

Genuine cross-border trials a reality at last

With international trials due to start in February 2008, **Ian Catling** talks to **David Crawford** about progress towards achieving interoperable EFC in Europe

Trial participants in the current European Road Charging Interoperability (RCI) project have now completed factory acceptance tests of prototype on-board units (OBU). These have led on to national site tests, which started before Christmas 2007 for completion in January 2008, and have paved the way for international – ie genuinely cross-border – trials in February 2008.

The whole process will mark an important half-way house in the progress towards achieving interoperable EFC in Europe, on the basis of the EC's pledged European Electronic Tolling Service (EETS). I hope that the new schedule for EETS implementation (see below) will now prove attainable.

OBUs have been developed by two supplier groups selected from a tendering process completed in 2006. One is led by FELA Management and also includes Q-Free and Italian equipment manufacturer ELEM; the other is the T²ASK consortium, led by Dutch Company Technolution, and also including Thales Transportation Systems, AGES International, Sociedad Ibérica de Construcciones Eléctricas (SICE) and Kapsch TrafficCom.

Ian Catling Consultancy (ICC) leads the validation workpackage which, after the international tests are completed, will culminate in a workshop in May 2008, to enable participants to discuss the findings by the time the project closes in June 2008. I hope that the EC will publish the full results as part of the necessary firming up of the scope of EETS.

The international operational tests will be run with two lorries, each equipped with a thin- and intelligent-client OBU, over a 3456km route linking the six national 'sites', each a stretch of the tolled road networks of the six participating countries, Austria, France, Germany, Italy, Spain and Switzerland (see table 1). The route includes a new bridge which currently constitutes the only point at which the German and Swiss lorry toll systems touch.

The project has defined the route with the aim of ensuring the most efficient use of the partners' networks, and generating the largest number of opportunities for interoperability within a two-week period. The fact that the operational tests are taking place in winter, and largely in mountainous areas, adds a certain physical rigour to the process.

To avoid, therefore, the risk of having both trucks blocked by adverse weather conditions at the same time, one will traverse the route in the reverse direction. The starting point will be Ponthévrard (France) where the manufacturers will install their OBUs ready for departure on 18 February 2008.

In France the trial will, for the first time, demonstrate equipment that complies with the new European standard for DSRC communication (EN 15509) and that operates correctly in the existing French TIS-PL scheme. When the trucks cross the Swiss border, the prototypes are designed, without any user intervention, to recognise that they have arrived in another charging framework or context.

They will adapt their behaviour to produce the distance-based data



One of the OBUs being used in the RCI trials

demanding by the Swiss Customs Authority. Carrying on into Germany, they will close the Swiss set of charging data and seamlessly begin detecting when they reach road segments covered by Germany's GNSS-based Toll Collect system.

At the next crossing, they will close their Toll Collect records in readiness for communication with the Austrian system. Entering Italy via Switzerland, they will communicate with Telepass beacons; entering Spain via France, they will be activated to exchange data on the basis of EN 15509.

GNSS

One consequence of the progress to date of tolling development in Europe is that all the RCI sites are wholly or partly DSRC-based. Germany is the only country deploying genuinely GNSS-based road pricing in its Toll Collect system, with DSRC integrated as part of the enforcement process.

The Netherlands – which might, had 2001 plans gone ahead, have had a GNSS-based system at least partially operational by now and available for inclusion – has just confirmed its latest attempt to get universal road pricing off the ground. While this has met with some predictable opposition, if recently-announced plans are successful there will be a substantial opportunity by 2012 for real interoperabil-

Interoperability on the move

ity between GNSS-based systems.

While, therefore, the tests as planned will be able to demonstrate DSRC-DSRC and DSRC-GNSS compatibility; none of six formal RCI sites will show GNSS-GNSS interoperability. This, of course, is just as important for validating the EETS concept.

It is for this reason that I am personally pleased to have been able to organise a small complementary test in London. The aim of this was to demonstrate how a GNSS-based unit capable of functioning on a German truck as part of the Toll Collect system could also work in a hypothetical distance-based scheme in London.

