

A photograph of a car driving through a tunnel, with light trails from other vehicles and the tunnel's structure visible. The image is partially obscured by a white diagonal shape.

Vehicle-to-Infrastructure Communication from an Inter-Urban Perspective

Dr. Gerhard Ploss, Swarco Traffic Holding GmbH

SWARCO | First in Traffic Solutions.

SWARCO: HISTORY AND VISION



➤ History:

In 1969 start with a glass bead factory
in Amstetten, Austria

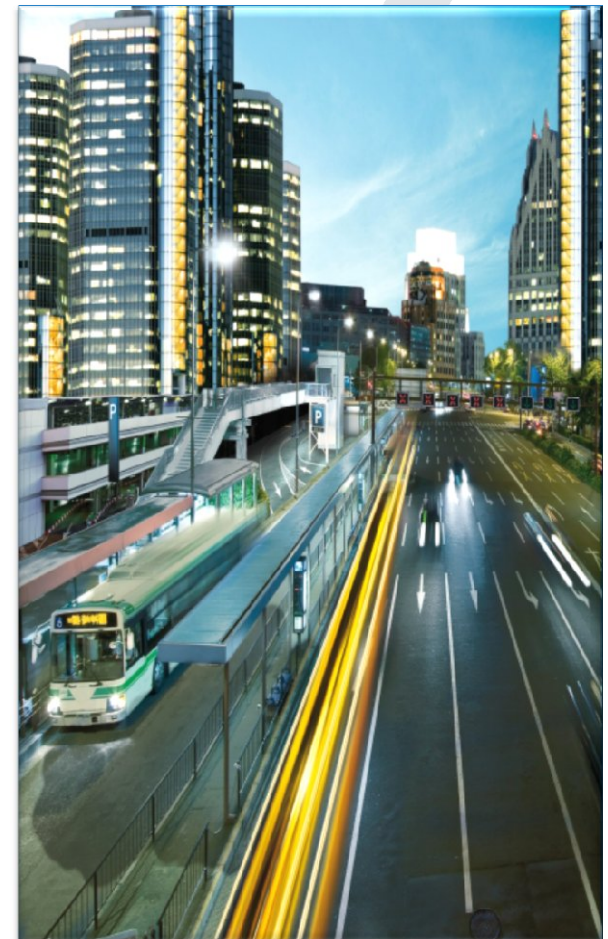
➤ Founder, owner and President of the Executive Board:
Manfred Swarovski

➤ SWARCO AG headquarters: Wattens / Tyrol

➤ complete programme of products, systems, services
and solutions in road marking, traffic signalling,
signage, and traffic management

➤ Vision:

*„We want to be the first choice in road safety
and intelligent traffic management worldwide.“*



THE LINK SWAROVSKI – SWARCO



Manfred Swarovski
Founder and Chairman of SWARCO

shareholder

D. SWAROVSKI & CO.
founded in 1895

Crystal

Optics

Abrasives

30,000 employees
€ 3,2 bn turnover

owner

SWARCO AG
founded in 1969

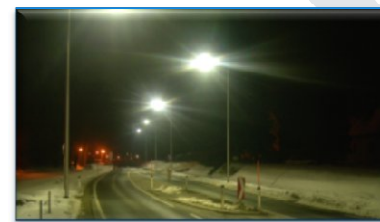
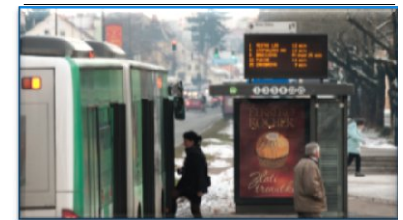
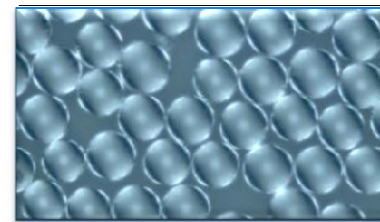
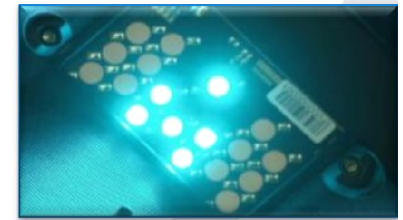
Road Safety &
Traffic Management

