The Robot-Era Domestic Robot: Kinova Jaco and MoveIt!

MoveIt! tutorial, ICRA-2013

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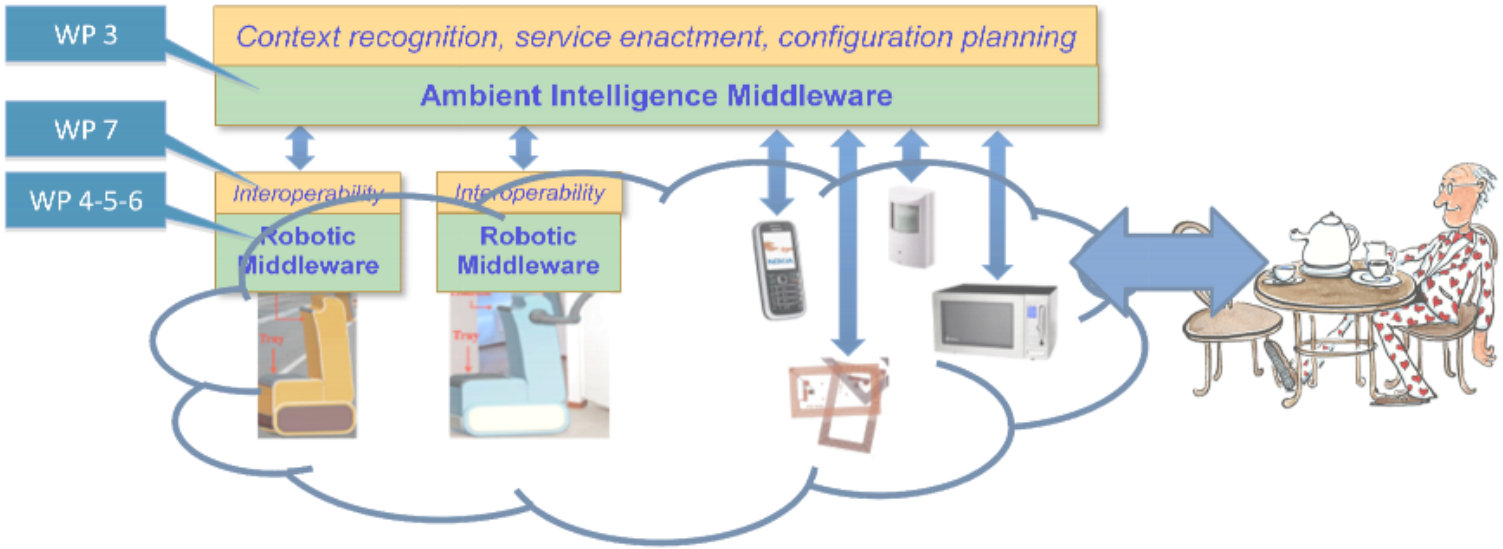
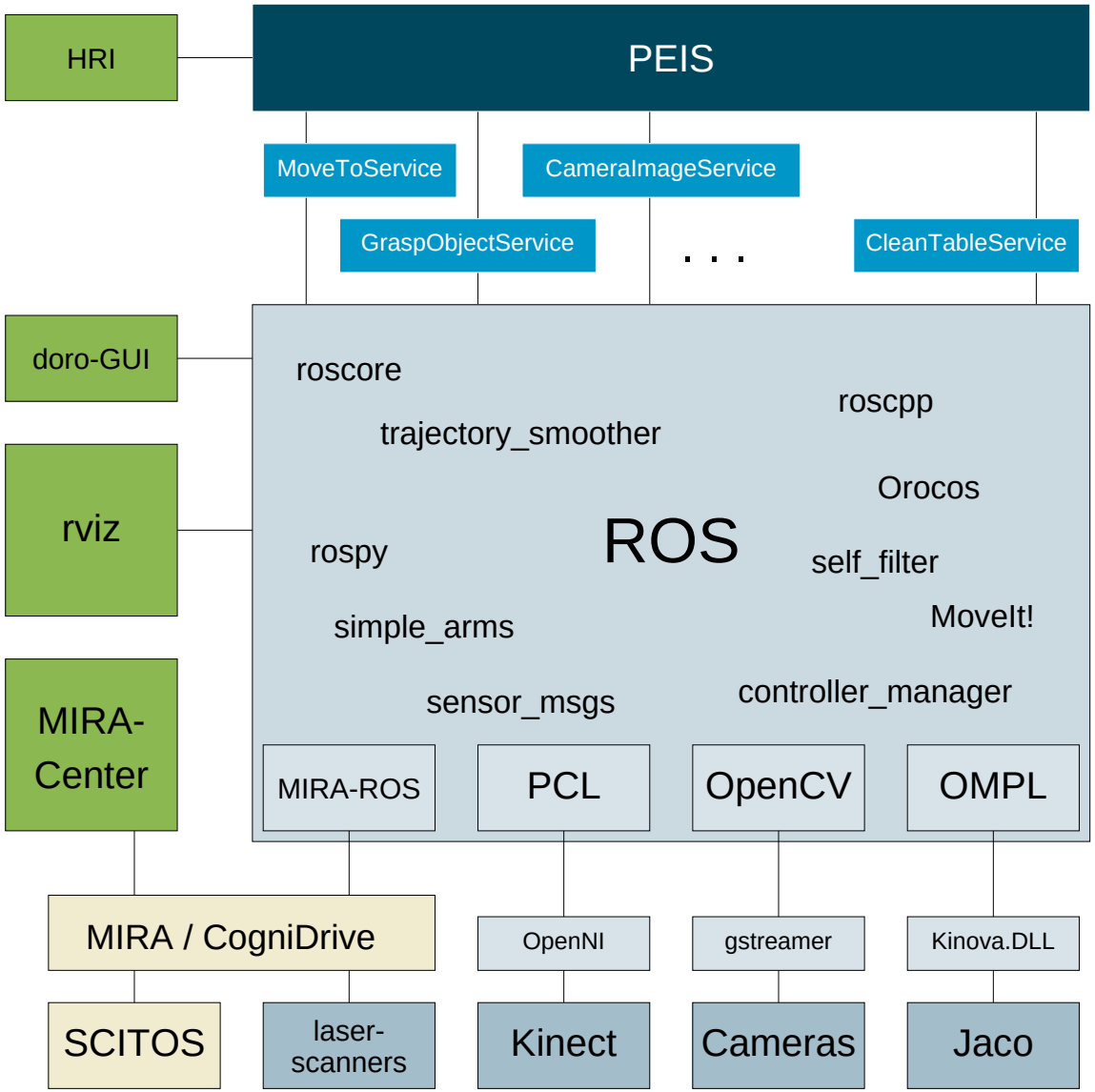
Robot-Era: Service Robots for Elderly Care



