ET FORUM

TECH TALKS

Cool ET Tools:
Coordinate Measuring Machines (CMM)

This ET Forum Tech Talk Session features Pete Cirak, Quality Assurance at Seal Dynamics defining the uses of Coordinate Measuring Machines (CMM), industry applications, and integrating them into our technical education programs.

January 22, 2021

FLORIDA FLATE ADVANCED TECHNOLOGICAL EDUCATION CENTER

part of the FloridaMakes network

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TECH TALKS

Who we are

Dr. Marilyn Barger
Director
Florida Advanced Technological Education Center, part of the FloridaMakes Network

Lara Sharp
Program Director of Engineering, Manufacturing, and Building Arts at St. Petersburg College

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Who we are

Florida Advanced Technological Education Center

Strengthening Career & Technical Education for the 21st Century Perkins V Act, State Leadership

VISION

FLATE will drive Florida's World-class Manufacturing Workforce Education

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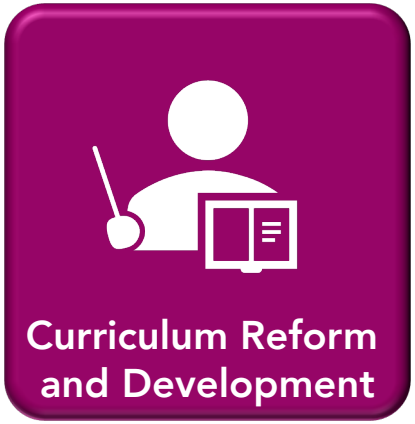
FLATE'S Work



Impact locally. Lead nationally.

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Guest Speaker

Pete Cirak

Quality Assurance Director
Seal Dynamics

ET FORUM TECH TALKS

SEAL DYNAMICS
A HEICO COMPANY

The Ins and Out of Coordinate Measurement Machines

Learning Objectives

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- Types of CMMs
- Components of a CMM
- Operating Environment
- How a CMM Works
- Part Set-Up
- Initial Part Alignment

Types of CMMs

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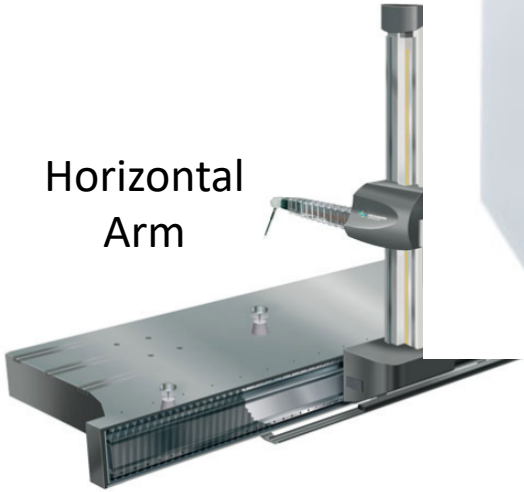
Cantilever

Gantry

Bridge

Horizontal Arm



Devices like CMMs

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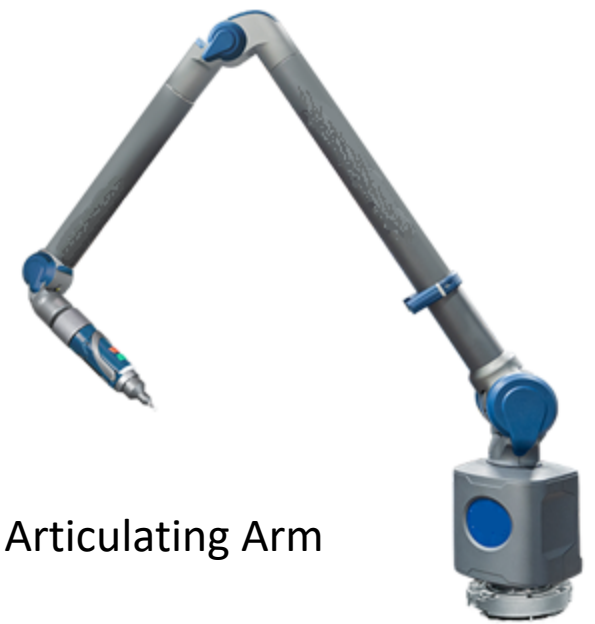

