Accelerating Industrial Additive Manufacturing

EPIC

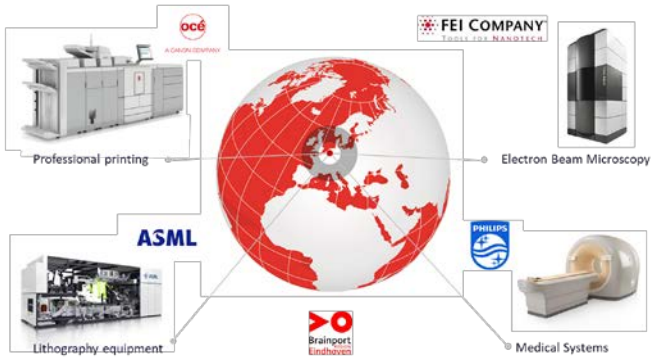
Advanced and Additive Metal Manufacturing

Webmeeting, October 19th, 2020

Harry Kleijnen

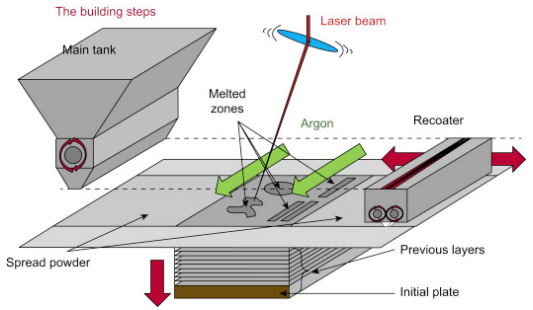
Additive Industries drives industrial Additive Manufacturing by providing a fully integrated and automated 3D metal printing platform the MetalFAB1

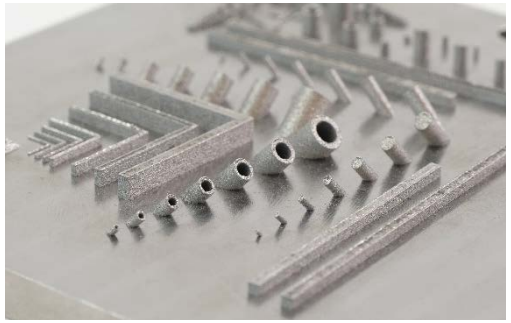
Additive Industries is born in Brainport, a region in The Netherlands around Eindhoven, famous for its high tech systems & electronics



- 420x420x400 mm platform
- Up to 4 500W lasers
- Automatic powder removal and powder reconditioning
- Multi material with multiple AMcores
- Automatic job change

The Additive Industries team is growing industrial additive manufacturing worldwide from locations in Europe, Asia & North America

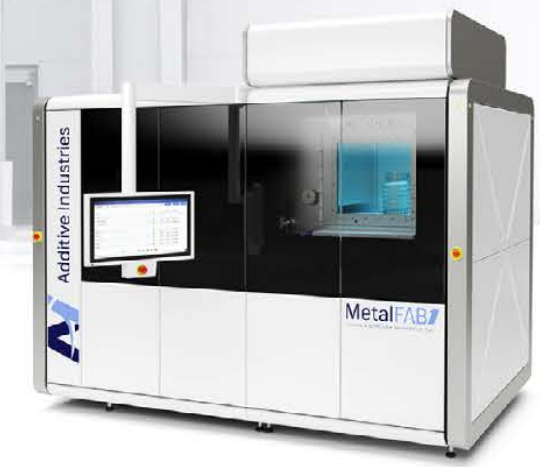




… allowing a variety of configurations a customer can chose from based on their business, the use case, application or performance level

MetalFAB1

Industrial Additive Manufacturing System



Process & Application
Development, Prototyping

Small series
Full automation

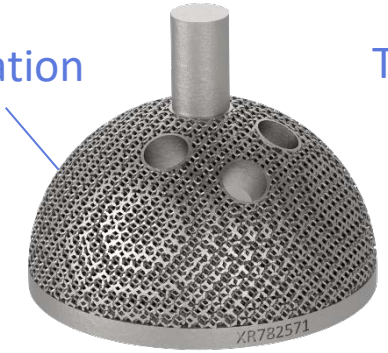
Larger capacity, multiple materials
Additional functionality

Depending on the industry, part, application, phase in the design process or product lifecycle, drivers for the business case vary

