

# Automatic Track Guidance of Heavy Goods Vehicles



Navigation / Positioning

### The Task

The human being is a very intelligent creature. He realises complex situations and can react to these very quickly. His optical and acoustical warning ability in e. g. every day traffic is enormous.

However

The human being tires quickly and is not reliable in his reactions.

Therefore there are many transport requirements which should be automated.

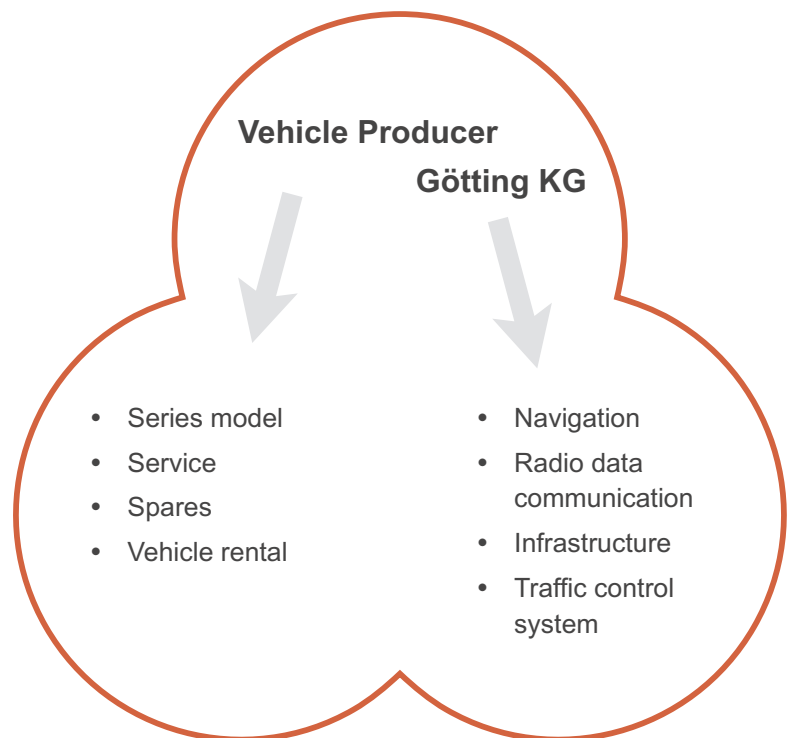
### The Experts



The answer to the system task are guaranteed through a strong partnership:

- Vehicle producer (Mercedes Benz and others),
- Götting KG (automated driving)

who are in their individual areas of responsibility the worldwide leaders.



**Tried and tested vehicles with intelligent technology offer the highest reliability and productivity.**

# Automated Heavy Goods Vehicle

## Leasing

### The Answer

The problems are solved through the automation of the vehicle:

- No accidents
- No stress
- No wasted journey
- Reduced fuel consumption
- Highly reliable
- Exact vehicle positioning
- Careful transportation of vehicle and load
- Exact route planning
- Optimal route control
- Reduced labour costs.

