



ASE GMBH

**NUMBERCHECK
RAIL GATE**

**DATA CAPTURE AND
STATE DOCUMENTATION
FOR RAILWAY TRAFFIC**

Eric Steck, June 2020





01

About us

WHO WE ARE / ASE-MILESTONES



Foundation 2002



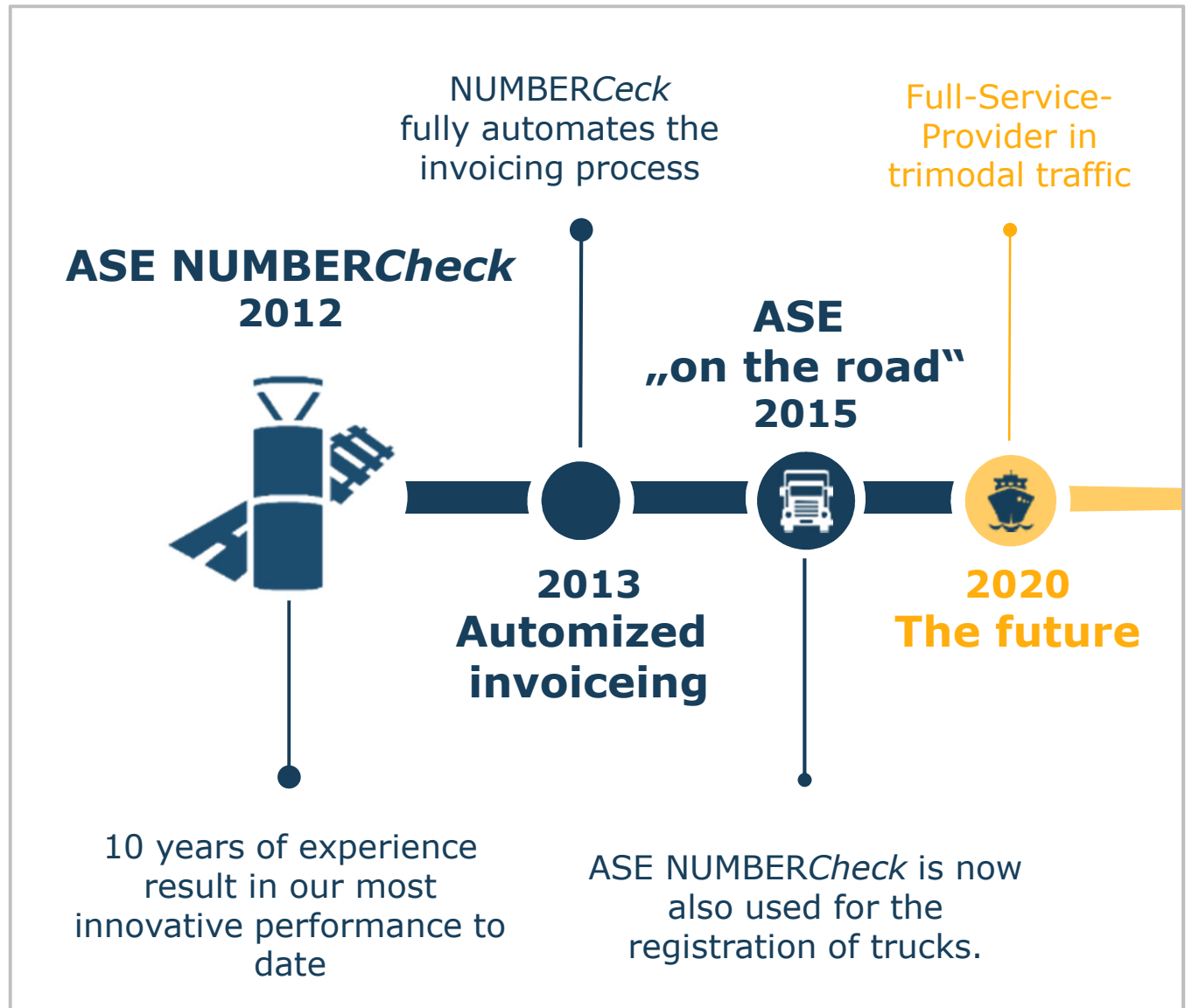
Customer-specific surveillance systems



