

TORKの活動と ROSパッケージの紹介

TORK and ROS packages

一般社団法人

東京オープンソースロボティクス協会

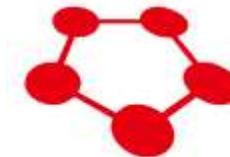
info@opensource-robotics.tokyo.jp

Open or Die?

Opensource Software



Apache



Chainer

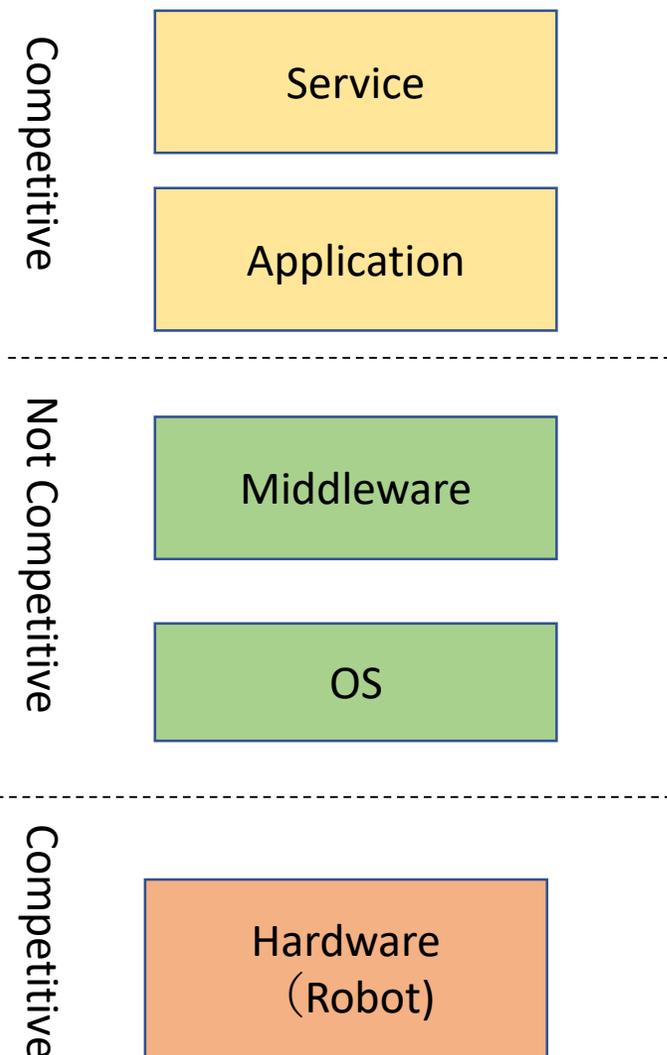
TensorFlow



- Quite normal in modern software world
(これら無しで現代のソフトウェア開発は成り立たない)
- What happened if you don't use? ... Loser!
(もし使えなかったら? ...負けですよ!)

Open, Robot !

- Large complex system (大きく複雑なシステム)
 - Including hardware (ハードウェア)
 - Various tech field (多岐に渡る分野)
 - Intelligent machine (高度な知能化)
- Fuzzy application (定まらないアプリ)
 - Various environment, target (種々の対象と環境)
 - Action in real world (実世界での動作)
 - Research speed is very fast (早い研究開発)
- Uncompetitive field (非競争領域)
 - Pointless to compete with others (差別化が無意味)
 - Important (しかし重要)
 - Could be cost (コストもかかる)
 - "Someone" create it for you? NO.
(参加しなくていいわけでもない)



東京オープンソースロボティクス協会

- 2013 年設立の一般社団法人
- Non-profit (非営利)
- 略称 **TORK** (トルク) Tokyo Open Source Robotics Kyokai
- メインメンバー：3人
 - 但馬 竜介 Ryosuke Tajima (Dr. Eng.)
 - 鈴木 夢見子 Yumiko Suzuki (Dr. Eng.)
 - 岡田 慧 Kei Okada (Dr. Eng.)



ROS

Opensource power to Robotics!

ロボットにも、オープンソースの力を！

Our activities (活動内容)

- Seminar, workshop (セミナー、ワークショップ)
- Event related opensource robot (イベント開催)
- Professional support for ROS/robot (サポートサービス)
- Software development (自発 & 受託)

Workshop, events

- ROS Workshop (初級、中級)
- Hackathon event (ハッカソン)
- World MoveIt! Day 2017



Workshop on manipulators



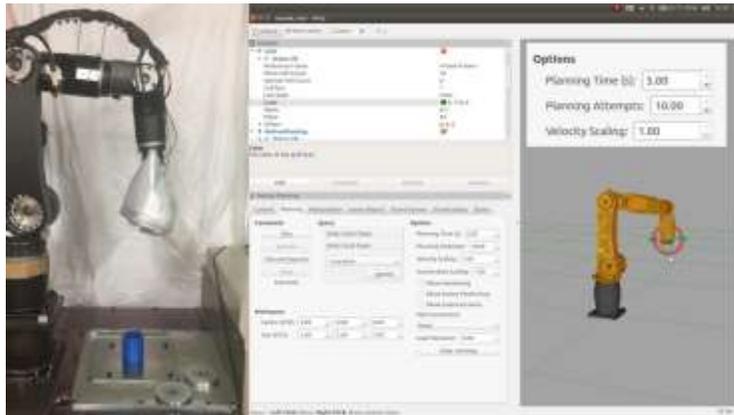
Toyota HSR
Hackathon



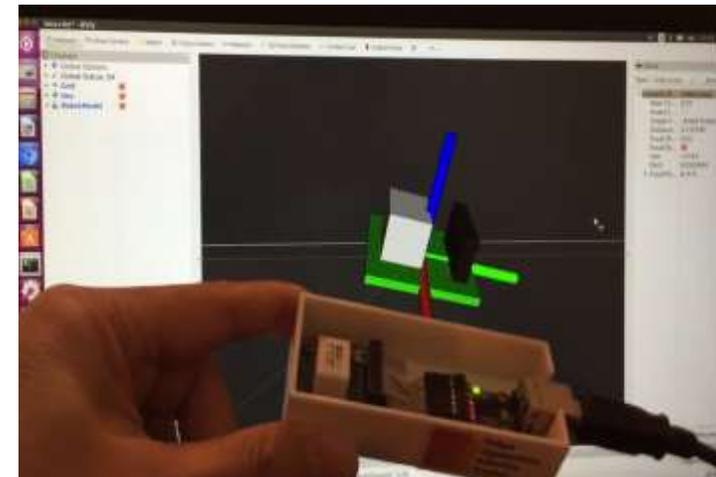
Workshop on navigation



(Open) Software development (受託開発とパッケージ公開)



TRA: EtherCAT based robot arm
<https://github.com/tork-a/minas>



Driver for IMU by Analog Devices
https://github.com/tork-a/adi_driver

We want to make it open! (sometimes cannot...)
成果をオープンソースに！（したい！）

Motivation(動機) to use ROS :Top 3

- Navigation for wheeled robot
 - ナビゲーション機能
- MoveIt! for manipulators
 - 軌道計画
- Sensor processing, object recognition
 - センサ処理 (対象物認識)

Conversation with a customer (お客さんとの対話)

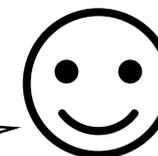
TORK



Hey, look! (どうですか!)
ROS has motion planning, sensor fusion, and GUI!
(ROSの動作計画、センサ処理、GUIは
すごいでしょ!)

Customer

Cool! (いいね!)
BTW, how can I teach the robot?
(ところで、ティーチングはどうすればいいの?)



Python!

Oh... (ええ...)



