PROGRAM ROBOTS IN MINUTES

NO-CODE. NO-CAD. HIGH-ROI.

AUGMENTUS

ROBOTICS SIMPLIFIED

A team with deep expertise in robotic automation

Founders

Yong Shin

CEO

Technology Lead at A*STAR, led scientists and engineers in industrial solutions

Daryl Lim

COO

Ex-Founder of Edge Neo, Leading edge computing startup

Voon Foo

CTO

Prolific **Robot Developer**, Leading robot algorithm expert

Advisors

Nalin Advani

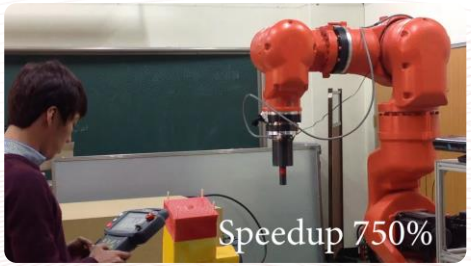
Ex-CEO of **GreyOrange**, AI-robotics startup which raised US $180M

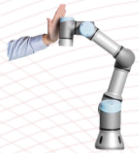
Joyce Law

Ex-Sales Head of **Unity3D**, world's leading development engine which raised US $1.3B

Difficulty and long downtimes in conventional robot programming

Teach pendant





Teach by demonstration (Lead-through)

