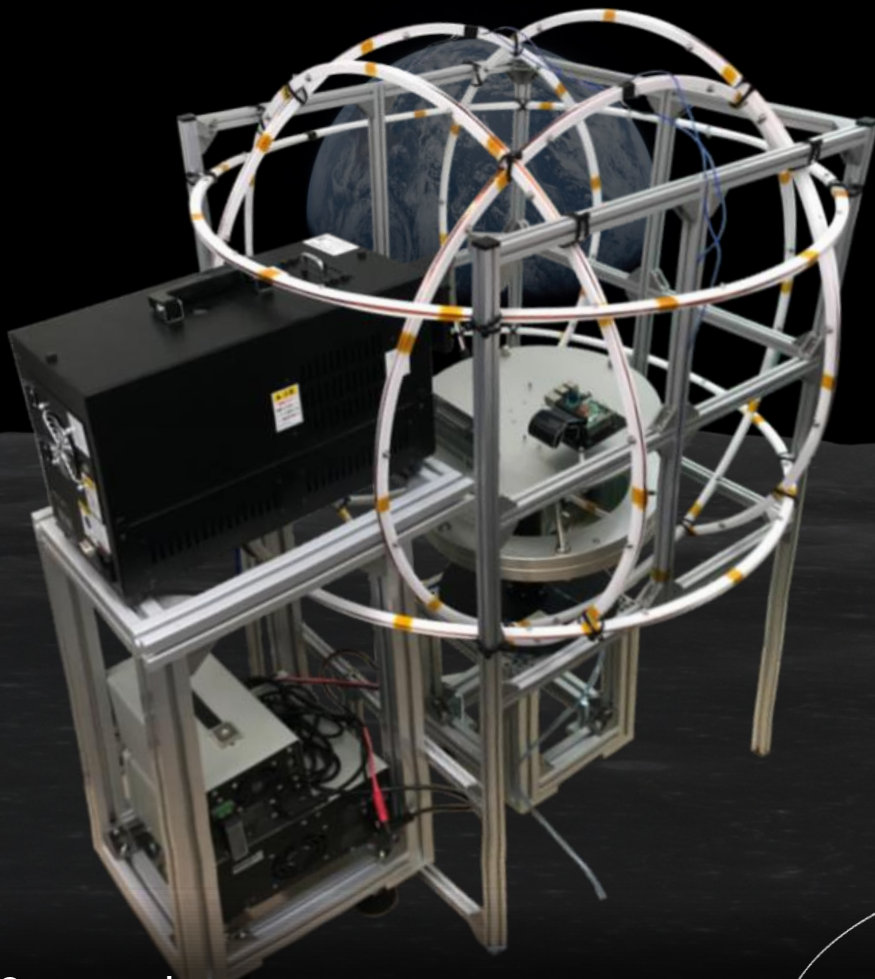




**TENSOR TECH**

# Attitude Control Calibration & Experiment Platform



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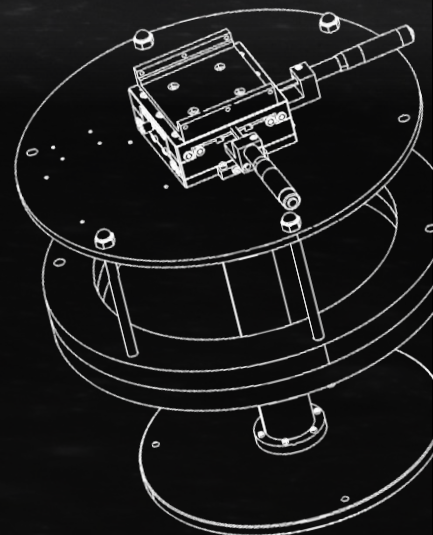
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# Introduction

Three space environmental conditions are simulated using this platform, "Sunlight," "Earth magnetic field," and "nearly-frictionless 3 degrees of freedom rotation." The sunlight spectrum above the earth's atmosphere is different from the sunlight on the ground. Therefore, we equip an AM0 Solar Simulator here with adjustable jigs. In addition, a 3-axis Helmholtz Cage is provided for canceling the local earth magnetic field and simulate the magnetic field on your targeted orbit. This equipment is helpful for magnetometer calibration or testing the performance of your magnetorquers. Finally, spherical air bearing provides a nearly frictionless environment for testing your attitude actuators; Processor and gyroscope onboard measure the real-time attitude of the platform for validating the performance of your ADCS.

