



RAMTEC[®]

In-House Integrator Internships



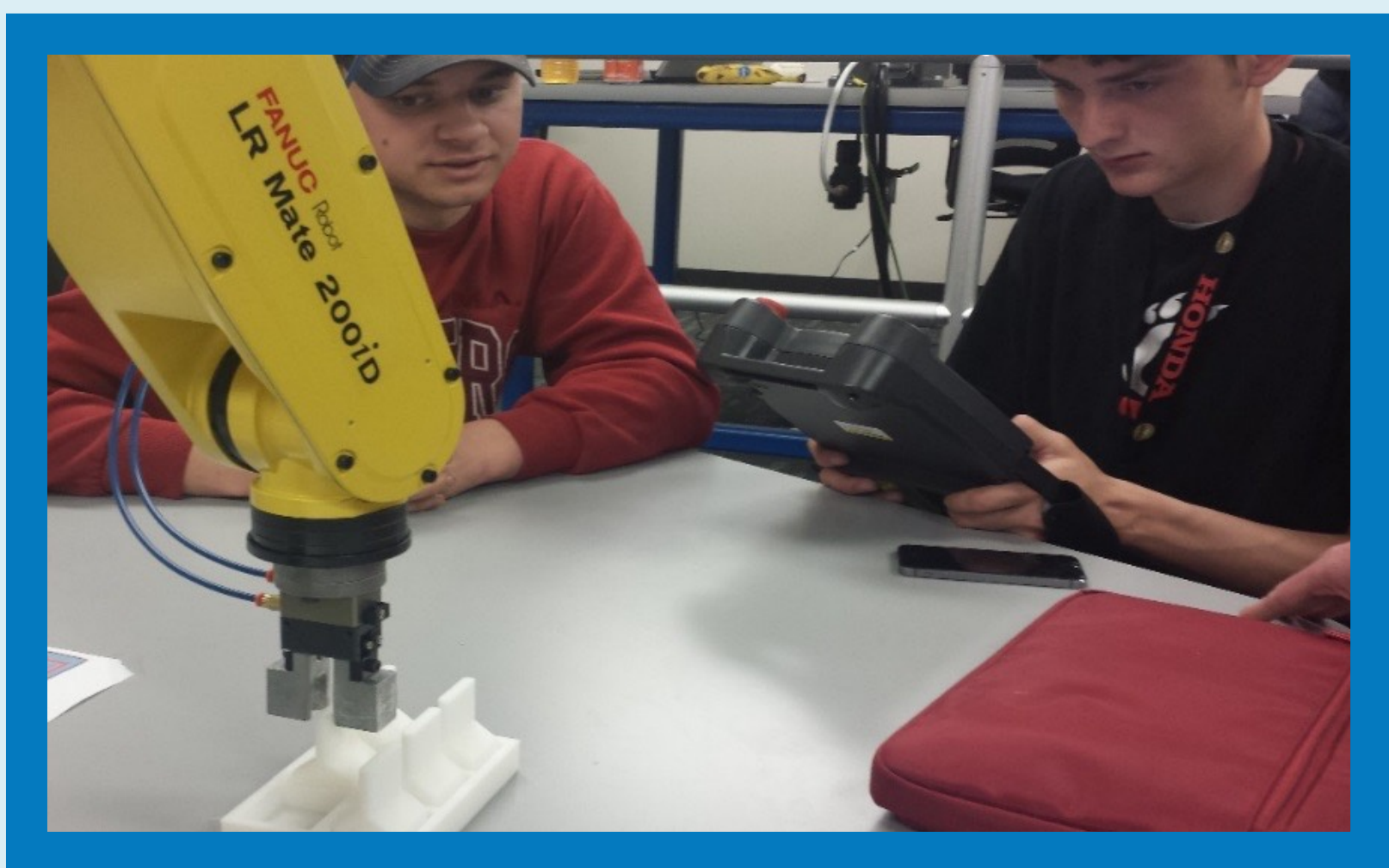
Success Bound Conference

Mark Edington – Robotics Coordinator

Tad Douce - Director Of Innovation

RAMTEC

State of the Art Training Facility
-- All Hands-on Training --
42 Industry Standard Robots



Area Industry Partnering with RAMTEC

SHOWA

 **Silver Line**
WINDOWS·DOORS™

Whirlpool
CORPORATION

 **YACHIYO**

Acoust-A-Fiber

 **Cardington
Yutaka
Technologies Inc.**

HONDA

FT Precision

MTD
For A Growing World.™ 

UTLX

 **Georgia-Pacific**

 **MARION
INDUSTRIES, INC.**

BRIDGESTONE

 **sparkfun**™
ELECTRONICS

GUARDIAN® 
INDUSTRIES

Area Industry Partnering with RAMTEC

- Whirlpool Corporation - Marion, Ohio
- Whirlpool Corporation - Ottawa, Ohio
- Honda of America
- Marion Industries
- US Yachiyo
- Cardington Yutaka Technologies
- Bridgestone - Upper Sandusky
- FT Precision - Fredericktown
- Guardian Industries - Upper Sandusky
- MTD Products Inc. - Willard
- SilverLine / Plygem
- UTLX - Union Tank Car Co.
- American Showa - Sunbury
- Sparkfun - Denver, Colorado
- Acoust-A-Fiber - Delaware Ohio
- Georgia-Pacific - Lexington, Kentucky

The success of Tri-Rivers' RAMTEC in Marion, OH has led to the creation of 23 additional RAMTEC facilities throughout Ohio. Thanks to industry and community partnerships, and more than \$22 million in funding from Ohio's Straight A Grants.



Benefits of Internships

- More likely to land job in industry of choice
- More job offers after graduation
- Higher starting salary
- Greater satisfaction on first job
- Advantage in getting into post-secondary school
- Develop Skills
- Improve knowledge of industry, functions, job titles, career paths
- Job reference and potential recommendation
- Added value to resume
- Have a solid lead with at least one potential employer
- College credit (sometimes)
- Income (sometimes)
- Gain experience

Barriers to Internships

- **Time within student's schedule**
- **Transportation**
- **Employer willingness to host minors as interns**
- **Ensuring all students can be successful outside of the classroom**



