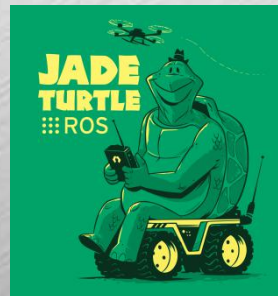
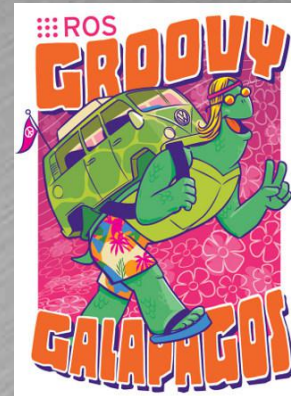
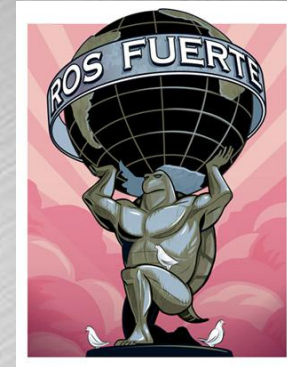


ROS项目开发

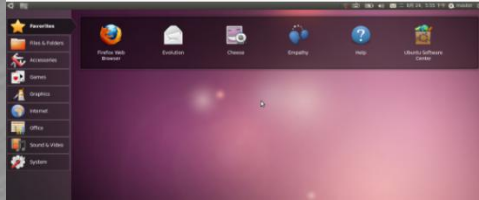
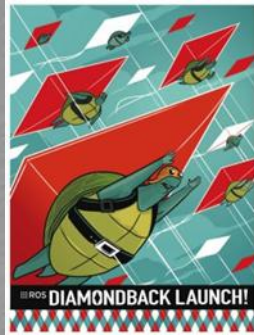


ROS Box Turtle



马庆华 • 上海一坤电气

Since 2011~



```
Mikrotik-RouterOS-5.18 [Running] - Oracle VM VirtualBox
Machine View Devices Help

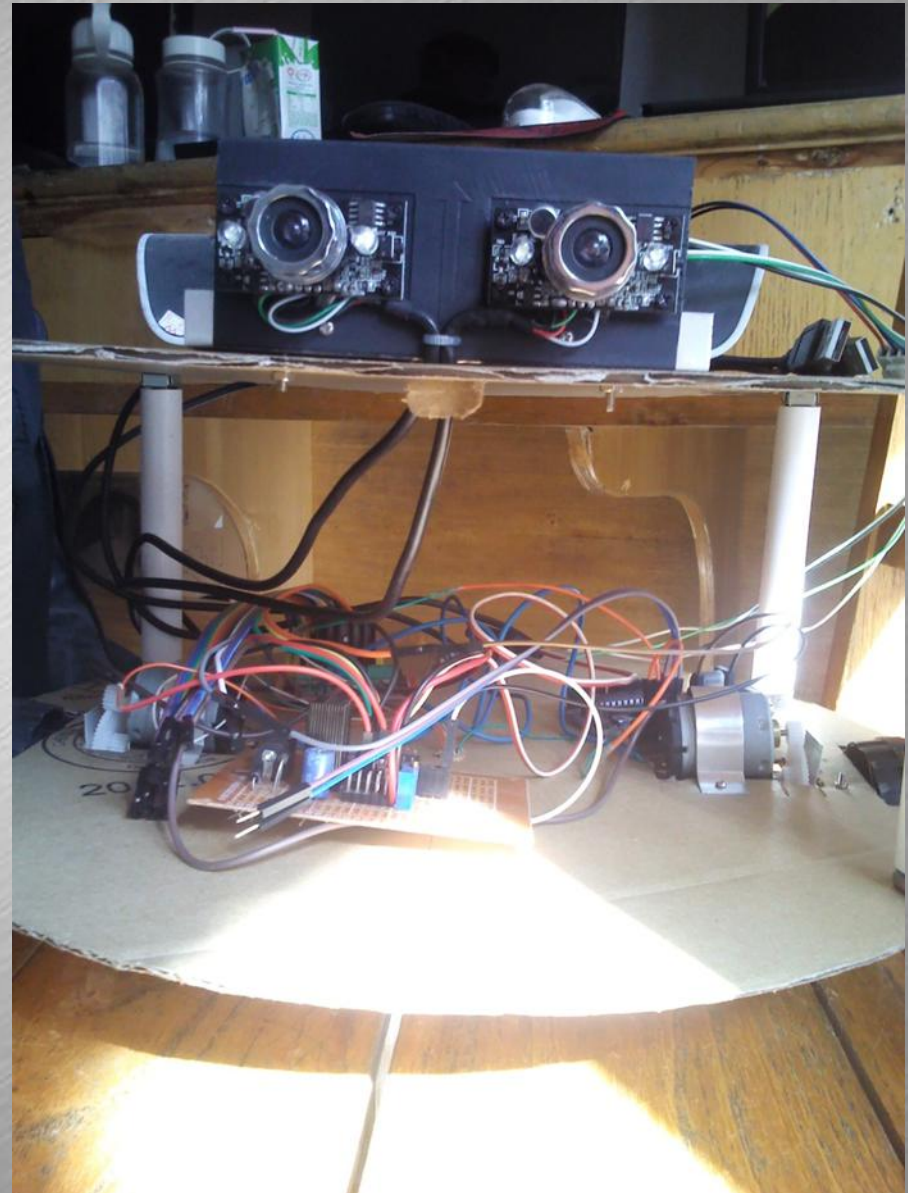
MMM   MMM   KKK               TTTTTTTTTT   KKK
MMMM  MMMM  KKK               TTTTTTTTTT   KKK
MMM  MMM  III  KKK  KKK  RRRRRR  000000  TTT   III  KKK  KKK
MMM  MM  MMM  III  KKKKKK  RRR  RRR  000  000  TTT   III  KKKKK
MMM   MM  III  KKK  KKK  RRRRRR  000  000  TTT   III  KKK  KKK
