SPACE AND DEFENSE GROUP
POWER AND DATA DIVISION

MOOG

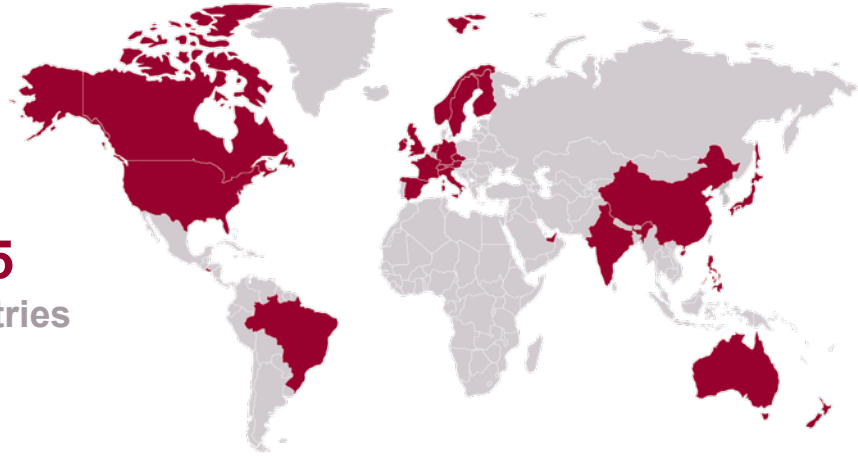
Shaping the way our world moves™

Moog At-A-Glance

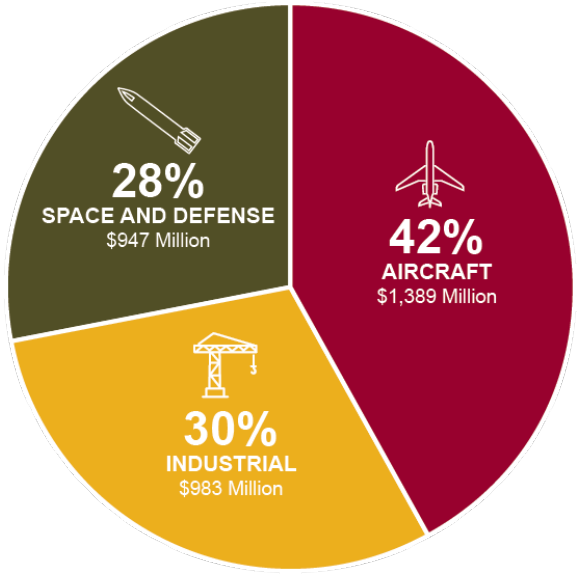
Shaping the way our world moves™

World leader in high-performance motion control solutions for mission-critical applications

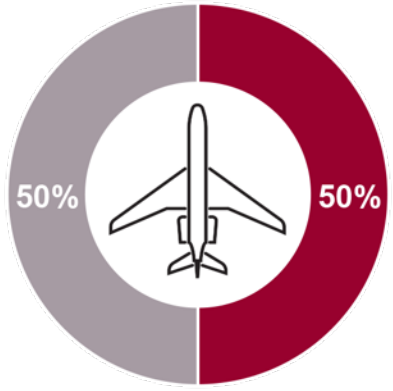
1951	14,000	$3.3 B	70+ YEARS	25
Founded by Bill Moog	Employees	FY 2023 Revenue	Controls Heritage	Countries



