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TECHNOLOGY

MEMS Putting Smart Phones Into Motion

By JAMES DETAR, INVESTOR'S BUSINESS DAILY

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Sensimed's Triggerfish product, using MEMS from STMicroelectronics, is a contact lens that tests for glaucoma. [View Enlarged Image](#)

Ever wonder how a car's air bag deploys, or how those wireless game controllers work, or what keeps your digital camera stable as you snap a photo?

The answer is electronic gizmos that are being used in more and more products: MEMS, micro-electromechanical systems, which combine circuitry with tiny, nano-scale gears on a sliver of silicon. They usually act as a sensor.

MEMS are being used more often because they use less space, cost less and work better than the alternative — separate chips and mechanical parts.

Tons of products already use MEMS, but it's just the start. Before October, patients will be wearing contact lenses equipped with MEMS to test for glaucoma.

phones, letting users manipulate displays, make a retail transaction or turn the handset on or off with a touch of a fingertip or flip of the wrist.

By late this year, some say, MEMS will be a regular feature in smart phones, letting users manipulate displays, make a retail transaction or turn the handset on or off with a touch of a fingertip or flip of the wrist.

"Sales and units shipped have skyrocketed the last two years," said Forward Concepts analyst Will Strauss. "And this is going to be another good year for MEMS."

MEMS are still a tiny fraction of the overall chip industry, but they're outpacing almost all chip sectors. Market tracker iSuppli says MEMS sales will jump to \$10 billion in 2014 from \$5.5 billion last year.

Texas Instruments, HP Lead

That's a compound annual growth rate of more than 12%, compared with single-digit growth every year but this one for chip sales overall, says research firm Gartner.

It's also one of the most hotly contested tech fields, with some 250 companies in the game.

Some tech giants are there. Among them are Texas Instruments ([TXN](#)) and Hewlett-Packard ([HPQ](#)), which rank Nos. 1 and 2, respectively, says market tracker Yole Developpement, and Swiss-based STMicroelectronics ([STM](#)), which is No. 4.

And there are scrappy smaller players such as Robert Bosch subsidiary Sensortec in Germany, No. 3 in the MEMS market, and InvenSense in Sunnyvale, Calif.

Privately held InvenSense makes a type of MEMS it calls a motion processing unit, or MPU. Nintendo ([NTDOY](#)) uses it in an add-on that plugs into its Wii game machine. Called Wii MotionPlus, it gives game players a wider range of motions.

InvenSense, STMicro and others are racing to bring motion sensor technology to smart phones. InvenSense's founder and CEO, Steve Nasiri, says his company's MPU-3000 will most likely be the first single-chip MEMS motion processor in smart phones.

Adding a keen ability to sense motion, MEMS have started moving into cell phones, the largest single product category in consumer electronics in terms of unit sales. The MEMS market "boomed" with the entry into cell phones, Strauss said.

Nasiri says the MPU-3000 will add "touch anywhere" and other features to cell phones. Users will be able to turn on and off smart phone applications with a touch, and "zoom in and out just by moving your wrist," he said.

MPU-3000 MEMS will address another problem faced by makers of smart phones and tablet computers.



Users won't be aware of the tiny MEMS in a Triggerfish contact lens. [View Enlarged Image](#)

Glaucoma is an eye disease in which the optic nerve is damaged, and is the second-most-common cause of blindness. One symptom is increased pressure in the eye. Sensimed's Triggerfish is a contact lens with a tiny MEMS sensor implanted in it. Patients won't notice a difference. They'll wear it for a full day.

Because it will measure over the course of a full day, Triggerfish will be more accurate than conventional tests, which have to take place in a doctor's office.

With Food and Drug Administration approval, "it will be available in the U.S. by the end of next year," said Benedetto Vigna, manager of STMicro's MEMS unit.

With such new applications coming out, MEMS is a hot field. For MEMS makers, says analyst Bouchard, the biggest fear is that with so many players, price competition will erode any profit.

"We believe the market will adjust," Bouchard said. "These companies have good control over the supply chain. But it makes us cautious."

"In the case of pad computers like (Apple's (AAPL) iPad, a MEMS sensor cannot sense direction if you hold it horizontally. You have to lift it and turn it," Nasiri said. MPU-3000 will let tablet computers sense if a user is holding it horizontally, vertically or whatever, and the display will match the direction.

Testing For Eye Disease

Nasiri says the MPU-3000 could be inside smart phones as early as this year. "We're talking with every smart phone maker," he said.

InvenSense has "very impressive technology," said iSuppli MEMS analyst Jeremie Bouchard.

But another impressive MEMS application may be even closer to hitting the market.

Switzerland's Sensimed plans, by the third quarter, to start selling in Europe a revolutionary new way to test for glaucoma, using MEMS supplied by STMicro.

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