

# Spectrum policy for ITS in Europe

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# Why road safety developments?

Transport EU-25, road accidents

41.600 fatalities

1.4 million accidents involving injury

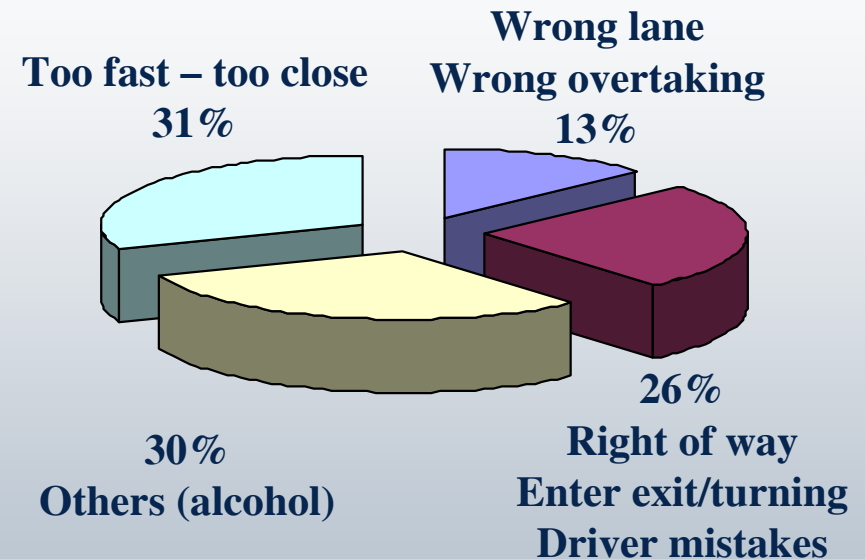
2.0 million injuries

Source: DG TREN-Statistical Pocket Book 2004



