Composite Technologies from Cobham Antenna Systems

Maintaining precision in the most demanding applications

The most important thing we build is trust
Cobham Antenna Systems’ technical leadership in the use of advanced composites and its unequalled track record in innovative design solutions have made Cobham one of the foremost designers and manufacturers of specialist composite components and structures in Europe.

Cobham delivers a complete design to installation solution for advanced composite structures for airborne, naval and land-based platforms.

As part of Cobham, Cobham Antenna Systems has the financial and management backing of one of the largest Aerospace and Defence organisations in the UK. This supports continual product and service development, the cornerstone of the company’s enviable reputation for excellence and reliability – essential assets in such demanding industries.

Radomes and structures are manufactured to the most exacting tolerances to meet diverse requirements such as aerodynamic loads, bird-strike, hail, green seas, low Radar Cross Section (RCS), installed radar / antenna performance through to ballistic performance.

A full-size model of a helicopter fuselage and belly radome / antenna are assessed for interference caused by the airframe, other antennas and FLIR pod. All measurements are made in the near field and the data converted to the far field by Fast Fourier transformations. Test results are used to verify predictions made by in-house electromagnetic modelling software (FORAM).
Composite Technologies has a wealth of experience with anisotropic materials, their benefits as well as limitations. This, coupled with a large, validated, materials database enables the company to propose efficient cost-effective solutions to design requirements.

Creating structures that work reliably in the most demanding environments requires a holistic approach to design, manufacture and test. At Composite Technologies innovative design and specialist RF and composite expertise, combine to provide customers with structures that perform at all levels. This performance is underpinned with the very latest test facilities.

Mechanical Design
Composite Technologies has wide experience in all aspects of mechanical design and a deep understanding of non-metals. This enables the company to analyse every aspect of a customer’s requirements to ensure development of the most efficient and cost-effective solutions.

The company’s experience in mechanical design covers static and dynamic structural aspects and Computational Fluid Dynamics (CFD). Furthermore, its vast knowledge of reinforcing fibres and specialist matrices, including thermoplastics, means that the materials’ properties are tailored for optimum product performance.

RF Design
Radomes operating from VHF to microwave frequencies are designed with in-house developed software using ray-tracing, physical optics, and method-of-moments solution techniques.

This software is able to predict radome / antenna performance parameters such as main beam transmission loss, boresight error, sidelobe degradation, radome-induced flash lobes and depolarisation.

The company also has considerable experience of Low Observable (LO) structures and Frequency Selective Surfaces (FSS) which incorporate periodic arrays of conductive elements. These achieve transmission properties that are frequency-dependent, and thus allow the radome / antenna to have a lower out-of-band radar cross section.

RCS predictions can then be correlated to actual measurements using the company’s in-house test range.
The company is based on two sites that provide over of 135,000 square feet (12,500 sq m) of purpose-built manufacturing space.

The latest CAD systems enable the company to optimise received data to create cutter paths for five axis machining centres that are crucial in the manufacturing process.

Whatever the manufacturing quantities, the precise tolerances demanded by the aerospace and defence markets are most stringently controlled.

Rigorous quality assurance procedures cover all manufacturing processes including hand lamination, pre-preg / autoclave, Resin Transfer Moulding (RTM), compression moulding, integration of metallic coatings through to final assembly backed up by proven abilities in repair and support.

Product integrity and consistency is of paramount importance -- from small components to large, complex structures, the company is focused on fast, cost-effective, and above all, precise production.

Resin Transfer Moulding

The properties of radomes need to meet the conflicting requirements of high impact strength, good temperature performance and excellent dimensional stability with low dielectric loss properties.

Eurofighter Typhoon nose radome quartz pre-form being laid up on male RTM tool.
Quality Assurance

Cobham Antenna Systems is continually reviewing and improving the performance of its products and services and reinforcing its rigorous quality assurance programme backed up by frequent external and internal audits.


The company uses pre-production test facilities for assessments of new designs, and imposes strict compliance checks on every finished product. An extensive range of test equipment includes facilities for three-axis co-ordinate measuring and ultrasonic NDE. The company has numerous customer-specific approvals.

Laboratory Support
Materials Database and Testing
The laboratory facilities provide mechanical data under a broad range of environmental conditions. Typical testing standards include British Standards, MIL-STD’s, ASTM and CRAG.

Evaluation of materials’ performance under other environmental conditions such as rain erosion, UV and chemical contamination is also conducted. Over 40 years experience in the design of RF windows has yielded an extensive database of the specialised polymer and reinforcement materials required for low loss dielectrics.

Three Axis Measuring
As well as meticulously measuring prototypes or finished products, the facility can be used to generate CAD models of components to verify compliance with the original drawings. In addition components that lack either full definition or have incomplete drawings data can be measured and stored automatically using computer controlled positioning and data acquisition systems. Arrows then point to features up to 0.01mm accurately to bring phase differences to within 0.5 degree of the required value.

Non-destructive Evaluation (NDE)
The company utilises a variety of NDE methods ranging from handheld ultrasonic A-scan to fully automated C-scan detection techniques.
Future Combat System

The Non-Line-of-Sight Cannon (NLOS-C) will serve as the key indirect fire support system for the US Army’s Future Combat System (FCS) programme. Composite Technologies conducts the overwrapping of the FCS vehicle drive rotors, with a high tension composite banding to clamp the magnets onto the structural hub.

Advanced Products
with Proven Performance

Eurofighter Typhoon Radomes
Composite Technologies manufactures the complete suite of radomes for Eurofighter Typhoon including: Nose Radome, MAW, DASS Suite, Fin Tip, Strakes and CRPA.

Bombardier Dash 8 Auxiliary Fuel Tank
Autoclave-cured honeycomb sandwich construction was employed to minimise mass for this lightweight and modular solution to increase fuel capacity and extend the range of Bombardier Dash 8 surveillance aircraft in Australia.

EH101 Belly Radome
This AEW radome measuring over 3.2m in diameter was manufactured by Composite Technologies to a particularly demanding specification for both structural and RF parameters.

Precision Reflectors
The company has a long history in the design and manufacture of single piece and segmented reflectors with tolerances down to 0.04mm RMS.

Sentinel Components
The main structural array housing, Strongback, SATCOM and fore / aft data-link radomes for the UK Sentinel aircraft were manufactured by Cobham Advanced Composites for installation on the Bombardier Global Express aircraft.

Filament Winding
Highly accurate repeatable filament wound structures are manufactured using glass, aramid and carbon reinforcements with a wide variety of matrices.

SATCOM Reflectors
5.4m nine segmented SATCOM reflector and sub-reflector with 0.5mm RMS surface accuracy.

AW159 Future Lynx
Composite Technologies is responsible for the design and manufacture of the Tailplane End Plate for the Future Lynx, this structure also encompasses embedded antennas.

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Ultimate performance structures

Cobham Antenna Systems will be at the forefront of tomorrow’s innovations, partnering with imaginative system designers to shape the future.

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