System Integrator

GAIN A THOROUGH UNDERSTANDING OF AN OPERATION

PROVIDE A PROJECT TIMELINE AND BUDGET

HIRE AND OVERSEE INSTALLERS

ENSURE COMPLIANCE WITH FIRE CODES

CONDUCT FINAL WALKTHROUGH

DESIGN AN OPTIMAL HANDLING SOLUTION

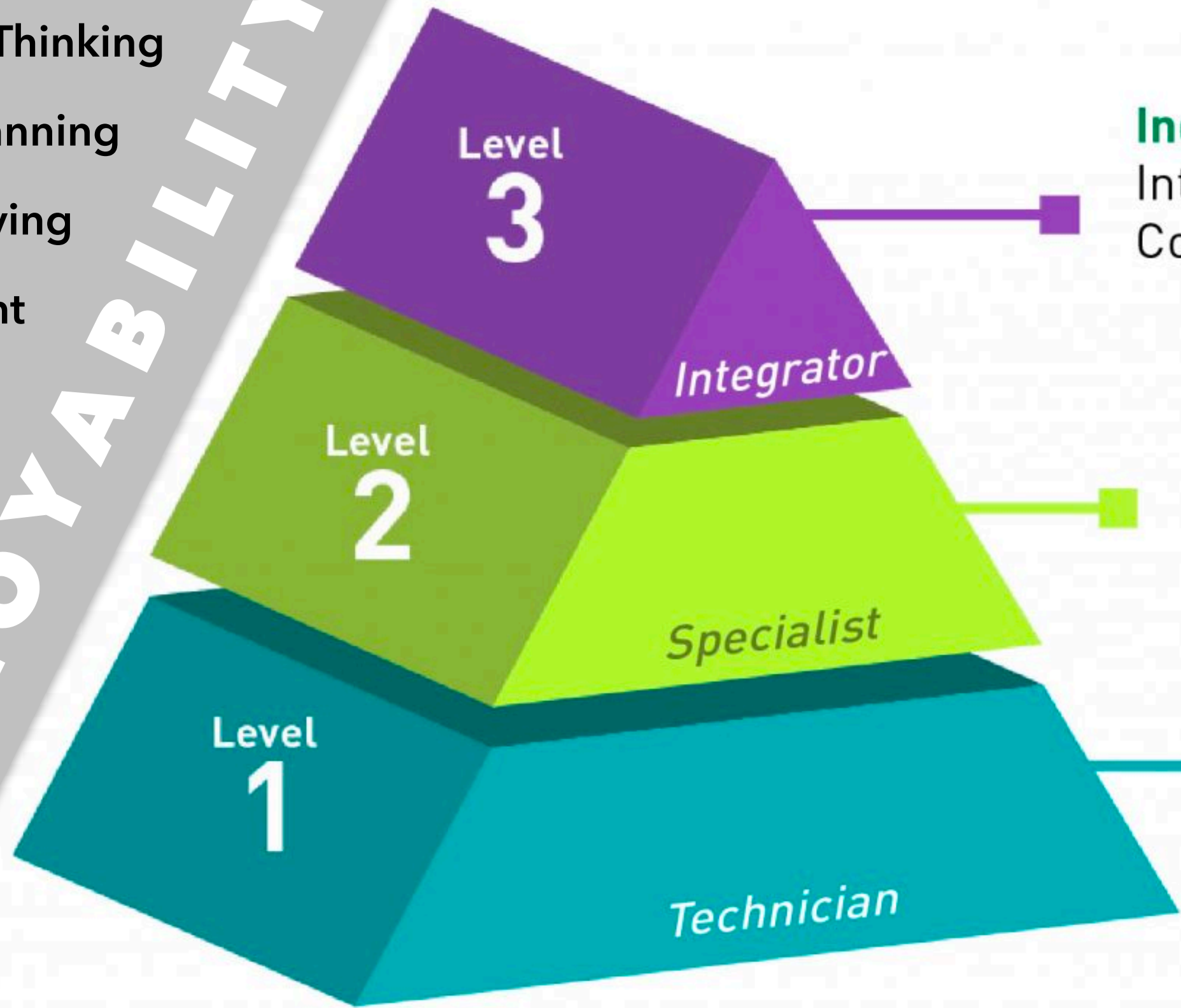
WORK WITH MULTIPLE MANUFACTURERS TO SOURCE PRODUCTS

MANAGE FREIGHT

PROVIDE TRAINING FOR CURRENT WORKFORCE

Project Management
Critical Thinking
Planning
Problem Solving
Time Management
Adaptability
Attention to Detail
Technical Ability
Interpersonal
Communication
Teaming
Safety

EMPLOYABILITY



Industry 4.0
Integration
Connectivity

Industry 4.0 Integrator
Systems Designer
Process Engineer
Integration Specialist
Operations/Maintenance Supervisor

Advanced
Processes
Programming
Interoperability

Mechatronics Specialist
Automation Specialist
Robotics Specialist
Applications Engineer
Systems Operator

Fundamentals
Technical Expertise
Micro-certifications

Electromechanical Technician
Production Technician
Industrial Maintenance Technician
Operator

Filling jobs is no easy task



of executives agree –
There is a talent shortage
in U.S. manufacturing

Six out of Ten

open skilled production positions
are unfilled due to talent shortage



The skills gap is widening



Over the next decade, nearly
2 million manufacturing jobs
out of **3½ million**
may go unfulfilled due to the skills gap.

The implications are significant,

as every job in
manufacturing creates
another 2.5 new jobs
in local goods
and services.



Skills Gap Forecast

- **Research and Markets, Reporting That the Worldwide Robotics Market Is Forecast To Grow From the 2015 Level of \$26.9B, to \$82.7B in 2020.**
- **This 11% Compounded Average Growth in the Next Five Years Is Unprecedented. The Number of Jobs That Will Be Required To Meet That Demand Will Grow Exponentially As Well.**

