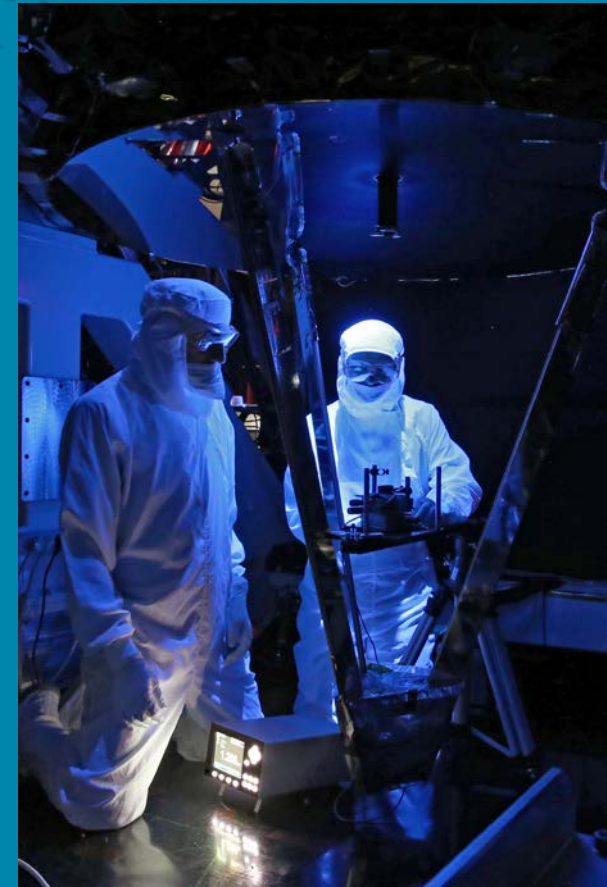


ADM-AEOLUS CALVAL 2017

The ALADIN instrument and its on-ground performance testing

Jérémie Lochard & Aladin team
Toulouse- France
March 2017



Overall architecture



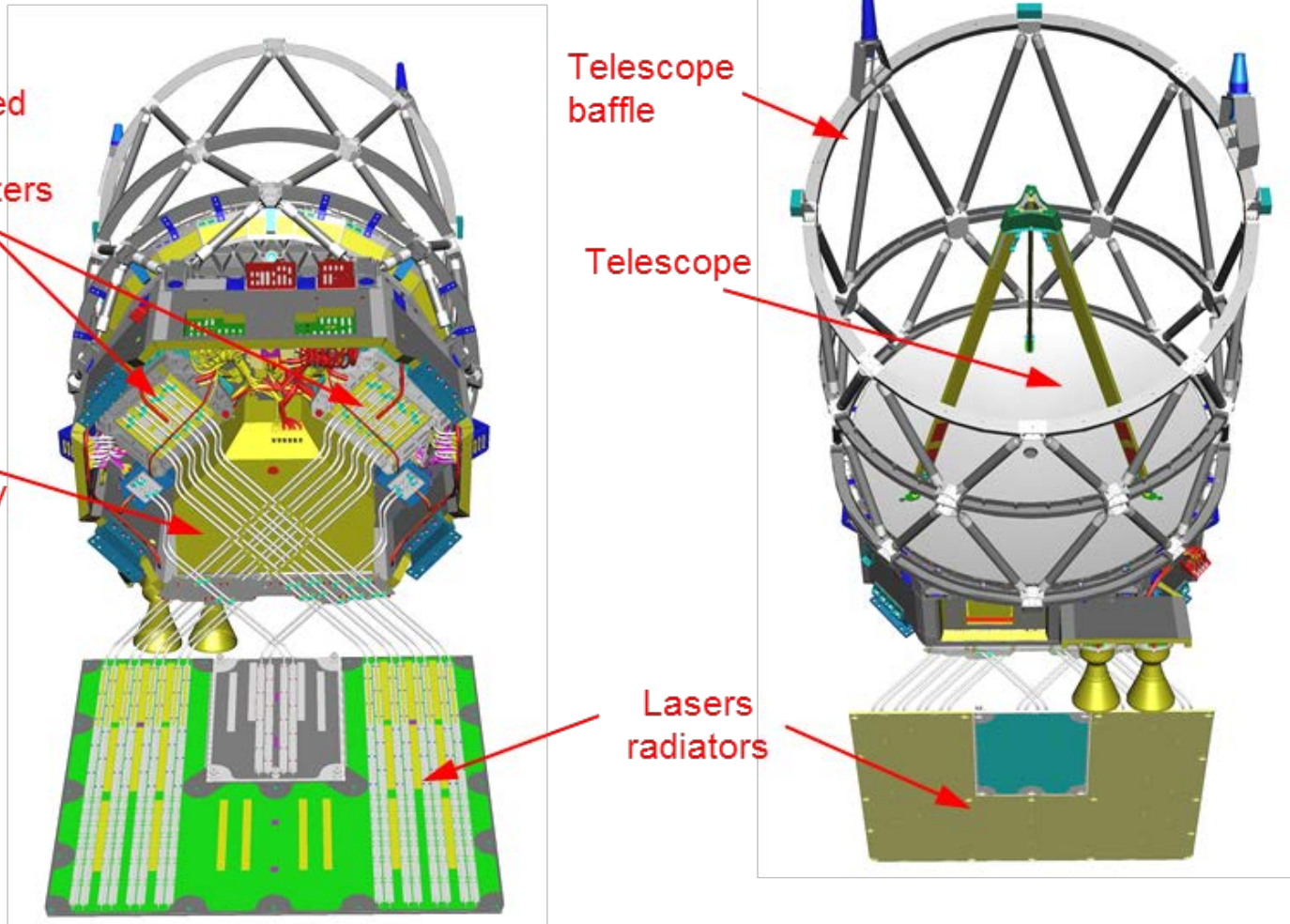
