Automated Inspection System for Processing Tomatoes (AIS-PT)

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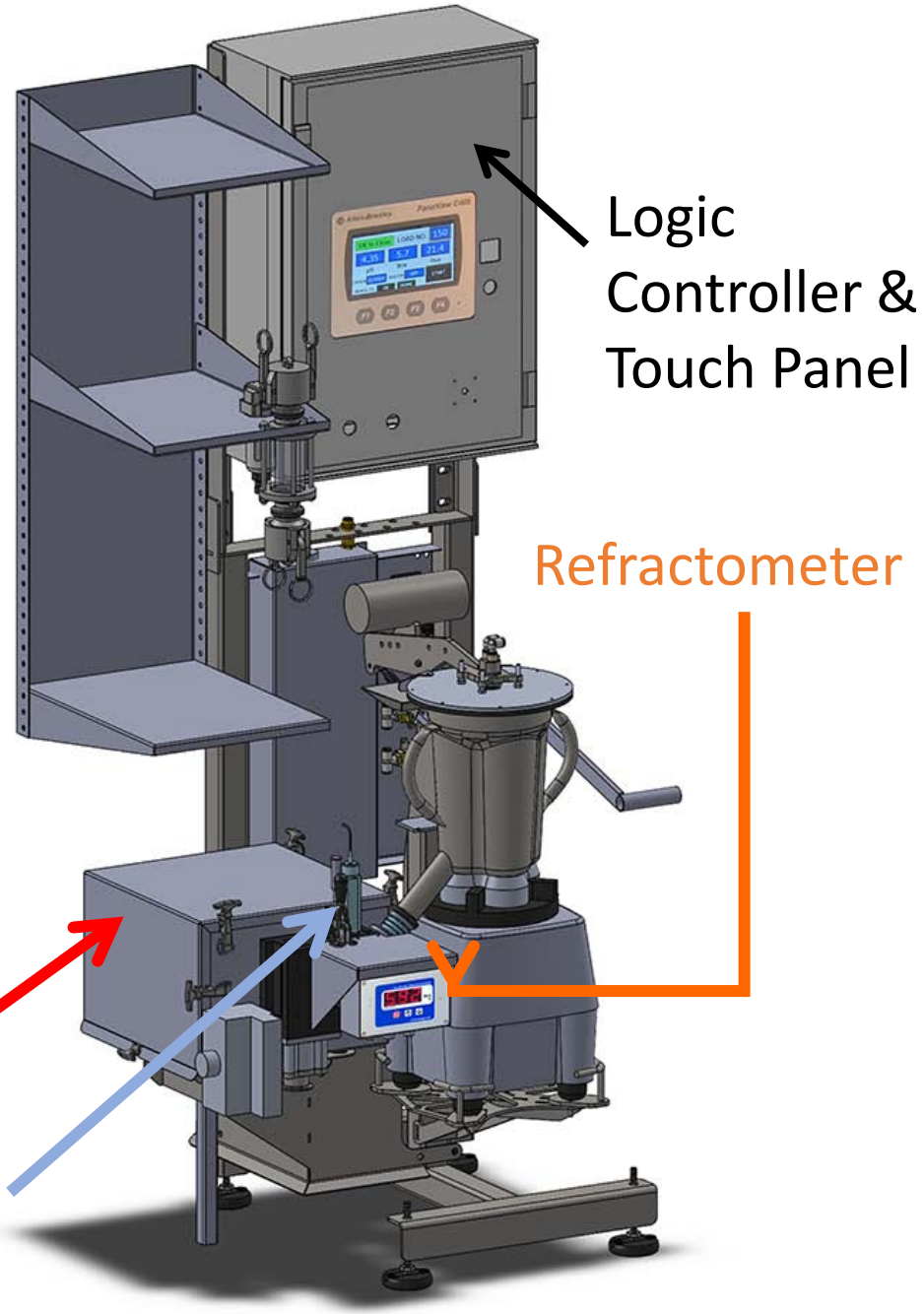
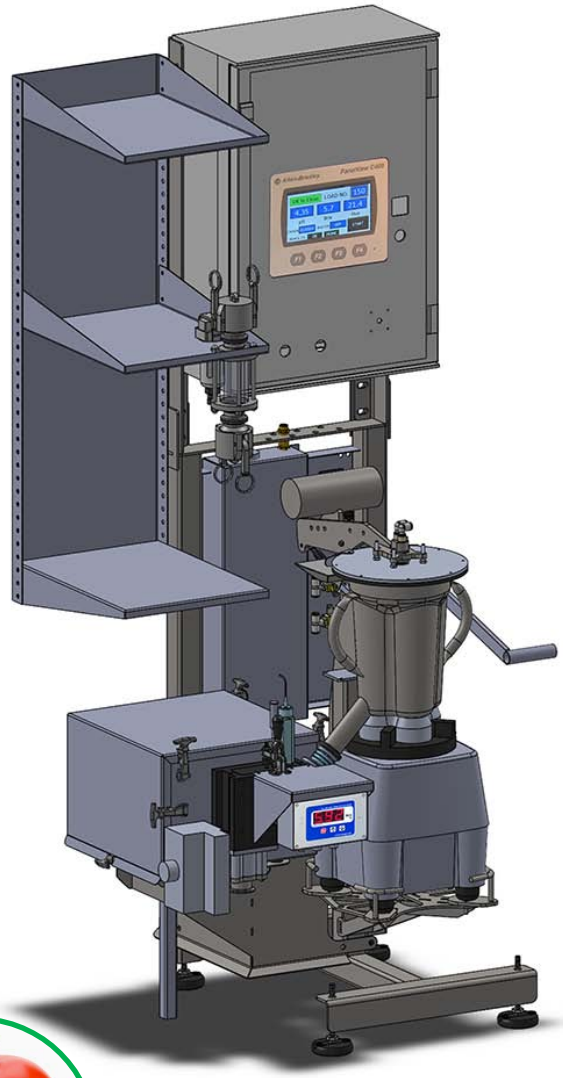
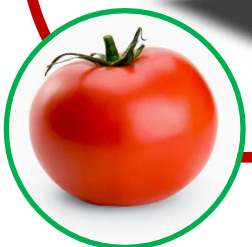
Project Goal:

