TEXAS ★ STATE
INGRAM SCHOOL OF ENGINEERING

Group 1 – Continental Senior Design Team

Ephraim Oluwasanya, Mazen Naser, Rhiannon Puckett, Matt Castro

Sponsor Names: Tyler Huebinger, Jeff Doney, Lauren Feliciano

Continental
The Future in Motion

PROBLEM STATEMENT

Collect data to reduce WS40(PCB mating station) and WS50(PCB press station) station errors. Then our team will create a teaching jig to Teach the machine at the beginning of each run, to prevent misalignment and improper joining of the PCB board into the external housing.
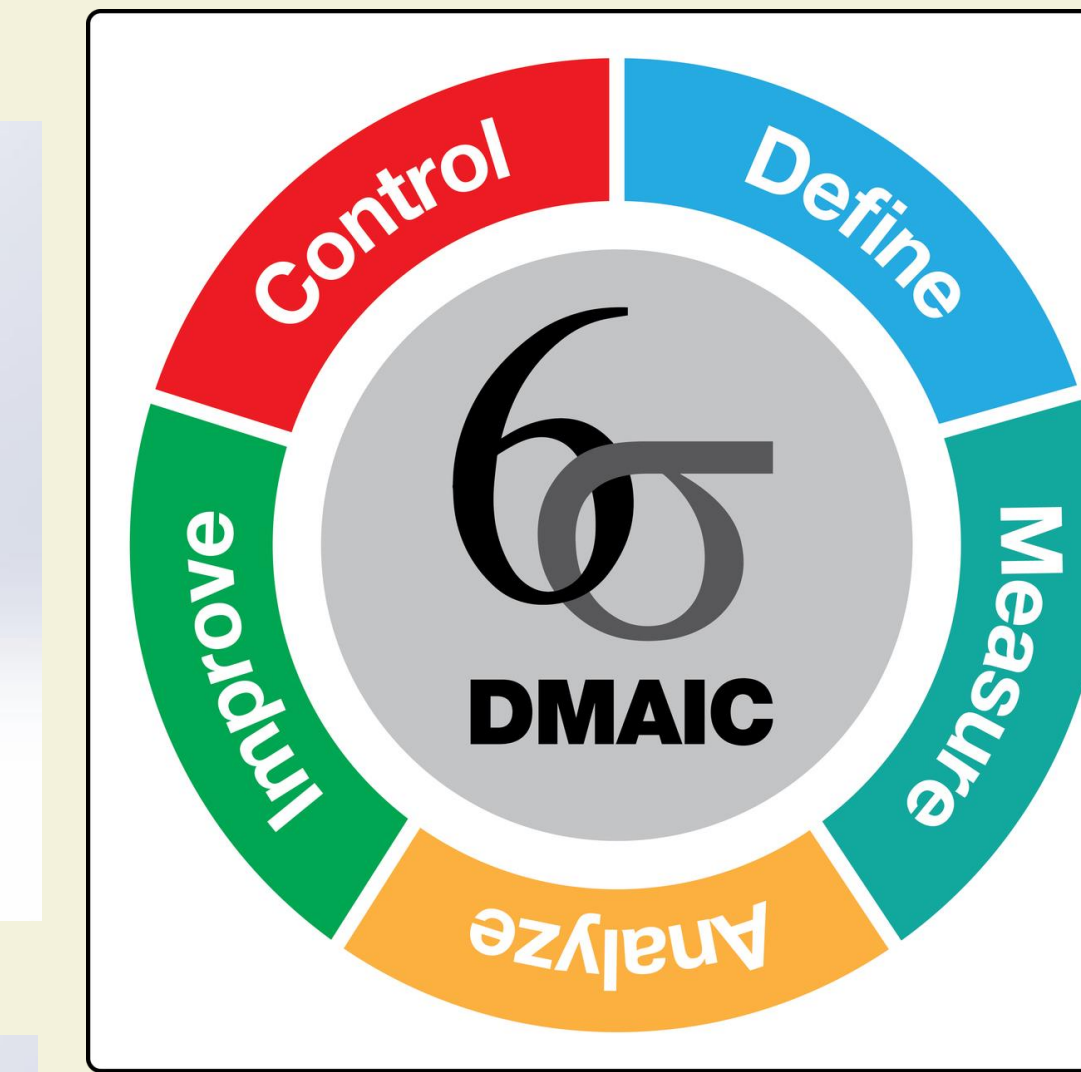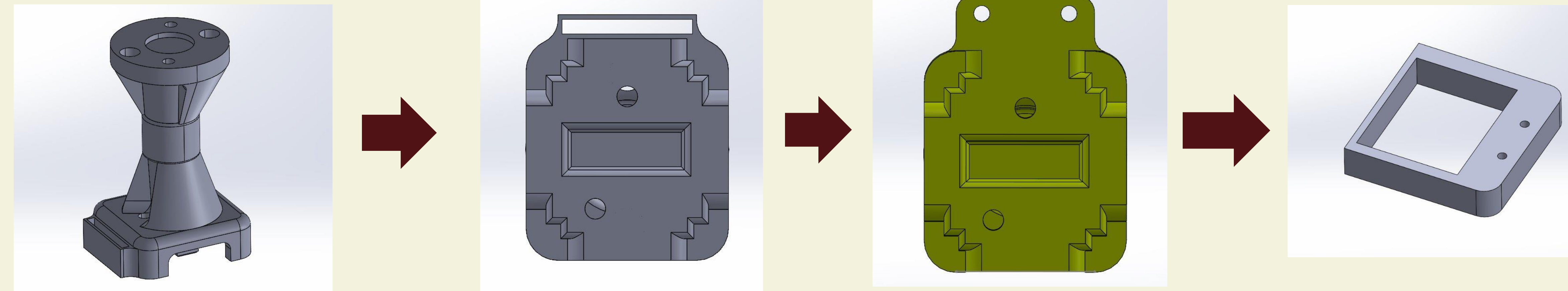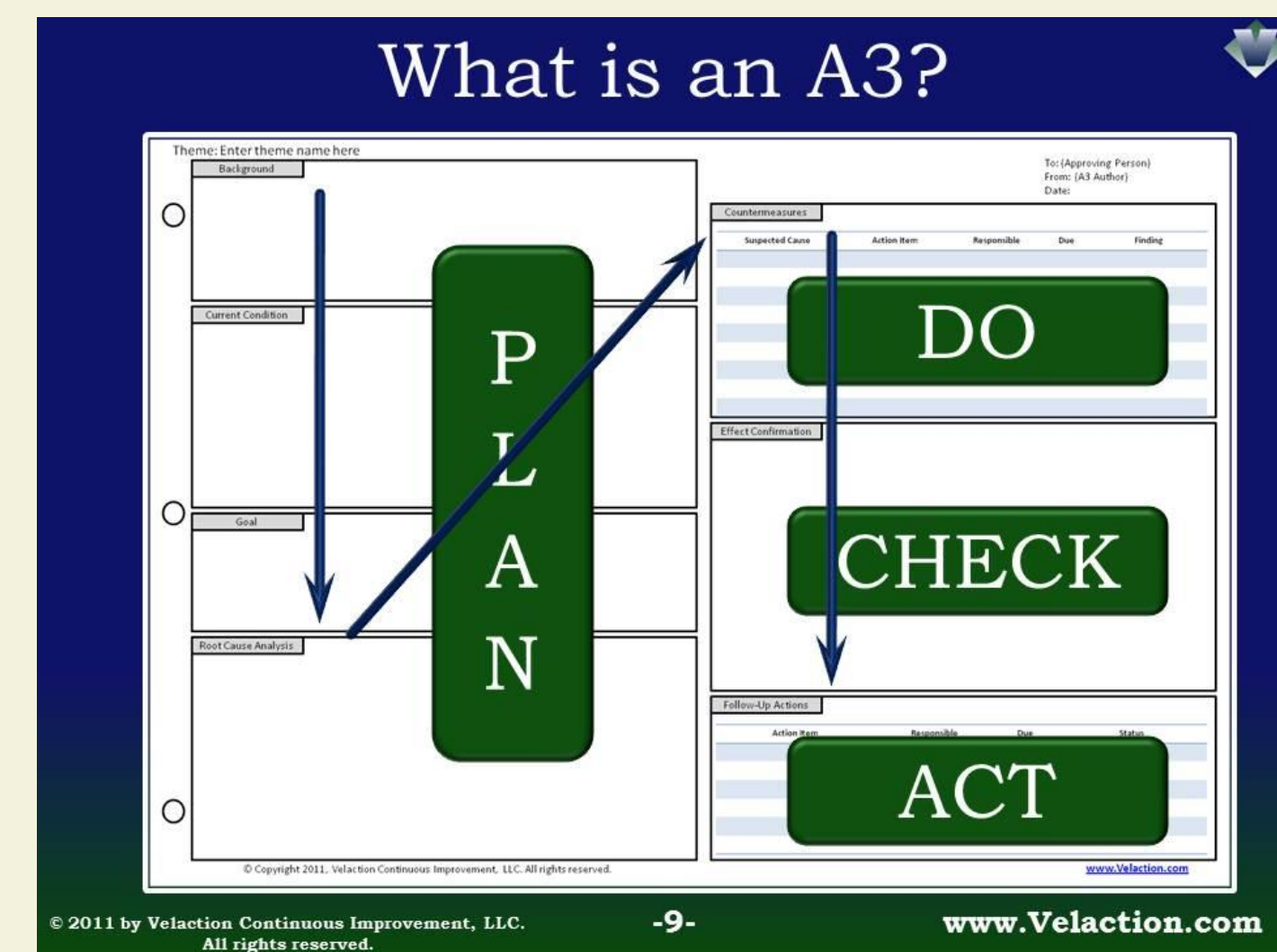
PROJECT PURPOSE

