Continental
The Future in Motion

eCAL Simulink Toolbox

MathWorks Automotive Conference EXPO 2021

Continental Group Structure

Effective January 1, 2020

Automotive Technologies

Rubber Technologies

Powertrain Technologies

Autonomous Mobility and Safety (AMS)

Vehicle Networking and Information (VNI)

Tires

ContiTech

Vitesco Technologies

Automotive Technologies

Automotive Technologies

Automotive Central Functions

A Purchasing	A SCM	A Manufacturing	A Sales	A IT	A Quality	Finance Controlling	Human Relations	Communications

Autonomous Mobility and Safety	Holistic Engineering and Technologies	Vehicle Networking and Information

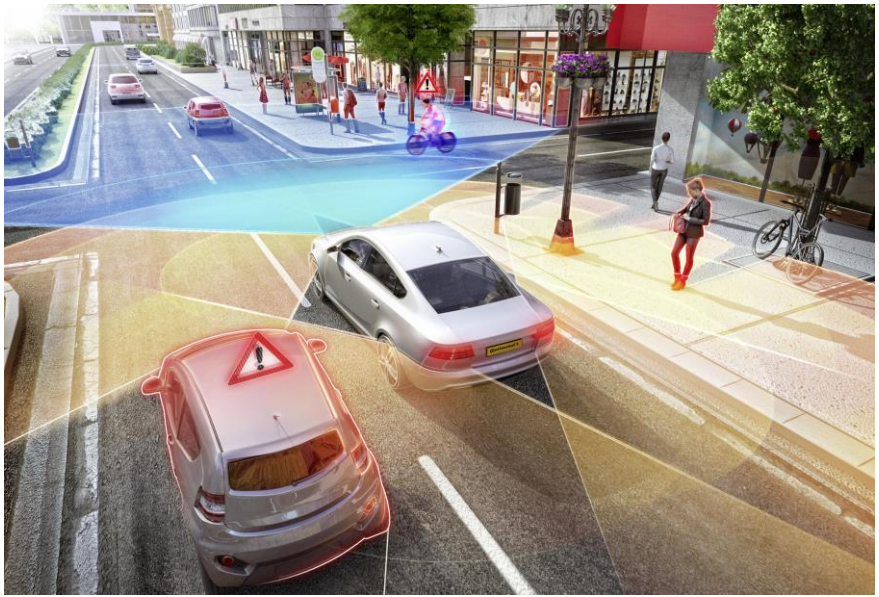
Vehicle Dynamics	Hydraulic Brake Systems	Passive Safety & Sensorics	Adv. Driver Assistance Systems		Connected Car Networking	Human Machine Interface	Commercial Vehicles & Services

About myself

- 2017 – present
  - Team Lead, Base Software Development and Integration, Research & Advanced Engineering, Continental
- 1997 – 2017
  - Leading eCAL middleware core development for AD systems
  - Senior Expert “Human Machine Interfaces”
  - Anti-lock braking system for EMB
  - Various other research projects ..
- 1997
  - Diploma Electrical Engineering Technical University Dresden / Germany