Design freedom

Part count reduction

Customization

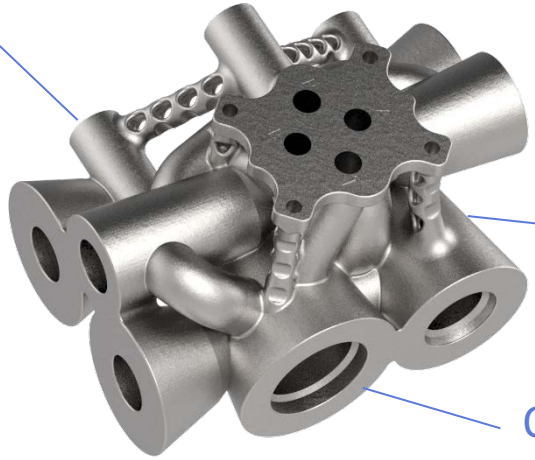


Temperature regulation

Increased performance

Supportless design

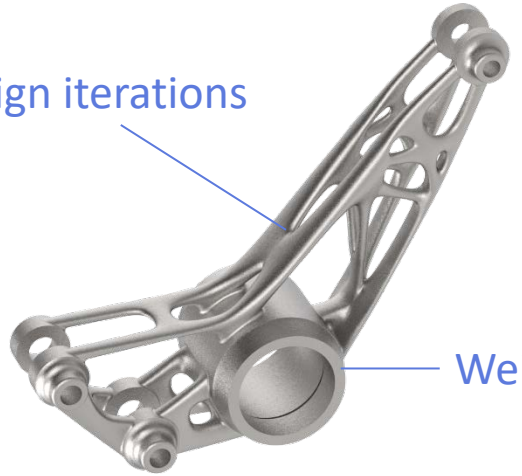
Fast design iterations



Unique part coding

On-demand manufacturing

Fast design iterations

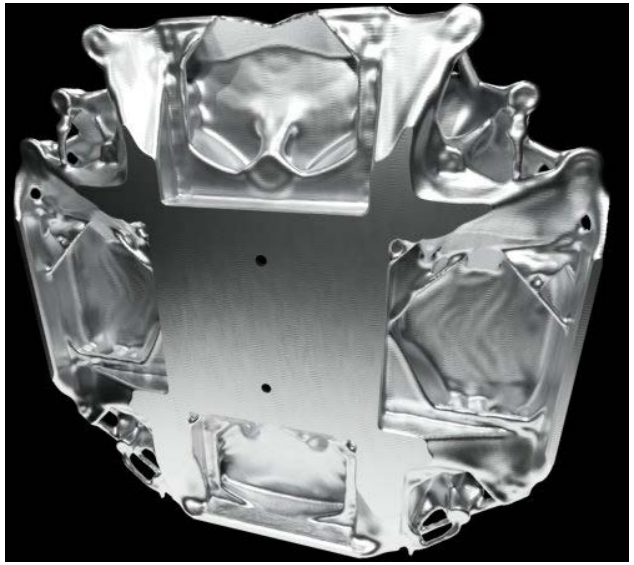


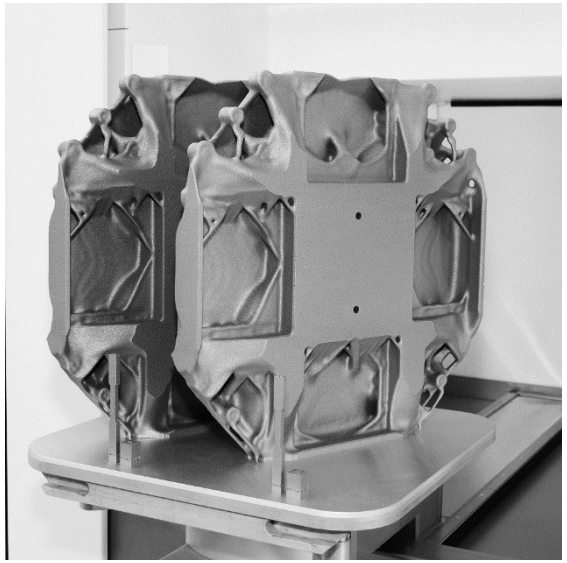
Weight reduction

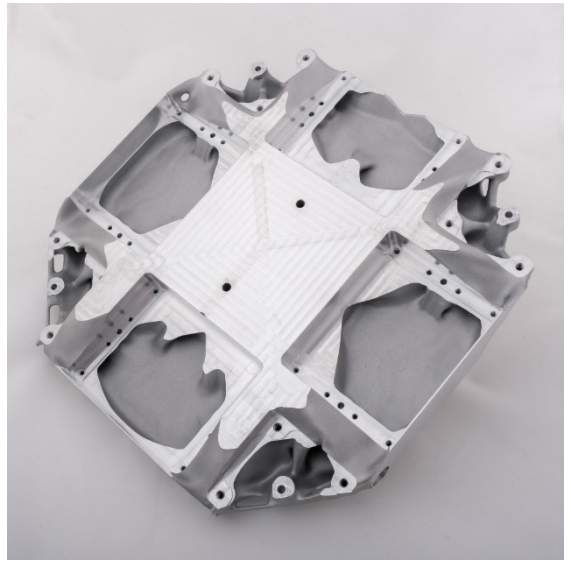
Function integration: Ti6Al4V wheel suspension with electric motor drive connection and integrated hydraulics

Performance improvement time to market reduction, cost savings; Chuck for waferstage, TUDelft, NWO project

https://bits-chips.nl/artikel/dutch-collaborators-bring-high-performance-motion-systems-to-a-whole-new-stage/

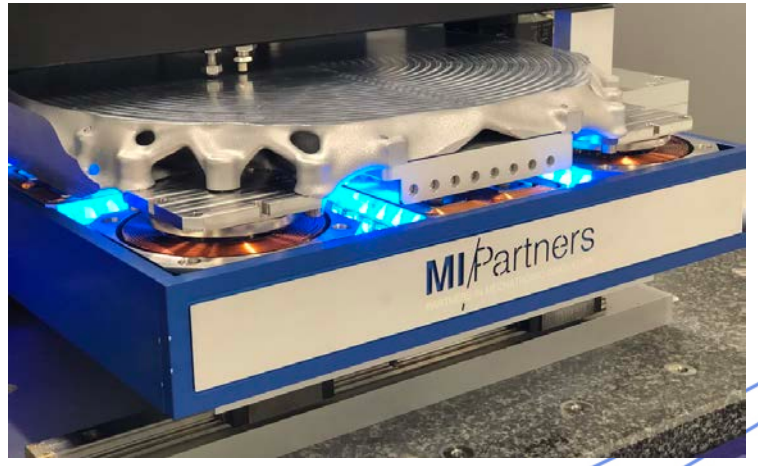






Arnoud Delissen, PhD student at TU Delft. “By using unique algorithms, computers can design optimal shape and dynamic properties, which can then be 3D-printed, offering never before realized efficiency – allowing industrial partners to work toward the next generation of machines.”

