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Intelligente Transport Systemer

Hvordan ser leverandørerne ITS? Hvad kan vi i dag? Hvilken udvikling tegner sig? Arbejder de med kooporative systemer?
Skal vi holde fast i system-tankegangen, eller kommer vi til at opleve en kombination af systemiske og kooporative løsninger?

Content

- About Siemens in Denmark
- Traffic data – the basis for traffic management
- Using the data
- Cooperative systems

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Siemens in Denmark

Siemens A/S			
Industry	**Infrastructure & Cities**	**Energy**	**Healthcare**
Industry Automation	**Mobility**	**Turbomachinery Solutions**	**Particle Therapy**
Drive Technologies	**Building Technologies**	**Siemens Wind Power A/S**	
	Power Distribution		

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Fakta om Siemens i Danmark

Etableret i 1893

Medarbejdere: ca. 7.000

Heraf 1.200 ingeniører i forskning og udvikling

Omsætning: >22 mia DKK i 2010
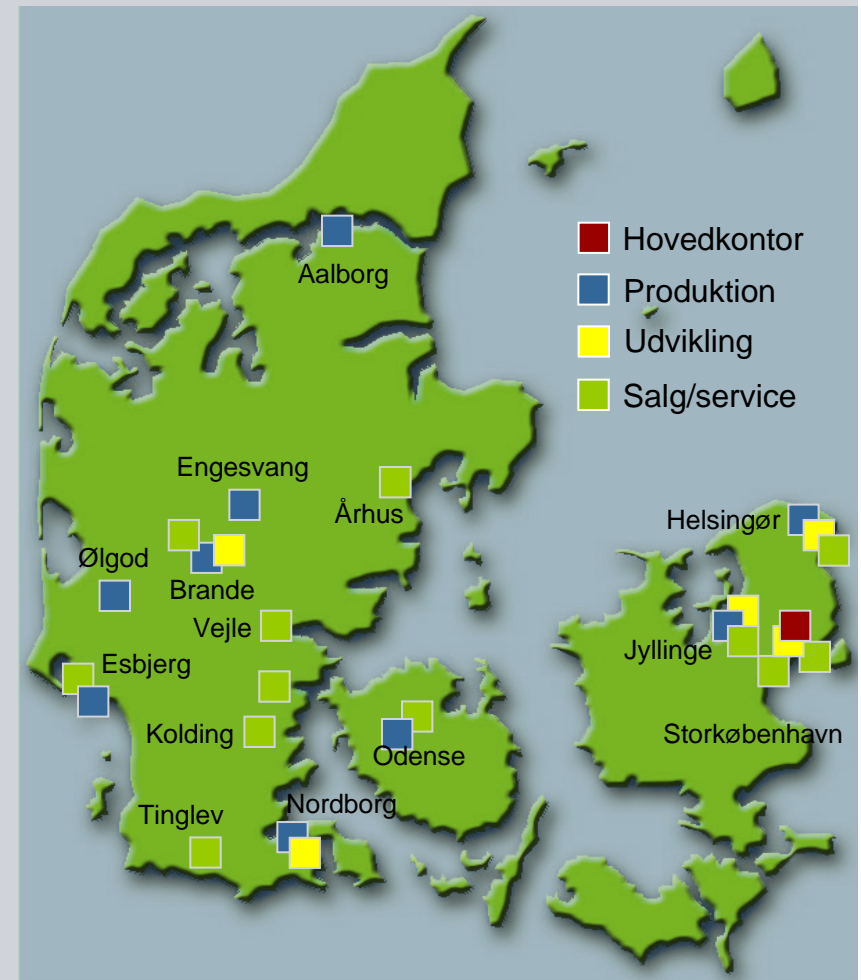
Eksport: 16,5 mia DKK

Investeret: > 6 mia DKK i DK siden 2003

Indkøb i DK: 12 mia kroner fra 3.000 danske underleverandører

Samlet **kontorareal:** 140.000 m2

Samlet **produktionsareal:** 135.000 m2

Samlet **lagerareal:** 50.000 m2

Hovedkontor
Produktion
Udvikling
Salg/service

Aalborg
Engesvang
Århus
Ølgod
Brande
Vejle
Esbjerg
Kolding
Odense
Tinglev
Nordborg
Helsingør
Jyllinge
Storkøbenhavn