Articulating Arm

CMM Components

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Watch Video

CMM Software

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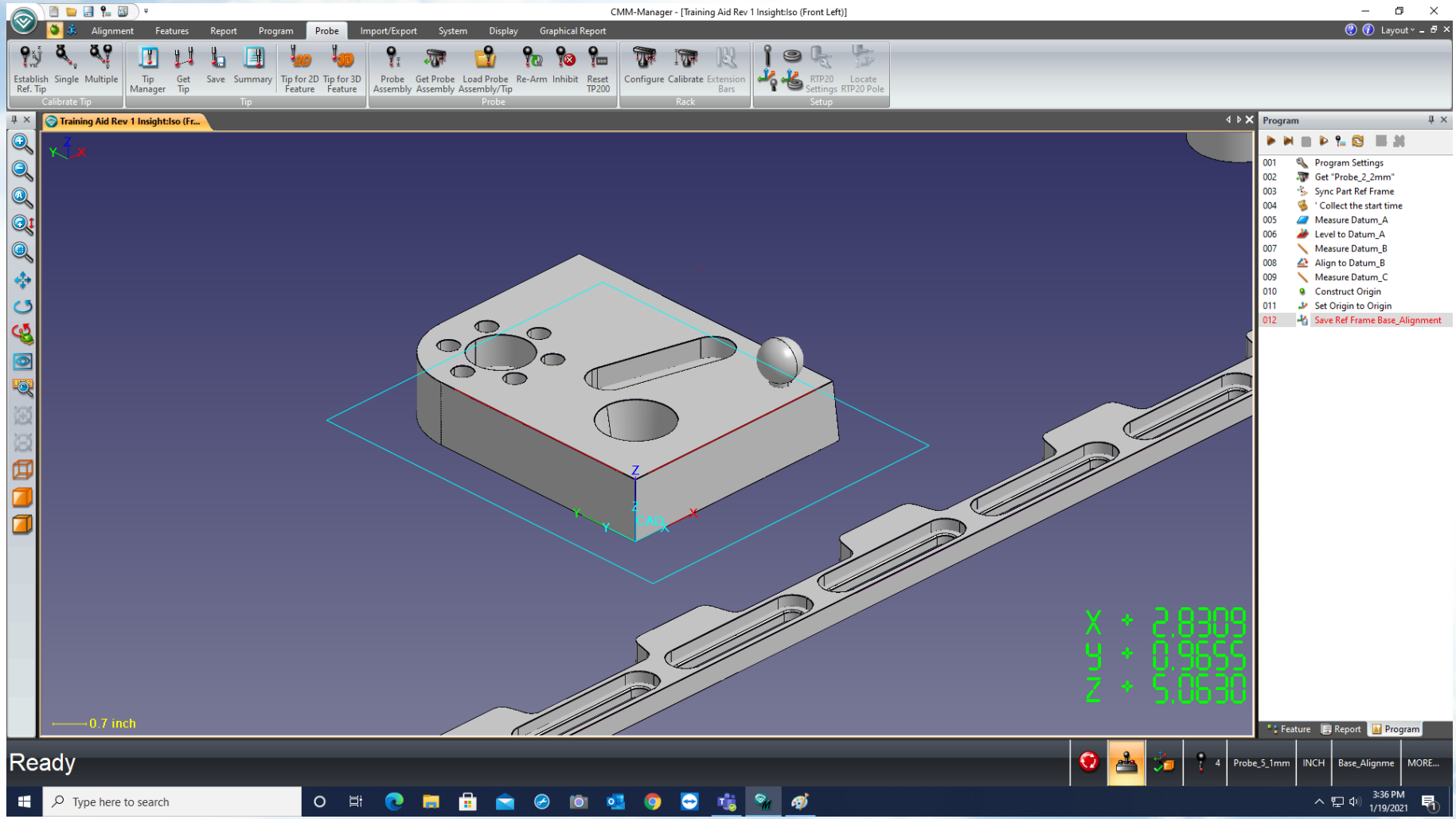

