voxeljet AG

Industrial 3D Printing



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AGENDA

- **Company & business model**
- Technology & products
- Market & customers
- VJET X – additive series production for leading German car maker
- Financials

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SAFE HARBOR SUMMARY

This presentation contains forward-looking statements concerning voxeljet AG's business, operations and financial performance and condition as well as our plans, objectives and expectations for our business operations and financial performance and condition. Any statements that are not of historical facts may be deemed to be forward-looking statements. You can identify these forward-looking statements by words such as "believes," "estimates," "anticipates," "projects," "expects," "plans," "intends," "may," "could," "might," "will," "should," "aims," or other similar expressions that convey uncertainty of future events or outcomes. Such forward-looking statements involve known and unknown risks, uncertainties, and other factors that could cause actual results to differ materially from the projections and estimates contained herein and include, but are not limited to statements relating to: the current trend and inflection point of the market or industry; success and effects of our integrated business model; market demand or market acceptance of our products or services; ability to turn Services customers into Systems customers; expected growth of the 3D printing market; ability to meet growing demand; introduction of VJET XIOB; continued innovation by voxeljet AG; new applications and markets to be supported by voxeljet AG; expected market sizes; actual and successful performance relating to VJET X printers; and voxeljet AG's ability to deliver a fully automated 3D printing solution for mass production. Factors that could cause actual results to differ materially from these forward-looking statements include, among others: the risks inherent in the company's industry; performance of and customer demand at the service centers; decisions and activities of the Company's management affecting margins, investment, capital spend; the Company's use of capital and strategy; the Company's ability to provide products and services satisfactory to its customers; development and achievements by competitors; economic and market conditions; the Company's outstanding indebtedness; the Company's ability to maintain sufficient internal controls over financial reporting; the impact of issuances of additional ADSs; and risks associated with conducting a global business, including application of foreign laws to contract and other disputes, environmental laws, enforcement and uncertain political and economic environments. These risks and other factors are discussed in more detail in the Company's public filings with the Securities and Exchange Commission. Statements made herein are as of the date hereof and should not be relied upon as of any subsequent date. The Company's past performance is not necessarily indicative of its future performance. The Company disclaims any obligation to update any forward-looking statements.

DISCLAIMERS

Guidance

Any estimates, forecasts or projections set forth in this presentation have been prepared by voxeljet AG management in good faith on a basis believed to be reasonable. Such estimates, forecasts and projections involve significant elements of subjective judgment and analysis as well as risks (many of which are beyond management's control). As such, no representation can be made as to the attainability of management's forecasts and projections. Readers are cautioned that such estimates, forecasts or projections have not been audited and have not been prepared in conformance with International Financial Reporting Standards.

Market and Industry Data

This presentation includes industry and market data, forecasts and information that was prepared based, in part, upon data, forecasts and information obtained from industry publications and surveys and other independent sources available to voxeljet AG. Some data also are based on voxeljet AG's good faith estimates, which are derived from management's knowledge of the industry and from independent sources. These third party publications and surveys generally state that the information included therein has been obtained from sources believed to be reliable, but that the publications and surveys can give no assurance as to the accuracy or completeness of such information. voxeljet AG has not independently verified any of the data from third-party sources nor has it ascertained the underlying economic assumptions on which such data are based.

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Management board



Dr. Ingo Ederer

CEO, founder and shareholder

20 years with voxeljet
26 years of industry experience

Management combined
holds ~20% of VJET shares

Rudolf Franz



CFO, COO and shareholder

16 years with voxeljet
24 years of industry experience

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voxeljet at a glance

Established in **1999**

5 locations worldwide

327 employees (FY18)

Binder-Jetting Technology for highest scalability in Additive Manufacturing

Industrial 3D-Printing: more than 400 patents and patent applications

Public company traded on **NYSE** since October 2013



"Our vision is to establish a new manufacturing standard by constantly pushing technological boundaries, enabling cost-effective mass-production utilizing our high-speed, large-format 3D printers and on-demand parts services."

