

Calian composites innovative technology

Composites excellence

Calian Composites started in 2015 as a research branch of Calian, Advanced Technologies to investigate composite production use in large aperture antennas for the SATCOM industry. Today, Calian Composites has nearly 30,000ft² of manufacturing space, with over 50 engineering and fabrication staff. Calian Composites is a subsidiary of Calian Ltd. which has offices around the world, including Calian, Advanced Technologies located in Saskatoon.

Calian Composites offers composites-specific engineering, metrology and project planning services, right through to full component prototyping with production of final products and assemblies. Calian Composites specializes in the design and production of high-precision carbon epoxy antenna structures. The antenna reflector panels that we produce as part of the satellite communication antennas we build, are constructed from more than 10 unique composite subcomponents, all of which maintain exceptionally high tolerances.

In 2019, Calian Composites produced the world's first composite 10m antenna that communicated over a qualified satellite payload at Q/V frequency band.

Engineering and technology

Calian Composites' engineering capabilities embrace the use of industry leading CAD, FEA, and metrology packages, as well incorporating state of the art methodologies to break new ground in our designs.

Our facility is equipped with <25µm 3D spatial positioning tools and high precision metrology equipment to achieve tight tolerances and validate those tolerances are maintained during production.

We use high-quality software and lab equipment to verify our designs throughout the product life cycle, in order to minimize costly redesigns and maximize product performance.

Material testing laboratory

- Two-sided composite layup and infusion table for monitoring and analyzing resin flow characteristics through any thickness of composite layup
- Ultrasonic test machine for void analysis
- Viscosity, mass and adhesion test equipment
- Environmental chamber

Metrology and precision

- FARO and API laser trackers, FARO arm
- Two 6-axis hexapod positioners
- Custom-built positioning fixturing that maintains tolerances of <10µm

Engineering and technology jig and tooling manufacturing

- In-house infused carbon epoxy tooling
- Rapid prototyping and quantification of existing designs
- Custom aluminum, steel and carbon composite jigs

CAD/CAE capabilities

- Industry leading engineering modeling and simulation package
- FEA for composites using ply-based or zone-based modeling
- Static, dynamic, buckling, thermal, modal and adhesive analyses
- Flat pattern generation

Projects: prototype and production

6m and 10m Prototype

6m and 10m QV frequency band prototype antennas:

- Designed and developed at Calian Composites using carbon fibre epoxy structures
- First verification over satellite of high-frequency antenna technology

10m Production

10m QV frequency band production antennas:

- Pilot plant production now online
- Produced antennas that have been deployed across the United States

14m Prototype

14m QV frequency band prototype antenna:

- Designing next large aperture antenna
- Expanding product line at Calian Composites

Manufacturing Assets and Capabilities

- Reconfigurable manufacturing facility with 30,000ft² manufacturing space
- 5-ton overhead and 1-ton jib cranes
- Large paint booth—14' x 28'
- Post-cure oven—8' x 8' x 20'
- Product-specific post-of-use manufacturing instructions and part quality documentation and tracking
- Established list of qualified machine shop partners
- In-house capability for design and fabrication of customized production jigs

Calian Composites manufacturing processes are incorporated early in the conceptual design phase to ensure manufacturability throughout product development.

Our talented team of mechanical engineers, design analysts, technicians, and composites fabricators develop products that both meet customer design requirements and our end user expectations.

Materials and Architectures

Materials

- Carbon fibre
- Fibreglass
- Kevlar
- Metallic meshes
- Core materials

Architectures

- Unidirectional
- Woven
- Braided
- Multi-layer NCS
- Veils

Production Overview

Vacuum infusion maintains remarkable tolerances and ensures strong and lightweight components.

Composite jiggling guarantees repeatable production.

Production tooling under 50µm RMS with large part tolerances at 100µm RMS and finished assemblies below 170µm RMS.

Incorporating proprietary inlamine de-icing. Structures with CTE of <7ppm.

Minimal field re-assembly owing to the internal development of a custom wet-shim procedure.



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calian.com/products/antenna-systems

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