

**GPU** TECHNOLOGY  
CONFERENCE

SAN JOSE MAY 8-11, 2017

Design your autonomous vehicle applications with  
NVIDIA DriveWorks components on RTMaps



**Nicolas du Lac**  
CEO, Intempora



Brief introduction about Intempora



- Software editor company
- Created in 2000 - Over 15 years experience in ADAS/A.D. and embedded computing
- Over 15 years of experience
- Strong partnership with **dSPACE**



# ⌚ History      *Over 15 years of experience in providing advanced solutions*



Multisensor Technology  
since 1998!



Video speed: 1x. Over 100 kmh | 65 mph

- **Darpa Challenge 2007 (Dotmobil Team)**



**Inria**  
INVENTEURS DU MONDE NUMÉRIQUE

- **NAVYA ARMA**



**navya**



# ADAS & AD Challenges

# Challenges ADAS and AD



Time coherency in distributed/multi-core multisensor applications



3



Offline development

5



Development costs / Time to market



Execution performance / Number crunching

4

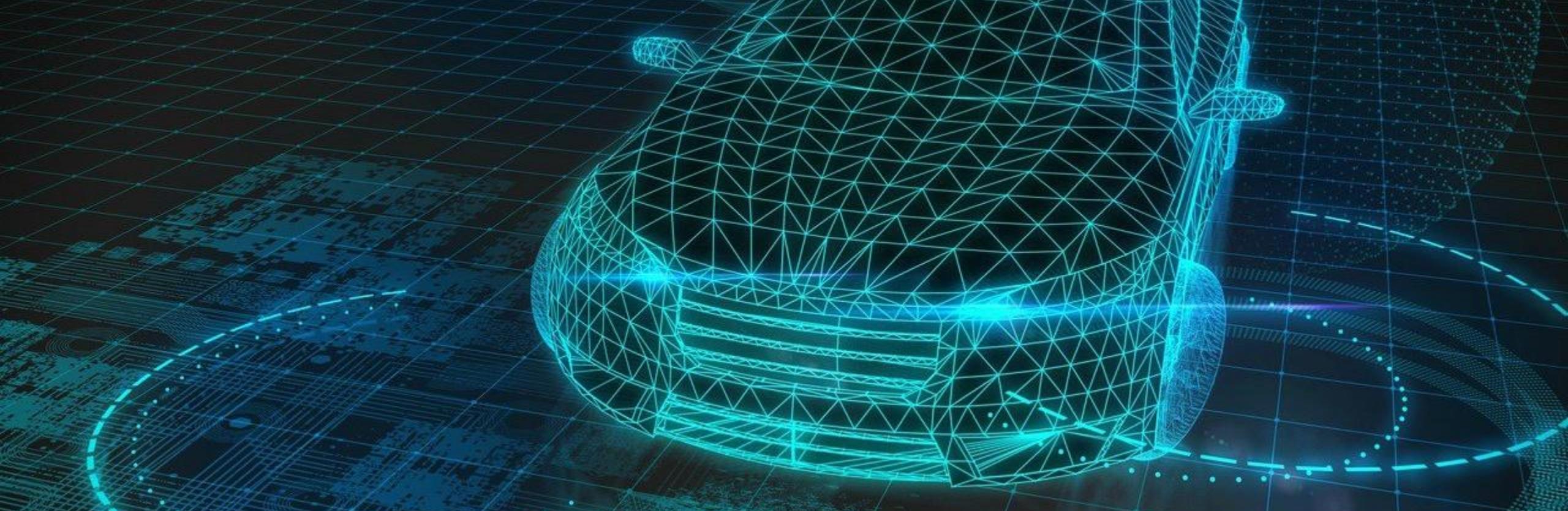


Ease of use / Ease for deployment

6



Test & validation



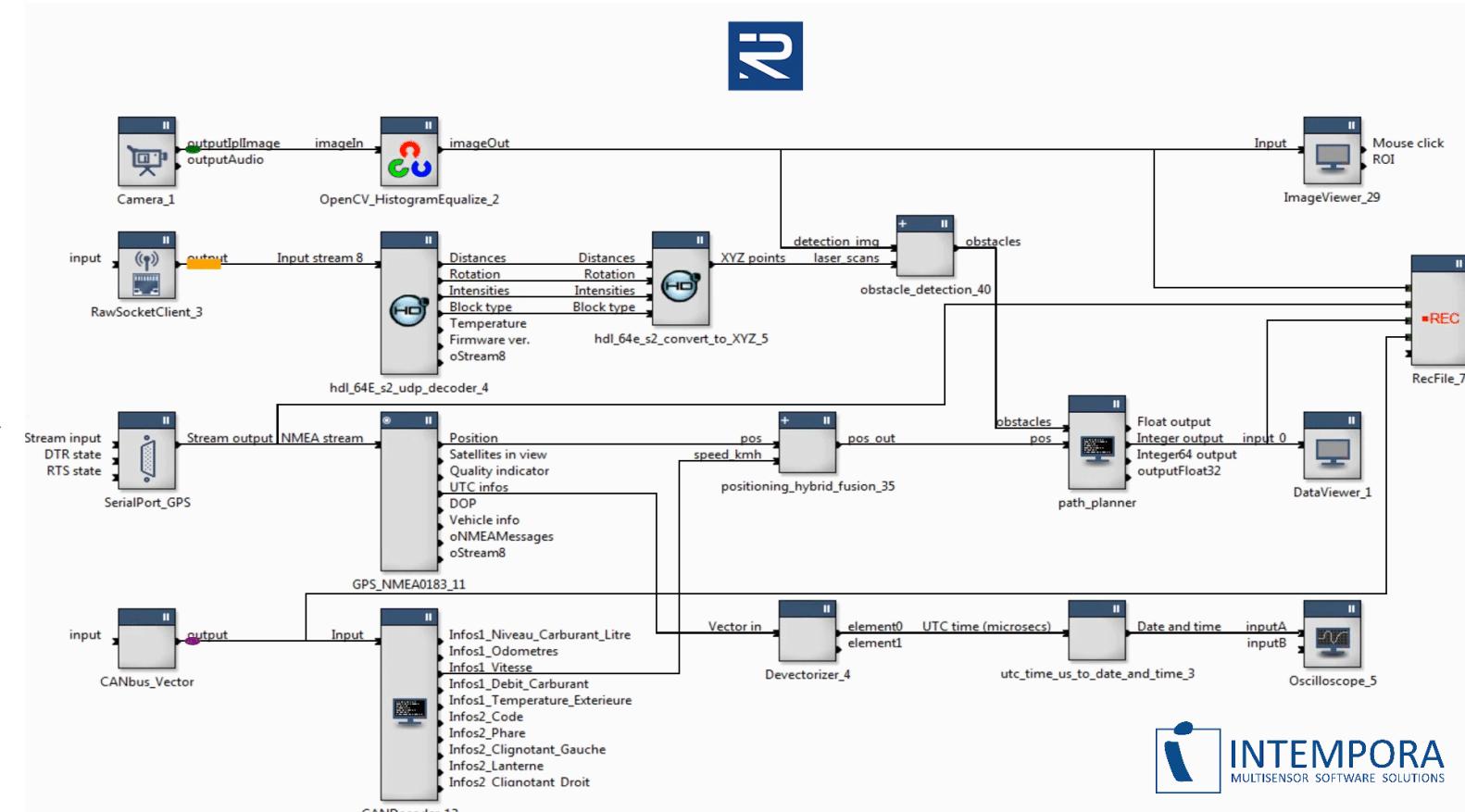
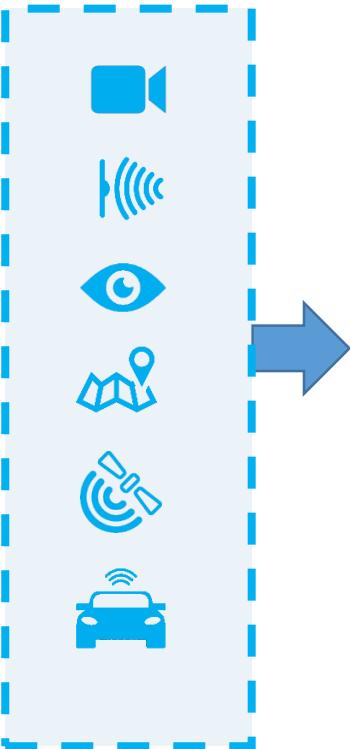
RTMaps  
middleware



