Easy-OBU Project

The Easy-OBU way to bridge GNSS outages

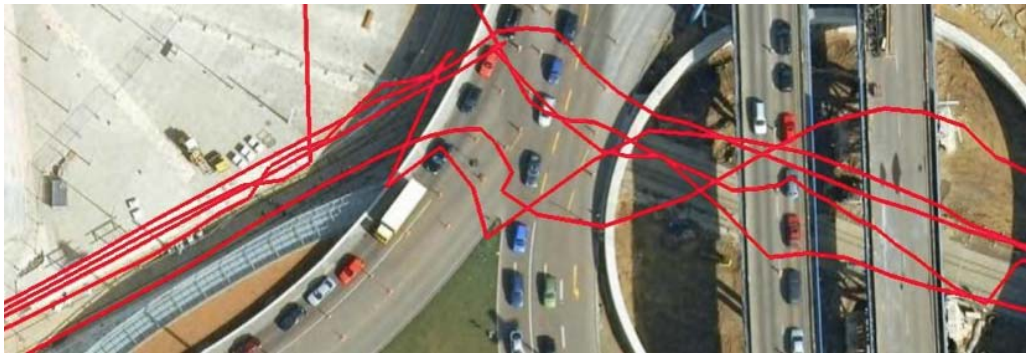
EFKON pwpSystems austriatech ITS&S Czech and Slovak Intelligent Transport Systems & Services CZECH TECHNICAL UNIVERSITY IN PRAGUE

Easy-OBU research project in a nutshell: GSA supported international project aimed at an introduction of cheap positioning solution with improved accuracy

- **What are we doing:** We are developing and preparing market introduction of a new On-Board-Unit capable of providing more accurate location information in challenging situations (such as tunnels) at low cost
- **Who we are:** An international consortium consisting of EFKON (AT), pwp-systems (DE), AustriaTech (AT), ITS&S Association (CZ) and ČVUT (CZ)
- **Public support:** The project is partially funded from the 7th Frame Programme of the European Union

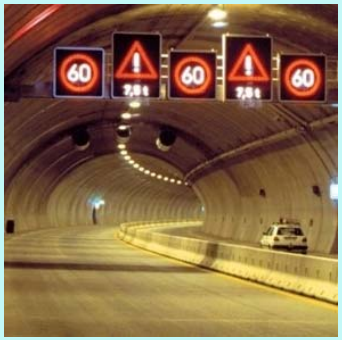
This project is funded by the European Union and carried out in the context of the Galileo FP7 R&D programme supervised by the GSA

Short term signal loss is a major challenge for GNSS applications



GNSS systems are currently unable to cope with loss-of-signal situations that are all but uncommon. When signal is lost, the location information becomes unavailable or very imprecise. Even with introduction of Galileo and other new systems, this problem is here to stay.

Urban Canyons



Tunnels

Junctions with underpasses

Railways

Solutions for localization precision improvement are available, but at a commercially unviable price point of tens of thousands of Euros per vehicle.

Easy-OBU will apply new technologies and scientific methods to radically cut the cost of the localization information improvement

User focused design and …

- one simple OBU that does not need anything but a power cord to connect with the car
- standard location information (GPS and EGNOS) when GPS is available
- improved location information for loss-of-signal situations when GPS is unavailable

