# Position Detection and Data Transfer for Railbound and Free Ranging Vehicles

Symeo GmbH

- Based in Munich/Germany since 2005

- Own hard- & software development

- In-house testing and quality control

- International sales/support network in over 20 countries

- 24/7/365 Service Hotline operation

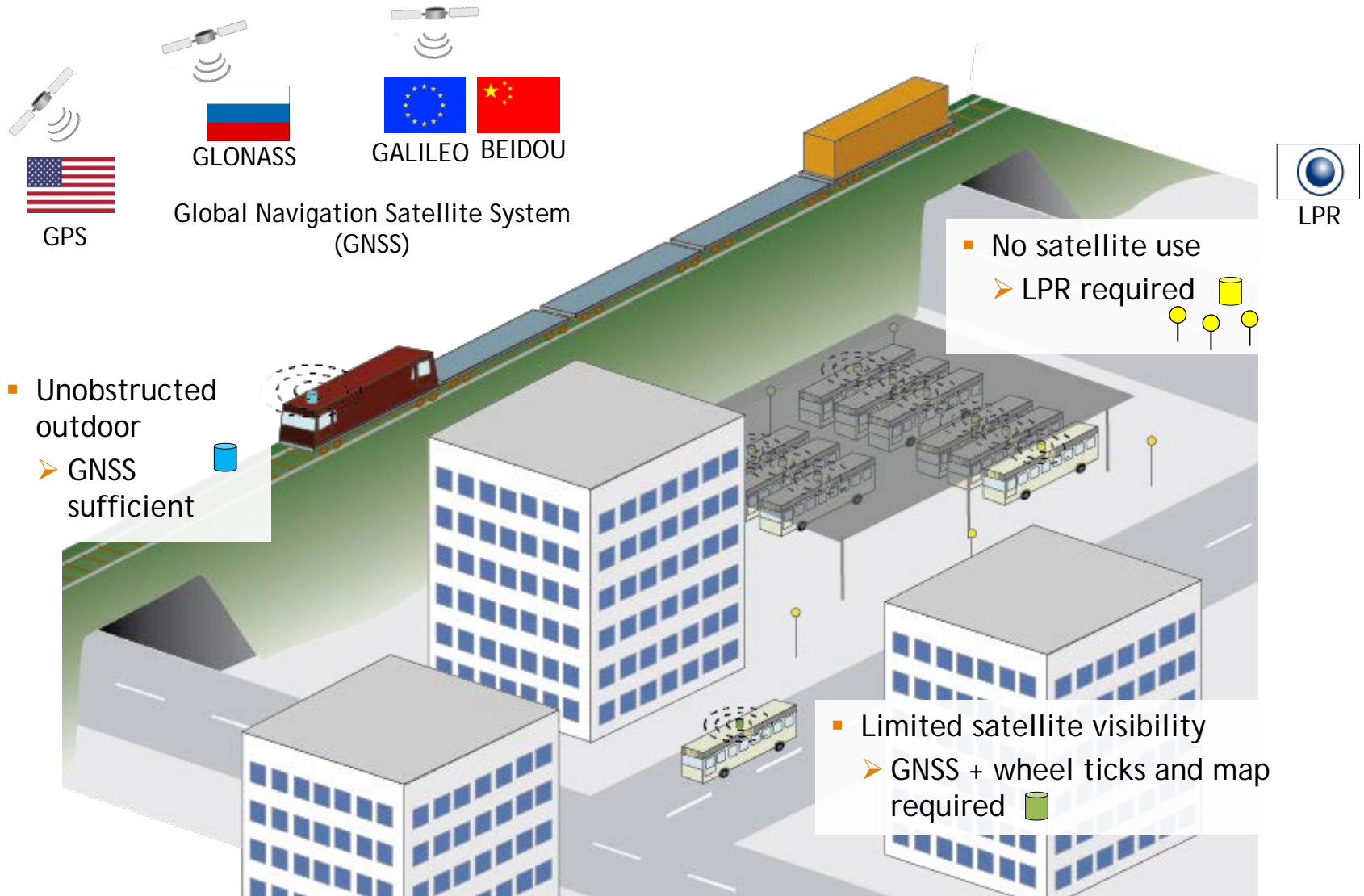- Wide range of product designs and customized solutions from 100 units onwards
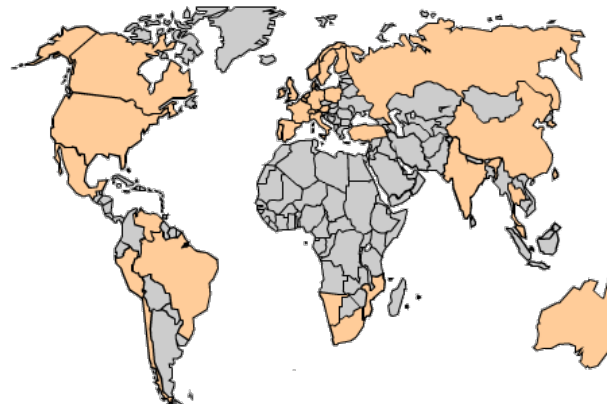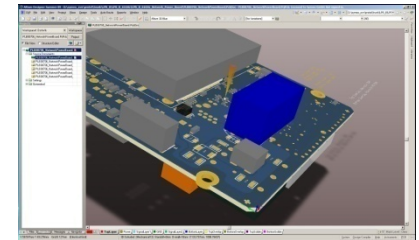
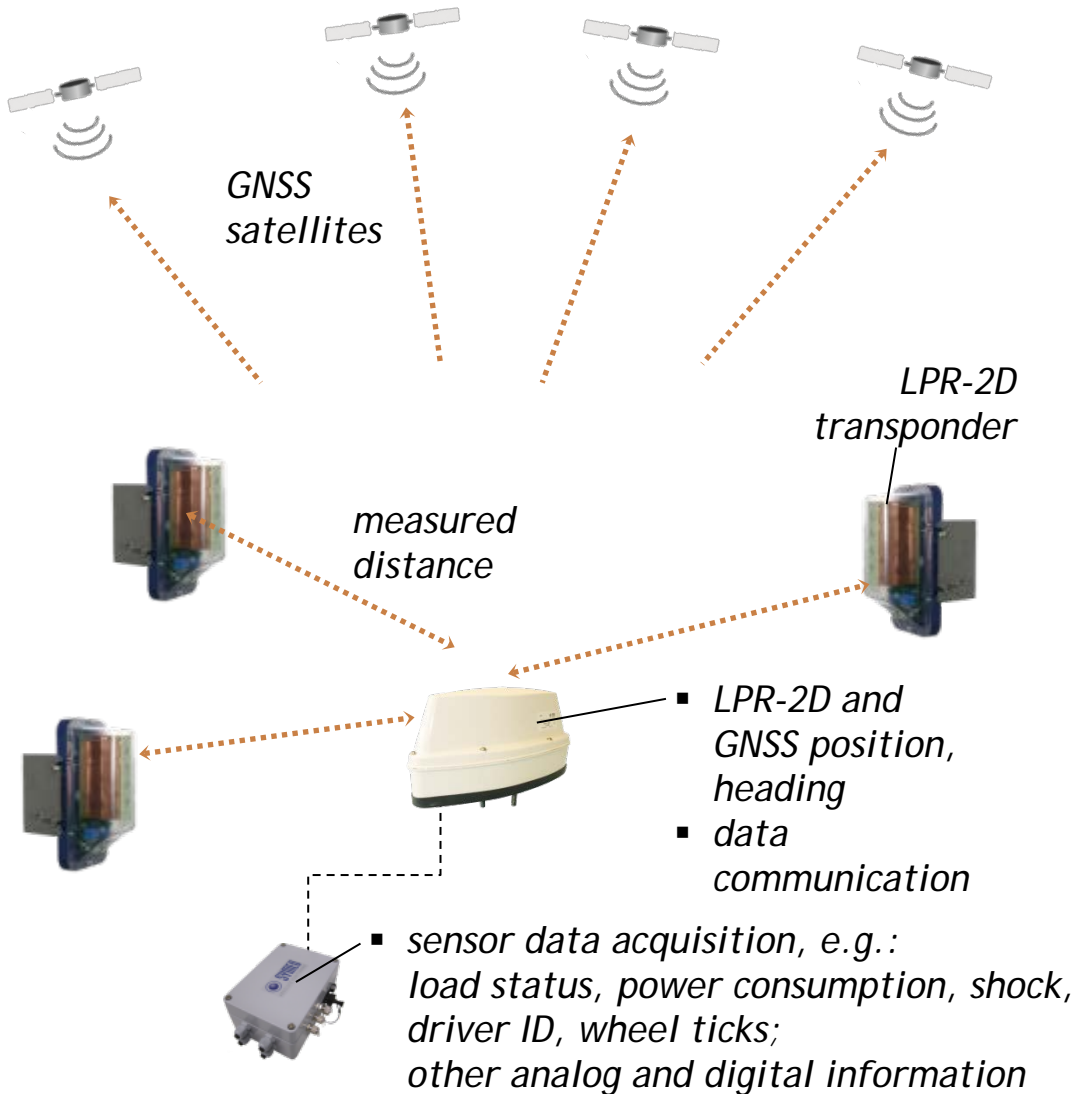# Why Position Detection?
Why Combined Data Acquisition?

