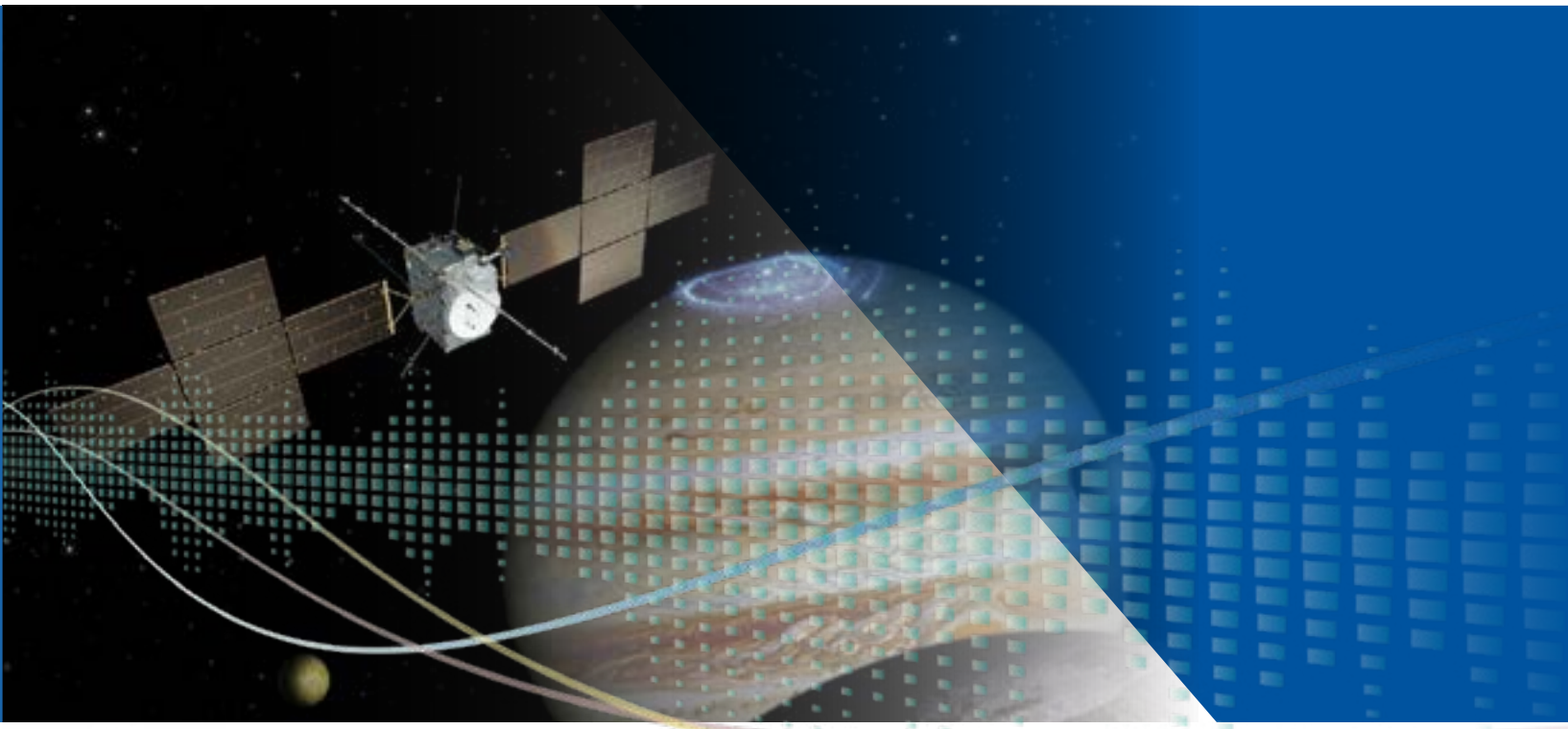
DIAMOND

Worldwide Supplier of

RF Rotary Joints for Space Applications



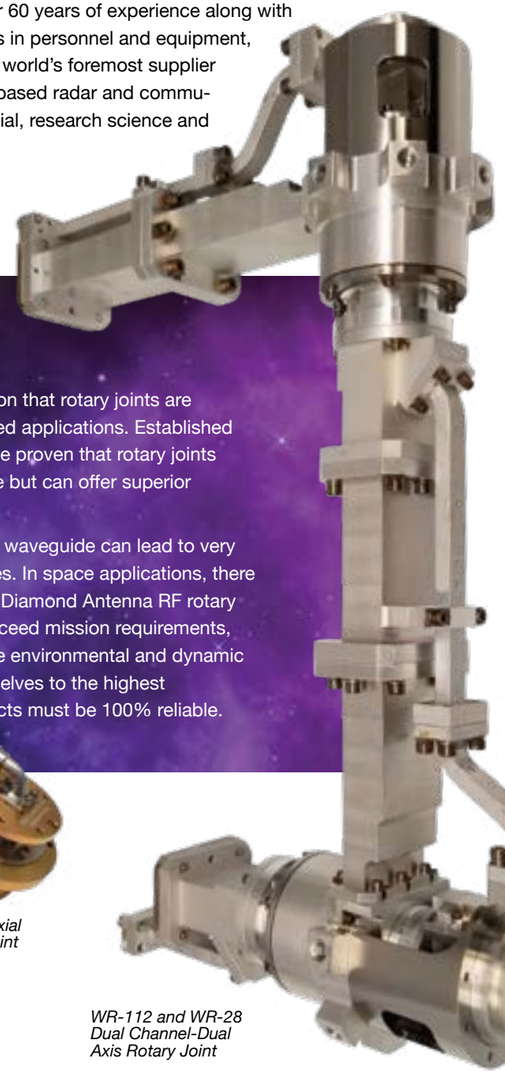
Space Products

Maximum Reliability for Mission Critical Space Requirements

The development of sophisticated equipment on satellites has increased the need for rotary joints as a critical component in complex rotational antennas for space-based radar and communication systems.