Dr. Ingo Ederer, CEO & founder of voxeljet

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Synergies built on integrated business model

Services
(On-demand 3D printing)

Systems
(3D printers & after-sales)

2018 Sales: EUR 13.8m

Volume contracts for printed parts

Strong competitive position:
global footprint/largest printers in the industry

Optimized CapEx and OpEx for own assets

Low barriers to entry
send data -> receive printed parts; from n=1

Synergies

Risk balancing
- Capture business either as 3D-Printer sale or on-demand printing contract
- Balance long with short sales cycles

Customer
- Early awareness of new projects
- Strong customer relationships

Operations
- Long track record of executing large-scale projects
- High cost competitiveness and efficiency

Innovation
- Improvement of applications and solutions
- Insights into customer processes

2018 Sales: EUR 12.2m

Multi-system sales

After-sales activities

Direct parts technology
High Speed Sintering

Indirect metals technology via hybrid AM

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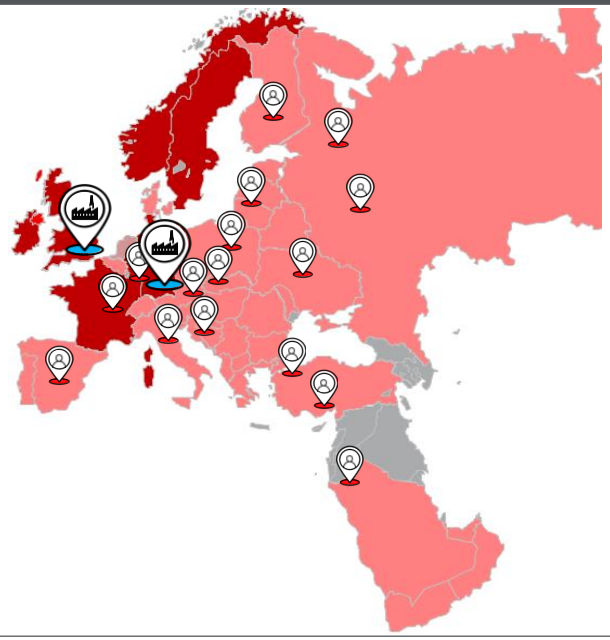
Powerful global sales network and production footprint

Americas: 37% of Sales

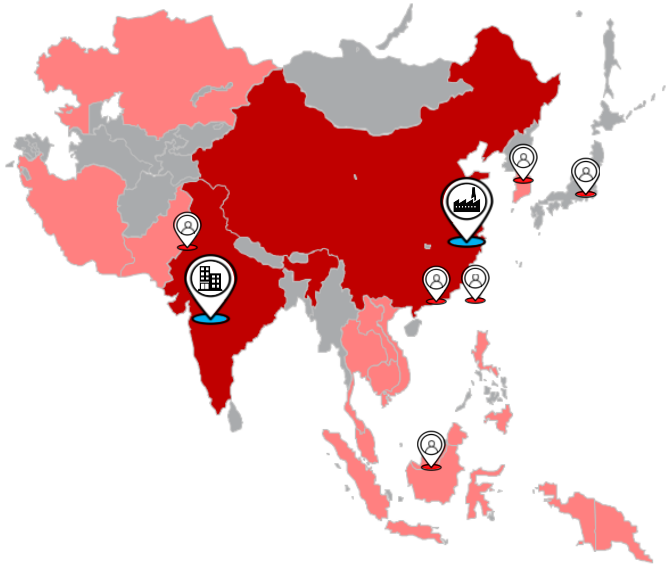
[based on 2Q19 sales]



EMEA: 51% of Sales



Asia: 12% of Sales



4 voxeljet plants / 1 sales office (India)

21 voxeljet sales partners

voxeljet direct sales

voxeljet sales partner coverage

Facilities in US and Asia focus on local and regional customers:
Key advantages of overseas facilities include: geographic proximity reduces transportation costs and purchase lead-time; provides timely value-added services for customers; staffs local engineers to promptly deliver technical and maintenance support

50,000 Sq. Feet	*10,000 Sq. Feet*	*135,000 Sq. Feet*	*1,000 Sq. Feet*	*78,000 Sq. Feet*
USA *3D Parts Production Center*	**UK** *3D Parts Production Center*	**Germany** *HQs, R&D/Engineering, 3D Parts Production Center*	**India** *Office*	**China** *3D Parts Production Center*

