

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



VIRES? – VIRES at a Glance






Founded 10/1996

Location Bad Aibling
Germany

Size 12+

Address Grassinger Straße 8
83043 Bad Aibling
Germany
p +49.8061.939093-0
f +49.8061.939093-13
e info@vires.com
w www.vires.com

				
Products	Image Generators	X	X	X
	Visual Databases	X	X	X
	Database Editor	X	X	
	Traffic and Scenario Simulation	X	X	X
	Sound Simulation	X		X
	Instructor / Operator Tools	X	X	X
	Simulator Framework	X	X	X
	Tools for OpenDRIVE™ OpenCRG®	X		
Systems	Simulators for Engineering and Training	X	X	X
	Avionics Test Equipment			X
Services	Standardization OpenDRIVE OpenCRG®	X		
	System Design & Integration	X	X	X
	Project Management / Consulting	X	X	X

Why OpenDRIVE?

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

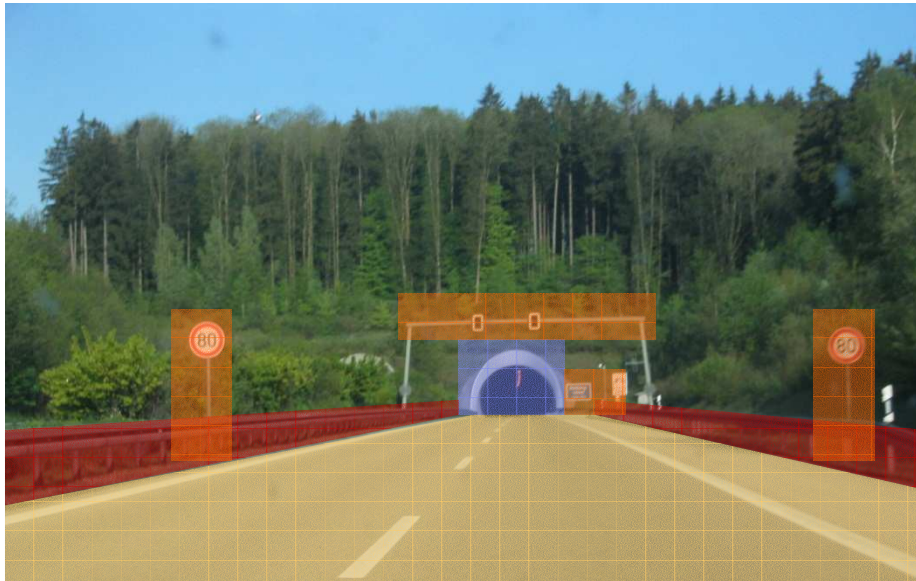
- Surface: feedback for vehicle dynamics
- Lanes and connections: paths for the routing and navigation
- Infrastructure: rules and restrictions

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!

Road Elements



Lanes & Road Marks

Signs & Signals

Tunnels, Bridges etc.

Obstacles



Surface

Road Network



Junctions and Crossings

- connection matrix
- connection paths
- priorities
- controllers

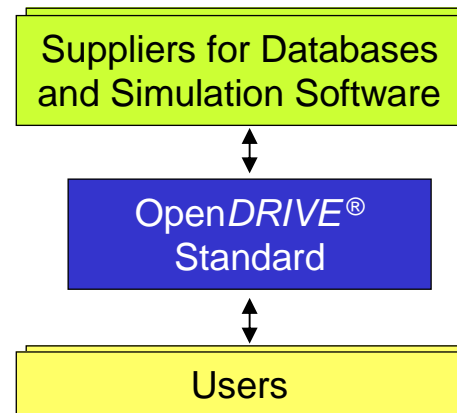
Exchanging road descriptions between various applications requires either