OCR-Technology since 2009

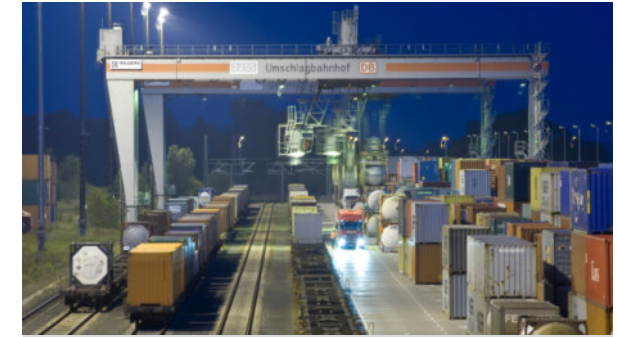
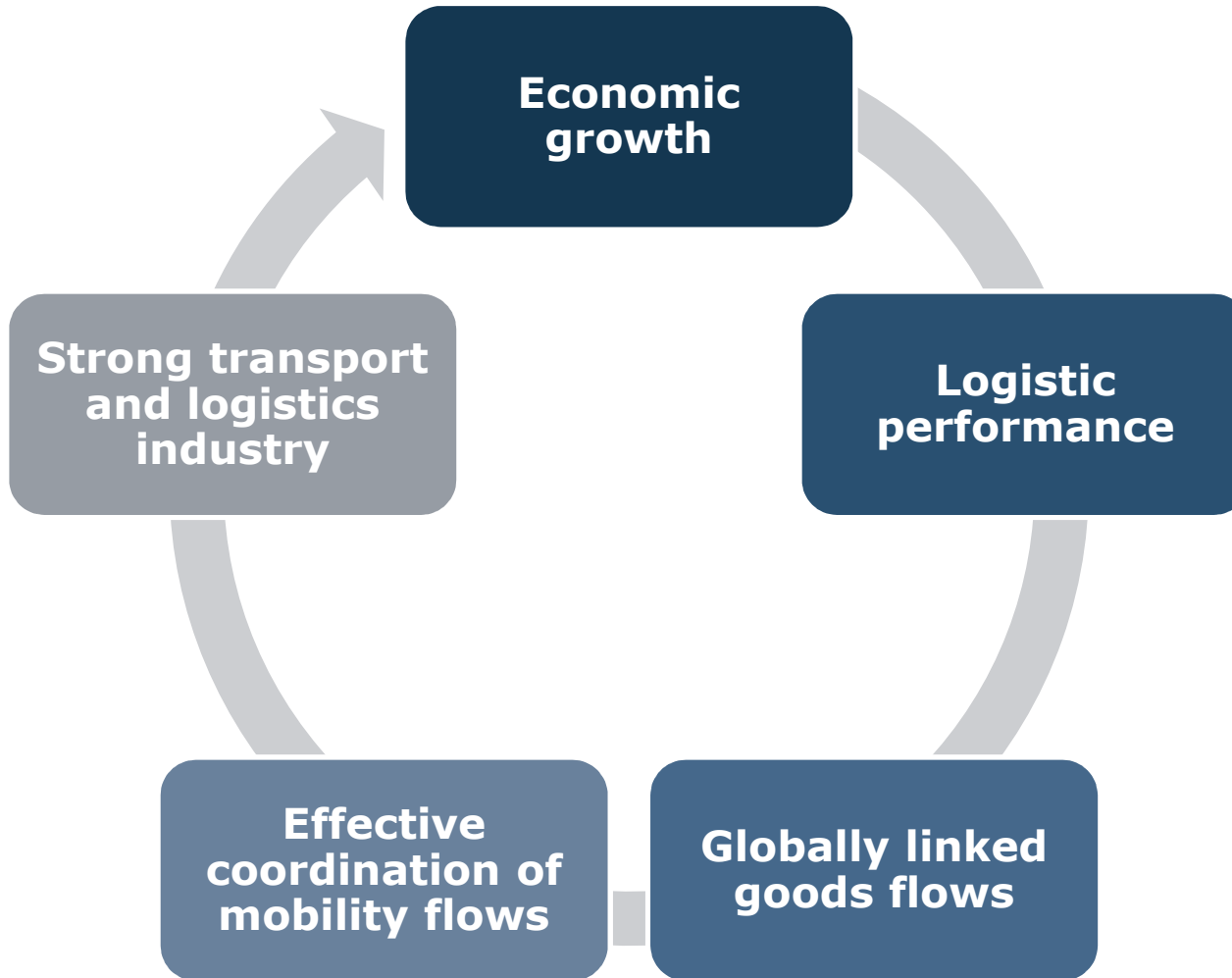


Over 100 clients





GROWING IMPORTANCE OF FREIGHT TRANSPORT



Bi-modal



Trimodal



Seaport terminals

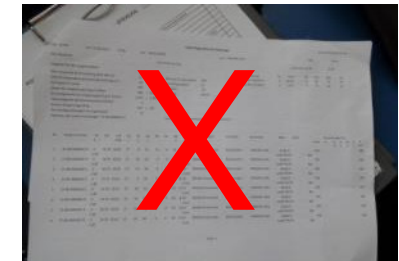
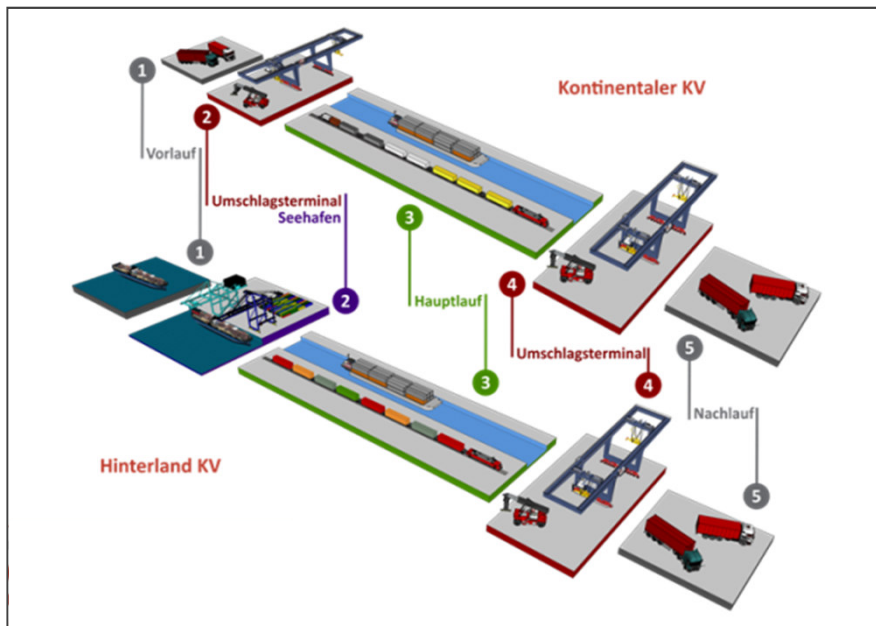


