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Press Release
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MEMS-based Display Solutions showcased at CES 2013

Mirrorcle Technologies, Inc (MTI), a California-based manufacturer of patented, gimbal-less MEMS micromirror devices demonstrated a variety of innovative display solutions at the Consumer Electronics Association (CES) trade show in Las Vegas. The company showcased its battery powered, compact optical cell laser display system at the booth of Sun Innovations, a provider of advanced super-transparent, unlimited-angle emissive projection display (EPD) foils. These foils are able to transform scanning laser beams of selective optical wavebands into bright fluorescent display of highly visible emissive "screen" images. Mirrorcle optical cells utilized "blue-ray" laser diodes to project a variety of vector graphics onto windows equipped with these specialty foils. One of the units displayed a broad banner with the text "CES – 2013" which moved around on the transparent window. The window in this demonstration was a foil-treated car windshield catering to the automotive industry's growing focus on head-up display (HUD) technologies. Another unit displayed a clock or other, user-defined content, in real time. One of the miniature display units was fully powered by a small battery, and the other by a laptop's USB port, demonstrating Mirrorcle MEMS drivers' very low electrical power consumption.

Figure 1. Mirrorcle Technologies' and Sun Innovations laser display on windshield demo at CES 2013. Displayed content is controlled in real time from a mobile Android OS device.

Mirrorcle mirrors open path to broad spectrum of operator assistance display applications

With Mirrorcle Technologies' presence at the CES show, which has always been a major showcase for new consumer products and a broad variety of innovative technology solutions, the company opens avenues to manufacturers of a wide spectrum of industries with its mature, high-precision beam-steering mirror solutions. MTI's MEMS-based display

technology, in combination with Sun Innovation’s emissive foils, make possible exciting new applications that may range from content-adjustable signs, unprecedented advertisements and other display application utilizing transparent surfaces. “Our visitors included representatives of a wide variety of markets, including automobile manufacturers that envision using our mirrors for HUD and other automotive-display applications as well as in novel lighting solutions”, said Dr. Milanovic, CEO of Mirrorcle Technologies. “What we did not expect were inquiries from companies that design operator interfaces in heavy machinery, sea and air vessels, or from toy companies that are working on innovative games and gadgets for children.”

Laser-based, brightness-controlled display technology allows for novel visual experiences

The compact display cell solution that Mirrorcle Technologies demonstrated at CES 2013 occupies only a few cubic centimeters of volume and can easily be integrated into a variety of spaces, whether in dashboards of trucks, cars or heavy machinery, in shop windows, businesses, retail stores etc. The current display scan module combines a low-cost laser diode with Mirrorcle Technologies’ gimbal-less two-axis MEMS mirror and optical lenses. A credit-card size printed circuit board (PCB) is equipped with intelligent software to control the precise movement of the mirror’s X- and Y-axes, deflecting the laser beam to user-defined trajectories, whether for continuous scans, or in point-to-point applications. The advantage of this technology lies in its ability to provide both high-frequency scans as well as the ability to quickly stop at any point. Content can be adjusted for any projection angle, or other optical distortions, since users fully control optical beam path and velocity.

Vector graphics approach allows for maximal use of laser power

Mirrorcle Technologies’ capability, combined with Sun Innovations' award-winning super-transparent water-clear fluorescent EPD film allows for brightness-adjustable images on a variety of surfaces, whether planar, curved or otherwise structured. The content is clearly visible, independent of the surrounding lighting environment, including bright daylight. MTI’s compact display unit is robust and requires only very little power, typically less than 2W at maximum laser brightness and less than 1W in indoor/darker conditions. The clarity and brightness, coupled with low power consumption is in great part due to the vector graphics approach which allows for nearly 100% efficient use of laser power on specific displayed content. By comparison, raster-display approaches spread allowable laser power over an entire image area, which is particularly inefficient in HUD applications with limited content. In summary, Dr. Milanovic noted: “Our synergy with Sun Innovations continues due to the great match and combined capability of our technologies. We were able to meet interesting new customers, and are confident that we will be able to assist in the development and launch of exciting new products that utilize our MEMS-mirrors and Sun Innovations foils.”

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About Mirrorcle Technologies, Inc.

Mirrorcle Technologies, Inc. (MTI), founded in 2005, is a California corporation that commercially provides products and services based on its proprietary optical microelectromechanical system (MEMS) technology. Since its founding, and supported by its continuous investment in R&D, MTI has offered the world's fastest point-to-point two-axis beam-steering mirrors, as well as resonating-type micromirror devices with rates up to HD video. MTI is globally the only provider of tip-tilt MEMS actuators in combination with mirrors from 0.8mm to several mm in diameter, offering customers a wide selection of specifications to optimize their paths to successful commercialization. In addition to a variety of existing designs and in-stock products, MTI also contracts to create specialty designs and fabricate custom units for its customers.

In addition to the laboratory at its headquarters, MTI has year-round, 24-7 access to wafer-based CMOS and MEMS fabrication facilities. Micromirror fabrication and wafer-level testing are performed in a clean-room environment. In 2010, MTI established a manufacturing service cooperation with a leading MEMS wafer foundry, allowing the company to ramp up volume-production while maintaining highest quality standards.

As a privately held company, MTI is able to act efficiently, offering creative and highly responsive service to its customers. The motivated staff is dedicated to provide highest-quality products and support to facilitate customers’ product development and successful commercialization. It draws on several decades of staff’s combined experience in MEMS design, fabrication, and testing.

About Sun Innovations, Inc.

Located in prime Silicon Valley region, Sun Innovations have dedicated long years in developing market persuasive product range with a global team of scholar PhDs. In the opening year of product deployment, Sun Innovations has more than 100 customers operating approximately 1,000 installations worldwide.

Sun Innovations also adds custom built MediaGlass TM and TransPlay TM Display technology with key customers in Media, Advertising, Entertainment, Aeronautic, Hospitality, Banking, Financial and Retail industries. MediaGlass products are employed to generate dynamic digital display portals with transparent, scalable, 2 side viewing angles and superior quality video projection systems available in 2 single color screens. The TransPlay product is designed to create massive, vibrant 3D, transparent, 2 side viewing angles with high quality UV single/dual color line art display solutions. Sun has also developed a complete array of emissive projection films.

The company has its Global Headquarters in Fremont, California, with two development branch offices in China employing more than 50 personnel worldwide. Sun Innovations’s rapid distributorship growth has brought tremendous exposure not only in United States but also in the countries like Canada, United Kingdom, New Zealand, Australia, China, India, Japan and Taiwan.