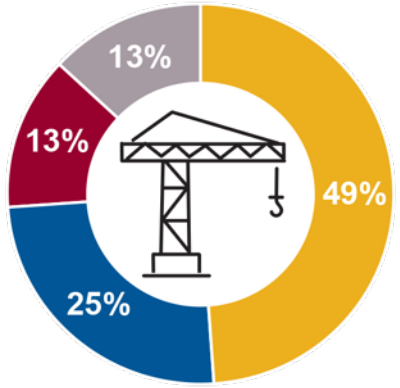
FY 23 Revenue



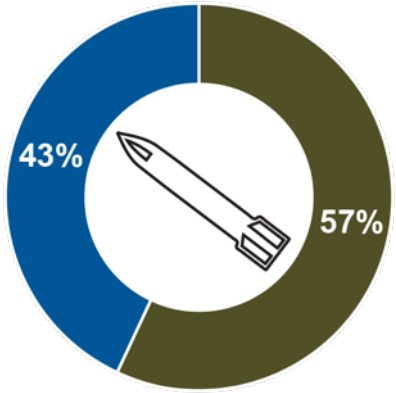
Business Segments



- Military Aircraft
- Commercial Aircraft



- Industrial Automation
- Medical
- Energy
- Simulation and Test



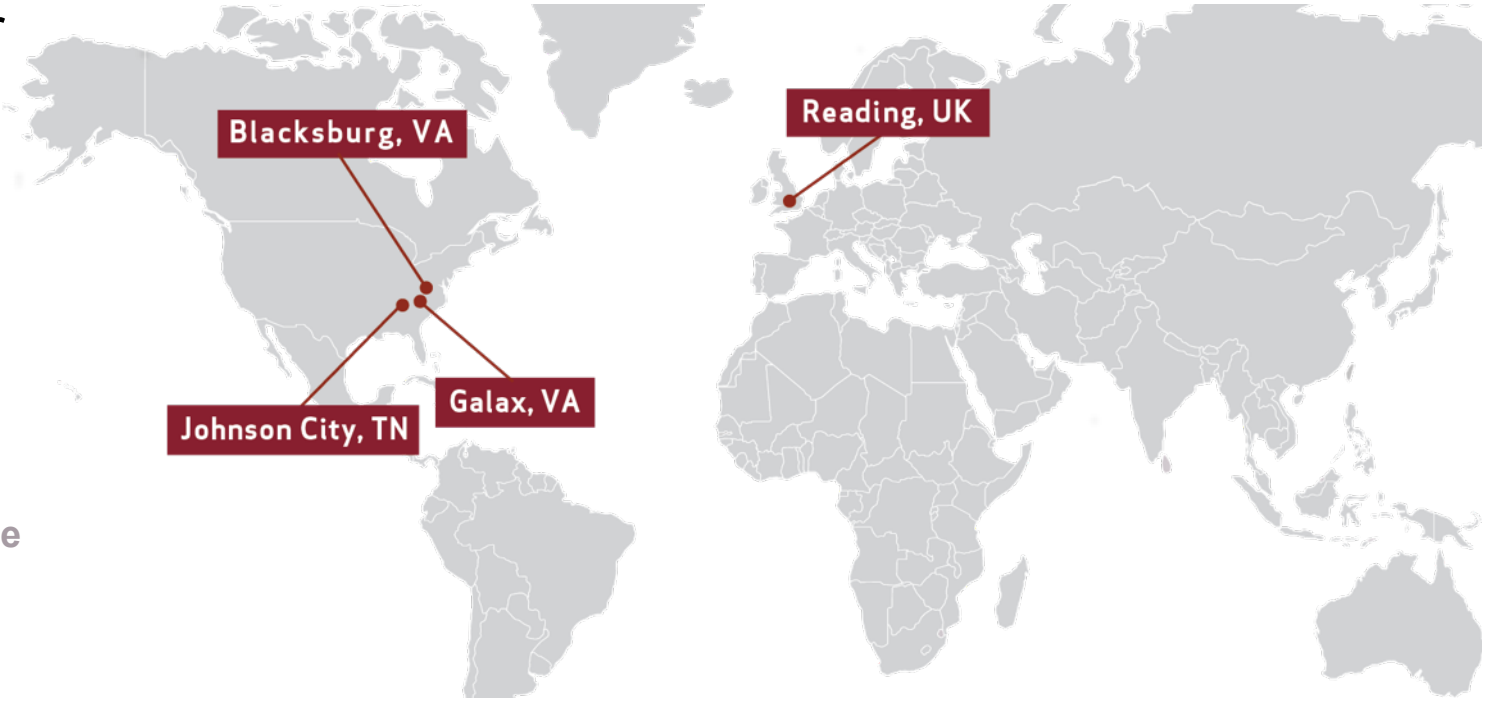
- Defense
- Space

MOOG

Power and Data Division

Power and Data Division

Moog is an innovative provider of power and data transfer solutions, motion control, and signal conversion products to the aerospace and defense markets.

