

interactive



Accident avoidance by active intervention for Intelligent Vehicles

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interactIVe – Accident avoidance by active intervention for Intelligent Vehicles

Aria Etemad
Volkswagen Research

Erlangen, 27 June 2013

VOLKSWAGEN

AKTIENGESELLSCHAFT

Project overview: Facts

- Budget: EUR 30 Million
- European Commission: EUR 17 Million
- Duration: 47 months (January 2010 – November 2013)
- Coordinator: Aria Etemad (1/2010 – 4/2013),
Christoph Kessler (5/2013 – 11/2013)
Ford Research and Advanced Engineering Europe
- 10 Countries: Czech Republic, Finland, France, Germany,
Greece, Italy, Spain, Sweden, The Netherlands,
UK



European Commission
Information Society and Media



Consortium

- OEMs



BMW Group
Research and Technology



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- Suppliers



DELPHI

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conekt

- Research

CHALMERS



bast



UNIVERSITY
OF TRENTO - Italy

- SMEs

alcor
consulenza *innovazione*



eict
European Center for Information
and Communication Technologies
EICT GmbH

Mission

The interactive vision:
Accident-free traffic and active safety systems in all vehicles.

- **Overcome the obstacle of independent functions and high system costs:**
 - Integrated solutions
 - Affordable systems
- **Consider all vehicle classes:**
 - Build up seven demonstrator vehicles: six passenger cars & one truck

Research concept



SECONDS

INCA

EMIC

Continuous driver support

Collision avoidance

Collision mitigation

Objectives

- Create an **innovative** model and platform for enhancing the **perception** of the driving situation
- Extend range of possible scenarios and usability of ADAS by multiple **integrated functions** and **active interventions**
- Improve **decision strategies** for active safety and driver-vehicle-interaction
- Develop solutions for **collision mitigation** that can improve the market intake within **lower-class vehicle segments**
- Further encourage the application of **standard methodologies** for the **evaluation** of ADAS

Seven demonstrator vehicles

SECONDS

INCA

EMIC

BMW

Enhanced dynamic pass predictor

Fiat

Continuous support with focus on haptic HMI solutions

Volvo car

Collision avoidance, continuous support and SafeCruise

Ford

Collision avoidance, continuous haptic support and automated driving

Volvo truck

Collision avoidance and run-off road prevention by braking and steering, stability considerations for heavy vehicles