The test ran in December 2007 using two equipped Transport for London (TfL) vehicles deployed in its trials of GNSS-based technology for possible future versions of the congestion charging scheme. One vehicle carried OBUs from both T²ASK consortium leader Technolution and member Kapsch; the other an OBU from FELA Management, incorporating the company's newly-developed infrared communications as well as EC-accepted 5.8GHz microwave charging capability.

The vehicles crisscrossed the London Congestion Charging Zone over a two-day period. It was, of course, of considerable benefit that TfL was already collecting highly valuable data on the performance of GNSS systems.

Its latest trials show, in contrast to earlier findings, that systems using later-generation GPS receivers and more sophisticated map matching to overcome the problem of urban canyons - let alone a future GALILEO - would be accurate enough for distance charging. An accuracy of $\pm 2.5\%$ or less is, for example, as good as, or better than, the quoted accuracy of a London taxi meter or a lorry's tachograph.

Speaking at a November 2007 Mapflow-hosted conference in Dublin of the Active Road Management Assisted by Satellite (ARMAS) project, Jeremy Evans, TfL Head of Traffic and Technology, Congestion Charging, indicated that TfL would reveal some specific and highly-encouraging figures early in 2008. Routes tested ran throughout Central London.

Despite all this encouraging technical evidence, however, TfL is likely to go for a DSRC-based system in the immediate future; while I cannot personally see any UK local authority bidding for the Department for Transport's Transport Innovation Fund (TIF) money for demand management schemes plumping for GNSS. (Two have so far bid; and any that do go ahead will need clear guidance on ensuring EETS compatibility and, thus, interoperability).

In contrast to its counterpart in The Netherlands, the UK Labour Government has been taking a slow track on GNSS-based charging. It has, however, recently invited eight potential equipment suppliers for planned 2008 system demonstrations of distance-based road pricing to join in a formal process of competitive dialogue over the next few months.

Meanwhile the Conservative Opposition, whose political stock has been rising dramatically, has now committed itself to introducing lorry road user charging (LRUC) in the UK, reversing the Government's 2005 abandonment (re-confirmed in November 2007) of an initiative that many observers saw as a practical way of dry-running a national all-vehicle scheme. I believe that introducing it could now cost less than was envisaged when it was originally proposed.

Europe-wide, there is considerable European momentum towards LRUC (with schemes naturally having to take into account EETS requirements - as built into the Slovak plan). Systems are up and running in Austria, the Czech Republic, Germany and Switzerland (which uses GPS as a check - one that, in practice, works better at measuring distance than the tachograph which is required by law).

The Czech Republic, the latest member of the club, has been running its DSRC-based system on the country's major road network since 1 January 2007. It built in, from the outset, the prerequisites for interoperability with neighbouring Austria's ASFINAG system (despite an initial commercial imbalance over the respective cost of the OBUs).



The RCI goal of European interoperability

It left open the question of the technology for a second phase, covering secondary and minor roads - a decision which has implications for its neighbours. Among these is Slovakia, whose NDS (National Highway Company) has finally released, to eight potential bidders, tender documents which it prepared some time ago. It did not specify a charging technology, though its Transportation Research Institute Director, has stressed the advantage in setting-up time of a GNSS-based system.

It expects to make a preliminary announcement in January 2008, naming five or six candidates to present technical bids for second-round evaluation. Early 2009 could be a realistic deadline for launching a system covering an initial 2400km network covering motorways, expressways and a significant portion of the first-class road network.

There may be some pressure to provide an extension to the existing Austrian system, as a potentially time-saving solution. But this might not be practical as the network includes many roads which are not to motorway standards and which would be expensive to equip for DSRC-based charging.

Hungary could well issue tenders in early 2008 for a 2009 start, and Slovenia is in a similar position. Sweden, as announced at the recent ITS UK International RUC Conference in London, has established the ARENA 2.0 framework in which it is developing plans for national LRUC, and is expected to take a political decision in the next few months on whether or not to proceed. Any decision on using a GNSS-based system would reflect the fact that this would be relatively straightforward to implement.