## Reasons for accidents

86% involve drivers

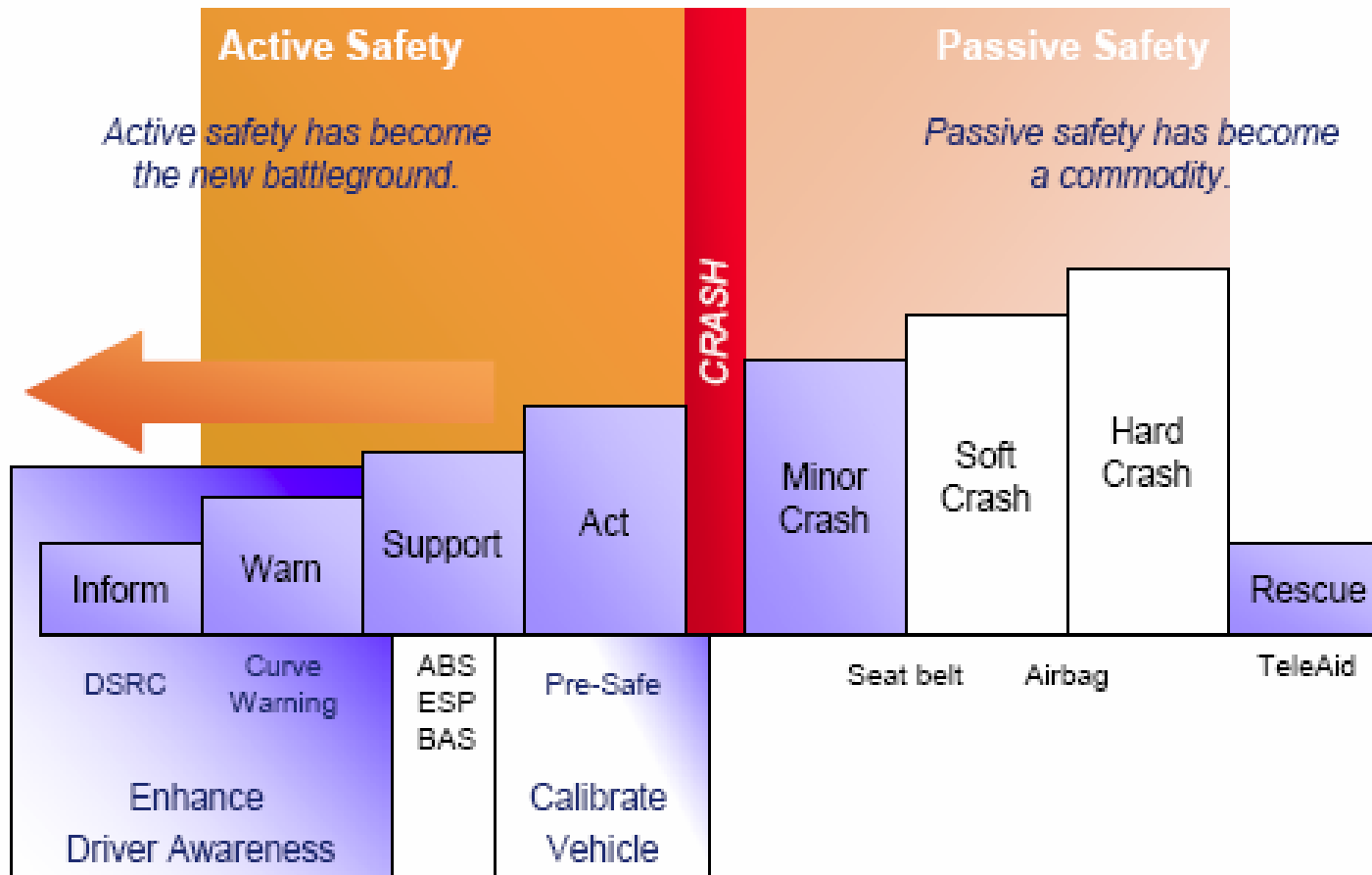


Source: Verkehr in Zahlen 2003, Deutscher Verkehrs-Verlag

50% improvement by co-operative driver assistance

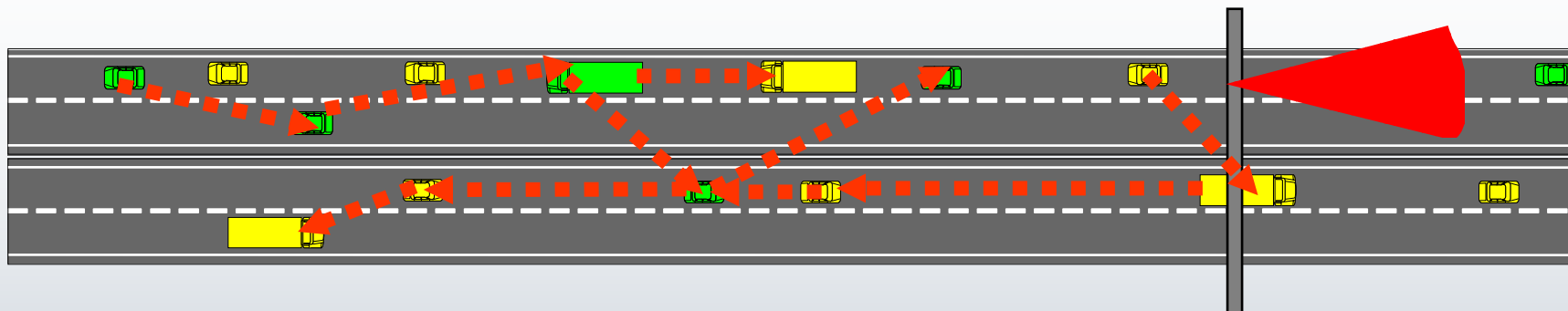
# Safety Application Areas

Focus in safety shifts towards accident avoidance and collision mitigation.



