Dortmund 2014-11-07

RFID in Rail

Lennart Andersson
Project manager

TRAFIKVERKET
Swedish Transport Administration

Trafikverket

TRAFIKVERKET - Swedish Transport Administration

- Is the biggest owner of infrastructure
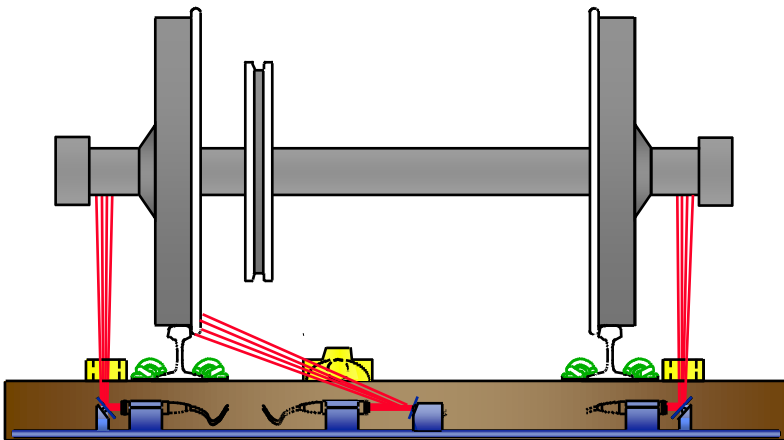 - railways
  - roads
- A network of RFID detectors
  - railways

Swedish Transport Administration
– On the right track with RFID

Trafikverket

- ## Maintenance
  - Combine measuring values from Wayside Train Monitoring System (WTMS) with correct vehicle (locomotives and wagons).

- ## Logistics
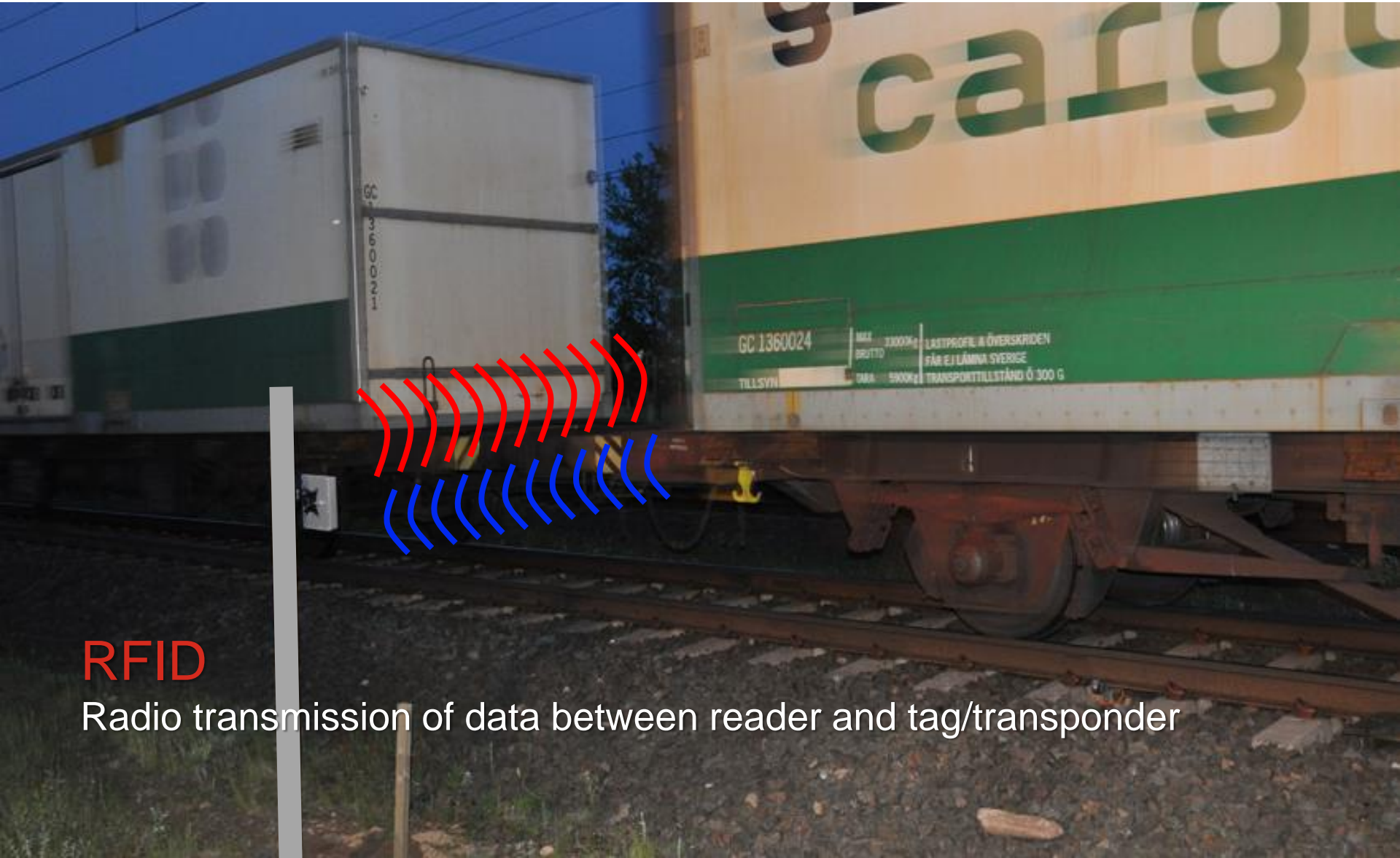 - track and trace vehicles (locomotives and wagons).