VW

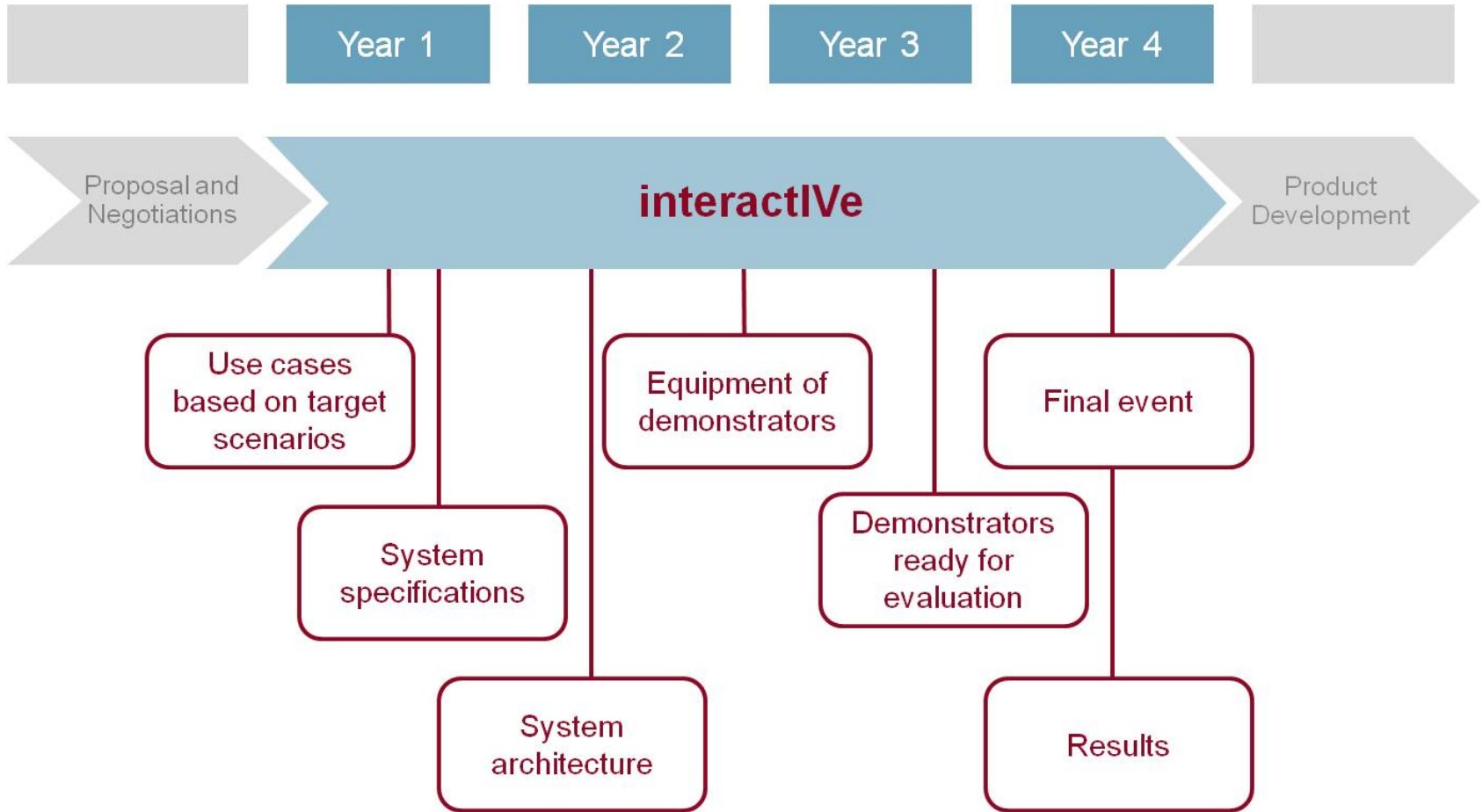
Collision mitigation with focus on cost-efficient sensors and algorithm approach

Conti

Emergency steering assistance with focus on radar/vision combination



Timeline



Project structure

Sub-project 1: **Integrated project (IP) management**



Integrated advanced driver assistance systems (ADAS) for continuous support and emergency intervention

Sub-project 2: **Perception**

Specifications for sensor interfaces and fusion modules

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Sub-project 3: **Information, warning and intervention (IWI) strategies**

Definition of use cases and requirements | Specifications for IWI strategies

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Sub-project 4: **SECONDS**

Safety enhancement through continuous driver support



Sub-project 5: **INCA**

Integrated collision avoidance and vehicle path control

VOLVO

Sub-project 6: **EMIC**

Cost-efficient emergency intervention for collision mitigation

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Seven demonstrator vehicles: six passenger cars and one truck

Sub-project 7: **Evaluation and legal aspects**

Test and evaluation framework for interactive applications | Analysis of legal aspects



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Thank you.

