



Statens vegvesen

AutoPASS system – technology and establishing

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Subjects

- Technology
- Tendering process
- Service & Maintenance
- Security
- EasyGO/ASFINAG



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AutoPASS - technology

- Based on DSRC technology
- The system and equipment is owned by NPRA
- Implemented in 2000 due to changes from the authority
- Components in the system:

Roadside equipment

OBU

Central system



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AutoPASS - technology

- Video enforcement system based on video and ALPR.
- Two cameras in front and rear of the vehicle.
- The new technology is made so you don't have to stop, which means that it's very safe.



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AutoPASS Toll plaza

In Autopass we have two different kinds of charging:

Manual payment with payment machines and attended toll plazas

The toll plazas have both manual payment and EFC lanes. Those plazas will not be implemented unless we can use the DSRC technology

among the manual payment



AutoPASS Toll plaza





AutoPASS Toll plaza

Automatic toll plazas is only made for DSRC and without manual payment.

In those plazas it's not necessary to stop and for those without an OBU, will receive a invoice by mail



system

This is one installation in Norway

Rv 55 Fatlaberget

[Rv55-CP-3D-Layout-2.1.4.avi](#)



System Oslo

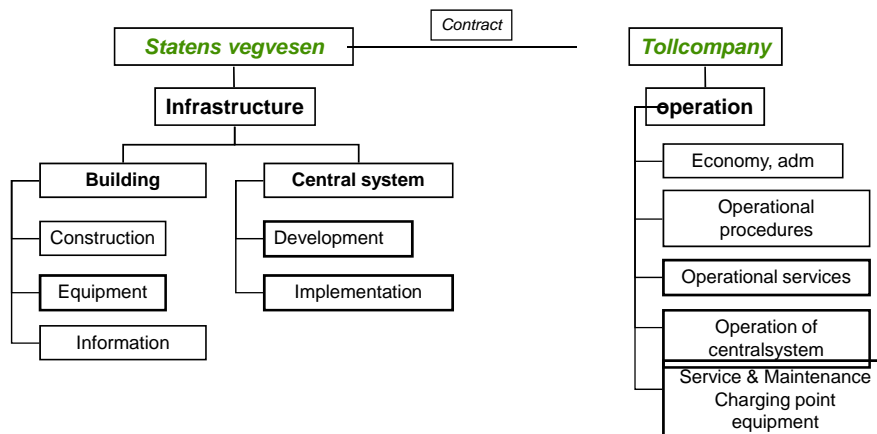


Oslo – new system



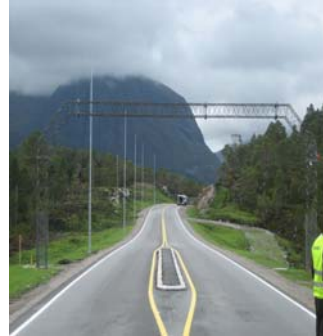
Roles of tolling in Norway

Establishing and operational control



Tendering process

- We are responsible for the tendering process in Norway
- We follow all rules and regulations given by the Norwegian Parliament and EU.
- The suppliers have to deliver by our AutoPASS specifications



Tendering process CPE

- We are the owner of the system and we make the final decision, based on award criteria
- One contract for each project.

Suppliers today:

Q-Free ASA Norway

Teccidel SA Barcelona Spain



Tendering process OBU

- We are responsible for the tendering process
- Framework agreement with two suppliers
- One contract, but we perform a competition every time we obtain new OBU's
- The specifications are the same, but we accept different design
- Suppliers: Q-Free ASA Norway, Norbit AS Norway

