

# Cost-effective, customized functional prototypes



*“Compared to the traditional aluminum fingers that which were very costly and took about 5 weeks for each iteration, the 3D printed designs cost almost nothing and took about an hour to create. Sometimes, I don’t even need tooling; and can use the 3D print as an end-use part.”*

— Guillaume Pradels,  
YuMi Product Manager at ABB Robotics

With 3D printing, ABB Robotics can minimize risk in the development process by proving the viability of a design before investing in an expensive tool. This shrinks the development process from months to days.



**Company**  
ABB Robotics

**Industry**  
Industrial automation

**Challenge**  
Reduce design validation times and rapid prototype robot parts without exceeding budget. Test iterations to establish the best fit for the final part.

**Solution**  
Use 3D printing to prototype and test multiple design concepts in-house at minimal cost.

**Results**

- Reduced prototyping and production times
- Increased iterations
- Reduced costs
- Increased flexibility

## ABB Robotics - Introduction

ABB Robotics is a global leader in power and automation technologies, developing industrial robots for use within the automotive, electronics and manufacturing industry. Improving productivity while minimizing environmental impact is a top priority; and innovation is a key driver in their business model. As a result, prototyping plays a vital role in their production process.

3D printing enables the company to make assembly tools and R&D aids that greatly improve efficiency. This couldn’t be achieved otherwise, due to the prohibitively high costs and extended timelines associated with traditional methods.

Using 3D printed prototypes, ABB Robotics can test out different iterations of the same model, comparing them side by side until they establish the best fit and appearance for the final manufactured part. This saves considerable time and money throughout all processes - from initial design to final production. The reliability and ease of the process allows 3D printing to take place while the team works on other tasks.

### Challenge

YuMi is a collaborative industrial robot dedicated to small parts assembly. It is designed to grab, pick and place parts, and perform insertions. Depending on the part, YuMi utilizes different finger shapes that require multiple prototypes to perfect. Previously, prototype finger design was carried out in-house and the prototypes were manufactured externally. This process required considerable time and money (one month waiting for parts and approximately €1,800 for four parts), so Guillaume started searching for an alternative approach. At that time, the team was using traditional metal prototypes and uncomfortable with the idea of replacing them with plastic prototypes.

### Solution

When ABB Robotics incorporated 3D printing in their workflow, they achieved dramatic improvements. Engineering took between one and four hours per finger, with an average cost of €300 – a marked reduction from the original cost and time. It also improved productivity. Now, they use previously designed fingers or design new ones and print them on the same day. Simple. It’s no longer a problem if the designs aren’t perfect. Iterations are easy, cheap and quick.

### Results

Guillaume reports that: “As new designs can now be printed from a desktop without having to pass all the stages of ordering and delivering, we save a lot of time and money. We can do a lot more tests and feasibility studies that we wouldn’t be able to do without the 3D printing solution.” The traditional method cost the company around €80,000; and the slow engineering times drastically reduced the number of tests, not to mention the potential number of sales. With 3D printing, ABB Robotics can now do around one test per week. This is over 50 tests per year at a cost of €15,000. Overall, the company estimates that they now save approximately €100,000 by purchasing just one Ultimaker 3D printer.

### Costs

New designs now bypass all traditional stages of ordering and delivery, saving money and time in the process. The reliability and consistency of the print quality means there’s very little waste. Greater flexibility enables the team to innovate more freely and this boosts company profits.



Different finger shapes require multiple design iterations



With 3D printing, ABB performs multiple feasibility tests for each design concept



New designs are printed quickly and cost-effectively, allowing higher responsiveness towards customers’ needs

	External suppliers	Ultimaker 3D printers
<b>Time/part</b>	2-4 weeks	1-4 hours
<b>Cost/part*</b>	€450	€75
<b>Feasibility tests/month</b>	1	5-6

\*Including engineering time, the 3D printing material cost is negligible (€1).

### About Ultimaker

Since 2011, Ultimaker has grown to become a leading brand, creating accessible, professional desktop 3D printers. The company has offices in the Netherlands, New York and Boston, with production facilities in both the U.S. and Europe. With a growing team of over 200 employees, plus over 24,000 active community members, Ultimaker strives to deliver the highest-quality 3D printers, software and materials, without compromise.

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