



Credit: U.S. Army Ralph Scott / Missile Defense Agency / U.S. Department of Defense



Credit: U.S. Army



Credit: U.S. Air Force / Giancarlo Casem



Credit: U.S. Air Force

MISSILE SYSTEMS

EQUIPPING THOSE
WHO DEFEND FREEDOM

HYPERSONIC MISSILE SYSTEMS

With a legacy spanning 70 years, Moog has been providing precision steering controls and propulsion systems for missiles traveling at hypersonic speed. Uniquely positioned to apply our knowledge, Moog is assisting the United States' Department of Defense in ensuring mission success across their portfolio of new, highly innovative hypersonic applications.

MOOG CAPABILITIES

- Actuation and control electronics
 - Thrust vector control
 - Fin control
 - Sensor gimbal motors, resolvers, and slip rings
- Arm/disarm switches
- Integrated propulsion systems and fluid control systems
- Avionics, inertial navigation sensors, and integrated solutions
- Structures and shock/vibration isolation solutions

TACTICAL AND STRIKE SYSTEMS

Moog designs and integrates highly-innovative steering solutions that enable the precise accuracy of the world's best tactical missiles, guided projectiles, and launch platforms.

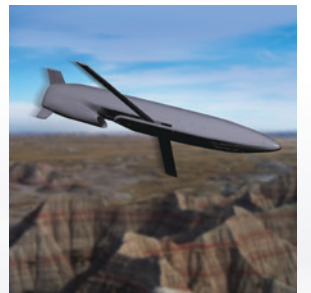
Having produced and delivered well over one million systems for dozens of high-profile platforms, customers appreciate our operational excellence value proposition: 100% quality, delivered 100% on-time.

MOOG CAPABILITIES

- Actuation and control electronics
 - Fin control
 - Wing deploy mechanisms
 - Fin lock and deploy solutions
- Integrated, additively manufactured structures
- Power distribution and management
- Seeker head motors