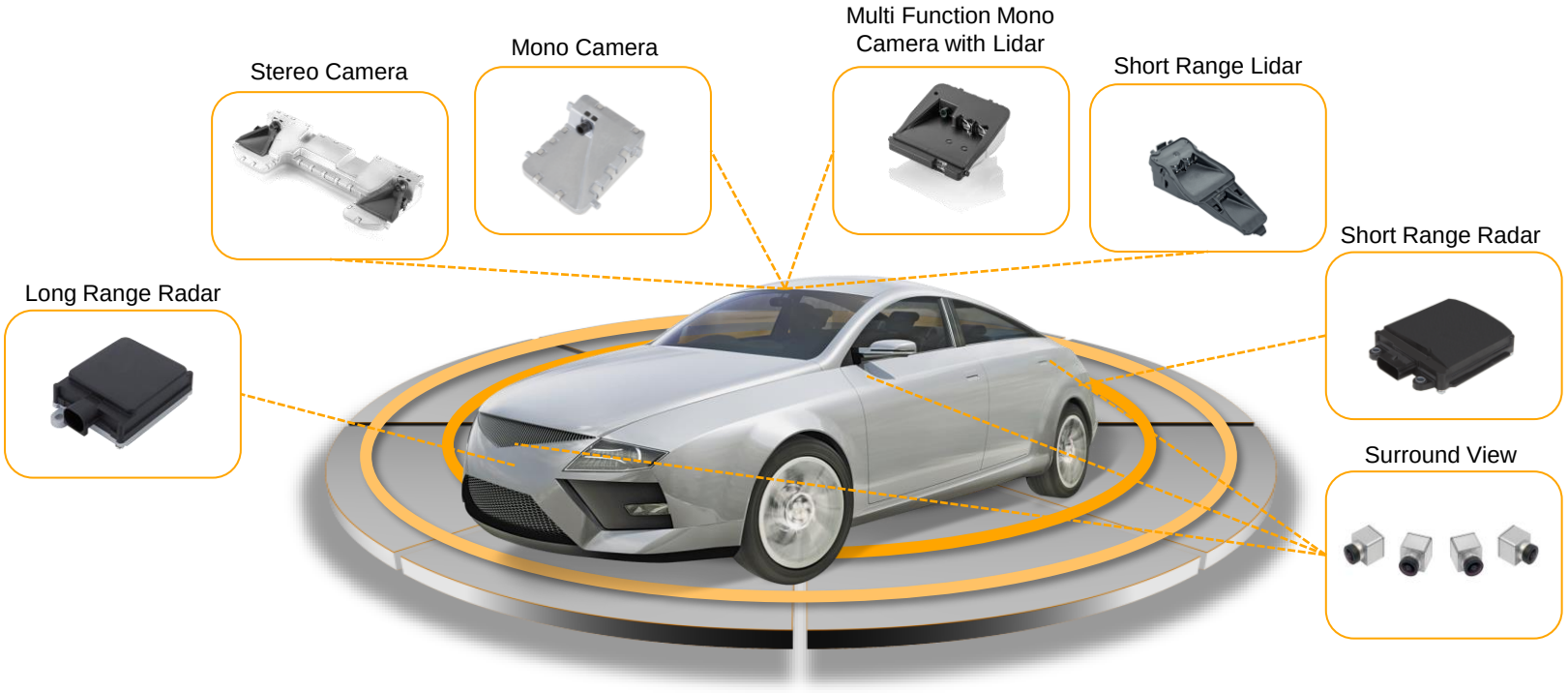
eCAL Simulink Toolbox

Autonomous Driving – The Challenge



- Radical changes to some aspects of driving
- From partially automated to fully automated driving
- Requires new sensor technologies and high-performance computer systems
- Cluster intelligence, formed from the vehicle fleet on the road
- Large quantities of data must be transmitted extremely reliably inside and outside the vehicles
- Cluster connectivity: The Internet will become the car's sixth sense.