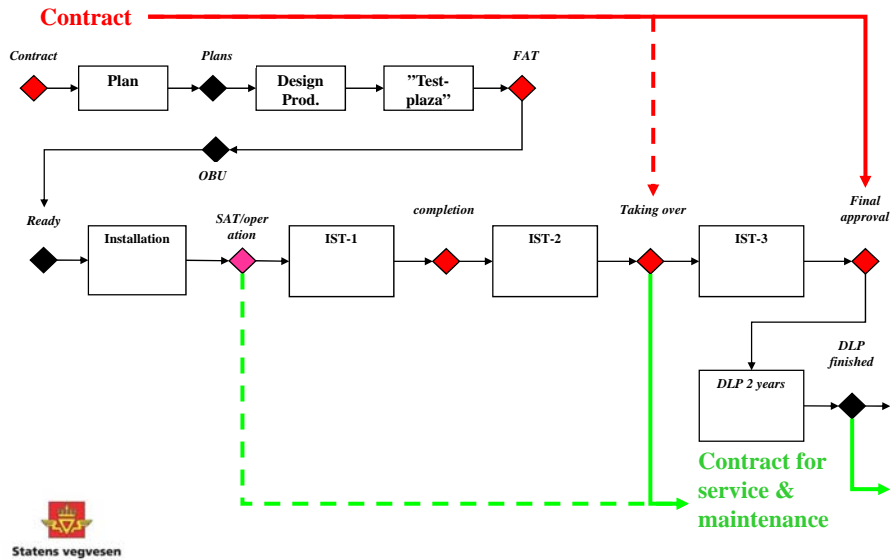


Tendering process CS

- One system for whole Norway
- One supplier for 5 years
- The contract is based on a ASP agreement
- Supplier are Q-Free ASA Norway



Deliverance for Roadside equipment



Payment milestones

• Contract signed by both parties	21.01.2009	5%
• Completed Design Verification Test (DVT)	20.02.2009	
• Completed Factory Acceptance Test (FAT)	30.04.2009	10%
• Start of installation	15.06.2009	
• Completed Site Acceptance Test (SAT)	28.08.2009	50%
• Start of Fee Collection	30.08.2009	
• Completion (approved IST1)	30.09.2009	0%
• Taking Over (approved IST2)	30.12.2009	20%
• Final approval (approved IST3)	30.12.2010	10%
• End of Defect Liability Period (DLP)	30.12.2011	5%

Quality is very important

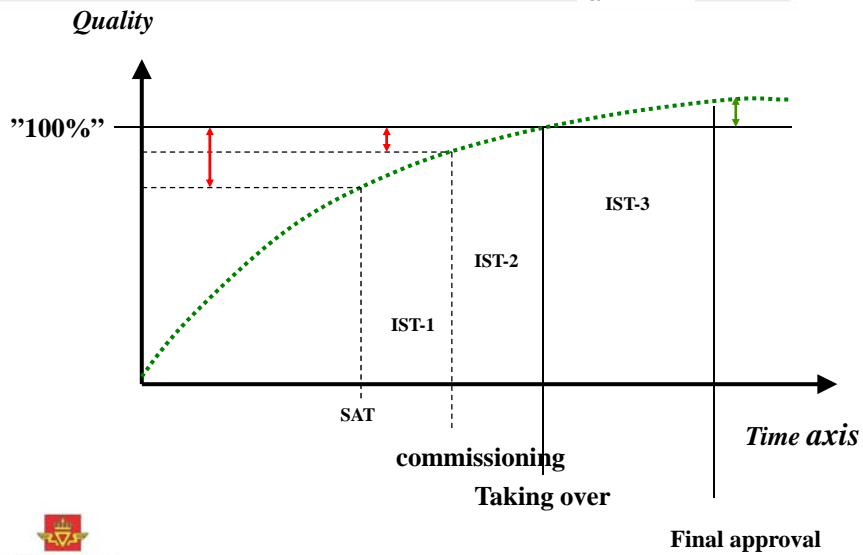
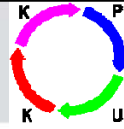


Quality surveillance

- Gives us tremendous possibility for more income:
 - To many pictures loosed due to bad quality.
 - Loss of income around 8 mill NOK every year
 - Improved quality for the CPE, will give us a better performance and more income for the toll companies