MMM   MM  III  KKK  KKK  RRR  RRR  000000  TTT   III  KKK  KKK

MikroTik RouterOS 5.18 (c) 1999-2012      http://www.mikrotik.com/

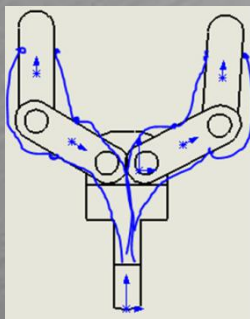
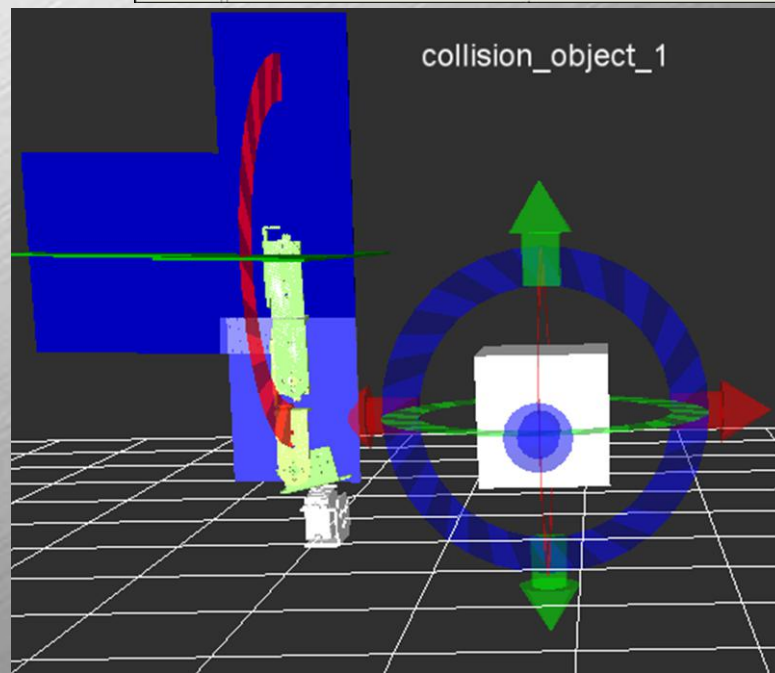
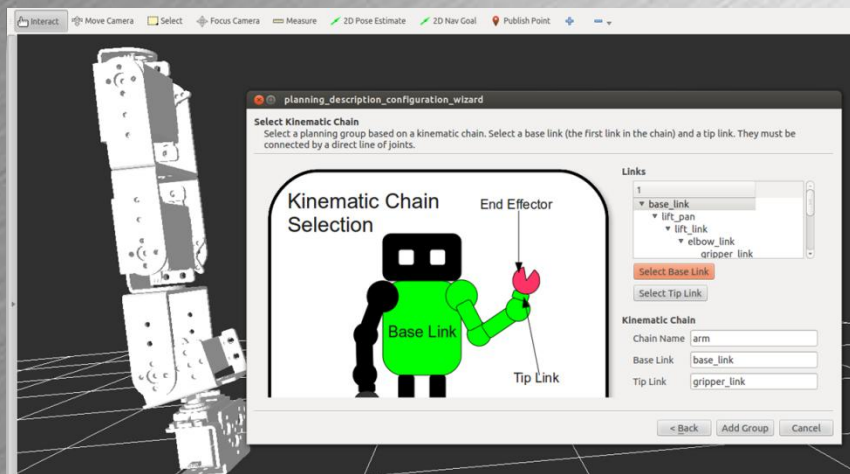
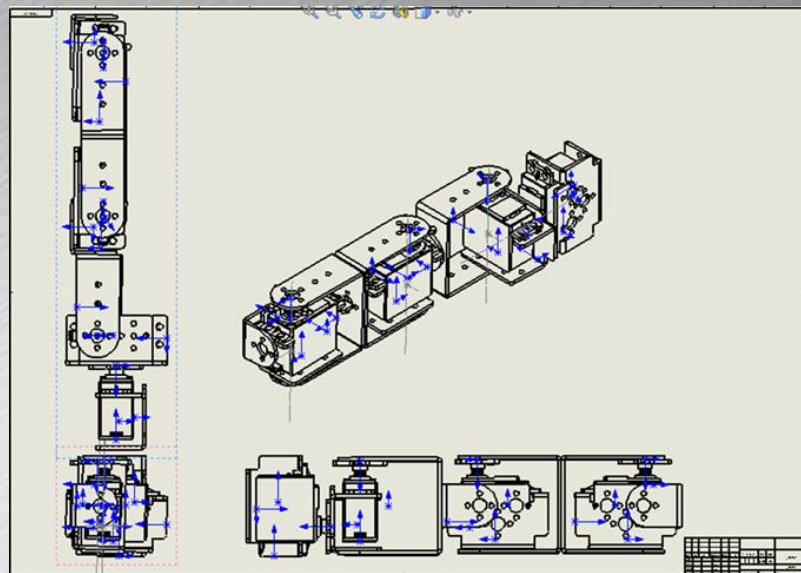
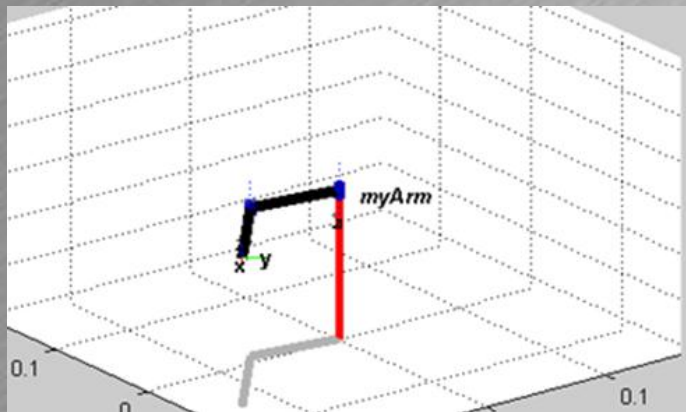
ROUTER HAS NO SOFTWARE KEY
-----
You have 23h49m to configure the router to be remotely accessible,
and to enter the key by pasting it in a Telnet window or in Winbox.
See www.mikrotik.com/key for more details.

Current installation "software ID": LLGQ-7MOL
Please press "Enter" to continue!

[admin@MikroTik] > _
```

