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Who are we?

- KU Leuven, Belgium, Department Mechanical Eng., Robotics Research
- Founders of the Open Robot Control Software - www.orocos.org
  - Real-Time Toolkit (RTT)
  - Kinematics and Dynamics Library (KDL)
  - Bayesian Filtering Library (BFL)
Outline

- RTT2.0 - ROS integration
- Implementing iTaSC on PR2
- Integrate with Blender
- ... and more
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Willow Garage – PR2 Beta Program
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RTT-ROS. What is our vision?

- RTT2.0 is optimal for managing software components (state machines, service management, supervision, ...)
- ROS as middleware and development tools
- ROS provides large amount of stacks
- They have similar semantic mapping
  - Topics - Ports
  - Services - Operations
  - Parameters - Properties
- Works as plug-in, no extra code or ROS/OROCOS specific code required by user
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RTT-ROS. Topics vs Ports

/NOEDE → /TOPIC

Connection

ROS

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RTT-ROS. Service vs Operations

ROS Service

RTT Interface Component Generated from srv-code

Services Interface

C++ functions:
- Callbacks
- Algorithms

Dynamic functions:
- State Charts
- Program scripts

Provides
Requires

/NODE

Willow Garage – PR2 Beta Program
Introduction

ROS - RTT

iTaSC

Blender

What else?

RTT-ROS. Parameters vs Properties

Param Server

Property Component

Properties

ROS

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What is iTaSC?

- instantaneous Task Specification using Constraints
- define motions based on constraints
- in any feature space, including estimation and automatic derivation of control equations
- include iTaSC methodology in ROS
- Illustrate iTaSC with the PR2
What is iTaSC?
What is Blender?

- FOSS
- 3D content creation suite
- Aimed at computer animators
Why Blender?

- Use it as both visualiser and simulator
- Large community
- Photo-realistic rendering
- Ideal virtual lab:
  - Lighting situations
  - Materials
  - Physics engine
MORSE

- Multi Open Robots Simulator Engine
- Based on Blender Game Engine
- Common effort between KUL, ONERA, and LAAS
- Official first release expected June 2010
- Current middleware efforts:
  - ROS
  - CORBA
  - YARP
  - TCP/UDP streams
- Include PR2 model + kinematics
What else?

- Robotics Scene Graph (COLLADA)
- Multi-Target Tracking and Localization (MTTL)
Demos

- PR2 follows human in crowded environment
- Using MTTL algorithm
- Shared manipulation between human and PR2
- Specified using iTaSC methodology