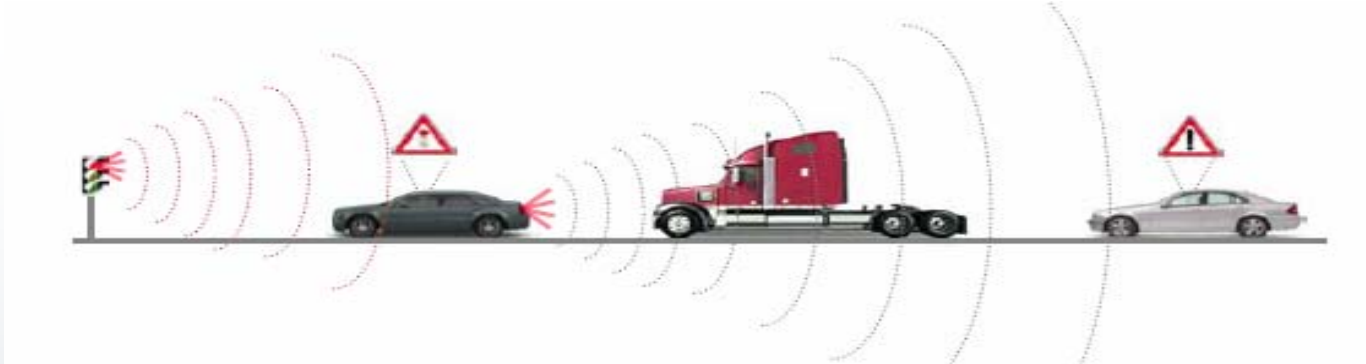
# What is ITS communication?

Networking between vehicles (IVC) and with roadside units (R2V)

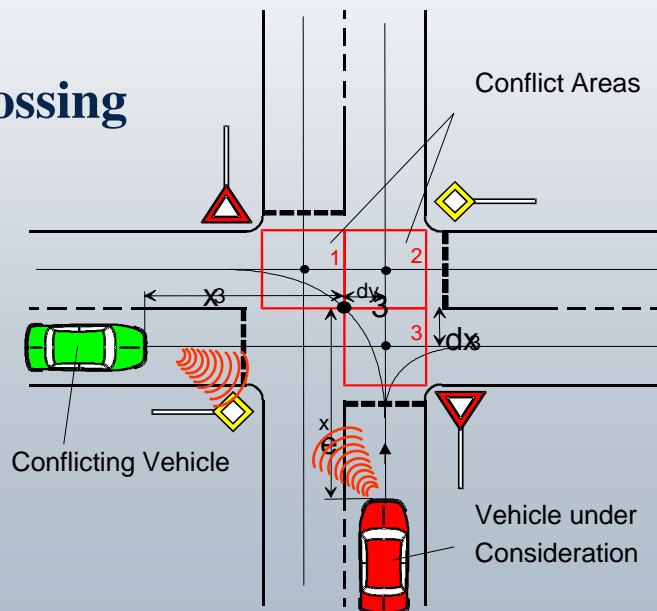


- Vehicular ad hoc networks based on existing 5 GHz WLAN technology
- Vehicles share sensor data for generation of traffic information
- IVC and R2V information exchange about road and traffic conditions
- IVC information exchange about intended driving maneuvers

