HP Multi Jet Fusion – Disrupting Manufacturing

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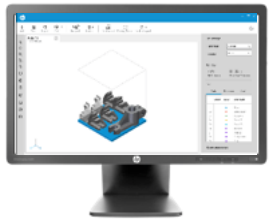
Agenda

1 Multi Jet Fusion (MJF) Technology and Materials

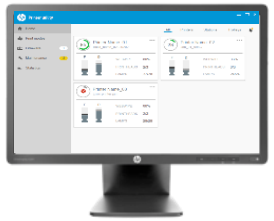
2 Applications

MJF Technology

Driving the transformation to industrial-scale 3D manufacturing

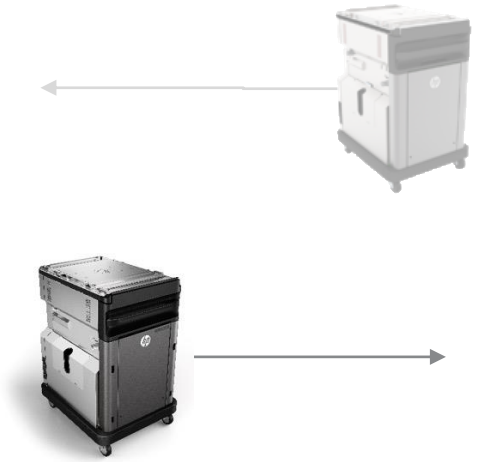


Software and Plugins



Command Center

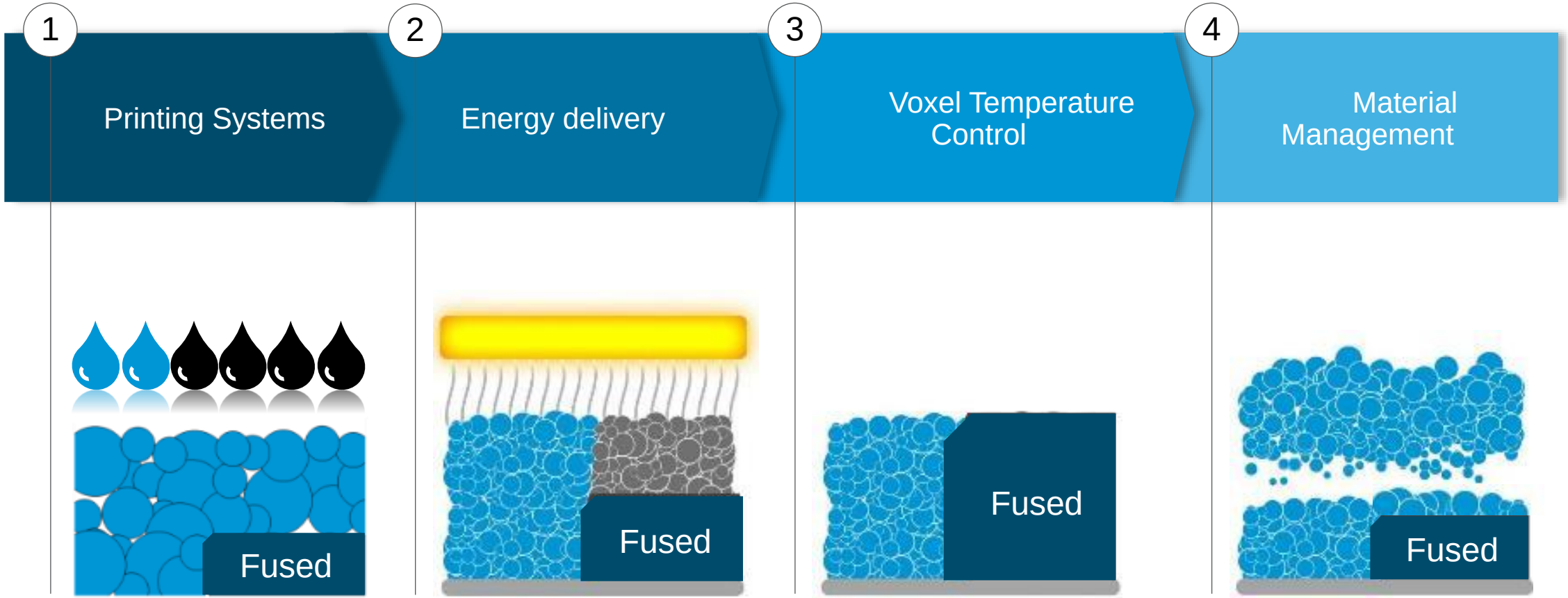
HP Jet Fusion 3D Printer



HP Jet Fusion 3D Build Unit

HP Jet Fusion 3D Processing Station

HP Jet Fusion 3D Printing Process



HP Open Platform

+7 materials planned
+50 partners in the pipeline

Success stories

HP Multi Jet Fusion accelerates production for intelligence industry

GIMBALL CAMERA ENCLOSURE

- Aurea Avionics' "Seeker" unmanned aerial system (UAS) is the intelligence industry's most advanced intelligence, surveillance, and reconnaissance (ISR) platform.
- To produce the first prototypes of a Gimball camera enclosure that covers and protects its drones, Aurea Avionics used FDM technologies but the parts were too weak in terms of mechanical properties.
- Aurea Avionics used HP Multi Jet Fusion (MJF) technology to 3D print the camera enclosures, resulting in improved material properties and the ability for rapid prototyping.

