CENTROTECNICA
stress to ensure

Suitable for all kind of shakers and chosen as optional equipment by IMV CORPORATION

Member of lombardia aerospace cluster

the Slip Tables

SPECIAL SERIES SP

aerospace testing is easier when performed on bearings

Based on the research presented at the **I**nternational **A**stronatical **C**ongress 20**24** and available on the portal ResearchGate

RT-SP: EVOLUTION OF **RT** SLIP TABLES DEDICATED TO **SP**ACE TESTING

RT 2000 SP in use at the clean room
at CENTROTECNICA's space testing laboratory.

RT series slip tables are equipped with a fully mechanical, **OIL-FREE** guiding system, a feature that eliminates the risk of DUT contamination. This feature is particularly appreciated by those performing spatial testing in clean rooms.

The main innovation of **RT-SP**s consists in the ability to customize the number and location of guide bearings[1]. This flexibility allows the bearings to be placed directly at the load points, optimizing support and reducing fixture complexity. This innovative approach allows the bearing to be carried to the load, rather than carrying the load to the bearing, thus optimizing the entire testing process.

The ability to customize the bearing configuration and use a simplified and lightened fixture[1] results in a substantial reduction in moving mass. An additional benefit is the ability to remove the RT table and design an ad hoc fixture, mounted directly on the bearings.

Another plus provided by RT-type slip tables is that it is very easy to add the bearings in the FEM analysis calculations of the entire test structure, including their positions and stiffnesses. This makes it possible to accurately simulate the behavior of the DUT under the test conditions.

On p. 6 we present a case study: the weight savings achieved with the targeted support, shaped table, and simplified fixture allowed us to perform a "sine burst" test using a 74 kN force shaker. A test that had previously failed at a laboratory provided with a 120 kN shaker and a standard slip table, demonstrating the effectiveness of the **RT-SP** solution.

[1] custom fixture, bearings configuration and shaped table can be provided by CENTROTECNICA.

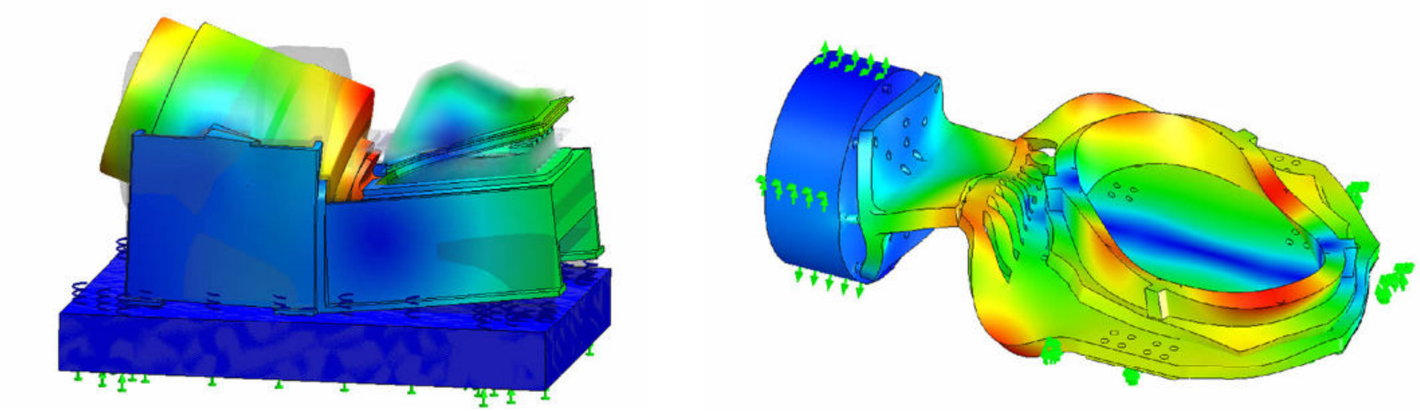
RT-SP IS THE RESULT OF RESEARCH BASED ON FEM DATA AND MECHANICAL IMPEDANCE

To achieve a reliable FEM analysis, a multibody analysis of the entire vibration system should be performed. However, it is possible to characterize the **mechanical impedance** (**MI**) of the system for the first mode of vibration and use it as a constraining condition in FEM analysis.