Autonomous Driving – it's all about data processing



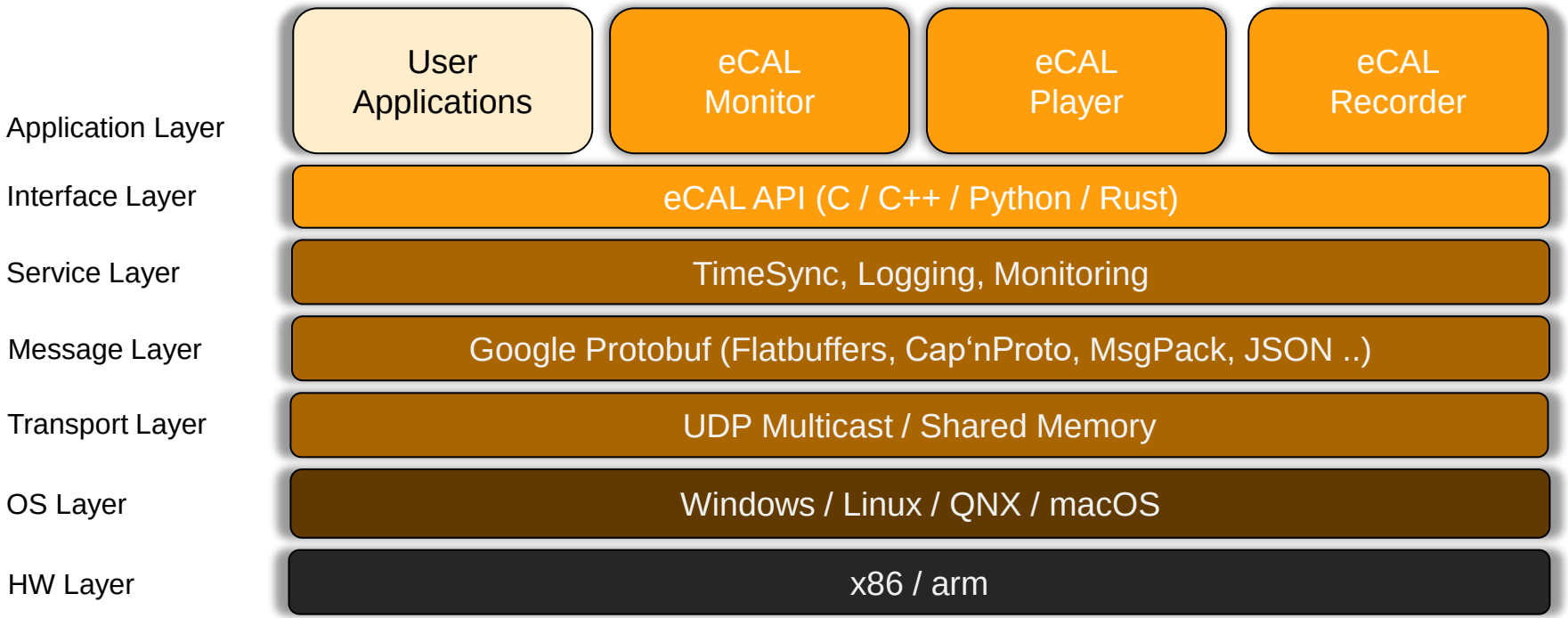
Middleware main requirements

- performance
  - ethernet and shared memory instead classic vehicle bus systems
  - message transport with minimal latency and high data throughput
- new in-vehicle cloud / domain architecture
  - heterogenous network of different hardware, operating systems, computing languages
  - publish / subscribe pattern
  - built-in support for different modern message serialization formats
- development tools for monitoring, recording, replay, system start

