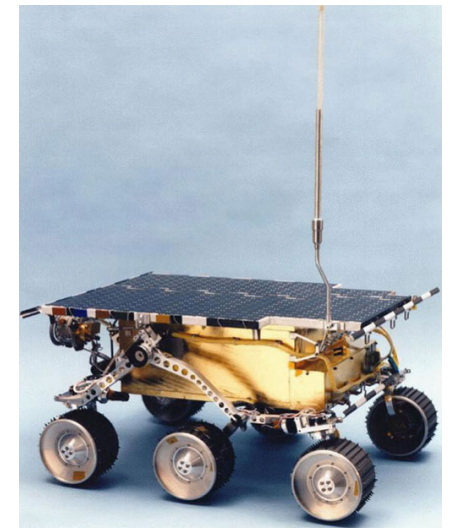


Talking to
ROBOTS
with
Pharo

Noury Bouraqadi, Luc Fabresse, Jannik Laval
<http://car.mines-douai.fr>



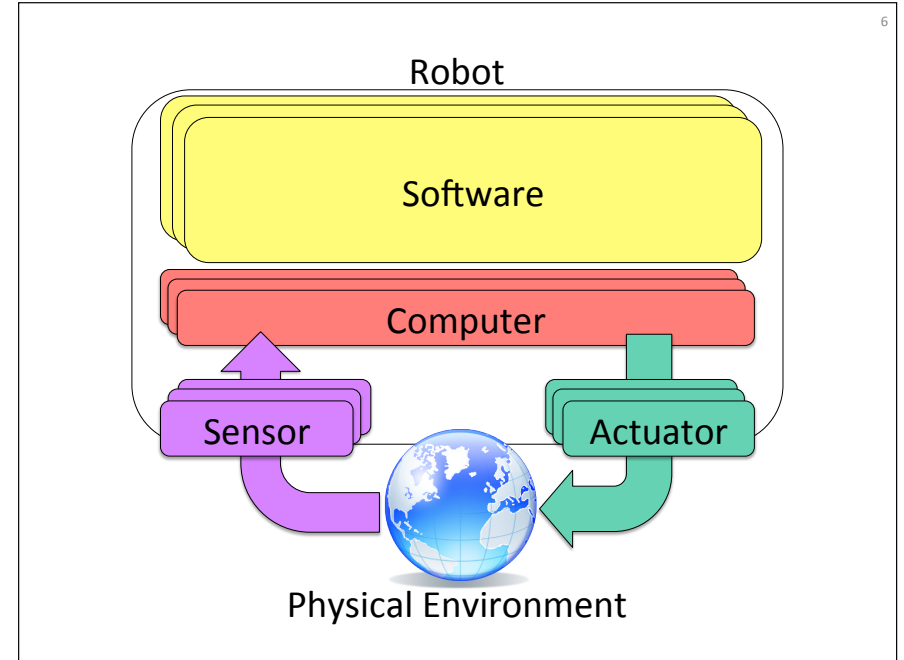
Current Robots



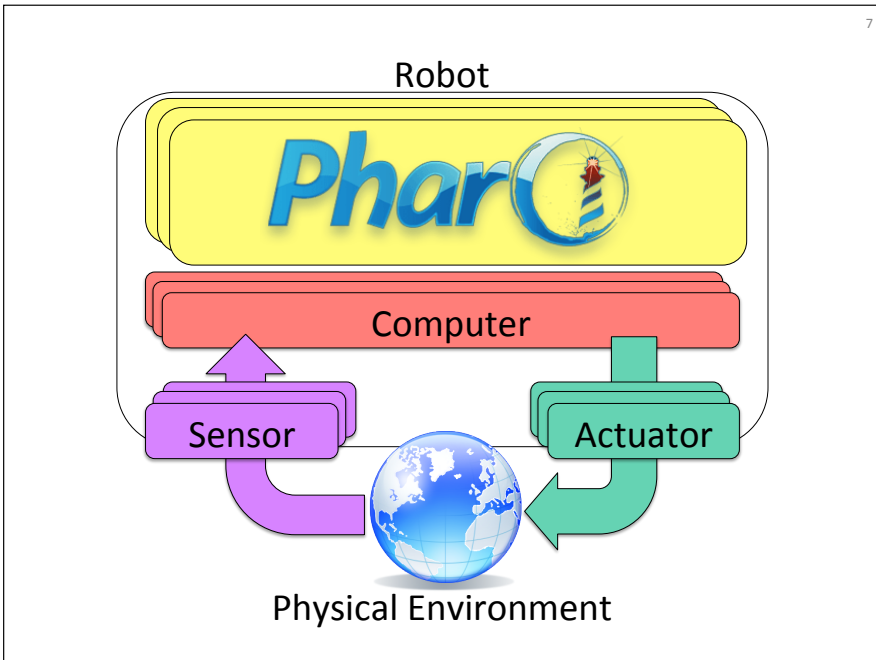
Robots at our lab



5

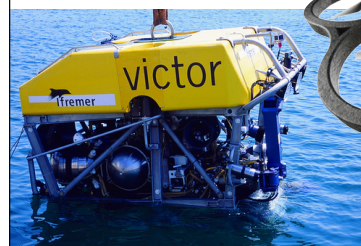