- three robots: outdoor, condominium, domestic
- PEIS ambient sensor network, tablet + speech HRI
- EU-FP7 project, 12 partners, 48 months
- ROS for robot-control, manipulation, simulation

Domestic Robot: manipulation services

- differential-drive platform, sensor-head
- one Kinova Jaco arm with gripper
- prototypes about 70K EUR


HRI
PEIS
MoveToService
CameraImageService
GraspObjectService
. . .
CleanTableService
doro-GUI
rviz
MIRA-Center
roscore
roscpp
trajectory_smoother
Orocos
ROS
rospy
self_filter
MoveIt!
simple_arms
sensor_msgs
controller_manager
MIRA-ROS
PCL
OpenCV
OMPL
MIRA / CogniDrive
OpenNI
gstreamer
Kinova.DLL
SCITOS
laser-scanners
Kinect
Cameras
Jaco

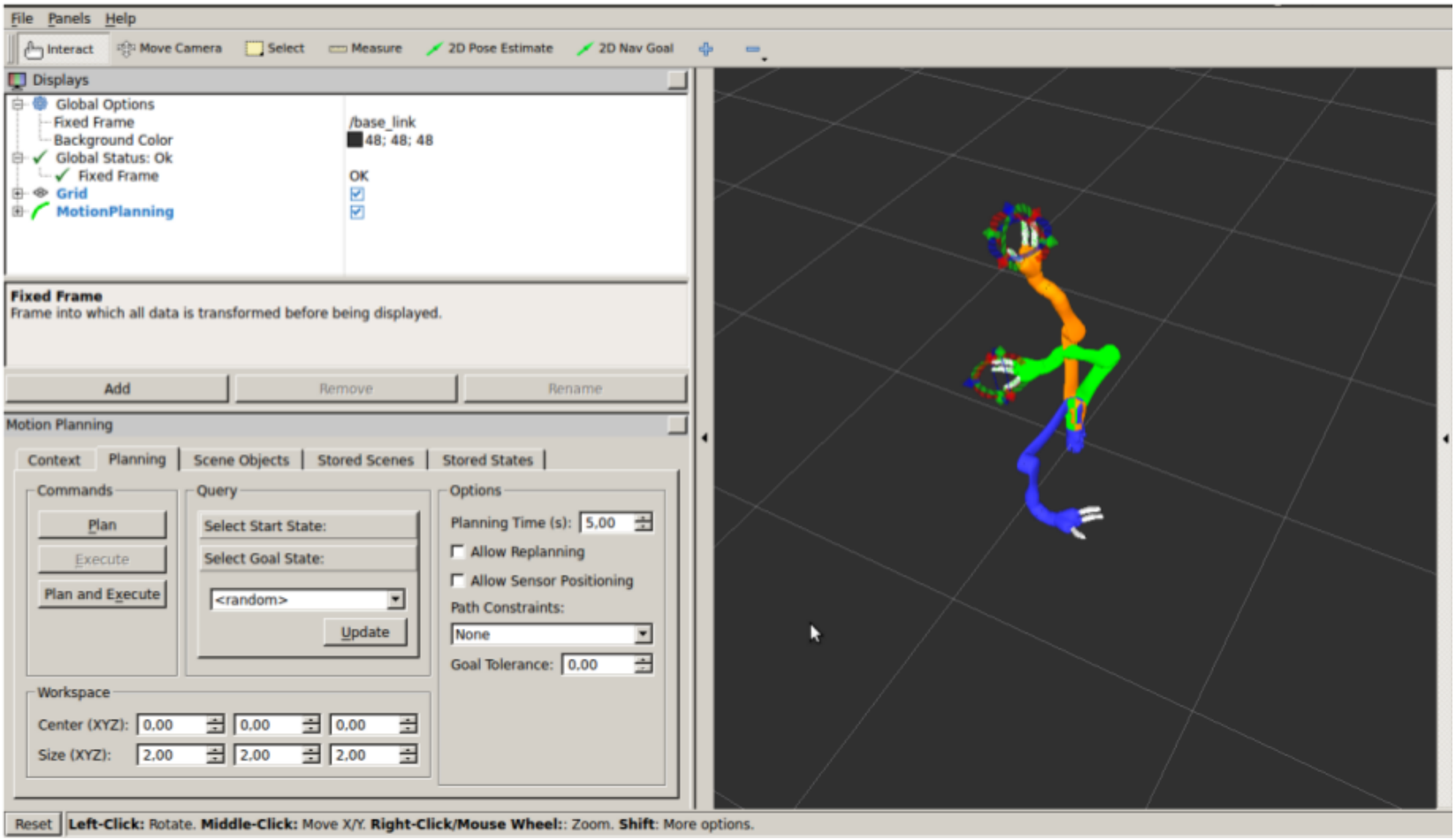

SCITOS G5

Doro manipulator: Jaco arm

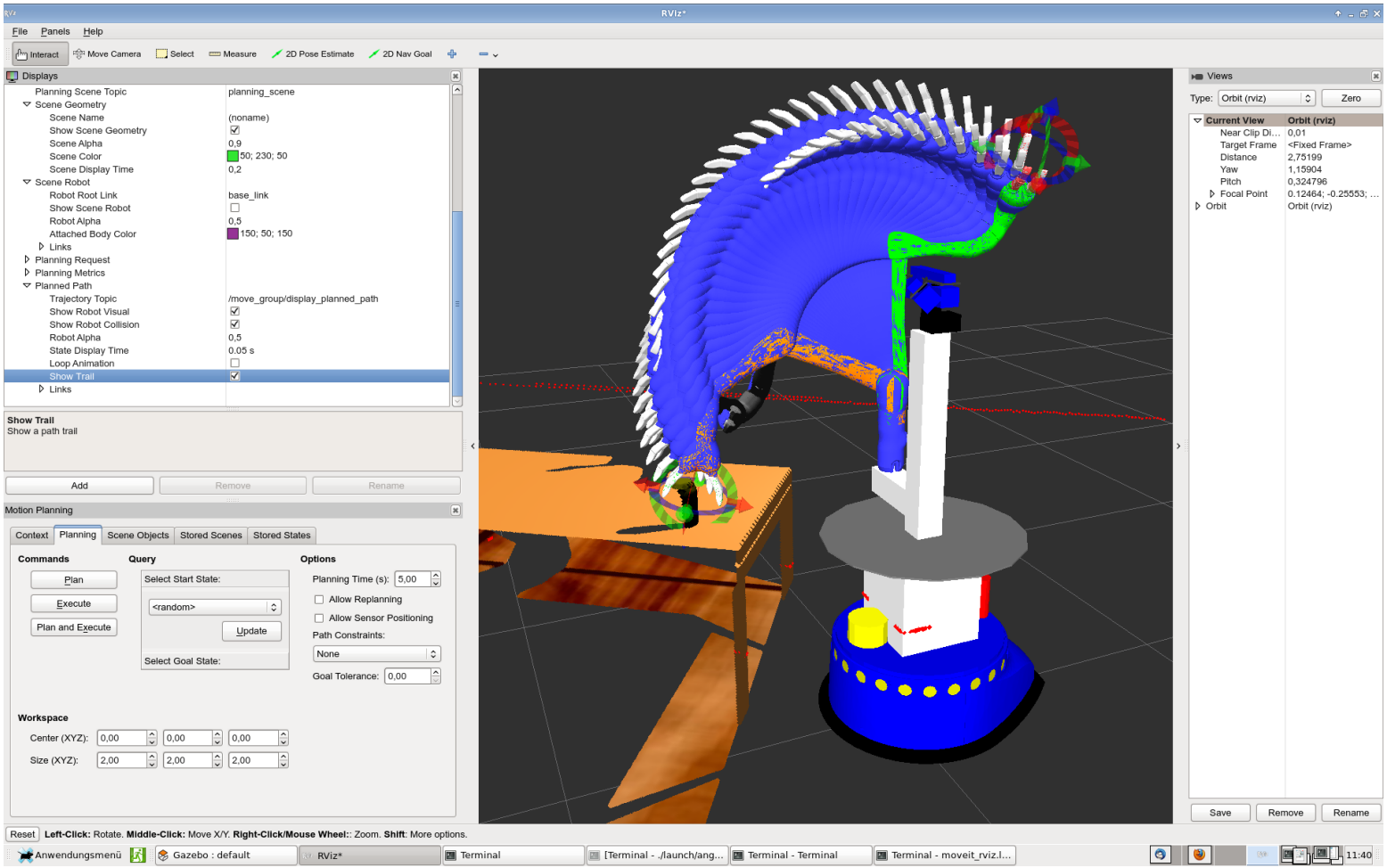
designed by Kinova Canada:

- rehabilitation + wheelchair use
- very good joystick control
- useful 3-finger gripper
- slow but safe (no brakes!)
- payload 1.5 kg, total weight 5 kg
- 6-DOF, 1 m reach
- unusual kinematics
- Windows .NET software
- basic ROS node, but no robust IK

MoveIt! standalone Jaco arm



MoveIt! works out of the box



MoveIt! status and future work

- setup is really easy, assistant works fine

- trajectory planning and generation works
- trajectory replay on Jaco works
- missing Kinova IK not a problem anymore

- self-collision model not perfect
- OMPL/RRT fast enough
- mixing Fuerte (Gazebo) and Groovy (MoveIt) ok
- working on the gripper now

Discussion

- Thanks for your attention!
- Questions?
  - www.robot-era.eu/
  - hendrich@informatik.uni-hamburg.de

- ROS incredibly useful
- MoveIt! very promising

- Acknowledgments: funding by project Robot-Era, FP7-288999