# RTMaps - Real-Time Multisensor applications

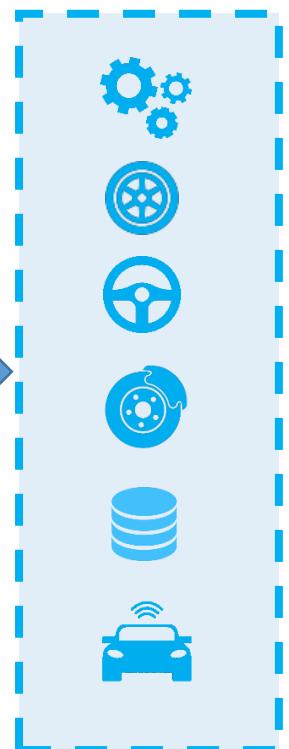
## Sensors

Vision, RADAR, LiDAR,  
GPS, Maps, IMU, V2X



## Actuators

Motor, Wheel,  
Brake, Database, V2X



Input

DATA PROCESSING

Output



**INTEMPORA**  
MULTISENSOR SOFTWARE SOLUTIONS



# Features



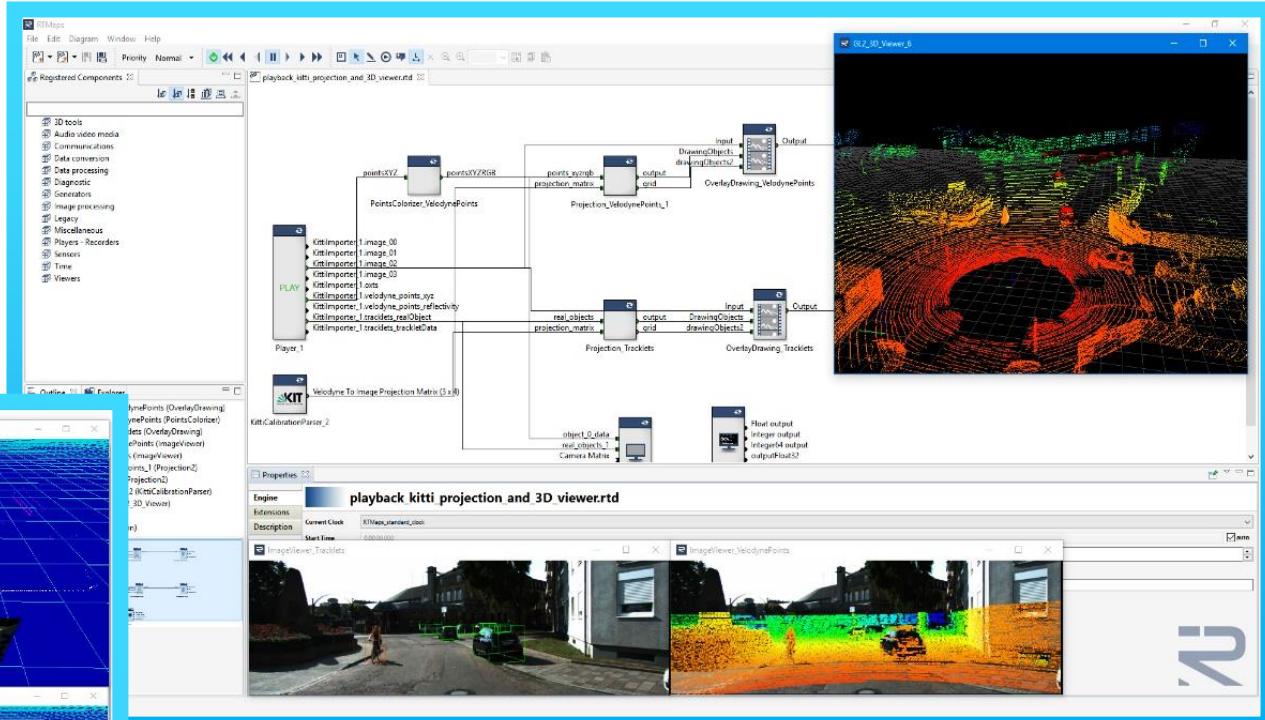
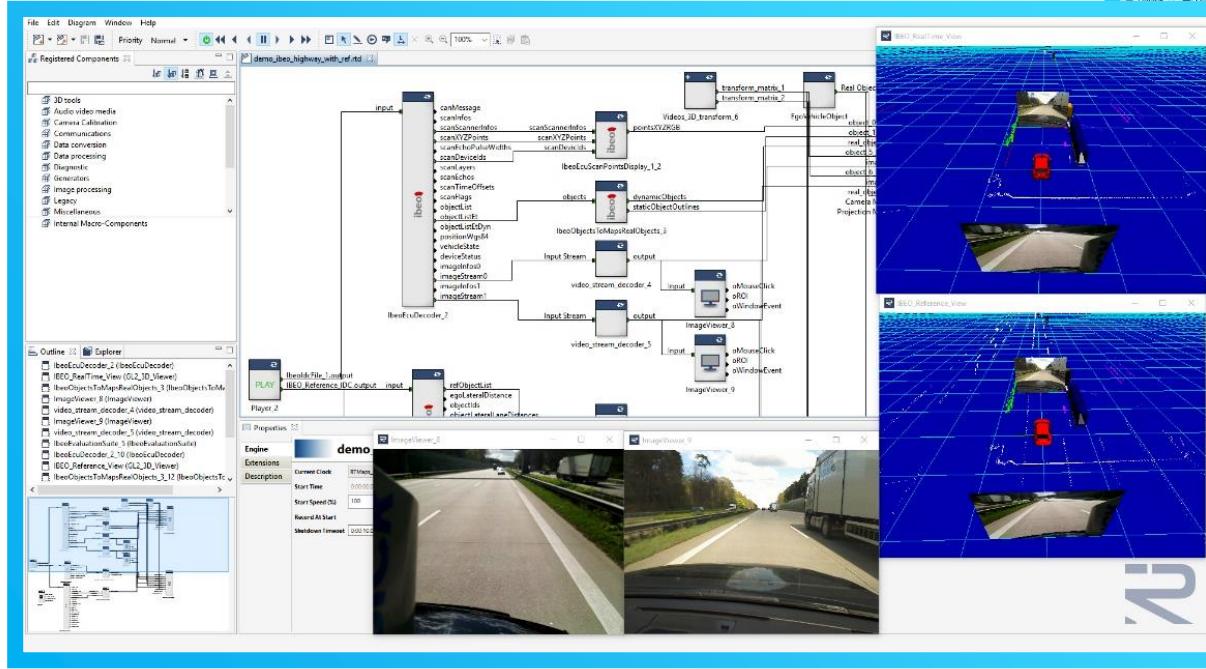
Graphical interface



