

# Small bit of a CMOS chip holds 2-D through-the-walls radar imager

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Two researchers from the USC Viterbi School of Engineering have created a send/receive chip that functions as an active array, sending out a matrix of 49 simultaneous ultrawideband radar probe beams and picking up the returned beam reflections.

Professor Hossein Hashemi of the Viterbi School's Ming Hsieh Department of Electrical Engineering and graduate student Ta-Shun Chu designed and fabricated the device that will be presented today at the 2008 IEEE International Solid State Circuits Symposium (ISSCC) in San Francisco.

According to Hashemi, "the chip benefits from a novel architecture that allows for the integration of an entire 2D array in a small area of a standard chip," processed by the familiar and economical CMOS process.

Creating the device on CMOS, says Hashemi, "reduces the cost by orders of magnitude, while increasing the functionality. In effect, the chip is a 49-pixel camera operating in the radio band.

"The chip can be used in various radar and imaging system to detect, identify and locate multiple objects simultaneously in a complex environment," Hashemi says. "Potential applications include through-the-wall imaging, and search and rescue missions" (such as finding earthquake victims buried in rubble, and distinguishing survivors from the dead).

Other possible uses include biomedical imaging, security monitoring devices and real-time collision avoidance systems for vehicles, both safety devices for cars with drivers and application in autonomous vehicles.

Last year the two researchers presented a CMOS chip that worked on the same principles but produced only a single beam, offering only single-point one-dimensional detection. The new version's 7x7 array of beams, scanning in "offers many more degrees of freedom for communication and imaging in complex environments," Hashemi said.

Source: University of Southern California

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