conversion
or
standardization

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**

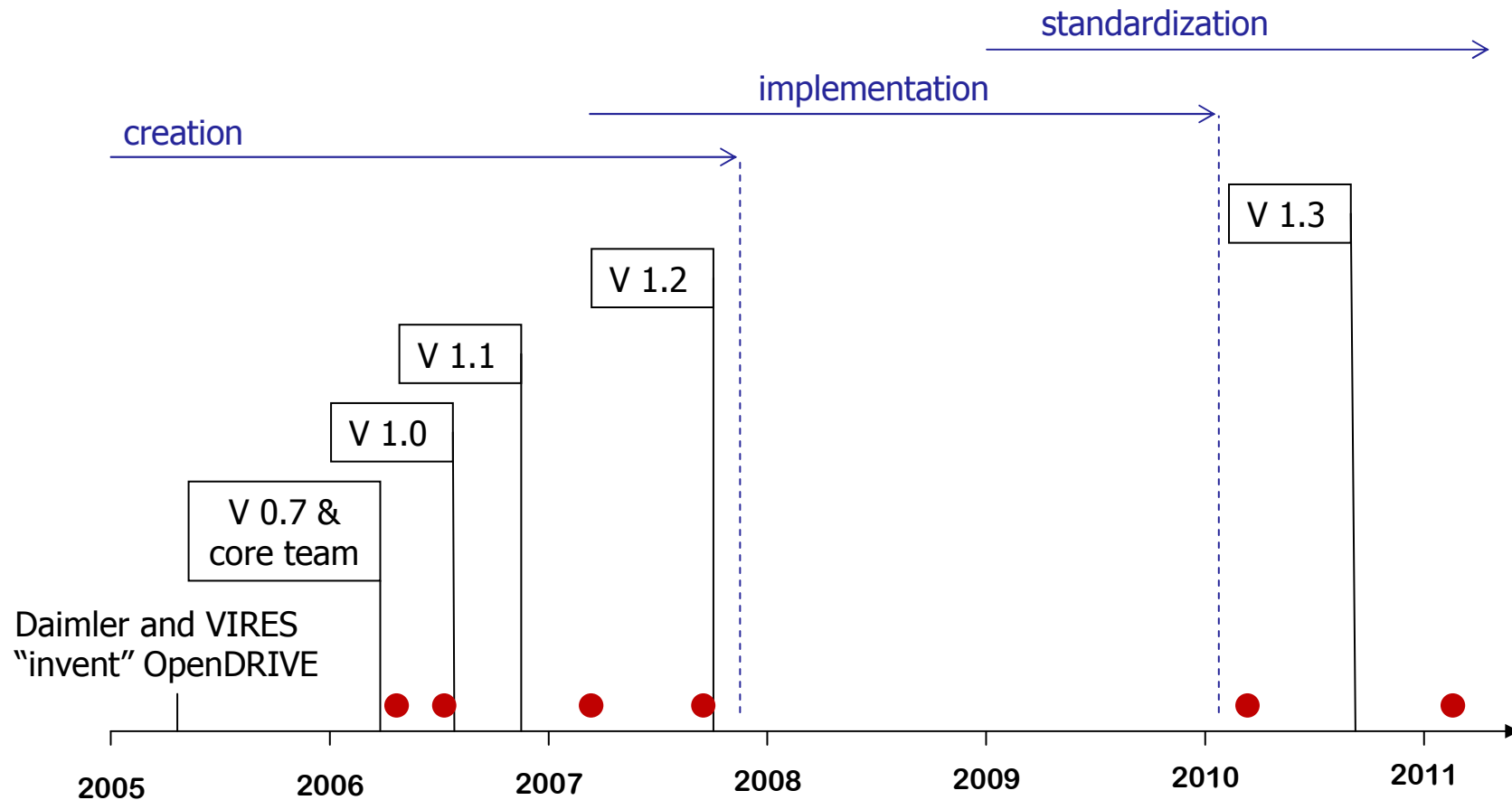
- free use
- XML-based
- human readable
- customizable
- extensible
- established

