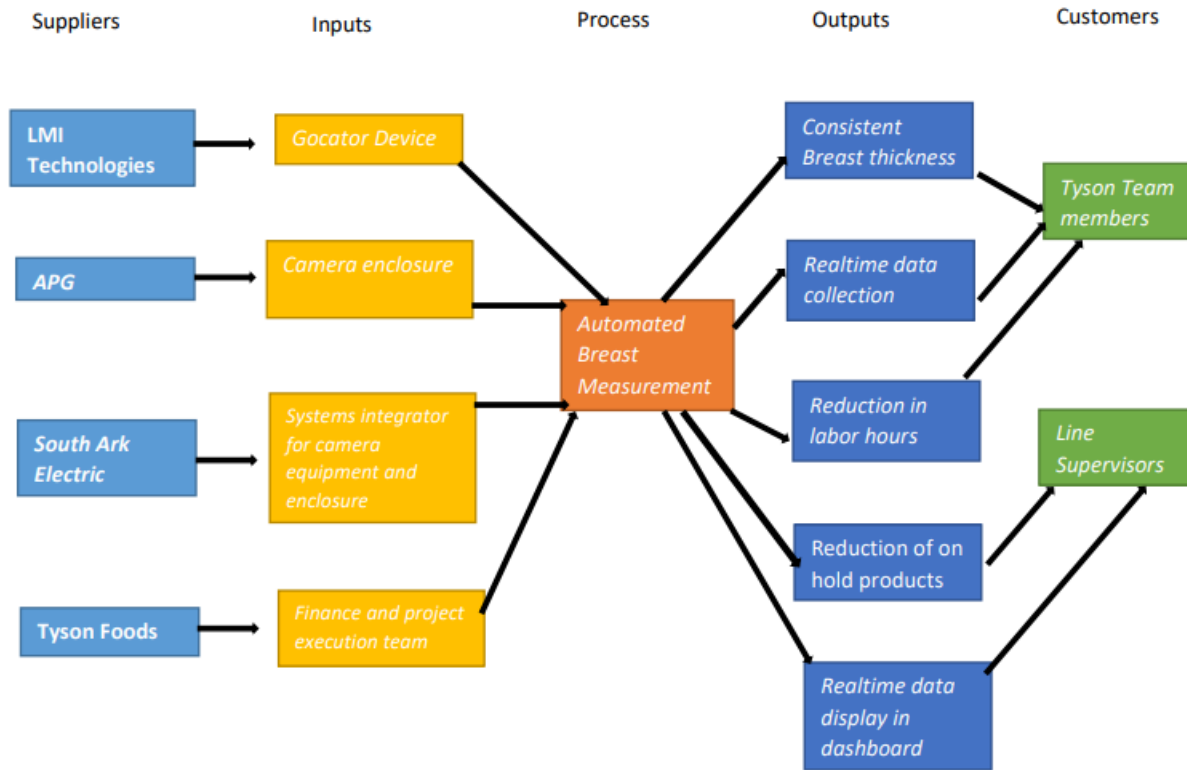


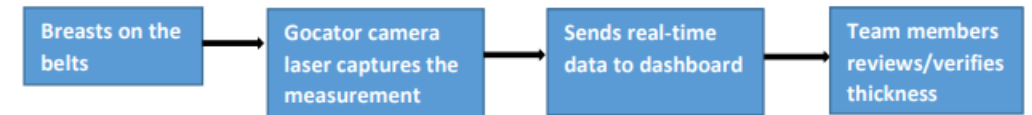
# Voice of the Customer (VOC)

Customer	Voice of the Customer	Key Customer Issue(s)	(CTQ) Critical Customer Requirement
Who is the Customer?	What does the customer want from us?	What does the customer want from us? We need to <b>identify</b> the issue(s) that prevent us from satisfying our customers.	We should <b>summarize</b> key issues and <b>translate</b> them into specific and measurable requirements
Wendy's plant location (Green Forest)	Replace the need for manual checks conducted by the FSQA team in favor of an automated approach that will show measurements in real time	Manual thickness measurements of the raw filet are taken every 30 minutes by the plant FSQA team members who take a sample of product after it exits the press. Measurement is needed to ensure that the product is produced to specification, which helps ensure the meat will be cooked at the restaurant correctly.	Calipers are used to measure the thickness of the chicken filet. Example of a target thickness can range from 9-11mm. There is a high degree of variability that comes with measuring the filet. It is possible to end up with 10 different measurements taken by 10 different people.
			A target thickness should range between 8-12 mm

