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Article 1 in The European Charter of Fundamental Rights (2009)

*"The dignity of man is untouchable. It is to respect and to protect"*

*"Den menneskelige verdighet er ukrenkelig. Den skal respekteres og beskyttes."*

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### What is privacy?

*Privacy is about the right to a private life and the right to decide on personal information.*

All people have an inviolable self-worth. As an individual, you are entitled to a private sphere that you control, where you can act freely without coercion or interference from the state or other people.

Source: Data Inspectorate




© 2014

*The European Convention on Human Rights § 8 – 1: Right to respect for private and family life*

*Everyone has the right to respect for his private and family life, his home and his correspondence*

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- in other words

*You decide!*



Photo: Data Inspectorate

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## Personal data



(1) 'personal data' means any information relating to an identified or identifiable natural person ('data subject'); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person;

Source: GDPR, § Article 4 Definitions

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## Norwegian transport industry norms for privacy

*Public transport privacy norm for e-ticketing supports anonymous travels by public transport where the anonymous customer has the same benefits as registered customers.*



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## Norwegian car dealer norms for privacy

*Car dealer privacy norm for new cars supports buyer and car producer awareness and consent about data collection and management of data collected by new cars.*



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## Form for data collection from new cars

### Informasjon om behandling av personopplysninger samlet inn gjennom bilens systemer

Informasjon om behandling av personopplysninger samlet inn gjennom bilens systemer

Denne informasjonen er viktig for deg som kjøper eller leier en bil, fordi den forteller deg hvordan dine personopplysninger blir behandlet i bilen. Du kan velge om du vil gi samtykke til behandlingen av dine personopplysninger.

**Personopplysninger som samles inn:**

- Navn
- Adresse
- Telefonnummer
- E-postadresse
- Identifikasjonsnummer
- Andre personopplysninger som kan være nødvendige for bilens funksjoner.

**Formål med behandlingen:**

- For å kunne bruke bilens funksjoner som navigasjon, kommunikasjon og andre tjenester.
- For å kunne tilby deg personlige tjenester og tilbud.
- For å kunne analysere bilens bruk og forbedre bilens funksjoner.

**Behandling av personopplysningene:**

- Personopplysningene blir behandlet i bilen og kan bli overført til andre systemer.
- Personopplysningene blir behandlet i henhold til de lover og forskrifter som gjelder.
- Personopplysningene blir behandlet i henhold til de sikkerhetsforholdsregler som gjelder.

**Samtykke:**

Jeg samtykker til behandlingen av mine personopplysninger i henhold til de vilkårene som er beskrevet i denne informasjonen.

☐ Ja, jeg samtykker til behandlingen av mine personopplysninger.

☐ Nei, jeg samtykker ikke til behandlingen av mine personopplysninger.

### Informasjon om behandling av personopplysninger samlet inn gjennom bilens systemer

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## New Norwegian law on personal data

- The new law shall implement the EU General Data Protection Regulation (GDPR)
- Based on the GDPR that comes into force May 2018
- Easier for both individuals, enterprises and organisations to act in accordance with privacy laws and regulations
- Takes into account the technological evolution



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Foto: GEANT Community Blog



### Many ITS applications collect personal data



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### However, the bad guy is really the car



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Foto: B. Secure




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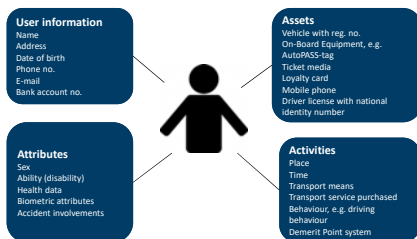
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### Data related to an ITS service User



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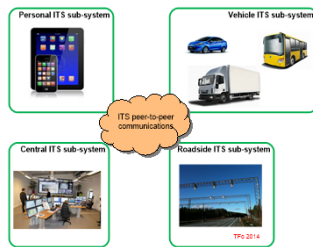
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## Where do we find the personal data?



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## Three major challenges in ITS services?

### 1. Privacy

### 2. Security in ICT systems supporting the ITS services

### 3. Authorities, operators and users awareness in relation to security including privacy



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## Examples on privacy threats

- **The ITS service User was there**  
*Electronic tracking of transport users (construction of travel patterns)*
- **The ITS service User is there now**  
*Registration of the presence of a person*
- **Person profiling**  
*Coupling of information from ITS with information in other systems*



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Some examples on where and when personal data may be collected



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Electronic fee collection by means of an OBE and Automatic Number Plate Recognition (ANPR)

AutoPASS-tag and ANPR



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## Electronic ticketing

Contactless smartcard as ticket media



Photo: GHD Transportdesign

Mobile phone as ticket media



Photo: Google Play

Mobile phone as ID (Be In – Be Out)



Photo: Wikimedia Commons

Photo: techradar.com

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**NB! We have an industry norm in Norway!**



### Access control based on ANPR



Photo: NetConnect

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### Parking payment and parking surveys based on OBE or ANPR