Develop a fully automatic system to measure color, pH and soluble solids content.

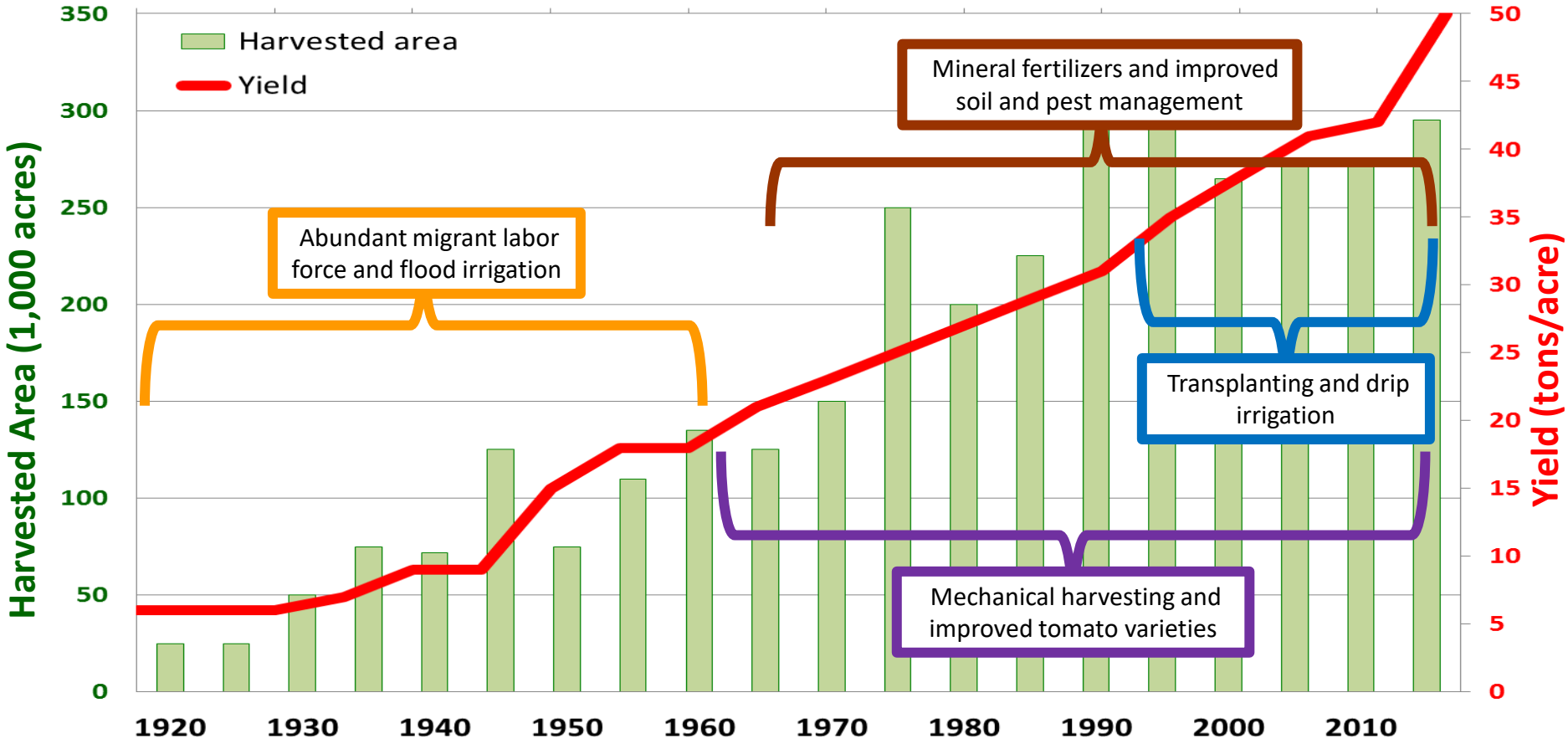




INTRODUCTION



CULTIVATION & HARVESTING PRACTICES

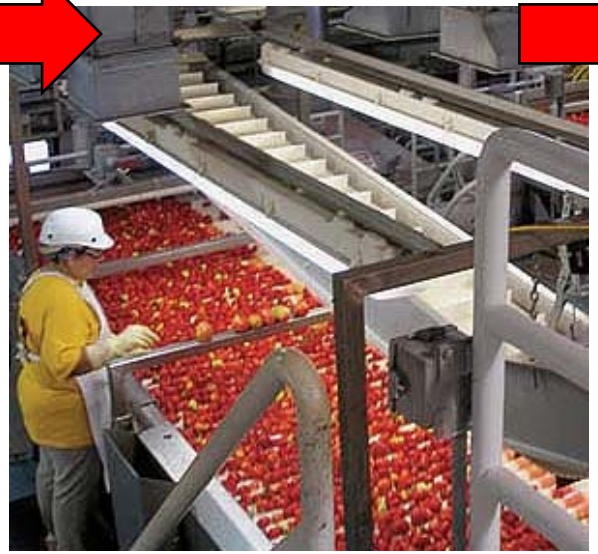


Before 1962
All hand-harvested

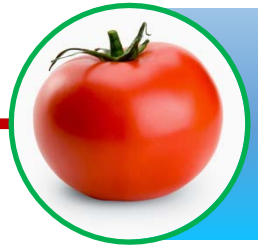
1962- First commercial harvester
Required 12 people to operate

NOW Harvester
Single operator

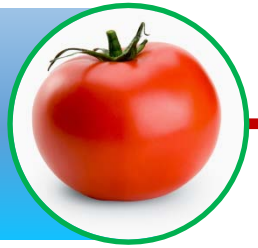
PROCESSING:
From Field to Finished product



Less than 6 hours!!!!



TOMATO INSPECTION



TOMATO QUALITY ASSESSMENT

PHYSICAL

- Cleanliness
- Disease or decay
- Size
- Weight
- Color

TOMATO QUALITY ASSESSMENT

CHEMICAL

- **Color**
- **pH**
- **Soluble Solids**

AIS-PT

- Titratable Acidity
- Bostwick consistency
- Juice/Serum Viscosity

WHY IS Color IMPORTANT?

BLENDING →

- Changes solids to liquids
- Allows uniform property measurements

COLOR → Ripeness = FLAVOR

WHY IS pH IMPORTANT?

