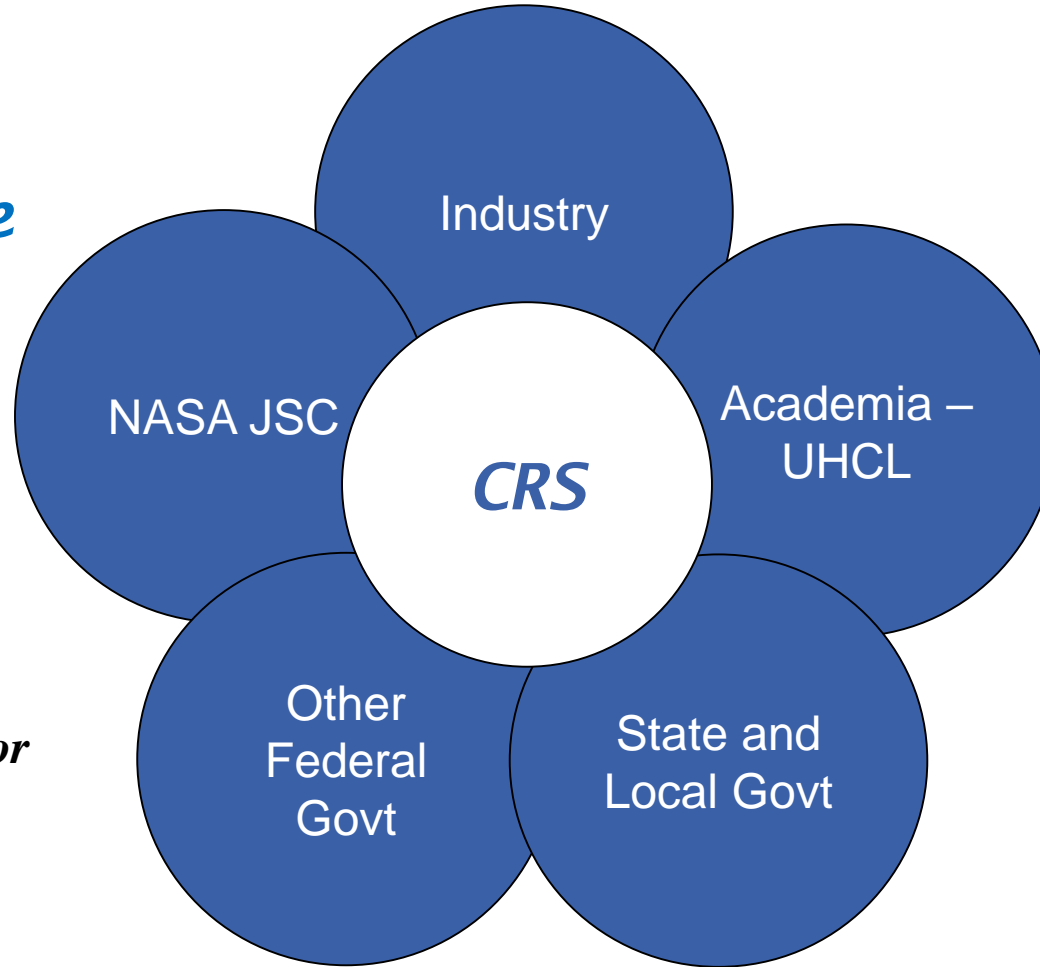


Center for Robotics Software




Thomas L. Harman, Ph.D. Director

Carol Fairchild, Co-Director

281 283-3825

crs@uhcl.edu

University of Houston  Clear Lake

MISSION STATEMENT

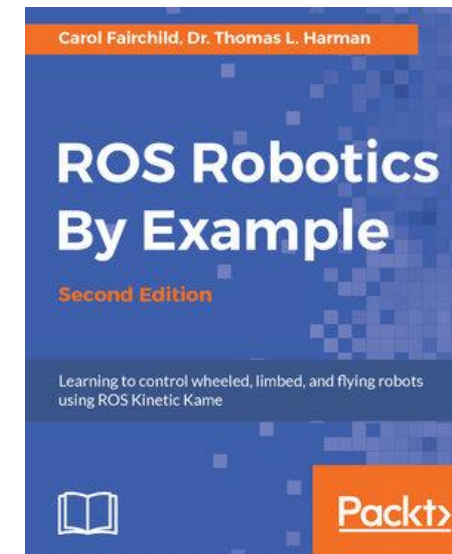
The Center was conceived during consultation with key members of the NASA and the Industrial technical community. The main purpose is to leverage the technical infrastructure that exists between NASA, academia, and industry to identify and solve challenging automation and robotics problems. The emphasis is on ROS applications.

