Case Study

CAD/CAM APPLICATION WITHIN PRODUCTION DIGITALIZATION FOR INDUSTRY 4.0

Keywords: *CAD/CAM, Digital Manufacturing, Digital Twin, PDM, ERP*

Background to Case Study

CAD/CAM (Computer-Aided Design / Computer-Aided Manufacturing) is the use of computer software to design and manufacture prototypes, products and production runs. CAD/CAM is an essential technology of Industry 4.0 implementation in SMEs from the manufacturing sector because it allows information transfer between various actors, including the CNC machines. In addition, it allows for off-line simulation and validation of products and processes which in turn reduces the rework and errors and decreases time and costs related with commissioning and onsite installation.

This case study presents a SME that leverages CAD/CAM in order to increase its capabilities and become more competitive.

Introduction to the Case Study and it's growth within Industry 4.0.

IP Automation Design (IPAD) is a Romanian SME that designs and manufactures equipment and machinery. In order to increase its capabilities, IPAD implemented an end-to-end digital manufacturing solution based on CAD/CAM solutions and covering all relevant processes, from request for quotation to maintenance, including design, analysis, manufacturing, documentation and delivery.

This enabled the company to increase efficiency and productivity as well as to reduce costs and time-to-market.

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The Case Study and Industry 4.0 Elements: A Pictorial Overview

Image source: IP Automation Design

The digital manufacturing solution implemented by IPAD consists of CAD/CAM software integrated with Product Data Management (PDM) and Enterprise Resource Planning (ERP) systems, as depicted in the figure below.

The digital manufacturing solution. Image source: Ludor Engineering

The application of CAD/CAM supports the growth of the SME under study by allowing it to simulate and validate the digital twin of their products and processes which led to a decrease in commissioning time as well as in the costs related with onsite installation. In addition, the SME was able to reduce errors and rework, tanks to the integration of CAD/CAM with Product Data Management and Enterprise Resource Planning systems. Least but not last, IPAD was able to procure more complex projects from its existing customers as a result of these improvements.

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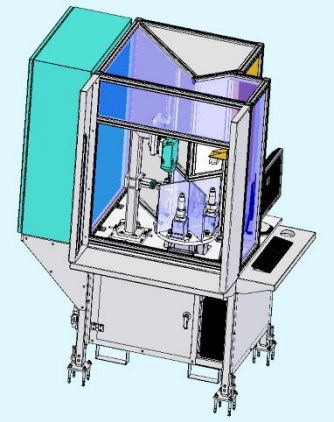
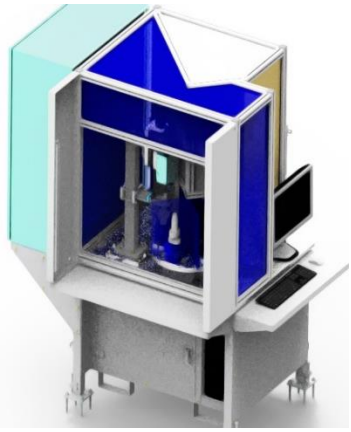
The Element Explored within Industry 4.0 Application.   *Images source: IP Automation Design*	*IPAD, as many manufacturing companies, started by using their CAD/CAM software for design, simulations and manufacture of their products and production runs. However, as the company moved toward the new industrial revolution, the next step was to implement a higher digital integration.* *The integrated CAD/CAM software ensure seamless flow of data between design and machining departments. In addition, the digital manufacturing solution created around CAD/CAM provides vital information continuous data access for other departments allowing for traceability, cost-analysis, post-project performance analysis, etc.* *The integration of CAD/CAM with PLM and ERP systems enables IPAD to simulate and validate the digital twin of products and processes. As a result, the time needed for on-site installation and commissioning of the manufactured equipment is reduced, as are the related costs. Also, there are less errors and rework in the design and manufacturing processes.*
Application Target Audience	*The results of the case-study are intended for use by SMEs and entrepreneur subjects.*
Resources Used:	*https://www.plm.automation.siemens.com/pub/case-studies/69926?resourceId=69926* *https://youtu.be/wpnyUIXGhwg* *http://ipad.ro/*
Further Reading:	*https://www.plm.automation.siemens.com/global/en/our-story/glossary/digital-manufacturing/13157* *https://www.pwc.de/de/digitale-transformation/digital-factories-2020-shaping-the-future-of-manufacturing.pdf*

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