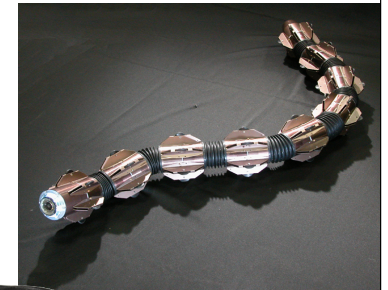


6



7

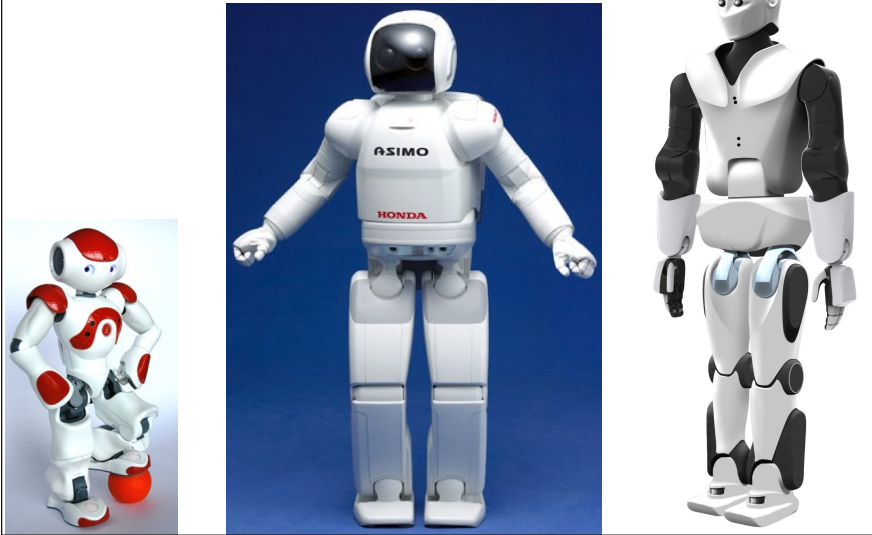
Multiple Kinds of Robots



8

Multiple Kinds of Robots

9



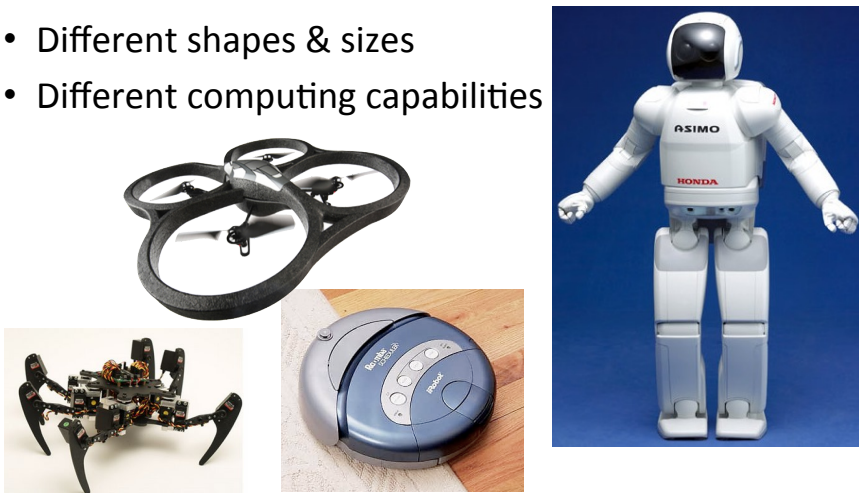
Multiple Kinds of Robots



Heterogeneity Challenge

11

- Different sensors & actuators
- Different shapes & sizes
- Different computing capabilities