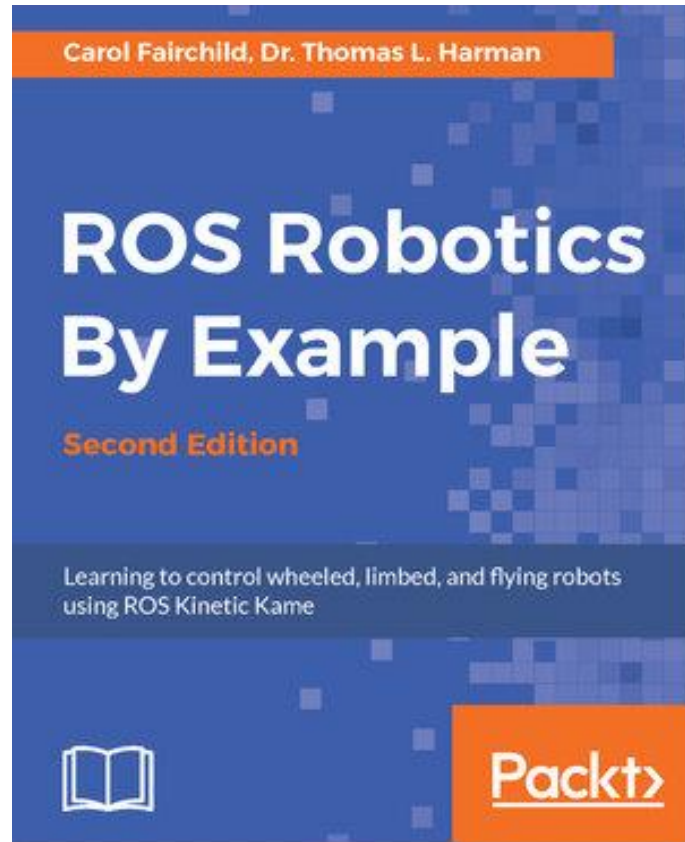
WHY A ROBOT OPERATING SYSTEM -ROS ?

- IDEAL FOR EDUCATION, RESEARCH, AND APPLICATIONS
- ROS software has revolutionized development of robotics software and applications around the world. Developed at Stanford and released about 10 years ago. Many robots are ROS compatible.
- ROS is composed of software packages for robot control, vision, and navigation. No need to write software if a package is available.
- ROS is Open Source. Use is not restricted.
- ROS packages can be modified to fit specific applications.

ROBOTICS COURSES AT UHCL

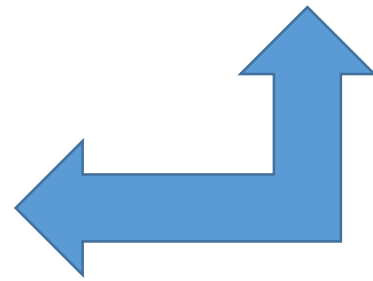
- At UHCL College of Science and Engineering, we are teaching several courses in robotics that include the use of ROS.
- An undergraduate course *Introduction to Robotics* has been developed based on ROS. The Senior Projects course encourages robotics projects. Students participate in robotic competitions (Swarmathon, IEEE).
- The graduate courses include:
 - Robotics – Introduction to the design and control of robots
 - Robotics Applications and Software – ROS course
 - Mobile Robots
 - Robotic Vision – OpenCV
 - Capstone or Master’s Thesis Robotics Projects
 - Other Courses – Digital Control, Digital Signal Processing



