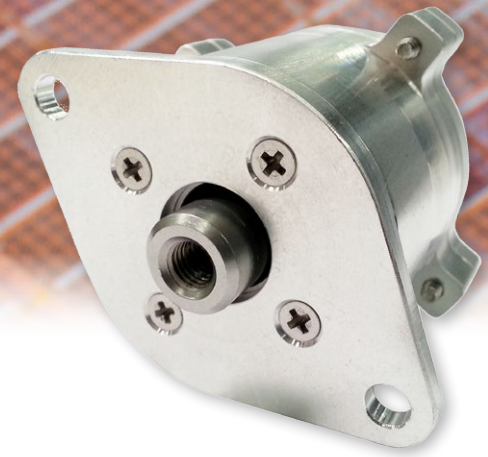
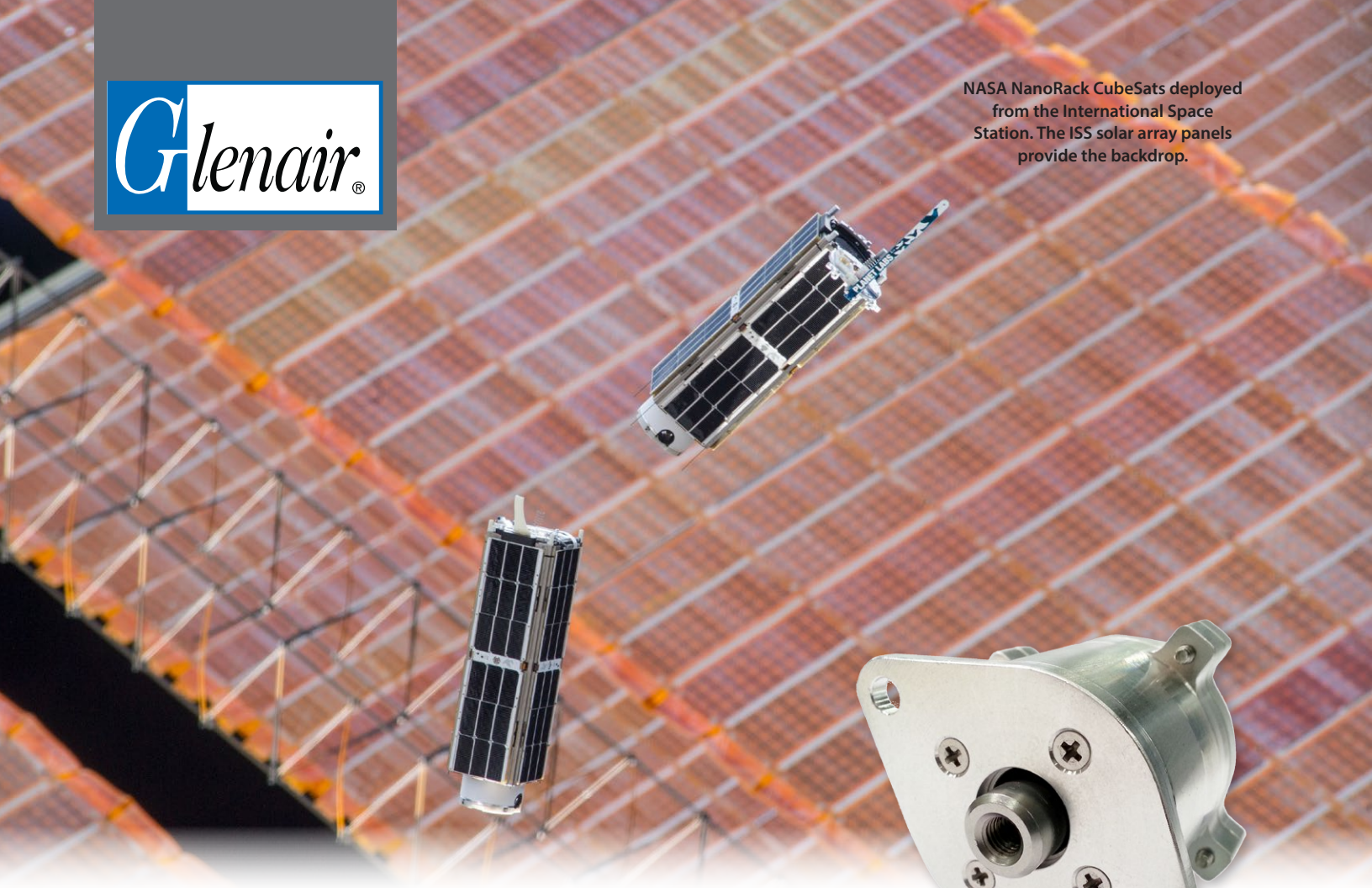




NASA NanoRack CubeSats deployed from the International Space Station. The ISS solar array panels provide the backdrop.