This project's purpose is to optimize the process between WS40 and WS50. We then continued to design and improve a PCB Mating Fixture and create a teaching jig for the stations at Continental. Focusing on reducing errors in mating and pressing PCBs essential for radar sensors used in autonomous vehicles. By addressing the current challenges faced in the manufacturing process, our aim is to improve efficiency, minimize failures, and enhance the overall reliability of radar sensor production.

OBJECTIVES

Design and improve a teaching jig for the machine	25%
Test the prototype design and collect the relevant data	25%
Reduce the scrap rate in the assembly process for different auto brands	15%
Save money from having to outsource labor to contractors	10%
Map errors and processes with the A3 system	5%

PROJECT SCHEDULE

Project Methodology

What is an A3?

DMAIC — Define, Measure, Analyze, Improve, Control

Cost Analysis

PARETO CHART

COST ANALYSIS

Cost center	Annual cost	Percent of total	Cumulative percent
3D Print Filament PETG	$2.26	1.23%	1.23%
3D Printer Electrical Usage per kWh	$0.88	0.48%	1.70%
FESTO Vacuum Cups	$11.26	6.11%	7.81%
Push-to-Connect Tube Fitting	$13.66	7.41%	15.22%
Brass Tapping Inserts	$2.16	1.17%	16.40%
Vacuum Generator	$147.00	79.75%	96.15%
Hi – Flex Cable	$7.10	3.85%	100.00%
Total	$184.32	100.00%	

COST CENTER
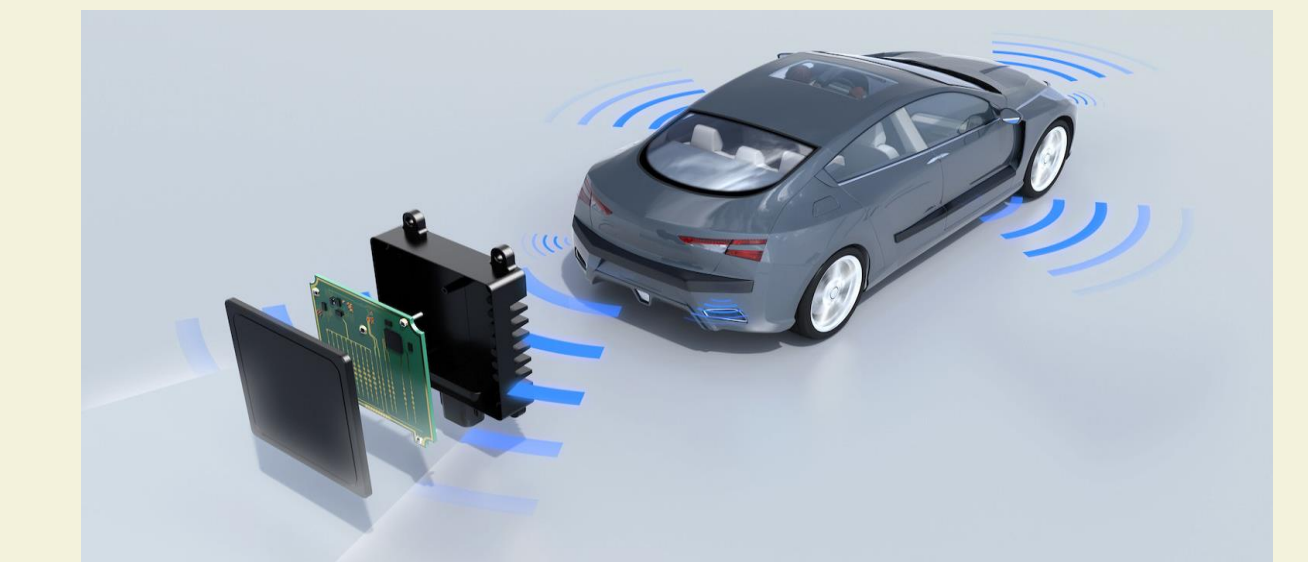

Accomplishments

Error Resolution: Identified and resolved key issues at WS40 and WS50, significantly reducing rework, waste, and costs.

