

## The need for better co-working

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## ITS TOOLS . . .

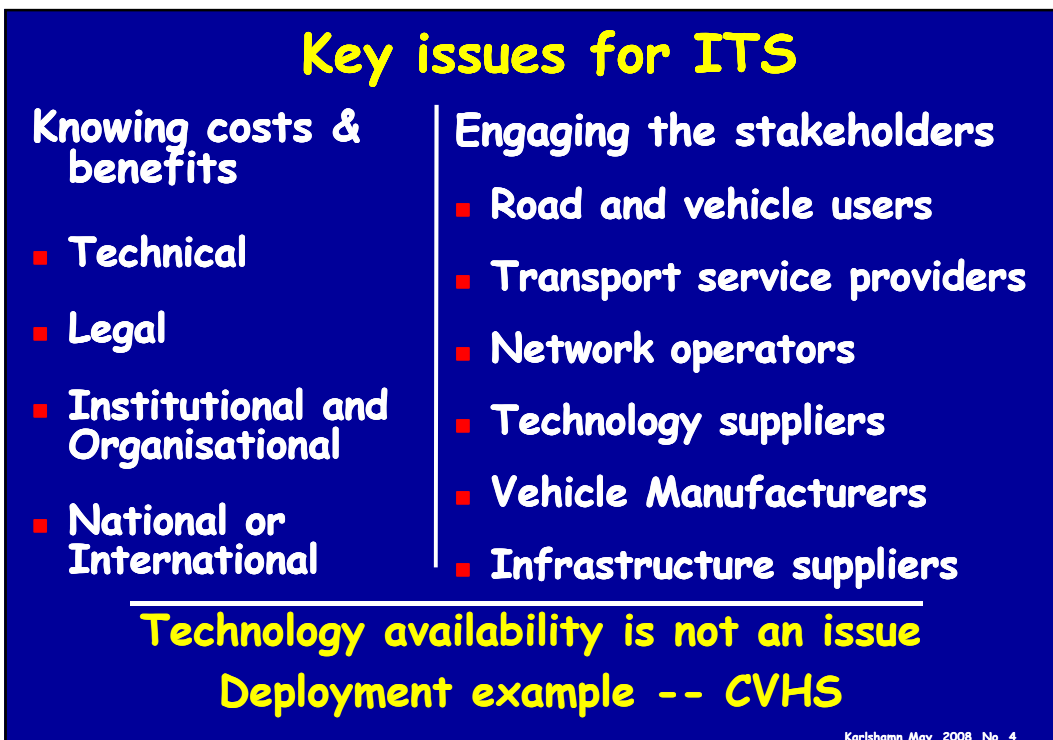
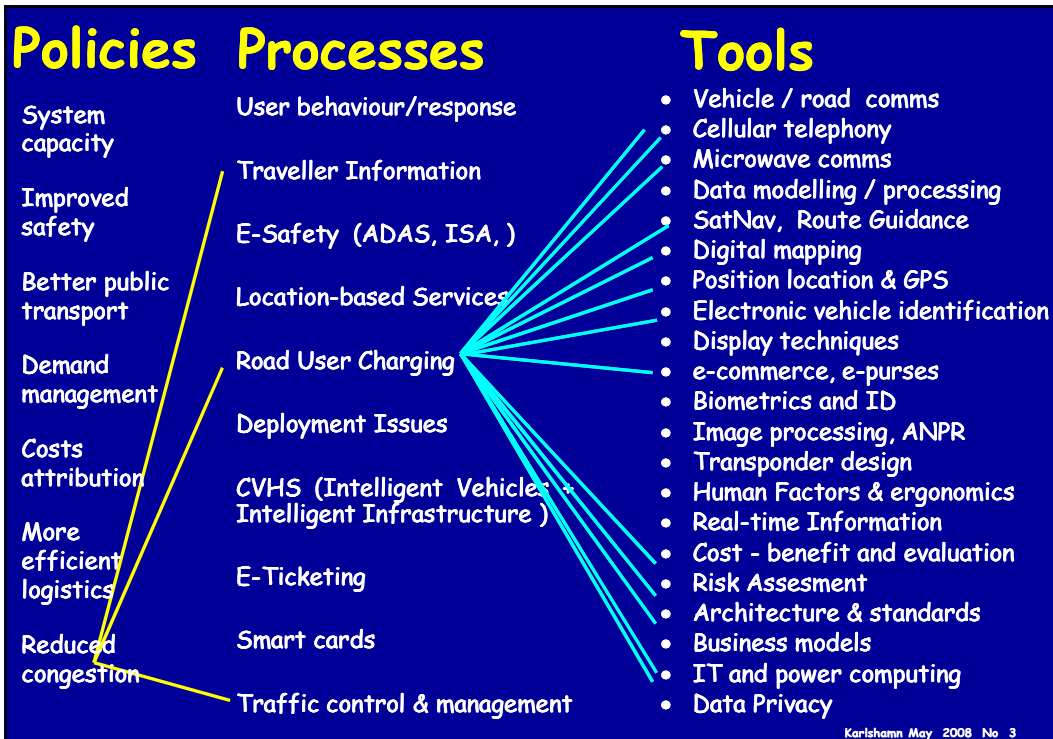
### Combine