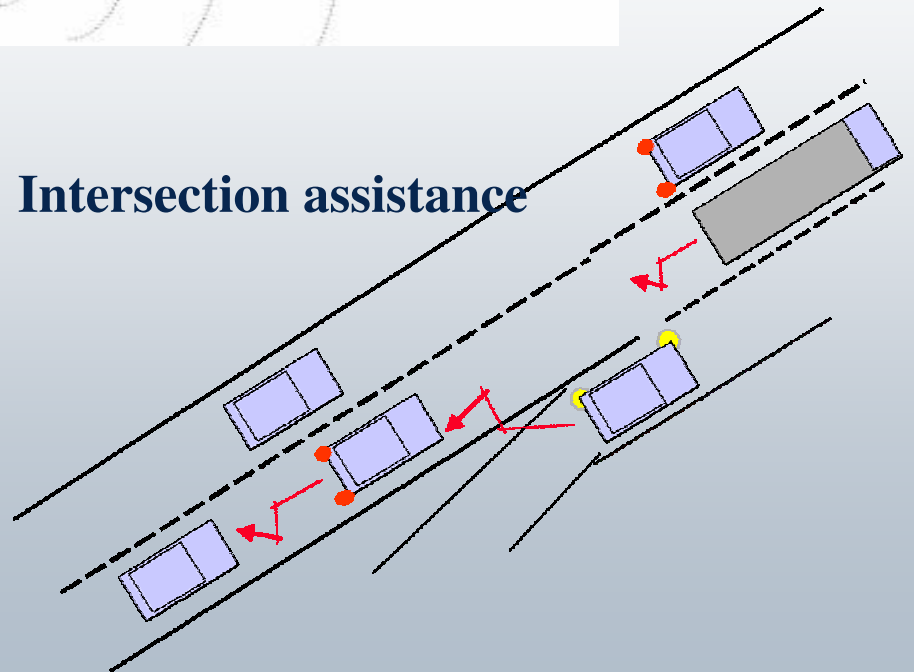
# ITS Communications - examples



## Crossing

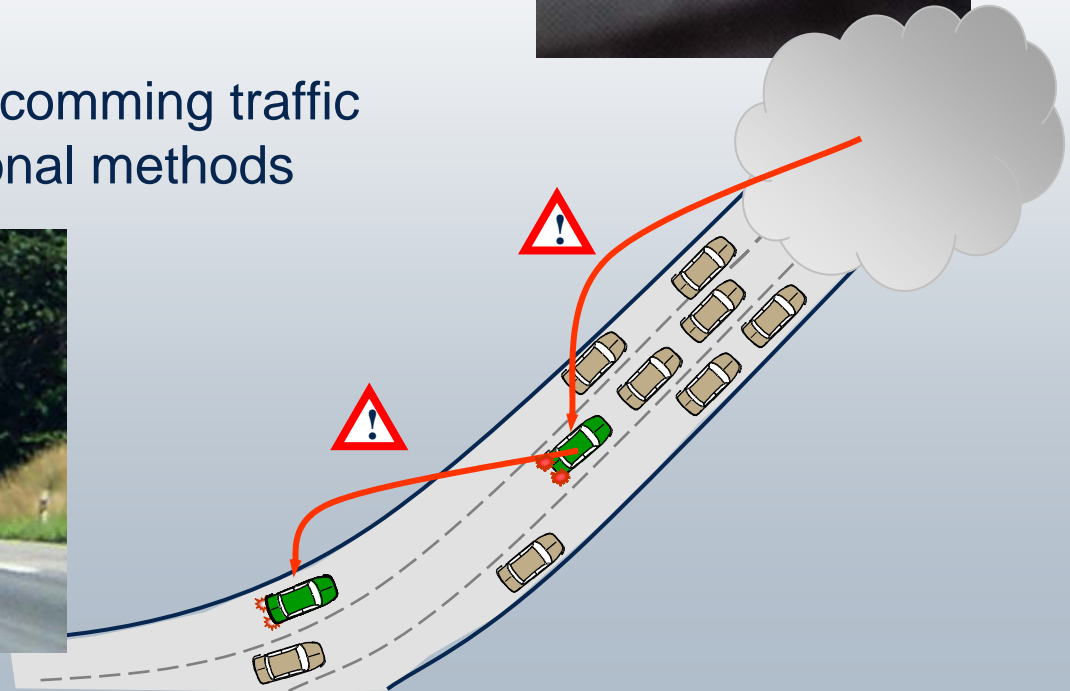
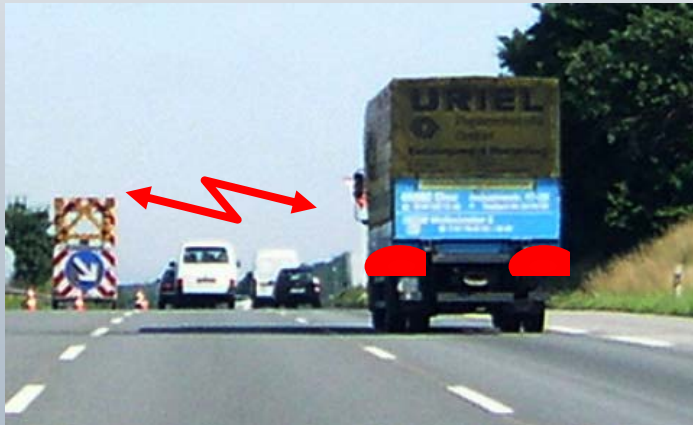