Heterogeneity Challenge

12

- Different Drivers & Protocols
- Different low-level algorithms

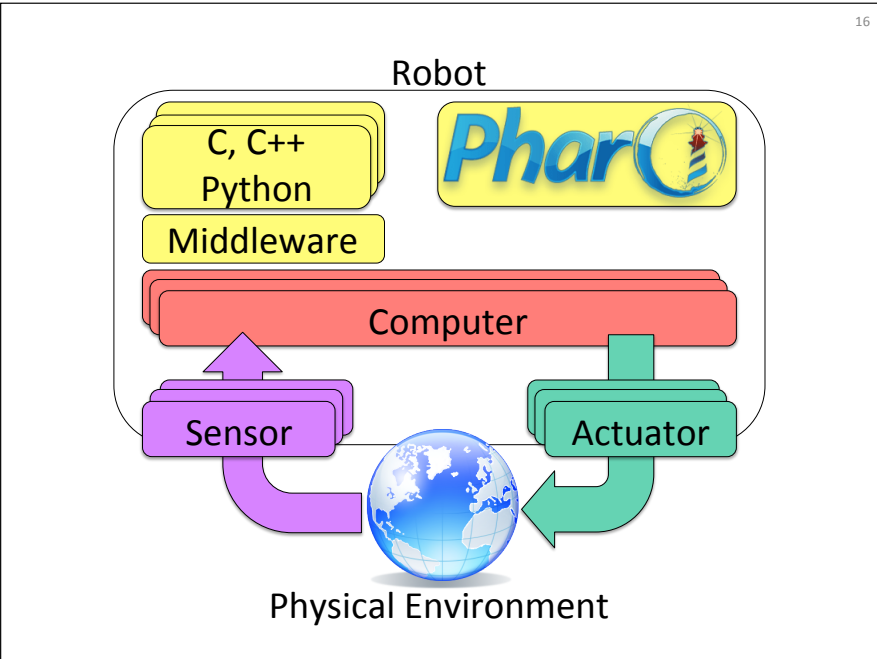
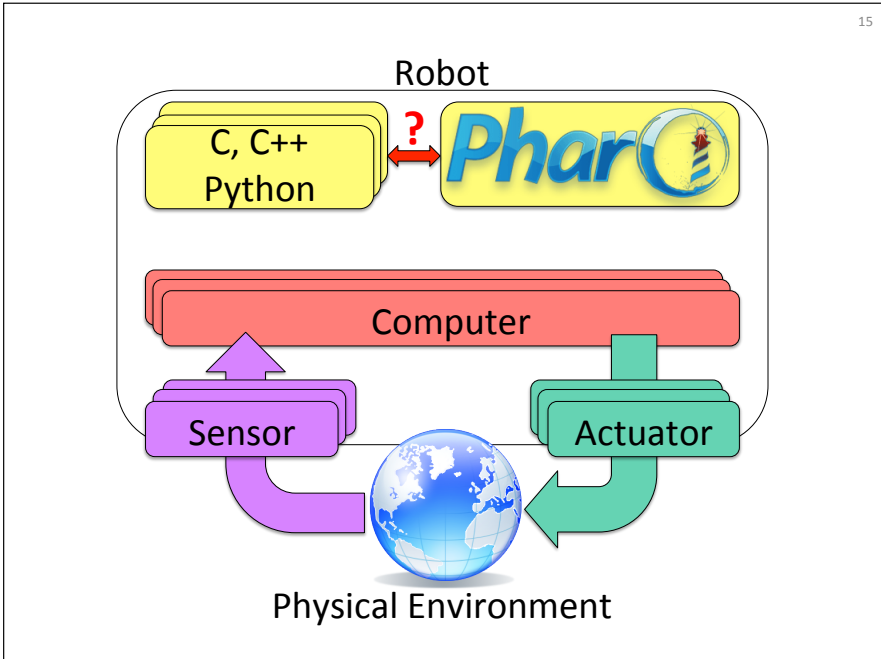
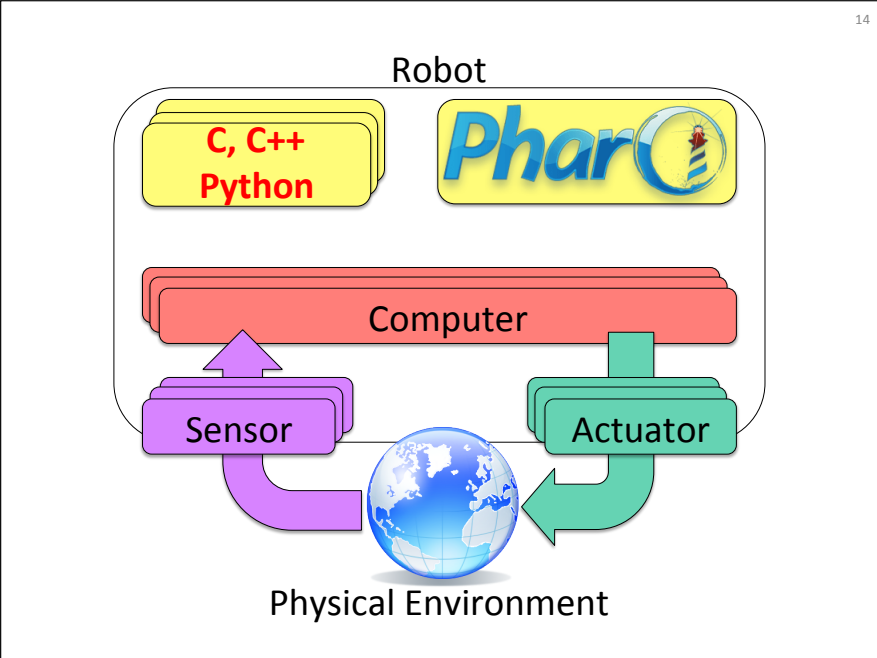


