

ROS-Industrial Consortium Americas

Driving to Advance Robotics Capability & Accessibility

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March 4, 2020



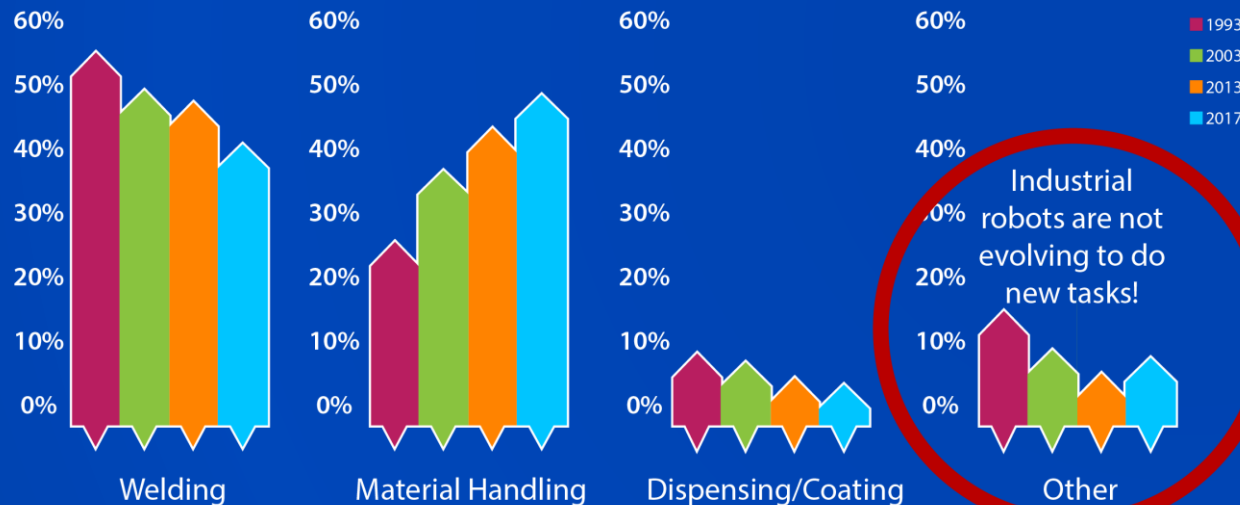
ROS-Industrial Consortium Americas
2020 Annual Meeting

Industrial Robotics – Silos & Stagnation

Stagnated Due to Reliance on Large-scale Manufacturers that Leverage Sheer Volume to Offset Cost and Limitations



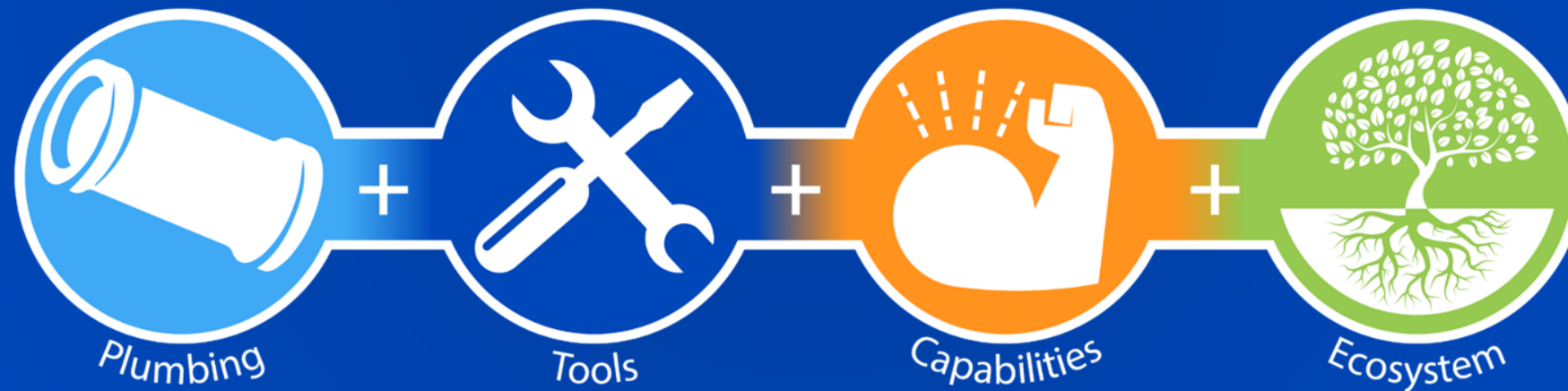
Industrial Robot Sales in North America 1993–2017