High Expertise Required

Highly trained experts needed to operate industrial robots

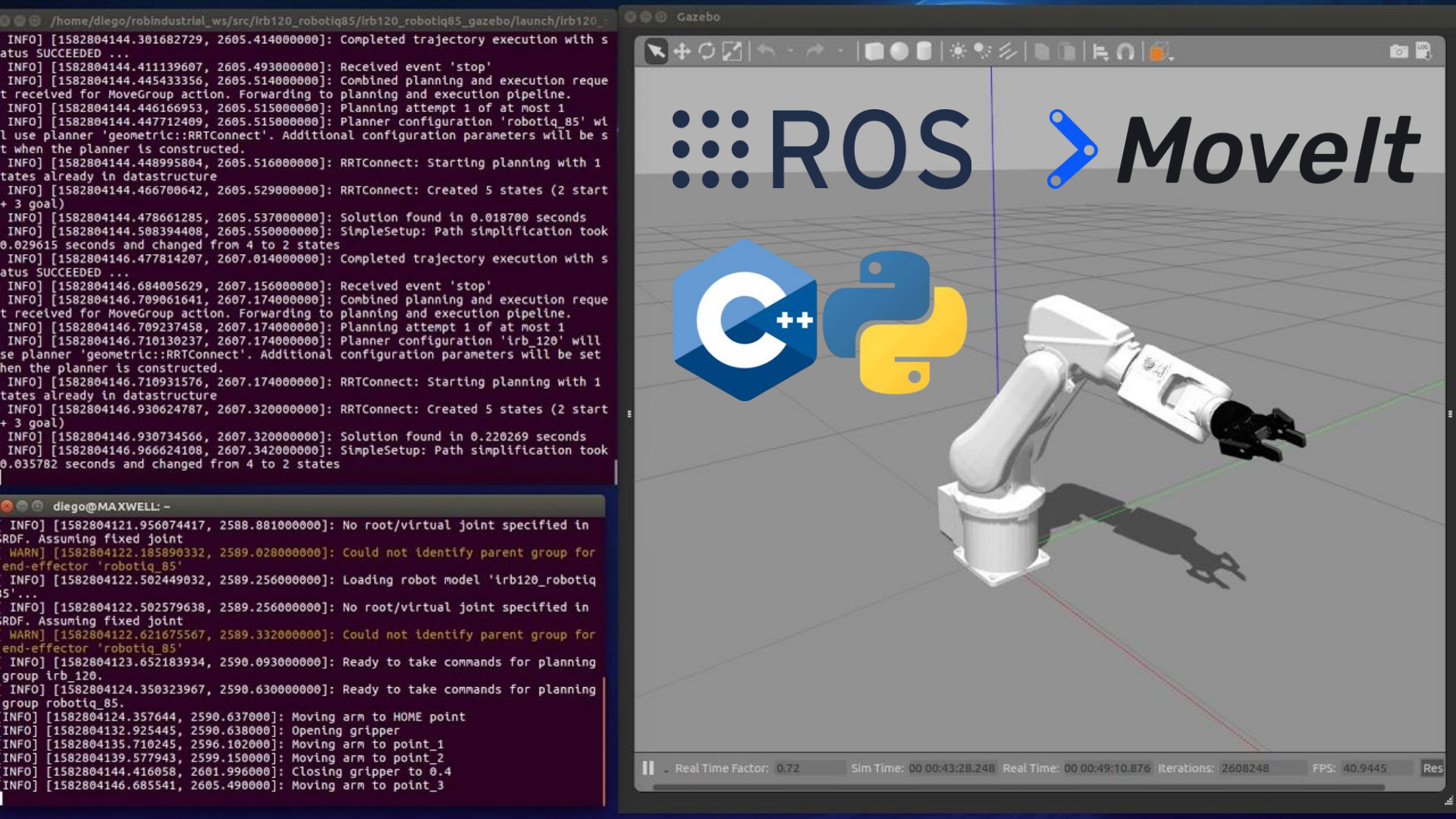
Heavy Fragmentation

Different robot OEMs have different programming languages

Long Downtime

Average 4 - 6 weeks of downtime for programming

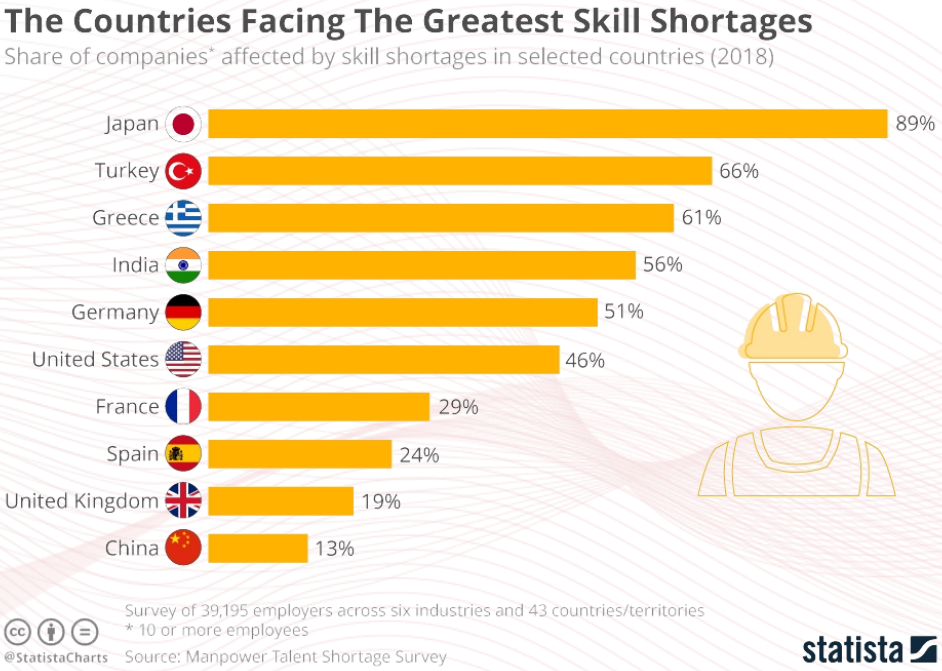
Technovio, 2019
McKinsey & Company, 2017


