ARENA RUC
Seminar 1 & 2

A summary of the seminars

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The ARENA project

ARENA is a national project that aims to build competence for a future introduction of a road user charging system for Heavy Goods Vehicles (HGVs) in Sweden. The project has been developed in accordance with EU Directives and the Swedish public authority plans to introduce a kilometre tax for HGVs. ARENA started in 2006 and is financed by the Swedish Road Administration and the Swedish Governmental Agency for Innovation Systems. NetPort.Karlskrona is the project coordinator.

The approach of ARENA is to take a wide view and not only focus on technology. Innovation potential, consequences and possibilities related to an implementation of road user charging is also important as well as respecting that different stakeholders have different needs and requirements. This requires interaction between relevant stakeholders at an early stage. The role of the ARENA project includes the following elements:

- acting as broker both between groups of stakeholders who normally do not meet and between competitors within the same group
- develop and support knowledge both within the project but also as a coordinator between other projects

A concept for a kilometre tax system in Sweden is developed with a functional approach, which does not prescribe any technical solutions. The concept is generic rather than specific, in the sense that it should be possible to implement the result in several ways. Hence, we are trying to define the system independently from its final technical design. The motivation for this is that the time horizon for realisation is far ahead, maybe 3-6 years, and we can expect considerably changes in technical preconditions over this period. The concept includes a number of characteristics that differs from existing systems, which will reduce cost, promote innovative solutions and enable European interoperability.

The work of ARENA will continue in ARENA 2.0, where the concept will be further developed in close cooperation with the industry and relevant authorities and administrations. A full-scale demonstration will be developed for the ITS World Congress in Stockholm 2009.

Swedish Road Administration

The Swedish Road Administration (SRA) is the national authority assigned the overall responsibility for the entire road transport system in Sweden. SRA’s task is to co-operate with others to develop an efficient road transport network in the direction stipulated by the Swedish Government and Parliament. SRA have been commissioned to create a safe, environmentally sound and gender-equal road transport system that contributed to regional development and offers individuals and the business community easy accessibility and high transport quality.

VINNOVA

VINNOVA (Swedish Governmental Agency for Innovation Systems) is a State authority that aims to promote growth and prosperity throughout Sweden. VINNOVAs particular area of responsibility comprises innovations linked to research and development. The tasks are to fund the needs-driven research required by a competitive business and industrial sector, and to strengthen the networks that are such a necessary part of this work.

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ARENA RUC
Seminar I
6th of February 2007
## Contents, Seminar 1

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Sweden is considering the introduction of a distance based road user charging system for heavy goods vehicles. A knowledge building process is ongoing within the ARENA project.

The current Swedish situation was presented, describing the principles of the system that formerly have been proposed in a governmental investigation as well as describing the political decision process. A decision on distance based charging might be made by the Swedish parliament already during 2007.

Then the concept that is being developed within ARENA was presented. The seminar is part of the concept development process, which should be seen as work in progress and not an official Swedish statement. The concept consists of four key elements: the thin client, the secure module, selectable position indicators and toll chargers key interface.

After the concept was presented six invited speakers commented the concept approach. Questions and issues discussed among the speakers were for example; Will the Swedish scheme will be a tax or a fee? What is the purpose of a charge? Have you considered the business model? Is the thin client approach feasible and can the OBU be mandatory? Many of these questions can’t be answered at this point and require further work. Regarding the tax or fee issue, the RUC scheme will probably be a tax taking the Swedish constitution into consideration.

Divided in smaller groups the seminar participants discussed challenging topics such as trials, business models, enforcement, telematics and interoperability.
During the first half of the seminar the current Swedish situation and concept were presented. Then invited speakers commented the Swedish approach followed by a discussion. Moderator was Phil Blythe. A summary of all the presentations can be found below. Presentation slides are available on the ARENA website www.arena-ruc.com/eng

Morning session
- The Swedish concept

Moderator: Phil Blythe, University of Newcastle

Introduction to the Swedish situation
Christer Rydmell, Swedish Road Administration Head Office

Introduction to the conceptual design
Jonas Sundberg, SWECO VBB

Experts give their view on the Swedish concept
Jesper Engdahl, RAPP Trans AG, Switzerland
Mirka Tikvicki, Satellic GmbH, Germany
Neil Schofield, Department for Transport, UK
Jan Willem Tierolf, Ministry of Transport, the Netherlands
Michael Bibaritsch, Prime Consulting Services, Austria
Viktor Hatwagner, Kapsch TrafficCom AG, Austria

Discussions

Afternoon session
- Break out session on challenging topics

Moderator: Eric Sampson, University of Newcastle

Introduction to break out sessions
Break out session
Conclusions and way forward

Welcoming address and introduction

Christer Rydmell, Swedish Road Administration

Mr Rydmell is service development manager at the Swedish Road Administration head office. He presented an overview of the current road charges in Sweden; the Öresund Bridge, Svinesund Bridge and the congestion tax in Stockholm that is planned to (re-)start during 2007. Mr Rydmell also mentioned the NORITS agreement, which addresses interoperability between the urban toll rings in Norway and the bridges connecting Sweden to Denmark and Norway. In 2004 a governmental road traffic taxation commission made a proposal concerning a Swedish RUC system for HGVs based on the following principles:

- The kilometre-tax will cover all public roads (with minor exceptions), and to some extent also private roads
- The kilometre tax will cover domestic and foreign vehicles with a maximum permitted weight of 3.5 tonnes and higher.
- The kilometre tax will be designed to stimulate the use of high class roads, i.e. a lower tax on the motorways, higher on the secondary roads
- The kilometre tax will differentiate on vehicle characteristics, promoting vehicles of a higher environmental class
- The kilometre tax shall be prepared for differentiation also on time of day, i.e. a higher tax in rush-hours

