

EETS: from theory to reality

Erich Erker, Norbert Schindler and Peter Tschulik from Siemens Electronic Tolling examine the barriers to EETS deployment.

Tolling in Europe was introduced to pay for the construction and operation of individual tunnels, bridges and highways and has evolved in major steps. The original manual tolling systems were highly disruptive to traffic flow and required the creation of large toll plazas, with multiple lanes and toll booths to ensure an acceptable throughput. With the introduction of Dedicated Short Range Communication (DSRC) microwave devices for frequent users, waiting times at tolling stations were reduced and allowed for more convenient methods of payment, such as monthly billing.

As more and more operators collected tolls for their road infrastructure, interoperability between existing operators become increasingly important. Electronic DSRC lanes typically employ barriers or single lanes for slow passage, but enable the use of a single Onboard Unit (OBU) and a single bill per customer. In parallel, new toll systems on a nationwide scale emerged. Eight European states have now introduced nationwide truck tolling schemes: Switzerland, Austria, Germany, the Czech Republic, Slovakia, Poland, Hungary and Belarus. These systems use either DSRC or Global Navigation Satellite Systems (GNSS) for a multi-lane free flow approach and are covered by a single national operator.

The next logical step in user-friendliness and in the reduction of obstacles for free traffic flow is the convergence of these existing systems into interoperable clusters of tolling systems. The Holy Grail in this respect is the European Electronic Toll Service (EETS) which is designed to integrate all tolling systems and operators of relevant size throughout Europe. The European Community has been attempting to achieve this vision through numerous EU-funded projects, such as CESARE and RCI and through relevant legislation.

Recent developments of EETS

Even though the deadlines defined in the European Commission's decision have come and gone, EETS still remains elusive. The reasons why that has happened are plentiful, but nonetheless considerable progress has recently been made. A prime example is the new *écotaxe* tolling service in France which was scheduled to go live in January 2014 but has been temporarily suspended. The French approach is unique in that it will expand its existing tolling policies which cover all vehicles and currently operate on approximately 8,000km of tolled motorways. By the end of 2013, all trucks in France above



Multiple OBUs in a modern truck



EETS-compliant hybrid OBU from Siemens

3.5 tonnes should be equipped with new hybrid OBUs using GNSS technology for the automatic payment of tolls on a new network that covers 15,000 km.

These mandatory OBUs also contain a 5.8GHz DSRC microwave interface, allowing for the automatic payment at all existing plazas of the motorways already subject to tolls. It is anticipated that over 800,000 new hybrid OBUs will be distributed to the trucks driving in France and will replace the DSRC tags that are currently in the trucks. The new OBUs can be installed by the driver in a matter of minutes and will be provided to the vehicle owners free of charge.

With this new tolling approach, Europe is witnessing the first implementation of a fully interoperable hybrid tolling system. The French system will be 'hybrid' in two ways: in terms of technology, supporting both GNSS and DSRC tolling, as well as in terms of organisation - serving both the new nationwide truck tolling system and of the existing private road operators.

The new OBU is compliant to all currently defined standards of the planned Electronic Toll Service, thus making it a commercially →

→ available 'EETS compliant' unit. The project in France even goes one step further into the direction of EETS. The DSRC interface of the OBU is fully compatible with the Spanish VIA-T microwave standard. Therefore trucks driving in France can use the roads in Spain without having to change the OBU.

Since the introduction of EETS did not unfold the way the European Commission has expected, it issued a statement conveying its disappointment with the conduct of the EETS stakeholders. To move things forward, a project called REETS (Regional EETS) was established to test the EETS concept in 'regional' tolling clusters that could grow, merge and finally result in the wide scale configuration originally envisioned. The new French *écotaxe* project, with the extension of interoperability to Spain, could be a perfect example for REETS going into operation, while the EU activities are only just beginning.

Europe is thus witnessing the next major step towards the implementation of the Electronic Toll Service which until now has only been theoretically discussed within the European Union. With its new truck tolling scheme, France will also be the first country to introduce a completely new business structure in which a private toll operator is subcontracted by the state road authority for the creation and operation of the tolling infrastructure, and multiple Toll Service Providers (TSPs) can enable their clients to use the established tolling infrastructure.

The system also allows multiple toll service providers (TSPs) to enable their clients to use the established tolling infrastructure. The TSPs register their clients in the tolling system, supply them with new Hybrid OBUs, handle all billing and payment issues, and ensure that they are fully compliant both in the old and new tolling domains. Due also to the fact that the new satellite-based *écotaxe* system will be interoperable with its traditional tolling schemes, and also to schemes in neighbouring Spain, France has been taking a leading role in what could become a forerunner to EETS.

