

## ASU developing flexible-display screens

ASU teaming with the U.S. Army and manufacturers

by **Andrew Johnson** - Feb. 14, 2009 12:00 AM  
The Arizona Republic

Mobile phones, laptops and televisions of the future will have display screens that can bend, fold and roll up.

The military, high-tech manufacturers and academia have made Arizona ground zero for bringing the technology into mainstream use.

They are pinpointing key materials and testing manufacturing techniques needed to make the sophisticated screens at Arizona State University's Flexible Display Center. The goal is to incorporate the flexible material in everything from entertainment devices to tools that aid soldiers.

Based at the ASU Research Park at Loop 101 and Elliot Road in Tempe, the center recently renewed a cooperative agreement with the Army, which is providing \$50 million over the next five years to operate the facility.

The Army signed an initial agreement with ASU in 2004 worth \$43.7 million to establish the center.

Since then, ASU and Army researchers have worked with Honeywell International, Boeing, HP, General Dynamics, DuPont Teijin Films and several startup companies to lay the groundwork for mass-producing flexible displays.

"We're poised to do more on the development side to show, demonstrate and scale the process," said Shawn O'Rourke, director of engineering at the Flexible Display Center.

The Army has been a major force behind private industry's willingness to invest in the technology. Soldiers would benefit by reducing the weight of electronics they carry. Military vehicles with flexible displays inside them also would emit less heat and consume less power.

"Our electronic devices that are in our combat vehicles . . . are power-hungry," said Thomas Killion, the Army's deputy assistant secretary for research and technology and chief scientist.

"The less energy they demand, the less demands you place on engines, and you extend the battery life."

Scottsdale-based General Dynamics C4 Systems, a center partner, has experimented with flexible displays for potential mission-planning devices that soldiers could wear on

Advertisement

# GET A FREE GIFT CARD

TO USE FOR GAS OR GROCERIES!



Get the best available rate on your *Arizona Republic* subscription. Change to EasyPay's monthly payment program. Take control of your bills, save money and get a free \$10 Safeway gift card!

## THE ARIZONA REPUBLIC

CALL 888-303-8949 OR VISIT [EPG.AZCENTRAL.COM](http://EPG.AZCENTRAL.COM) TO SIGN UP!



**EASYPAY**  
Easy to do. Easy to save.  
Change the way you pay.

PROMO CODE: EPG

Print Powered By  FormatDynamics™

their wrists or carry in their hands.

Manufacturers see potential for consumer applications.

Polymer Vision Ltd. expects to begin selling an electronic-book device called the Readius later this year. It will have a rollout screen.

Experts say future versions of Amazon.com's Kindle likely will include a flexible display, making the e-book device more rugged and power-efficient.

Sales of flexible displays are expected to reach \$2.8 billion by 2013, up from \$80 million in 2007, according to technology-research firm iSuppli Corp. in El Segundo, Calif.

Although the term "flexible display" is typically associated with screens that can bend and roll up, the phrase applies to broad characteristics that generally allow for less power consumption and greater portability.

Most panels used in electronic devices today are made with glass. Flexible displays are made with plastic, which is more durable.

The technology is considered a financial gamble because the materials needed to manufacture the panels are scarce.

Through collaboration, the center aims to

encourage companies to invest in the technology by lowering the "business and technical risks" of manufacturing, said Nick Colaneri, center director.

Key characteristics of flexible displays include the ability to view the screens in a variety of lighting conditions, outside or at an angle, said Carl Taussig, director of the information surfaces at HP Labs, the research arm of computer seller HP.

The devices also are lighter and thinner because they require fewer battery components.

A major challenge for HP and other companies is figuring out how to avoid damaging the plastic during manufacturing because existing equipment is made to handle glass.

Researchers tried gluing sheets of plastic to glass plates and other hard surfaces and running the plates through traditional machines. But temperature variances caused the plastic to stretch.

The center now uses glue made by Henkel that overcomes those challenges, Colaneri said.

Using discoveries learned by center researchers, Palo Alto, Calif.-based HP developed a flexible-display prototype last

Advertisement

# GET A FREE GIFT CARD

TO USE FOR GAS OR GROCERIES!



Get the best available rate on your *Arizona Republic* subscription. Change to EasyPay's monthly payment program. Take control of your bills, save money and get a free \$10 Safeway gift card!

## THE ARIZONA REPUBLIC

CALL 888-303-8949 OR VISIT [EPG.AZCENTRAL.COM](http://EPG.AZCENTRAL.COM) TO SIGN UP!



EASYPAY  
Easy to do. Easy to save.  
Change the way you pay.

PROMO CODE: EPG

Print Powered By 

year.

HP also designed a process for running rolls of plastic through a device that cuts individual panels similarly to the way newsprint is processed by a printing press.

Such roll-to-roll manufacturing is significant because it drives down production costs, Taussig said.

Honeywell sees potential for using flexible displays in cockpit tools that could result in lighter, more fuel-efficient aircraft, said Bob Witwer, an advanced-technology director at the company's Aerospace business in Phoenix.

The center has a staff of 35 researchers funded by the Army, Colaneri said. In addition, about a half-dozen ASU faculty members work at the center, which is in a 250,000-square-foot building formerly part of Motorola.

The center's industry partners pay annual dues of \$50,000 to \$500,000, depending on their size and involvement, Colaneri said.

Advertisement

## GET A FREE GIFT CARD

TO USE FOR GAS OR GROCERIES!



Get the best available rate on your *Arizona Republic* subscription. Change to EasyPay's monthly payment program. Take control of your bills, save money and get a free \$10 Safeway gift card!

### THE ARIZONA REPUBLIC

CALL 888-303-8949 OR VISIT [EPG.AZCENTRAL.COM](http://EPG.AZCENTRAL.COM) TO SIGN UP!



**EASYPAY**  
Easy to do. Easy to save.  
Change the way you pay.

PROMO CODE: EPG

Print Powered By  FormatDynamics™