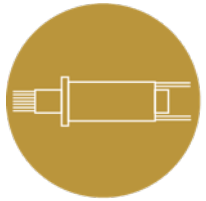


70+ YEARS
High Performance Components

1,200
Power and Data Employees

WORLD LEADER
Military/Aerospace Slip Rings

Business Segments


Slip Rings


Motion Control


Military Electronics

MOOG

Power and Data Division

- Slip rings, motors, resolvers for armored vehicle and remote weapon station turrets, aerospace sensors and weapon systems, solar array drive assemblies
- Multi-component and pedestal solutions for electro-optics/ infrared sensors and airborne, naval and ground-based radar systems
- Flight servos and utility actuators for UAVs, aircraft and military systems
- Communication networking ethernet switches, media converters, optical transceivers

Space and Defense Group – Power and Data Division

Miranda Layne
Group Vice President

Clarke Wingfield
Engineering

Kim Jackson
Business Development

Joe Dascano
Slip Rings

Tom Layne
Motion Control

Tina Davis
Finance

Melissa Vaden
Human Resources

Steve Nestor
Contracts

Blacksburg Central

Slip Rings

Higher Level Solutions

Profile

- Location: Blacksburg, VA
- Number of employees: 700
- Space: Over 200,000 square feet
- Core business description: Designs and manufactures slip ring assemblies and integrated motion solutions for aerospace and defense markets.

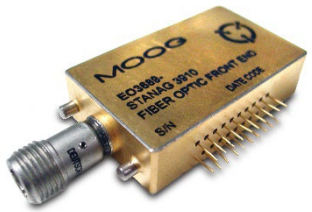
Highlights

- World's leading manufacturer of slip ring assemblies
- Headquarters for Space and Defense Group's Power and Data Division
- Materials and analytical expertise
- Certifications:
  - AS9100:2016
  - ISO9001:2015
  - FAA repair station
  - EASA

Blacksburg North

Motors – Resolvers

Fiber Optics



Actuators

Solenoids

Profile

- Location: Blacksburg, VA
- Number of employees: 250
- Space: 110,000 square feet
- Core business description: Designs and manufacturers motors, actuators, solenoids, position sensors and fiber optics for aerospace and defense markets.

Highlights

- Over 50 years experience in precision motors/resolvers and electromechanical assemblies
- Major supplier of high-performance motors to key aerospace and defense programs
- Certifications:
  - AS9100:2016
  - ISO9001:2015

Galax

Flex Tape

Printed Circuit Boards

Profile

- Location: Galax, VA
- Number of employees: 50
- Space: 30,000 square feet
- Core business description: printed circuit boards, flexible circuit boards and electronic assembly

Highlights

- Quick-turn prototype to mid-volume production printed and flexible circuit boards
- Industrial, aerospace and military applications
- Single, double and multi-layer PCBs
- Certifications:
  - AS9100D
  - ISO9001:2015
  - MIL-P-50884 and MIL-PRF-55110

Reading

Slip Rings

Profile

- Location: Reading, UK
- Number of employees: 150
- Space: 50,000 square feet
- Core business description: Design and manufacture slip rings and rotary solutions for the aerospace, defense and space markets.

