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In pursuit of wireless energy: the sky's the limit with energy harvesting technology

Scott Wecker was in a canoe in the Canadian wilderness when the idea that would become his passion hit him: How to make energy wireless – that is, portable and capable of sustaining its power indefinitely.

It's an interesting idea, but it won't work, said Dr. John Langley, a recognized expert in wireless technology, when Wecker approached him about his idea.

In 2005, Wecker, Dr. Langley and Dr. Bor Yann Liaw started Ambient Micro (<http://www.ambient-micro.com/>), a company that develops wireless energy solutions for micro-technology. And the rest, as they say, is history.

The humble, three-person team manages Ambient's operations as well as conducts research and development from their offices in the Maui Research and Technology Center in Kihei. As the technology grows, so does the company's need for space, and a lab in Half Moon Bay, California now serves as a test facility.

What exactly is this enigma, wireless energy?

Scott and his partners have developed the Multi-Source Ambient Power Supply (MS-AMPS) Module as the tool that makes wireless energy possible. The module acts as an "energy scavenger," collecting solar, thermoelectric, vibration and radio frequency energies from the environment to continuously recharge the battery or capacitor of a micro-technology device.

Harvesting energy simultaneously from several sources increases both the power and reliability of the module, which is small and lightweight. The MS-AMPS Module also adds incremental energy without incremental weight, and is renewable, avoiding the pitfalls of using traditional batteries to power such devices.

Ambient Micro has partnered with a number of companies on joint development efforts, including Lockheed Martin, Williams Aerospace and Oceanit. Today Ambient's staff works primarily with the U.S. military to develop applications that will extend the operating life of various devices, such as unmanned systems, wireless sensors and sensor networks.

What will the future of wireless energy look like?



Dr. John Langley tests a thermoelectric generator for a heavy-fuel unmanned aerial vehicle engine

Scott and his team are excited by the many possible commercial uses for their technology. They are looking ahead to develop “battery-less” devices, new remote charging technologies and even an “Ambient Power Chip.” Their goal is to create a standardized power chip that is low cost and can be used in a range of applications. What will this mean for you and me? It may mean our laptops and cell phones will no longer require batteries, but will operate using a pack that collects energy to continuously recharge the device. It could also mean the arthritis in our knee that keeps us from being on top of our tennis game will no longer affect us so much because an implantable micro-sensor run off the energy from our heartbeat tells our body how to compensate for the physical shortcoming.

The desire to make things better drives the team at Ambient Micro. And there seems to be no end in sight for the applications of this technology.

“How we use this technology to make our lives better is up to us - we must guide it,” Wecker says. “It could prolong our lives, increase our ability to enjoy life, even provide ways to end sources of conflict in the world over resources such as food, energy and water.”

Expanding the frontiers of medical information technology



Akimeka's Tommy Takeshita demonstrates web-based technologies to Senator Akaka

For Hawaii native Vaughn Vasconcellos, the idea of spending another long winter in Boston seemed unbearable. So on a cold, bitter day in December, 1995 he packed his bags and came home.

He found work in the information technologies sector, and what began as a contract job in telemedicine for the Tripler Army Medical Center in 1997 quickly grew into a career interest and the start of Akimeka (<http://www.akimeka.com/home/>).

Today Akimeka is one of Hawaii's largest information management/information technologies (IM/IT) services and solutions providers. This ever-expanding company maintains operations on Maui and Oahu and has branched out to mainland locations in Texas, Florida, Maryland and Virginia.

Akimeka devotes much of its energy to government projects. Next to most of its peers in the federal market, it's a small company. But as President and CEO, Vasconcellos leverages Akimeka's status as a Native Hawaiian Minority-owned company to compete, and win.

Akimeka means perseverance in the Hawaiian language. It is also Vaughn's middle name.

Currently the firm's biggest customer is the Department of Defense, Health Affairs. By churning out innovative network, software and web-driven solutions, Akimeka helps the government achieve a level of organization and connectivity that some may never have dreamed of.