Robot teaching on ROS

- MoveIt! Rviz plugin
- rqt_joint_trajectory_controller

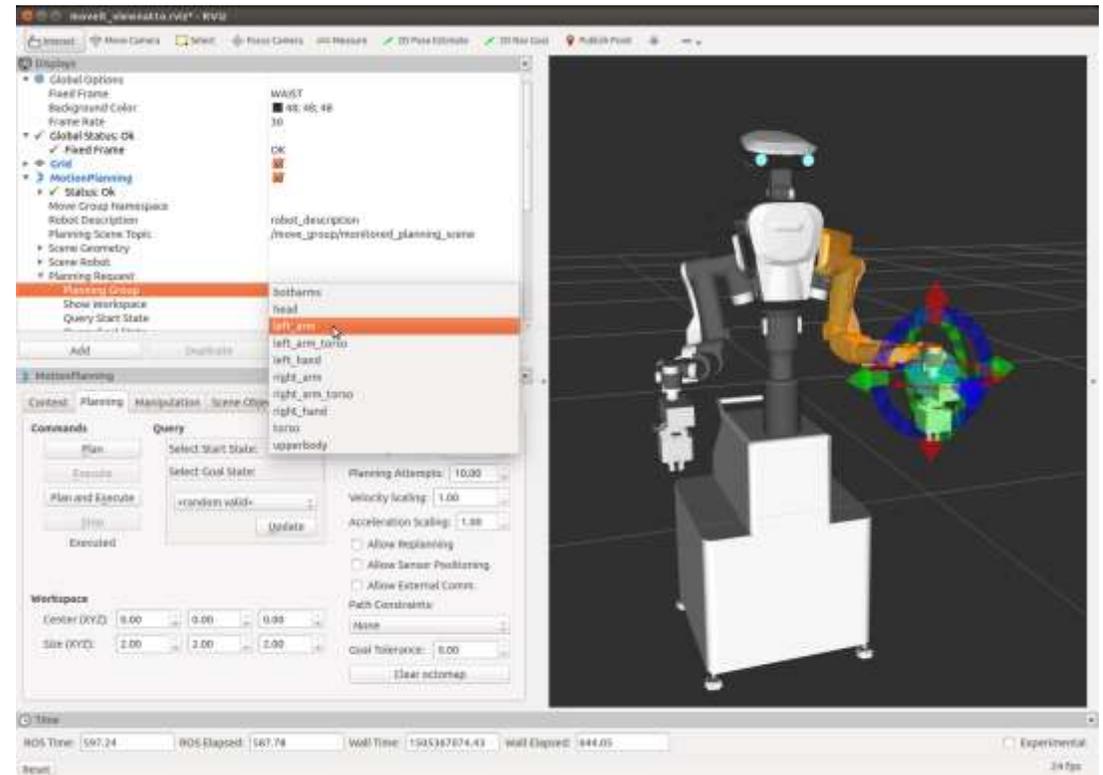


壁

- Python /C++ API
 - moveit_commander
 - Smachなど、便利なpythonライブラリ
 - Anything is possible (基本的に何でもできる)

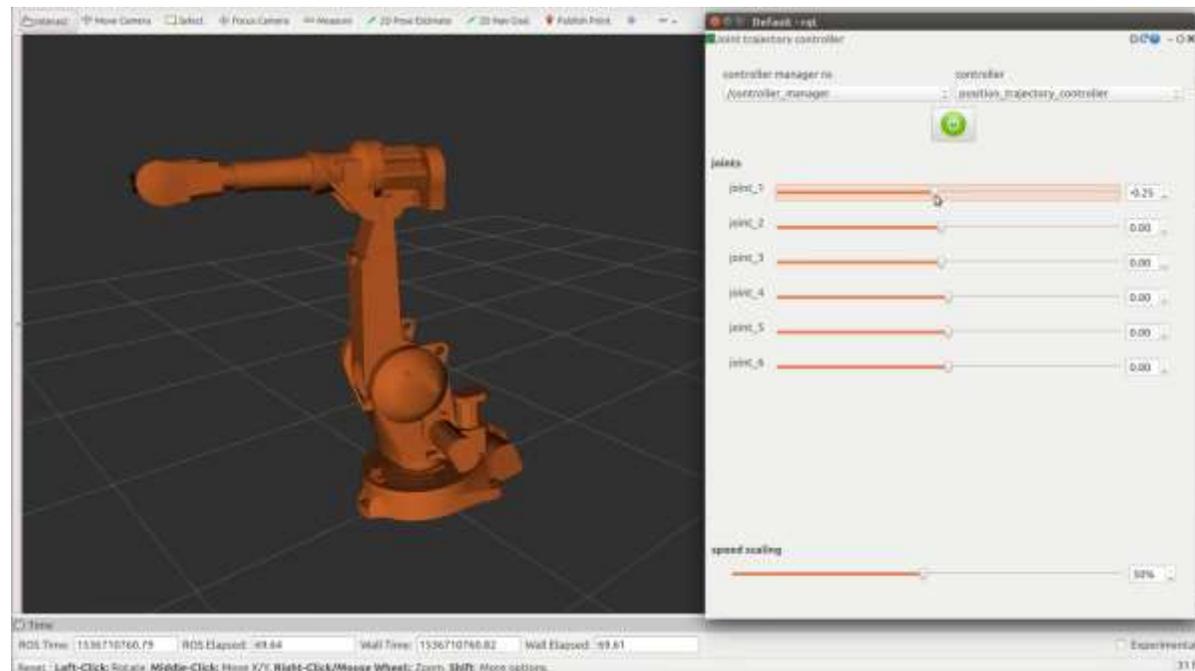
Movelt! Rviz plugin

- Good GUI !
 - Not jog control (ジョグではない)
 - Difficult to use with actual robot... (実機で動かすとき苦労する)
- Unable to...
- Save target poses (目標姿勢を保存できない)
 - Regression from Hydro
- Plan and execute sequentially (経路点の連続再生ができない)
- Set planning in cartesian coordinate (直角座標系オプションがない)
 - APIからはできる



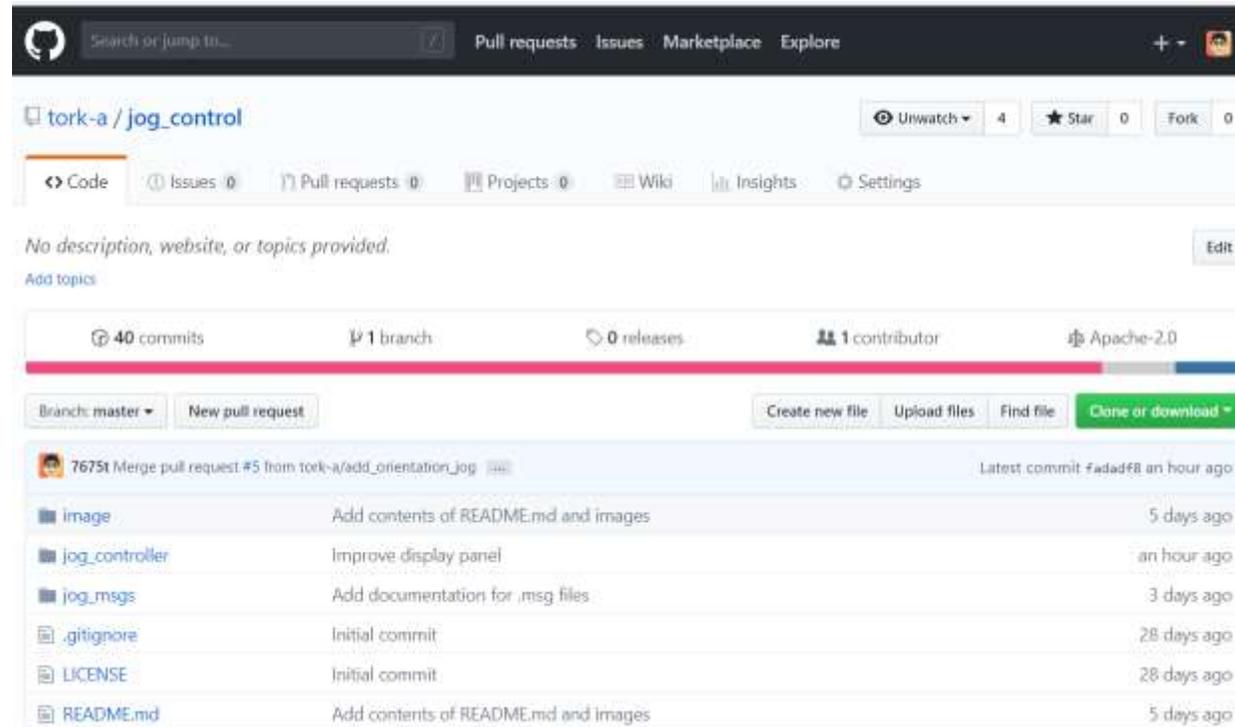
rqt_joint_trajectory_controller

- Sliders to command the joint angles (各関節への指令)
- Not jog control (ジョグではない)



jog_control package

Released to Kinetic! (Kineticにリリース済み!)



