

ADD FAB

Kooy-symposium

Duurzaamheid voor de Krijgsmacht: *Een operationeel vóórdeel!*

Additive Manufacturing for industrial applications is rapidly gaining momentum



shapeways* Create Discover Community Go

Shapeways 3D Printing News and Innovation

Thursday, October 18, 2012

Factory of the Future: Our Plan to 3D Print 3 to 5 Million Unique Products Per Year in NYC

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Shapeways Director of Industrial Engineering Kegan Fisher (@keganfisher) shares our vision for the future of manufacturing as we cut the ribbon on our NYC Factory of the Future.

When we opened the doors to the Shapeways NYC office, we dreamed of building a factory nearby. A factory that would provide the thousands of designers and innovators in NYC a place to bring their products to life.

We are incredibly excited to announce that today marks the beginning of our Factory of the Future in Long Island City. We are cutting the ribbon on our new space with a little help from our friends...including Mayor Bloomberg of NYC and Kenneth Adams, President & CEO of Empire State Development.



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Special report: Manufacturing and innovation ▾

A third industrial revolution

As manufacturing goes digital, it will change out of all recognition, says Paul Markillie. And some of the business of making things will return to rich countries

Apr 21st 2012 | from the print edition [Like](#) 2.7k [Tweet](#) 1,339



by WinWeek

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Additive Manufacturing Will Change in the Next 5-10 Years

Comment now

Manufacturers looking to shorten supply chains, eliminate shipping costs and reduce lead times can benefit from additive technologies. One of the top events is coming up this month: RAPID 2012 is an event that brings buyers, sellers and end-users of design, prototyping, tooling and direct manufacturing technologies together in an educational (and some sales) environment.

The Society of Manufacturing Engineers (SME) RAPID 2012 Conference will be in Atlanta, Georgia this year on May 22 - 25. Everything from reverse engineering (via 3D Imaging) to medical/dental devices and implants, laser sintering (think 3D printing in metal), 3D printing with electronics embedded, and a



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14 SEP, 2012, 12:33AM IST, REUTERS

3D printers bring hi-tech manufacturing to the home

Story Comments

Read more on Printers MakerBot digital model 3D printers

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Ads by theglobe

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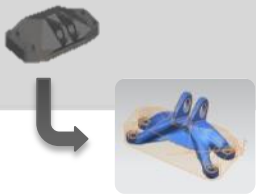
Not so long ago, harried moms and dads would brave the holiday season crowds at the mall to buy those Lego accessories or that Star Wars battle cruiser.

Now, with increasingly cheap and easy-to-use three-dimensional printers, they can turn out such gifts in the comfort of the family living room or garage.

3D printers - which use a process called additive manufacturing to make objects from a digital model by laying down layers of material - aren't new. They've been used to make manufacturing and engineering prototypes for more than 25 years.

Light weight

- Mass reduction
- Design optimization



Free form

- Design for optimal function and performance (especially flow and thermal design)



Reliability through high integration level

- Fewer BOM parts
- Fewer connections
- Avoiding difficult manual integration

Fast Design by lower NRE cost

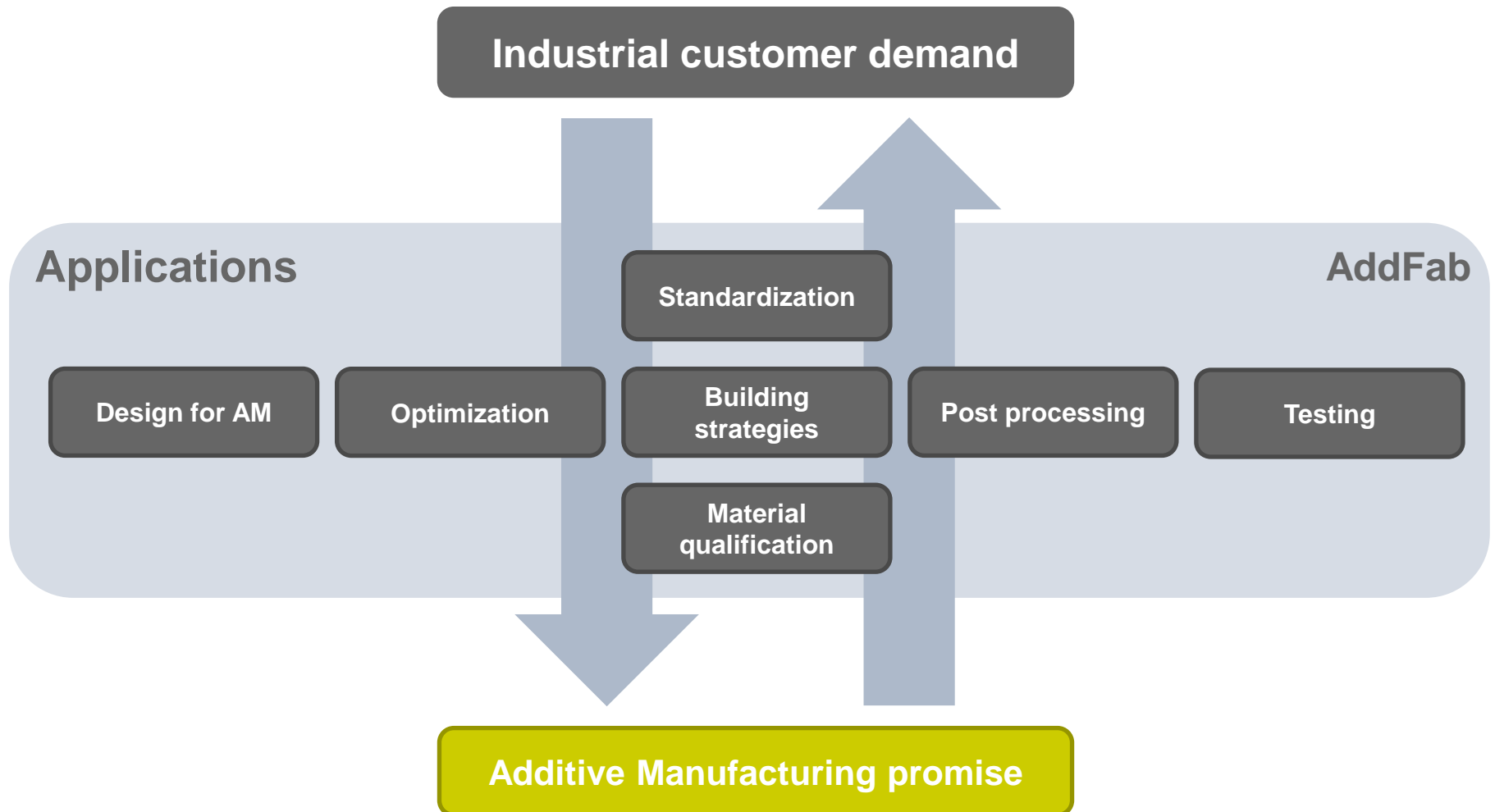
- First product fast concept design confirmation
- Complexity at no additional cost
- Small series at no additional cost

