The Project DemoOrt

„Demonstration of safety critical localization of trains“

Michael Meyer zu Hörste (DLR)

DLR m/rt BOMBARDIER Technische Universität Braunschweig Institut für Verkehrssicherheit und Automatisierungstechnik iVA Prof. Dr.-Ing. Dr. h.c. E. Schnieder

DemoOrt
Structure – of the presentation

- Structure of the consortium
- Motivation
- Approach
  - Components
  - Architecture
- Results
- Perspective

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DemoOrt - Project Structure of the Consortium

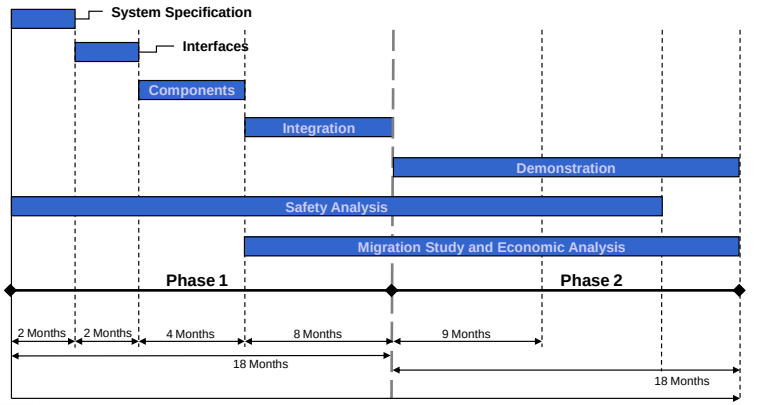
German Aerospace Center
Institute of Transportation Systems
Braunschweig, Germany

Technical University of Braunschweig
Institute of Traffic Safety and Automation Engineering
Braunschweig, Germany

University of Karlsruhe
Department of Measurement and Control
Karlsruhe, Germany

Bombardier Transportation
(Signal) Germany GmbH
Mannheim, Germany

DemoOrt – Project Timeplan



DemoOrt – Motivation

- Current localization principles used by railways are basing on infrastructure-side sensors (e.g. axle counters). These lead to:
  - Significant maintenance effort
  - Difficult to adopt to modified operational requirements
- For up-to-date railway operational concepts as ERTMS/ETCS Level 3 a vehicle-autonomous localization with high accuracy, dependability and integrity is required
- Examples of advantages of autonomous localization:
  - Concentration on the vehicle
  - Reduction of trackside maintenance effort
  - Reduction of system complexity

ERTMS: European Rail Traffic Management System ETCS: European Train Control System

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DemoOrt – Approach
Idea and Components

Integration of three different Systems to one highly available and vehicle autonomous localization platform

1. Global Navigation Satellite System
- No terrestrial signal required
- By using Galileo Integrity of the Signal is guaranteed

2. Eddy Current Sensing System
- Precise measurement of metallic in-homogeneities of the track
- Absolutely independent from weather
- Robust

3. Map Matching
- All captured data can be used for fusion
- Visualization

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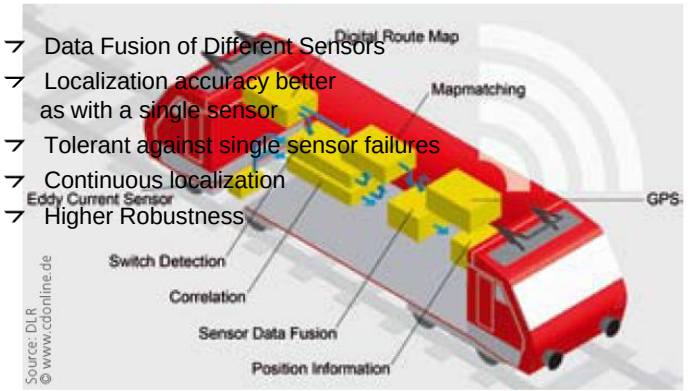
DemoOrt – Approach
System Overview

- Data Fusion of Different Sensors
- Localization accuracy better as with a single sensor
- Tolerant against single sensor failures
- Continuous localization
- Higher Robustness



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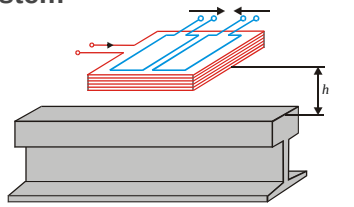
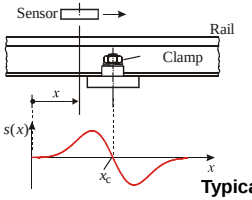
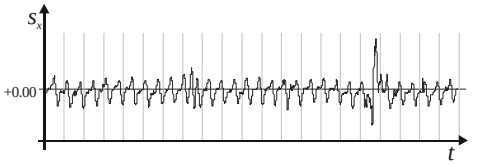
DemoOrt – Aprroach
Eddy current sensing system

Global Principle







Typical Sensor Signal (free Track)

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DemoOrt – Results and Perspective

- Demonstrations:
  - TeZ Poprad (SK)
  - AVG Karlsruhe (D)
- Development of a reference measurement system
- Approach for a Safety Case according to CENELEC
- Analysis of Migration strategies

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Thank you for you attention!

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