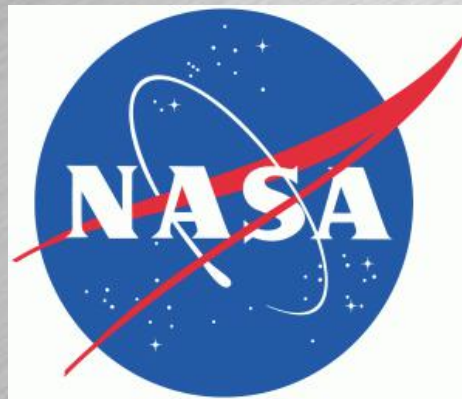


基于ROS的机械手臂设计-2012





Why ROS?



内容提要

自主导航类	机械手臂抓取类
Husky室外自主导航	Shadow脑电系统
Guardian远程操作平台	Baxter百家乐
	Jaco + BioTac

Husky室外自主导航



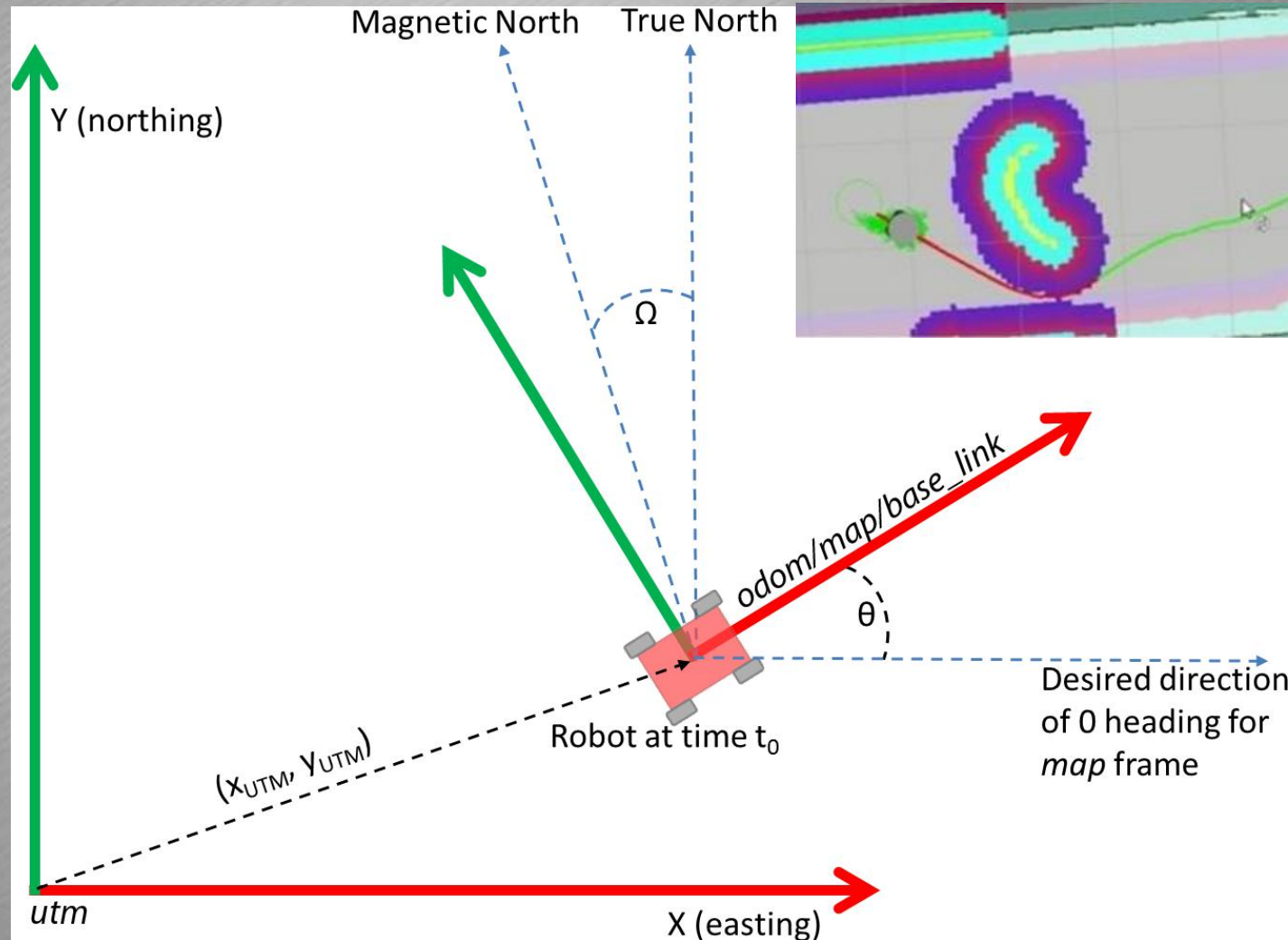
● PTZ相机



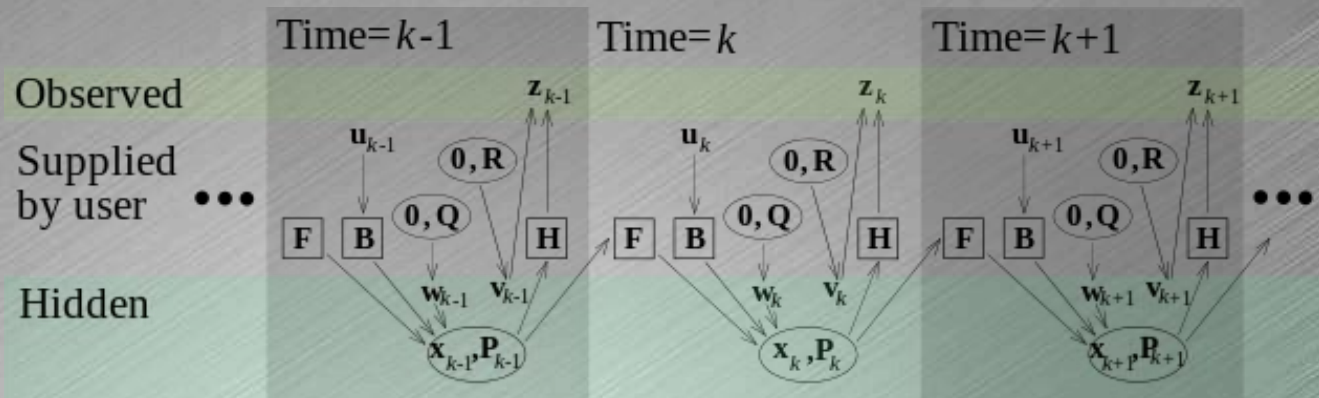