DEMAND: COORDINATION OF FLOWS

Rapid provision and exchange of information

Secured, efficient and cost-saving transports

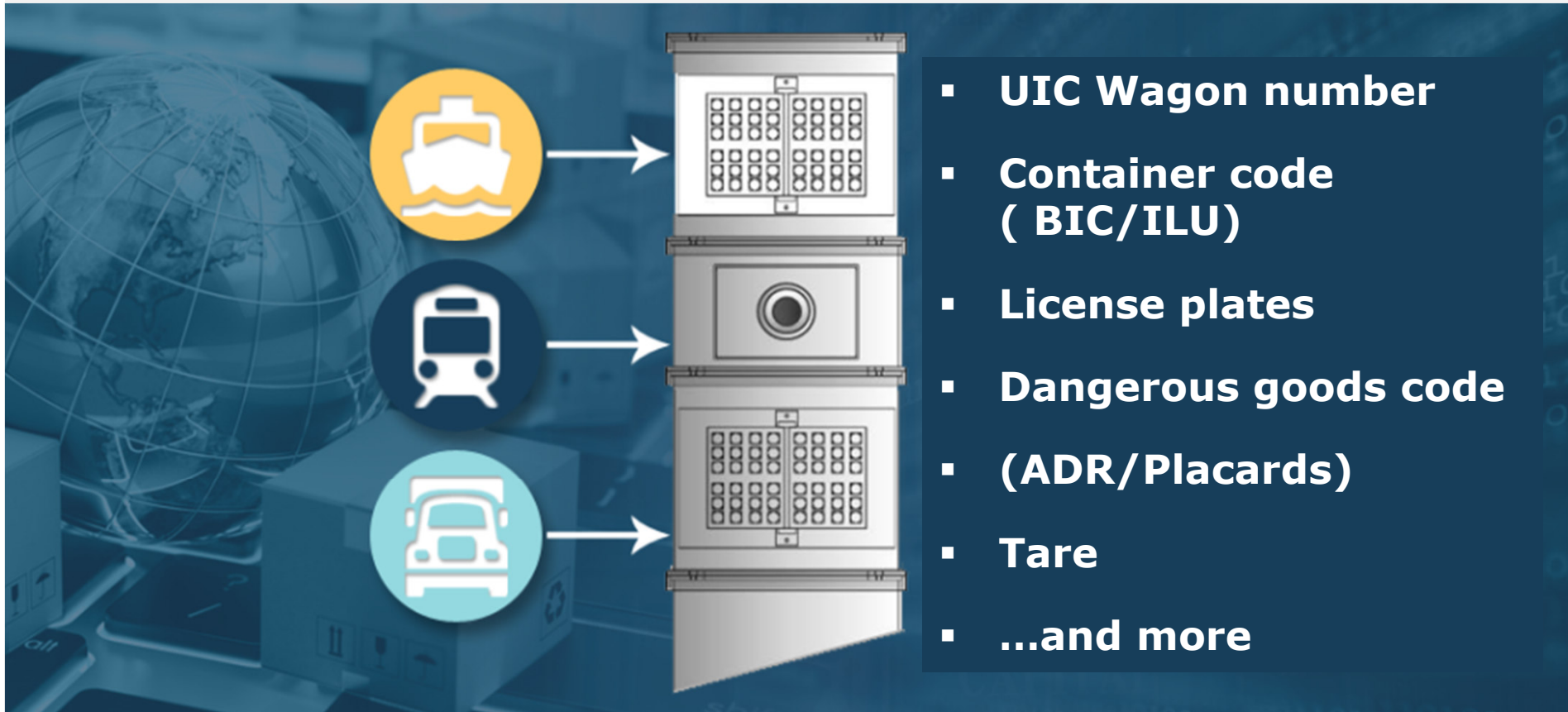
Standardization of data exchange with all stakeholders





OUR TECHNOLOGY DIGITIZES PROCESSES IN GOOD TRAFFIC

ASE's OCR gate "NUMBERCheck" is a camera-based identification system that recognizes and records various character types fully automatically during operation and makes them available to the stakeholders in freight transport via interfaces



For complete data transparency and optimization of transport processes

03

NUMBERCheck – Rail Gate




AUTOMIZED DATA CAPTURE FOR RAIL TRAFFIC



MAXGROSS 30.480 KGS
TARE 8.700 KGS
PAYLOAD 21.780 KGS
CUB. CAP. 78.4 CUY
2.700 CUY

31 81 665 0 286-0

ANSB 1009030 903



K-BE 5818

← 15,5m →

33
1202

03

NUMBER *Check* – Rail Gate

SYSTEM COMPONENTS RAIL GATE





Sensoric in steel column and/or at steel portal

Sensoric components at steel masts

Hardware:

- 2D cameras
- 3D laser sensors
- Sophisticated lighting
- Axle sensors
- Transmission moduls
- Analyzing unit (PC)



OCR-TECHNOLOGY / SOFTWARE & DATA BASE

Processing of the captured data in the NUMBERCheck system
Data transfer via XML interfaces to customer system

Train data:

- Date/Time
- Location
- Passage duration
- Direction
- Number of axles
- Train length
- Average speed

Vehicle data:

- Sequence number
- UIC-/Wagon number
- Confidence (OCR)
- Number of Axles
- Verification status
- Wide range of images
- Picture of UIC wagon number

The screenshot displays the NUMBERFinder software interface. The top section shows search filters for 'Code', 'Von' (Date/Time), 'Bis' (Date/Time), 'Tor', and 'Richtung'. Below this is a table of search results with columns for 'Zeit', 'Tor', 'Richtung', and 'Status'. The bottom section shows a list of wagon data with columns for 'Wagon', 'Code', 'Quil.', 'Achsen', and 'Status'. A camera feed on the right shows a train passing through a gate, with a timestamp of 05.12.17 11:27:07.117.

