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5G as an enabler for the safety of vulnerable road users

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Introduction: Problem

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- According to the latest report on road safety of the Word Health Organization (WHO) [1], pedestrians comprise 22% of all road traffic deaths, approximately 275,000 worldwide

- About 80% rectangular crossing of street (30% with obfuscation)

[1] Global status report on road safety 2015. Geneva, Switzerland: World Health Organization, 2015.

Passive and active Approaches in Products

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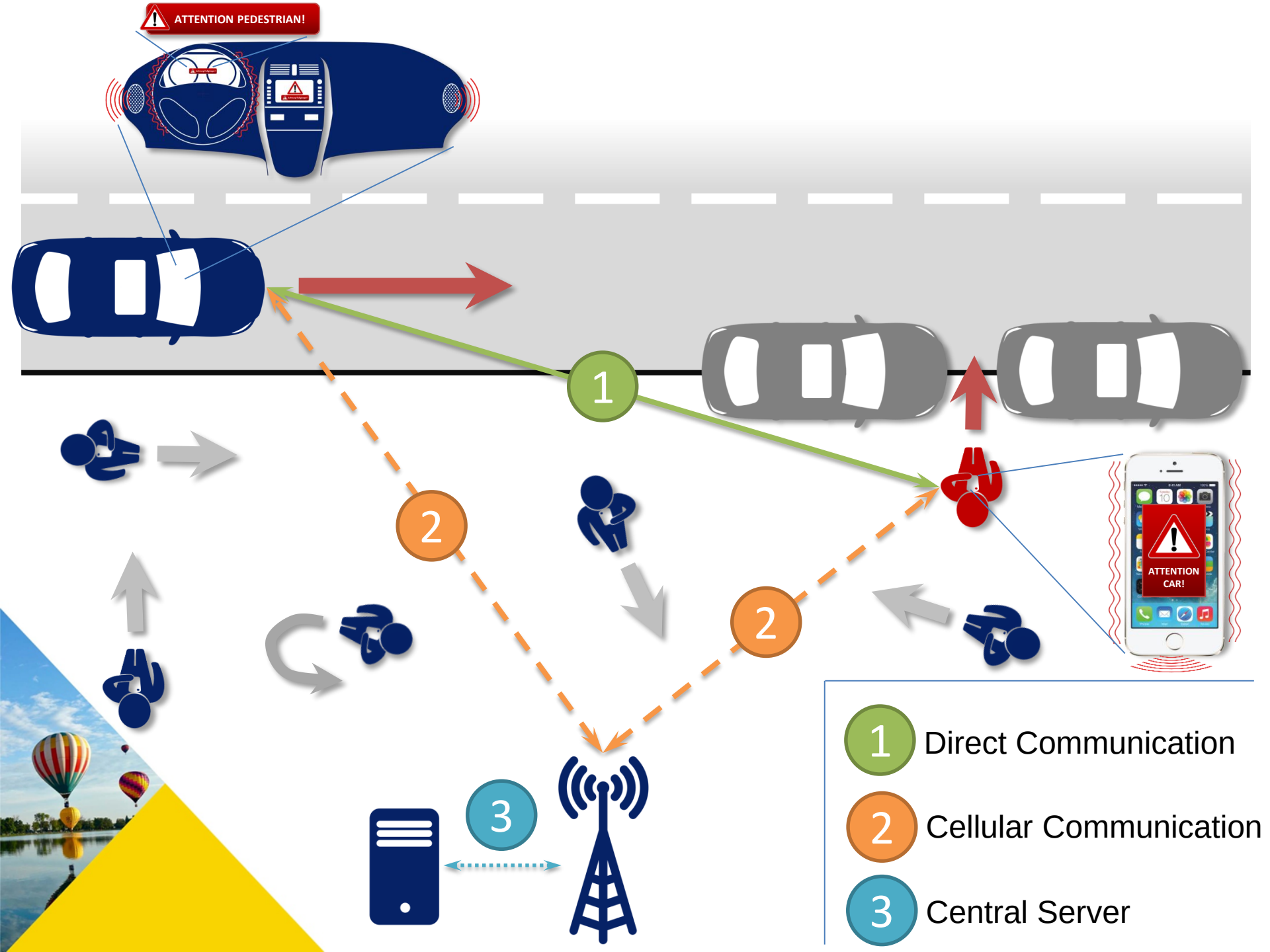
