July 23rd, 2025

# SCHC Adaptation for Geonetworking

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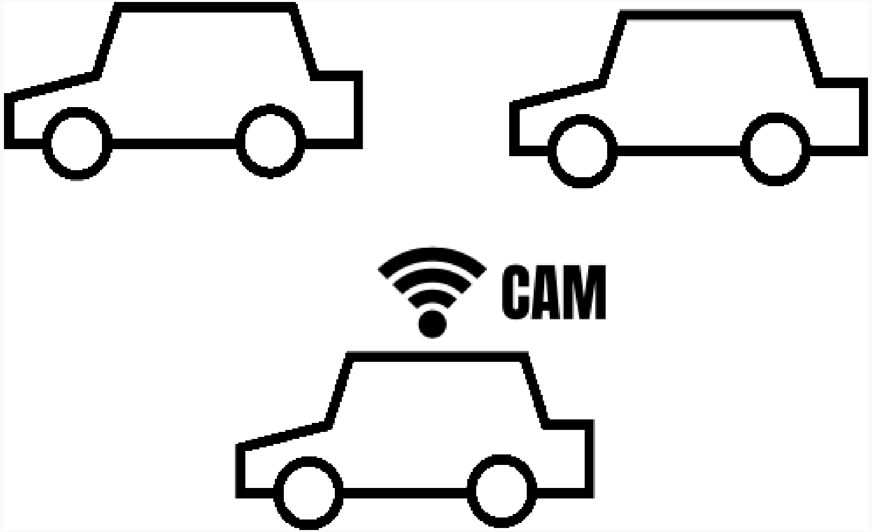
# Agenda

Part I:  Why?

Part II: How?

# What Problem are we solving?




**Cooperative Awareness Messages (CAMs)**

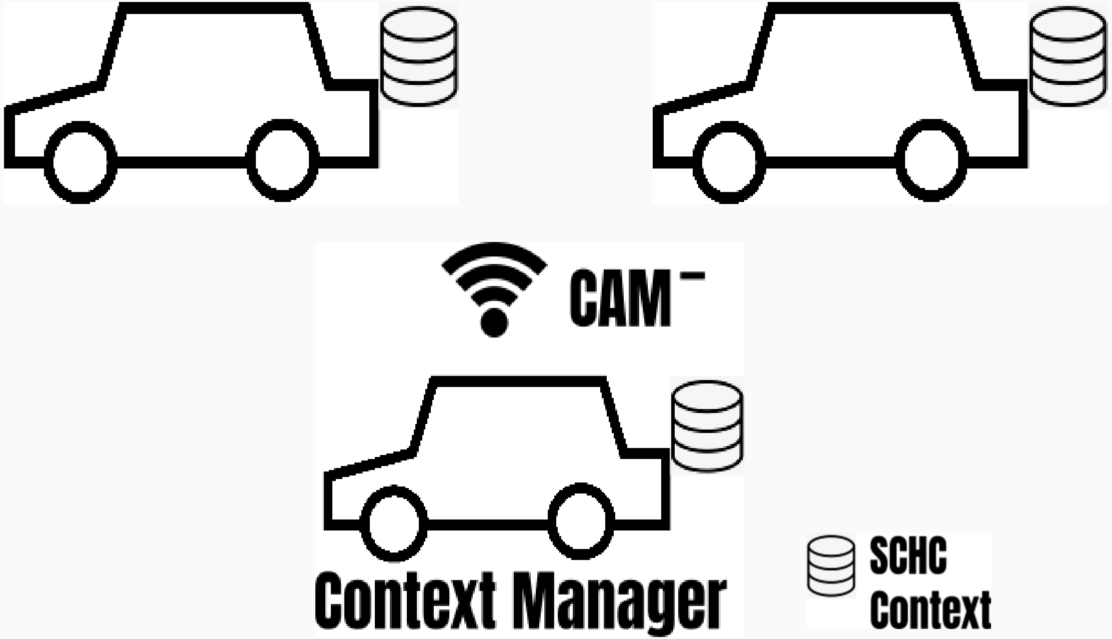
* contains safety and kinematic information