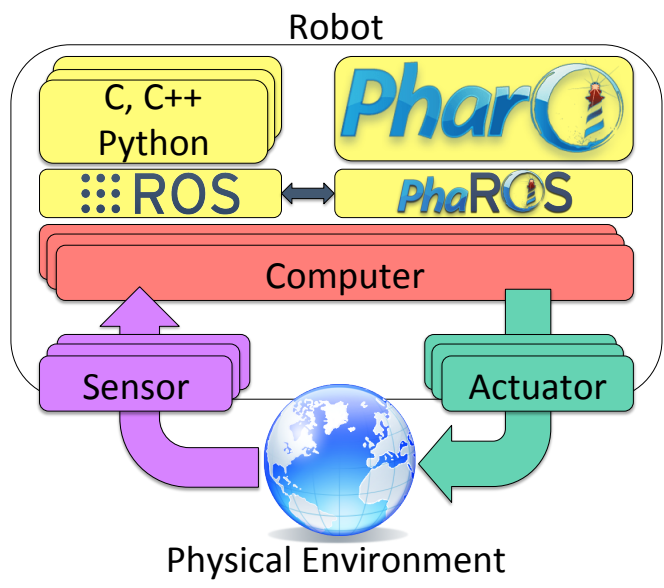
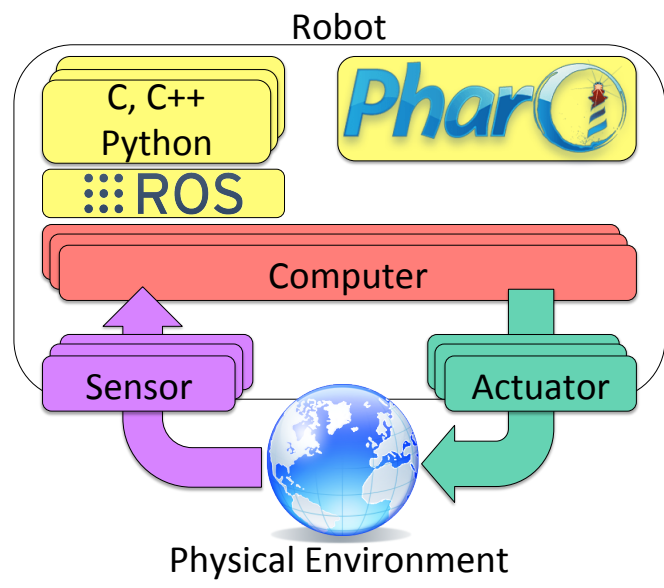
Heterogeneity Challenge