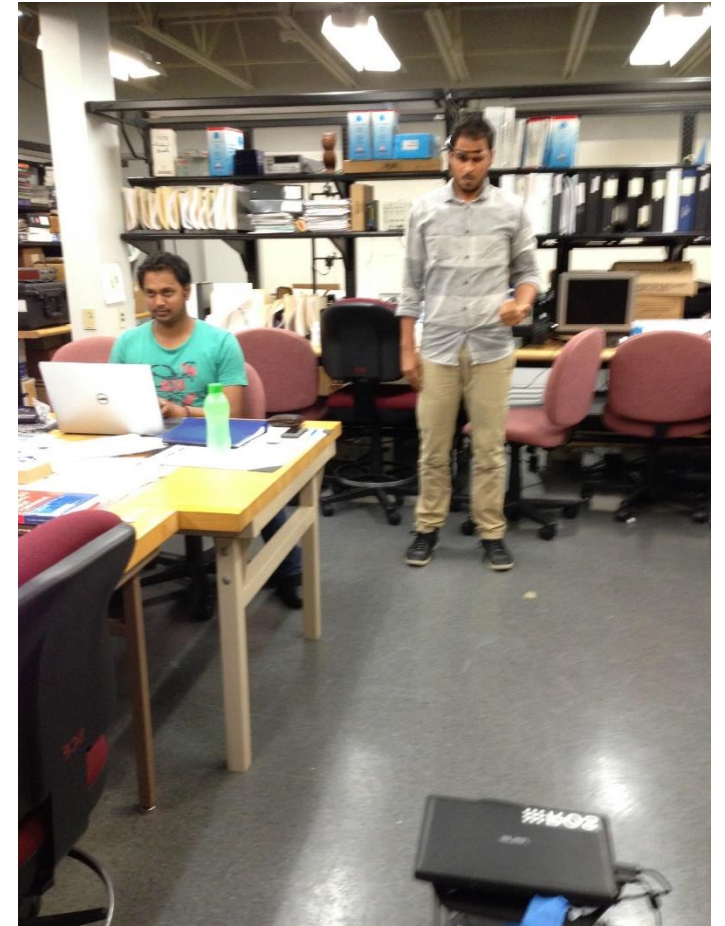


Center for Robotics Software CRS

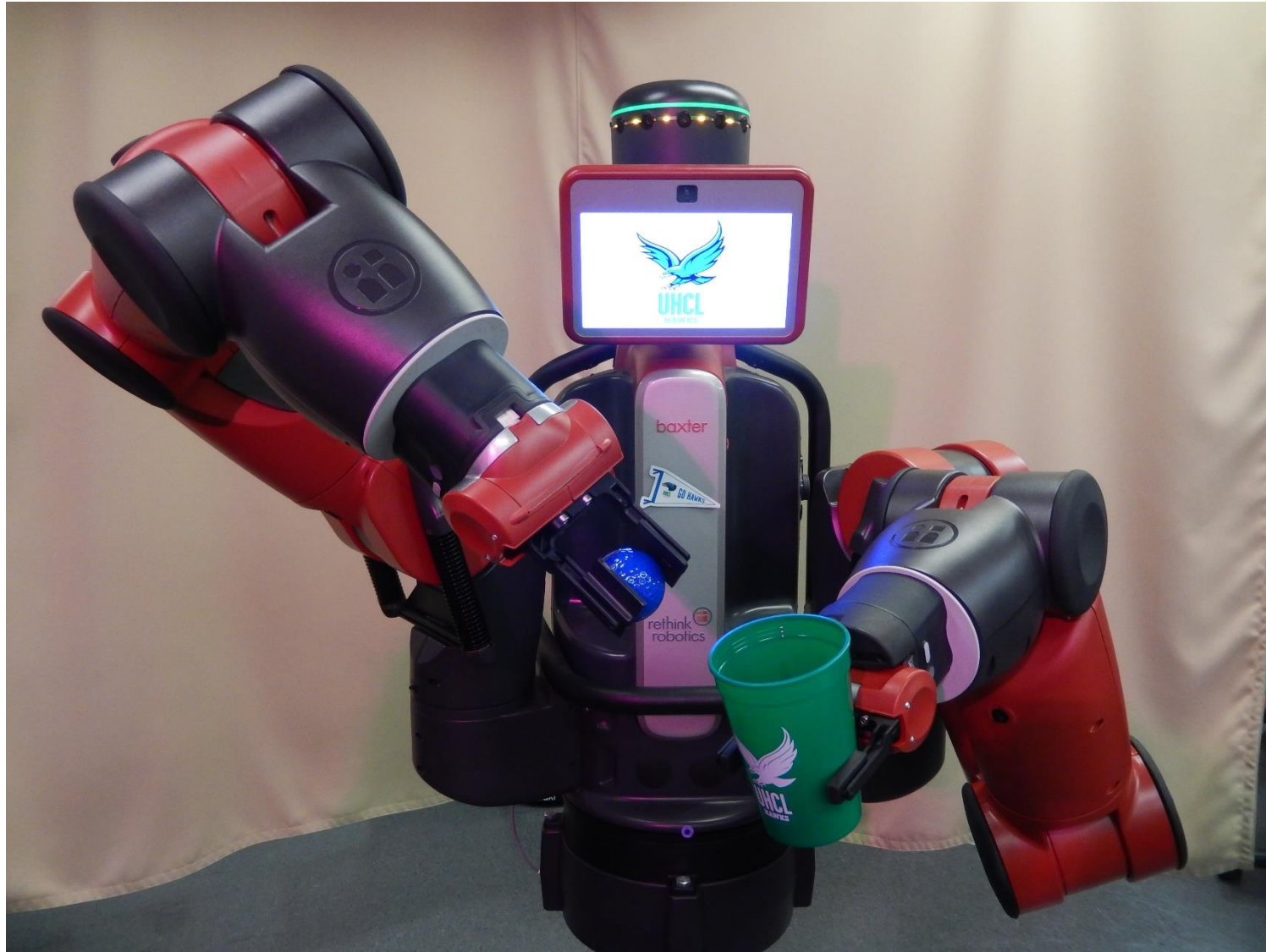
- Our first Textbook Published in 2016
- Updated in Summer 2017
- ROS Basics, Simulation, and Real Robots
- Mobile Robots, Baxter, Flying Robots
- ROS connections with External Devices
- ROS applications in MATLAB



FROM BRAIN TO BAXTER



MOVE Darn It!