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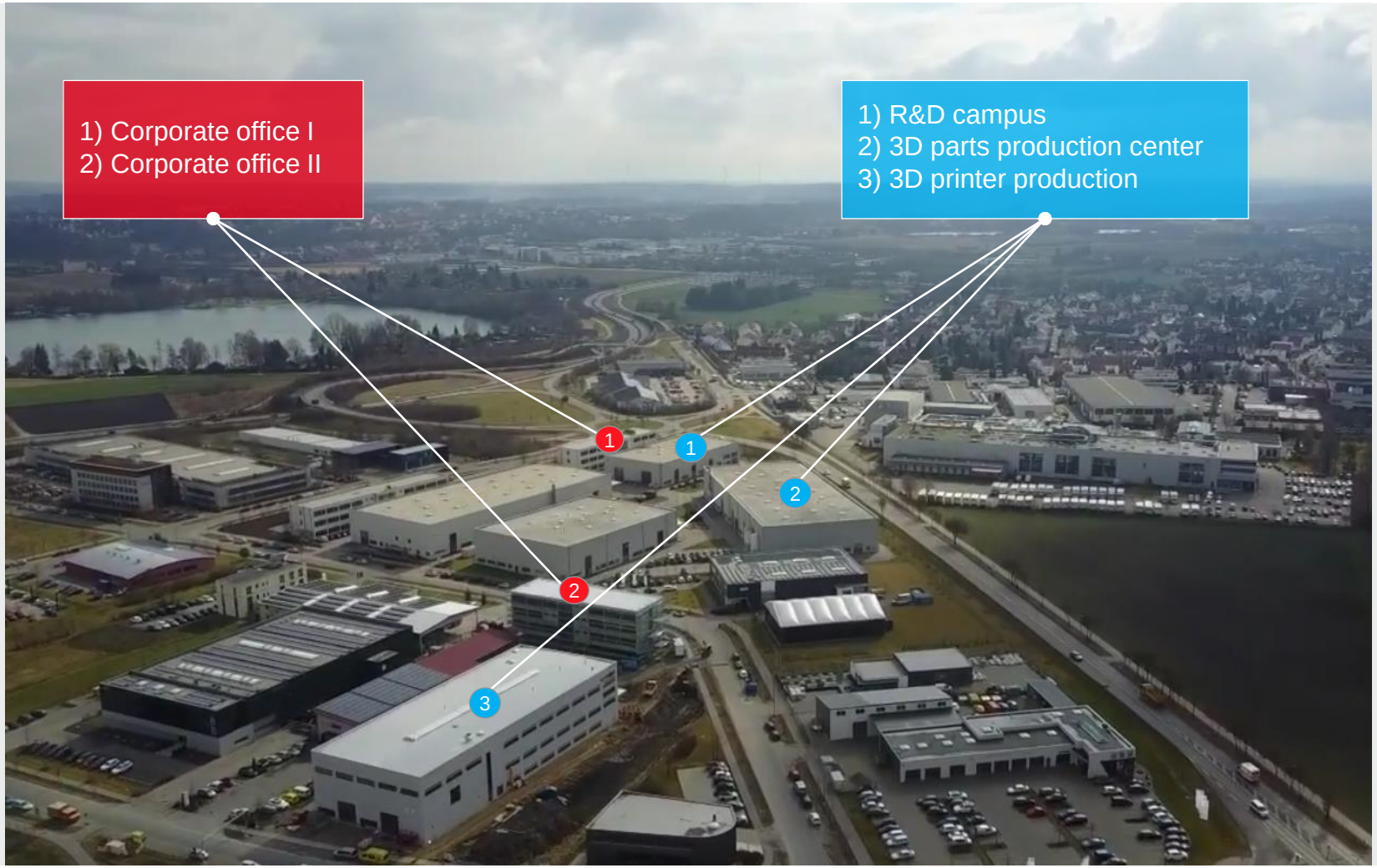
HQs in Germany (nearby Munich)



Comments

> One of the largest 3D parts production centers in Europe

> R&D hub: 51 (FY18) colleagues working on new and improved processes and 3D printers

