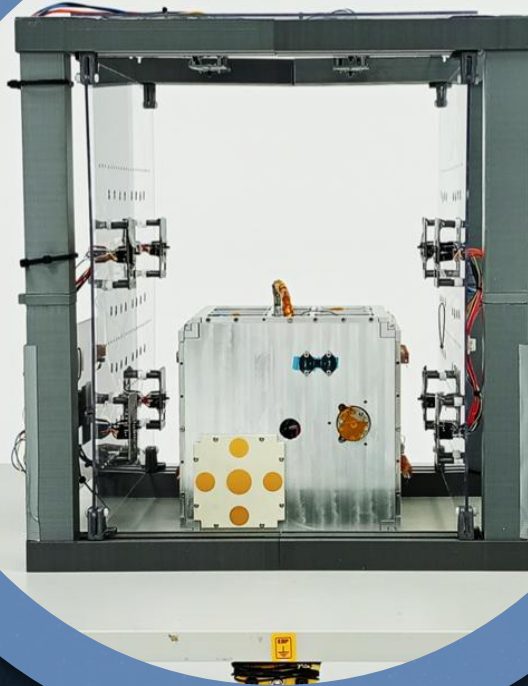




MAGNETIC DIPOLE ESTIMATION SETUP(MADES)

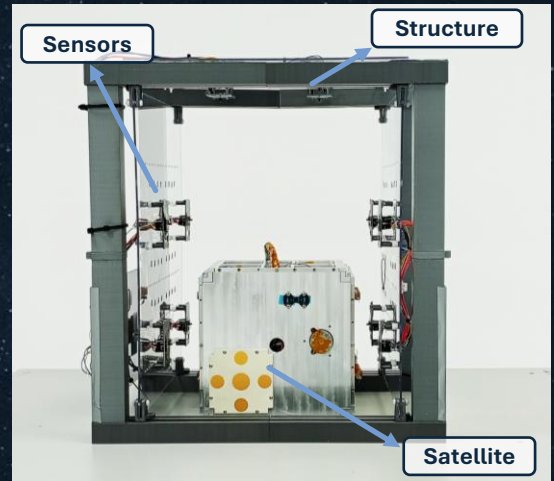
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MAGNETIC DIPOLE ESTIMATION SETUP (MADES)

SYSTEM OVERVIEW

MADES is a cost-effective magnetic characterization platform featuring an adjustable non-metallic frame, 12 magnetic sensors, and dedicated algorithms to estimate dipole position, direction, and magnitude. It supports satellites from 1U to 12U, with customizable configurations available to meet specific needs, and enables magnetic cleanliness testing from individual ADCS hardware and magnetically sensitive payloads to full systems and satellites without the need for a magnetic cleanliness device.



**Test satellites
up to 12U ***



**Volumen [mm]:
400x400x430 ***



**System mass:
0.5 Kg ***



**Reliable
accuracy**

*Dimensions and capacity can be customized upon request.

BENCHMARK TESTING

MADES has been cross-validated through testing on the E.T.PACK-F satellite, against a conventional dipole estimation setup using a Helmholtz cage and fluxgate sensors. Additional experimental tests with controlled dipole sources demonstrated reliable operation, confirming readiness for use in small-satellite missions.

SENSOR SPECIFICATIONS

Measurement Range	$\pm 1100 \mu\text{T}$
Noise	$\sigma_{\eta} = 15 \text{ nT}$
Bias	$\sigma_{\beta} = 100 \text{ nT}$
Sensitivity Level	$S_s = 13 \text{ nT}$

ESTIMATION PERFORMANCE

Dipole magnitude error	6%
Dipole direction error	8°
Dipole position error	8 mm
Test conditions	Ambient noise $< 200 \text{ nT}$, Dipole moment $> 0.02 \text{ Am}^2$



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