

Polarsys Rover project

Modeling and Analysis in Software Engineering
(MASE) group at Queen's University

Group leader: Juergen Dingel (dingel@cs.queensu.ca)

Efforts and People involved at Queen's



Different efforts:

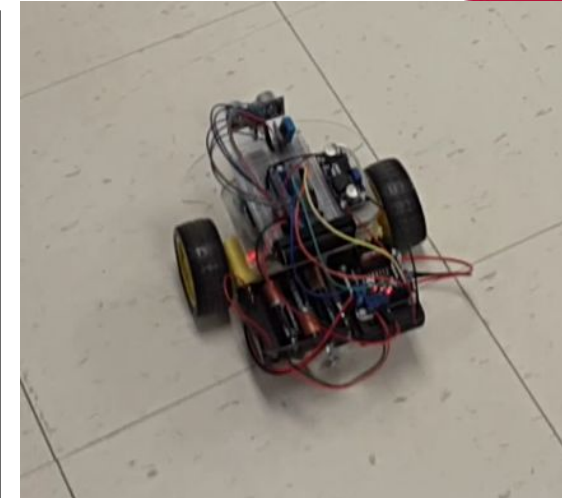
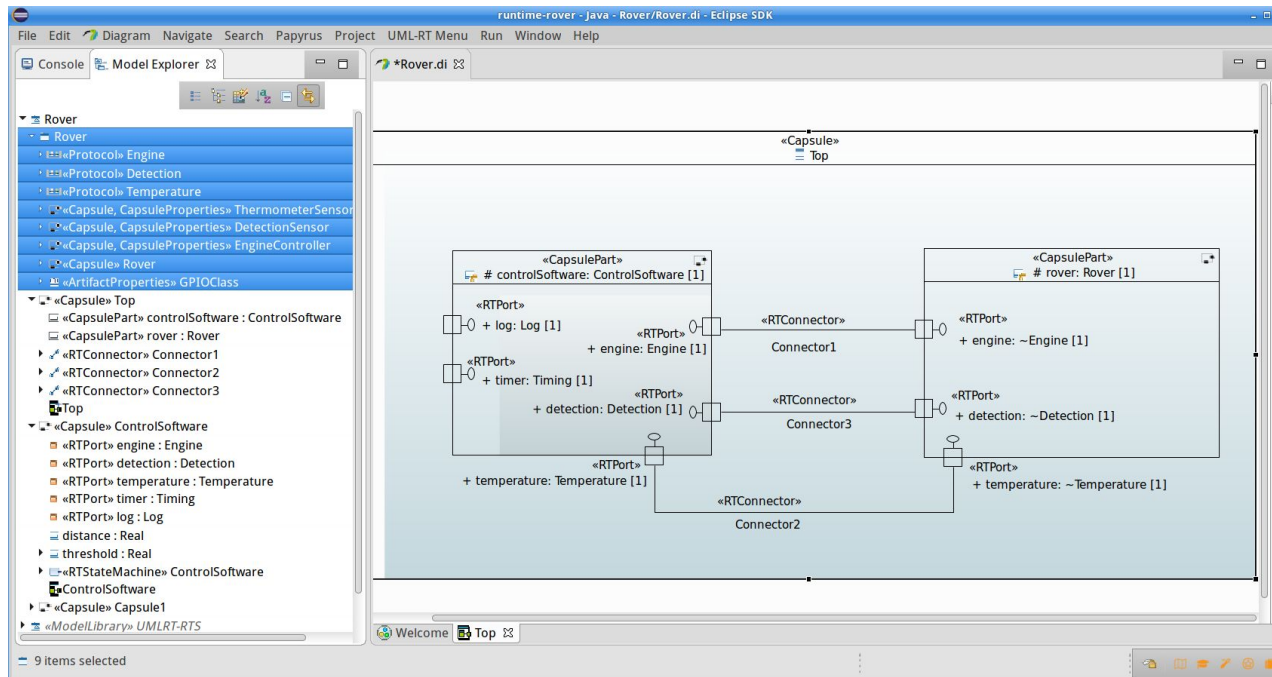
- Creating models for the Rover in UML-RT with Papyrus-RT
- Customizing Papyrus-RT for the Rover (and other target platforms)
- Upcoming event: Unconference at EclipseCon in Toulouse (June 2017)

People involved at Queen's University in the MASE group:

- Several PhD students, MSc students, postdoc fellows involved
- Two MSc students directly involved in the creation of models for the Rover and the customization of Papyrus-RT