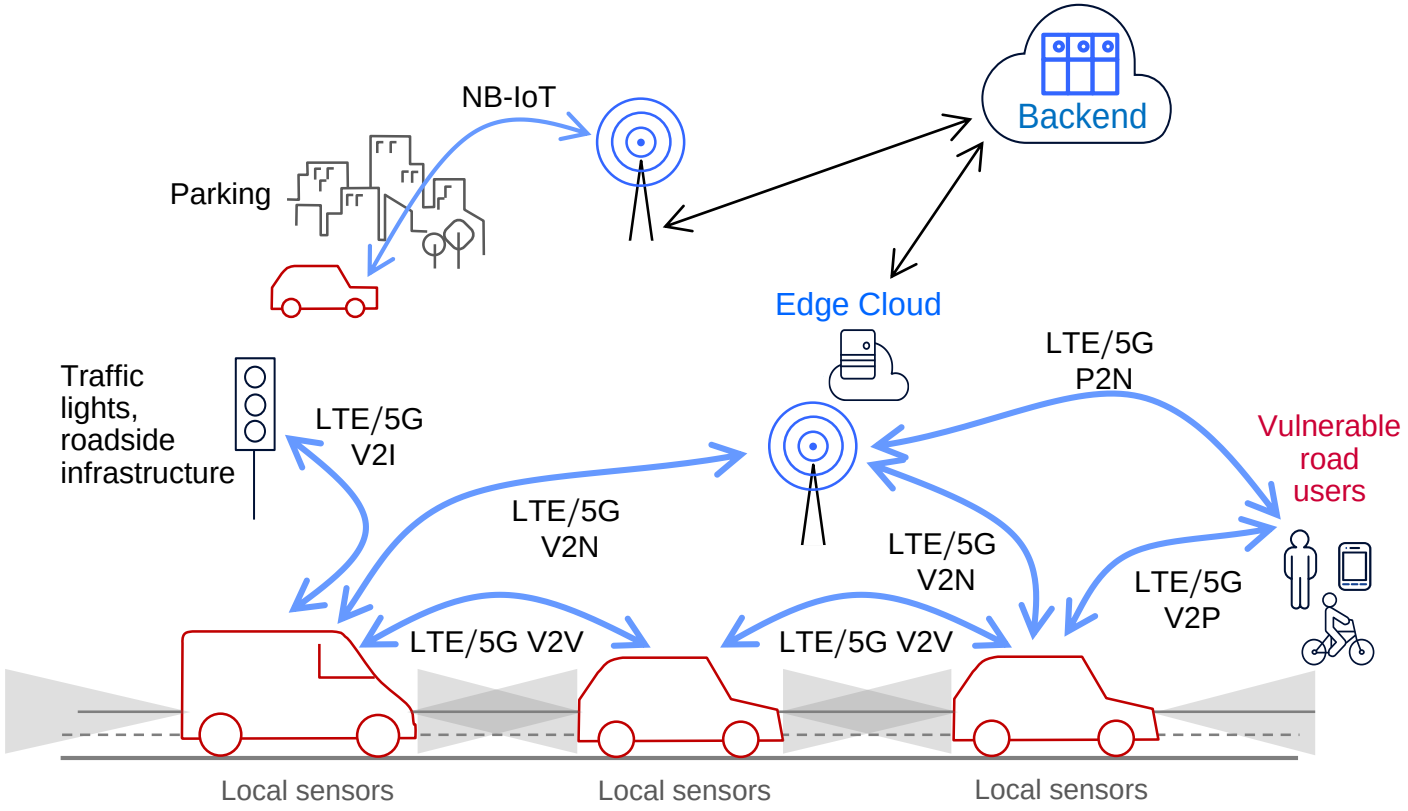
- Passive: Optimized design of the car, so that collisions harm pedestrians less
  - Automatic opening and lifting of the bonnet (hood)
  - Suspensions of the windscreen wiper hidden under the front part
  - Concepts of outside the car “air-bags”
- Active:
  - Radar
  - Cameras
  - Infrared
  - LIDAR (Light Detection and Ranging)


ATTENTION PEDESTRIAN!
1
2
2
3
ATTENTION CAR!
1 Direct Communication
2 Cellular Communication
3 Central Server

Cellular V2X

C-V2X is a unified technology platform which includes:

- Short-range, network-less, direct communications (LTE-V2X PC5)
- Long-range cellular network communications (LTE-V2X Uu)



Source: 5GAA

Cellular or Direct?