Whirlpool Strategic Partner with RAMTEC

Whirlpool Vent Tube Automation Project

Project Start February 2, 2019 Through May 4, 2019



Whirlpool Equipment Conveyor



Setting Up Conveyor



Whirlpool Equipment Arriving



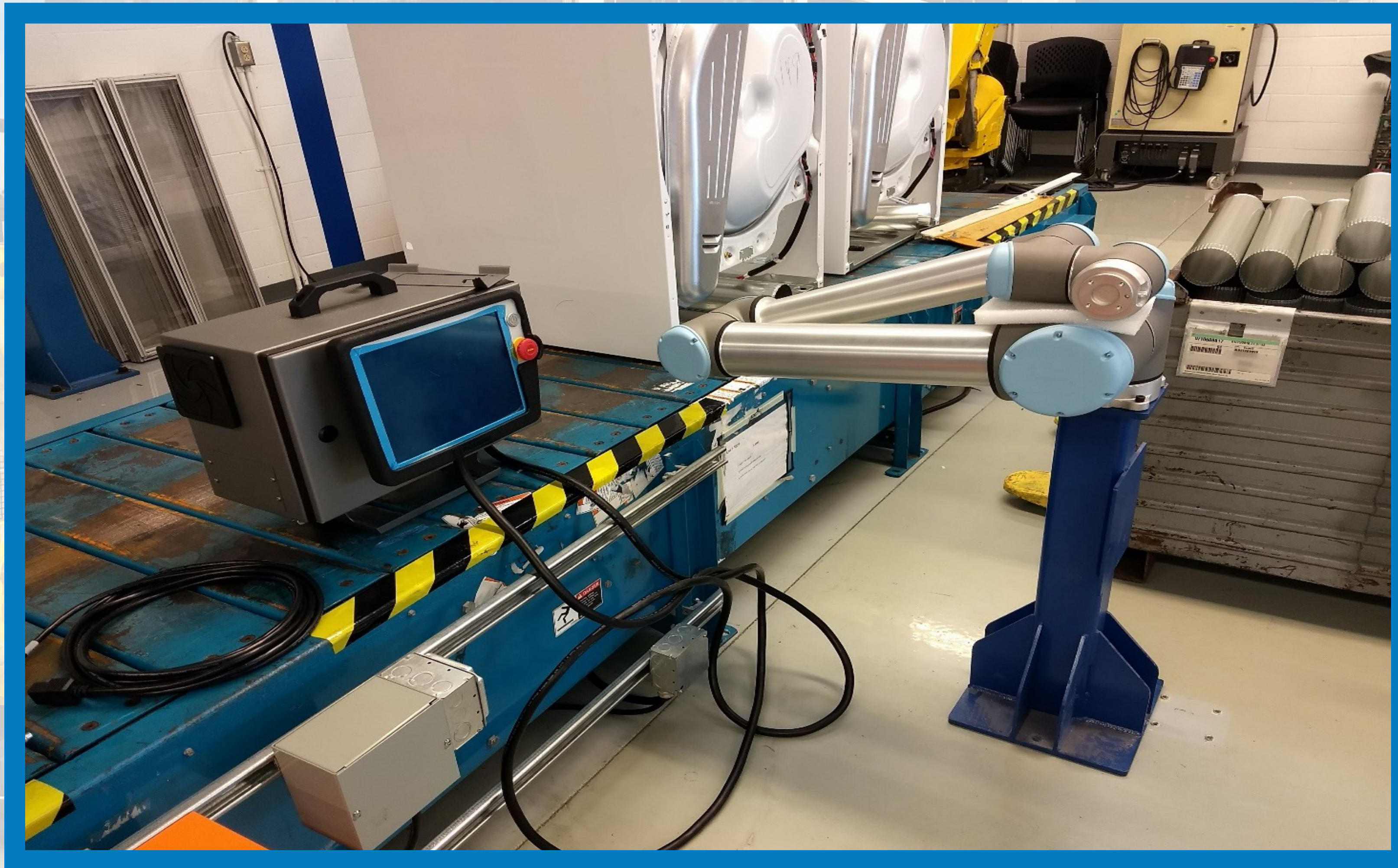
Unpacking the UR Robot



Strategic Laying out of Components



Mounting Robot and Base

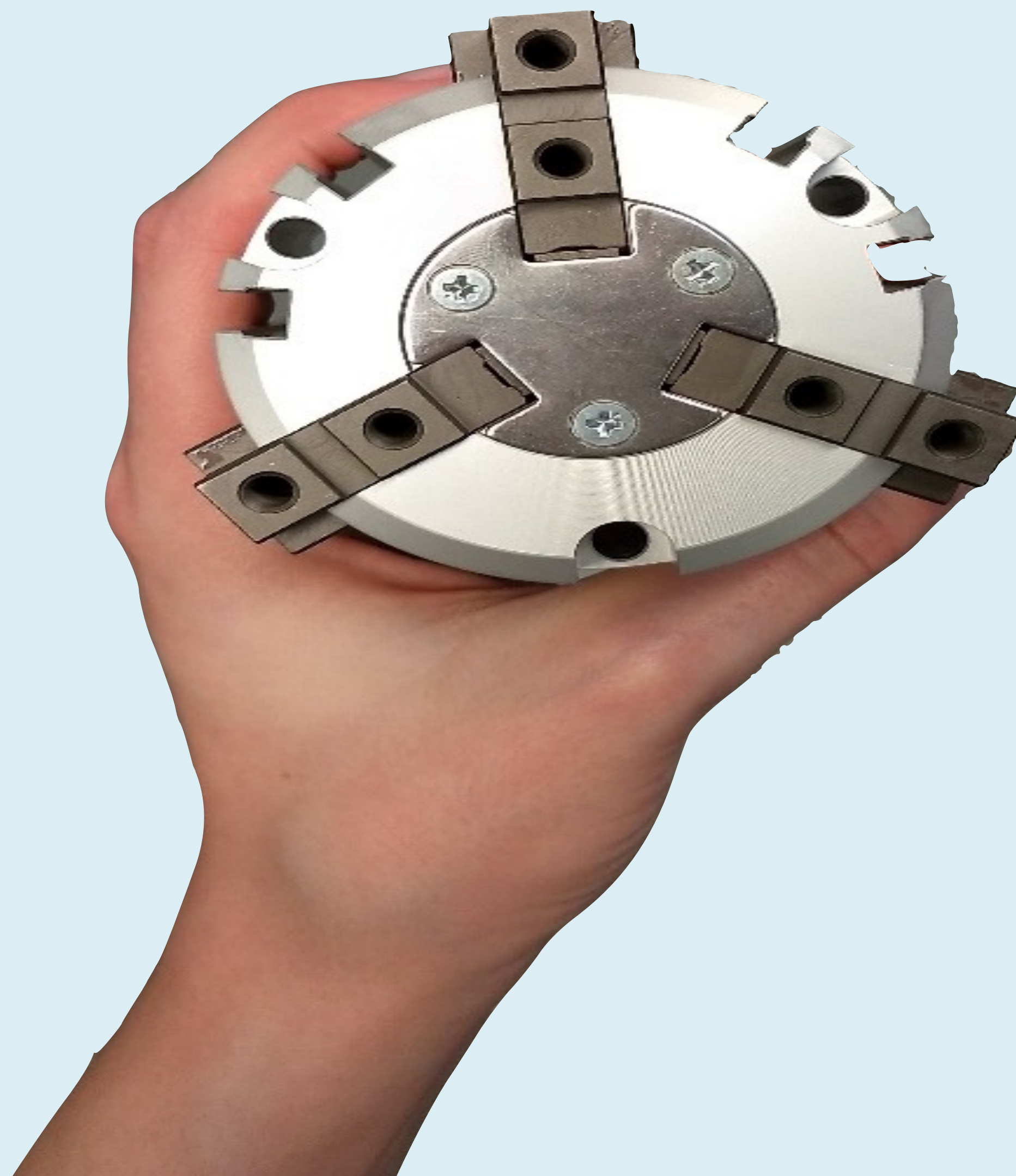


Automation / Integration

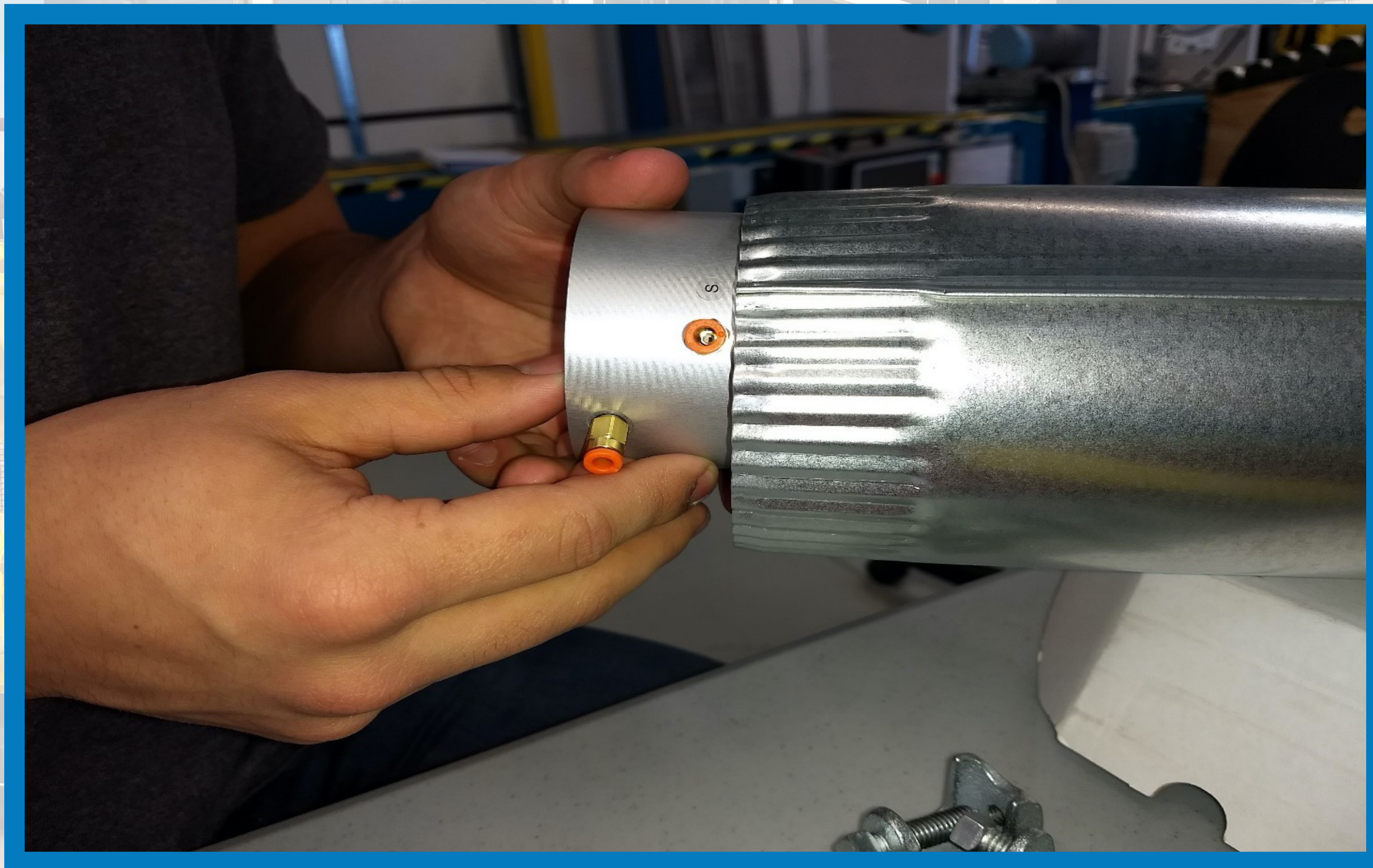
Task Analysis:

1. Conveyor / VFD ... 40HZ, Spacing of Dryers on Conveyor
2. Encoder - Absolute Type, Where and How To Mount
3. Balluff Ethernet Connection Block ...Mount and Configuration
4. Prox. And Laser Sensors ... How To Mount, Wire, Config.
5. Pneumatic Port Block Assemble (Mount)... for Robot EOAT
6. Universal Robot (UR10) ... Program, Line Tracking, Mount
7. Robot EOAT- Grippers & Sensor ... Prototype & 3D Print Parts
8. Robot EOAT Adaptor Plate ... Prototype / Machine Part
9. Allen Bradley PLC ... Wiring and Programming
10. Warning Beacon (Light) ... Green - Red

