Press release

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Microscope satellite
First results looking very promising

CNES's Microscope satellite has begun the long science phase of its mission after successfully completing in-orbit checkout, during which it has already achieved very promising results.

Exceptional satellite and instrument performance
Six months after launch, the Microscope satellite (*MICROSatellite à trainée Compensée pour l'Observation du Principe d'Équivalence*) has completed its in-orbit checkout. To accomplish its mission to test the equivalence principle with unprecedented precision, the satellite has to compensate in all directions for all forces acting on it other than gravity, like residual atmospheric drag (Microscope is orbiting Earth at an altitude of 710 kilometres) and pressure exerted by sunlight.
The measured performance of the compensation system is already proving exceptional, making the CNES satellite a new world benchmark in low-Earth orbit. The instrument, comprising two differential accelerometers supplied by the French aerospace research agency ONERA, is so sensitive that it has been able to detect the gravity-gradient effect of a displacement of the proof masses* of no more than a few micrometres, and the variation in pressure exerted by sunlight during a partial eclipse by the Moon.
The proof mass control system is so precise that it is able to maintain their relative position to within the width of a hydrogen atom—one millionth that of a human hair.

New science phase begins
The science phase of the mission has now begun and will last for at least 18 months to obtain the most precise measurements possible.
A first performance status check is planned for June 2017 and final results will be published no later than April 2019 to validate science data processing.

Note
Microscope is designed to test in space the validity of the founding principle of the theory of general relativity developed by Albert Einstein between 1907 and 1915, in which he assumed the equivalence of a gravitational field and a corresponding acceleration of the reference system. The challenge for Microscope is to achieve a level of precision 100 times better than any experiment yet performed on Earth, thus opening new vistas for theories of gravitation.

** The proof masses are nested cylinders designed to test the universality of free fall*

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