Large library of off-the-shelf components



Record / Playback

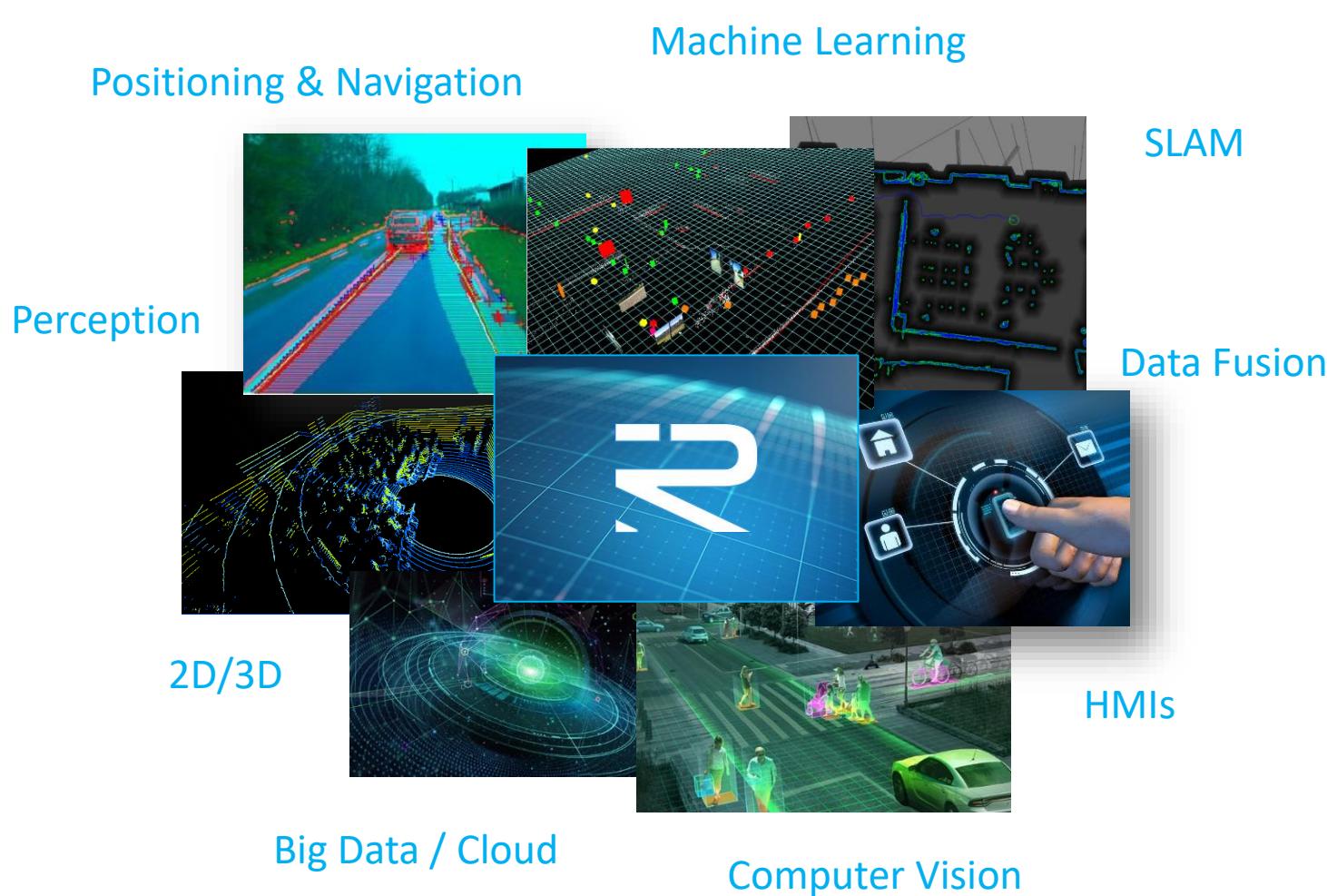


Optimized (multithread, pre-allocated buffers, copyless)



