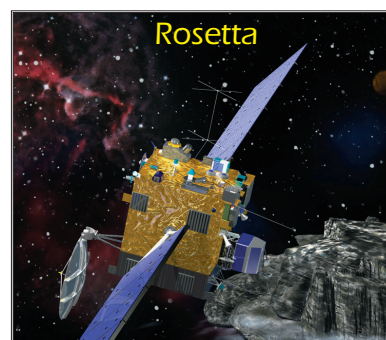
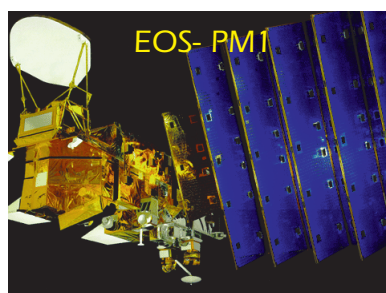
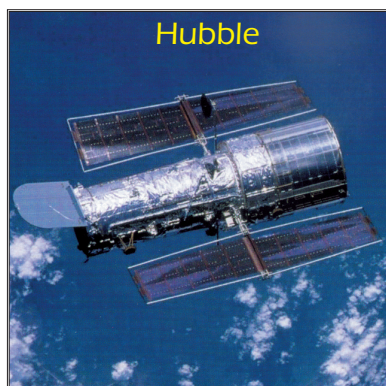


Controllable Drive Actuators Space Heritage Short Form



CDA INTERCORP
CONTROLLABLE DRIVE ACTUATORS

PROGRAM HERITAGE



CDA InterCorp has provided high reliability actuators and rotary transducers for more than 200 critical space flight, ground support and high vacuum applications, in the past decade. All of these application requirements were satisfied with our standard product line of motors, gearboxes, and rotary transducers. The standard nature of our product line, enables CDA InterCorp to support expedited deliveries for new applications, and reduced standard lead times for normal production hardware.

A partial listing of some of our past and current program involvement is shown below. A detailed list of all our flight heritage information is available upon request.

Hubble Space Telescope:

- COSTAR
- Space Telescope Imaging Spectrograph (STIS)
- Near Infrared Camera and Multi-Object Spectrometer (NICMOS)
- Advanced Camera For Surveys (ACS)
- Fine Guidance Sensor (FGS)
- Cosmic Origins Spectrometer (COS)
- Wide-Field Camera-3 (WFC-3)

International Space Station

- Water Pump Drive
- Valve Controls
- Potable Water Sampler
- Vacuum Valve Actuation
- Eddy Current Dampers

Shuttle Science Experiments

- Mechanisms of Granular Materials
- Space borne Imaging Radar-C (SIR-C)
- Shuttle Radar Topography Mission

Commercial Satellites:

- Eurostar 3000
- Worldstar
- Skynet
- Orbview
- IPSTAR
- Quickbird

Science & Military Missions

- Earth Observer 1 (EOS-PM1)
- Far Ultra Violet Spectroscopic Explorer (FUSE)
- Space Infra Red Telescope Facility (SIRTF)
- SAGE III
- Thermal Imaging Radar
- GeoLITE Lasercom
- Solar-B
- Rosetta
- Genesis
- HIRDLS
- Messenger (Mercury Mission)
- TRIANA / NISTAR
- Ozone Mapping Profiler Suite (OMPS)
- Solar Variable Irradiance Monitor (SOVIM)
- Spaced Based Infra Red System (SBIRS)
- Gas and Aerosol Monitoring System (GAAMS)
- Prospector
- Gravity Probe B
- James Web Space Telescope (JWST)
- Solar Heliospheric Observatory (SOHO)

...and many more...

CDA InterCorp

In appreciation for the precision stepper motors used in the Corrective Optics Space Telescope Axial Replacement (COSTAR). Your fine workmanship and technical assistance was crucial in the COSTAR's construction. The flawless operation of the COSTAR on board the orbiting Hubble Space Telescope (HST) is proof positive of a job well done.

Your contribution greatly enhanced the success of the HST First Servicing Mission, December 2-13, 1993

* Copied from a plaque presented by the HST Program Manager to CDA InterCorp, June, 1994. Including applications on COSTAR, CDA has over 50 products on HST alone.

CDA'S STANDARD MODULAR DESIGN

CDA InterCorp's Controllable Drive Actuators, Eddy Current Dampers, and complementary Rotary Transducers are being utilized in many performance critical applications for space and space support. CDA's standard modular design concept, with off-the-shelf-technology, provides high reliability space-heritage components, with unparalleled performance per unit volume. A substantial benefit with CDA's modular design is the multi-function tasking capabilities within a single drive assembly. Every module within CDA's product line is an established, qualified component. A new application can derive the benefit of custom performance with qualified modular hardware.

While critical internal materials and processes are standard, the external mounting configurations and winding characteristics may be tailored to satisfy specific system performance and mechanical interface requirements. Most of our current applications are mission critical, and some are even flight critical.