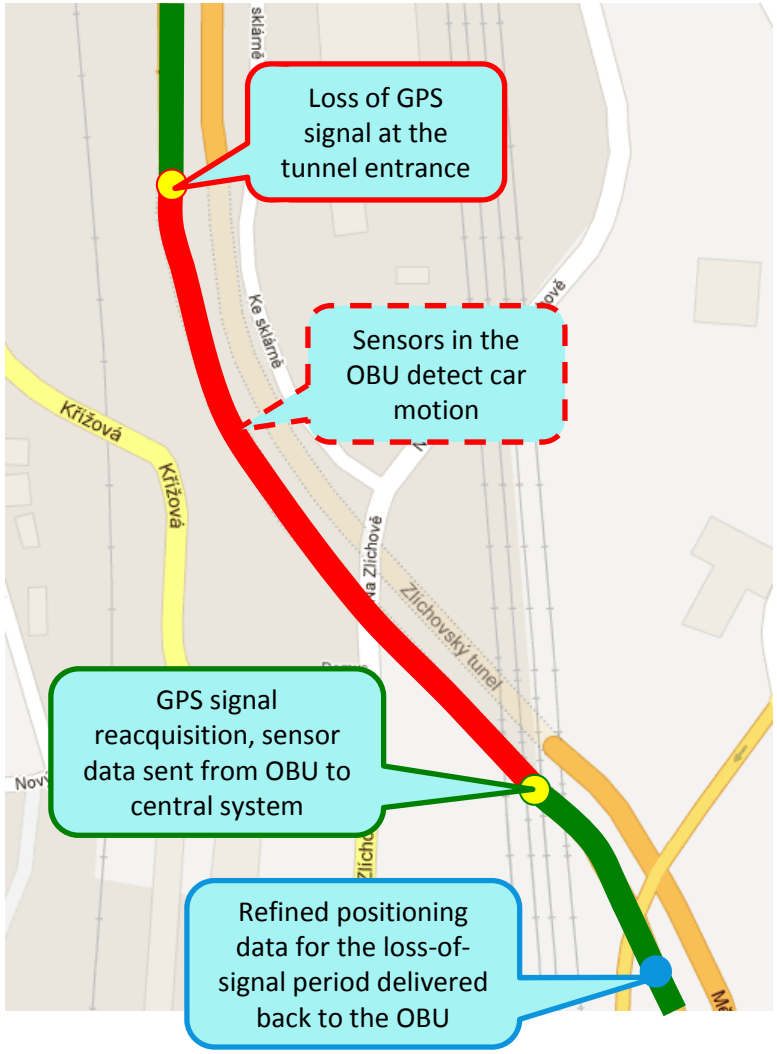
&

… the technology behind

- Low-cost sensors integrated into the OBU (gyroscope, accelerometer)
- Application of non-causal filtering that delivers great location information improvement even in combination with low-cost sensors
- Open interfaces for integration

Simple, cost effective and commercially attractive solution for location information improvement able to compensate 95% of signal outages and ready for integration into various ecosystems

Easy-OBU can offer location precision improvement to applications that do not insist on real time availability of the location information