● GPS RTK

动态地图与坐标系统

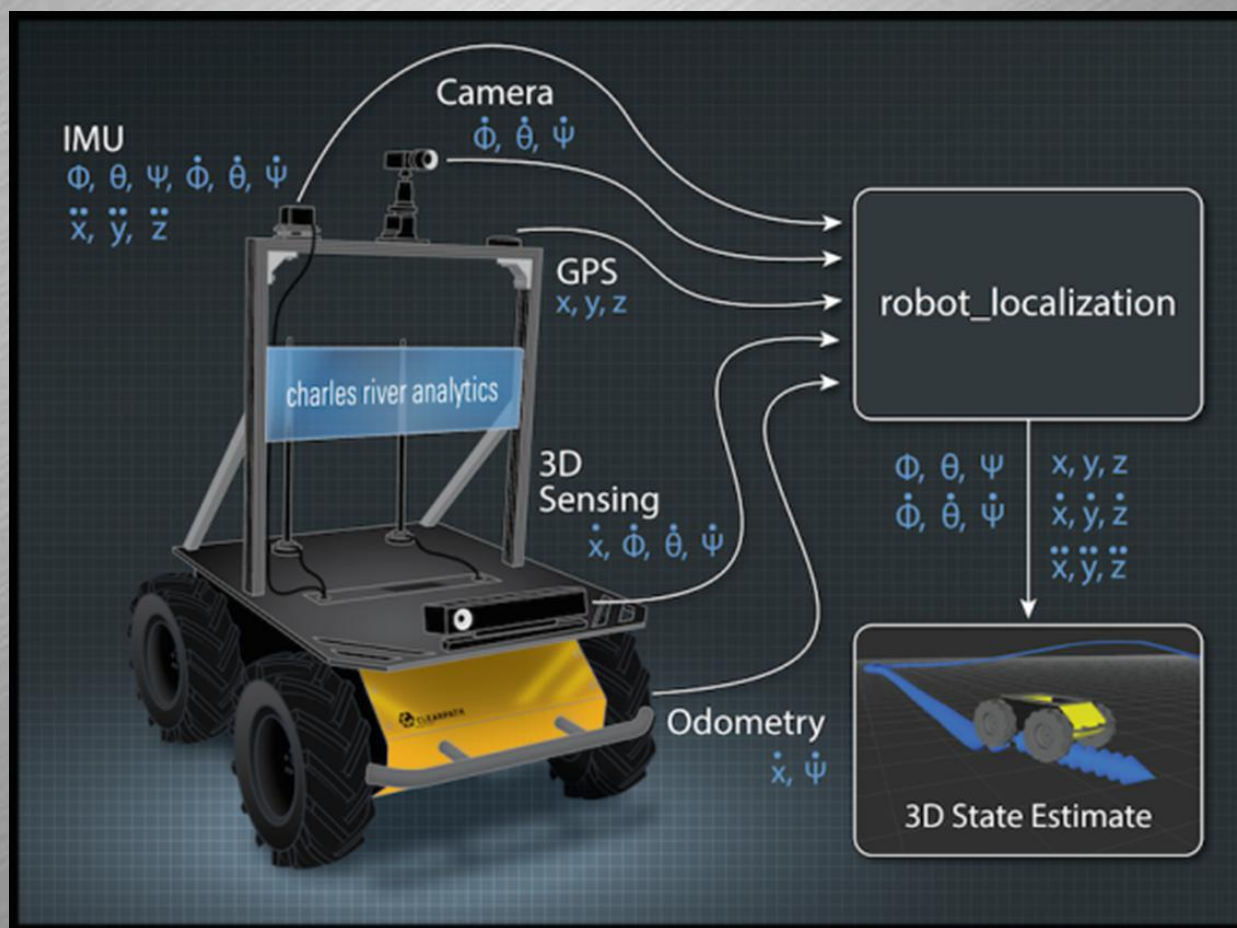
WGS84--UTM



EKF与UKF

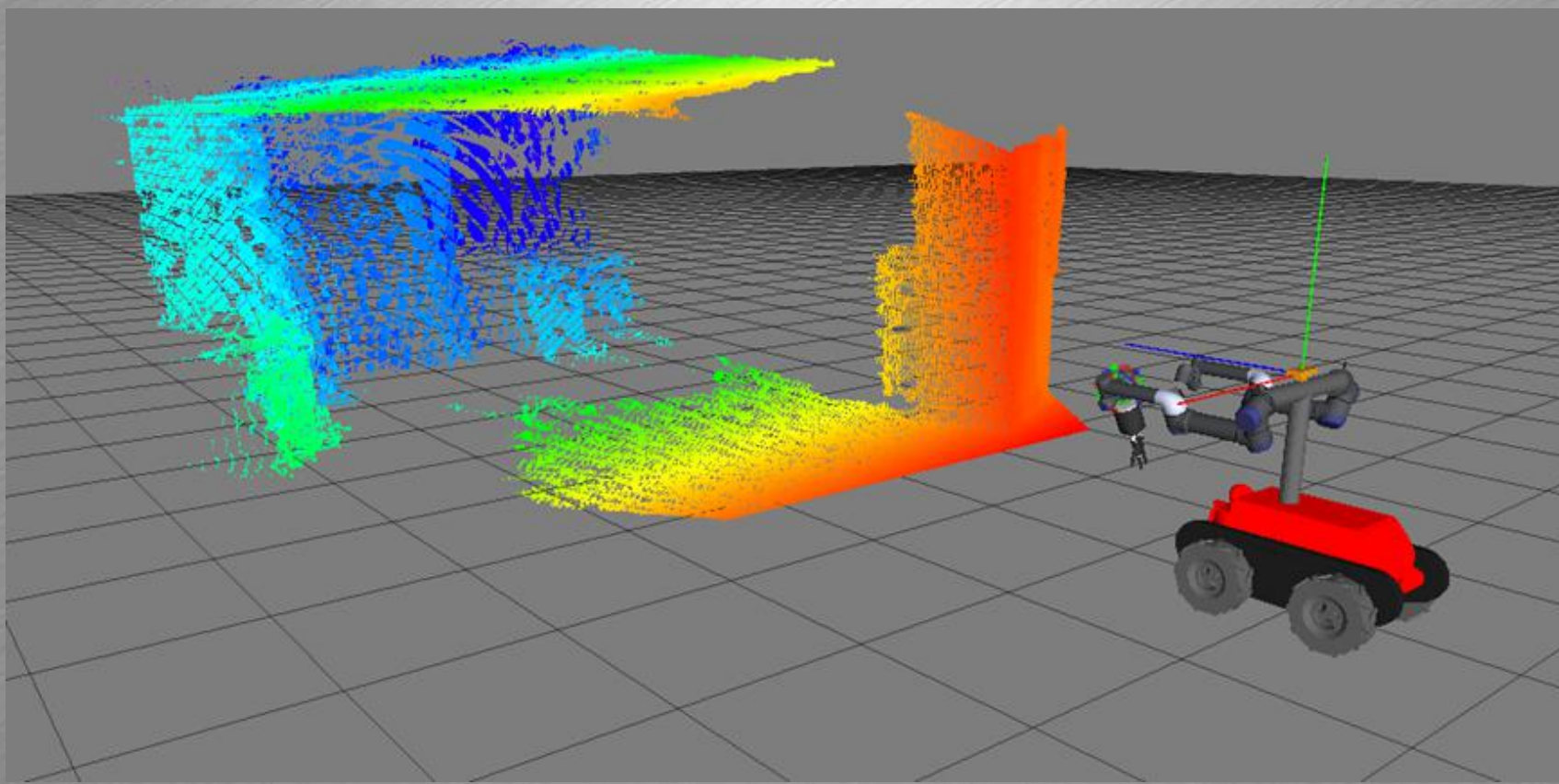
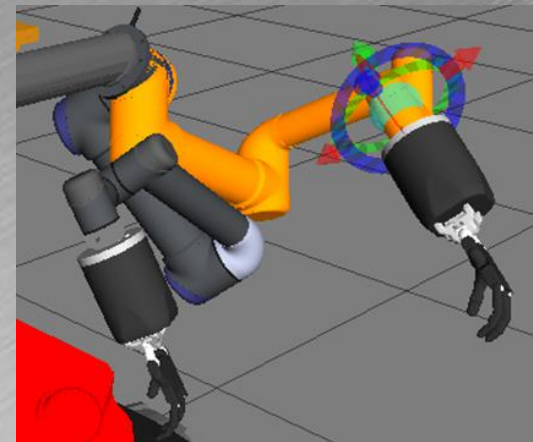
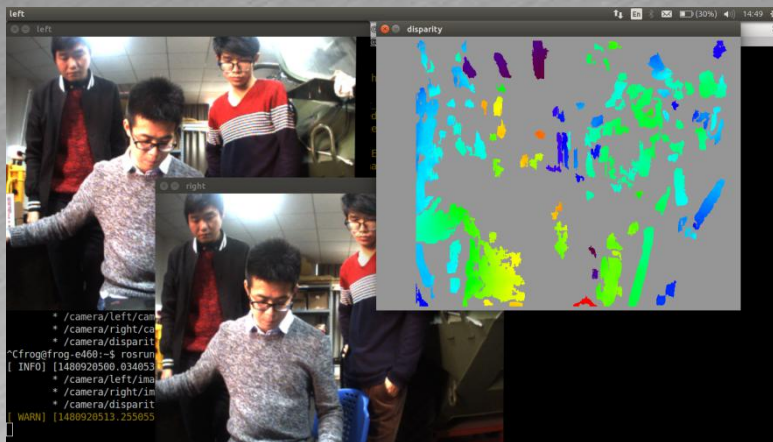
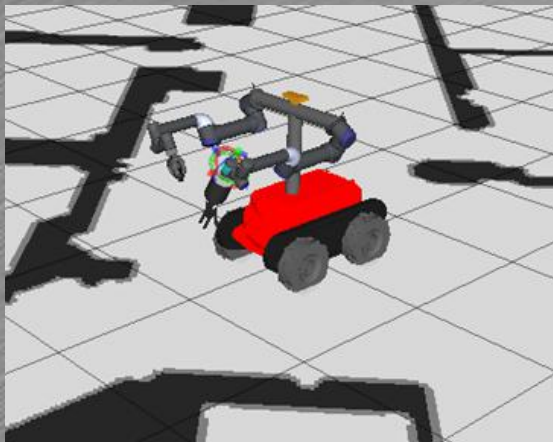


