



# Intelligent Transport Systems: 802.11-based Roadside-to-Vehicle Communications

By Syed Faraz Hasan, Nazmul Siddique, Shyam Chakraborty

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This book begins by describing a mathematical model that represents disruption in WLAN-based Vehicular Communications. Secondly, it sets out to reduce the handover latency for establishing quick connections between the mobile nodes and the roadside WLAN APs.

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- Published on: 2014-08-08
- Released on: 2014-08-08
- Original language: English
- Number of items: 1
- Dimensions: 9.25" h x .39" w x 6.10" l, .55 pounds
- Binding: Paperback
- 152 pages



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## **Editorial Review**

### **Review**

From the reviews:

“It is a broad-based work addressing the network-related issues of emerging wireless networks for vehicle-to-vehicle (V2V) and road-to-vehicle (R2V) communications based on the IEEE 802.11 family of protocols. ... the book could be useful as an academic exploration for network systems engineers who intend to study this experimental work in greater detail. Such readers might use the authors’ findings to develop their own verifiable models to gain a deeper understanding of mathematical modeling of wireless networks, not just roadside and vehicle networks.” (Satya Prakash Saraswat, ACM Computing Reviews, March, 2013)

### **From the Back Cover**

Focusing on the nuts and bolts of wireless network access for computers on-board vehicles, this volume shows how in-car computerization now does much more than merely act as a glorified map-reader. Wireless communication is transforming road travel in ways previously undreamt of, allowing vehicles to “talk” to a wider network and monitor road conditions, potential delays and traffic congestion, all automatically. Toll payments can be made without opening the driver’s window on a cold day, while vehicles might themselves take active steps to avoid collisions.

It is the connection between on-board computers and wireless access points, ubiquitous in most cities now, that is a key area of research. Moving vehicles transfer their communications to new points as they progress, and this causes delays, known as “handover latency.” In this book, new stochastic models are developed to map the disruption when connecting to 802.11 WLAN points. It details the application of stochastic tools to analyzing communication networks, as well as previous literature on handover latency and relevant mathematical modeling. Finally, it presents a scheme for monitoring traffic congestion using WLAN connectivity. This volume will be a useful addition to the libraries both of wireless communication students and those studying probability theory.

### **About the Author**

Syed Faraz Hasan is an Assistant Professor in the College of Information and Communication Engineering, Sungkyunkwan University. He was with the University of Ulster at the time of this writing. He finished his PhD in Vehicular Communications from University of Ulster in 2011. He completed his Bachelors degree in Electrical Engineering from NED University of Engineering and Technology in 2008. His research areas include vehicular communication networks, 802.11 WLANs, stochastic modeling, and positioning and localization techniques. He serves as a reviewer in various peer-reviewed research journals.

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Dr. Shyam Chakraborty was a Reader at the University of Ulster, and presently he is an independent

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