



Norbert Schindler examines the crossover potential for electronic tolling and fleet management and looks at Eastern Europe for working and workable examples

Last year I reported on the impact that the European Electronic Toll Service (EETS) was having in transforming nationwide truck tolling throughout Europe¹ and on the advancement of satellite-based tolling in Eastern Europe.² Now, at the beginning of 2020, eight states in the European Union are operating nationwide distance-based charging schemes for heavy goods vehicles. Five of these electronic tolling systems rely on satellite-based technologies, and two more EU member states are currently implementing GNSS-based solutions for nationwide tolling.

The Czech Republic was the most recent country to join the “GNSS club”, i.e. those nations using satellite technology for nationwide tolling schemes. In December 2019, the Czech microwave-based system was replaced by a GNSS-based solution, covering a tolled road network twice as large as the former system. The obvious question might be: how much more does it cost to double the length of the tolled

roads? The answer: operational costs of the GNSS-based solution is about *half* of the old microwave system. Despite years of exploring how to best migrate to a “hybrid system” in which both technologies could operate in parallel, it eventually became clear that it would make no sense to operate and maintain the existing DSRC roadside infrastructure. Consequently, once each tolled vehicle was equipped with a GNSS-based On Board Unit (OBU),

“Once each tolled vehicle was equipped with a GNSS-based On Board Unit (OBU), the hundreds of DSRC gantries that were installed on every Czech toll segment in 2007 became obsolete”

the hundreds of DSRC gantries that were installed on each and every toll segment back in 2007 became obsolete and were therefore torn down.

Poland, which has been incrementally adding microwave-gantries along its tolled road network since 2011, has also given up on the outdated DSRC technology and will ditch hundreds of the costly gantries as well.

According to the Polish Ministry of Infrastructure, the new GNSS-based system should be launched in 2021. This would make Poland the seventh member of the GNSS club, following Bulgaria that was already expected to have launched its satellite-based tolling scheme in 2019. By comparison, the “nuclear club” of nations having nuclear weapons has eight members. If we include the Russian “PLATON” and the Swiss “LSVA” charging systems for trucks, there will already be eight nations with GNSS tolling this year, with Poland becoming ninth next year.

ONE STEP FORWARD...

Unfortunately, Bulgaria's tolling scheme has already been delayed a number of times. According to the Road Infrastructure Agency, the new tolling system should go live in March 2020. The contract for building the system was awarded in 2017 and includes both the GNSS-based tolling solution for trucks above 3.5 tons and an electronic vignette system for passenger vehicles. The time-based e-vignette was launched in January 2019, but according to reports in the Bulgarian press the distance-based truck tolling scheme seems to be facing a number of difficulties – including protests by truck forwarding companies.

Nevertheless, the Bulgarian tolling solution promises to be unique and could well have a significant impact on the way similar nationwide tolling systems will be

“The time-based e-vignette was launched in January 2019, but reports in the Bulgarian press suggest that the distance-based truck tolling scheme seems to be facing a number of difficulties”

implemented in the future. We could be witnessing a major advancement in the world of electronic tolling in Europe. For the first time, a toll contractor will not be providing OBUs to road users but is merely required to install the central IT system and enforcement infrastructure that are

needed for the system's operation. The idea is that international EETS service providers as well as Bulgarian “National Service Providers” will supply the OBUs to their own clients and simply connect to the central system that is designed to handle the toll payments for vehicles required to pay the distance-based charge.

Hungary launched a similar solution in 2013 in which national Toll Declaration Operators (TDOs) used existing fleet management solutions to identify travel on the tolled road networks and to make electronic toll declarations as an alternative to the manual toll declaration scheme, which will also be an option in the Bulgarian solution.