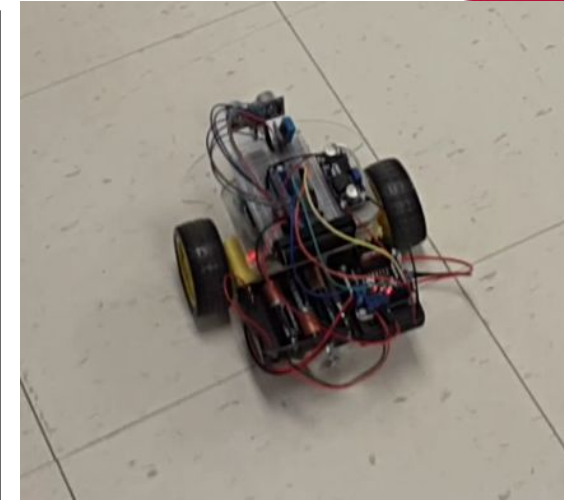
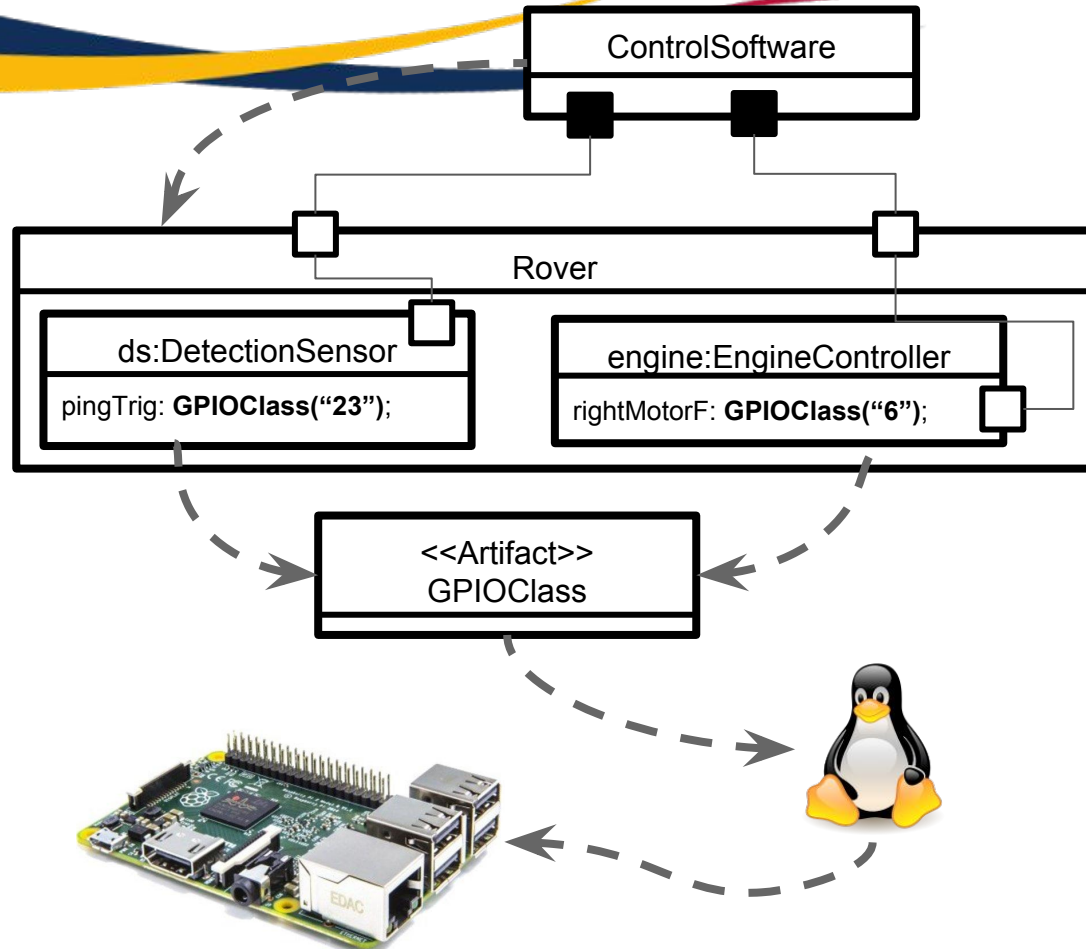
Creating Models (Harshith Vasanth Gayathri, MSc)

Graphical Model using Papyrus-RT



- ⚠ Current models are not for the official Rover
- Models available in a Git repository