* periodic and frequent

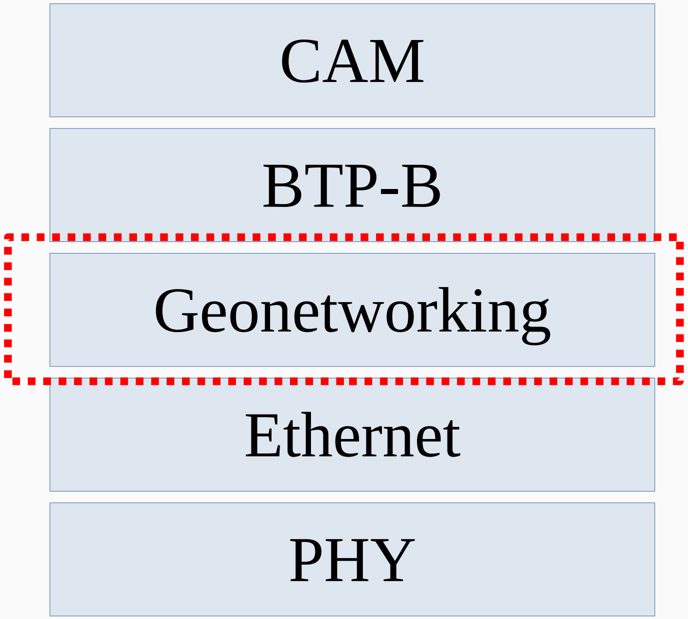
* can jam the network

* *IEEE 802.11p (DSRC)*
*5.9GHz 10MHz*

# How are we solving?



# ETSI Stack simplified




Sending CAMs

- * Broadcast only
- * About 10Hz
- * 100-113byte total frame size
- * geonetworking ~ 40bytes

# SCHC for Geonetworking Layer

**Applying Static Context Header Compression (SCHC) to GNW Protocol***

**Basic Header**

- Version — E (Elide)
- Next Header — P (Send Partially)
- Reserved — E
- LifeTime — F (Full Send)
- Remaining Hop Limit — E

**Common Header**

- Next Header — F
- Reserved — E
- Header Type/Sub Type — P
- Traffic Class — F
- Flags — P
- Payload Length — E
- Maximum Hop Limit — E
- Reserved — E

**T-S B P**

- GN_ADDR (has MID) — P
- Timestamp — F
- Latitude — P
- Longitude — P
- PAI — F
- Speed — F
- Heading — F
- Reserved — E

*Conservative rules

# SCHC Compression

- SCHC Modelling for geonetworking layer:
  - Two rules: Conservative & Aggressive rules