There is an ongoing political process, see picture 1. The proposal of the road traffic taxation commission for a new taxation model for HGVs, which included a kilometre tax, was followed in spring 2006 by a governmental transport policy proposal that a kilometre tax should be considered provided acceptable consequences for industries and regions. In May 2006 the parliament accepted the policy document
Introduction to the conceptual design

Jonas Sundberg, SWECO VBB

Mr Sundberg is a senior consultant at SWECO VBB Stockholm. He is an expert on road user charging and manager of the SWECO ITS team. Mr Sundberg first pointed out that the conceptual design part of the ARENA project is a living document under development, e.g. the input from the seminar will be used to improve it. He further stressed that it is not an official Swedish statement. The concept approach is to describe a system with the purpose of giving all stakeholders a common view of preconditions, a common perception of systems architecture ("What is it and what does it do"), a method to build authorities and stakeholders knowledge in distance based RUC, a reference document in discussions with stakeholders and a reference while comparing alternative proposals in systems procurement process. The concept is built on knowledge and experience, requirements from policymakers and legal people, interoperability requirements and user requirements. The concept currently has four key elements:

- The thin client
- The secure module
- Selectable position indicators
- Toll Chargers key interface

The Concept in full can be downloaded from ARENA website: www.arena-ruc.com/eng
Reflections on the conceptual systems design

Jesper Engdahl, Rapp Trans AG

Mr Engdahl is an EFC consultant at Rapp Trans AG Switzerland with experience from various RUC schemes around the world, including the introduction the Austrian HVF system. He is the convenor of the EFC standardisation working groups on worldwide and European levels and has been a member of several expert teams commissioned by the European Commission.

Mr Engdahl started his presentation by recalling that free circulation of goods is a basic principle within the EU. Non-discrimination access to the roads and transportation network is important, which implies that the same conditions are required where taxes are levied. The presentation reflected on two basic system concepts, a system with mandatory on-board unit and a mixed system (i.e. where regular users are using OBUs and occasional users are using a simple OBU or journey booking service).

Systems with mandatory on-board units require low price/deposit OBUs with simple installation (user mounted and battery operated). The result of Austria’s negotiations with the EC suggests that 10 Euro and 15 minutes effort for obtaining and installing the OBU is acceptable. These systems have limited recording and declaration capabilities and are suitable for RUC schemes without complex differentiations, e.g., where road type differentiation is not supported.

With a mixed system it is important to realise that the same principles must apply for all users of the scheme, e.g. the same tax level must be applied. Capable OBU can offer added convenience to the user but cannot offer more sophisticated tariff differentiation than the simplest tool used in the system. The simplest tool in the system determines the maximum tax differentiation / modulation that can be used. Mr Engdahl also stressed the importance to gain further understanding of the correlation between the external cost drivers and the tax rate differentiators. E.g. preliminary research in Switzerland suggests that the external costs are more related to the duration of driving than the travelled distance.

Lessons learnt

Technology
• DSRC suitable for motorway charging for regular and occasional users
• GSM/GPS and tachograph technology require occasional user schemes

Users / Operations
• Journey booking solution not practical
• Integration of EFC system in traffic environment is essential

Policy
• Keep requirements simple!
• Integration of value added services is difficult
• Strong government role has many advantages

The key challenge is to provide equitable services for foreign occasional users:
• A viable solution for mandatory use of OBUs; or
• A mixed scheme that include a viable means to deal with the occasional users in an equitable manner
Because Mobility Matters - Comments on Sweden’s approach to LRUC

Mirka Tikvicki, Satellic Traffic Management GmbH

Ms Tikvicki is Director of Partner Management at Satellic and responsible for the Nordic market. She started her presentation by introducing Satellic and the partnership behind the German toll operator Toll Collect. General remarks of the Swedish concept were then presented, with recommendations for things to look into, for example:
• Who is liable to the tax, vehicle owner, driver or both?
• Declarative system necessary for fall back and possibly occasional users
• Simple tariff scheme, differentiation of road types may lead to high maintenance cost

The described OBE approach were also discussed
• Privacy issue with the thin client approach, all movements will be recorded and transmitted and privacy is an important issue.
• Updateable OBE is recommended, because basic conditions may change
• Amount of data may generate extensively high costs in mobile communication

Conclusion
• Protection of invest requires architecture that is flexible
• Interoperability calls for flexibility – since also Swedish km Tax is required to issue EETS contracts & OBU to clients demanding it (see Directive 2004/52)
• Full flexibility also mandated by demands of new services on same platform (e.g. wide range of legally required, publicly or commercially wanted telematics applications)
• Main reason for thin client architecture is to avoid need for updates (e.g. of map material) and high cost of OBU - but with 2 years experience in operation updateability is strongly recommended and communication costs of updates are lower than higher amounts of geographical data

• Hardware cost is dominated first by numbers, second by sensors, communications, HMI and package and security while faster CPU & more memory are cheap
• There is a wide range of choices between the extremes „GPS logger“ and „fully billing OBU“ (Germany), e.g. detection of road segments for later legally binding rating in back end
Swedish Lorry Charge proposals  
- a UK perspective

Neil Schofield, Department for Transport UK

Mr Schofield works in Road Pricing Framework Division in the Department for Transport in UK. The presentation started with a RUC background in the perspective of UK. The UK LRUC charging programme was shelved in 2005, with the aim that goods vehicle charging should be taken forward in the context of work on charging all vehicles. London congestion charging is in operation and is about to be extended. Interoperability is a key issue for the UK, both between local schemes and between UK and EU.