Implementation

At the ARMAS Conference mentioned above, I had the pleasure of giving a presentation on European Interoperability and the EETS: an Update, on behalf of Charles Surmont of EC DG Energy and Transport (DG TREN), who was unable to attend in person. He has recently taken over from Philippe Hamet in DG TREN's Logistics, Innovation, Intelligent Transport & Co-Modality unit, with responsibility for implementing the interoperability directive.

Surmont presented a new timetable for EETS implementation (see table 2), which everyone involved hopes will prove to be achievable after previous postponements. (To ensure that it does, I would urge the EC to be ready to invest some money in setting up the EETS service, as it is doing with GALILEO).

He also reminded us that EC Directive 2004/52/EC on the interoperability of electronic fee collection (EFC) - as amended to include provision for DSRC - as well as GNSS-based systems - was due to

Table 1: charging system being tested

Country	System
Austria	ASFINAG
France	TIS
Germany	Toll Collect
Italy	TELEPASS
Spain	VIA-T
Switzerland	LSVA

Table 2. New EETS implementation schedule

Stage	Deadline	Delivery
1	End-2008	Service definition
2	End-2011	Availability for HGVs and long-distance coaches
3	End-2013	Availability for all vehicles

have been incorporated into the national legislation of Member States. (Failure to do so has led to the initiation of infringement proceedings against Denmark).

Recent developments in urban congestion charging have highlighted the Directive's let-out provisions for 'local' schemes, and led to questions as to whether, for example, London and Stockholm (both currently ANPR-based) should be included. The issue is not fully resolved, but the general opinion is that London, because of its scale, is included. At some point, however, some clarity of definition is going to be needed.

Another issue awaiting resolution at EC level is the role of the 'EETS provider' as defined in the model developed within the CESARE (Common EFC System for an ASECAP Road tolling European service initiative), being run by the European motorway operators' group to handle the practical and contractual aspects of

EFC interoperability. (RCI has taken the third phase of CESARE as its starting point and close cooperation continues, while ASECAP is currently working on CESARE IV to focus on management aspects).

The current model separates the role of the EETS provider from that of the toll operator, or charger. But I would expect that, in practice, the toll operators will take on the role of service provider, if they wish, and several have already indicated their keenness to do so.

In this context, it is perhaps significant that some observers see the changeover as head of the EC staff responsible for implementing the Interoperability Directive as heralding a change of emphasis. Previously, this was on the desirability of a tightly-defined and fully-described EETS.

Now, however, there seems to be a willingness to give the EETS provider greater freedom in deciding what to offer the market. One obvious example would be in giving a choice between a thin- or more highly-functional intelligent-client solution (the latter being the one adopted by Toll Collect).

From the point of view of charging, it is not critical whether this is handled by the OBU or at a back-office control centre. The real issue – which is soluble – is over enforcement, and this will demand a degree of negotiation.

As I said at the beginning, we have reached a critical half-way house on the road to EETS. There are grounds for optimism, with the RCI trial results that will be available in the first half of 2008 and the effectively completed reports of the EC's expert groups contributing to a vast technical knowledge bank, and CESARE continuing to contribute on contractual and managerial aspects.

Ian Catling is head of the Ian Catling Consultancy, the firm he established in 1983 and which since then has been influential in the development of ITS technology, particularly for road user charging. He is the convener of the international standards group which has drafted the standard for GNSS-based charging systems, and was the leader of the EC's expert group on GNSS-based charging.

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RUC - a European update

Chris Humphrey reviews the European scene and concludes that good technical systems are not enough to ensure success, without complementary 'soft' components.

Traffic levels in major European urban centres continue to rise, causing ever more delays, accidents, and noise and air pollution. Road congestion is now a serious problem facing major cities in all European countries, including new Member States.

In response, governments and cities are introducing financial measures in the form of road pricing or road user charging (RUC) – as distinct from tolling – to manage traffic demand and raise money for investment in transport. All road users, of course, already pay a fee for access to the highway network.

They do this either indirectly, as duties on fuel or through vehicle taxation, both of which are controlled by governments; or directly, in the form of tolls. The latter give them entry to a road section, bridge, tunnel or – as with larger schemes such as the Oslo Toll Ring in Norway – a whole road network.