80 companies
3,500 employees
€ 650 million turnover

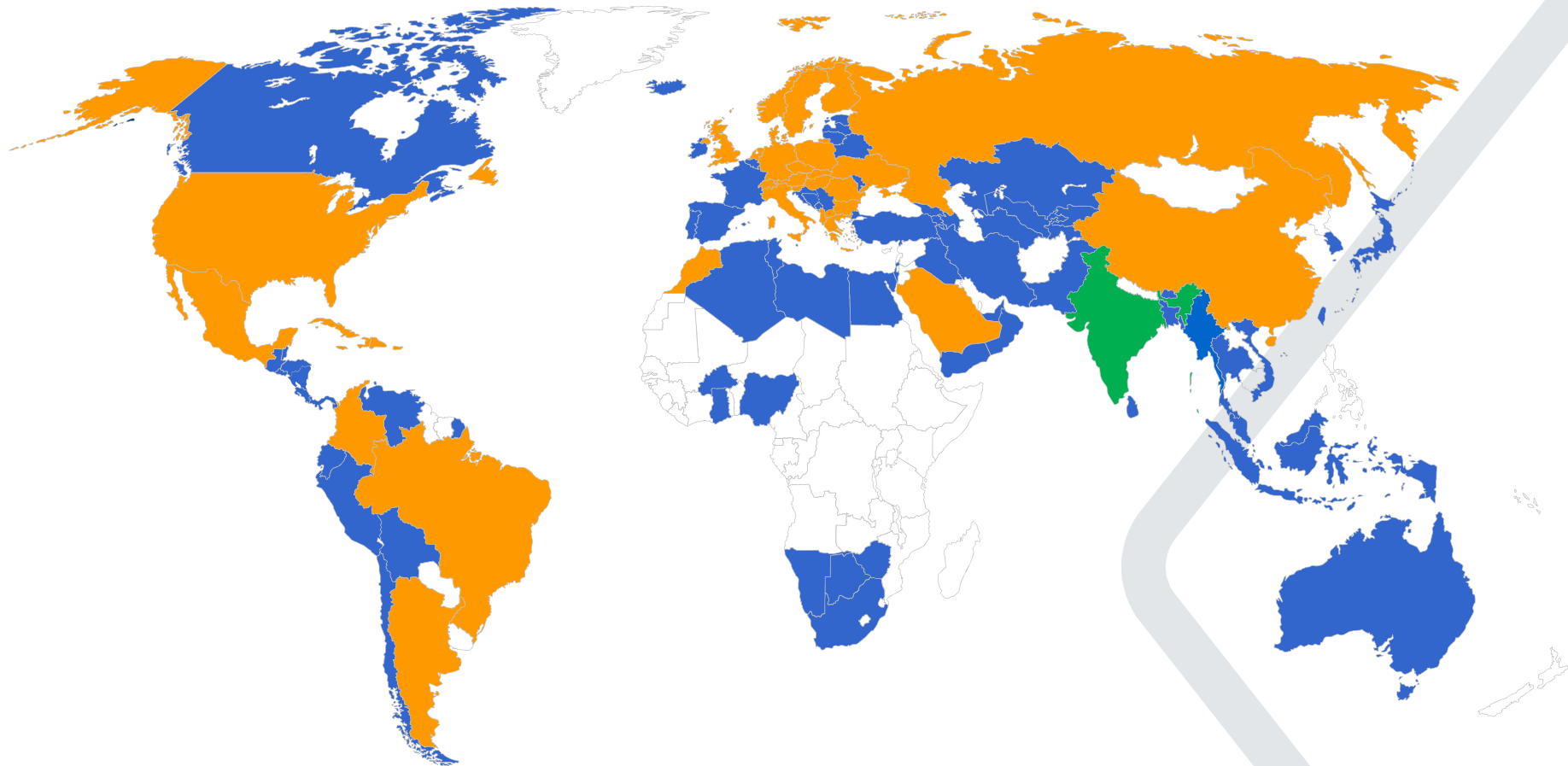
SWARCO LEADING POSITIONS



- Worldwide no. 1 in traffic signal production
- Worldwide no. 2 in glass bead production
- Industry leader in LED signalling technology
- Industry leader in adaptive traffic control
- Market leader in central systems and Smart City Technologies in Europe
- Market leader in traffic materials e.g. in the USA and Germany
- more than 80 companies in 30 countries
- SWARCO exports into almost 80 countries



