

A short introduction to ITS

ITS seminar 21.03.2019

TBA 4286 Traffic Engineering and ITS

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ITS - Intelligent Transport Systems (and Services)

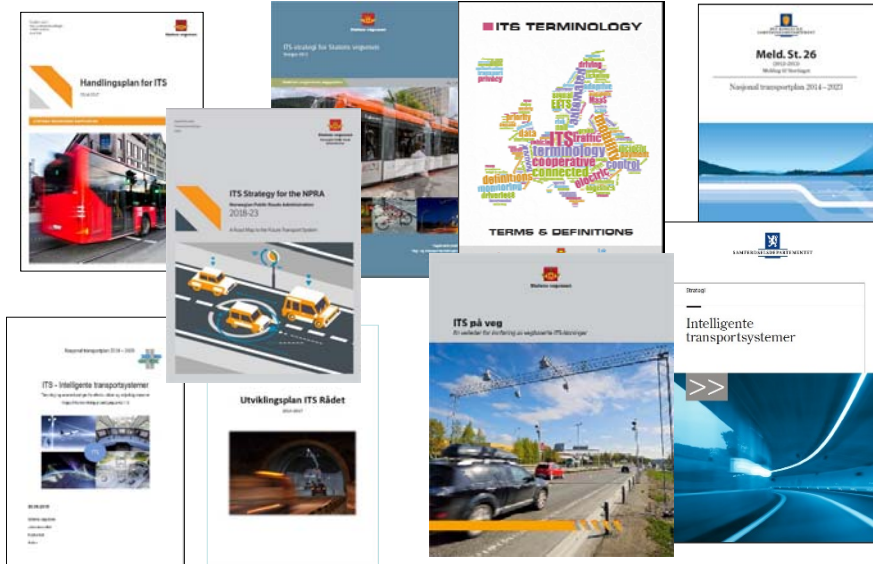
Information and communication technologies and services applied to transport and the related infrastructure

ITS incorporates solutions using ICT in a traffic or transport system.

The intention is to influence user behaviour and improve transport solutions and management in order to improve

- traffic safety and security
- mobility and efficiency
- sustainability including air and noise pollution
- accessibility and user satisfaction

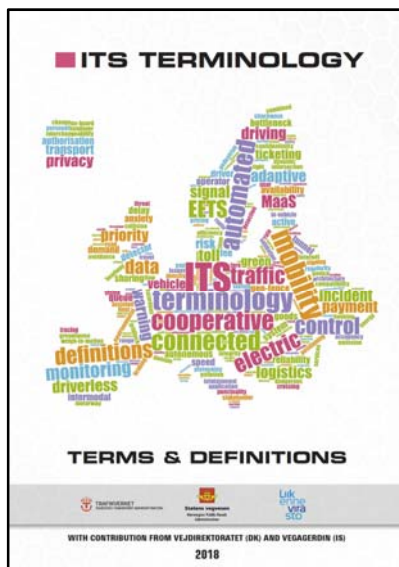
More focus on ITS



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ITS Terminology – see www.its-terminology.com



- Published by Nordic Road Association, ITS group (NVF-ITS) and the Nordic road administrations
- Cooperation between Norway, Sweden, Denmark and Finland
- First edition 1997 (230 terms)
- Second edition 2002 (490 terms)
- Third edition 2012 (870 terms)
- Fourth edition 2018 (1070 terms)
- This terminology is internationally accepted by PIARC, CEN, ERTICO, EU etc
- Authors / experts:
 - Kristian Appel, Finland
 - Arvid Aakre, Norway
 - Peter Kronborg, Sweden
- www.its-terminology.com (ver 4)

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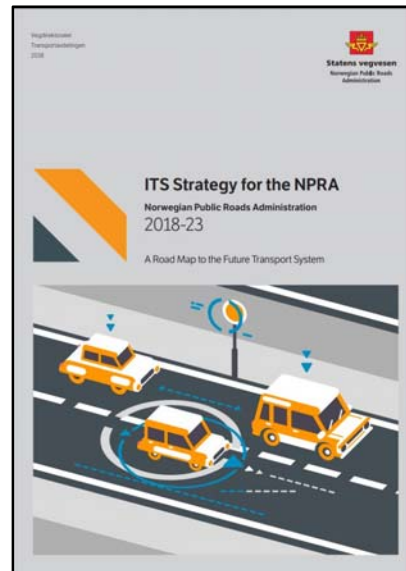
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NPRA – ITS Strategy