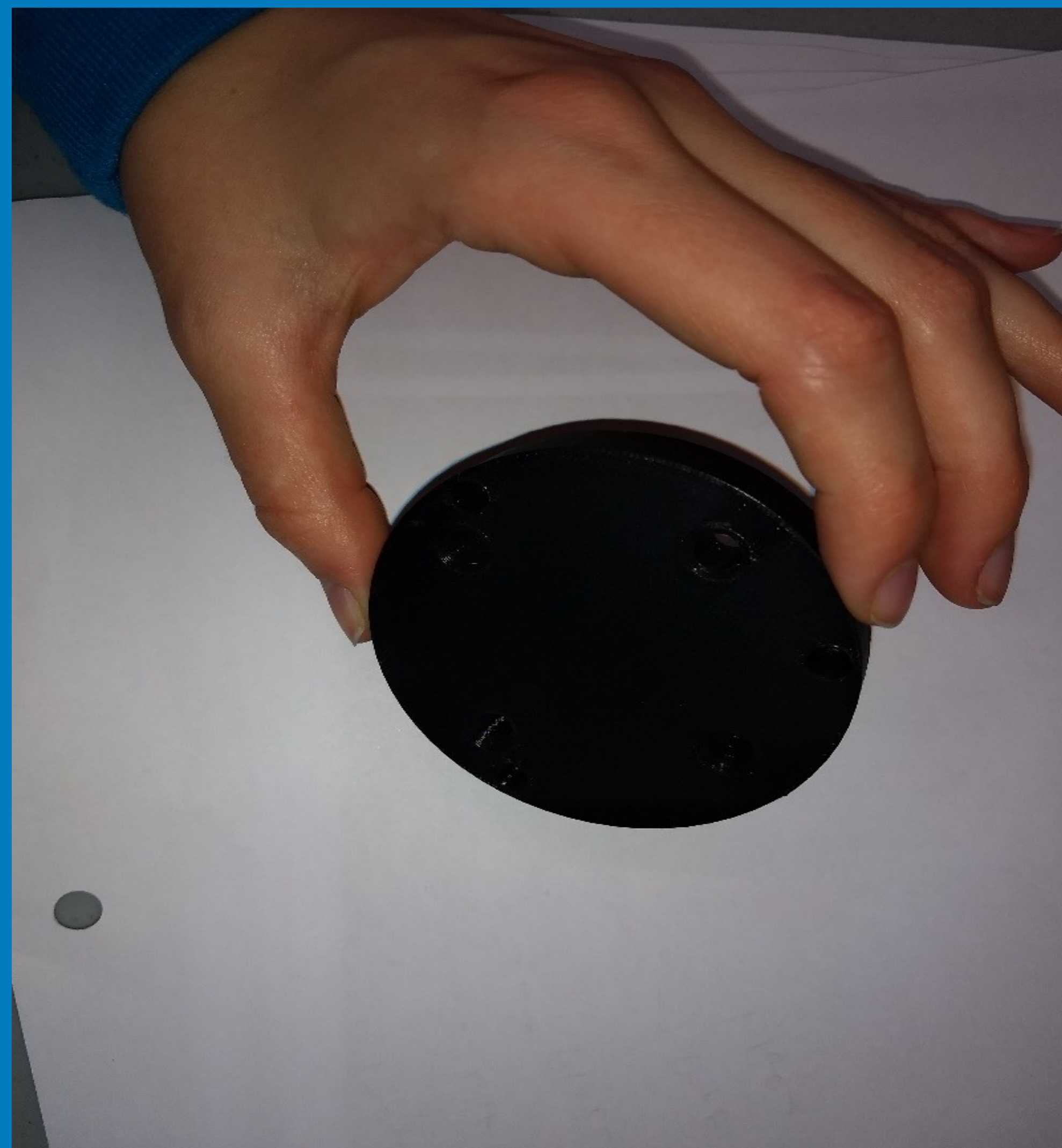
EOAT Gripper Cylinder



EOAT Cylinder Prep



Prototype EOAT Adaptor





Prototype



Machined Part

End of Arm Tooling - Gripper Fingers

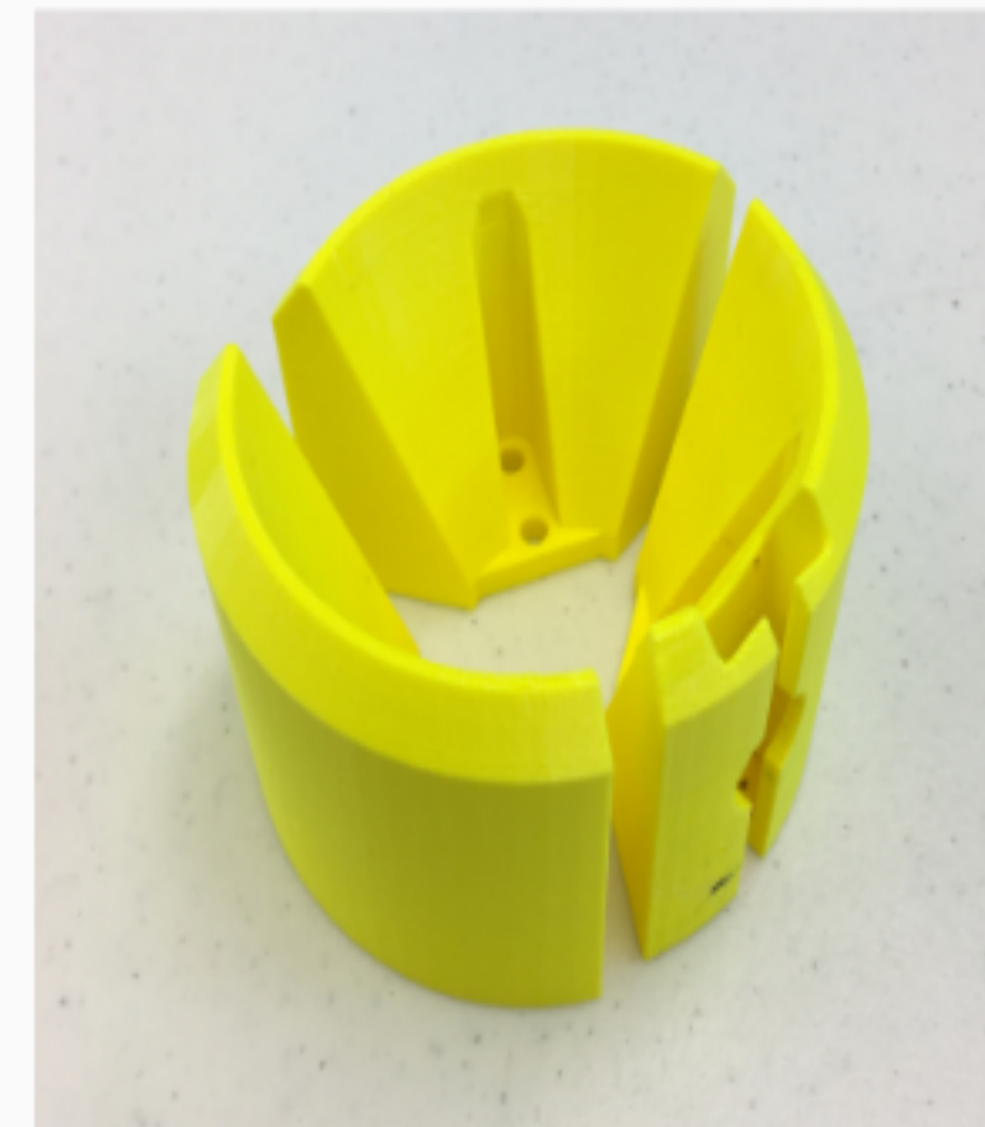
Our design for the gripper fingers went through 3 main innovations.