> Production of print heads as the most critical part of a 3D printer

> Assembly of 3D printers

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New production facility in China (nearby Shanghai)





Opening ceremony, May 2019

Comments

> China as the largest casting market

> New state-of-the-art facility, 36 months free of rent (beginning in March 2019)

> Plan to source / assemble parts of our printers in China to reduce costs; primarily for the Asian market

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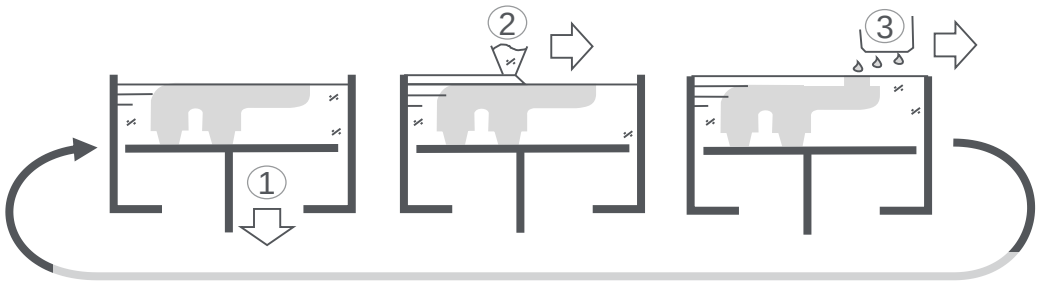
Powder binder-jetting technology

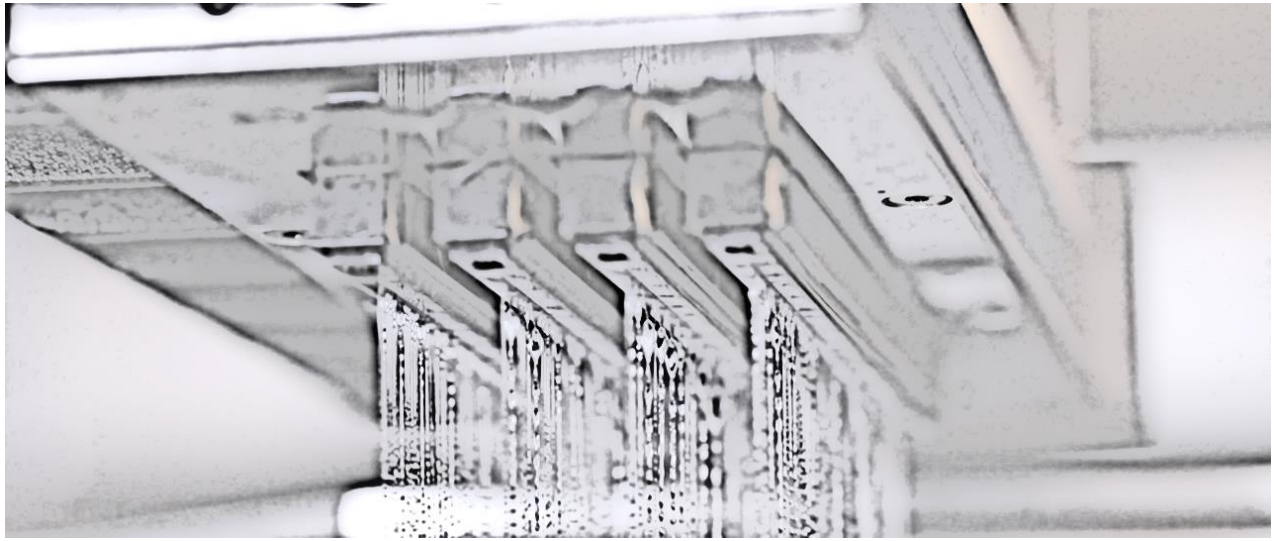


In additive manufacturing, shaped bodies are built up layer by layer. Powder binder-jetting repeats the steps:

1) Lower the layer

2) Coating with particle material such as sand or plastic

3) Printing with a binding agent or ink



Key advantages as compared to other additive manufacturing technologies:

> **Scalability: number, size and performance of printheads**

> **Ready for large-scale manufacturing**

> **Material diversity: various industrial grade materials**

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Product portfolio



VJET X *Layer Time < 5 seconds*
https://www.youtube.com/watch?v=xZpmNZ3LCEM



VX4000 4,000 x 2,000 x 1,000 | 60 | 144 |
$2,100,000



VX2000 2,000 x 1,000 x 1,000 | 37 - 84 | 21 - 58 |
$950,000 – 2,000,000



VX1000 1,000 x 600 x 500 | 15 - 65 | 9 - 43|
$840,000 – 1,000,000



VXC800 850 x 500 x ∞ | 78 | 12 |
$735,000



VX500 500 x 400 x 300 | 25 – 35 | 4 - 7 |
$445,000 – 505,000



VX200 300 x 200 x 150 | 20 – 40 | 0,6 - 2 |
$150,000 - 260,000

Build Box Size (L x W x H) (millimeters) | Layer Time (seconds)[(1)] | Volumetric Output Rate (liters per hour)[(2)] | List Price[(3)]

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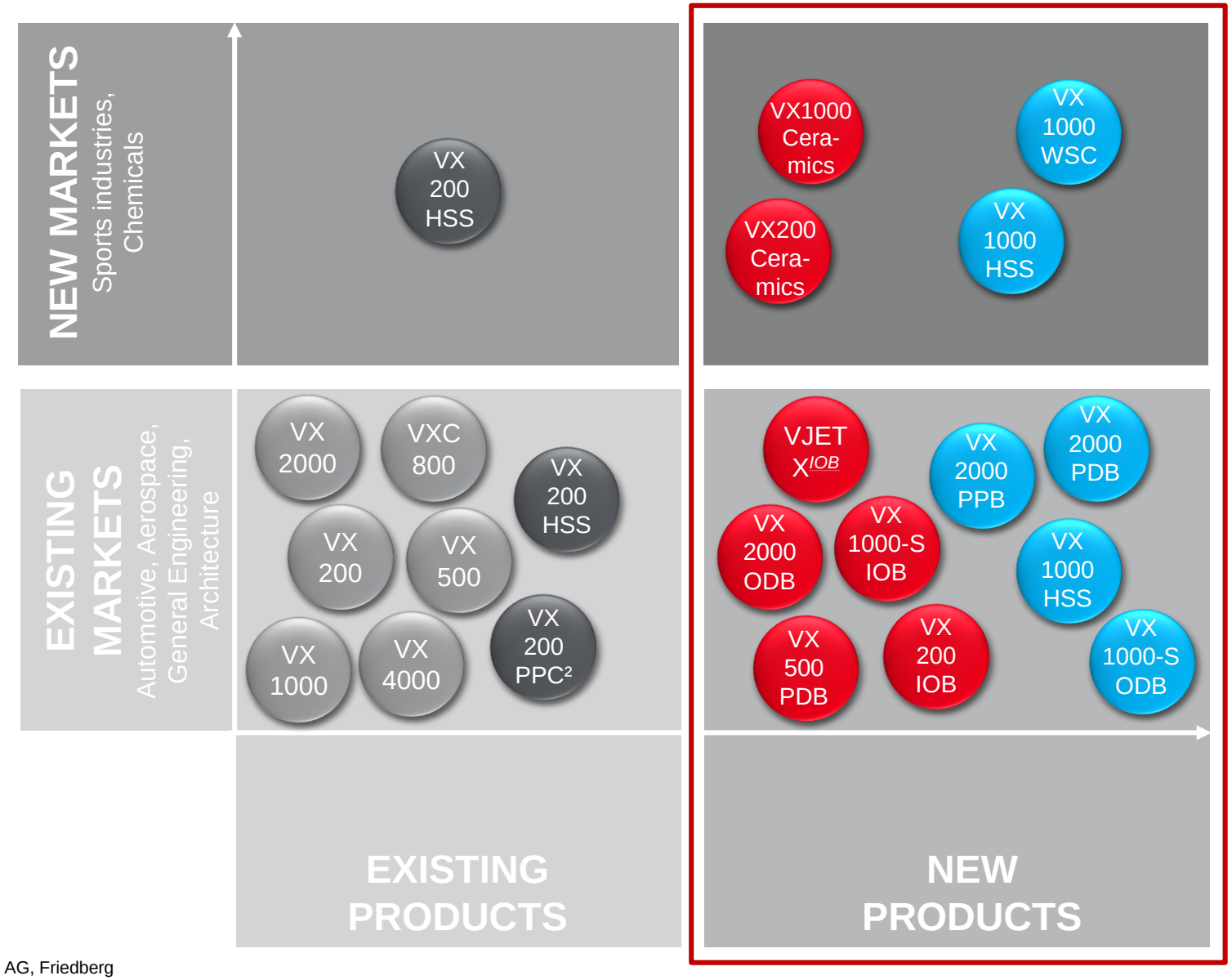
(1) Layer times are indicative and depend on system configuration and materials
(2) Volumetric output rates are approximated and depend on, among other factors, layer thickness
(3) Prices are indicative, depend on system configuration and materials and are subject to change