Search or jump to... Pull requests Issues Marketplace Explore

tork-a / jog_control Unwatch 4 Star 0 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

No description, website, or topics provided. Edit

Add topics

40 commits 1 branch 0 releases 1 contributor Apache-2.0

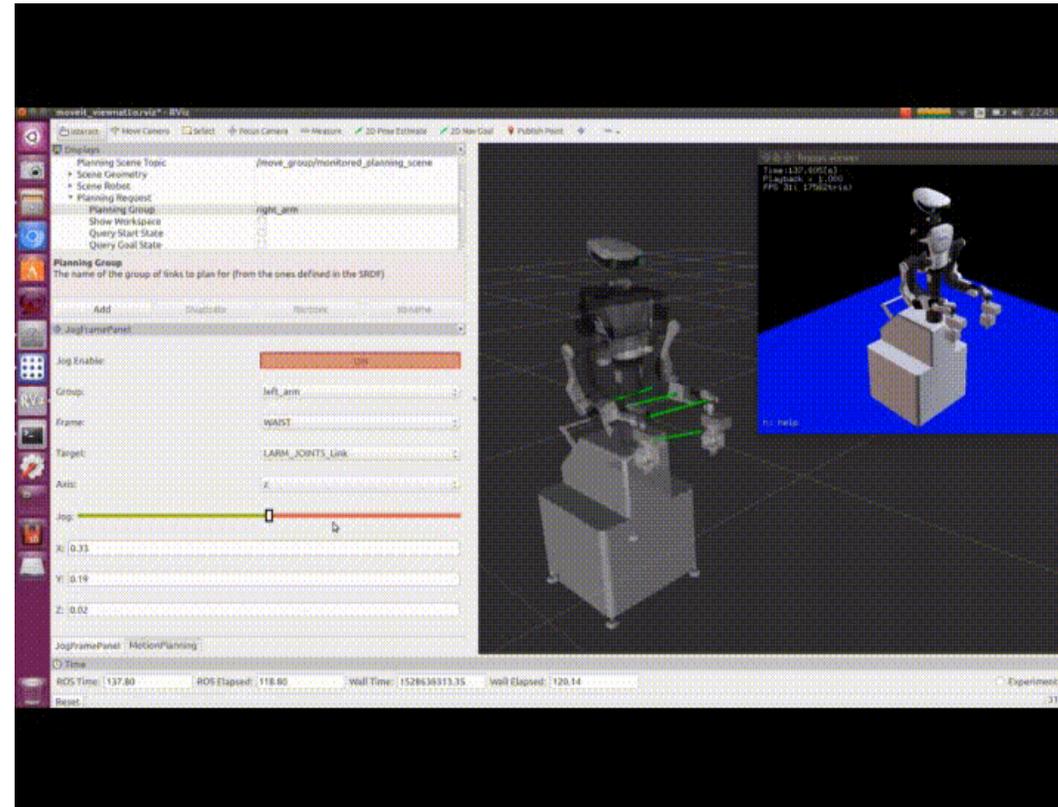
Branch: master New pull request Create new file Upload files Find file Clone or download

7675t Merge pull request #5 from tork-a/add_orientation_jog Latest commit fadadfb an hour ago

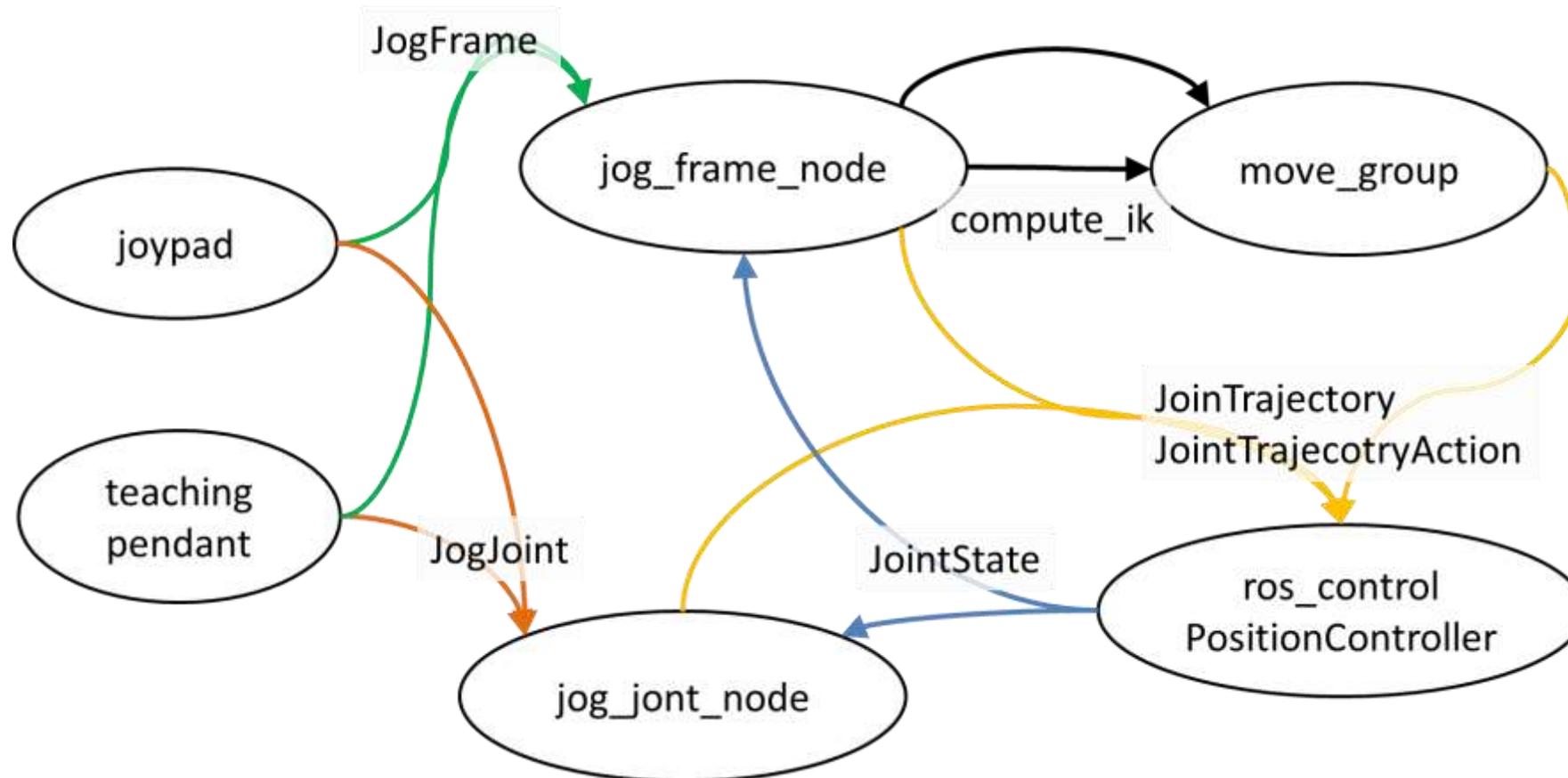
image	Add contents of README.md and images	5 days ago
jog_controller	Improve display panel	an hour ago
jog_msgs	Add documentation for .msg files	3 days ago
.gitignore	Initial commit	28 days ago
LICENSE	Initial commit	28 days ago
README.md	Add contents of README.md and images	5 days ago

