

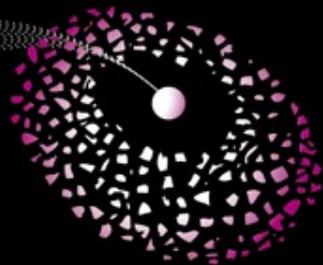
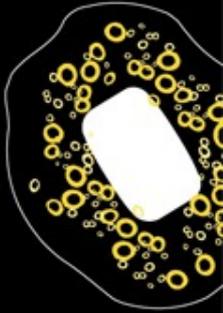
UNIVERSITY OF TWENTE.

Fringe Session: Developing JIWI using TERRA

Communicating Process Architectures 2012

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- CSP Meta-Model just presented
- Used by
 - CSP Editor
 - Model validation
 - Code generation (FDR, C++/LUNA)
- Obviously it all is very nice (and works)

- At least that is what we just told...

Time for a demo!

- CSP Editor
Modeling a simple robotic setup
- Transformation to CSPm/FDR
- Transformation to C++/LUNA
- Execute C++ code on target

- JIWY with an architecture model
 - Two controllers (Pan & Tilt)
 - Safety / Scaling model
 - Interaction with hardware
- CSP Models to implement the sub-models
 - Communication defined by the architecture model
- Not available unfortunately
- So we will use only a CSP model

- JIWY with a CSP model
 - Controller sub-models
 - Readers/Writers for data communication
 - Empty sub-models used for (20-sim) controller algorithm containers
 - Safety sub-model
 - Readers/Writers for data communication
 - Separated for Pan and Tilt signal
 - Empty sub-models used to add some C++ code for safety checks
- Fake interaction with hardware
 - Thrown away!
 - Channels replaced by link drivers to communicate with HW

Live demo

- Formal verification of TERRA models
- Basic CSP objects can be transformed
- C++ Code (blocks) not... (obviously)
 - `Process = SKIP`
- Formally checking of robotic oriented models is limited
 - Only software structure (ie pure CSP)

Live demo

- All CSP constructs represented by C++ / LUNA code
- All (sub-)models expressed in header/source file
 - Contains channels, processes, ports, groups, etc.
- Modifying generated code is possible
 - Protected regions: comment, constructor/destructor, execute()
- Code blocks filled in by custom code
 - Or by code generated from control law design tools (e.g. 20-sim)
- Additional generated files
 - Entry point (main() function)
 - Makefile to build the application

Live demo

- Compile & Link
 - Should be automated in the future
- Send executable to (QNX) target
 - Should be automated in the future
- Execute, experiment, test, ...!
(and hope we did not make any mistakes...)
 - Would be nice to automate as well, but probably stays manual...

Live demo

- As claimed by the paper presentation

Usable for “Developing Embedded Control Software”

- If you are still interested

Come to us for a 'Do It Yourself' session!