Mr Schofield finds the Swedish concept rather like the LRUC, but a main divergence is the definition. The Swedish concept is defined in much greater detail. The UK approach was to let the market decide technology and systems solutions through a set of procurement packages. The purpose was not to change road traffic behaviour, but to reform system of collection of lorry taxation. However, like Sweden, UK is examining ways in which third-party suppliers could become involved in collection of road charges.

Examples of issues from Mr Schofield’s presentation:

- Building the business case – technology and systems will be driven by costs and benefits
- Interoperability and EETS – likely to be crucial issue. Achieving equal treatment for foreign users without escalating costs will be a key challenge
- Enforcement – ensuring compliance will be a crucial issue, especially in relation to foreign vehicles
- Work towards a definition of EETS that allows the flexibility to develop an appropriate solution, especially in relation to GNSS in the absence of standards
- Address the question of occasional/foreign users – especially for enforcement
- Procurement
- Purpose of charge – clear understanding of charge and revenue
Swedish HGV Kilometre Tax - Issues and Interoperability

Jan Willem Tierolf, Ministry of Transport NL

Mr Tierolf is working for the Ministry of Transport in the Netherlands and is an expert on road user charging. He is also a member of the Stockholm group.

Mr Tierolf started his presentation by discussing the global trends concerning charging. Road investments become more and more important reasons for introducing RUC schemes all over the world. Tolling is becoming big business. In the Netherlands several attempts to introduce RUC schemes have been made. At the moment there is an activity called market consultation, which aims to let the market propose technical solutions for a HGV and car RUC scheme in the Netherlands.

Mr Tierolf stated five top issues for a successful implementation of HGV road user charging system:

- Political and societal support
- Decide what the charge is for
- Decide the form of Toll
- Secure tendering
- Adequate process/project management

Checks and questions regarding the Swedish concept:

- The Eurovignette Directive states
  - Only infrastructure costs may be covered
- Non-discrimination
  - You may charge foreigners, but you may not charge them more
- Effects of Tariff Levels
- Only HGVs are considered, how about coaches?
- EETS vehicle parameters only (in practice)
- Will Swedish OBE also be an EETS OBE?
- Certification/Quality Requirements for non-EFC equipment?
- Ownership of OBE or of smart card
- Mandatory OBU for foreigners only allowed if low cost and easy installation

He finished the presentation by describing the Stockholm Group which was founded in 2002, because of the isolated initiatives taken by the Netherlands, UK, Austria and Germany. The goal of the group is to promote interoperability, exchange best practice, explore novel concepts and influence EC decision making. The members of the group is ministries, tax offices and road authorities in Austria, Switzerland, Germany, Finland, Netherlands, Sweden, Slovenia, UK and Poland.
The Swedish approach towards HGV tolling

Michael Bibaritsch, Prime Consulting Services

Mr Bibaritsch is general manager of Prime Consulting Services, Austria. Mr Bibaritsch has many years experience in the field of ETC systems. Prime Consulting Services advised for example the Austrian Ministry of Transport on the decision towards the national motorway RUC scheme for HGVs.

Mr Bibaritsch started the presentation by introducing Prime Consulting Services and continued with stating his top 6 issues for a successful implementation of a road user charging system for HGVs, namely:

- Be well prepared in terms of
  - Political Willingness (not intention only!)
  - Legal Background and Backing
  - The Public Procurement Process
  - The Overall Time Schedule
  - Parallel Measurements (like PRI)

- Clear Decision
  - (Additional) source of income, or
  - Environmental Aspects

- Tax OR Fee
  - Tax = Domestic Traffic
  - Fee = Foreign + Domestic Traffic
  + subject to VAT

- The “WWH - questionnaire”
  - WHO is subject to the toll?
  - WHERE is it due?
  - HOW MUCH is it?

- Interoperability within the European Context
  - Technically
  - Procedurally
  - Contractually

- No System Decision Beforehand!

These issues were basis for the rest of Mr Bibaritsch’s presentation. A few examples of his messages were, to let the market decide technical solution, develop a business case and decide whether it is a tax or a fee. Finally he recommended a way to go:

- Set up system-neutral requirements following the “WWH-questionnaire” while having in mind what’s technically possible and commercially feasible
- Public procurement process
- Bid evaluation + contract → system definition
- Implementation
- Operation
The Swedish approach in a European context

Viktor Hatwagner, Kapsch TrafficCom AG

Mr Hatwagner works at Kapsch TrafficCom in Austria and was internal project manager for the implementation of the Austrian RUC system for HGVs.

Mr Hatwagner started his presentation with the fundamental question whether the Swedish charging system should be a tax or a fee; which according to Mr Hatwagner has a tremendous impact of the charging policies, revenues, handling of foreign users, enforcement strategy etc. The trend in EU is towards a fee, which has a more flexibility in the relation with the customer. He also would like to see a more clear structure regarding charge responsibility, vehicle owner or driver? Mr Hatwagner recommended vehicle owner.

Integration with existing technologies for bridges and tunnels is important, the concept must be open for CEN 278 DSRC and new approaches like GPS, then there followed a discussion about the cost – revenue regarding enforcement. Having the approach that 100% of the toll obligated users should be controlled will end up with too high system costs. It’s important with right level of enforcement – a ratio between costs and performance.

Then he made a short presentation of enforcement techniques used in the RUC scheme in Czech Republic; stationary enforcement, mobile enforcement and mobile readers.