CMM Controller

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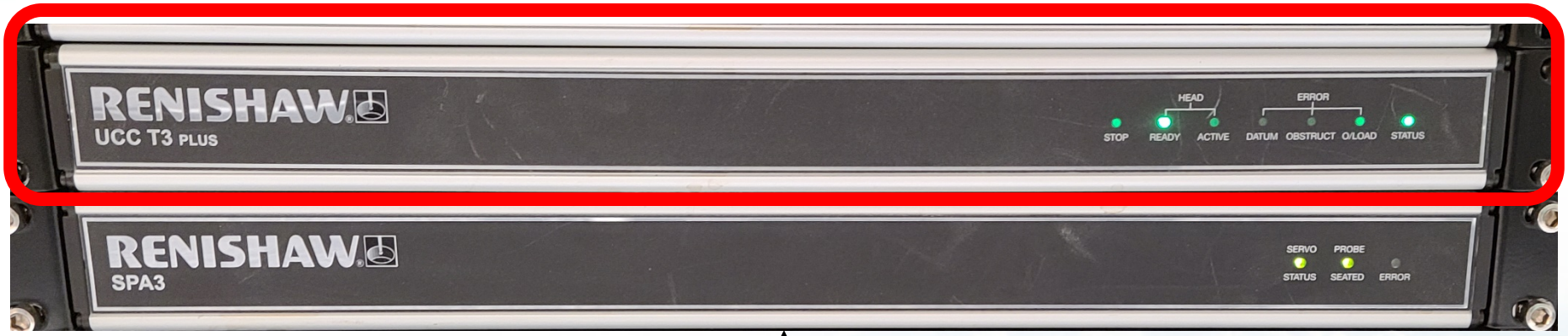
CMM Software → Controller → CMM

Controller



Servo Power Amplifier

Operating Environment

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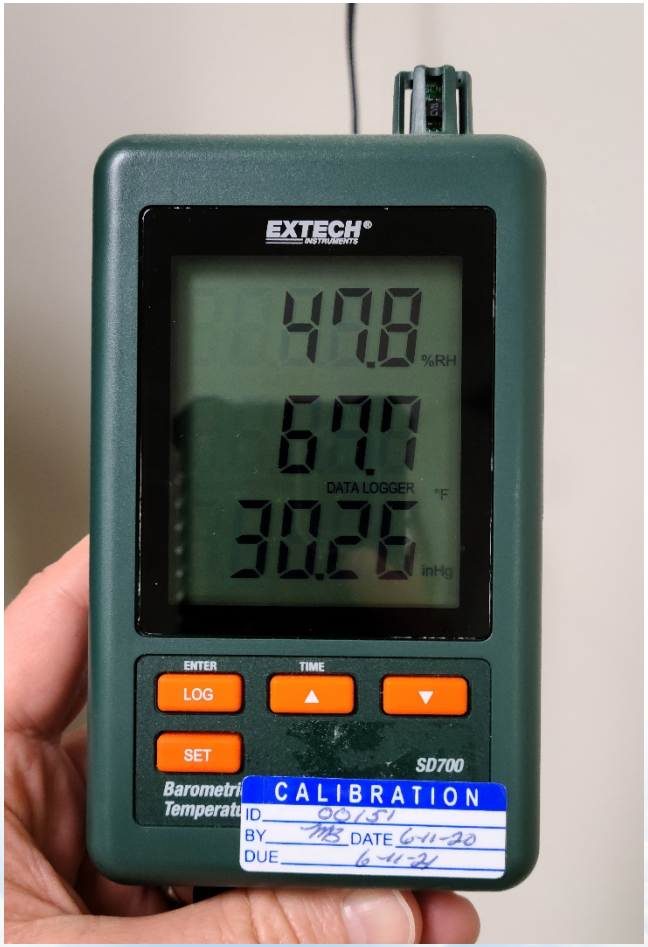
- Temperature and humidity
- Cleanliness
  - Don’t forget air
- Vibrations



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What does a CMM know?

- Home and volume
- Probe size
- Location of probe center
- Travel direction (vector)

So be careful what you teach it.

