(how we are) Building Blocks for Mobile Manipulation (that you can use)

Brian Gerkey

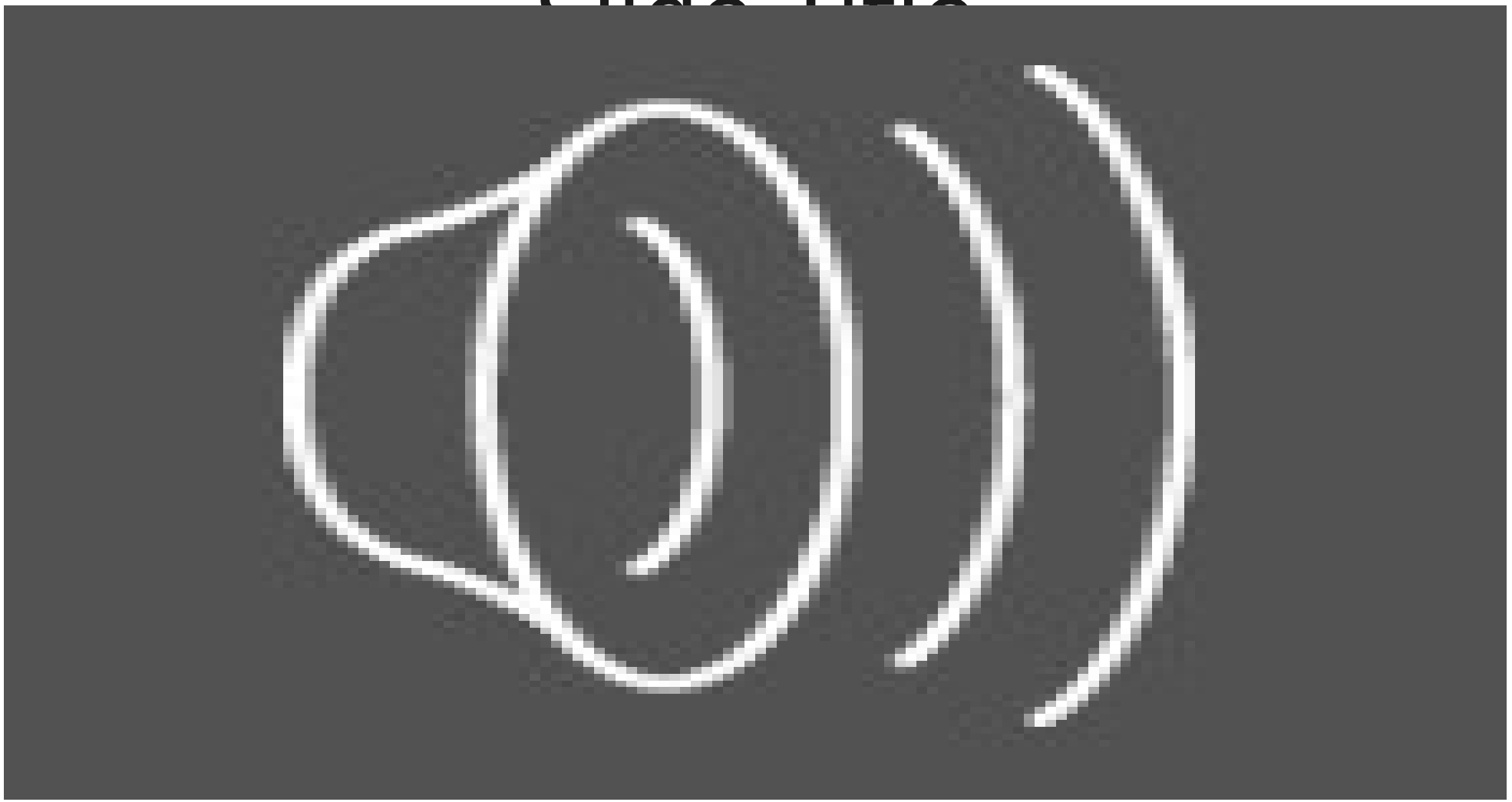
Willow Garage

- Navigation (real)
- Navigation (ICRA experiments in sim)
- Door-opening (real)
- Door-opening (sim)
- Plug-in (m2)
- Calibration (real)
- Web interface (screenshots)
- Plug-in (24-hour)
- Plug-in (sim)
- Rviz (montage)
- Ioan arm planning (real)
- ICRA manip demo (real)