Different Drivers & Protocols

Different low-level algorithms

Implementations exist





Robot Guide using *PhaROS*

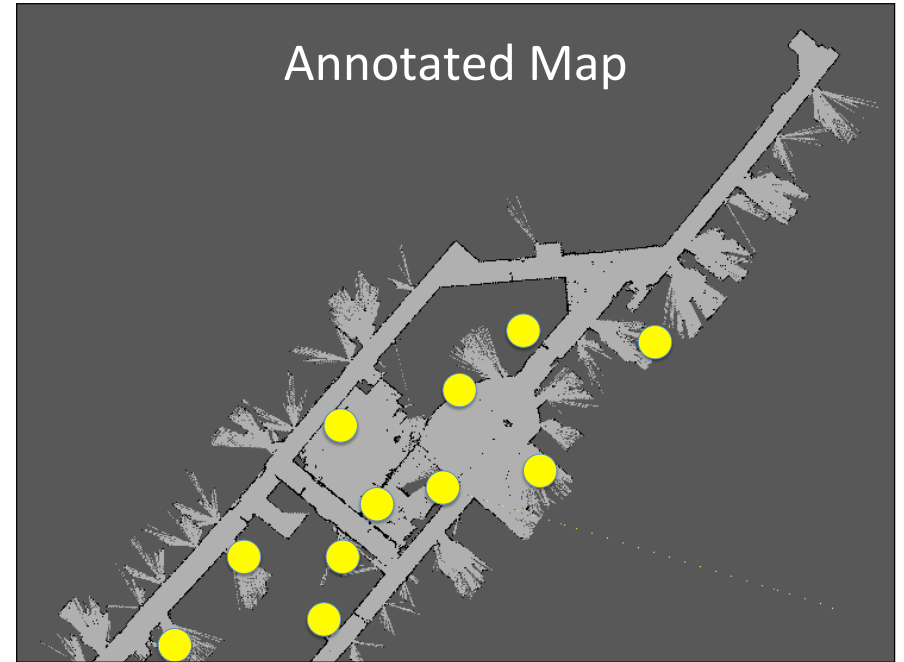
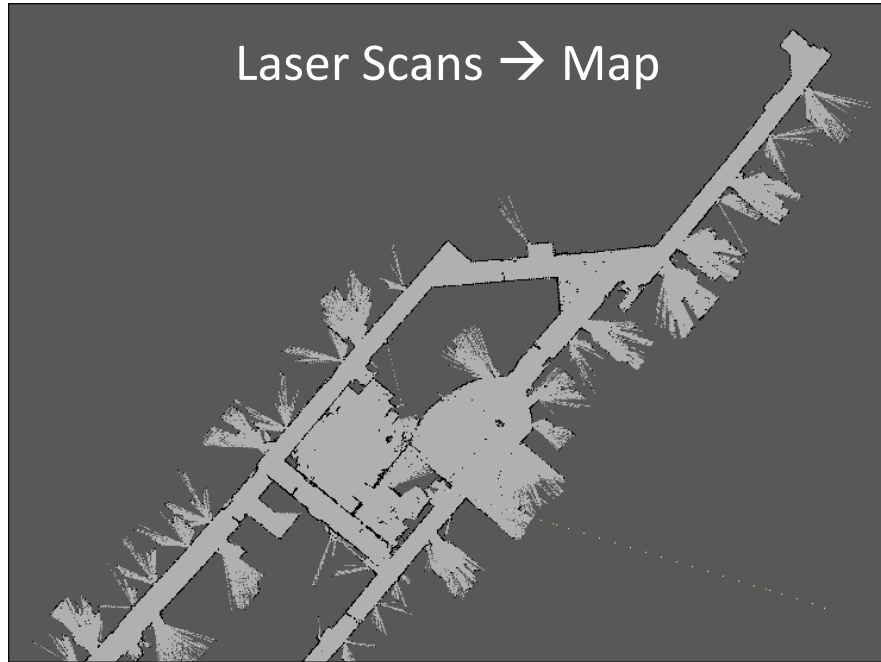
- Museum
- Hospital
- Shopping Mall
- ...