(本プロジェクトはNEDOの支援を受けました)

Rviz jog plugin panel (パネル)



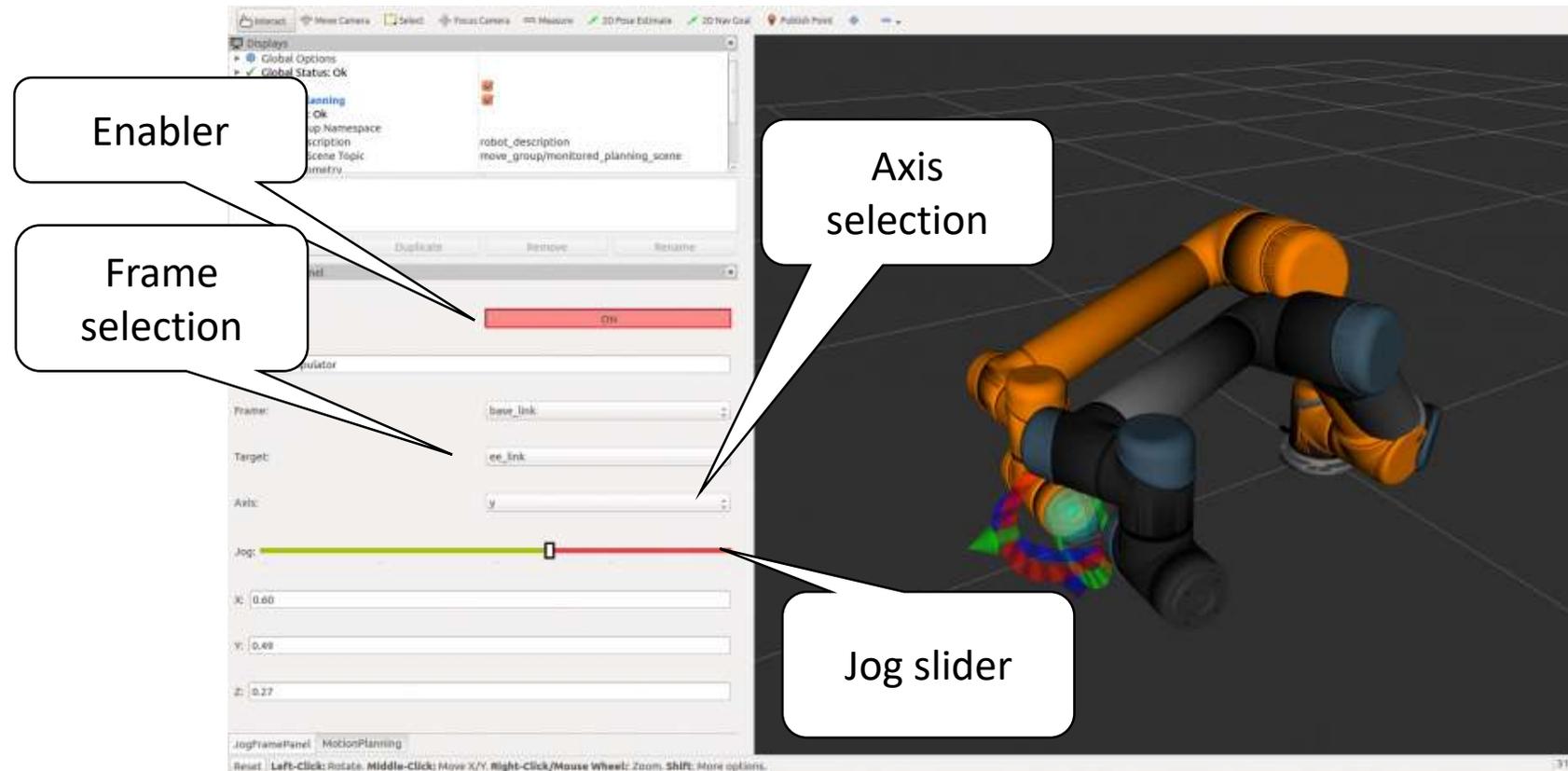
Overview of jog_control



Available on ANY robot (どんなロボットでも動く)

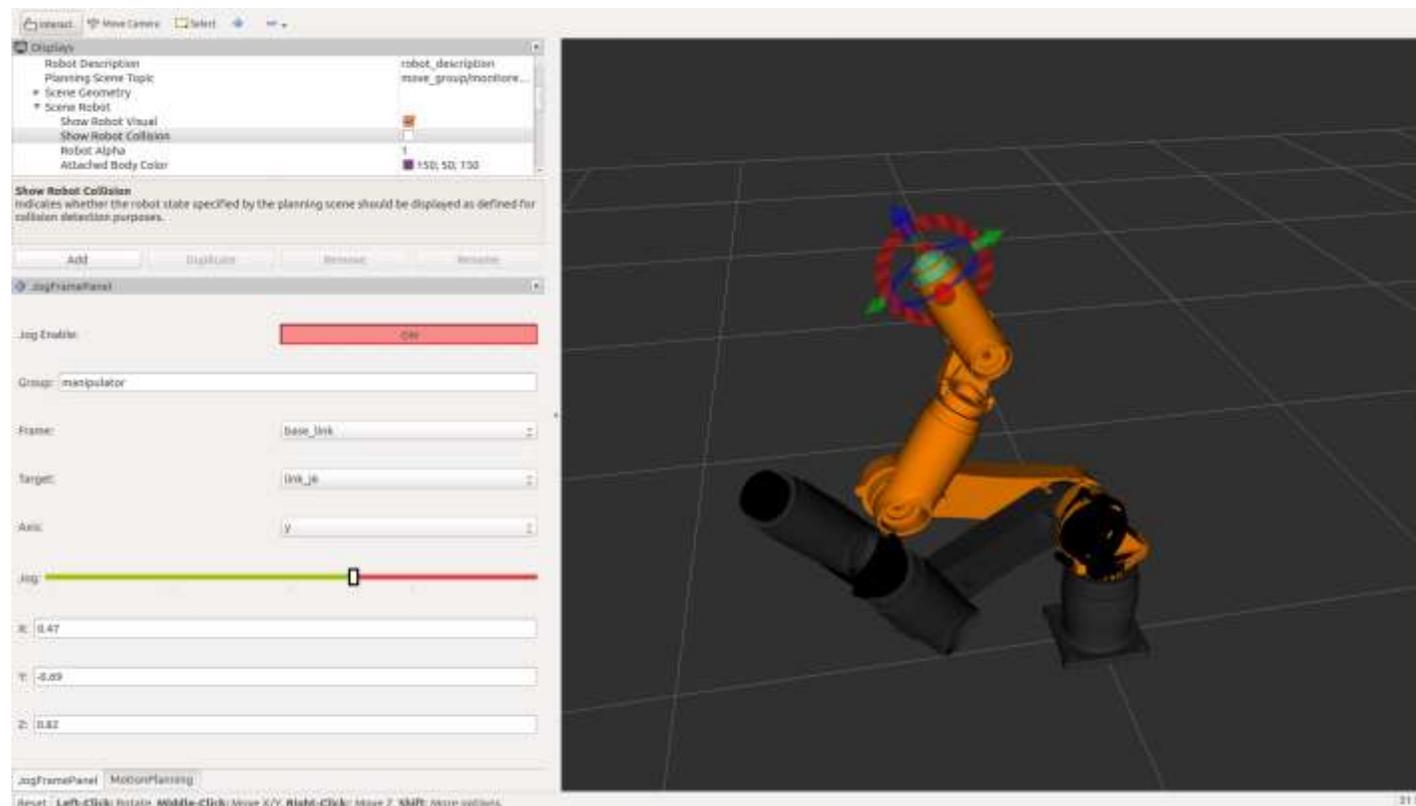
- Depending on MoveIt!(move_group) (MoveIt!には依存)
 - FK (順運動学), IK(逆運動学)
 - List of the controller (コントローラー一覧をMoveIt!のパラメータから取得)
- Depending on ros_control interfaces (ros_control interfaceが必要)
 - JointTrajectoryAction アクション
 - JointTrajectory メッセージ
- Choice of target frame, base frame (対象座標系、基準座標系を選ぶ)
 - Target frame (対象座標系) : Hand (手先), tool (ツール), a point on the tool, etc.
 - Base frame (基準座標系) : World (世界座標系), tool, etc.
- Support for dual (multi) arm robots (アームが複数ある場合でも対応)

