

OpenDRIVE

managing the road ahead

3rd Meeting

11 July 2006

M. Dupuis



OpenDRIVE - managing the road ahead

OpenDRIVE at DSC

- The paper „OpenDRIVE – an open standard for the description of roads in driving simulations“ has been accepted by the DSC committee
- Authors: VIRES / DaimlerChrysler
- Official introduction of OpenDRIVE into the international driving simulation community
- Presentation: 04 October 2006, 9:30h
- OpenDRIVE meeting during DSC shall be organized

OpenDRIVE - managing the road ahead

OpenDRIVE 1.0

- Release date: June 25, 2006
- Binary version (0.6) no longer supported
- Includes
 - schema file
 - sample file
- Changes vs. OpenDRIVE V0.7:
 - see next slides

OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0

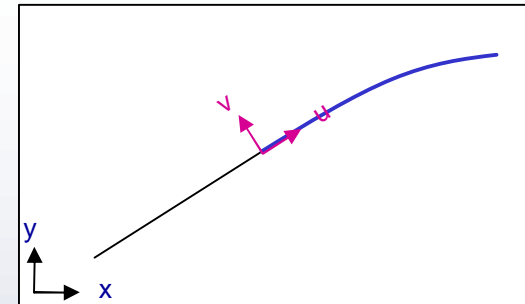
Cubic polynomial for cord lines (in addition to lines, arcs and spirals)

$$V_{\text{local}} = a + b \cdot du + c \cdot du^2 + d \cdot du^3$$

- Specification:

Delimiters: <poly3/>
Parent: <geometry>
Maximum Instances: 1
Optional: no
Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
a	double	parameter A
b	double	parameter B
c	double	parameter C
d	double	parameter D



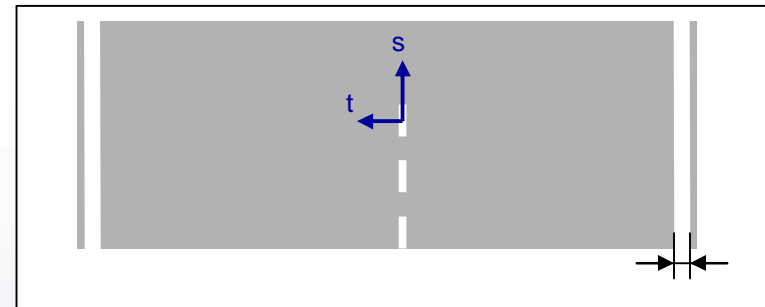
OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Road marks may be provided with width information

- Specification:

Delimiters: <roadMark/>
Parent: <lane>
Maximum Instances: unlimited
Optional: yes
Arguments:



<i>name</i>	<i>type</i>	<i>description</i>
sOffset	double	start position (s-coordinate) relative to the position of the preceding <i>laneSection</i> record
type	string	type of the road mark, see chapter 6.2
weight	string	weight of the road mark, see chapter 6.3
color	string	color of the road mark, see chapter 6.4
<i>width</i>	<i>double</i>	<i>width of the road mark in [m] - optional</i>

OpenDRIVE - managing the road ahead

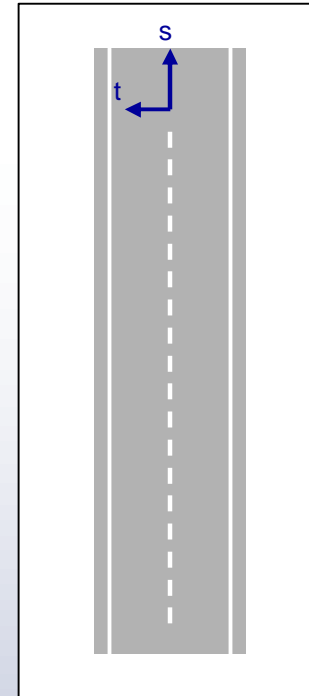
New Features in OpenDRIVE 1.0 (cont'd)

Lane speed information

- Specification:

Delimiters: <speed/>
Parent: <lane>
Maximum Instances: unlimited
Optional: yes
Restrictions: not allowed for center lane (laneId=0)
Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
sOffset	double	start position (s-coordinate) relative to the position of the preceding <i>laneSection</i> record
max	double	maximum allowed speed in [m/s]