Robot Guide using *PhaROS*

- Museum
- Hospital
- Shopping Mall
- ...





Robot Guide using *PhaROS*

23

Proprietary Software

Rangefinder Odometer Motor

This slide features a photograph of a white mobile robot on the left. The robot has a vertical mast with a sensor tower and a horizontal screen. To the right of the robot, there is a diagram showing a yellow box labeled 'Proprietary Software' positioned above three stacked boxes: a purple box for 'Rangefinder', a purple box for 'Odometer', and a green box for 'Motor'.

Robot Guide using *PhaROS*

24

Path Planner

ROS

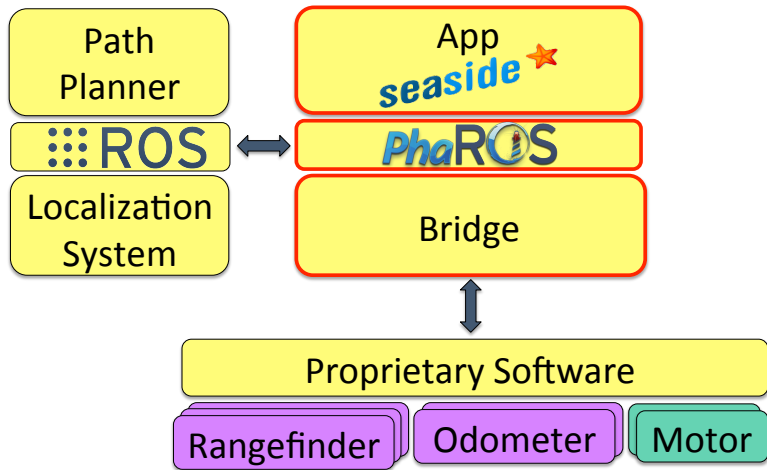
Localization System

Proprietary Software

Rangefinder Odometer Motor

This slide contains a block diagram of the robot's software stack. At the top, a yellow box is labeled 'Path Planner'. Below it is a yellow box with the ROS logo and the text 'ROS'. Underneath that is another yellow box labeled 'Localization System'. At the bottom, a yellow box labeled 'Proprietary Software' sits above three stacked boxes: a purple box for 'Rangefinder', a purple box for 'Odometer', and a green box for 'Motor'.

