

## An Esterel Virtual Machine (EVM)

Aruchunan Vaseekaran & Tamara Blain

## Why

- Esterel is suited for Deterministic Control Systems
  - Imperative Language
  - Synchronous
  - Concurrency, Preemption
- Not widely available in low cost systems.

## Related Work - Pascal

- EVM Concept
  - Compile code for abstract machine.
  - Write Interpreter for each target platform
  - Makes compiler very portable
  - Slower Speed
- Pascal P-Code Machine
  - 1970
  - Machine understood pascal primitive types
  - Single Stack
  - Single Threaded

## Related Work - JVM

- Java JVM
  - All java code compiled down to JVM byte codes
  - Stack based – 1 Stack/Thread
  - Supports multiple threads
  - Object creation/de-allocation
  - Monitors for protecting critical code sections

## Plan

- Design EVM
- Create Compiler by modifying ECL
- Implement Linux EVM & Test
- Create EVM on Lego Mindstorms
- Compare Approaches
  - Expect EVM approach to be slow
  - Expect EVM code size to be small

## Lego Mindstorms

- A Robotics Invention kit
- Brain is a Hitachi H8 Microcontroller
  - 32K External RAM
  - 16K ROM
- 3D Scanner Robot