Zeit	Tor	Richtung	Status
05.12.17 12:21:02	Duisport Gate 1	Ausfahrt	
05.12.17 11:24:49	Duisport Gate 1	Einfahrt	
05.12.17 11:05:23	Duisport Gate 1	Ausfahrt	
05.12.17 10:06:39	Duisport Gate 1	Einfahrt	
05.12.17 08:52:30	Duisport Gate 1	Ausfahrt	
05.12.17 07:05:46	Duisport Gate 1	Einfahrt	
05.12.17 06:30:48	Duisport Gate 1	Ausfahrt	
05.12.17 03:13:06	Duisport Gate 1	Einfahrt	
05.12.17 02:36:41	Duisport Gate 1	Ausfahrt	

Wagon	Code	Quil.	Achsen	Status
> 0	318049922251		6	
> 1	338549926248		6	
> 2	318045586514		4	
> 3	318044960500		6	▲
> 4	336849520091		6	
> 5	378049520505		6	
> 6	338849618101		6	
> 7	318049556125		6	
> 8	330849520638		6	▲
> 9	338549926057		6	
> 10	338549926016		6	
> 11	338549926024		6	
> 12	338849616236		6	
> 13	336849522238		6	
> 14	338549926412		6	
> 15	318049610468		6	
> 16	318049541911		6	
> 17	318049536549		6	
> 18	908032950145		4	

In the NUMBERCheck database the transit data are stored for a limited time.
This database can be viewed on a workstation PC via the GUI

03



SELECTION OF DETECTED CHARACTERS

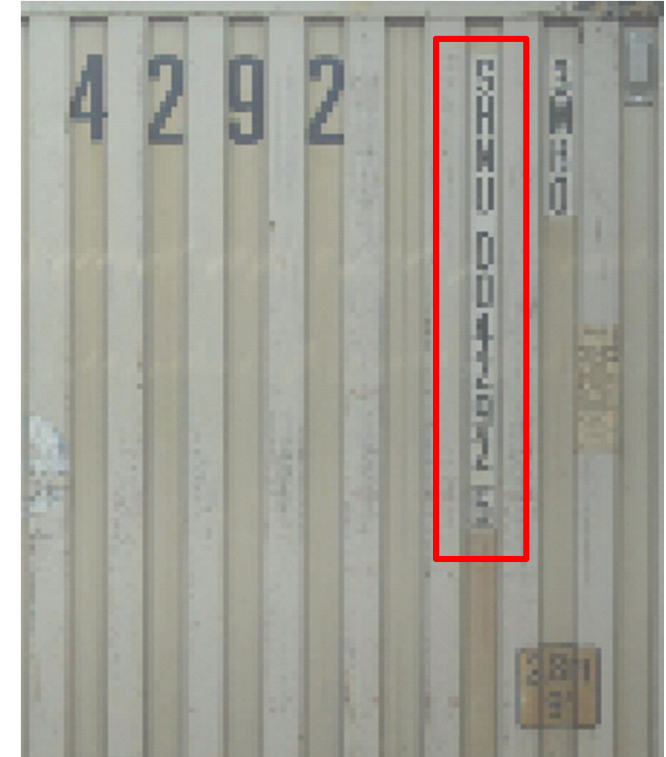
UIC - wagon number
(Passenger, goods, tank wagons)



Russian wagon numbers

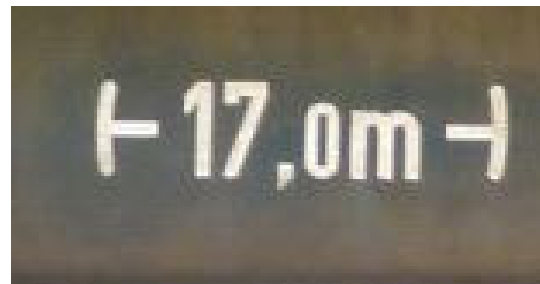


Container code
(BIC / ILU)



