



Goddard's HHT to be Used in RFID Demonstration System



Continuing a three-year technology transfer relationship with Goddard, BCG Wireless has signed a second Space Act Agreement (SAA) with the Center on the heels of its 2006 license of Goddard's Hilbert-Huang Transform (HHT) technology. Initial testing at Goddard indicated that applying HHT to degraded radio frequency (RF) signals can significantly improve the detected signal, enabling better reception and more accurate signal transmission. BCG Wireless is now embarking on collaborative work with Goddard researchers to develop a device that will demonstrate in real time the signal-cleaning capabilities of HHT applied to radio frequency identification (RFID) systems.

Benefits of Technology Transfer

- BCG Wireless may be able to significantly improve the performance of a variety of RFID devices, offering software and hardware that enhances the usability of existing systems.
- BCG Wireless will be able to demonstrate the value of HHT applied to RFID systems through its collaboration with NASA and the resulting demonstration system, helping the start-up company establish a strong competitive position.
- Consumers may benefit from RF products with improved reception and longer battery life.
- Companies may benefit from improved RFID technology, enabling them to implement more efficient shipping, receiving, inventory, and item-identification processes.
- NASA may be able to use enhanced RF capabilities to benefit its own radiometers, telescopes, satellites, and other space program technologies, and RFID capabilities to track parts and components for various missions.

On the Record

“HHT is, without question, one of the cornerstones of our company. We will use this important technology to create products which solve one of the basic problems in wireless communications: interference. Working closely with NASA scientists, engineers, and business development staff, we have demonstrated that HHT can be successfully adapted to RF systems.” – *Jack Barse, CEO, BCG Wireless*

About BCG Wireless

BCG Wireless, LLC is a start-up company affiliated with the Emerging Technology Center (ETC), a technology incubator in Baltimore, Maryland. Based outside Baltimore, the company also receives support from the Maryland Technology Development Corporation (TEDCO).

Technology Origins

A revolutionary, adaptive set of signal-analysis algorithms, HHT was developed at Goddard in 1995 by Dr. Norden Huang as part of oceanic wave research. Unlike precursor technologies, HHT provides an effective method for analyzing nonlinear and nonstationary signals while improving the accuracy of linear- and stationary-signal analysis. The award-winning technology's first application within NASA was analysis of wing-flutter tests and the next generation of aircraft design at NASA Dryden Flight Center. The technology has also contributed to Shuttle mission safety as it was used in testing the tiles that insulate the Shuttle in space.

Finding a New Use

Because analytical measurements within many areas of science benefit from a quantitative measurement of nonlinear data, Goddard researchers found HHT to be widely applicable to a broad range of fields, including medicine, electronics, the environment, and business. As part of the first SAA with BCG Wireless, research conducted at Goddard at the request and with the support of the company indicated that HHT may be very beneficial for RF signal analyses. Using a simple RFID kit, researchers introduced noise that degraded the RF signal. When the researchers then introduced the HHT algorithm, they were able to extract the signal, despite the noise. This testing validated that HHT can be used to improve signal reception for RF devices, which may also help preserve battery life and improve usability.

Having licensed the HHT technology and with a second SAA in place, BCG is focusing initial commercialization efforts on the RFID market and plans to implement an RFID demo system to validate its benefits to potential partners and customers. RFID is widely applicable and is being deployed in many commercial applications, notably supply chain, access control, and security systems. BCG Wireless expects to demonstrate the increased robustness of products that integrate HHT technology versus those that do not.

The Transfer Process

Collaboration between Goddard and BCG Wireless began in 2004 when the company was part of Baltimore's technology incubator: ETC. ETC made BCG Wireless aware of HHT and its capabilities. After evaluating the technology, BCG Wireless suggested that HHT may be applicable to RF devices and collaborated with Goddard to conduct research to validate this hypothesis as part of a reimbursable SAA signed in January 2005. Based on the positive findings, BCG Wireless submitted a license application and worked with Goddard's Innovative Partnerships Program (IPP) Office to finalize the agreement, which was signed in July 2006. Realizing that a prototype would help showcase the unique benefits of HHT in a real-world setting to potential customers, partners and investors, BCG again approached Goddard to collaborate in the development of a demonstration unit through a second reimbursable SAA.

Looking Ahead

With a new SAA in place, BCG researchers are beginning collaborative work with Goddard to develop the demonstration unit. A four-month timeline gives researchers the goal of having a demo unit available by early summer 2007. BCG Wireless plans to begin presenting the system to potential customers at that time. In the meantime, the company's sales team will be talking to potential customers, partners, and strategic investors about the current collaborative work.

For More Information

If you would like additional information about Goddard's technology transfer opportunities, please contact:

Innovative Partnerships Program Office
NASA Goddard Space Flight Center
techtransfer@gssc.nasa.gov
<http://ipp.gssc.nasa.gov>