Mobility Complete Transportation

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Tunnel Solutions

Tunnal Scada System Storebælt
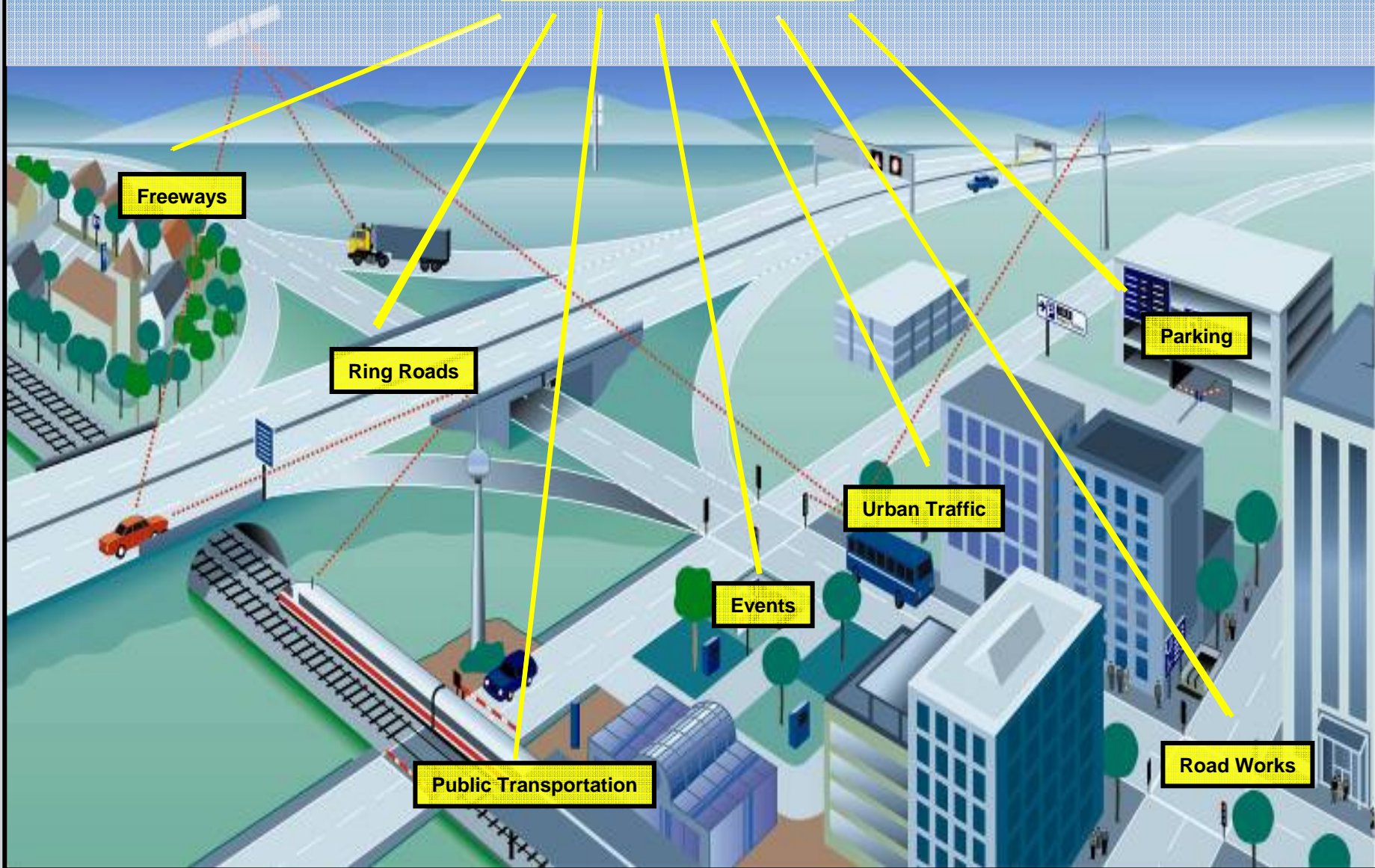
E-Mobility Charging

1700 PDM's Copenhagen

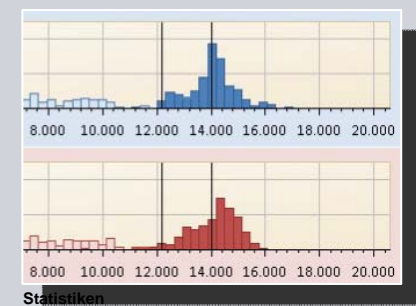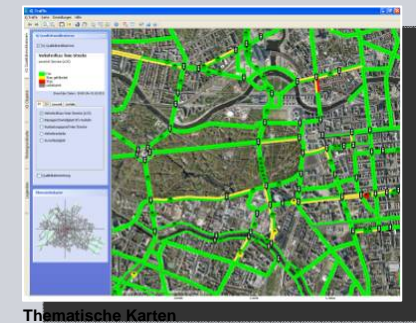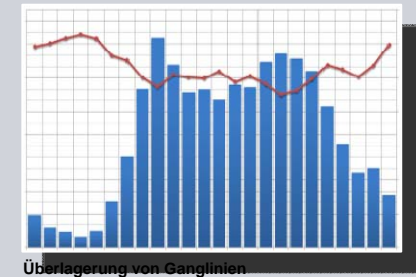Main Customers: Banedanmark, City of Copenhagen & ChoosEV

Content

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- About Siemens in Denmark
- **Traffic data – the basis for traffic management**
- Using the data
- Cooperative systems

Traffic data is the key to intelligent traffic management

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traffic

Traffic quality IT

Traffic quality PT

database accidents

Bild: SenGUV

Environment

air pollution

Noise pollution

CO_2

Historical traffic and environ-mental data

Überlagerung von Ganglinien

Thematische Karten

Statistiken

Traffic data is the key to intelligent traffic management

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Traffic data urban road network

Traffic data Motorway, Freeway

CCTV cams

Floating Car Data (FCD)

Online Traffic Information

Roadworks, Events

Public Transport Data

Weather and Environmental Data

Data Airport

Traffic information central

Dispatcher

Assistance traffic control center

Online traffic situation and traffic information

Traffic Information Internet

Daily traffic forecast for different media

Dynamic message signs

traffic, environmental reports

Dynamic Message Signs with new kind of information

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traffic situation

Frankfurter Allee
ab Samariterstraße
nur 1 Spur frei - Rohrbruch

multimodal

Von Lichtenberg zum
Alexanderplatz: Staufrei
mit der U5 in 12 Minuten

events

ITB 2011
Parkplatz Olympiastadion
Messe-Shuttle nutzen

increase safty

Unfallschwerpunkt:
Beachten Sie die zulässige
Höchstgeschwindigkeit!

