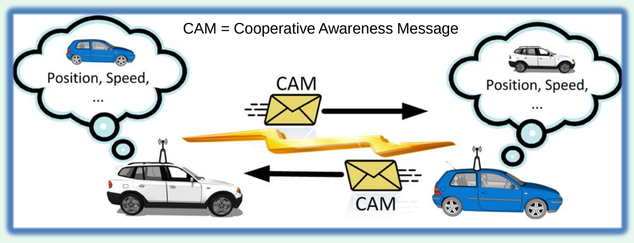
Tweaking Vehicular Safety Communications

Bernhard Kloiber (DLR), Jérôme Härri (EURECOM), Thomas Strang (DLR)

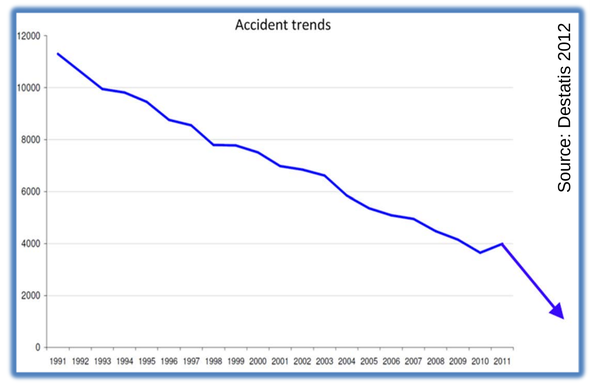
Motivation



IEEE 802.11 OCB* communication enables *mutual awareness.*

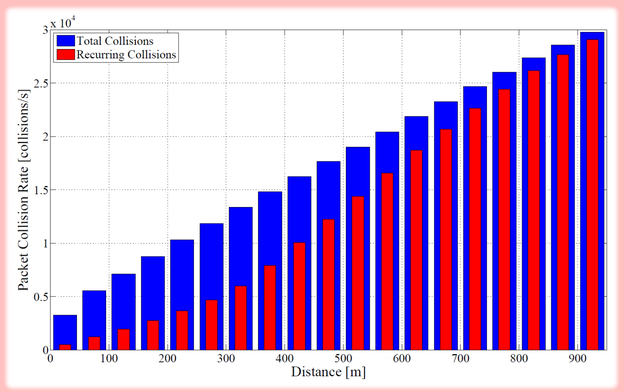
*Outside the Context of a BSS, formerly known as IEEE 802.11p

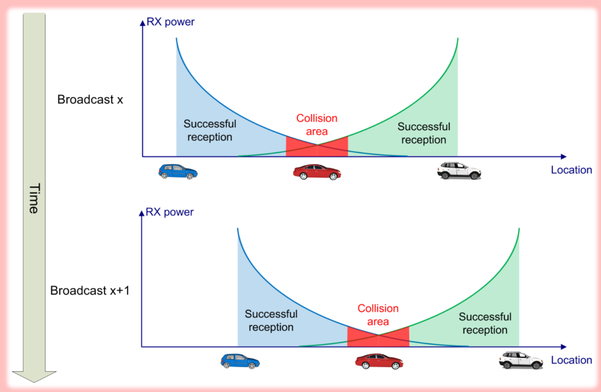
Highly dense and complex traffic scenarios.