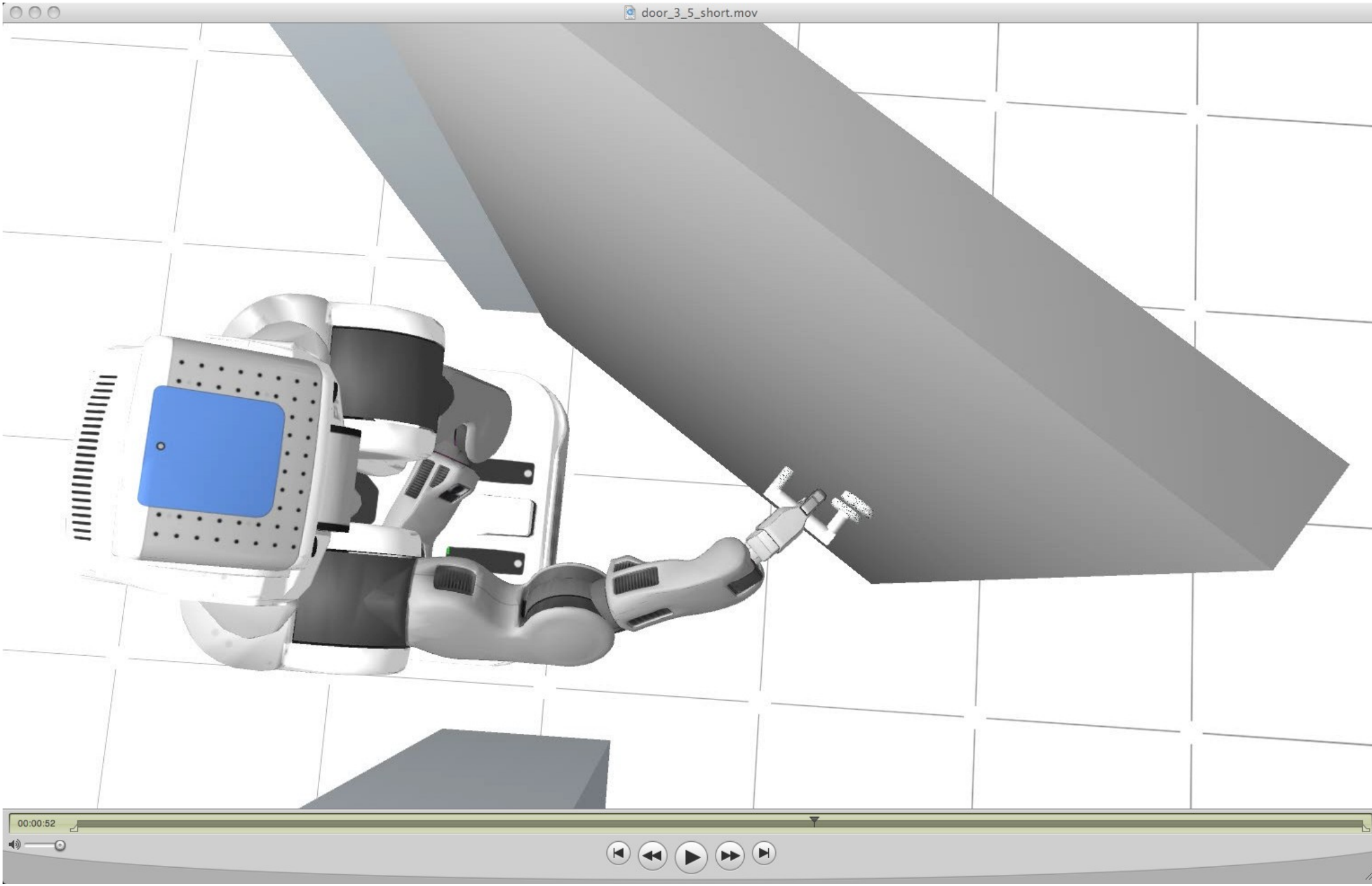
Building blocks

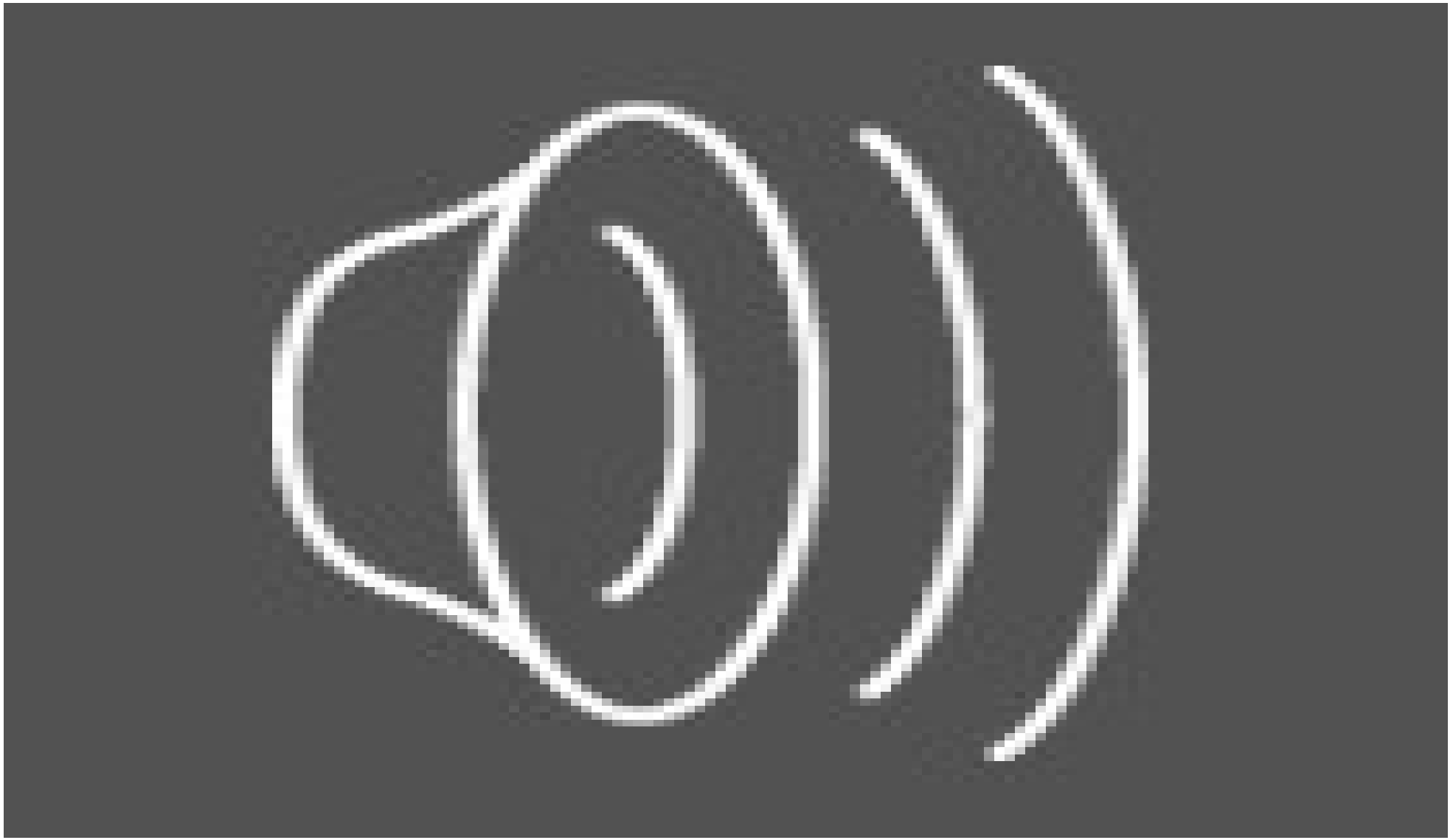
- Robots are more useful and easier to use if they have some basic capabilities
- Even “solved” problems entail significant implementation effort
- Important to know that your building block works
- Important to know that it **continues to work**
- Big benefit of packaging it up for reuse