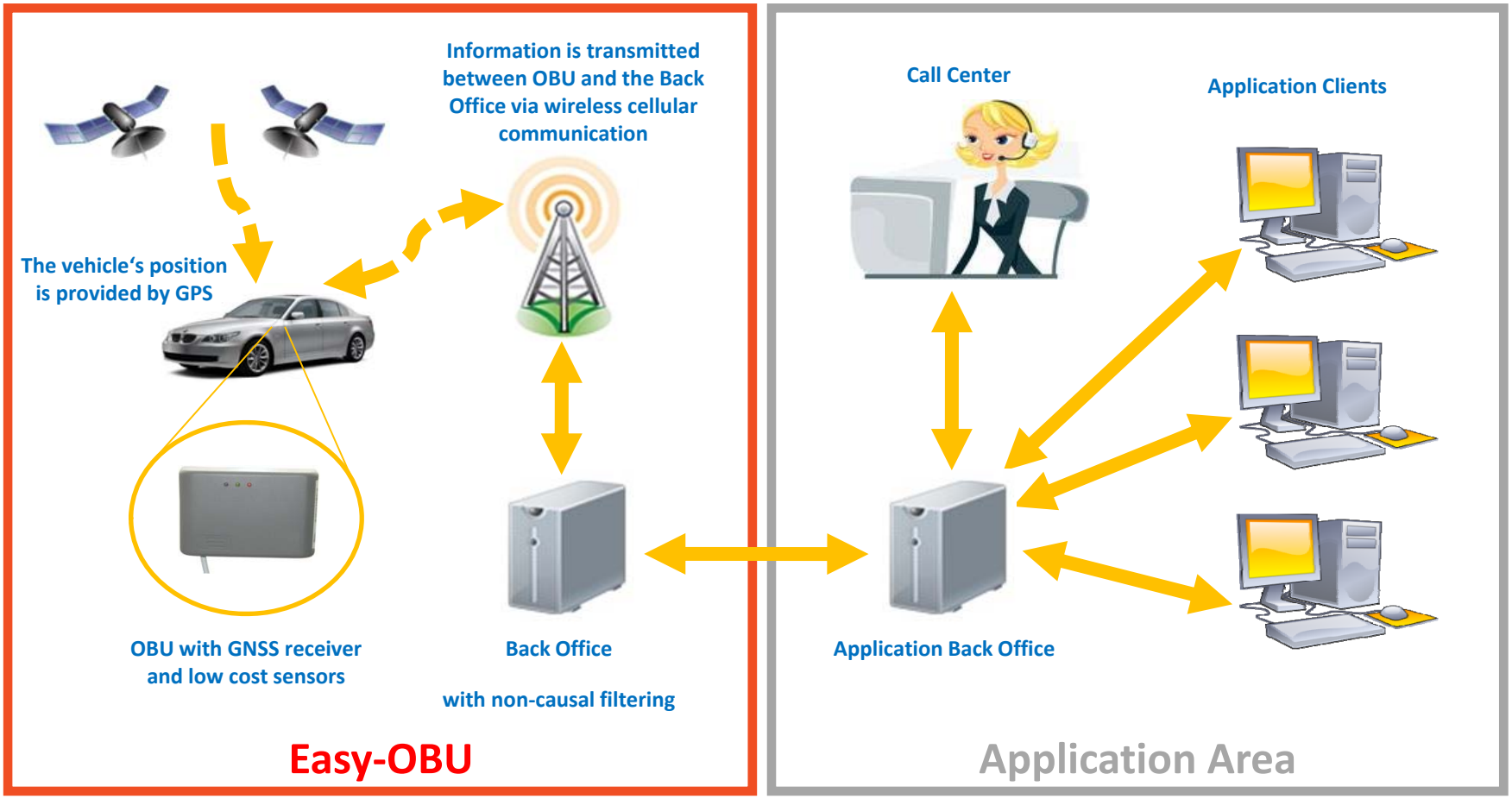


The only limitation of Easy-OBU (and a "price" paid for the low cost of the unit) is availability of the refined positioning data only after a short delay.

Easy-OBU is suitable only for applications that do not necessarily require the improved location information in real time:

- Shortly after leaving the tunnel, but not during the signal loss in the tunnel
- Examples of such applications may include:
  - Fee collection (tolling, parking etc.)
  - Car Sharing pay-per-use models
  - Route controlling (e.g. hazardous goods transport monitoring)
  - Fleet monitoring with analytics that requires a more precise location information
  - Ecological apps (CO_2 monitoring etc.)

Easy-OBU project – System Architecture



Easy-OBU - System interfaces

- **Interface 1**

  Open interface at the central server

  Used by end-users to access the data

  Data in the central server are application independent

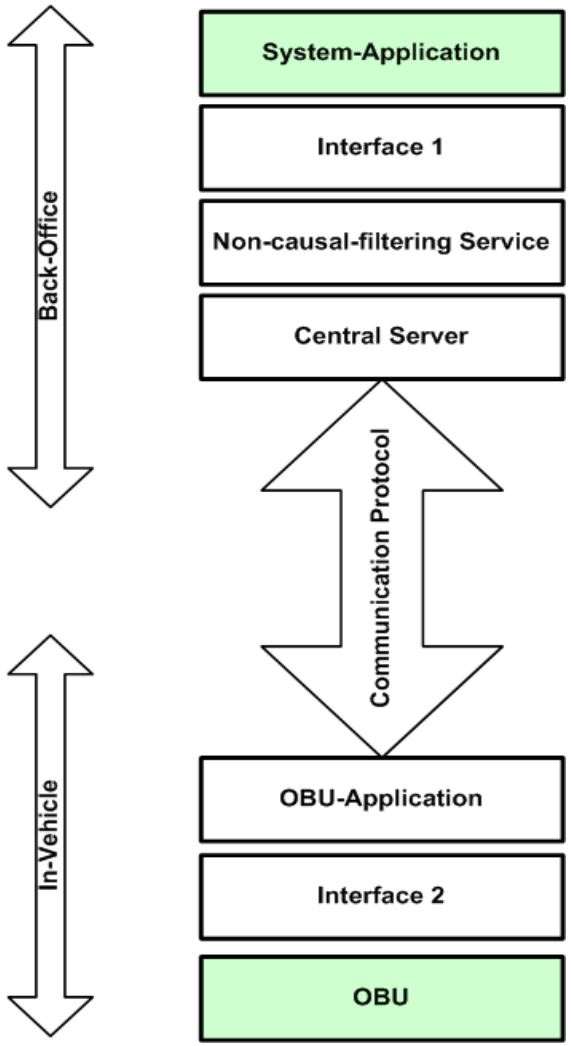
  System application can run in another location

