TRONIS® meets Truck: How virtual reality leverages real prototyping of autonomous vehicles

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TWT – Science & Innovation

100 % Innovative Industrial Solutions

19 Public Scientific Research Projects

350 Experts

- Digital Vehicle
- Information Technologies
- Consulting
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Audi and NVIDIA announced to put the World’s Most Advanced AI Car on Road by 2020 (NVIDIA News, 04.01.2017)

Volkswagen set their goal to 2020 to bring vehicles to the market, that are able to drive fully automatic on highways (Automobilwoche, 3.6.2016)

Tesla/Elon Musk: By the end of 2017 a Tesla would be able to drive safely in full autonomous mode from Los Angeles to New York “without the need for a single touch” on the wheel (theguardian.com, 20.10.2016)
Complex Environments
Complex Electronics

- Camera
- Radar
- Ultrasonic
- Lidar
- Infrared
- LTE
- WIFI

[Image of vintage cars with labeled sensors]
6.200.000.000 test kilometers ~ 3.875.000.000 miles
155.000 earth circulations

50
120 km/h
75 mph
8 h
> 350 years

Challenge: >98% Simulation
Control Theory
Autonomous Driving

Reference → Controller → Model → Position

how prototyping? assurance?

Measurement/Interpretation
Autonomous Driving
Model/Hardware in the Loop

TWT Tronis®

NVIDIA Drive PX2

Lidar
Ultrasonic Radar

Network
- Signal strength
- Workload

GPS, IMU

Camera
- Shadows
- Reflections (Water, Glass)
- Movement

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TWT Tronis®
Features

Unreal Engine
- Realistic Physics Engine
- Realistic Materials
- Unreal Editor!

Tronis® – Plugin Collection
- Stereo-Camera
- Hard Realtime Kernel
- Segmentation
- Depth
- Draw & Drive: Easy Road-Spline Controller
- Map Loader
- Radar: Raw Data!
- and much more!
Deep Learning could really help here
Training data?
Handcrafted? Lot of work 😊
TWT Tronis®
Fully automatic Segmentation

Every Object can be differentiated
Deep Learning: Training: Virtual Detection: on real Data
Coming Together

Gaming World

Tronis®

Autonomous Driving