NASA SWARMATHON KENNEDY SPACE CENTER OUR TEAM GAINED 4TH OUT OF 20 TEAMS!



Partners: NASA Robotics group at JSC next to UHCL



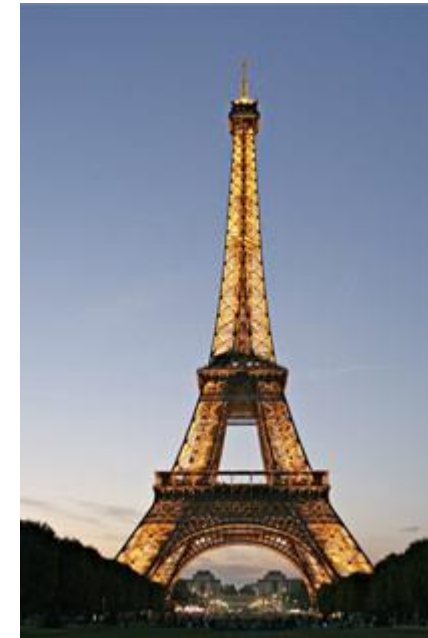
Multithreading/Multiprocessing Simulation of The International Space Station Multibody System Using A Divide and Conquer Formulation with Flexible Bodies



Luong A. Nguyen
Assistant Professor
Engineering Department
University of Houston – Clear Lake

