Nordic

# WAY 3

## Evaluation results

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Picture: Wikimedia Common, S. Solberg J.

# Public-Private Collaboration

NordicWay 3 was **a public-private collaboration** with partners in Sweden, Finland, Norway and Denmark

Co-financed by the European Union within the Connecting Europe Facility (CEF) Programme

- NordicWay (2014–2017)
- NordicWay 2 (2016–2020)
- NordicWay 3 (2019–2023)

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# NordicWay 3 objectives

- Pilot deployment of Day 1 and Day 1.5 C-ITS services & some CCAM services
  - Interoperable and scalable services
  - Harmonization of services
  - Possibility to collect data from vehicles
  - Federated interchange network, border independent
  - Sustainable business models and ecosystems

Credit: Risto Kulmala

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# Focus: C-ITS services for the Nordic conditions

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# Evaluation activities

- Build on findings of NordicWay and NordicWay 2
- Focus of evaluation on: **Is it feasible to provide C-ITS services in the Nordic countries?**
  - Are C-ITS services accepted in the Nordic countries?
  - Is the technical performance sufficient for service provision?
  - Do drivers react to messages as intended?
  - Can we expect socio-economic benefits from the use of C-ITS services?
  - Can we find viable ecosystems for the service provision?
- Single evaluations carried out by different deployment pilots across NordicWay 3, some joint evaluation topics: roles & responsibilities and costs

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# Findings on technical feasibility of C-ITS

- The NordicWay approach was developed to support service interoperability
- NordicWay 3 looked for specific solutions for implementing C-ITS services
  - A solution to predict time to red and green with acceptable quality
  - A 3D Lidar Edge AI solution for timely prewarning of the turning traffic of a cyclist in the blind spot
- Latencies were sufficiently low for informative services like for signalised intersections
  - End-user applications should be specifically designed to minimise latencies
  - No critical safety aspects requiring faster message delivery

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# Findings on technical feasibility of C-ITS

- 4G and 5G network technologies can provide the connectivity and capacity needed for C-ITS services
  - Future developments of 5G may even improve this
- The mismatch between digital and real-world signs 5-11% in Gothenburg, Helsingborg and Stockholm
  - National initiative needed to resolve issues
- In conclusion: Progress was made for the technical implementation of the services, but some issues remained to be solved

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# Findings on socio-economic impact of C-ITS

- NordicWay 2 did an extensive evaluation of the socio-economic impact of C-ITS services as a bundle
- In NordicWay 3, the socio-economic impact of the emergency vehicle related services were addressed anew
  - Warning of approaching emergency vehicle (EV) and EV priority can lower the risk of mid-intersection collisions with civilian drivers
  - EV priority can shorten travel time for EV
  - The socio-economic value of the benefits of EVA could not be estimated
  - The overall investment for the service less than 2M€ and recurring costs 400k€ annually in total

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# Findings on acceptance of C-ITS

- Online questionnaire investigated the acceptance of approaching emergency vehicle and accident zone alerts confirmed earlier finding on the positive attitudes for both services
- Another study was carried out to clarify the views of the transport industry on real-time traffic information services like C-ITS
  - Already some experience with real-time information services
  - Attitudes towards C-ITS services were mainly positive
  - Some willingness to pay, if the benefits the services are verifiable
- In conclusion, professional drivers were experienced in use of real-time services, they saw C-ITS useful and companies indicated willingness to pay. The last result is important as a lack of willingness to pay was earlier identified as one of the main challenges.

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# Findings on driving behaviour with C-ITS

- The correct reaction of the warned drivers is a necessity to gain any benefits of C-ITS services
- Simulator study results showed that the drivers reacted to the given information related to an accident correctly and without hazardous effect in terms of mean speed change
  - Reaction of slower and gradual braking, earlier than those without
  - Everyone with the service reacted to the ambulance while some of those without it exposed themselves and the ambulance to a risky situation and caused a delay for the ambulance

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# Findings on C-ITS ecosystems

- The lack of feasible ecosystem(s) was seen as one of the main obstacles hindering the introduction of the C-ITS services in NordicWay 2
- NordicWay 3 put effort into analysing the ecosystems: roles and responsibilities
- There is no single model that would be the ultimate solution for all, but different solutions were sketched - all with public and private stakeholders
  - For Finland, a study was also conducted on different authority roles and which authority should carry them out
- Service specific costs were estimated to different actors in the ecosystem: in the implementation phase and for the operation of the service
  - Cost elements were identified, but all costs could not be estimated
  - It depends greatly on the specific C-ITS service what costs and to whom they are required for service provision

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# Conclusions

- New insights of provision of C-ITS services were gained in NordicWay 3
- Overall, technical implementation, acceptance and driver behaviour impacts of the services seem promising
- There is even some willingness to pay for the services among transport industry - if the benefits of the service are clear
- Yet, work remains in building optimal ecosystems where the public and private stakeholders take the role fit for them and cooperate in a viable manner
- As the implementation costs of the services seem significant, long-term commitment will be needed of all stakeholders involved

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NordicWay 3 Evaluation Results deliverable soon available in nordicway.net website and in the publication series of Traficom

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