Version 1



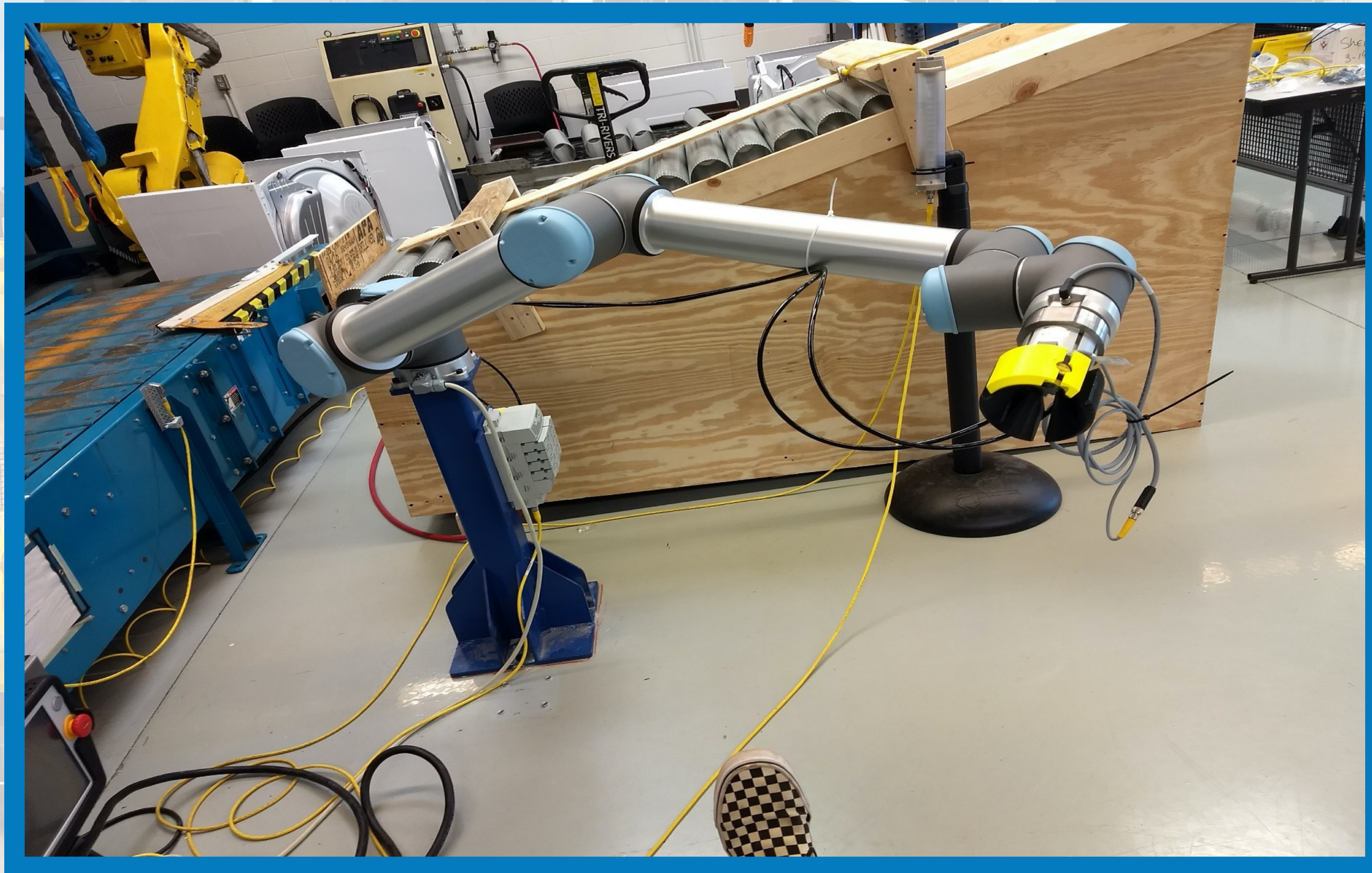
Version 2



Version 3
(Final)