The combination of Fleet Management Services with Toll Services was completely unique to Hungary and has obviously influenced the design of the Bulgarian system. Until now, the Hungarian “Fleet Management Solution” has been more like an EETS microcosm, with 20 different TDOs operating within Hungary. Yet none of those Hungarian service providers are operating with their telematics solutions in any of the other national tolling schemes in Europe. Inversely, there have been no EETS service providers that offer their services in Hungary until now. The Bulgarian approach could enable both solutions: local fleet management providers and international EETS providers would be able to act as Toll Service Providers (TSPs). If proven successful, this approach could make a significant impact on the European tolling landscape – which is currently being disrupted by the arrival of EETS service providers now sweeping across Europe.

Thanks to EETS, commercial vehicles that are obliged to pay distance-based tolls will be able to select a single Toll Service Provider, equip their vehicle with a single GNSS-based On-Board Unit and can travel throughout Europe without having to register in each individual country. Most countries still have a single national toll operator, with a specific On-Board Unit (OBU) hardware designed exclusively for the payment of distance-based tolls on its own road network. But this is changing



▲ The different OBUs of the accredited service providers in Belgium (courtesy of Viapass)

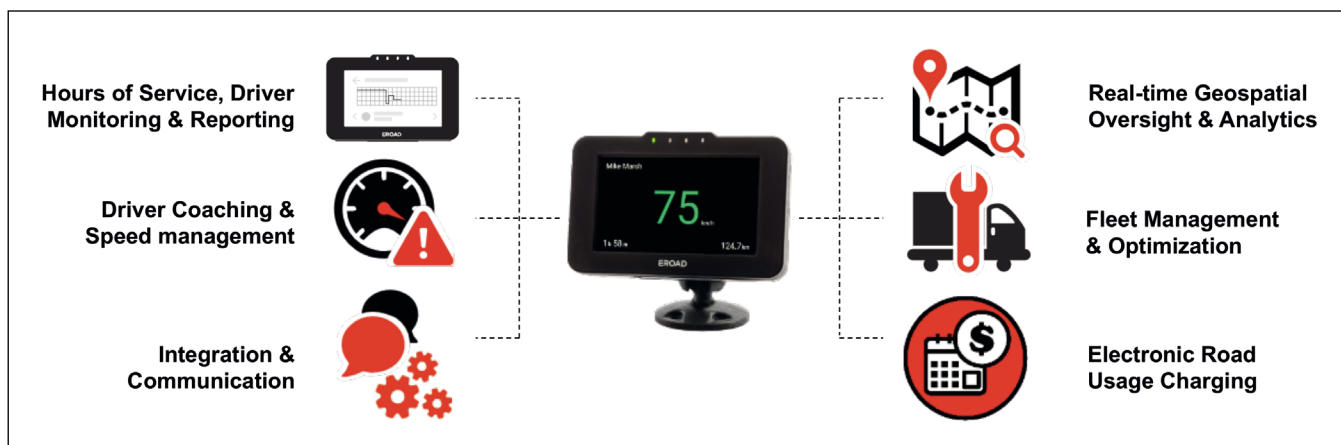
▼ Some of the Fleet Management Tracking Devices Used in the Hungarian Toll System



NOTES

[1] <http://magazine.h3bconnected.com/thinking-highways-february-2019/tolling-eets/>

[2] <http://magazine.h3bconnected.com/thinking-highways-february-2019/tolling-eastern-europe-in-a-nutshell/>



▲ **Figure 1: A GNSS-based mobility services platform for commercial and regulatory services**

fast. When Belgium launched a nationwide tolling scheme that supported EETS in 2016, users of the toll system could choose among different EETS TSPs from the first day of operation. These TSPs provide their clients with automated tolling in Belgium with their individual OBU-based services.

By the end of 2019, a total of five TSPs have become accredited EETS providers in Belgium in addition to the national service provider that supplies the mandatory OBU to each tolled vehicle by default. In 2020, another three TSPs should be accredited as well. Whereas EETS providers in Belgium made up for approximately 25% of the market share by the end of 2019, it is anticipated that this should increase to more than 40% by the end of 2021, according to statements made by Viapass. The impact that EETS is already having in Europe is clear.