- Information Technology
- Communications
- Sensors
- Maps and Databases

### To deliver journeys/services that are

- More efficient
- Safer
- More comfortable

### For Rail, Air, Maritime and Road



## The CVHS vision

**Cooperative Vehicle-Highway Systems:  
joining up a smarter road and a smarter  
vehicle using wireless, with the potential  
for big wins in network management &  
road safety**

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## The case for CVHS

- **Big wins in road safety & network management**
- **Safer vehicles, more driver support & assistance = fewer accidents**
- **Better prediction & management of traffic flow = less congestion**
- **Better management of traffic = reduced emissions and energy consumption**
- **Range of new products and services for automotive manufacturers and ITS industry**
- **Widespread recognition of societal and commercial benefits**

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## The road management gains

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## Pressures on the road network 1

- More throughput
- Improved safety
- Reduced environmental impact
  - vehicle emissions and noise levels
  - visual intrusion
- Better integration with public transport
- More reliable/predictable freight trips

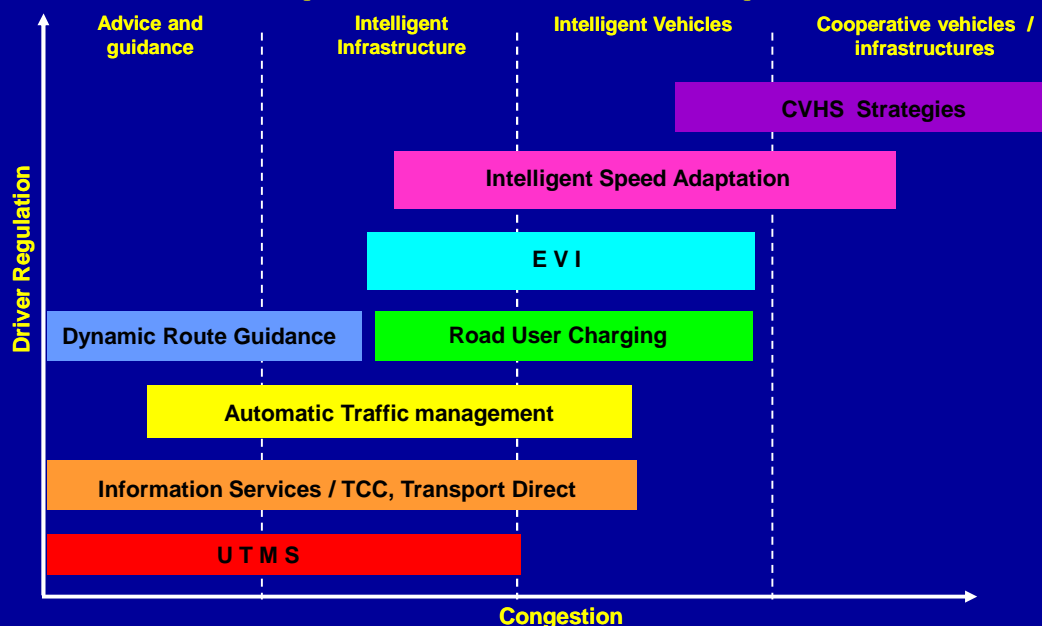
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## Pressures on the road network 2