Lean logistics

- Fewer parts
- Less spare parts stock
- Life cycle management
- Less transportation cost

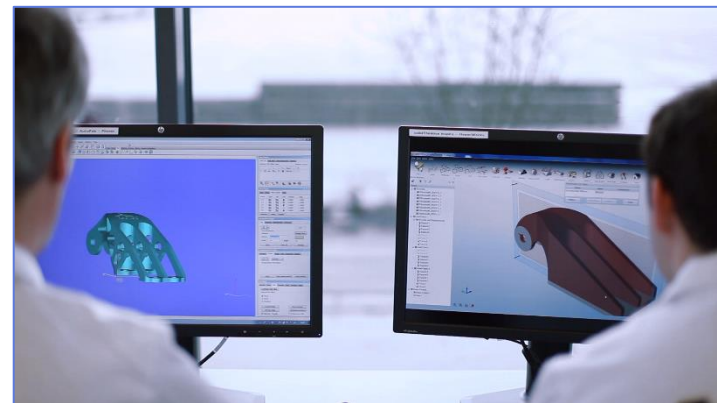
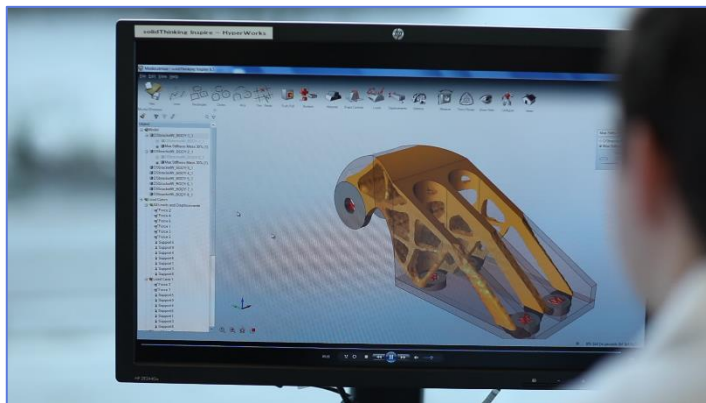


Market demand grows; Additive Manufacturing need further refining for industrial use



To reap the benefits of AM, designers will need help from software

- Application of additive manufacturing typically begins with a thorough assessment of the product, its function and freedom to (re)design
- (Re)design starts with a functional model including domain, load cases and boundary conditions
- Optimization software (such as Topology optimisation) will generate a first draft based on optimal material distribution for the required performance
- The design engineer will evaluate and fine-tune the result & shape



ADDFAB offers **engineering** and **3D metal printing services** and **supports** its customers in the technical and commercial trade-off between the **unique 3D printing feasibilities** and the established machining technologies.

3D printing unique features are:

- Weight reduction by creating hollow stiff structures (internal hollow structures)
- Design of complex and free form internal cooling channels (cooling optimization)

Our services include:

- Topology optimization and engineering services
- Prototyping both 3D printing (Additive Manufacturing) and machining
- Business case validation

AddFab is founded by 3 partners from the Dutch high tech supply chain



1. KMWE



2. NTS Group



3. Machinefabriek De Valk



Financial partner
of AddFab



Network partner
of AddFab

AddFab

AM
assessment

Design &
engineering

Material &
process
selection

Prototyping
& process
optimisation

Parts
manufacturing

Post
processing

Parts supply
& Distribution

Partners

3D Design & Engineering:

- Design for Additive Manufacturing
- Redesign
- Digitization/scanning
- Topology optimization
- Technology consulting
- ...

AddFab: Shared lab facility:

- Demand pooling
- Materials research
- Prototyping
- Process optimization
- Building strategy development
- Quality testing
- ...

Post processing & Supply

(through partners):

