

# Composite Solutions

*Advanced Composite Development, Design and Manufacture*



World-class development, design and manufacture of high quality, lightweight composite components

Specialize in radomes, aircraft structures, engine components and rigid wall shelter systems

General Dynamics Mission Systems is a world-class developer, designer and manufacturer of high quality, lightweight composite components for aerospace customers in the commercial and defense markets. Our key product areas include radomes, aircraft structures and engine components and rigid wall shelter systems. Located on 64 acres in Marion, VA, our Composite Solutions houses approximately one million square feet of manufacturing space in three state-of-the art facilities.

General Dynamics Mission Systems is a leader in providing solutions for the design and manufacture of high quality composite products for the most demanding environments.

Our facilities and equipment allow for a complete scope of services from small development projects to large, complex, high-rate production programs. With over 70 years of experience delivering high performance composites, we have the expertise and technology needed to cover the full spectrum of advanced composites design, development, manufacturing, testing and repair.

Products include aircraft radomes, engine components, control surfaces, fairings, landing gear and weapons bay doors and rigid wall shelter systems.

As a proven and reliable supplier, our highly skilled team is committed to continuous improvement and consistently strives to be the standard to which others are compared.

## Key Processes

- Hand lay-up
- Stitched Resin Infusion (SRI)
- Resin Transfer Molding (RTM)
- Vacuum Assisted Resin Transfer Molding (VARTM)
- Panel bonding

## Materials

- Fibers: carbon, aramid (Kevlar®), quartz, glass
- Resins: epoxy, cyanate ester, bismaleimide, polyimides (PMR-15, MVK-14), thermoplastics

## Key Process Capabilities

Capabilities cover the full spectrum of advanced composites fabrication, including resin transfer molding, hand lay-up, precision fiber impregnation, precision machining, large panel bonding, filament winding, automated oven and autoclave curing, test and analysis, assembly and integration.

## Hand Lay-Up

Our skilled team produces a wide variety of hand lay-up products, both autoclave and oven cured. Materials include both thermoset and thermoplastic resins with a wide range of fibers. Autoclaves up to 10 feet in diameter and 50 feet in length handle large products to accommodate a wide range of composite structures.

## Stitched Resin Infusion (SRI)

SRI allows for dry fabric pre-forms to be stitched together and infused in a unitized structure, thereby eliminating the need for secondary bonding operations. This results in a high quality, lighter weight, more durable product with lower manufacturing costs compared to a conventional composite assembly made with individually cured and bonded details. We have successfully implemented the SRI process for manufacture of landing gear doors for military aircraft.

## Resin Transfer Molding (RTM)

Significant capacity allows us to meet the high volume, high-precision requirements inherent to the RTM process. We have the ability to deliver a variety of RTM composite products, including highly complex aircraft and engine structures.

## Vacuum Assisted Resin Transfer Molding (VARTM)

We specialize in thick, complex structures, using various materials and resins to achieve the desired result. Extensive experience in VARTM includes parts for aircraft, submarine and other applications.

## Panel Bonding

Our panel bonding operation includes clean and etch preparation of aluminum skins with an environmentally friendly process and non-hexavalent chromium based conversion coating or structural bonding primer in compliance with DoD directives. Skins are then bonded to the specified core to yield sandwich panels that are lightweight and high strength for a host of military rigid wall shelter applications. Electro-magnetic interference (EMI) shielding and ballistic hardening are examples of custom requirements that can be incorporated into bonded panel structures as specified for each system's application.



## GENERAL DYNAMICS

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