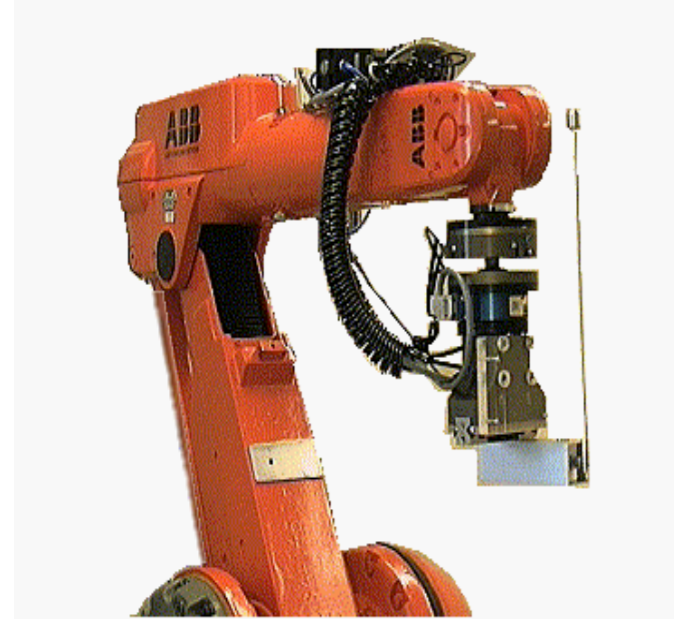
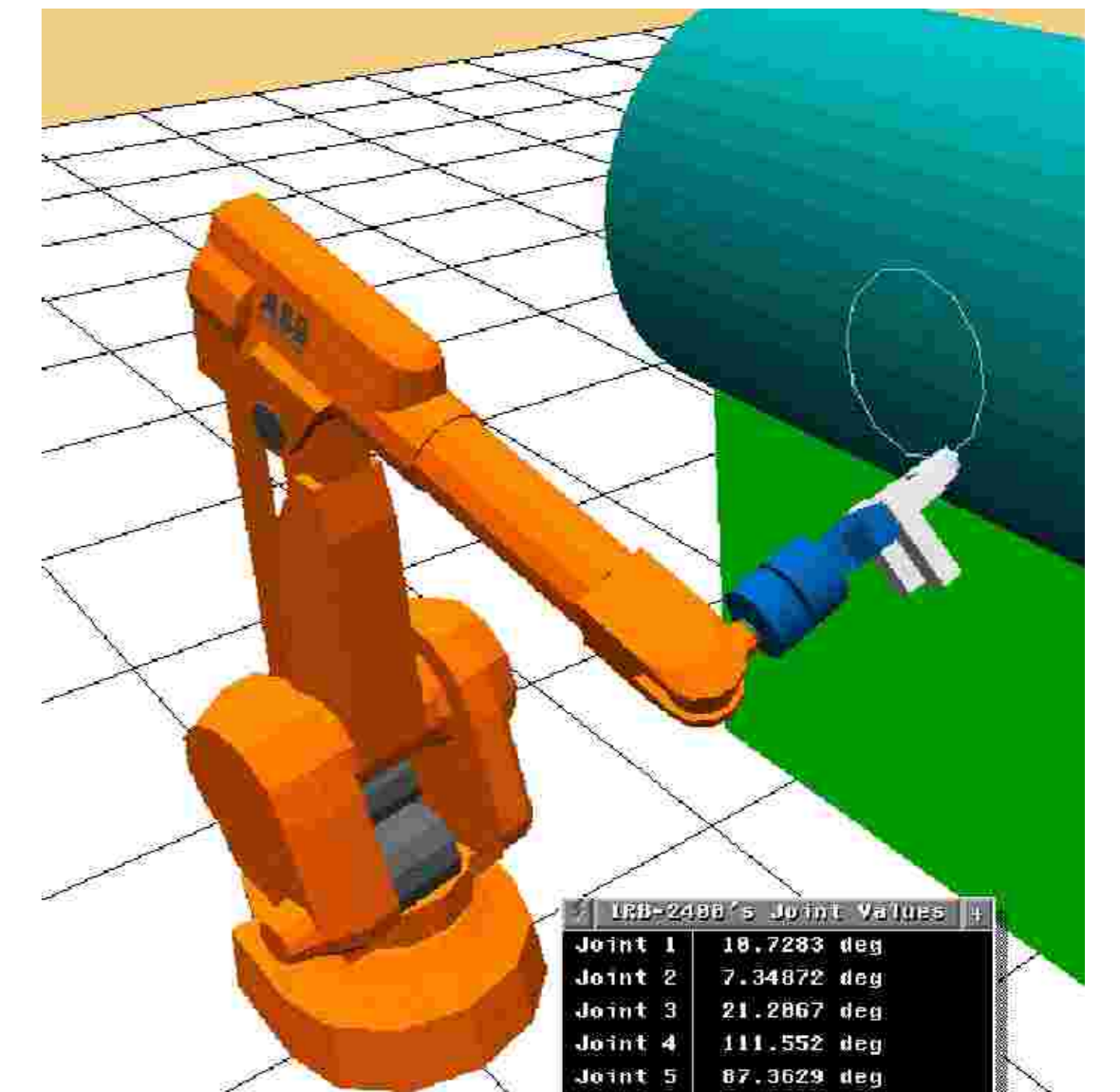


