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SPACE CASE STUDY

WEATHER SATELLITE CALIBRATION INSTRUMENT

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OMNISEAL® METAL FACE SEALS

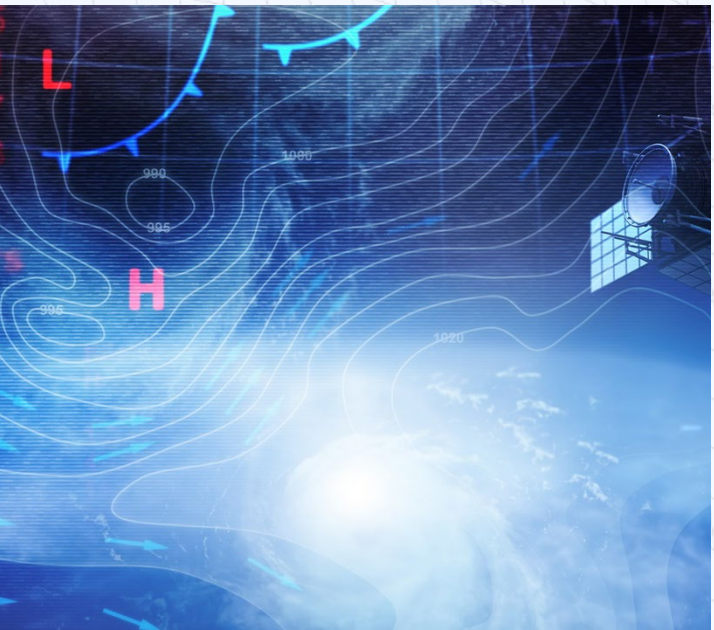
Weather Satellite Calibration Instrument

Hilde Joosen July 2021

CRYOGENIC EXTREME ENVIRONMENT

Environment

There are a variety of satellites, each with a specific function and supporting a specific aspect of our daily life. It can be used to enhance navigation, GPS or internet communication; to monitor tides; or to forecast weather. In order to link with each function, a satellite carries instrumentation that needs to operate for many years since maintenance is not possible on a satellite. Instrumentation also needs to be protected from the outside atmosphere, all of which are possibly detrimental, as well as from internal corrosive fluids and substances that are carried by the satellite for its other functions (such as hypergolic fuels that power its thrusters).



Sealing components are used in several satellite applications where allowable leakage is very low and needs to be kept stable for many years such as in electric thruster tanks and optical systems.

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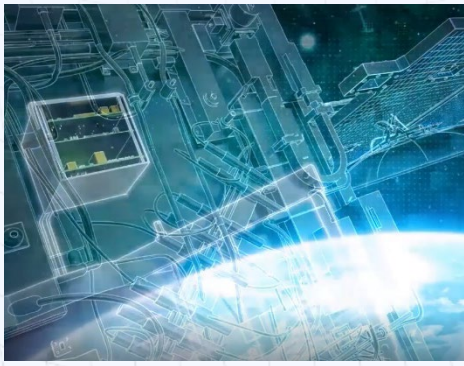
Challenge

Extreme tight leakage is mandatory in this type of application as protection of key electronic systems such as altitude or system sensors becomes the priority. However, most sealing solutions such as PTFE seals tend to be restricted to the permeability of the PTFE in cryogenic conditions and cannot meet the stringent leakage requirements.



Solution

Spring-energized metal C-Seals are the sealing solution that protects these weather calibration instruments since they are the most suitable in meeting challenging leakage requirements and have no problem with permeability. The silver plating is a critical factor in making the tightness more “soft” to fill microscopic voids on the mating surfaces. The spring is key to maintaining tightness when gaps are created by different thermal expansion of the mating surfaces (stainless steel and aluminum).

Fair weather ahead when you use metal sealing solutions.

Benefits

- Maintains very low leakage with different thermal expansion of the mating materials
- Handles mating surfaces with different coefficients of thermal expansion
- Designed to respect compression loads constraints

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Design Expertise & Tailor-made Solutions for Your Critical Applications

Omniseal Solutions is a global engineering leader with over 65 years of historical legacy, relentlessly dedicated to the design and manufacture of precision sealing and material solutions that protect critical applications in the most demanding environments and passionately driven to push *Beyond the Boundaries of Possible*.

About the Author

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