Contents

Foreword

1. The ITS vision
2. Background
3. The NPRA's leading roles
 - 3.1. Regulator
 - 3.2. Facilitator
 - 3.3. Knowledge developer
 - 3.4. Owner of systems and services
4. ITS contributes towards transport policy goals
 - 4.1. Mobility and traffic flow
 - 4.2. Traffic safety
 - 4.3. Climate and environment
5. NPRA priority areas
 - 5.1. Digitalization and technology
 - 5.2. A sustainable transport system
 - 5.3. Cooperative and automated mobility



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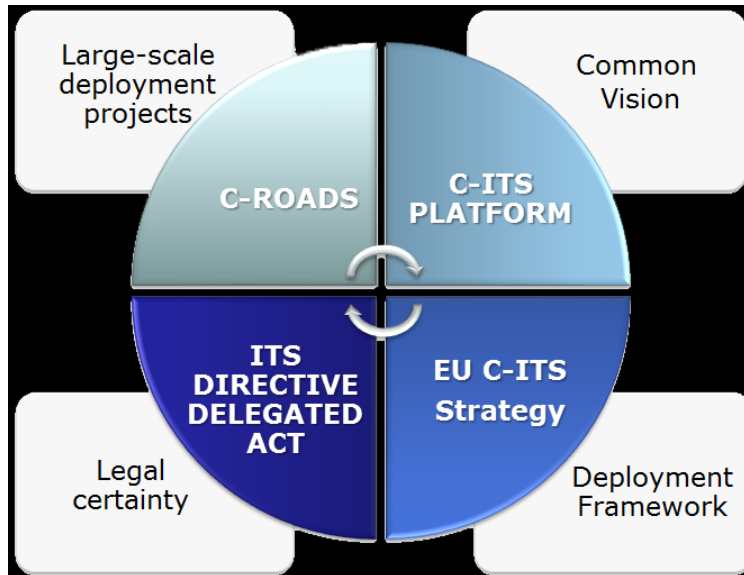
EU - ITS Action Plan and ITS Directive

Optimal Use of Road, Traffic and Travel Data	Continuity of Traffic and Freight Management
Road Safety and Security	Integration of Vehicle and Transport Infrastructure
Data Protection and Liability	
European ITS Coordination	

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Cooperative, connected and automated mobility (C-ITS)



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its-elearning.eu

- CAPITAL is a support action funded by the European Union which aims to design and deliver a collaborative and free capacity-building programme within ITS

9 free courses are available:

1. Introduction to ITS and C-ITS
2. ITS and C-ITS user services
3. TMC and roadside technologies for ITS
4. Standards, architectures and communication technologies for ITS and C-ITS
5. Impact assessment of ITS and C-ITS systems
6. Financial incentives and business and procurement models for C-ITS deployment
7. Cost-benefit analyses of ITS services
8. Guidance in deploying ITS and C-ITS
9. Information security, data protection and privacy



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Cooperative systems (C-ITS)



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SAE levels of vehicle automation

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/Deceleration	Monitoring of Driving Environment	Fallback Performance of Dynamic Driving Task	System Capability (Driving Modes)
Human driver monitors the driving environment						
0	No Automation	the full-time performance by the human driver of all aspects of the dynamic driving task, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	Driver Assistance	the driving mode-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	the driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the human driver perform all remaining aspects of the dynamic driving task	System	Human driver	Human driver	Some driving modes
Automated driving system ("system") monitors the driving environment						
3	Conditional Automation	the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene	System	System	Human driver	Some driving modes
4	High Automation	the driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene	System	System	System	Some driving modes
5	Full Automation	the full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver	System	System	System	All driving modes

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Some aspects of automation

- **Comfort**
This is quite «simple», we have lots of these systems today
- **Environment**
It is possible to optimize the driving process to reduce emissions and other environmental impacts
- **Safety**
Safety is very important and a critical factor to get acceptance of automation (responsibility, functionality, create / avoid accidents)
- **Efficiency**
It is a large potential for increased efficiency, but this is quite difficult and it will probably require many years of experience and development to get real benefits

Automation – man vs machine

- Will automated systems be better than manual systems?
- The answer is probably both YES and NO
- Automated systems
 - Might reduce errors ?
 - Might be more consistent ?
 - Might react and communicate fast
 - Might optimize for the community
 - Might see without visibility, will never be tired etc
- Manual systems
 - Might evaluate and give priority to the most important details ?
 - Might use own experience and preferences to adjust driving ?
 - Might be more flexible ?
 - Might work better during bad weather conditions ?
- Acceptance, security, hacking, liability, terror, privacy etc ?

Nordic research within automation

- The worldwide car industry are using very large resources on automation
- It is important to follow these research activities, but the Nordic countries will probably not be able to compete on all research fields
- The Nordic countries should probably put their focus on typical Nordic conditions and challenges:
 - Winter conditions
 - Two lane roads
 - Challenging nature, topography and road design
 - Electrical mobility
 - Intersections, design, regulation and priority