Redunded laser transmitters

Optical Bench Assembly (under cover)

Telescope baffle

Telescope

Lasers radiators



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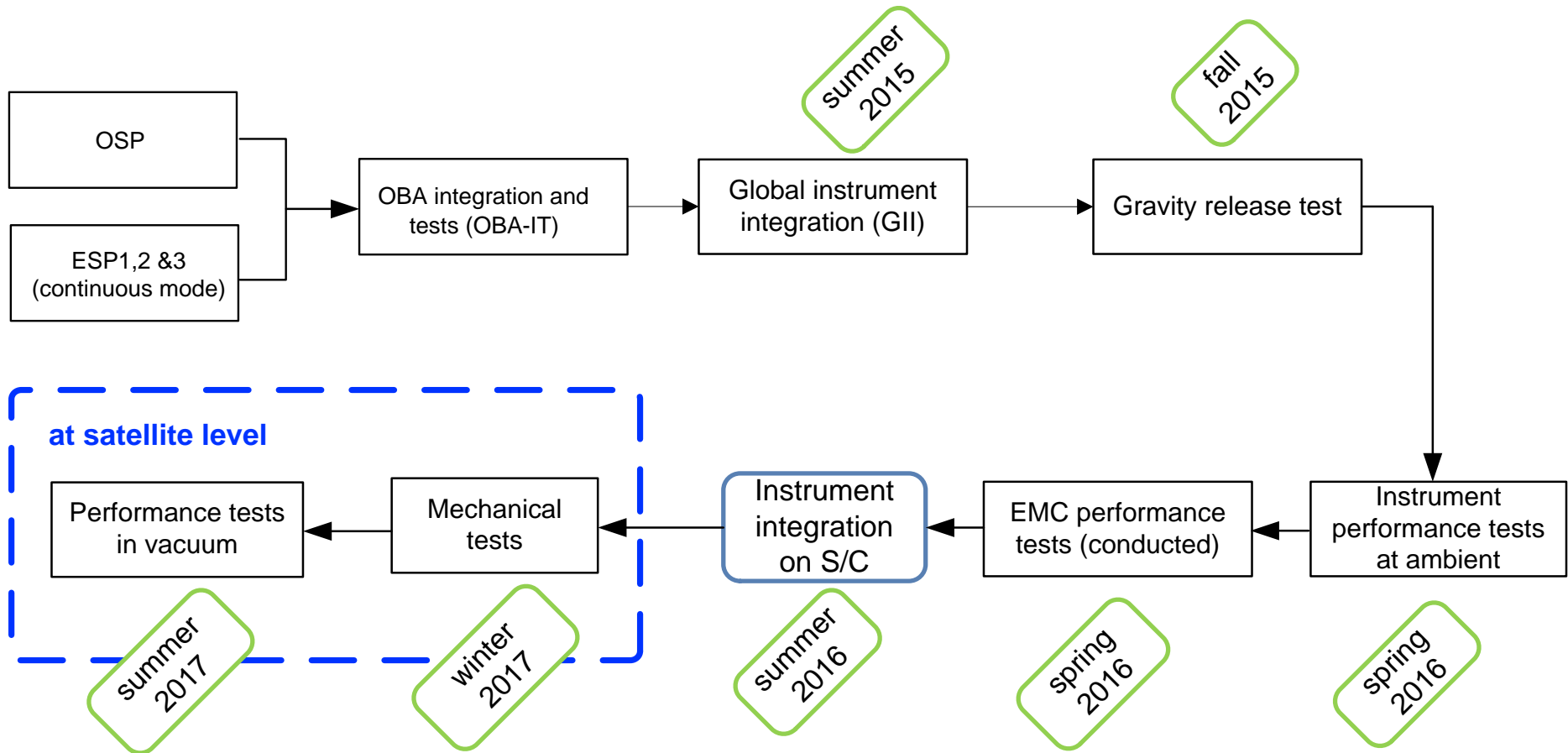
Aladin before shipping to ADS-UK