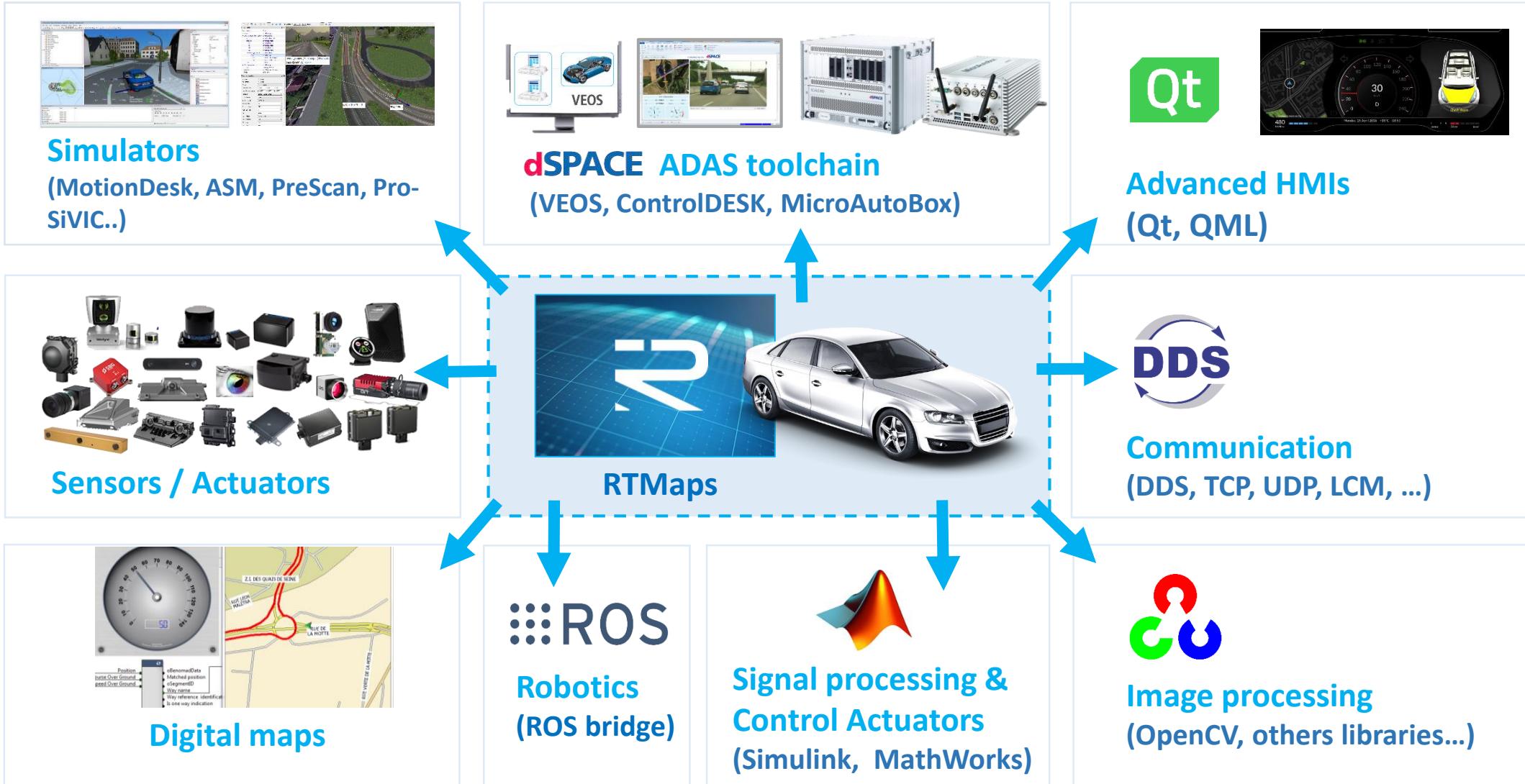
Preserves time coherency

# ☰ Applications



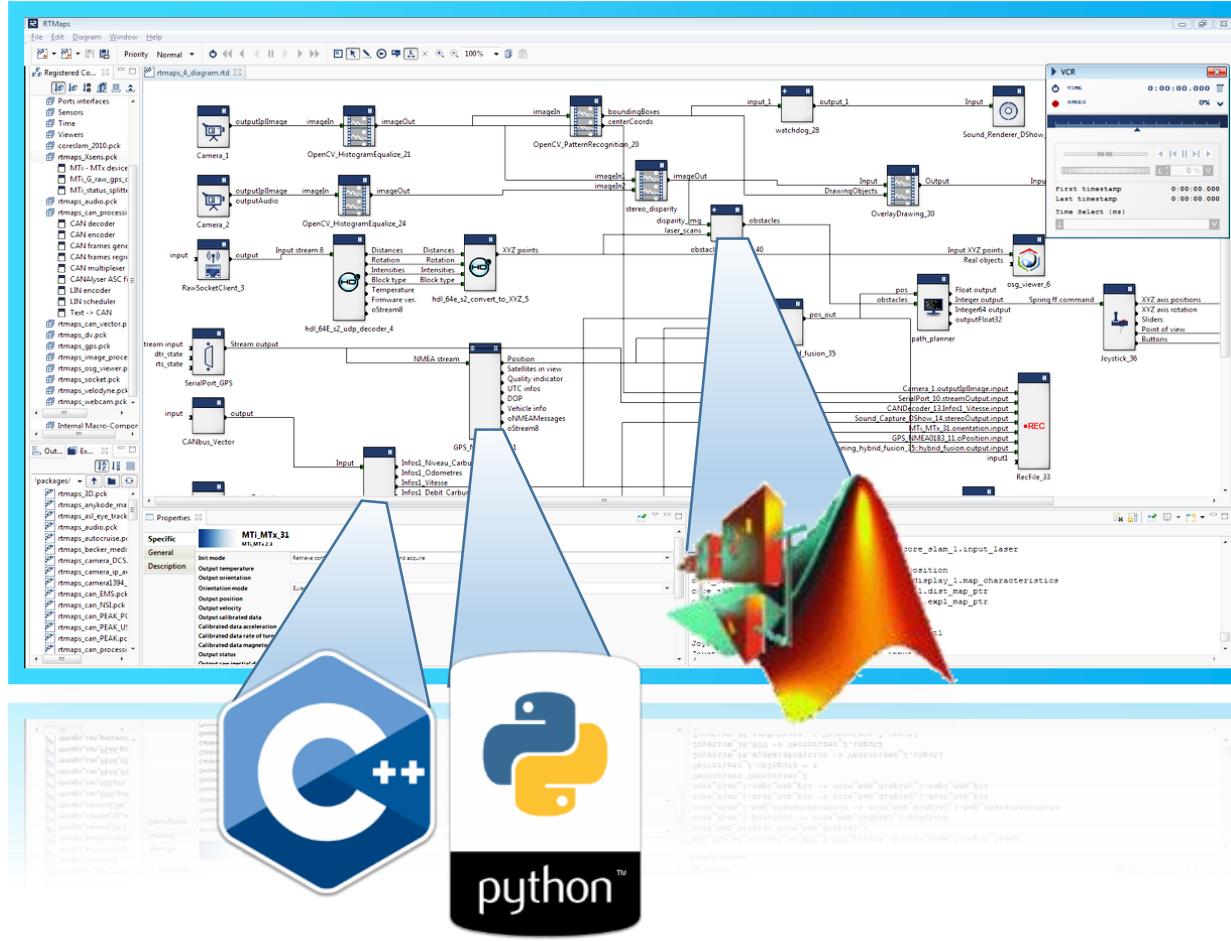


# Interoperability





# SDK / Develop your own RTMaps components

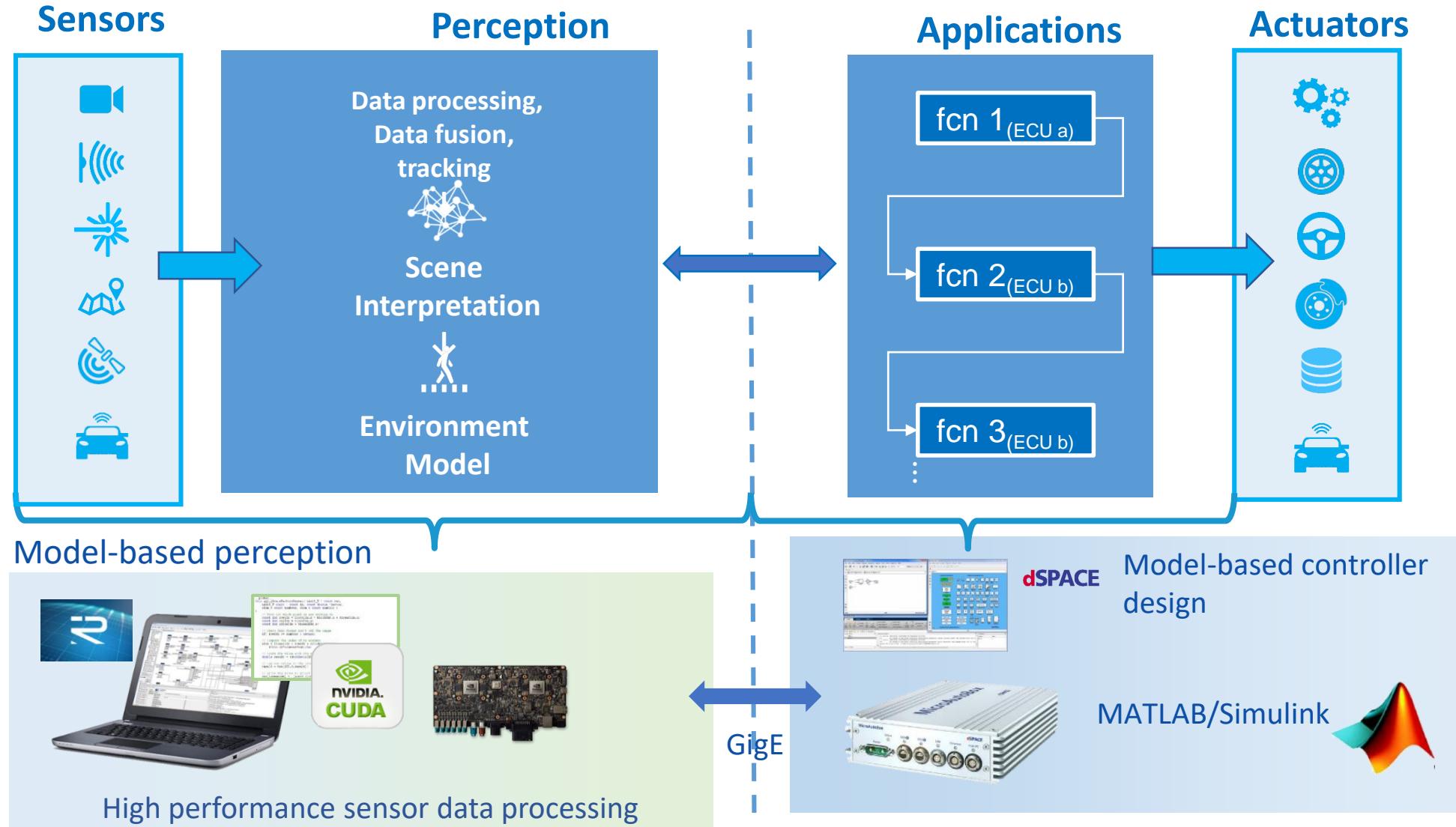


A cross platform / multi-language API

C++  
Python  
Simulink  
QML



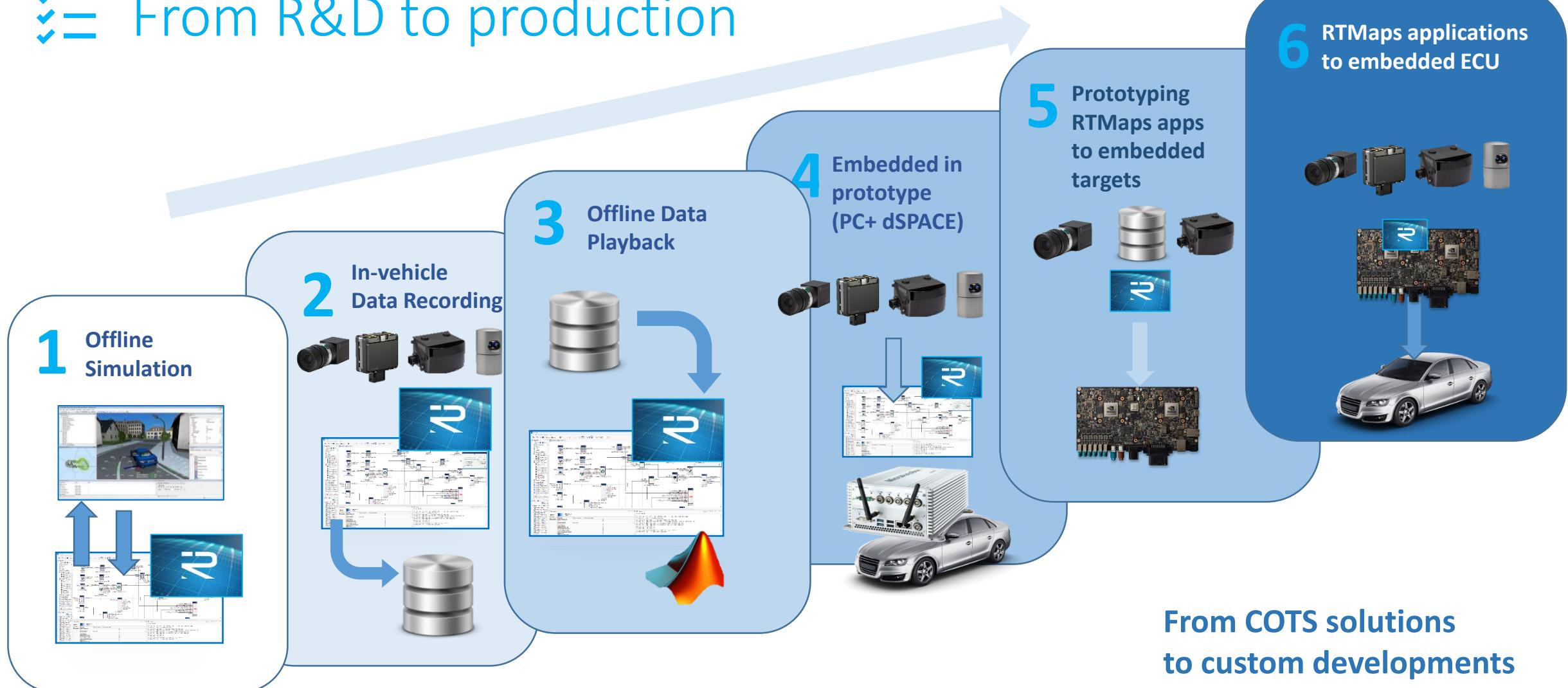
# 👁 Model based perception





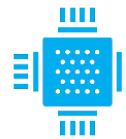
# RTMaps workflow

# From R&D to production





RTMaps Embedded & NVIDIA



# RTMaps on Nvidia boards since 2013

- ELA Project 2013

Automotive Electronics and Software