A Disruption in Software for Automation

Enter ROS – Robot Operating System

- Open Source
- Established to prevent re-inventing the wheel
- Maintained by Open Robotics
- Reusable Software Components
- >1,000,000 user downloads/mo

The ROS logo consists of a 3x3 grid of white dots on the left, followed by the letters "ROS" in a white, sans-serif font on a light blue rectangular background.

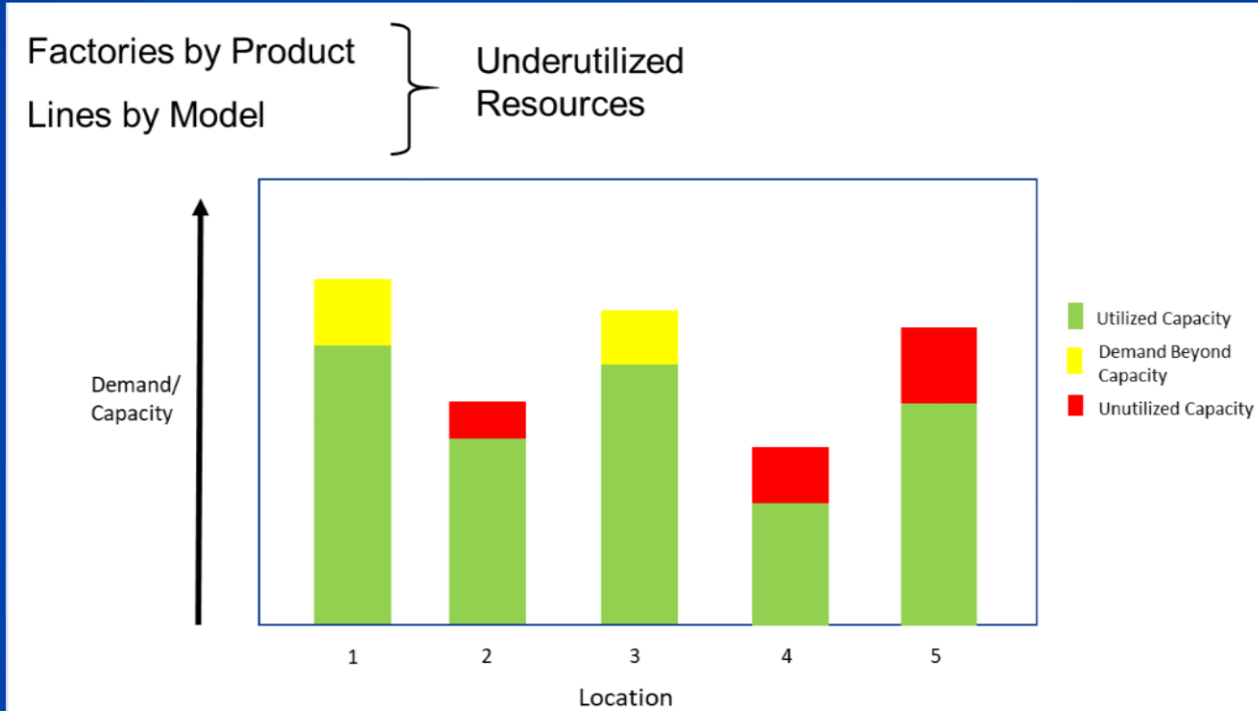
What is ROS-I?