## Intersection assistance



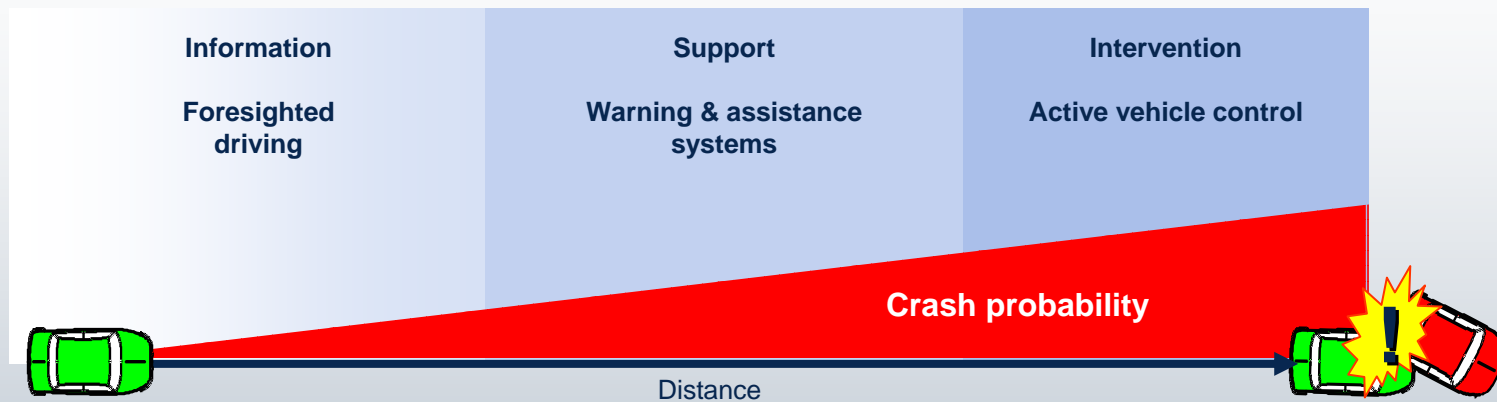
# Hazard Warning and Road construction

- Direct car to car communication warn the driver and avoid or mitigate accidents
- Information distribution triggered by airbag-sensor, friction-sensors or switching on the warning flashers
- Information reaches the upcoming traffic much faster than conventional methods



# Need for critical safety communication

Road safety information is time critical close to a crash



- Reliable communication needed in a highly dynamic environment
- Low latency and robust communication needed
- Protection against interference from other radio systems important

# Road Safety and traffic efficiency Applications



- Traffic Signal Violation Warning
- Stop Sign Violation Warning
- Left Turn Assistant
- Stop Sign Movement Assistance
- Intersection Collision Warning
- Blind Merge Warning
- Pedestrian Crossing Information at Designated Intersections
- Approaching Emergency Vehicle Warning
- Emergency Vehicle Signal Preemption
- SOS Services
- Post-Crash Warning
- In-Vehicle Signage
- Curve Speed Warning
- Cooperative Collision Warning
- Low Parking Structure Warning
- Wrong Way Driver Warning
- Low Bridge Warning
- Work Zone Warning
- In-Vehicle Amber Alert
- Safety Recall Notice
- Just-In-Time Repair Notification
- Cooperative Forward Collision Warning
- Vehicle-Based Road Condition Warning
- Emergency Electronic Brake Lights
- Lane Change Warning
- Blind Spot Warning
- Highway Merge Assistant
- Visibility Enhancer
- Cooperative Vehicle-Highway Automation System (Platoon)
- Cooperative Adaptive Cruise Control
- Road Condition Warning
- Pre-Crash Sensing
- Highway/Rail Collision Warning
- Vehicle-To-Vehicle Road Feature Notification
- Intelligent On-Ramp Metering
- Intelligent Traffic Flow Control
- Cooperative Glare Reduction
- Instant Messaging
- Adaptive Headlamp Aiming
- Adaptive Drive train Management
- Enhanced Route Guidance and Navigation