OpenDRIVE - managing the road ahead

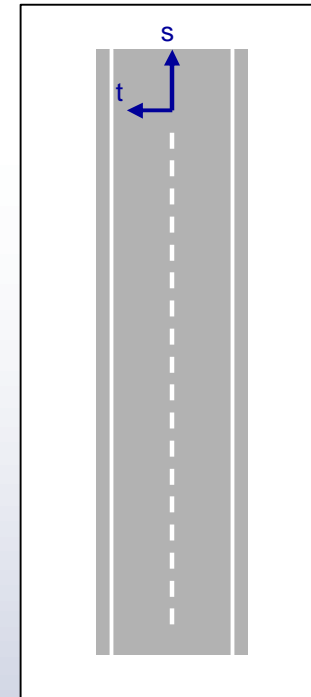
New Features in OpenDRIVE 1.0 (cont'd)

Lane access restrictions

- Specification:

Delimiters: `<access/>`
Parent: `<lane>`
Maximum Instances: unlimited
Optional: yes
Restrictions: not allowed for center lane (`laneId=0`)
Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
<code>sOffset</code>	double	start position (s-coordinate) relative to the position of the preceding <i>laneSection</i> record
<code>restriction</code>	string	identifier of the participant to which the restriction applies, see also 6.9

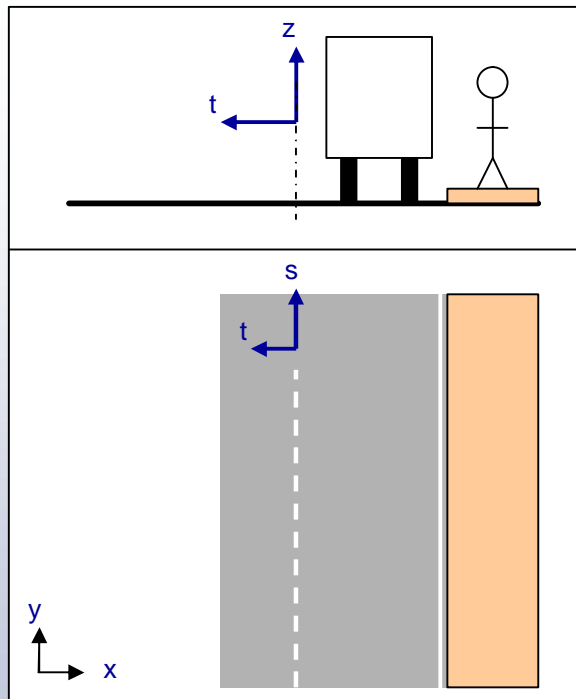


OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Lane height information

- Specification:



Delimiters: <height/>
Parent: <lane>
Maximum Instances: unlimited
Optional: yes
Restrictions: not allowed for center lane (laneId=0)
Arguments:

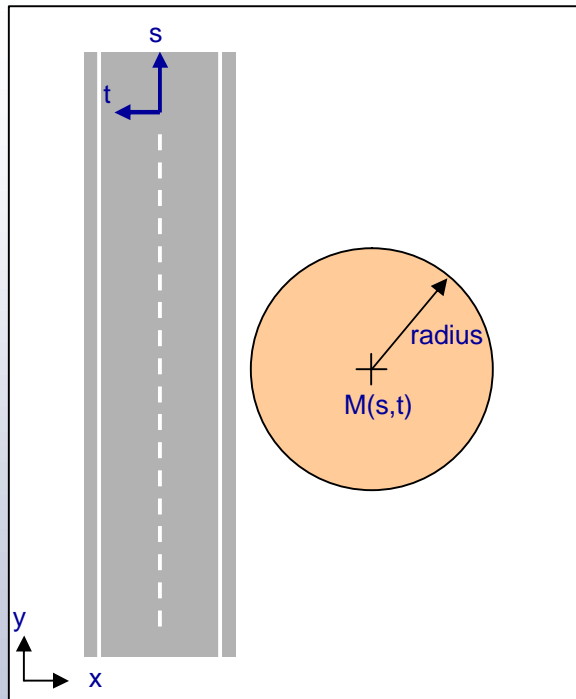
<i>name</i>	<i>type</i>	<i>description</i>
sOffset	double	start position (s-coordinate) relative to the position of the preceding <i>laneSection</i> record
heightInner	double	inner offset from road level in [m]
heightOuter	double	outer offset from road level in [m]

OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Object radius

- Specification:



Delimiters: <object/>
 Parent: <objects>
 Maximum Instances: unlimited
 Optional: no
 Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
:	:	:
length	double	length of the object [m] (inertial dx)
width	double	width of the object [m] (inertial dy)
radius	double	radius of the object [m]; alternatively to width and length
height	double	height of the object [m] (inertial dz)
:	:	:

OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Object outline (container + entries)