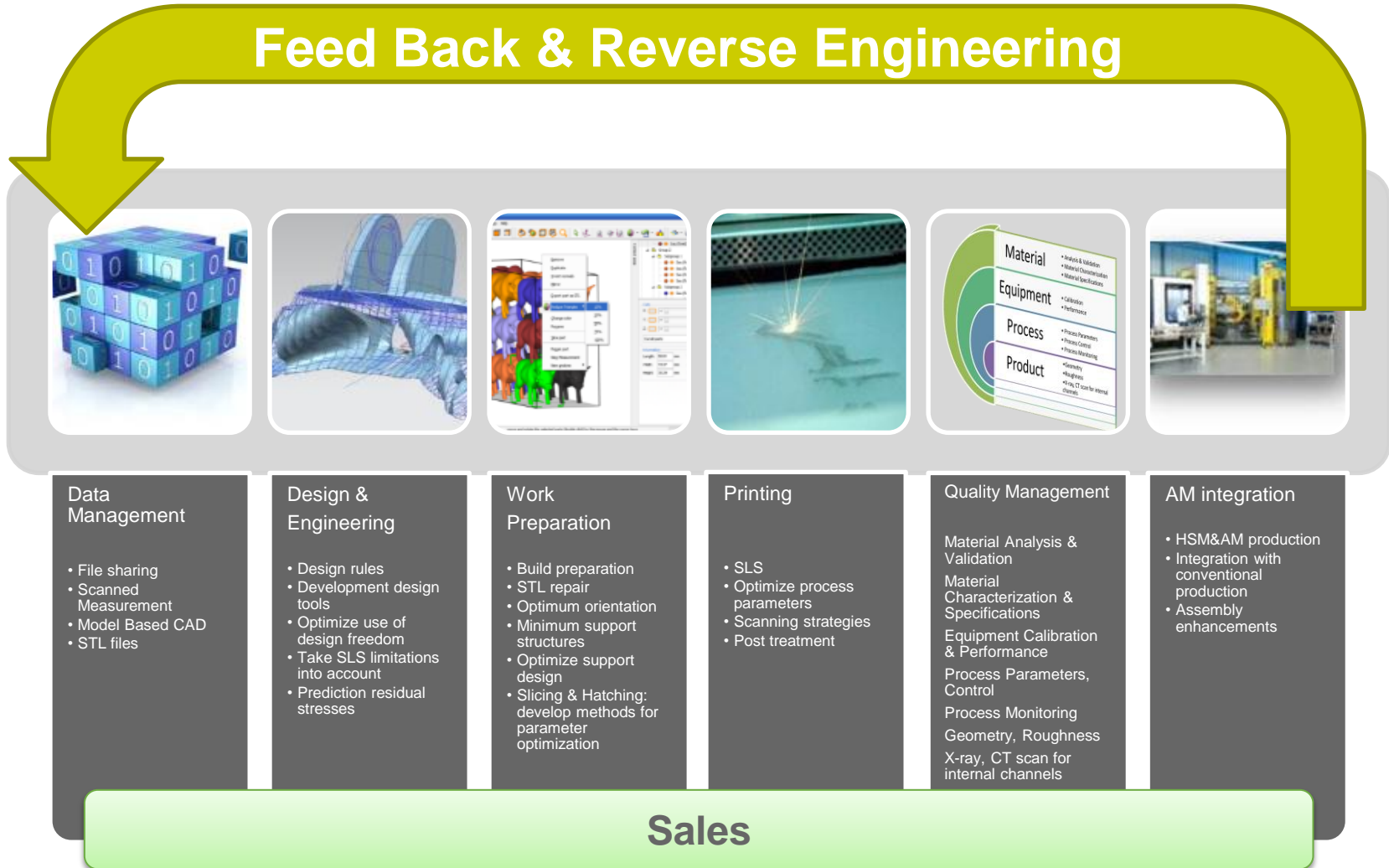
- Production
- Assembly
- Supply
- Distributed printing
- ...

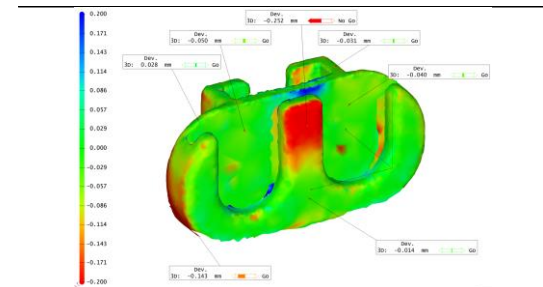
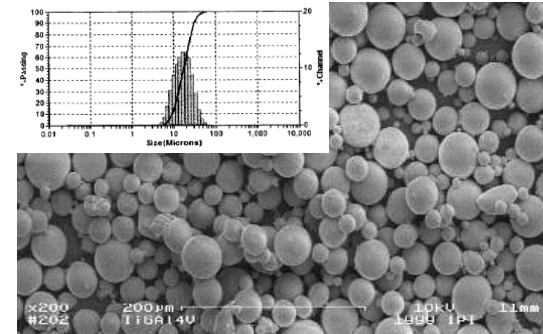
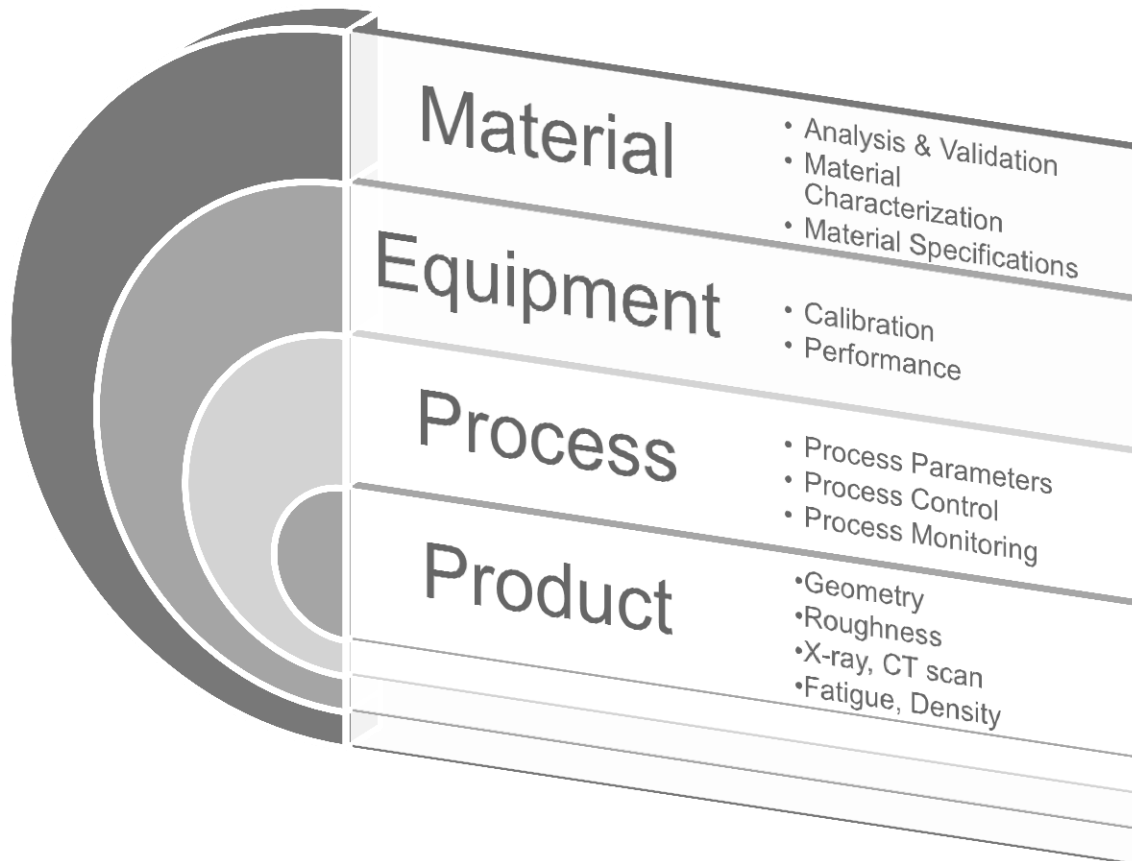
AddFab program designed to maximize exchange of application knowledge and experiences