forecast

Montag 21.00 – 05.00 Uhr
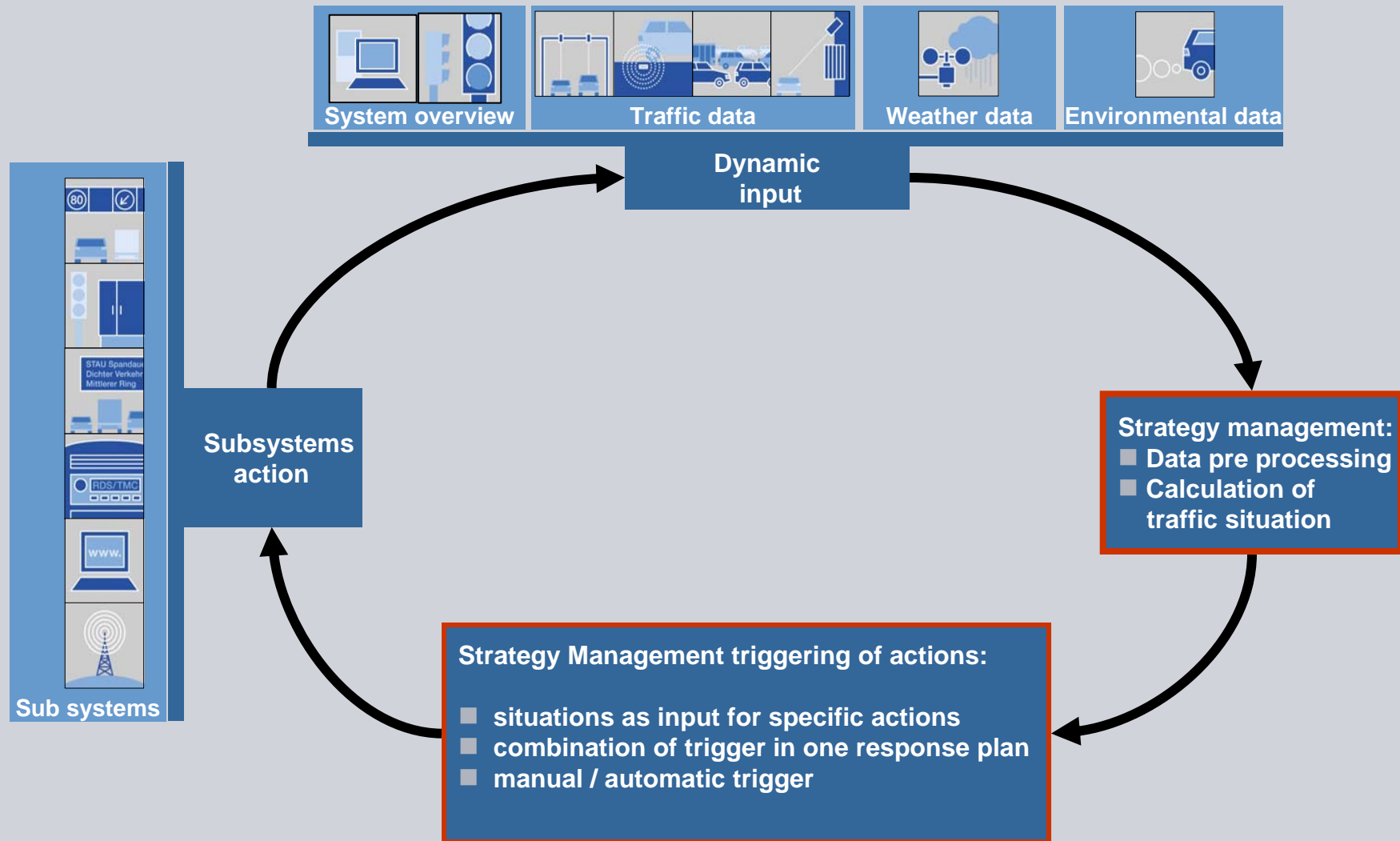SPERRUNG
A100 Tunnel Britz

environmental information

Hohe Luftschadstoff-
Belastung:
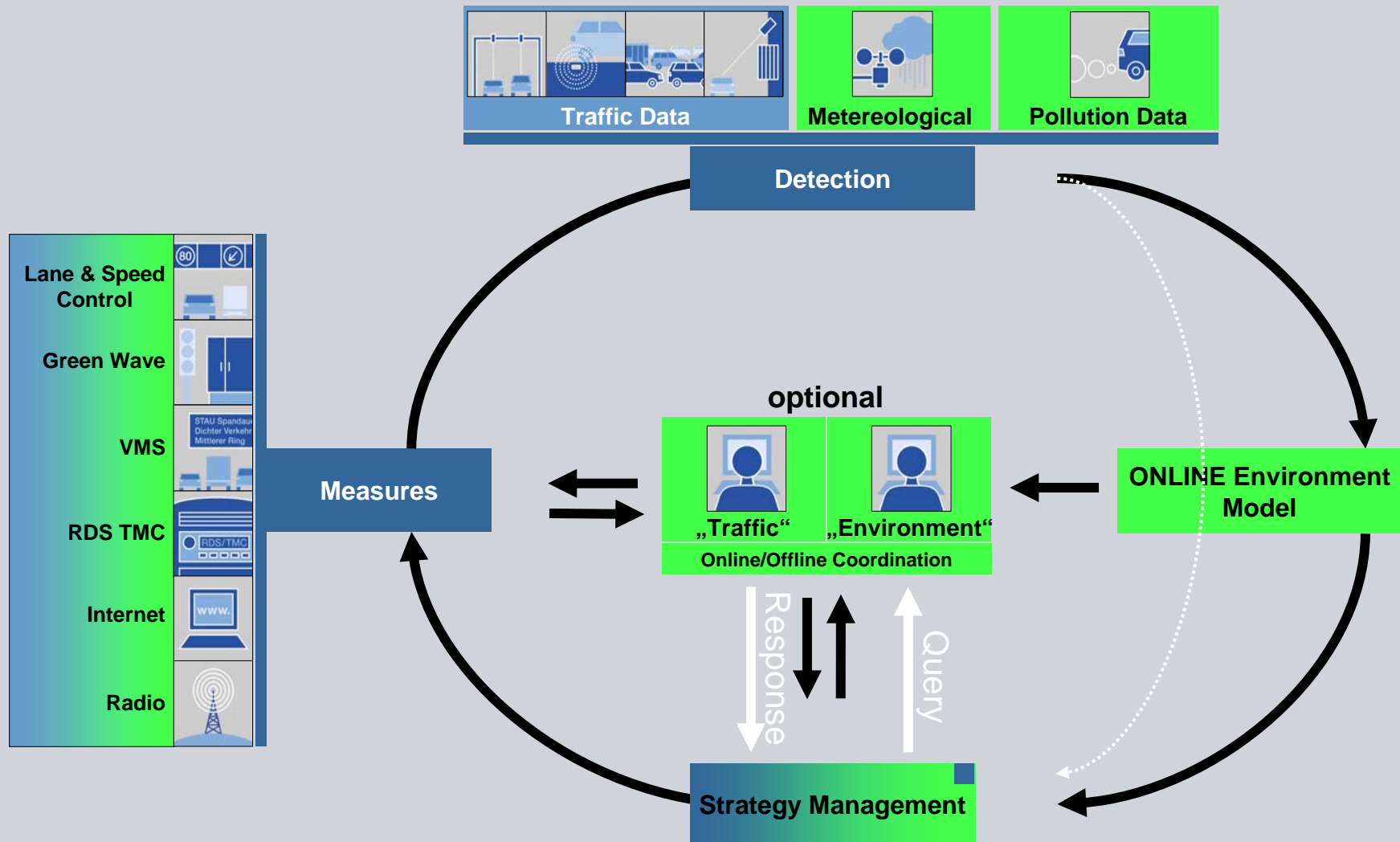Bitte den ÖPNV benutzen