Laser radiator

laser units

Instrument performance testing approach



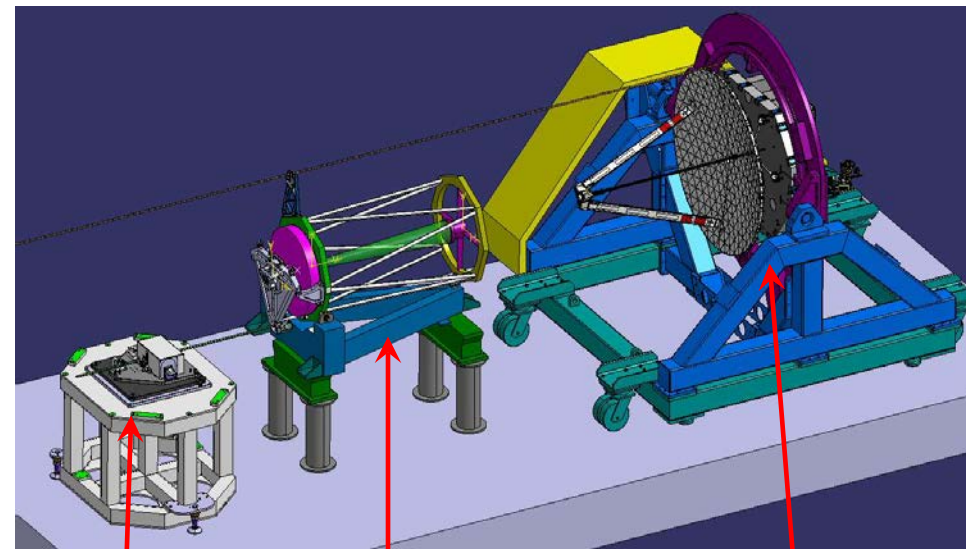
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Performance tests at ambient

- Performance and functional tests at ambient in Toulouse, spring 2016
- Intended to validate the random error
- Rehearsal of the performance test to be performed in vacuum
- Emission, reception and internal calibration paths tested
- Both lasers tested (nominal & redundant)
- 15 days, 24/7
- Around 50 tests performed including close to 30 performance tests

