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Inventors

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Tilt sensors based Molecular Electronic Transducers

An inclinometer is a gravity sensitive device which is capable of measuring angles of tilt. These tilt sensors have a broad range of applications, from seismology and aviation to consumer electronics. The variety and scope of these applications means that inclinometers must have high resolution and accuracy, while also providing reliable performance under harsh conditions. However, the inclinometer is sensitive to gravity, making it difficult for traditional solid mass-spring systems to achieve high performance. Therefore, there is a need for a reliable, high performance tilt sensing device.

Researchers at Arizona State University have developed a tilt sensor based on Molecular Electronic Transducer (MET) technology. MET seismometer cells are inertial sensors which detect motion based on the movement of a liquid electrolyte between electrodes. This transduces the liquid motion to electrical signal by electric-chemical reaction. The electrical current from the liquid/solid interface is based on the generation and absorption of ions on the surface of electrodes. Because the output current depends on contact surface area, changes in the angle of tilt can be detected with high precision and performance.

Potential Applications

- Seismology
- Consumer Electronics
- Space and Planetary Exploration
- Aviation

Benefits and Advantages

- Improved Accuracy – Highly sensitive to angle of tilt.
- Tolerant of Harsh Environments – METs can use liquid electrolytes with a broad range of liquid-phase temperatures, which increases possible applications.
- Improvement on Existing Technology – Not sensitive to gravity, like traditional solid mass-spring inclinometers.

For more information about the inventor(s) and their research, please see

[Dr. Hongyu Yu's directory webpage](#)

For more information about related technologies, please see

[M14-216P: MET Based Accelerometer Using Ethylammonium Nitrate \(EAN\) Based Potassium Iodide Droplets as the Sensing Body](#)