Highlights

- Customer Service Centre for multiple space and defense market segments
- Over 60 years experience in slip rings precision motors/resolvers and electromechanical assemblies
- Queen’s Award for Enterprise: International Trade 2010
- Certifications:
  - AS9100D
  - ISO9100-2015

Johnson City

Optical
Transceivers

Ethernet
Media Converters

Ethernet
Switches

Video
Media Converters

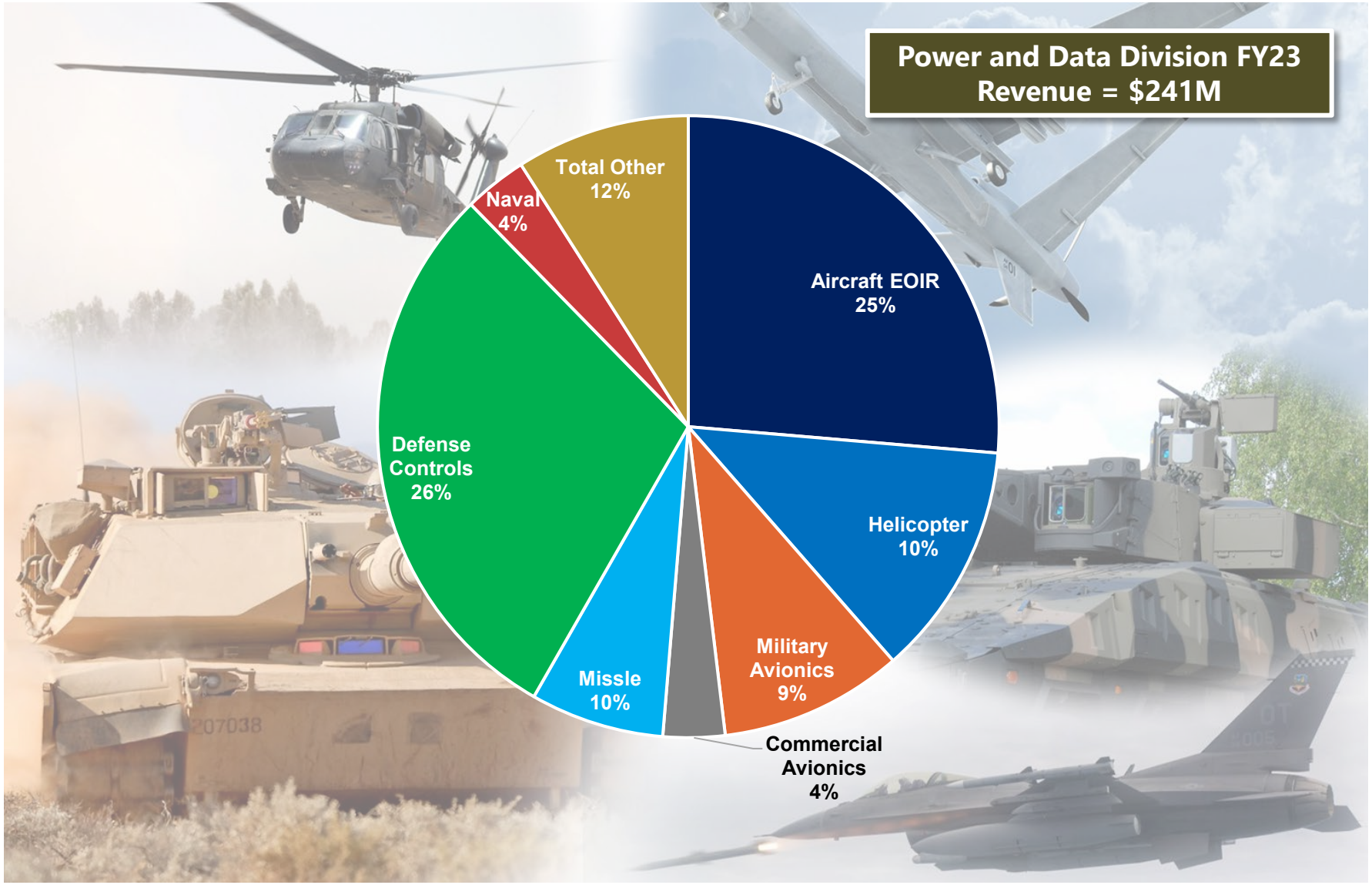
Profile

- Location: Johnson City, TN
- Number of employees: 50
- Space: 25,000 square feet
- Core business description: Designs and manufactures high-speed optoelectronic components and communication subsystems for use in harsh environment networking equipment applications.