The **MI** then becomes a measure defining the vibration system.

RT-SP series slip tables allow calculation and optimization of bearing configuration according to **MI**.

An advantage in the space testing domain is to be able to correctly match the vibration test to the results of the FEM analysis, allowing accurate validation of the FEM model.



Mechanical impedance is a measure of the attitude of a structure to set itself into vibration as a result of the application of a system of forces.

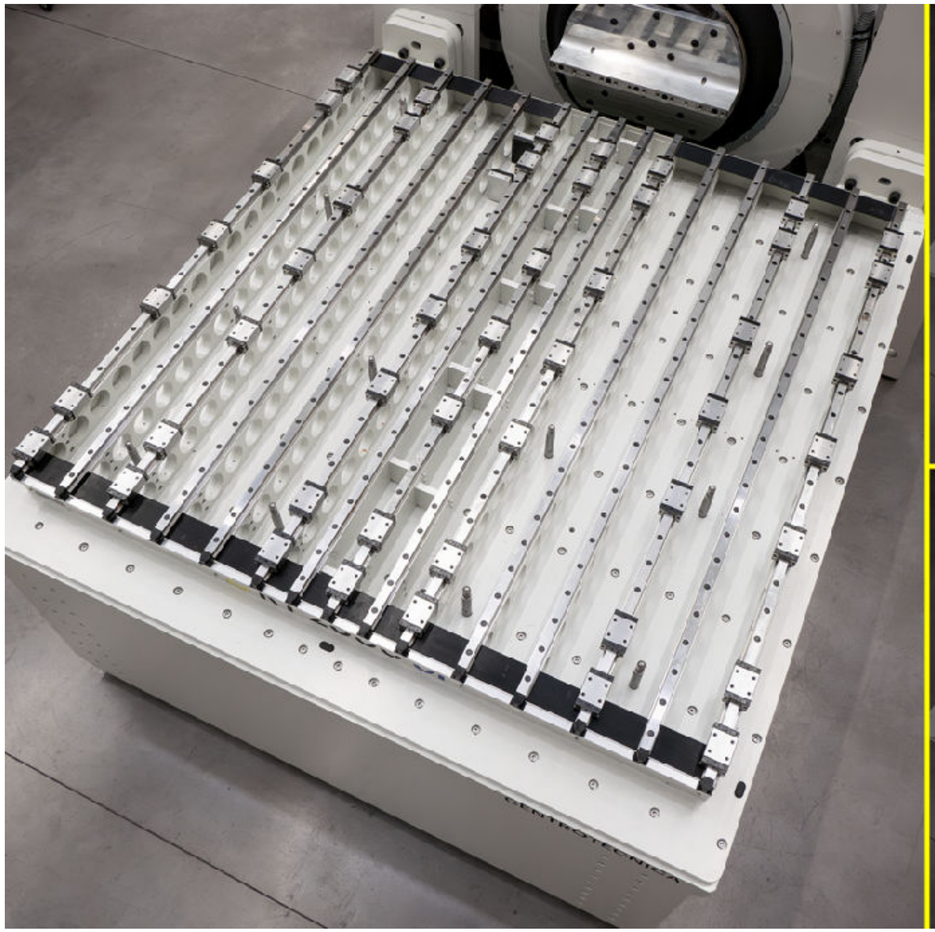
CENTROTECNICA has focused its research on this measurement, making it an accessible quantity of the vibrating system, in order to define the dynamic behavior of the **RT-SP** series slip tables and to understand how it will interact with the specimen during testing.