- **Interface 2**

  Open interface inside of OBU

  Specifies the sensor information required by Easy-OBU

  Used by OBU provides to integrate their own OBU into Easy-OBU



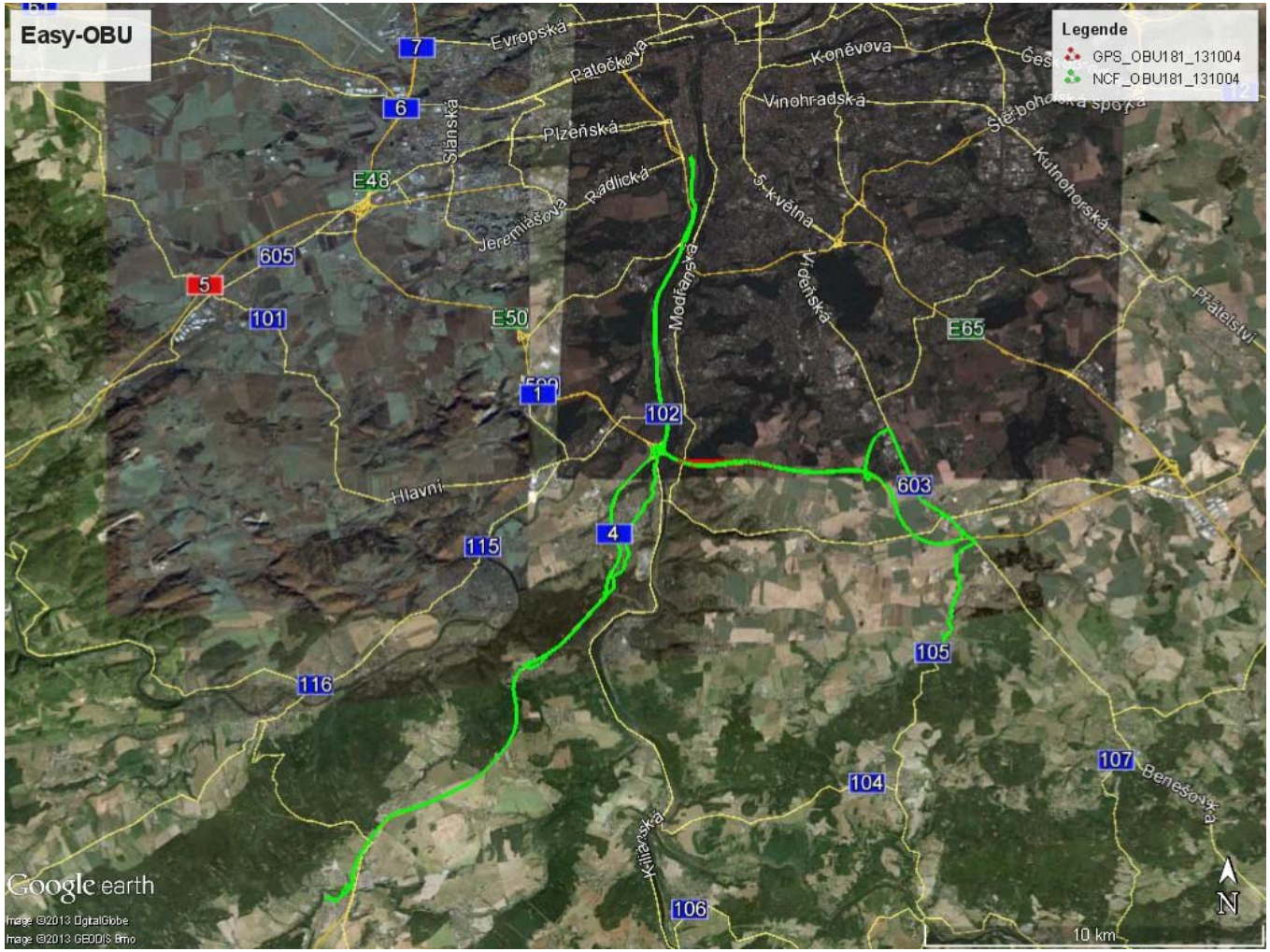
Easy-OBU – Performance Parameters

- **Performance parameter:**
  - Availability > 99.9 %
  - Position accuracy: < 10 m
  - Heading accuracy: < 5 °
  - Velocity accuracy: < 2 km/h
  - Accuracy of distance travelled: < 1 %
  - Time accuracy: < 0.5 s
  - Gap filling delay: < 10 min.
  - Position update rate: 1 Hz