# Productive Robotics @ LTH

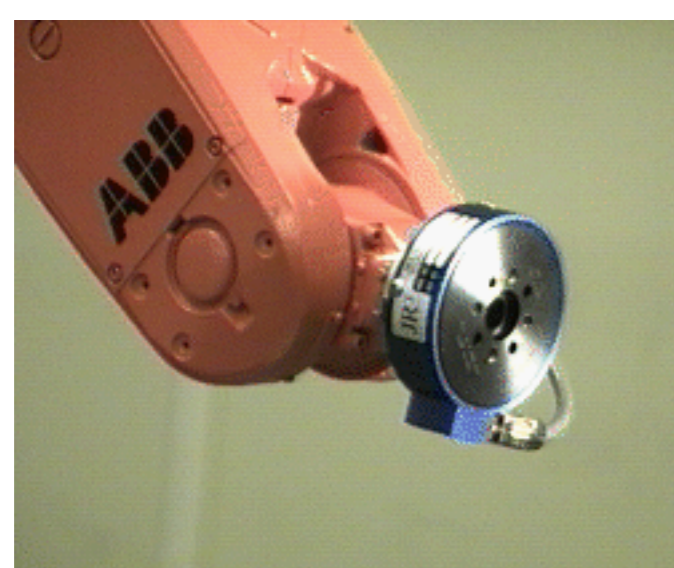


Balance an inverted pendulum using the robot. Illustrates an inhouse developed robot controller supporting integration of sensor information below the task level normally supported in industrial controllers.

Robot control systems and other manufacturing equipment are traditionally closed. This circumstance has hampered system integration of manipulators, sensors and other equipment. As a result, such system integration has often been made at an unsuitably high hierarchical level.



The environment of robots are dynamic and must be observed by perceptual equipment. For adaptation of task realizations to the environment, the robot control system must have the ability to support and react to the observed information.