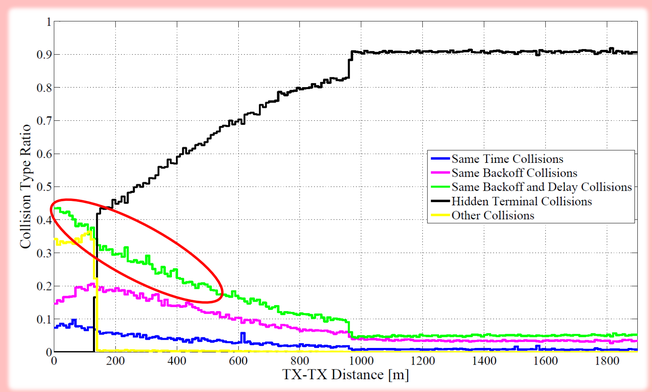
Reducing traffic fatalities

Problems



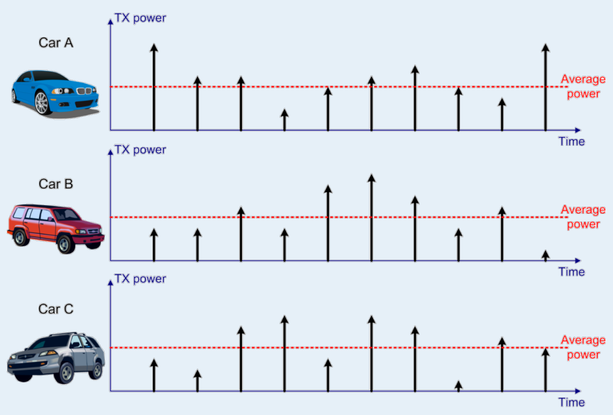


Periodic CAM broadcasts in combination with slow relative speeds can cause *recurring hidden terminal packet collisions*!

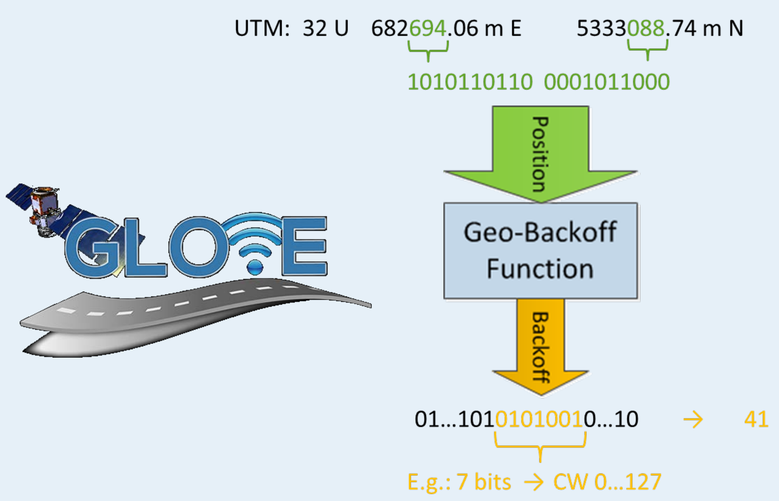


High amount of collisions due to short contention window in IEEE 802.11 OCB!

Concepts

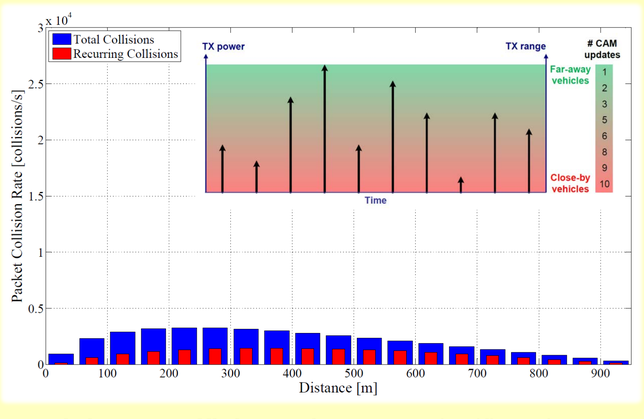


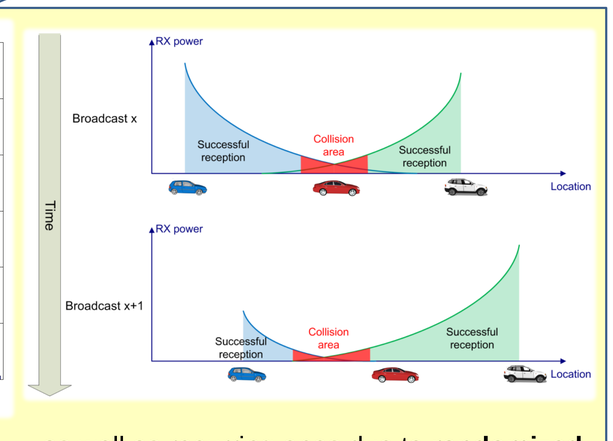
Random Transmit Power Control (RTPC):
Random selection of current TX power for each transmission and vehicle.