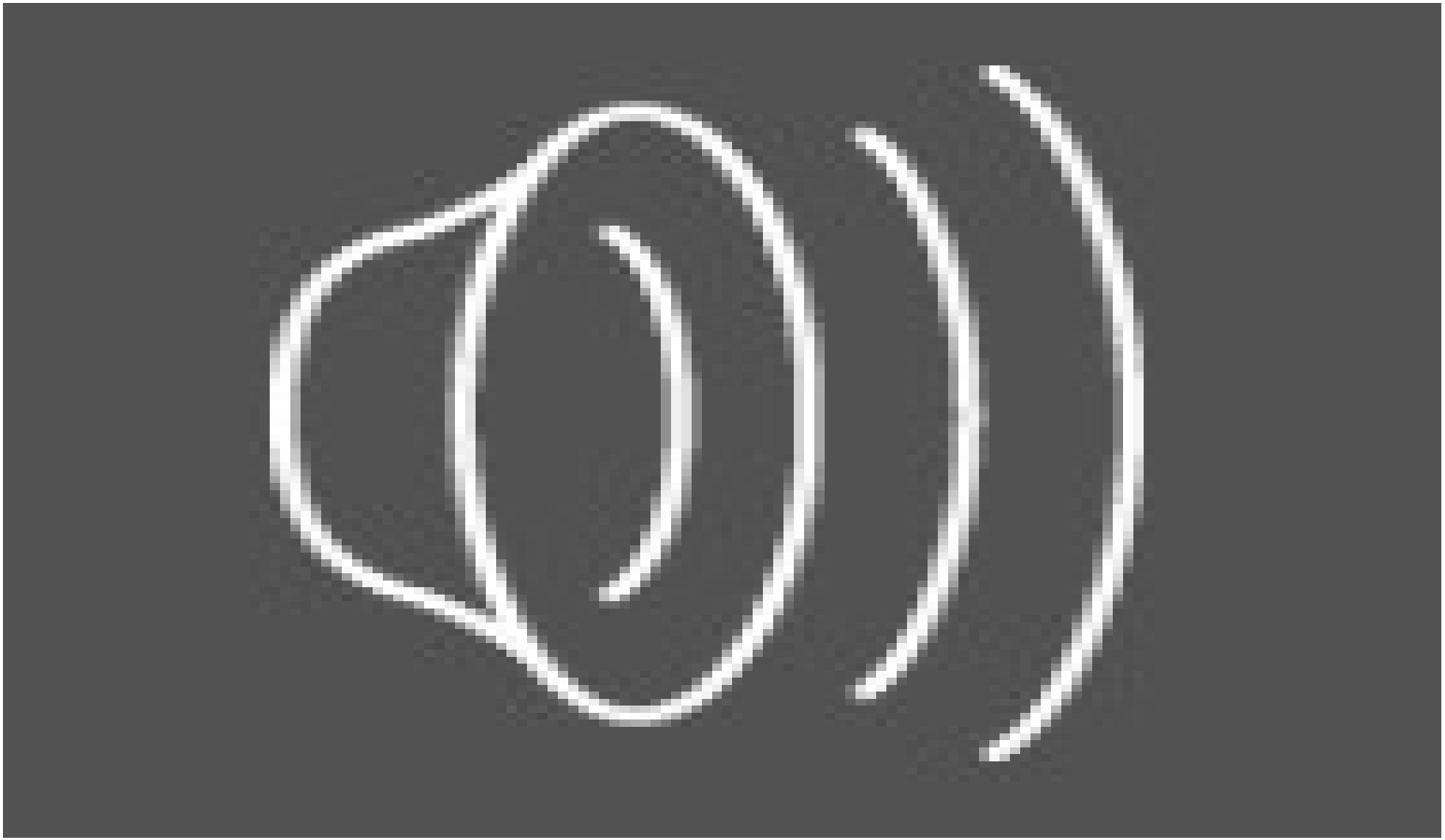
Slide Title



Willow Garage


door_3_5_short.mov
00:00:52





pr2_calibration/ Tutorials/ Calibrating the PR2

Wiki
ROS
StackList
RecentChanges
FindPage
Calibrating the PR2

Page
Edit (Text)
Info
Subscribe
Add Link
Attachments
More Actions:

User
BrianGerkey
Settings
Logout

1. PR2 Full System Calibration

Description: Calibrating the PR2's cameras, and kinematic parameters

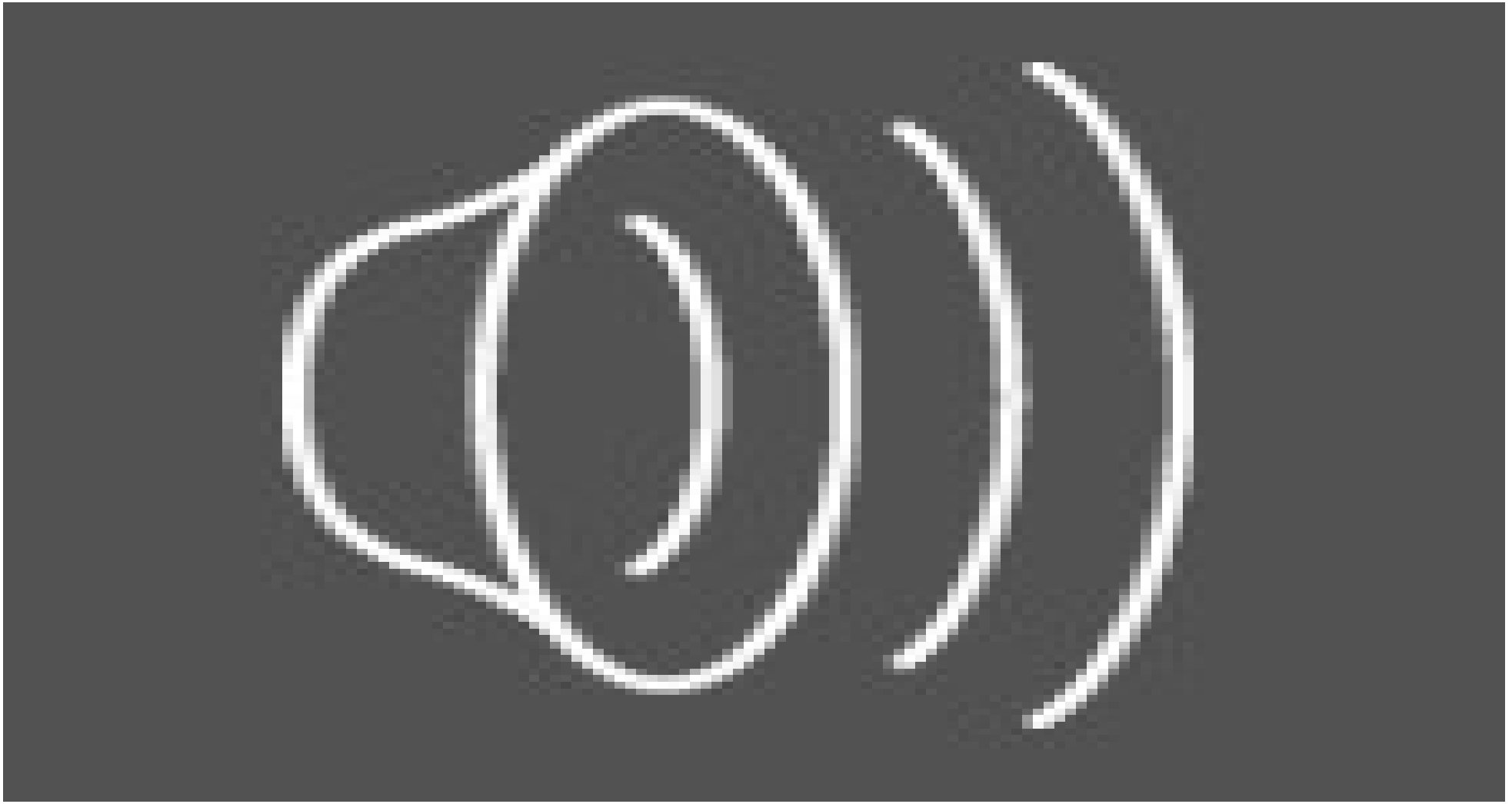
Tutorial Level: INTERMEDIATE

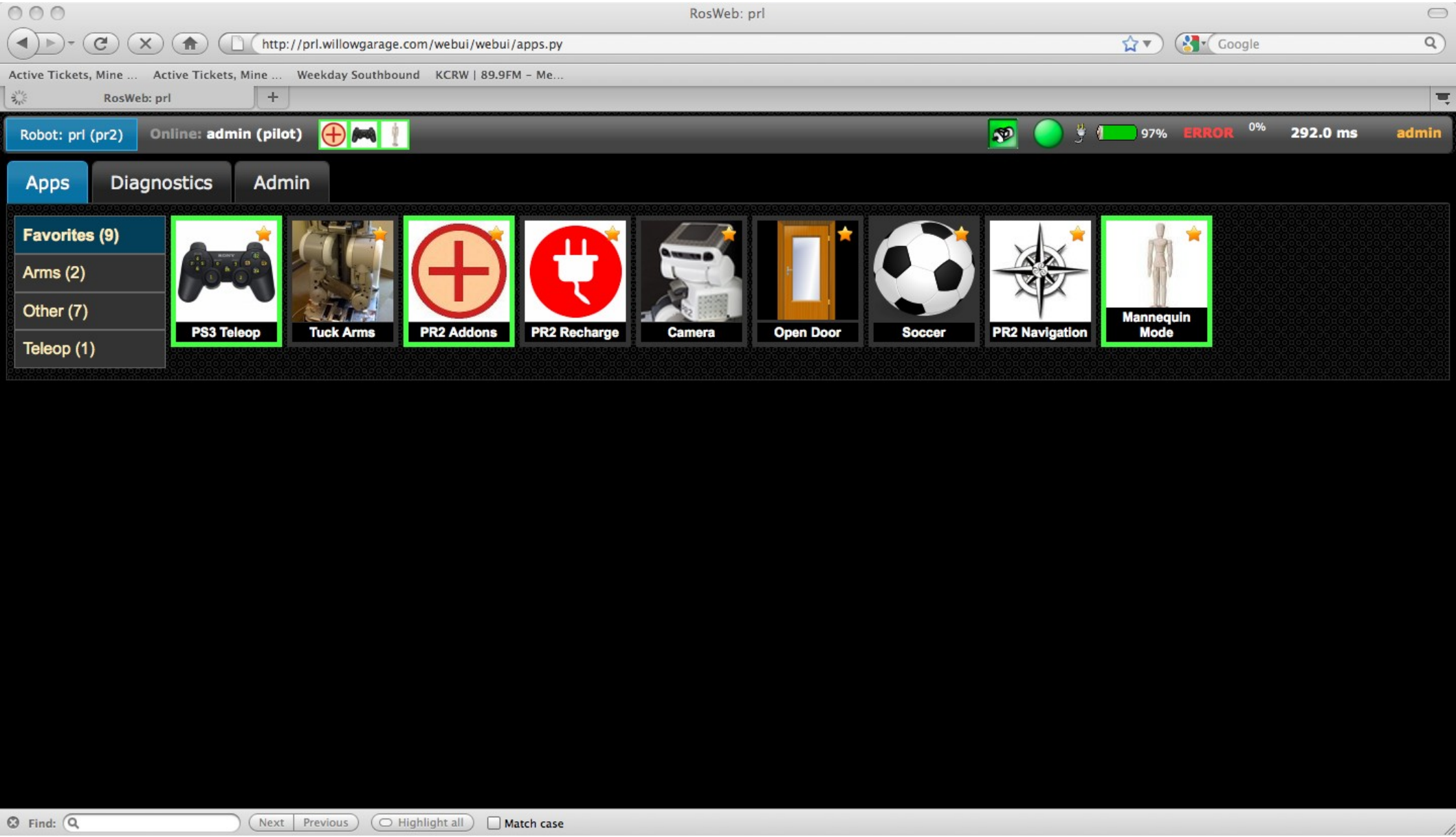
2. Checkout and build

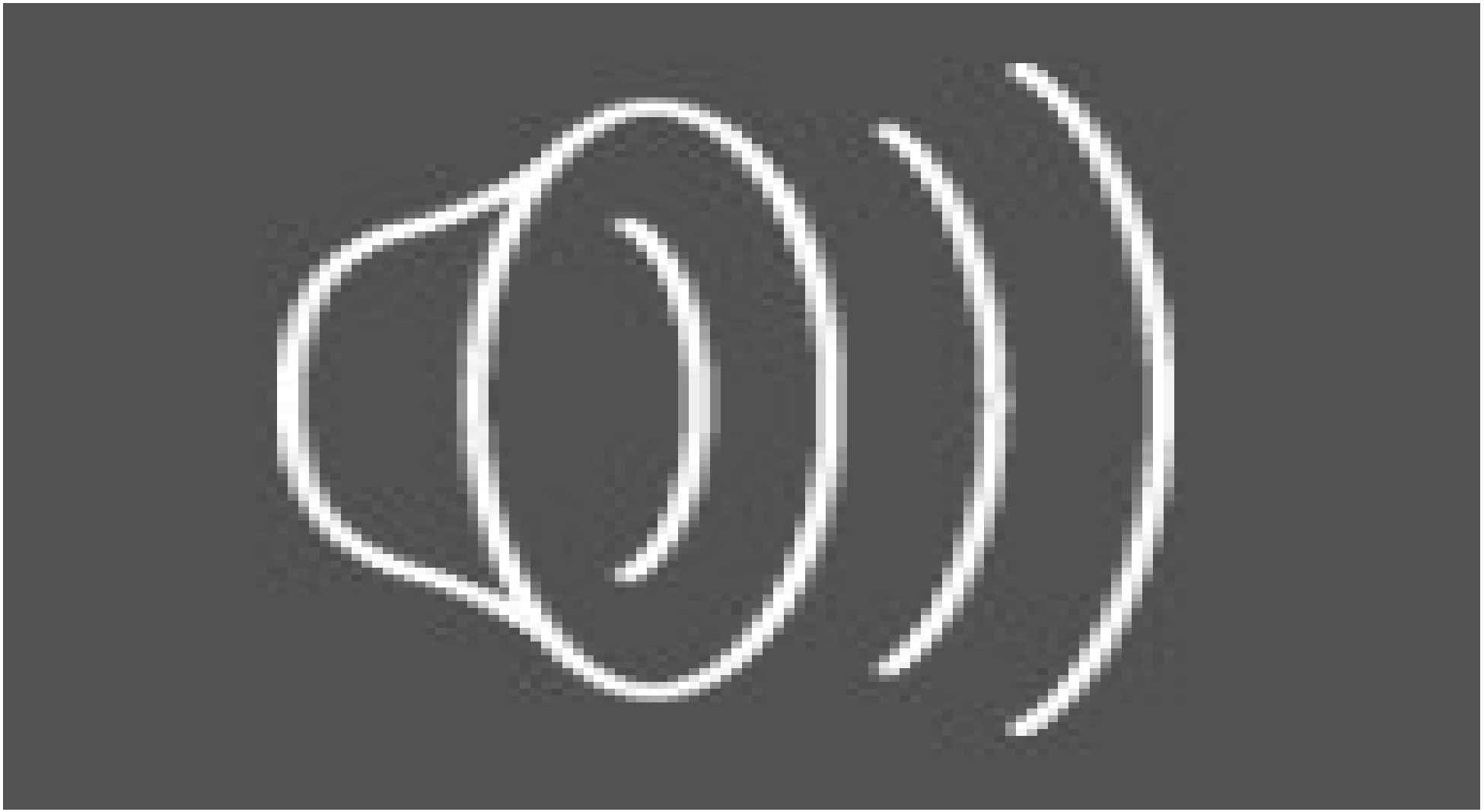
On the robot, add pr2_calibration and robot_calibration to your overlay, and build.