Product roadmap



Existing Products

Launched in 2017

Launched in 2018

To be Launched in 2019

35% of FY19
Systems sales estimated to come from new products

50% of FY20
Systems sales estimated to come from new products

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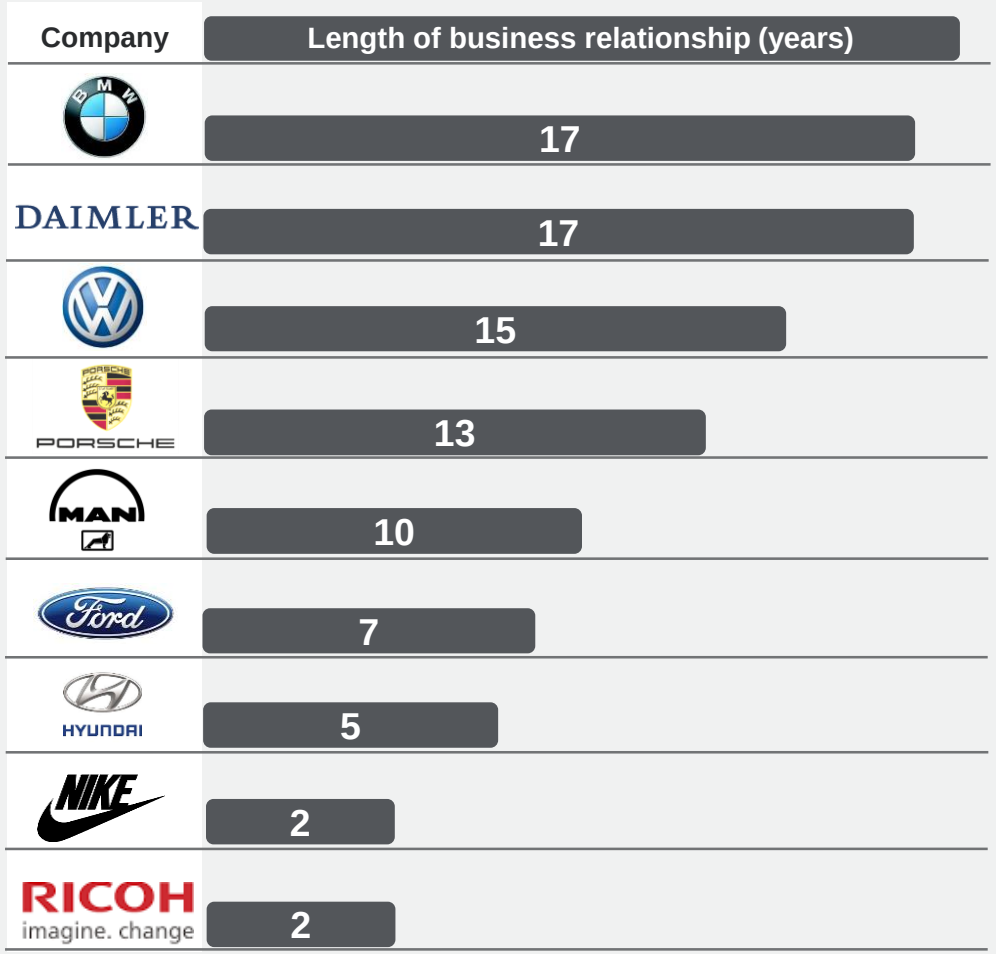
Proven track record

Long-term relationship with global industry leaders



Why Additive Manufacturing is being adopted

90% of all manufactured goods contain some metal castings, and our disruptive technology is rapidly displacing how molds and patterns are made.