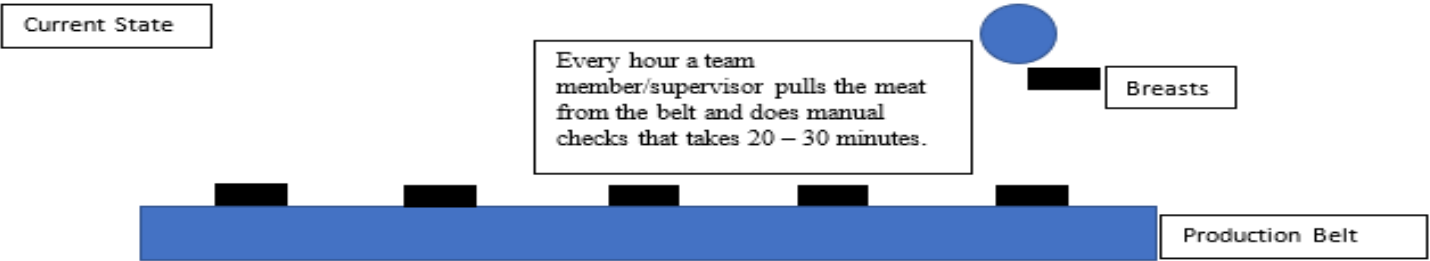
# SIPOC Map



## Process Steps



# Thought Process Map



# Communication Plan

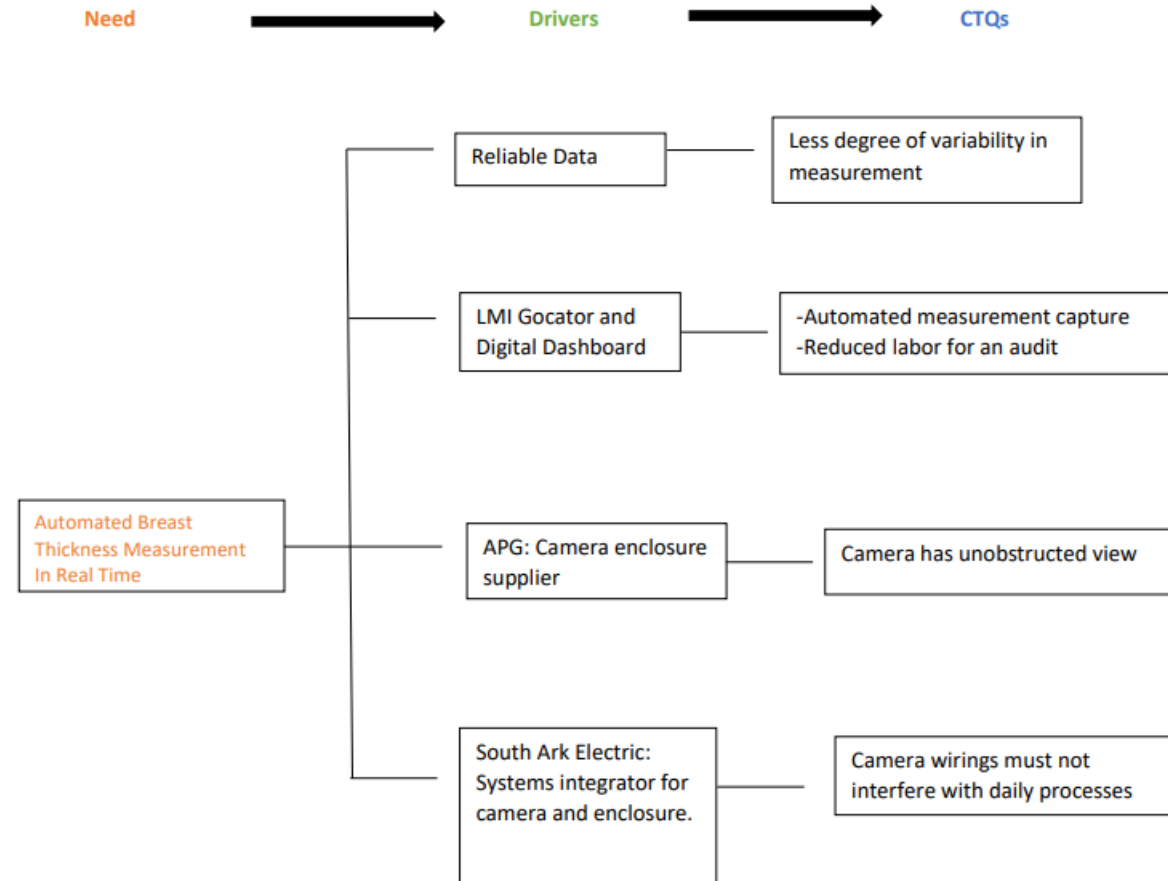
- Team will use Teams/Zoom for meetings
- Team will also use Outlook e-mail for both internal and external (vendor) communication
- JIRA Roadmap will be available to all stakeholders through out product development process
- Project Manager will work with team to build weekly status report that will be presented to the leadership

# Risk Analysis

Risk #	Risk Description	Impact Type	Probability of Occurrence Rating	Impact Rating	Priority Rating	Risk Response		Owner
		Scope Cost Time	1 - None 2 - Low 3 - Medium 4 - High	1 - None 2 - Little 3 - Moderate 4 - Heavy	(Probability x Impact)	Accept Avoid Mitigate - Minimize Probability Mitigate - Minimize Rating	Identify and Describe Risk Response	
1	Wiring of cameras must not interfere with daily processes		2	4	0	Avoid		Vendor/Tyson Team
2	Camera has unobstructed view of the product coming out of the press.		2	2	0	Mitigate – Minimize Probability		Vendor/Tyson Team

# Operational Definitions

CTQC Tree – Wendy Breast Meat Project



# Initial Data Collection Plan

<i>Measure</i>	<i>Type of Measure</i>	<i>Operational Definition</i>	<i>Sample (In mm)</i>
Breast	Thickness		11.4
Breast	Thickness		13.2
Breast	Thickness		13.8
Breast	Thickness		9.6
Breast	Thickness		14.1
Breast	Thickness		15
Breast	Thickness		11.4
Breast	Thickness		13.3
Breast	Thickness		13.6
Breast	Thickness		9.7
Breast	Thickness		14
Breast	Thickness		14.8

This is a sample data. Actual data resides on Confidential Excel File.

# Baseline Performance

<i>CTQ</i>	<i>Sigma Level</i>	<i>Yield (Current Performance)</i>
Less degree of variability in measurement	3.2	95.5% or less
Automated measurement capture		
Camera has unobstructed view		
Camera wirings must not interfere with daily processes		
Reduced labor for an audit		