Thin or Heavy OBU was then discussed; from Mr Hatwagner’s perspective the answer was thin! A simple thin OBU can be made mandatory and no parallel scheme is needed. He finished the presentation by some thoughts and a summary:

- What about private vehicles? It should be considered, sooner or later it might be a topic
- Is the EU-OBU a dream? We need a valid business for EETS
- It’s an ongoing Telematic hype, but who’s going to pay?
- A good legal basis is already more than half of the success
- Do not underestimate the importance of PR and customer information
- Set realistic time schedules to build, test and go live with a scheme
- Rely on proven technology, try not to invent any thing new
Discussion and conclusion

After the presentations the six invited speakers plus Jonas Sundberg were part of a panel debate moderated by Phil Blythe. A lively discussion took place where questions about different aspects of the concept were reviewed.

Questions and discussions

Tax or fee
As almost every speaker mentioned, there is an unclear situation about whether a RUC scheme in Sweden will be a tax or a fee. Jonas Sundberg answered that it is probably going to be a tax. In the road traffic taxation proposal from 2004 the charge is named as a tax. The payments collected during the Stockholm congestion charge trial in 2006 had to be seen as a tax according to the constitution of Sweden. Jonas also stressed that there are strong routines in place to make sure a tax is paid, which could be an advantage.

Thin vs. thick client
The pros and cons were heavily discussed, Oene Kerstjens, project manager of the RCI project, pointed out that this matter is an important issue in the project. RCI is lead by ERTICO and funded by the European Commission. The RCI project consists of 26 partners including toll operators, suppliers, truck makers, representatives of both the DSRC and the CN/GNSS communities and some specialist companies providing expertise on relevant research issues.

The question of “thin” vs. “thick” client has been raised in work on standardisation as well and the choice is left open.

A conclusion from the discussion is that the thin – thick client needs more research!

Technology solution
A comment from several delegates where that the technology solution should be provided by the market and not by the authority or organisation ordering a system. Other points in this discussion was that the procurement process may be more effective when suppliers compete with similar options (if the concept is prescribed) and not completely left open for the market to specify.

Privacy and driver acceptance
Data privacy was an important issue in Germany when designing their system. Transparency throughout the system is important for systems understanding. One conclusion was that privacy issues should not be underestimated. They could become even more pertinent due to the discussion in many countries on introducing charging of private cars.

Also other aspects related to driver acceptance are important. Jonas Sundberg proposed that the Service Provider may provide additional services to the driver/customer as a “compensation” to the tax to be paid.

Conclusions

Phil Blythe, University of Newcastle upon Tyne

Phil moderated the first half of the seminar and concluded the presentations and discussions:

• Policy first, technology and systems later
• Is the Swedish concept really a tax or a fee?
• Thin vs. Thick client needs much more analysis
• How to link a public payment scheme to a private one
• Need to test legal issues – collection of payments, enforcement powers
• Any toll system must link to traffic management
• EETS interpretation still unclear and legally not tested
• Mandating an OBU is almost impossible
• The payment scheme concept must be simple, flexible and allow flexible payment options
• Occasional user schemes/enforcement schemes should have a cost/benefit test
• Make system procurement easy and transparent
• Get public and political support from the start
Phil encouraged the ARENA team to use the input from the experts to strengthen the concept and said that the morning session did show some weak points that need to be dealt with.

The experts’ final words

**Mr Schofield**
- Objectives with the tax is important
- Cost and benefit analysis needed
- Politicians have to be “warmed up”, i.e. have a chance to form a initiated and personal opinion
- Dealing with occasional users.

**Mr Engdahl**
- What is the purpose? The use of revenue is important to communicate for acceptance
- A smart concept is leaving out the technical solution
- How should the system be included in the traffic system
- How to deal with occasional users

**Mr Bibaritsch**
- Really important to have a business model/case
- Interoperability important

**Mr Hatwagner**
- Tax or fee is an very important issue to solve
- Operational cost is what matters in the end

**Ms Tikvicki**
- Impressed by the work in ARENA project so far – continue in the same way
- Stick to a realistic time frame

**Mr Tierolf**
- The considered tax comprises about 80 000 vehicles – that number of vehicles can be handled, positive fact.
- Don’t define to much beforehand
- When communicating on European level – use the right language
Break Out Sessions

During the second half of the seminar the delegates where divided into smaller groups discussing four challenging topics. Each topic is described more detailed and followed by a short summary of findings from different group. Break out session moderator was Eric Sampson.

How will we achieve European interoperability?

Who wants to be an EETS provider? What is the relationship between the User and the Toll Service Provider (e.g. the EETS provider)? Can the interface between these two be proprietary, i.e. all info from the OBU is channelled through its issuer, the Toll Service Provider? Will we see a big bang approach or a number of bilateral agreements?

Group discussion summary
Group moderator: Ruperta Westerberg

- What is the business case for interoperability/EETS?
- Where is the revenue stream
- Data transfer OBU – TSP or wider
  - Privacy
  - Toll charger needs some data too
- Technology options
- Occasional users a difficulty in terms of organisation and costs
- No Big Bang on European level
- Different technical approaches as of today

RUC and telematics a happy marriage? Where are the benefits?

The Swedish concept is proposing a “secure core”. That core could be fitted into existing telematic equipment. Is that the way forward? Will it improve public and political acceptance? Can the RUC development and implementation be a basis for industrial growth and knowledge development?

