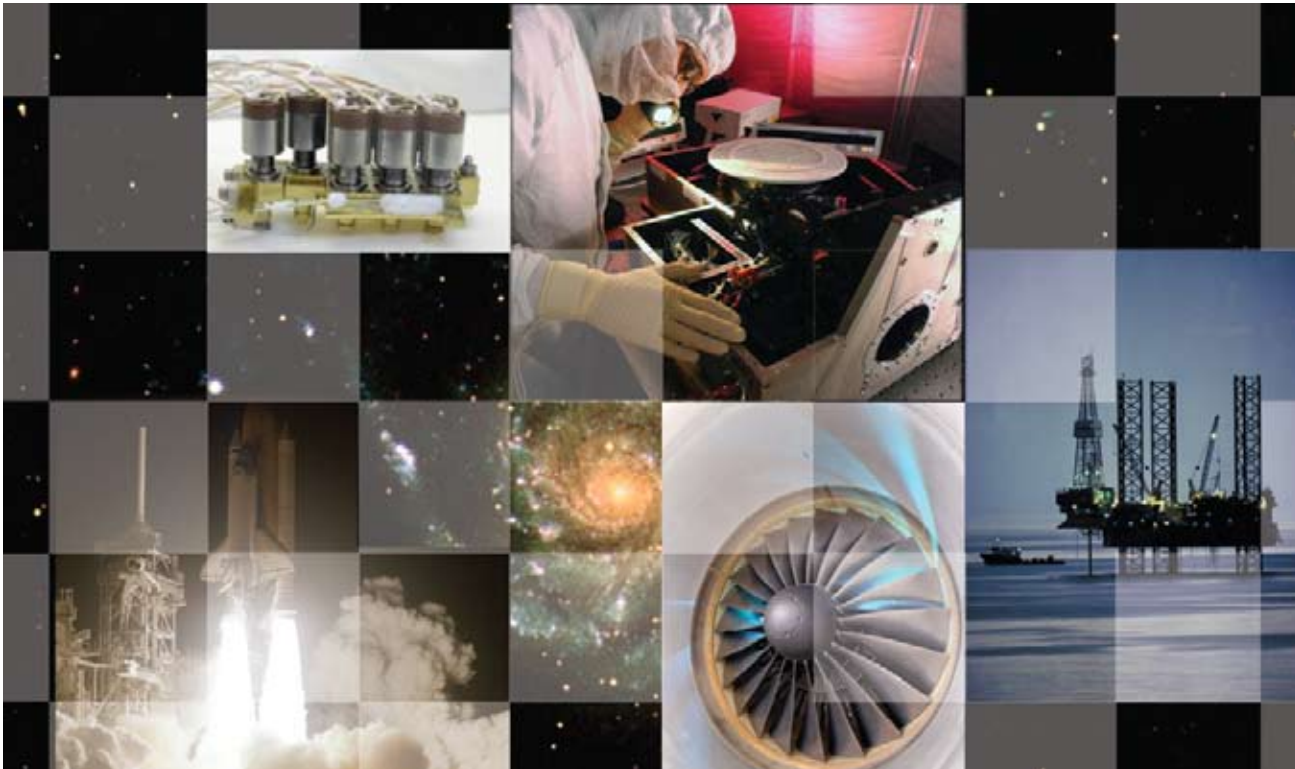




technology opportunity

# Innovative Microvalve Technology



NASA Goddard Space Flight Center (GSFC) is offering an innovative valve technology for licensing. This double-latching solenoid valve offers greater reliability than existing technologies while being smaller, lighter, costing less, and using less energy. In addition to its applicability to the space program, this valve also can be used in several Earth-based applications.

## Benefits

- **Low leak rate:** In the closed state, the valve orifice is sealed hermetically, resulting in less flow leak.
- **Self-adjustable:** A “floating” pintle tip self-adjusts to create a tight seal.
- **Removable and replaceable:** The solenoid valve can be removed and replaced in the event of failure.
- **Low power requirement:** The double-latching technology reduces the valve’s power requirement.
- **High temperature capability:** High temperature capability: Microvalves have been tested successfully in temperatures ranging from  $-60$  to  $+240$  °C.
- **More reliable, smaller, lighter, and lower cost:** Fewer parts, reduced complexity, and greater tolerance result in higher reliability as well as reduced cost and mass.

## Applications

- Gas-sampling systems
- Gas chromatograph/mass spectrometer (GC/MS) systems
- Portable gas “sniffers”
  - High-temperature applications
  - Down oil wells
  - Inside jet engines

## Technology Details

### *How It Works*

This technology is a small, double-latching solenoid valve. It uses a permanent magnet to latch the valve in either the “open” or “closed” position. Coils are energized with an electronic pulse to change the state of the valve from open to closed and vice versa.

In the closed state, a revolutionary “floating” pintle tip seals the valve orifice hermetically. This approach corrects for small errors in machining (i.e., machining tolerances), overcoming about 2–3 mils of radial misalignment and thereby ensuring a consistently tight seal.

### *Why It Is Better*

More reliable than existing technology, this valve has two coils that can be run in parallel or series. If there is a failure associated with one of the coils, the entire solenoid can be removed and replaced.

Unlike other technologies, this valve performs well in high-temperature applications, have been tested successfully in temperatures ranging from –60 to +240 °C, making the technology suitable for high-temperature applications. The valve also has an improved leak rate, lower manufacturing costs, and weighs only 20 g (current art is 27 g)—all of which make it smaller, lighter, and more economical to manufacture than competing technologies.

### *Patents*

NASA Goddard is pursuing patent protection for this technology.

### *Licensing and Partnering Opportunities*

This technology is part of NASA’s Innovative Partnerships Program (IPP), which seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry. NASA invites companies to consider licensing the Miniaturized Double-Latching Solenoid Valve (GSC-15039-1) for commercial applications. For information and forms related to the technology licensing and partnering process, please visit the Licensing and Partnering page on Goddard’s IPP Office Web site (<http://ipp.gsfc.nasa.gov/lic-partnerships.html>).

## For More Information

If you would like more information or want to pursue transfer of this technology, please contact:

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