RTMaps Embedded on ARM architecture



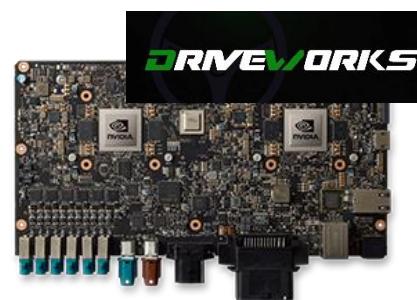
Nvidia Jetson  
Tegra K1



Nvidia Jetson  
Tegra X1



Nvidia Drive PX



Nvidia Drive PX2



dSPACE SPU

2014

2015

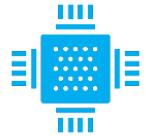
2015

Today

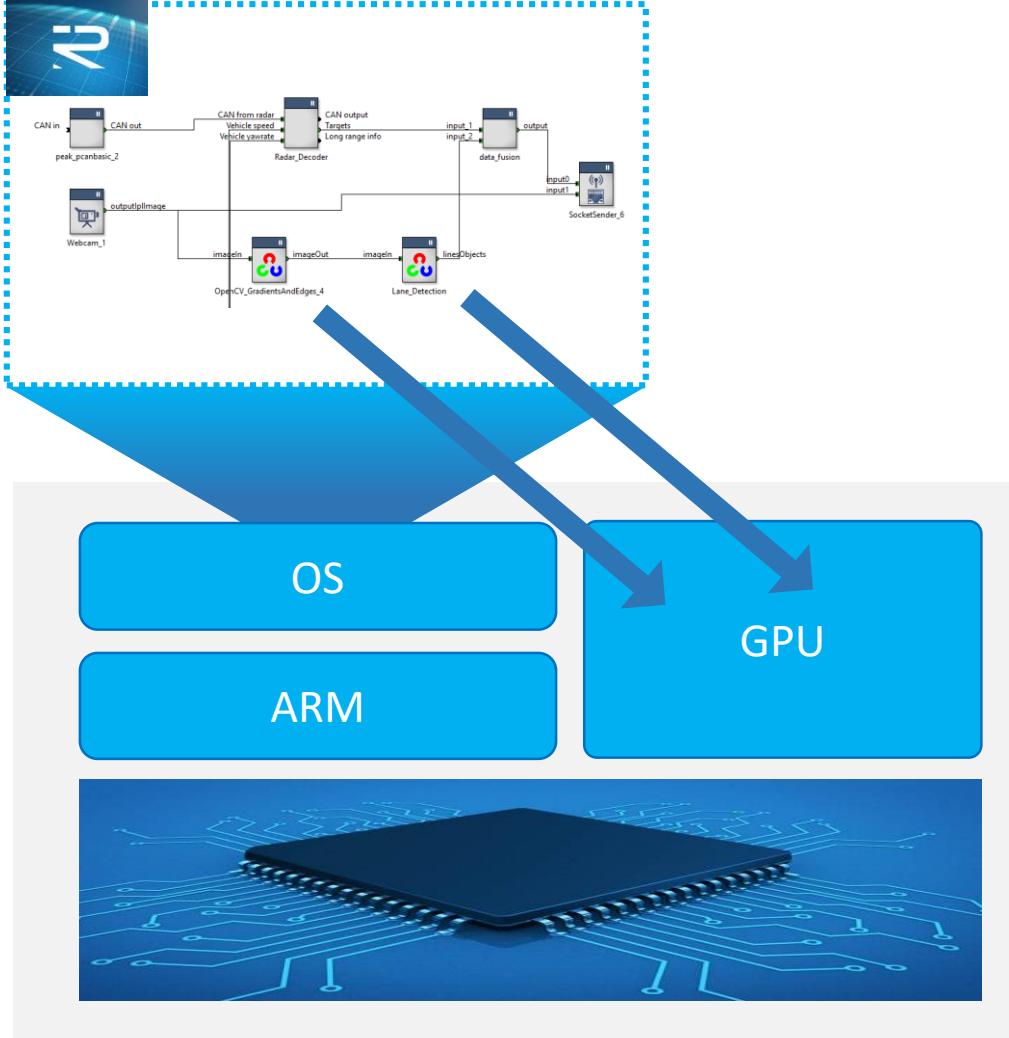
Q3 2017

?

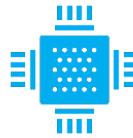




# Intensive computing taking advantage of hardware acceleration

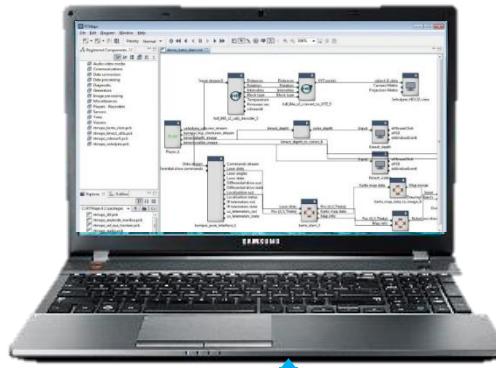


- RTMaps Runtime engine runs on the ARM CPU
- Components (image processing for instance) can wrap intensive computing algorithms taking advantage of GPU