**Key Takeaways**

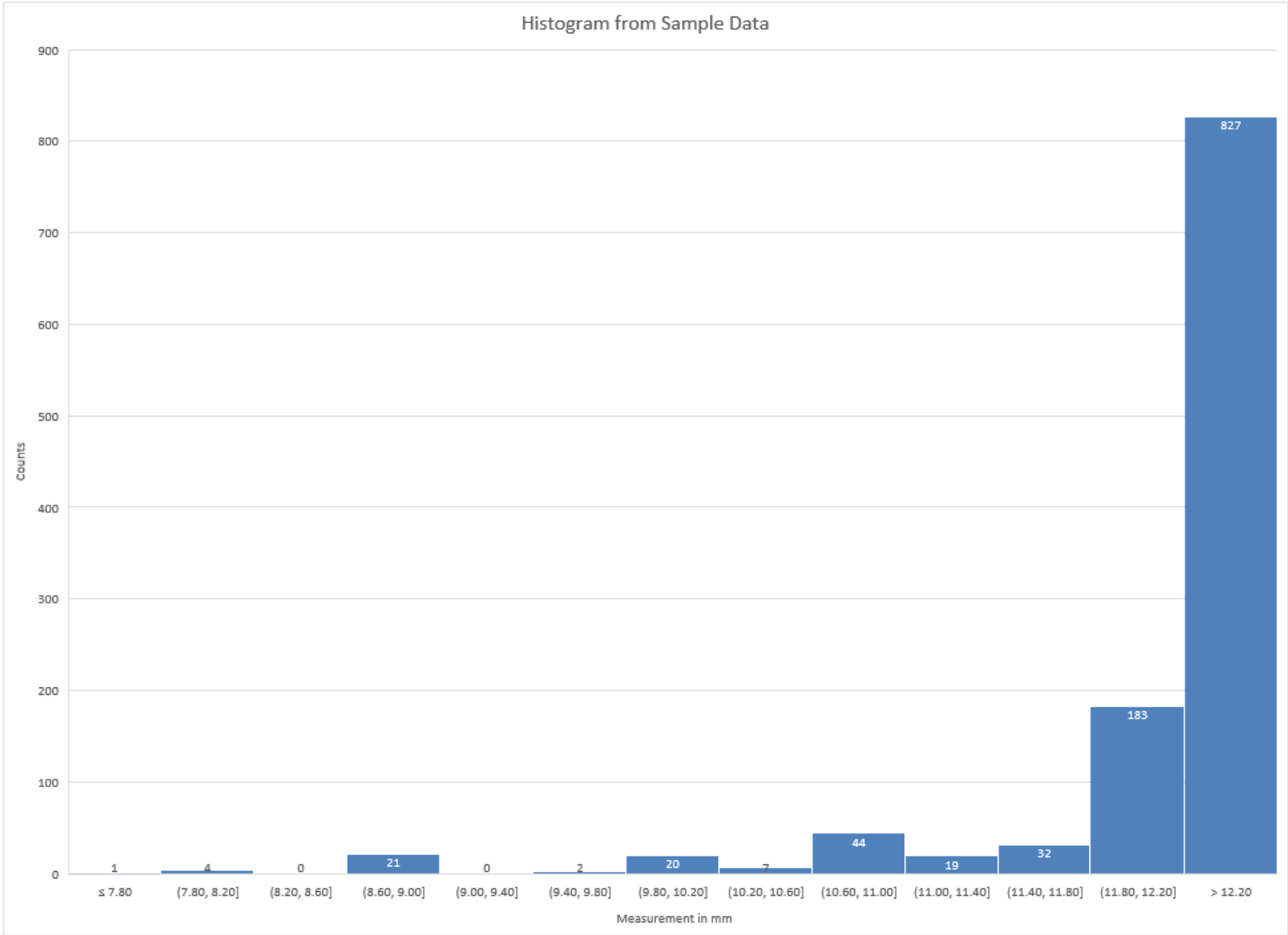
The Sigma Level 3.2 indicates that there will be 44,600 defects in 1 million opportunities. The percentage of product that is free of defects is 95.5% or less.



# Baseline Data/Current Process Performance - Summary

## Key Takeaways

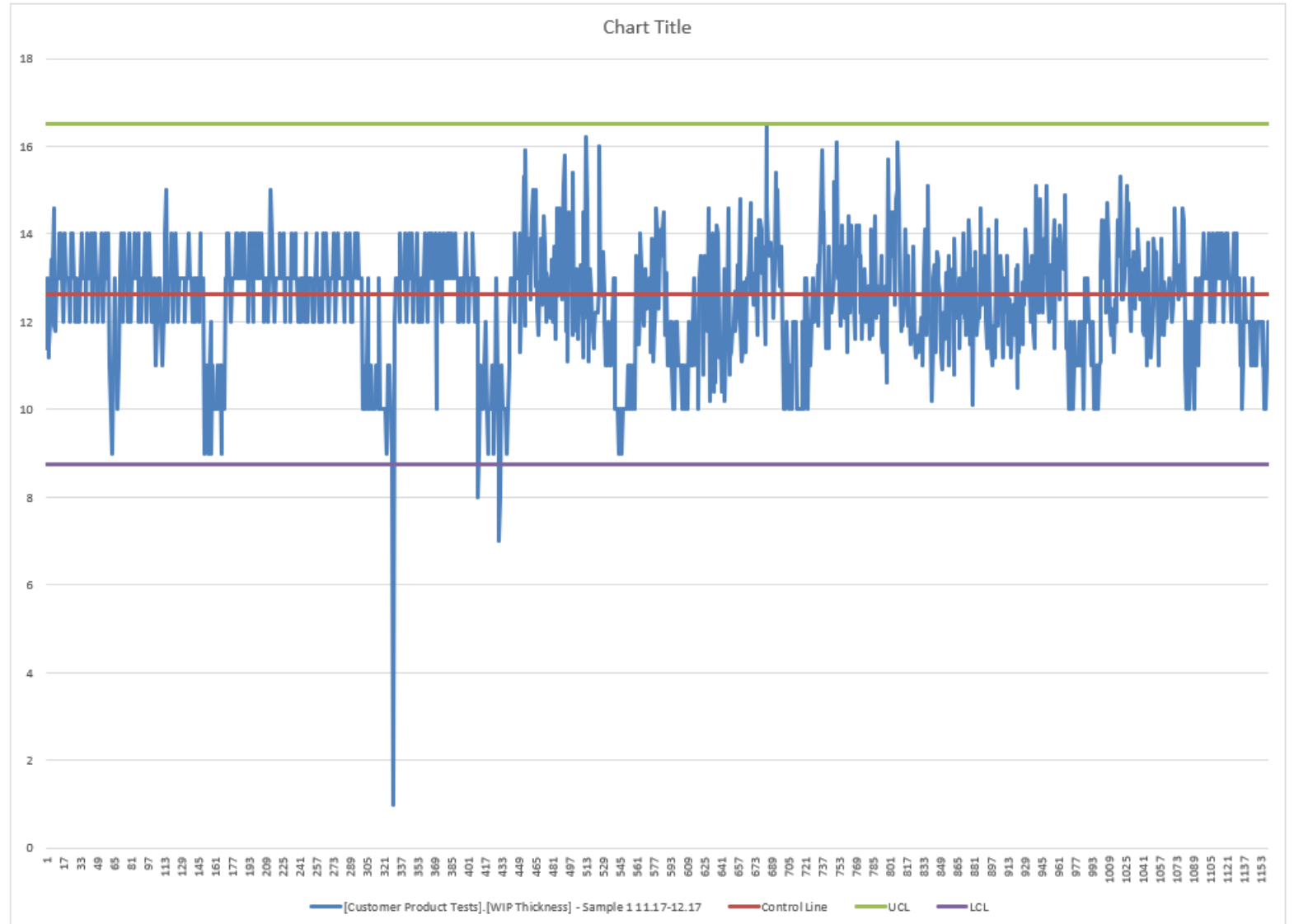
- 1160 data points collected or counts.
- The current process has high variability in measurement pf breast meat thickness.
- If we look at the histogram, we have more than 800 counts of breast meat that measures either less than 7.80mm or higher than 12.20mm.
- The goal is to have between  $\leq 7.80$  mm and  $\leq 12.20$  mm.