BEST FLEET FORWARD

Coming back to Bulgaria, it remains to be seen whether enough EETS service providers will be ready to take the commercial risk of providing the toll service from the first day of operations – especially if they are given a relatively short period of time to implement their solution. If Hungary is an example, fleet management operators in Bulgaria may become motivated in becoming National Service Providers in order to maintain (and hopefully expand) their customer base. Therefore, it would seem only natural that fleet management service providers would be destined to become TSPs

“The Bulgarian approach could enable both solutions: local fleet management providers and international EETS providers would be able to act as Toll Service Providers”

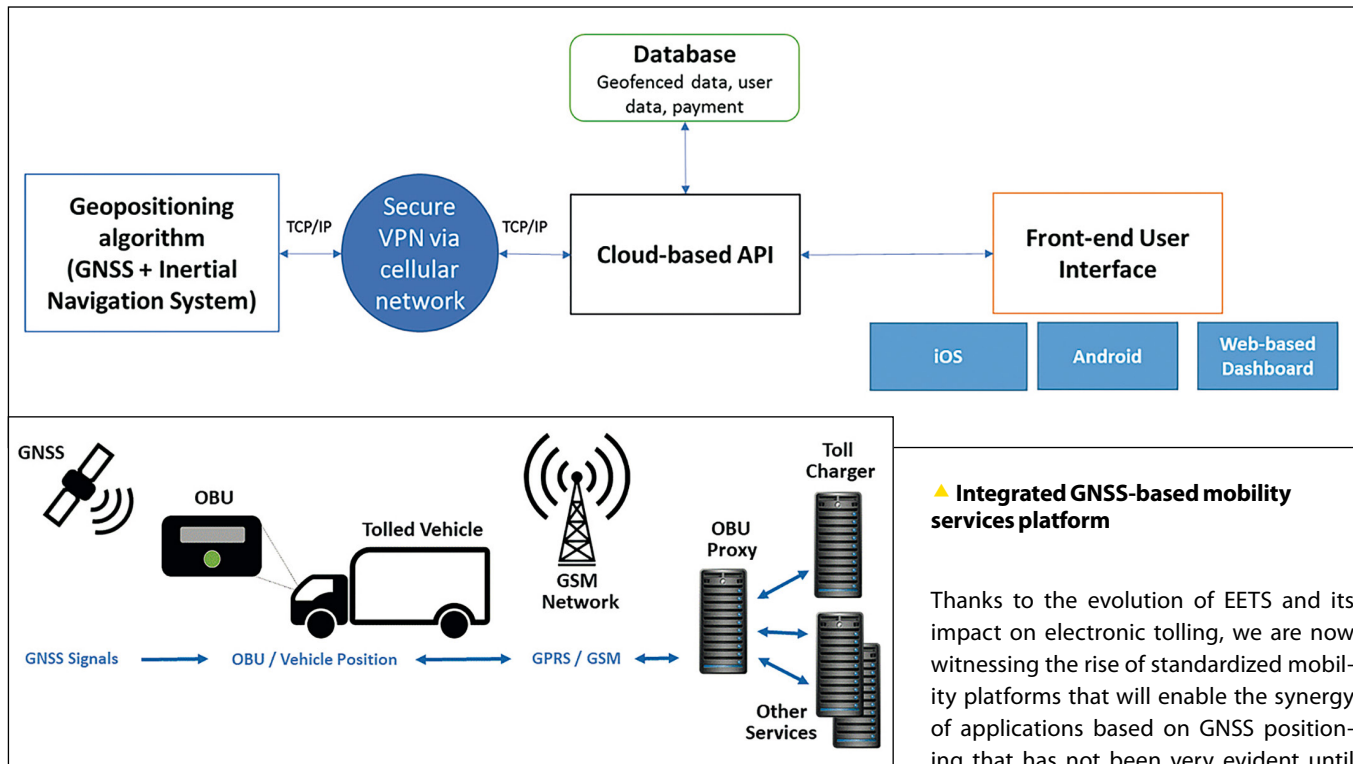
throughout Europe. In contrast to Hungary, which has a proprietary tolling solution that is not really compatible with other toll domains in the EU, Bulgaria clearly anticipates the combination of EETS with fleet management. It seems that experienced fleet management companies would be in an ideal position to extend their service portfolio to include EETS provision.