BLENDING →
- Changes solids to liquids
- Allows uniform property measurements

COLOR → Ripeness = FLAVOR

pH → Designates acidity= Acidic foods (pH<4.5) limit microbial growth

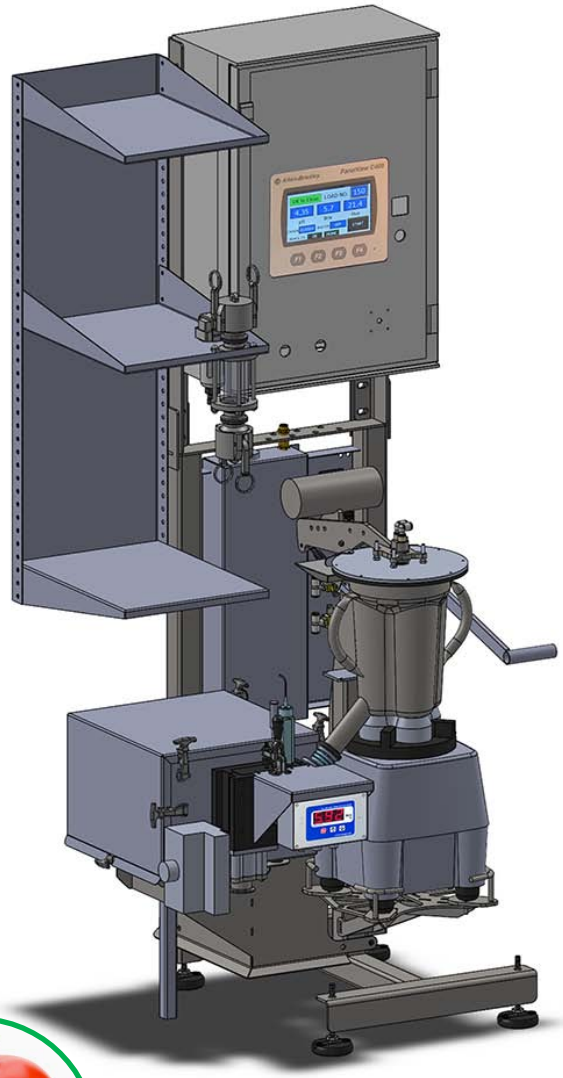
WHY ARE Total Dissolved Solids (TDS) IMPORTANT?