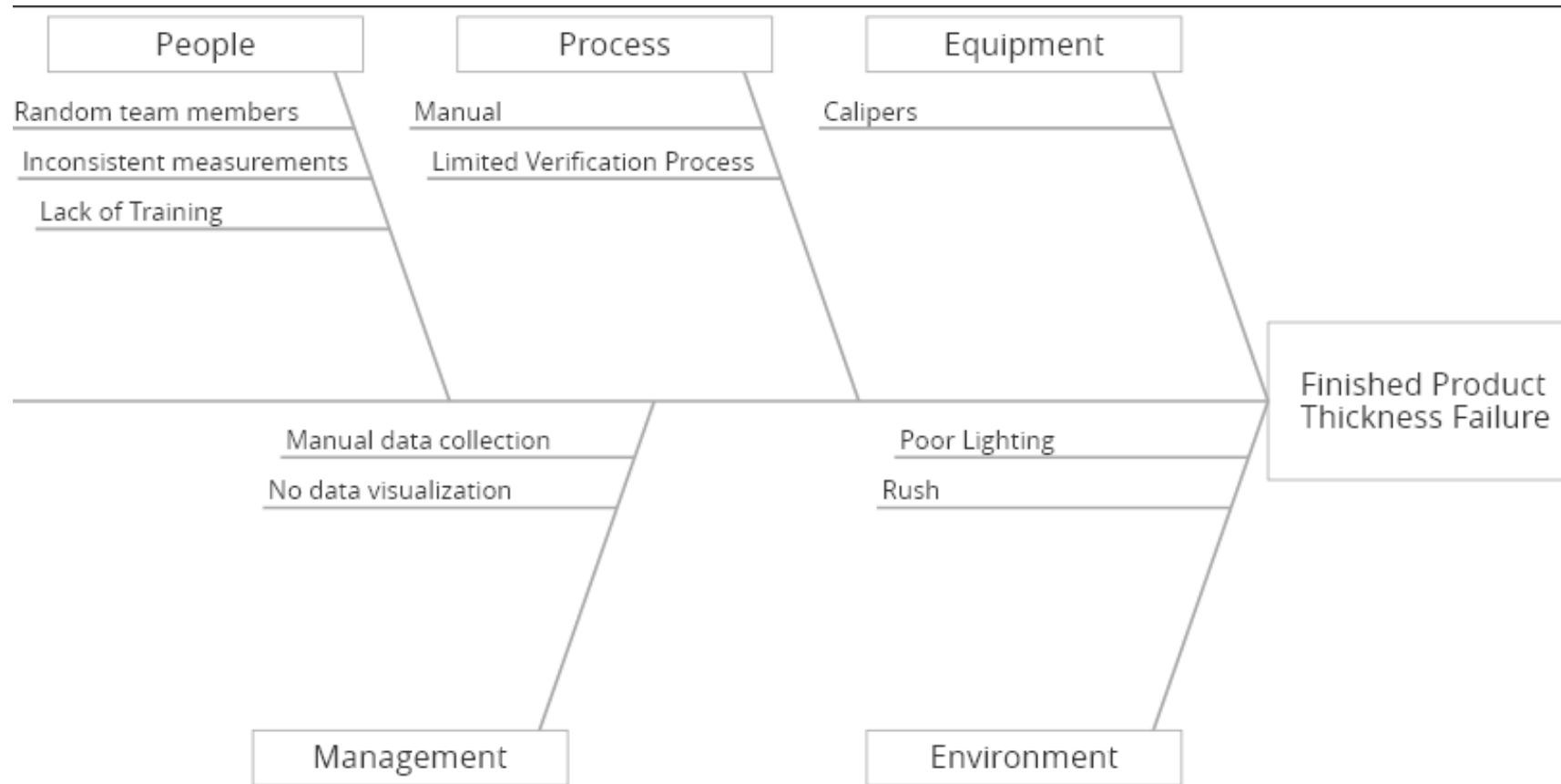
# Baseline Data -Control Chart

## Key Takeaways

- The current measurement is stable over time with experiencing common cause variation. However, the goal is to have thickness level between 8mm -12mm thus there is high variation if the goal is considered.
- 1160 data points collected with zero subgroups, thus the I&MR control chart selected.