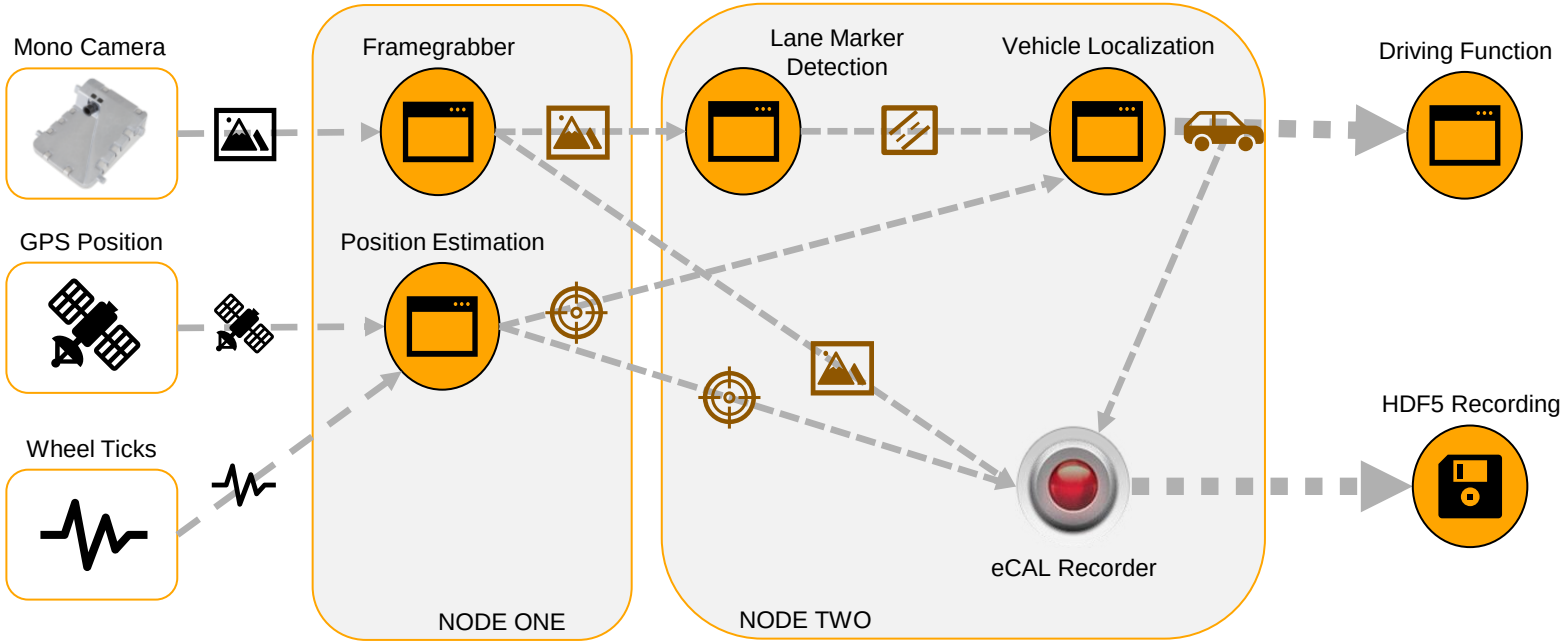
eCAL Simulink Toolbox

1. Motivation
2. eCAL
3. eCAL Toolbox
4. Conclusion