- **Light weight unit in the vehicle**

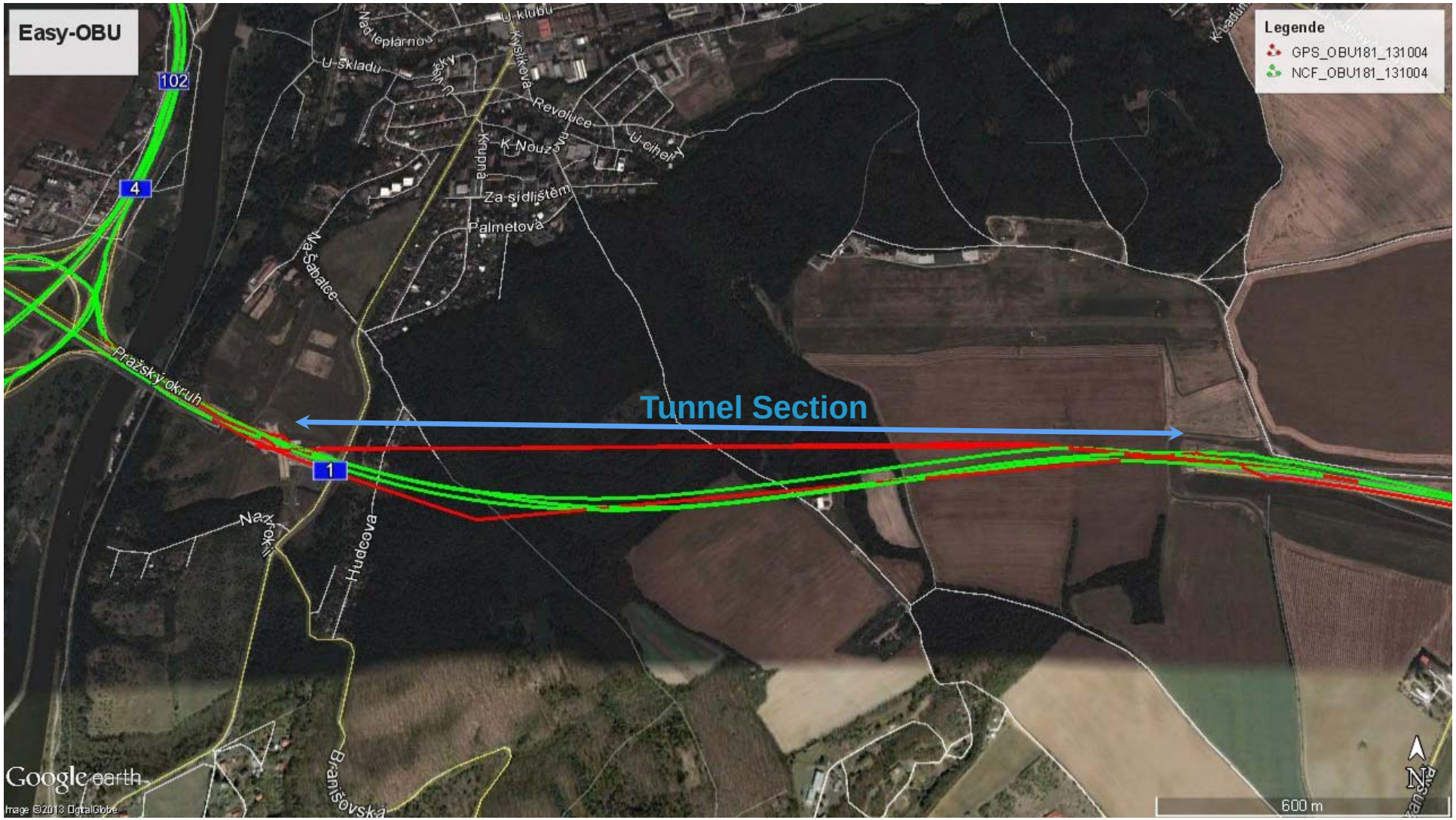
- **Small in size (the view through the windscreen is not disturbed)**