**SERIES 06**

# Non-Pyrotechnic Space Mechanisms

**High-reliability, non-explosive electromechanical release mechanism technology for dependable stowage and release of deployable space systems**

**G**lenair space mechanisms are optimized for life-of-system reliability with built-in mechanical and electrical redundancy. The planned release of the deployable payload is activated by a pre-determined value of electrical current to a fuse-wire system which causes the wire to break under tension and allows a pre-loaded mechanical bolt to actuate. Glenair's line of low-shock, redundant and non-redundant space mechanisms includes both HDRM devices as well as a new family of pin pushers and pin pullers. Customer-defined housing and mounting configurations are available.



Glenair pyrotechnic-free space mechanisms offer quick release time, low shock, relatively low power input, and virtually no temperature sensitivity. Glenair HDRMs, pin pushers, and pin pullers also deliver higher preload carrying capacity compared to similar devices.

- **Pyrotechnic-free alternative for single-event release of deployable space systems**
- **User-serviceable and refurbishable units**
- **Standard catalog as well as custom designs**
- **Not susceptible to transient and noise (EMI/EMP/ESD/RFI) inputs**
- **Extended temperature ranges: -150°C to +150°C**



**G**lenair non-pyrotechnic space mechanism technology is based on a fusible wire-actuated separation nut design. Increasingly popular for its reliability and non-pyrotechnic action, fusible wire-actuated nut technology has the added benefit of being partially reusable and refurbishable post-deployment. Glenair HDRMs, pin pullers and pushers are immune to all forms of EMI or ESD, and capable of easily sustaining launch loads as well as defined preloads—with release deployment times comparable to conventional explosive actuators, but with low-shock and low power input.

A broad range of hold down release mechanism technologies have been historically used to hold secure and subsequently deploy satellites and other appendages (solar arrays, antenna reflectors, radiators, instruments, doors, sensors, booms, and so on) in space. Most of these technologies relied on non-reusable (explosive/pyrotechnic) designs that suffered from a broad range of deficiencies, including susceptibility to electromagnetic interference, problematic synchronization of release with mission requirements, high-shock release action, and significantly, the inability to reuse or refurbish the device during test. Historically, actuators and release devices of this type have included explosive release nuts, bolt cutters, separation nuts, and wire and pyro cable cutters

Glenair has taken a different path in the development of non-explosive HDRMs and other space mechanisms with a consumable initiator which, post-actuation, allows the device to be refurbished and reset on-site, or at the factory. Glenair fusible wire-actuated nut technology solves all of the problems associated with conventional explosive hold down and release devices.

Glenair new family of pin pushers and pin pullers are low-shock mechanisms comprised of a spring-loaded pin held in place using the same fusible wire-actuated technology found in our hold down release mechanisms. Once actuated the restraining fuse wire breaks under tension causing the pin to retract under the force of the drive spring. The effects from the release of potential energy from the loaded spring during actuation of the rod are absorbed via a smooth release action to limit the effects of shock.

All three key components of Glenair space mechanisms (preloading assembly, release actuator, and load-carrying structure) may be packaged according to specific customer requirements including connectorization in place of wire leads. Packaging options include cylindrical or rectangular housings, lightweight materials, unique shapes and profiles, non-standard mounting dimensions and more. Consult the factory for more information.

### SCALABLE DESIGNS: FROM CUBESATS TO 20,000 POUND PAYLOADS

- Fuse-wire based technology
- Redundant or non-redundant actuation circuit
- Space-rated and screened materials
- Electrical initiation up to 5 amps



Build-to-spec solutions also available, including connectorized HDRMs and power draw resistors

### DEPLOYMENT APPLICATIONS



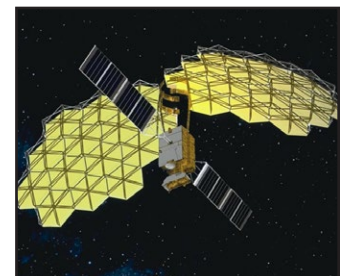
Solar Arrays



Booms and Masts



Antennas



Reflectors