- 状态估计
- 非线性
- 非高斯
- 数据融合



Guardian远程操作平台



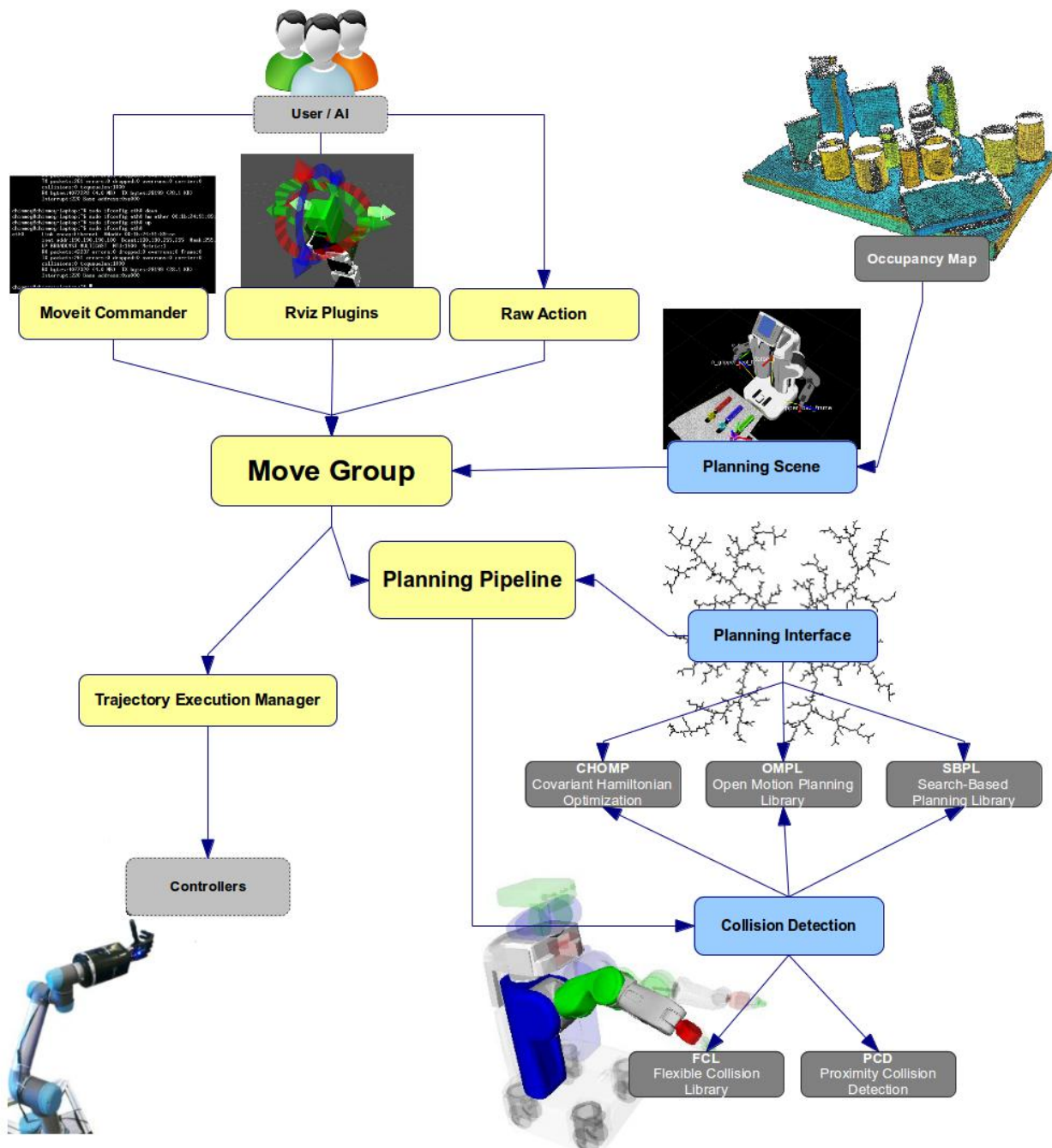


Shadow脑电系统

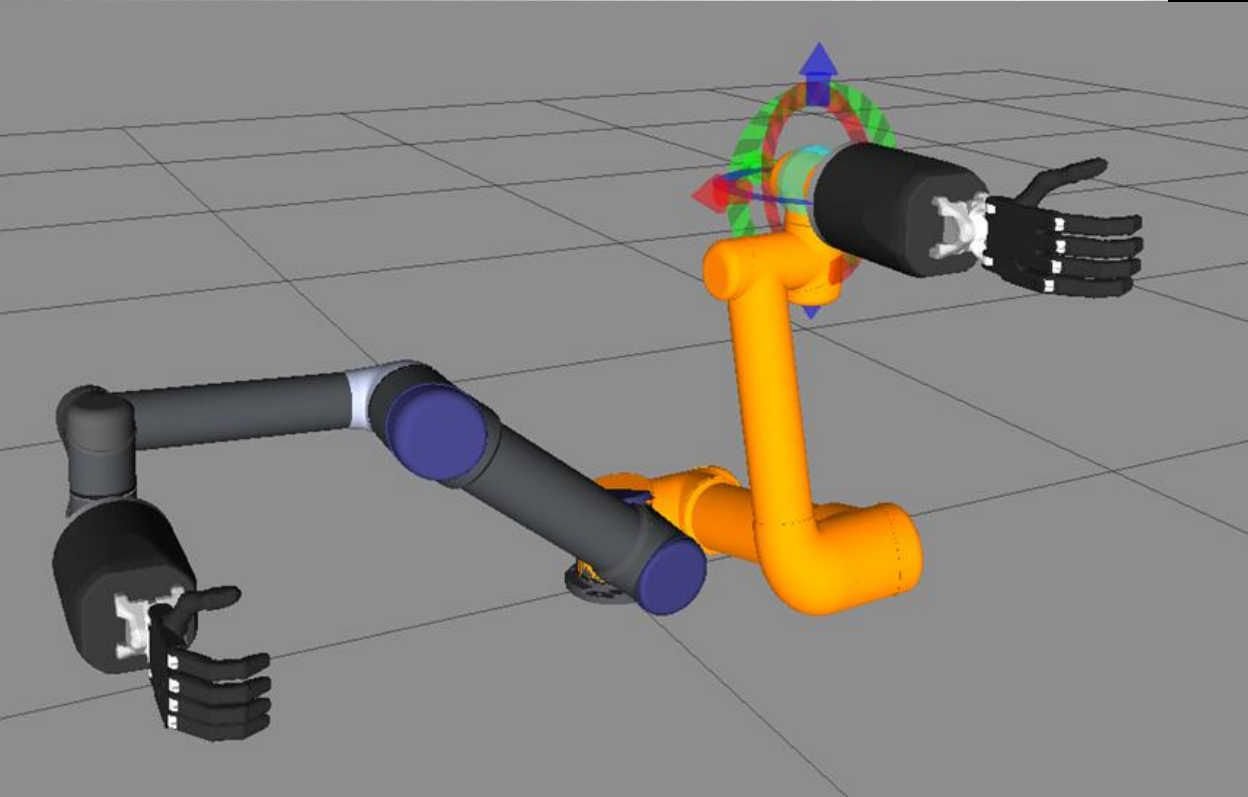
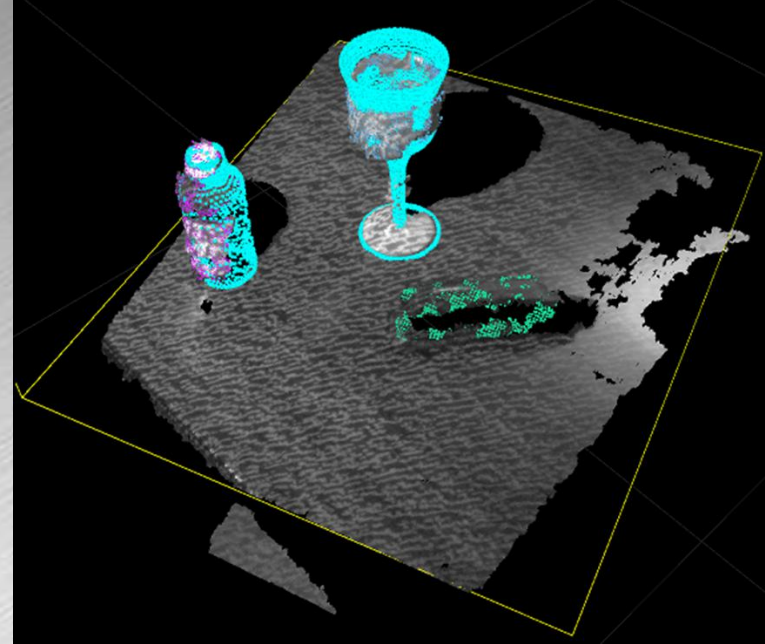


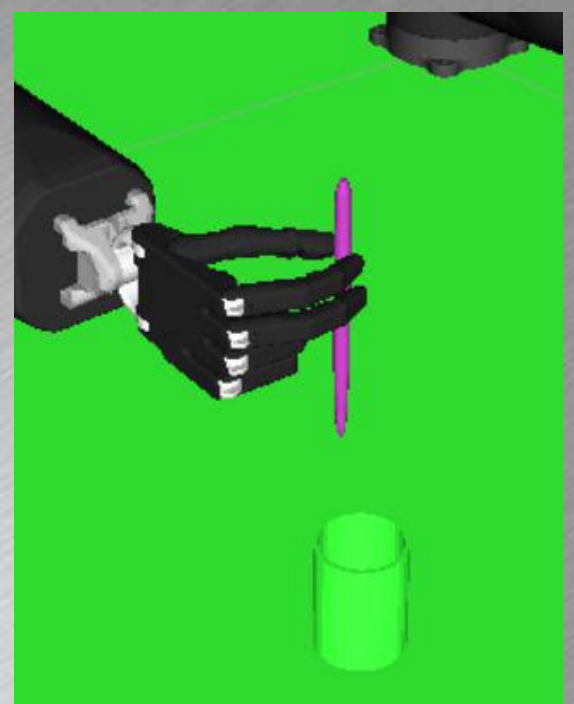
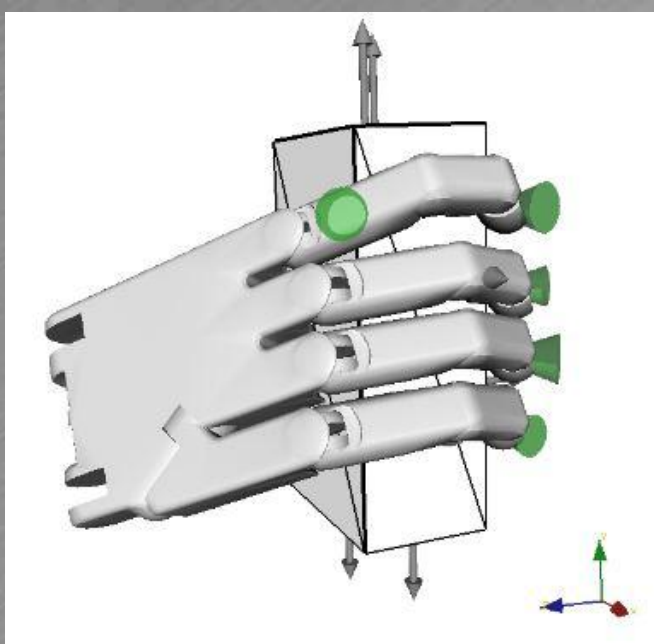


- KDL、IKFast正逆运动学、动力学求解
- 计算Cartesian空间路径
- FCL碰撞检测
- 规划场景感知
- 轨迹优化与控制器管理
- 动态执行规划轨迹