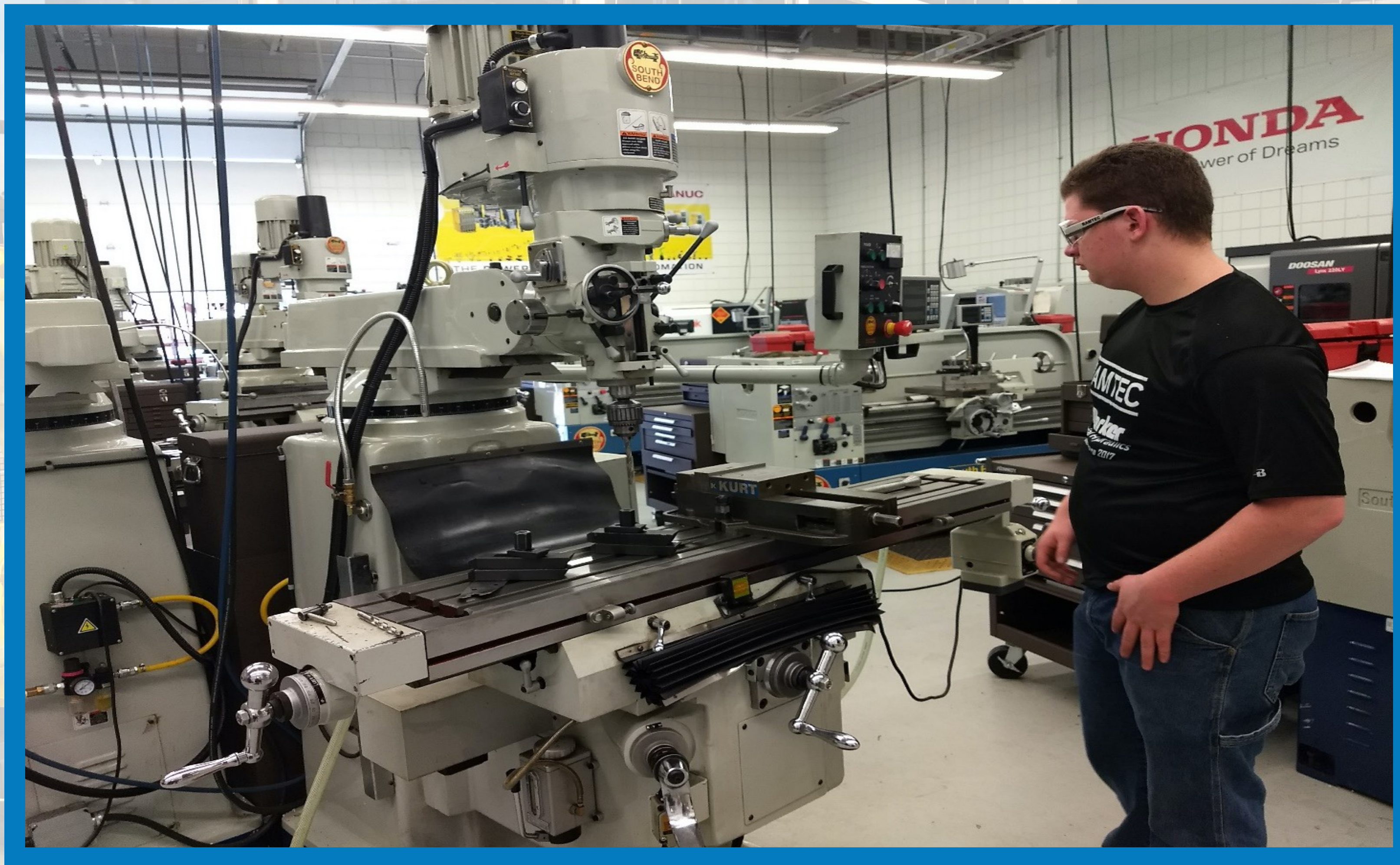
EOAT 3D Printed Grippers



Dryers for Testing Equipment



Machining Components



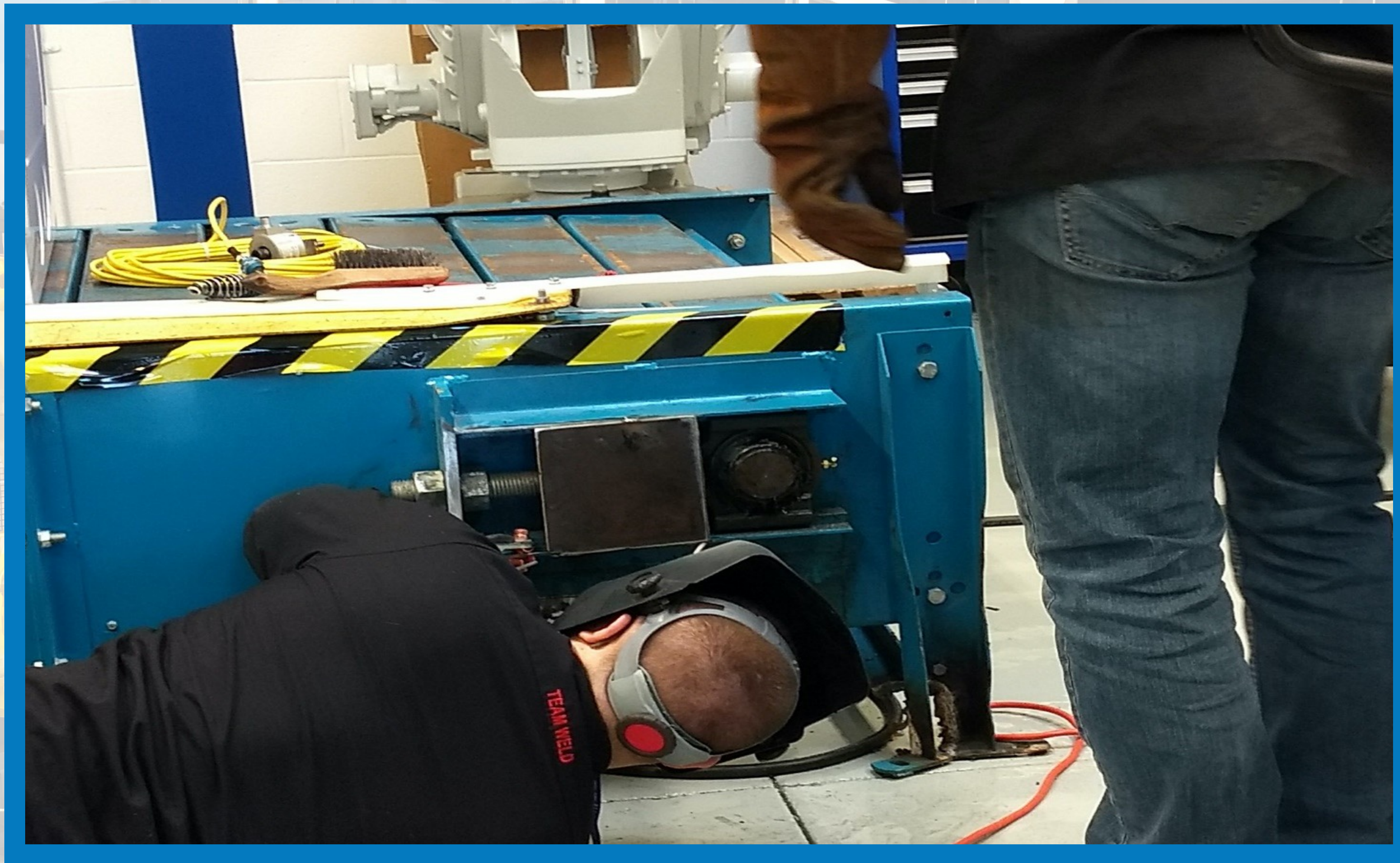
Fabricating Mounting Plate CNC Plasma Cutter