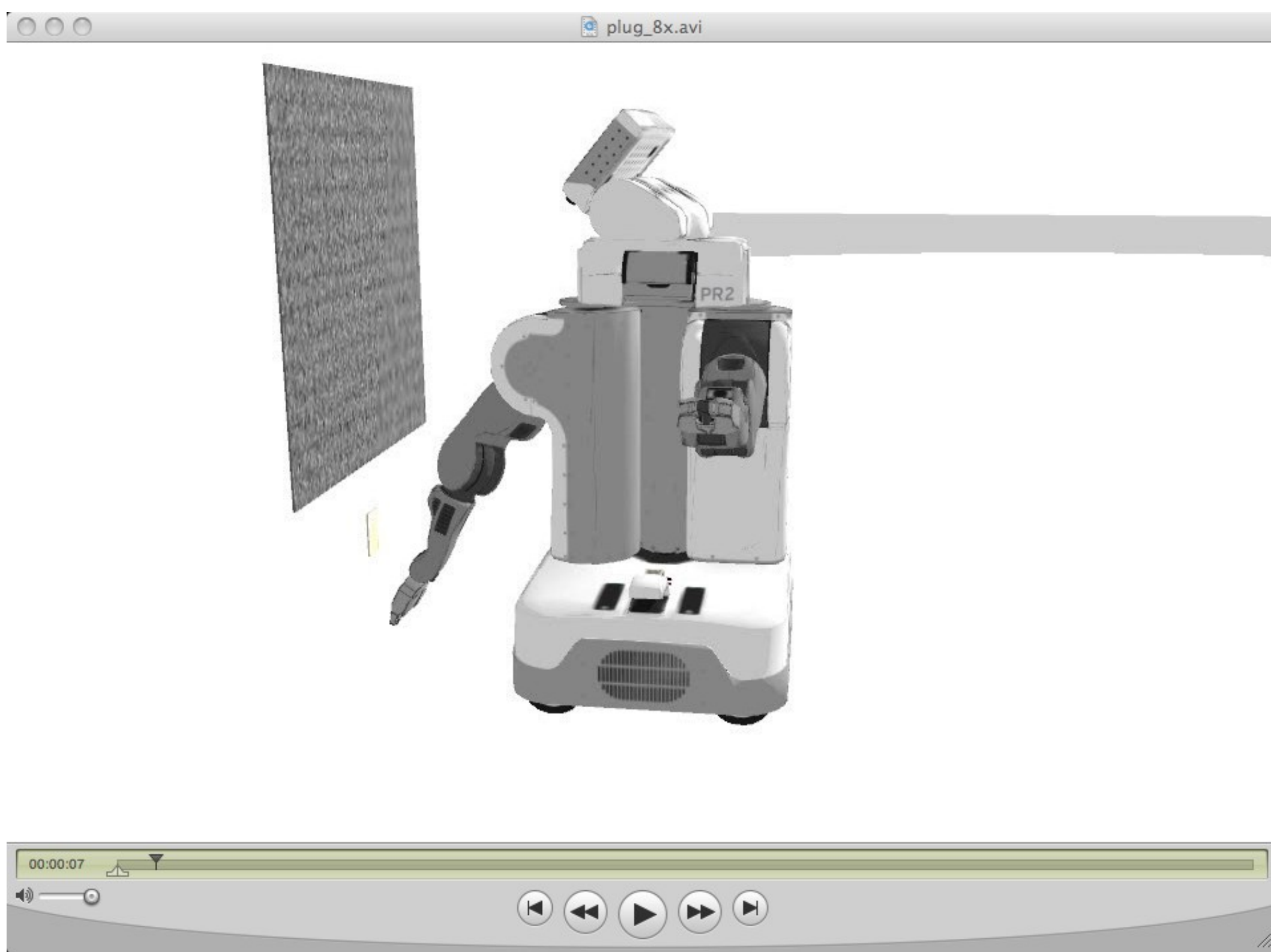
```
svn co https://code.ros.org/svn/wg-ros-pkg/stacks/pr2_calibration/tags/boxturtle pr2_calibration
svn co https://code.ros.org/svn/ros-pkg/stacks/camera_drivers/tags/boxturtle camera_drivers
svn co https://code.ros.org/svn/ros-pkg/stacks/image_pipeline/tags/boxturtle image_pipeline
rospack profile
rosmake pr2_calibration_launch pr2_bringup
```