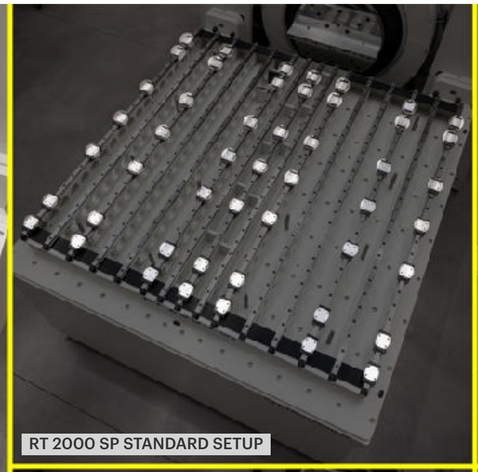
The relevance of this study and its practical consequences is evidenced by being selected as one of the abstracts for interactive presentation at IAC 2024 in Milan, Italy.

Later, the research was published in its full extent on the specialized portal for scientific publications Research Gate and is now available for reference and download.

THE **RT-SP** SERIES COMPARED WITH THE **RT** - BEARINGS DISTRIBUTION

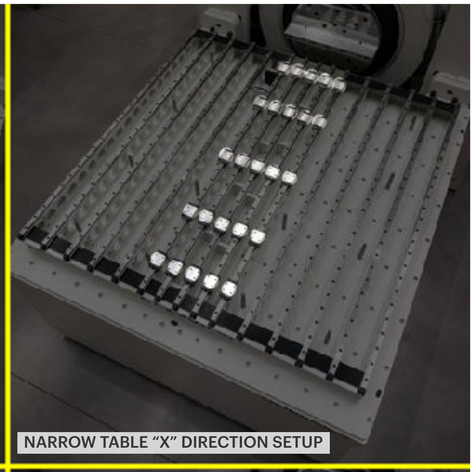
CUSTOMIZATION of the bearing distribution scheme, in accordance with the mass distribution and the geometry of the test setup, is more accurate and with virtually unlimited possibilities due to the presence of a greater number of bearing guides.



