



CMOS chip enables real-time location to within 10cm

Julien Happich - November 11, 2013

Fabless semiconductor company DecaWave has moved from prototypes to proven integrated silicon, now unveiling its first single chip solution for accurate indoor location and communications. The ScenSor DW1000 integrated circuit makes it possible to electronically identify the specific distance to any object, person or thing with a $\pm 10\text{cm}$ precision.

DecaWave's ScenSor works by transmitting wireless signals to readers that use them to locate the tagged object to within 10cm. Fabricated in 90nm CMOS, the chip comes in a 6x6mm 48-pin QFN package and is operational in the industrial temperature range of -40 to +85°C, it is compliant with IEEE 802.15.4a standards (now IEEE802.15.4-2011). Because it only draws 31mA in transmit mode (64mA in receive mode) while offering a 2 μA watchdog timer mode and a 100nA deep sleep mode, the IC can operate several years from a battery cell or within an energy harvesting environment (from a single 2.8V to 3.6V supply).

ScenSor can either replace or complement the Radio Frequency Identification (RFID) and WiFi technology currently used for indoor tracking (where GPS signals are unavailable) by allowing for more specific, minute-to-minute location information for high-value goods over short range and through obstructions providing more accuracy than ever before. This brings new opportunities across multiple industries including future applications for the technology incorporated in smartphones and tablets.

To demonstrate the technology, the company has developed a module, the DWM1000, supporting data rates of 110kbit/s, 850kbit/s and 6.8Mbit/s over six frequency bands from 3.5GHz to 6.5GHz. Designed for wireless sensor networks, the 23x13x2.9mm module offers a communication range of up to 290m thanks to coherent receiver techniques.

The short packet durations support high tag densities, up to 11,000 in a 20m radius, claims DecaWave. An evaluation board is also available featuring DecaWave's two-way ranging application, "DecaRanging" installed as standard.