Easy-OBU – Results



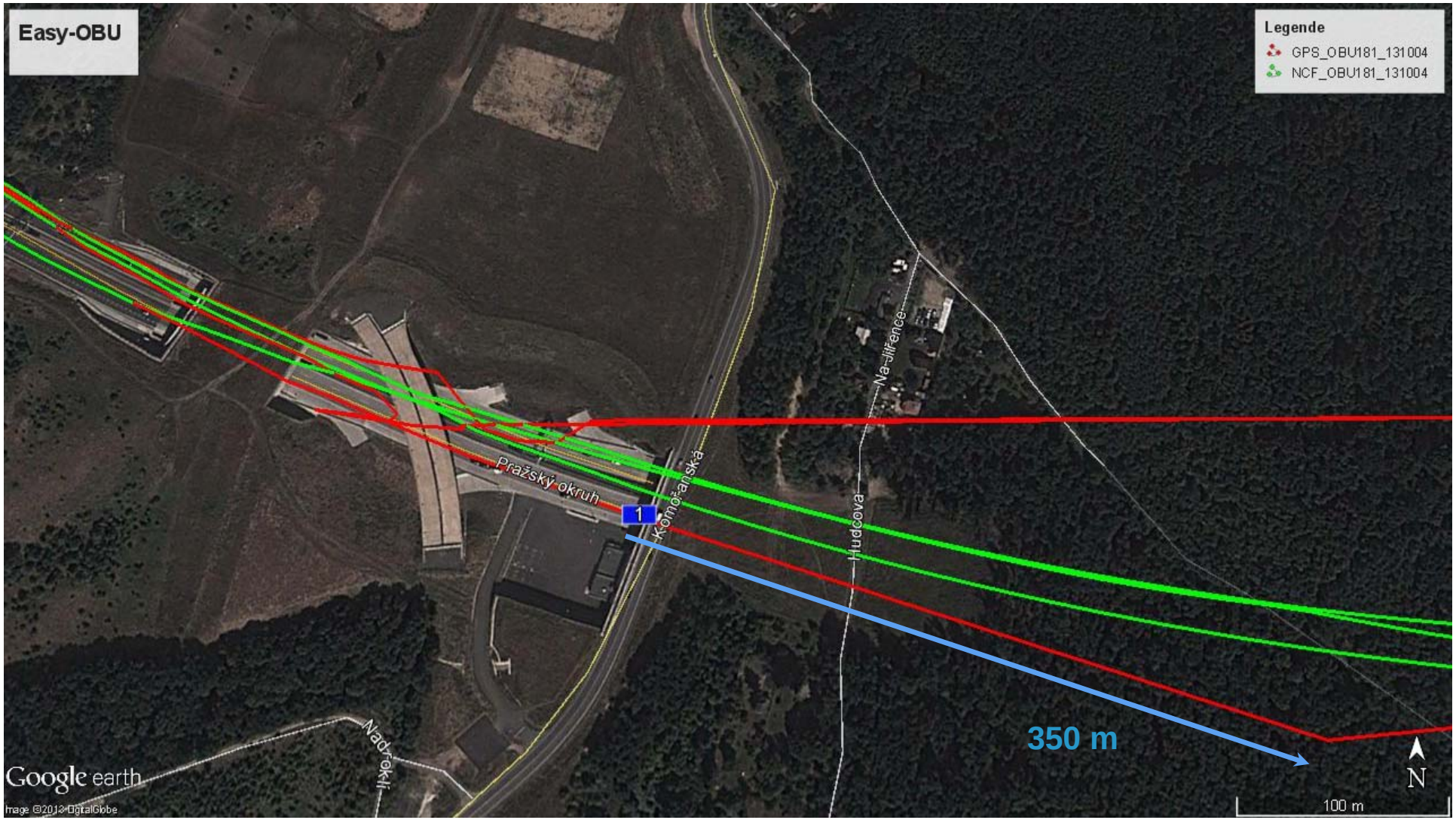
- **Test trial info:**
  - Date: 4th Oct. 2013
  - Area: Prague-region (CZ)
  - Appl.: public transport

Easy-OBU – GPS-outage (due to tunnel of 1.9 km in length)



- GPS – Fixes (straight line during outage)
- Easy-OBU – Results (no outage in tunnel)

Easy-OBU – Tunnel Entry Scenario



- GPS shows position-fixes until 350 meters deep into the tunnel.
- Due to the special construction at this entry, GPS shows various error-types.

EFKON AG
Dietrich Keller Strasse 20
8074 Rabba
Austria

pwp-systems GmbH
Otto-Hahn-Str. 20a
65520 Bad Camberg
Germany

Austriatech – Gesellschaft des Bundes für Technologie Politische Massnahmen GmbH
Donau-City Strasse 1
1200 Wien
Austria

Sdružení pro dopravní telematiku
Nám. Franze Kafky 7
110 00 Praha 1
Czech Republic

České vysoké učení technické v Praze
Fakulta dopravní
Zikova 1905/4
166 36 Praha 6
Czech Republic

Dr. Hannes Stratil
Director R&D - Engineering
EFKON AG

www.efkon.com
hannes.stratil@efkon.com

Further project information:
www.easy-obu.eu