World Leader in Flight Control Systems and Critical Control Applications
Over the last 60 years, Moog has developed a reputation throughout the world as a company whose people and products are at the forefront of the aerospace industry. We are known for our successful solutions to motion control challenges that are viewed by others as impossible. This directly reflects the creativity, work ethic and remarkable attention to purpose of our people.

Over this period, Moog has grown from a high technology component manufacturer to become a leading supplier of integrated flight control systems. We are continuously investing to extend the depth of our product expertise while simultaneously expanding our capabilities to take on the challenges and responsibilities of a changing industry. As a result, we are positioned today on virtually every aircraft in the marketplace, supplying reliable flight control systems and specialized control products that are highly supportable and add significant value for our customers.
From Products to Complete Systems

Proven Building Blocks
- Flight Control Electronics
- Servoactuators
- Inertial Guidance
- Software
- Components

Advanced Technologies
- Integrated Electronics
- Electrohydrostatic Actuation
- MEMS Sensors
- High Temperature Actuation
- Ballistic Tolerant Designs

Logistics Support
- Worldwide Support
- Personalized Service
- Integrated Logistics

Manufacturing
- In-House Rapid Prototyping
- Supply Chain Management
- Global Production Sourcing
- Additive Manufacturing

Certification
- Validation and Verification
- Ground and Flight Testing
- FAR/JAR Part 25 Systems

Integrating Systems Capability
- Modeling and Simulation
- DO-178B Level A Software
- DO-254 Hardware
- HW/SW Integration
- System Qualification

MOOG SYSTEM SOLUTIONS

Primary Flight Controls
Secondary Flight Controls
Navigation & Guidance
Engine Controls
Utility Systems
Comprehensive Systems Capabilities with Complete Turnkey Solutions

**Requirements Definition**

- Joint Concept Definition
- Architectural Trade Studies
- Hazard Assessment
- Redundancy Management
- Requirements Development

**System Design**

- Requirements Flow Down
- Manage Industry Teams
- Modeling and Simulation
- Software
- Reliability Analysis
- Prototyping

**System Integration**

- Hardware/Software Integration
- Verification and Validation
- Sub-System Qualification
- Iron Bird Testing
System Qualification

- Platform Integration
- Safety Analysis
- Ground Testing
- Flight Certification

Production

- On-Site Technical Support
- Kanban Inventory Management
- Kitting for Point-of-Use Delivery
- Third Party Supplier Management

Support Solutions

- Training and Documentation
- 24-Hour AOG Support
- Repair and Overhaul
- Engineered Solutions
- Field Support
Moog was selected by Lockheed Martin as the system integrator for the Primary Flight Control and Leading Edge Flap Actuation Systems on all three variants of the F-35 Joint Strike Fighter. Rolls-Royce also selected Moog to design, qualify and manufacture the Lift System Primary Actuation for the F-35B variant.
Flight Control Systems
The F-35 “power-by-wire” system represents an advancement on the more electric aircraft topology, integrating:

- Self-contained electrohydrostatic (EHA) actuators to position primary flight surfaces
- Electronic control units to remotely drive and control the EHAs
- Electrically driven power drive units (PDUs) to position the maneuvering leading edge flaps

As the prime contract holder, Moog’s role includes managing the industry team, integrating the complete actuation system and supplying critical technologies and major sub-systems.

While not part of the flight control system, Moog also developed the wingfold actuation system for the carrier variant, which includes Moog’s advanced spline lock technology.

Lift System Primary Actuation
The hovering ability of the F-35B STOVL aircraft is provided by the lift system, which combines a thrust vectoring nozzle that directs main engine exhaust downward to generate aft vertical lift, and a centrally mounted lift fan to counterbalance forward vertical lift. Moog supplies the lift system primary actuation, which includes:

- The actuation system for the three-bearing swivel nozzle, which is rotated 90 degrees, directing the main engine’s exhaust downward
- The actuation system for the lift fan’s variable area nozzle and inlet guide vane, which controls airflow through the lift fan

These actuation systems use electronically controlled hydraulic and fueldraulic servoactuators specially designed for operation in extreme temperature and vibration environments.
Moog designed, integrated and provided certification support for the complete Primary Flight Control Actuation System and the High Lift System on the Boeing 787 Dreamliner. The Moog systems position and monitor all the aircraft’s flight surfaces in response to pilot commands.
Primary Flight Control Actuation System
The 787 flight control system controls 21 primary flight surfaces on the airplane, as well as the spoilers and horizontal stabilizer, and includes a mix of electro-hydraulic (EH) and electromechanical (EM) servoactuators and all associated control electronics.