Highlights

- Leads the industry in developing innovative optoelectronic components and communication subsystems for harsh environments.
- Manufactures components and systems qualified on many military platforms, including F-16, PATRIOT, MRAP, F-22, B-52, C-130 among others.
- Certifications:
  - AS9100D
  - ISO 9001:2015

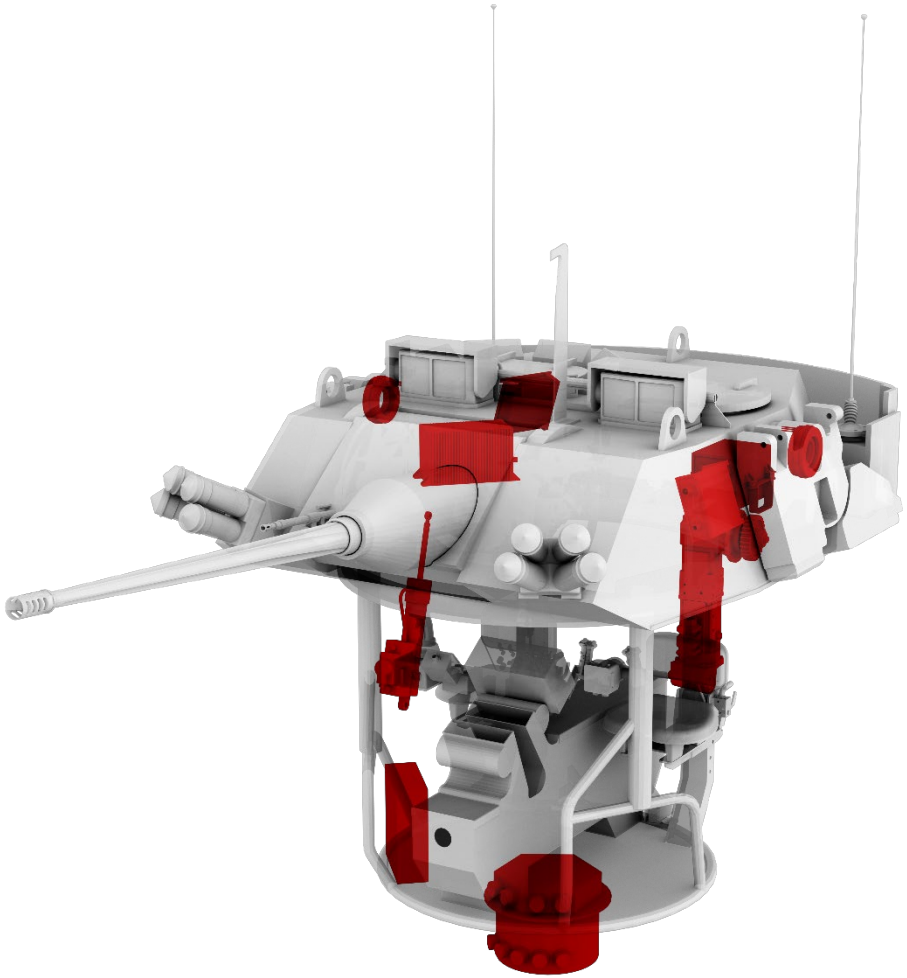
Power and Data Division Revenue by Market



Key Applications

- Armored Fighting Vehicle
- Electro-Optics/Infrared
- Helicopters
- Military Electronics
- Space

Armored Fighting Vehicle



Military modernization projects are replacing legacy platforms to respond to today's threats.

- Turret slip rings allow power and signal to be transferred up and down from the turret to the hull
- 360° independent rotation of the CIV allows for wider viewing to maintain situational awareness using slip rings and motors

Electro-Optic Infra-Red

Imaging systems to provide total situational awareness both day and night and identify targets and assess threats.