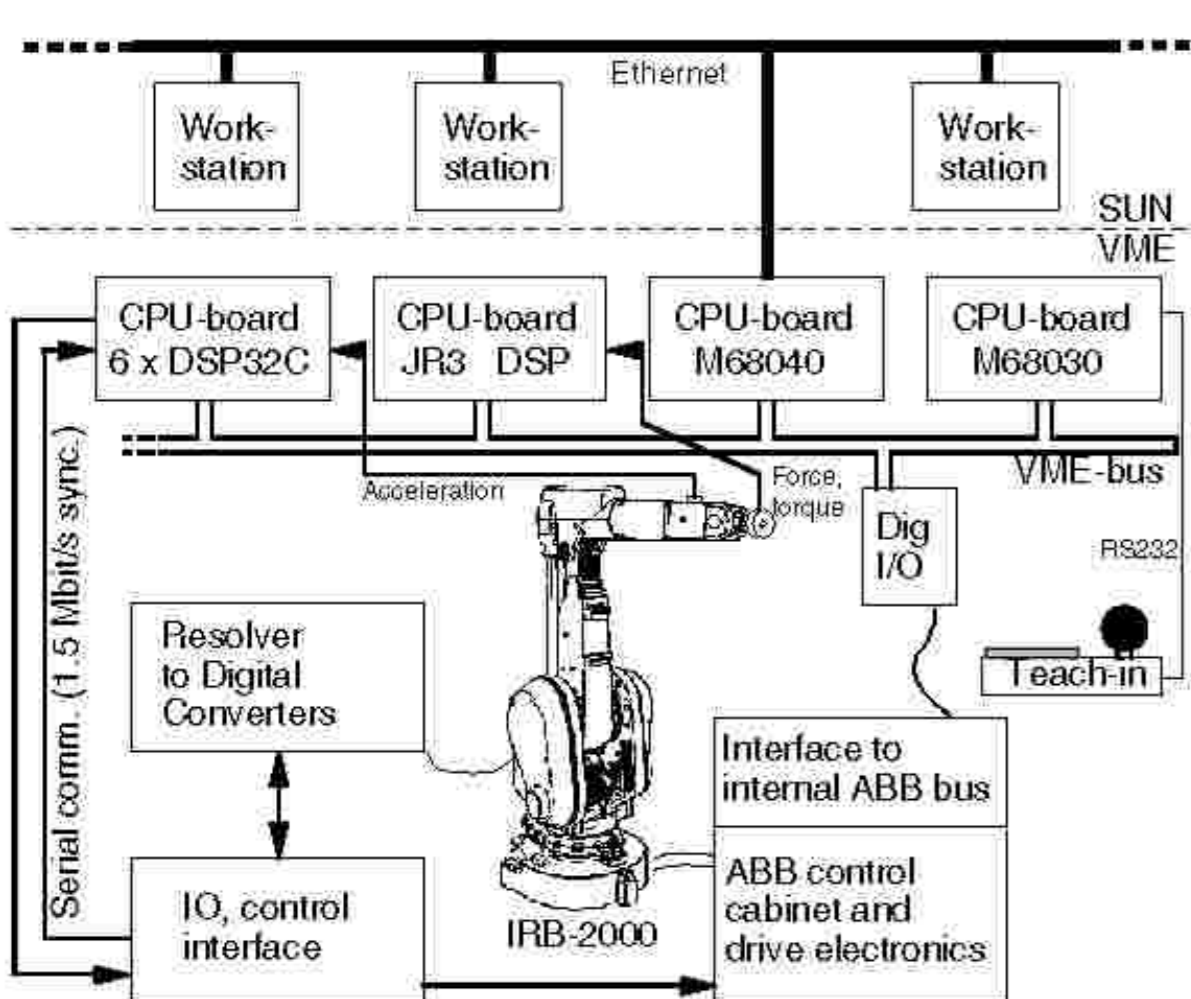
A force sensor mounted on an industrial robot in the robot laboratory.

The purpose of past and present projects is to show how to organize open robot control systems and to verify these ideas by means of experimental verification.



Eye-in-hand mounted analog camera used for visual servoing experiments where image information from cameras are used to directly control the robot.

As a part of this research, we have developed several experimental open robot control systems. The systems are built around industrially available robots that have been reconfigured for experimental purposes.



Hardware configuration of the in-house developed open robot control system for an Irb 2000 robot (originally using an ABB S3 controller).

The developed specific robot interfaces and the integration of the robots into a complete system forms a unique environment for testing and development of algorithms for improvement of performance, sensor integration, programming automation and autonomous operation.

Url: <http://www.robot.lth.se>

## Examples of research interests represented in Robotics Lab:

- Open Control Software Architectures
- Exteroceptive Robots
- Force Control
- Robot Vision
- Sensor Fusion
- Adaptive and Iterative Learning Control
- Task-level Programming

## Involved departments att Lund Institute of Technology:

- Automatic control
- Computer Science
- Mechanical Engineering, Division of Robotics
- Industrial Electrical Engineering and Automation
- Mathematics

## NETWORK AND PARTNERS:

### Industrial partners

- ABB
- Kranendonk
- KPS Rinas

### Universities

- University of Coimbra
- Polytechnical University of Valencia
- University of Illinois
- KU Leuven
- University of Cambridge

### Research institutes

- Fraunhofer IPA
- DLR

