

# Compressed Multi-Access for MIMO-Based Vehicle Communications Network

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**Abstract**—An efficient and reliable multi-access scheme for large-scale Vehicle Communications Network (VCN) is necessary in future. In this paper, a compressed multi-access scheme is proposed for MIMO-based VCN via compressive sensing (CS) techniques. In particular, a Zero-Forcing (ZF) based random precoding scheme is proposed for vehicles to combine the advantages of MIMO and CS. Correspondingly, an iterative Orthogonal Matching Pursuit (OMP) algorithm is devised for half-blind reconstruction at central station' side. Based on these two subschemes, the active vehicles keep sending the precoded symbols until central station decodes successfully and sends back the feedback reports. Simulation results show that, while maintaining a certain level of mean square error (MSE) performance, the proposed multi-access scheme can save the time resources notably when comparing with traditional multi-access schemes.

**Keyword**—Vehicle communications network, Compressive sensing, MIMO, precoding, half-blind reconstruction



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