

# 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 30,000ft<sup>2</sup> of manufacturing space, with over 50 engineering and fabrication staff. Calian Composites is a subsidiary of Calian Ltd. who 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 over ten 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, allowing us 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 lifecycle, 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 fiber 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 30,000ft<sup>2</sup> 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
- Inhouse 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 fiber
- Fiberglass
- 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 jiggging guarantees repeatable production.

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

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

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



## Contact Mike today.

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