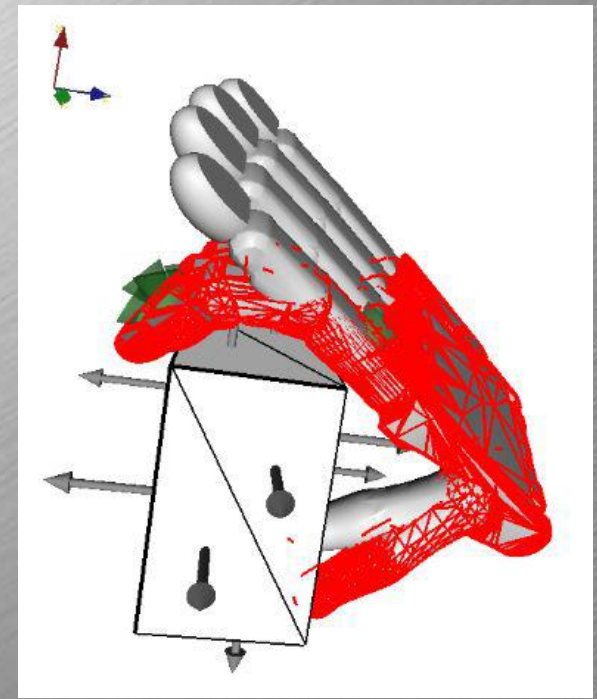


Object Recognition





Grasping





move_to_grasp_shadow.py x

```
        g.id = str(len(grasps))
        g.grasp_quality = 1.0 - abs(pitch)
        grasps.append(copy.deepcopy(g))

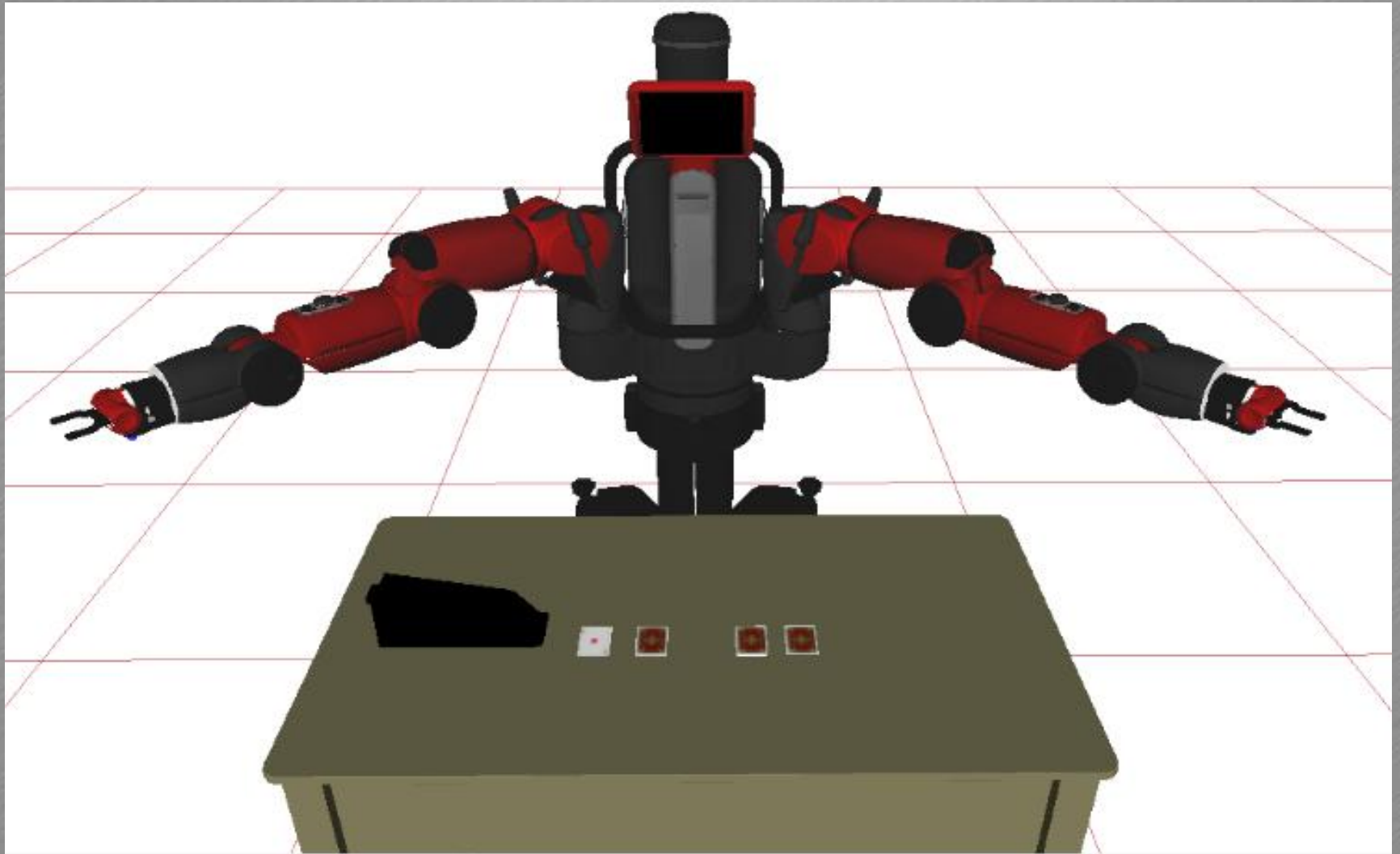
    return grasps

def make_places(self, pose_stamped, mega_angle=False):
    l = PlaceLocation()
    l.post_place_posture = self.make_hand_posture(HAND_OPEN)
    l.pre_place_approach = self.make_hand_translation(0.1, 0.15, [0, 0, 1])
    l.post_place_retreat = self.make_hand_translation(0.1, 0.15, [0, 0, -1])
    l.place_pose = pose_stamped

    rolls = [0]
    #rolls = [-0.1, 0, 0.1]
    #pitches = [0]
    pitches = [-0.15, -0.1, 0, 0.1, 0.15]
    #yaws = [y/100.0 for y in range(-140, 140, 20)]
    yaws = [y/100.0 for y in range(-158, 158, 8)]

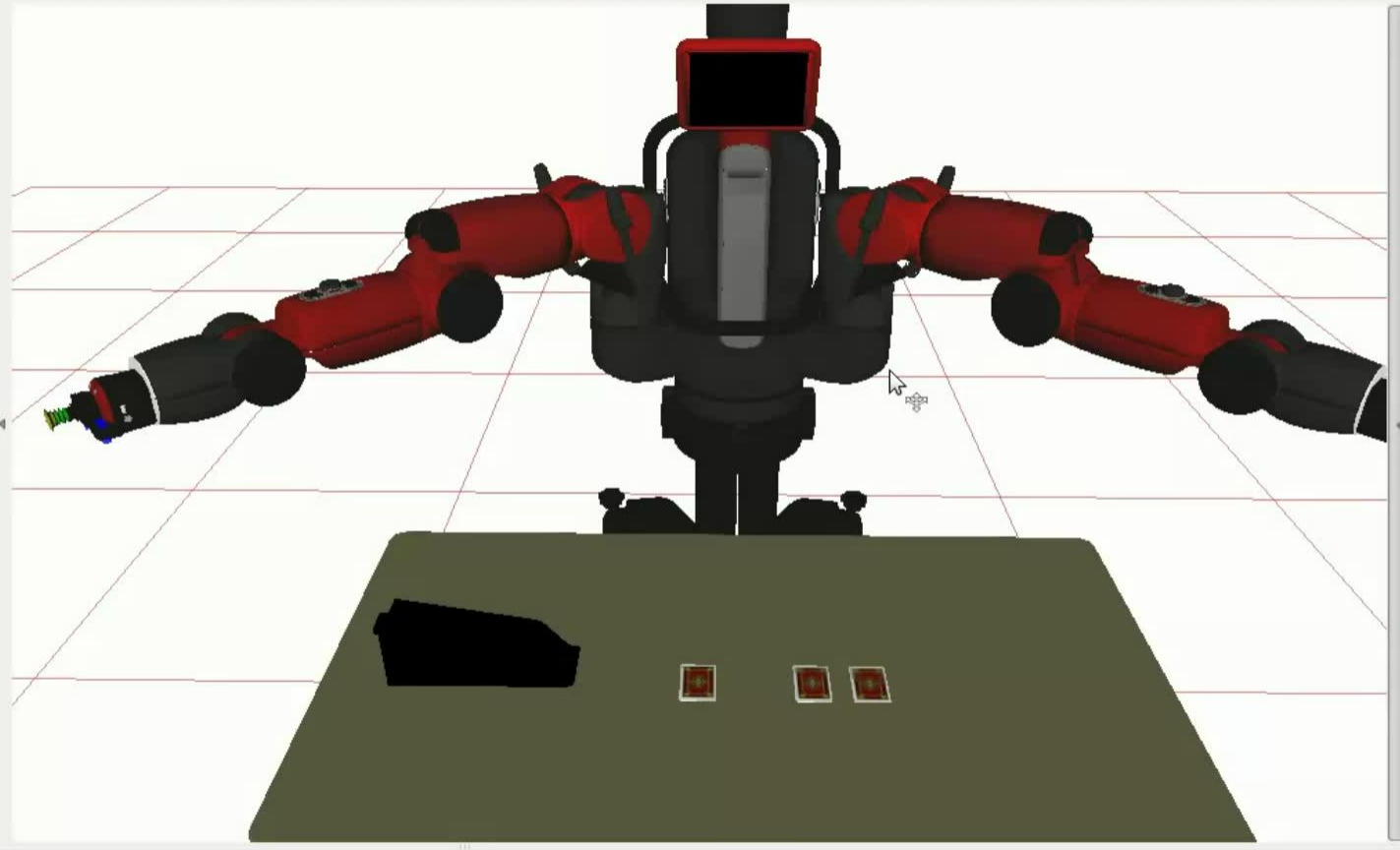
    # generate list of place locations
    places = []
    for roll in rolls:
        for pitch in pitches:
            for yaw in yaws:
                q = quaternion_from_euler(roll, pitch, yaw) # now in object frame
                l.place_pose.pose.orientation.x = q[0]
                l.place_pose.pose.orientation.y = q[1]
                l.place_pose.pose.orientation.z = q[2]
```

