

TO: Iowa Newspaper Association Member Editors
FROM: Iowa Department of Economic Development
DATE: July 28, 2009
RE: "Iowa Innovators"

The "Iowa Innovators" series is a joint project of the Iowa Newspaper Association and the Iowa Department of Economic Development (IDED). The series is an outgrowth of an idea from member INA publishers. "Iowa Innovators" articles describe initiatives that Iowa communities have used to improve their ability to attract business and industry and demonstrate community innovation. The articles also describe Iowa companies on the leading edge of technology, business expansion, workforce development and recycling.

It is hoped that these article ideas will be published locally and spark community and business initiatives statewide. If you have community or business success stories to share, contact IDED, 200 East Grand Ave., Des Moines, IA 50309, 800.245.IOWA (4692) or e-mail: business@iowalifechanging.com.

The following is a list of companies and communities featured in this round of "Iowa Innovators" articles:

1. In the north central Iowa community of **Mason City**, a 59-year-old company is building upon its innovative solutions for customers' labeling needs. **Metalcraft Inc.**, which has been providing property identification solutions since 1950, has leveraged that expertise and is now viewed as one of the industry leaders in Radio Frequency Identification (RFID) technology. According to John Henry, Metalcraft R&D and technical manager, RFID tags are attached to items for easy identification and tracking. The company recently partnered with **Iowa State University's Center for Industrial Research and Service (CIRAS)** to develop two new RFID antenna designs.

2. **Componica, a start-up technology company based in the University of Iowa's Technology Innovation Center**, is providing a Spanish-language learning application for use on the Apple-iPhone. The company, founded in 2005 by Steven Mitchell, who holds a Ph.D. in computer and electrical engineering from UI, developed the application "Memorize Words for Spanish." The app has been available for download from Apple since April 2009. It joins the more than 25,000 applications available from iPhone.

3. With the completion of an expansion project at **Skyworks Solutions, Inc.'s semiconductor design center in Cedar Rapids**, the company is now hiring new design engineers, product engineers and technicians to continue its leadership in mobile connectivity and wireless communications. With the completion of nearly 15,000 additional square feet of office and laboratory space, Skyworks' Joel Penticoff says the Iowa location is now Skyworks' largest U.S. research, design and development center. And he believes the 31 new high-technology jobs that will soon be created will help his 100-employee team continue to produce innovative technologies that will advance not only mobile connectivity, but support automotive, broadband, cellular infrastructure and other applications.

Metalcraft's Ingredients for RFID Success

In the north central Iowa community of Mason City, a 59-year-old company is building upon its innovative solutions for customers' labeling needs.

Metalcraft Inc., which has been providing property identification solutions since 1950, has leveraged that expertise and is now viewed as one of the industry leaders in Radio Frequency Identification (RFID) technology.

According to John Henry, Metalcraft R&D and technical manager, RFID tags are attached to items for easy identification and tracking.

"RFID tags function as tiny computers, containing data about the object they're affixed to," says Henry. "A silicon chip holds the unique data in each tag, and when combined with an antenna you have an inlay, the core of any RFID tag."

Compared to other types of scannable codes, RFID tags have a much longer reading range, they're reprogrammable, and they can store and communicate plenty of information about the object they're affixed to, including such things as origin and destination.

"Their big advantage is that they can be read wirelessly via radio signals, transferring their data automatically to an inventory management program," says Henry.

One hurdle to widespread acceptance of RFID tags, however, is the readability of tags attached to metal surfaces, such as the millions of shipping containers moving across the world's oceans.

"Metal interferes with the radio signal, especially when the tags are read at longer distances," says Henry. "One solution is to use tags with a thick insulating layer to separate them from the metal. But these tags stand off the surface and thus are susceptible to accidental removal."

Working with Iowa State University's Center for Industrial Research and Service (CIRAS), new RFID technology has been developed that addresses many of these challenges.

"Our partnership with CIRAS culminated in prototypes for two new RFID antenna designs. The new antennae ensure that RFID tags work even when mounted on metal surfaces," says Henry.

Metalcraft signed a royalty agreement with the Iowa State University

Research Foundation to license the new intellectual property and patents are pending.

Metalcraft received a \$117,810 award from the Iowa Department of Economic Development's Iowa Demonstration Fund to assist it in commercializing the new technology.

The growth of RFID has created a marketplace with hundreds of choices designed to achieve a wide variety of different goals. Helping a company select the best RFID tag components is where Metalcraft brings its years of expertise to bear.

"Since our founding we've provided thousands of businesses throughout North America a range of choices in durable nameplates and

labels to meet their tracking and controlling needs," says Henry.

"Our nameplates have been manufactured using the toughest materials including polyester, anodized aluminum, stain-

less steel, polycarbonate, ceramic and more."

Henry says the company can develop RFID tags that withstand environments ranging from mild to extreme and resist abrasion, caustics and acids, solvents, salt air, high temperatures, and UV rays.

For example, one customer, Cruz Thru Express Carwash, needed RFID to automate member access to a dedicated express lane.

"Cruz Thru needed an adhesive label that could be read on glass without the foam standoff of other windshield tag designs," says Henry.

Metalcraft's solution was encapsulating the inlay between thin layers of polypropylene, adding a bar code and human readable information to one side and a windshield-compatible adhesive to the other.

To test the durability of the new design Metalcraft placed the tag on a sheet of Plexiglas mounted in a car wash tunnel for 45 days – the equivalent to two years of car washes.

"The tags passed with flying colors, without any problems with the label surface or readability of the inlay," says Henry.

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iPhone asks: ¿Habla Espanol?

A start-up technology company based in the University of Iowa's Technology Innovation Center is providing a Spanish-language learning application for use on the Apple-iPhone.