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Content

- About Siemens in Denmark
- Traffic data – the basis for traffic management
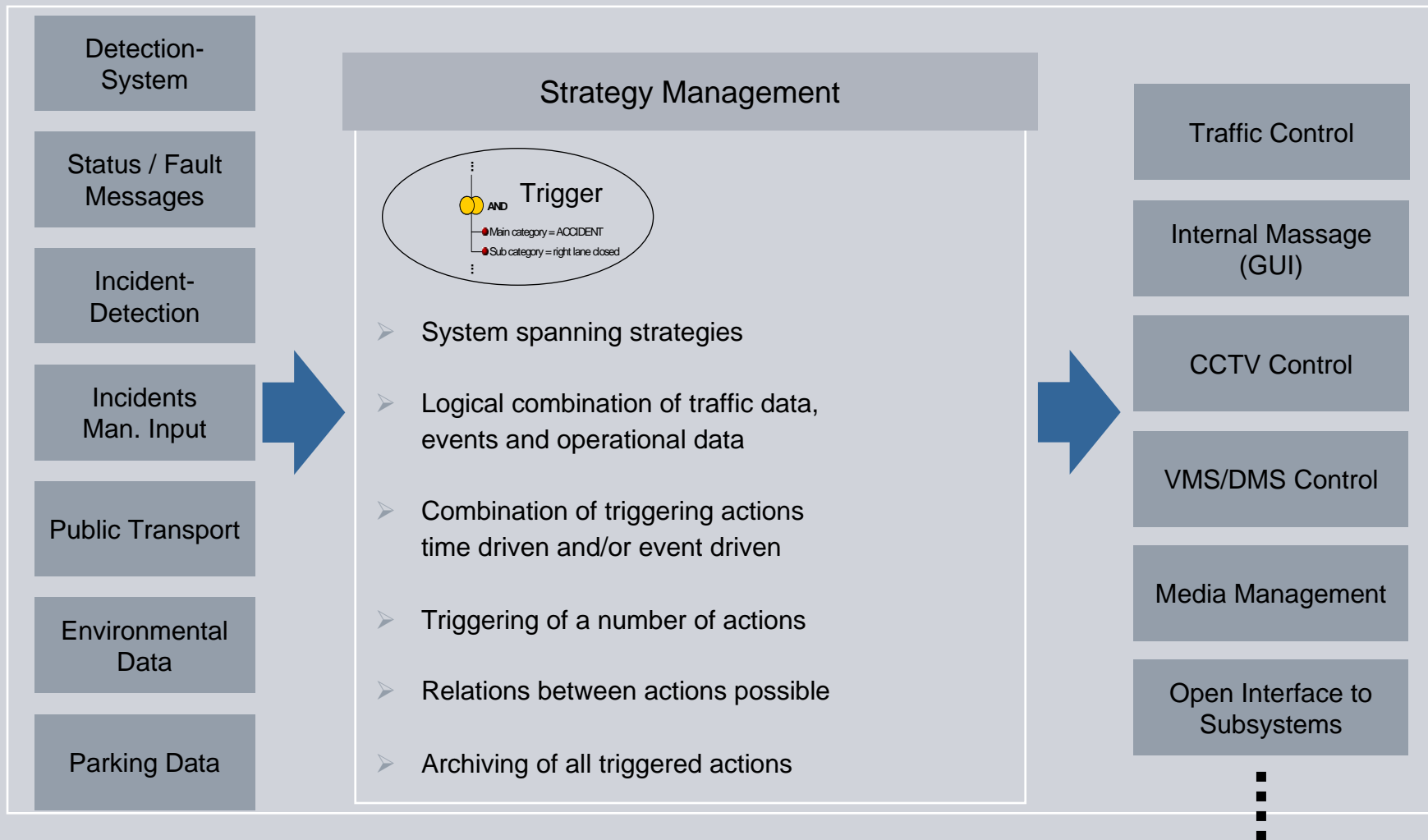- **Using the data**
- Cooperative systems

System wide traffic strategies

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System overview | **Traffic data** | **Weather data** | **Environmental data**

Dynamic input

Sub systems

Subsystems action

Strategy management:
- Data pre processing
- Calculation of traffic situation

Strategy Management triggering of actions:

- situations as input for specific actions
- combination of trigger in one response plan
- manual / automatic trigger

Strategy Management: Environmentally sensitive feedback loop

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Strategy Management – using triggers

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Inputs	Strategy Management	Outputs
Detection-System		Traffic Control
Status / Fault Messages		Internal Massage (GUI)
Incident-Detection		CCTV Control
Incidents Man. Input		VMS/DMS Control
Public Transport		Media Management
Environmental Data		Open Interface to Subsystems
Parking Data		

Strategy Management

Trigger

AND
- Main category = ACCIDENT
- Sub category = right lane closed

- ➢ System spanning strategies
- ➢ Logical combination of traffic data, events and operational data
- ➢ Combination of triggering actions time driven and/or event driven
- ➢ Triggering of a number of actions
- ➢ Relations between actions possible
- ➢ Archiving of all triggered actions

Strategy Management
Response Plan

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- ➢ Plan and simulation of response plan to test action plans

- ➢ Simulation in parallel to online-system, simulation of operator interventions possible