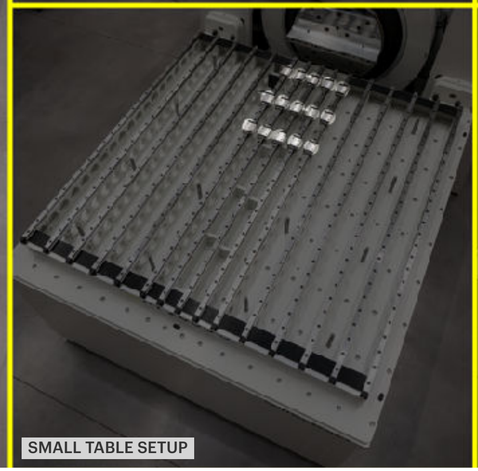


RT 2000 SP STANDARD SETUP

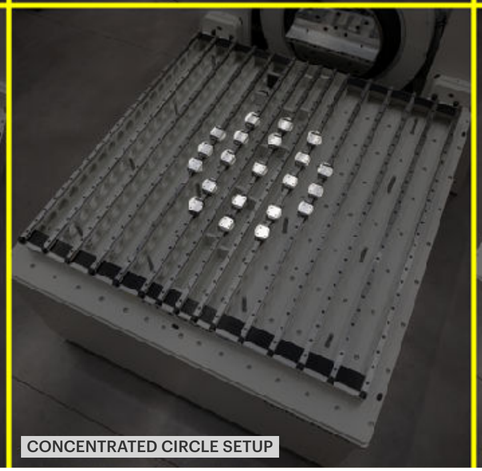
NARROW TABLE “Y” DIRECTION SETUP



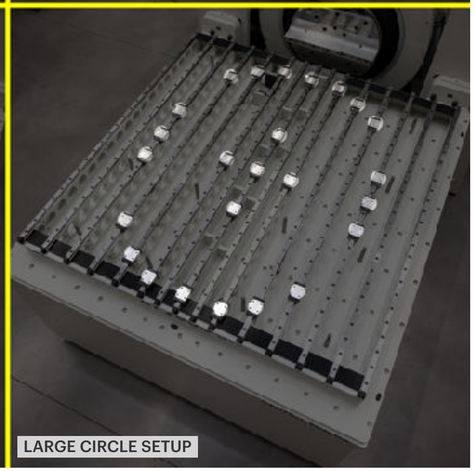
NARROW TABLE “X” DIRECTION SETUP



SMALL TABLE SETUP

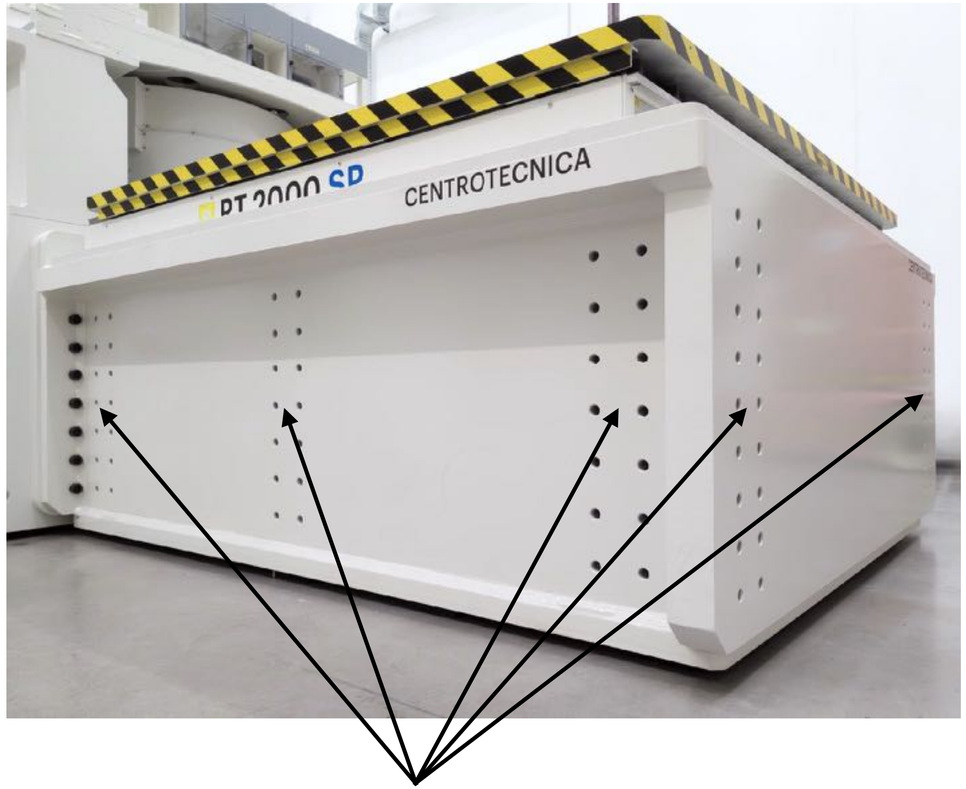


CONCENTRATED CIRCLE SETUP



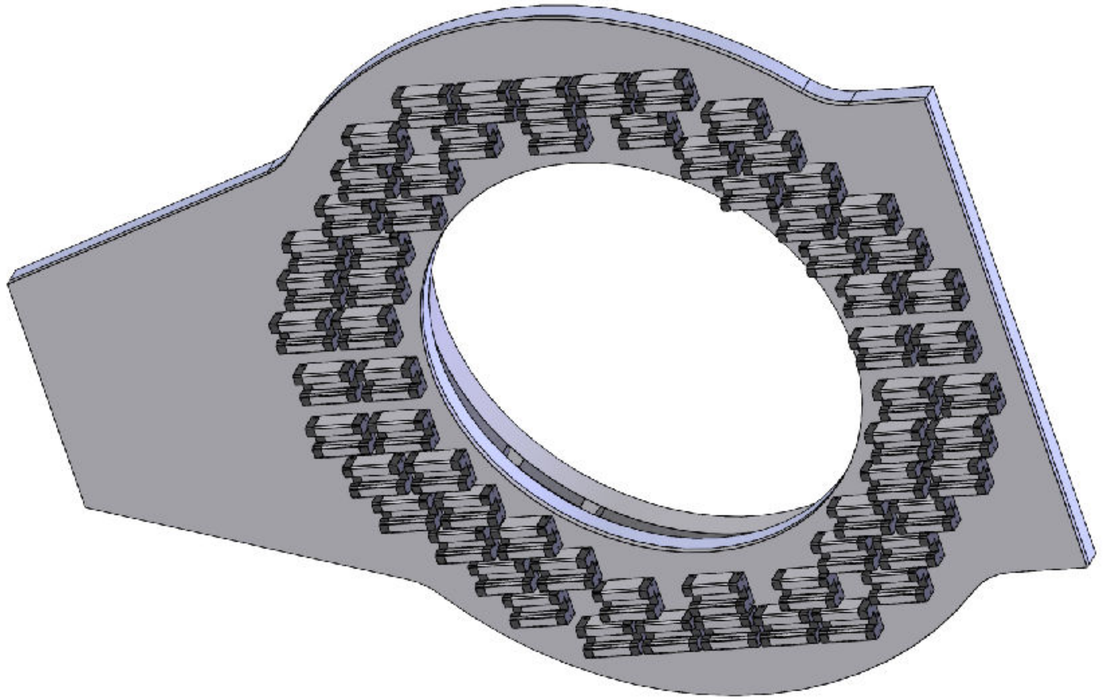
LARGE CIRCLE SETUP

THE **RT-SP** SERIES COMPARED WITH THE **RT** - FURTHER POTENTIALS

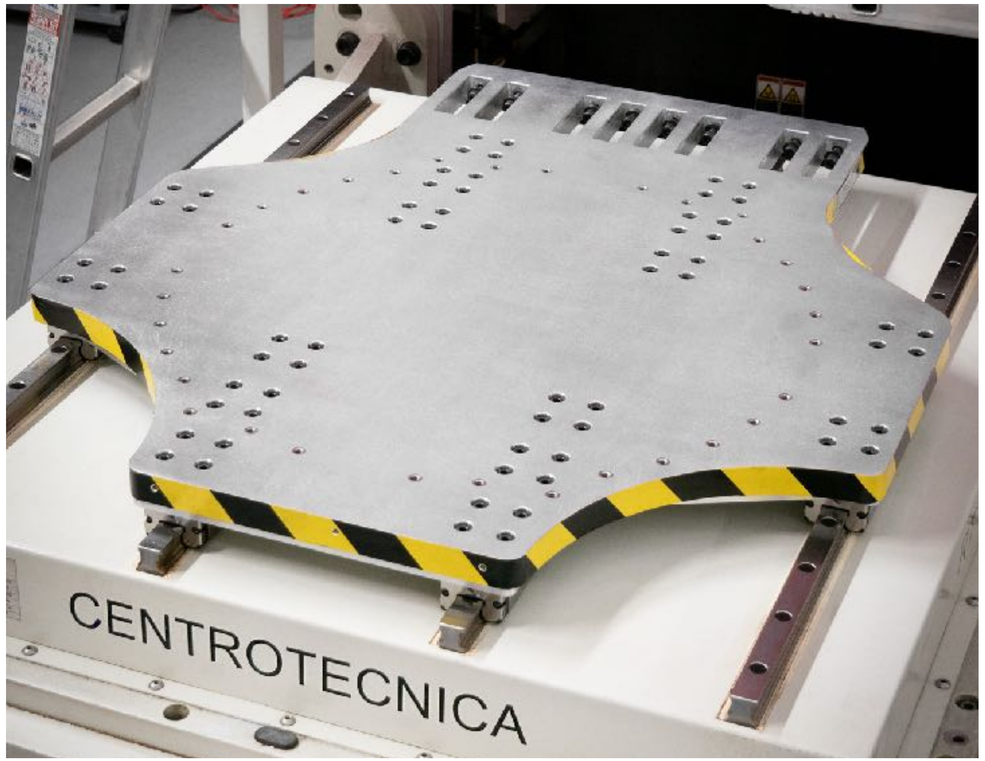


SEISMIC MASS with provision for attaching additional loads, supports or guides through threaded holes.

