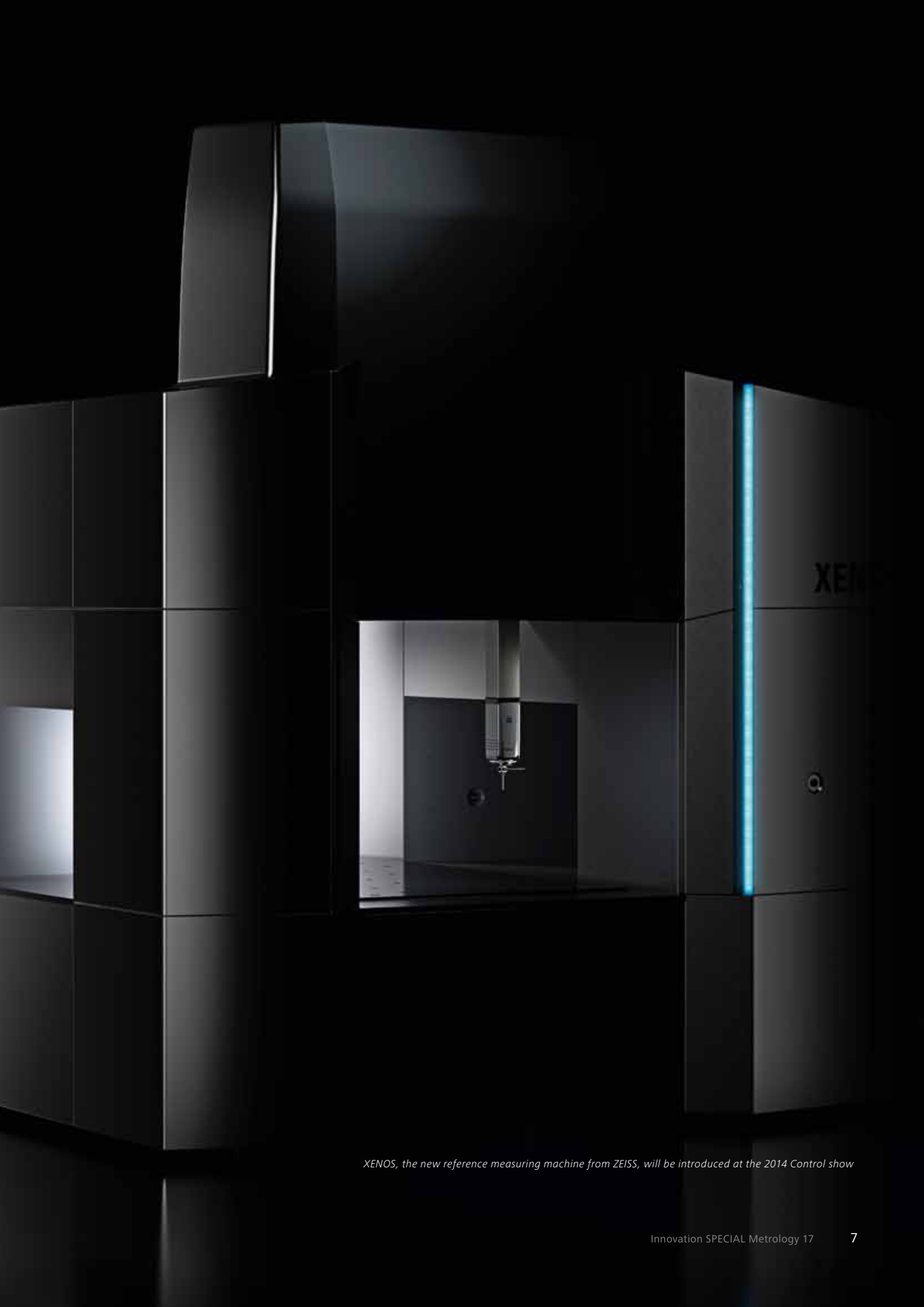
// Measuring innovation
Bridge-type measuring machine / ZEISS XENOS

XENOS

The New Standard

XENOS. The name conjures up images of superheroes. Fitting, considering that the new coordinate measuring machine from ZEISS is entering a new realm of accuracy and dynamics with its innovative technology. XENOS from ZEISS delivers length measurement error of just 0.3 micrometers – unbeatable accuracy in this machine class.



XENOS, the new reference measuring machine from ZEISS, will be introduced at the 2014 Control show

The next generation of high-tech ceramics: silicone-carbide ceramics – maximum rigidity for maximum precision and reproducibility

Innovative mechanical design with optimal properties for dynamics, weight ratios and reproducibility

First use of linear drives in reference measuring machines: safe, dynamic and futureproof (through inherent intelligence)

LED status display – quickly determine what is going on

Measuring range: 900 x 1500 x 700 mm – for a wide range of applications with small or large parts

New VAST gold probe for maximum accuracy and reproducibility

ZEISS has repeatedly pushed the limits of contact measuring with systems such as ZEISS PRISMO, ZEISS UPMC ultra or ZEISS F25. Today, they serve as reference machines in national institutes around the world.

0.3 micrometers per cubic meter

With a measuring volume of around one liter, the F25 from ZEISS can only measure small parts. By comparison, ZEISS XENOS offers a measuring range of just about one cubic meter (900 x 1500 x 700 mm). The engineers at ZEISS took a new approach for the development of XENOS in order to set a new standard in precision with this measuring volume, while also increasing the measuring speed. "All standard measuring machines can only be optimized up to a certain level. Sooner or later, this potential is exhausted," explains Konrad Werner, ZEISS XENOS Product Manager. This machine is a new innovation from ZEISS. XENOS from ZEISS stands for accuracy and future proofness thanks to the use of innovative technologies and materials, which also pushed the limits of technology.