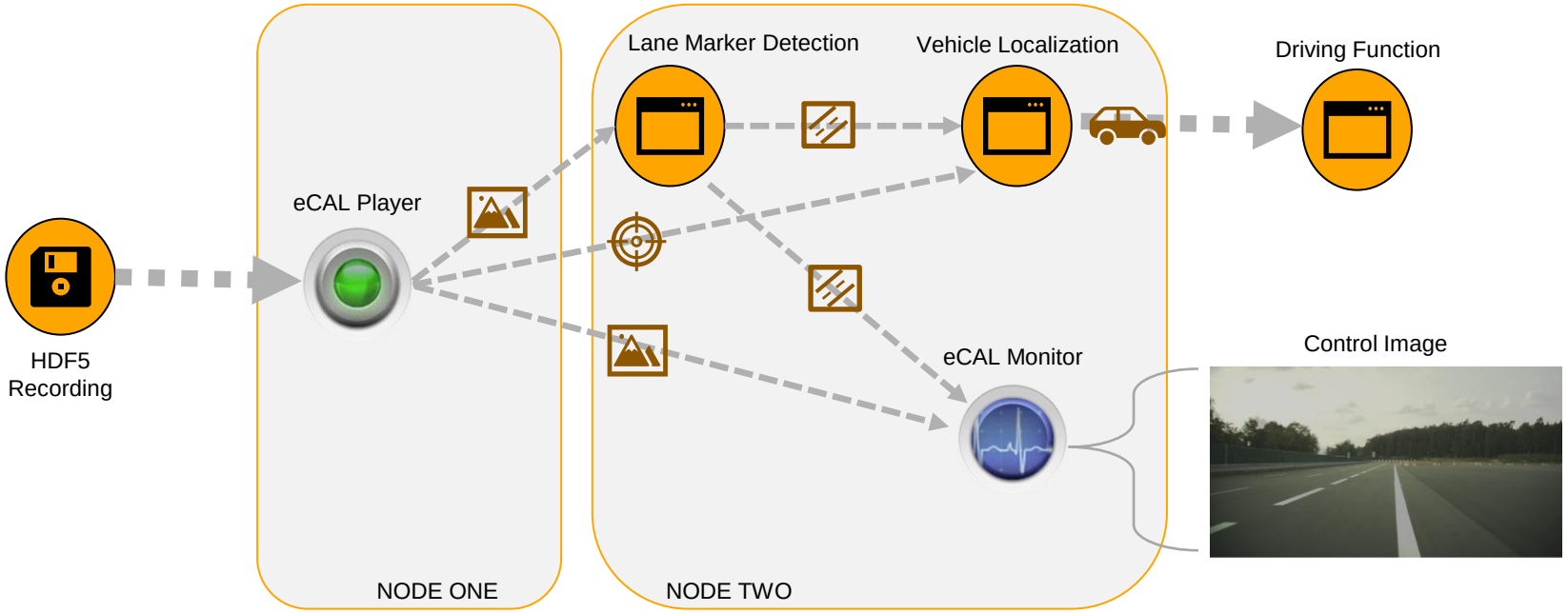
Architecture



Data driven design – Run & Record