# Non Safety applications

Minimum penetration ~10% for impact on road safety ~ 2 years in new cars

With additional features first customers will also benefit

## WLAN hotspot access

Wireless diagnosis  
Automatic Payment  
Local Map Update  
Internet Access

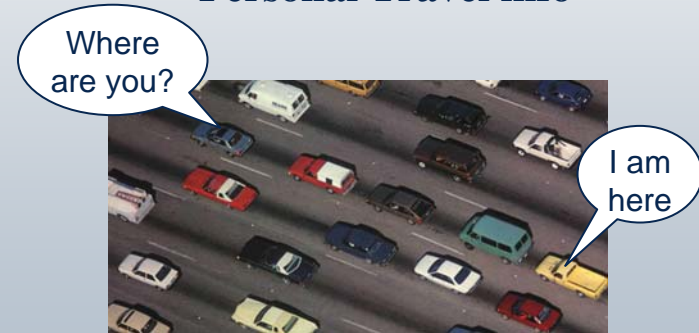


Media Download  
Route Data Download



## Car to Car entertainment

Virtual Caravan  
Chat  
Personal Travel info



# European cooperation for eSafety

Flagship Initiative:

Road Safety Action Program:  
Reducing the number of fatalities by 50% until 2010

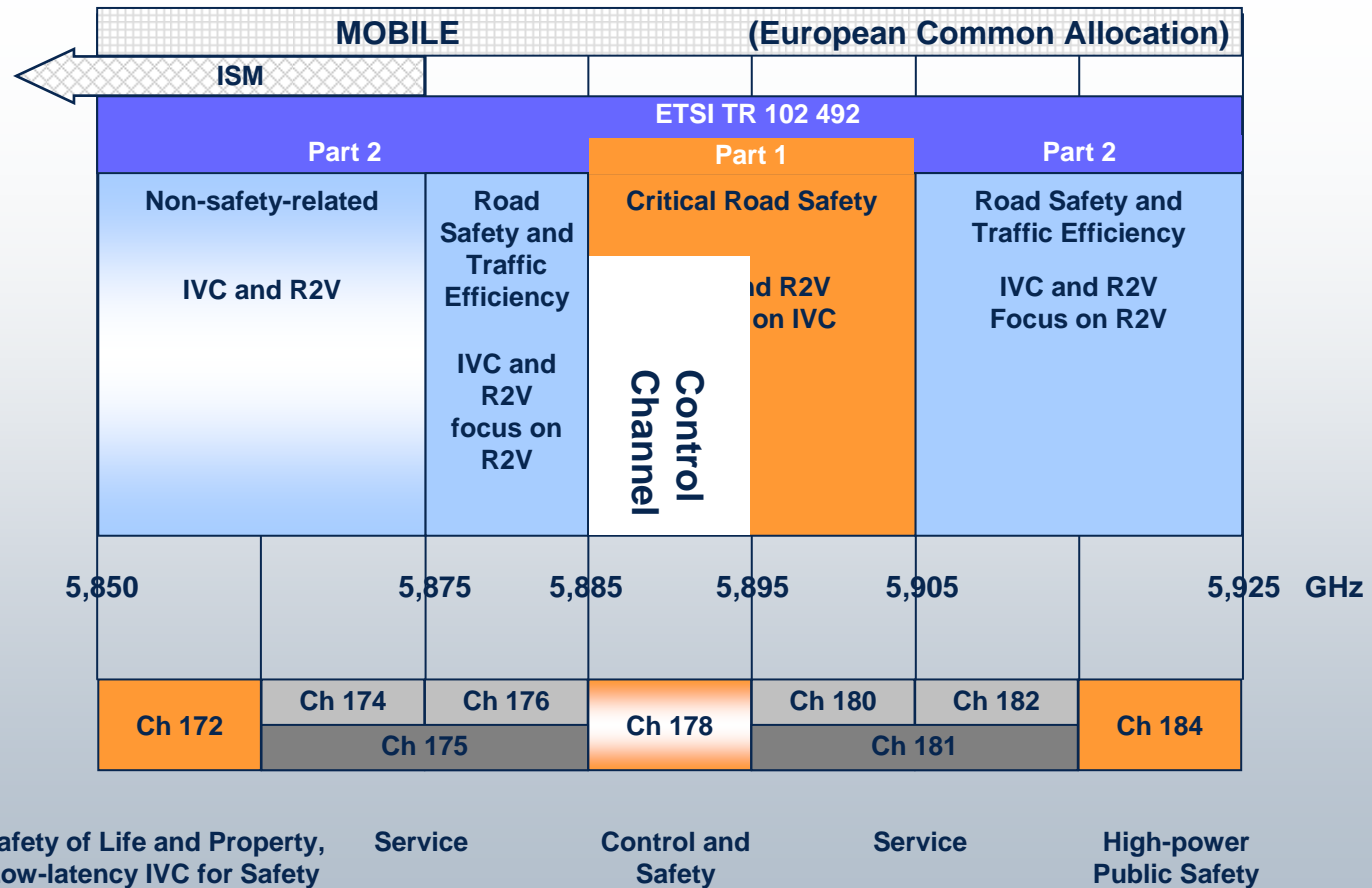
System Reference Document Standardization