Jig Redesign: Introduced micro-adjustments and visual Indicators to the teaching jig, enhancing alignment precision.

Maintenance Protocols: Established regular calibration schedules, ensuring consistent jig reliability and performance.

FUTURE WORK

- The inclusion of an interchangeable piece to allow for removal of jig piece when mating begins,
- Adding ability to install better innovations later
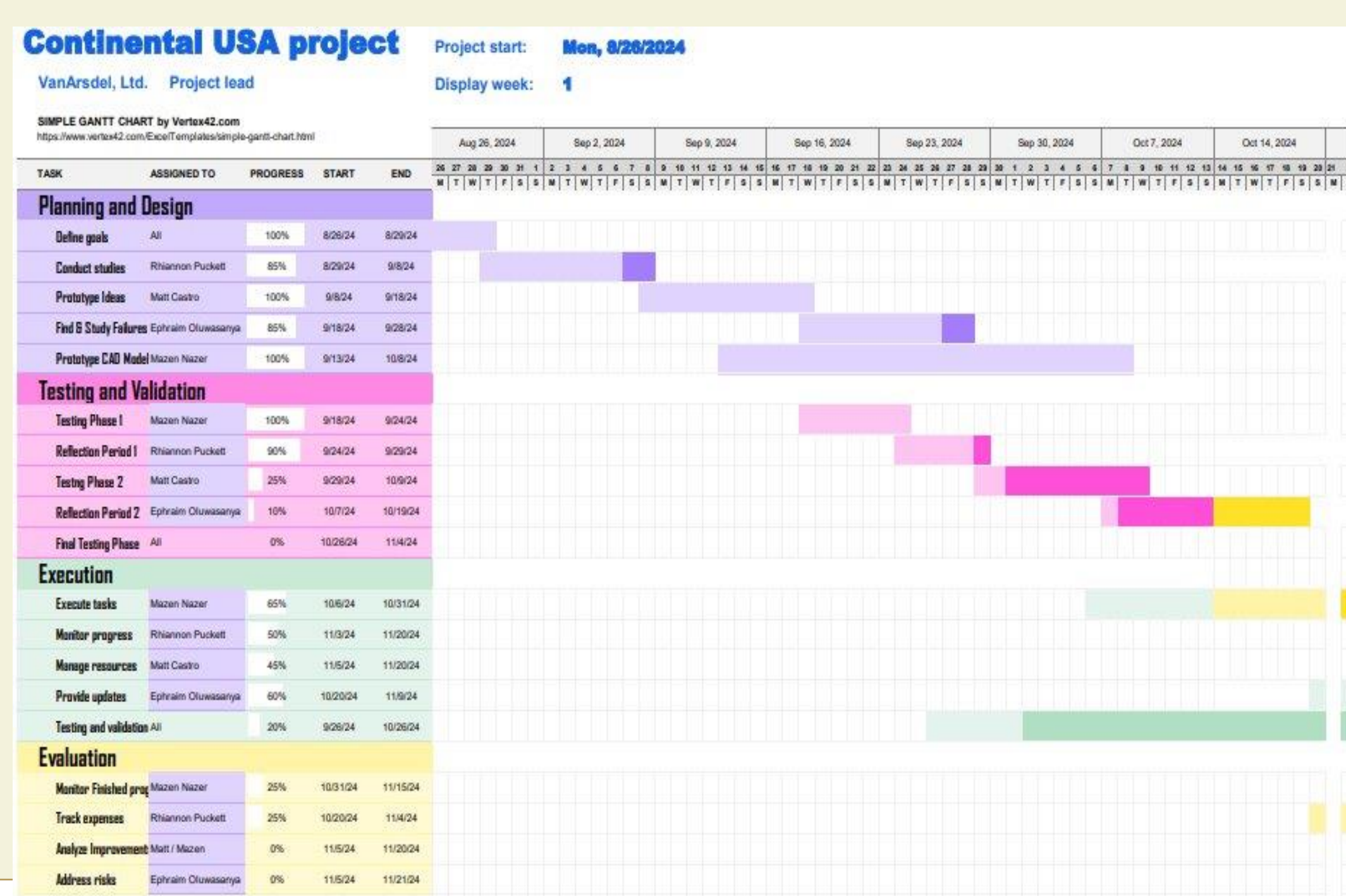- Adding sensors to notify operators of an misalignments