Space Heritage

Diamond Antenna and Microwave Corporation has been supplying space-qualified RF rotary joints since the onset of rotational requirements on satellites. Drawing on over 60 years of experience along with significant recent investments in personnel and equipment, Diamond Antenna is now the world's foremost supplier of RF rotary joints for space-based radar and communication systems in commercial, research science and military applications.



Mission Reliability

Gone is the misconception that rotary joints are unreliable for space-based applications. Established methods of research have proven that rotary joints are not only more reliable but can offer superior performance.

Cable wraps and flexible waveguide can lead to very expensive mission failures. In space applications, there is no room for failure. All Diamond Antenna RF rotary joints are designed to exceed mission requirements, while subjected to severe environmental and dynamic conditions. We hold ourselves to the highest standard, that our products must be 100% reliable.

WR-34 Rotary Joint

TNC Coaxial Rotary Joint

WR-112 and WR-28 Dual Channel-Dual Axis Rotary Joint

Quality Design

To ensure 100% reliability, all space designs at Diamond Antenna go through extensive design and process reviews. While most space applications are unique, Diamond draws from an extensive list of heritage designs for each new requirement.

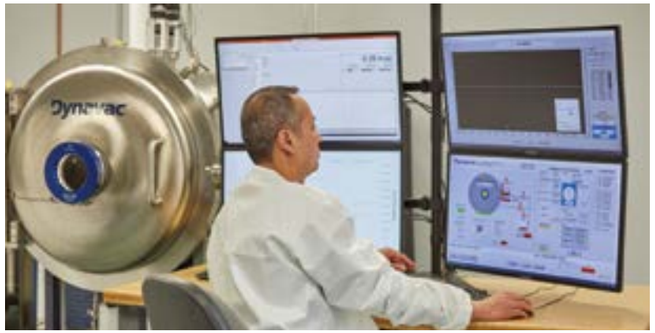
Design Process

With space flight applications, rigorous and numerous specifications are typical. Diamond Antenna examines dozens of conditions regarding material selection, structural factors, thermal control and quality requirements in support of providing a compliant design.

RF testing in Clean Room

RF and Mechanical Accuracy

In order to meet all RF and mechanical requirements, Diamond utilizes several software packages to analyze the integrity and accuracy of the initial design. All S-parameters of the RF design are simulated. Additional analysis of high-power thermal rise, corona prediction, RF change vs. temperature, multipaction and RF dimensional tolerance may also be performed. A complete structural analysis of the mechanical design is also performed to assure positive margins of safety are seen during launch, satellite separation and other flight maneuvers.



To support the continued growth of space rotary joint products, Diamond has invested in tools, fixtures, test equipment, additional laminar flow benches and a state-of-the-art thermal vacuum test chamber.

Data Requirements:

A significant portion of space program activity centers around review meetings and documentation: Supplier Data Requirements List (SDRL's). Diamond's expert team will manage this process to improve schedules and reduce costs.

The Assembly Process

Diamond takes clean production seriously, as contamination or debris can cause mission failure. All parts are cleaned prior to assembly and kept this way until shipment. All processing and assembly is performed within at least a Class 10,000 clean room, with critical operations performed in a Class 100 clean environment.

Qualification Testing

It's common for a qualification process to consist of the following tests: RF Acceptance, Mechanical Acceptance, Dimensional Inspection, Torque, Sine Vibration, Random Vibration, Shock, Thermal Vacuum, Thermal Cycling, RF Testing, and Mechanical Life Testing. The scope of the qualification testing can be tailored to the specific program requirements.

Credit: NASA/Johns Hopkins APL

A Universe of Opportunity

Diamond Antenna's WR-112 U-style single channel waveguide spaceflight rotary joint was used onboard NASA's Double Asteroid Redirection Test (DART) Impactor Spacecraft. DART is the world's first planetary defense mission to successfully impact or deflect asteroids headed for Earth.

WR-112 Rotary Joint

Dual Axis Rotary Joint with Integrated Waveguide

Today and Beyond

Diamond Antenna will continue to support current and future demand for critical space qualified RF rotary joints used by customers around the world.

AS 9100 / ISO 9001 certified design and manufacturing of precision rotating products.

For product drawings and additional information please visit our website.
www.diamondantenna.com

DIAMOND ANTENNA AND MICROWAVE CORPORATION

www.diamondantenna.com

59 Porter Road, Littleton, MA 01460

978-486-0039

For inquiries contact: sales@diamondantenna.com

2/2023 250