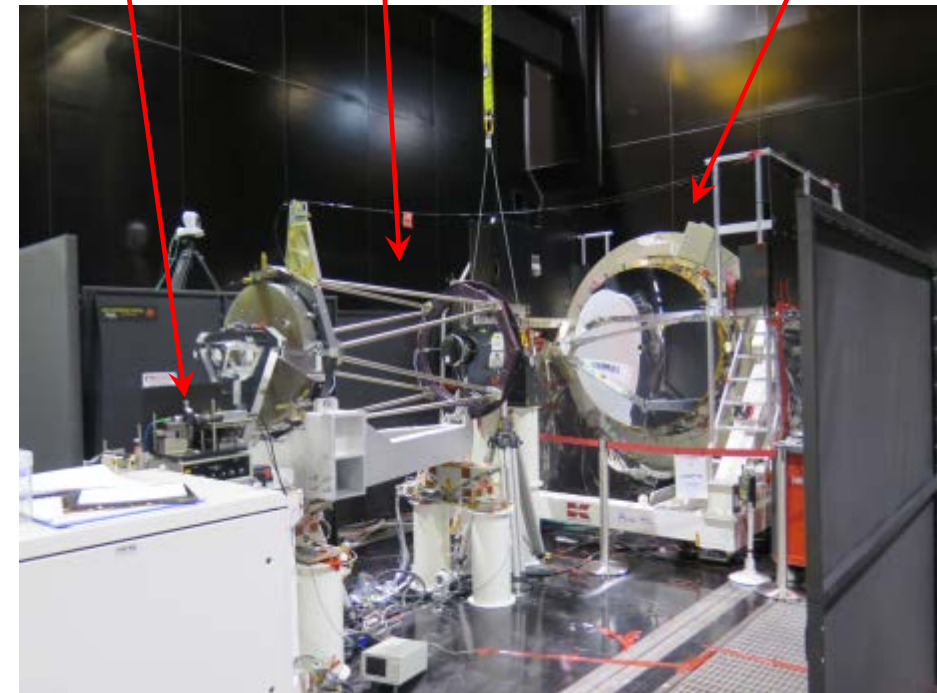
→ **consolidation of the instrument performance budget at EOL**



OGSE

Collimator

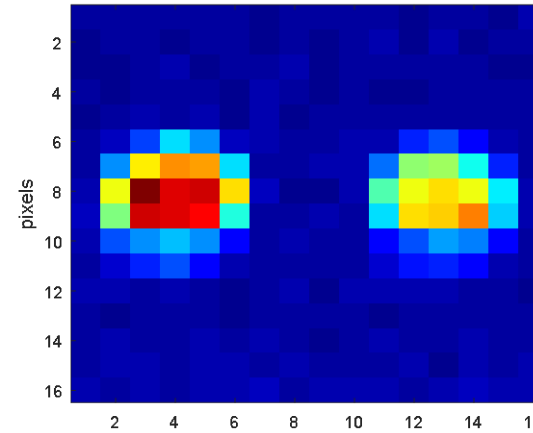
Aladin instrument



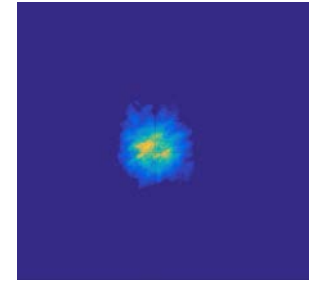
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Performance status after tests at ambient

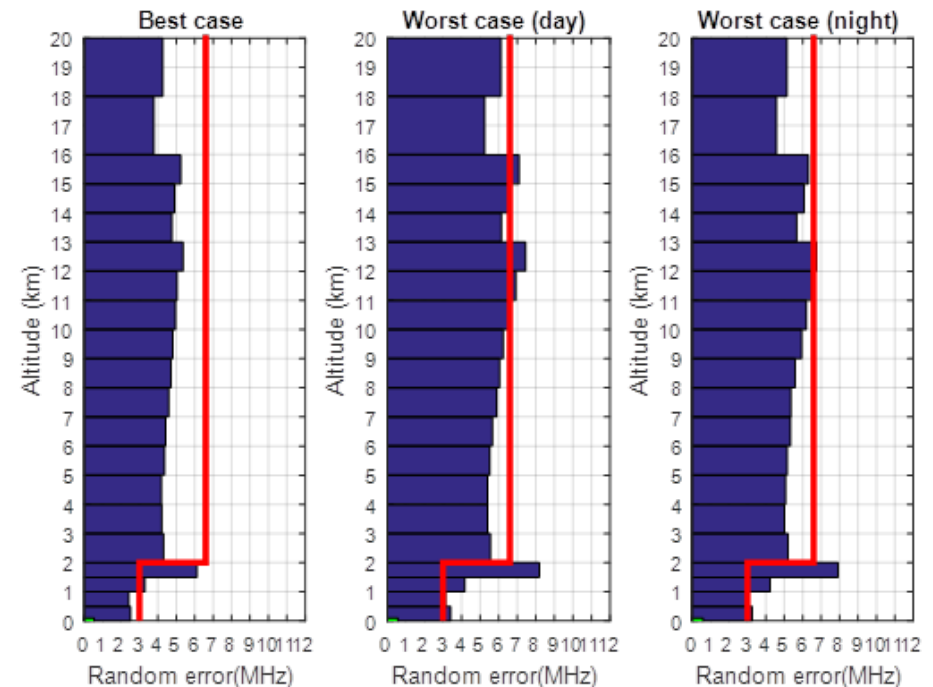
- The measured performance is close to the expected value, especially the random error
- An endurance test was embedded in the performance test: no degradation of the transmission performance over 50 Mshots
- The laser now operated at 80mJ per shot
- The satellite now flying at 320 km
- **In-orbit random error estimate consolidated with test results. Post-test performances are in line with previous estimates.**



