Furness Toolset for the AADL

SAE AS2C
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Outline

- Background
- Features
- QA Activities
- Plans
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Background

Goals

- Develop analysis tools for AADL
- Present the tools so that they are attractive to practicing engineers
- Spread the gospel
  - No more systems designed with Word, PowerPoint, Excel and a compiler
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Background

- Development
  - Tools are a joint effort of Fremont Associates and Penn under an AFOSR STTR.

- Business Model
  - Give the stuff away
  - Sell support
    - Pays for traditional customer service roles
    - Pays for ongoing maintenance and enhancements
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Background

Focus Areas

- Traditional embedded systems applications
  - Avionics, Automotive, robotic dogs
- Plug-and-play Medical Devices
  - Emerging system-of-systems problem
  - Driven by demands of demanding (but naïve) users
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Features

Furness Toolset

- Schedulability Analysis
- Resource Analysis
- Simulation
- Simulation

VERSIA
- Modeling and Analysis of Resource-Bound Real-Time Systems

Charon
- Modeling and Analysis of Hybrid (Discrete/Continuous) Systems

OSATE/TOPCASED
- Syntax and Semantic Analysis of Textual and Graphical AADL Language

Eclipse IDE
- Integrated Development Environment Supporting Multiple Languages and Development Perspectives through an Open-Source Plug-in Based Framework
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**Features**

- **Furness Perspective**
  - Eclipse perspective providing task-oriented interface for AADL tools

- **Schedulability Analysis**
  - Binary schedulable/unschedulable report
  - Best/Worst-Case Execution Time by Thread
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Features

- Thread Simulation in the Eclipse Debugger
  - Interactive Simulation (single-step, run to breakpoint, etc.)
  - Manual or random non-determinism resolution
  - Graphical timing diagram view of simulation progress
  - Graphical view of resource utilization over time
  - Graphical view of thread states over time
Tool Architecture

OSATE

Instantiation

Translation

Debug perspective

Simulator interface

State interpretation

Schedulability analysis view

Schedulability analysis view

VERSA
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Features

- New to Version 1.0.3
  - Event queues
  - Enhanced resource utilization view
  - Enhanced thread state view
  - QA Activities
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QA Activities

- Open Source
  - A few highly motivated souls create software enjoyed by the many
  - Implementation driven
  - Work products are
    - Feature rich
    - Quality unknown

- The very definition of CMMI Level 1
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QA Activities

- Open Source
  - Good:
    - Sharing of source
    - Rapid incorporation of new and novel features
  - Not so good:
    - Lack of mature development process
    - Lack of critical artifacts (requirements, V&V artifacts, etc.)
- What to do for tools intended for domains controlled by FAA (DO-178B), FDA, etc.??
  - Question is not unique to the Furness Toolset. TOPCASED has formed a QA group to address the same issues.
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QA Activities

- Fremont Associates Strategy:
  - CMMI Level 3 by year-end 2007
  - Develop requirements
    - SAE Standard document
    - User Input
  - Enhanced Validation Activities
    - Requirements-based testing
    - Reporting of source code coverage
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QA Activities

- **Current**
  - Defining, implementing and executing key CMMI process areas
    - Requirements Management
    - Technical Solutions
    - Verification
    - Validation
    - *Etc.*
  - Acquiring needed tools
    - Telelogic DOORS (requirements management)
    - Rational Functional Tester (record/playback automated test tool)
    - Rational Pure Coverage (source code coverage metrics)
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**Plans**

- **Functional Enhancements**
  - Oleg
  - Can
  - Fill
  - These
  - In

- **QA Activities**
  - Continued participation in TOPCASED QA group
  - Extract formal requirements from SAE Standard
  - Achieve full test coverage of requirements
  - Achieve decision coverage of source code
Questions? Comments?

Free download:
- http://www.furnesstoolset.com

Contact:
- Oleg Sokolsky sokolsky@cis.upenn.edu
- Duncan Clarke dclarke@fremontassociates.com