Group discussion summary
Group moderator: Scott Wilson

- Input to current services much likely
- Fleet management
- Network management
- Speed enforcement
- Fuel distribution
- Customer wants data exclusivity – public authorities have the opposite objective
- GSM traffic data cost can not increase
- Public reuse of RUC important:
  - Plan ahead to avoid red lights based on the incoming traffic from the highway
  - Speed enforcement
  - Monitor dangerous goods, e.g. in tunnels at time of accidents
  - Learn how the roads are used to plan maintenance
- Consumer reuse of RUC
  - Find pizzeria etc. not believed to fit with RUC. This should be purely private run.
  - Learn from mobile phone industry: High end content has still to take off, most people text and call rather than find the closest pizza place
- Potential professional reuse of RUC
- Fleet management – all the data needed is gathered in the RUC system, a tempting co-use.
• However, there are very different requirements on reliability and availability.
• As above, but with reversed logic – fleet management system offer RUC as a value added service. Note the tax risk added to the fleet management company, if lost tax data, then the company is liable.
• Austrian experience: Hauliers used the website info as automated input into fleet management system. ASFINAG turned this into a commercial product, selling the customers’ information back to them.
• The public player sometimes seem to think: “The private players will finance the solution, in order to be allowed in on the platform.” This is not necessarily true.
• Any secondary use of the tolling data is in effect sponsored by the tolling operation

Key Principles
• Toll collection business case
• Risk for lost tax owned by the right party
• Whoever builds and maintains the future Swedish system, the government agency should ensure the ownership and right to use the data collected, as this is a potential revenue stream.
• The market invents faster than the operator. It is not possible to foresee all future uses. Flexibility and the ability to add on will be a key to success.
• Reuse of data must be used and resold in a non discriminating manner, without any mark up on the cost. (Hence probably no advanced value added services will be developed by the operator.)

What can we learn from earlier experiences? How to organise the process? What is the role of demonstrations? How to make sure that the system is future proof in regard of extended demands and new technology development? Scalability and flexibility? When and how to co-operate with the industry and how to chose procurement strategies?

Group discussion summary
Group moderator: Simon Smith
• Slide on a perfect system
• Specification is a wish list
• Clarity of data ownership
• User education – easy understanding is crucial
• Contract with as few actors as possible (preferably one)
• Functional procurement is the best solution
• Degree of freedom for systems development
• Space for innovation

Trials
• Period of 3-6 months
• Show concepts – end to end solution
• To see what you get, to convince politics, public and customers (users)
• Trials are feedback for concept and requirements
• Every implementation is unique

Road to success
• Meet the objectives
• Clear use of revenues
• Public/transport industry acceptance
• No negative impacts of economy
• Deliver system on time
• Operators fulfil requirements
• Local systems not influenced
Viable enforcement

An important part of the delivery of a viable RUC system is the provision of a robust and effective compliance and enforcement regime. The concept, as explained in the papers, presents a mixed approach to charging that seeks to facilitate interoperability with existing systems, insofar as they are able to meet the requirements of the proposed scheme. The ability to accommodate both thin and thick client technical solutions has been outlined as part of the approach.

Group discussion summary

Group moderators: Duncan Matheson and Andrew Pickford (two groups)

- Tariff effect compliance
- 100% controlled vehicles can’t be the goal – too expensive
- Legal evidence for enforcement systems unclear
- Cross border possibilities not yet clear – follow VERA
- Enforcing a tax makes easier collection abroad
- Design enforcement as part of the system from the start
- Enforcement – deterrence – compliance
- Enforcement is two things: “who are you” and “have you paid”?
- Unequipped users - the worst problem
- One box and one contract is still an objective
- Everybody must be liable
- Perceived high penalty for evasion (e.g. Stockholm) so high compliance precedent
- The right to audit - very important
- Companies will wish to avoid the hassle of going through a tax audit
- Users have to be clear on when OBU doesn’t work

Enforcement methods

- Fixed, portable and mobile units
- Enforcement of companies in-house
- Capture violators at roadside before leaving country is important
- Check against other systems at yearly vehicle inspection
- The enforcement should be made locally, in each country

What positive role can Service Providers play in supporting compliance checking?

- TC will not accept TSPs that do not provide sound practices and procedures
- The role of TSP in the Swedish scheme needs to be clarified – still some uncertainty
• Quality of service contracts needs to be defined with TSP
• TSP signals anomalies to the Toll Checker
• The TSP issues a payment guarantee – hence the TSP has an interest in integrity and accuracy of report
• Interfaces needed for service providers and the toll charger to exchange information
• Issuers should deliver a daily blacklist
• Germany: if criminal action; reduced to use manual system = big loss
• Live cattle problem when stopping vehicle

What are the timeliness requirements – the contrast between compliance data capture and obtaining data from Services Providers?
• Several SPs can calculate tax differently; risky.
• Important to control and monitor SPs systems
• How do you resolve discrepancy between SPs data and control system observations?
• The way the tariffs are constructed will affect the frauds done
• Responsibility for SP to monitor the OBUS, that they are working/ have failed
• Issuers need to be on local issuer lists
• Foreign OBU needs to support local requirements

• OBU have to respond to interrogation from enforcement systems
• Simple checks can be made locally
• Feedback to user – to inform of offence?

What real evidence is foreseen as necessary to demonstrate non-compliance and support enforcement action and how can this be obtained?
• A dead onboard unit
• Photos of blacklisted vehicles, location and time.
• Preparation for the legislation very important, so the right interpretations of evidence needed is clarified in advance
• The owner of the vehicle must be viable to pay the tax, since driver can not be caught in the image
• Relationship between enforcement density and relation to the amount of the fine
• Need precedence in court – so institutional learning period expected
Conclusions and way forward

The afternoon session was closed by Professor Sampson. He thanked all the groups for their valuable work and good presentations and concluded that there are still a number of open issues to solve.

Professor Sampson argued that the seminar should not be seen as a single activity but as a module in an ongoing co-operation. A follow up seminar should be organised, ideally it should be arranged in autumn since the EETS directive is expected to be delivered then. A proposal was directed to Holland asking them to organise the next workshop.