- Changing trends:
  - population age distribution
  - e-shopping
  - tourism & leisure
  - teleworking
  - business location
  - flexible office hours, manufacturing etc
- Need flexibility & fast response to change

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## Strategic Traffic Management



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## We were warned — UK Foresight study

1955	2005	2055
More Infrastructure	More effective Infrastructure	Intelligent Infrastructure
Lots of Fossil Fuels	Fossil Fuel supply limited	Post-Fossil Fuels
Economy only priority	Economy before Environment	Economy <u>and</u> Environment
Rich can move	Right to Move	Should I Move
Cope with shocks	Plan for most shocks	Prepared for all shocks
Demand led investment	Invest for efficiency	Externalities in rational basis
Public own Infrastructure	Hybrid Public & Private owned	?
Space Age	Information Age	Intelligence Age

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## Pressures on the road network 3

- More throughput ✓ CVHS
- Improved safety ✓ CVHS
- Reduced environmental impact ✓ CVHS
  - vehicle emissions and noise levels ✓ CVHS
  - visual intrusion ✓ CVHS
- Integration with public transport ✓ CVHS
- More reliable/predictable freight trips ✓ CVHS

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## CVHS toolbox

- Latitudinal / longitudinal support
- Lat / long collision avoidance
- Platooning / convoying
- Adaptive route guidance
- Traffic and traveller information
- Controlled traffic flow
- Best practice driver advice



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## Migration: 1 - 5 Years

TODAY

- Driver in full control of vehicle \*
- Speed/behaviour monitored by Police
- Increasing real-time information ( IT IS, TrafficMaster, RDS-TMC radio)
- Driver assisted by in-car technology (close following *etc*)
- Driver manoeuvre / collision warning
- External speed alert (ISA)
- Real-time information on conditions
- Motorway charging introduced ?
- Driver in command, rather than control

\* Except Airbag; ABS etc

1 - 5  
YEARS

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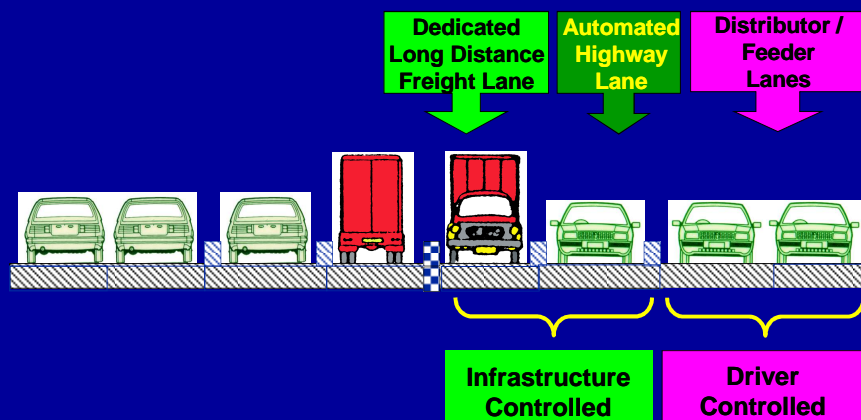
## Migration: 7 - 20 Years



- Cooperative platoons of vehicles
- External speed control
- Over-ride of driver manoeuvre
- In-car office systems accepted
- Automated highways: users are passengers (freight before passenger)
- Mode choice by price and journey needs
- Public transport "units" for hire