Robot Guide using *PhaROS*



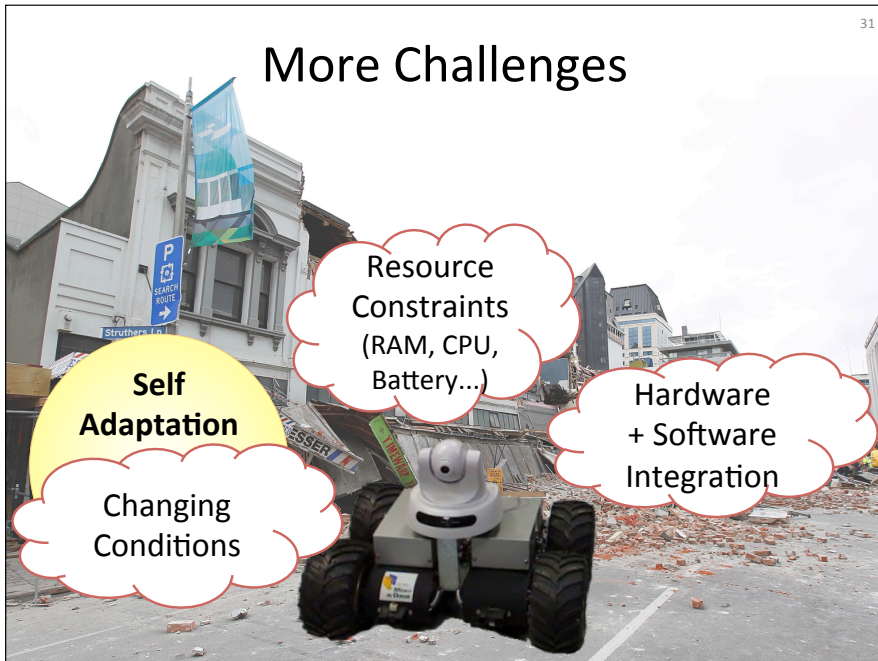
More Challenges



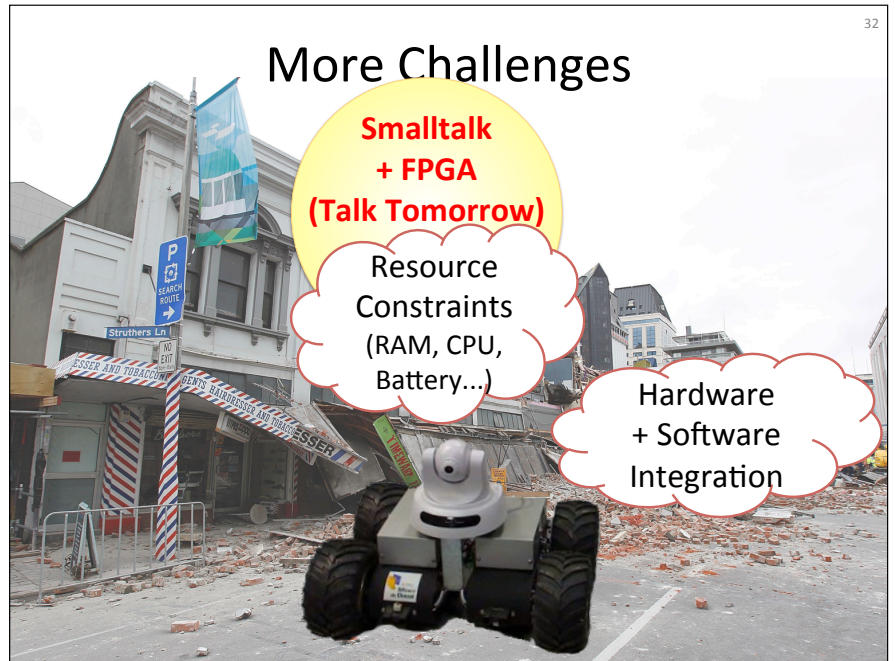
More Challenges



More Challenges



More Challenges



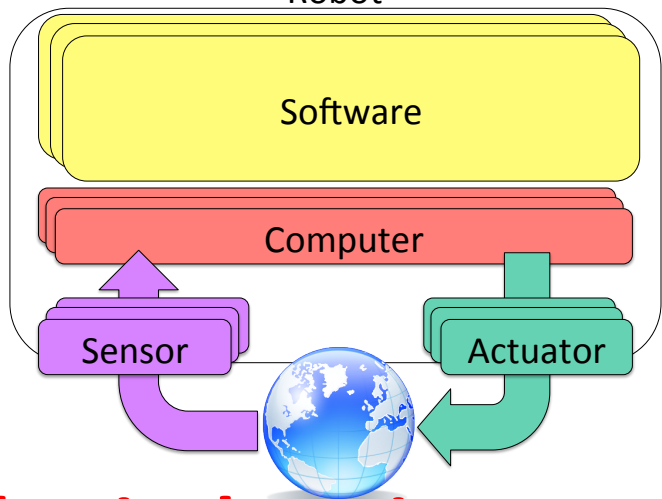
More Challenges



More Challenges

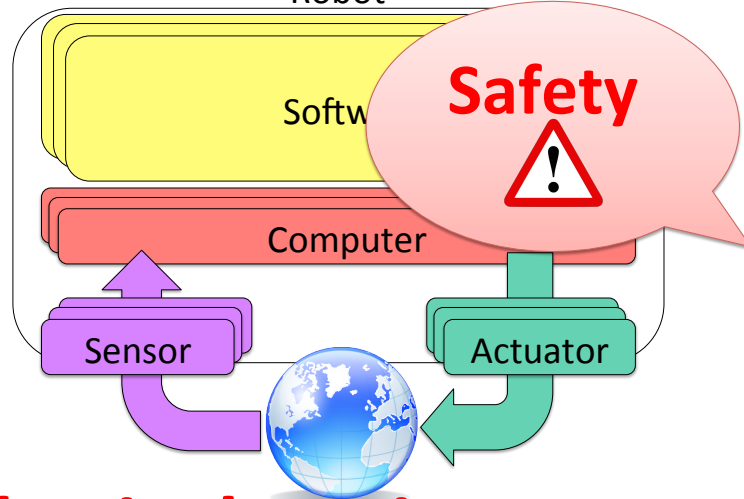


Robot

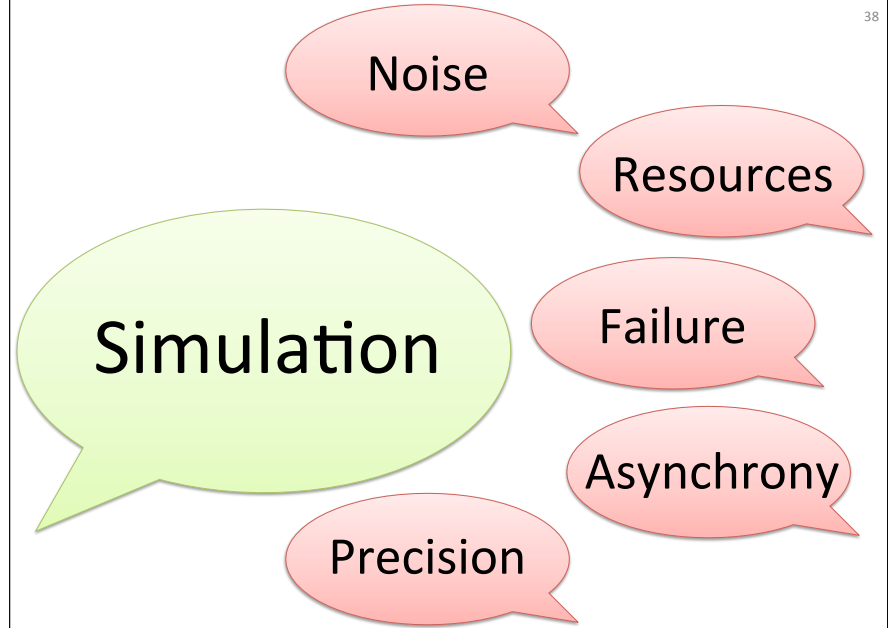
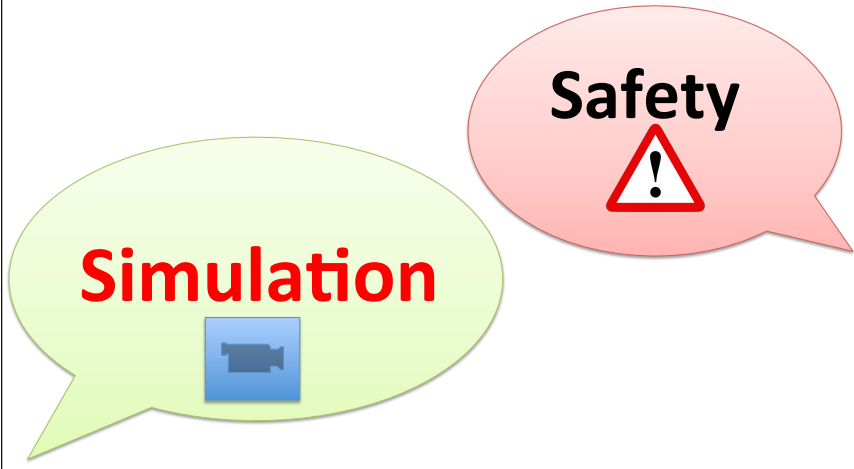


Physical Environment

Robot



Physical Environment



Methodology for Safe TDD

- Ensure **emergency stop** working!

Methodology for Safe TDD

- Ensure **emergency stop** working!
- **Order** tests
 - Sensors before actuators
 - Controlled environments before open ones
 - Static environments before dynamic ones

Methodology for Safe TDD

- Ensure emergency stop working!
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Methodology for Safe TDD

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BoTest
Framework

the
Future
is
Robotics



Big Players Invest in Robotics

- Amazon Drones for Parcel Delivery



Big Players Invest in Robotics

- Google Self-Driving Car



Big Players Invest in Robotics

- Google Self-Driving Car



Google Bought 8 Robotics Companies in 2013!

the
Future
 is
Robotics

the
Future
is
Robotics
Let's make it with
Smalltalk



Noury Bouraqadi, Luc Fabresse, Jannik Laval
<http://car.mines-douai.fr>

