

# ONE OBU FITS ALL

A multipurpose, GNSS-based OBU can be used for a range of diverse and demanding applications

→ Satellite-based tolling has been spreading throughout Europe for more than 10 years. More than one million tolling onboard units (OBUs) using global navigation satellite system (GNSS) technology are already in use in Germany, Slovakia and Hungary. A few million more GNSS-based OBUs are currently being prepared for deployment in the nationwide truck tolling systems being implemented in Russia and Belgium. Singapore is presently planning to transition its electronic road pricing system to GNSS-based technology, where it is anticipated that another million new GNSS-based OBUs will be installed into passenger cars using this urban tolling scheme. Solutions for road pricing using satellite technology are also in preparation in the US states of Oregon and California.

Also on the rise are mandatory requirements for tracking trucks that transport certain goods, such as livestock or dangerous materials. In an increasing number of countries, customs and tax authorities are developing or deploying GNSS-based solutions to track the transportation of all products being imported, exported, or in transit – also to identify tax fraud.

As the deployment of automotive devices using GNSS-based technology becomes increasingly widespread, there is greater motivation to take advantage of a common hardware platform that is both robust and flexible enough to address the diversity of requirements of these different services using satellite technology. Based on the experience of four generations of GNSS-based OBUs for electronic tolling, a new a GNSS platform has been developed by Siemens that delivers very high position accuracy due to the combined use of GPS (global positioning system), GLONASS (global navigation satellite system), EGNOS (the European Geostationary Navigation Overlay Service), and now also Galileo. This GNSS platform is suitable for a range of applications that address a variety of regulations throughout Europe, particularly: tracking and tracing of



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(Left) Three types of GNSS-based OBUs on a vehicle's windshield (Above) The Galileo satellite system

dangerous-goods vehicles; tracking and tracing of livestock; and tracking and tracing of transit vehicles and of goods entering and leaving the country.

### BEYOND TOLLING

Missing trader fraud, i.e. the theft of value added tax (VAT), has become a growing concern within the European Union (EU) as the movement of goods between EU member states is VAT-free. An organization committing this crime charges VAT on the sale of goods and absconds with the VAT

rather than handing it over to the state's tax collection authority. According to the *International Tax Review*, it is estimated by Europol that missing trader intra-community fraud costs member states €100bn (US\$111bn) per year, or €270m (US\$300) per day.<sup>1</sup>

In early 2015, the Electronic Public Road Trade Control system was launched in Hungary to enforce VAT tax laws. By using this new system, the actual route of the goods can be tracked since transportation-related data is registered in a central

electronic system before the transport commences. Thus, the actual delivery of goods to and from specific warehouses – where the import or export has been declared – can be monitored. Such a detailed monitoring system requires a high level of technological complexity and, one might think, a substantial investment. However, since Hungary had already introduced a GNSS-based electronic tolling system on all of its major transit routes in 2013, the new Electronic Public Road Trade Control system took advantage of the existing tolling

infrastructure to track the movement of all transport vehicles. The required capital investment for this system was so low that it paid for itself within a few weeks. In fact, the VAT surplus during the first half year of system operation (compared with the same period in the previous year) approached nearly €500m (US\$553m), which is roughly the income generated by a nationwide truck tolling scheme on the tolled road network of approximately 6,700km over the period of an entire year.

### FLEXIBLE SOLUTION

Information provided by an OBU based on satellite technology can be the basis for individual or global services. Aggregation of information may open up a range of new services that can serve the public interest. A multipurpose GNSS-based OBU captures road usage data from every vehicle and transmits the data to the back office for further processing. Consequently, the OBU, which until now has been the key component of satellite-based electronic toll collection (ETC) systems, can also form the centerpiece of other mandatory and optional GNSS-based services. Since data privacy is typically required for various location-based services, state-of-the-art security technology is deployed to ensure protection of the data during transmission and while it is stored in the central computer system (back end).

The plug-and-play OBU can be easily attached to the windshield by the driver within a few minutes. The OBU is permanently connected to the vehicle's power supply, either with a cigarette lighter connection or by fixed cabling. Once installed, the OBU operates completely on its own, establishing a communication link to the back end of the system.

After many years of deployment experience, the robust, cost-effective and user-friendly GNSS platform from Siemens for distance-based road user charging lends itself to becoming the basis for more diverse and more demanding applications, particularly in domains in which state regulations require a secure and reliable monitoring of position data.

The demand for tracking and tracing particular groups of vehicles has been steadily growing, particularly within the EU. Hungarian authorities demonstrated how easily they could establish an electronic trade control system to combat cross-border tax fraud. By simply taking advantage of the flexibility of GNSS technology, the existing satellite-based road user charging system implemented in Hungary on all important transit routes was used to create a powerful anti-fraud system with minimal overheads.

This is but one example of the new opportunities that are now unfolding, in which the technological platform established for satellite-based tolling systems can provide a completely new generation of services and applications in the road transportation sector and beyond. ■

(1) <http://www.internationaltaxreview.com/Article/3223305/UK-Missing-trader-intra-community-fraud-Are-businesses-really-prepared.html>: 'UK: Missing intra-community fraud: Are businesses really prepared?', Tim Jones, June 25, 2013

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