/home/diego/robindustrial_ws/src/irb120_robotiq85/irb120_robotiq85_gazebo/launch/irb120_
INFO] [1582804144.301682729, 2605.414000000]: Completed trajectory execution with s
atus SUCCEEDED ...
INFO] [1582804144.411139607, 2605.493000000]: Received event 'stop'
INFO] [1582804144.445433356, 2605.514000000]: Combined planning and execution reque
t received for MoveGroup action. Forwarding to planning and execution pipeline.
INFO] [1582804144.446166953, 2605.515000000]: Planning attempt 1 of at most 1
INFO] [1582804144.447712409, 2605.515000000]: Planner configuration 'robotiq_85' wi
l use planner 'geometric::RRTConnect'. Additional configuration parameters will be s
t when the planner is constructed.
INFO] [1582804144.448995804, 2605.516000000]: RRTConnect: Starting planning with 1
tates already in datastructure
INFO] [1582804144.466700642, 2605.529000000]: RRTConnect: Created 5 states (2 start
+ 3 goal)
INFO] [1582804144.478661285, 2605.537000000]: Solution found in 0.018700 seconds
INFO] [1582804144.508394408, 2605.550000000]: SimpleSetup: Path simplification took
0.029615 seconds and changed from 4 to 2 states
INFO] [1582804146.477814207, 2607.014000000]: Completed trajectory execution with s
atus SUCCEEDED ...
INFO] [1582804146.684005629, 2607.156000000]: Received event 'stop'
INFO] [1582804146.709061641, 2607.174000000]: Combined planning and execution reque
t received for MoveGroup action. Forwarding to planning and execution pipeline.
INFO] [1582804146.709237458, 2607.174000000]: Planning attempt 1 of at most 1
INFO] [1582804146.710130237, 2607.174000000]: Planner configuration 'irb_120' will
se planner 'geometric::RRTConnect'. Additional configuration parameters will be set
hen the planner is constructed.
INFO] [1582804146.710931576, 2607.174000000]: RRTConnect: Starting planning with 1
tates already in datastructure
INFO] [1582804146.930624787, 2607.320000000]: RRTConnect: Created 5 states (2 start
+ 3 goal)
INFO] [1582804146.930734566, 2607.320000000]: Solution found in 0.220269 seconds
INFO] [1582804146.966624108, 2607.342000000]: SimpleSetup: Path simplification took
0.035782 seconds and changed from 4 to 2 states
diego@MAXWELL: ~
INFO] [1582804121.956074417, 2588.881000000]: No root/virtual joint specified in
SRDF. Assuming fixed joint
WARN] [1582804122.185890332, 2589.028000000]: Could not identify parent group for
end-effector 'robotiq_85'
INFO] [1582804122.502449032, 2589.256000000]: Loading robot model 'irb120_robotiq
5'...
INFO] [1582804122.502579638, 2589.256000000]: No root/virtual joint specified in
SRDF. Assuming fixed joint
WARN] [1582804122.621675567, 2589.332000000]: Could not identify parent group for
end-effector 'robotiq_85'
INFO] [1582804123.652183934, 2590.093000000]: Ready to take commands for planning
group irb_120.
INFO] [1582804124.350323967, 2590.630000000]: Ready to take commands for planning
group robotiq_85.
INFO] [1582804124.357644, 2590.637000]: Moving arm to HOME point
INFO] [1582804132.925445, 2590.638000]: Opening gripper
INFO] [1582804135.710245, 2596.102000]: Moving arm to point_1
INFO] [1582804139.577943, 2599.150000]: Moving arm to point_2
INFO] [1582804144.416058, 2601.996000]: Closing gripper to 0.4
INFO] [1582804146.685541, 2605.490000]: Moving arm to point_3
Gazebo
ROS
MoveIt
C++
Real Time Factor: 0.72
Sim Time: 00 00:43:28.248
Real Time: 00 00:49:10.876
Iterations: 2608248
FPS: 40.9445