Hot Box/Hot Wheel detection

RFID reader

RFID

RFID
Radio transmission of data between reader and tag/transponder

RFID detector

iCargo

RFID reader/antenna
app. 3 m from nearest rail

- detect vehicles/wagons without transponders/tags
- direction
- distance between axles
- speed

Axle/Wheel sensors

Rail traffic in Sweden

60-70% of all wagons in Sweden, from other European countries

Need:
- European standard for RFID system
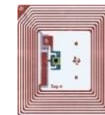
- Standard for information exchange

Standards

EAN® 3750

Started 1977
Changed name 2006

GS1

International Organization

- ✓ **Open standards and solution**
- ✓ **Member demands**
- ✓ **Neutrally**
- ✓ **Non profit organization**
- ✓ **1,3 million customers**
- ✓ **Offices in 108 countries and active in 145 countries**
- ✓ **Board members from global companies**
- ✓ **ISO certified**

Identifiering — GDTI, GSRN, GIAI, GRAI, GPC, SSCC, GLN, GTIN

Informationsbärare — EAN 13, EAN8, GS1-128, ITF14, DATABAR, DATA MATRIX, RFID/EPC

Elektronisk handel — EANCOM, GS1 XML

7 350000 000023

073 50000 00002 3

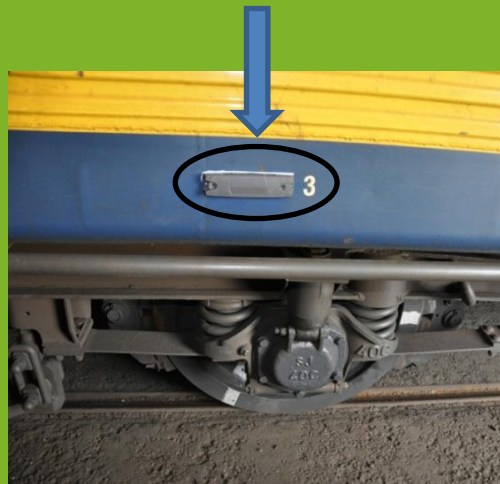(01)07350000000023(15)041223(10)437825
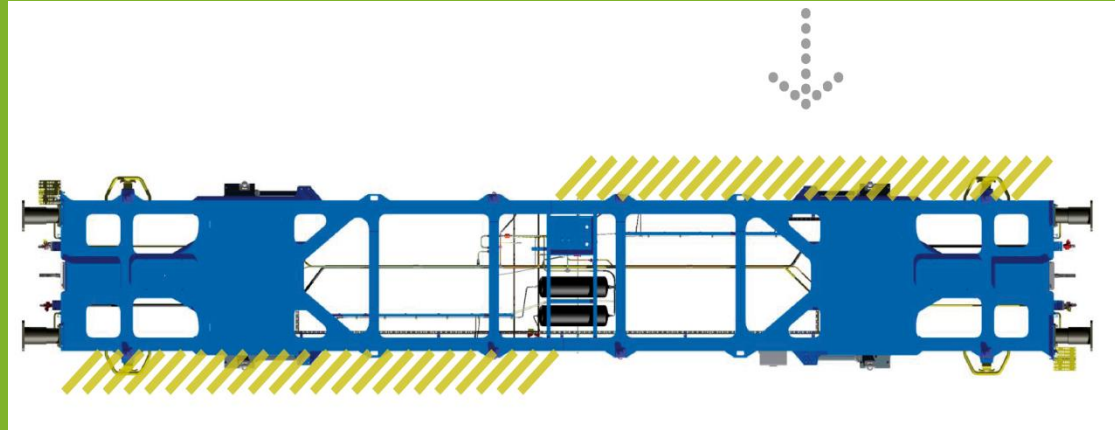
Standards