Geo-Backoff:
Vehicles with slightly different positions would result in the selection of a significantly different backoff counter (≈ cryptographic hash functions).

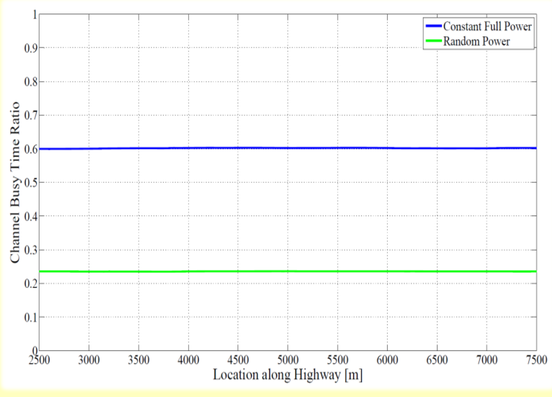
Results

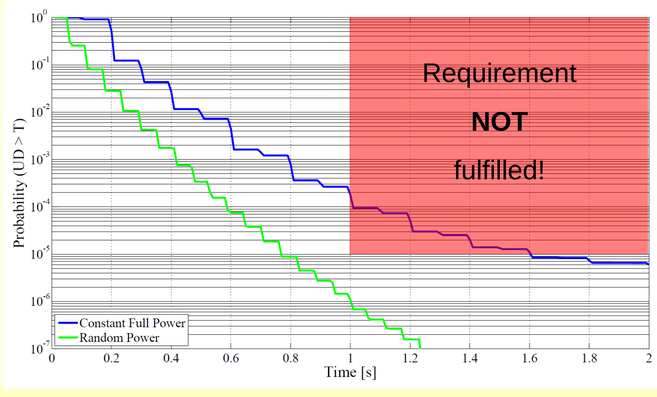




Higher TX efficiency in space significantly reduces total packet collisions …

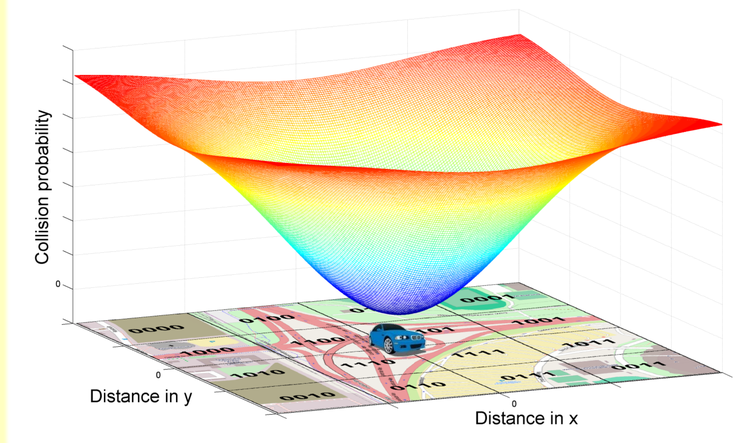
… as well as recurring ones due to **randomized collision and interference areas**!





Gained **congestion reduction** can be used to **further increase the TX rate**, …

… which **increases the communication performance significantly** for close-by vehicles, where it is critical!



Objective: Reduced packet collision probability with close-by vehicles!
Investigations still ongoing within the GLOVE project.

Deutsches Zentrum für Luft- und Raumfahrt

Bernhard Kloiber
German Aerospace Center (DLR)
Institute of Communications and Navigation
Tel.: +49 8153 28-3208
Email: bernhard.kloiber@dlr.de

EURECOM
Sophia Antipolis