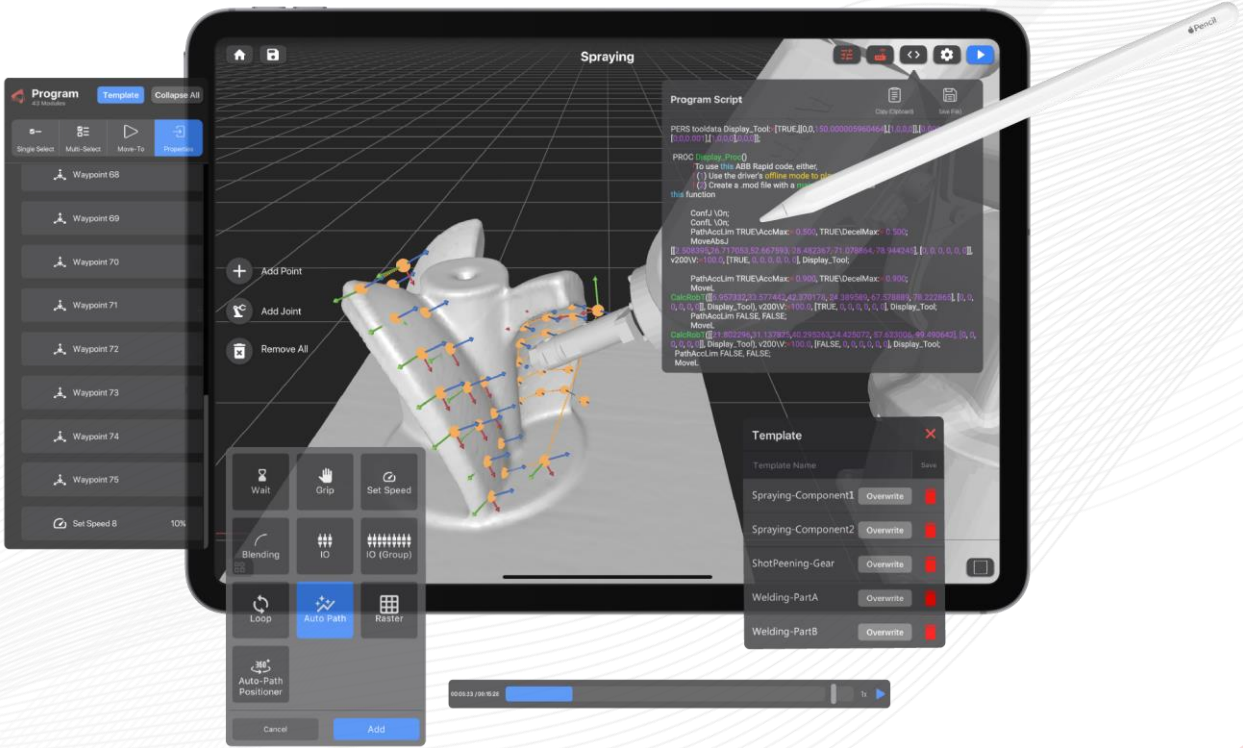
A global labor shortage is pushing more firms towards automation

