

Cryogenic and adjacent sensing

Sensors capabilities in space

Collins Aerospace delivers advanced temperature, speed, and pressure sensors built for the harshest space environments.

Our flight-proven solutions combine precision, durability, and deep systems integration. By reducing integration complexity and verification costs, these sensors enable trusted data that set them apart from traditional sensor. These sensors also ensure stable, reliable performance over the full mission life.

As an example, the entire family of Collins cryogenic temperature sensors on the Space Shuttles were confirmed to still be within their initial calibrations even after up to 134 engine cycles. Our sensors were also critical to the successful 'unfolding' procedure of the James Webb Space Telescope, and continue to provide the precise measurements required for mirror control and image stability.

Platinum temperature - surface

- Myriad configurations for many applications
- -269°C to 1000°C typical
- <1% FS accuracy
- Low cost
- Small form factor
- Fast response

Platinum temperature – cryogenic immersion

- 65-year LH2, LHe, and LOX pedigree
- -269°C to 1000°C typical
- Highest fidelity
- Minimum 65 mm diameter
- Typically launch platforms
- Housing design to application needs

Speed/Flow

- Cryogenic pump/turbopump speed sensing
- Contact/noncontact, magnetic/nonmagnetic
- Correlates to accurate flow
- Mass flow sensing (deltaT)

Thermocouples

- Typically hotter temperatures
- Preburners and combustion chambers
- Jet engine applications also typical

Pressure

- Typically jet engine applications
- -55°C to 100°C typical
- 25-1000psi typical (1.7-69 bar)
- If temperature and media-isolated, can be used in cryogenic systems



Space sensor use cases

Satellites

- Surfaces
- Solar arrays
- Electronics health
- Propulsion systems

Small launch

- Engine temperature
- Engine speed
- Maneuvering system temps

Medium launch

- Engine temperature
- Engine speed
- Maneuvering system
- Surface temperature

Heavy launch

- Tank temperature
- Tank levels
- Feed-line temperature
- Line-flow rates
- Low-pressure turbopump temperature and speeds
- High-pressure turbopump temperature and speeds
- Preburner temperature
- Surface temperature

Deep space probes/rovers

- Surfaces
- Solar arrays
- Electronics health
- Propulsion systems
- Radioisotope thermal generators

Human habitation

- Life support
 - Thermal management system
 - Water management
 - Oxygen generation
- Propulsion/maneuvering
- Solar arrays

Cryogenic and adjacent sensing

Major space programs

NASA

- Cassini
- Hubble
- James Webb Space Telescope
- Mars Pathfinder
- Mars Lander
- Mars Rovers
- Voyager 1 and 2
- Orbiting Carbon Observatory
- Nancy Grace Roman Telescope
- Psyche
- Deep Space Optical Communications

United Launch Alliance

- Delta
- Atlas
- Vulcan

Boeing

- Starliner
- Space Shuttle Orbiter
- International Space Station
- HS376, HS601, HS702 and GPSIIF

Lockheed Martin

- Space Shuttle external tank
- International Space Station
- Titan
- Centaur
- A2100
- Orion

Aerojet Rocketdyne, a subsidiary of L3Harris Technologies

- AJ-26
- Space Shuttle main engine
- RS-25
- RS-25A
- RL10A
- RL10B
- RL10X
- XRS2200
- RS-68
- J-2X
- THAAD

ATK Thiokol

- SS Reusable Solid Rocket Motor

United Technologies

- International Space Station
- Orion Environmental Control

Loral Space & Communications

- 1300

European Space Agency

- Rosetta
- Herschel
- Automated Transfer Vehicle
- Galileo

CNES

- Spot
- Ariane 5 tank

Safran Aircraft Engines

- Vulcan engine
- HM-7

European Aeronautic Defence and Space Company (EADS)

- Eurostar
- Ariane 5
- Ariane 6

Thales Alenia Space

- Spacebus 2000/3000

Indian Space Research Organisation

- Indian National Satellite System
- Chandrayaan 3

IHI Aerospace

- H-IIA

Learn more at rtx.com/collinsaerospace/spacesensors

Contact

+1.952.892.4000
sis@collins.com

Collins Aerospace
14300 Judicial Road
Burnsville, MN 55306
USA

Connect with us



[RTX.com](https://rtx.com)