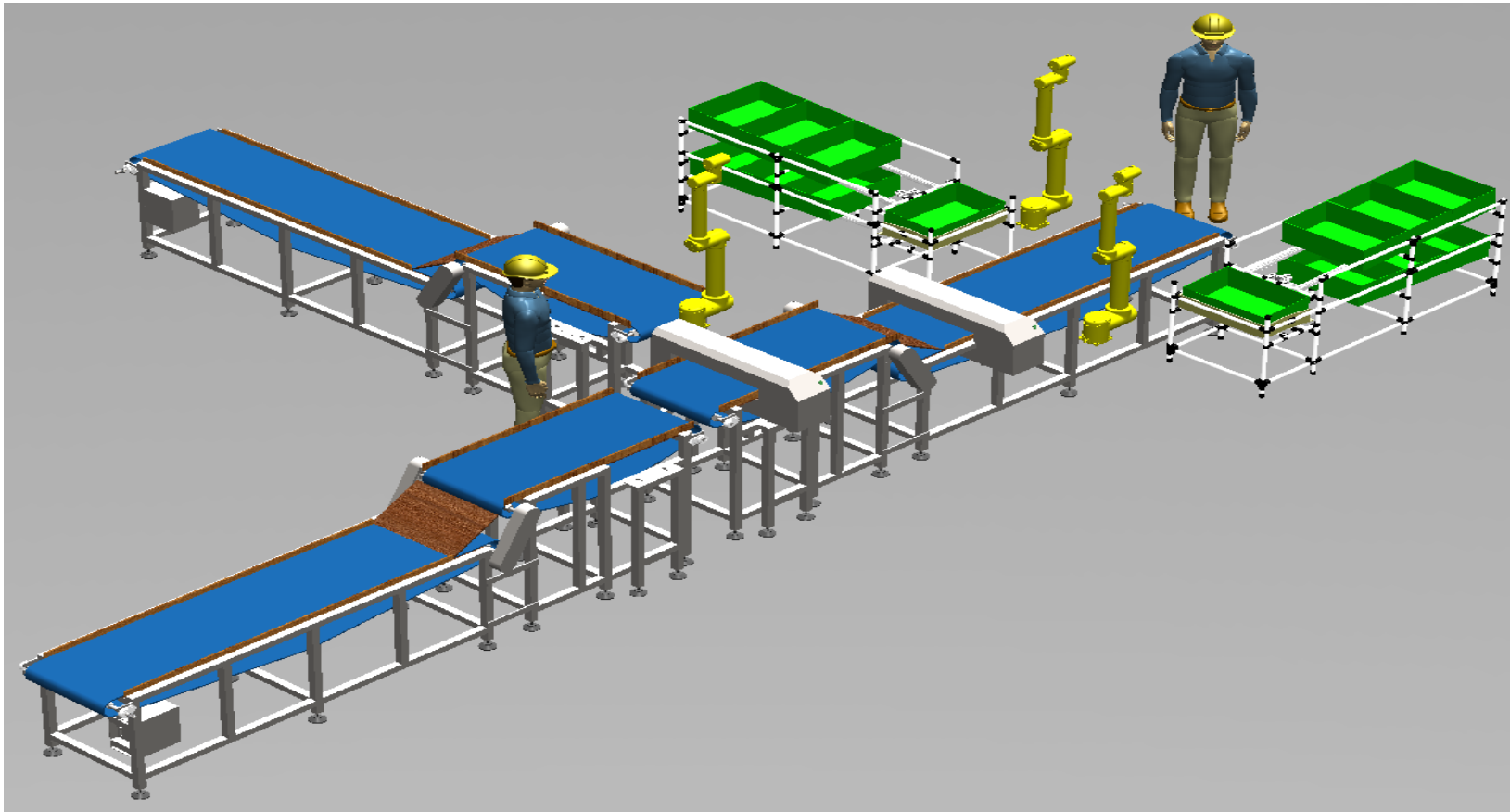
National Security Solutions
L-3 Communications
Elihu Deneke
National Security Solutions
L-3 Communications
Houston, Texas, USA

Thomas L. Harman
Professor and Chair
Engineering Department
University of Houston – Clear Lake
Houston, Texas, USA



ICARA 2017

May 18-19 2017, Paris, France



Proposed Oyster Sorting system

OTHER PERSONEL AND ASSOCIATES:

Faculty Members:

**Dr. James Dabney, Dr. Michael Findler,
Dr. Luong Nguyen, Dr. Lu, Dr. Unwala,
Dr. Sakoglu and Others.**

**We also partner with researchers at UH and
Rice. Students are also actively engaged in
research in the robotics lab.**

SCOPE of CRS

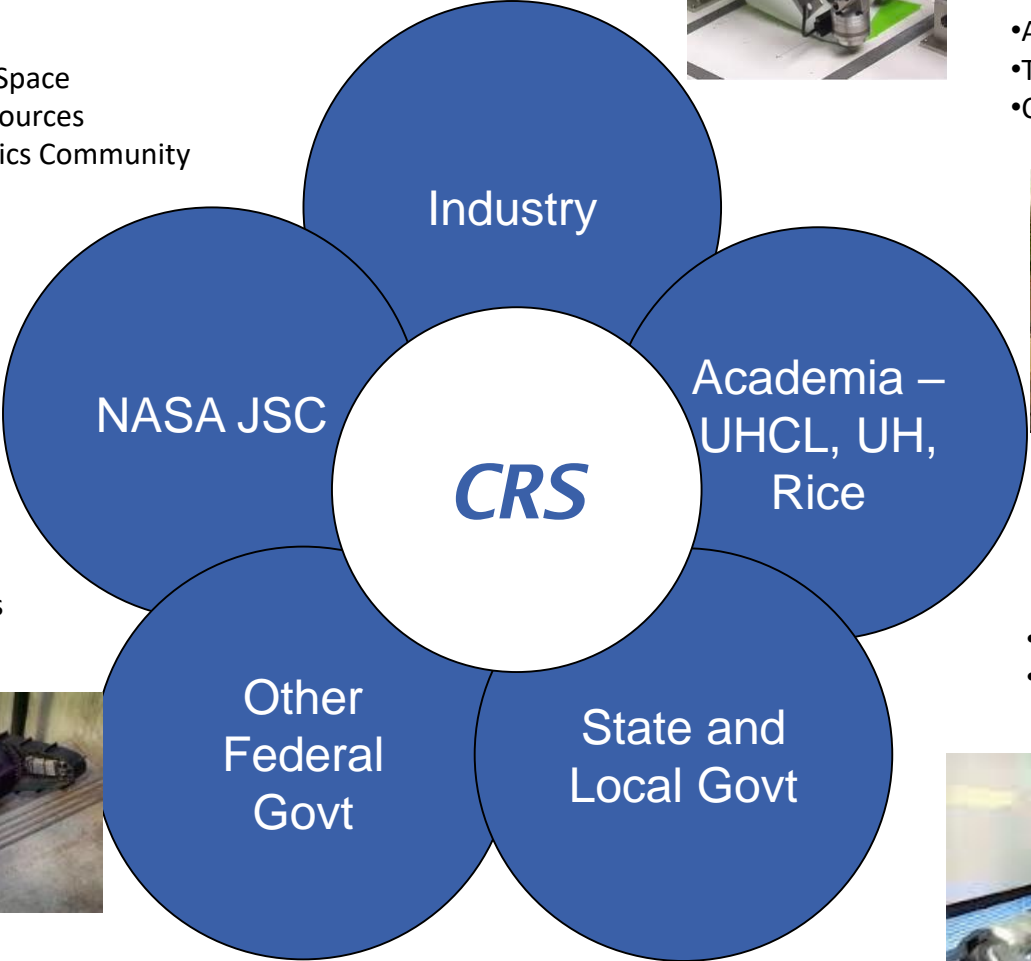
•Commercialization of Space Technology



•Educated Workforce

- Attract Top Students
- Train Students for Robotic Careers
- Conduct Research

- Advanced Robotics for Space
- Leverage Academic Resources
- Strengthen Local Robotics Community



- Solutions to Hard Problems
- Capabilities to Deploy



- High Tech Jobs
- Grow the Local Economy



SUMMARY

- For the Center, the focus is on using ROS for robotic software projects. This software has revolutionized development of robotics software and applications around the world.
- For example, NASA JSC is using ROS for future development of the Robonaut humanoid robot that is in current use on the International Space Station.