UR5 (Gazebo)



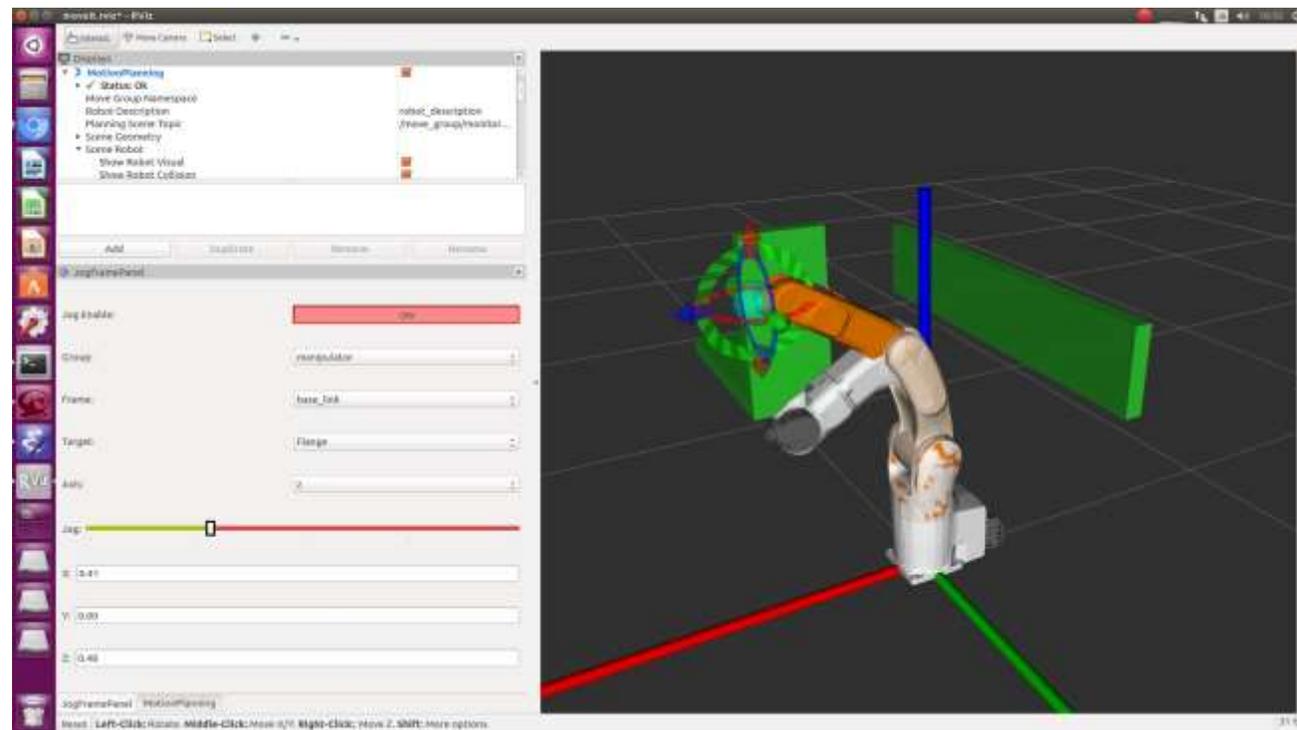
https://github.com/ros-industrial/universal_robot

