SPACE LAUNCH VEHICLE SOLUTIONS

SAFE, RELIABLE AND PROVEN

Innovative solutions customized to meet platform needs

For over 50 years and 117 successful space missions, Collins Aerospace has supported space travel through advanced technologies and innovative solutions. Our products have been proven to perform in the harshest environments.

We have an extensive history providing auxiliary power units (APUs) and hydraulic systems that provide power for vectoring rocket engines from the Space Shuttle to the Space Launch System (SLS). Our cryogenic fluid management solutions have flown dating back to Apollo. Collins' technical capabilities enable us to design custom solutions to meet your specific needs with affordability and agility in mind.

Collins APUs derived from Shuttle hydrazine systems were reengineered to operate in a gaseous hydrogen system and performed flawlessly during the SLS Green Run Test in March 2021 and subsequent Artemis I flight.

Launch vehicle thrust vector control (TVC) systems

Hydraulic or electro-mechanical TVC systems provide control power for the launch vehicle, enabling a safe and successful launch.

Cryogenic fluid management solutions (CFM)

Our CFM pumps recirculate liquid hydrogen or liquid oxygen in a safe, clean and temperature-controlled system that can tolerate the harsh space environment.

Collins solutions can be custom designed for a diverse range of systems. We deliver highly reliable TVC and CFM systems on time and on budget.

KEY FEATURES & BENEFITS

- Proven safe and reliable TVC and CFM solutions
- Performs in extremely harsh environments
- Customizable to different platforms
- Human rated
- Expendable, reusable and long duration operations
- Affordable solutions

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HYDRAULIC APU FEATURES

Our hydraulic auxiliary power units:

- Design features can be varied to meet your needs:
  - Power: 10-150HP (Current Artemis APU power output is 150HP)
  - Speeds: Up to 145,000 RPM
  - Operating Temperatures range from 2,200º F to -135º F
  - Inlet pressures: Up to 10,000 psi
- Extreme environment operations
- Propellant control
- Integrated thermal management
- High speed rotor dynamics
- Electronic system controls
- Energy sources include
  - Hydrazine
  - High pressure gases such as steam, helium, hydrogen, nitrogen and methane

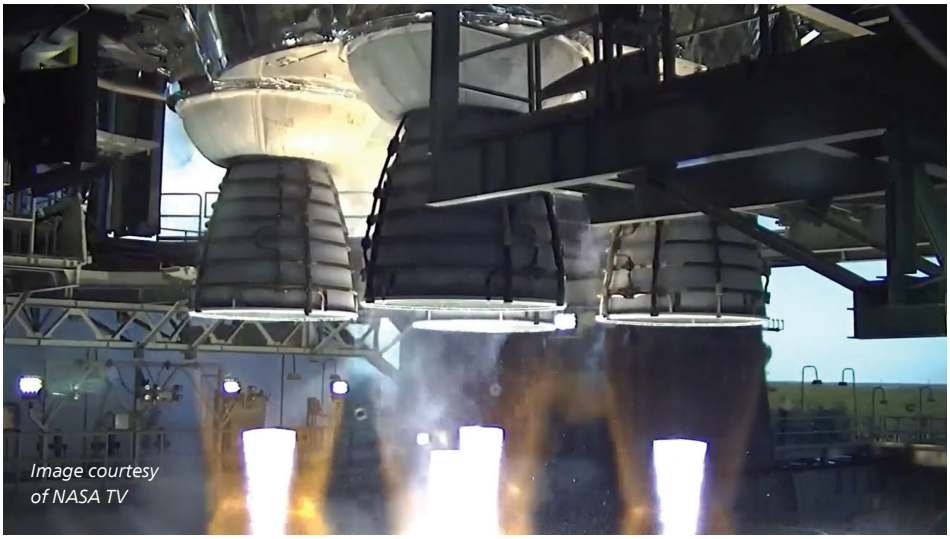

Image courtesy of NASA TV

ELECTROMECHANICAL ACTUATION SYSTEM FEATURES

- Sized up to 100,000 lbf
- Single or dual channel electronic system controllers
- Linear and geared with single or dual motors
- Conduction, convection cooling
- Unique envelope constraints
- Aircraft, space, launch vehicle and missile applications
- System performance modeling to support vehicle design specifications
- Frequency response up to 50 Hz
- High stiffness and zero backlash

Specifications subject to change without notice.

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