Smartphone Functionality in Harsh Environments Aims at Walkie-Talkie Market

WP2P
wireless peer-to-peer technologies

Challenge & Solutions

Wireless technologies such as 3G and 4G networks have dramatically enhanced communication between people around the world – except for those living in remote or undeveloped areas where advanced digital services are unavailable. In response to the demand for ubiquitous smartphone-like communication, Wireless P2P Technologies AB (WP2P) is developing affordable, license-free and digital two-way radios for wideband long-distance communication in areas without cell-phone infrastructure. These handheld radios are not only transmitters – they are also routers and repeaters in self-formed mobile ad hoc networks (MANETs). They support Voice over Internet Protocol (VoIP), instant messaging, GPS and map sharing, and file sharing in groups with hundreds of users. Compared to walkie-talkies, the state-of-the-art radio communication in uncovered areas for private users, WP2P's MANET communication technology is a disruptive innovation.

Specifically, the project extended the communication range and improved the reception of radio signals in harsh environments by changing radio frequency from the 33-cm (900 MHz) to the 70-cm wavelength (433 MHz) ISM band. This enabled digital two-way radios to provide reliable, flexible communication in remote areas. The solution enables smart-phone functionality in a walkie-talkie radio form factor far from cellular reception. To achieve this, the project team used the 70-cm wavelength (433 MHz) ISM band, which required a complete redesign of the RF circuit board in existing 900 MHz prototypes. In addition to the RF design and simulation work, the team also designed and developed a power- and cost-saving microprocessor and 433 MHz ISM-band prototypes. Finally, it demonstrated prototype usage in the field and created a roadmap for post-project product development supporting market introduction, which will enable hunters, fishermen and outdoor recreationists to stay in touch and share vital information wherever they are.

EuroCPS Support

Luleå Technical University provided technology, IP and expertise for using new frequency bands and output power for WP2P's T@lkit-M1 digital radio. Particularly, LTU helped with the final-stage wideband amplifier, filters and measurements of wireless standards. Its electromagnetically shielded chamber allowed precise measurements of radio performance in the range of relevant frequencies, which was key to extending communication range.

Digital Skills

WP2P: Embedded systems product design, R&D in self-forming, infrastructure-free, wireless networking (MANET), TCP/IP protocol stack, VoIP, Linux apps, radio design and robustness.

Luleå Technical University: Analog and mixed-signal integrated circuit design, microelectronics and EMC laboratories, CPS design specification, embedded software design, hardware architecture design & components reuse, HW/SW system integration.

Company

The company is focused on wireless P2P Technologies AB develops affordable and license-free, digital two-way radios based on a network-centric architecture. (SW) www.wp2p.org

6 employees

Partners:
Luleå Technical University

Since 2014

Impact / What's next

SelfCommNet boosted production and accelerated market introduction of WP2P's existing T@lkit-M1 in 2017. This packet-switched mobile, handheld two-way digital radio began generating revenue three months after the project ended. The company will expand its presence in Scandinavia's hunting-radio market in 2018 with a formal marketing phase and additional staff for both R&D and sales. It estimates it will more than double 2017 revenue of 1.7 million SEK in 2018.

EuroCPS — Cyber-Physical Systems

EuroCPS is an European funded project gathering several design centers in order to boost and initiate synergies between innovative companies, major CPS-platforms and CPS-competency providers.