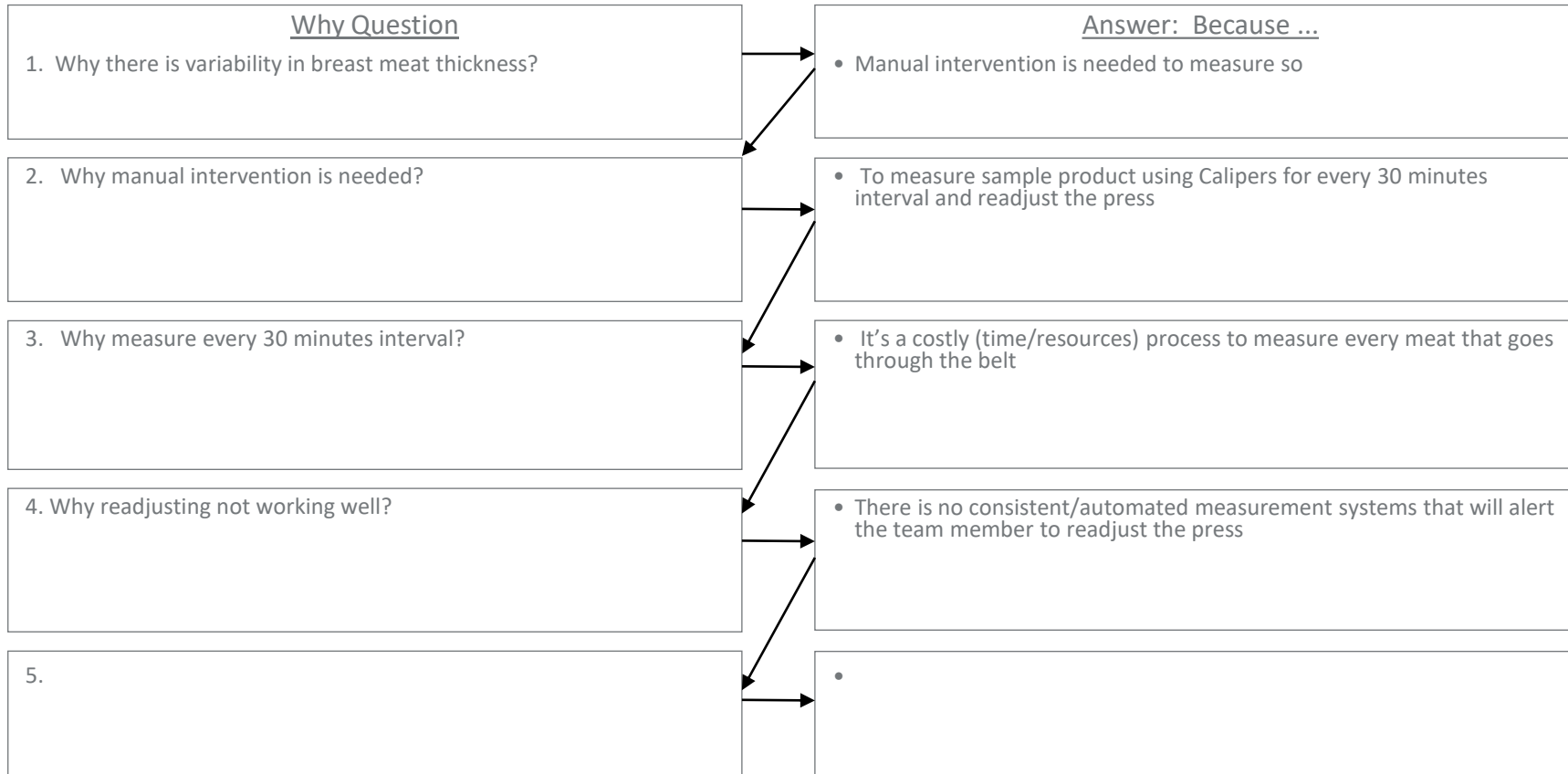


# Root-Cause Identification



## Problem Statement:

Customers complaining about Breast meats not cooked well.



Suspected Root Cause: No consistent/automated measurement system that will alert the team member to readjust the press

# Hypothesis Testing Analysis

- What is the purpose of the test?

Test to determine (at  $\alpha = 0.05$ ) whether the sample mean measurement is significantly greater than 12.

- What are the null and alternate hypotheses?

Null hypothesis  $\leq 12$

Alternative hypothesis  $> 12$

# t-Test

t-Test: One-Sample	
	Breast Thickness
Mean	12.62978017
Variance	1.66885062
Observations	2320
Hypothesized Mean Difference	12
df	2319
t Stat	23.4814139
P(T<=t) one-tail	7.2732E-110
t Critical one-tail	1.645510971
P(T<=t) two-tail	1.4546E-109
t Critical two-tail	1.960987481

## Key Takeaways

Rejection Region: Reject Null hypothesis if  $t > 1.65$

Test Statistics:  $t = 23.48$

p-value =  $7.27e-110$

Decision/Conclusion:

Because  $t = 23.48 > 1.65$  &

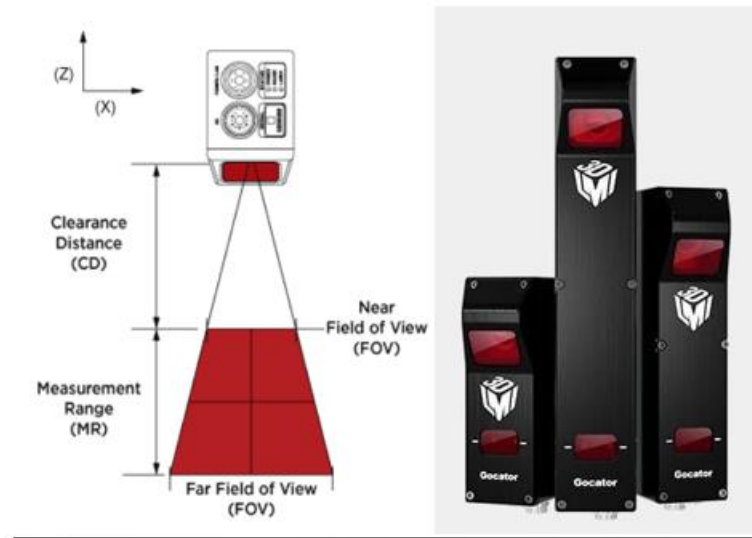
p-value =  $7.27e-110$

$< 0.05$ , thus reject null hypothesis. This means, there is enough evidence to infer that mean Breast Thickness is significantly greater than 12.

# Solution Identification

- Vendor Solution

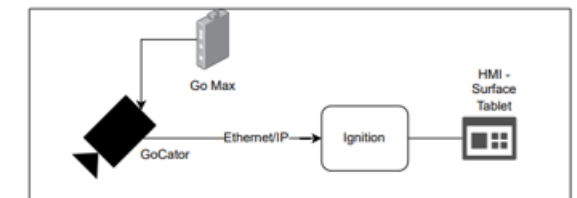
LMI Gocator



Ignition dashboard example:

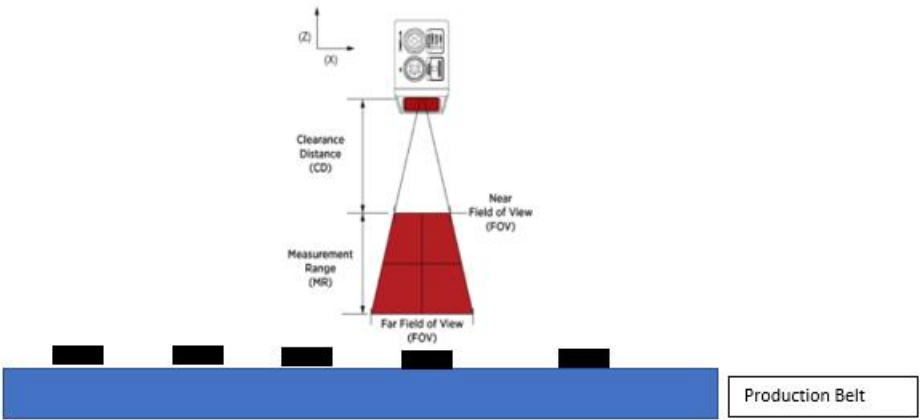


Architecture diagram:



# To-Be Process Map

Future State



Key Takeaways



# Cost/Benefit Analysis

Cost			Benefit		
	CAPEX ▼	OPEX ▼			
LMI Gocator 2180 + GoMax kit	\$10,272		Projected Labor Cost/ Hour	\$ 5.33	
APG Gocator 2180 enclosure	\$774		Hours of Production	16	
LMI equipment integration	\$2,975		Daily Savings per plant	\$ 85.28	
Cabling and conduit	\$10,000		Annual Savings per plant	\$25,584.00	Assuming 300 working days
HMI display + enclosure	\$2,600				
HMI development (160 hours)		\$10,240	Scalable to other plants such as Prepared Foods and Case Ready Plants.		
Project mgmt & go-live support (320 hours)		\$20,480			
Sub total	\$26,621	\$30,720			
<b>Total Investment</b>	<b>\$57,341</b>				

# Solution Implementation Plan

## Product Project Lifecycle

WBS ↕	Name	Start	Finish	Status	% Com...	
+	1	Project Management - Expense	9/21/22	8/14/23	Started	0%
	2	Analysis - Expense: Define Project Goals/ Objecti...	9/21/22	3/23/23	Completed	100%
	3	Design - Capital: Technical Reqts; Architecture Rv...	10/11/22	5/9/23	Completed	100%
	4	Develop - Capital: Build Solution; Unit Testing; Ar...	10/14/22	7/21/23	Completed	100%
	5	Test - Capital: Perform Integration, Regression a...	3/17/23	3/17/23	Completed	100%
	6	Deploy - Capital: Cutover & Rollback Plan; Contr...	11/21/22	8/14/23	Started	95%
	7	Deploy - Expense: Conduct Go Live; Hypercare; E...	11/21/22	8/14/23	Started	95%
	8	Maintain - Expense: Support Turnover Signoff; Cl...	11/21/22	8/14/23	Started	75%
	9	...	...	...	...	...

# Current Process Performance

## Before the solution

Defect	312
Count if between 8-12	850
Defect Opportunities per breast	People, Process, Equipment, Environment, Management
Unit (U)	2320
Total Defects (D)	469
Opportunity (O)	5
Defects Per Unit (DPU) = D/U	0.2022
Defects Per Opportunity (DPO)	0.0404
Defects Per Million Opportunities	40431.03
Rolled Yield	95.96
Sigma Level	3.25

3.2 Sigma level indicates 44,600 DPMO.

## After the solution

Count if between 7.80 - 12.20	47
Unit (U)	50
Defects (D)	3
Opportunity (O)	5
Defects Per Unit (DPU)	0.06
Defects Per Opportunity (DPO)	0.012
Defects Per Million Oppor.	12000
Rolled Yield	98.8
Sigma Level	3.757129244

3.8 Sigma level indicates 10,700 DPMO.

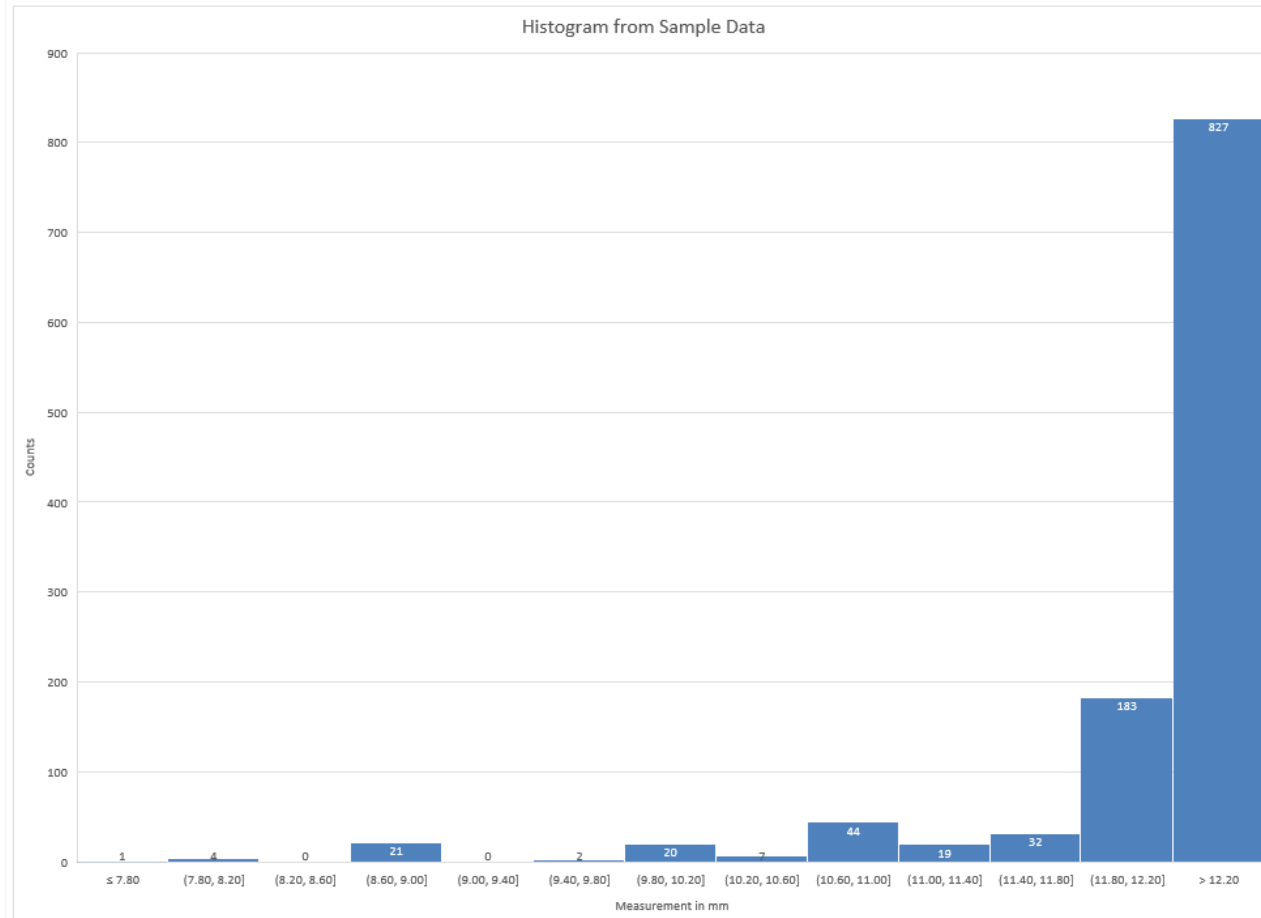
### Key Takeaways

Above, we can observe that the defects are significantly lower after the new solution in place with only 10,700 defects/million opportunities compared to 44,600 defects/million opportunities.

