



Projektowanie  
i Doradztwo  
Techniczne

# PiDT optimizes palletizer for Raben

## Innovation Tailored To Customer Needs: From Generative Design To 3D printing

### COMPANY

Projektowanie i Doradztwo  
Techniczne – PiDT Engineering

### LOCATION

Jasin, Poland

### SOFTWARE

Autodesk Inventor®  
Inventor Nastran®  
Autodesk Fusion 360®  
Autodesk Generative Design®  
AutoCAD®  
Voronoid Sketch Generator®



Photo courtesy of PiDT – palletizer

### INTRO

PiDT, a Polish company founded in 2008, specializes in end-of-line solutions and the robotization of production processes. Initially focused on distributing packaging machines, PiDT gradually shifted towards designing customized solutions for the imported machinery. Over the years, the company has grown into a team of a dozen automation engineers and designers. PiDT develops and implements complex robotics solutions, as well as modernizes and optimizes existing workstations and production lines.

In 2021 PiDT joined forces with the iPS Team—an integrator with a 25-year history. The iPS Team represents complementary brands across various sectors and industries. Each brand within the iPS structure operates autonomously, developing its unique core competencies. In specific collaborations, these brands combine their expertise to serve customers effectively. As part of the iPS Team, PiDT specializes in building special machinery and process lines, primarily for the food, logistics, and automotive sectors.

Since its inception, PiDT has utilized Autodesk software for design.

**Our success is based on a high-caliber team and innovative Autodesk solutions. These tools empower less experienced designers to leverage their skills and inspire innovative ideas, while seasoned designers**

**can tap into the software's full potential – says Krzysztof Pustkowiak, PiDT CEO.**

The company's consistency, innovation, and flexibility enable undertaking large-scale projects for multinational corporations. **One of such project involves Raben**, a company engaged in logistics, warehousing, transportation, freight forwarding, and fresh produce logistics.

### CHALLENGE

PiDT had previously designed and manufactured a palletizer for Raben—the device weighing 66 kg and having a load capacity of 120 kg. Over time Raben's subsequent locations required a new, more versatile, and space-saving machine. Once again, PiDT was commissioned to design a new palletizer.

The challenge from Raben extended beyond the typical packaging line. Unlike in the case of classical manufacturing companies with a limited assortment of packaged products, Raben's offerings change daily. To meet this diversity, the production line needed flexibility in both – packaging capabilities and warehouse logistics. The robot working on this line had to manage packages of varying sizes, weights, and shapes. Additionally, its gripper needed sufficient top pressure to prevent jars or bottles from falling out of tray-covered packages. The robot also had to be lightweight and easily

positioned on a reconfigurable frame. User-friendly operation for the packaging line crew was another critical criterion.

The new palletizer had to be not only **smaller and more versatile** but also required **dedicated software**. The software had to allow operators to independently program the palletizer, adapting it to the dynamic tasks of daily operations.

**At PiDT we always try to give the customer added value, something from ourselves that will set us apart from the competition. Most often it is innovation and flexibility. In Raben's case, we designed a smaller and lighter device, saved space, and gained new functionality – emphasizes Krzysztof Pustkowiak.**

Autodesk, market standard that facilitates seamless collaboration with clients by providing all the essential elements necessary for our work. With a team possessing specialized technical knowledge and access to Autodesk programs, you can transform your concepts into optimal designs tailored to each customer. Throughout the product development and its life cycle, you can leverage the tools that Autodesk offers.

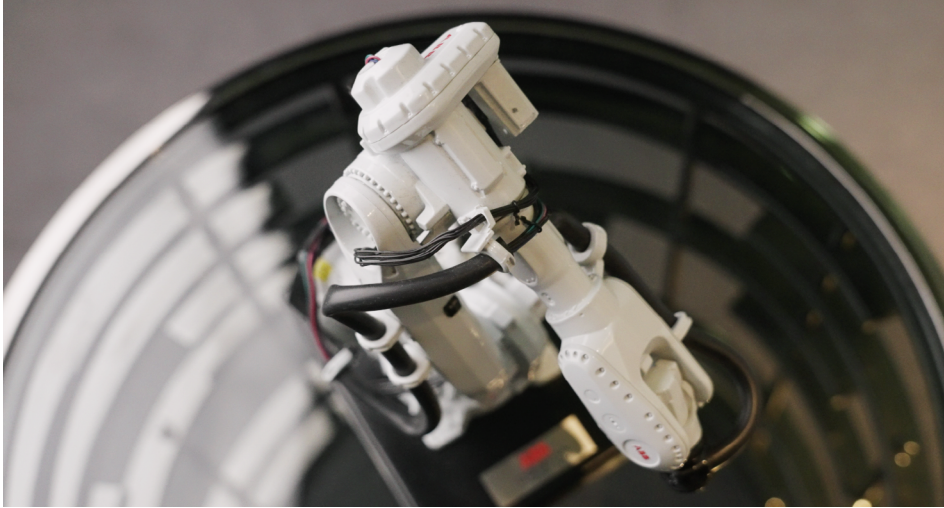


Photo courtesy of PiDT - model of a robot

## SOLUTION

Executing the Raben project PiDT utilized Autodesk® Inventor®, Autodesk® Fusion 360® and Autodesk® Generative Design®.