A majority of the new EETS providers appearing on the market recently have had limited or no experience with electronic tolling services in the past, but are established in offering fuel card services. It would seem only logical, then, that fleet management operators would also join the ranks of EETS providers. The launch of the Bulgarian tolling system may deliver the initial spark for this to happen on a broader scale. Fleet management offered in combination with tolling services on a single platform could significantly reduce the operational cost for freight forwarding companies. The next logical step would be for other value-added services to be

offered, using the same infrastructure that has been established by tolling and fleet management providers

With highly accurate geo-positioning and reliable connectivity between the vehicles' OBUs and the back office of fleet management operators, additional applications such as parking, navigation, use-based insurance, and congestion charging could be easily implemented using the same platform. Such a platform could operate in different jurisdictions, i.e. in different regions or cities, and provide a wide spectrum of applications from nationwide tolling to last-mile deliveries. If a single technology platform can solve both freight logistics and urban delivery issues, for example, such an integrated solution can quickly gain traction in the market and potentially affect the shaping of future transport policies.

The idea of combining multiple satellite-based mobility services is not new. In New Zealand, EROAD established a purpose-built platform in 2010 for regulatory telematics. Together with Electronic Road User Charging (RUC) for commercial fleets they also offered fleet management services that provided higher security and accuracy than existing telematics services – based on the requirements set forth by the electronic tolling system. EROAD offers additional telematics services with their platform, as shown in Figure 1. For the transport operator this means that the system provides a higher return on investment by streamlining operations,



▲ Integrated GNSS-based mobility services platform

Thanks to the evolution of EETS and its impact on electronic tolling, we are now witnessing the rise of standardized mobility platforms that will enable the synergy of applications based on GNSS positioning that has not been very evident until now. New standards and interfaces need to be developed across multiple transportation applications that will enable fast deployment of new mobility services. In this environment, fleet management solutions could be one of several key application areas that could tap into this potential. New opportunities could unfold with respect to establishing the technological basis upon which new generations of mobility services and applications can evolve. Integrated telematics solutions with standardized application program interfaces will enable freight forward operators to significantly increase the efficiency in the management and monitoring their fleets. Before long, the doors to the GNSS club will no longer be supervised by national tolling monopolies, but will be opened by service providers that give access to multifaceted services that will, hopefully, make financing the operation and maintenance of road networks through distance-based tolling feel much less of a burden than it does today.

▲ Using the GNSS-based tolling platform for multiple mobility services

using one system (and one device) for RUC, driver fatigue management, as well as fleet management. This illustrates how both commercial and regulatory services can be integrated in one GNSS-based mobility services platform, such as:

- Hours of Service, electronic logging, driver monitoring and reporting
- Driver coaching and speed management
- Integration and communication
- Real-time geospatial oversight and analytics
- Fleet management optimization
- Electronic Road Usage Charging

PARKING SPACE PROGRAMME

Parking is also becoming one of the solutions emerging from an integrated mobility services platform. Although still early in their deployment efforts, companies like Parkofon (<https://www.parkofon.com/>) and Parkd (<https://parkd.com/en/>) use highly accurate telematics solutions to improve last-mile delivery and fleet efficiency in North America and in Europe, respectively. These parking startups offer promising state-of-the-art telematics solutions that

overcome the challenges of geo-positioning accuracy in demanding environments such as tunnels and urban canyons, where multipath errors are caused by the reflection of satellite signals off tall buildings. Such platforms that overcome the challenges of the city will also be well prepared for offering services such as fleet management and satellite-based tolling.

Satellite-based telematics solutions have already been on the market for decades.

"Thanks to the evolution of EETS and its impact on electronic tolling, we are now witnessing the rise of standardized mobility platforms that will enable the synergy of applications based on GNSS positioning that has not been very evident until now"

Norbert Schindler is the founder and CEO of GNSS Consulting
www.gnss-consulting.com