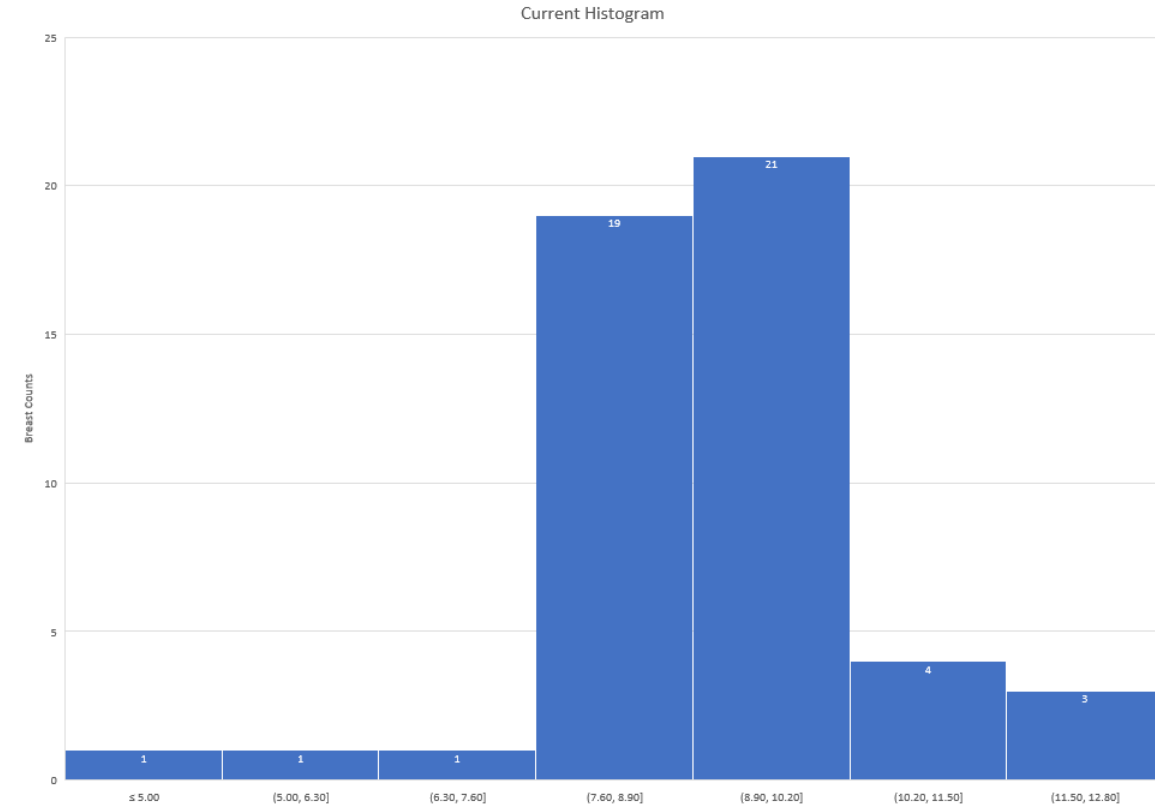
The percentage of product free of defects was 95.5% or less whereas **after the new solution, the percentage of product free of defects is 98.9% or more.**

# Current Process Performance

## Before the solution



## After the solution



- If we look at the histogram, out of 50 counts, we have only 3 counts of breast meat that measures either less than 7.80mm

# Process Monitoring Plan

<i><b>CTQ</b></i>	<i><b>Data Collection Method</b></i>	<i><b>Data Collection Frequency</b></i>	<i><b>Owner Responsible for Collection</b></i>
Less degree of variability in measurement	Automated in PlantView application.	Real-time	Plant team member/Supervisor
Automated measurement capture			Plant team member/Supervisor
Camera has unobstructed view			Plant team member/Supervisor
Camera wirings must not interfere with daily processes			Plant team member/Supervisor

# Response Plan

<i>Measure</i>	<i>Action</i>	<i>Timing</i>	<i>Owner</i>
Monitor average thickness in Dashboard	If <b>RED</b> , then adjust the Press	Real-time	Plant team member/Supervisor