Spots on the Rayleigh spectrometer



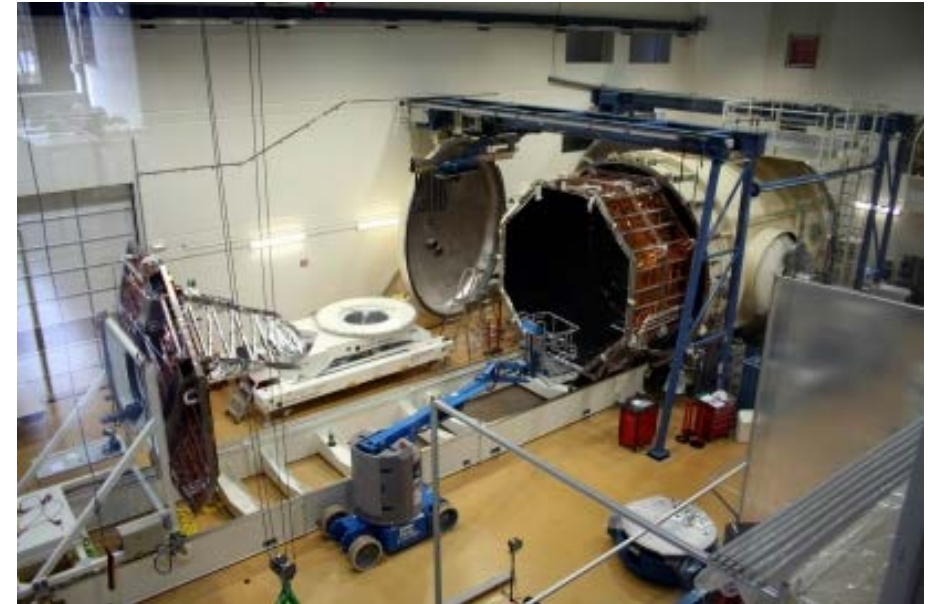
Aladin far field seen by OGSE



1 m/s is 3.4 MHz

Next step: performance verification in vacuum

- ❑ Thermal vacuum test of the instrument integrated on the S/C
- ❑ Performance and functional tests at both instrument and satellite levels
 - more representative environment including thermal orbital cycling and simulation of calibration attitude
 - instrument commanded via S/C as in orbit
- ❑ Similar tests than at ambient with more complex configuration.
- ❑ Additional stability tests:
 - lasers stability
 - spectrometers response stability
- ❑ Stability test results will feed the unknown bias and slope error budgets
- ❑ Summer 2017 at Centre Spatial de Liège (Liège, Belgium).
- ❑ Focal 5 chamber

