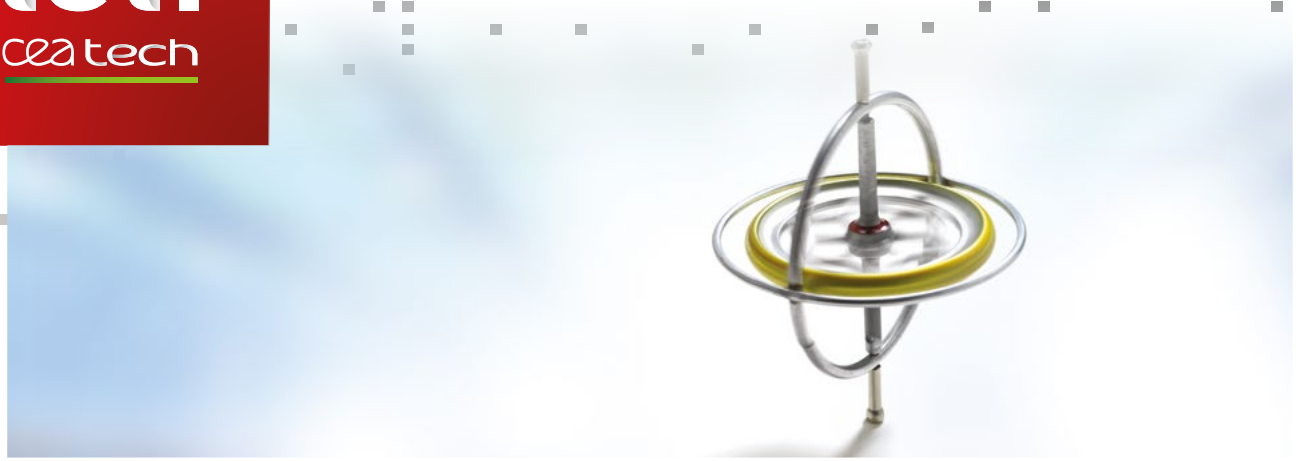

M&NEMS GYROSCOPE

A PIEZORESISTIVE NANOGAUGES GYROSCOPE SENSOR FOR DRIVE AND MOTION DETECTION

WHAT IS M&NEMS GYROSCOPE?

The M&NEMS gyroscope demonstrator integrates electronic board, lock-in amplifier, source, oscilloscope and rotating table. Its board functions are i) gauge polarization in a full Wheatstone bridge, ii) drive oscillation generation and iii) drive frequency, phase and motion amplitude control. The sensing gauge signal is demodulated by the SR830 lock-in amplifier, which uses the board-generated drive frequency as reference. The signal delivered by the component is proportional to the rotational speed and is displayed by the oscilloscope.

APPLICATIONS

MEMS Gyrometers are used in multiple fields because of their small footprint and low power consumption. They can monitor and control device position, orientation, direction, angular motion and rotation. Their integration into cars improves vehicle stability through an electronic stability control (ESC) system. They will soon be used for dead reckoning in driverless cars. Their integration into smartphones allows detection of unit rotation and twist (gesture recognition functions), indoor navigation when GPS is disabled and mixed reality, among other functions.

This device was developed in collaboration with Politecnico di Milano

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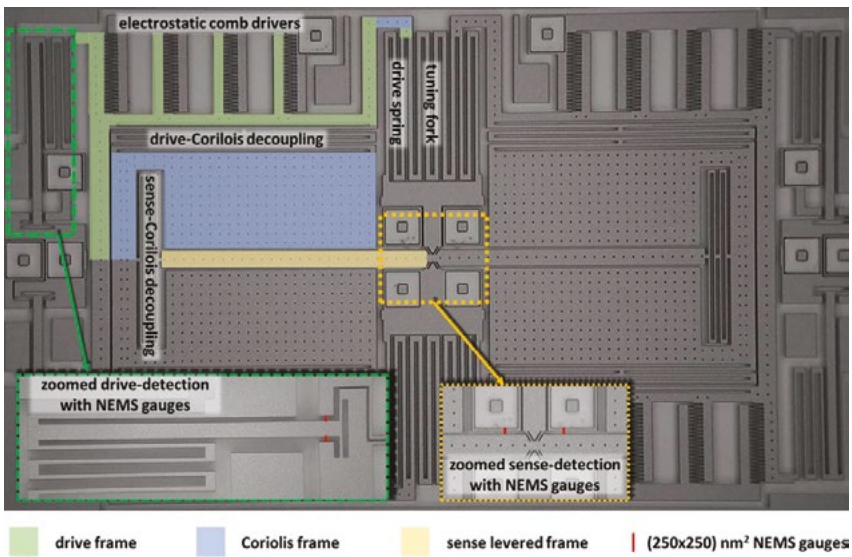
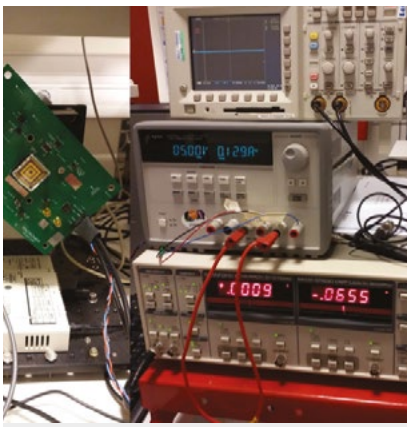
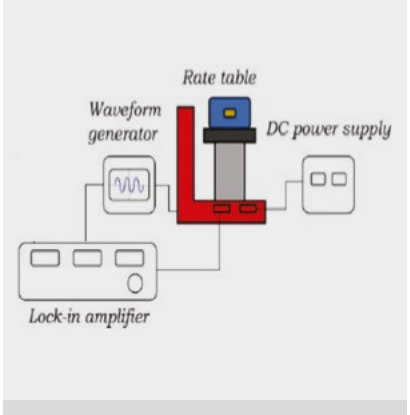
WHAT'S NEW?

This M&NEMS gyroscope uses piezoresistive nanogauges for not only rotational speed detection, but also drive detection. This significantly lowers the rotor actuation voltages and makes feedthrough effects irrelevant in comparison with capacitive sensing. Moreover, the device scale factor is immune to gauge factor and resistance temperature changes.







WHAT'S NEXT?

Further developments are directed towards high-end devices and automotive applications.

INTERESTED IN THIS TECHNOLOGY?

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