- Air interface – ISO
  - ISO 18000-6 C/UHF gen 2

- Tag standard – GS1
  - EPC – GIAI96

- Information exchange – GS1
  - EPCIS – What, Where, When and Why

EPC = Electronic Product Code
EPCIS = Electronic Product Code Information System
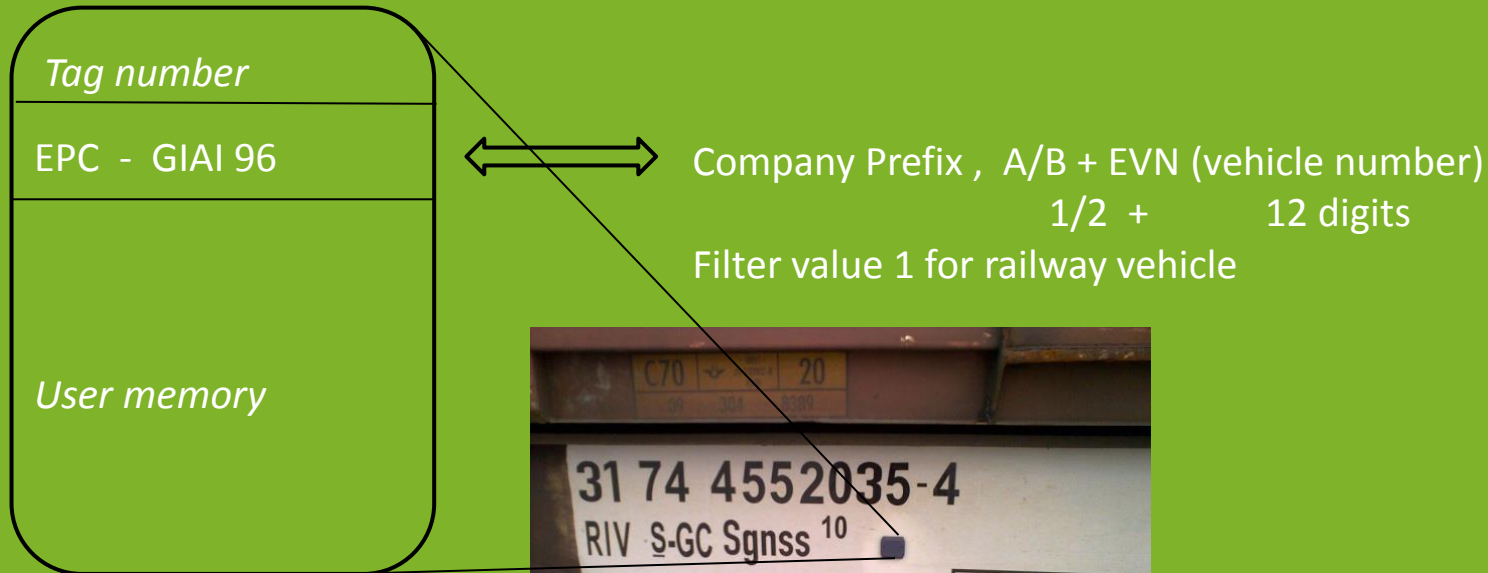
Tag position