CMM Probe Details

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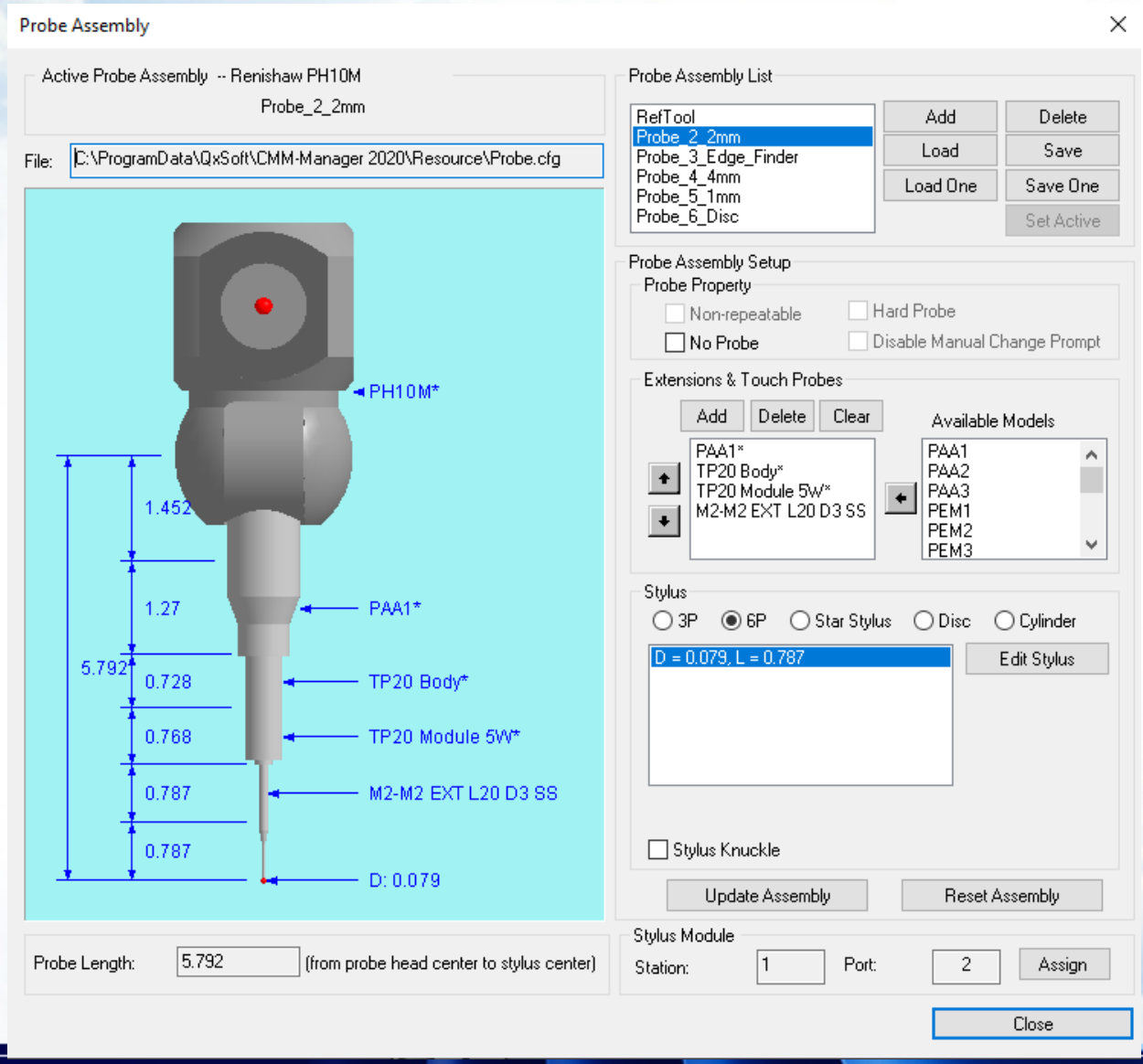

