Tech firm to market wireless devices

Bluetronix aims to build the next Internet

TECHNOLOGY COMMERCIALIZATION

Bluetronix – with locations in both Maumee, Ohio's Arrowhead Park and Chagrin Falls, Ohio – has developed and demonstrated fully functioning prototypes of the next generation wireless sensor communications. The company develops and markets next generation wireless communications devices for wireless sensors and other related wireless

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communication devices. The devices are designed to provide a self-forming, self healing, and impromptu ad hoc network without IP addressing or commonly used routing tables.

Bluetronix intends to move forward by transforming these prototypic systems into commercial products consisting of tiny swarming intelligent devices that can produce a wireless sensor networking that is self-forming, self-healing, self-adapting, both battery powered, and non-battery powered.

The company has been working toward commercialization for several years and has been working on product development for about 16 months.

Mark Heiferling, president and founder of Bluetronix, explained, "The Regional Growth Partnership (RGP) gave us an Ignite! grant, is giving us some advisory assistance, and is working with us to update the business plan and also find other interested people. [The RGP] is also getting involved in the product development."

TECHNOLOGY COMMERCIALIZATION

According to Heiferling, traditional wireless standards and protocols are currently based on wired networks, and they do not deal with the problems of dynamics – mobility, change in topology, scalability, and lack of centralized infrastructure. Existing technology does not exhibit any scalability, reliability, and adaptability needed to successfully implement large mobile ad hoc based networks. In fact, many existing standards and protocols are ported directly from the wired world and therefore have difficulties presented by a lack of a fixed network structure, node mobility, network traffic, network size, node faults, and any changes. In addition, set-up is cumbersome and range limited.

Bluetronix explained that its work has simplified many of these issues and made range almost unlimited by hopping radio signals through connections to other connections. The company proposes to address these issues with low-cost, miniature, modulated product designs using swarming routing algorithms based on the behaviors of social insects like ants (swarm intelligence).

This approach provides for a self-forming, self-healing ad hoc network solution specifically designed for last mile connections, with scalability to thousands of nodes, very low startup time, and much higher efficiency than current based routing. Applications of this system include wireless sensor networks, RFIDs, emergency communications devices, military radios, cell phones, consumer appliances, home and industrial wireless sensors, and

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more. The Bluetronix approach uses its swarming algorithms to solve these issues in commercial-off-the-shelf (COTS) platforms and the 802.15.4 standard in its own FCC approved modular tiny formats.

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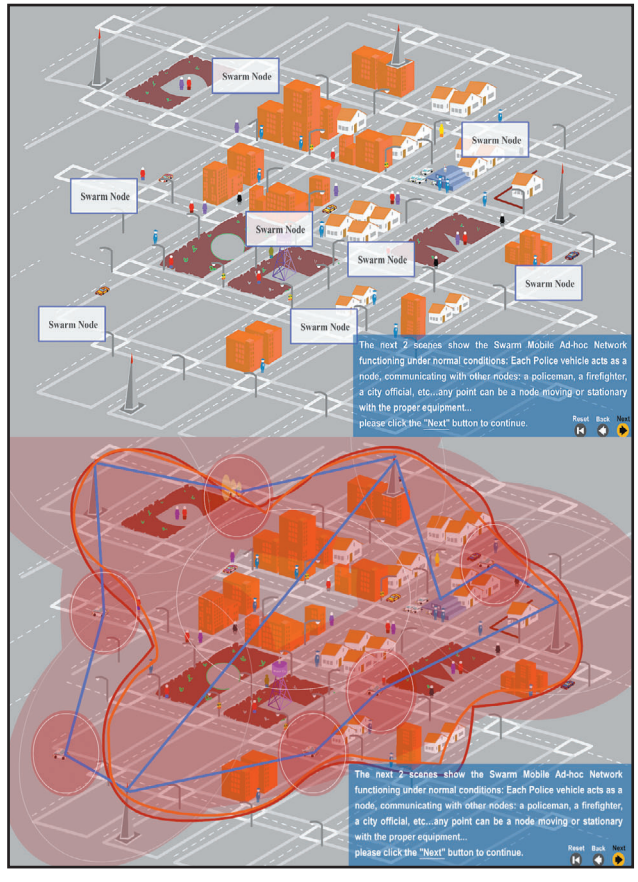
Heiferling stated, "We took insect swarming behavior and built algorithmic code and put that into hardware and made it work; this has never been done before. It's easy to make things work in simulation, but to make it work in the real world becomes harder than can be imaged. We designed some products to accomplish this effectively."

These wireless sensor networks work in many areas, including instrumentation, controls, chemicals, monitoring, and more. For efficient usability, networking modules must be small, inexpensive, and adaptable to a dynamic wireless venue, according to the company. Bluetronix sensor networking modules will use a standard referred to as IEEE 802.15.4 compliant commercial-off-the-shelf (COTS) platforms. This aims to work with all sensor types to provide instant, adaptable, scalable, wireless ad hoc connectivity.

The first group of modules uses both 8-bit and 32-bit microcontrollers with 802.15.4 radios. Bluetronix technical manager, Sanjaya Gajurel, PhD, a recent graduate from Case Western Reserve University, explained that these new products will revolutionize wireless communications and possibly be the next Internet; this is Internet that won't actually be seen but will be used every day to gather information all around by sensors and measuring devices.

Bluetronix has demonstrated the swarming algorithms and hardware and plans to integrate these fully functioning product lines to a range of sensor network applications by March.



Demonstration of the Bluetronix Swarm Mobile ad-hoc network. Each node in an ad-hoc network is the destination of information packets while at the same time functioning as a relay station for other packets to their final destination. This multi-hop support is the way Swarm ad-hoc networks function, making communication between nodes outside direct radio range of each other now possible in the event of a disaster or loss of communication with the network infrastructure. Therefore the system will work even if 90% of it is destroyed.

According to Bluetronix, it needs to accelerate and expedite its commercialization efforts for market entry by hiring additional personnel.

NASA and the Defense Advance Research Projects Agency (DARPA) have funded Bluetronix approximately $2 million for over six years of effort.

"Wireless communication is moving to the point of wide acceptance, not only consumer-wise, but now in the industrial marketplace as well," Heiferling noted. "We have some unique technology that was developed for DARPA to now productize to the commercial world.

"Today, installing hardwire conduit ranges from a cost of $50 to $200 per linear foot. Any retrofit is even higher and quite cumbersome. These markets are unlimited, but in near-term and through next year, targeted markets are industrial applications for temperature and pressure sensing. These specific markets include sensors, instrumentation, process, and controls. The Bluetronix wireless technology is battlefield developed and needs no setup or prior programming. Because of this ad hoc capability, intelligence, and simplicity, this lends itself to simple low cost products and what industrial markets want now in order to reduce cost and increase efficiency. Bluetronix is working on putting that into a format that will be in a product to be shipped by April."

Rocket Ventures, a program of the Regional Growth Partnership (RGP), and David Miller, Rocket Ventures business development manager, are working with Bluetronix, Inc. to promote the northwest Ohio company and its emerging technologies.

Heiferling stated, "The ongoing partnership between Rocket Ventures and Bluetronix will ensure success and value to the local economy in the coming months."

He explained that the assistance and ongoing relationship with Rocket Ventures and Miller will lead to immediate jobs and exciting products that will enable manufactures to reduce cost and increase quality and efficiency in these areas.

Heiferling concluded, "These are major markets for Ohio manufacturing and existing products and markets that are shipped worldwide."