- Two tags per wagon
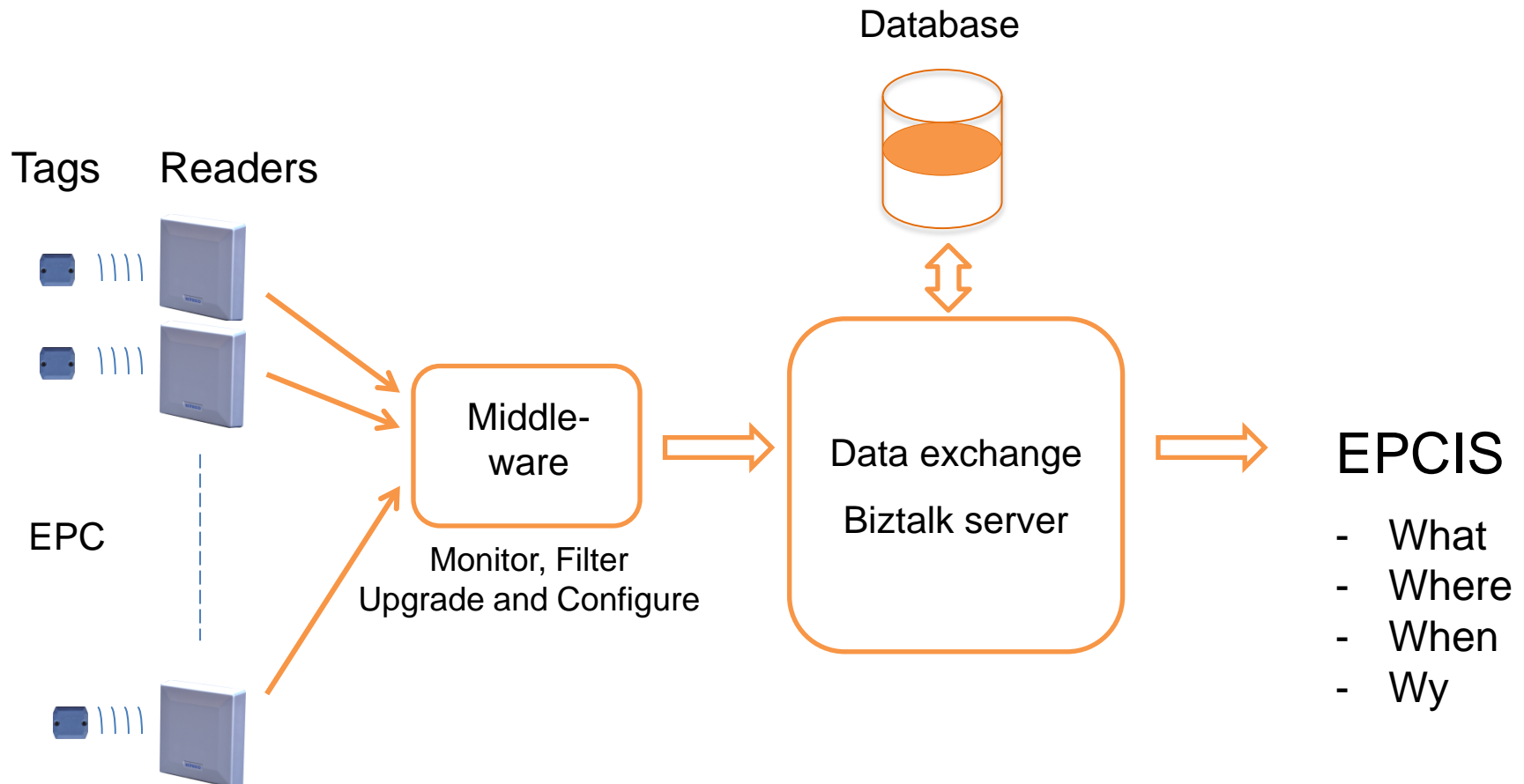- Left mounted
- Height 0.5-1.1m

Tag structure

iCargo

Transponder/tag

Tag number

EPC - GIAI 96

$\longleftrightarrow$ Company Prefix , A/B + EVN (vehicle number)

1/2 +   12 digits

Filter value 1 for railway vehicle

User memory


```
C70    20
      384  8389
```

31 74 4552035-4

RIV S-GC Sgnss [10]