Baxter 百家乐



Interact Move Camera Select Focus Camera Measure 2D Pose Estimate 2D Nav Goal Publish Point

- Displays
- Global Options
 - Global Status: Ok
 - Grid
 - RobotModel
 - PlanningScene
 - Axes
 - DepthCloud
 - Image
 - PointCloud2
 - Range
 - Camera
 - TF
 - Odometry
 - LaserScan
- Add Remove Rename



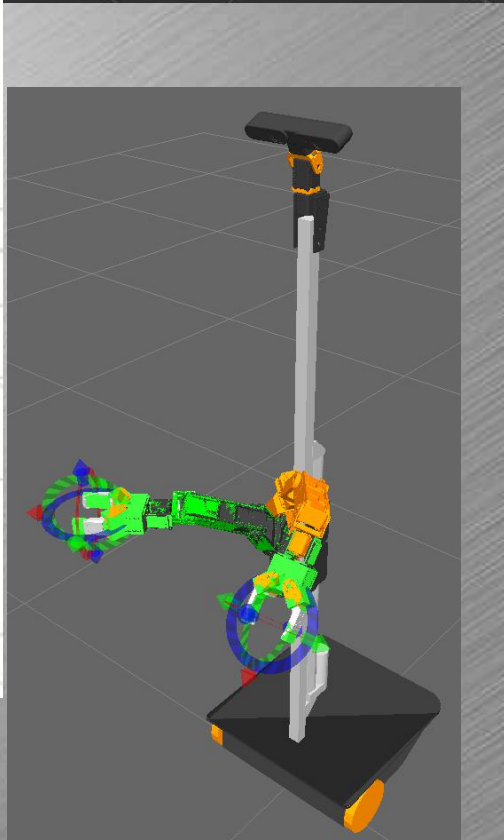
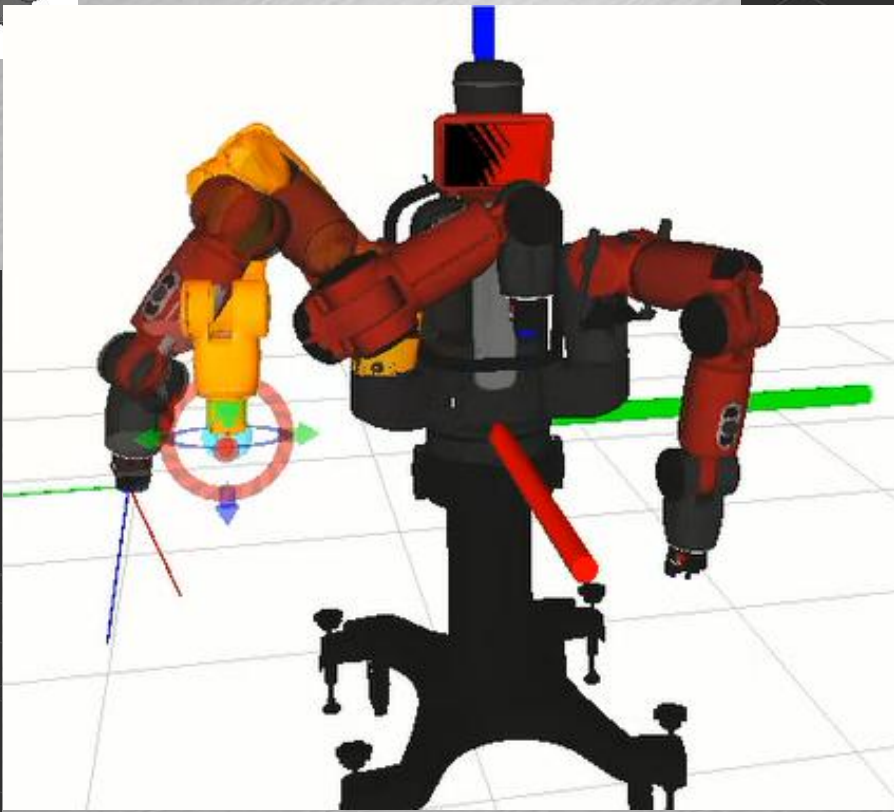
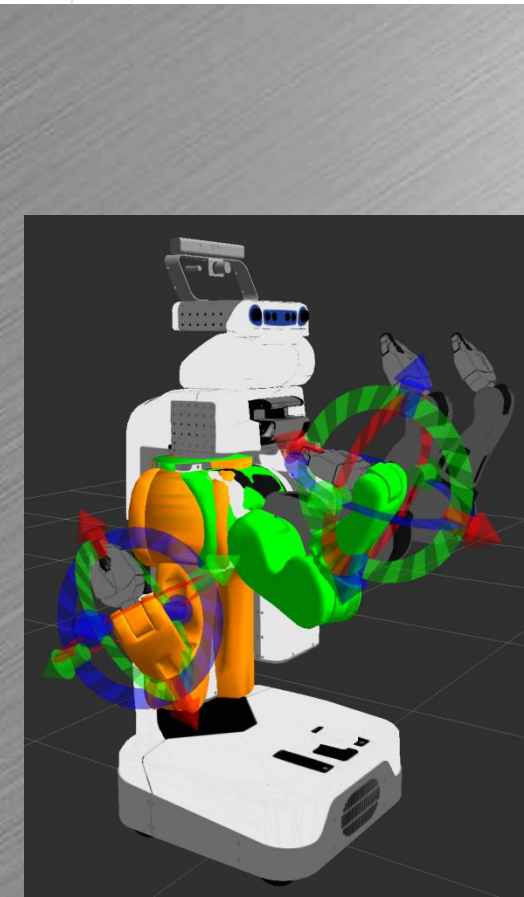
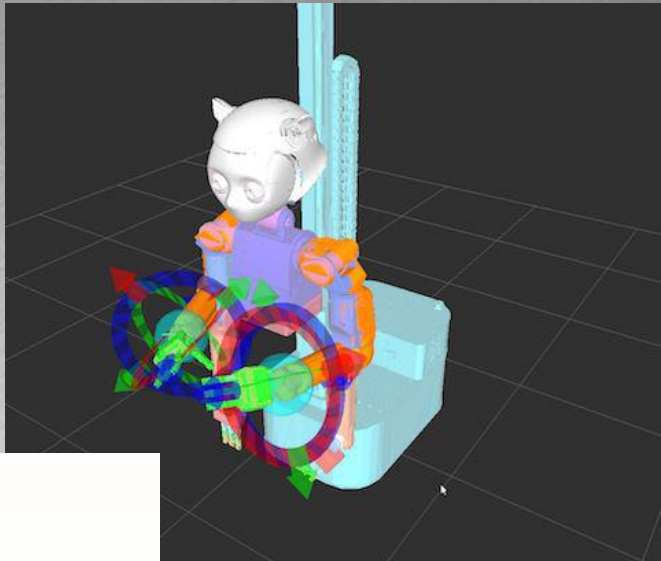
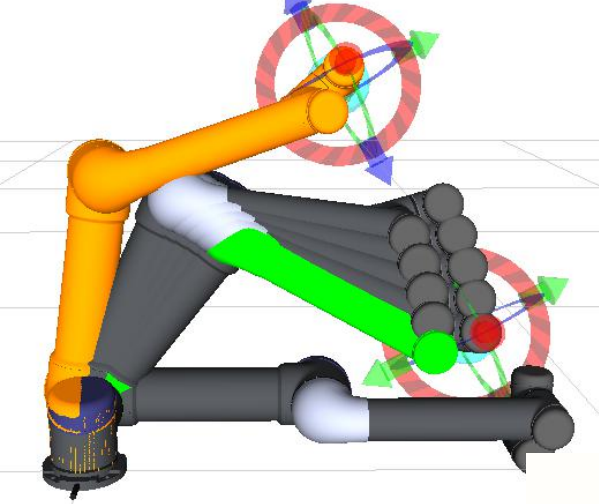
Time