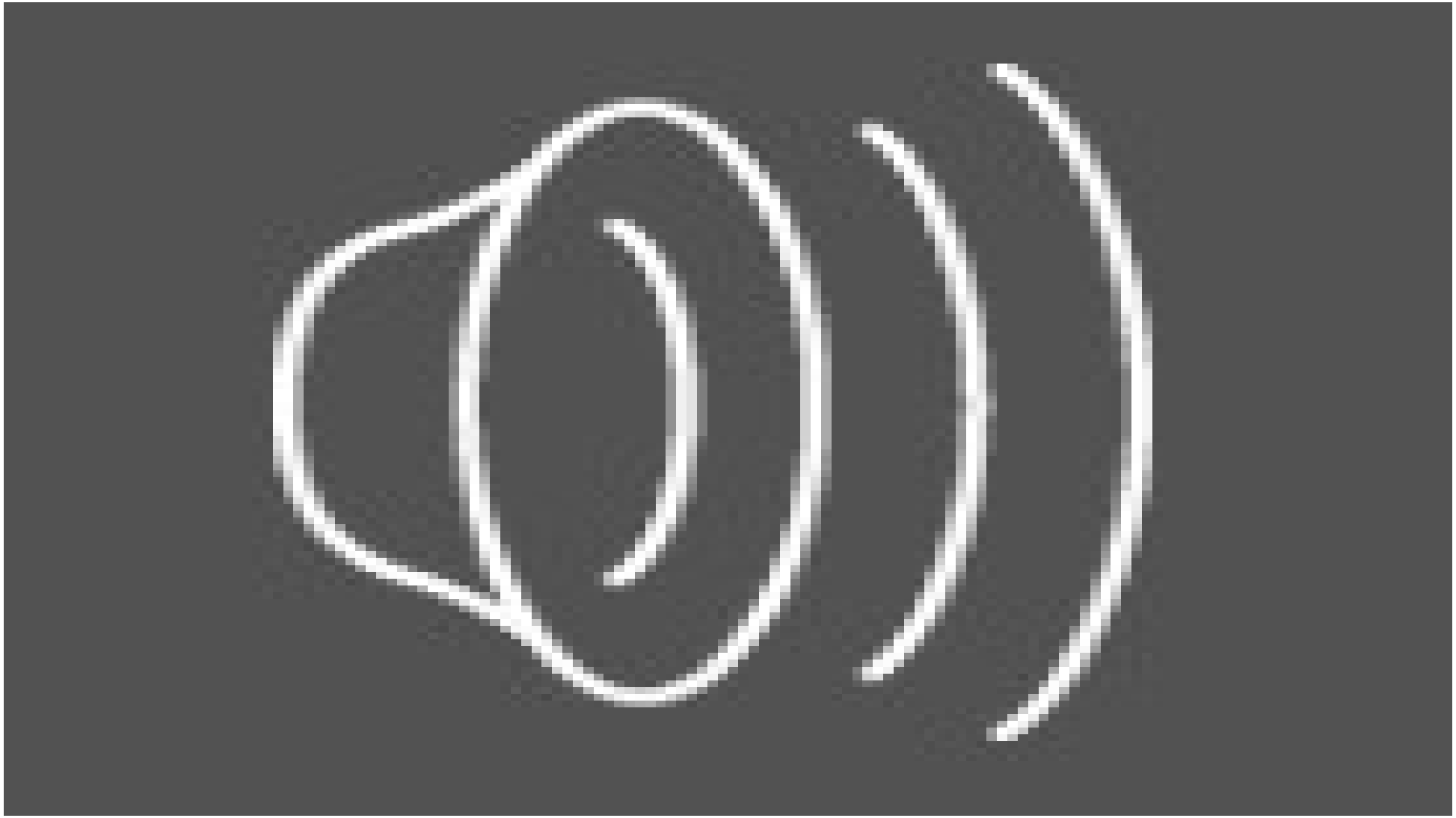
We are assuming that the working dir is part of the `ROS_PKG_PATH`.