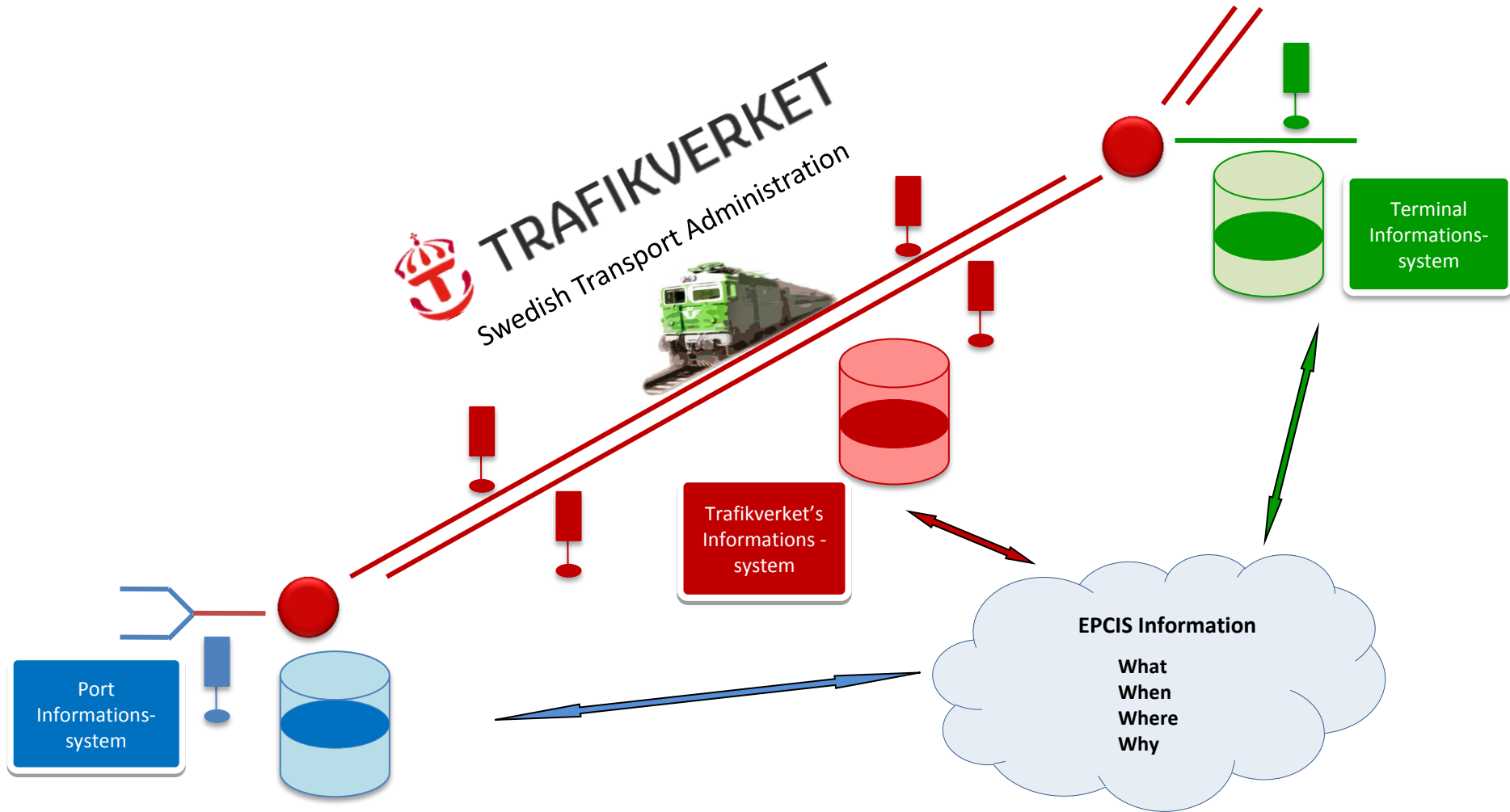|	A	B	
S	44.0t	52.0t	62.
SS	44.0t	52.0t	

EPC = Electronic Product Code

RFID IT-system

EPCIS –Information Exchage

Benefits

- Owner of the infrastructure

- Railway companies

- Customers of cargo transports

- End customers and private persons

Benefits

- Proactive vehicle maintenance
- Less traffic disruption
- Track and trace vehicles
- Correct train composition
- More effective shunting of freight wagons
- Better use of resources
- Lower freight costs
- Reduced environmental impact, CO_2

RFID in Europe

- InnoTrans in Berlin 2010 and 2012

- RFID in Rail meeting in
  - Stockholm, February 2011
  - London, October 2011
  - Nuremburg; September 2013

- EPCIS in Rail
  - Oslo, February 2014
  - London, November 2014

- Sweden, Finland, Norway, France, UK, Austria, Switzerland, Germany, Netherlands, Czech republic, Russia, Slovakia, Spain, Denmark

"European Guideline for the Identification of Railway Assets using GS1 Standards"