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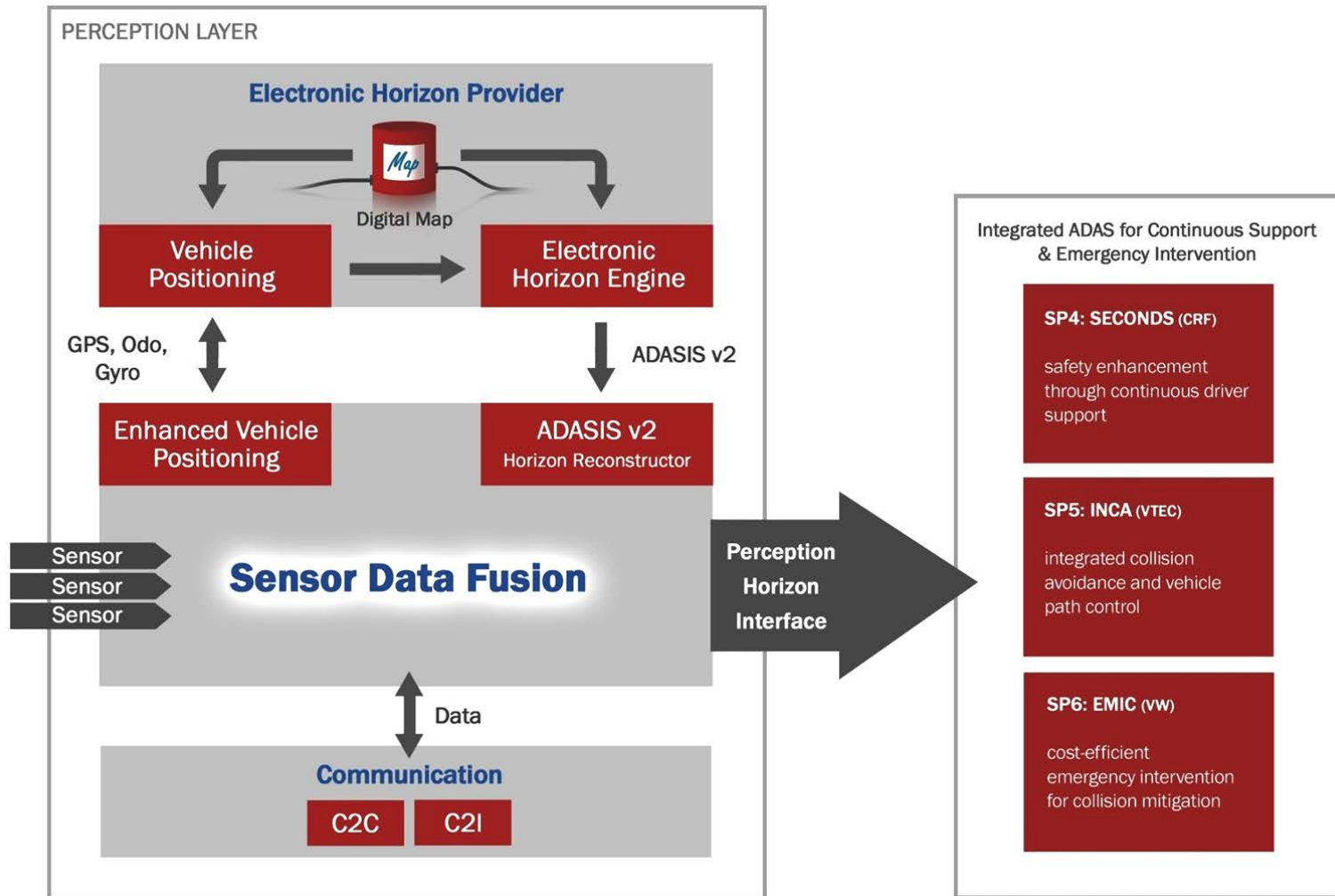
interactIve – Perception platform & ADASIS

