PRESS BACKGROUNDER

Microvision's products address the unmet need facing growing mobility markets. Namely, consumers want a far better viewing experience than they currently get from traditional small displays on their mobile devices. Microvision addresses this need by offering original equipment manufacturers (OEMs) in the telecommunications, consumer electronics, automotive and avionics markets the world's only ultra-miniature laser scanning engine: PicoP®. Small and low power enough to be embedded directly into mobile devices, such as wireless handsets, the PicoP display engine is a video projector capable of producing high-resolution, color-rich, DVD-quality images as large as 100" across.

Microvision is also the developer of a thin, light, plug-n-play accessory projector based on the PicoP diplay engine. The production version of this tiny laser projector, the SHOWWX laser pico projector, won several awards at Macworld 2009. At just 118mm long by 60mm wide by 14mm thick, SHOW WX is no larger than an iPhone, is completely battery-operated, and can project a full-color, Wide Video Graphics Array (WVGA at 848 X 480 pixels), DVD-quality image with vivid colors and exceptional contrast. The company is selling the SHOWWX to a variety of global distributors under the SHOWWX brand name, as well as pursuing opportunities for private label branding.

The End User Experience

The PicoP display engine-enabled applications such as SHOWWX are designed for people on the go who want to spontaneously view mobile TV, movies, photos, presentations and more—but who don't want to spend their time squinting into a tiny mobile device display. Users can take the pocket-sized projector anywhere to enjoy a big-screen experience while on the road, at home, or with friends, family or business associates. From the convenience of any portable media device with TV-Out or VGA functionality, users just plug the SHOWWX into their portable media players, mobile phones, notebooks and other mobile media devices to transform a small screen into a large projected one.

Because the SHOWWX requires no focal lens, displayed images are always in focus on any surface—whether you are projecting a 12" image or a 100" one. This frees users from constantly having to manually focus projected images associated with non-laser miniature projection systems—and it's a big advantage over competitive pico projectors.

Bright yet power-efficient, the SHOWWX has an expected battery life of over 90 minutes, allowing plenty of time to view most movies or provide a presentation on a single battery charge.

The Technology Inside

Microvision's patented PicoP display engine combines two-dimensional microelectromechanical systems (MEMS) light-scanning technologies; red, blue and green lasers; optics; and electronics to comprise a small, thin, low-power laser projector module for embedded mobile devices and plug-n-play accessory devices.

The key component of the PicoP display engine is Microvision's bi-directional MEMS scanning mirror—a silicon device which has a tiny mirror at its center. This mirror is connected to small flexures which allow it to oscillate vertically and horizontally to capture (imaging) or reproduce (display) an image pixel-by-pixel.

The PicoP display engine uses a single beam of laser light and a single small scanning mirror to create a brilliant, full-color, high-contrast, uniform display over the entire field of view.

The PicoP display engine provides significant advantages over competitive pico projector technologies. These include:

- **Small and thin engine size**—just 7 x 20 x 40 mm
- **Only display that is always in focus**—by not requiring a projection lens or focal adjustment, projected images have infinite focus
- **More vibrant image**—supporting 200% National Television System Committee (NTSC) colors, 2x more than any competitive pico projector
- **Far greater contrast**—10,000:1 dynamic range outpaces Texas Instruments Digital Light Processing's (DLP's) 1000:1 and Liquid crystal on silicon's (LCoS's) 100:1 dynamic range
- **Better resolution**—WVGA resolution outperforms competitors' Half-size VGA (HVGA) to VGA resolution
- **Impressive brightness**—at 10 lumens, images displayed by the PicoP display engine can be viewed in a variety of controlled lighting environments.

Head-up Displays and Wearable Displays

The PicoP display engine, with some modification, can be embedded into a vehicle or integrated into a portable standalone aftermarket device to create a head-up display (HUD) that could project point-by-point navigation, critical operational, safety and other information important to the vehicle operator. The PicoP display engine can also be embedded into a pair of glasses to provide the mobile user with a see-through or occluded personal display to view movies, play games or access other visual content.