- ➢ No effects on online-system and no storage

- ➢ Definition of offset-times

- ➢ Simulation time adjustable

- ➢ Visualisation of execution of actions

Strategy Management
Response Plan

- Plan and simulation of response plan to test actio...
- Simulatio... simulatio... possible...
- No effec... storage...
- Definition...
- Simulatio...
- Visualisa...
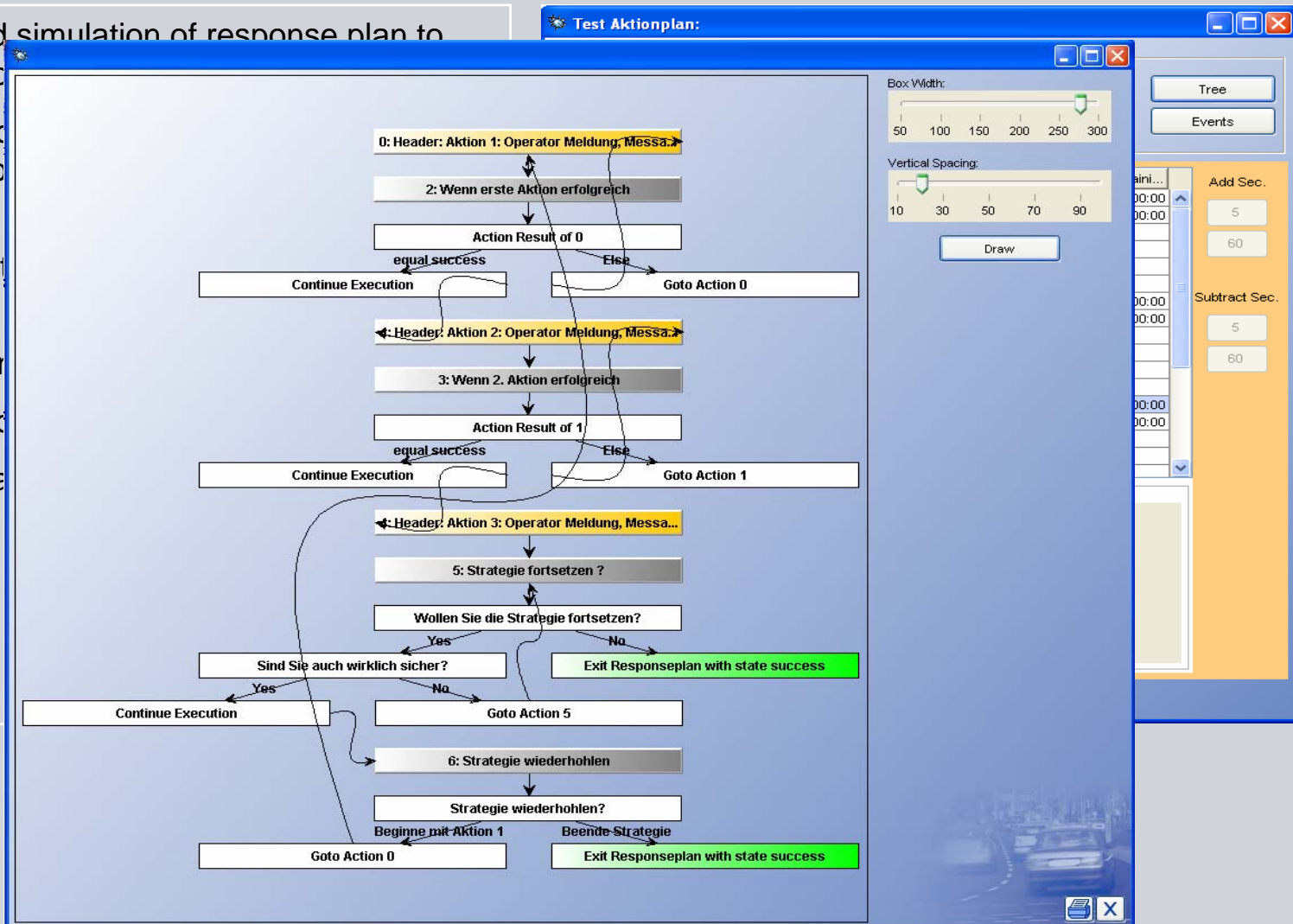
Traffic Management "Green" Example:
Truck Routing in Hagen

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Environmental Monitoring & Preventive Routing