- **Guideline for vehicle identification**

- **Guideline for MRO identification** (maintenance, repair and overhaul)
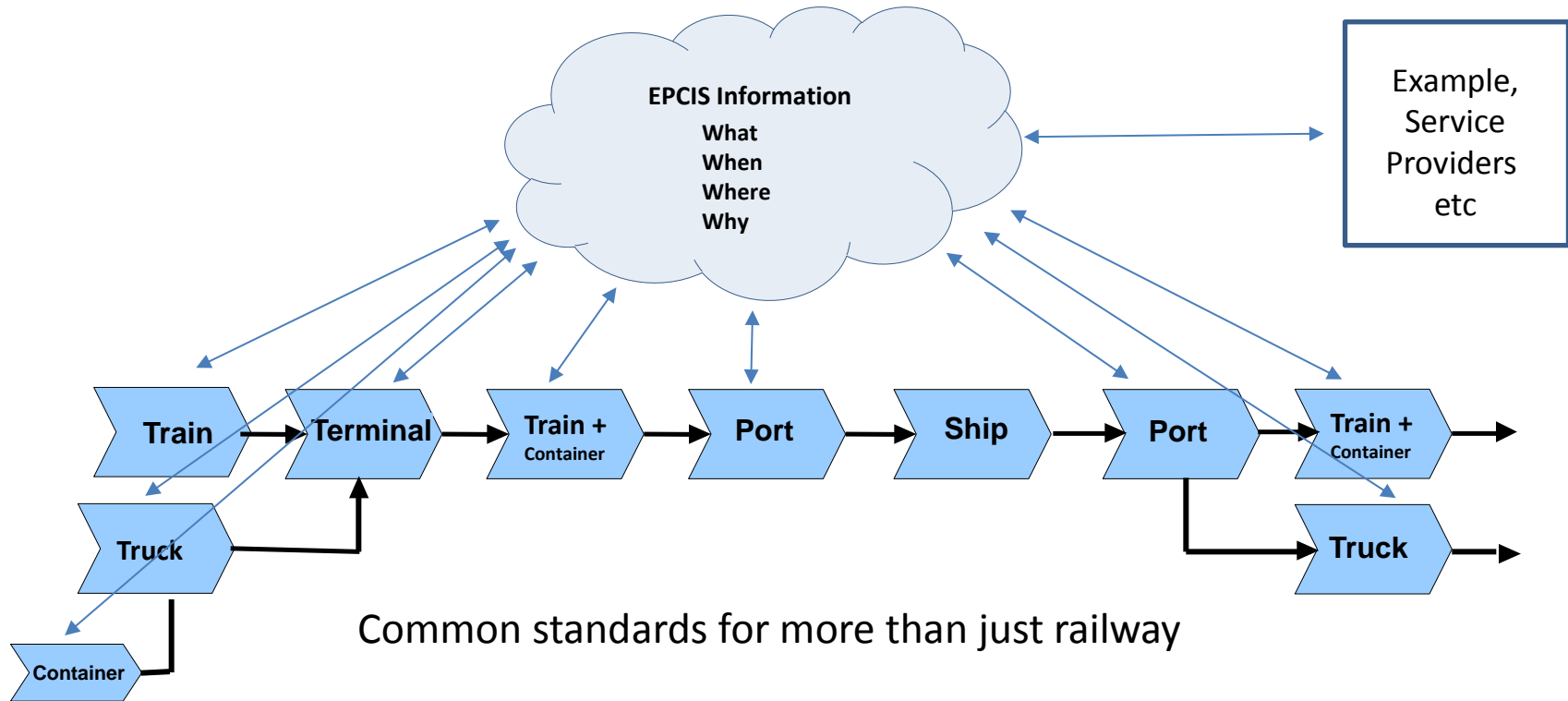
- *Guideline for EPCIS in Rail*

RFID in Sweden

Deployment in Sweden

180 RFID detectors end of 2014

approx. 4000 taged vehicle