Professor Sampson also mentioned that the ARENA project is in the process of establishing an industry forum and encouraged the industry to join.
ARENA RUC Seminar 2

22nd of May 2007
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Abstract

Sweden is considering the introduction of a distance based road user charging system for Heavy Goods Vehicles. A knowledge building process is ongoing within the ARENA project.

The ARENA project’s second international seminar on road user charging was arranged in Stockholm the 22nd of May 2007. 60 experts from industries, consultancies, ministries and authorities participated when the current Swedish situation and approach on control system were presented.

A governmental investigation with the objective to analyse what impact a kilometre tax would have on regions and specific industry branches was finalised in March 2007. The conclusions were that kilometre taxation is a good method for internalising external costs and that the introduction of a tax would have limited impact on production and employment. However, it was pointed out that the charging system could be an expensive method to collect tax and not necessarily socio-economically viable. The investigation also suggests a system based on the tachograph as an alternative to the ARENA concept.

The investigation resulted in the development of a new control approach within the ARENA project. Characteristics of the new approach are; more focus on control mechanisms related to business processes – more intelligence and less hardware. Business relations through contract between the different actors involved in the charging system are the key element. The revised control concept reduced the approximated investment cost by half. The objective with the seminar was to test our new approach for the control system on the participating experts.

Experience related to the new approach was presented by the Swedish Vehicle Register and Swedish Customs. The two authorities have practised relationship based on trust with private companies for many years. The Swedish Vehicle Register, SRA is cooperating with private Information Service Providers (ISP). The ISPs can access and alter information and owner status in the public register, i.e. a public partner is carrying out a task that is normally an authority task. The Swedish Customs described their initiative “The Stairway”, which is based on an accreditation philosophy, where trusted users are given the possibility to self declaration and better services. The approach has resulted in reduction of compliance costs, improved quality of Customs declarations, better control of accredited companies, increased hit rate and improved service to the business community.

After the presentations the seminar participants could interact and discuss specific topics with the speakers and the results of the discussions were presented during the closing panel. The results from the seminar can be summarised in the following points:

- The Swedish approach was welcomed as an interesting alternative and no major objection was mentioned.
- The majority of the users want to comply – let us support them by doing it easy and attractive
- Enforcement need to be viewed as a package consisting of business processes, road side enforcement and non-toll enforcement.
- The issue of integrity was stressed, especially when combining different sources of data
- A concept for fall back solutions was requested
- The experiences from the Swedish Customs was viewed as very interesting, especially since it resulted in that resources could be used in a more efficient way. This is illustrated by an increased hit rate from 5 to 44%
During the first half of the seminar the updated approach on the ARENA control concept was presented. Invited speakers presented different views on control systems in their domain. The presentations were discussed during lunch. In the afternoon some companies presented input from different initiatives in Europe. Moderator was Christer Rydmell. The day ended with a closing panel moderated by Jeremy Evans. A summary of all presentations can be found below. Presentation slides are available on the ARENA website www.arena-ruc.com

Welcome and introduction
Christer Rydmell, SRA and Inger Gustafsson, Project Manager ARENA

The updated ARENA approach on control system and enforcement
Jonas Sundberg, SWECO VBB

Interoperability and international aspects on enforcement
Jan W Tierolf, Rijkswaterstaat AVV

Information Service Providers in the Swedish Vehicle Registration
Ann-Christine Olsson, SRA Vehicle Registry

Trust and benefits from a Customs perspective
Mats Wicktor, Swedish Customs

Discussion arena

Industry speed presentations
Karl-Heinz Stappert, TÜV Rheinland InterTraffic
Gunnar Johansson, IBM Sweden
Lars Olsson, Kapsch TrafficCom AB
Daniel Scholz, VITRONIC
Mirka Tikvicki, Satellic Traffic Management
Wolfram Tuchscheerer, EFKON
William Gillan, Transport Research Laboratory

Closing panel
Moderator was Jeremy Evans, Transport for London
Welcome and introduction

Christer Rydmell, Swedish Road Administration and Inger Gustafsson, project manager ARENA

Mr Rydmell is Service Development Manager at the Swedish Road Administration Head Office. Ms Gustafsson is project manager of the ARENA project. Mr Rydmell welcomed all participates, both new and the 33 returning delegates. Ms Gustafsson continued with an introduction and input from February’s seminar in Malmö. The input dealt with:

• How the business model could look like
• Mandatory On-Board Unit (OBU) – is it feasible?
• Level of enforcement

Ms Gustafsson described a Swedish investigation recently delivered by the Swedish Institute for Transport and Communications Analysis (SIKA) and The Swedish Institute for Growth Policy Studies (ITPS), SIKA 2007:2. The investigation studied how a kilometre tax will influence industry and regions in Sweden. Some conclusions were:

• Distance based charging is a good method for internalising external costs.
• The consequences for production and employment by introducing a kilometre tax are in general small, but in some cases business will be negatively affected.
• The investigation also concludes that in some business sector the production will increase.
• SIKA is suggesting a careful tax implementation, starting with low taxes, and to further study how the charging system should be designed.
• The former system approach made by ARENA was too expensive
• Is kilometre taxation socio-economically viable?
SIKA highlighted the importance of a cost effective charging system suggesting a system based on the tachograph.
Ms Gustafsson also presented the idea of the ARENA industry forum. The concept developed within the ARENA project engages different actors, authorities, users and industry. The project provides an arena where the different actors can contribute to the development process on different levels and support on open questions (business models, integrity aspects etc.) Members of the forum will receive invitations to review ongoing work and to participate in task forces and get access to selected documentation. It is also an intention to enable networking for future projects. Registration is open on the website.

