SVG for Automotive User Interfaces

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Introduction

HMI: human-machine interfaces

- Design of HMI displays for car cockpits:
  - EDONA for automotive embedded systems,
  - HMI project: deliver a design tool chain.

- HMI Modeling:
  - SVG for HMI graphic content,
  - domain-specific extensions.
3M/Visteon X-Wave I

http://www.visteon.com/innovate
3M/Visteon X-Wave II
Display Configuration Range

Graphic Content vs Platform

- **High-end**
  - Reconfigurable displays

- **Low-end**
  - Basic instrument clusters
Flexible Instrument Clusters
Design of embedded software systems:

- Interoperability and standards,
- Safety-related application development,
- Diversity of platform configurations.
EDONA HMI Environment

- Model-based tool chain,
- Integrated environment,
- Several runtimes.
HMI Model Structure:
- Graphics,
- Interface,
- Functional model,
- Metadata.
Graphic Model
Graphics: HMI SVG Profile

Why SVG?

- W3C authoritative standards,
- Adequate graphic model,
- Profiling and extensions policies,
- Software support (authoring & toolkits)
Graphics: HMI SVG Profile

SVG Tiny 1.1 reference basis,

- PLUS opacity, gradient and clipping,
- MINUS declarative animations: instead, data-driven updates of the graphic state.
Component Interfaces

- Synchronous input and output signals,
- Trigger controls activation (logical time)
Dynamic Graphic Data I

- Dynamic Data:
  - Transformations,
  - Shapes,
  - Styling,
  - Text.
Dynamic Graphic Data II

- Static XML structure and array-like attrs,
- Label the data for read/write,
- Expose in component interface.
- Beyond raw access to SVG data,
- Support for simple data-flow constructs.
Functional Constructs

- Signals:
  - circle radius
  - 3.1415
  - velocity

- Functions and delays:

- Hierarchical triggered components:
Functional model: slider
Conclusions and Future

- EDONA started in sept. 2007,
- So far, survey and HMI modeling,
- By the end of 2010, complete tool chain and two demonstration designs:
  - Intelligent transportation system prototype,
  - Safety-critical, certified industrial project.
Questions ?