CORPORATE OVERVIEW



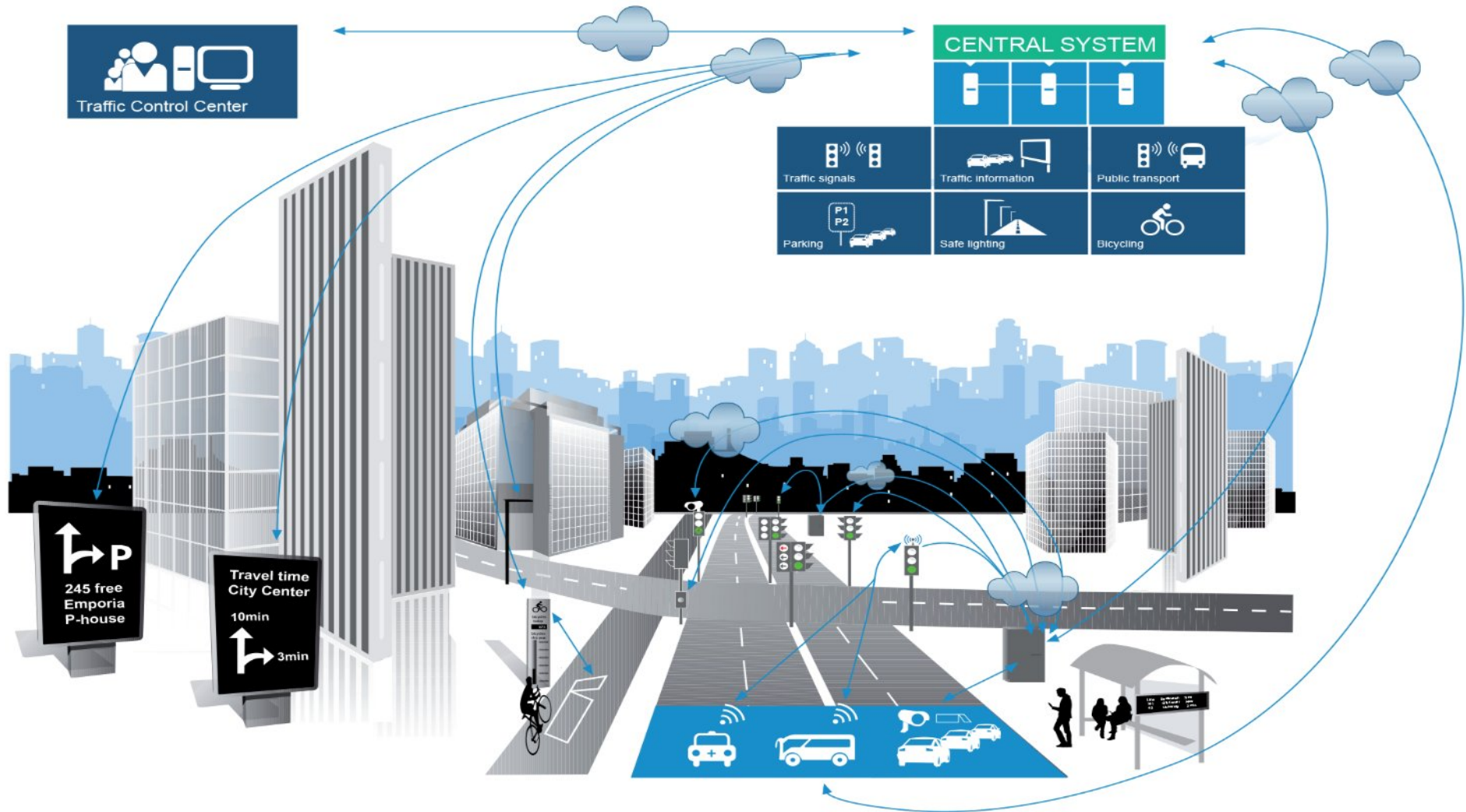
Country with SWARCO
company or location

Thanks to a dense network of cooperation partners, SWARCO quality
solutions can be found in almost 80 countries around the globe.