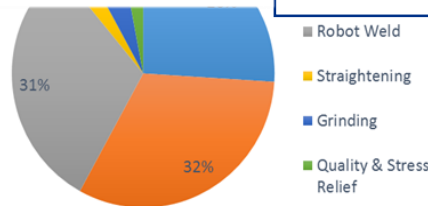
Technical Vision Supported by Industry



Attacking End-User Opportunities



Significant inefficiencies driven by limitations in legacy systems & processes



Legacy Automation Support Costs

Cost Drivers that Challenge Period Cost Structure to Support Automation

Program New Parts	Update/Create Programs for Engineering Changes	Modify Programs to Resolve Down Condition
<ul style="list-style-type: none"> • Asset Specific • Programs do not transfer or scale • Creation of New Program is Cumbersome • Validation 'On the Fly' – under supervision 	<ul style="list-style-type: none"> • Involves Detail Program Review • Programs are still asset specific • Validation 'On the Fly' – under supervision 	<ul style="list-style-type: none"> • Input Variations • Limited Range to Manage Change in Condition • Desire to Meet Delivery Timelines • Difficult to manage in a PCN culture

Automated, in the context of time
66% of time is manual activity to enable and compliment the automation

Consortium Driven ROS Development

- Provide Direction
- Enable Investment to Accelerate Development
- Education
- Efficient Pipeline from Universities to End-Users
- Global Leverage with Regional Focus



Delivering Capability Into Production

Intuitive Process Application – Registration, Multi-Process Planning

Use the GUI to define the properties of a new part or modify those of an existing part

1. Load Part Model
2. Define Model Data
3. Save Model Data
4. Define Job Data
5. Save Job Data

List

Parameters

Process Type: None

Line Spacing (m)

Point Spacing (m)

Tool Z-axis Offset (m)

Min. Hole Size (m)