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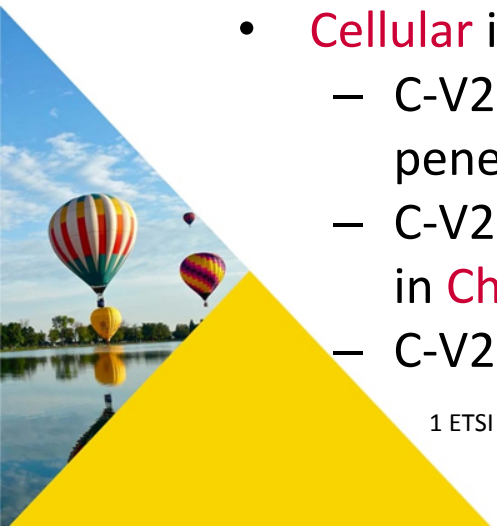
- C-V2X is a unified technology for ITS including:
  - network-less, direct, short-range communications for road safety at 5.9 GHz,
  - complemented by cellular networks for long-range communications.
- ITS-G5[1] has laid down the foundations on which the C-V2X technology builds
- C-V2X is expanding current capabilities, offers a clear evolutionary path to 5G, and Cooperative Connected and Automated Mobility.
- Cellular is dramatically reshaping the automotive landscape:
  - C-V2X is allowing synergies/economies of scale due to its high market penetration.
  - C-V2X is gaining traction at global level in the US and Asia, especially in China.
  - C-V2X deployment in vehicles is foreseen as early as 2020.



1 ETSI ITS-G5 is a European standard for intelligent transport systems (ITS) whose radio access layer is based on IEEE 802.11p.

Coexistence of C-V2X and 802.11

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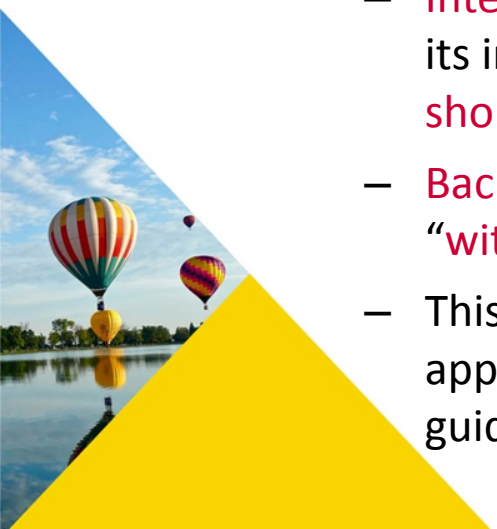
- 5GAA studies show that co-existence of 802.11p and C-V2X at 5.9 GHz and subject to market demand would deliver the highest societal benefits (€ 43 bn), compared to scenarios where only one technology is mandated.

- Co-existence of 802.11p and C-V2X at 5.9GHz is possible and will be studied by CEPT/ETSI in response to the recent EC RSCOM mandate.

- EU requirements for ITS must ensure uncompromised road safety, while abiding by the key principle of technology neutrality:
  - Interoperability is a complex issue, and is being addressed at ETSI. But its impact on road safety should not be overstated in the short/medium term.
  - Backward compatibility is only to be ensured "where appropriate" and "without hindering new technologies", as stated in the ITS Directive.
  - This would be the most effective, cost-beneficial and proportionate approach, while allowing innovation as per the EC's Better Regulation guidelines.



Conclusion

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- Pedestrian Safety is an important Challenge!
- Various passive and active approaches
- An “Ideal Solution” is possible and has been presented here
- 5G with
  - low latency
  - direct communication
  - high capacity

  would be an ideal network to realize this

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