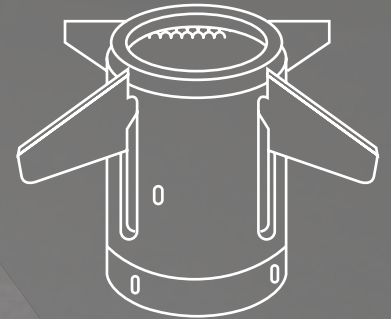


# CONTROL ACTUATION SYSTEMS



MISSILE SUBSYSTEMS

MISSILE AND ROCKET COMPONENTS



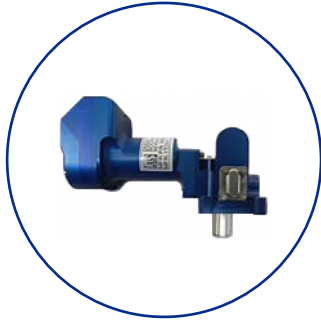
**General Dynamics Ordnance and Tactical Systems is a premier developer, manufacturer and integrator of Electromechanical Control Actuation Systems (CAS).** For over 30 years, we have provided full service engineering and manufacturing of custom electromechanical control actuation systems used to guide the flight trajectories of rockets, missiles, and strategic systems.

## GUN HARDENED CAS

Our gun hardened CAS product is used to turn artillery shells into cost effective, guided munitions. The CAS must survive accelerations from the gun launch in the range of 8,000g to 30,000+g, and then reliably operate. The post launch operation typically has two complex mechanical motion functions: fin deployment and fin actuation.

Aerodynamic fins are stored inside the shell during initial ballistic flight to extend the range. After the fin deployment mechanism locks the fins into their extended state, the CAS responds to guidance commands that steer the shell into the target. Gun launched munitions offer significant cost and logistical advantages over propulsion launched systems.



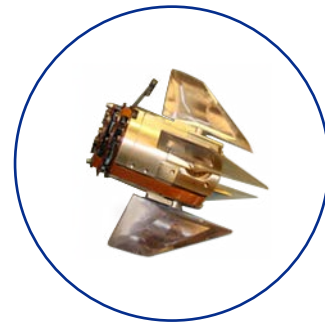


### STRATEGIC SYSTEMS ACTUATION

We have a long history and current outstanding performance in both development and production on these extremely high priority, and highly managed systems. Our Strategic Systems actuators are focused on high performance, light weight, and minimal volume – all with the customer demanded quality, and program oversight and reporting.

Our primary product in this product line are the actuators within the Throttleable Divert and Attitude Controls System (TDACS) on SM-3 interceptors. These GD actuators provide unparalleled guidance and control accuracy. Additionally, our products operate in a challenging thermal and structural environment; all tested and verified over multiple ground and flight tests.

All manufacturing in this product line are under strict Mission Assurance methods required by the Missile Defense Agency.



### TACTICAL MISSILE CAS

Our tactical missile CAS have made enormous advances in performance density. First, they offer high levels of operation in the torque vs. speed domain. Secondly, they have exceptionally high fin position loop bandwidth (ultra-fast response to position commands).

We are currently in development of a variety of applications ranging from approximately 1 3/4" diameter to 21" diameter. Additionally, we are in production with a recently qualified high performance and thermally hardened 4-axis system.