Data driven design – Replay & Test



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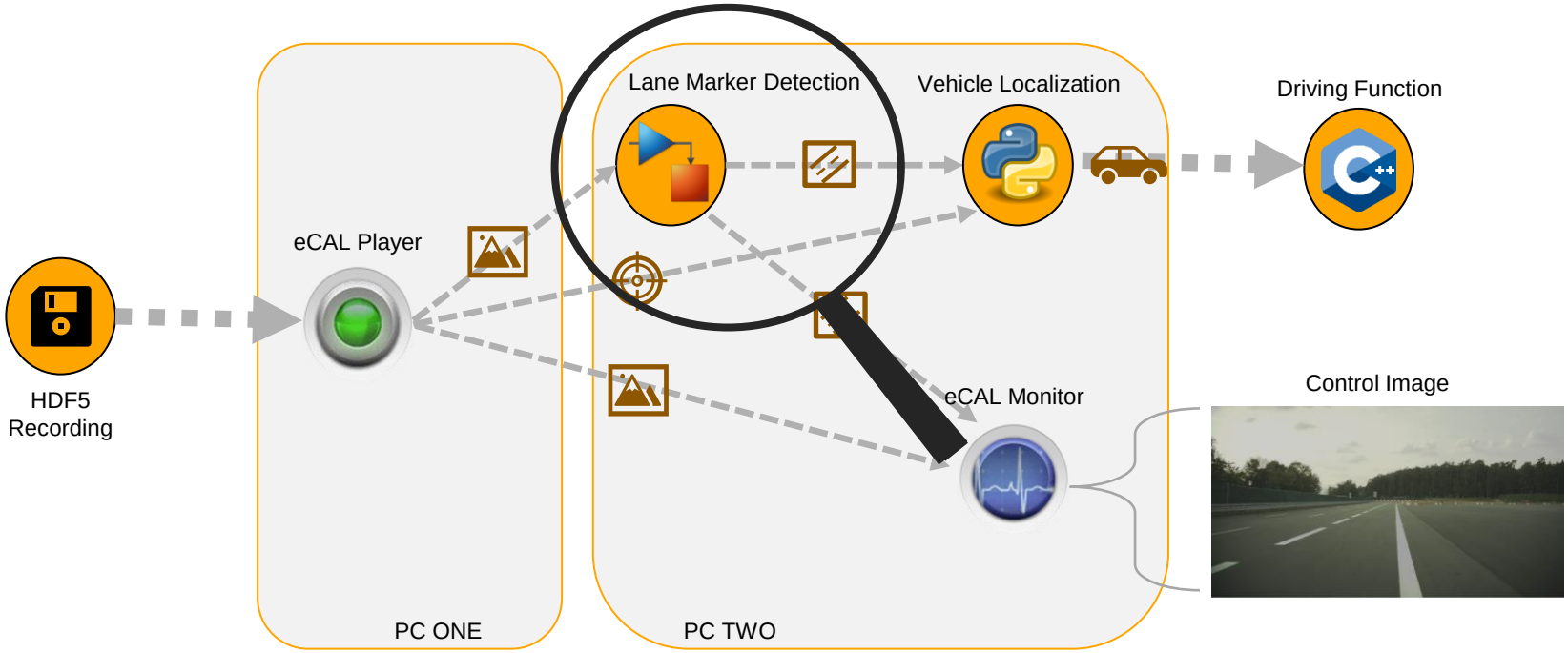