In response to Raben's requirements, PiTD developed a new, smaller robot equipped with an innovative gripper capable of lifting 45 kg. **By modeling the device parameters during the design stage using Autodesk Fusion 360® with Generative Design®** technology, PiTD optimized the weight of the machine from 66 kg to just 23 kg. This 30-40 kg weight reduction significantly improved the overall design, and the sleeker frame facilitated easier integration. As a result, Raben required less shop floor space, allowing for the installation of additional devices. **AutoCAD tools enabled PiTD to test the reach of the robotic arm and fine-tune its height settings.**

From Raben's perspective, a critical aspect of the project was developing a unique clamping device. This component ensured that transported goods (such as coffee jars) gripped from above would remain secure. Designed using **Autodesk Inventor® and Autodesk Generative Design®**, this lightweight detail resembles a human bone. It was manufactured using **3D printing technology**. In the Autodesk Generative Design®, the designer specified guidelines for the final clamp shape, including screw and connection locations and maximum weight. The program then presented various 3D shapes that met the specified criteria.

**Our design process commenced in Autodesk Inventor®, a tool that enables accurate calculations. Gradually, we were honing the design by simulating the clamping behavior, considering the evolving requirements of the packaging line. The designer then meticulously examined and enhanced the**

**model, assessing its movements and behavior within the packing line context – stresses Krzysztof Pustkowiak, PiDT.**

Additionally, during the design phase, PiDT prioritized versatility. The new **solution needed to empower operators to independently program the robot**, adapting to daily needs such as adjusting pallet placement or modifying arm trajectories.

Thanks to the judicious use of Autodesk products, even during the offer preparation stage, you can verify and recalculate the specified device parameters. Based on this analysis, you can provide improved offers and effectively demonstrate to customers our proposed solutions.

## RESULTS

**By skillfully utilizing Autodesk programs and 3D technology**, PiDT successfully

prepared customized quotations and presented solutions during the quotation stage. In the case of the Raben project, early testing of the robot's trajectory was particularly crucial during the conceptual phase.

**Within Autodesk solutions, we appreciate the documentation quality and its applicability at every project stage. This includes visualizations for quotations, technical designs that account for task distribution among specific constructors and optimizing documentation cataloging for completed projects (to facilitate subsequent maintenance) – explains Krzysztof Pustkowiak.**

From quotation to production, Autodesk tools support the company. They enable effortless modeling of diverse shapes, rapid detailing of intricate components, and material selection. Notably, prototyping and detailing come at a reasonable cost. For PiDT, the ease of working with Autodesk programs and their inherent flexibility are paramount.

**The Autodesk Generative Design® solution significantly reduced engineering time, allowing us to complete the project more efficiently. This efficiency boost directly enhances our competitiveness. The Raben project now stands as an excellent reference for our small company, even when serving large corporate clients – sums up Krzysztof Pustkowiak.**

Autodesk tools empower you to offer solutions, expand your portfolio, and prepare flexible, well-informed offerings. This flexibility, innovation, and customer-centric approach build your competitive advantage.

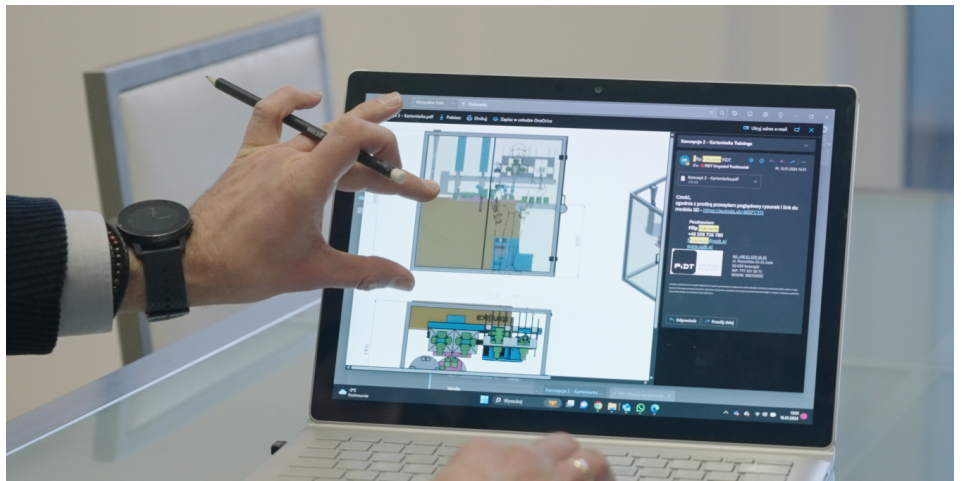


Photo courtesy of PiDT - palletizer designing