Smart City: and extended and variable mix of systems and services



Smart Mobility



Cui bono – Why V2X?



C-ITS Platform 2015 – final report:

http://ec.europa.eu/transport/themes/its/c-its_en.htm

A first overall conclusion is thus that the benefits of deploying C-ITS services are very large indeed but they will not appear in the short-term.

Dominant benefits

- Reduced travel times/ increased efficiency (66%)
- reduced accident rates (22%)
- Fuel consumption savings (11%)

Source: WG1 final report p38

June 2015: Rupert Stadler, Berliner Wirtschaftstag:
"If all traffic lights in Germany would be connected,
900 million litre fuel could be saved per year. This
equivalents more than two million t less CO₂."

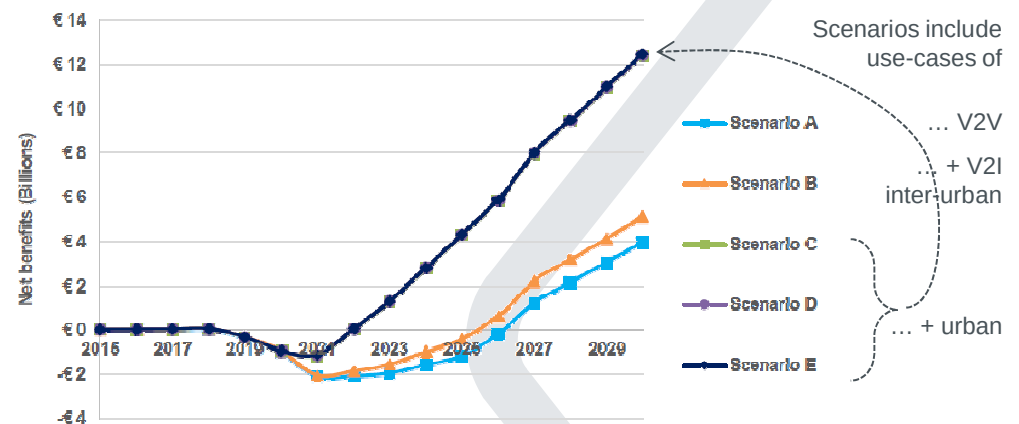


Figure 3: Net Benefits from C-ITS

Quis solvit – Who pays?



C-ITS Platform 2015 – final report

Dominant costs

- Hardware in vehicles (86%)
- Aftermarket devices (10%)
- Rest - incl. Infrastructure (4%)

Source: WG1 final report p38

i.e.

- Vehicle Industry will have to bear main extra-costs
...and therefore be a key driver

http://ec.europa.eu/transport/themes/its/c-its_en.htm

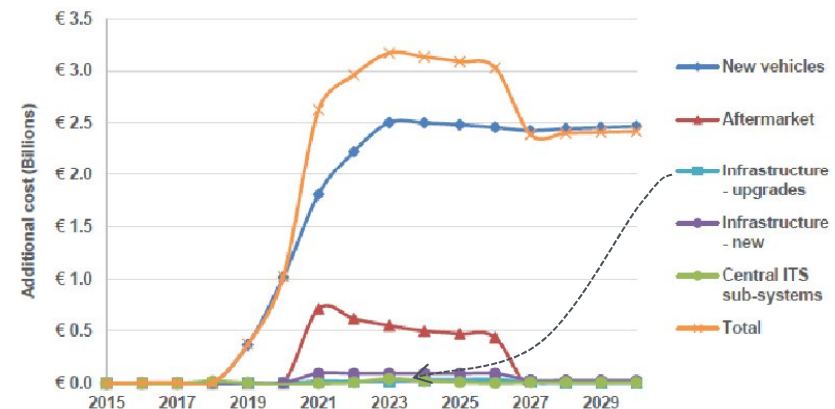


Figure 4: Costs for C-ITS deployment

V2X: A new Basis for Intelligent Traffic Management



Traffic survey

Use vehicle movement data

Every second a probe: V2X-CAM messages as source

Data collection on the intersection

- Stops (per lane; before/after stop line)
- Waiting times & travel times
- Start and end positions (origin-destination)

Detect with one sensor a range of several 100m

- Speed / travel time for individual lanes or ramps
- Traffic jam generation/resolution

Cooperative traffic data

- Possibility for traffic analysis in new dimension, based on individual vehicle movement data.