BLENDING →
- Changes solids to liquids
- Allows uniform property measurements

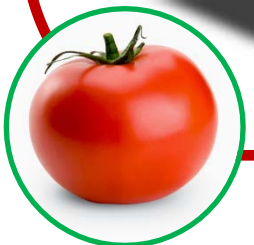
COLOR → Ripeness = FLAVOR

pH → Designates acidity= Acidic foods (pH<4.5) limit microbial growth

TDS → Sweetness, Ripeness =FLAVOR



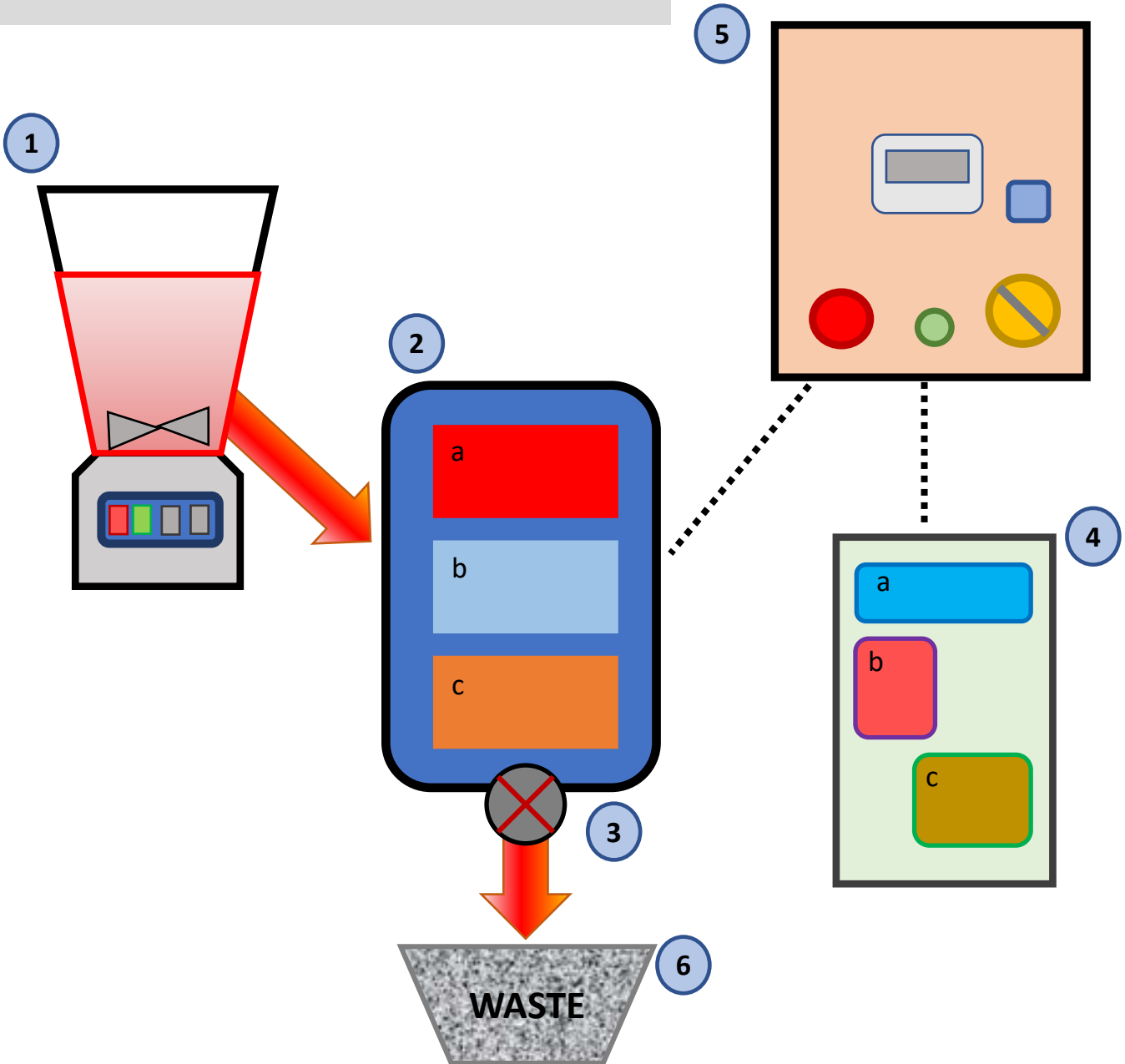
AIS-PT Machinery OVERVIEW



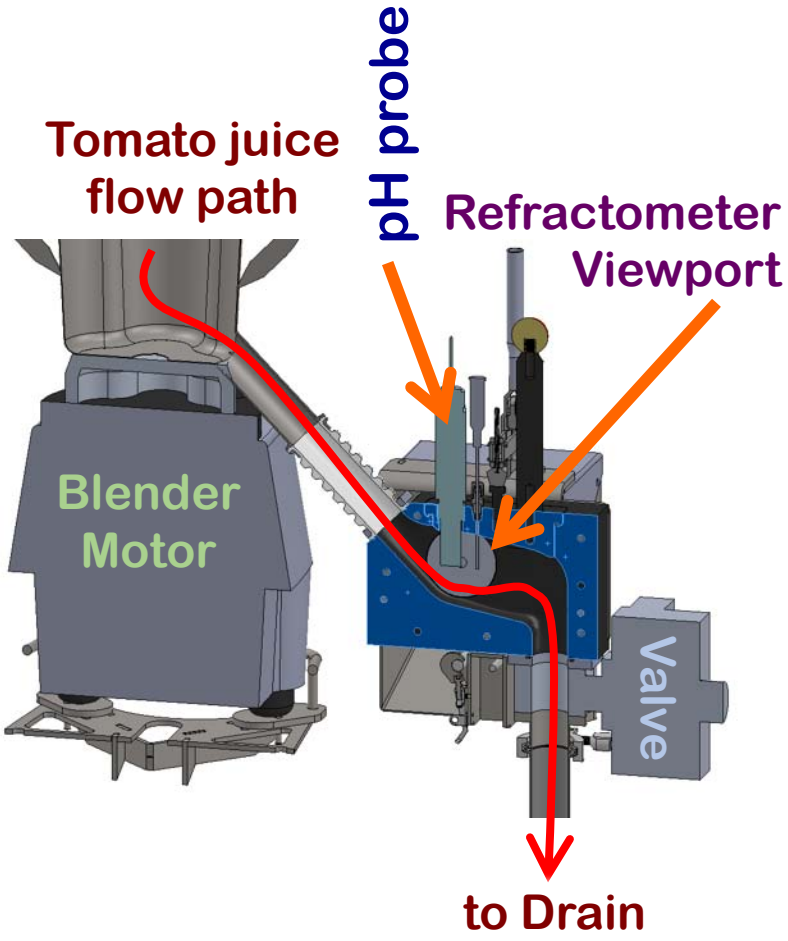
OPERATIONS OVERVIEW

MAJOR COMPONENTS

1. Blender
2. Analysis Chamber
   a) Colorimeter
   b) pH Meter
   c) Refractometer
3. Pneumatic Ball Valve
4. Valve/Pumps
   a) Air vacuum
   b) Water Pump
   c) Flowmeter
5. Logic Controller & Touch Panel
6. Waste stream



INTERIOR VIEW OF AIS-PT (LOOKING FORWARD)



Why Automate Tomato Inspection ?