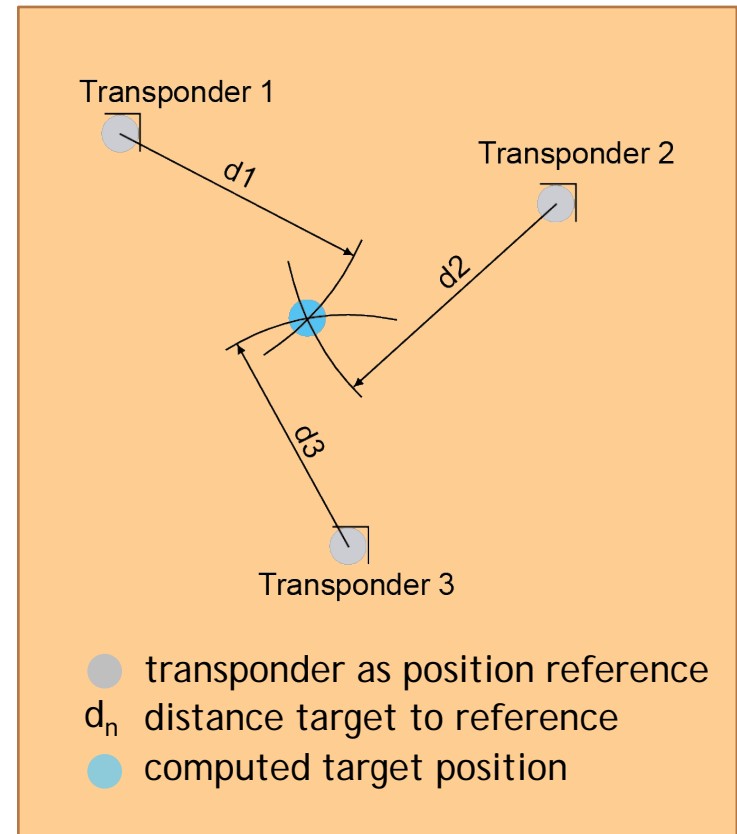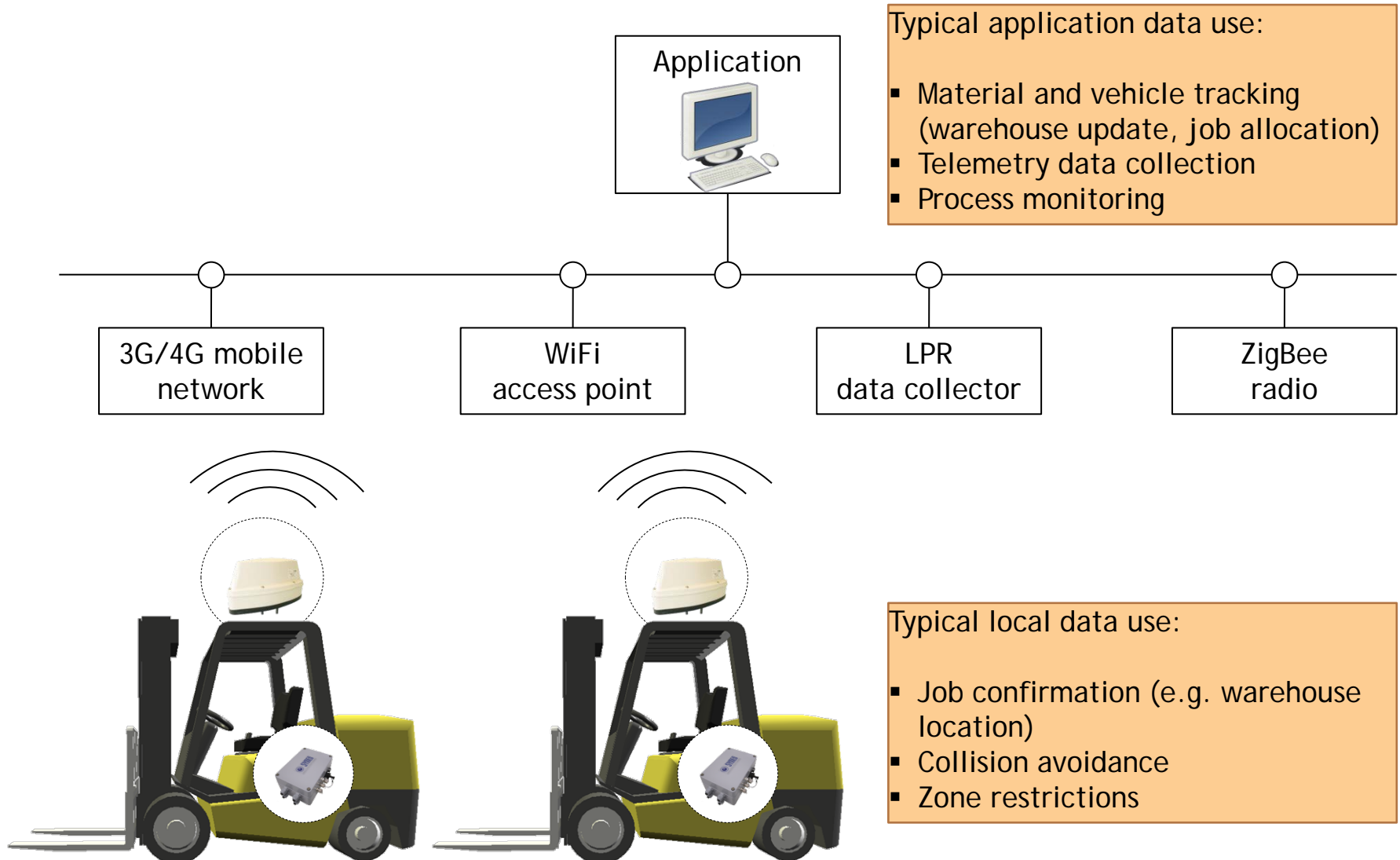| Object	Position reqmt.	Data reqmt.
Stacker/Reclaimer	Correct stockpile, equal material distribution, collision avoidance	Arm length, luffing angle, heading, speed
Forklift truck	Track material flow (WMS), track vehicle position (optimized job assignment)	Load change event, load weight, battery capacity
Container Terminal	Track containers by tracking cranes and transport vehicles; collision avoidance	Container size, load change event, telemetry data
Railway Locomotive	Track positions for energy invoicing	Energy consumption
Public transport	Position along route (arrival indication), parking location at depot	Telemetry data (travel distance, gas reserve, tyre pressure
Subway train	Stop at predefined position at station; automatic speed control	Train length, station length, stopping point definition