Masterclasses	Design rules for AM, topology optimisation, AM building strategies, additive manufacturing principles, material testing, etc
Learning curve	(Bi-)monthly knowledge exchange sessions, presentation of printed products, experiences (partners only)
Knowledge Base	White papers, presentations, articles, contacts, lectures, etc
Open AddFab	Quarterly demonstration of AM processes to potential industrial users/buyers of AM

Feed Back & Reverse Engineering

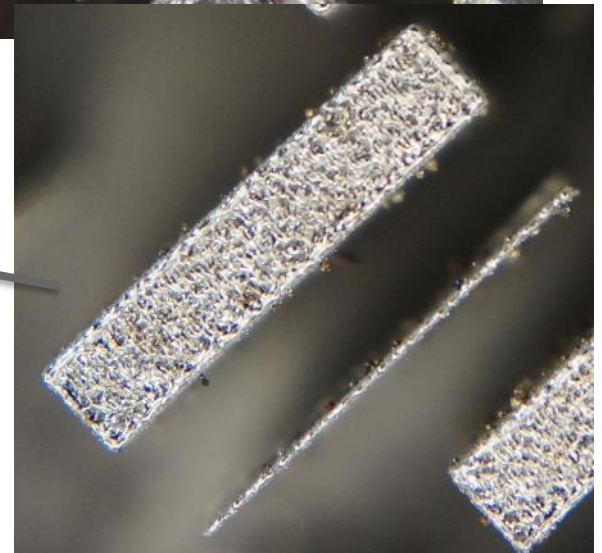
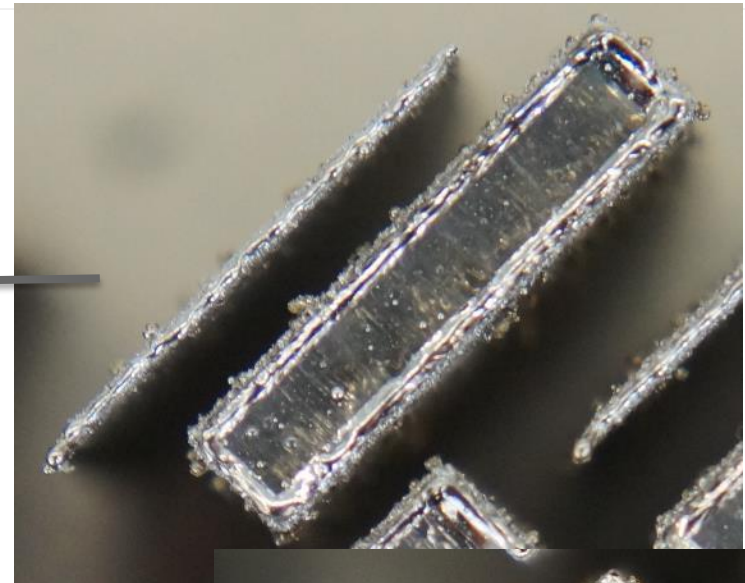
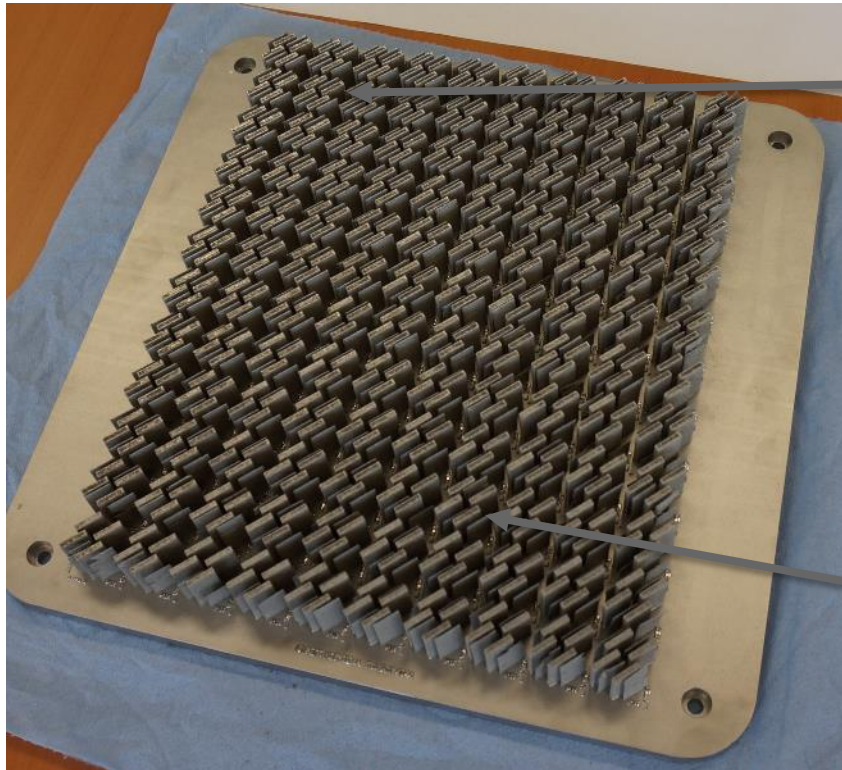