RFID –intermodal transport chains

EPCIS Information
What
When
Where
Why

Example, Service Providers etc

Train → Terminal → Train + Container → Port → Ship → Port → Train + Container

Truck

Container

Truck

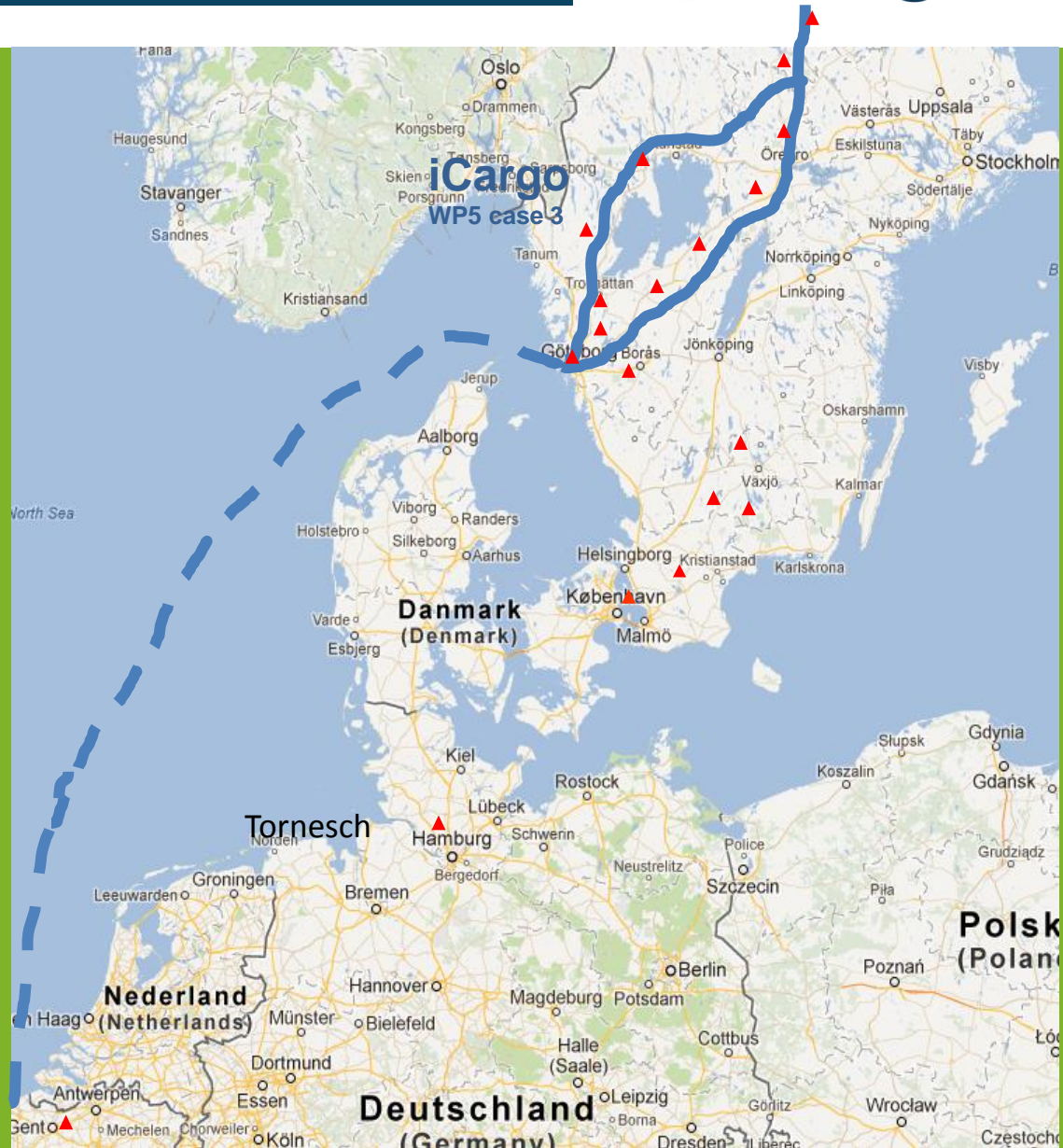Common standards for more than just railway

