

## *Chapter 16*

# **GNSS-based tolling: standards and Implementations**

*Norbert Schindler\* and Erich Erker*

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## **16.1. Overview of major GNSS tolling projects in Europe and worldwide**

### *16.1.1. Introduction*

Since the turn of the century, the use of satellite-based tolling has been spreading throughout Europe. By 2013, more than one million tolling On Board Units (OBUs) using Global Navigation Satellite System (GNSS) technology have been in use in Germany, Slovakia, and Hungary. More recently, nationwide truck tolling systems have been implemented in Russia and in Belgium – which have more than doubled the number of satellite-based OBUs being used for tolling. Singapore is presently preparing 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 - as described in Chapter 6.

In Oregon and in California, solutions for road pricing using satellite technology have been developed as well, which is described in detail in Chapter 18.

There have also been three failed attempts to introduce GNSS-based tolling - in the UK, the Netherlands and France, which we briefly address in an effort to explore the lessons to be learned from these cases.

### *16.1.2. The Swiss Distance-Based 'LSVA' System*

Switzerland was the first country to introduce a kilometre-based scheme for all trucks on its entire road network in 2001, known as LSVA<sup>1</sup>. The tax replaced the flat-fee vignette levied on all domestic and international trucks above 3.5 tons. Each travelled kilometre, regardless of road category, is charged. An OBU (figure 16.1) is mandatory for all trucks registered in Switzerland; foreign trucks can use a manual booking system available at each border crossing [1].

\* GNSS Consulting, Austria

<sup>1</sup> In German: **LSVA** (**L**eistungs**ab**hangige **S**chwer**ver**kehrs**ab**gabe), which roughly translates to 'performance-related heavy vehicle duty'.