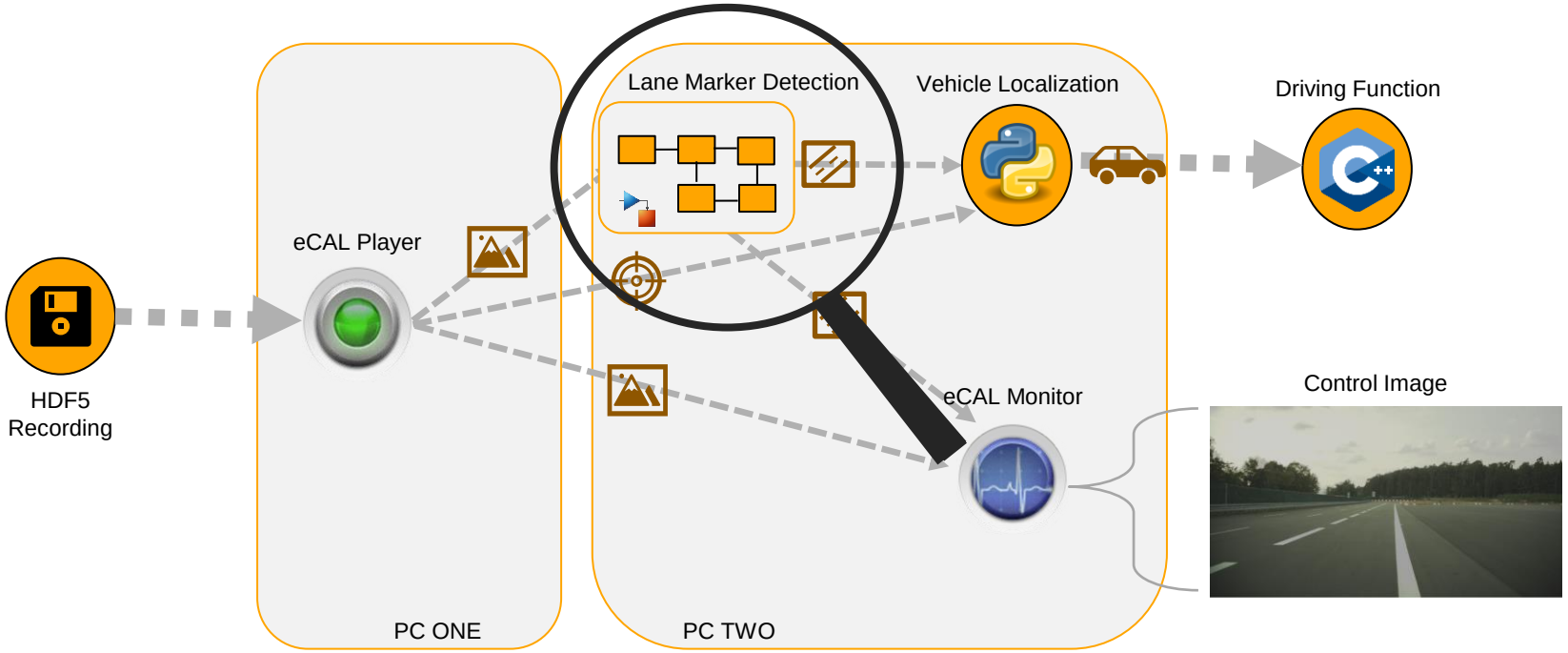
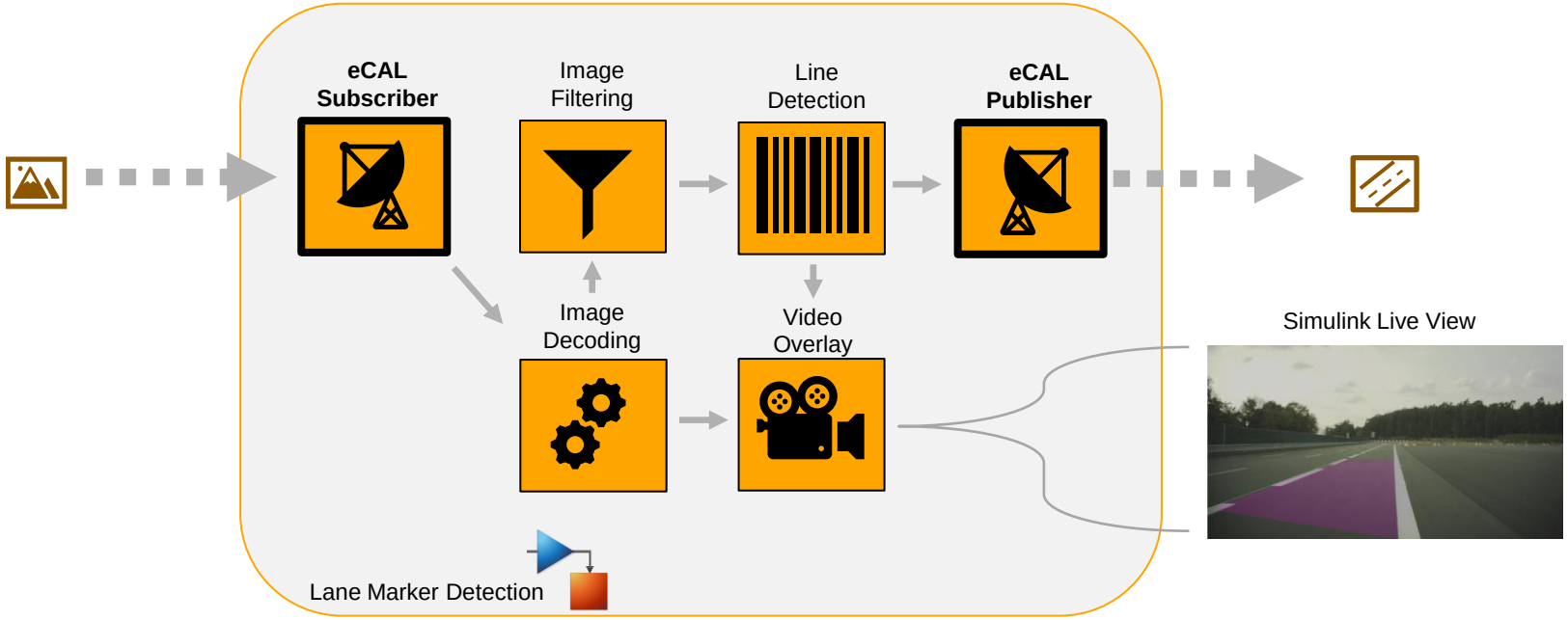
Development diversity