Group members

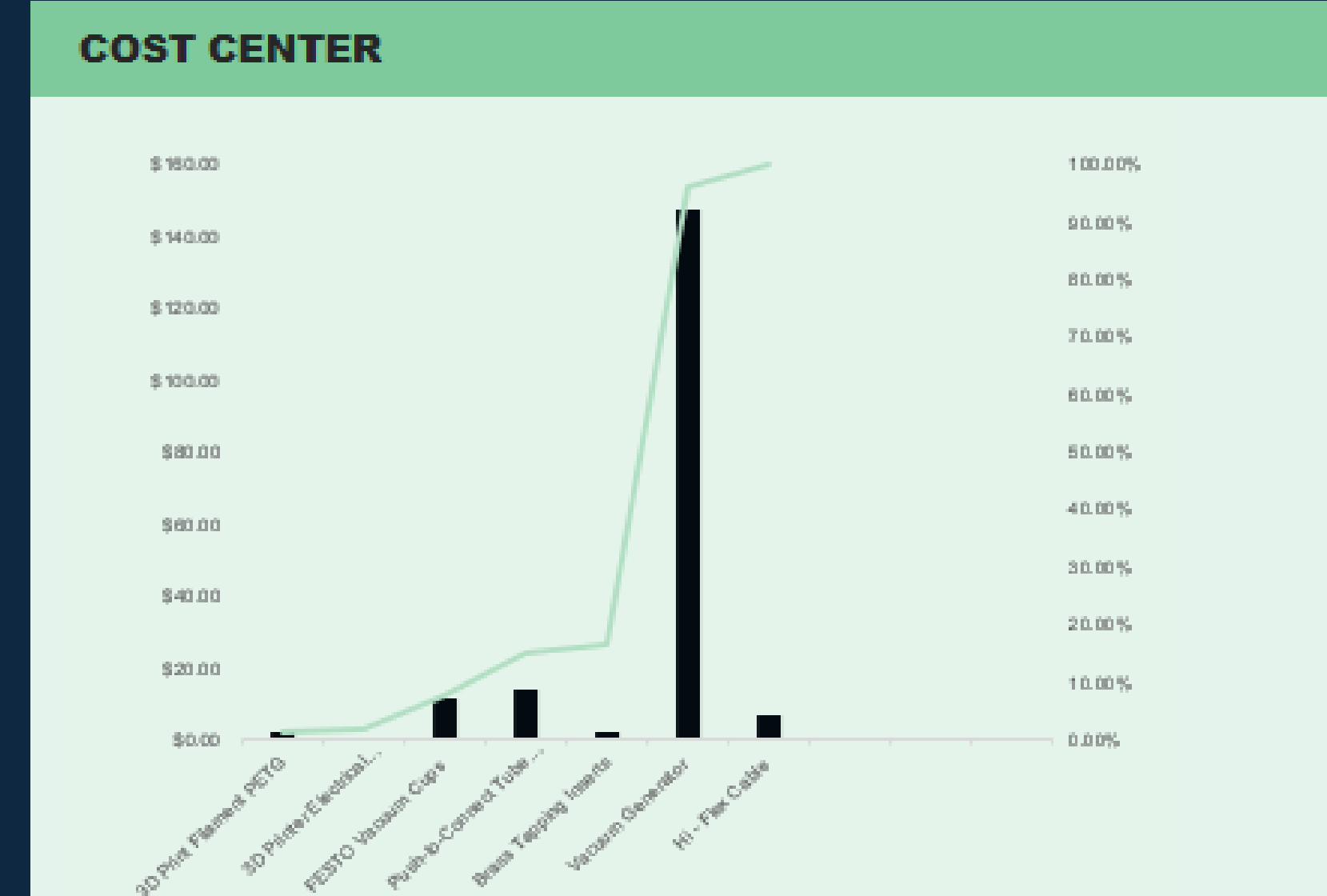Matt Castro, Mazen Naser, Ephraim Oluwasanya, Rhiannon Puckett

SPONSOR / FACULTY

Thank you to our sponsor and faculty for your unwavering support, guidance, and encouragement in making this project successful.

- Sponsor: Tyler Hubinger, Jeff Doney, Lauren Feliciano
- Instructor: Dr. Gerardo Trevino-Garza