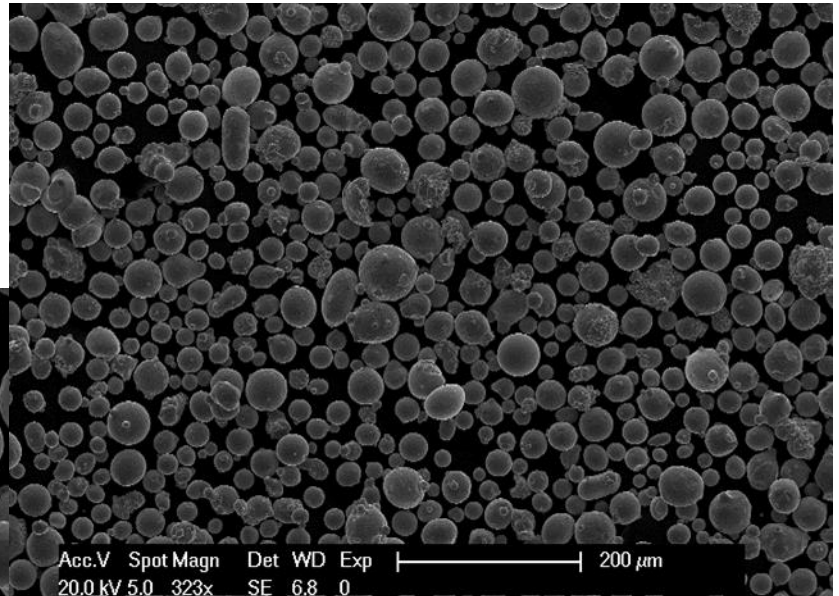
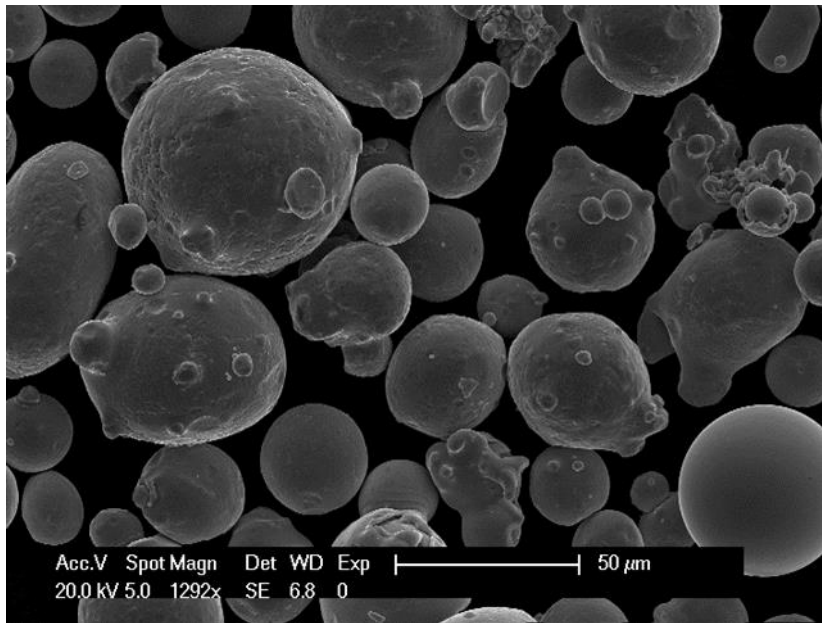
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		Report:



Quality Control

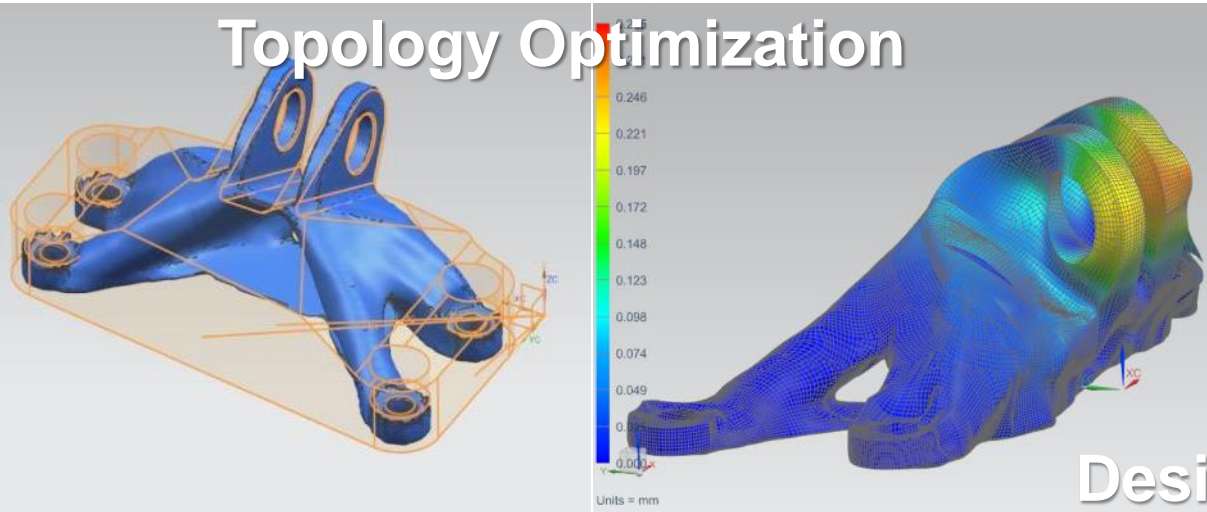


Powder Quality Control



Case Topology Optimisation

Topology Optimization



Design For Printing

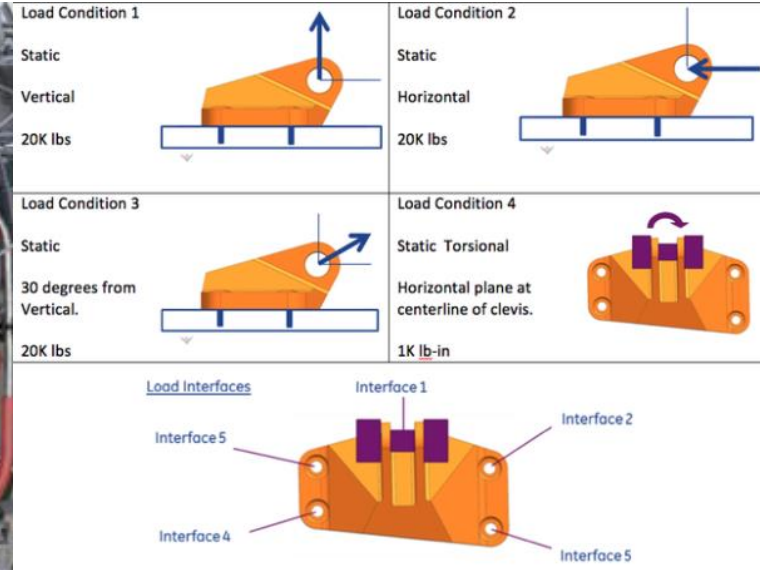


Case Topology Optimisation



Jet engine
bracket
challenge.

GRABCAD

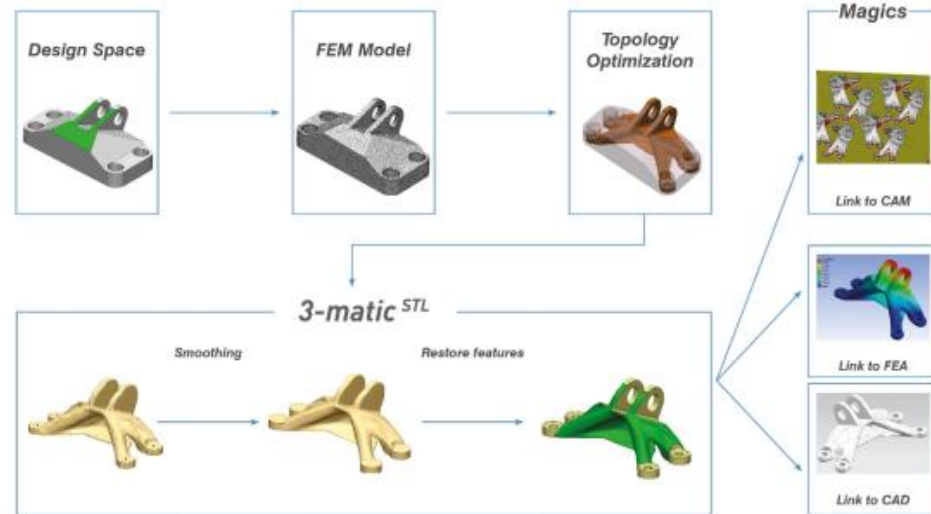


Additive Manufacturing solutions for Aerospace & Defense market

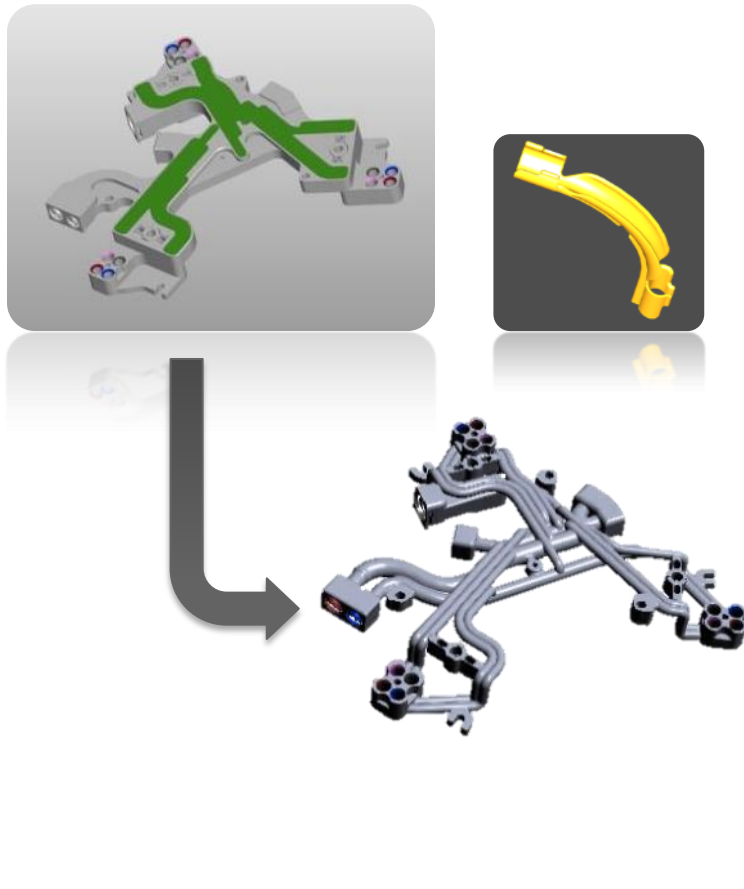
Focus Area

Weight reduction & Stiffness:

1. Hollow stiff structures
2. Optimise resonant frequency
3. Topology optimisation



75% WEIGHT REDUCTION



Focus Area

Complex components including internal cooling channels and internal structures:

1. Cooling channels (flow optimization)
2. Optimise resonant frequency
3. Topology optimization
4. Cleaning of Channels (loose particles)



Additive Manufacturing solutions for Medical & Analytical market



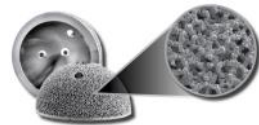
Dental steg



Jaw



Spinal implants



Hip Joint

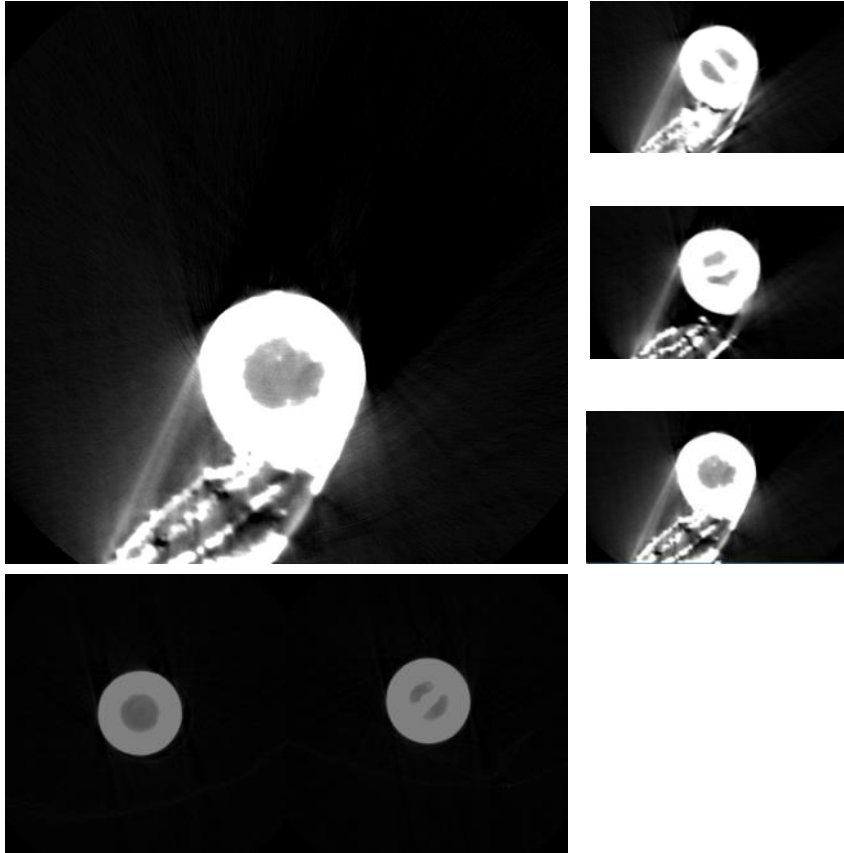
Focus Area

Complex implant design incorporating articulated joints and dedicated features

Mixing and transporting of fluids:

1. Scanning,
2. Value Engineering
3. Topology optimization

Additive Manufacturing solutions for Medical & Analytical market



Focus Area

Complex implant design incorporating articulated joints and dedicated features

Mixing and transporting of fluids:

1. Scanning,
2. Value Engineering
3. Topology optimization



Additive Manufacturing solutions for Industrial Automation market

Focus Area

Complex integrated components including internal cooling channels and internal structures. Mixing and transporting of fluids:

1. Cooling channels (flow optimization)
2. Hollow stiff structures
3. Optimize resonant frequency
4. Topology optimization
5. Cleaning of Channels (loose particles)



Printing Process: different technologies

3D Systems ProX300



SLM Solutions 280 HL

- Focus on Industrial Additive Manufacturing
- Vertical Integrated Supply Chains (From powder to part)
- Application development
 - Integration of functions into one part
 - More complex parts
 - New design options will contribute to lower TCO

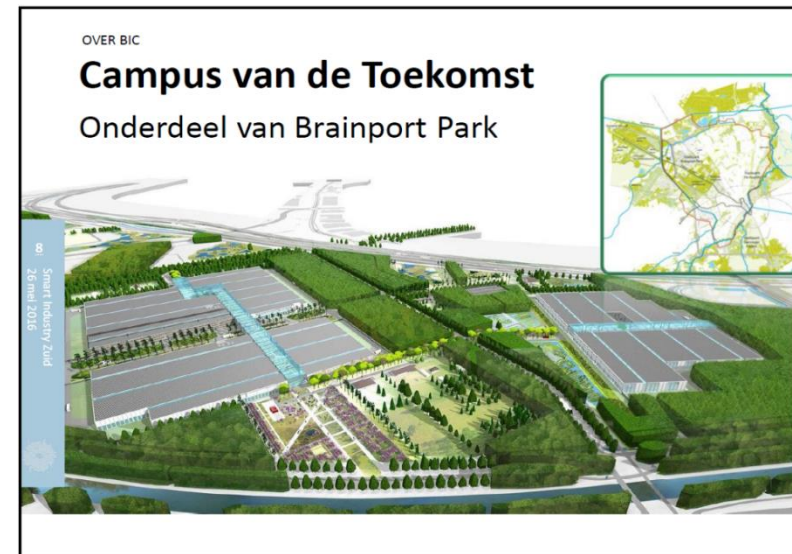
But lack of 3D printing expertise and lack of mature 3D printing technology are main challenges