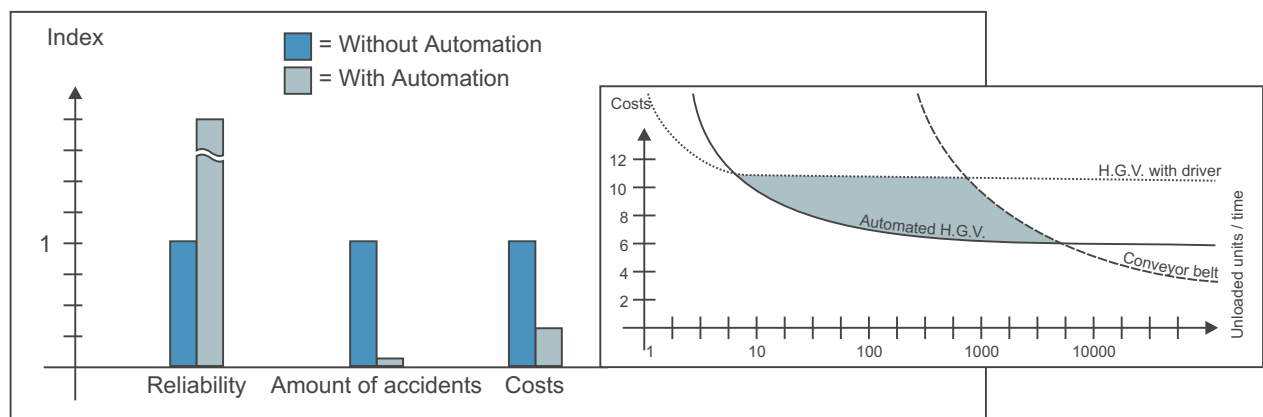


### The various customer and system advantages:

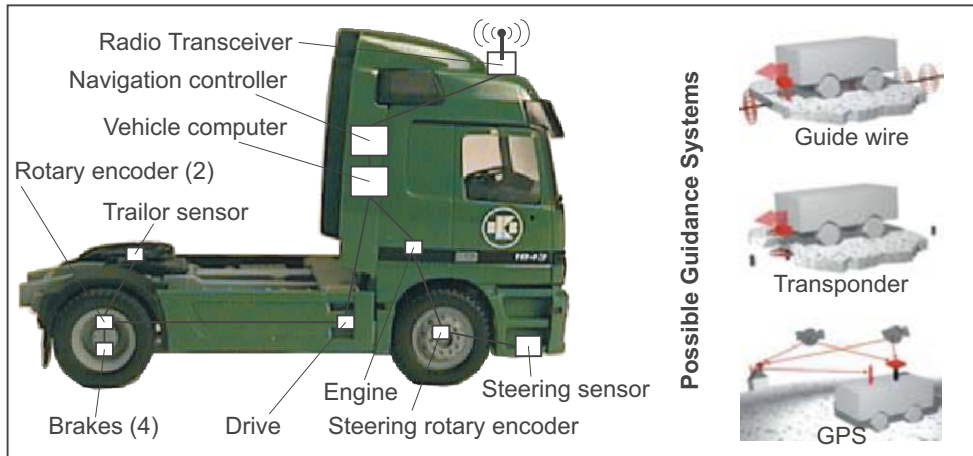
- Series production vehicle
  - low cost of purchase
  - widely available
  - tried and tested equipment
  - world wide service
- Automated driving
  - low cost
  - reduced labour costs
  - optimal transportation of vehicle
  - no human error
- Rental
  - no financing risk
  - reduced capital tie up



### Cost-Usage Analysis



### Vehicle Setup



The new series of heavy goods vehicles have the ability to be fitted with various track guidance systems. Dependant upon their area of operations, it is possible to use: Guide wire, transponder, satellite navigation (GPS), laser or even camera guidance systems.

In addition rotary encoders are used to register the steering angle and driven route. Optionally laser, ultrasound or radar systems are available as a means of detecting obstacles.

With thanks to the new (CAN-) controllable vehicle elements, e. g. steering cylinder, speed controller, automated gearbox, brakes, etc. it is possible to automate almost any vehicle with a minimal amount of alterations. The vehicle can be driven manually or automatically at any time.



### The system is advantageous as a track guidance when:

- the route is no longer visible (e. g. Blizzards)
- on a predesignated route (e. g. shopping precincts, road sweepers, etc.)
- as an aid when shunting





**The use of automated vehicles is a valuable alternative on:**

- Long routes
- Continuous transport
- Flexible track set up (in comparison to rail mounted vehicles or conveyor belts)
- Areas or loads hazardous to people such as
  - explosive or radioactive material
  - high rate of air toxicity (dust, gases)
  - dangerous routes
- The requirement for highly accurate track guidance
- Complicated shunting
- Civil engineering sites