OpenDRIVE is a
de facto **standard**

- standardization by
establishment in the
market

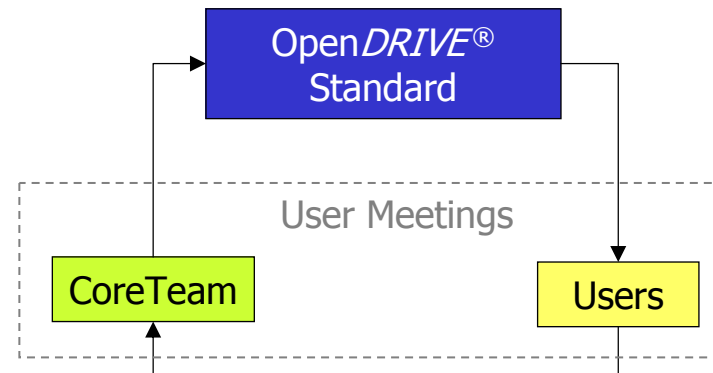


A Brief History



● user meeting

A Well Managed Format











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

Users

OpenDRIVE
managing the road ahead

 Audi Electronics Venture GmbH	Link to website...
 BMW Group Research and Technology	BMW Group Research and Technology applies OpenDRIVE® and is convinced by its key benefits like the facts that OpenDRIVE® is a comprehensive and community proven approach for describing road networks as well as it enables the exchange of software components and databases. Link to website...
	Daimler uses OpenDRIVE® in its driving simulators as an efficient road description standard and profits from well-proven utilization and exchange between different applications. Link to website...
 Deutsches Zentrum DLR für Luft- und Raumfahrt e.V. in der Helmholtz-Gemeinschaft	At DLR <i>Institute of Robotics and Mechatronics</i> , the OpenDRIVE® standard is used for road definitions in the context of simulations for the assessment of mechatronic vehicle components and vehicle dynamics control systems. Link to website... DLR <i>Institute of Transportation Systems</i> uses OpenDRIVE® as road description for generating virtual landscapes based on real world data. Link to website...
	OpenDRIVE® supports the efficient development of road networks in the Fraunhofer IVI driving simulator and facilitates the exchange with other research partners. Link to website...
 KRAUSS-MAFFEI WEGMANN	Link to website...
 Mercedes-Benz technology	The MBtech Group uses OpenDRIVE® in its tool suite along the automotive development and testing chain as it is a very clever, flexible and de-facto standard format for road networks. Link to website...
	RTI has found the OpenDRIVE® standard to be comprehensive in its coverage of features needed for our autonomous traffic driving on correlated data. Link to website...
 DYNAware	Link to website...
 Intelligent Terrain Solutions	TrianGraphics GmbH has integrated OpenDRIVE® export into their database generation system Trian3D Builder. Thus the automatic urban generation with roads and complex crossings is usable in driving simulators. Link to website...
 TECHNISCHE UNIVERSITÄT MÜNCHEN	The OpenDRIVE® standard facilitates efficient exchange of data between universities and industrial partners. Link to website...
 Simulationstechnologie GmbH	With OpenDRIVE® we were able to standardize key components of our tool-chain and make them available to a broad customer base without further adaptations. Link to website...
 FINDING A BETTER WAY	VTI, Swedish National Road and Transport Research Institute, is an independent and internationally prominent research institute within the transport sector. VTI is a world leader in several areas, for instance in simulator technology. VTI's high fidelity vehicle simulators use OpenDRIVE® as the standardized road database in order to enhance the software environment and be compatible with external simulator facilities. Link to website...

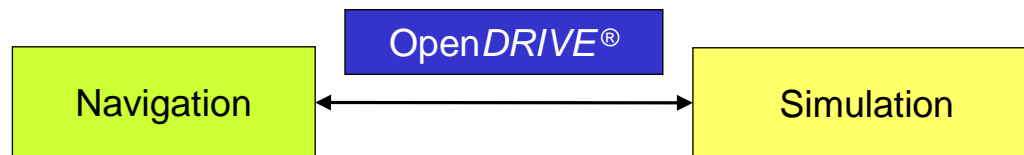
Please register!

It's free
and
without obligations.