RAPID PROTOTYPING

3D printing with HP MJF allows for faster testing of the products on the field compared with other manufacturing technologies.

CUSTOMIZATION AND REDESIGN

Engineers can freely design under any constraints to create the most specific part that meets their requirements.

MATERIAL

HP 3D HR PA 12

Drill extraction shoe

Drill extraction shoe

Challenge

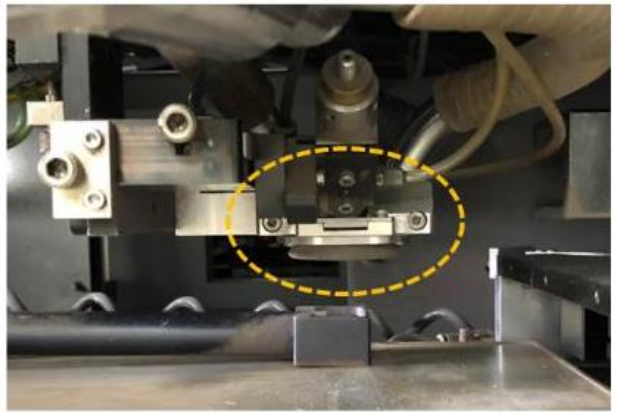
Reduce assembly parts
Reduce cost
Reduce lead time
No need of MOQ

Applicati on

Drill extraction shoe used during the cutting in order to remove the silicon sludge and water that continuously appears to produce print heads.
The shoe creates a more efficient laser drilling process due to the requirement of silicon debris free during the printhead production.

Benefit of MJF

>95 % savings
Shorter lead time
Allows more efficient geometries and a laminar flow thanks to Dfam
Assembly parts reduction (12 PARTS INTO 1)
More efficient laser drilling do to silicon debris free
Fluid tightness – pressure fluids without need of being coated



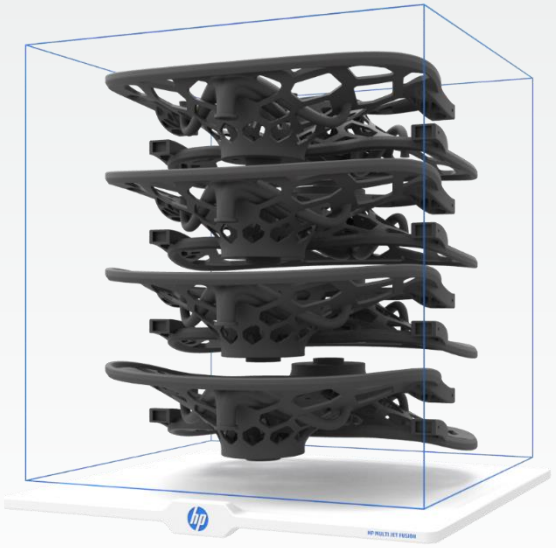
	Conventional	HP 3D print with MJF
PRODUCTION	CNC	MJF
COST SAVINGS		95%
WEIGHT REDUCTION		90%
LEAD TIME	3-5 days	24 hours