How Akimeka helps keep Health Affairs in top shape:

Medical Logistics: The Joint Medical Asset Repository (JMAR) is a single source for medical logistics information, allowing the Army, Navy and Air Force to access information on medical supplies from anywhere in the world. This means that at any given time, staff can look up how many cotton balls are in supply, or the type and amount of blood units in treatment facilities, or anything in between.

Medical Command and Control: A joint medical workstation provides field commanders with medical information to help them make timely, informed decisions. Efforts are coordinated through software that tracks medical personnel movement as well as acts as a predictive analysis tool. So if a number of troops are getting a rash or a virus, the software can track this and quickly relay the information to commanders, who then can decide how to proceed.

E-Health: Web-based software gives field staff access to specialists at medical centers, providing premium healthcare for patients. For the Pacific Rim, this means clinics in Guam, Japan, Korea and elsewhere can consult with staff at Tripler Army Medical Center to facilitate treatment efforts. Vasconcellos' savvy carries through not only in what he does, but also how he does it.

Vaughn runs his company with a spirit of ohana, or family. “We try to treat employees and clients with a sense of family, so they understand we are looking out for their best interest. This way, everybody is working together to create a successful outcome.”

And for Vaughn, the meaning of family goes beyond the walls of Akimeka and into the community. His long-term goal is to empower Hawaii’s communities through the use of technology. One way he is making this happen is through Maui’s Digital Bus Program. Akimeka pioneered this program to provide free, portable IT lab equipment and an accredited corresponding curriculum to Maui County public schools that lack such assets. “We must do everything we can to facilitate educational outreach to our children and bridge the digital divide,” he says.

Holidays prove to be a strategic time to recruit visiting kama’aina

Nearly 200 jobseekers flocked to the annual High Tech Maui Holiday Job Fair at Kihei’s Maui Research & Tech Park, for a day of information exchange and in some cases -- life-changing opportunity

Of those attending the December 27th event, over 90% were kama’aina (Hawaiian for “child of the land”) which includes individuals going to college on the mainland or former residents interested in returning home to work.

Each year, the Maui Economic Development Board sponsors the popular High Tech Job Fair to give participants a chance to discuss their qualifications in person with top science and technology employers. At the same time, it provides Maui-based companies the opportunity to relay company information and recruit skilled kama’aina who are motivated to stay and live in Hawaii.



2007 Job Fair

According to MEDB Project Manager Jenilynne Gaskin, the timing is really perfect for both parties.

“The holidays are a great time to recruit kama’aina since they are back home in the islands, enjoying family, friends, sun and surf,” Gaskin said. “They appreciate returning to their roots...and no amount of employment marketing can buy that connection.

This year’s jobseekers provided a diverse mix of experience including backgrounds in biotechnology, various fields of engineering, information technology, physics and more.

Some, like Maui native Nathan Kimura, found the High Tech Job Fair to be the perfect place to leverage his college skills into a company internship and later, permanent employment. When Nathan was a junior at Gonzaga University, he attended the event during winter break, where he applied for, and later received a summer internship. The experience led to a subsequent internship at Textron Systems after graduation, which eventually developed into a full-time position.

Participating employers at the 2007 High Tech Maui Holiday Job Fair included Akimeka, The Boeing Company, County of Maui, Hnu Photonics, Lockheed Martin, Maui High Performance Computing Center, Maui Memorial Medical Center, Oceanit, Pacific Disaster Center, Textron Systems, and more.

For more information on the High Tech Maui Holiday Job Fair, contact Jenilynne Gaskin, MEDB Project Manager at 808-875-2332 or email jeni@medb.org.

The MEDB High Tech Maui Holiday Job Fair is funded in part by the U.S. Departments of Commerce and Labor with support from the County of Maui.

To receive email updates about High Tech Maui events please visit the following link: <http://www.hightechmaui.com/programs/email-list.cfm>.

High Tech Maui A Project of Maui Economic Development Board, Inc.

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