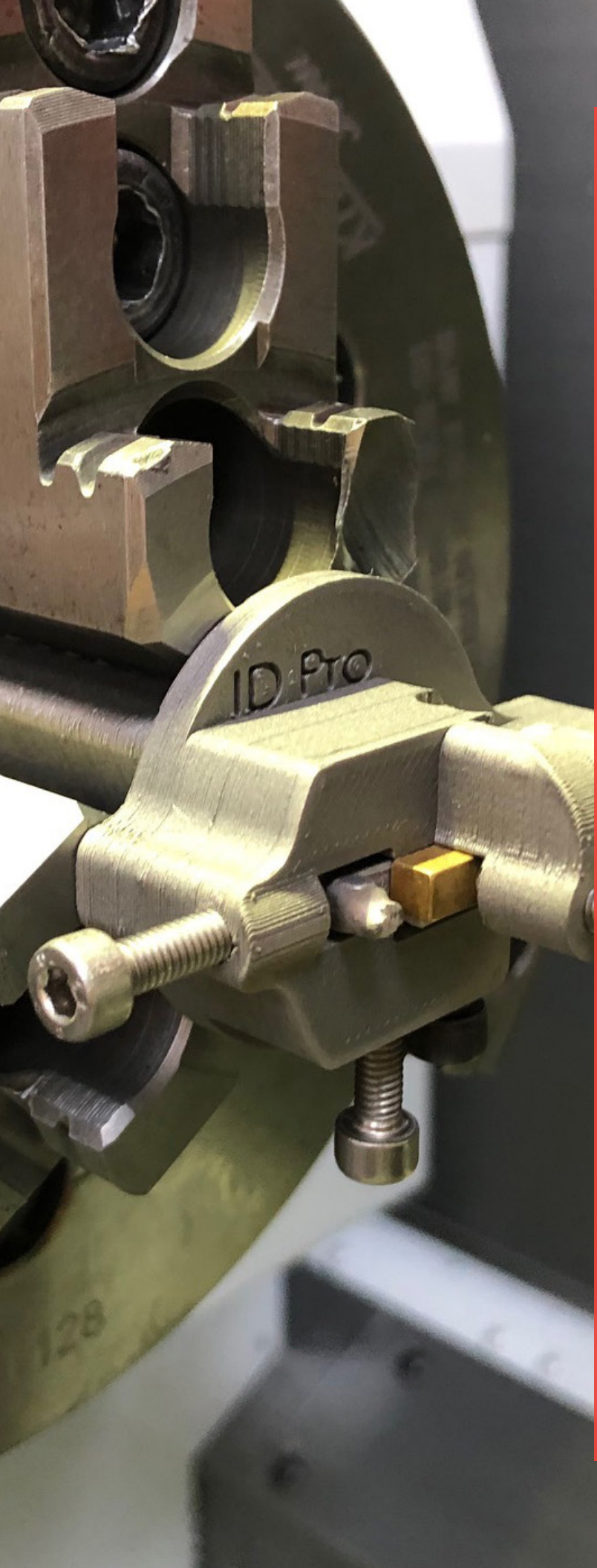


Desktop Metal

[Case Study]

PFT IDPro

www.desktopmetal.com

00 Overview

Based at the Lycée Polyvalent Aragon Picasso secondary school in Givors, France, PFT IDPro was founded in 2010 to help students and teachers develop advanced manufacturing skills. In addition to its educational mission, the center works closely with local companies as they explore how new technologies like additive manufacturing can aid in the development of mechatronic products and systems.

01 The Challenge

It's a term most people may be unfamiliar with, but they've almost certainly felt the benefits of mechatronics.

An interdisciplinary branch of engineering, mechatronics brings together electronics, electrical engineering, mechanical engineering and more with concepts from robotics, computing, telecommunications and more.

That combination has led to the development of a vast array of products and technologies, from pacemakers and electronic fuel injection to "smart" devices like doorbell cameras and robotic vacuums.

With the rising popularity of mechatronic products, many companies are eager to explore the field and are turning to IDPro's expertise.

Sharing that expertise, however, is not without challenges. A school first and foremost, IDPro must ensure students develop skills they'll need as they enter the workforce.

