Design and Development of an Advanced Measurement System for Manufacturing Process Improvement

Final Report

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Executive Summary

Based out of Fort Wayne, Indiana, CYZ LLC is an innovative designer and manufacturer of thermal and climate systems, including heating, cooling, sensors and controls. XYZ has been named Indiana's Small Business Exporter of the Year. They offer a wide array of both standard and custom products in heating, cooling and sensing, utilizing a worldwide set of design and supply partners. They are ISO9001:2008 registered and carry UL component recognition on the majority of their products.

Under the Purdue IN-MAC program, this IN-MAC project, was awarded on Dec. 6, 2017, for Purdue Principal Investigator, Paul Lin, Professor of ECET, to provide engineering design, development, and technical training services for **XYZ LLC** in support of the project entitled "Design and Development of an Advanced Measurement System (AMS) for Manufacturing Process Improvement."

The XYZ LLC desired Advanced Measurement System (AMS) objectives are as following:

(a) Enable automated resistance measurement and leakage current measurement of heater elements, and data logging in the manufacturing floor;

(b) Integrated tracking solution using Bar Code scanners for work in process (WIP) to improve part tracking, cost saving, streamline operations and quality control;

(c) Statistical process control and process capability index trending capabilities for tracking how closely the manufacturing process is able to produce the output to its overall specifications;

(d) Add a manufacturing database that allows for instant access to up-to-date logged measurement data, database reporting and charting.

The performed seven project tasks include: (1) Analyze the XYZ LLC desired Advanced Measurement System (AMS), (2) Conduct conceptual and preliminary design, (3) Conduct detailed AMS system and subsystem design, (4) AMS Subsystem Testing and Software Development, (5) AMS System Integration and Testing, (6) AMS System Final Testing and Debugging, and (7) Documentation and Reporting - Final Project Report.

The deliverables of this project include the following seven reports:

- AMS system analysis report, delivered January 6, 2017
- AMS system preliminary design report, delivered January 12, 2017
- AMS system design report, delivered March 1, 2017
- AMS subsystems testing and software development report, delivered April 28, 2017
- AMS system integration and testing report, delivered May 11, 2017
- AMS final testing report, delivered May 19, 2017
- AMS final project report, delivered May 23, 2017