Status on automated and connected vehicles in Norway

Source: Norwegian Public Roads Administration
● New law on testing of automated driving
● Smart feeder
● E8 & Borealis
● C–ITS activities in NPRA
● Participating in standardisation of C–ITS
● Developing an ITS–station
● RSI project
● TLA project
● Automated Control
● Large scale C–ITS pilots in NTP 2018–2029
Høring - Forslag til ny lov om utprøving av selvkjørende kjøretøy på veg

Samferdselsdepartementet sender på høring utkast til ny lov om utprøving av selvkjørende kjøretøy på vei. Formålet med denne loven er å legge til rette for utprøving av selvkjørende kjøretøy på vei, innenfor rammer som særleg ivaretar trafikksikkerhets- og personvernhensyn.
Connected and automated driving in Norway

Smart feeder

- Long term pilots with automated shuttlebuses
- Seamless public transport
- Get experience with establishing prosject like this in Norway
- Data for evaluating effects etc.

Jernbane-direktoratet
SINTEF
Statens vegvesen
ITS NORWAY
ACANDO
Connected and automated driving in Norway

E8 & Borealis

North-Norway

Tromsø
Bodø

Nordland county

Tromsø
Kirkenes

Finnmark county

Nordkjosbotn
Skibotn

Troms

38 km

Nordkjosbotn to Skibotn via E6

15.02.2017
Connected and automated driving in Norway

E8 & Borealis

- Length 38 km
- 22 km has speed limit of 90 km/h
- Traffic volume: 700 AADT, 27% HGV
- Important route for transportation of fish
- The road has a yellow center line, but the road is partly narrow
- The combination of a narrow road, sharp curves and steep gradients causes problems for heavy goods vehicles (HGV)
- Snow drifting is a problem closer to the finish border
- Accidents involving reindeers
Why is it important to develop ITS for transport and traffic on the roads in Finland and Norway?

- To provide efficient, safe and environmentally friendly transport
- Facilitate increased export industry

Looking into the future;
- Autonomous driving
- There will be a lot of different activities to support future autonomous driving on level 4
Consequences for the E8 project – Borealis

Borealis must facilitate technical solutions to enable the implementation of systems that will contribute to achieving the overall goals.

Requirements:

- Complete 4G coverage – will be in place within at the end of 2017
- High-quality GPS coverage
- Fiber cable – implementing and/or facilitate in all NPRA road projects
- Emergency network
- DAB
- Sufficient number of weather stations
- Sufficient number of traffic counting stations
- Facilitate other ITS solutions
- Facilitate business development and new services within ITS, based on open data
Connected and automated driving in Norway
E8 & Borealis

Information from and between vehicles, ref Nordic Way

- C–ITS (Cooperative ITS)
  - Use of C–ITS to collect and share information
  - Navigability (when poor visibility caused by drifting snow)

- Sensors on vehicles driving in the area
  - Fish transport, Skjervøy–Helsinki
  - Other?

- Warnings of
  - Slippery road
  - Incidents
  - Wildlife
C–ITS activities at NPRA

- **International participation:**
  - Amsterdam Group where stakeholders from cities, vehicle manufacturers, road operators and road authorities meet to promote deployment of C–ITS
  - ERTRAC which is the European technology platform bringing together road transport stakeholders to develop a common vision for road transport research in Europe.
  - Polis is a network of European cities and regions working together to develop innovative technologies and policies for local transport.

- **Pilot project and demonstrations**
  - Participation in national and international R&D project (Innovation Norway, the Norwegian Research Council, NordFoU, EU etc)

- **Knowledge retrieval**
  - Participation at conferences and workshops nationally and internationally, such as ITS Europe, ITS World, TRA and TRB

- **Promoting C–ITS** in the Norwegian National Transport Plan 2018–2029
Participating in standardisation of C–ITS

ITS Standards Developing Organizations

- ISO TC204: 1993
- CEN TC 278: 1992
- IEEE
  - IEEE 802.11p
  - IEEE P1609
- IETF
- IPWAVE
- ETSI TC ITS: 2007
- SAE
  - J2735
  - J2945
International harmonisation of C–ITS

Standards Harmonization WG – Participation

C–ITS in Norway
Road Status Information – The car as a sensor

Can the car warn about slippery roads?

- Connected vehicles
- Network of mobile sensors
- Can alert the driver of slippery roads
- Can provide data for decision support tools for winter operation
- Learn about a new, mobile data sources and the “Internet of Things”
- Cooperation with the car industry, Trafikverket and universities
Traffic Light Assistant – TLA

- 48 signal intersections are updated to share signal shifts with approaching vehicles (Signal Phase and Timing – SPAT)
- The information is used to customize the speed towards the intersections or countdown to green signal
- Using default standardised SPAT message sets
- The purpose is to gain experience with C–ITS based Signal Phase and Timing solutions.
C–ITS based information to the driver

Illustration of SPAT and other information

![Dashboard with warning sign indicating tunnel is closed](Image)
Commercial transports / C–ITS

Automated controls

- The next-generation vehicle reports its own status on brakes, weight, resting and driving time etc.

- Access control to:
  - Downtown areas
  - Tunnels
  - Bridges
  - etc.
Proposals for large scale C–ITS pilots

- Pilot proposals for Norwegian National Transport Plan 2018–2029:
  - Tunnels
  - Rural areas
  - Urban areas
  - Commercial transports
- Pilot roads:
  - E8, Finland – Skibotn / Tromsø
  - E6, Skibotn – Trondheim
  - E39, Trondheim – Kristiansand
  - E18, Kristiansand – Oslo
  - E6, Oslo – Trondheim
  - E6, Oslo – Sweden
Thank you for your attention…

Sunrise in Rondane. National Tourist Routs, Rondane
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