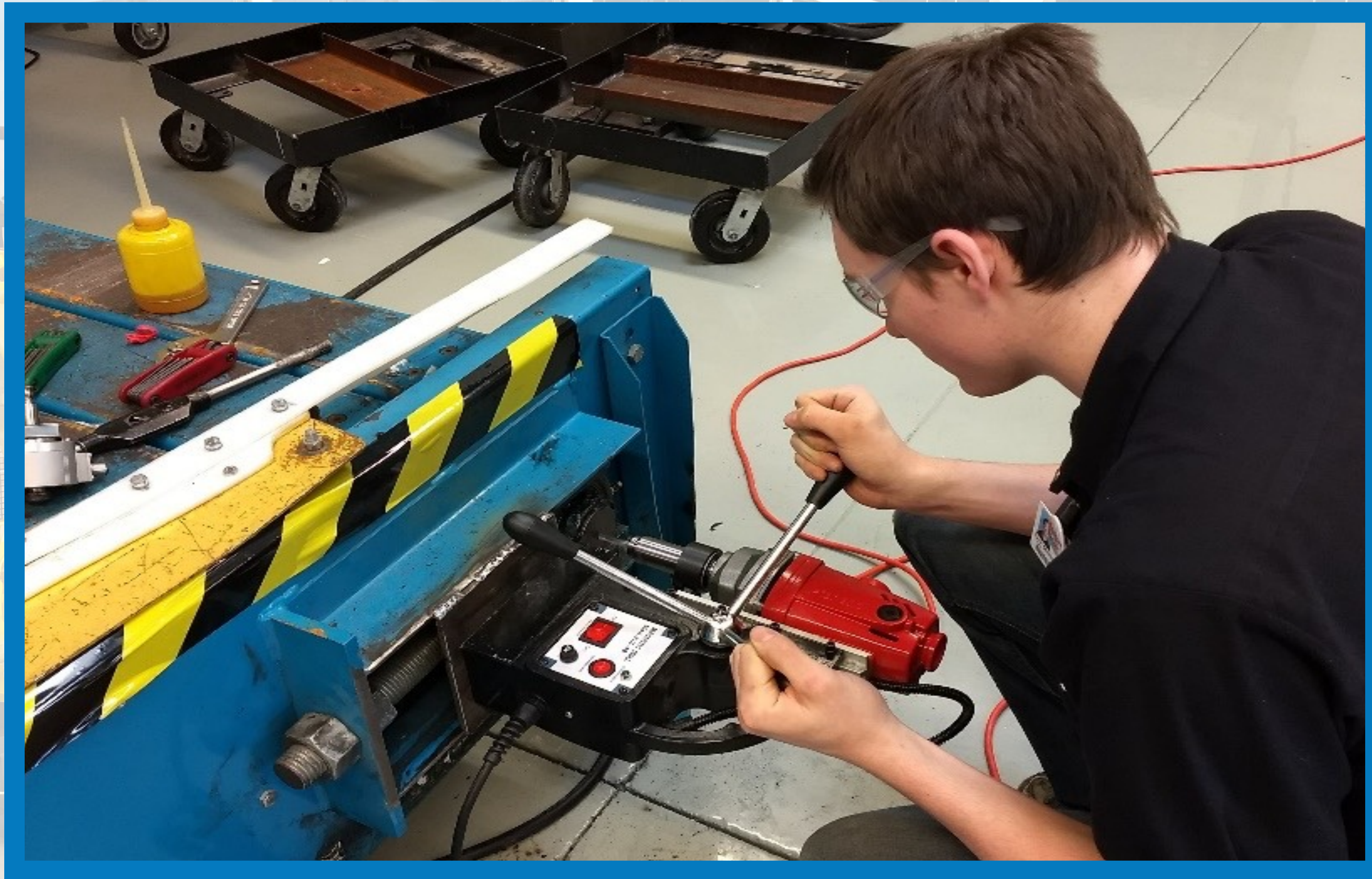
Fabricating Mounts



Welding Plate to Conveyor



Drill Conveyor Shaft / Prepare for Encoder



Encoder Mounted



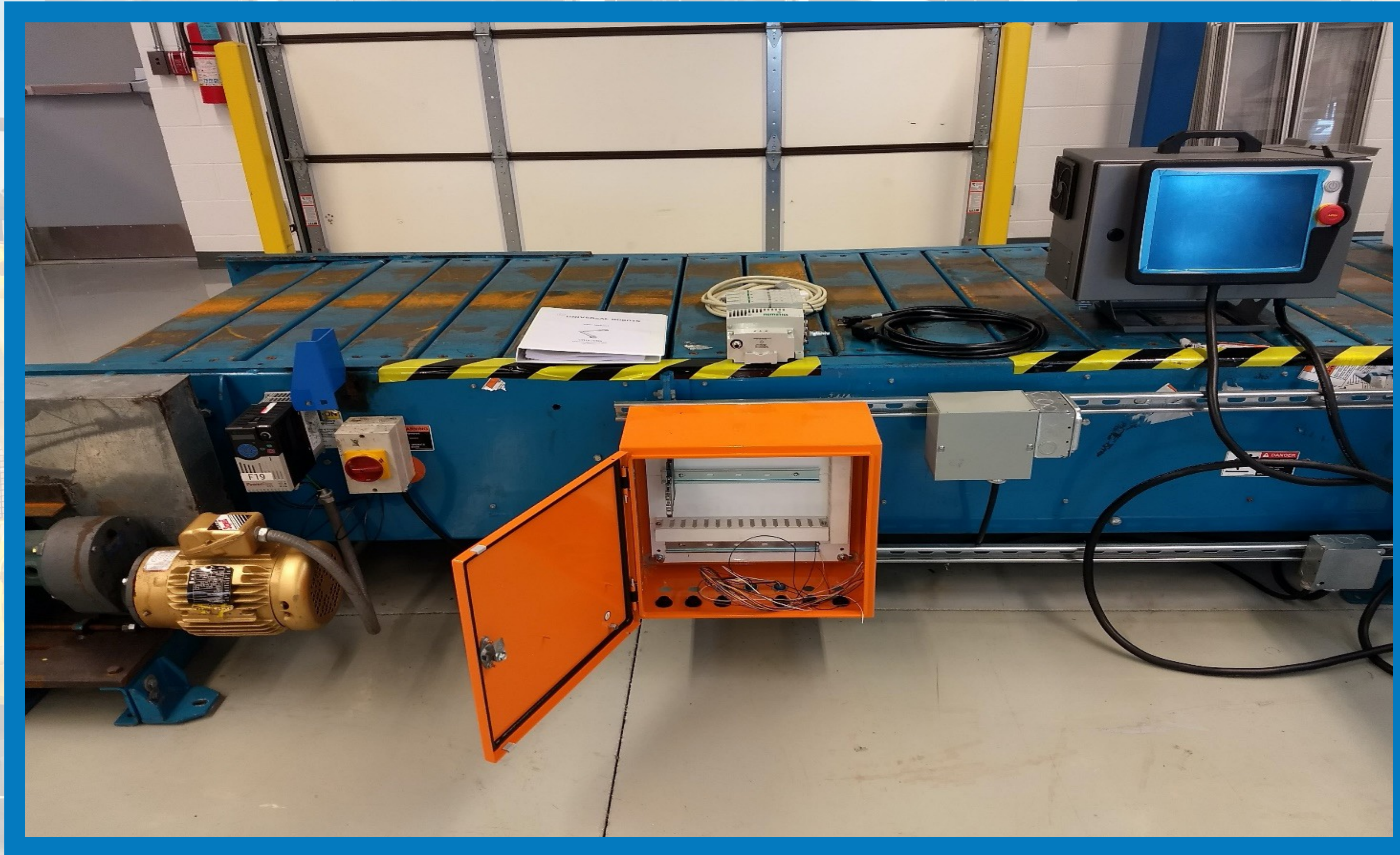
Pneumatic Valves Installed



Mock Conveyor for Vent Tubes



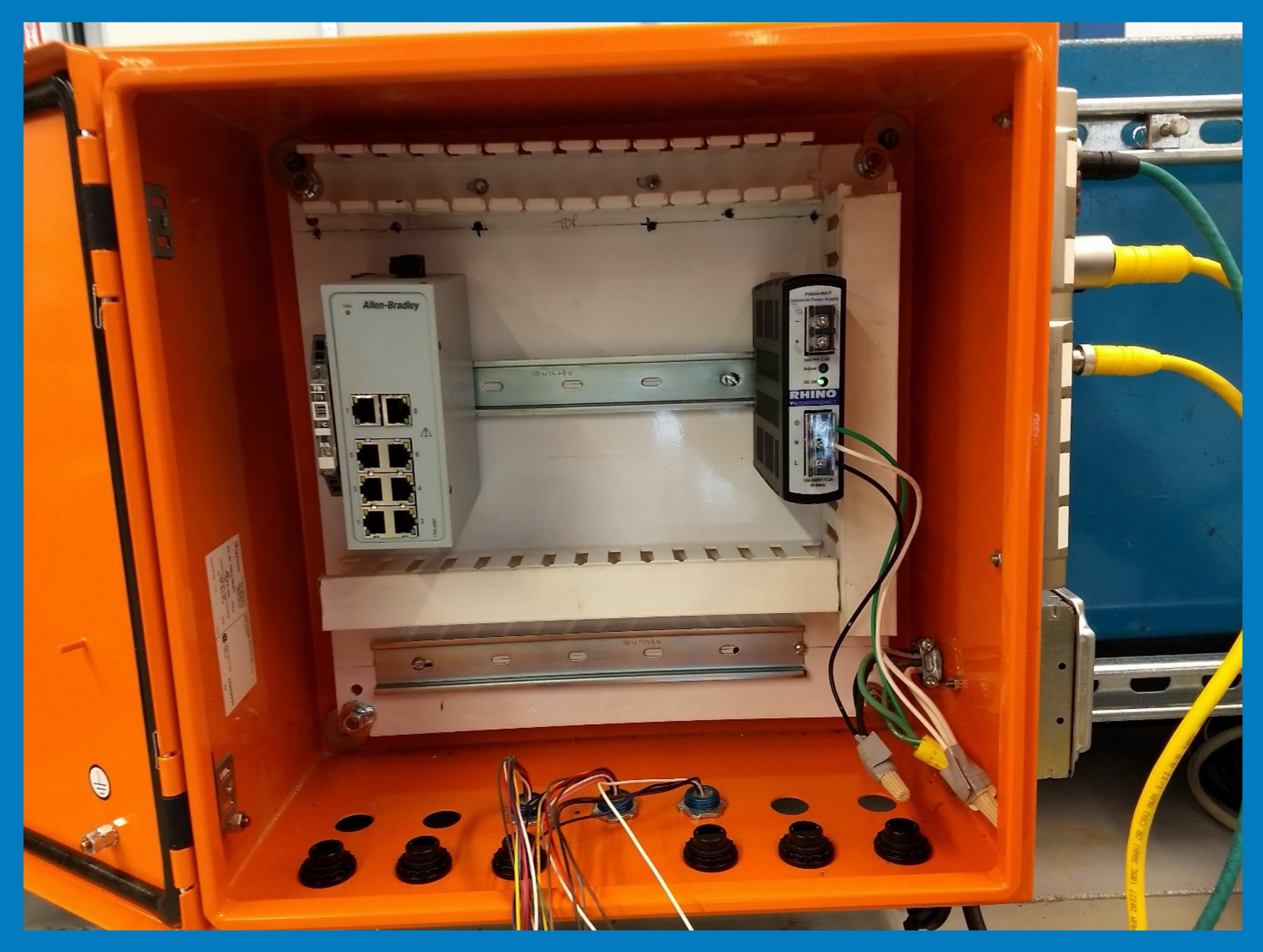
Starting to Mount Electrical Cabinets



Wiring the PLC



Installing Power Supply and A&B Ethernet Block



Install PLC and Terminal Strip



Wiring and Programming



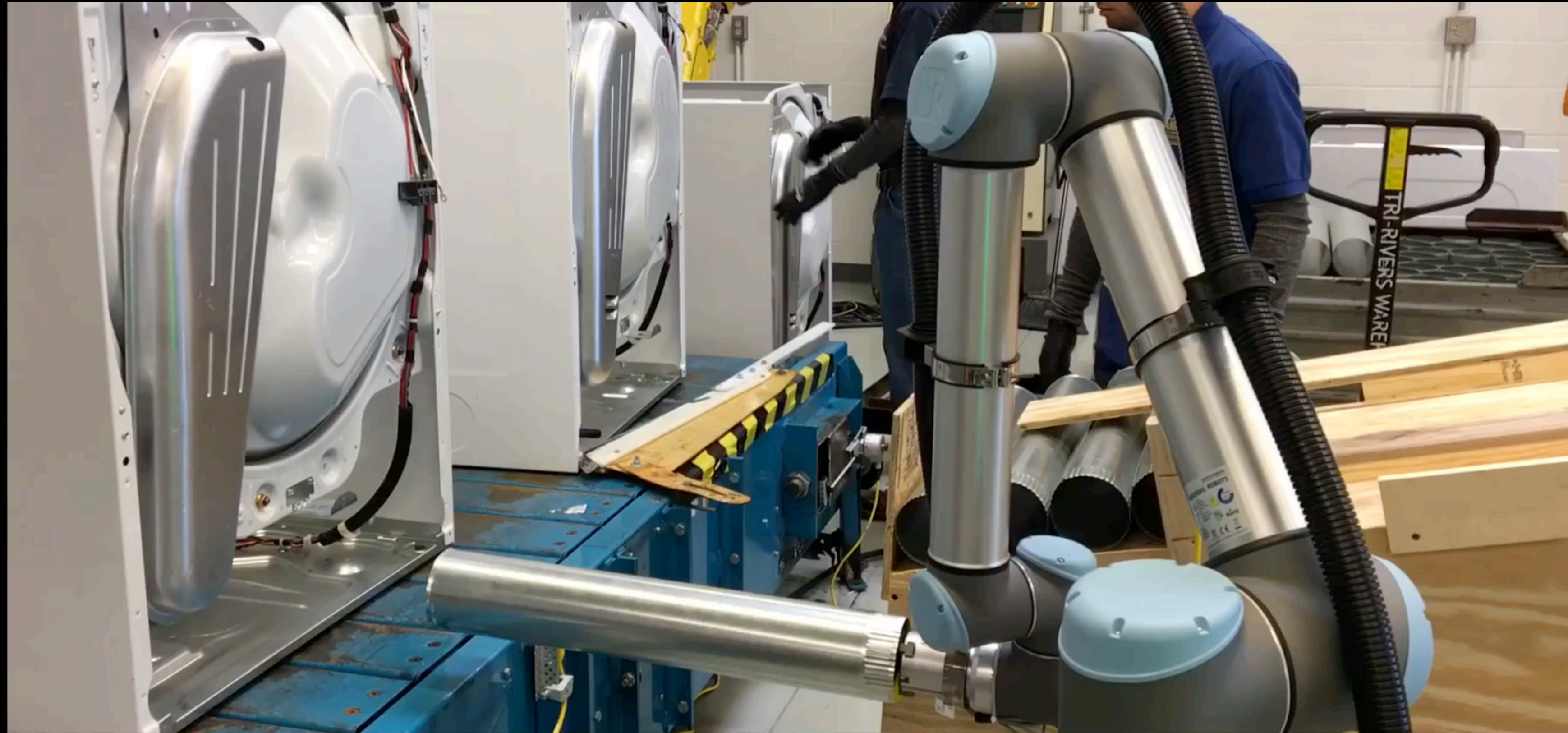
Setting Up Line Tracking



Programming The Robot



Whirlpool Project Equipment Run-Off



This work cell picks up gravity-fed vent tubes and loads them into dryers.

Projected Cost Industry Summary

- Project Man Hours = 300hr.
- Man Hours (4 Engineers) = 75hr. Per-Engineer
- $300 \times \$150.00$ per Hr. = \$45,000.00
- Equipment Costs = \$65,000.00
- Misc. Project Cost = \$10,000.00
- Utilities, Machining, 3D-Printing Materials
Design / Engineering Prototypes.
- Approx. Summary of Project ... \$120,000.00

\$120,000.00 vs. \$250,000.00 Projection Cost
Cost Savings of \$130k

Project Team Members