Calibration

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- Machine calibration
  - Typically performed annually
  - Whenever it is moved
  - Significant work is performed
- Probe tip calibration
  - Typically performed weekly
  - Whenever a tip is changed
  - After a collision or similar event

Master Part

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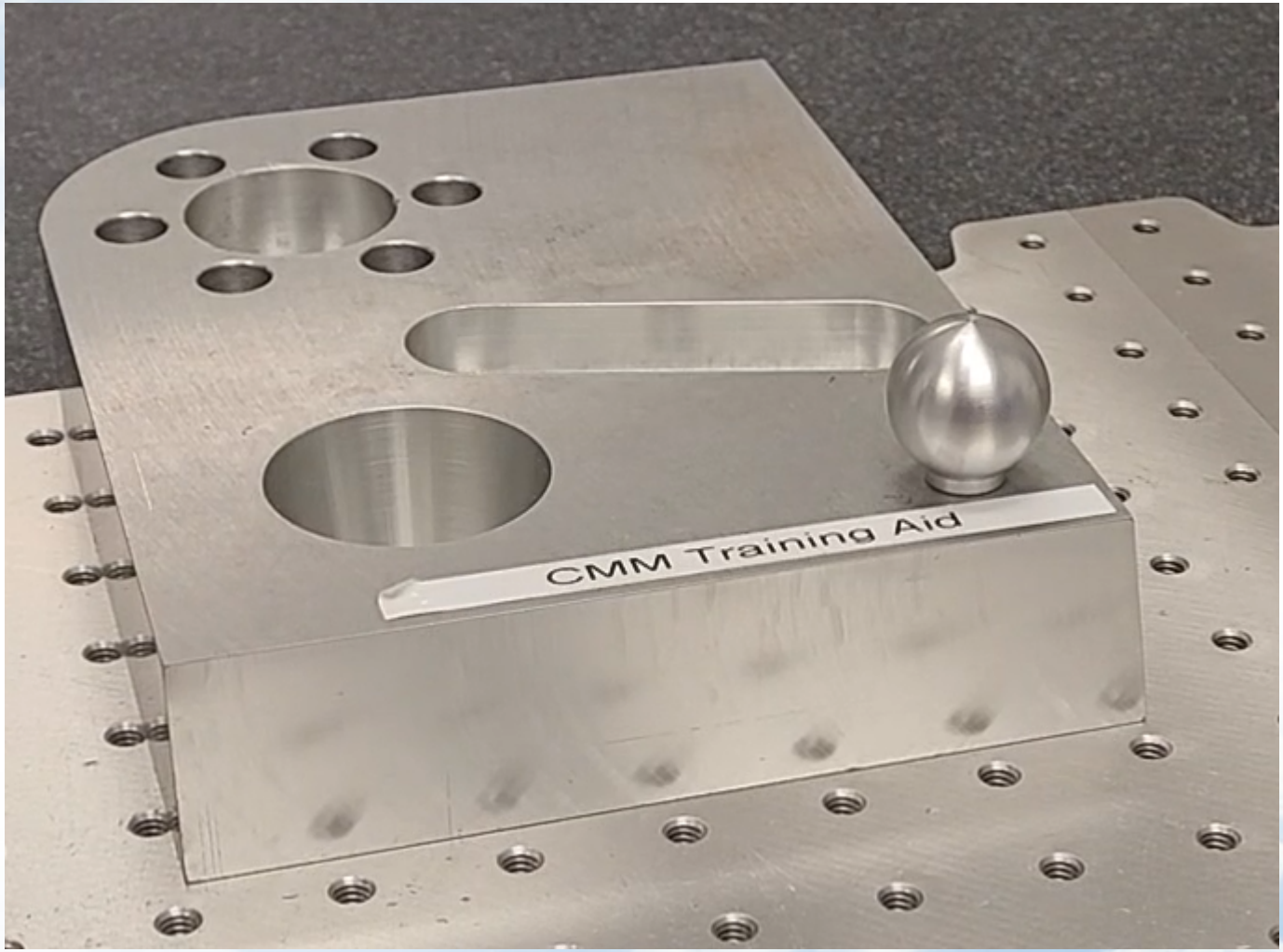