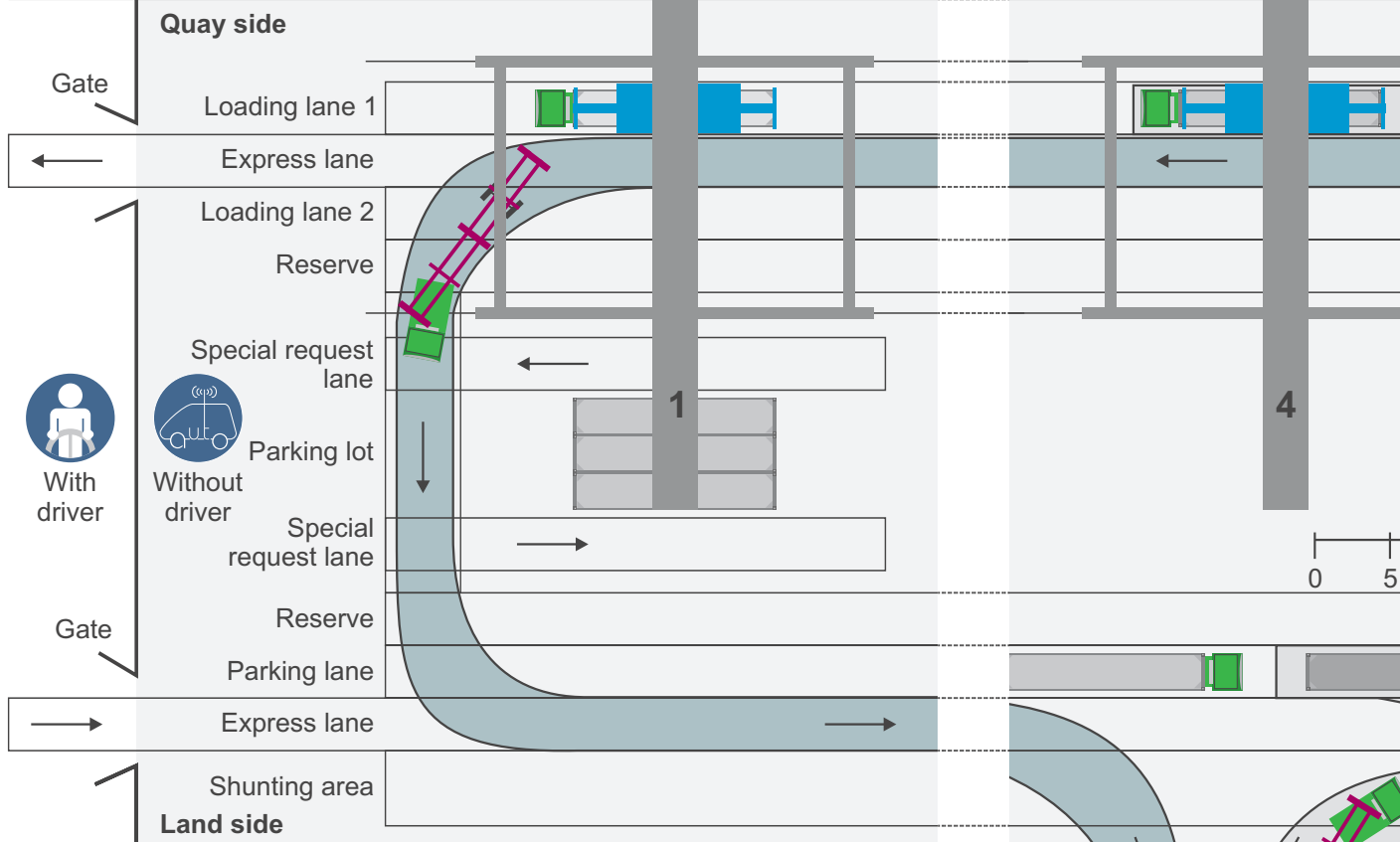


# Automated Heavy Goods Vehicle

# Terminals

## Automated Container-Terminal

Diagram with 45ft containers  
Throughput by 6 cranes: 4 Container / min

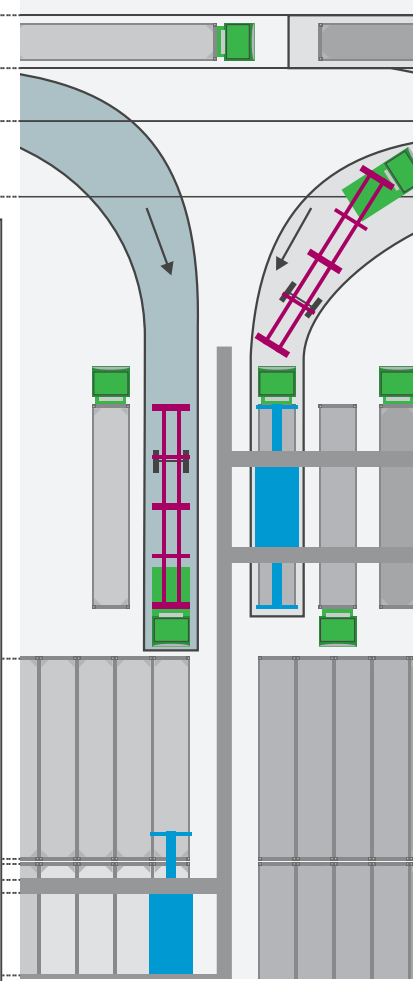
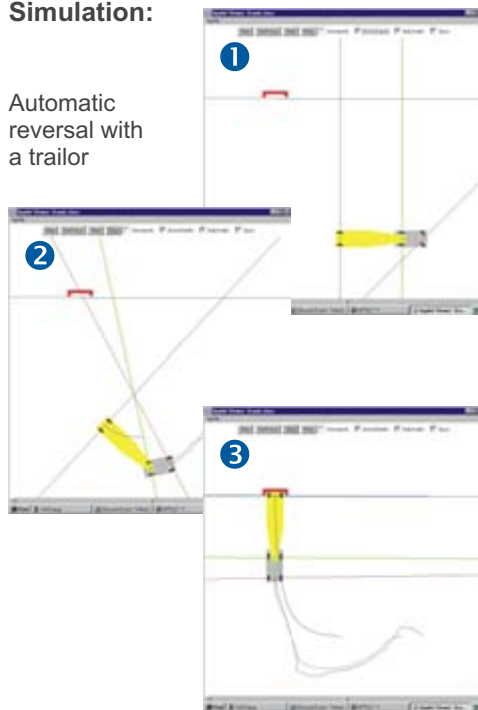


### Modern Container terminals and automated vehicles supplement each other:

- No missing transport or swapped containers.
- Optimal route planning.
- Integrated traffic control.
- The orders and target locations are transmitted and acknowledged per radio.
- Exact disposition of the vehicles position (typ. +2 cm).
- Minimal requirement for protection to pedestrians (no admittance to pedestrians).
- Automatic trailer reversal.
- Minimal requirement for roadway and parking lots.
- Vehicles can also be used outside of the terminal (with driver).