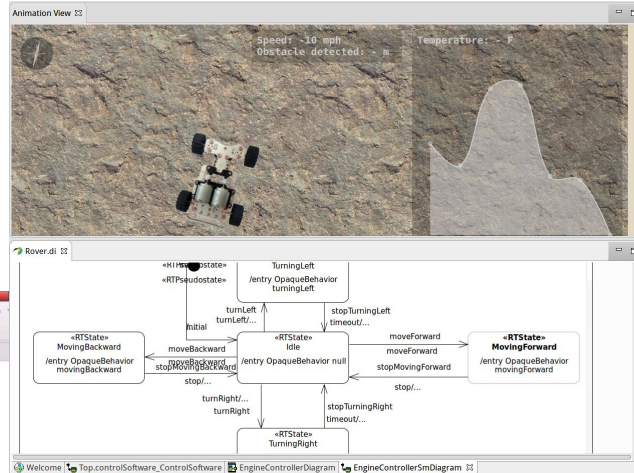
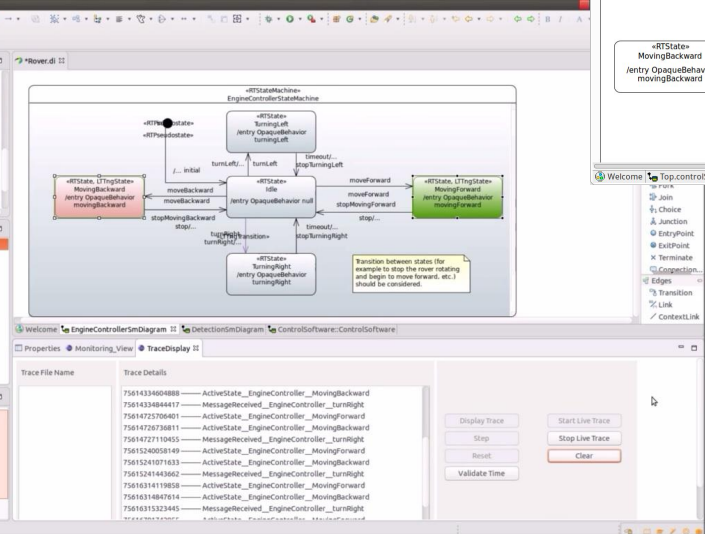
Creating Models (cont'd)



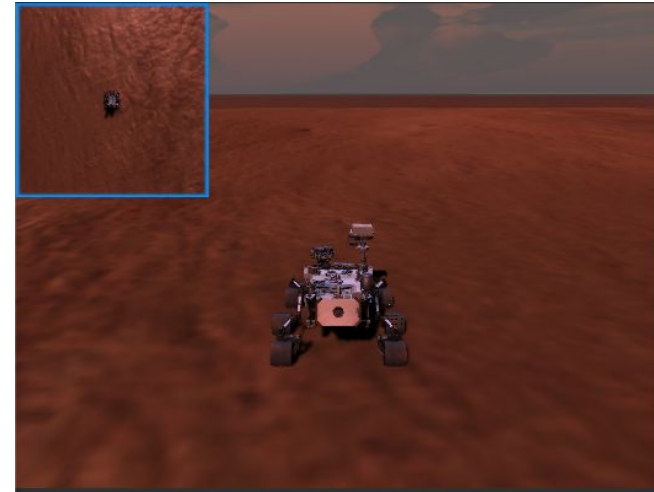
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Other Activities related to the Rover

Model Monitoring of timing constraints (LTTng)



Model Animation in a 2D environment (Web-based)



Model Animation in a 3D environment (Unity)

Customizing Papyrus-RT for the Rover

The screenshot displays the Eclipse SDK interface for editing a Papyrus-RT model named 'rover.di'. The Model Explorer on the left shows a hierarchical structure of the model, including capsules like 'Engine', 'Detection', 'Temperature', and 'Rover', and their properties. The Overview window shows a photograph of a Raspberry Pi 3 Model B and lists its hardware specifications: CPU Core (Quadcore ARM Cortex-A53, 64Bit), Clock Speed (1.2GHz), GPIOs (2 x 20 Pin Header), GPU (400 MHz VideoCore IV®), Name (Raspberry Pi 3 Model B), RAM (1 GB), and Power Supply (2.5 A). The Properties table lists various properties and their associated capsules and GPIO pins. The Properties window at the bottom shows the 'Advanced' properties for the selected element, including 'derived' (false) and 'editable' (true).

Property	Capsule	GPIO
pinTrig	DetectionSensor	GPIO 23
pinEcho	DetectionSensor	GPIO 24
rightMotorBackwards	EngineController	GPIO 5
leftMotorForward	EngineController	GPIO 22
rightMotorForward	EngineController	GPIO 6
leftMotorBackwards	EngineController	GPIO 27

Property	Value
derived	false
editable	true

Goal: Creating specific views in order to customize Papyrus-RT whenever the Rover model (or any other model of a target platform) is imported.

MSc involved:
Sudharshan Gopikrishnan

Unconference Event at the EclipseCon

Planning an unconference event at the EclipseCon in Toulouse, France (June 2017)

- **Format:** example & hands-on sessions
- **Goal:** familiarizing attendees with Papyrus-RT and UML-RT for modelling robotic systems
- **Material:** bare Raspberry PI 3 with sensors / actuators ; Pololu Rover
- **Status:** first draft of proposal
- Everyone interested in participating to the realization of this event is welcome !
Feel free to contact me (hili@cs.queensu.ca)