TRA : EtherCAT based robot arm



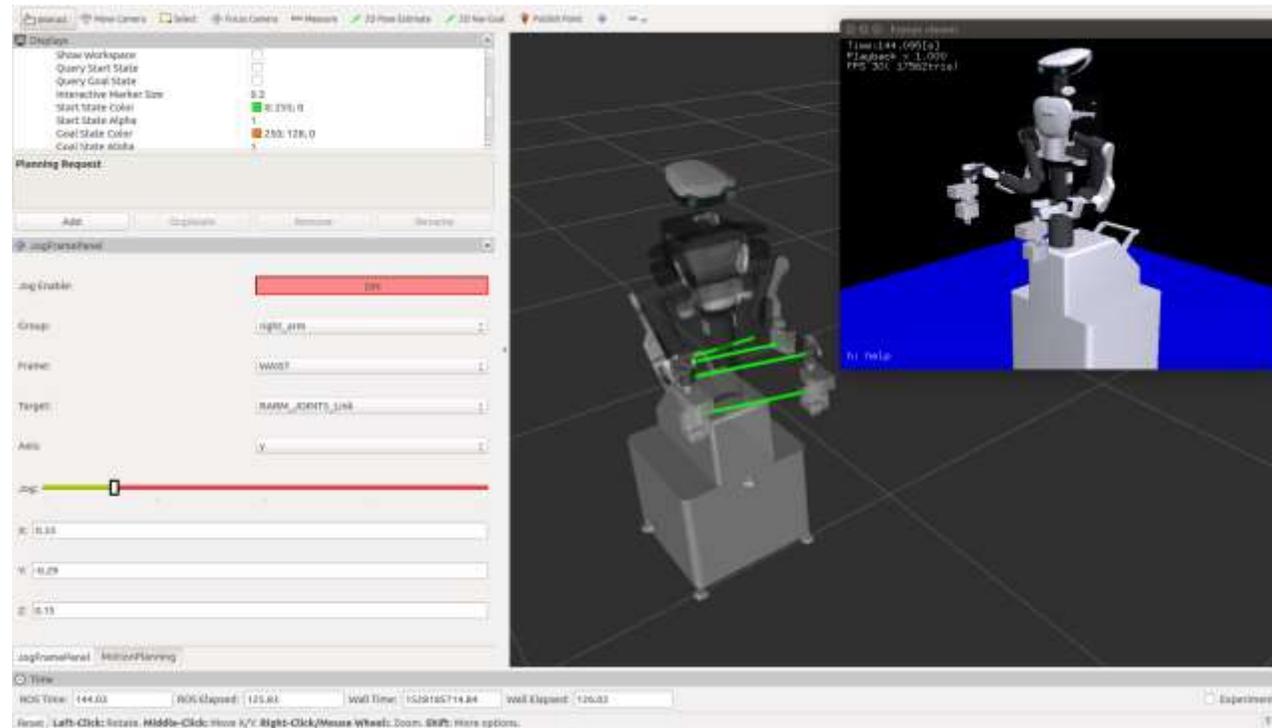
<http://wiki.ros.org/minas>

Denso VS060



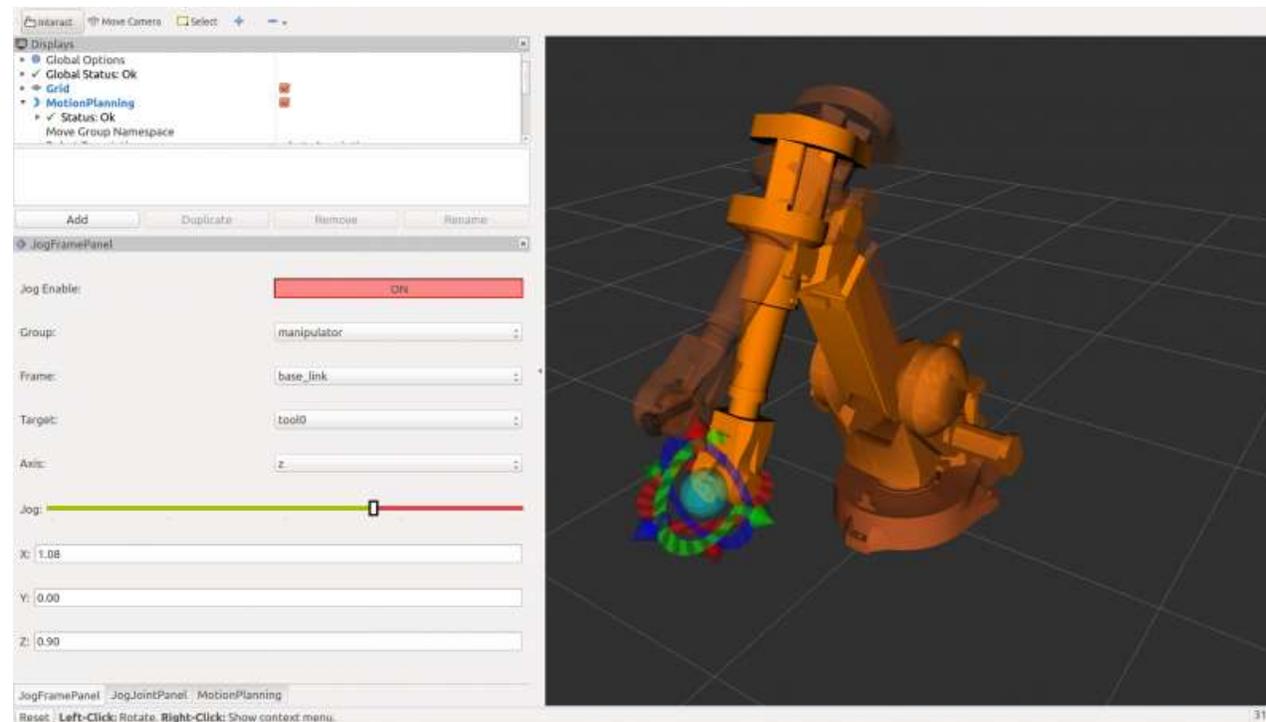
<http://wiki.ros.org/denso>

KAWADA NEXTAGE Open (Dual Arm Cobot)