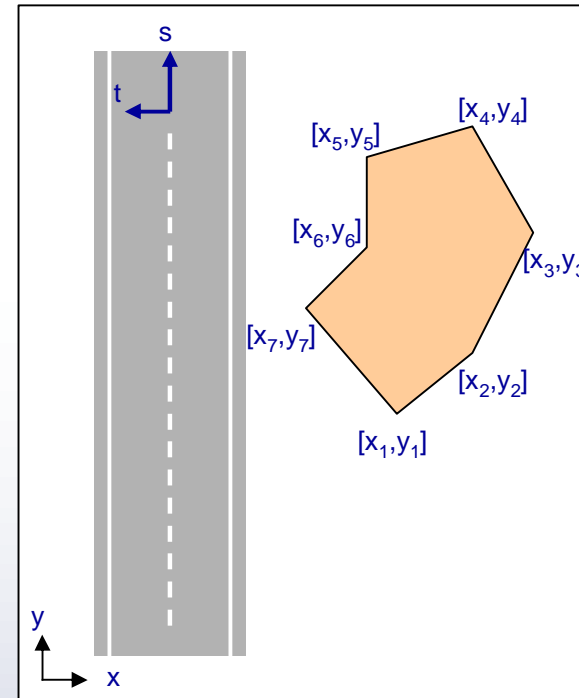
- Container:

Delimiters: `<outline> </outline>`
 Parent: `<object>`
 Maximum Instances: 1
 Optional: yes
 Arguments: none

- Entries:

Delimiters: `<cornerInertial/>`
 Parent: `<outline>`
 Maximum Instances: unlimited
 Optional: yes
 Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
x	double	inertial x co-ordinate of the corner
y	double	inertial y co-ordinate of the corner
z	double	inertial z co-ordinate of the corner
height	double	height of the object at this corner in [m]



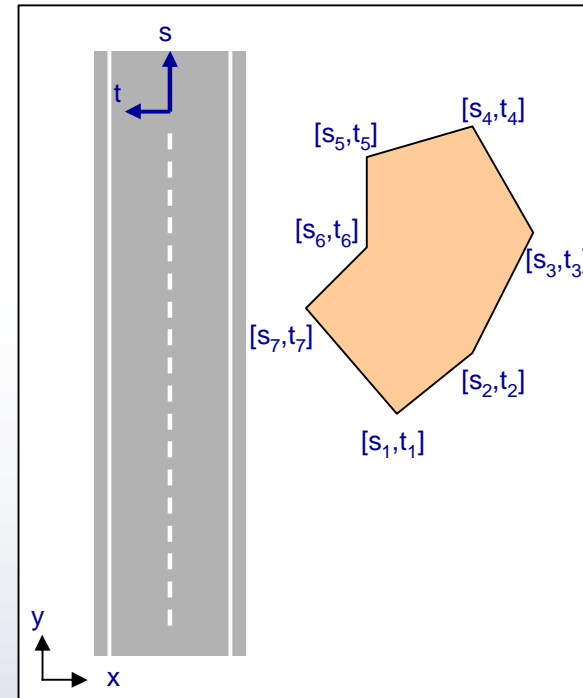
OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Object outline, alternative entry

Delimiters: <cornerRoad/>
Parent: <outline>
Maximum Instances: unlimited
Optional: yes
Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
s	double	s co-ordinate of the corner
t	double	t co-ordinate of the corner
dz	double	delta z of the corner relative to road's cord line
height	double	height of the object at this corner in [m]



Note: object outlines do **not** need to be closed, i.e. linear features can be described

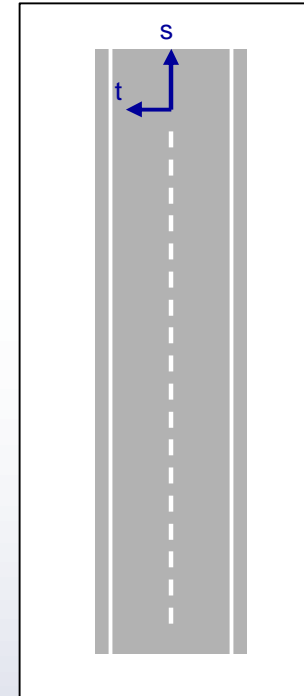
OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Tunnel record

Delimiters: <tunnel/>
Parent: <objects>
Maximum Instances: unlimited
Optional: yes
Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
s	double	track position (s co-ordinate)
length	double	length of the tunnel in [m] (s direction)
name	string	name of the tunnel
id	uint	unique ID within database
type	string	type of the tunnel, see also 6.7
lighting	double	degree of artificial tunnel lighting [0.0..1.0]
daylight	double	degree of daylight intruding the tunnel [0.0..1.0]