Quality surveillance



Quality measurements IST

Handling of deviation

- Procedures for reporting errors
- Deviation log

IST-analysis

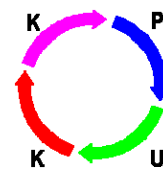
- Transactions analysis (deviation, registration certainty)
- Equipment quality and service (runtime, MTBF, MTTR)
- Performance index (assembled system quality)

Surveillance and improvements

- Status reporting

Evaluation

- Actions



Activities IST 1

- Directing and administration (plans, reporting, decisions)
- Evaluations and revision of IST-procedure
- IST-analysis for all projects
- Evaluations and comparison testresults



Activities IST 2

- Upgrading of the installations.
- Plans and accomplishment .
- Upgrading of documentation
- coordination of supplementary deliveries
- accomplishment of OBU cleaning



Activities IST 3

- Handling of warranties
- Evaluation and revision of the contract for service & maintenance
- Establish service & maintenance agreements after the DLP
- Quality revisions



Quality requirements

Measure	Requirements
MTBF for critical components	> 10 000 hours
MTBF for non-critical components	> 10 000 hours
MTTR for critical components	< 5 hours
MTTR for non-critical components	< 24 hours
Operating time for critical components	> 99.95 %
Operating time for non-critical components	> 99.5 %



Quality requirements

Component	# Comp.	# Errors	MTBF	MTTR	Operating time	Requirements	
						MTTR	Operating time
MR	38	12	10943:31	0:01	100,000 %	5:00	99,95 %
LC	68	11	21358:58	0:35	99,997 %	5:00	99,95 %
TPC	21	4	18143:27	18:10	99,900 %	24:00	99,50 %
CSSS	1	0	3456:00	0:00	100,000 %	24:00	99,50 %
Video system	5	0	17280:00	0:00	100,000 %	5:00	99,95 %
Monitoring system	2	0	6912:00	0:00	100,000 %	24:00	99,50 %



Service- and maintenance

- The period of preparedness are between 8am to 4 pm on working days
- Contractor will provide a log of all exceptions in each project.
- The quarterly tests give the contractor the foundation for the quarterly invoice.
- Supplier of service 6 Maintenance have a minimum requirement to surveillance all his project twice a day 6am and 6pm everyday the whole year round. This includes all weekends and holidays.
- If the equipment has an error, the supplier shall try to restart the equipment remote. If that is impossible he's obliged to correct the error on daily working time



Service- and maintenance

- The quarterly tests shall be reported and give the supplier a basis for the invoices:
 - A. Test for the performance for operational certainty of the CPE.
 - B. Registration certainty and test of the OBU reader (antenna).
 - C. Video quality - Test of the camera
 - D. EFC-performance – test of the cooperation between the camera and OBU reader (antenna)