Shortage of > 2 million US manufacturing workers by 2030

Forbes, 2022
McKinsey & Company, 2017



AUGMENTUS Simplifying Robotics



Agency for Science, Technology and Research
SINGAPORE

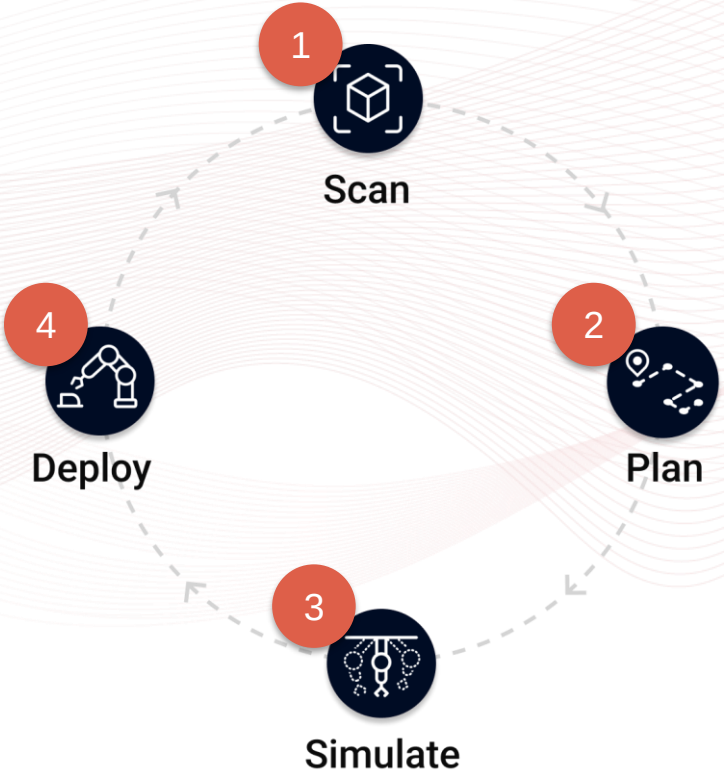
A*STAR Spin-off

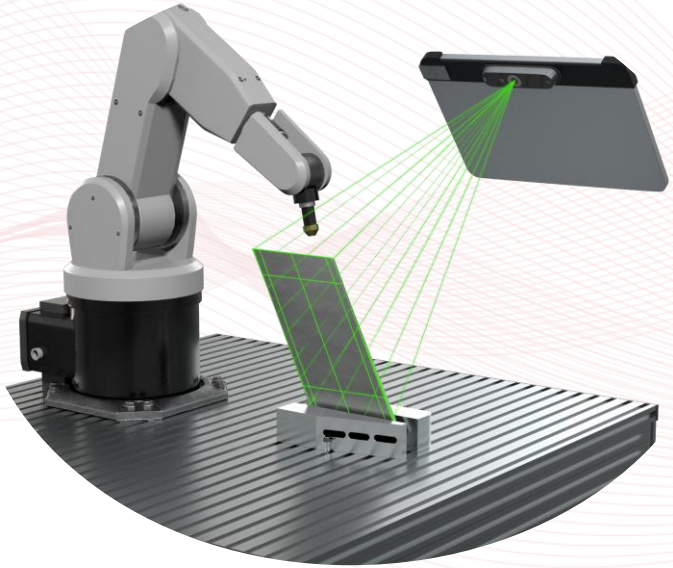
Technology Partner
A ROCKWELL AUTOMATION PARTNER

Augmentus

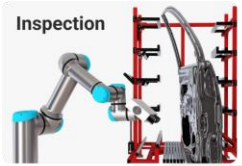
Downloadable iOS app
CI/CD, portability and commercialization

AUGMENTUS Scan-2-Plan (Patented)



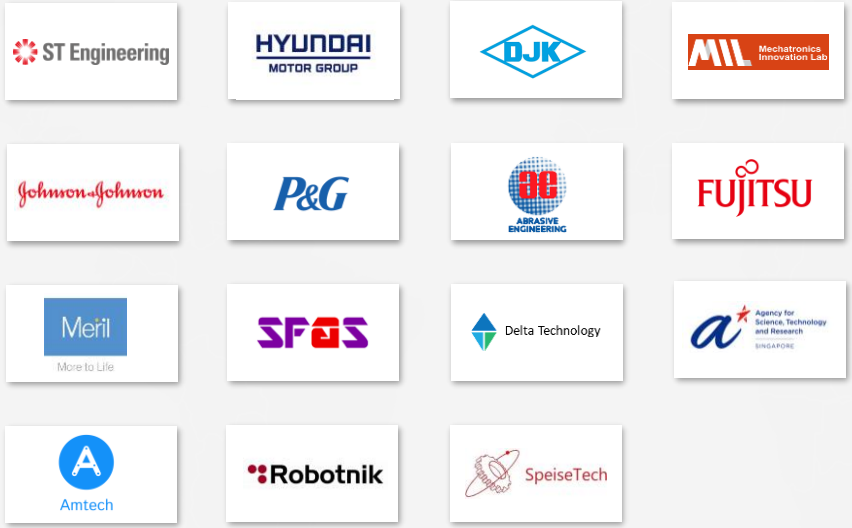


AUGMENTUS Use Cases



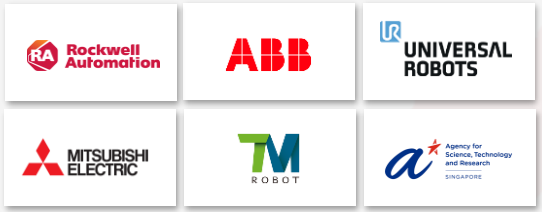
Used by the **leading** manufacturing companies

Clients:



SI Resellers:

Tech Partners:



Augmentus & ROS Collaboration

AI-based pick-&-place of FMCH SKU

Augmentus focus was AI model generation with inbuilt annotation and cloud-based training

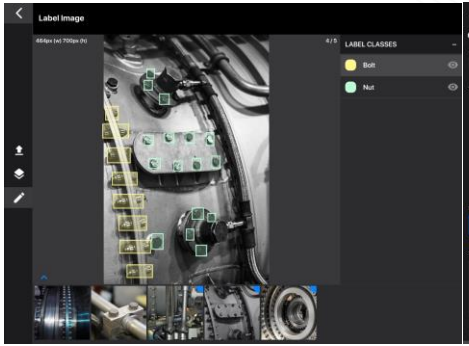
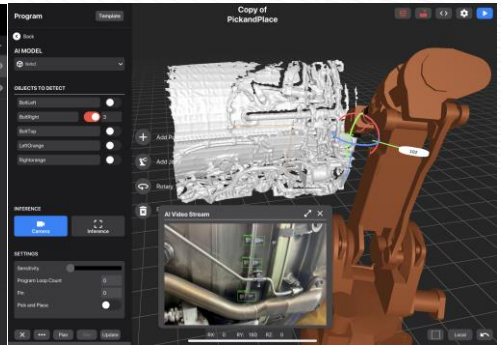