TRAFFIC LIGHT ASSISTANT (TLA)

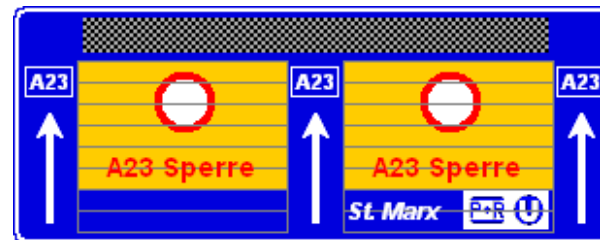
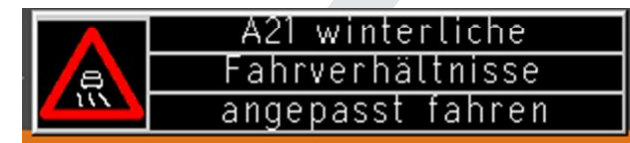


Operational in Berlin, Garmisch, Verona...



In-Vehicle Information (ISO/TS 19321)

Content of [dynamic] road signs



Images: ECo-AT ECo-AT_SWP2.1_InVehicleInformation

Other defined applications



“On air standard messages are not enough”

Roadworks Warning (RWW)

- › Allow vehicles to “see” warning trailers

General (safety) warnings

- › Mark upcoming area to be driven with care
- › Local Hazards
- › Share information on slippery road, jams ends, accidents,...



Image: drive-c2x.eu

Cooperative Warning

- › Is precise ‘on the spot’
- › Injects “electronic knowledge” on risks to our safety systems



Image: <https://www.afas-online.de/>

Other defined applications



Variable signs:
Speed limits



Image: drive-c2x.eu

➤ Shockwave damping

- Avoid creation and propagation of jam ends due to oversaturated traffic flow
- Already shown in A58, NL
- To be deployed in C-ROADS, Hessen, Germany

Shockwave Damping



Tomorrow: Speed recommendations between signs directly to the onboard assistance systems



C-ROADS
Hessen Mobil
Straßen- und Verkehrsmanagement

Launch Q4/2018: C-ROADS
Hessen



Continental

What else is SWARCO providing on Highways?



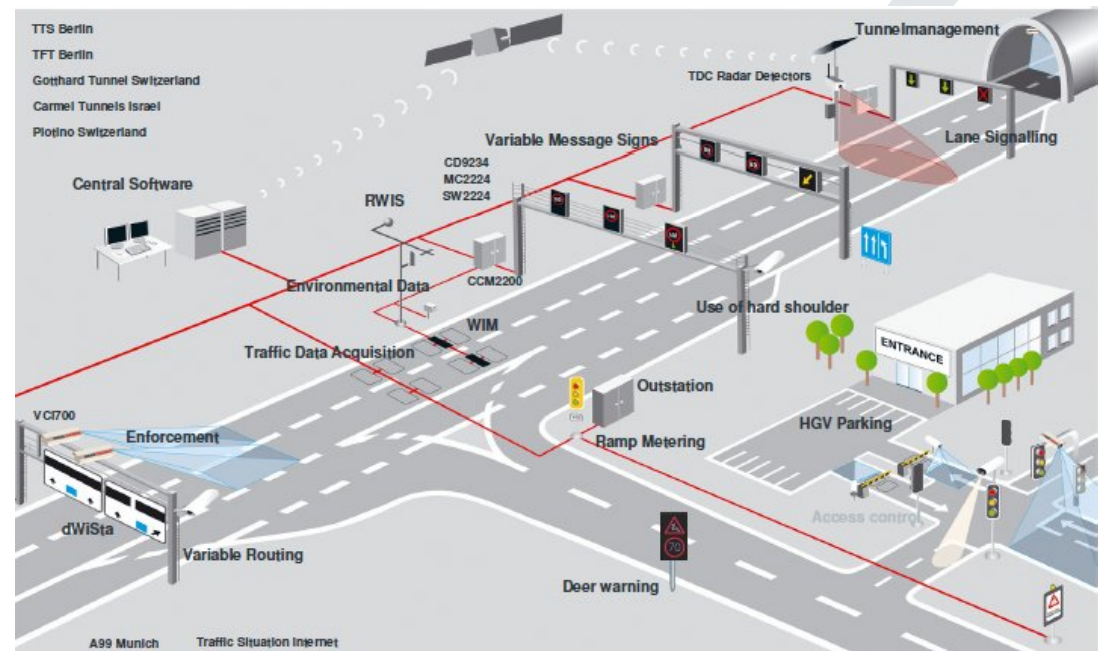
- Design
- Engineering
- Software development
- Production
- Installation
- Implementation
- Maintenance
- Project management
- Research and development