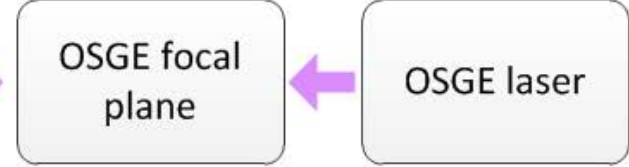
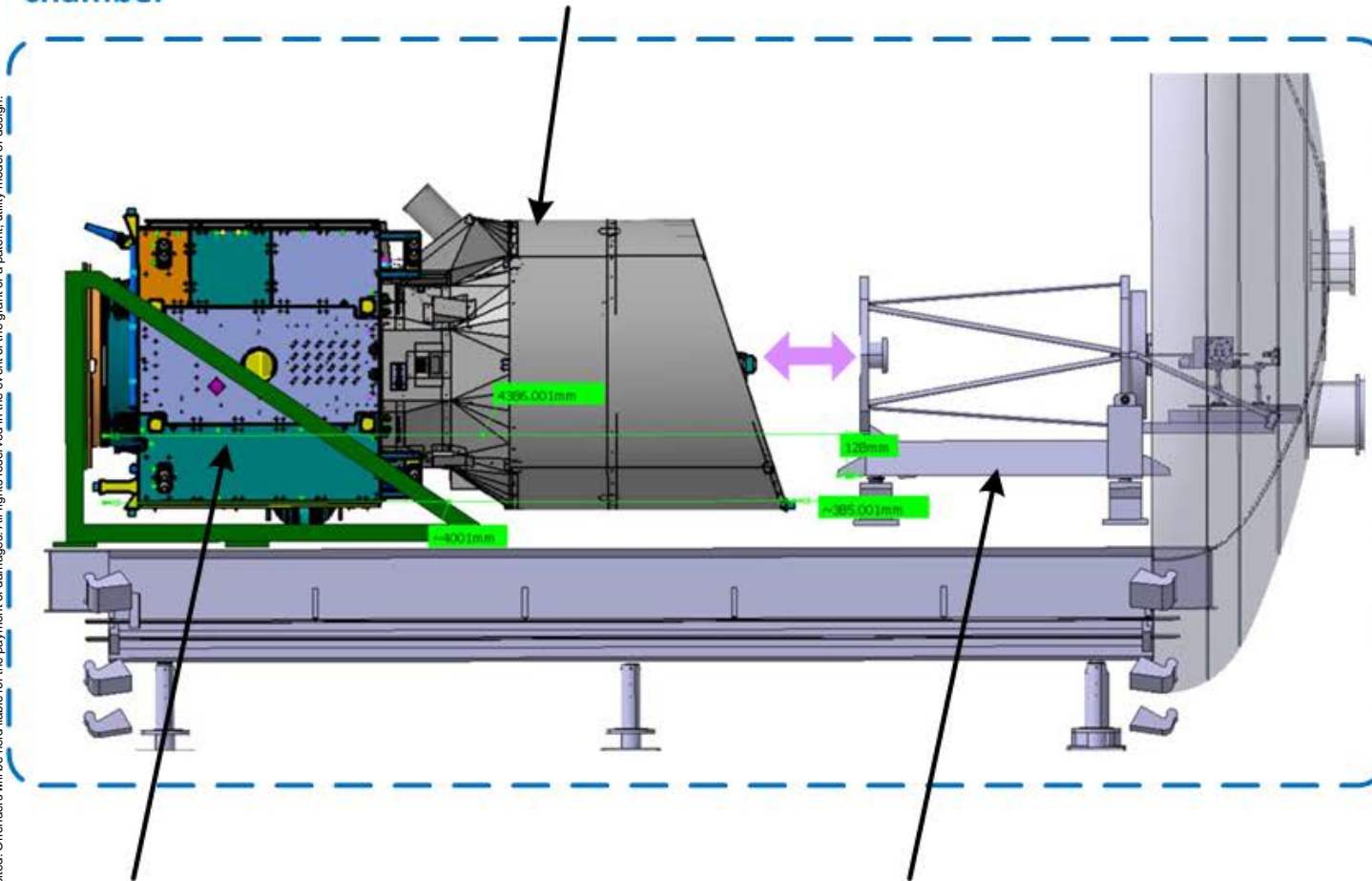


Vacuum chamber at CSL

Test in vacuum configuration

Vacuum chamber

Instrument



- Analyzing instrument emitted beam
- Generating atmospheric echo with delay

Platform

Collimator

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