Ms Gustafsson concluded the presentation with an introduction to the programme of the day and some of its objectives:
- To test the new approach for the control system based on relationship and trust
- Can experiences from other sectors serve as inspiration? For example, Vehicle registration and Customs?
- Is the development in line with the European way forward?
- In line with industries way forward?
The updated ARENA approach on control system and enforcement

Jonas Sundberg, SWECO VBB

Mr Sundberg is a senior consultant at SWECO VBB in Stockholm. He is an expert on road user charging and manager of the SWECO ITS team. Mr Sundberg presented the development since February’s seminar. He mentioned the SIKA study and how the ARENA project contributed with a cost estimate. The investigation concluded that the system was too expensive (investment as well as operational costs) in relation to the foreseen revenue. Questions like “Why should the kilometre tax be the most controlled tax system in the country” have occurred. Per Kågesson, a key player in the transport policy discussion in Sweden, made a “low cost system proposal” based on the tachograph which was annexed to the SIKA report and the ARENA project decided to review the control approach. The revision reduced the approximated initial investment cost with at least half and also reduced the operational cost considerably.

The previous approach to control:
- Control stations for real time control on every 50 km of the primary and secondary road network
- Mobile control stations on lower grade roads
- Border control points
- Non-real time control included

Beside the fact that the former control approach was too expensive (in relation to the foreseen revenue), the secondary (municipally) roads were not really covered. The road network is too large to be covered by installations and physical observations for real time control.

Characteristics of the new approach
- More focus on control mechanisms related to business processes – more intelligence and less hardware
- The Toll Charger and the TSP (could be an EETS provider) have a business relation through a contractual agreement
- The TSP and the user have a business relation through contract
- The debiting function and the control mechanisms are not integrated, and not carried out at the same time
- Vehicles liable to tax are known to the TC
- Travel behaviour can be retrieved afterwards
- Adaptation to the existing legal base for road side control and enforcement authority – as tax authorities are not mandated to stop vehicles at the road side

![Picture 1: Control and information flows in the new approach](http://www.arena-ruc.com/eng/?info=downloads)
Interoperability and international aspects on enforcement

Jan Willem Tierolf, Rijkswaterstaat AVV

Mr Tierolf is working for the Ministry of Transport in the Netherlands and is an expert on road user charging. He is also a member of the Stockholm group. Mr Tierolf let us know that he is encouraged by the process that is ongoing in Sweden. Mr Tierolf presented the interoperability and standardisation timetable and also discussed why HGVs are easier to charge compared to cars:

- The numbers are lower
- There are less privacy issues
- National company checks can be made
- Companies are easier to trace
- There are more ways to motivate compliance

Mr Tierolf said that it is realistic to expect a decision on the rewritten EETS proposal in mid 2008. The standardisation process (draft standard) regarding GNSS could be extended to early 2008. GNSS should include an updating protocol, enforcement protocol and allow ‘thin’ and ‘fat’ units.

Enforcement is national/local responsibility in the first place

- Therefore checks are best done and enforced, while the HGV is in toll domain/in the national jurisdiction
- Non-enforcement approach is less susceptible to this and interesting if you don’t go for 100% control

The roll model of EETS is still valid (between interoperability manager, EETS provider, Toll Charger and Service User), but less strict than before. He stated the requirements set by the European Commission (EC):

- No Borders, EC allows no border checks/controls (5 km inland ok?)
- OBUs can not be mandatory for foreigners, unless cheap (5 ?) and easy to install (<10 min?)
- EETS OBU & Contract to be accepted
- Non-discrimination, also for foreign TSPs?
- HGV & Tax directives + EU Market Rules
- Only 3 technologies allowed, but parallel other system for national HGVs allowed? (could be cheaper)

Mr Tierolf concluded his presentation by giving some input on the concept and the updated approach on control, which he found interesting. He finds parallels to the Toronto toll and said the concept might work for national HGVs. There might be problems with HGVs from abroad and rules set by the EC.
Information Service Providers in the Swedish Vehicle Registration

Ann-Christine Olsson, Swedish Road Administration Vehicle Registry

Ms Olsson works in the Swedish Vehicle Register managing services in the register. The Swedish Vehicle Registry has been in service since the beginning of the 20th century and is an authority associated with the Swedish Road Administration. Since around 1970 Sweden has one joint vehicle registration. Before the organisation was localised to different regions.

She presented the specific areas which concerns the register:

- Owner, status and identification
- Annual vehicle inspection
- Road tax collection and accounting
- Insurance particulars
- Loss and theft

What makes the Vehicle Register interesting in the area of road user charging? Can experiences from this field be used? In 1996 a concept of self-service was introduced. This means that besides the authority, two private companies’, Information Service Providers (ISP), access and alters the information in the register. The objective is to “Collect data at the source and transfer it to the registry computer system without any use of paper documents”. For example; Car dealers can enter data of a car owner directly into the register through an ISP (of their own choice). Service Providers and the authority offer web services to customers like:

- Car Dealers
- Insurance Companies
- Car Wreckers
- Vehicle Workshops

The authority offers a simple interface for their customers and the commercial providers offers the same plus added services, like providing financial opportunities or to compare insurance solutions. The two commercial providers have around 80% of the market. The introduction of the self-service concept has resulted in more up-to-dateness, reliability and accessibility of the register. The authority saves money and the business community can give better service to their customers. Misuse is highly uncommon.
Trust and benefits from a Customs perspective

Mats Wicktor, Swedish Customs

Mr Wicktor is the Director of Customs Future Centre. The Swedish Customs was founded in 1636 and today there are mainly two businesses:

- Simple border crossing – Managing the Trade
- Efficient protection – Enforcement

The Customs has 2400 officers all over Sweden. Some figures for 2006:

- Governmental budget 1.4 billion SEK
- Collection of 48 billion in taxes and duties
- Benefit for society 1.7 billion

The flows to be managed by Swedish Customs are:

- 1,636,000 trucks
- 11,106,000 cars
- 146,000 aircrafts
- 131,000 vessels
- 80,138,000 travellers

Annually there are 6 million custom declarations made, whereof 98% is made electronically. Mr Wicktor said that what the trade wants is; predictability, precision, speed and cost. The philosophy is: Compliance, simplification and better use of resources will achieve better competitiveness and better control. The model for implementing this philosophy is called the stairway.