Image Annotation



AI Inference

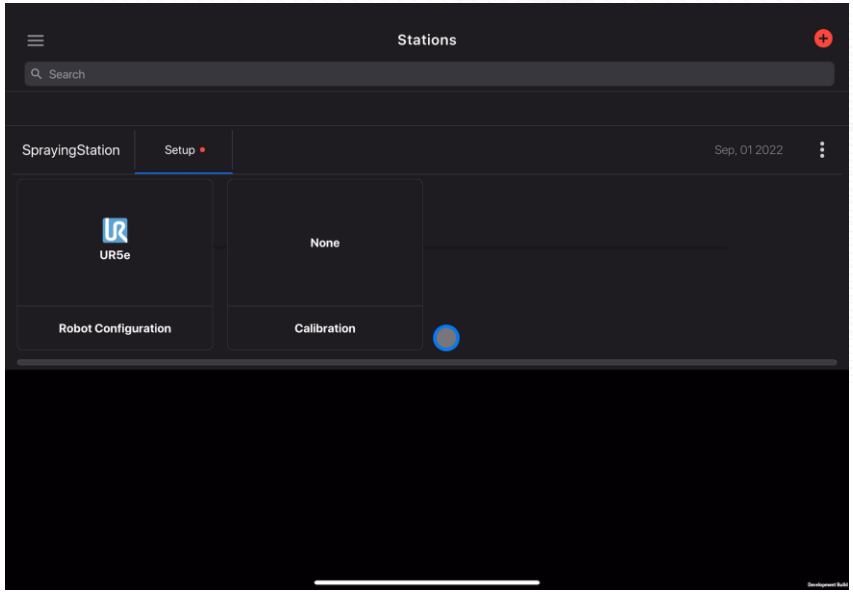
Object frame calculation for Rviz

Augmentus to provide coordinate frames of components within 3D scan of robot cell

