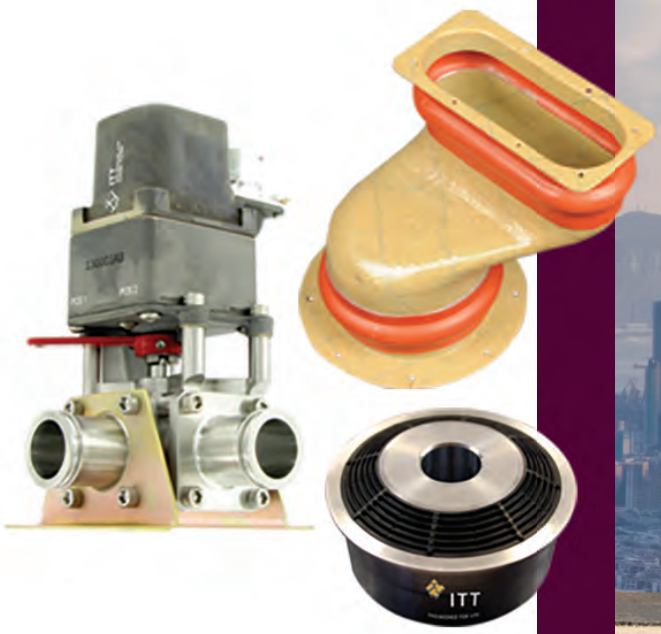
Motion, Flow & ECS Products for Rotorcraft Applications



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ROTORCRAFT COMPONENTS

Aerospace Controls is the recognized world leader in aerospace Flow Motion Control and Environmental Control Systems components, because of our ability to translate our customers' specific technical requirements into reliable hardware solutions. Our long established pedigree in the commercial aviation and military sectors is a tribute to our depth of experience and proven track record of providing high quality custom solutions.

Aerospace Controls partners with you to solve your most challenging rotorcraft application requirements.

Motor Operated Valves

Aerospace Controls provides a wide range of low weight, high strength and reliable high performance valves for a variety of applications including; commercial, business and civil aviation, as well as military and cargo aircraft. Our extensive knowledge and experience within these applications with a focus on reliability, including HALT, enables us to provide our customers with superior products, services and support. Environmental / EMI testing per RTCA-D0160 and customer specifications. Rapid prototyping is available.

- Types: Ball, Butterfly, Gate, Solenoid
- Applications: Fuel, Hydraulic, Pneumatic, Water, PAO Coolant

Harsh Environment Linear Actuator

The Harsh Environment Linear Actuator is Aerospace Controls newest linear actuator design. The linear actuator incorporates a two piece machined housing to control sealing surfaces while providing a high strength structure which limits fluid ingress. All sealing surfaces were improved to provide easy assembly and the highest level of protection from harsh elements. Additionally, the exterior surfaces are finished with a military specification anodic coating.

- PMDC motor typical, Brushless optional
- Meets MIL-A-8064 requirements
- Non-jamming mechanical stops
- Integral electromechanical motor brake optional
- Switched or continuous position feedback
- ACME or Ball Screw drive
- Force limiting capability

Pressure, Temperature, Flow and Limit Switches

Aerospace Controls has nearly 50 years of industry experience in aerospace pressure, temperature and flow switches with a standard line of envelopes that can be customized for harsh environments. Our core switch technologies offers industry leading stable set points with high cycle life, temperature range, and vibration resistance for use in fuel, hydraulic, water, pneumatic, ECS, and engine systems.

- Patented Nega-Rate® Belleville spring
- Hermitically sealed variants possible
- Proof pressure up to 4500 psig
- Temperatures up to 400°F (204°C)
- Qualified MIL-STD-9395/27
- Stable set points eliminating recalibration
- Vibration capabilities up to 200G's
- Manual rest indicator
- Flame-proof capability

Composite and Metal Heated Surfaces

Exterior surfaces can be run wet or kept free of ice using our Electro-thermal heater assemblies. Specifically designed for each application with performance, weight and cost in mind.

- Internally bonded heater assembly
- Reinforced silicone rubber
- Phenolic epoxy composite
- Polyimide hybrid composite (anti-ice)
- Qualified to DO-160E
- Thin film internal heaters
- Watt densities to 50+ watts/sq in
- Rapid temperature deltas
- Hail and lightning resistant

Fan/Duct Heater Assemblies

For spot heating requirements in cabin equipment or ECS bay, Aerospace Controls supplies a family of plug and play integral fan/duct air to air heaters. By utilizing our patent pending FanFlow Adapter, the fan assembly can be mounted much closer to the heater without degrading heater performance. The heater is derived from Aerospace Controls heater line with over 40 years of installation history and is DO-160 Qualified, lightweight and vibration/shock resistant, available in 3", 3.5" and 4" diameters and various total wattages.

- This is a patented ITT AC Plug and Play Fan/Duct Heater
- Available with up to 2000 Watts
- 115/200 3 phase or 28 VDC power
- Controllers are closed loop, sensing both output and environmental temperatures.
- BIT, error reporting and health monitoring functions are built into the Controller
- Design based on over 15,000 installed duct heaters on leading commercial aircraft which meets required weight restrictions, low pressure drop and increased flow requirements.

