Industry
Small & Medium Sized Manufacturer

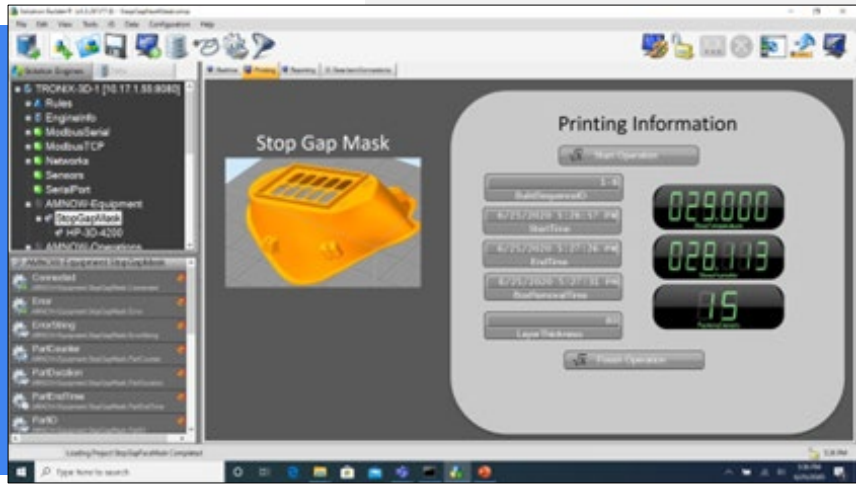
Technologies
Data Analytics

Solutions
Operational Efficiency

CESMII
THE SMART MANUFACTURING INSTITUTE

PROJECT CASE STUDY

Improving Small & Medium Manufacturer Productivity with IoT Driven Smart Manufacturing



PROJECT LEAD

Advanced Manufacturing Int'l.

PROJECT TEAM

Highwood; Polysciences; LECS Energy; National Center for Defense Manufacturing and Machining (NCDMM); Delaware Valley Industrial Resource Center (DVIRC); Manufacturers Resource Center (MRC); TechSolve

PROJECT OBJECTIVE

Demonstrate how a low cost, open standard, and secure IoT platform can enable small manufacturers to adopt smart manuafcturing technology. Smart manufacturing technologies will measure real time data to maximize throughput and quality.

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Implementing Smart Manufacturing Technologies Result in a 50% Improvement in Equipment Utilization for Small Manufacturers

BENEFITS TO OUR NATION

In 2022, manufacturers contributed $2.9 trillion (or 11%) to the $25.5 trillion US gross domestic product. 75% of all manufacturers have fewer than 20 employees. Technologies developed specifically for small manufacturers will have an impact on American economic activity generally. Marginal improvements in operational efficiency will contribute billions of dollars annually to the US economy.

BENEFITS TO INDUSTRY

Highwood USA is a small business that manufactures outdoor furniture that partnered with Advanced Manufacturing International (AMI) on this project. Successful implementation of smart manufacturing tools will result in a 50% increase in CNC machine utilization rates at Highwood. This will yield additional revenues of $200,000 per year for this small manufacturer. If smart manufacturing tools are implemented at all 13,000 US small manufacturers of furniture, the industry could enjoy hundreds of millions of dollars of additional revenue annually.

PROJECT DESCRIPTION

TECHNICAL APPROACH

Implement an open-standards based IoT edge gateway to provide productivity analytics directly to the plant floor. Leverage smart manufacturing profiles, MT Connect adapters and the CESMII Smart Manufacturing Innovation Platform (SMIP) to transfer that data to the cloud platform to bring real time visibility and improved decision making to manufacturing management. Create smart manufacturing profiles for IoT devices and manufacturing equipment.

ACCOMPLISHMENTS

- Developed and implemented plant floor operations dashboards for all industrial partners that participated in the project. The dashboards enabled production personnel to track key production metrics such as Overall Equipment Effectiveness (OEE) and other performance measurements.
- Trained plant floor personnel on configuring dashboards to visualize production data specific to their particular operational needs.

DELIVERABLES

- Demonstration of the Low Investment Manufacturing System (LIMS) IoT platform and associated dashboards for tube filling processes at Polysciences.
- Demonstration of the LIMS IoT platform and associated dashboards for CNC machines at Highwood USA.
- Developed and demonstrated a CESMII SMIP profile for the LIMS IoT device.
- Delivered source code and hardware schematics for all technologies developed during project execution.

REUSABLE OUTCOMES / SM MARKETPLACE

- LIMS IoT Device Profile
- CNC Machine Profile
- Tube Filling Machine Profile
- MTConnect Custom Edge Adapter

RESULTS

↑ $15k/yr

Demonstrated a 5% yield increase worth $15k/yr at Highwood USA through improved OEE.

↑ 5%

Demonstrated a 5% energy savings per production line at Highwood USA when smart manufacturing tools were implemented.

↑$10k/yr

Demonstrated a 10% downtime reduction worth $10k/yr per production line at Highwood USA when SM tools were implemented.

PROJECT DETAIL
Budget Period: BP5
Submission Date: 09/30/2022
Sub-Award (contract) Number:
4550 G ZA039
SOPO: 2340

Insert Acknowledgements

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