Environmental Sensors

- ➢ Fine Particulate
- ➢ Ozone Level
- ➢ CO2 Emission
- ➢ Weather Status

Traffic Detection Units

Traffic Management System

Traffic Data Collection

+

Level of Service   *Environmental Data*

Operator

Strategy Management

Trigger

AND

Main category = ACCIDENT
Sub category = right lane closed

1. Set Dynamic Message Signs   ✓

INNER-CITY TRAFFIC RESTRICTION

All Trucks Detour via North End Road

Freeways
Ring Roads
Urban Area

Traffic Flow has Direct Impact on the Local Emissions of Nitrogen Oxides
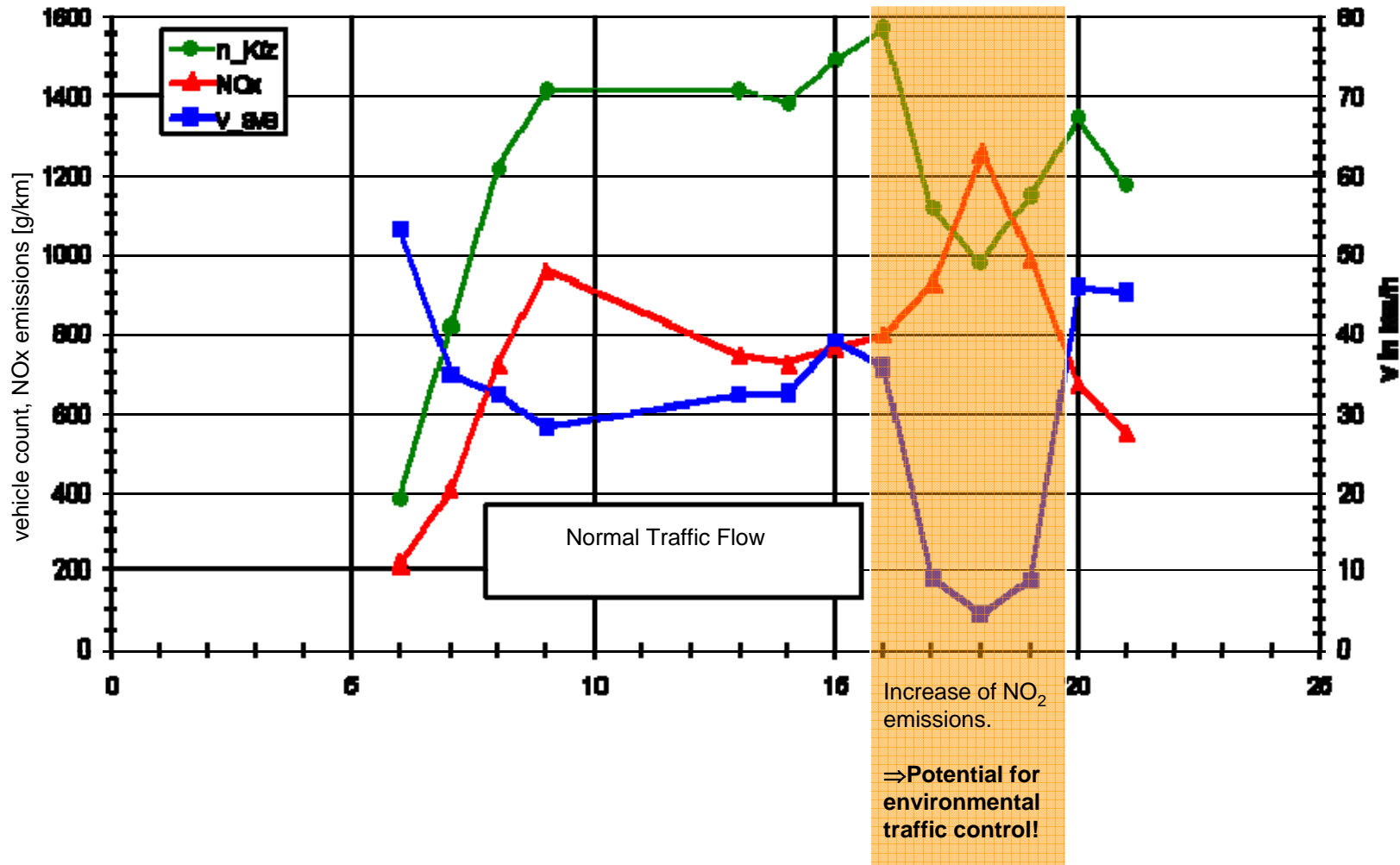
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Source: TÜV Nord, H. Steven; 2008; research project iQmobility
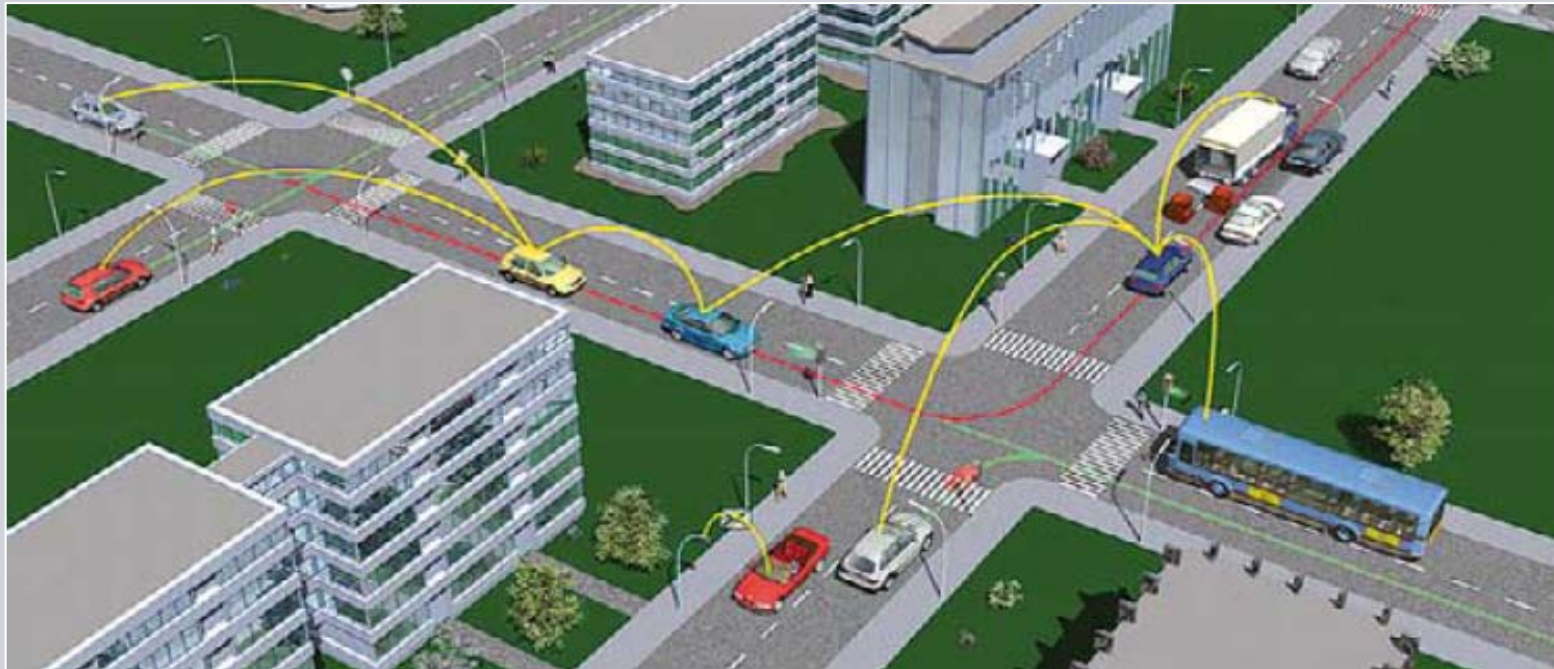
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- **Cooperative systems**

What are Cooperative systems?

- C2x is the new paradigm for transportation

- C2x gives us new ways to address
    - Increasing efficiency and safety through vehicle and infrastructure cooperation
    - Creating a wireless network between vehicles and infrastructure

- C2x will happen–it's only a matter of when and how, C2x means:
    - Car-to-Car communication
    - Car-to-Infrastructure communication
      (Infrastructure means both, outstations and traffic centre)
    - Infrastructure-to-Infrastructure communication

What are Cooperative systems?