At first glance, the new measuring machine clearly distances itself from the previous top model ZEISS PRISMO ultra. The mechanical concept was derived from the successful ZEISS CenterMax inline system: the reference machine for production measuring technology since 2001. The fixed side walls provide extreme stability throughout the system. Because only the upper cross bar moves in the Y direction, the moving weights are reduced, which remains always constant in comparison to a machine strategy with a moving workpiece. Together, the weight reduction and constantly moving masses enable optimal coordination of the drives regarding acceleration and maximum speed.

Virtual central drive

Unlike other systems, the ZEISS XENOS uses linear drives on all axes instead of friction drives. Until now, these have been rarely used on measuring machines. The benefits: high speeds, very fast acceleration, high positioning accuracy and shear force-free drives. Thanks to an innovative overall concept, it was possible for the first time to decouple the force transmission of the linear drives of the guideways and measuring system. Taking into account the high-resolution scales on ZEISS XENOS, the new drive technology results in very high path adherence and extremely high positioning accuracy clearly below 100 nanometers. For example, the stylus deflection remains more constant, which results in higher accuracy. Another benefit of the very high path adherence is evident when measuring curved surfaces: the more reliably and accurately a stylus follows the specified path, the more precisely errors can be identified.

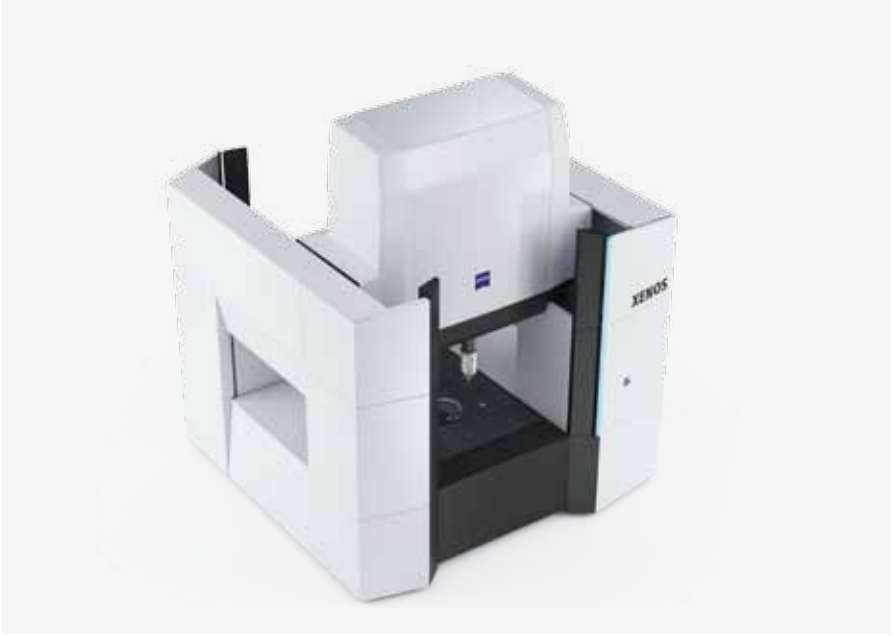
Based on its 30 years of experience with precision drives, ZEISS is now introducing the patented, virtual central drive. The full incorporation of dynamic mass distribution is enabled by the latest generation of controller and algorithm.

The new VAST gold probe from ZEISS was developed to meet maximum demands on sensitivity, accuracy and reproducibility

Silicon-carbide high-tech ceramics
In the past, ZEISS used aluminum oxide ceramics or CARAT-treated aluminum for the parts of the machine structure relevant to accuracy. These are known for their lightness, rigidity and invariance regarding temperature fluctuations. With ZEISS XENOS, our engineers have once again raised the bar. As a result, an innovative silicone-carbide ceramic is being used for the first time on a measuring machine. Until now, this material has rarely been used for a comparable part size or accuracy. Compared to the white standard ceramic, the black silicone-carbide ceramic exhibits around 50 percent lower thermal expansion, up to 30 percent higher rigidity and 20 percent less weight. Compared to steel, it delivers twice the rigidity at half the weight.

New VAST gold probe
ZEISS XENOS features various other new equipment in addition to the previously mentioned innovations. This includes the enhancement of the VAST gold reference probe and its optimal integration for better accuracy and repeatability. Optimized air bearings with considerably improved integration enhances stability and also contributes to better accuracy. The influence on precision of moving cables on all coordinate measuring machines has been clearly reduced through the improved decoupling and a new electronics concept.

The foundation for precision
XENOS features standard ZEISS floating Zerodur scales. Zerodur is a glass ceramic material with virtually no thermal expansion. Thermal expansion on steel scales must be compensated. The temperature sensors and the estimated expansion coefficient would be sources of uncertainty that are avoided on ZEISS XENOS from the start. Product Manager Werner: "Some time ago, someone mentioned completely compensating mechanical invariance mathematically. Our approach with



ZEISS XENOS was to uncompromisingly push the limits of mechanical precision, to eliminate hysteresis influences and to use the computer only for the last bit. We are certain that this course of action has enabled us to achieve maximum precision with ideal repeatability."