Min. Segment Length (m) 0.00

Intersecting Plane Height (m) 0.00

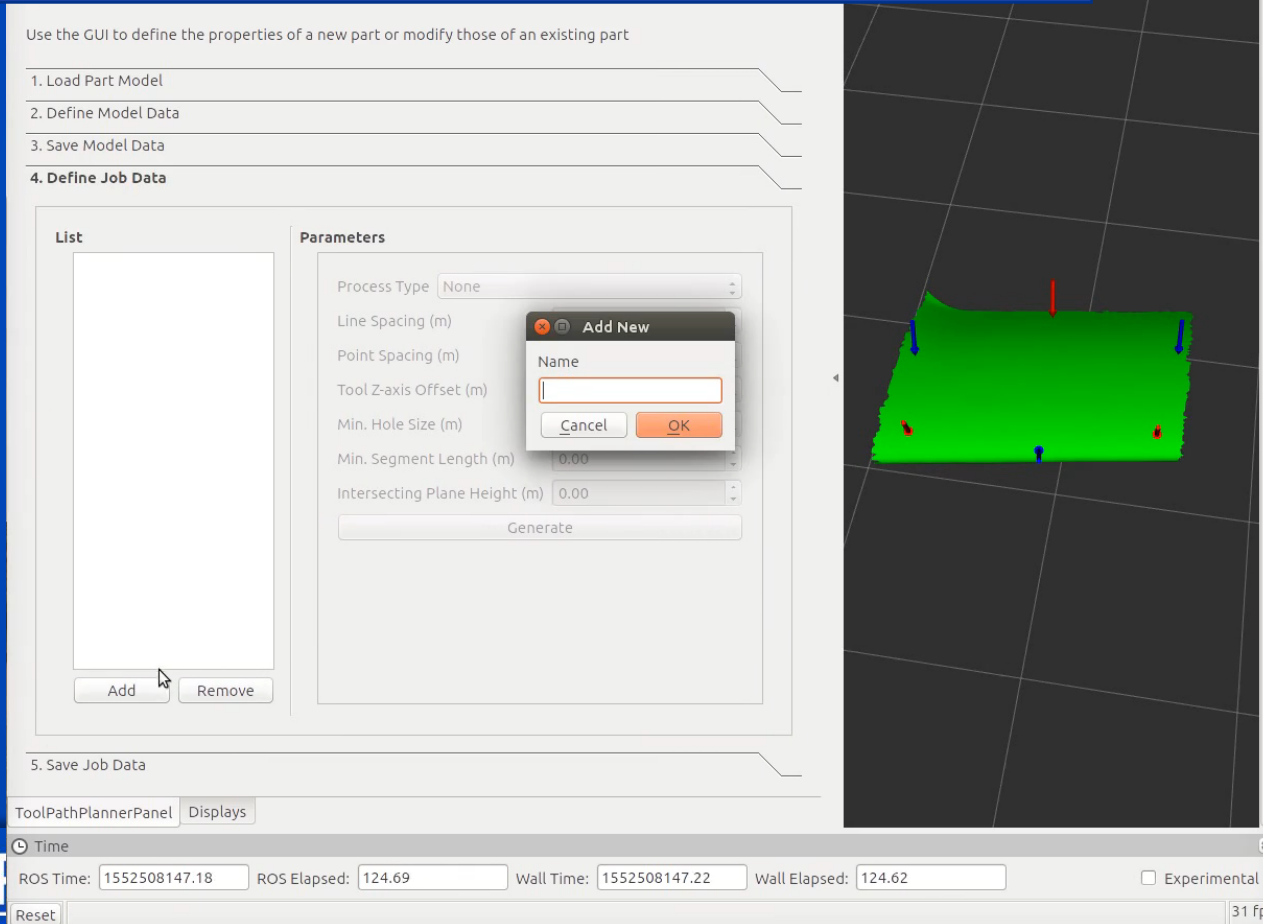
Generate

Add Remove

Add New

Name

Cancel OK

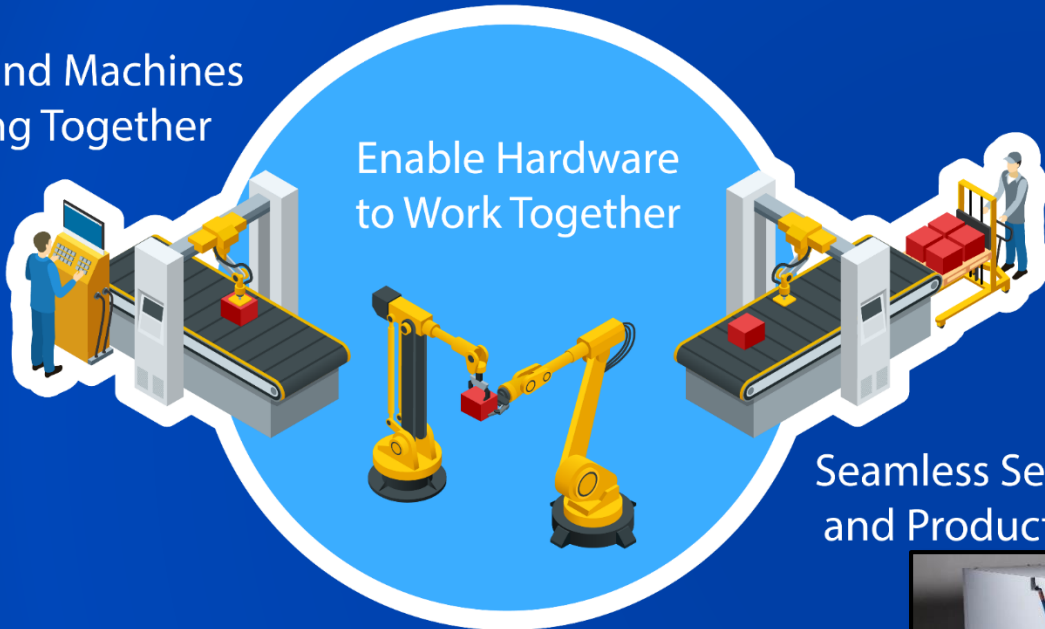


Driving End-User Value through Collaboration

People and Machines
Working Together

Enable Hardware
to Work Together

Seamless Set Up
and Production

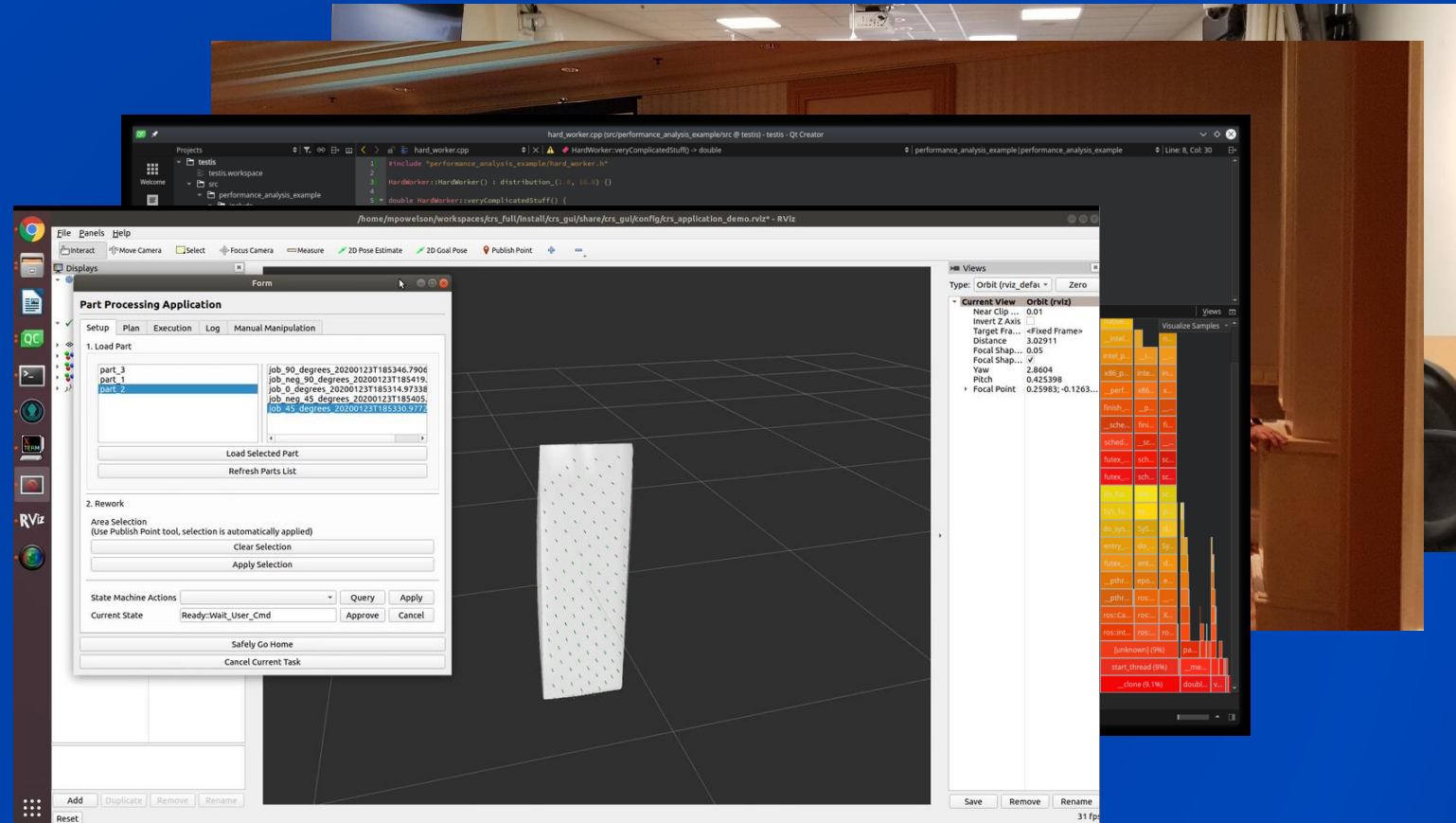


Improved User Experience

Training

Workshops

Front-End Utilities



End-User Off-Line Process Planner

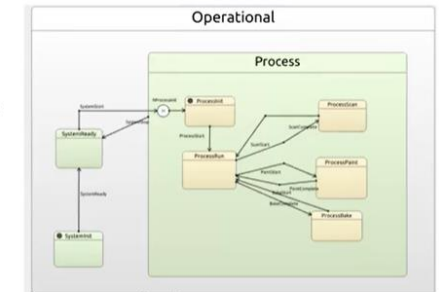
Means to Collaborate & Work Together

- Member Forum
- Quarterly Community Meetings to Share Progress
- Mid-Year Consortium Advisory Council Meeting
- Focused Technical Projects

ROS_SCXML

• Description

- State machine library based on Qscxml that loads a scxml state machine file definition in order to run a FSM.
- It allows attaching custom c++ function callbacks to state events and can be embedded into a qt gui application
- Open sourced in the near