- Supported OS: Windows, Linux, Embedded Linux (**Yocto/Poky**)
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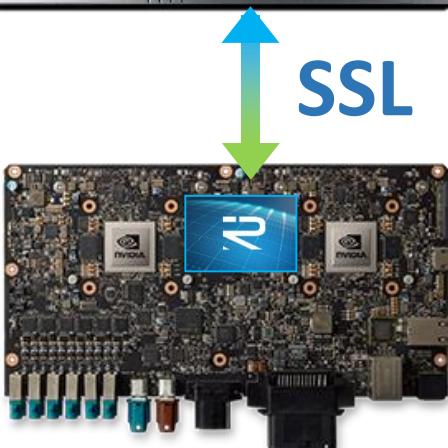


# RTMaps Embedded

- RTMaps Studio operating on separate laptop with **direct SSL connection with the runtime engine on the target**. Used for diagrams edition (design and configuration).



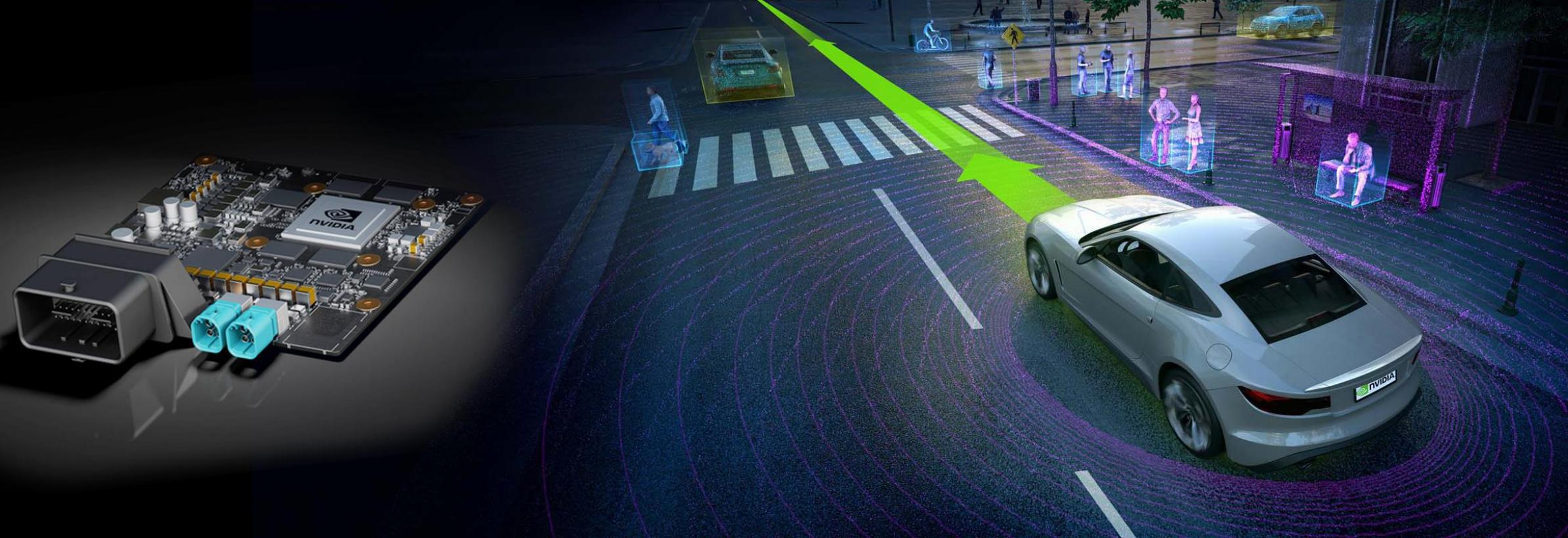
Work & Edit  
your algorithms  
from PC



SSL

Easily deploy  
on board

- RTMaps Runtime Engine and components compiled on chosen target
- RTMaps SDK for cross-compilation on a Linux PC, or available directly on the target



