OpenDRIVE – a de facto standard for the description of road networks in driving simulation

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## VIRES at a Glance

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Motivation

Why OpenDRIVE?

For driving simulation applications, the road is **THE** key component.

- Surface: feedback for vehicle dynamics
- Lanes and connections: paths for the routing and navigation
- Infrastructure: rules and restrictions

**Important note:** "road" in this context means the logical and physical properties of a road (network) not primarily its visual appearance.

There have been – and still are – many formats describing road networks for various types of applications, but basically

**A Road is a Road!**
Motivation

Road Network

Junctions and Crossings

• connection matrix
• connection paths
• priorities
• controllers

Exchanging road descriptions between various applications requires either

conversion
or
standardization
The benefits of a standardization of road descriptions are obvious:
- *one* format for many applications
- exchangeability of information between various users
- homogeneous road databases in heterogeneous simulation environments
- cost reduction:
  - users may select from a broader range of suppliers
  - suppliers don't have to adapt to each user
What is OpenDRIVE?

**OpenDRIVE** is an **open format** for the description of **road networks**
- free use
- XML-based
- human readable
- customizable
- extensible
- established

**OpenDRIVE** is a **de facto standard**
- standardization by establishment in the market
Implementation

A Brief History

2005
Daimler and VIRES “invent” OpenDRIVE

2006
V 0.7 & core team

2007
V 1.0

2007
V 1.1

2008
V 1.2

2009

2010
V 1.3

2011

creation

standardization

implementation

user meeting
Revision Process

A Well Managed Format

OpenDRIVE® Standard

User Meetings

CoreTeam

Users

Core Team

- Martin Strobl / BMW Forschung und Technik GmbH
- Hans Grezlikowski / Daimler AG
- Andreas Richter / Deutsches Zentrum für Luft- und Raumfahrt e.V.
- Dr. Günther Nirschl / Fraunhofer-Institut IVI
- Ekkehard Klärner / Krauss-Maffei Wegmann GmbH & Co. KG
- Dr. Bernhard Bock / Rheinmetall Defence Electronics GmbH
- Ingmar Stel / TNO
- Marius Dupuis / VIRES Simulationstechnologie GmbH
- Mats Lidström / VTI

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Please register!

It's free and without obligations.

...and quite a few more across the planet.
Applications

Existing
- Vehicle Driving Simulation
- Tram Driving Simulation
- Railroad Simulation
- Conversion and Export of Navigation Data

New Fields
- Town and Country Planning
- Macroscopic Traffic Simulation
- etc.
Definition

Elements
(incomplete list)

*.xodr File

Header

Road

Controller

Junction

Reference Line

Link

Elevation

Super-elevation

Lane Section

Object

Signal

Link

Priority

Ctrl

Lane

Lane Link

Link

Width

Material

Road Mark

+ optional custom extensions at each node
Partner Project
Describing the Road Surface

- open format + open source
- tire and vibration simulation
- initially funded by automotive industry
- managed by VIRES
- release 1.0 in Q2/2010
- user meeting in June 2010
- available in
  - Delft tire
  - ADAMS
  - etc.
- www.opencrg.org

Image courtesy of Daimler
Back to OpenDRIVE...
Getting Started

Examples

VIRES Town
- Cross-country and inner-city roads with various OpenDRIVE elements
- Available since V 0.7

VIRES 8 - simple
- Simple crossing with traffic lights in endless course

8 - complex
- Complex crossing with traffic lights in endless course

VIRES 8 - roundabout
- Roundabout in endless course
Points of Contact

Specification, Overview, Documentation etc.

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Thank You!