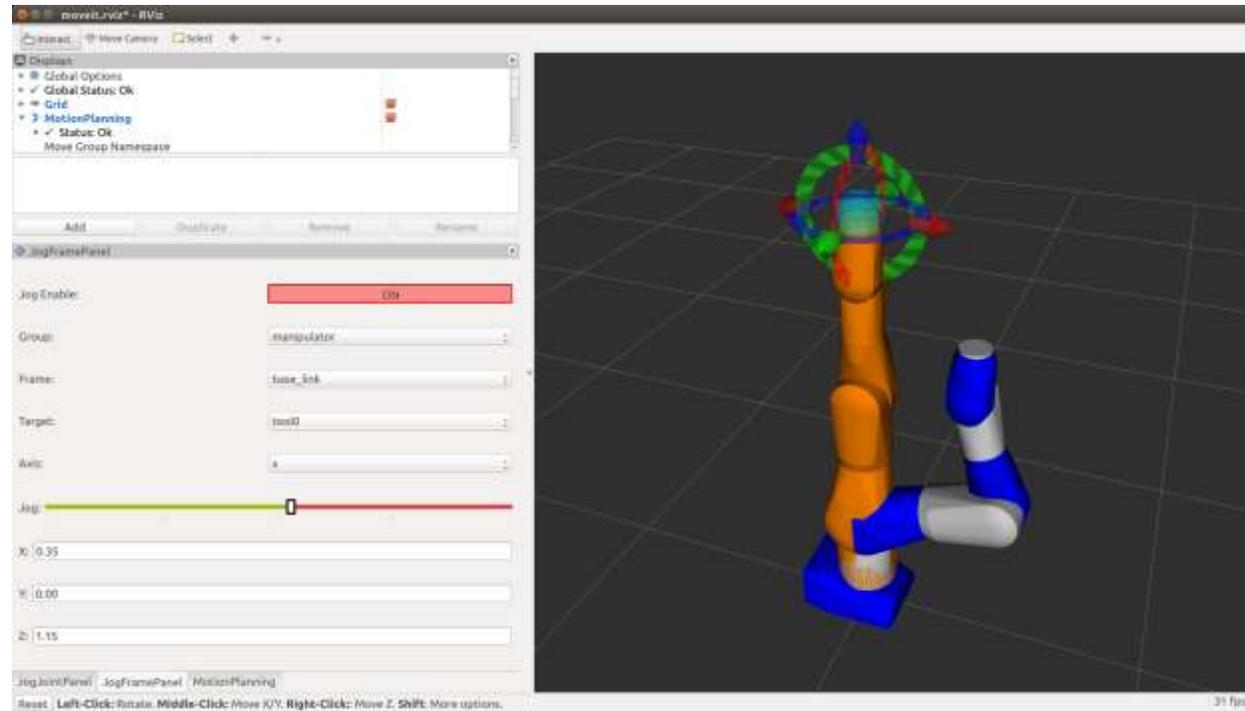
<http://wiki.ros.org/nextage>

ABB IRB2400



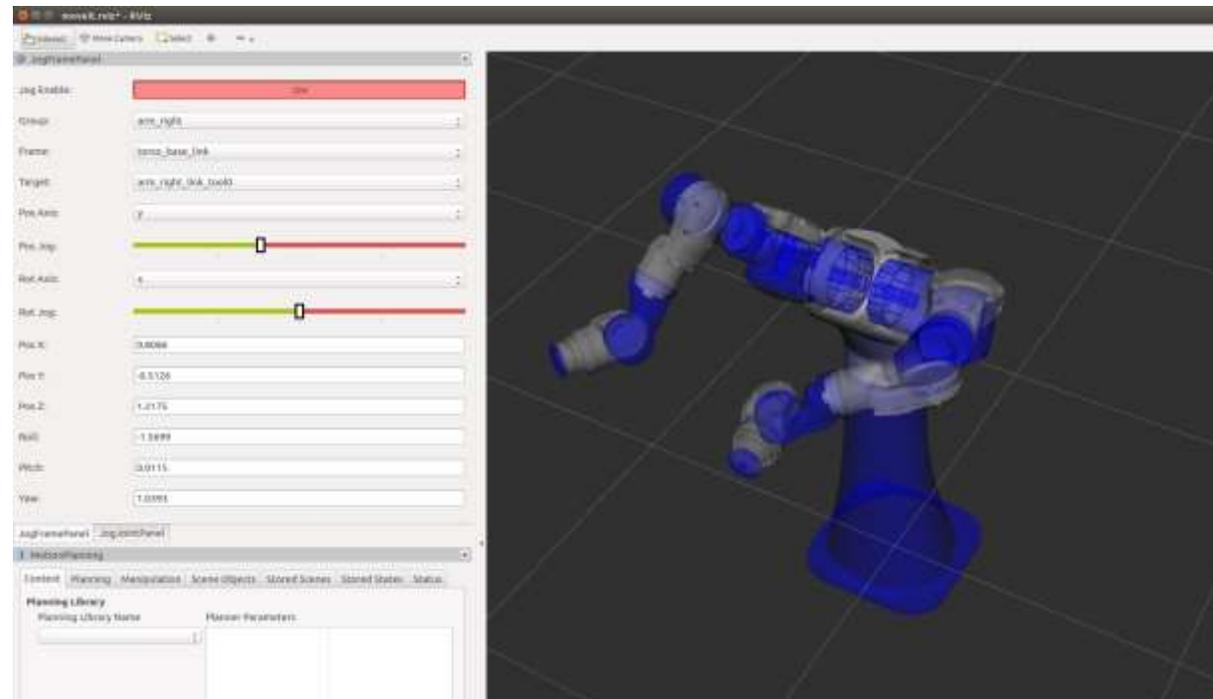
<https://github.com/ros-industrial>

MOTOMAN SIA20D



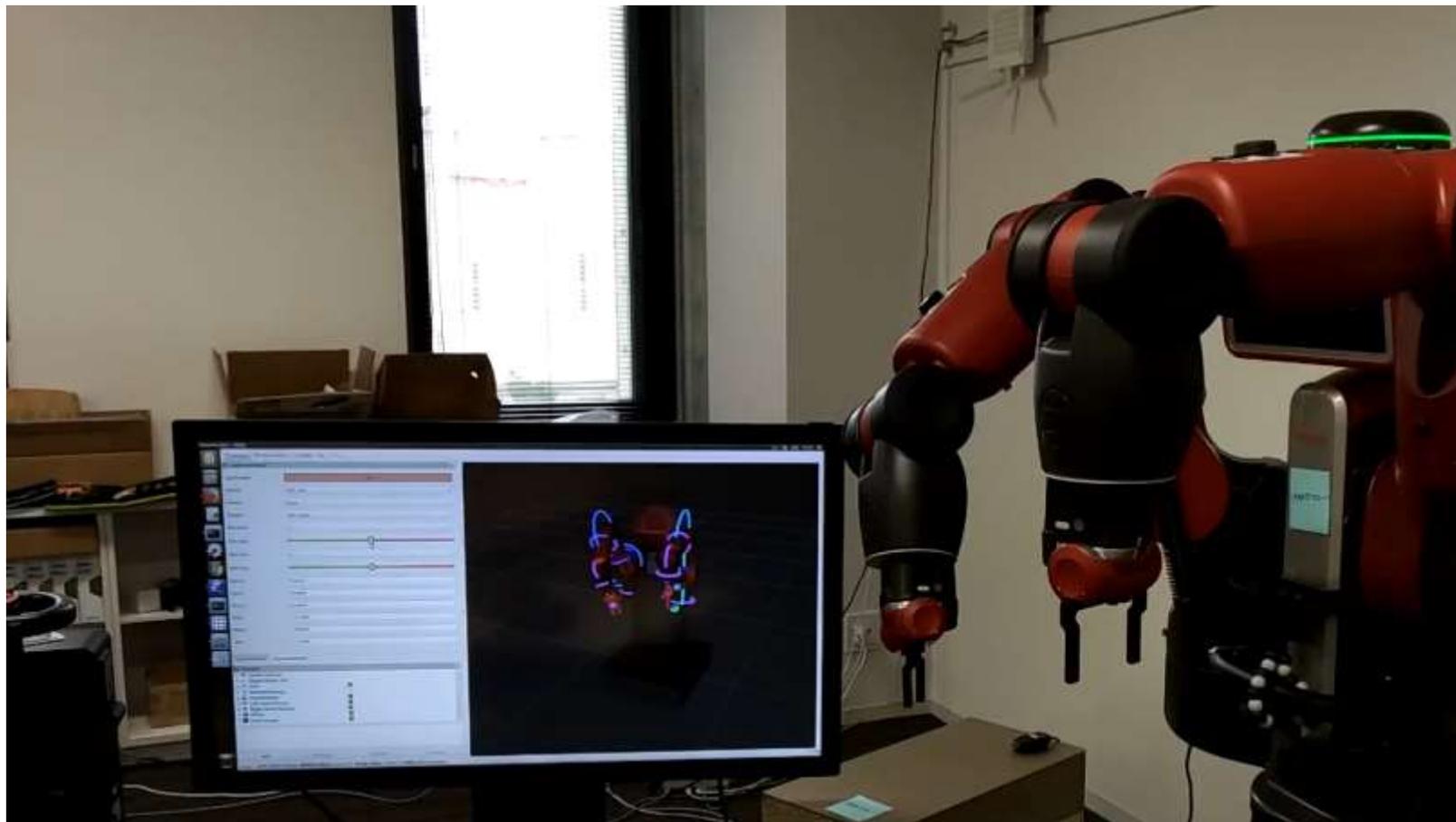
<https://github.com/ros-industrial>

MOTOMAN SDA10F



<https://github.com/ros-industrial>

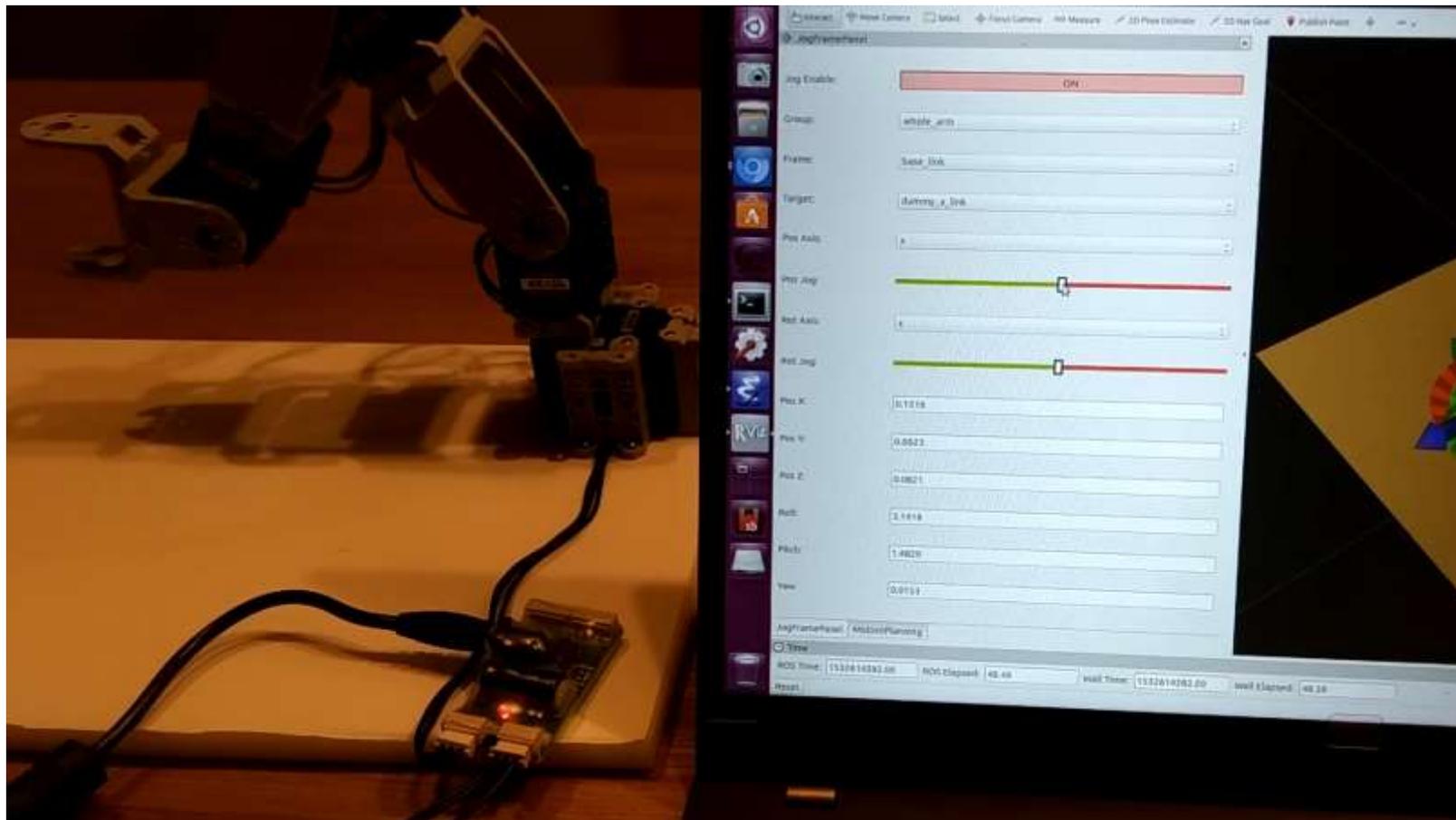
Demo (Jog by Rviz plugin)



Demo (Jog by Joypad)



StackIt!