EFFICIENCY/COST REDUCTION

- Use less resources for same results
- Reduction from 5 to between 3-4 workers per grading station

CONSISTENCY

- Repeatable
- Data digitally transmitted and stored

SPEED

- Reduces inspection grading from 3 to 1 minutes

SAFETY

- Less physically demanding
- Reduced exposure to potential hazards

COMPARISON: OLD vs NEW (AIS-PT)

Reduced from **3 min** to **1 min**

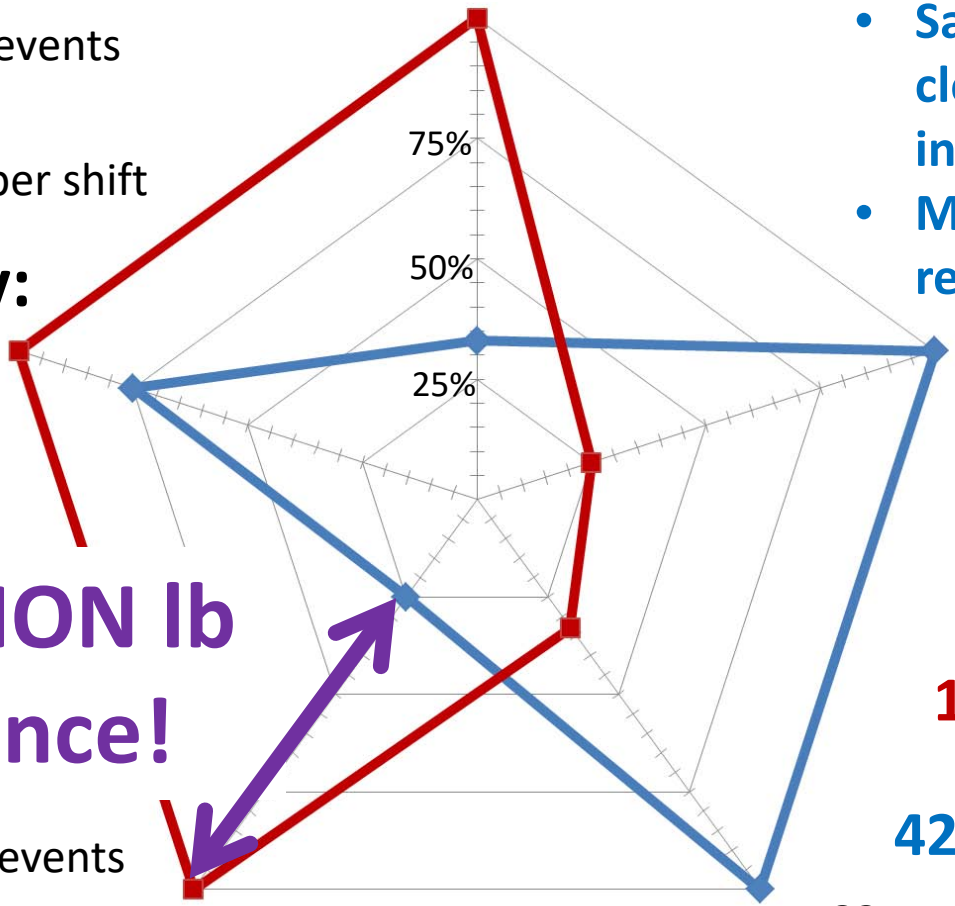
Grading Time

560 lifting events
vs
420 events per shift

Worker Safety:
lifting events per shift

- **Sampling and system cleaning is inspector independent**
- **More analyses points recorded**

Consistency



15 MILLION lb difference!

140 load inspections
vs
420 inspections per shift

½ million lifting events

Worker Safety:
lifting events total season

Efficiency

Thank You, Questions?

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