



MicroVision

“The lasers are the largest cost in the ShowWX pico projector bill of materials,” notes Lance Evans, MicroVision

MicroVision counts on disruptive green laser technology, narrowed focus, and big partners for success in pico projector market

Stalwart startup MicroVision says a new generation of direct green lasers will enable significantly smaller, cheaper laser-scanning pico projectors.

Strongest interest is coming from automotive makers who see the technology as an enabler for heads-up displays. The company aims to narrow its focus back down to the display engine and to rely more on its partners for systems design and sales to succeed in this market.

The market for embedded pico projectors in consumer mobile electronics gear has been slow to take off, as brightness, power consumption and cost have yet to hit the sweet spots needed to spur wide adoption. Yole Développement estimates the pico projector market reached only about 750,000 units in 2010, largely dominated by DLP and LCoS technologies. But the market is ramping at close to 100% CAGR, and it is not yet clear how DLP, LCoS and laser scanning technologies will share the market.

Low cost direct green lasers could change the game

Lasers have been a big part of the high cost of laser-scanning projection technologies. “The lasers are the largest cost in the ShowWX pico projector bill of materials,” notes Lance Evans, veteran MicroVision engineer now director of business development for the heads-up display business, noting as well that higher power lasers were the key to the 50% improvement in brightness in the company’s most recent generation product. The green lasers have always been a particular problem, since green could only be obtained by frequency doubling of an IR laser. But the new type of green lasers, slated for production at multiple suppliers by early next year, will emit green directly. Evans figures that eliminating the wavelength conversion optics will allow about a 30% reduction in the size of the display engine. Price at introduction is expected to be ~20% of synthetic laser prices, or a few \$10s. “It’s now getting to where customers don’t throw us out of the room for having too many zeros,” he jokes. And the kinds of major volumes approaching 1 million units a year in the mobile phone market could drive both laser and MEMS unit costs quickly down the cost curve. At least five players are

introducing direct green lasers, and three are targeting commercial production in 1H 2012.

MicroVision is currently demonstrating the direct green laser to customers in its current pico projector. Evans notes that there is quite a spread in lumens from the different suppliers, but expects efficiency will increase in time as other lasers have done, so that 10-15 lumen projectors will be possible. The direct green lasers also conveniently turn out to decrease the appearance of speckle that’s typically an issue with laser displays, as their several nanometers variation in wavelength limits the random scatter of the light on the wall, and because of the particular sensitivity of the eye to the green wavelengths, people reportedly tend to perceive a significant improvement in the display.

First application is likely aftermarket automotive heads-up displays

Most interest in the lower cost laser scanning pico projectors is initially coming from the automotive world for heads up displays, which show information in the driver’s field of view, out in front of the car. The big market driver is safety – the potential to prevent accidents by keeping the driver’s attention focused on the road, instead of on the air conditioning settings or the GPS instructions. Major partner Pioneer targets an aftermarket automotive see-through display next year, most likely for navigation.

Evans argues the laser scanning technology allows more transparent heads-up displays because it paints no light for the black, so there is no background glow as with competing matrix-type displays, resulting in higher contrast, and in less interference with visibility through the windshield. The polarized and narrow laser beams also reportedly produce images bright enough to be read in the bright sunlight. The image is painted on a relatively small image plane, then magnified by the relay optics and folded into the line of vision, the light rays bent to make the image look like it is out in front of the car.

The company reports it is working with Tier 1 automotive suppliers and has prototypes based on its current pico projector driving in cars in North America, Europe and Japan. About half of the 40 or so potential customers with which it is currently engaged are aftermarket suppliers, looking at heads-up vehicle displays for the navigation information from the GPS or smart phone, or for specialty applications ranging from fire trucks to forestry vehicles. Built-in automotive displays likely wouldn't appear until about the 2015 models.

Lower cost laser-scanning pico projectors are also getting interest from the gaming market, since unlike the LED-based projectors, the laser technology remains in focus at any distance, so can work for immersive gaming that displays the game scene on the wall and keeps it in focus as the player moves around the room. MicroVision has been demonstrating a projector attached to a toy gun for gaming, which displays the scene ahead from the view point of the player holding the gun, and uses inertial sensors to change the scene appropriately as he turns in different directions. Evans says the company is currently in discussions with game producers to develop games making use of this display. Near-eye displays for augmented reality could also come down in cost enough to see some market traction in three to four years.

MicroVision has had a respectable showing from its stand-alone accessory mini projector, selling \$800,000 worth of product in the quarter ended in March, up 200% from a year ago, and regularly being among the top selling pico projectors on Amazon in recent months. The company ended up designing and selling its own brand of pico projector in an effort to showcase the technology. It has smartly positioned the projector for ease of use with Apple's big installed base of consumer media gadgets, and sells online and through distributors in Europe and Japan, including to Apple stores in Europe, but it has been a stretch for a small company.

Strategy turns to simplifying operations, tighter focus on direct green display engine

Funding this long development process for disruptive technology for the demanding low margin, high volume consumer market isn't easy for a small company. MicroVision revenue was \$4.7 million in 2010, up 24% from the year before, but losses grew almost as fast, up by 23% to \$48 million. The company still loses money on its current pico projector sales - its most recent 10K report notes that the cost of the \$800,000 in product sales in Q1 was some \$2.2 million, as the declining prices for accessory pico projectors have



Vehicle display
(Courtesy of MicroVision)

decimated margins and necessitated a big write down in inventory value.

But the company is emphasizing a newly focused plan to its customers and investors. It now plans to focus its efforts all on its pico display engine with the new direct green laser, to start to seed samples in Q4 for commercial product in 2012. It will rely on partner ODMs or OEMs to integrate the display engine into systems and to market the end products. It counts on large and well known partners, from the well known LED makers who will be supplying the direct green lasers, to partner Pioneer who will be designing and selling the aftermarket automotive display, to provide credibility. And it aims to simplify operations to reduce cash used in operations by 40%, starting with its 20% reduction in work force back in January. The company recently signed an agreement to sell up to \$40 million worth of additional stock to Azimuth Opportunity.

Dr. Lansing B. Evans (DEEE) Director, Business Development Automotive & Advanced Applications, MicroVision

Dr. Lance Evans is the Director, Business Development, responsible for Automotive & Advanced Applications for Microvision. He joined MicroVision in 2000 and was responsible for the technical leadership, product development and commercialization of the Nomad and Spectrum display product lines while leading MicroVision's systems engineering organization. Lance has 35 years of experience in display product technology and application, with 23 years at AlliedSignal primarily in aerospace flight deck display applications. He led development and certification of the industry's first Active Matrix Liquid Crystal Display (AMLCD) flight deck indicator for the Traffic Alert and Collision Avoidance System (TCAS) as well as LCD-based and CRT-based Electronic Flight Instrument Systems (EFIS). He holds a Doctor of Engineering in Electrical Engineering (DEEE) degree from Tulane University.

www.microvision.com