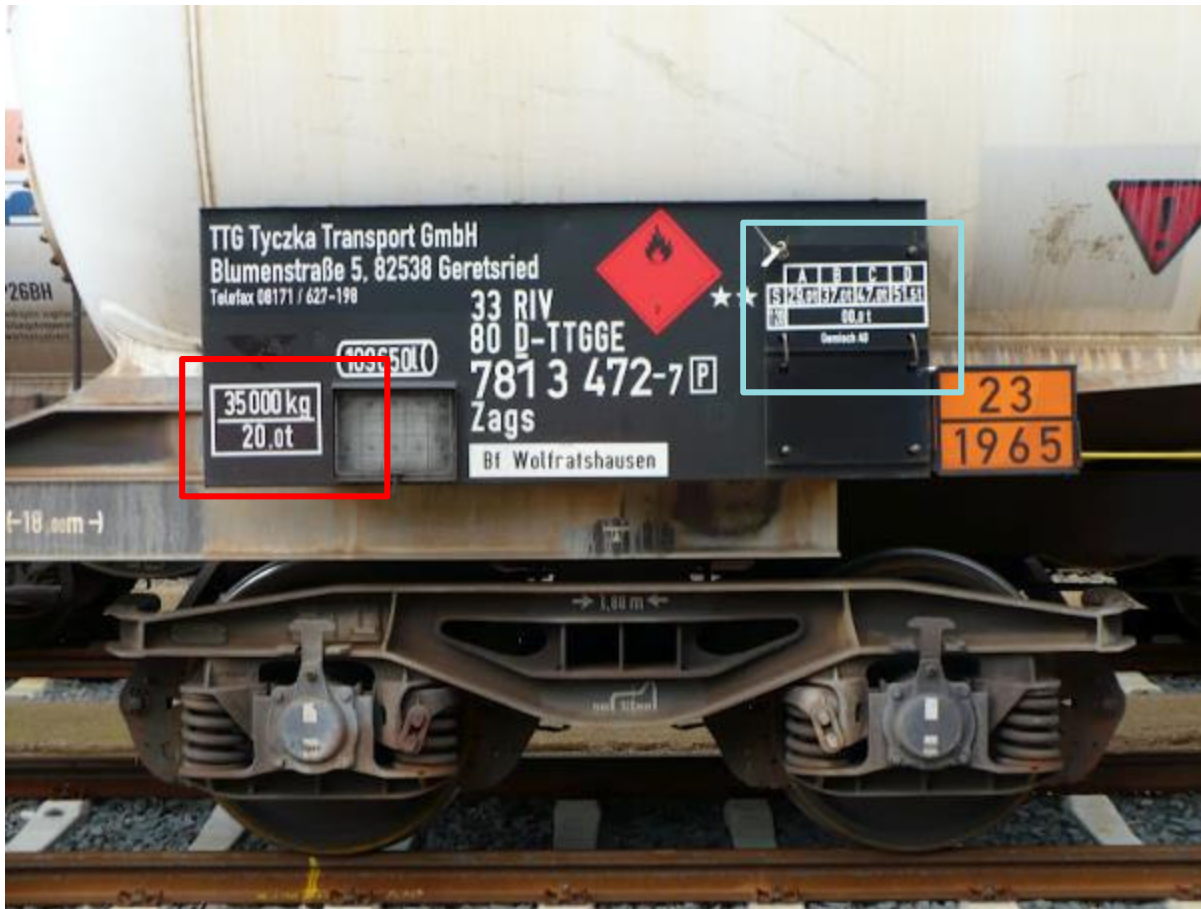
Dangerous good code
(ADR/placards)

Length over buffer (LoB)





SELECTION OF DETECTED CHARACTERS



Weight/Tare

- Comparison with existing data
- Avoidance of overloading
- Detection of malfunctions

Load limit grid

in development

Comparison of permitted maximum load weight with transport data

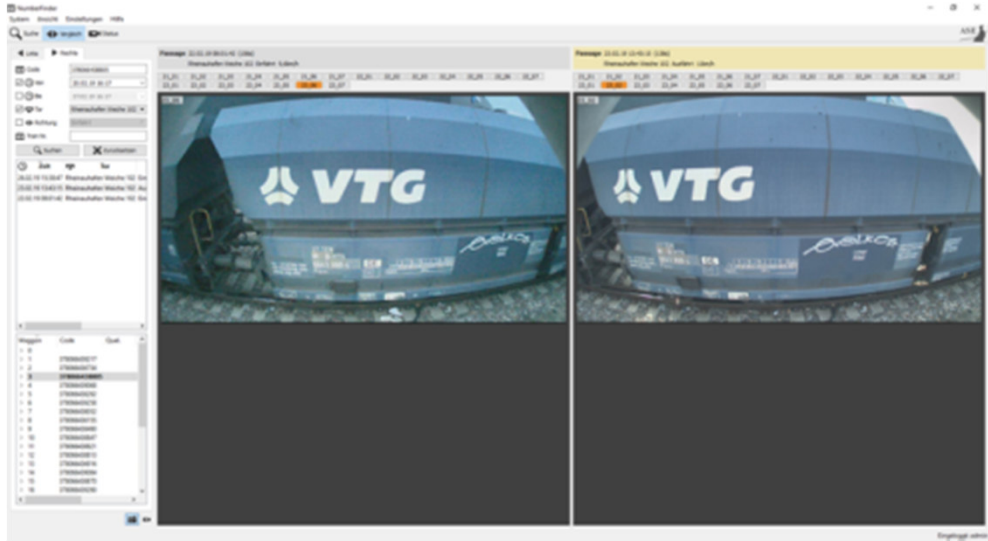
03



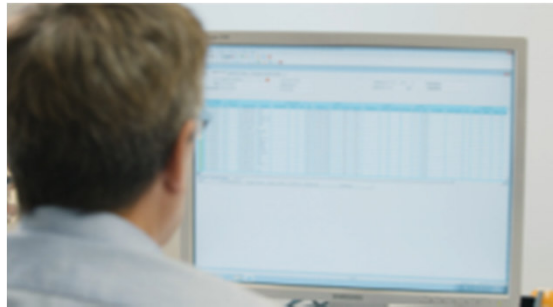
STATE DOCUMENTATION

Image data provide conclusive condition documentation or are used for maintenance and repair work

Comparison pictures at entry and exit
Search parameters:
Wagon number, date / time,
Direction, location etc.