Part Set-up

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- Easily repeatable
- Sturdy/Stable, can handle the trigger force
- When possible mimic the design datums
- Document the set-up
- Have someone test it

Part Set-up

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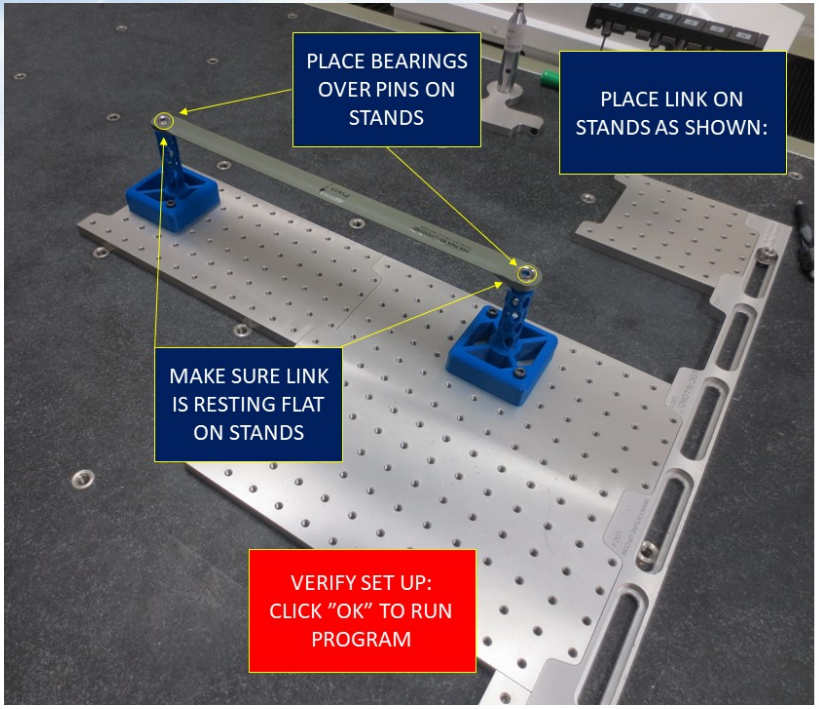

