

# ITS og signalregulering

## *ITS and Traffic Signal Control*

Ørjan Tveit  
Statens vegvesen Region midt

09/03/2018

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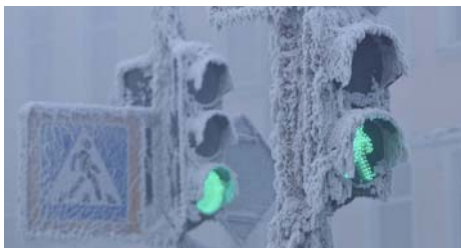
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# ITS and Traffic Signal Control



Who thinks that Traffic Signal Control = ITS?

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# ITS and Traffic Signal Control

- Traffic signal control was one of the first areas to utilize mainframe computers.



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## Forenklet kapasitetsberegning

- Kombinasjon av faser og beregning av kapasitet

Ved bruk av den forenklete metoden er kapasiteten i formelen bare avhengig av antall faser i signalanlegget.

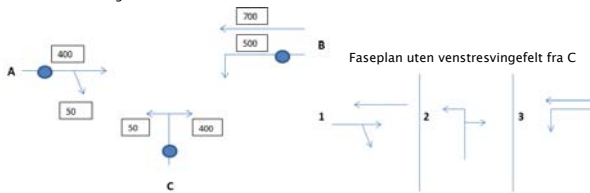
$$\text{Belastningsgrad} = \frac{\text{dimensjonerende trafikkbelastning}}{\text{kryssets kapasitet}}$$

Kryssets kapasitet med hensyn til dimensjonerende belastning settes til 1800 pbe/t minus 100 pbe/t pr. faseveksling i omløpet.

Forskjellene mellom ulike alternativer fremkommer ved at trafikkbelastningen i krysset fordeles på ulike antall felt og faser

## Forenklet kapasitetsberegning

Uten venstresvingefelt fra C

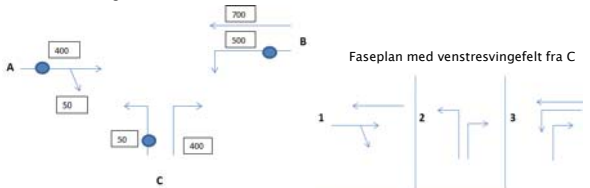


Dimensjonerende belastning  
450+450+500=1400

$$\begin{aligned} \text{Kapasitet} &= 1800 - (3 \times 100) = 1500 \\ \text{Belastningsgrad} &= 1400 / 1500 = 0,93 \end{aligned}$$

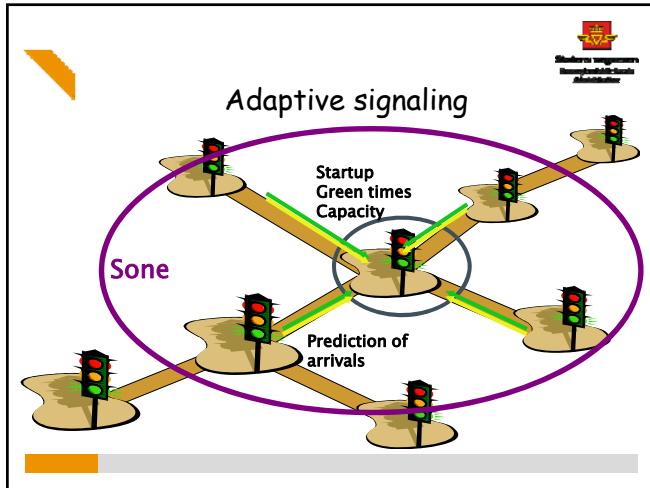
## Eksempel på effekten av separat felt for en underordnet svingebevegelse

Med venstresvingefelt fra C



Dimensjonerende belastning  
450+50+500=1000

$$\begin{aligned} \text{Kapasitet} &= 1800 - (3 \times 100) = 1500 \\ \text{Belastningsgrad} &= 1000 / 1500 = 0,67 \end{aligned}$$