- Targeting pod that includes slip rings, motors and resolvers
- Sensors for unmanned systems that use slip rings, twist capsules and resolve for the gimbal system

Helicopters

High-performance helicopter products meet the demands of rugged environmental conditions.

- De-ice system to remove snow, ice and slush from the rotor blades use Moog slip rings
- Weapon station
- EO / IR sensor systems

Military Electronics

Moog's solutions facilitate secure communications in harsh environments by providing highly integrated components and subsystems.

- Ethernet switches, media converters and transceivers

Space

Moog's space products are on multiple satellites that provide global safety and security.

- Satellite systems that scan the earth and watch for threats
- GPS satellites that provide location by using navigation systems and phones

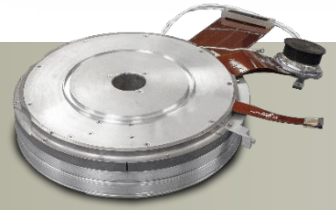
Slip Rings and Twist Caps

SLIP RINGS

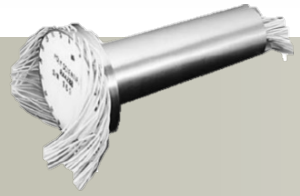
- World leader in slip ring design and manufacturing, over 60,000 designs
- Differentiators for success
  - Non-contacting technology
  - Passing high frequency signals
  - Long life, high reliability
    - Contacting systems (geometry)
    - Lubrications
    - Alloys

TWIST CAPS

- Limited rotation but can be >360
- Known torque response
- Longer life than cable wrap
- Transfer high frequency signals
- Can include impedance matching and EMI protection
- Can be used in volume constrained areas



Electro-Optic Slip Ring



Miniature Capsules

Twist Capsules

Capsule Assemblies

Rotary Joint Assemblies

Motors, Alternators, Resolvers and Solenoids

DC MOTORS

- Frameless style, high torque density brushless and brush-type motors
- Limited angle toroidally wound and sectional motors
- Motor diameters from 0.5 to 22 inches
- Housed and custom configurations available

PERMANENT MAGNET ALTERNATORS

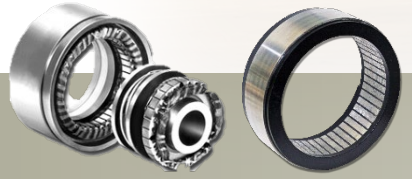
- High power density per volume
- Standard alternator diameters from 5.2 to 22 inches
- Continuous rated power to 100 KW

RESOLVERS

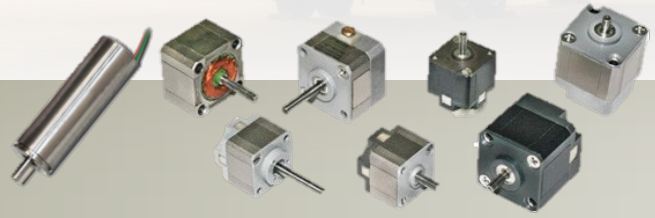
- Highly accurate, frameless resolvers, designed for harsh environments
- Frameless, flanged, housed configurations
- Single speed and multispeed available
- Brushless configurations
- Custom modifications, including redundant windings

SOLENOIDS

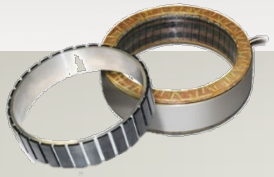
- Rotary and linear designs
- Linear solenoids for push/pull applications
- High force
- Safe and arm devices



Pancake Torque Motors
(Direct Drive) and Resolvers



Small Diameter and Cube Motors



Alternators

Sectional and Limited
Angle Motors

Solenoids

Integrated Assemblies

ROTARY JOINT ASSEMBLIES

- Integrating slip rings, resolvers or encoders, fiber optic rotary joints
- Can be offered with data converters and multiplexers