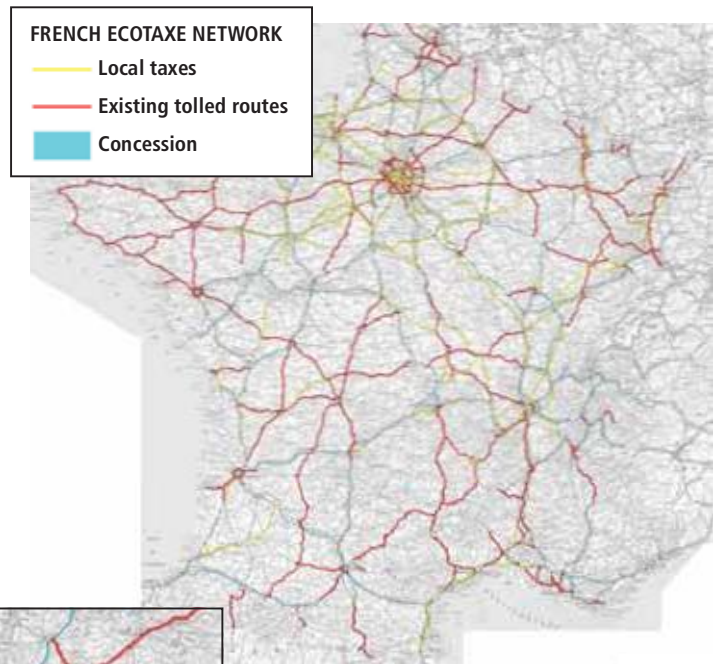
Hurdles of EETS

The French example demonstrates 'EETS in the small' – that is on a national level and with interoperability in Spain. In order for EETS to move from theory to practice on the European level, international toll service providers need a compelling business case which would motivate them to invest in the significant (mostly administrative) overhead that EETS would require. The preparation of the French project has been a valuable experience that has shown in practice why EETS is still struggling to become reality.

The EU commission has issued directive 2004/52/EC and a decision (2009/750/EC) defining several aspects of EETS. Some of its standards are listed as mandatory for all EETS stakeholders while other relevant standards are only recommended, with the final decision about implementing these requirements left to the individual tolling companies. Since a large number of tolling companies will take part in EETS (at least one per member state) this will lead to a huge body of diverging (if not contradicting) requirements that will be almost impossible to manage and implement. Unfortunately, the tolling companies' Toll Domain Statements, which sets out requirements for their acceptance of EETS providers, vary widely in level of detail, content and quality in general.

Therefore a clear path to EETS certification does not exist, possibly one of the major reasons why no EETS provider has emerged yet to tackle the task. Siemens has a new OBU platform which can be configured to meet these and other challenges along the path to EETS but that path has not yet been defined.

This shows how important it is to streamline the specifications for the technology employed in EETS. A prominent example is the



current EETS decision requiring the Italian version of DSRC (ETSI ES 200 674 standard suite) to be supported by all EETS OBUs. For technology suppliers, this is a big obstacle to implementation and certification because at the moment there is practically only one supplier of compatible DSRC modules in Europe. A supplier can either choose to use the existing module, clearly against European rules on competition, or would have to develop it on its own – even though sufficiently detailed test requirements have not been made available!

Additionally, other important aspects for interoperability have been left open.

Therefore, tolling companies tend to place 'special requirements' into their toll domain statements which result in the fragmentation of the system landscape. Several parts of the EETS directives merely make recommendations which individual tolling companies may or may not implement, that could lead to a large body of diverging and contradicting requirements. If this happens it would make it extremely difficult to implement EETS throughout Europe.

Summary

France has taken the first significant step towards EETS, by implementing a system that is interoperable with the technology used by legacy toll systems (based on DSRC) and with the new tolled network of roads (based on GNSS). The French *écotaxe* system also supports the ability of multiple service providers to offer to truck drivers and truck companies the tolling service that is required by law, as well as other "value-added" services.

The French *écotaxe* project has shown that EETS is possible and that a realistic business case for EETS providers does exist, provided the system is specified in a way that mitigates the risks of operation in a widely heterogeneous environment. ■



LEFT TO RIGHT: Erich Erker, Norbert Schindler & Peter Tschulik