

## GOALS

This demo aims at showing the features of the IEEE 802.11p / WAVE devices that will be installed in the 465 node vehicular testbed to be deployed by the DRIVE-IN project. Along with the hardware that will be installed on the vehicles we show a non-proprietary driver, that is being developed by IT - Aveiro.

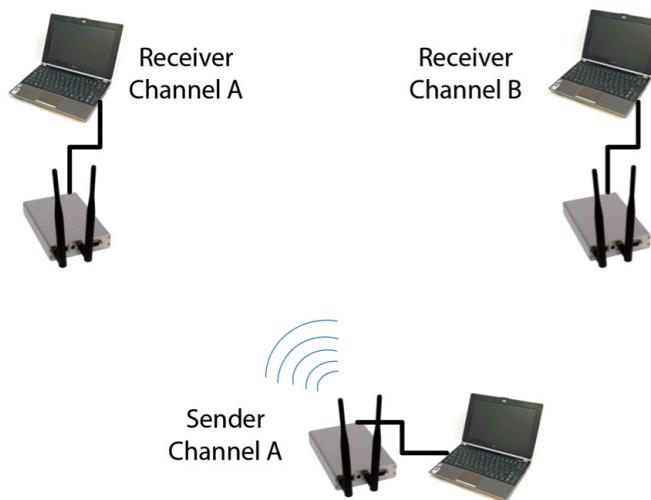
Our setup can be seen in the figure below. There are two video receivers connected to the boards that are tuned to two different wireless channels. The bottom laptop is a video streamer connected to another board that is able to switch from channel A to channel B, according to the IEEE 802.11p / WAVE specifications. The demo consists on observing that the streamer can communicate and transmit independently to each device (the video stops when the channel is switched) and then observing that, if channel switching is issued at a high frequency, a user can seamlessly watch the video on the two receivers. Thus, our driver can seamlessly switch channels, therefore respecting the VANET standards by being able to alternate between a control channel and a service channel without disrupting the communication.

## TEAM

ANDRÉ CARDOTE  
ARNALDO OLIVEIRA  
BRUNO AREIAS  
CARLOS AMEIXIEIRA  
FILIPE NEVES  
JOÃO AFONSO  
JORGE DIAS  
RICARDO MOREIRA  
SUSANA SARGENTO



## AN IEEE 802.11P / WAVE IMPLEMENTATION WITH SYNCHRONOUS CHANNEL SWITCHING

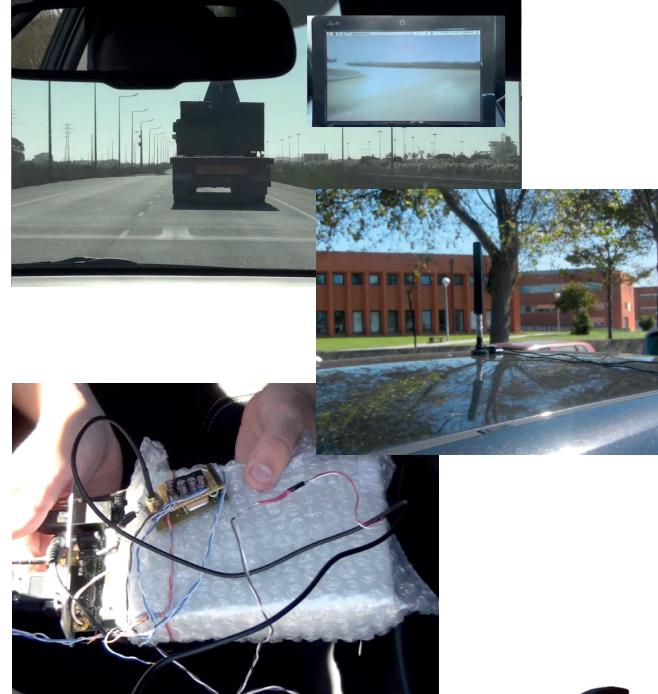


INSTITUTO DE TELECOMUNICAÇÕES  
CAMPUS UNIVERSITÁRIO DE SANTIAGO  
3810-193 AVEIRO  
PORTUGAL

W: [HTTP://NAP.AV.IT.PT](http://NAP.AV.IT.PT) E: NAP@AV.IT.PT

## INTRODUCTION

The goal of the DRIVE-IN project is to investigate how vehicle-to-vehicle communication through the recently allocated 5.9 GHz band can improve the user experience and the overall efficiency of vehicle and road utilization. One of the outcomes of this project is the deployment of a 465 taxis testbed in the city of Porto, Portugal. As there are no affordable IEEE 802.11p compliant network units, the development of our own hardware setup and compliant driver based on the ath5k linux driver is one of the core tasks of the whole deployment. The IEEE 802.11p / WAVE standards mandate that the network device must be able to switch periodically (in tight slots) between a control channel, which can only be used for control and safety-critical messages, and the service channels, used for all the other purposes. This way, the driver can be timely informed of any safety-critical event despite any other concurrent traffic.



## FEATURES

- Channel Coordination
- Cannel Routing
- Channel Access
- Multi-channel Synchronization



## PUBLICATIONS

- F. Neves, A. Cardote, R. Moreira, and S. Sargent. "Real-world evaluation of IEEE 802.11p for vehicular networks". In Proceedings of the Eighth ACM international workshop on Vehicular inter-networking (IEEE VANET '11). ACM, New York, NY, USA, 89-90.
- C. Ameixieira, J. Matos, R. Moreira, A. Cardote, A. Oliveira, S. Sargent, "An IEEE 802.11p/WAVE implementation with synchronous channel switching for seamless dual-channel access", IEEE Vehicular Networking Conference (VNC), 2011 IEEE , pp.214-221, 14-16 Nov. 2011
- F. Neves, A. Cardote, R. Moreira, and S. Sargent. "Real-world Implementation and Evaluation of IEEE 802.11p for vehicular networks". In Proceedings of Conferência de Redes de Computadores. Coimbra, 2011.

## DEMOS

- ACM MOBICOM 2011, Las Vegas
- IEEE VNC 2011, Amsterdam
- FIA, Ghent
- Cisco Portugal, Porto
- Fórum TICE Mobilidade, Aveiro
- CMU|Portugal Annual Conference, Lisbon
- POLARIS for Future Cities, Porto