System supplier and - integrator



- Network-wide rerouting
- Corridor and lane control system
- Ramp metering installations
- Temporary use of hard shoulder
- Speed warning system
- Traffic data acquisition
- Truck parking system
- RWIS
- WIM
- Wild animal warning system
- Wind warning systems
- Height control System

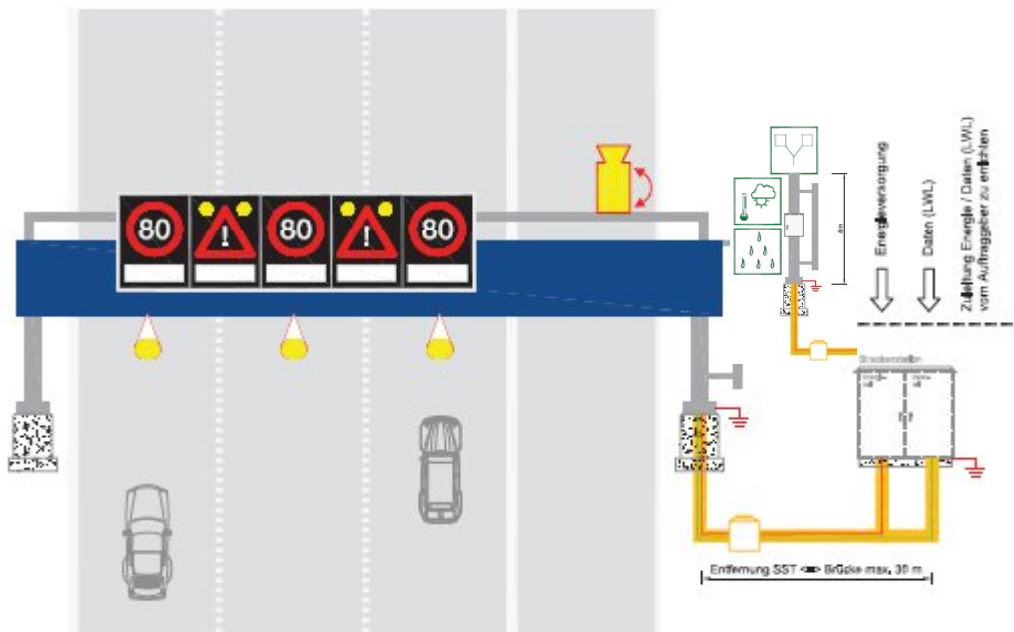


Corridor and lane control system



➤ Benefit

- Reduction of accidents of 30% up to 50%
- Increasing road capacity of approx. 10%



➤ Function

- ▶ Detectors and Environmental sensors monitoring the traffic situation and weather conditions
- ▶ Data will be sent to the traffic management centre
- ▶ Special developed algorithm determine the optimal traffic program
- ▶ Based on real data:
 - ▶ the traffic flow will be harmonized (speed limit)
 - ▶ warning signs will be activated (traffic jam, road construction, fog , ice ...)



Network-wide rerouting



➤ Benefit

- Optimum use of road capacity
- Travel time information to the drivers
- Safe travel time



➤ Function

- In case of incidents like traffic jam, road work, accidents ... the driver will be informed at junctions about a alternative route.
- Further information could be displayed at the dynamic signs (Prism or LED)
- The operator in the management centre create or use predefined messages and send it to the dynamic signs
- The message could be also generate automatic at all the other affected signs



HAMBURG CONTROL CENTER



THANKS FOR YOUR INTEREST



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