visual observation
at the workplace





STATE DOCUMENTATION



Stitching - Analyses:

- View of the complete train formation
- Display of the train in small format on the screen
- Zoom and move as you like

Example



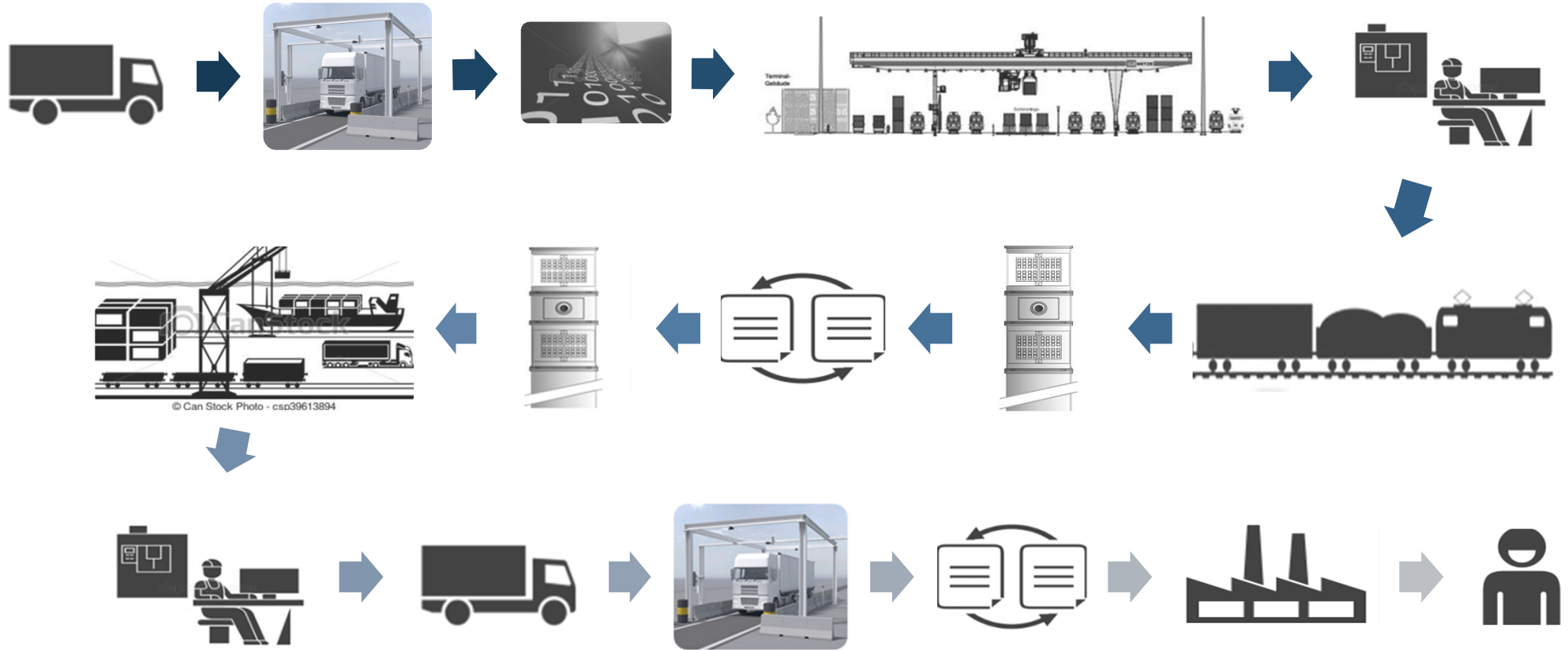
Recognition of pin/cone position on container wagons

- in development-

- Folded in or ready for use?
- Early allocation of freight containers to empty wagons possible



