A Methodology for Control Systems GUI Prototyping - a case study

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1. Introduction
Language modeling
Language transformation
Rapid GUI prototyping
The CMS Tracker

15232 modules
1944 power groups
356 control groups
GUI for slow controls

3D visualization
Monitoring
Interaction
Simulation

? Lots of components
Lots of man hours
Need to hire SW engineers
What is needed?

- Geometry
- Commands
- Events
- States
- Hierarchy
- Properties
What do already have?

- Geometry
- Commands Events
- States
- Properties
- Hierarchy
Idea

Generate a 3D GUI and system simulator from this information.
2. Methodology
Language

Unify information formats
Domain specific
Support evolution
Machine- and human-readable
Language (cont.)

Object
Type
Hierarchy
FSM
Command
Event
Property
Rules
Geometry

Cospel
Cospel
Generative approach

- Cospel Model
- ATL Transformation Rules
- Verification
  Validation
- System Simulator
  CO-OPN + Java
- Communicate
- Load

- GUI model
- DB

- GUI engine
Communication

System Simulator

GUI engine

Communicate
Communication

System Simulator

Driver

Real System

Driver'

GUI engine
The CMS Tracker
Cosmic Rack

20 power groups
2 control groups
Specification

Made by hand

Could have been made automatically from information sources
Result after transformation
Remarks

1. Modular language

Easy to add/remove/refine features
Remarks

2. Flexible framework

Can easily make richer editors (visual syntaxes, constraint checking, design-time validation)
Remarks

3. Java-based from A to Z

Cross-platform (with some limitations)
Remarks

4. Stereoscopy supported

Evaluate the stereo-perception influence on system navigation
5. **Thin client**

“Fatter” clients possible, but involves more GUI specification (language scope extension)
Present & Future

Full-scale CMS Tracker

Application to similar domains

Natural interaction
Thank you.

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