Tooling Application

Robotic Arm Gripper

Part designed in the IAM 3D Hub for an **automotive company**

Used as robotic end effector to place the dashboard glass



Printing this part with MJF enables to:

- Stock reduction: printing parts on demand
- Less weight to increase robot precision and reduce consumption
- Geometry can be adapted for each car model

DIMENSIONS
X: 10.6 in / 26.9 cm
Y: 3.22 in / 8.2 cm
Z: 3.94 in / 21.5 cm

MATERIAL
HP 3D High Reusability PA 12

POST PROCESSING
Bead Blasting

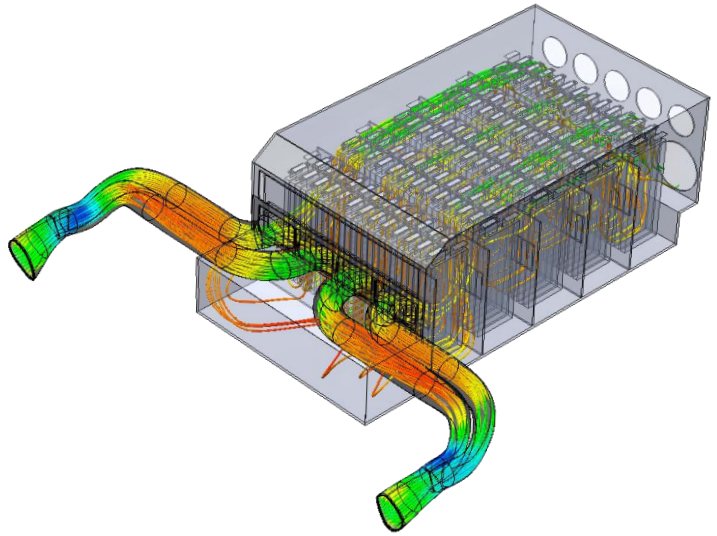
TOTAL COST PER PART
HP 3D MJF part: $126 / 102€

WEIGHT REDUCTION
CNC Machined part: 1830 g.
HP MJF part: 237 g.
87% Overall weight reduction

DELIVERY TIME
HP MJF part: 24 h.

