

ADDITIVE MANUFACTURING
Aerospace



we create for you



New Technology

Additive Manufacturing

Aidro, an Italian hydraulic systems developer, has incorporated Additive Manufacturing (or Metal 3D Printing) into its manufacturing processes, to create a new generation of solutions and to overcome the limits of conventional mechanical components.

This new technology allows to produce fast prototypes and spare parts, functional products with the following advantages:

- lightweight and space saving
- complex geometries at no extra cost
- better performances thanks to the optimization of the internal channels, curved shapes and elimination of 90° intersection angles, absence of auxiliary caps and plugs
- fast lead time

Additive Manufacturing starts from metal powder particles that are melted using a high power laser in sequential ultra-thin layers, creating functional 3D parts.

Metal Powder Materials

Aluminium (AlSi10Mg, F357)

offers good strength, hardness and dynamic properties and it is also used for parts subject to high loads. It is ideal for applications that require good thermal properties and reduced weight.

Titanium

has excellent mechanical properties and corrosion resistance combined with low specific weight and biocompatibility.

Stainless steel (AISI316L)

is characterized by having good corrosion resistance and mechanical properties. This is widely used for special applications, such as oil&gas, off-shore and marine.

Inconel (625, 718)

is a heat and corrosion resistant nickel alloy characterized by having high tensile, creep and rupture strength. Components in this type of nickel alloy have typically excellent fatigue and thermal-fatigue values.

Maraging Steel

is known for possessing superior strength and toughness without losing malleability. The parts made from this steel are easily machinable after the 3D printing process.

3D metal printing

Activities

Design

new products with complex geometries and re-design of traditional parts to reduce weight, space saving, consolidate multiple parts into one.

Dedicated softwares, FEM, CFD, fatigue analysis and stress test.

Production

with our metal 3D printer machines, a wide range of high quality metals is available such as Aluminium, Titanium, Stainless Steel, Inconel, Maraging Steel.

Testing

on material properties, pressure resistance, mechanical and micro-structural properties, functional test, NDT.

Measurement

dimensional control by 3D scan and reverse engineering.

Fast Prototyping

with metal 3D printing the lead time is short, as 1-2 weeks. Compared to casting mold, a 3D printed prototype is more convenient in term of cost and timing.

Post Treatments

heat treatment of 3D metal printed parts, surface finishing.

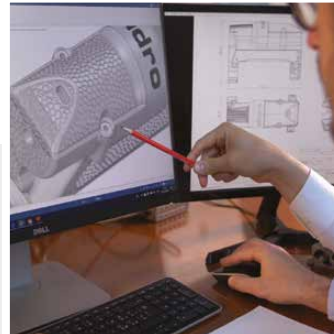
CNC finishing

with our flexible vertical machining center, we provide the machining of cavities, surfaces and parts of the 3D printed products that require a finishing.

Certifications & Memberships

We are qualified ISO9001:2015 & EN9100:2018

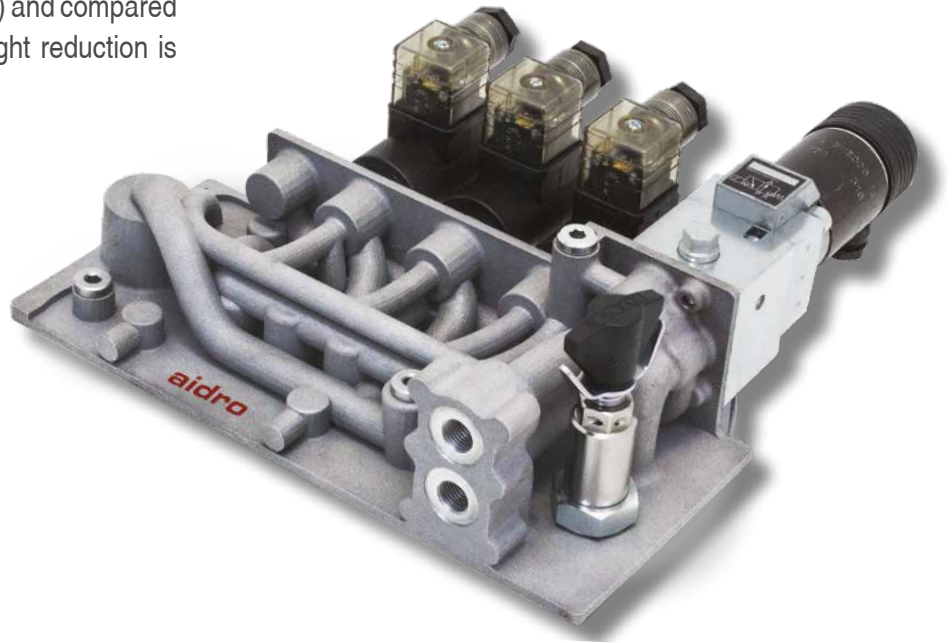
We are members of Lombardia Aerospace Cluster



HIGH PRESSURE HYDRAULIC MANIFOLD

This 3D printed Hydraulic Manifold is designed for high pressure (700 bar).