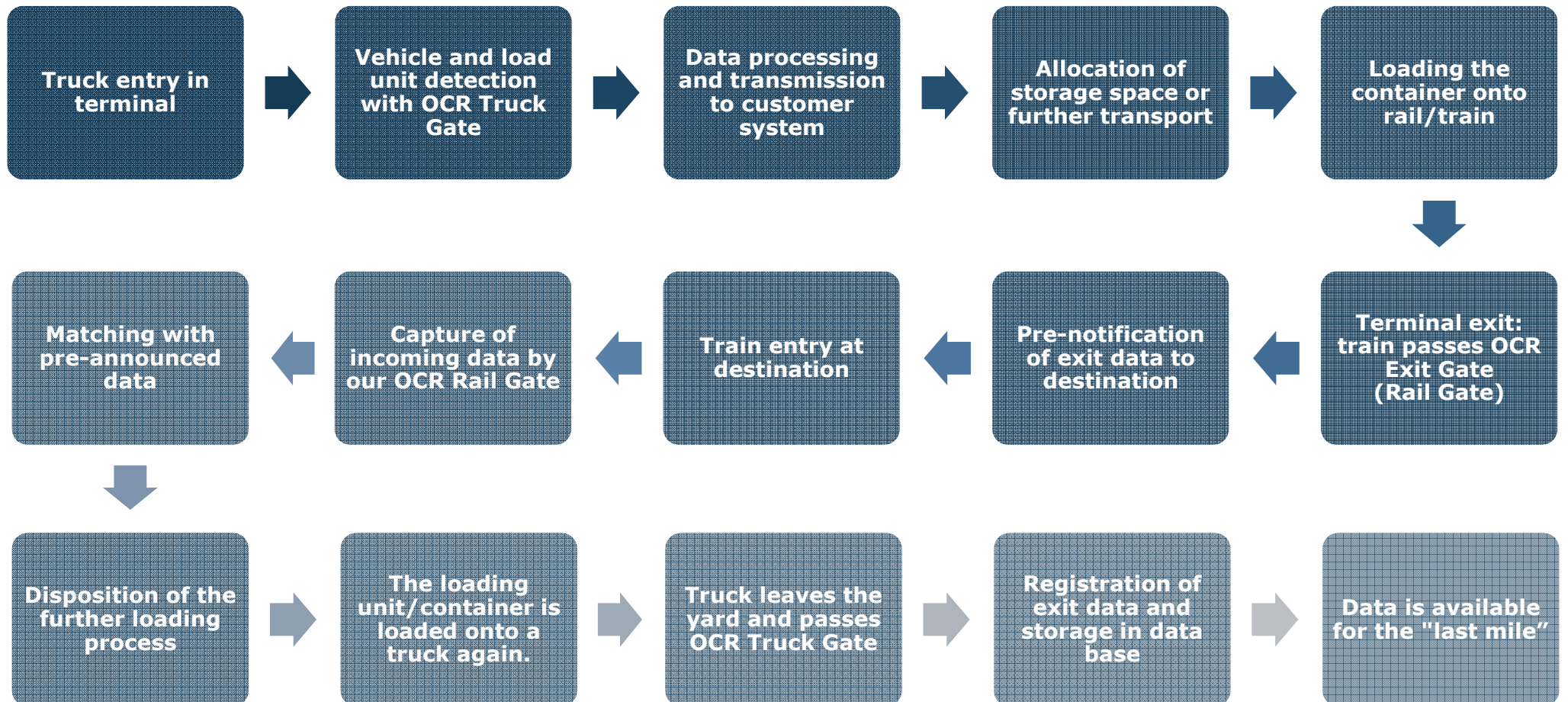
AUTOMATED TRANSPORT/LOADING PROCESS EXAMPLE: ROAD TO RAIL TRANSHIPMENT





AUTOMATED TRANSPORT/LOADING PROCESS

EXAMPLE: ROAD TO RAIL TRANSHIPMENT





BENEFITS OF NUMBERCHECK RAIL GATE

- ✓ **Reduced use of shunting locomotives**
→ Arriving trains and wagon row are known
- ✓ **Less crane moves and automatic handling of crane orders**
→ The location of the wagons and loading units is known; cranes can easily be navigated
- ✓ **Effective allocation of containers to empty wagons**
→ Early detection of the pin position on entry optimizes this process
- ✓ **Higher handling capacity, shorter processing times**
→ Exact information regarding time of arrival optimizes disposition
- ✓ **Additional income from usage and parking fees**
→ Comparison of reported RU data with actual values
- ✓ **Evidence-based status documentation for efficient claims management**
→ High-resolution image data can be retrieved and reviewed at any time
- ✓ **Compliance with TAF/TSI requirements**



PROFIT FROM OUR USP

**High reliability and accuracy
(detection rate >95%)**



Evidential state documentation



Easy to use - Software



Data capture in real time



**Modular design and continuous further
development of the system**



Individual customized adaptation



Vandal-proof steel column





OPTION: AUTOMATIC RU MATCHING / TRABSYS

- Comparison of the recorded passages with RU pre-announcements
- Automatic billing to all users of the infrastructure (TrAbSy = means of transport billing system)
- Mobile input devices for longer parking times

The screenshot displays a complex data table with multiple columns, including what appears to be time, location, and status. The table is organized into several sections, with some rows highlighted in blue and others in red. The interface includes various menu options and a search bar at the top.

The screenshot shows a document titled 'KOPIE' (Copy) with a header section containing contact information for 'SEITE 1' and 'SEITE 2'. Below the header, there are several lines of text, possibly representing a bill or invoice, with a table at the bottom showing numerical data.

Automation

Higher
efficiency

Less costs

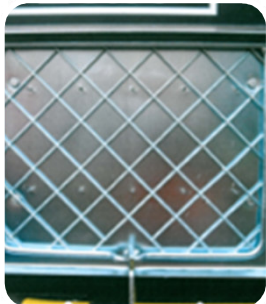
Sales
increase



OPTIONAL DETECTIONS AND MONITORING FUNCTION



Brake lever position



Transport note holder
(note existent: yes/no?)



Flange position



Wagon roof inspection



Pantograph monitoring



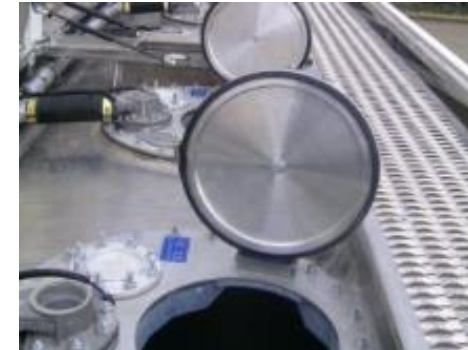
OPTIONAL ADD-ONS FOR RAILWAY OPERATORS



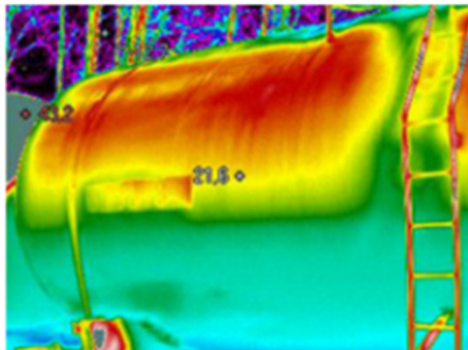
Interface to
Flat detection



Interface to track
scale system



Detection open
dome covers



Fill level detection
Liquid



Fill level detection
Bulk material



Leakage detection

→ In the event of an alarm, an additional UIC number recognition system can immediately identify the wagon in question and rectify the malfunction.