ROS Time: 1417743035.22 ROS Elapsed: 12.39 Wall Time: 1417743035.26 Wall Elapsed: 12.36

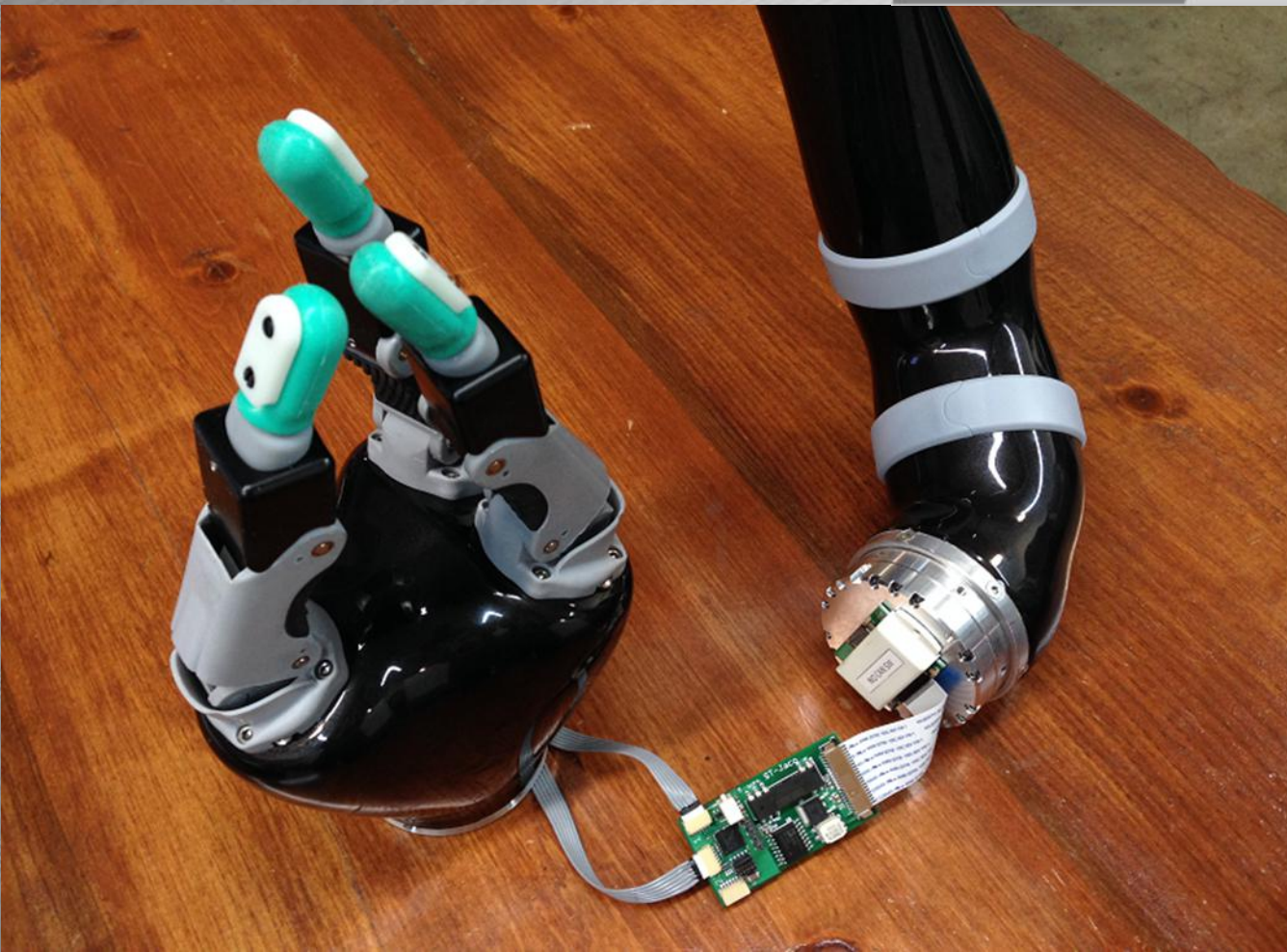
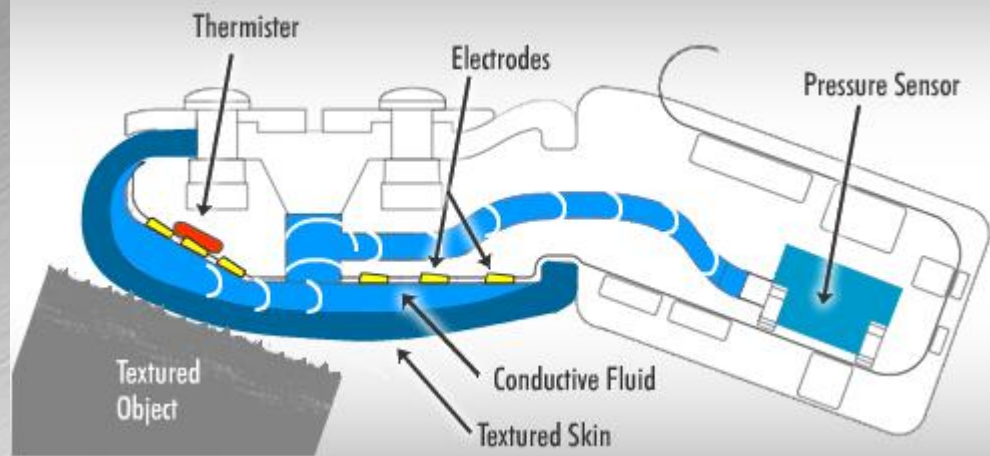
Experimental

Reset Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel: Zoom. Shift: More options.

30 fps



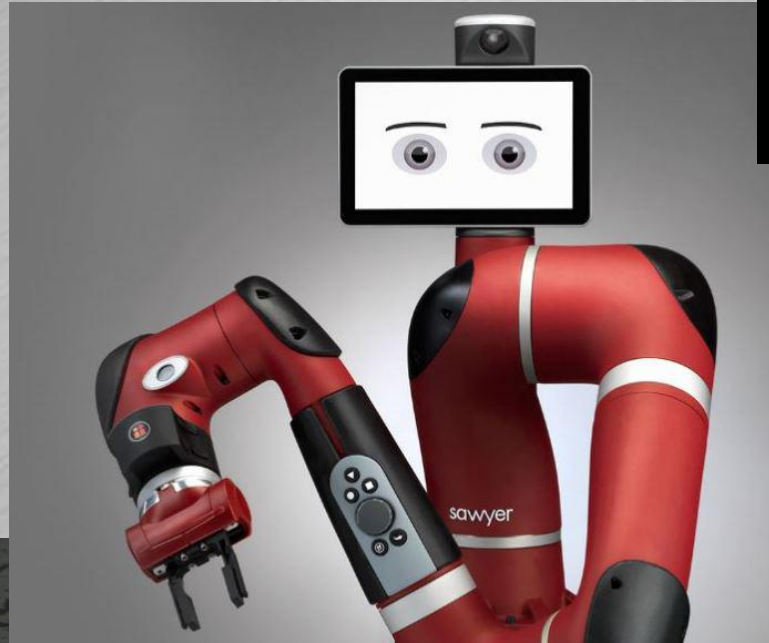
Jaco + BioTac



 **ROS**®

The Future of Robotics

- 柔顺
- 协作
- 互联
- 自主
- 智能



QUESTIONS?

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