Componica, founded in 2005 by Steven Mitchell, who holds a Ph.D. in computer and electrical engineering from UI, developed the application "Memorize Words for Spanish." The app has been available for download from Apple since April 2009.

It joins the more than 25,000 applications available from iPhone. Apple recently reported that iPhone users have downloaded more than one billion various applications for use on the iPhone.

"Memorize Words is a suite of vocabulary-building applications designed to help you memorize thousands of words as quickly as possible while maintaining a 90 percent retention rate," says Mitchell. "Memorize Words for Spanish is our first software application for teaching language on the mobile computing and communication device."

Memorize Words, available for download at \$7.99, does not need an on-line connection for use. It joins approximately 2,100 educational applications available for iPhone, many offering study guides for math, literature and foreign languages.

The vocabulary-building app has more than 6,300 words and makes full use of the iPhone's interactive capabilities. Users see a flash card on the screen with a word displayed and spoken. A native Spanish speaker provides the pronunciation for each recorded word.

"Each word appears on a digital index card, the way many students learn language in school," says Mitchell. "A set amount of words are presented with their translations during each session, with quizzes and games offered to aid with word retention."

What makes Memorize Words unique, according to Mitchell, is that the program learns with the user and tailors lessons to the user's proficiency.

"Our app tracks the progress of the learner, his or her progress and deficiencies and adjusts accordingly," says Mitchell.

Words are selected based on frequency of use in conversations, but the software changes the words

that appear as the user learns them.

"The program learns with you, so if you get proficient at a particular flash card, Memorize Words will start to show you the opposite of the flash card," says Mitchell.

"Or the program will switch from Spanish-to-English to English-to-Spanish. Or as a user gets really good at recalling a particular word, it starts appearing less often to focus on words you may be having trouble with."

Memorize Words is based on a proprietary algorithm developed by Mitchell and his two software engineers, Michael Merickel and Patrick Kellen.

In fact, Componica was founded and continues primarily as a consulting firm.

The six-employee company's core business is finding industrial applications for machine learning, pattern recognition, and computer vision among others.

"We have developed software solutions on every platform, from Web design, to JAVA to Linux to Windows and Mac OS X," says Mitchell. "Developing an application for iPhone, however, did have unique challenges."

"We still had to make a program as robust as for a desktop computer but had to take into account readability on a much smaller screen size."

"We also had to consider the user's interface with an iPhone," he continues. "We needed to realize that users would be using Memorize Words for minutes at a time, while waiting for a bus or waiting on a friend to arrive."

Now that Componica has developed the Spanish version of Memorize Words, Mitchell is excited to start developing applications in other languages.

"We are coding the dictionaries of other languages so we can develop Memorize Words for Korean, Russian and French, as well as English as a second language," says Mitchell. "We also want to place Memorize Words on other platforms such as Windows."

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The Sky's Limitless

With the completion of an expansion project at Skyworks Solutions, Inc.'s semiconductor design center in Cedar Rapids, the company is now hiring new design engineers, product engineers and technicians to continue its leadership in mobile connectivity and wireless communications.

What's more, the expansion by Skyworks—an industry innovator of mobile connectivity technology that is at the heart of today's multimedia smart phones—demonstrates that the Cedar Rapids area continues to be at the forefront of radio frequency and wireless communications technology.

But that's not surprising, considering when Apollo 11 first touched down on the moon

40 years ago, it was Cedar Rapids-based Collins Radio that designed and built the equipment that transmitted virtually all voice, video and data between the astronauts and mission control, including Neil Armstrong's first words from the moon's surface.

Collins Radio merged with Rockwell International in 1971. Rockwell Collins was spun off as an independent company in 2001.

Conexant Systems spun away from Rockwell International in 1999. Its wireless business merged with Alpha Industries to become Skyworks Solutions in 2002.

"Cell phones, BlackBerrys, Palms and other wireless devices are elaborate radios," says Joel Penticoff, Skyworks Solutions senior director of engineering and site manager of the Cedar Rapids location. "Our Iowa facility houses design engineering, layout, prototype development and test optimization for a variety of Skyworks' products.

"These power amplifiers, semiconductors, modules and direct conversion radios enable consumers to not only converse on their cell phones, but to send e-mails, download images and videos, and surf the Internet from their hand sets," he continues.

Penticoff says his staff keeps three words in mind as they design and develop the next generation of wireless technology: smaller, higher and lower.

"Skyworks is constantly striving to develop smaller power amplifiers and semiconducting chips with higher efficiency to consume less battery

power at lower costs," he says.

"Nokia, Samsung, Sony Ericsson, Motorola and other makers of multimedia hand-held devices must optimize every millimeter of their devices so we need to deliver innovative solutions."

With the completion of nearly 15,000 additional square feet of office and laboratory space, Penticoff says the Iowa location is now Skyworks' largest U.S. research, design and development center. And he believes

his 100-employee team will continue to produce innovative technologies that will advance not only mobile connectivity, but support automotive, broadband, cellular infrastructure and other applications.

"Skyworks chose to expand here based on the positive experience the company has had here," he says. "We have an established track record of innovation and successful product development and look forward to growing our business here in the future."

Helping leverage the multi-million dollar expansion—which will create 31 new high-technology jobs—was a series of tax benefits and credits from the Iowa Department of Economic Development's High Quality Job Creation (HQJC) program.

"We feel that Cedar Rapids has the available technological workforce to fill these critical positions," says Penticoff. "And the area's high quality of life and low cost of living is advantageous if we do need to recruit talent."

As hand-held devices evolve from phones to music and video players, Internet devices, cameras and more, advances in wireless technology and robust semiconductors will be important drivers in this evolution.

Building on Collins Radio's history of radio and avionics innovation, Skyworks Solutions Iowa semiconductor design center promises to lead the mobile connectivity revolution.

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