

# Mechatronic leverages HP's 3D Printing technology to build better parts at a lower cost



HP Multi Jet Fusion technology helps **Mechatronic** develop better-performing parts with more aesthetic appeal, a lighter weight, and at a lower price.

Rotor before redesign



Rotors redesigned and 3D printed with HP Multi Jet Fusion technology



## Introduction

*“Mechatronic’s core business is the design and construction of machines for industrial painting plants,” says Mechatronic CEO Luigi Volontè. “We make some of our machines in large quantities, but we specialize in customized applications, ranging from one to about 50 machines per year. Therefore, our main strength lies in our ability to adapt our products to customers’ requests.”*

Mechatronics is defined as the branch of **automation engineering** that studies the interaction between three disciplines (mechanics, electronics, and computer science) in order to automate production systems and simplify human work.

Mechatronic S.r.l. is an industrial automation company headquartered in Castello di Brianza in the Province of Lecco,

Italy. The company has more than **20 years of experience** working with customers in different markets and providing solutions in several areas including home automation, robotics, and process control.

One of Mechatronic’s core customers is a global leader in the industrial painting sector to whom Mechatronic provides customized machines that are uniquely tailored to specific requirements. The customer then resells these machines to their clients.

The industry is highly competitive, so to maintain its 20-year relationship with such an important client, Mechatronic consistently leverages technology to provide **innovative solutions**.

- **Industry**

Industrial equipment

- **Sector**

Industrial equipment

- **Objective**

To use 3D printing to create prototypes and final production parts for industrial paint machines.

- **Approach**

Evaluate the characteristics of HP’s Multi Jet Fusion technology to determine if its **mechanical properties can meet Mechatronic’s requirements for quality**. Also, compare the speed and cost with other production methods and, if superior, begin to use HP’s 3D Printing technology to produce prototypes and end-use parts.

- **Technology | Solution**

HP Multi Jet Fusion technology, HP Jet Fusion 3D Printing Solution

- **Material**

HP 3D HR PA 12

## Challenge

*“Our customers are very demanding,” says Volontè. “If we weren’t able to meet their standards and requirements, they would have companies lining up to take our place.”*

**Producing highly customized industrial equipment** in small batches can be difficult because many traditional manufacturing techniques aren’t cost effective.

One component that Mechatronic manufactures is a touchscreen control panel. The flange that surrounds the panel was formerly CNC Machined from metal, modified by hand, and assembled with screws. Eventually, Mechatronic’s customers became dissatisfied with its appearance.

In another instance, challenges were more utilitarian. Mechatronic produces the world’s only industrial painting machine that automatically sieves the painting powder and cleans the basket where the powder is stored.

Until recently, the metal housing included three legs with rubber buffers and an impeller made from plastic. In addition to being expensive to produce and assemble, the part was also prone to failure. If one of the metal screws that held the parts together loosened, it would cause the other screws to fail and break the entire structure.

In still another example, Mechatronic’s painting machine featured a device to **automatically clean the paint powder basket** and remove any trace of powder from the previous job.

The design and size of the hole direction were very important because they drive the rotation of the device, and the placement of the holes determined how well the device cleaned the basket, the sieving structure (mentioned above), and the sieve itself.

Among the many issues with a CNC Machined part, Mechatronic realized that:

- It was impossible to make all the holes that the part needed.
- Since the metal pipes were the same dimensions everywhere on the device, holes far from the inlet nozzle received less air than holes closer to the nozzle, and therefore cleaning capacity was partially compromised.
- The balance of the device was compromised and rotation wasn’t perfect.
- CNC was prohibitively expensive as each hole needed to be programmed into the machine separately.
- Two suppliers were needed to manufacture and assemble the part.
- Quality was suspect because some of the holes would close during an assembly welding process.

## Solution

*“We’ve been experimenting with 3D printing for over three years and have actually built extrusion-based systems for our clients,” says Volontè. “In a short time, we were able to produce prototypes optimized for HP’s Multi Jet Fusion, and then produce final parts using the exact same technology.”*

When they compared HP Multi Jet Fusion technology with CNC Machined plastic parts, Mechatronic engineers found that the quality was equivalent or better and that the design freedom possible with HP’s 3D Printing technology allowed them to nearly **match the mechanical characteristics of CNC Machined metal parts**.