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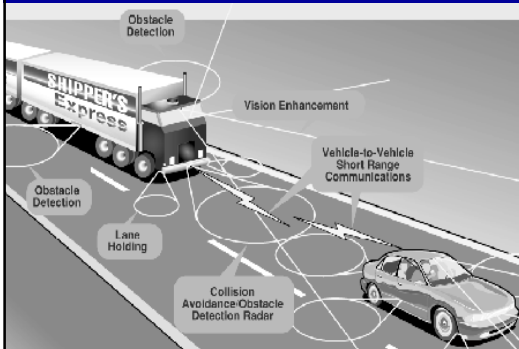
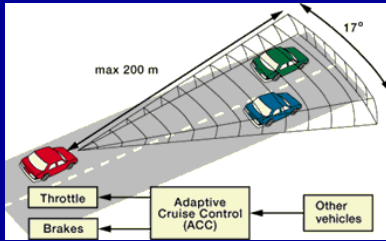
## A Future Strategic Network ?



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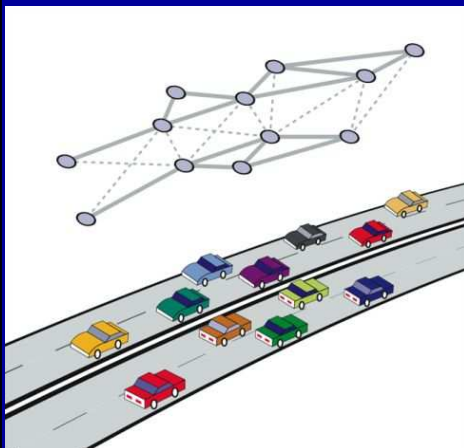


# Vehicles will be part of infrastructure

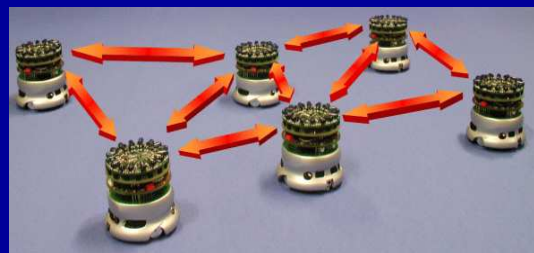


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# Information will be part of infrastructure



A mobile ad hoc network — a number of mobile information devices cooperate to form a dynamic computing network without fixed infrastructure.



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## Personal support will use infrastructure

- New Generation hand-helds
  - location based services
  - personalised information delivery
  - plan trips
  - buy travel slots
  - guide between modes
  - healthy travel options
  - monitor environment
  - <http://www.transportdirect.info>



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## Common worries

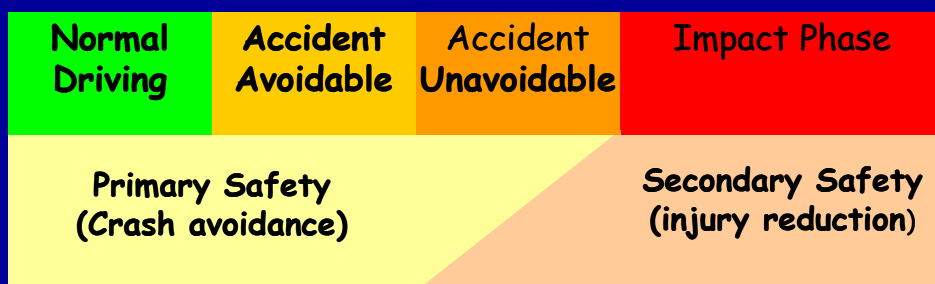
- How assemble / unassemble platoons ?
- Really let a driver sleep ?
- Dangerous when it fails
- Who do I sue if I'm hit ?
- Can I trust it ?
- "Big Brother" tracking and policing
- What happens if it doesn't work ?
- How do I see what it's actually doing ?
- Do I have to use it ?