- Conservative → Generic rules, more interoperable

  Example: geonetworking.version → Elide

- Aggressive → More specific, less interoperable

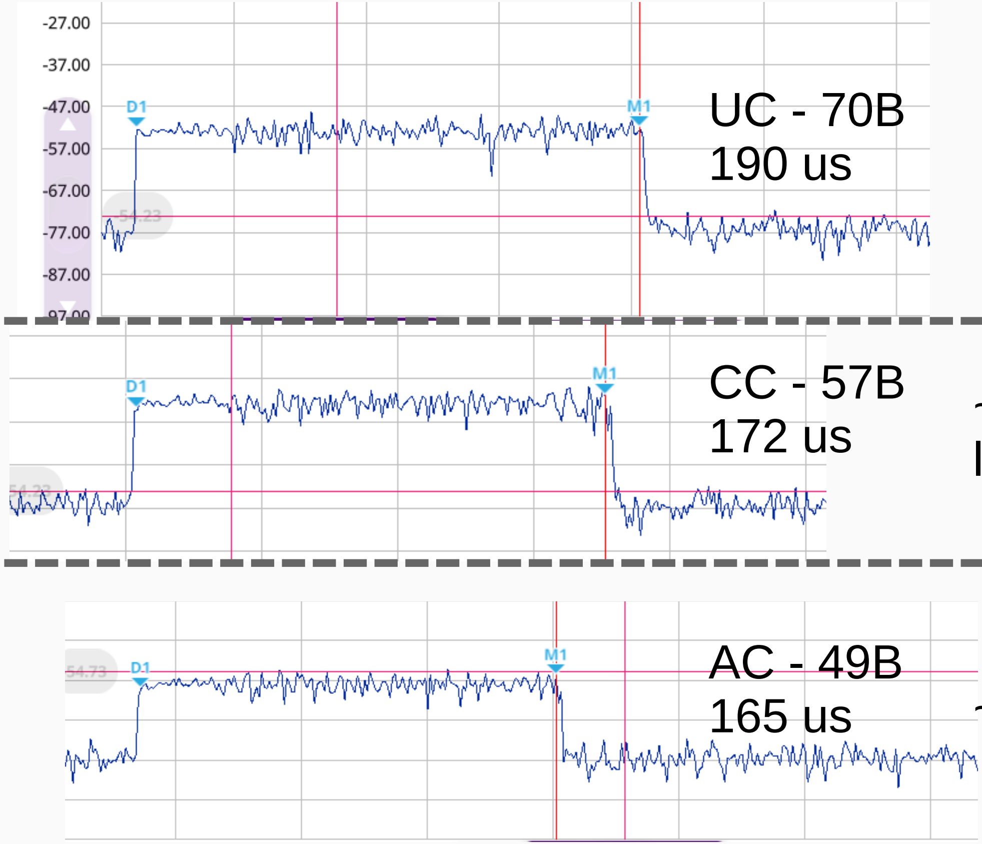
  Example: geonetworking.latitude → send only 15 out of 32 bit LSB*