RTMaps & NVIDIA DriveWorks

# RTMaps & NVIDIA DriveWorks

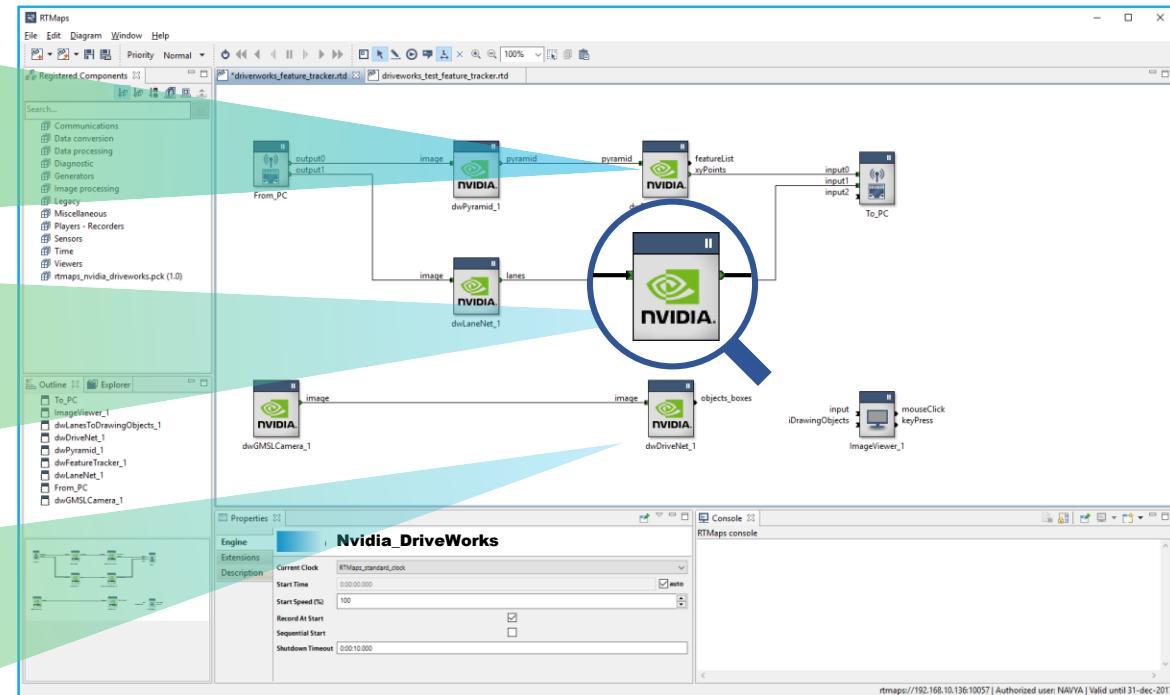
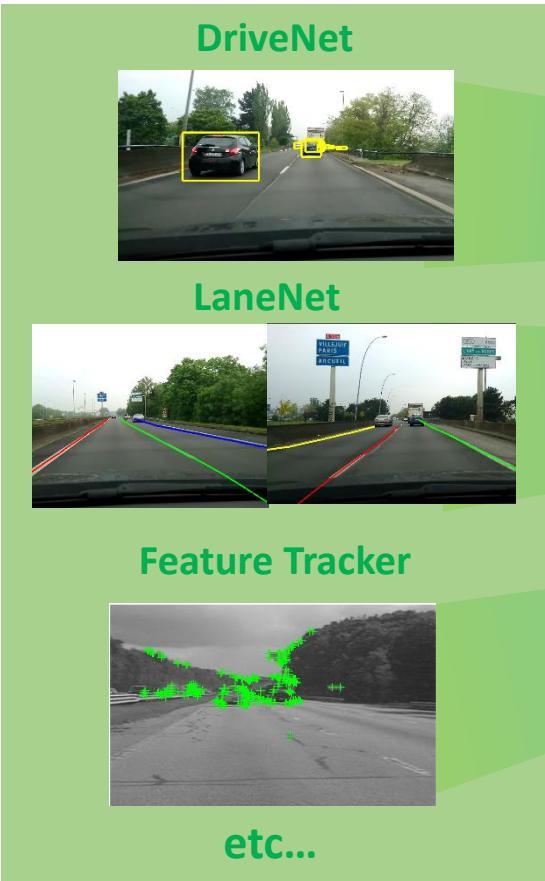
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NVIDIA. DriveWorks Components (C++ / CUDA)

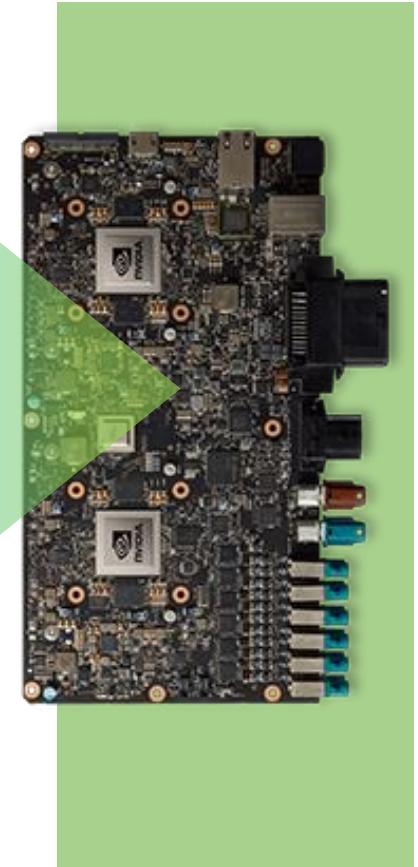


RTMaps

NVIDIA. DRIVE PX 2



\*Easily deploy on target with RTMaps Remote Studio (SSL)