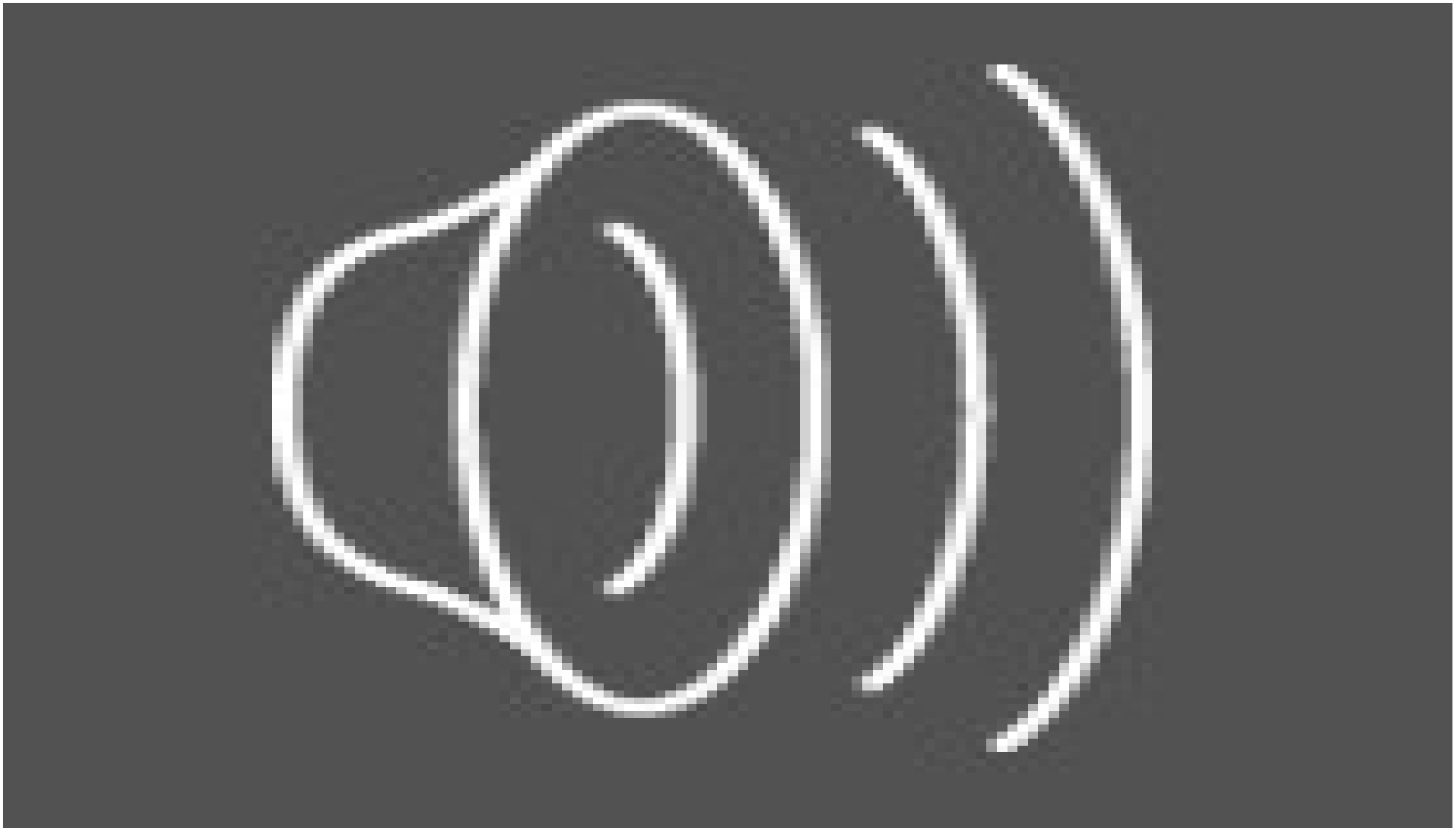



RosWeb: prl
http://prl.willowgarage.com/webui/webui/apps.py
Google
Active Tickets, Mine ...
Active Tickets, Mine ...
Weekday Southbound
KCRW | 89.9FM – Me...
RosWeb: prl
Robot: prl (pr2)
Online: admin (pilot)
97%
ERROR
0%
292.0 ms
admin
Apps
Diagnostics
Admin
Favorites (9)
Arms (2)
Other (7)
Teleop (1)
PS3 Teleop
Tuck Arms
PR2 Addons
PR2 Recharge
Camera
Open Door
Soccer
PR2 Navigation
Mannequin Mode
Find:
Next
Previous
Highlight all
Match case