CUSTOMIZATION of the table that can be shaped (and lightened) according to bearing distribution.

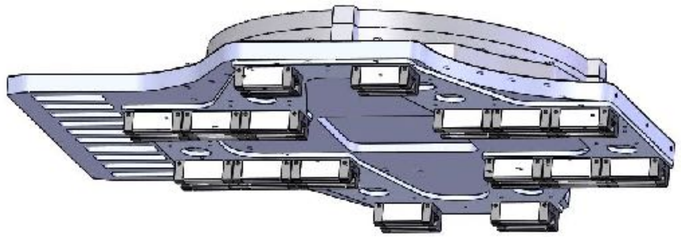


CASE STUDY: THE STARTING POINT FOR THE DEVELOPMENT OF THE **RT-SP** SERIES



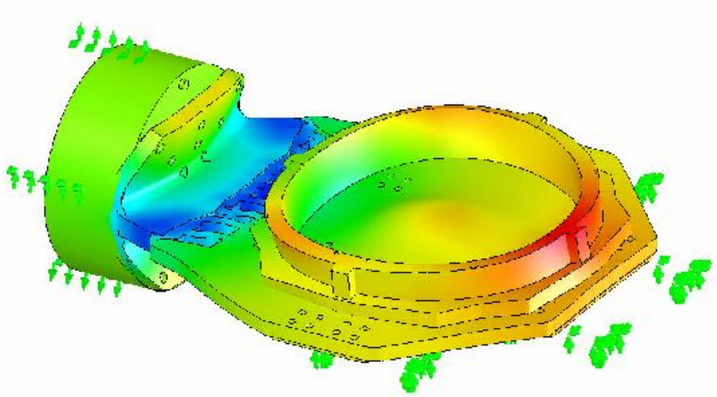
RT-series slip table shaped to achieve maximum weight savings and reduce tipping moment under tests with very demanding acceleration levels.

Intended use of this specific model: aerospace testing of a satellite.

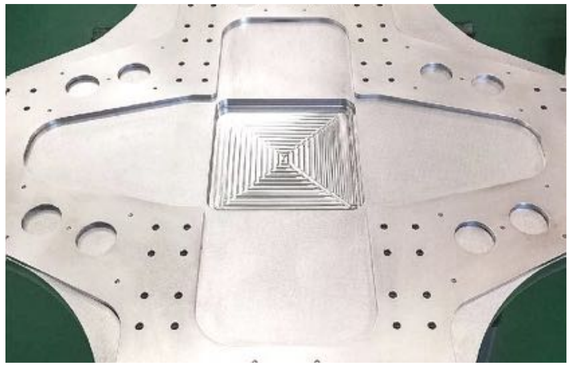


The bearings are placed at the support area of the ring fixture to maximize the resistant moment.

Ring fixture, it is simple and lightweight.



FEM analysis of dynamic behavior.



Lightening discharge of the sub-plate.

CENTROTECNICA
stress to ensure

REFERRING LINKS

RT-SP video introduction

slip tables

Instant Clamp

thermal barriers

fixture RT

CT-SPP

design department

production department

CENTROTECNICA provides installation, support, service and maintenance for all slip tables delivered worldwide.
These services are provided through its network of distributors or directly.

For info or RFQs, pls contact us at mail: sales@ctecnica.it - phone: +39(0)255305888

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