Note: a subsequent <validity/> record may restrict the tunnel to certain lanes only

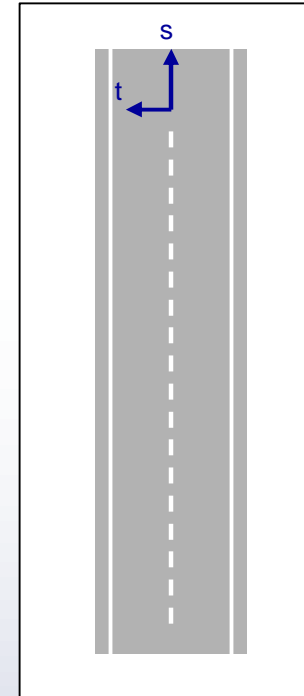
OpenDRIVE - managing the road ahead

New Features in OpenDRIVE 1.0 (cont'd)

Bridge record

Delimiters: <bridge/>
Parent: <objects>
Maximum Instances: unlimited
Optional: yes
Arguments:

<i>name</i>	<i>type</i>	<i>description</i>
s	double	track position (s co-ordinate)
length	double	length of the bridge in [m] (s direction)
name	string	name of the bridge
id	uint	unique ID within database
type	string	type of the bridge, see also 6.8

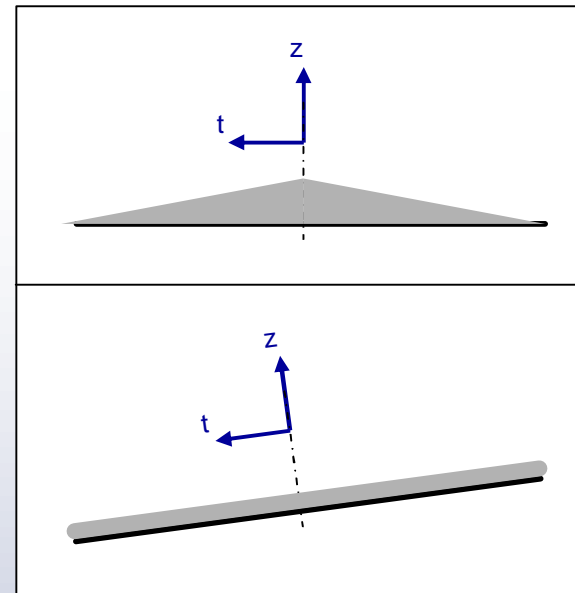


Note: a subsequent <validity/> record may restrict the bridge to certain lanes only

OpenDRIVE - managing the road ahead

OpenDRIVE 1.1

- Intermediate Release
- Proposed Contents:
 - Crossfall vs. Superelevation
 - References to Signals
 - Include Tag
- Deadline for Inputs: 25 July 2006
- Release: asap



Open*DRIVE* - managing the road ahead

Open*DRIVE* 1.2

- Proposed Extensions:
 - ?? – please provide your inputs!!!!
- Deadline: 15 November 2006
- Release Date: December 2006

OpenDRIVE - managing the road ahead

Establishment of the Core Team

- Tasks:
 - review of pre-releases of future versions of OpenDRIVE
 - discussion of incoming requests for extensions
 - supervision of style guide
- Team members will be listed with name+company on the website
- All industry sectors should be included
 - simulator users (automotive industry)
 - simulator manufacturers
 - research institutes
- Current members (alphabetic order by company)
 - Strobl, Martin – BMW Forschung und Technik GmbH
 - Grezlikowski, Hans - DaimlerChrysler AG
 - Klärner, Ekkehard – Krauss-Maffei Wegmann GmbH
 - Dupuis, Marius - VIRES Simulationstechnologie GmbH
 - to be continued....

OpenDRIVE - managing the road ahead

Partners of OpenDRIVE

- Companies and Institutions
- Must have a member in the core team
- Must be active users of OpenDRIVE
- Public supporter of OpenDRIVE
- Free listing on the website with logo and direct link

Users of OpenDRIVE

- Companies and Institutions
- Free listing on the website with company name
- Logo and direct link as options

OpenDRIVE - managing the road ahead

Roadmap

- Management of OpenDRIVE will be continued by VIRES
- July 15, 2006
 - Establishment of core team
- July 25, 2006
 - Deadline for inputs to OpenDRIVE V 1.1
- August 10, 2006
 - Release of OpenDRIVE V 1.1
- October 4, 2006
 - Presentation of OpenDRIVE at DSC, Paris
- November 15, 2006
 - Deadline for inputs to OpenDRIVE V 1.2
- December 2006
 - Release of OpenDRIVE V 1.2