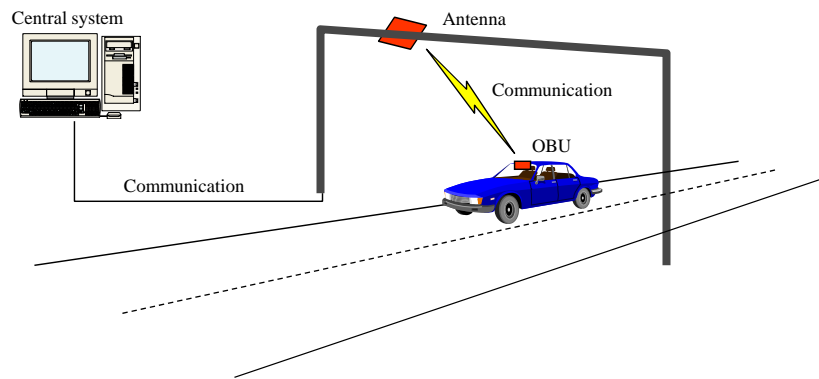


AutoPASS Security

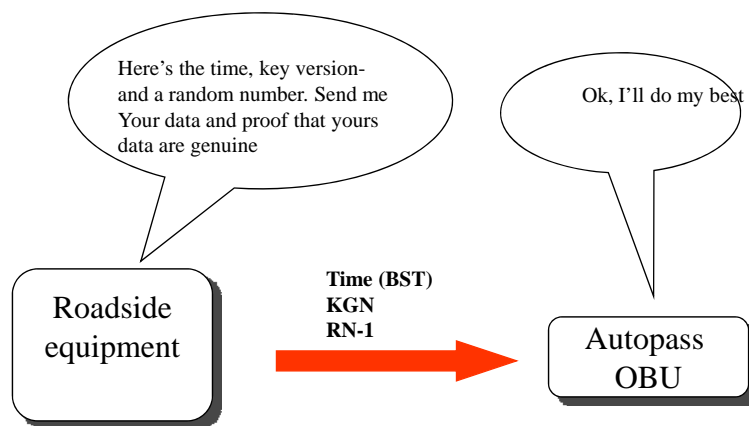
- Worlds most secure tolling system



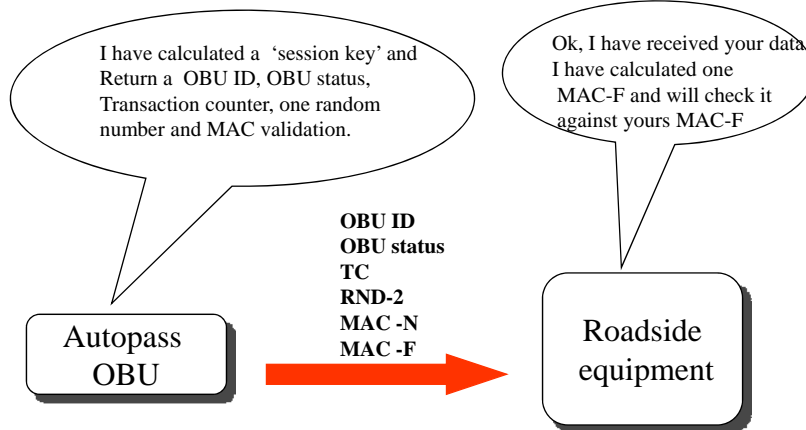
Road side equipment



Roadside equipment 'Challenge' the OBU



The OBU respond to the CPE



System Oslo

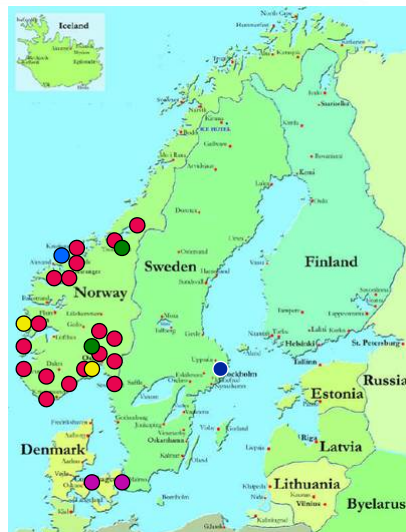


Oslo – new system



Nordic EFC history

- World's first EFC (87)
- World's first Toll rings (City of Oslo and Trondheim) early 90'
- First Danish (98) and Swedish (00) toll systems
- AutoPASS (98-02)
- Fully automated (04)
- National interoperability in Norway (04)
- Stockholm trial (06)
- **NORITS (07)**



Example from **Sweden and Norway**
The Svinesund Bridge between Norway and Sweden
opened 2005



This project identified the need for practical cross-border services



Example from **Denmark**
The Great Belt Bridge in Denmark
opened 1998



One of the world's largest toll stations in terms of turnover

€ 300 mill/year



The EasyGO and ASFINAG Project

- Feasibility study during 2008 and 2009
- Agreement will be signed 2010 /11 between:
 - Norwegian Public Roads Administration
 - Swedish National Roads Administration
 - Sund & Bælt Holding AS
 - Øresundsbrokonsortiet
 - ASFINAG (Austria)



to implement interoperable toll collection for nordic toll operators and ASFINAG

- A link to ASECAP by Sund & Bælt and Norvegfinans
- Almost 2 years of planning, implementing and testing
- The EFC tolling service will be in service from 2011
- It will be able only for trucks
- It's based on the EETS specification



Questions



Thank you!

