft - TBC

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Tods Technology is a trading name of Tods Defence Limited, a company registered in England. Company registration number 01929464.