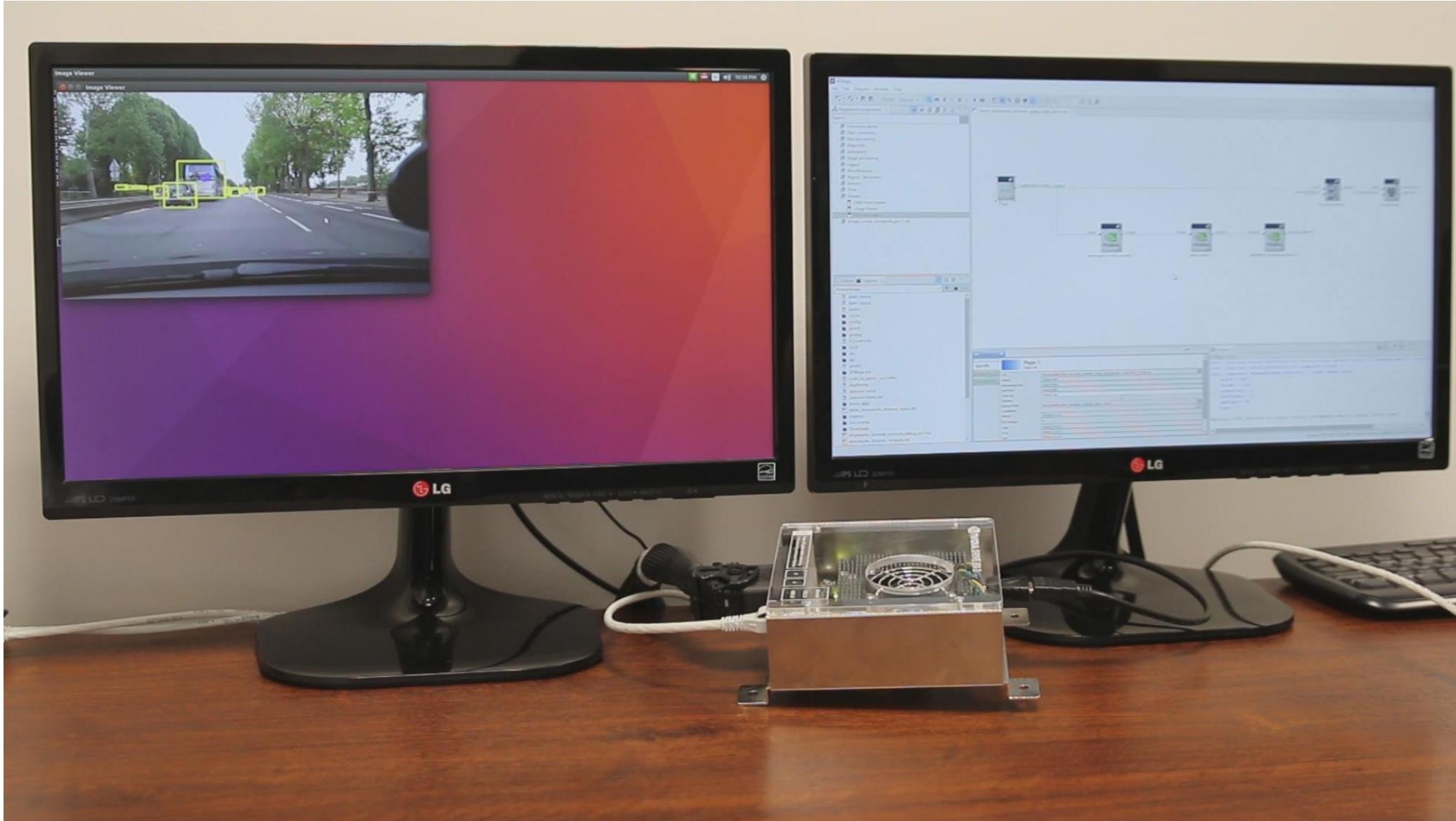




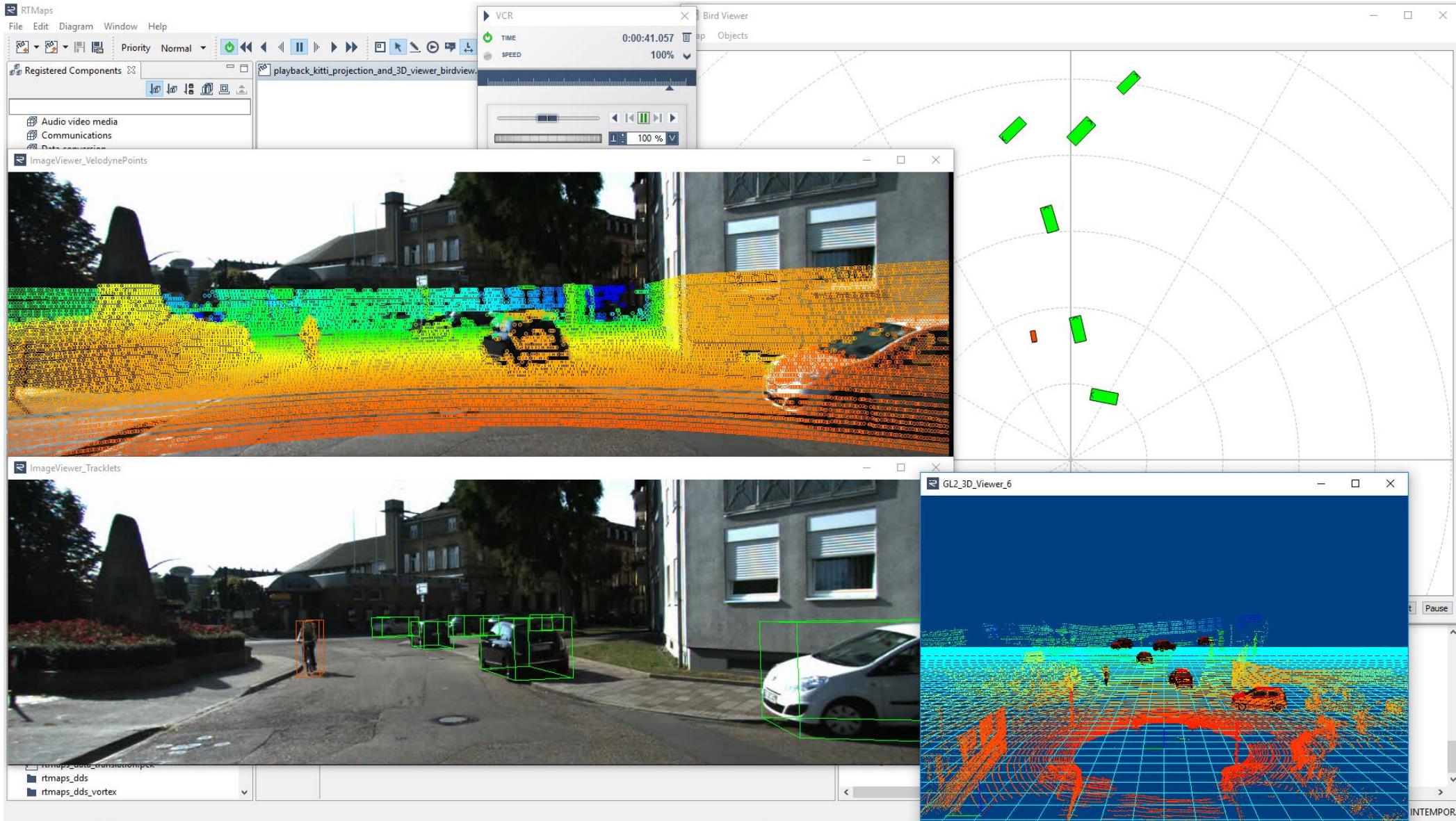
# Conclusion: Video Live Demonstration

Reduce and enhance your development cycles

# RTMaps & NVIDIA DriveWorks



# RTMaps & KITTI





# Thanks for your attention

**dSPACE**



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## Evaluate RTMaps!

- 1- Download RTMaps from [intempora.com](http://intempora.com)
- 2- Send an activation request at  
[eval@intempora.com](mailto:eval@intempora.com)

To see live demonstrations, meet us on booth #1105 with dSPACE Inc



**Nicolas du Lac**  
CEO, Intempora