Companies on higher steps have less interaction with the Customs and more of self declaration. A contractual relation built on trust.

Results of introducing the philosophy:

- Reduction of compliance costs 30-75 %
- Improved quality of Customs declarations
- Better control of accredited companies
- Hit rate increased from 5 to 44 %
- Improved service to the business community

The Customs are involved in the global and European development regarding information exchange and Mr Wicktor concluded his presentation by saying that if the same system is used in two or more countries, we can start to save money!
A couple of companies provided information on enforcement strategies, trials and experiences from abroad. For more information download presentation slides from http://www.arena-ruc.com/eng/?info=downloads

HGV Charging in Germany - What is comparable to the Swedish Control Concept?
Karl-Heinz Stappert, TÜV Rheinland InterTraffic GmbH

The Stockholm Congestion Charging
Gunnar Johansson, IBM Sweden

Nationwide Lorry Tolling System in Czech Republic
Lars Olsson, Kapsch TrafficCom AB

Roadside Enforcement for High Compliance in Tolling Systems
Daniel Scholz, VITRONIC

Show Case Interoperability in the Alsace
Mirka Tikvicki, Satellic Traffic Management GmbH

EFKON in the German Lorry Tolling Systems
Wolfram Tuchscheerer, EFKON

Tolling and Charging Acceptance Issues
William Gillan, Transport Research Laboratory
Output from discussion 
arena and panel debate

During lunch the four speakers were available for discussions. The closing panel debate was moderated by Jeremy Evans, TfL.

Jonas Sundberg, SWECO VBB

Political status in Sweden
Since February’s RUC seminar no political steps have been taken towards a tax for HGVs. The study from SIKA is to be referred for consideration and further investigation will probably be ended before a decision is made.

Concept of trust
Can foreign TSPs really be trusted? If Toll Collect’s On-Board Units are being used in Sweden, can they be trusted as an EETS provider? What is needed for this?

Mandatory on-board units – Can it be feasible?
Simple OBU solutions might be solved by using pre-paid accounts? A majority of vehicles using the Swedish road network today originates from countries near Sweden (Denmark, Norway, Finland, Germany, Poland etc.). The share of users which enters Sweden without an OBU is expected to be low.

Fall back solution
A fallback solution to a certified OBU is required, perhaps in combination with a real time call centre option.

Time differentiation
The investigation from year 2004 (Commission of road traffic taxation, 2004:63) suggests time differen- tiation in a future system, but doesn’t recommend to use it in the beginning of an implementation. Other suggested differentiations are vehicle characteristics (EURO class), total weight and road characteristics (road type, high class or secondary road).

Discussion on trials and demonstrations
This is being planned for the ARENA2 project, were there are thoughts of implementing a test bed, with a defined price list to test interoperability.
Mats Wicktor, Swedish Customs

**Modern Customs**
Mr Wicktor told us that the Customs have had an interesting journey from a traditional orientation with 100% control to more self declaration. It’s a complete new climate to work in. Get rid of the “what if”-question within the organisation, 100 % control isn’t the goal, but it’s important to understand that control still exist.

**Reuse of infrastructure**
When implementing new systems it’s important to use infrastructure and systems already set up by authorities.

Jan Willem Tierolf, Rijkswaterstaat AVV

**Enforcement**
An important part of enforcement is a purely national issue, but there are parts that need to be regulated by a directive as well. DSRC systems already have everything in place; autonomous systems are clearly in need of a framework. There should be some kind of service to make EETS OBUs enforceable.

**TC vs. TSP doing enforcement**
There were questions about the TC and the TSP. The TC is doing the enforcement but, Jonas Sundberg says the TSP is doing it, how?
We are pushing the enforcement functions into contractual arrangements between the TC and the TSP thereby reducing them to a minimum. It also gives greater possibilities for different types of checks and balances.

Ann-Christine Olsson, SRA Vehicle Registry

**Information Service Providers**
Since the self service concept was introduced in 1996, there have been 4 service providers at most. Today there are two providers, InfoTorg and Bilvision. Both have around 80% of the market.
References

Documents

Presentations and discussion during the seminar were mainly based on the documents below. The PM on the new approach to control and the general ARENA concept is available on http://www.arena-ruc.com/eng/?info=downloads

Note: The documentation below isn’t a Swedish statement. The conceptual development is part of the ARENA project describing a system with the purpose of giving stakeholders a common perception of systems architecture.


Web

ARENA project
www.arena-ruc.se

Swedish Road Administration
www.vv.se

VINNOVA (Swedish governmental agency for innovation systems)
www.vinnova.se
List of ARENA reports

ARENA 1., NetPort.Karlshamn


ARENA REPORT 2008:5. Hamilton, C J. “A market based approach to achieve EFC interoperability in Europe”. Policy Technology


ARENA REPORT 2008:9. Sundberg, J., “PM kring legala frågeställningar”. SWECO VBB


ARENA REPORT 2008:11. Sundberg, J., PM kring kostnadsberäkning”. SWECO VBB


ARENA REPORT 2008:13
Published papers produced within the project
Project partners:
Swedish Road Administration • SWECO • BMT Transport Solutions • Blekinge Institute of Technology • NetPort.Karlskrona