

# Cognata Simulator

General Information & Map Formats

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# Cognata

<https://www.cognata.com/>

“delivers large-scale simulation to responsibly accelerate the time to market of automated driving”

Highly realistic simulation of 3D environment for autonomous vehicle

- **Training, Validation, Analysis**

## Products

- Scenario Studio
- Analytics Dashboard
- True Life 3D Sim

(modeled to scale with HD maps accuracy)

- Cloud Platform



# Cognata - Training

- drivable, digital twins or synthetic worlds
- photorealism enabled by DNN
- time of day, weather conditions
- simulate sensors (DNN learnt models)
- large-scale data sets
- exportable and reusable
- accurate and consistent annotation
- traffic agents, AI geo-specific, interactive behaviours

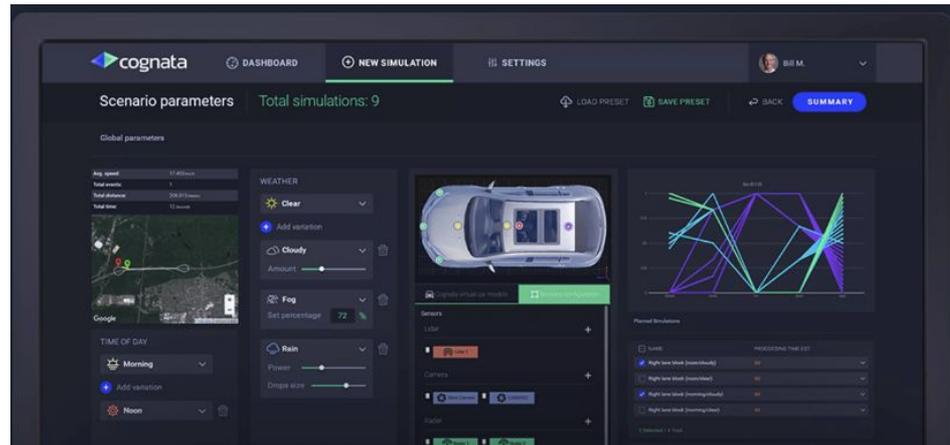


# Cognata - Validation

- library of ready to use scenarios, support for common assessment program, fuzzing to augment scenarios, scenario authoring
- integration with existing components, closed loop simulation, automated testing with Jenkins and Bamboo, coverage based validation

# Cognata - Analysis

- Data insights: ready-to-use criteria, trend mining
- visualisation: goal oriented, multi-layer dashboards, design decision augmentation
- deployment: progress to road readiness, virtual certification, support geo-expansion



# “How It Works”

## Static Layer

### Automatic Virtual Worlds

Procedurally-built 3D environments of roads, buildings, and infrastructure accurate down to the last lane marking, surface material, and traffic light.



## Dynamic Layer

### Intelligent Traffic Agents

AI drivers, pedestrians, and cyclists that accurately replicate behavior customary to the region being simulated.



## Sensing Layer

### Accurate Simulation of Sensors

Popular camera, LIDAR, and radar sensor models, built with deep neural networks, and a toolchain for quickly on-boarding new sensors.



## Cloud Layer

### Elastic Scale in the Cloud

Cost-effective infinite scale to cover thousands of scenarios and deliver results faster.



# From News Articles

“According to Cognata, the first layer is the static layer that "procedurally builds a 'digital twin' of the world." Virtual AVs require virtual assets to interact with, such as the roads themselves, buildings or city infrastructure (like lane markings, traffic lights or utility assets). That is, the static layer of Cognata offers an automated process to generate 3D environments from which specific scenarios can begin to be built to test any particular edge case that a developer wishes.”

“TrueLife 3D Mesh generates the assets—such as the roads, lane markers, trees, buildings, and pedestrians—in an automated fashion. “

<https://www.engineering.com/DesignSoftware/DesignSoftwareArticles/ArticleID/18972/Autonomous-Vehicles-Find-a-New-Playground-with-Cognata.aspx>

# Partners

- Audi: Autonomous Intelligent Driving GmbH
- Microsoft: Cognata through Azure cloud services
  - Web App SimCloud - sales point for Cognata - submit form
  - <https://appsource.microsoft.com/en-us/product/web-apps/cognata.simcloud10?flightCodes=QTCHideKey&tab=Overview>
- Dassault Systems
  - use Cognata simulat as part of design process autonomous systems
- NVIDIA
  - NVIDIA DRIVE platform cloud simulation: cloud-to-car solution
  - large scale hardware-in the loop simulation.
  - traffic agents and Cognata Studio scenario authoring available to developers on the DRIVE Constellation platform
  - TRI-AD using DRIVE Constellation
  - VIRES (OpenDRIVE) is a partner

[https://www.researchandmarkets.com/research/8l6gjc/global\\_autonomous?w=12](https://www.researchandmarkets.com/research/8l6gjc/global_autonomous?w=12)

## Global Autonomous Driving Simulation and Virtual Test Industry Chain Report 2018-2019

### 5. Scenario Simulation Companies

- 5.1 Introduction to Scenario Library
  - 5.1.1 Requirements of Intelligent Vehicle Simulation Testing on Traffic Scenario Simulation
  - 5.1.2 Standardized Testing Scenarios
  - 5.1.3 Measurement Parameters of Standardized Testing Scenarios
- 5.2 VTD
  - 5.2.1 VIRES
  - 5.2.2 VTD Simulation Tool
  - 5.2.3 Three Standards Based on VTD Environment Simulation
  - 5.2.4 Composition and Advantages of Open Drive Standard
  - 5.2.5 Application of Open Drive
  - 5.2.6 Open Drive Map Data Analysis
  - 5.2.7 Establishment of a Map Coordinate System in Open Drive
  - 5.2.8 Open Drive-Reference Line Construction
  - 5.2.9 Open Drive-Lane Construction
  - 5.2.10 Open Drive-Complete Road Models
  - 5.2.11 Open CRG Simulation Applied in Vehicle Control, Driving Comfort, etc.
  - 5.2.12 Open CRG- Workflow
  - 5.2.13 Open-Scenario Standard
- 5.3 Pro-SIVIC
  - 5.3.1 Profile of ESI
  - 5.3.2 ESI's Products
  - 5.3.3 ESI Enhances Core Simulation Technology through Acquisition and Integration
  - 5.3.4 Profile of Pro-SIVIC
  - 5.3.5 Traffic Scenarios and Sensor Models of Pro-SIVIC
  - 5.3.6 Process of Composograph Processing with Pro-VISIC Simulation
  - 5.3.7 Result of Composograph Processing with Pro-VISIC Simulation
- 5.4 rPro
  - 5.4.1 Profile
  - 5.4.2 HD Virtual Modeling for Test Fields
  - 5.4.3 R&D of HD Virtual Modeling
- 5.5 Cognata
  - 5.5.1 Profile
  - 5.5.2 Autonomous Driving Simulation Platform
  - 5.5.3 Cooperation with Nvidia
  - 5.6 51VR/RealDrive
- 5.6.1 Profile

# Conclusions

Not enough information

Pros:

- designed for ADAS, AV development
- visualisation realism
- sensor models
- CI testing environment
- Scenario authoring

Cons

- no information
- proprietary
- target market



Intelligent Vehicle

[www.tier4.jp](http://www.tier4.jp)