Road tolling schemes tend to be operated by commercial companies as part of what is now a mature European industry, with ASECAP as its trade body. In seeking to limit and manage demand for roads, however, RUC represents a historic policy shift, since charges are set at a level that will actually deter some road users from making journeys.

Once, for instance, a price is put on peak-hour entry into a city, or for each km of road driven, some users will choose to drive off-peak or combine trips to reduce costs. Funds raised can be reinvested in eg improving public transport.

Even a relatively small reduction in peak-hour car trips per week can bring about a dramatic fall in congestion levels - as in London and Stockholm, which have already adopted large-scale road pricing. Other European cities are also actively exploring the potential, as part of a larger package of transport improvements designed to tackle congestion and climate change.

In The Netherlands, where new legislation is required, a 1994 policy envisaged a morning-peak cordon around Amsterdam, The Hague, Rotterdam, and Utrecht – but these dropped out in 2001, due largely to lack of political and public acceptance. In September 2006, however, it was shown that the operational costs for a scheme actually fell.

This provided the impetus to accelerate work on a national distance-based scheme to go live in 2012. Revenues from national road pricing would replace existing taxes.

In the UK outside London, Cardiff (Wales) businesses are support-



A charging point in the Stockholm congestion charging scheme

ing a congestion charging scheme, but the matter is on hold until after local elections in 2008. Edinburgh (Scotland) voted against charging scheme in a 2005 referendum, in contrast with Stockholm.

The Swedish capital's permanent 'congestion tax' scheme began on 1 August 2007 and operates between 0730hrs and 1830hrs Monday to Friday. It followed a successful September 2006 referendum on a January–June 2006 trial, which showed inner-city traffic levels down by 20-25% and time spent in queues down by 30-50%; while emissions also fell.

The UK Department for Transport (DfT) has also awarded grants, from its Transport Innovation Fund (TIF), to ten English local authorities for feasibility studies on introducing RUC schemes, with the prospect of gaining resources to fund these.

In Italy, the city of Rome has been operating limited traffic zones (LTZs) since 2001. Access to particular areas is restricted to holders of an annual pass, costing around €300. Enforcement technologies include electronic gates, smartcards and automatic numberplate recognition (ANPR).

The system has helped to reduce car traffic in the LTZ areas by 15-20%, and the city is now expanding their number.

Markets

Across Europe, many different suppliers are pitching into the technical market for hard components, eg systems and infrastructure. They are leveraging their experience in related competencies eg project management (Capita Symonds, IBM), road tolling (EFKON, Kapsch TrafficCom, Q-Free), telecoms (Satellic) and mapping (Mapflow).

Judging by what has happened in Stockholm and London, the technical systems needed for new schemes will tend to be delivered through consortia of suppliers, to cover the necessary range of expertise. Individual contracts will be periodically re-let – as in

London, where project management of its congestion charging will pass to IBM from Capita Symonds in 2009.

But good technical systems are not enough to ensure success, without complementary 'soft' components. It is important to consider how users will react to the imposition of charging – 'acceptability' – and how well they can understand the system – 'usability'.

We can therefore identify a second market consisting of market research, consultation and PR. Unless authorities address the human aspects prior to implementation, schemes will either fail to get off the ground, as in Edinburgh, or risk having adverse consequences on the travelling public.

London appointed a PR agency, Fishburn Hedges, to handle the media and ensure that the news agenda stayed positive when the charge was first introduced. Negative headlines such as 'This dastardly plot will ruin London' and 'Don't take away my car' were countered with the message that the charge was 'needed, workable and fair'.

Both cities also undertook extensive consultation to ensure that the scheme design met the needs of stakeholders such as businesses and residents.

Dr Chris Humphrey is a principal consultant with Transport & Travel Research (TTR). Russell Tricker, a senior consultant, helped with research.

TTR is the coordinator of the EC-funded CURAÇAO (Coordination of Urban Road-user Charging Organisational issues) project (see *ITS Solutions*, April 2007) and is currently providing consultancy to two UK TIF authorities. In the UK East Midlands 6Cs pilot, it is responsible for engaging local businesses in solutions aimed at addressing future congestion.

www.curacao-project.eu.

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