The material is Aluminium (AlSi10Mg) and compared to the conventional manifold the weight reduction is 75%.



3D printing advantages:

- Optimized performances, thanks to curved channels and no more 90 degrees intersection angles
- Good material properties (similar to metal bars)
- Lightweight solutions
- High pressure resistance (700 bar)



from
Traditional production
5 kg

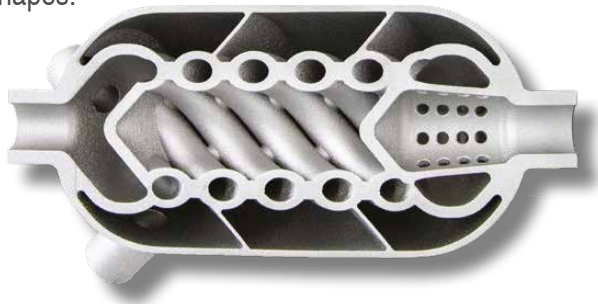


to
Metal 3D printing
1,3 kg

HEAT EXCHANGER

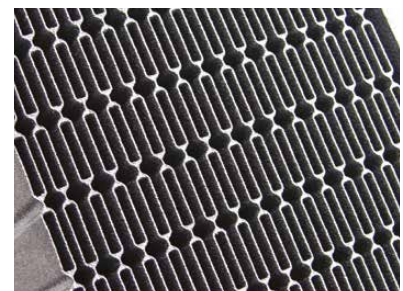
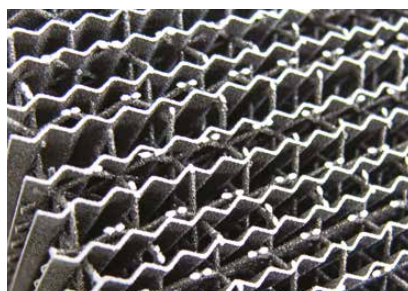
Additive manufacturing is suitable for the re-design and production of Heat Exchangers. In the photos there are examples of heat exchangers made with Additive Manufacturing with different internal structure such as lattice structure and gyroid.

The main advantages are the weight reduction and the compactness compared to the traditional heat exchanger. With Additive Manufacturing it is possible to improve the performance thanks to innovative shapes.



3D printing advantages:

- High performances in small size
- Possibility to combine multiple parts into one without joints nor weldings
- Weight reduction
- Optimized exchange surface
- Complex surface geometries like gyroids only achievable with Additive Manufacturing technology
- High temperature & corrosion resistance with Inconel
- Advantages for maintenance





CUSTOM-MADE TOOLS

Servofly T4/1 is a flight control installed on the cockpit of an ultra-light aircraft without any modifications of the aircraft structure that allows a person with disabilities to pilot.

This "plug-and-fly" device was made of Aluminium using powder-bed laser fusion technology (LPBF or SLM).

This tool allows the pilot, who suffered of severe damages after an accident, to fly with one hand only.

His dream to fly became true, also thanks to Additive Manufacturing technology.

Aidro contributed to the design process and manufactured the tool.

More information on: www.servofly.it



3D printing advantages:

- Custom-made solution
- Fast manufacturing lead time
- Ease of integration on the cockpit without any aircraft structural modification

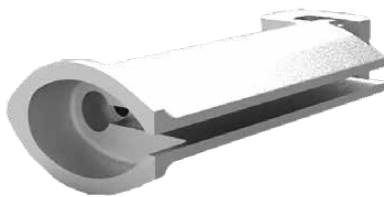
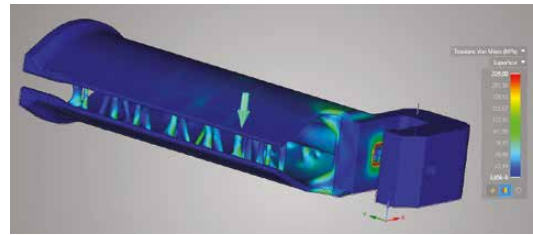


PROTOTYPES FOR AERONAUTICS

Prototype of helicopter pedal

3D printing advantages:

- From CNC Aluminium standard initial solution to re-designed AM solution through topological optimization
- 55% weight reduction
- Inspectability of the part
- Anti-corrosion performance guaranteed by surface treatments
- Possible change of material with Stainless Steel AISi316L: better corrosion proof at equivalent weight of initial solution



from
Traditional production
484g



to
Metal 3D printing
216g

In collaboration with Mecaer

PARTS FOR SATELLITES & DRONES

Antenna bracket for RUAG's Sentinel satellite certified for deployment in outer space

3D printing advantages:

- Topological optimization
- 40% weight reduction
- Material: Aluminium AISi10Mg



Courtesy EOS

Faraday probe for satellite



In collaboration with T4i

Bracket for Drones



aidro

hydraulics & 3D printing

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