Letter of Understanding

## European Projects

COMeSafety SAFESPOT  
PREVENT CVIS CyberCars EASIS  
WATCH-OVER COOPERS  
ATTESST AIDE COM2REACT  
SEVECOM GST HIGHWAY

# Spectrum required



# European Commission Mandate

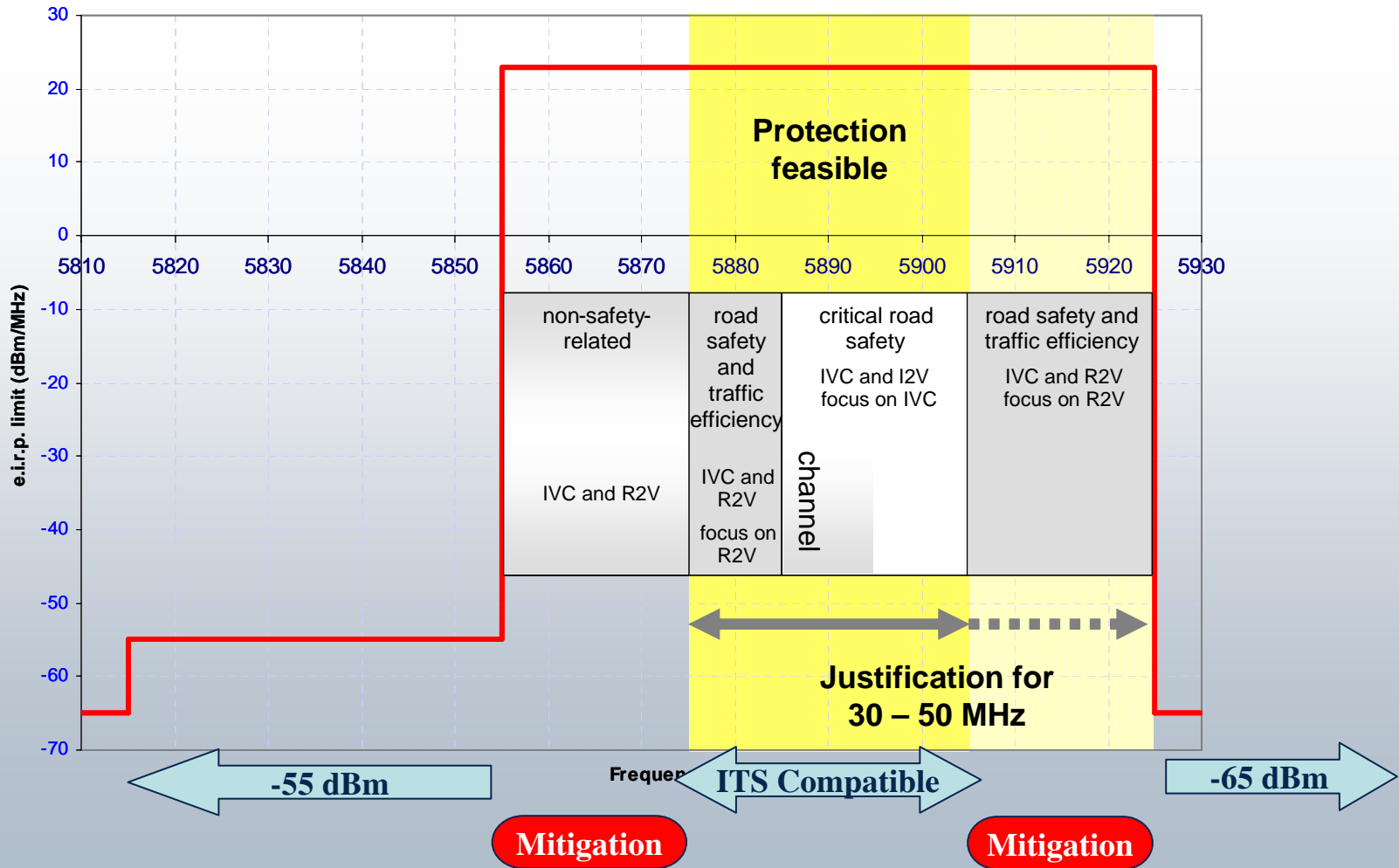
## CEPT is mandated to

- Verify spectrum requirements for safety critical applications
- Define the level of protection requested and available
- Determine the frequency range to focus on
- Undertake required technical compatibility studies
- Consider optimal channel plans
- Propose a work plan

**The report is due by December 2007 – as the basis for EU wide regulation on ITS.**



# Results of compatibility studies



# Justification of spectrum requirements



Traffic scenarios with a total of 552 active vehicles and 100 roadside units

Envisaged IVC and R2V

Maximum data throughput in ad hoc networks

CEPT conclusion that realistically 30-50 MHz would be required for ITS in Europe.

# Impact Assessment



- Ad hoc low latency and robust communication
- Economic benefits of reduction of road accidents and fatalities
- Risks and costs of Market and Regulatory failure
- Costs of harmonisation – opportunity costs
