

Tabletop Micro Air-bearing

Introduction

To simulate the conditions of the space environment at ground the SRL was developed a tabletop Micro testbed.

The Tabletop Testbed provide near-frictionless motion environment with 360-degree rotation about one axis (yaw rotation) about 35-degree around two other axis (Roll and Pitch).

Tabletop Micro Air-Bearing has 2 main parts:

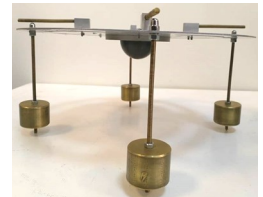
1. Platform with balancing mechanism
2. The hemispherical Air bearing with its support



Balancing platform

The platform must be tall enough to place test equipments in the middle of it and provides a stable base.

In order to create a balancing platform a 30 cm diameter circle was utilized. One again it made of a non-ferrous material. In order to remove weight, material was removed from the circular plate. The balancing masses made of Brass. The platform is portable at approximately 1700 g so it could be easily moved by one person.



Air Bearing

The bearing and load are supported by input compressed air. The compressed air creates a thin film of air. The hemispherical bearing supports at most 15 kg in a maximum operating pressure of 3 bar.

The bearing has a low moment of inertia, and provides a range of motion: $\pm 360^\circ$. The air bearing and balancing platform made of a non-ferrous material so it does not interfere with the magnetic field.



Specifications

Technical Index

Carrying Capacity	15kg
Rotation Range	XY axis: $\pm 35^\circ$ Z axis: 360°
Friction Moment	$\leq 0.005\text{Nm}$
Bearing noise	Un-measurably small
Sensitivity to temperature changes	Operates over wide range of temperatures
Size	Height 32cm Platform Diameter Version A 20cm; Version B 30cm; Version C 40cm.
Weight	$\leq 6.5\text{kg}$
Life	≥ 5 years

System Composition

Component	Amount
Platform + Balancing device	1
Air bearing with its support	1