To support unique vehicle display designs, the PicoHUD, powered by the PicoP display engine is significantly smaller and brighter and provides higher contrast than competitive HUD technologies. The PicoHUD demonstrates the PicoP display engine's ability to project a full-color high-resolution readable image during day or night onto the windshield of an automobile, specialty vehicle, truck or bus to provide easy visual access to information related to the vehicle's operation. Microvision is working with various automotive suppliers to develop a PicoP display engine-enabled HUD.

The PicoP display engine can also be integrated with a lightweight optical design to create a full color near-eye wearable display platform. This wearable display platform can be in the form of ruggedized helmet-mounted display systems or lightweight fashionable eyewear displays. The company has entered into contracts with commercial and government customers to develop high-definition (720 pixels) eyewear displays.

Company History and Management Team

Founded in 1993, Microvision is headquartered in Redmond, Washington, USA. The company's prototyping and product development facility spans around 65,000 sq. ft. The company is an ISO 9001-certified organization, and is focuses itself on delivering quality and reliability in both product design and customer service.

The company has 160 employees in the U.S., and is also represented out of Europe and Asia-Pac.

The success of Microvision is backed by a strong management team led by the president and CEO, Alexander Tokman, who is responsible for operations such as sales, marketing, research and development, and supply chain. The sales and marketing team is led by Vice President Ian Brown; the research and development team is headed by Vice President Sid Madhavan; and Thomas Walker serves as the vice president, general counsel and secretary in Microvision. Additionally Jeff Wilson serves as the CFO of the company.

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Glossary of Terms

Pico Projector = A **handheld projector** (also known as a **pocket projector** or **pico projector**) is an emerging technology that applies the use of a projector with or embedded into a handheld device.

PicoP® Display Engine = Microvision's proprietary ultra-miniature laser projection module that can be integrated directly into mobile devices to project large, high-resolution images. The PicoP display engine is a novel display technology based on using only one micro mirror, lasers, relay optics and electronics to produce displayed images.

SHOWWX = Microvision's product name for a a battery-operated pico projector designed with a PicoP display engine.

PicoHUD™ = Microvision's prototype name for an automotive head-up display designed with a PicoP display engine.

WVGA (848 X 480), VGA (640 X 480), HVGA (320 X 240) = The sharpness, clarity and size of a viewed image on the screen is determined by a projector's resolution. Resolution is simply the number of pixels (or "picture elements") the projector uses to create the image. The more pixels it uses, the "higher" the resolution.

Resolution is usually quoted in two numbers, such as "848 x 480," where the first number refers to the number of pixels from side to side across the screen, and the second number refers to the number of pixels vertically from top to bottom.

Microelectromechanical systems (MEMS) = the integration of mechanical elements, sensors, actuators and electronics on a common silicon substrate through microfabrication technology. Microvision's single bi-axle scanning mirror used inside the PicoP display engine is an example of a MEMS device.

Dynamic Range = Measured ratio between true white (light colors) and black (dark colors), often referred to as contrast ratio. A high dynamic range means that the user will see richer colors and greater depth in the colors.

National Television System Committee (NTSC) = the analog television system used in most of the Americas, Japan, South Korea, Taiwan, the Philippines, Burma and some Pacific island nations and territories

Head-up Display (HUD) = A **head-up display**, or **HUD**, is any transparent display that presents data without requiring the user to look away from his or her usual viewpoint. The origin of the name stems from the user being able to view information with their head "up" and looking forward, instead of angled down looking at lower instruments.

Although they were initially developed for military aviation, HUDs are now used in commercial aircraft, automobiles and other applications.

Wearable Display = **A head-mounted display** or **helmet-mounted display**, both abbreviated "HMD," is a display device, worn on the head or as part of a helmet, that has a small display optic in front of one (monocular HMD) or each eye (binocular HMD).

Digital Light Processing (DLP) = a trademark owned by Texas Instruments, representing a technology used in projectors and video projectors that is based on the use of millions of individual mirrors.

Liquid crystal on silicon (LCOS or LCoS) = a "micro-projection" or "micro-display" technology typically applied in projection televisions. It is a reflective technology similar to DLP projectors; however, it uses liquid crystals instead of millions of individual mirrors.