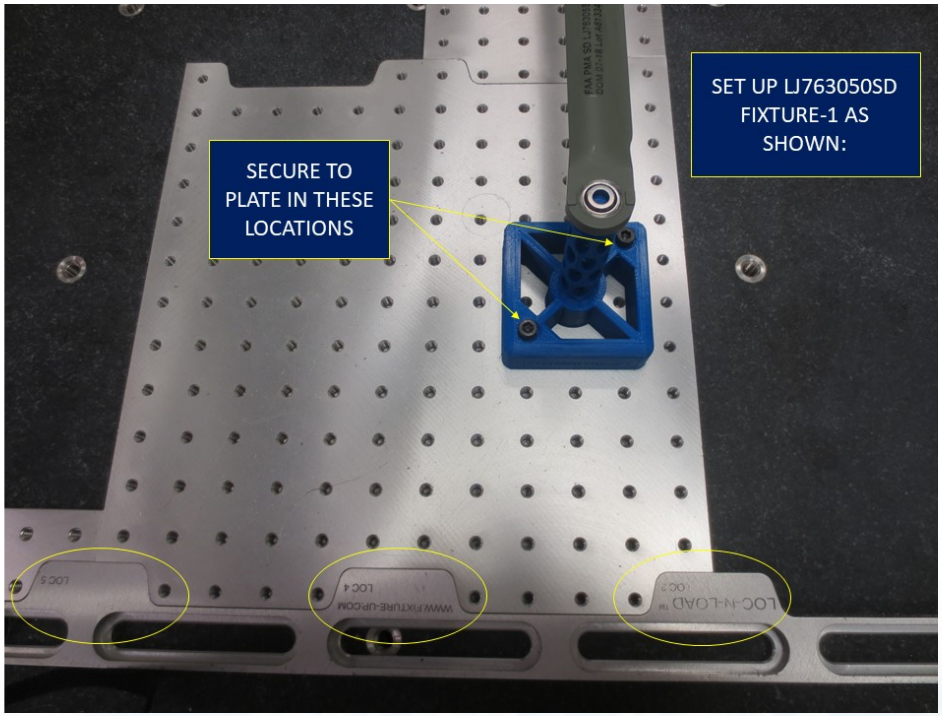

Initial Part Alignment

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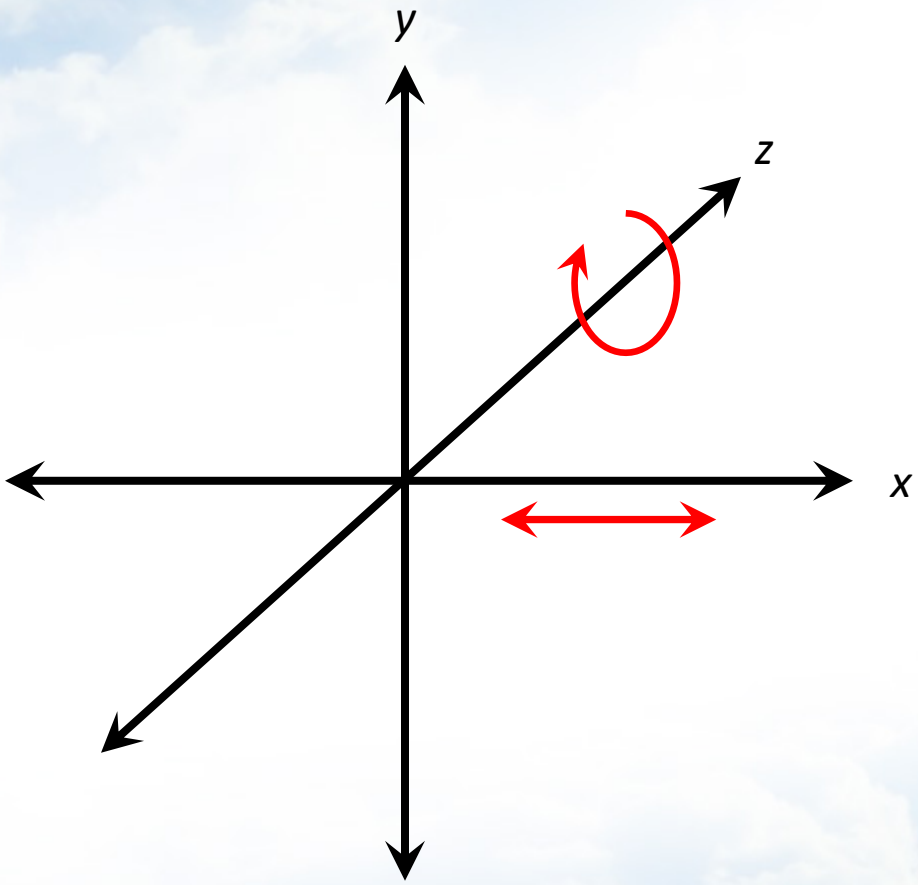
- Best Practice – use datum feature simulators
- Doesn’t need to be datum system
- Understand types of features
  - Plane, line, point
- Constraining the six degrees of freedom