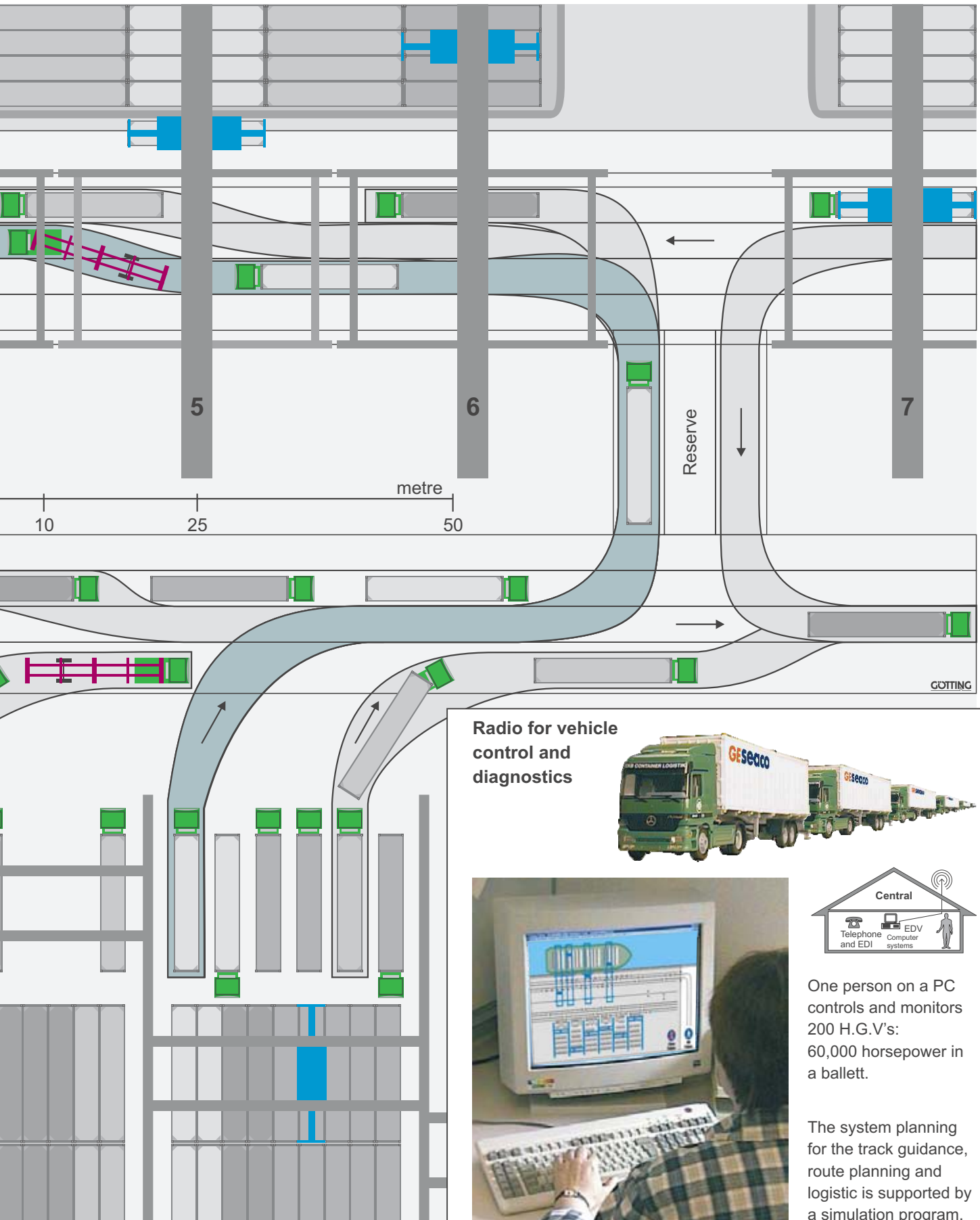
### Simulation:

Automatic reversal with a trailer

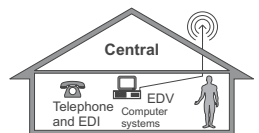


# Automated Heavy Goods Vehicle

# Terminals



## Radio for vehicle control and diagnostics



One person on a PC controls and monitors 200 H.G.V's: 60,000 horsepower in a ballet.

The system planning for the track guidance, route planning and logistic is supported by a simulation program.

**Automated driving: Götting KG**

Celler Straße 5  
D-31275 Lehrte/Röddensen (Germany)

Mr. H.-H. Götting  
Tel.: +49 (0) 51 36 - 80 96 -0  
Fax: +49 (0) 51 36 - 80 96 -80

eMail: [hg@goetting.de](mailto:hg@goetting.de)  
Internet: [www.goetting.de](http://www.goetting.de)

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