NextageOpen

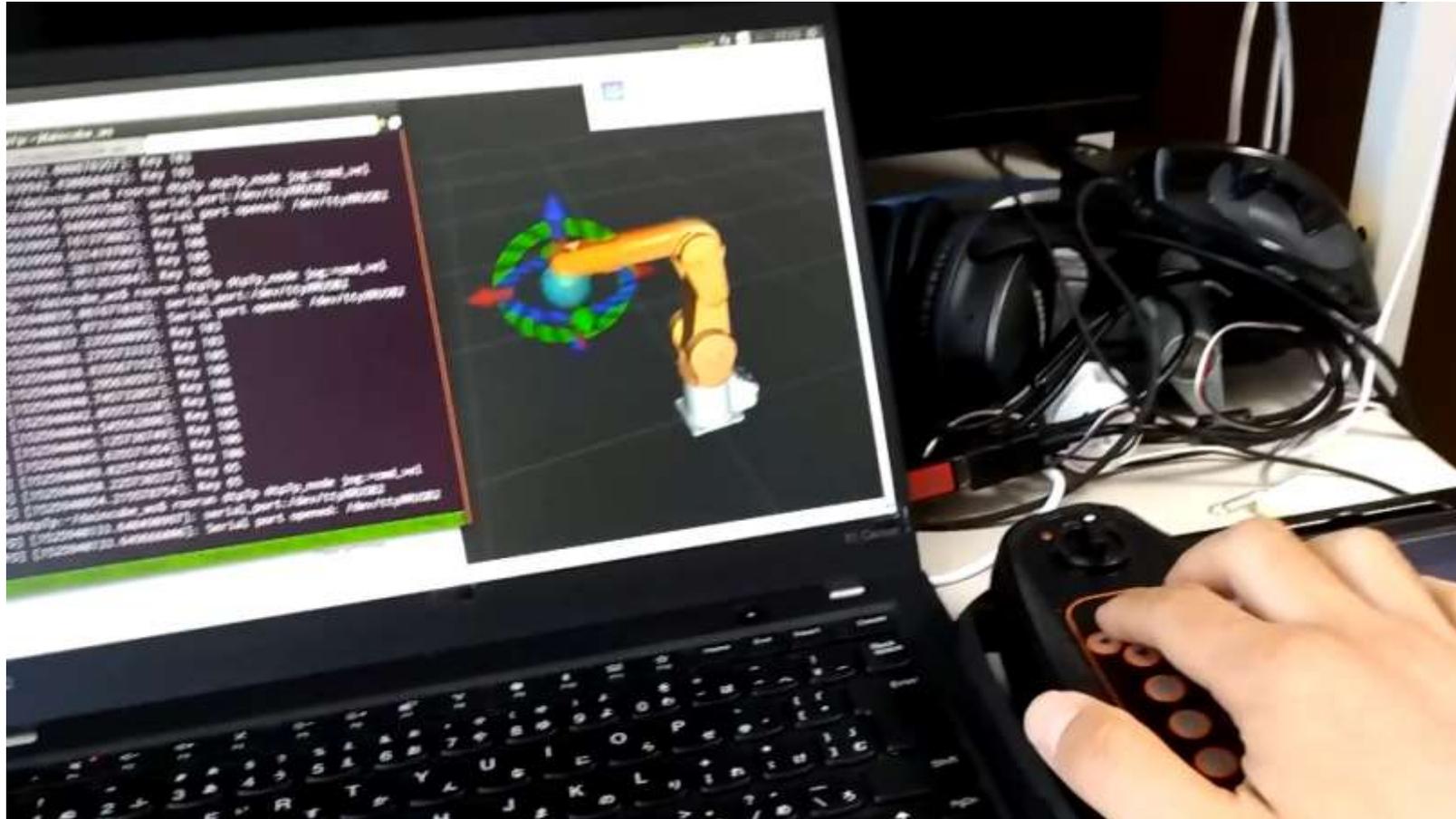


ROS Teaching Pendant (Under development, 開発中)



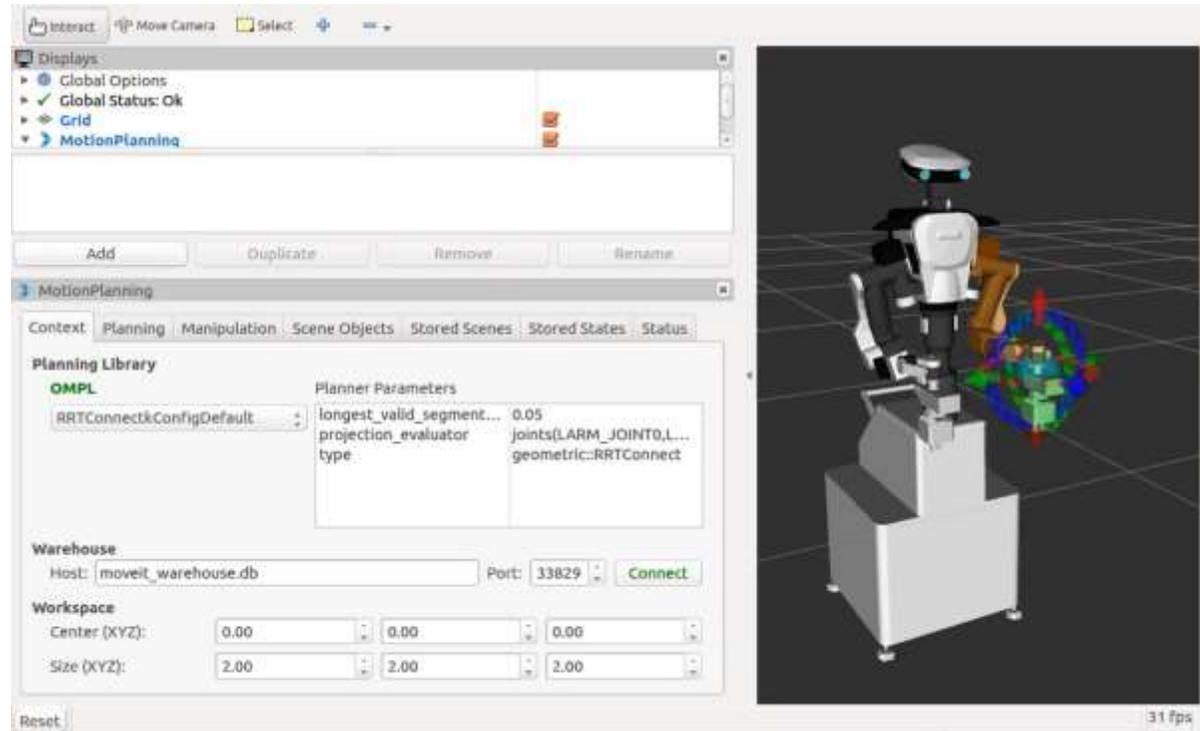
- Unified Pendant
(統一ティーチングペンダント)
- ROS native
- Daincube DTP7P
 - 7-inch touch panel
 - Ubuntu / ROS
 - Physical buttons for jog (-/+)
 - Enabler SW
 - Emergency SW

Jog by Teaching Pendant



Sequential Plan and Execution on Rviz plugin

(Rvizプラグインでの軌道の連続計画&再生)



<https://github.com/ros-planning/moveit/pull/932>

(本プロジェクトはNEDOの支援を受けました)

おわりに

- ロボットの共通部分はオープンに開発しましょう！
 - パッケージを使ってみよう！
 - フィードバックを送ってみよう！
 - 開発に参加していこう！
 - 車輪の再発明はやめよう！
- TORK活動への支援、お手伝いも募集しています
 - Orphaned Package Maintainer (メンテナ不在パッケージの管理者)
 - ROS貢献プログラム (報酬あり)
 - 寄付など

お問い合わせ : info@opensource-robotics.tokyo.jp