## Vehicle-to-X Communications: The Killer Application of Millimeter Wave

Robert W. Heath Jr.\*
The University of Texas at Austin
Austin, Texas
rheath@utexas.edu

## ABSTRACT

Vehicles are becoming more intelligent and automated. To achieve higher automation levels, vehicles are being equipped with more and more sensors. High data rate connectivity seems critical to allow vehicles and road infrastructure exchanging all these sensor data to enlarge their sensing range and make better safety related decisions. Connectivity also enables other applications such as infotainment or high levels of traffic coordination. Current solutions for vehicular communications though do not support the gigabit-per-second data rates. This presentation makes the case that millimeter wave communication is the only viable approach for high bandwidth connected vehicles. The motivation and challenges associated with using mmWave for vehicle-to-vehicle and vehicle-to-infrastructure applications are highlighted. Examples from recent work are provided including new theoretical results that enable mmWave communication in high mobility scenarios and innovative architectural concepts like position and radar-aided communication.

## **KEYWORDS**

Millimeter wave; vehicular networks

## SHORT BIO

Robert W. Heath Jr. received the B.S. and M.S. degrees from the University of Virginia, Charlottesville, VA, in 1996 and 1997 respectively, and the Ph.D. from Stanford University, Stanford, CA, in 2002, all in electrical engineering. From 1998 to 2001, he was a Senior Member of the Technical Staff then

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a Senior Consultant at Iospan Wireless Inc, San Jose, CA where he worked on the design and implementation of the physical and link layers of the first commercial MIMO-OFDM communication system. Since January 2002, he has been with the Department of Electrical and Computer Engineering at The University of Texas at Austin where he is a Cullen Trust for Higher Education Endowed Professor, and is a Member of the Wireless Networking and Communications Group. He is also President and CEO of MIMO Wireless Inc. He authored "Introduction to Wireless Digital Communication" (Prentice Hall, 2017) and "Digital Wireless Communication: Physical Layer Exploration Lab Using the NI USRP" (National Technology and Science Press, 2012), and co-authored "Millimeter Wave Wireless Communications" (Prentice Hall, 2014).

Dr. Heath has been a co-author of fifteen award winning conference and journal papers including the 2010 and 2013 EURASIP Journal on Wireless Communications and Networking best paper awards, the 2012 Signal Processing Magazine best paper award, a 2013 Signal Processing Society best paper award, 2014 EURASIP Journal on Advances in Signal Processing best paper award, the 2014 Journal of Communications and Networks



best paper award, the 2016 IEEE Communications Society Fred W. Ellersick Prize, the 2016 IEEE Communications and Information Theory Societies Joint Paper Award, and the 2017 Marconi Prize Paper Award. He received the 2017 EURASIP Technical Achievement award. He was a distinguished lecturer in the IEEE Signal Processing Society and is an ISI Highly Cited Researcher. He is also an elected member of the Board of Governors for the IEEE Signal Processing Society, a licensed Amateur Radio Operator, a Private Pilot, and a registered Professional Engineer in Texas.