Indoor and Outdoor
Position Detection – How to?

GLONASS

GALILEO   BEIDOU

GPS

Global Navigation Satellite System
(GNSS)

LPR

- No satellite use
  - ➤ LPR required

- Unobstructed
  outdoor
  - ➤ GNSS
    sufficient

- Limited satellite visibility
  - ➤ GNSS + wheel ticks and map
    required

Local Positioning Radar (LPR) and GNSS for Position Measurement

GNSS satellites

LPR-2D transponder

measured distance

- *LPR-2D and GNSS position, heading*
- *data communication*

- *sensor data acquisition, e.g.: load status, power consumption, shock, driver ID, wheel ticks; other analog and digital information*

Position Detection Principle

Transponder 1

Transponder 2

d_1

$d2$

$d3$

Transponder 3

- transponder as position reference
- d_n distance target to reference
- computed target position

System Architecture

Application

| 3G/4G mobile network | WiFi access point | LPR data collector | ZigBee radio |
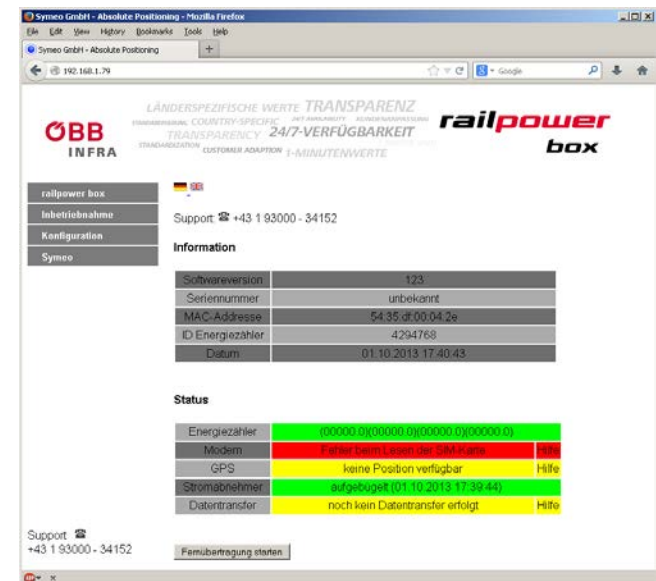
OeBB Infra - Location Based Energy Consumption: The Railpower-Box

