ITS use-cases C-ACC and Platooning

draft-petrescu-its-cacc-sdo-04

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ITS BoF at IETF 95
April 6th, 2016
Buenos Aires
Cooperative Adaptive Cruise Control

• “combination of automated speed control with a cooperative element, such as Vehicle-to-Vehicle (V2V) and/or Infrastructure-to-Vehicle (I2V) communication”[CACC-def].

• “C-ACC is understood as a automated formation of chains of automobiles following each other at constant speed.”
C-ACC (2)

• An ETSI ITS term, but

• BMW:
  – Cruise Control -> Dynamic Cruise Control
  – Dynamic Cruise Control -> ?

• Renault:
  – Cruise Control -> Adaptive Cruise Control
  – Adaptive Cruise Control -> ?

• Drawbacks of non-Cooperative ACC: “In a complex environment (metal bridge, etc.), the system [ACC] may be affected.” [user’s guide]
C-ACC example app-layer exchange

Sense neighbor

IP is in front of me (camera-based)

[de/ac]celerate

Don’t follow

What is your IP address?

This is my IP address

What is your position/speed/heading?

This is my position/speed/heading

Can I follow you?

Yes but I usually overcome speed limits
(no, I don’t like people following me)
Platooning scalability and interoperability

Scalability and interoperability issue of initial demonstrators

Later developments including scalability and interoperability
Gap Analysis

• Neighbor Discovery critique: RA only for Hosts, prefix must be on-link can not be of other link.
• Mobile IP: must use HA, irrelevant in V2V
• AODVv2: default routes are out of scope of AODV whereas V2V needs it; V2V topology is not complex whereas AODV is for complex topologies
• More gap analysis is needed: how other IETF protocols in the stack (related to DNS, HTTP, others) can work in a V2V setting?