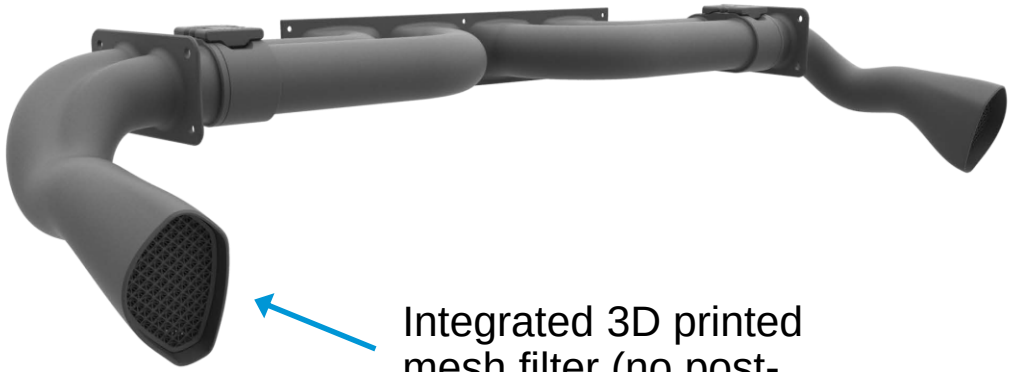
Battery Cooling System

EEEB e-Tech Racing



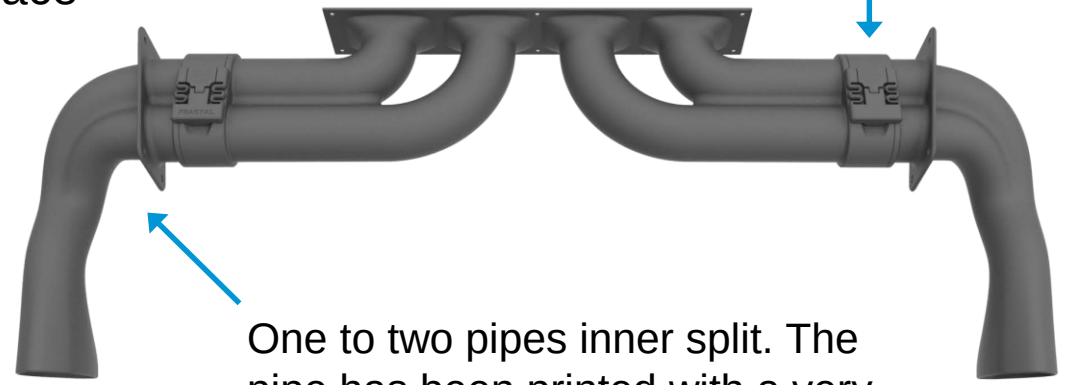
Customer designed air intake, ducts and manifold for the battery cooling system of the e-Tech Racing electric formula car.
Critical requirements:

- Air tightness
- Lightweight
- Complex geometries (flow optimization)
- Easy release of parts for fast disassembly of the battery pack during the race
- Survive vibrations and small energy impacts during the race



Integrated 3D printed mesh filter (no post-assembly)

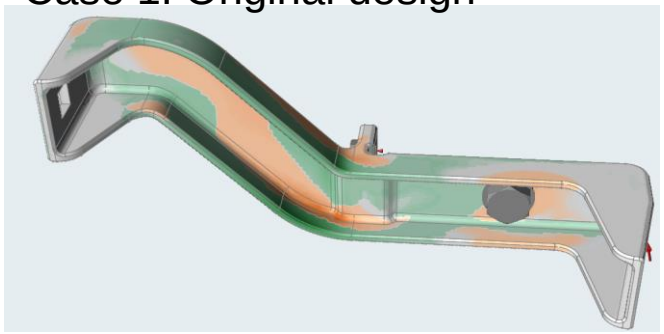
Easy release 3D printed clip

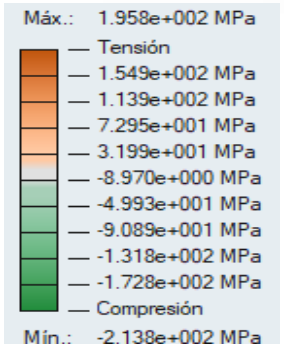


One to two pipes inner split. The pipe has been printed with a very unique inner shape that allow to split the initial single air intake to two pipes.

Designing for additive
CAF Digital Manufacturing

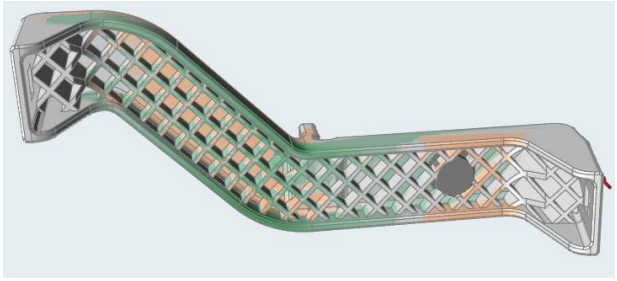
Case 1: Original design

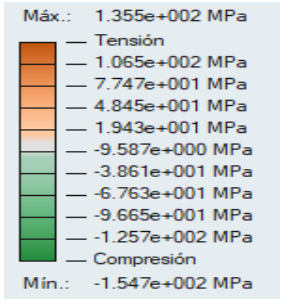




First FEA analysis is done only by replacing the original material (aluminum) by the HP 3D High Reusability PA12 to detect the weak areas.

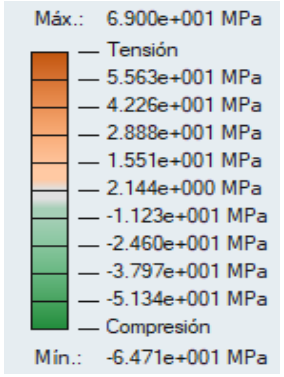
Case 2: Design iteration 1





The first design iteration is done with the introduction of an internal lattice structure which reinforces the part. It is stronger than the previous one, but still needs to be improved.

Case 3: Design iteration 2



The second design iteration adds additional material and introduces a rib which help to reinforce the weak spot of the part. The FEA confirms the design is now within specifications.

Thankyou!