Anastasia Bolovinou
ICCS

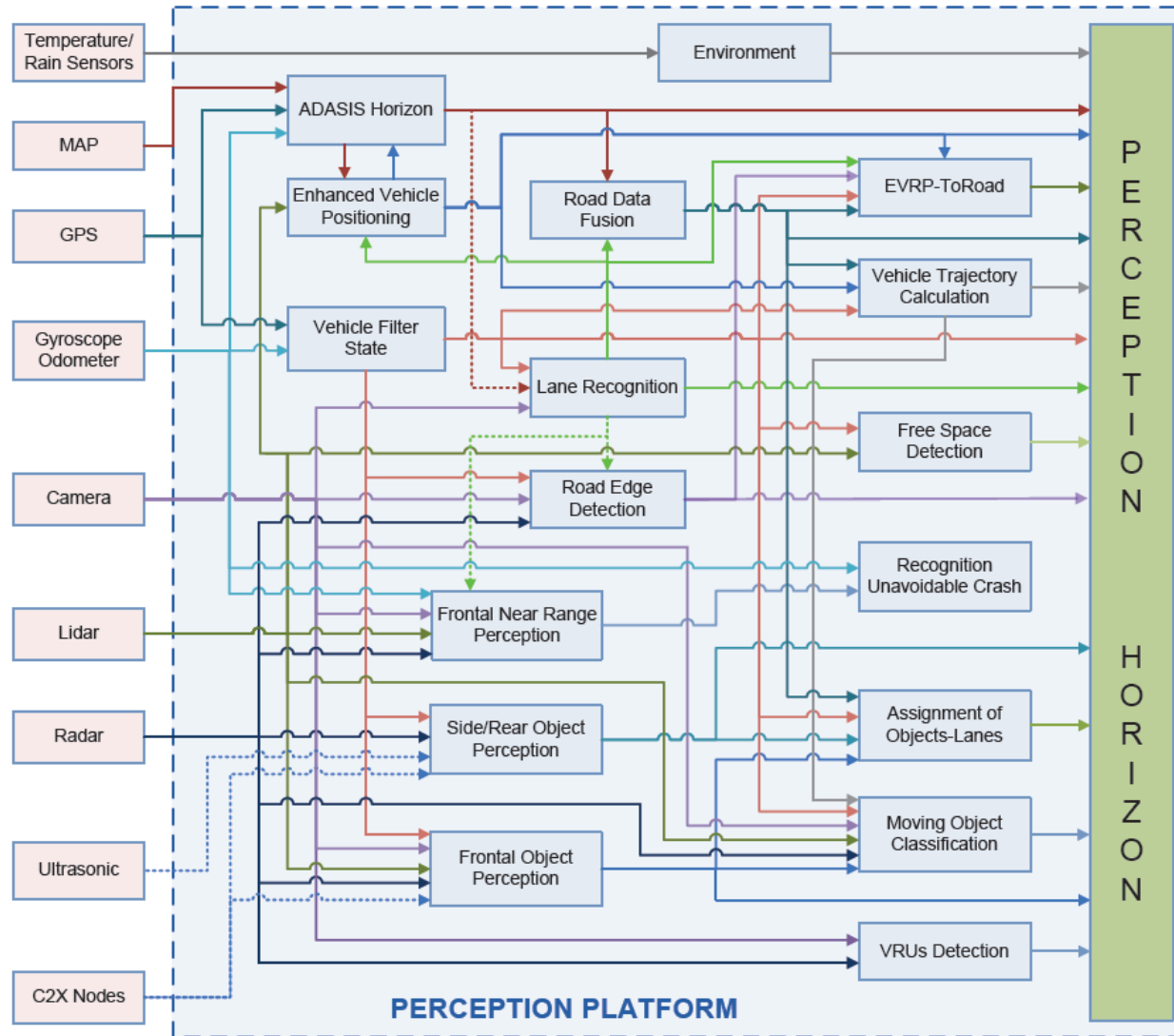
Erlangen, 27 June 2013



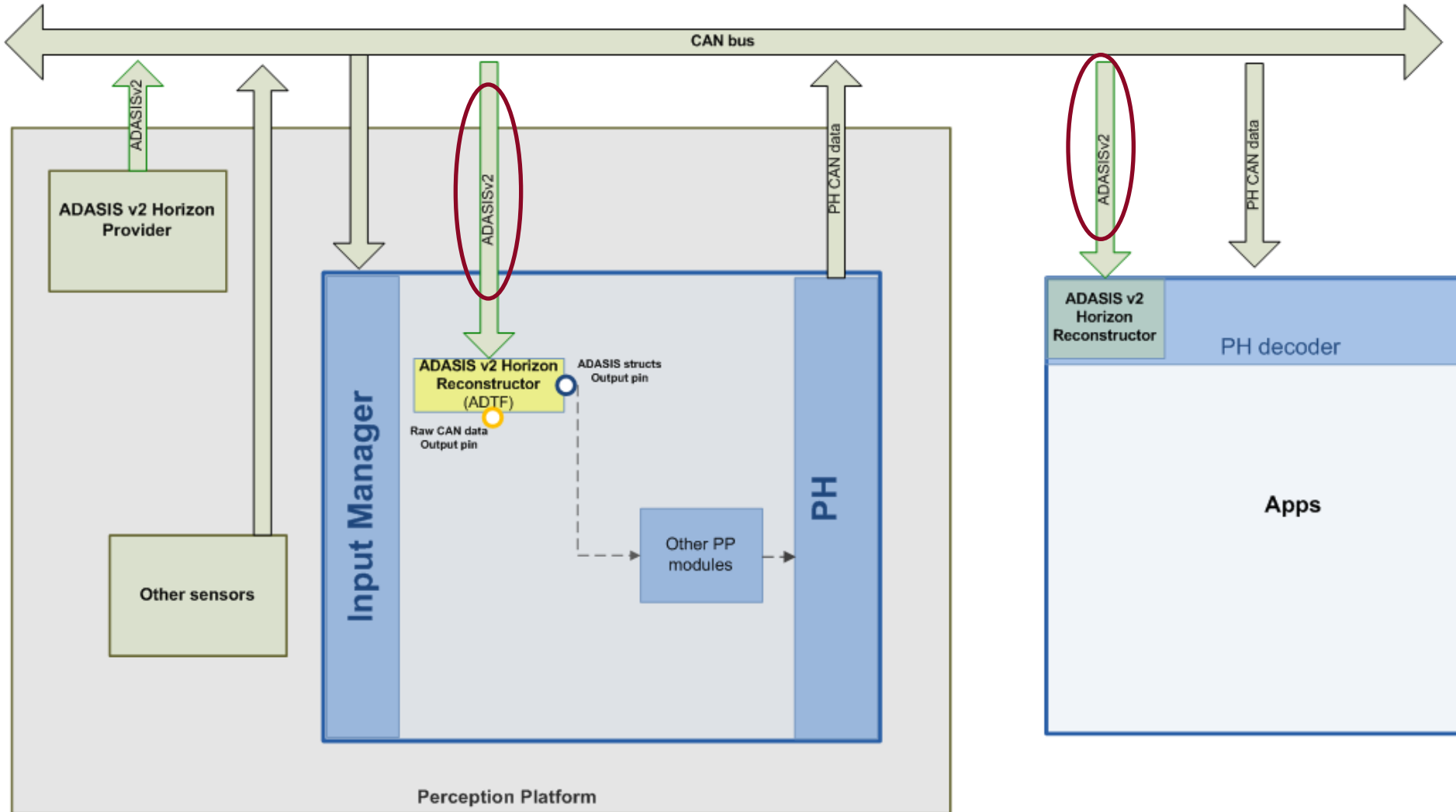
SP2: Perception



Functional Architecture of Perception Platform



Interfacing with digital map via ADASISv2 protocol

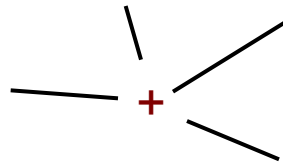
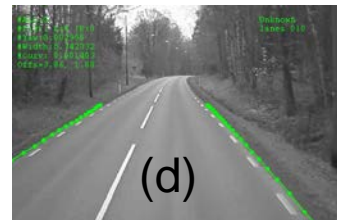
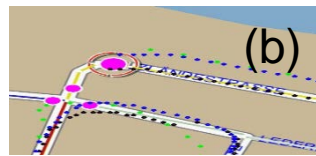
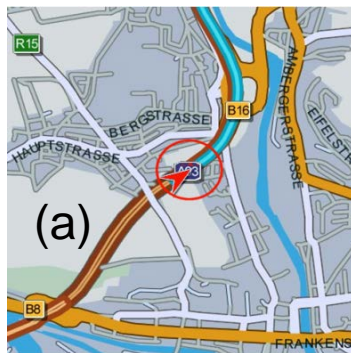
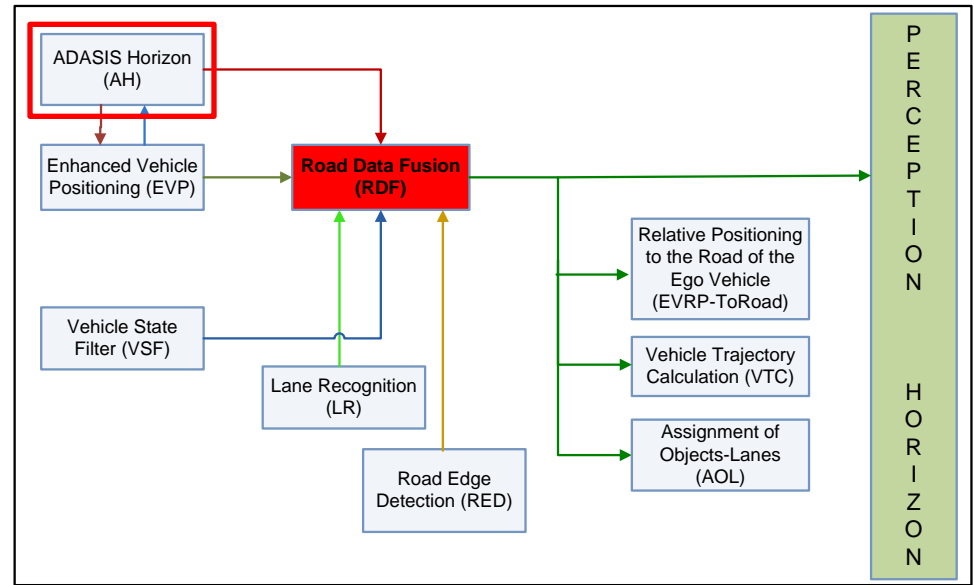


Road Data Fusion in the perception Layer of interactive

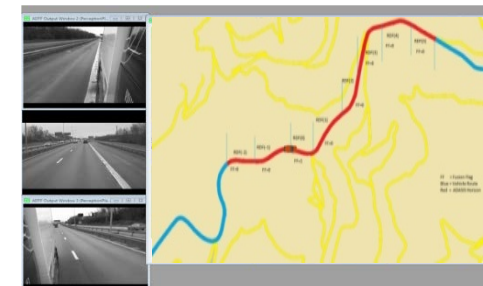
→ Fusing ...

(a) ADASIS Horizon, with
 (b) map-matched vehicle
 positioning (EVP module) and
 (c) camera-based lane (LR module)
 and (d) road edge information (RED
 module).

*Note: RDF module uses as
 reference road line the ADASISH
 reference line*



Our RDF GUI



Perception layer input: **ADASIS Horizon specification**

ADASIS Horizon	<p>This block generates the description of the road in front of the vehicle with the following attributes:</p> <ul style="list-style-type: none">• Number of lanes• Road side guarded or not• Direction of lanes• Type of lane markings• Hard or soft shoulder• Road curvature profile• Road geometry (latitude, longitude, heading)• Posted speed limits• Landmarks• Type of road• Slope• Junctions
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Perception layer output w.r.t road geometry: **RDF specification**

Road Data Fusion	<p>This block provides the following information, with better accuracy, for the current road segment:</p> <ul style="list-style-type: none">• Number of lanes• Width of lanes• Lateral position of the vehicle on the road (lateral offset with respect to road centre line described in the maps)• Precise curvature profile (based on fusion between map and camera data)
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