ROS Resources: [Documentation](#) | [Support](#) | [Discussion Forum](#) | [Service Status](#) | [Q&A answers.ros.org](#)

ROS Discourse

ROS Industrial Consortium Advisory Council | all tags | Latest | Top

Topic

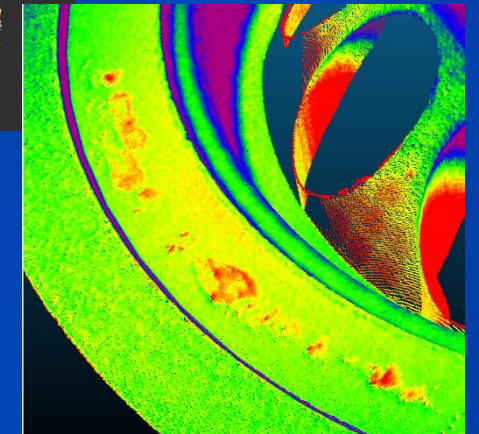
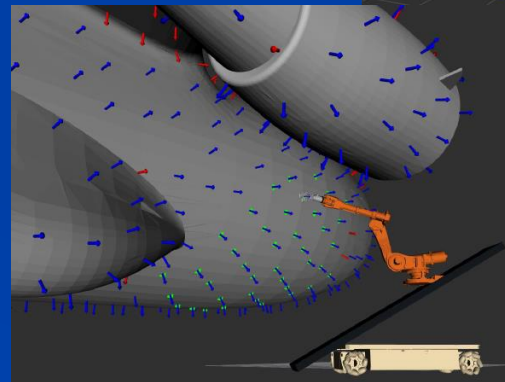
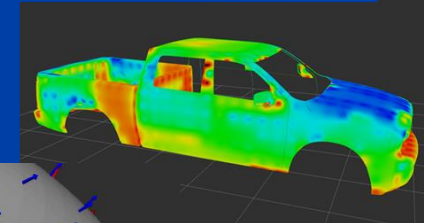
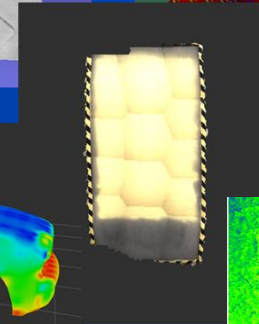
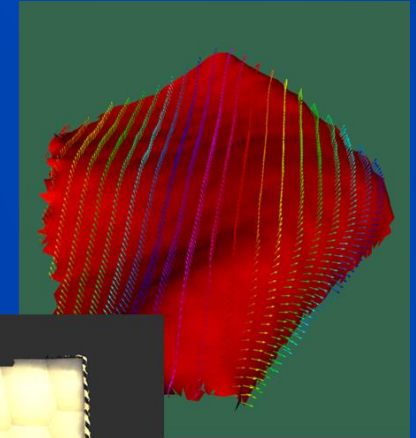
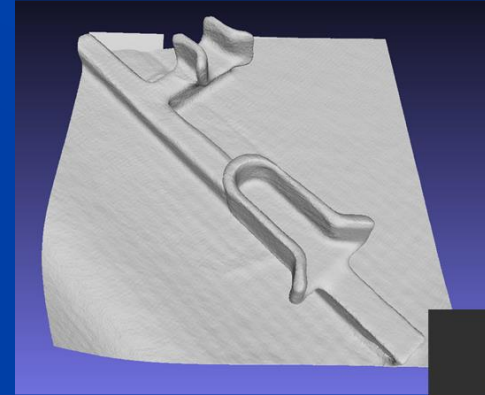
Member Only Streaming Service for Day 2

Annual Meeting Workshop

Robotic Blending Milestone 5 with New End-User/Use Case

Member Feedback to Capability

- Improved Reconstruction Tools
- Process Planning
- Hybrid Planning
- Optimization-based Free Space Planning
- Process Analysis Tools