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## The safety gains

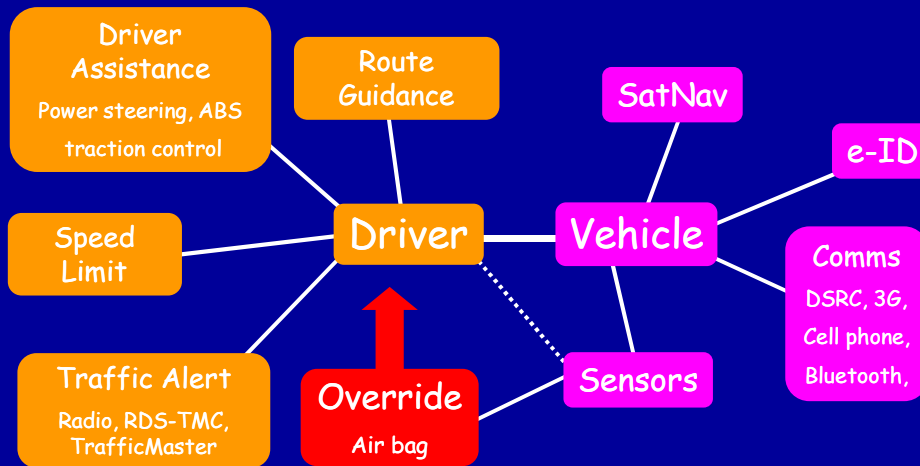
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## Accident Phases

