OVERVIEW

Moog produces mechanisms for spacecraft motion control with design and flight heritage expanding over 45 years. With origins from historic programs such as Apollo and Pioneer to present-day satellite programs, Moog brings heritage-based solutions to spacecraft mechanisms technology. The spacecraft mechanisms facility in Chatsworth, California includes a fully-integrated engineering/design, manufacturing and test capability. Moog spacecraft products are flexible to meet customer requirements for a wide breadth of applications ranging from commercial to government flight programs.

MANUFACTURING CAPABILITIES

- Class 100 certified laminar flow work stations
- Class 1,000 Clean Room for Bearing Processing
- Class 10,000 Optical Assembly Clean Room
- Class 100,000 General Assembly
- Extensive machining capacity, over 900 square meters of floor space

TESTING CAPABILITIES

- Vibration Test Facility
- 14 Thermal-Vacuum Chambers
- 8 Thermal-Cycle Chambers
- Automated Acceptance Testing and Data Acquisition (Labview)
- Cryogenic Test Capability
SPACERRAFT MECHANISM PRODUCTS

ROTARY ACTUATORS
The family of Rotary Actuators is based on heritage design with a wide range of step sizes available. Options include:
• Stepper or Brushless DC Motor
• Direct Drive or Gear Transmission
• Several options for position feedback such as optical encoders, resolvers, potentiometers, and hall effect sensors

LINEAR ACTUATORS
The family of Linear Actuators includes the following options:
• Range of Travel
• Position Feedback
• Fine Position/Nanometer Incremental Motion
• Integrated Ball Screw or Lead Screw

SOLAR ARRAY DRIVES
Moog Solar Array Drives offer a large selection of heritage solutions to customers. Options include:
• Single or Dual Axis
• Stepper or Brushless DC
• Slip Ring, Twist Capsule or Cable Management
• Resolver, Potentiometer, or Feedback Options

SPECIAL APPLICATIONS
Custom mechanisms for unique applications:
• ISS payloads, science instruments, gimbal and latch devices
• Optimized solutions for specialized requirements
• Integrated structures and mechanisms

DOCKING AND RELEASE MECHANISM
LATCHING AND POINTING APPLICATION
**SPACECRAFT MECHANISM PRODUCTS**

**ELECTRIC PROPULSION POSITIONING GIMBALS**
Flight qualified electric propulsion gimbals provide vector pointing capabilities for various propulsion thruster configurations, including Xenon and Arc-Jet. Options include:
- Dual axis with wide angular range
- High resolution
- Stepper motors
- Harmonic drive transmission
- Potentiometer
- Propellant lines with heaters/thermistors and MLI blankets

**ANTENNA POSITIONER MECHANISMS**
APMs are available in several configurations. Either azimuth over elevation or X/Y (crossed axis) geometry are available. Options include:
- Rotary or Linear Actuators
- Stepper or Brushless DC Motors
- Encoders, Potentiometers or Resolvers
- RF & Cable Management
- Launch Locks

**ELECTRONIC CONTROL UNIT**
The Moog ECU is comprised of hybrid stepper motor controllers, EMI filters and analog pass-throughs for telemetry. The ECU is available in 1, 2 or 4 channel configurations.

**INSTRUMENTS AND SYSTEMS**
Moog Mechanisms are used on a wide variety of spacecraft instruments. These include:
- Opto-mechanical applications
- Multi-axis payload gimbals
- Precision mechanical instruments