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- C2x is the new paradigm for transportation

- ture

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-

Cooperative Systems Vision

Over the next five years, communication via multiple mobile channels will allow vehicles everywhere to be fully 'networked' with the road infrastructure.

The vehicles themselves will act as traffic data generators, greatly enriching the data available.

In addition to the traditional collective messages, traffic management and control systems will offer - at any point on the road - specific information for individual vehicles.
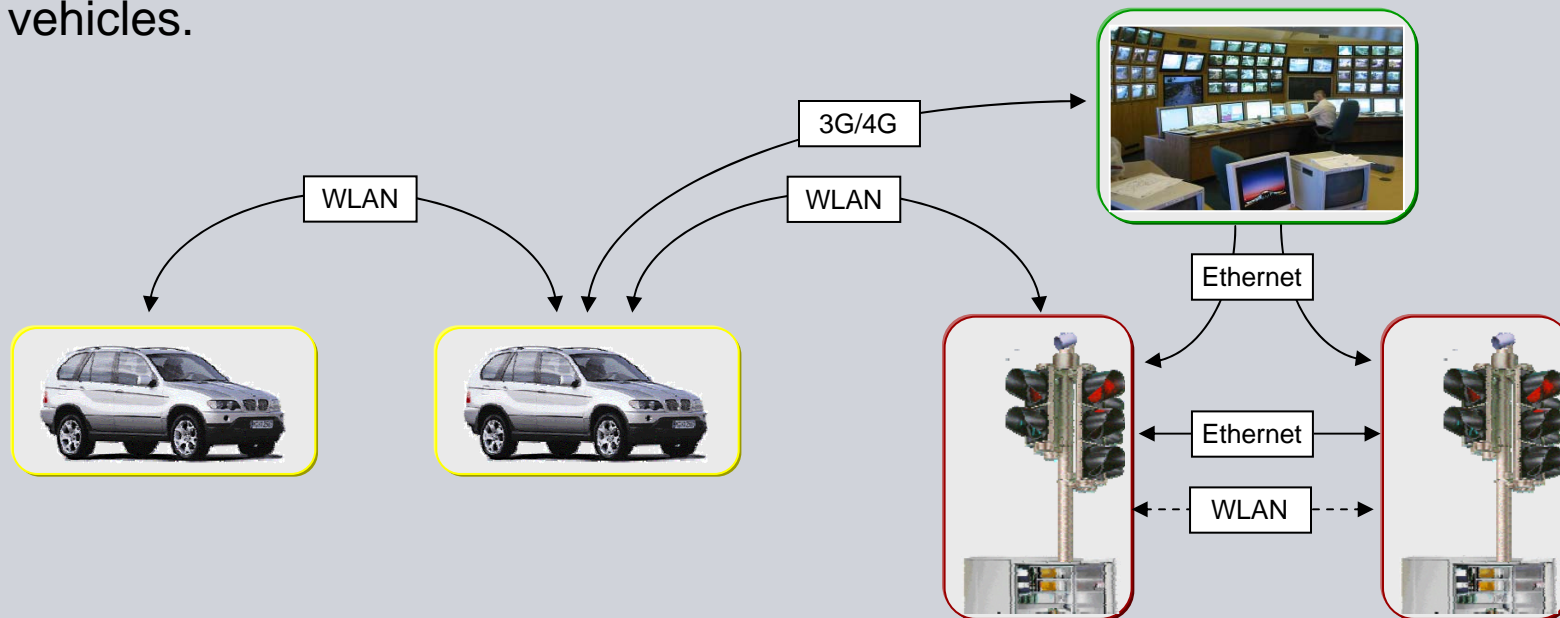
CS raise Expectations

Traditional ITS functionalities can be improved and new functionality will be
required; e.g.:

- Accident/incident warning
- Weather condition warning
- Traffic congestion warning
- In-vehicle variable speed limit info
- Parking space availability
- Signal timing for downstream intersections
- ….

Likely initial scenario: mutual beaconing

- Infrastructure elements upgraded to broadcast locally displayed signal, limits, warnings, …
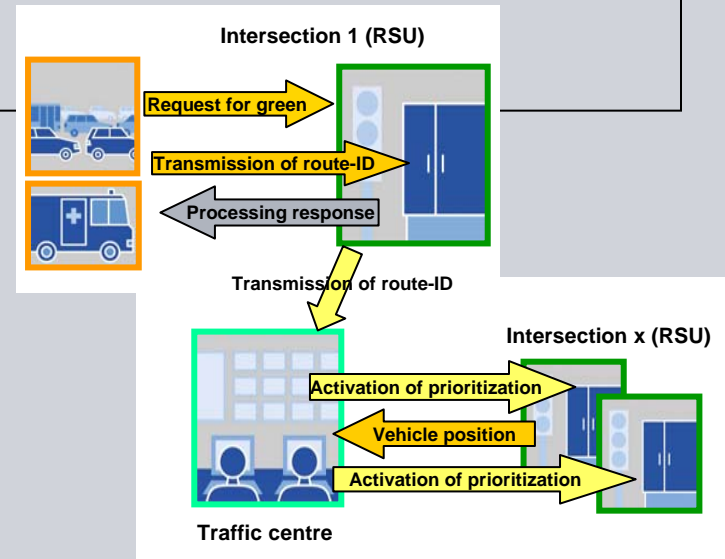- Vehicles equipped to "pulse" continuously their position, speed, direction, …

Example of Siemens pilot activities
Field Trial in Dortmund (Research Project CVIS)

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5 intersection controller (C900) equipped with Co-operative ITS equipment