OPTION: MONITORING AND ALERTING

Warning for critical values and alerting

- ✓ Prevention of breakdowns
- ✓ Quick-recovery of system functions

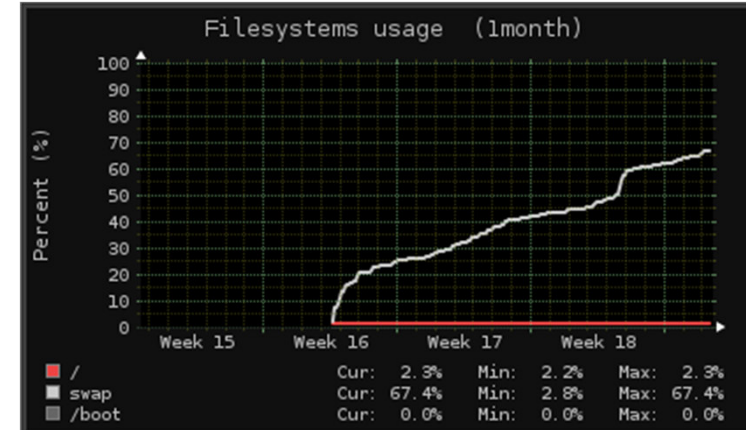
Monitoring and long-term statistics of:

- **Server Hardware and system status**
(CPU, File system, Storage, etc.)

- **System components**
(Camera, axle sensors, infrastructure, etc.)

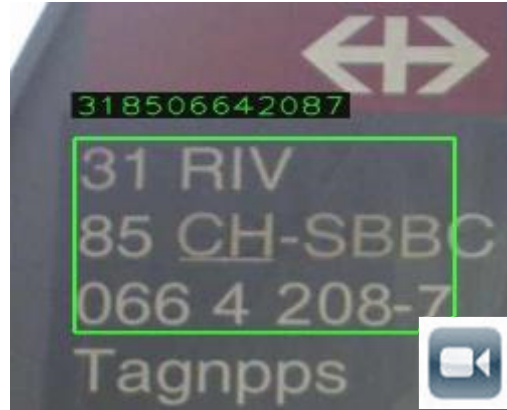
- **Software components**
(Process statistics, resource demands, etc.)

- **Numberfinder statistics**
(Recognition rate, Confidence, cycle time)





NUMBERCheck - Rail Gate PRAXIS EXAMPLES



System: Ansicht: Einstellungen: Hilfe

Suche:

Code	Zeit	Ter	Richtung	Status
0	08.04.18 08:28	RIV	Gleibogen Gate	Ausfahrt
1	08.04.18 08:28	RIV	Gleibogen Gate	Einfahrt
2	08.04.18 08:28	RIV	Gleibogen Gate	Ausfahrt
3	08.04.18 08:28	RIV	Gleibogen Gate	Einfahrt
4	08.04.18 08:28	RIV	Gleibogen Gate	Ausfahrt
5	08.04.18 08:28	RIV	Gleibogen Gate	Einfahrt
6	08.04.18 08:28	RIV	Gleibogen Gate	Ausfahrt
7	08.04.18 08:28	RIV	Gleibogen Gate	Einfahrt
8	08.04.18 08:28	RIV	Gleibogen Gate	Ausfahrt

Waggons

Code	Quell	Achsen	Status
0		2	
1	84806057544	4	
2	84806050066	4	
3	84806050068	4	
4	84806050322	4	
5	84806050934	4	
6	84806052552	4	
7	84806052949	4	
8	84806050088	4	

Details

Zeit: 08.04.18 12:28:35
Ter: RIV Gleibogen Gate
Richtung: Ausfahrt
Waggern: 9
Achsen: 34
Länge: 96,13m
Geschwindigkeit: 6,8km/h

System: Ansicht: Einstellungen: Hilfe

Suche:

Code	Zeit	Ter	Richtung	Status
0	19.02.18 12:11:07	Handelskafen	Ausfahrt	
1	19.02.18 12:11:07	Handelskafen	Einfahrt	
2	19.02.18 12:11:07	Handelskafen	Ausfahrt	
3	19.02.18 12:11:07	Handelskafen	Einfahrt	
4	19.02.18 12:11:07	Handelskafen	Ausfahrt	
5	19.02.18 12:11:07	Handelskafen	Einfahrt	
6	19.02.18 12:11:07	Handelskafen	Ausfahrt	
7	19.02.18 12:11:07	Handelskafen	Einfahrt	
8	19.02.18 12:11:07	Handelskafen	Ausfahrt	

Waggern

Code	Quell	Achsen	Status
0		4	
1	318506642087	4	
2	318506642087	4	
3	318506642087	4	
4	318506642087	4	
5	318506642087	4	
6	318506642087	4	
7	318506642087	4	
8	318506642087	4	

Handelskafen

Infalt: 75 m²
+ 12,0 m²
BA 00 Q-REH
665 0 754-4



CONTACT DATA / SOME OF OUR REFERENCES

ASE GmbH

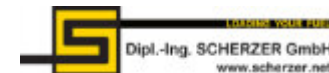
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NumberCheck - References



Thank you for your attention

Eric Steck

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