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

Existing

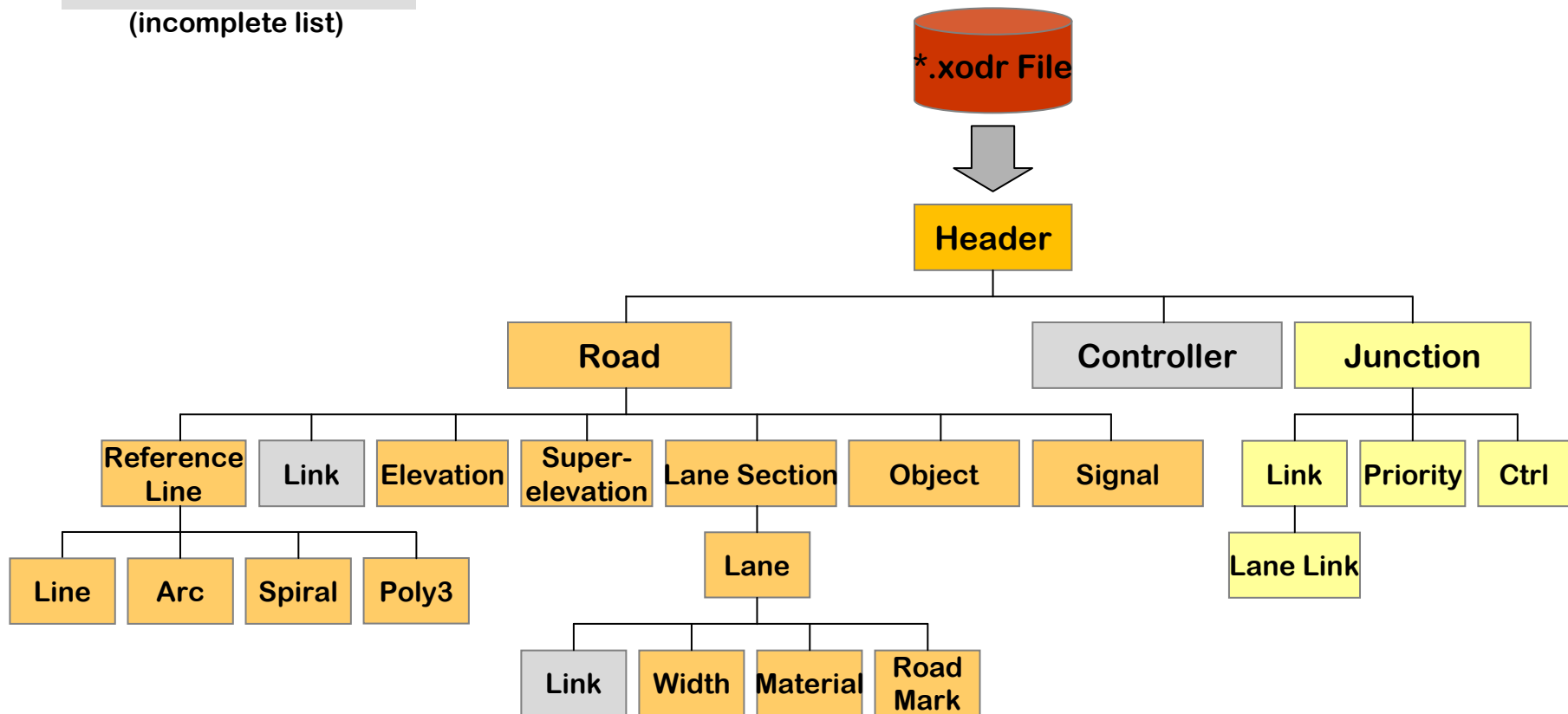
- Vehicle Driving Simulation
- Tram Driving Simulation
- Railroad Simulation
- Conversion and Export of Navigation Data



New Fields

- Town and Country Planning
- Macroscopic Traffic Simulation
- etc.

Elements
(incomplete list)



+ 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

OpenCRG[®]
managing the road surface ahead



Image courtesy of Daimler

Back to OpenDRIVE...

Examples



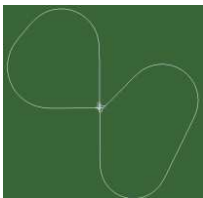
VIRES Town

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



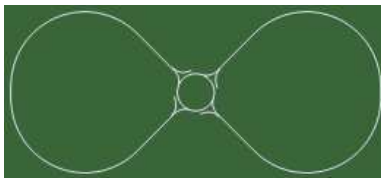
VIRES 8 - simple

- 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.

www.opendrive.org
www.opencrg.org

Newsletter

newsletter@opendrive.org
newsletter@opencrg.org

E-mail

opendrive@opendrive.org
opencrg@opencrg.org

Developers

marius@vires.com / www.vires.com

Thank You!