Model-based development with eCAL

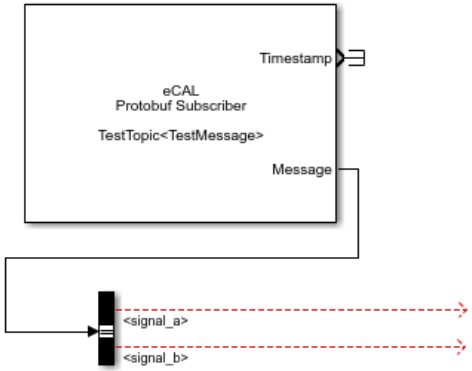


Model-based development with eCAL

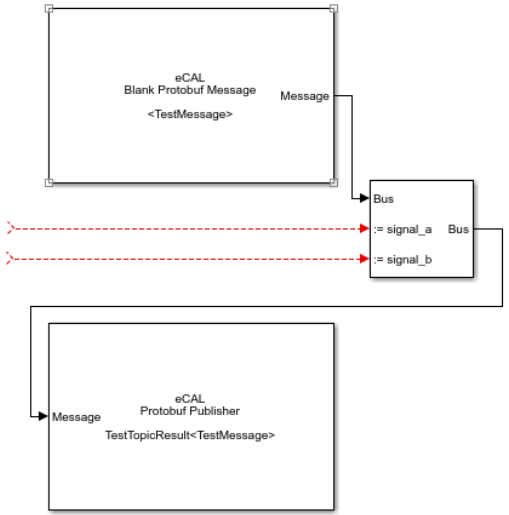


Simulink blockset for eCAL

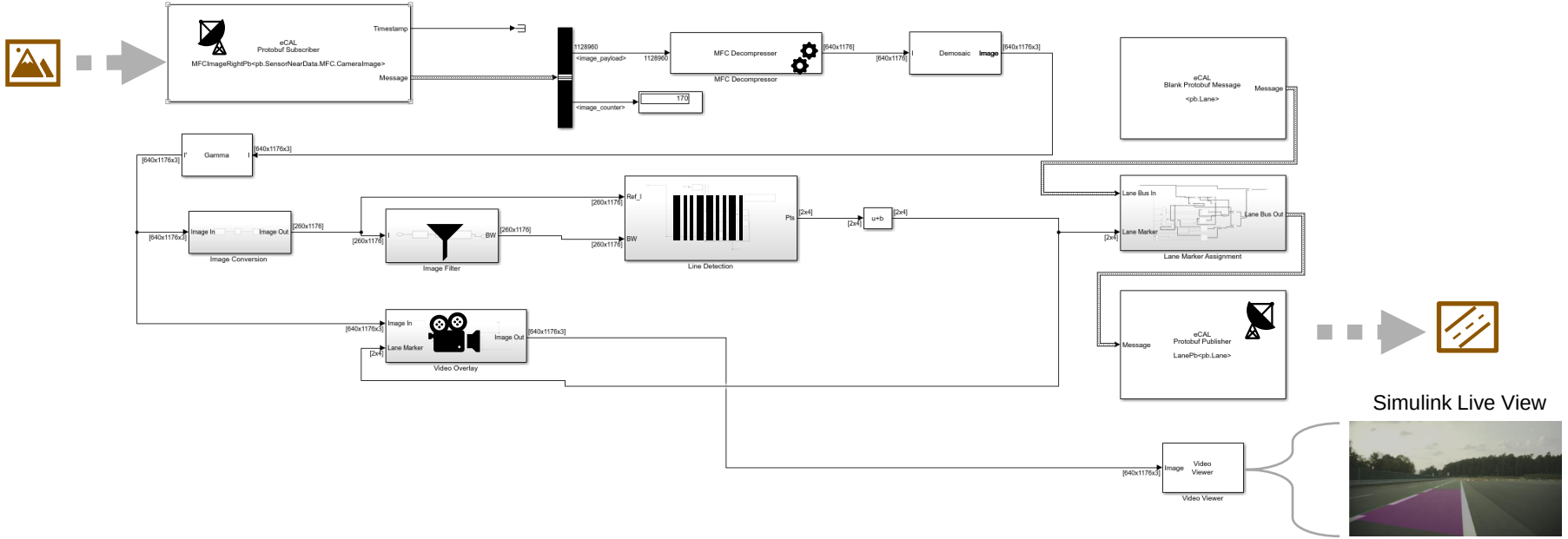
eCAL Subscriber



eCAL Publisher



Lane Marker Detection Model



Lane Marker Detection Model – Live Demo

Please insert *Schilasky_Rex_Continental_Slide19.mp4* here.

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Conclusion

- eCAL provides high performance interprocess communication for rapid prototyping
- eCAL is open source software (https://github.com/continental/ecal)
- eCAL Simulink toolbox opens a wide range of new applications
- eCALize your Simulink based development !

Thank you for your attention

eCALize it !