Noise Control Solutions

Aerospace Controls noise control solutions improve passenger comfort and provide compliance with noise level regulations. For the cabin noise control, we provide engineered silencers that are integrated into aircraft environmental control systems (ECS). In order to control helicopter external noise, Aerospace Controls addresses significant noise sources, such as a main engine and shrouded rotors. Specifically, our products perform the following functions:

- Reduce noise of engine bleed and trim air
- Reduce noise in air distribution system
- Reduce noise in main engine inlet and exhaust
- Reduce noise of a shrouded main or tail rotor

Conveyance

Aerospace Controls provides composite ducting in small and large scale, building integral ECS conveyance solutions. Our hybrid ducting joins the strength of composites and metal with the flexibility of elastomers to fit the most demanding applications. A full suite of elastomeric products to connect ducting, including bellows, diameter transition and non-round connectors are available. As a solution to your elastomeric hose requirements, ITT AC offers a wide range of COTS AS/NAS spec hoses in a variety of materials and rapid prototype tooling for quick delivery of custom shapes.

Molded Components

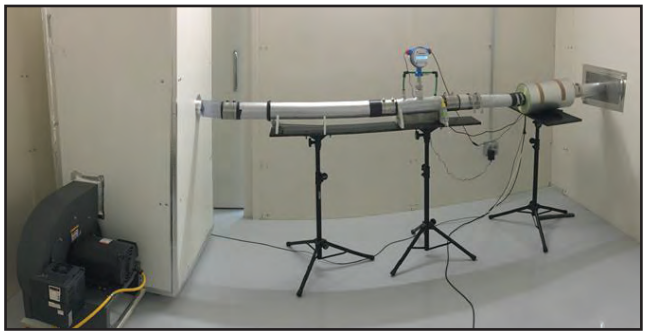
- Composite, elastomeric and/or metal
- Complex hoses, transitions, inlets and seals
- Metal/Composite Bonding
- High temperature BMI and Polyimides
- Flexible hoses, connectors and molded into parts
- Lightweight composite ducting
- Specialty silicon shapes

Materials

- Silicone & Fluorosilicone
- Neoprene
- Buna-N
- Insulation
- Acousti-Flo®
- Feltmetal® acoustic material
- CRES and super metal alloy

We Solve It

At Aerospace Controls we have integrated our development team and product lines to serve our worldwide customers more effectively. This also enables us to leverage engineering resources across different disciplines and to better define, build, integrate, deliver, and support industry-leading subsystems and components for the global aerospace market.



Our multidisciplinary teams combine proven processes and technology with innovative thinking to minimize complexities and risk, lowering cost and speeding time to market.

Their work is enhanced by:

- Advanced dynamic modeling, stress, vibration, acoustics, aerodynamics, and thermal simulation
- Test lab for the development, acceptance, and qualification testing of aerospace components
- Engineering model shop enables rapid prototyping of even the most complex parts
- 3D printing capability to model advanced concepts and production tooling for composites

Advanced Engineering Capabilities

Aerospace Controls has developed advanced engineering capabilities in software control and electronics for full integration into our customer's platforms. Our talented in-house engineers in DO-178 software and control electronics means we can assume complete responsibility for defining the logic, writing and verifying the code to be implemented within an aircraft's electronic or software systems.

We also provide world-class acoustics and aerodynamics engineering to reduce engine and cabin noise to comply with noise level regulations and improve passenger comfort. Our in-house technical team, skilled in design, analytical modeling, production and lab testing can provide a unique noise control solution to maximize performance and economics.

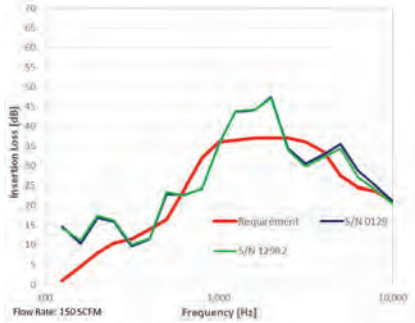
The Aerospace Controls solutions typically feature our proprietary, Acousti-Flo® acoustic materials, including the AF3.1 for the high temperature, exhaust applications. Our designs often incorporate super alloys and advanced composites to meet the most demanding aerodynamic, structural, environmental and weight requirements. Our in-house design, analysis, testing and manufacturing capabilities allow us to optimize a solution and provide a prototype early in a project to shorten the time of product qualification and introduction to production.

Testing Capabilities

Our in-house test capabilities offer a full suite of equipment capable of providing vibration, thermal, and endurance / life testing per RTCA/DO-160 and MIL-STD-810. Our recently commissioned acoustic lab allows verification of acoustic and aerodynamic performance including:

- Insertion loss
- Attenuation
- Transmission loss
- Pressure drop

This core competency is key to bringing products to market faster and having real-time test capability to support our customers during aircraft certification. We continue to invest in Aerospace Controls labs and look forward to bringing new capabilities for HALT and subsystem integration.



Typical Acoustic Test Results

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