In addition to their educational mission, IDPro works closely with local companies to provide technical guidance and a wide variety of manufactured parts, from test parts to customized mold tools, for the development of mechatronic systems.

To help address those challenges, IDPro turned to the Desktop Metal Studio System.

02 The Studio Solution

As an educational tool, the Studio System fills an important role for IDPro.

While the center already has a variety of 3D printers, including a laser-based system for producing metal parts, none use an extrusion-based print method like that of the Studio System.

Unlike other metal 3D printing systems, which rely on loose metal powders, the Studio System uses bound rods - metal powder held together by polymer binders. Those rods are heated and extruded to shape parts layer by layer, similar to the Fused Filament Fabrication (FFF) method commonly used by plastic printers.

By investing in the Studio System, IDPro can be sure students get hands-on experience with the broadest possible range of metal 3D printing technology, and can then apply that experience in the workplace.

For IDPro's corporate partners, the system fills a different niche. The tooling-free nature of the Studio System allows companies to produce functional parts in just days, rather than weeks or even months for traditional manufacturing.

In comparison to the center's laser-based printers, the Studio System also prints parts at significantly reduced cost and far fewer logistical challenges, such as handling potentially dangerous metal powder or the need to remove build plate supports via machining.

That combination of low cost and high accessibility opens the door to a new manufacturing environment, where it is possible to justify printing many parts in metal.

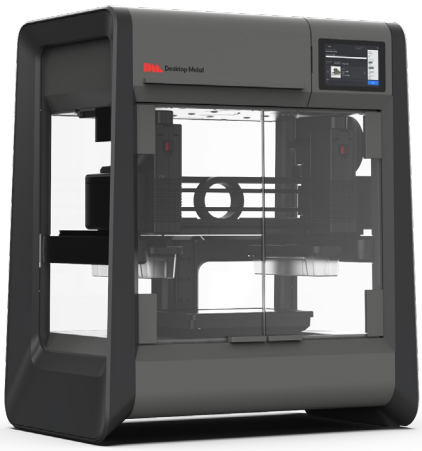
The system also allows for far more design iteration. Rather than producing one or two prototypes, companies can quickly produce a variety of parts, each with subtly different designs and test each to produce a final part that fits their exact needs.

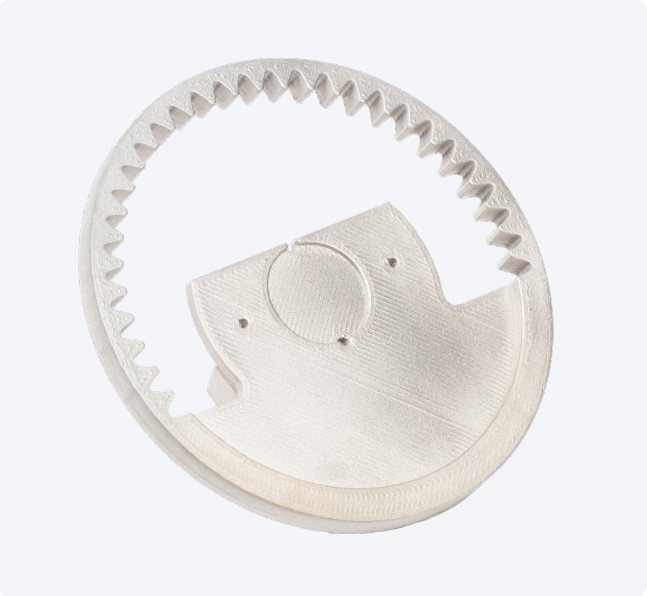
03 Why Desktop Metal?