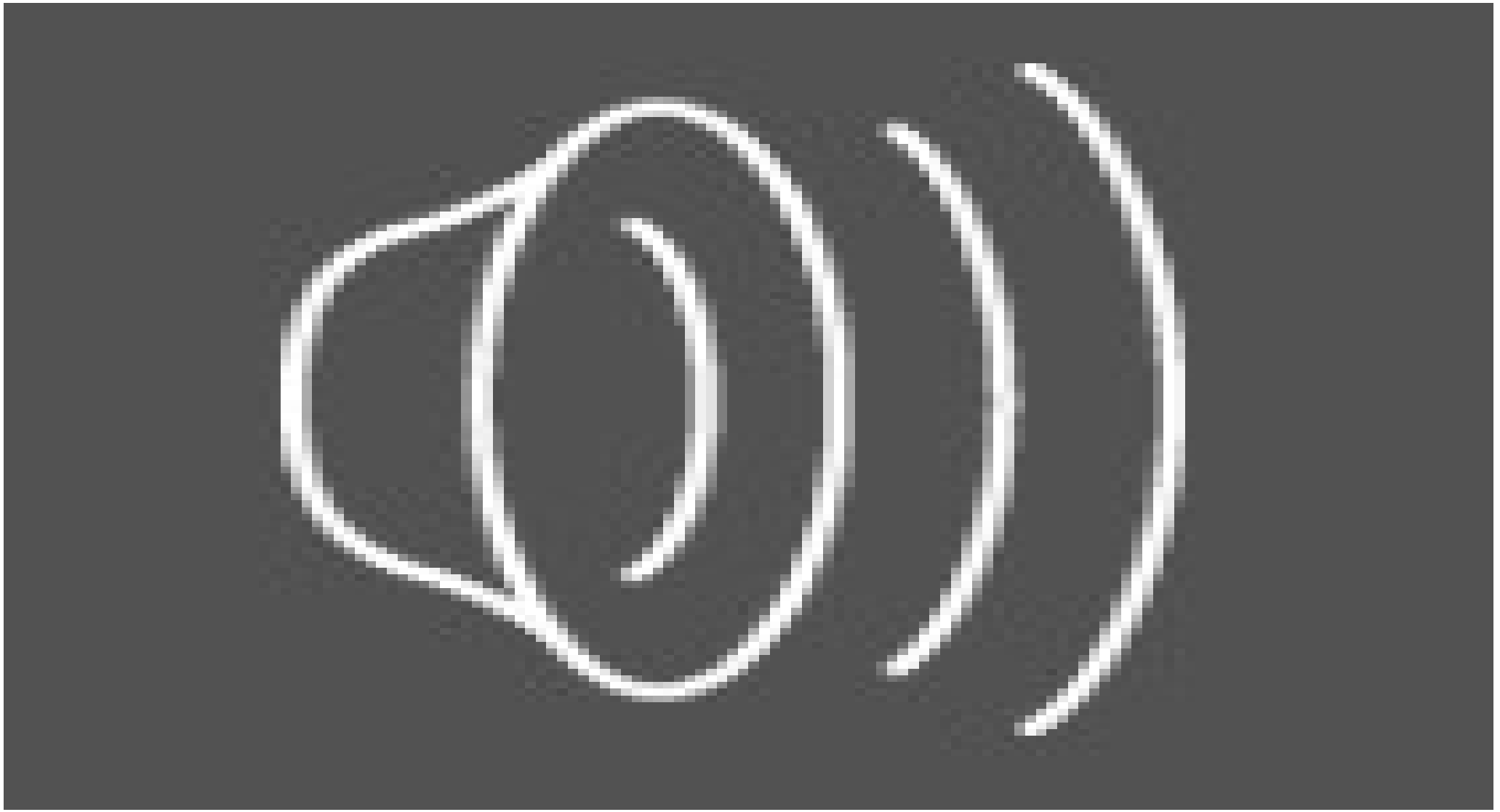


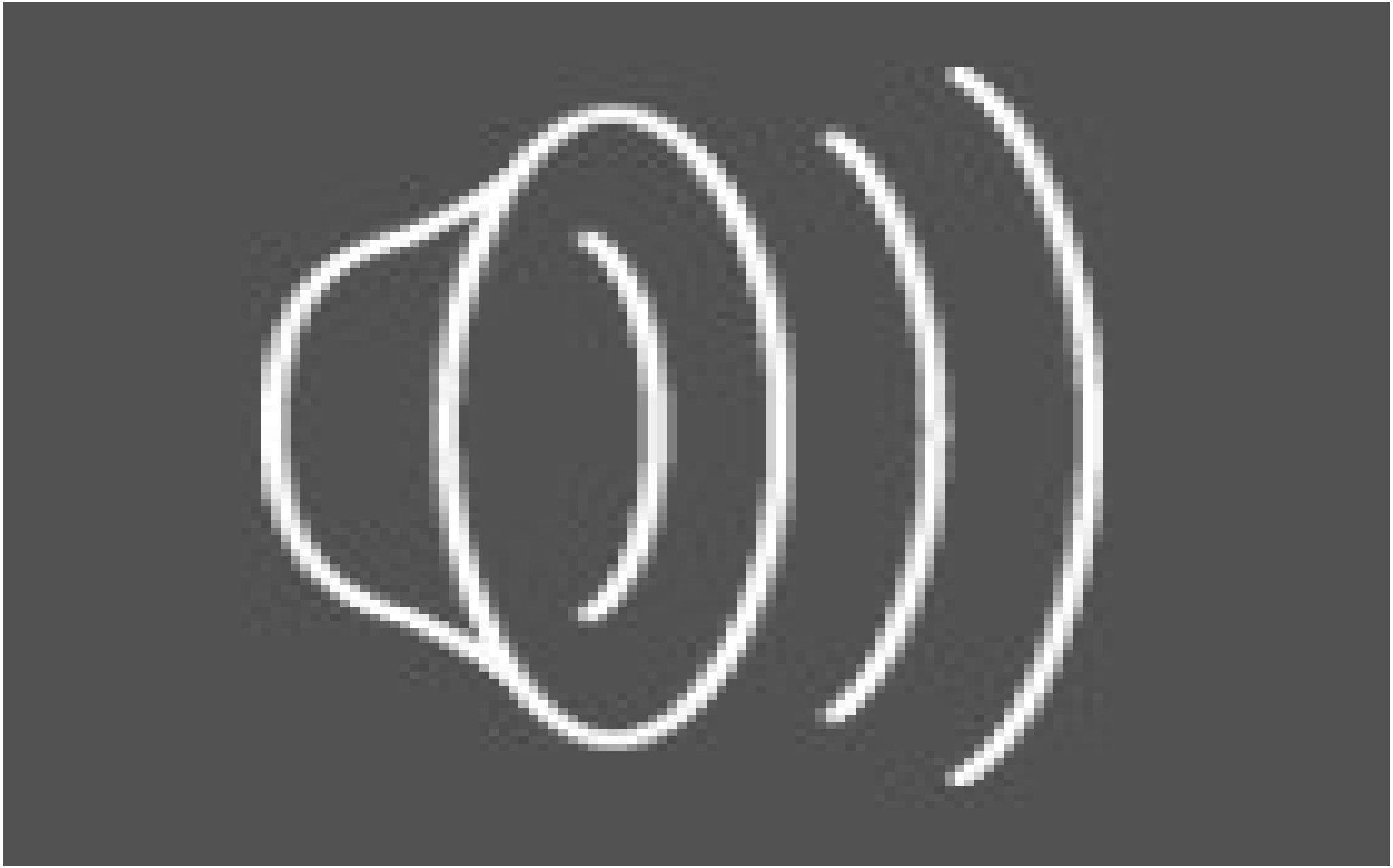

plug_8x.avi
PR2
00:00:07






icra_manipulation.m4v
00:00:00
SPAM





6. Instructions for reproducing experiments

In order to run the experiments presented in this paper, we assume some knowlege of the Robot Operating System (ROS). Detailed documentation on ROS can be found here.

6.1 Checking Out the Code

An Open Source implementation of the PR2 navigation system written using the Robot Operating System (ROS) is available for download. All of the experiments presented in the paper can be installed and run using the following `rosinstall` file: icra_navigation_gazebo.rosconfig. For instructions on installing and building a source tree from a `rosinstall` file please see the following documentation.

6.1.1 rosinstall File

icra_navigation_gazebo.rosconfig

6.1.2 Install Command

Get rosinstall:

```
wget --no-check-certificate http://ros.org/rosinstall -O ~/rosinstall
chmod 755 ~/rosinstall
```

Install the code:

```
~/rosinstall ~/icra10_navigation_ros 'http://www.ros.org/wiki/Papers/ICRA2010_Marder-Eppstein?action=AttachFile&do=get&target=icra_navigation_gazebo.rosconfig'
```

Before executing the steps below to build or run the code, be sure to source the shell setup file:

```
source ~/icra10_navigation_ros/setup.sh
```

6.2 Running Experiments in Simulation

Running the simulated experiments presented in this paper requires two steps.

First, build the `icra_navigation_gazebo` package:

```
rosmake icra_navigation_gazebo
```

Next, run the tests presented in the paper:

```
roscd icra_navigation_gazebo
make test
```

You should see the robot move through each of the test worlds, avoiding obstacles along the way.

Building blocks

- Build and test reusable capabilities, for:
  - Mitigation of demo bitrot
  - Faster development in your group
- Distribute your building blocks, for:
  - Faster development in the community
  - Better scientific practice
- Thanks to (in no particular order): Eitan Marder-Eppstein, Ioan Sucan, Radu Rusu, Sachin Chitta, Kaijen Hsiao, Matei Ciocarlie, Conor McGann, Marius Muja, Vadim Pisarevsky, Tully Foote, Josh Faust, Ken Conley, Tim Field, Jon Bohren, Eric Berger, Vijay Pradeep, Kurt Konolige, Gary Bradski, John Hsu, Melonee Wise, Wim Meeussen, **Tony Pratkanis**