Datums and Degrees of Freedom



3 Translations

3 Rotations

Datums and Degrees of Freedom

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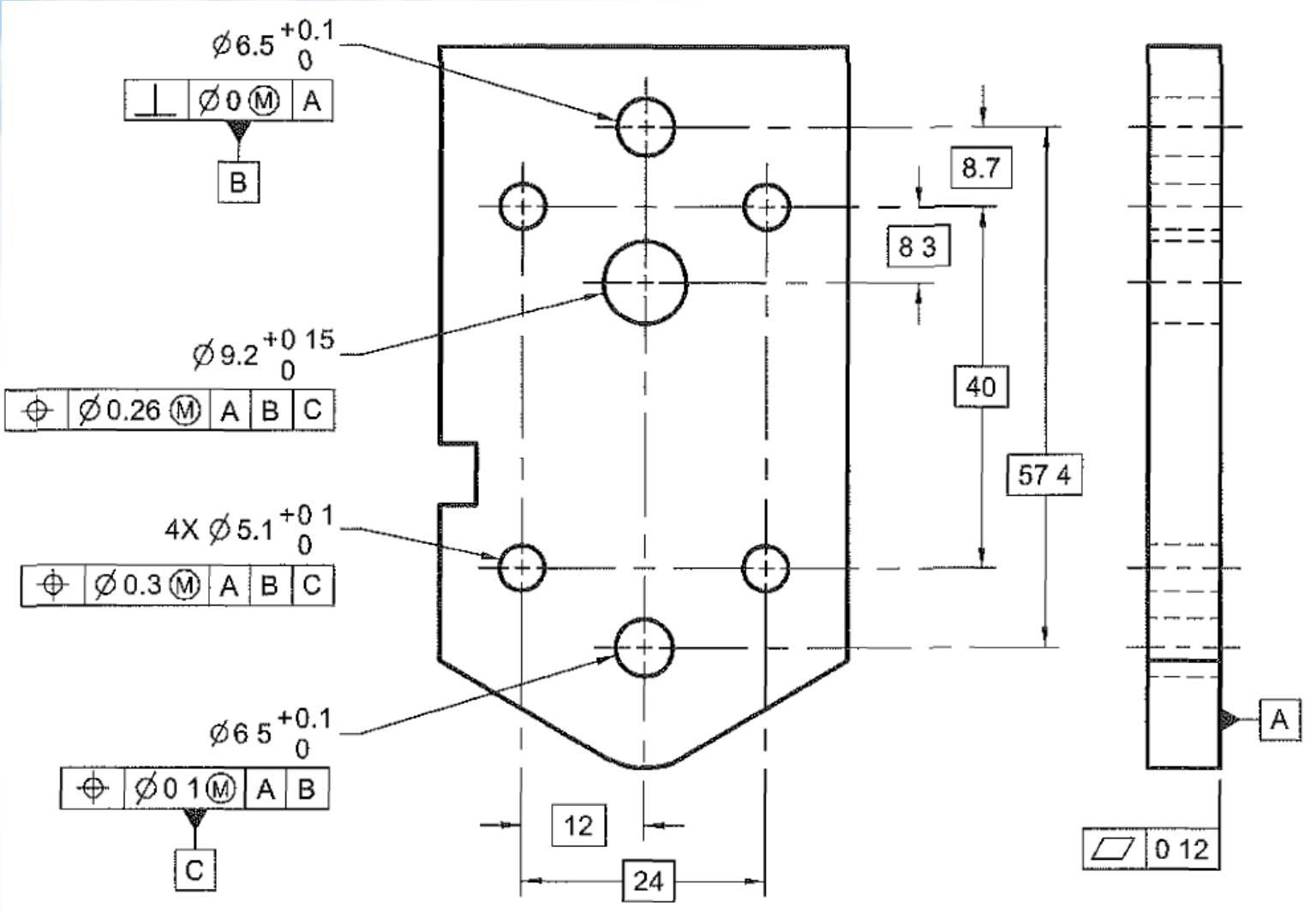

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Who we are

Q & A

Pete Cirak
Quality Assurance Director
Seal Dynamics

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Who we are

Resources

Free lessons, labs, and activities--www.skillscommons.org

FARO Training Academy--https://www.faro.com/support/training/training-videos/

https://metrology.news/future-coordinate-measuring-machines/

https://www.youtube.com/c/GaugeHow/featured

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TECH TALKS

JOIN US!

TECH TALKS Session 2:
Tools to Better Implement Root Cause Analyses
Friday February 26, 9-10 AM EST

Featuring Bill Mazurek, President and Managing Director of Maz-Tech & Associates, LLC.
Register

TECH TALKS SESSION 3:
Exploring Occupational Safety and Health Administration for Manufacturing
Friday April 23, 9-10 am EST

Featuring Mr. Mike Ennis, FloridaMakes Business Advisor at the Manufacturers Association of Florida's Space Coast
Register

Visit FloridaMakes/Events or Register Here

Or events on www.flate.org

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Thank You!

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Presentation and link to the recording available at **www.flate.pbwiki.com**