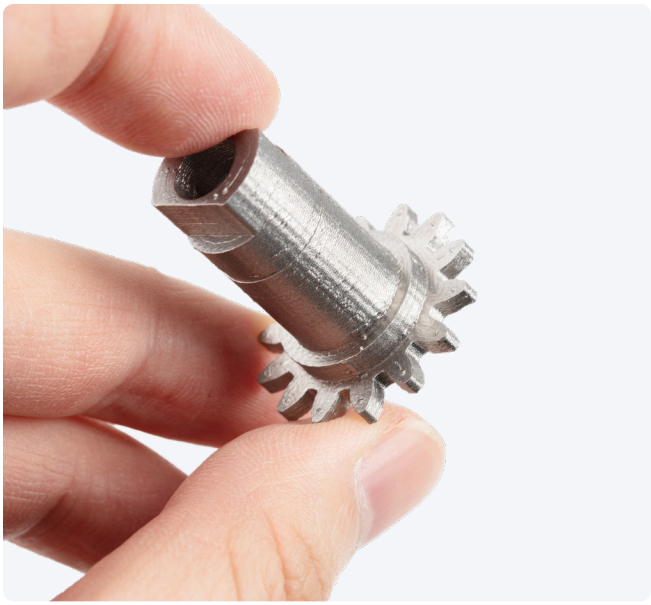
A number of factors went into IDPro's decision to invest in the Studio System.

While the system helps to fulfill the center's goal of training students in a variety of advanced manufacturing technologies, the Studio System's safety was also a significant factor.

The Studio System's office-friendly design - no loose metal powder or lasers are used - also eliminates the need for special facilities or respiratory PPE. The safety and ease of use make the system ideal for a school setting, and allow students to quickly have hands-on access to producing metal parts.







Part Fabrication & Comparison

Gears

Gears are some of (if not the most) common mechanical components. Used to transfer torque between two rotating components, there are thousands of options available when selecting gearing. Even with thousands of options available there are still many situations that need or benefit from a custom gear. These custom gears can be incredibly difficult to produce in low volume via traditional manufacturing methods, requiring advanced machining methods.

The Desktop Metal Studio System makes printing these gears easy since it simply builds them up layer by layer. By printing, IDPRO can also combine other features into the gear, which would traditionally be produced separately and then fastened or welded to the off-the-shelf gear.

These two gears - one with 14 teeth and the other with 48 - were developed as part of an effort to develop a new product in collaboration with Paint Up.

The Lyon-based startup specializes in developing robotic systems capable of automating the treatment of building facades, from painting, stripping and cleaning to drilling holes for mounting prefabricated panels.

Part Fabrication & Comparison

Lever Arm

This lever arm is a replacement part used in an alarm system. Though normally cast and then machined to final tolerances, the tooling for this part is no longer available, forcing students to explore other manufacturing options.

Rather than take on the expensive and time-consuming process of recreating that tooling, students instead turned to 3D printing. To machine the part, by comparison, would require a highly skilled operator to create CAM programming as well as significant setup time.

To print the lever arm, students simply needed to upload the part design to the printer, press print, and in less than three hours the part was ready for sintering. Printing the lever arm also allowed students to produce the part at significantly less cost and lead time than traditional manufacturing approaches.

Part Fabrication & Comparison

Gear shifter

This gear shifter was designed by IDPro students for the Écurie Piston Sport Auto (EPSA) race team.

Made up primarily of students from the Ecole Centrale de Lyon graduate school, the team each year designs a prototype vehicle and works with a variety of partners - including a number of vocational schools, including IDPro - to fabricate various parts.

Printing this part allowed students to incorporate cutouts inside of the part that would be impossible to create with any manufacturing method beside 3D printing, helping to minimize weight - a key consideration for race teams - then quickly fabricate it without the need for expensive tooling.

About Desktop Metal Inc.

Desktop Metal, Inc. is accelerating the transformation of manufacturing with end-to-end metal 3D printing solutions. Founded in 2015 by leaders in advanced manufacturing, metallurgy, and robotics, the company is addressing the unmet challenges of speed, cost, and quality to make metal 3D printing an essential tool for engineers and manufacturers around the world. In 2017, the company was selected as one of the world's 30 most promising Technology Pioneers by the World Economic Forum, and was recently named to MIT Technology Review's list of 50 Smartest Companies. For more information, visit www.desktopmetal.com.

About PFT IDPro

A technological unit incorporated into the Lycée Polyvalent Aragon Picasso secondary school, PFT IDPro was created to help develop advanced manufacturing skills among students and teachers. In addition to its educational mission, the center works closely with local companies as they explore how new technologies like additive manufacturing can aid in the development of mechatronic products and systems.