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Press release

Kistler launches world's first dynamometers with ceramic top plates to track higher-frequency micro-vibrations

Improved satellite imaging quality thanks to dynamometers with increased natural frequencies

Winterthur, January 2020

Kistler is introducing its new piezoelectric dynamometer (9236A), specifically designed to measure micro-vibrations in satellite testing. Featuring a ceramic top plate instead of a steel plate, this new dynamometer offers exceptionally high natural frequency. The benefit: users can now measure micro-vibrations up to 40% higher frequencies than ever before – the 9236A can even capture the most minimal dynamic changes in small forces at high frequencies. The launch of the 9236A marks a major step forwards in improving terrestrial observation.

We are used to seeing high-precision images whenever we sign in to Google Maps. But the quality of those images depends on eliminating or reducing micro-vibrations that would otherwise cause blurring. Micro-vibrations are extremely small accelerations of very low intensity. Piezoelectric force sensors and dynamometers – with their very high natural frequencies – have proven to be ideal for measuring micro-vibrations and tracking down their causes.

Facing new challenges in micro-vibration measurement

Images of the earth captured by satellites have to meet ever-increasing standards of precision, so cameras with higher resolution are required. But enhanced resolution also makes cameras more vulnerable to micro-vibrations. Two approaches to solving this problem have emerged: first, dynamometers with higher natural frequencies are used so that high-frequency micro-vibrations can be isolated more easily. And second, larger dynamometers are deployed to measure complete subsystems and entire small satellites. Piezoelectric dynamometers are the solution of choice for measuring micro-vibrations because they can handle static preloads and measure dynamic forces and moments with high resolution in six axes. The dynamometer's top plate is usually made of steel – and the larger the dynamometer, the heavier the top plate will be. However, increased mass also means reduced natural frequency – and this effect cannot be compensated by selecting sensors that are more rigid. With the materials that are currently in use, therefore, dynamometers have clearly reached the limits of their potential natural frequency.

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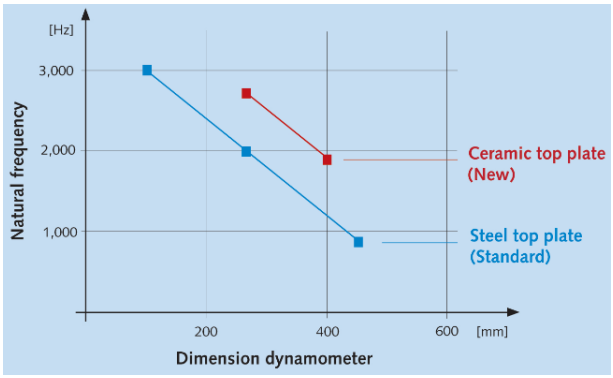
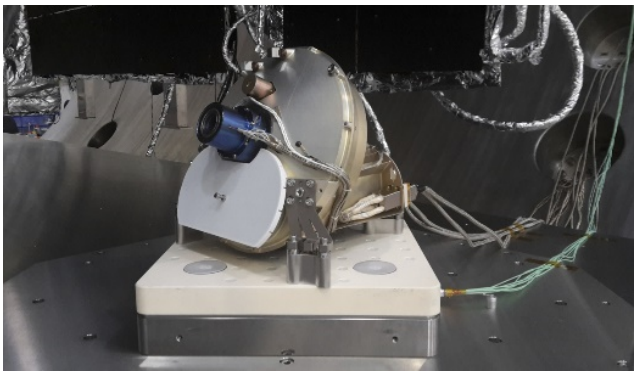
Boosting the potential of piezoelectric dynamometers

Kistler has now responded to this challenge by developing a new dynamometer with a ceramic top plate instead of a steel plate. After overcoming the difficulties presented by such a brittle material as ceramic, the developers have perfected a new design that offers outstanding benefits: improved rigidity, lower weight and a natural frequency of 2.6 kHz (40% higher than the conventional steel-top version). The new ceramic-top dynamometer's size remains unchanged at 260 x 260 mm and thanks to this unique combination of features, it can measure micro-vibrations across an unprecedented measuring range from -500N to 500N. Thanks to this unique combination of features, the new ceramic-top dynamometer can measure micro-vibrations across an unprecedented measuring range. An added benefit: the dynamometer's dimensions can be increased to handle complete systems or small satellites, so Kistler offers customers a choice of two different sizes.

Image material (please name the Kistler group as picture source)



Dynamometers with a ceramic top plate offer significantly higher natural frequencies. Customers benefit because micro-vibrations with high-frequency content can be measured and reduced – leading to satellite images with vastly improved quality.



For larger satellite test units, Kistler offers the new ceramic-top piezoelectric dynamometer (9236A2) measuring 400 x 400 mm. (Source: Centre Spatial de Liège)

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The new ceramic-top piezoelectric dynamometers from Kistler: 9236A1 (260x260 mm) and 9236A2 (400x400 mm, shown here)

High resolution satellite image of New York City – enhanced resolution makes cameras more vulnerable to micro-vibrations

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About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,200 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and in 2018, it posted sales of CHF 475 million. About 8% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.