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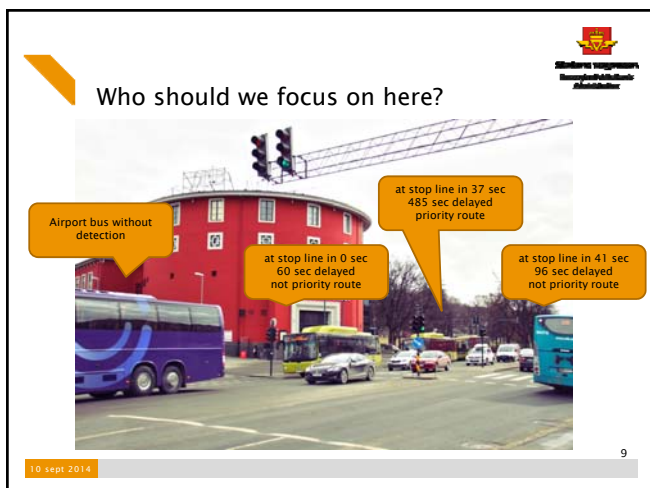
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Practical division and integration for the project

Public Roads Administration      Operating company

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Chosen priority for signaling

Priority regime:

- Cars weights**
  - Stopped = 1
  - Driving = 3
  - Platoons = more
- Pedestrian weights**
  - 2 up to 100
- Bus up to 430**
  - Separates for:
    - imp routes
    - delay
    - direction
    - location

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Informasjonsgang ved prioritering

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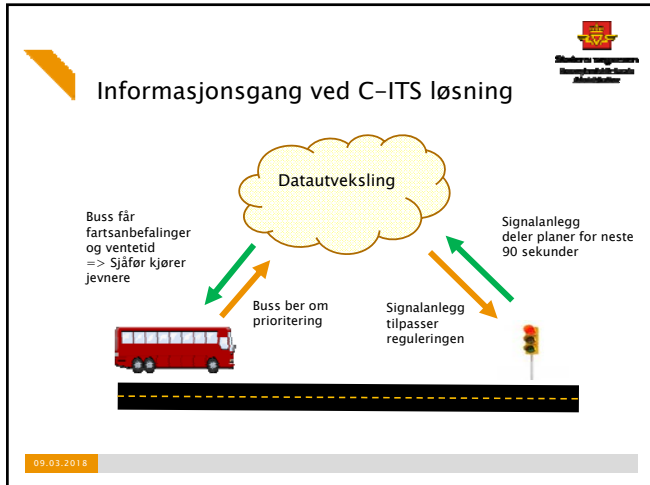
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### Autonomous vehicles – sharing traffic signals

To gain experience with C-ITS the Norwegian Public Roads Administration are sharing traffic light signals in Trondheim. The project consists of two parts

- Facilitation of data signaling
  - Our responsibility, important to gain experience with the installation and operation
- Use of data from signaling
  - Managed by the market, important to acquire safe solutions

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### Traffic signals in the vehicle

- Through sharing the traffic signal status and planned shift, a vehicle knows if it must stop or can pass freely at a selected speed.
- Information sharing in the installation in Trondheim is based on cellular communication between the vehicle and a back-end solution
- We have established a solution open for utilization from February 2016 to 2017 (as a start).

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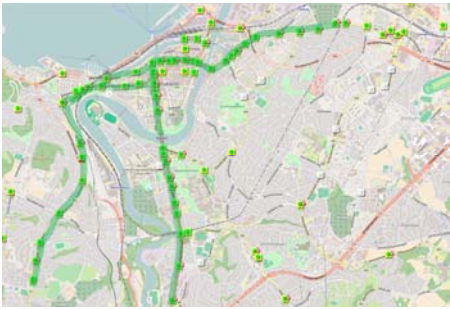
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## Traffic light assistance in Trondheim

– 48 intersections is online





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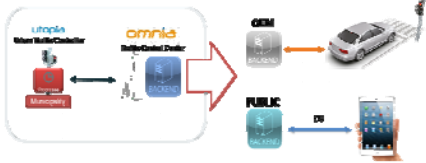
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## Information sharing

- We share information with both individual vehicle (apps) and car manufacturers (backend to backend)
- Big difference to serve 19 car manufacturers and potentially up to 100,000 users





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## Traffic signal into the vehicle

- NPRA cooperate with Volvo to show recommended speed and countdown to green signal (figures on the right)
- Speed recommendation shall take into account the time to signal changes, distance to the stop line, use of turn signals, speed of cars in front etc.
- The goal is that the car should react to information and adjust it's speed or stop on its own – and not leave this to the driver.





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### Samarbeid med Volvo – enkel visning





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### ITS and Traffic Signal Control





Who thinks that Traffic Signal Control = ITS?

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Thanks for the attention!

Orjan.Tveit@vegvesen.no

09.03.2018

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