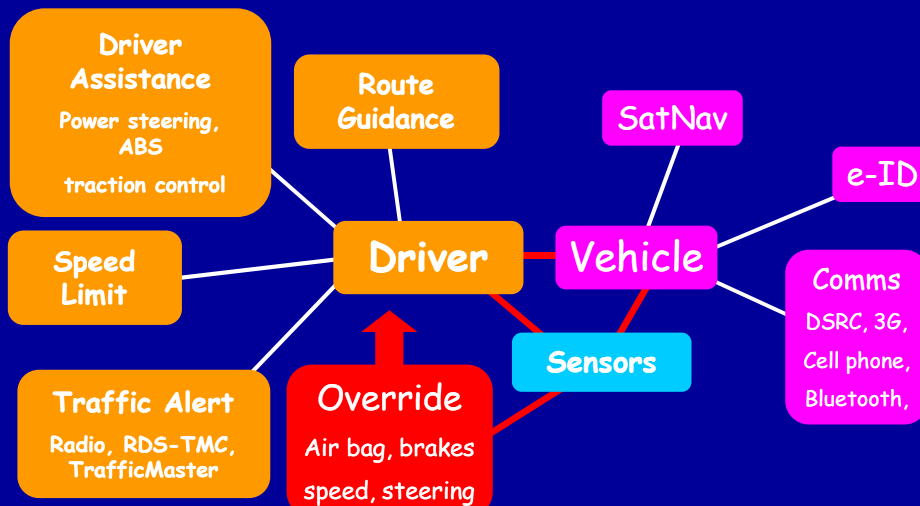


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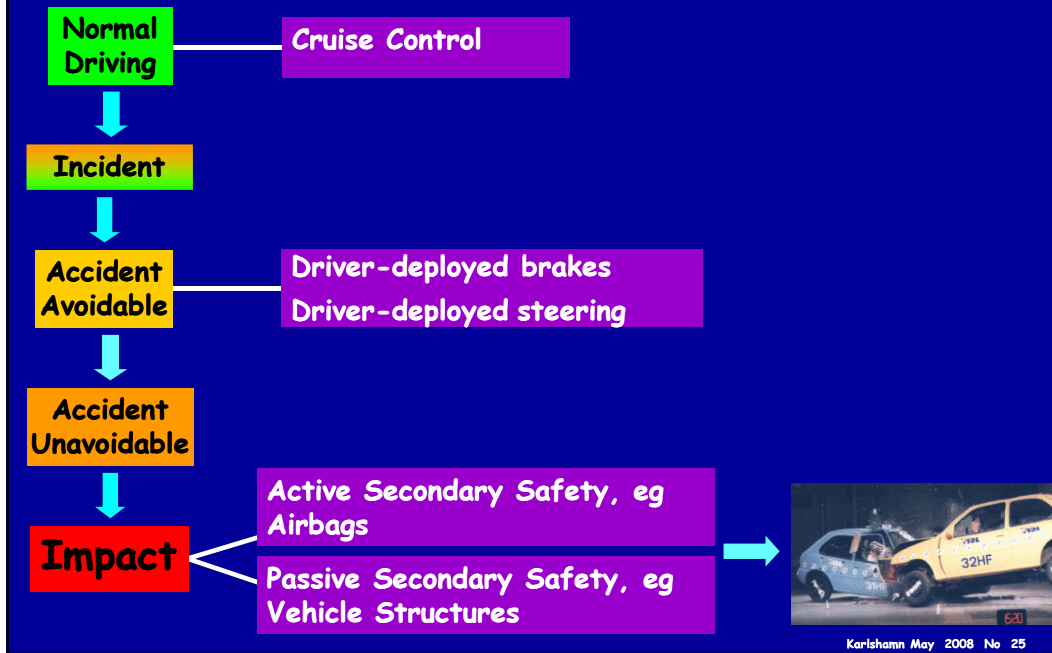
## Towards the e-vehicle 1



