The Control System Modeling Language

Klemen Žagar (klemen.zagar@cosylab.com)

Jozef Stefan Institute, Slovenia (http://kgb.ijs.si) in cooperation with
Cosylab Ltd., Slovenia (http://www.cosylab.com)
What is CSML?

- Notation language
  - Diagrams
  - Properties of entities
  - Relationships
  - Documentation
- Documenting entities in a control system
  - Devices
  - Properties
  - Operations
  - Events
  - Characteristics
  - State machines
- Based on Unified Modeling Language (UML)
CASE Tools

- Computer Aided Software Engineering
  - Rational Rose
- UML as the notation language
- Extensible:
  - CSML plug-in
XML

- Extensible Markup Language
  - World Wide Web Consortium Standard
- XML representation of CSML model:
  - Physical representation of the model
  - CASE-tool neutral
  - Easy to manipulate using widely-available XML tools (parsers)
- Extensible Style-sheet Language Transformations
  - Standard way to transform XML into another XML or text
Generators

- Transformation of CSML XML using:
  - XSL transforms
  - Extensible Program Generator Language (XPGL)
  - Custom utilities (based on XML parsers)

- Transformation of CSML XML into:
  - CORBA/DCOM IDL files
  - EPICS (database definition, templates, state notation language)
  - Servers (C++)
  - GUI clients (Java)
  - Configuration database schema
  - Web services
An Example

- We’re about to:
  - Construct a property
  - Construct a device
    - Ramped power supply
  - Describe device’s behavior
    - State chart diagram
A Property

- An observable in a control system
  - Temperature
  - Electric current
- Data and behavior:
  - Characteristics
  - Events
  - Operations
- Interfaces vs. classes
A Device

- Models a physical device
  - Power supplies
  - Antennas
  - Motors
  - Vacuum gauge
- May contain other devices
- May contain properties
Conclusion

- The entire system is defined in one place
  - CSML model
  - Includes documentation
- Other artifacts are kept in-sync with the CSML model
  - All other artifacts are generated
  - Generators are adjustable
Any questions?