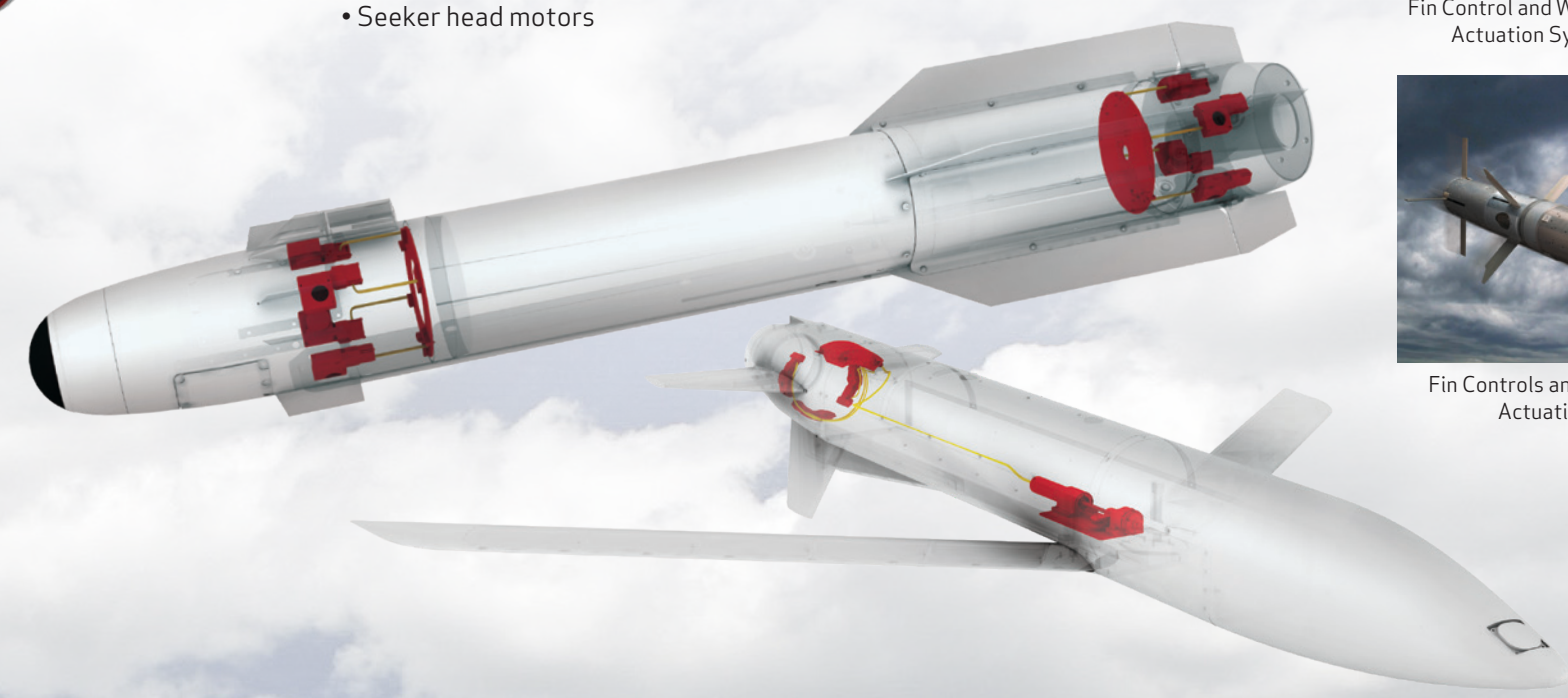
Fin Control Actuation Systems



Fin Control and Wing Deploy Actuation Systems



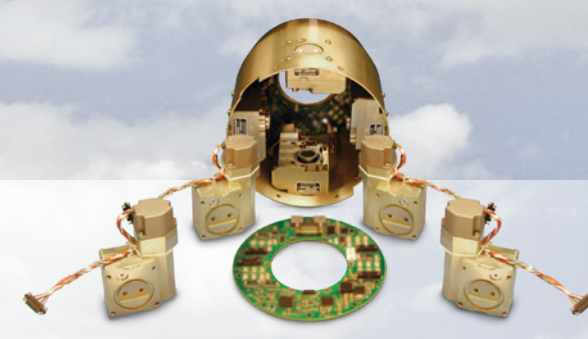
Fin Controls and Shutter Actuation



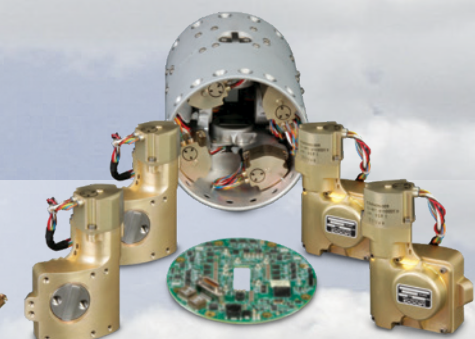
SUPERSONIC CONTROL ACTUATION SYSTEM



ROLL AND ATTITUDE PROPULSION



TACTICAL CONTROL ACTUATION SYSTEM



CANARD CONTROL ACTUATION SYSTEM



LONG RANGE FIN AND WING ACTUATION SYSTEM

LONG RANGE BALLISTIC MISSILES

Moog has produced tens of thousands of thrust vector control (TVC) actuators and servo valves for strategic missiles, ranging from fractional, up to 70+ horsepower. Moog's controls hardware has been used on all of America's strategic missile programs for the last 70+ years. Starting in the late 1950s, our first TVC actuators leveraged Bill Moog's invention of the electrohydraulic servo valve that enabled fly by wire, precision flight control systems for the Jupiter, Titan, and Atlas ballistic missiles. Our hydraulic and electric TVC solutions were later used on Minuteman III, Peacekeeper, Small ICBM, Titan, and Trident I and II. Our legacy Minuteman III propulsion and actuation products have demonstrated 30+ years design life and are still in service today.

MOOG CAPABILITIES

- Actuation and control electronics
 - Thrust vector control
 - Fin control
 - Sensor gimbal motors, resolvers, and slip rings
- Servo valves
- Arm/disarm switches
- Liquid and cold gas propulsion
- Avionics, inertial navigation sensors, and integrated solutions
- Structures and shock/vibration isolation solutions



Thrust Vector Controls

AIR AND MISSILE DEFENSE

For over 30 years, Moog has supported the United States' Missile Defense Agency (MDA) through the application of mission critical solutions in support of a layered defense system, keeping our warfighters, homeland, and the homeland of our allies free from harm.

MOOG CAPABILITIES

- Actuation and control electronics
 - Thrust vector control
 - Fin control
 - Solid rocket pintle control
- Kill vehicle and booster propulsion components
- Avionics, inertial navigation sensors, and integrated solutions
- Structures and shock/vibration isolation solutions
- Seeker head motors
- Servo valves
- Arm/disarm switches



Thruster Valves



Servo Valves



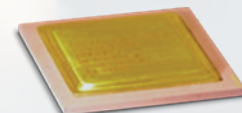
SENSOR GIMBAL



PROPULSION



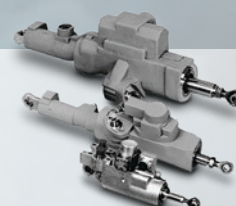
ARM/DISARM SWITCH



BRE440™ MICROPROCESSOR SYSTEM-ON-A-CHIP (SOC)



AVIONICS AND CONTROL ELECTRONICS



ACTUATION



PROPULSION MODULES



ROCKET ENGINES AND SYSTEMS



THRUSTER VALVES



REGULATORS



PROPELLANT TANKS

THE MOOG ADVANTAGE

HERITAGE

- First missile servo control provided by Moog in 1951
- Electrohydraulic (EH), electropneumatic (EP), electromechanical (EM), and electrohydrostatic actuation (EHA) system architectures
- Moog continues to invest in critical missile control technologies

OPERATIONS CENTERS OF EXCELLENCE

- Preferred supplier status at major customers
- Lean assembly and test processes
- Clean rooms for assembly and test
- Secure manufacturing
- Salt Lake City facility: high volume production of missile control systems
- East Aurora facility: actuation system design development and low rate production
- Niagara Falls facility: propulsion design, assembly, and hot fire test capabilities
- Gilbert facility: avionics capabilities
- Mountain View facility: structures and shock/vibration isolation
- Blacksburg facility: motors, resolvers, slip rings, twist capsules, and safe arm switches

HUMAN CAPITAL

- Strong corporate culture based on trust that fosters innovation and embraces change
- Very low turnover rates
- We recruit, develop, and retain top talent

CAPABILITIES

- In house vibration and environmental test facilities
- High volume production
- Low volume rapid prototyping
- Build-to-print services
- Focused, dedicated supply chain
- Medium volume/medium mix production



LOCATIONS

Argentina
Australia
Austria
Brazil
Canada
Finland
France
Germany

India
Ireland
Italy
Japan
Luxembourg
The Netherlands
Norway
Philippines
Singapore

South Africa
South Korea
Spain
Sweden
Switzerland
United Arab Emirates
United Kingdom
United States

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