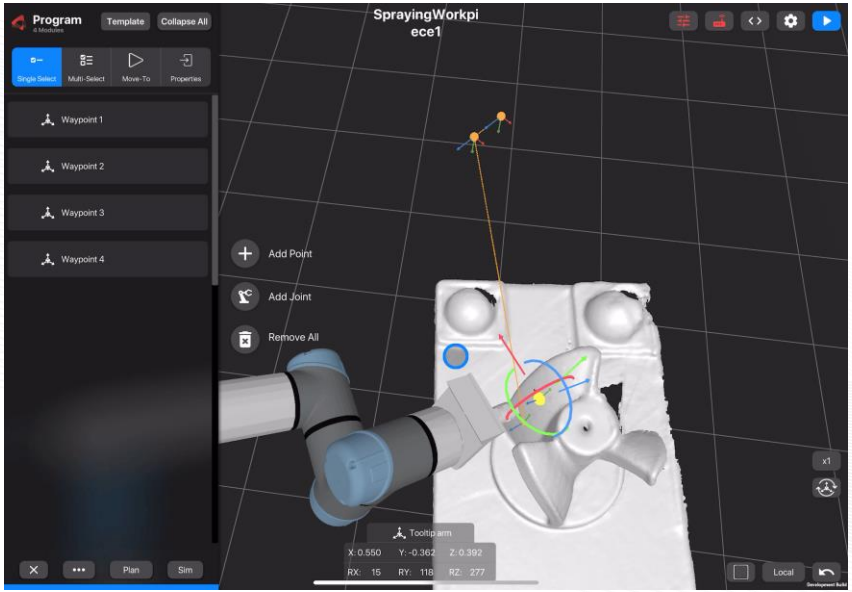
Augmentus & ROS Collaboration

open robotics

Object frame calculation for Rviz

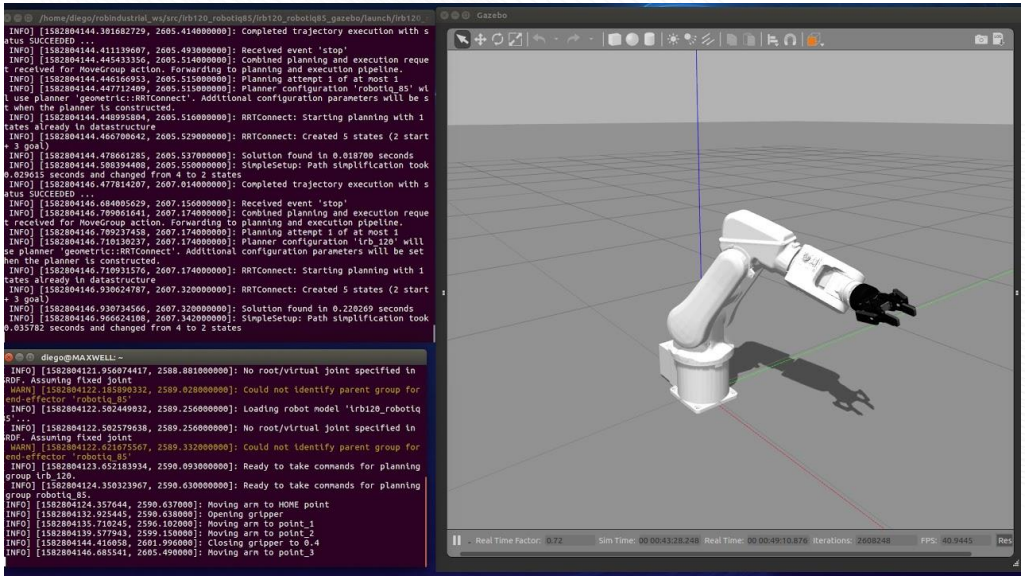


Robot localization



Coordinate calculation

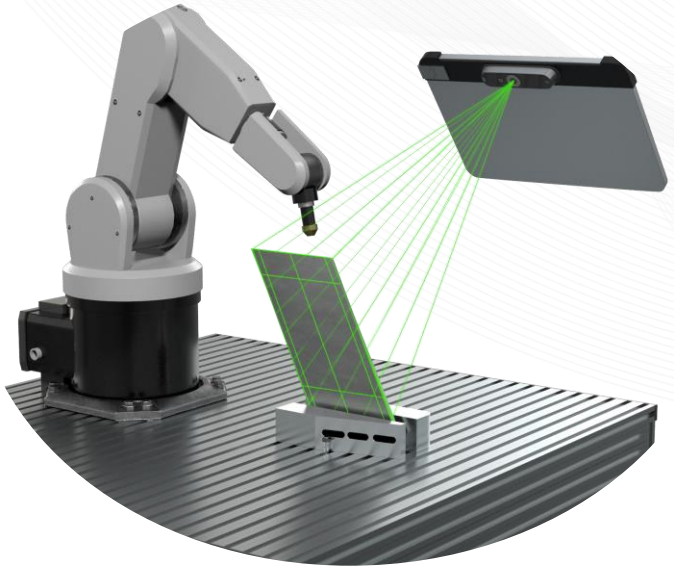
Augmentus using ROS for validation



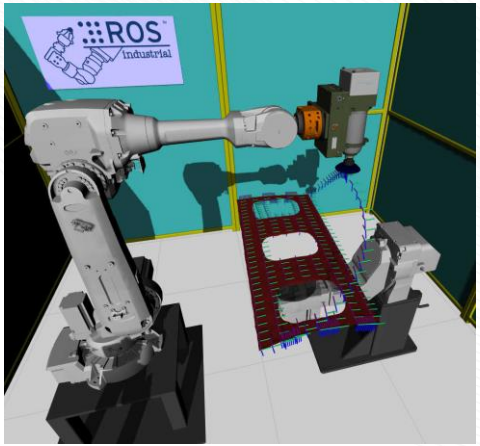
- Used ROS to validate kinematics and motion planning of robots in initial stages
- But the open-source materials were occasionally incorrect
- Often lead to situations where intensive troubleshooting were needed
- Urge for official URDF repository that have been validated

