AEROSTRUCTURES

DELIVERING EXCELLENCE TO OUR CUSTOMERS EVERY DAY
Aerostuctures

Aerostuctures Programs

Aurora Flight Sciences is a leading provider of high value-added Aerostructures products. We provide full lifecycle support of our products from conceptual design and development to testing and first part qualification/certification. Aurora delivers finished products that are ready-to-install, integrated assemblies utilizing advanced composite structures along with integrated subsystems, such as pneumatics, fuel and airlines, de-icing capabilities and avionics.

Core Competencies

Aurora's Aerostructures business unit specializes in complex design, build-to-print, and rapid prototyping of metallic and composite airframes fabricated via a combination of manual (i.e. hand layup) and automated processes (e.g., Automated Fiber Placement (AFP)). We offer a full-service solution while maintaining the unique ability to integrate our engineering expertise and manufacturing talent to rapidly produce new products for our military and commercial customers.

Air Vehicles:

Aurora focuses on the design and production of complete air vehicles. We are capable of taking a new air vehicle concept from customer requirements or conceptual design level through the entire development cycle of an air vehicle program, culminating in rate production. Our design and build role for the entire fuselage and tail on the S-97 RAIDER™ helicopter program is evidence of Sikorsky Aircraft Corporation’s confidence in our demonstrated success in engineering development and rapid prototyping capability.

For the U. S. Air Force, Aurora produces the entire Orion UAS air vehicle; airframe, propulsion, avionics and control systems. The Orion airframe is a bonded composite assembly with integral fuel tanks, retractable nose gear, and interchangeable engine nacelles. Orion was designed by Aurora's product development center in Manassas, VA and fabricated at our Mississippi production facility.

Wings and Lifting Surfaces:

Aurora has developed over a dozen unique wing structures, varying from 8 to 150 feet in span. Using automated fiber placement, Aurora manufactures the horizontal tails on Gulfstream G500 business jets. In 2011, Aurora won Aviation Week’s “Most Innovative Product” award for the design and build of the wing delivered to The Boeing Company on the Phantom Eye program. This product showcases how we support our customers through design development, material selection and testing, engineering analysis, tooling, structural testing, and production.

For the US Air Force Global Hawk and US Navy Triton Broad Area Maritime Surveillance (BAMS) programs, Aurora has been producing the fully integrated V-Tails under contract to Northrop Grumman. Aurora’s scope includes bonded composite primary structures and flight critical metal fittings and the integration of anti- and de-icing systems, control surfaces, wiring harnesses, and air data pneumatic lines.
Fuselages:
Aurora has built composite fuselage assemblies for US Air Force Global Hawk aircraft program since 2001. Aurora delivers integrated assemblies comprised of several hundred composite and titanium parts. On the Sikorsky Aircraft Corporation’s S-97 RAIDER™ helicopter program, Aurora is responsible for the design and fabrication of the entire composite fuselage, which is 70% composite (by weight) and comprised of over 1,000 custom detail components in six major primary and secondary structure assemblies.

Engine Nacelles:
Aurora is currently producing engine inlets and nacelles for the USMC CH-53K Heavy Lift Helicopter program, the US Air Force Global Hawk and US Navy Triton program. Expertise in integrated nacelle assemblies includes: interchangeable doors and access panels; system install provisions; work platforms and insulation. Aurora also designs and provides unique nacelles and inlets for the Orion and legacy UAV platforms. Aurora is an industry expert in the design and manufacture of complex engine nacelle products.

Control Surfaces:
Aurora develops and produces control surfaces, such as flaps, ailerons, spoilers, rudders, and elevators to meet various customer requirements. We have designed and built a variety of composite control surface products including composite bonded assembly, full-depth honeycomb core, metal bond, and co-cured composite structures. Our engineering and tooling capabilities allow Aurora to meet the most stringent tolerance requirements and enable our products to be interchangeable Line Replaceable Units (LRUs).

Fairings, Pylons, and Radomes:
Aurora has expertise in the design, build, and certification of fairings, pylons, and radomes. Aurora manufactures and assembles the composite fairings of the Bell 525 Relentless™ helicopter main engine cowling section. In addition, we are the proud recipient of the 2013 AHS Supplier Excellence Award for our role as a design-build supplier to Sikorsky for the CH-53K Main Rotor Pylon (MRP). As Sikorsky’s design partner for the MRP program, we provide CAD modeling, engineering analysis, tooling, and tear down article fabrication and produce interchangeable composite fairings that install onto a modular composite frame with titanium firewall assemblies.

Aurora’s success in radome development and production includes cyanate ester radomes for the US Navy and the radome for the US Air Force’s Orion program. Our experience with cyanate ester/quartz prepreg and film adhesives from previous and ongoing programs leads to the design and fabrication of an extremely efficient radome using low-cost materials and processes where high through-transmission and low signal loss are critical to success.