PRODUCTS

- Motor Modules:**
 - Stepper Motors
 - Brushless Permanent Magnet Motors
 - AC Induction Motors
 - Square Wave Driven AC Motors
 - Damped Rotary Switches
 - Housed Limited Angle Torquers
- Eddy Current Dampers:**
 - Rotary
 - Linear
- Gearing Modules:**
 - Rotary:
 - High Torque Planetary Gearing
 - Right Angle Drive High Torque Gearing
 - High Accuracy Zero Backlash Gearing
 - Linear:
 - Ball Screw Actuation
 - ACME Lead Screw Actuation
- Brakes:**
 - DC Friction Brakes
 - Permanent Magnet Detent Brakes
- Rotary Transducers:**
 - Acceleration Transducers:
 - Brushless DC Rotary Accelerometer
 - Position Transducers:
 - Brushless Resolvers
 - Single Speed or Multiple Speed
 - Tandem or Cluster Redundancy
 - With or Without Gearing
 - On Axis Coarse Resolvers
 - RVDT's
 - Tandem or Cluster Redundancy
 - With or Without Gearing
 - Velocity Transducers:
 - AC Tachometers
 - Damping Tachometers
 - Rate Tachometers
 - Permanent Magnet Alternators
 - Single Speed
 - Multiple Speed

-Great Orion Nebula -

FEATURES

- Standard Qualified Modular Design
- Temperature Range:
 - 80°C to +220° C (Wet Lube)
 - Down to 4K (Dry Lube)
- High Grade Stainless Steel Construction
- Class H220 Insulation System
- Low Outgassing Materials
- Optional Redundant Windings
- Rugged Construction
- High Torque Precision Gearing
 - Through Hardened
 - Low Backlash
 - High Torsional and Radial Stiffness
 - Space Rated Lubrication - Standard
- CDA InterCorp can combine our standard modules into multi-function integrated actuators.

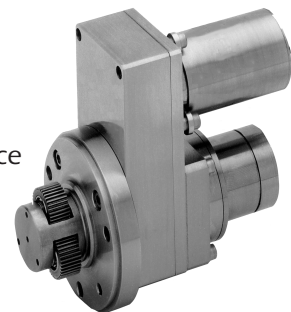
APPLICATIONS & CUSTOMERS

Past Applications Include:

- Cryogenic Actuators
- Cryogenic Resolvers
- Corrector Mechanisms
- Joy Stick Deployment Damper
- CCD Shutter Drives
- Filter Wheel Drives
- Mirror Deployment Drives
- Focus Mechanisms
- Pump Motors
- Deployment Drives
- Field of View Drives
- Shutter Stow Drives
- Mirror Tip/Tilt Drives
- Mechanism Position Transducers
- Launch Lock Devices
- Valve Control Drives
- Bellows Actuator
- Calibration Wheel Drives
- Door Actuators
- Boom System Tuned Damper
- Valve Lock Brakes
- Slit Mechanism Drives
- Redundant Position Transducers
- Pupil Adjustment Mechanism Drives
- Antenna Trim Actuators
- Ground Support Actuation
- Vacuum Valve Control Drives
- Solar Array Deployment Actuators
- Solar Array Drive Actuators
- Solar Array Deployment Eddy Current Dampers
- Robotic Actuation Systems
- Spectrometer Drive
- X-Y- & Z Axis Drives
- Center of Gravity Control Drives
- ... and many more...

Customers Include:

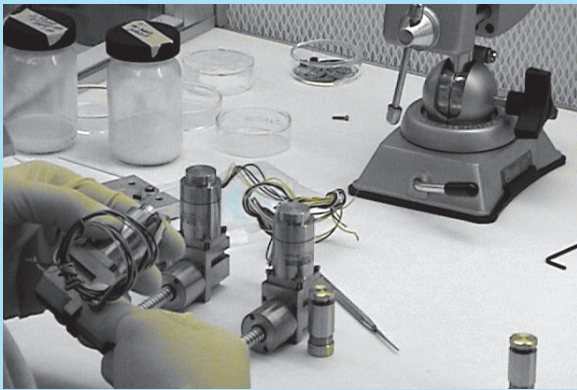
- Alcatel
- Applied Physics Laboratory
- ATK Space Systems
- Ball Aerospace
- COM-DEV
- Conae
- Contraves Space
- DLR
- EADS
- Galileo Avionica
- Goodrich
- Honeywell
- HTS
- ITT Space Systems
- Jet Propulsion Lab
- Kongsberg
- Laboratory for Atmospheric & Space Physics
- Lockheed Martin
- Marotta Scientific Controls
- MD Robotics
- MIT Lincoln Laboratory
- NASA, Goddard Space Flight Center
- NASA, Johnson Space Center
- NASA, Langley Research Center
- Naval Research Laboratory
- Northrop Grumman
- Orbital Sciences Corp.
- Raytheon
- Sandia National Laboratory
- Space Dynamics Lab
- Space Systems Loral
- SSG, Inc.
- Swales Aerospace
- Technospazio
- TNO
- University of Padova (CISAS)



CLEAN ROOM, ASSEMBLY & TEST



500 Square Foot Clean Room



Actuator Assembly



Actuator Assembly



Rotary Accelerometer Testing



Actuator Final Acceptance Testing



Eddy Current Damper Acceptance Testing



Eddy Current Damper Assembly

The product, capability and program heritage information contained herein is a result of continuous industry demand for high reliability controllable drive actuators and rotary transducers utilized in critical space applications. CDA InterCorp's actuators, eddy current dampers and rotary transducers are designed to operate under the most demanding requirements of space, deep space, and cryogenic applications, while maintaining remote and automatic control of torque, acceleration, velocity, and/or position. These components are used in aerospace, defense, commercial aviation, "down hole", robotic, nuclear robotic, high reliability industrial control as well as space applications, throughout the world.

With over 35 years in the industry, CDA InterCorp's core philosophy of modular standardization has withstood the test of time. Each module design utilizes the same inventoried piece part standards, materials, and construction techniques. Inherent in our standard modules are unequalled reliability and ruggedness, while maintaining flexibility in providing "custom actuator" requirements and extremely responsive prototype deliveries.

CDA's quality system is certified to ISO 9001: 2000. A government quality representative is available to provide source inspection, as required.

For responsive support to your specific requirements, or to request a complete set of application data brochures, please call, fax, e-mail, or write CDA InterCorp directly. CDA's System Actuator Design Engineers are available to visit your facility to assist in the selection and integration of our rugged, high reliability actuators into your system. CDA also provides marketing personnel throughout the United States and internationally.



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