Controller, GNSS position and GSM modem

Energy meter
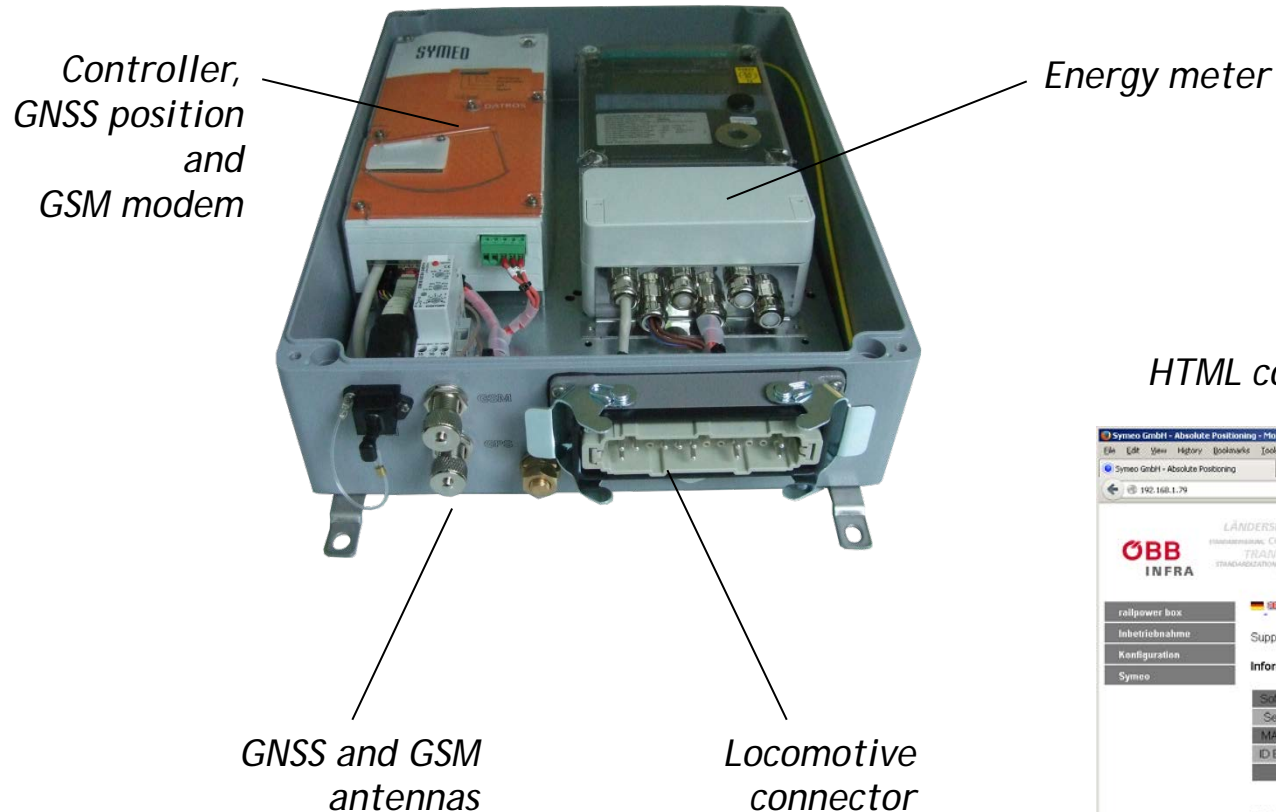
HTML commissioning interface

GNSS and GSM antennas

Locomotive connector

OeBB Infra - Railpower-Box
Design Variations

- Different connectors for Bombardier

- Different housing for Siemens Vectron (space restrictions)

- Symeo quickly adapts to customer requirements and delivered all unit variations acc. to specs, on time

OeBB Infra
Intermodal Container Terminals

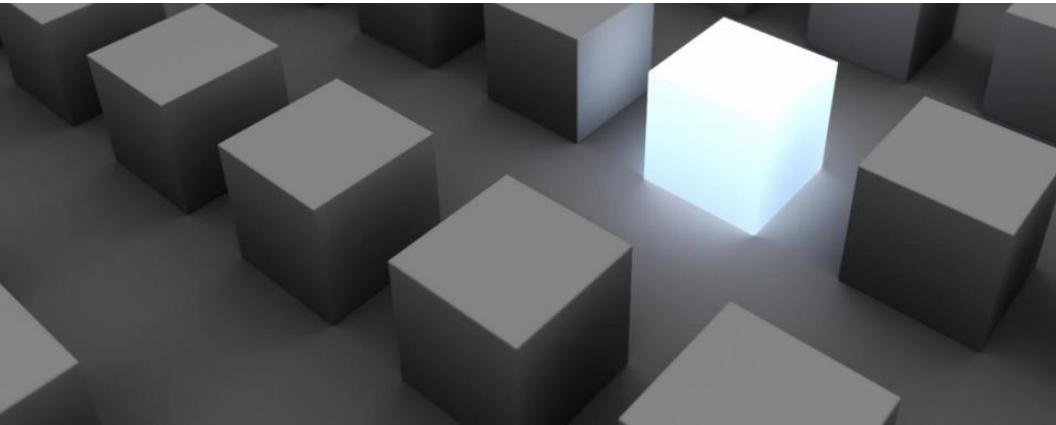Dynamic acquisition of
- Position
- Heading

Data collection
- Container size,
- Container presence

Data transfer to
Vienna TOS application

Contact

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Data sheets and further information:

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