4 Co-operative ITS applications:
- local priority app
- central priority app
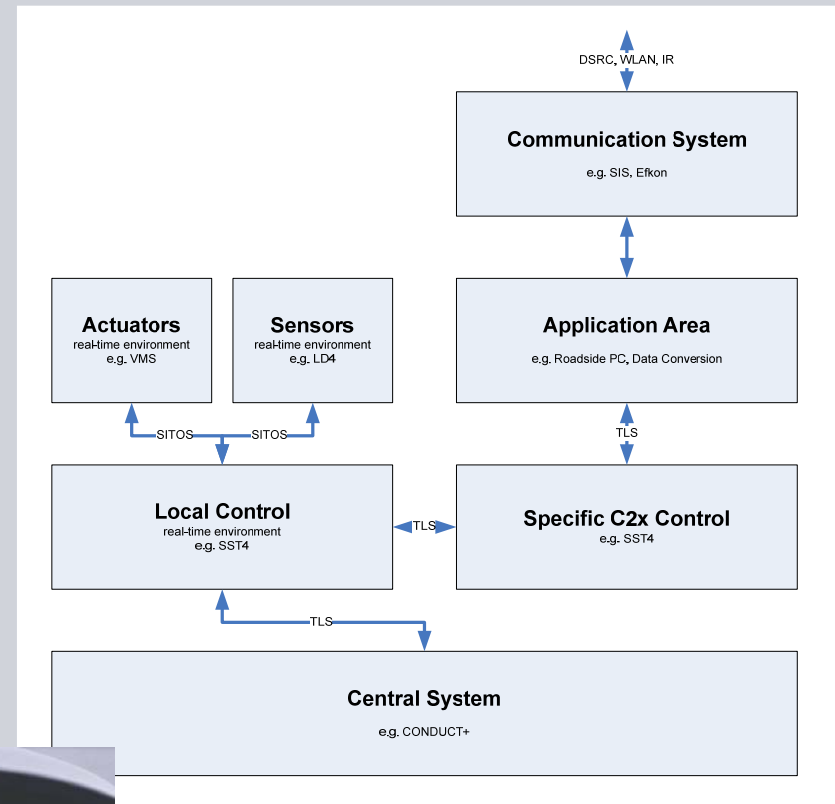- local traffic state
- data fusion (FCD/loop sensor)
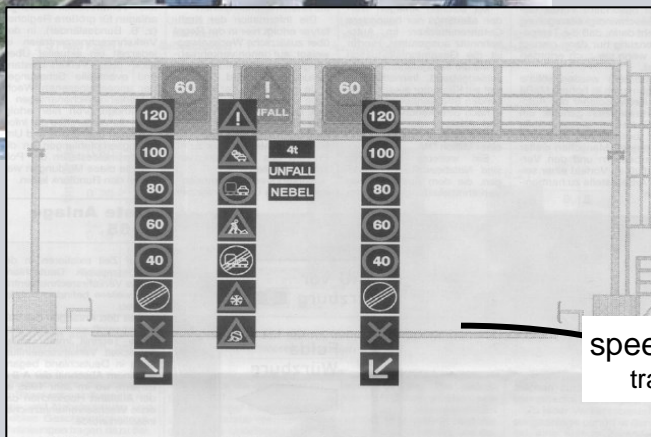

Intersection 1 (RSU)

Request for green

Transmission of route-ID

Processing response

Transmission of route-ID

Intersection x (RSU)

Activation of prioritization

Vehicle position

Activation of prioritization

Traffic centre

In-vehicle Speed Limitation Info

speed limitation
transmission

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Field Trial in Munich together with BMW

4 Traffic Controller in Meyerbeer- / Offenbachstreet
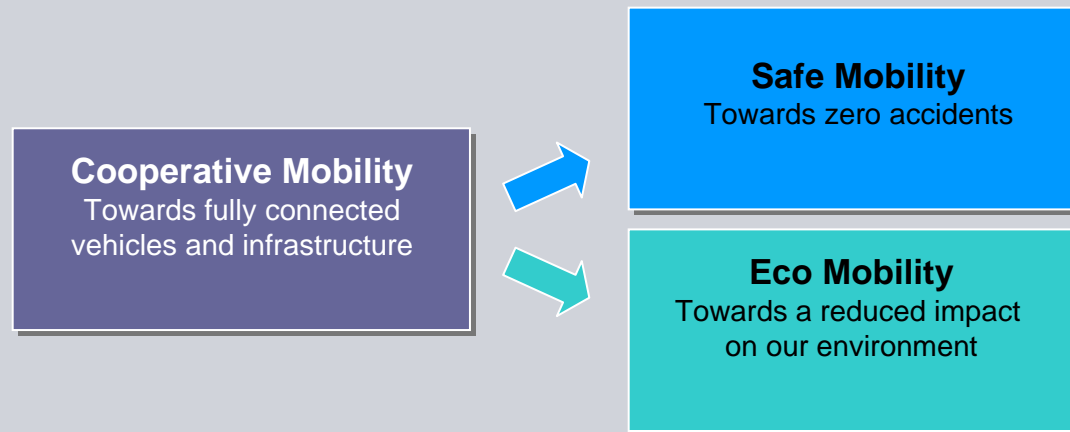
3 BMW- test vehicle

Start up engine just before green

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Requirements for Market Development

- **Traffic management**, a sovereign task – not only today but in the future too.
- **Market launch** of C2x applications for traffic safety and efficiency improvement have to be mandatory.
- Global commitment by all stakeholders to the overall **C2x system architecture**.
- Government have to establish the **frameworks for C2x deployment** and have to outline what public authorities have to do and not to do.
- Continue seriously and finalize **standardization** issues asap.
- **Car-OEM self-commitment** to equip new cars with C2x technology beginning 2012 at the latest.
- **Deployment of RSUs** on primary and secondary road network (interurban, urban) and **deployment of C2x-control/management centers** by road operators/public authorities.
- **Free of charge use** of FCD and xFCD by public authorities.
- Market launch, **first stage**: start 2010 (USA), 2013 (EU)
- Market launch, **final stage**: start 2012 (USA), 2017 (EU)

Conclusion

Cooperative Mobility
Towards fully connected
vehicles and infrastructure

Safe Mobility
Towards zero accidents

Eco Mobility
Towards a reduced impact
on our environment

Systems and cooperative technology will coexist

CS offer the possibility to reduce investments in loop detectors, above ground sensors, VMS, etc.)

CS allow combining individual navigation and collective route guidance

CS support the political targets for future transportation: Enhance Safety and reduce green house gas emissions

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Thank you for your attention

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