RFID – iCargo, pilot case

Green Corridors between Sweden and the European Continent

Intermodal transport with RFID tagged wagons and sea transport to Zeebrugge

▲ RFID detector

iCargo

Rail transports

between Sweden and

the European Continent

Volvo train,
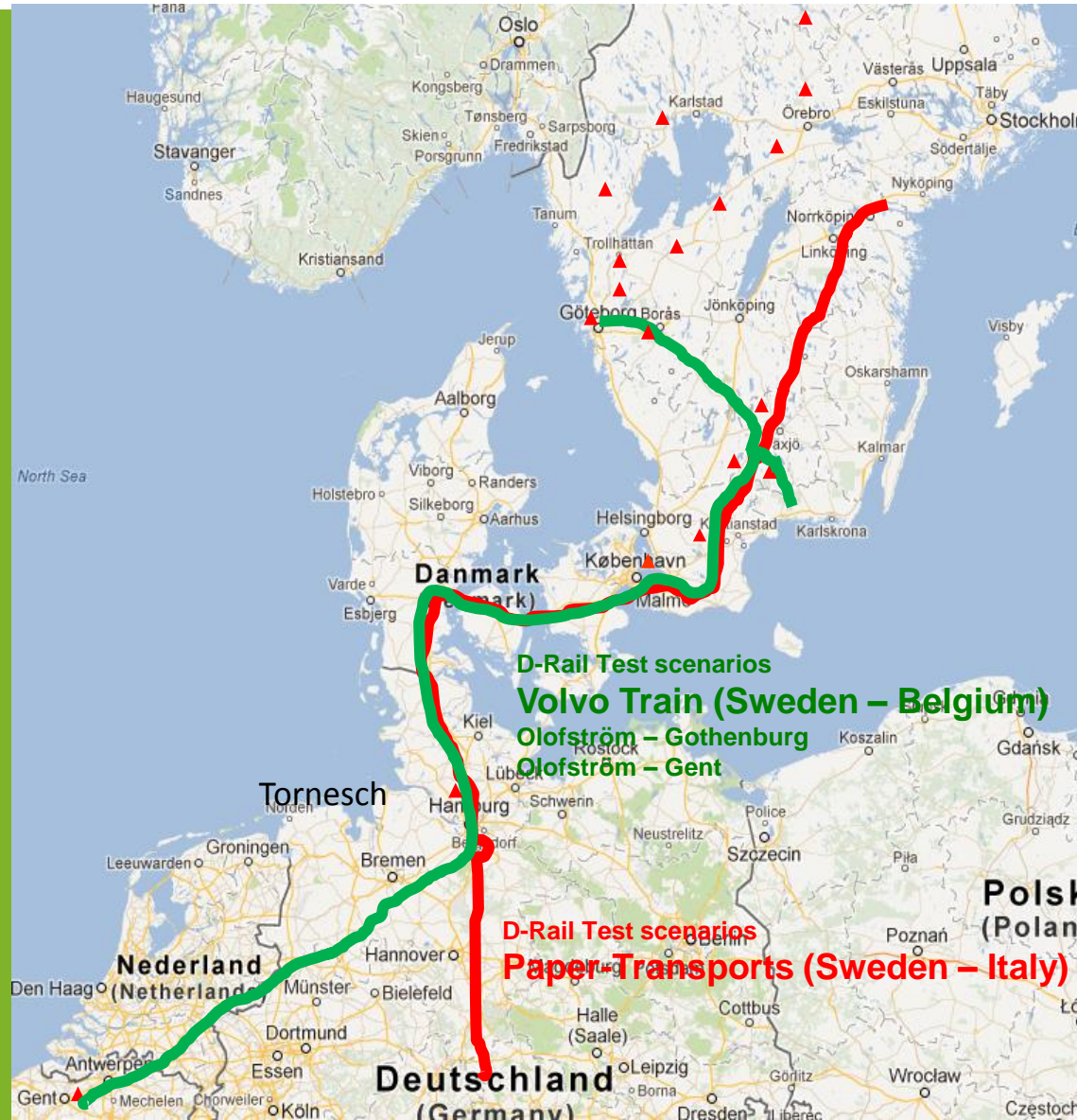
- 240 container wagons
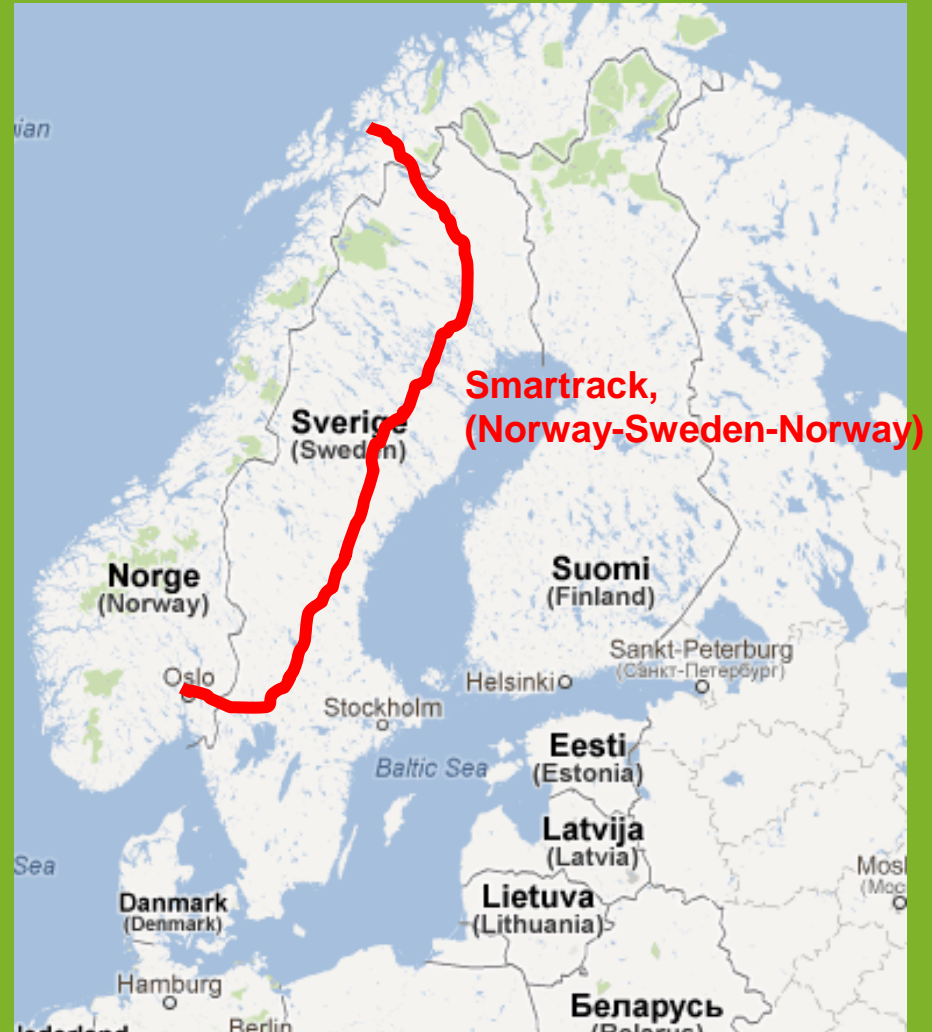
Paper transports

- to be establish

D-Rail Test scenarios
Volvo Train (Sweden – Belgium)
Olofström – Gothenburg
Olofström – Gent

D-Rail Test scenarios
Paper Transports (Sweden – Italy)

▲ RFID detector

RFID –intermodal transport chains

Smartrack –
Norwegian pilot

Intermodal transport with
RFID tagged
containers and wagons

RFID - Conclusions

- Common European RFID standards

- Track and trace

- Logistics

- Maintenance

Thank you!

Lennart Andersson
lennart.c.andersson@trafikverket.se