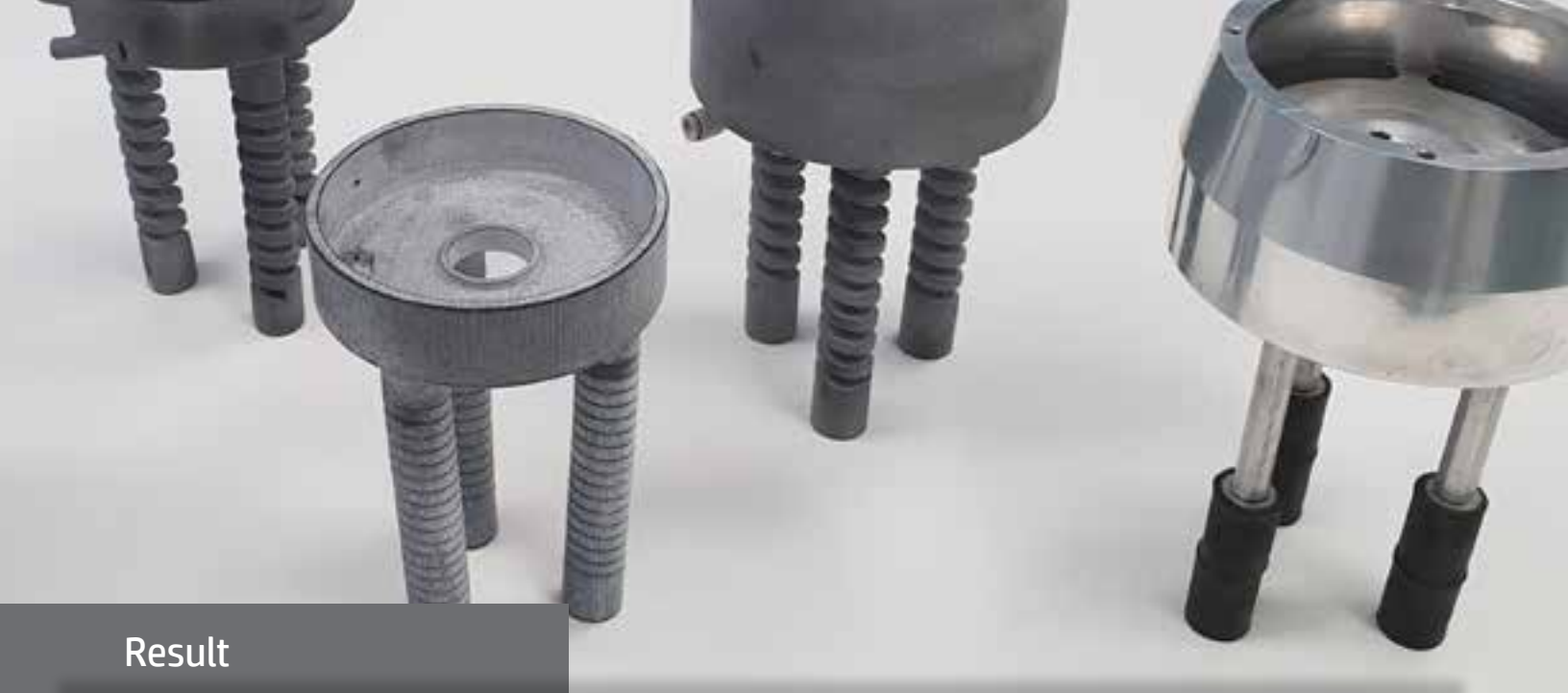
*“When CNC Machining metal parts, we’ve found that the more complicated the geometry, the more expensive the part,” says Volontè. “Therefore, we tended to work with simple, suboptimal geometries that were ‘good enough’ for the job. With HP Multi Jet Fusion, we simply don’t need to compromise on quality.”*

In early 2018, Mechatronic purchased its HP Jet Fusion 3D 4200 Printing Solution. One of the first applications they transferred was the touchscreen flange, which they could 3D print for their 7-inch and 9-inch touchscreens.

Mechatronic also could completely reinvent their sieve structure by making it almost entirely plastic, with only metal ball bearings to reduce friction during impeller rotation. The new sieve structure features spiral-shaped legs, which better support the sieve’s weight and absorb vibrations. The new design better **facilitates the cleaning process**, while the lightened weight allows for lower air pressure, **reducing energy cost**.

The new design of Mechatronic’s paint powder cleaning device was manufactured from HP 3D HR PA 12 using HP Multi Jet Fusion technology and offers several advantages, including:

- A barycenter that is perfectly aligned with the rotation axis to prevent imbalance during operation.
- An internal structure that is wider at the top and narrower at the bottom for homogeneous airflow distribution.
- An additional hole below the intake nozzle to clean the sieve, which was impossible previously.
- A decreased weight, which, when combined with the perfect balance on the rotation axis, reduces the amount of energy required.



## Result

*“We are learning from and building on our early successes,” says Volontè. “Now we try to understand if a new piece can be made through Additive Manufacturing at a very early stage of product development. The earlier the better, as this will prevent rework and redesign at the end of the process. I admit that my designers are so enthusiastic that I have a bit of the opposite problem: I must keep them from trying to move everything to our new HP Jet Fusion 3D 4200 Printing Solution!”*

The aesthetic qualities of objects made with HP Multi Jet Fusion have enabled Mechatronic to **create small-batch parts without making compromises**. In the example of the touchscreen flange, this has enhanced the professional look of their equipment, ultimately improving customer satisfaction.

The strength and other mechanical properties of HP Multi Jet Fusion also have allowed Mechatronic to replace some of their key metal parts with plastic. In the past, the sieve structure was heavy, inefficient, and prone to failure. With HP’s 3D Printing technology, the team at Mechatronic was able to create a part

that was **lighter and more productive**. Further, the device was less costly to produce, dropping from 150 euros when using traditional manufacturing technologies to 50 euros with HP’s process.

Finally, the design freedom that 3D printing offers has allowed **Mechatronic to create parts that work better and more efficiently**. The new paint powder cleaning device is better balanced and does a better job of distributing compressed air to the point of need. Further, the part can be produced in one day compared with the multiple weeks it took to produce in metal.

For the makers of industrial equipment, HP’s Multi Jet Fusion technology can **potentially improve the speed** at which they innovate, while also allowing them to improve the overall quality of their products. It also allows them to produce in small batches more cost effectively. For Mechatronic, the combination creates a competitive advantage that few others in their industry can match.

Learn more about HP Multi Jet Fusion technology at:

[hp.com/go/3DPrint](http://hp.com/go/3DPrint)

Connect with an HP 3D Printing expert or sign up for the latest news about HP Jet Fusion 3D Printing:

[hp.com/go/3Dcontactus](http://hp.com/go/3Dcontactus)

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