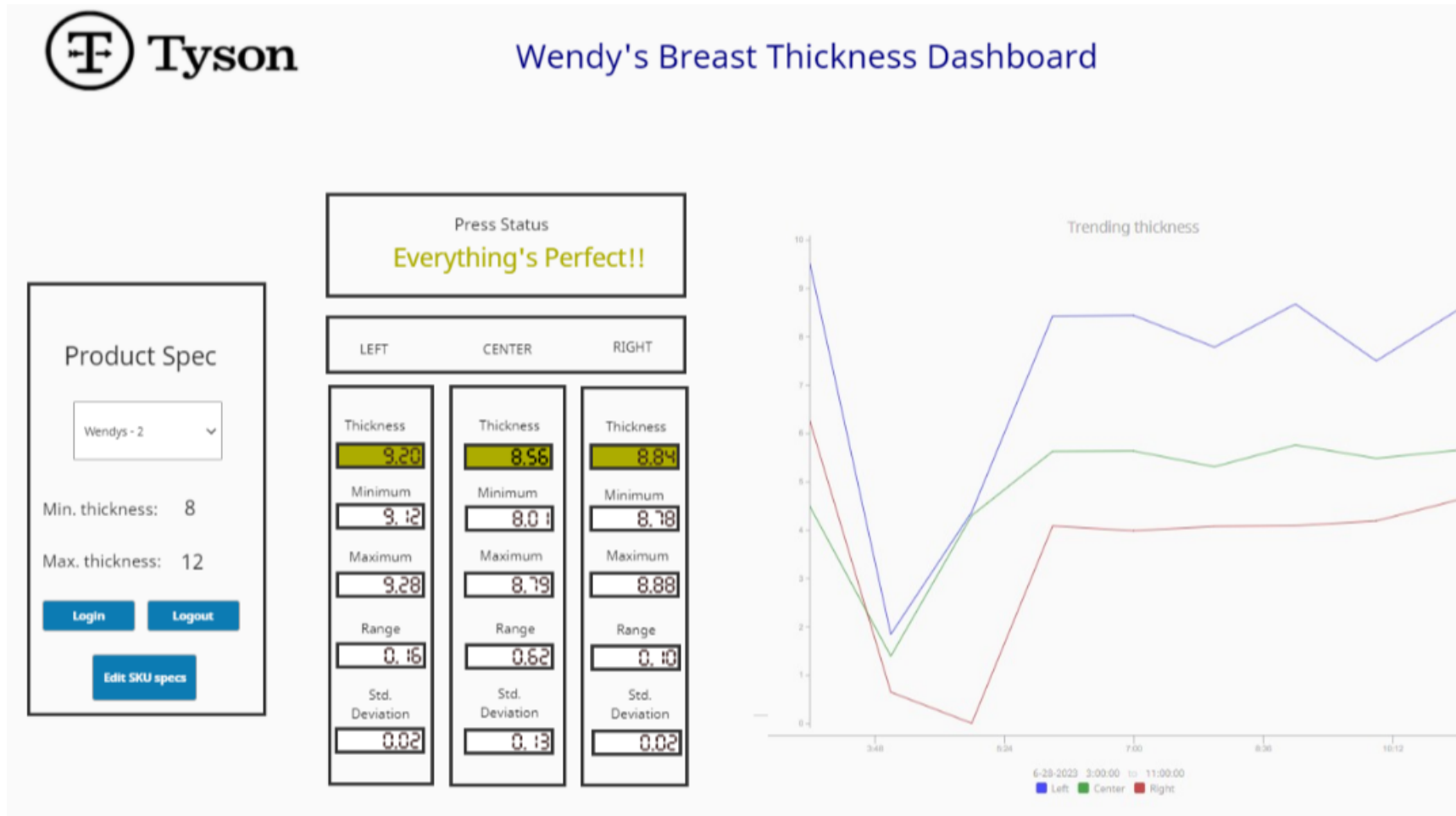
Time	Center	Left	Right	Average Thickness	Dashboard Message	
1.69E+12		8.85	6.63	10.23	8.57	Everything's Perfect!!!
1.69E+12		4.92	10.14	9.50	8.19	Everything's Perfect!!!
1.69E+12		3.40	11.14	10.24	8.26	Everything's Perfect!!!
1.69E+12		9.49	10.79	9.28	9.85	Everything's Perfect!!!
1.69E+12		9.26	8.25	7.23	8.24	Everything's Perfect!!!
1.69E+12		8.34	10.07	6.31	8.24	Everything's Perfect!!!
1.69E+12		9.60	8.44	10.25	9.43	Everything's Perfect!!!
1.69E+12		10.22	9.36	6.36	8.65	Everything's Perfect!!!
1.69E+12		3.26	6.82	3.84	4.64	<b>RED</b>
1.69E+12		7.54	8.40	8.34	8.09	Everything's Perfect!!!
1.69E+12		6.56	10.29	7.58	8.14	Everything's Perfect!!!
1.69E+12		8.95	8.46	11.84	9.75	Everything's Perfect!!!
1.69E+12		6.98	9.37	10.25	8.87	Everything's Perfect!!!
1.69E+12		6.31	15.92	5.77	9.33	Everything's Perfect!!!
1.69E+12		9.25	8.06	7.98	8.43	Everything's Perfect!!!
1.69E+12		6.58	10.56	7.54	8.23	Everything's Perfect!!!
1.69E+12		9.92	7.57	9.25	8.91	Everything's Perfect!!!
1.69E+12		5.56	13.26	6.49	8.44	Everything's Perfect!!!
1.69E+12		5.95	8.02	12.33	8.77	Everything's Perfect!!!
1.69E+12		13.2	9.65	6.24	9.70	Everything's Perfect!!!
1.69E+12		6.89	12.54	11.69	10.37	Everything's Perfect!!!
1.69E+12		7.79	14.12	5.13	9.01	Everything's Perfect!!!
1.69E+12		8.11	13.51	11.97	11.20	Everything's Perfect!!!
1.69E+12		9.74	7.89	8.18	8.60	Everything's Perfect!!!
1.69E+12		11.52	7.12	6.48	8.37	Everything's Perfect!!!
1.69E+12		6.15	8.09	5.06	6.43	<b>RED</b>
1.69E+12		7.29	9.52	11.3	9.37	Everything's Perfect!!!
1.69E+12		7.21	9.40	13.38	10.00	Everything's Perfect!!!
1.69E+12		14.32	10.88	10.34	11.85	Everything's Perfect!!!
1.69E+12		9.98	8.40	11.27	9.88	Everything's Perfect!!!
1.69E+12		5.66	15.46	6.57	9.23	Everything's Perfect!!!
1.69E+12		7.24	22.38	6.46	12.03	Everything's Perfect!!!

# Process Performance Metrics

The following key process performance metrics will be monitored on an ongoing basis:

- **Performance Metric**
  - Data Collection: Plant Supervisor, PlantView Application, Real-time basis, and Automated
  - Performance Review: Plant Manager, PlantView Application, Weekly, and Use Report

# Dashboard – MVP - Prototype





# Replication Opportunities

Replication Opportunity (Description)	Location(s)	Planned Actions	Responsible	Schedule
This solution is scalable beyond the Wendy's plants.	<ul style="list-style-type: none"><li>• Big Bird Value Added</li><li>• Prepared Foods</li><li>• Case Ready</li><li>• Small Bird Value Added</li></ul>	<ul style="list-style-type: none"><li>• N/A</li><li>• N/A</li></ul>	<ul style="list-style-type: none"><li>• N/A</li><li>• N/A</li></ul>	<ul style="list-style-type: none"><li>• N/A</li><li>• N/A</li></ul>

## Key Takeaways

Currently, annual saving from one plant where the POC is being implemented would equate to roughly \$22,000 in labor. **If implemented in other locations as mentioned above, Tyson could save potentially more than \$1 million.**

# Transition to Process Owner

Items transitioned to the Process Owner:

- Final Charter
- Analysis Summary
  - What was measured?
  - Root cause summary
- Improvements Summary
  - Revised 'To-Be' Process Map
  - Specific solutions, by root cause
  - Results from the solution
- Financial Benefits Summary
- Implementation Plan
  - Risk/Process monitoring plan
  - Response Plan
  - Process Performance Metrics
  - Implementation work plan

# Solution Transfer Plan

<b><i>Steps Required for Completion / Handoff to the Business</i></b>	<b><i>Owner</i></b>	<b><i>Scheduled Completion</i></b>
Recalibrate Gocator equipment each week because processing line is physically dismantled and reassembled after sanitation on the weekend		7/24/23
Publish a weekly work order to calibrate the Gocator every Sunday night before processing begins		7/28/23

# Lessons Learned

- The development took longer than estimated
- Team were not aware of recalibration of Gocator until late in the project