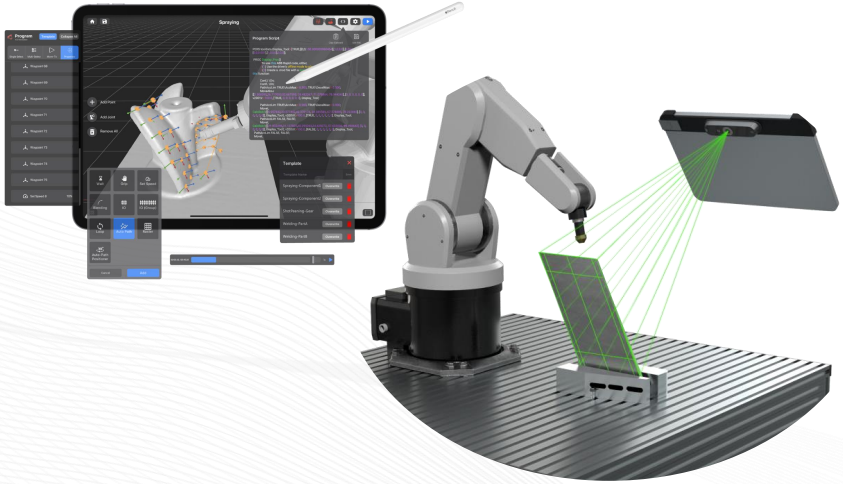
Next Step

Upgrade Scan-&-Plan for high precision applications: Looking for R&D Partnership



Open to Collaborations





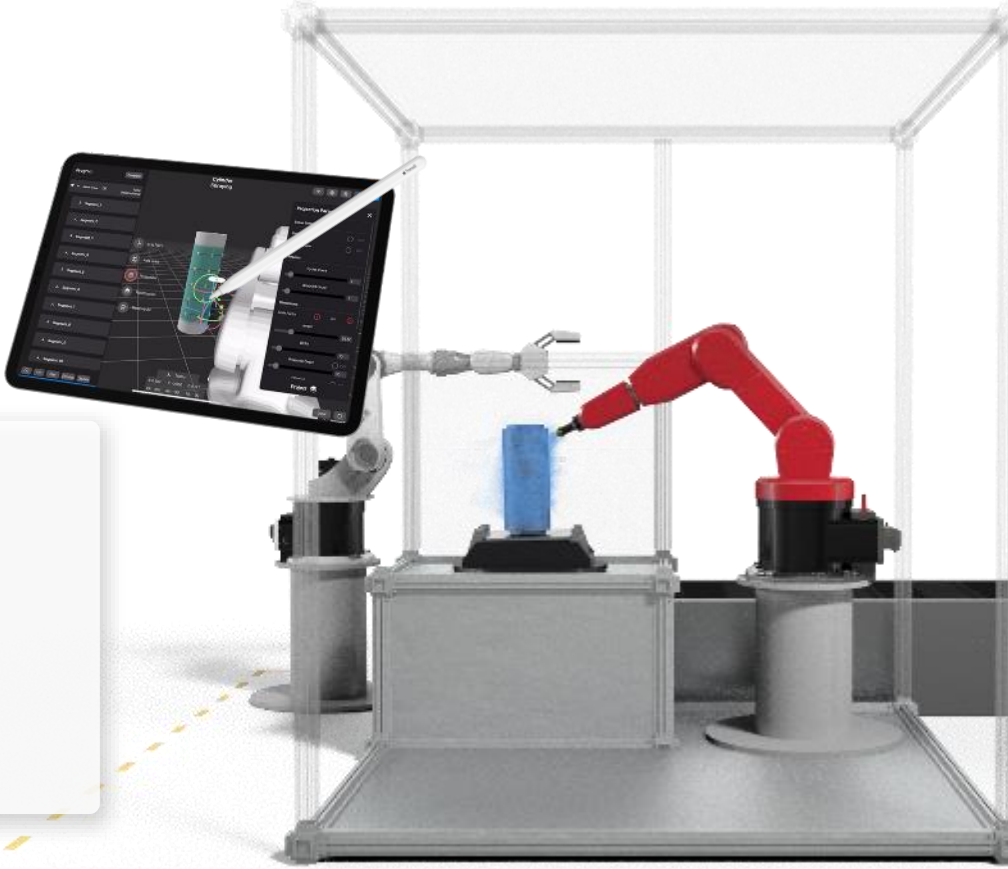
Develop proprietary property in ROS environment

- Algorithm
- Process
- System

Deployment interface via Augmentus (end user)

- Reprogramming/ finetuning
- Coordinate frame calculation
- API library – inject custom functions
- Connectivity via TCP/IP, FTP, Restful

Join us in making #RoboticsSimplified



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