## 3-axis Helmholtz Cage

- ☞ Jigs included for co-working with the platform
- ☞ Max. magnetic flux density: 1 Gauss
- ☞ Working area: 350\*350\*350 mm

## Air Bearing Platform

- ☞ Spherical air bearing ordered from 3rd party
- ☞ Manual adjusted x/y axis platform and Jigs for carrying the tested object
- ☞ All made with non-magnetic materials
- ☞ Turbine Torque 5  $\mu$ Nm
- ☞ +/- 45 deg travel; Max. loading: 20 kg

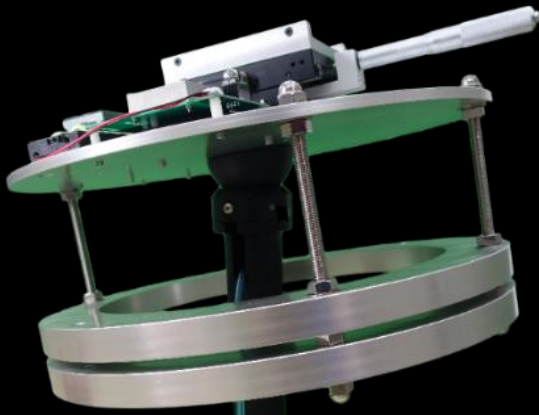
## AM0 Solar Simulator

- ☞ Ordered from 3rd party
- ☞ Jigs included for co-working with the platform
- ☞ Spectral match: AM0, qualified to Class A, ASTM
- ☞ Spatial non-uniformity of total irradiance: < 2%
- ☞ Time instability: <1%
- ☞ Light spot dimension: 40\*40mm
- ☞ Collimation: < 4 deg



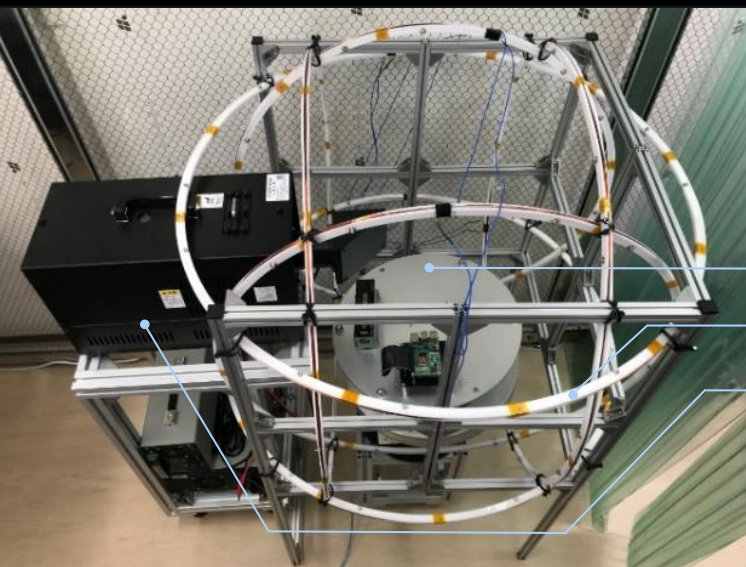


# Attitude Measurement Unit and Software Embedded



The embedded software on the raspberry-pi reads the measurement result from the sensors and wirelessly transmits these data to the user's PC via wi-fi. A provided software could do an initial zeroing via the readouts from the inclinometer. Moreover, after the experiment starts, readouts of the gyroscope are used for propagating the attitude. The attitude measured could be served as a reference for improving the tested ADCS.

Raspberry-pi, tactical grade gyroscope, and inclinometer are integrated on the air bearing platform. The gyro has in-run bias instability of 0.8 deg/hr and angular random walk of 0.09 deg/ $\sqrt{\text{hr}}$ . The inclinometer has relative accuracy up to 0.1 deg. However, the inclinometer is only referenceable when the platform gets stabilized.



## Optional Equipment

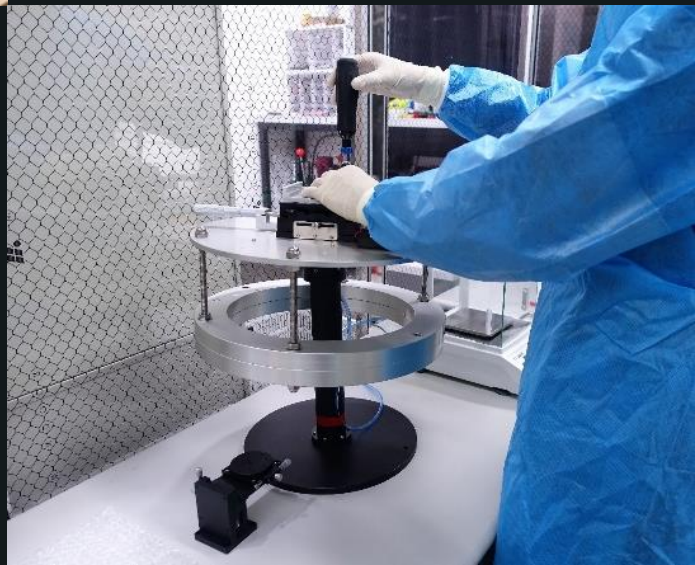
The air bearing platform includes spherical air bearing, attitude measurement unit, and necessary jigs for conducting experiments.

- ☞ Option A. Air Bearing Platform
- ☞ Option B. 3-axis Helmholtz Cage
- ☞ Option C. Solar Simulator
- ☞ Option D. Mass properties measurement software

## Mass Properties Measurement

Accurate mass properties are necessary to tune your ADCS. An optional software could work with this air bearing platform to perform such a measurement. Or, you may send your satellite to us for conducting such a service. The spec for this measurement will be:

- ☞ Mass: +/- 10 mg
- ☞ Center of Mass: +/- 0.1 mm
- ☞ Moment of Inertia: +/- 2%





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