Model-driven development of software for the PolarSys Rover using Papyrus-RT

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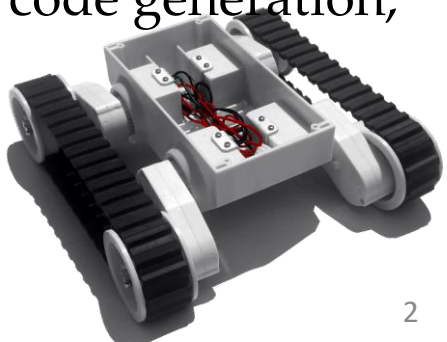
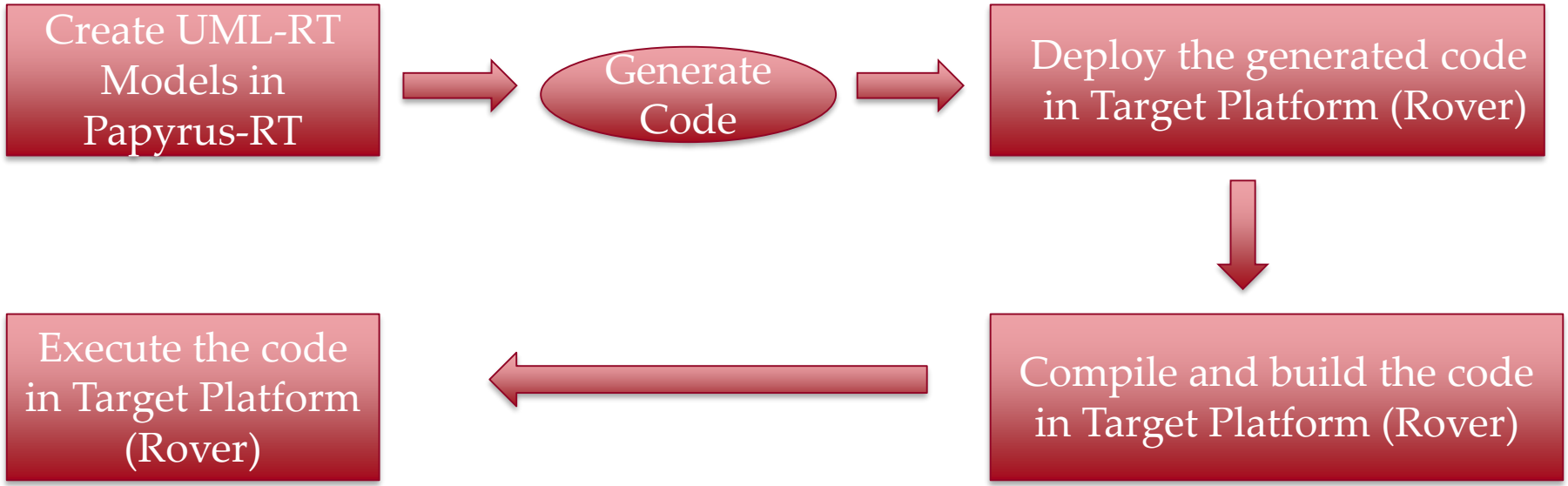
Motivation

- As part of PolarSys Rover Project, the intention is to perform model-driven development of software for the Pololu rover using Papyrus-RT.

- To get a hands-on on all the phases of the development of an embedded system, including system hardware and software requirement, architecture and detailed modeling, code generation, and execution.



High-Level Design Flow



Rover Architecture

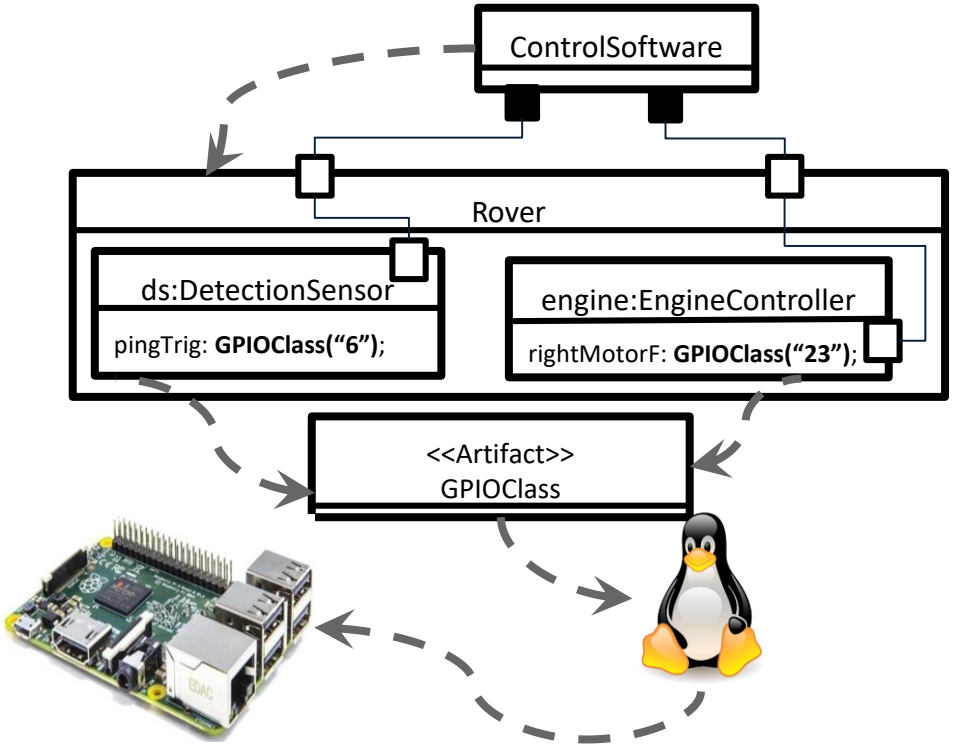
Application

Rover Library

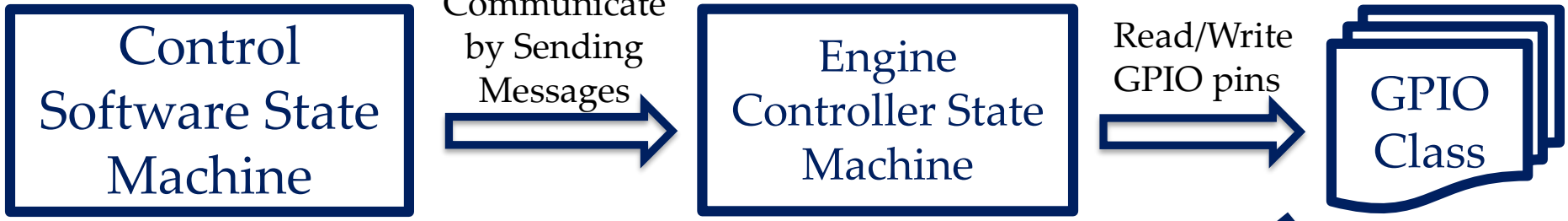
GPIO Class

Mapped File System

Hardware



Rover Work Flow



Future Work

- Replacing the C++ GPIO class with WiringPI.

- Using non-blocking mechanisms to make the design more reliable. e.g., using Interrupt library of WiringPI for interfacing Ultrasonic detection sensor SR04.

Future Work (Cont.)

- Making the Rover model accessible to Papyrus-RT users.

- Creating complex control software use case scenarios:
  - Establishing communication between two rovers for autonomous exploration.
  - Line following Rovers.
  - Autonomous Rover which uses camera and GPS for navigation.

Thank You !!