The system includes EH servoactuators with remote loop closure electronics for the ailerons, flaperons, inboard and outboard spoilers, elevator and rudder. The horizontal stabilizer and mid-board spoilers employ EM servoactuators with associated motor drive control.

Key features of the system include:
- Smart actuators with on-board loop closure
- 5000 psi system operating pressure
- High power controllers with active front ends
- EM HSTA with dual load path
- EM mid-board spoilers
- Advanced materials for optimized weight

High Lift Actuation System
The 787 high lift system is comprised of nearly 450 discrete assemblies including: power drives, electronic controls, trim controls, geared rotary actuators, rack and pinion roller assemblies, transmission shafts, gearboxes, sensors and accessory components.

Key features of the system include:
- Advanced flap trim control for reduced wing drag
- Hybrid hydraulic and electric power drive
- Advanced composite transmission components
- 5000 psi operating pressure
Proven Products and Leading Edge Technologies

Products

- Pilot Controls
- Flight Control Electronics
- Inertial Sensors and IMU
- Electromechanical (EM) Actuators
- Electrohydrostatic (EHA) Actuators
- Hydraulic Actuators
- Mechanical Actuators
- Components

Images:
- Side Stick Controls
- Flight Control Computers
- Attitude and Heading Reference Systems
- Distributed Control Electronics
- Fly-by-Wire Primary Flight Control Actuators
- Motor Drive Control Electronics
- Leading Edge Flap Electric Drive Units
- Horizontal Stabilizer Trim Actuators
- Wingfold Geared Rotary Actuators
- Engine Inlet Guide Vane Actuators
Technologies

- Redundancy Management
- Advanced Controls
- High Integrity Electronics and Software
- MEMS-Based Inertials
- High Temperature EM Actuation
- High Pressure Hydraulic Actuation
- Advanced Materials and Processes
- Advanced Motor and Pump Designs
- Ballistic Tolerant Designs
Pilot Controls
Vehicle Management Systems
Flight Control Computers
Navigation and Guidance
Fly-By-Wire Flight Control Systems and Software
Primary Flight Control Actuation Systems
Maneuvering Leading Edge Flap Actuation Systems
Weapons Bay Door Drive Systems
Wingfold Actuation Systems
Engine Controls
Weapon Systems
Utility Actuation

Superior Engineering and Advanced Technologies
High Reliability Solutions for Military and Civil Rotorcraft
Ruggedized Products and Proven Solutions

- Pilot Controls
- Flight Control Computers
- Navigation and Guidance
- Fly-By-Wire Control Systems and Software
- Primary Flight Control Actuation
- Stability Augmentation Systems
- Active Vibration Control Systems
- Prognostics and Health Management
- Utility Controls
Best Value for Commercial Transport, Regional and Business Jets
High Reliability Designs and Cost Effective Solutions

- Cockpit Controls
- Flight Control Computers
- Navigation and Guidance
- Fly-By-Wire Control Systems and Software
- Primary Flight Control Systems
- Secondary Flight Control Systems
- High Lift Systems
- Engine Controls
- Autopilot Servoactuators
- Stabilizer Trim Actuators and Control Electronics
- Utility Controls
Moog Global Support

- Engineered Solutions
- Performance-Based Logistics
- Flight Hour Maintenance Services
- Depot Partnering and Support
- Asset Management
- Repair and Overhaul Services
- Modifications and Upgrades
- 24/7 Hour AOG Support
- Spares Provisioning
- Technology Insertion
- Obsolescence Management
- Support Equipment
- Technical Support and Data
Moog Aircraft Group is recognized as the world leader in flight control systems and critical control products. We are committed to maintaining a superior level of customer support for our wide range of products, and support virtually every commercial airline in the world, as well as US government agencies and foreign military customers. We maintain repair and overhaul facilities that are staffed and stocked to satisfy our customers’ turnaround time requirements, and we hold certificates from FAA, EASA and CAAC. As one of our most valued assets, our reputation within the aerospace industry has been solidified by the reliability of our products.