“Going into this last phase of the design, we reviewed the plans, allowing our team to bring in the specific AM constraints, like maximum angulation of surfaces, to be integrated into the algorithm, then it was ready to go,” recalls Kleijnen. “The design was perfectly suited to print. We printed two parts, which took roughly 10 days total – 5 days per part.



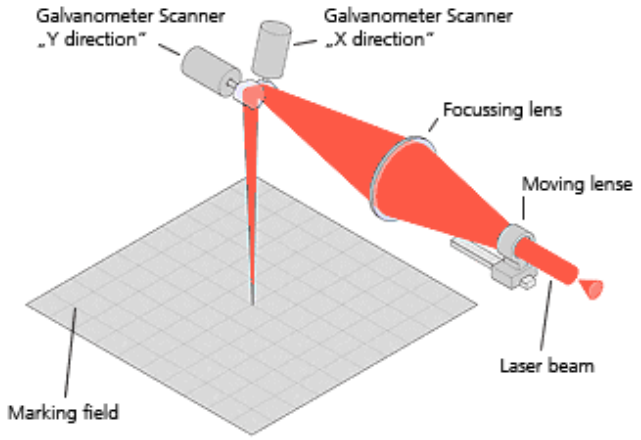
Optics in AM equipment drive the business case

Typical components

- Laser
- Laser beam shaping and positioning control
  - Dynamic focus solutions
  - F-Theta lens
- Optical windows
- Protective windows (IR protection)

Typical challenges

- Focus stability
- Power stability
- Positioning stability
  - +/-50mu on incident surface
- Long term stability
  - Laser to laser calibration accuracy



MetalFAB1 Laser optics,
Dynamic focus lens, full field coverage, variable spot size, integrated HR camera

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