Doors and Reinforced Structures:
Aurora is the rate-production supplier of the S-92 Lower Air Stair/ Upper Clam Shell Door for the Sikorsky Aircraft Corporation. In 2007, Aurora’s engineering team was pivotal in the redesign of this product. Accomplished within a six month period these assemblies were constructed of composite sandwich panels and machined metal components and are currently being shipped for final installation on the S-92 assembly line. Aurora’s work on the S-92 program has helped to fulfill Sikorsky’s international offset requirements, for which Aurora was named the 2015 Sikorsky Supplier of the Year for Industrialization. Aurora also produces the landing gear doors for the Global Hawk and Triton aircraft for the Northrop Grumman Corporation. These landing gear doors are made of co-cured honeycomb core panels with local reinforcements to attach metal fittings.
DESIGN

Aurora specializes in the design, rapid prototyping, and production of advanced composite and metallic structures for air vehicles. Aurora Flight Sciences of Virginia (AVA), our Product Development Center, is located at the Manassas Regional Airport and provides our customers with expert airframe engineering services as part of the Aerostructures team design-to-build capability. AVA has the tools, skills, knowledge, and experience to design, analyze, and validate advanced aerostuctures components and assembly systems. Within our AS9100-certified processes, we use industry-standard CAD/CAE software packages, such as CATIA® V5, SmarTeam, ENOVIA LCA, and the Femap/NASTRAN suite. Aurora's design-build teams work closely with our customers’ engineers to address materials, processes, and producibility issues early in the design phase to assure affordable, high-quality aerospace structures for successful production programs. In addition to manufacturing aerospace components for prime contractors, such as Northrop Grumman, Sikorsky, and Boeing, Aurora often serves as a prime contractor to U.S. government agencies.

MANUFACTURING

Aurora has two manufacturing locations. The West Virginia (AWV) manufacturing facility is ISO 9001/AS9100-certified and is comprised of 100,000 sq. ft. of factory space designed specifically for the manufacture of composite and sheet metal components and high-precision airframe assemblies. This facility has a 42,000 sq. ft. composites facility designed for lean aerospace manufacturing. The composite facility contains a 10,000 sq. ft., class 100,000 clean room, autoclaves and NADCAP-approved non-destructive inspection (NDI) capabilities including large component ultrasonic C-scan, shearography, and phased array. The 50,000 sq. ft. metals, composites, and tooling facility includes multiple CNC machine centers, a CNC router, and water-jet cutter.

The Mississippi (AMS) manufacturing facility provides airframe design, fabrication, assembly and integration. AMS is an AS9100-certified facility and is comprised of an 86,000 sq. ft. composite fabrication area, clean rooms, curing ovens and autoclaves, climate-controlled material storage, non-destructive inspection and all other capabilities required for high-quality Aerostructures fabrication. We have recently expanded our capabilities with a new building that includes a state-of-the-art 7-axis 67’ X 30’ high-rail gantry Electroimpact Automated Fiber Placement (AFP) machine, a 16’ x 40’ autoclave and an automated Marietta ultrasonic NDI through-transmission system.

QUALITY

Aurora's AS9100/ISO9001 certifications represent our commitment to quality, continuous improvement, and satisfying the needs of our customers. We have been recognized as a Platinum Supplier to Northrop Grumman, a Gold Supplier to Sikorsky Aircraft and to UTC, and a Gold-rated supplier to Boeing reflecting our sustained quality performance. The Aurora team continually pursues further improvement to our Quality Management System, focusing particularly on the engineering, manufacturing, and supply chain management processes that enable us to maintain a competitive advantage, remain agile, and solve our customers' problems with excellent quality and on-time delivery performance.
COMPLEX COMPOSITE STRUCTURES

- Assembly and integration of complex airframe structures with composites, titanium and aluminum parts
- Production of primary and secondary airframe structures
- Integration of flight control structures, rigging and wiring
- Solid Laminate and sandwich construction with honeycomb or foam core experience
- Hand Layup of Prepregs
- Automated Fiber Placement (AFP) of Prepregs
- Experience with carbon, fiberglass, and aramid prepregs with thermoset resin systems, such as epoxies, bismaleimides, vinyl esters, and cyanate esters.
- Wire harness fabrication and test

COMPOSITES LAYUP AND CURE

- Class 100,000 clean rooms for composite lay-up
  - Automated ply cutting
  - Laser Ply Projection (8 heads)
- Automated Fiber Placement (AFP) ¼" and ½" tow
- Four autoclaves up to 16' x 40'; digital and analog controls
- PC data acquisition with bar code product scanning
- Multiple bonding ovens
- Heat treatment ovens

NON-DESTRUCTIVE INSPECTION (NDI)

- Ultrasonic A and C-scan NDI
- Shearography and Phased Array
- Multiple Coordinate

TESTING AND INSPECTION

- Measurement Machines
- Other NDI technologies Eddy current, Rockwell hardness, and dye penetrant
- Machining and Cutting Centers
- Water-Jet Cutter and NC Routers
- NC Machining Centers with 5-axis CNCs
- Computer aided manufacturing and inspection
  - Laser Trackers
  - Verisurf 3D model inspection software

DESIGN DEVELOPMENT AND PRODUCT ENGINEERING

- Material and Processes Engineering
- Airframe design using CATIA V5, SmarTeam and Enovia LCA
- Structures analysis using NASTRAN and hand calculation methods
- Aerodynamic analysis using Computational Fluid Dynamics
- Aeroelasticity and thermal analysis
- Structural testing for validation and certification
- Experience with rapid engineering change activity

TOOLING, PROCESS DEVELOPMENT AND MANUFACTURING ENGINEERING

- Composites fabrication process development
- Configuration management and control
- Visual Enterprise for Materials & Manufacturing ERP
- Tooling fabrication
  - Curing fixtures, bond jigs
  - Assembly tools, master gages
  - Trim and drill fixtures
Aurora Flight Sciences is a leader in the development and manufacturing of advanced unmanned systems and aerospace vehicles.

We are headquartered in Manassas, VA and operate production plants in Bridgeport, WV and Columbus, MS. Aurora also has Research and Development Centers in Cambridge, MA and Mountain View, CA.