- Benefits of harmonisation
  - Economics of scale
  - Interoperability and cross border roaming in Europe
  - Spectrum efficiency
  - Promotion of investment
- European wide harmonisation needed



# Need for regulatory certainty

Compatibility other services



Justification of requirements



Impact assessment



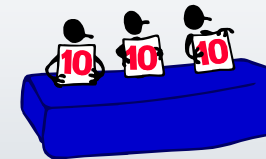
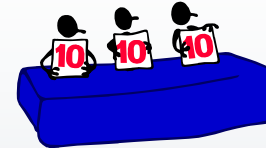
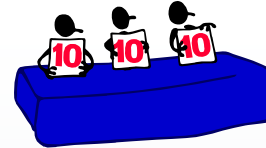
CEPT/ECC Decision (voluntary) **End 2007**



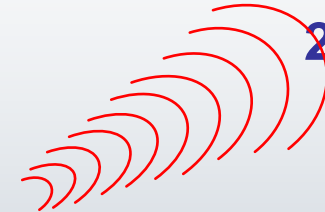
EC Mandate Report **End 2007**



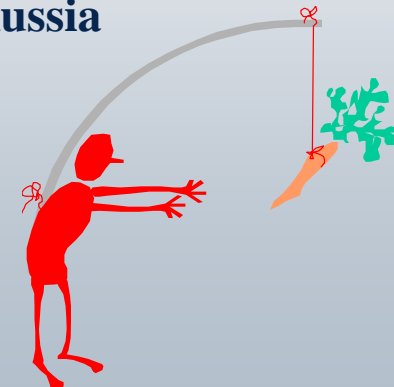
EC Decision **1Q 2008**  
– Mandatory implementation



**Field Trials  
2007**



**Russia**



# Conclusions

## Regulation for implement and deployment of ITS in Europe

- Technical Standard to be finalised in ETSI
- System trials during 2007
- Regulatory certainty needed for infrastructure investment
- Spectrum allocation envisaged beginning 2008
- Spectrum allocation and standards ready in USA

**The regulation in Europe is ready in 2008  
- are industry and road operators ready?**



# Thank you for your attention

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