Photo: linkedin.com

20



### Traffic data collection based on OBE, ANPR and mobile phones ID



Photo: kylogit



Photo: pinapay.com

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## Enforcement of Payment of fees, taxes and insurance based on ANPR



Foto: NIK/NIK

- Control of :
- Annual vehicle fee
  - Insurance
  - EU vehicle control



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## Mobile unit for collection of traffic data (ASSET – EU prosjekt)



Foto: ASSET

- ASSET mobile unit is equipped with 3D-camera, infrared camera and ordinary camera for collection of data from individual vehicles:
- Number plate data
  - Time and place for road use
  - Type of vehicle
  - Vehicle dimensions
  - Speed
  - Headway
  - Picture of vehicle front including number plate
  - Usage of safety belt



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## Personal advertising based on ANPR



Foto: [www.safespeed.org.uk/](http://www.safespeed.org.uk/)

- A hidden camera reads the number plate and access the UK vehicle register to find the car make and model
- The driver is informed about which oil type to use for his vehicle referring to the license plate number of the vehicle



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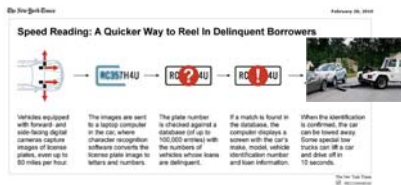
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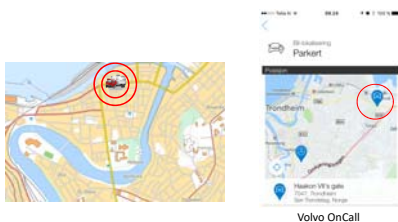
## Enforcement of non-performing loans based on ANPR



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## Fleet management with vehicle tracking, real time applications, stolen vehicles and smart apps (e.g. Volvo OnCall)



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## Jamming of GPS – privacy or crime?



GPS-JAMMERE  
Tyver, taxi-sjåfører og  
radiosendere

Merger mulighetene med GPS og radio i en og samme enhet

Teknisk Ukeblad 12. mars 2014

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## Location based services



- Information about
  - Services
  - Points of Interest
  - Public transport
- Driver assistance systems, e.g. route guidance

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## Pay as you drive



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## Security in ITS sub-systems

### Potential attackers:

- Hackers
- Activists
- Terrorists
- Criminal organisations
- ITS service Users
- Operators
- Authorities
- Foreign powers



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## How to get access to the vehicles internal ICT system?



www.canbushack.com



www.hackaday.com



www.caranddriver.com



REPORT: VOLVO

Volvo On Call

Bestcase

Bestcase: Volvo On Call (VOC) is a cloud-based service that allows you to control your Volvo On Call vehicle from your smartphone. It's a great way to keep track of your car's location, lock and unlock doors, and even start the engine remotely. However, there are some security concerns with this service, particularly regarding the potential for hackers to gain access to the vehicle's internal systems.

iTunes Appstore



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Teknisk Ukeblad 8. mai 2017

For Chrysler vilde bilhackeren i 5. mai 2017 ha en Jeep Cherokee og en Jeep Grand Cherokee som han har hacket. Det er det som har gjort det mulig for ham å kontrollere bilen uten å være inne i den.

HACKING AV BIL

**Mannen som hacket en Jeep advarer: - Alle biler lar seg hacke**

- Det er vanskelig å hacke en bil. Men det burde være enda vanskeligere, mener Charlie Miller.



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Nissan Leaf lar seg kontrollere fra internett. Uten passord



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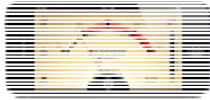
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## What is the awareness of authorities, operators and users?

Literature review shows that :

- The awareness of safety and security in intelligent transport systems is limited and there is a gap that should be closed
- The awareness on privacy is better which probably is caused both by laws and regulations and more attention regarding privacy in other sectors, e.g. the health sector.



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## Could privacy be ensured in intelligent transport systems?

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## 'The simplest is often the best'

*Avoid as far as possible collecting and/or using data that could be linked to a person*



*In worst case, - encrypt or make the data anonymous*

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## Privacy by design shall be the default methodology



*Specification and development of ITS applications should take place in close cooperation with the Data Inspectorate*

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## Three very important principles

# CIA



- **C**onfidentiality – data shall be protected against non-authorised access (Konfidensiell)
- **I**ntegrity – data shall not be changed between authorised sender and authorised receiver of the data (Integritet)
- **A**vailability – data shall be available when the ITS application requires the data (Tilgjængelighet)

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## Other principles

- User consent of the use of personal data
- Deletion of data as soon as they have served their purpose
- Transparency for the Transport user
- Transport user involvement
- Easy accessible and understandable description of the purpose of the data management
- Minimisation of the data collection
- Limited use of the collected data
- Personal data shall be correct, relevant, timely and complete
- The data shall be protected against loss and non-authorised access, deletion and changes
- Revisions shall be carried through
- Training of personal handling the data



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0011000011010111000101
0111110001110001101110
  
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Could privacy be ensured in  
intelligent transport systems?

**The answer is Yes, if .....**

*Thank you for your attention!*

trond.foss@sintef.no

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