# Evaluation: On-air time

YoGoKo OBU

Spectrum Analyzer

CAM broadcasts
IEEE 802.11



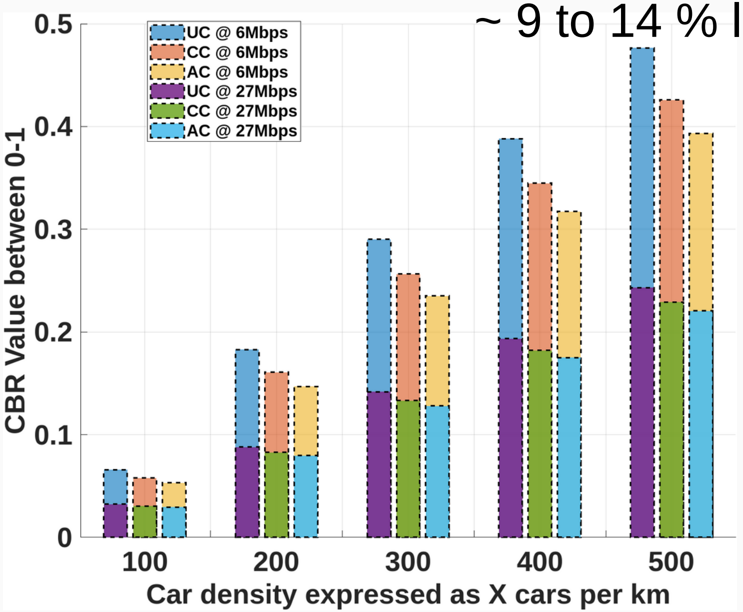

~ **9%** less

~ **13%** less

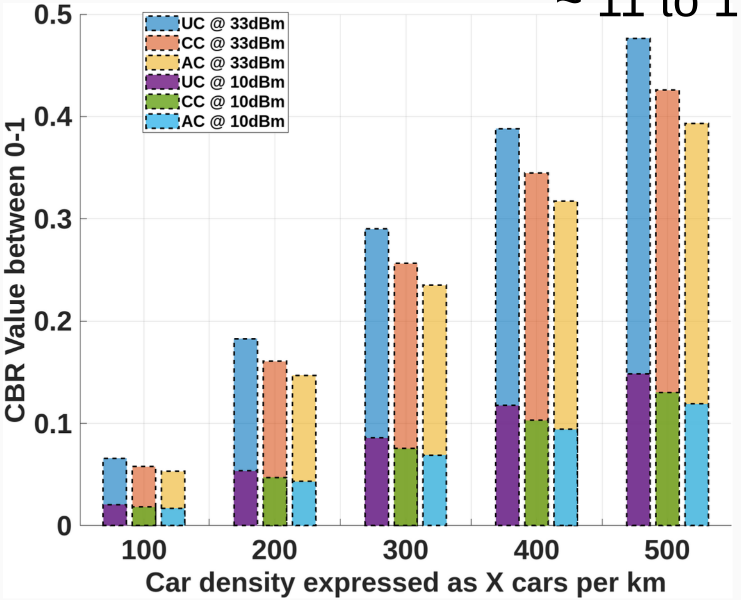
# Evaluation

Channel Busy Ratio (CBR)* $= \dfrac{\text{Channel Busy Time}}{\text{Total Time}}$

~ 9 to 14 % less




~ 11 to 19 % less



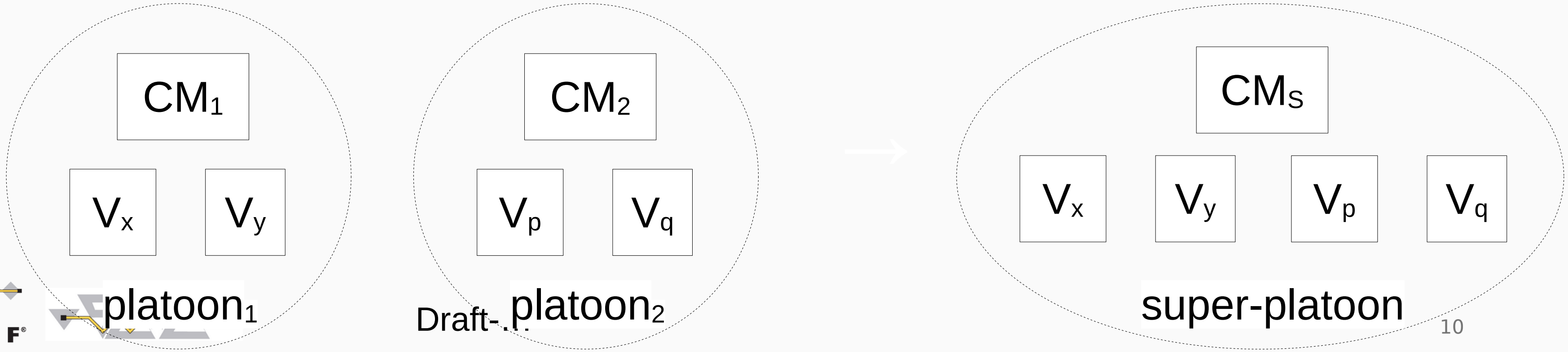

CBR vs compression for diff. data-rates

CBR vs compression for diff. TX power

Draft-…**M. Sepulcre et al "Analytical Models of the Performance of IEEE 802.11p Vehicle to Vehicle Communications"*

# How to?

- * apply SCHC for broadcasts?
- * find “optimal” rules for a specific V2X scenario?
- SCHC architectural issues
  - * adapting context based on networking conditions (say CBR)
  - * build consensus on SCHC context (V2X scenario)



# Next?

* Simulations to understand impact on network metrics?
    * Wael Ayoub et al. *“Implementation of SCHC in NS-3 Simulator and Comparison with 6LoWPAN”* submitted Feb 2019
    * Missing support for protocols
    * discussion around architecture?