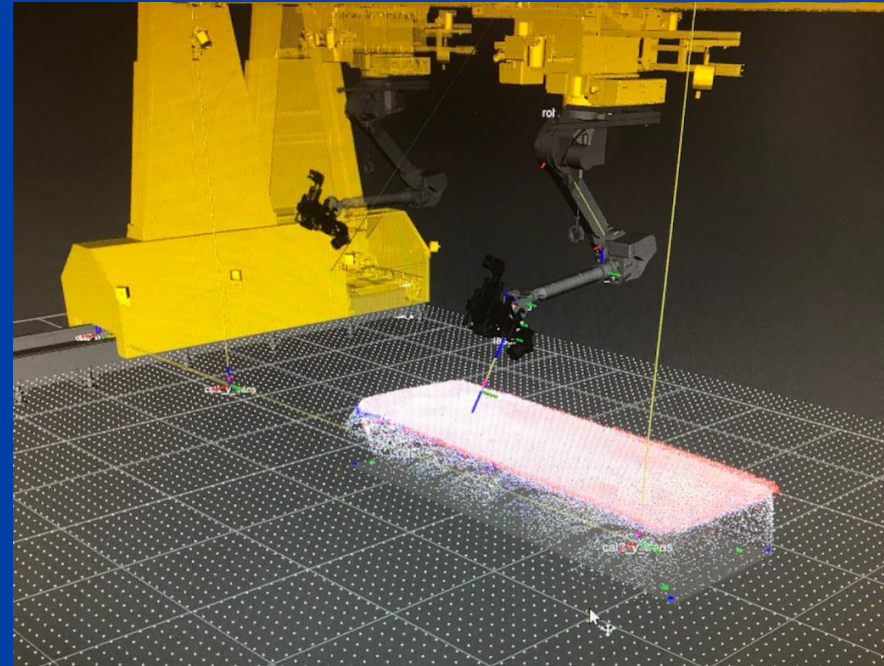
Combining Forces to Accelerate Progress

- ARM Institute
- Open Robotics
- Movelt
- Workshops across communities
- Work with members to collaborate on opportunities
- Scale training



Leverage of Developed Building Blocks

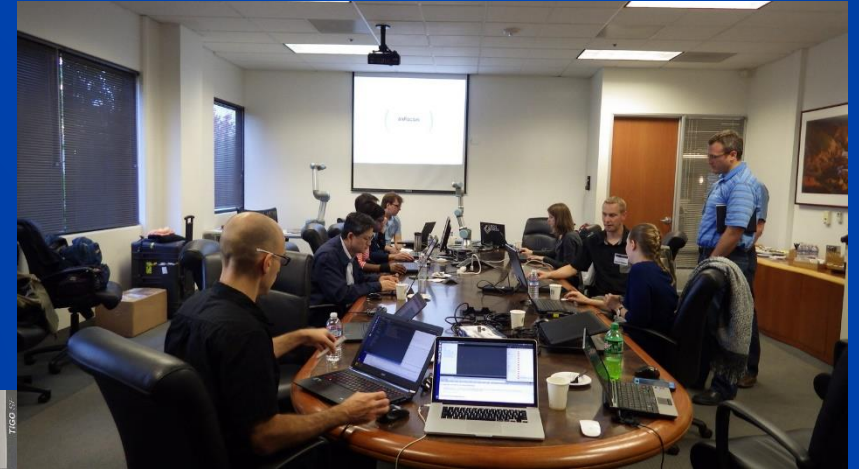
- Grab and Go Capability
- Cross-Platform
- Assured Quality and Performance
- Non-expert Application Set Up
- Enable Solution Developer and End-User Value



GUI-Based Registration & Process Application

Continue to Foster Collaboration

- Break down barriers to enable efficient project launch
- Drive value through capability and ability for IP development
- Collaborate across global network to leverage each region focus areas
- Provide the tools to enable a broader community



ROS-Industrial is a community

- Each member contributes to the vision
- A foundational repository of enabling building blocks
- Grow a community with a passion towards open source for industry



Tools & Resources for the Community

- ROS-Industrial
 - Home: rosindustrial.org
 - Documentation: wiki.ros.org/industrial
 - Code: <https://github.com/ros-industrial>;
<https://github.com/ros-industrial-consortium>
 - Training: http://ros-industrial.github.io/industrial_training/
 - ROSin: <http://rosin-project.eu/>
- Upcoming Events (<https://rosindustrial.org/events-summary/>)

Thank You!