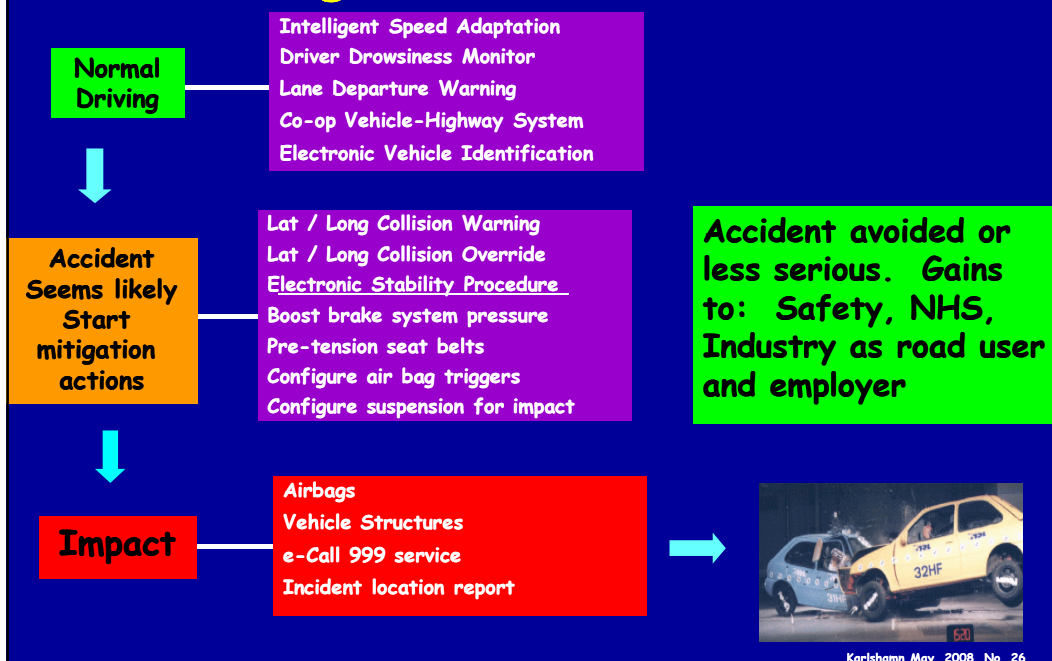
## Towards the e-vehicle 2



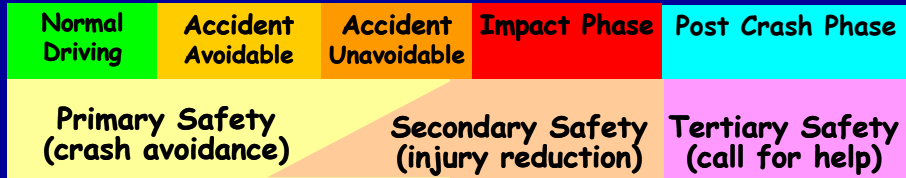
# Conventional vehicle's accident



# Intelligent vehicle's accident



# Future accident phases



The technologies are identical

## CVHS State-of-the-art 1

- Many teams working on applications, connectivity
- Technologies developing quickly but poor integration / convergence on standards for safety, convenience and navigation
- Standards bodies "competition" unwelcome with end users
- Introduction of electric vehicles requires new style vehicle—infrastructure linking
- Getting wireless link A to B easy; response time and data volumes need more thought

## CVHS State-of-the-art 2

- Communication Architectures mostly ready but can we future-proof?
  - vehicle to vehicle
  - vehicle to infrastructure
  - in vehicle, including nomadic devices
  - vehicle-to-grid
- In-vehicle devices not being designed to common patterns / standards. Some understanding of driver distraction and overload; less work on driver underload. HMI research thin. All four points could become major Regulatory issues

## CVHS State-of-the-art 3

- Role of cellphones still unclear: embedded, integrated or autonomous ? Decision has impact on business cases
- Business / payment models differ for safety, climate change and comfort/convenience — how do we get them to converge ? Does it matter if we can't ?
- Not yet clear what multi-functionality we need  
*eg* does an e-Call unit have to deliver infotainment services ?

## CVHS State-of-the-art 5

- No clear view on Users' / Regulators' / Suppliers' security, liability and privacy concerns — could be a major barrier
- No single list of standards and agreed 'owners' — unhelpful for application designers
- Not clear what international body can bring the players together
- Not enough lateral integration or cooperation



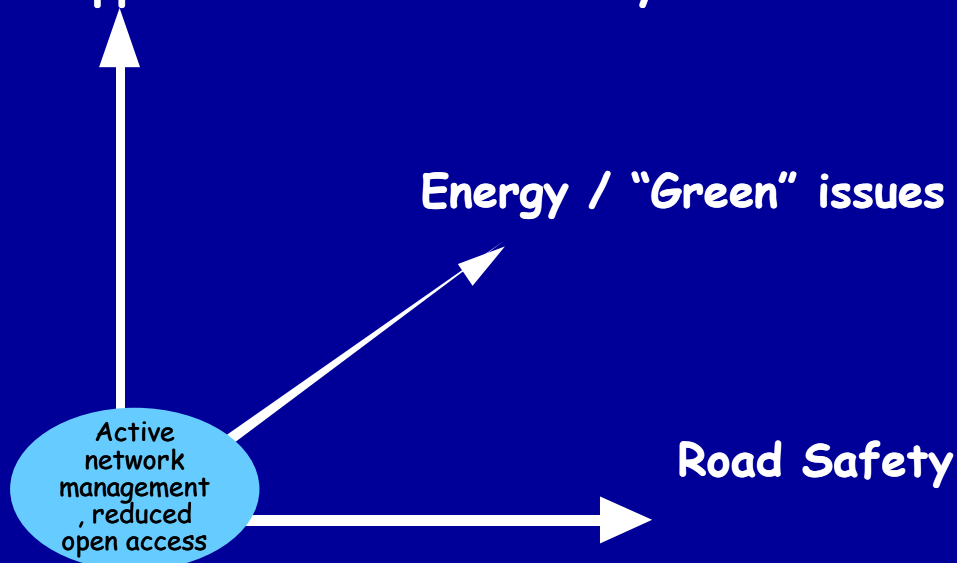
## CVHS State-of-the-art 6

- Multiple stakeholder relationships:
  - Asia-Pacific or Americas or Europe
  - Public sector or Commercial
  - ITS services, telecom bodies, infrastructure owners/operators
- Too much focus on technology, not enough on the business and commercial activities
- We need wider-ranging cross-sector collaboration; probably coordinated by OECD or UNECE and Governments

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## The new managed transport world

Support to national economy



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