***So focus on:
education,
sharing of experiences and examples***

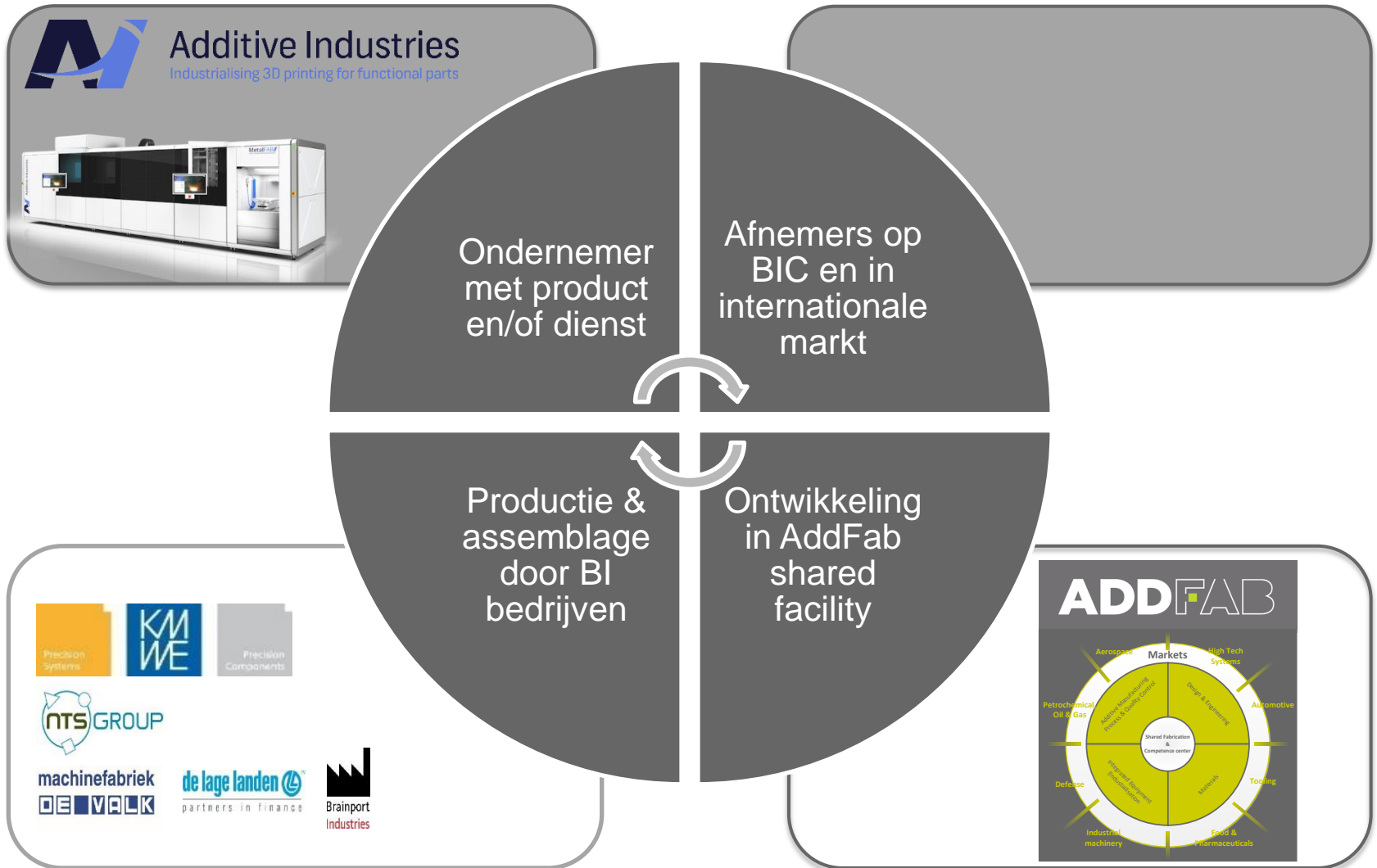


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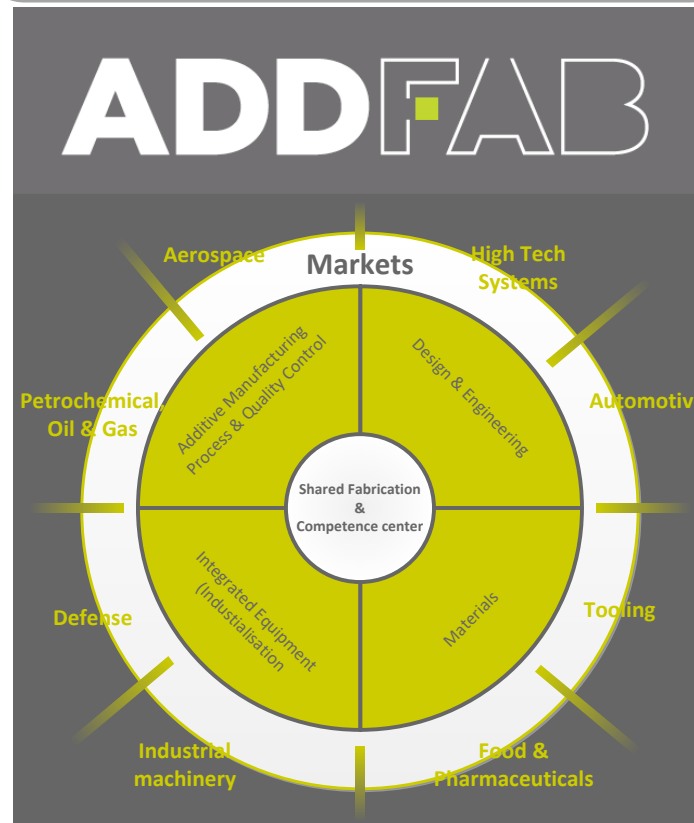
Fabriek van de Toekomst



Het businessmodel BIC



AddFab focus



P2
Quality Management
Proof of Quality procesflow

P1
Industrialisatie
AM integratie voor post processing: frezen en meten

P3
Industrial applications
Workshops e.d.

ADD FAB

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