New National Training Center – Universal Robotics –



Maricopa
Technical College

SilverLine Windows

Automation Project

- Partnered With RAMTEC (Tri-Rivers) to Engineer and Develop Window Automation.
- Approximately 5 Different Projects
- Utilizing Robotics / Automation - Integration
- SilverLine To Supply the Equipment
- RAMTEC Students Will Develop the Equipment and Processes

SilverLine Windows

Automation Project

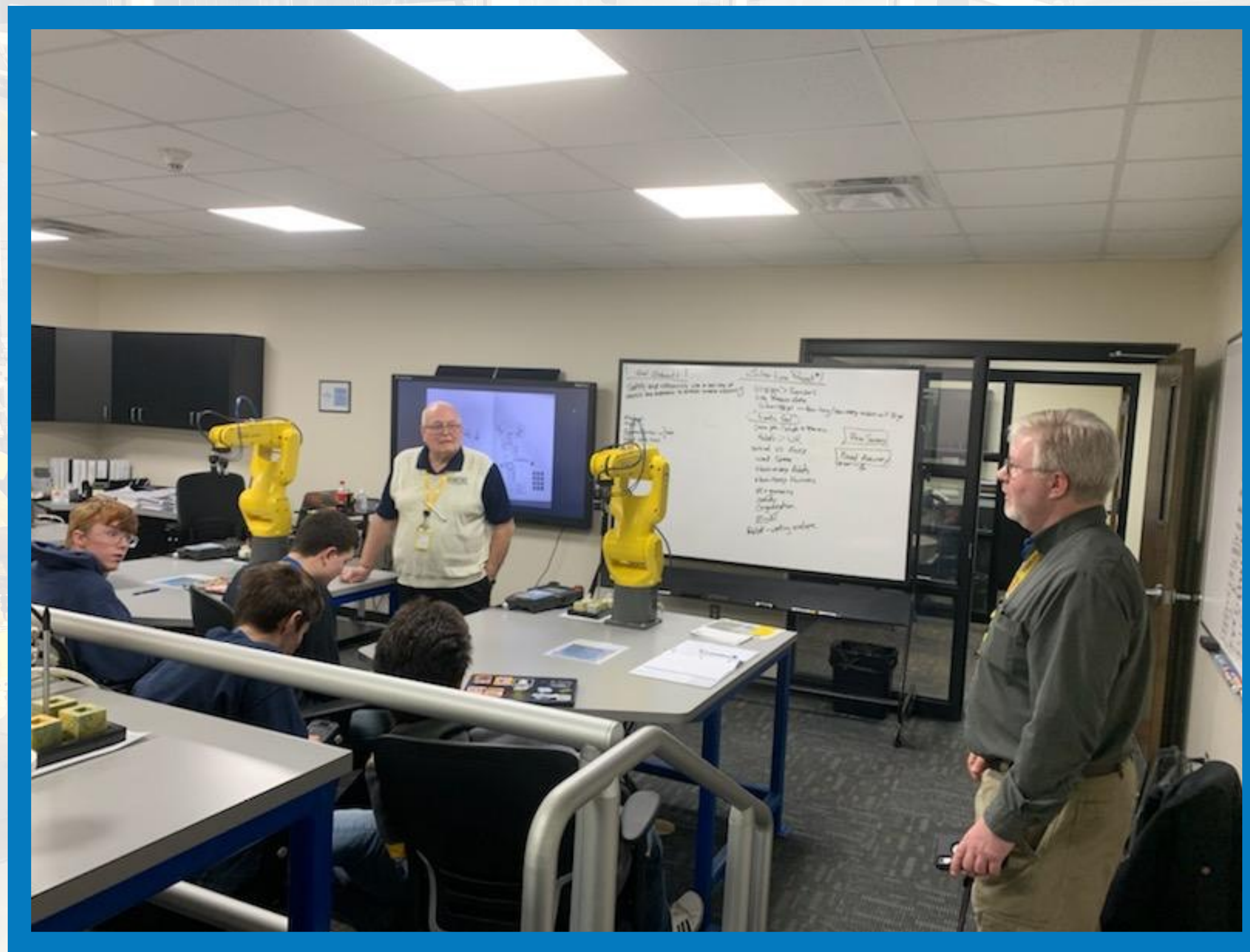
- **Plygem, New Owners Are Committed to Making the Marion, Ohio Window Plant the Center of Excellence By Investing Capital \$ To Automate the Processes. After the Automation Is Rolled Out (in Phases) Then the Other Window Plants in North America Will Also Be Upgraded.**

Silver Line Project Team



Project Strategic Planning Meeting

"Brainstorming" concepts



SilverLine Windows

Automation Project

- **SilverLine investing in the Plant - Longevity**
- **Investing in the plant employees - Training**
- **Investing in the "Future" - Student Engineers**
- **Investing and Growing the Community**

Making the Marion, Ohio Economy Stronger

Questions ?

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