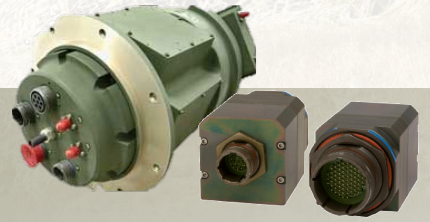
INTEGRATED AXIS DRIVE ASSEMBLIES

- Single axis gimbals that integrate power and data slip rings, DC motor, resolver or encoder, in a housing and bearing system that supports the customer's payload
- Can be offered with servo electronics

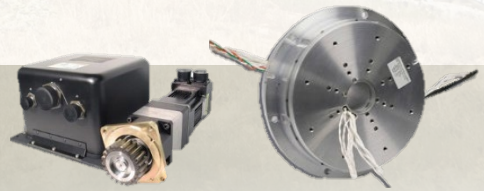
TWO-AXIS GIMBALS AND PEDESTALS

- Integrates all mechanical and servo control features into integrated assemblies
- Plug and play for EO/IR sensor payloads, radar panels, laser pointers
- Can withstand rugged aerospace and military environments

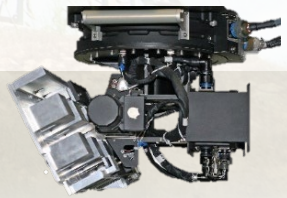
Rotary Joint Assemblies



Rotary Data Link Solutions



Integrated Axis Drive Assemblies



2-Axis Gimbals and Pedestals

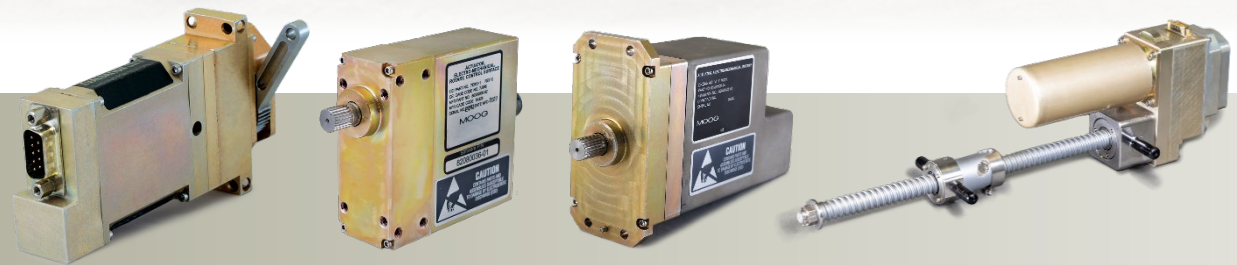
Electromechanical Actuators and Position Feedback Assemblies

ELECTROMECHANICAL ACTUATORS

- Compact, low voltage actuation solutions for flight control, utility and pointing mechanisms used on airborne and ground vehicle platforms
- Offered with and without integrated position loop servo control
- Rotary actuator peak torques of 25 to 3,000 in-lbf
- Linear actuators peak forces of 50 to 3,000 lbf

POSITION FEEDBACK ASSEMBLIES

- Integrates RVDTs or resolvers
- Geared or directly coupled
- Single to triple redundant



Electromechanical Actuators

Transducer

Summary

- ***Worldwide manufacturer***
- ***Critical applications***
- ***70+ years of heritage in the aerospace and defense markets***
- ***Dedicated, talented, innovative people across all disciplines***
- ***Prioritizing social and environmental responsibility***

Committed to our customers, partners, employees, and planet

The appearance of U.S. Department of Defense (DoD) visual information does not imply or constitute DoD endorsement.

Contact Us

MOOG
SPACE AND DEFENSE GROUP

Power and Data Division - Americas
1213 North Main Street, Blacksburg, Virginia 24060
1501 North Main Street, Blacksburg, Virginia 24060
+1 (540) 552 3011 poweranddata@moog.com
www.moog.com

Power and Data Division - Europe
30 Suttons Business Park, Reading Berkshire, RG6 1AW
+44 (0) 118 966 6044 poweranddata@moog.com
www.moog.com

Moog Space and Defense | Moog Inc. | @Moog_Inc | @Moog.Inc

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