> Key benefits
  - Process and product innovation
  - Higher accuracy and optimized geometric shapes
  - New and improved features and functionalities
  - Faster time to market
  - Lower labor requirement

> No need to invest in tooling – molds created using 3D printers (reduced storage needs)

> Ability to alter the design digitally and re-print the mold / shell quickly without significant incremental cost

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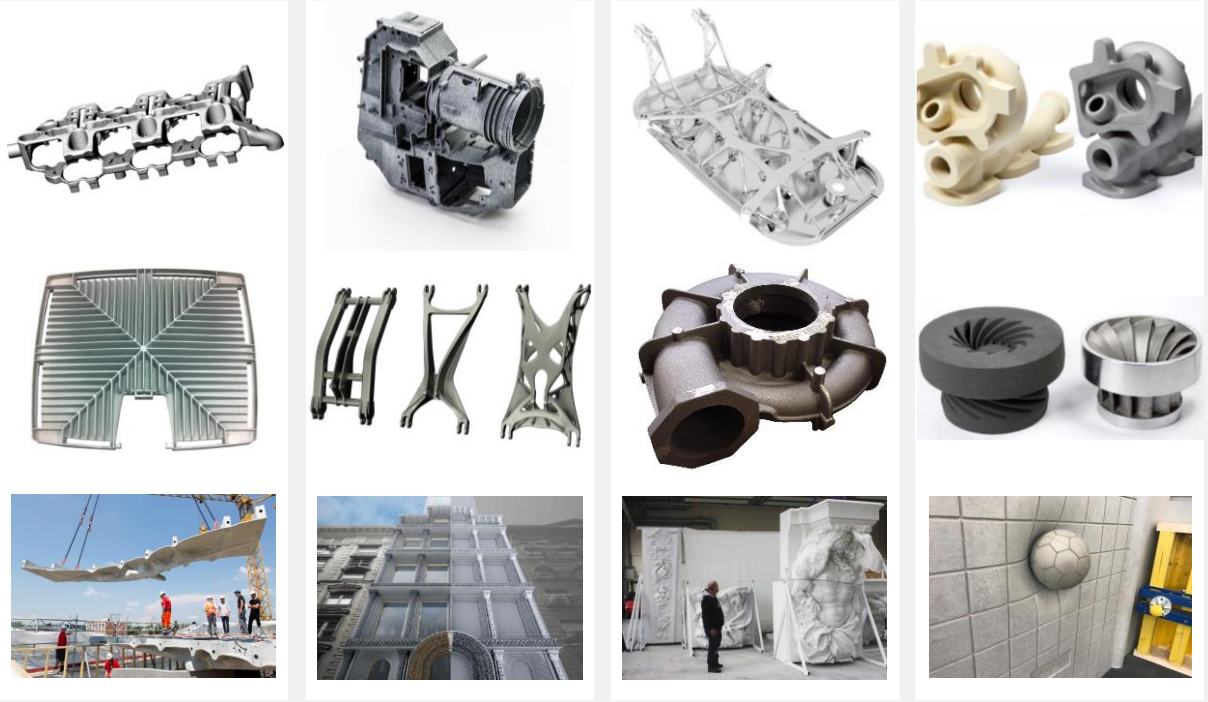
Applications

AUTOMOTIVE, AEROSPACE, GENERAL ENGINEERING

MECHANICAL ENGINEERING & DESIGN

ART & ARCHITECTURE



Size
Largest 3D printing systems in the market

Speed
High speed printing and fast availability

PRODUCTIVITY IN 3D

Material diversity
Various applications, processes and materials

Cost efficiency
Optimization of production and service costs

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Aerospace – aircraft doors

original aircraft door



3D printed pattern after geometric optimization



final precision-cast aircraft door (aluminum), using the 3D printed pattern



> **Original design** **7.2 kg**

> **New optimized design** **4.8 kg**

> **33% weight reduction**

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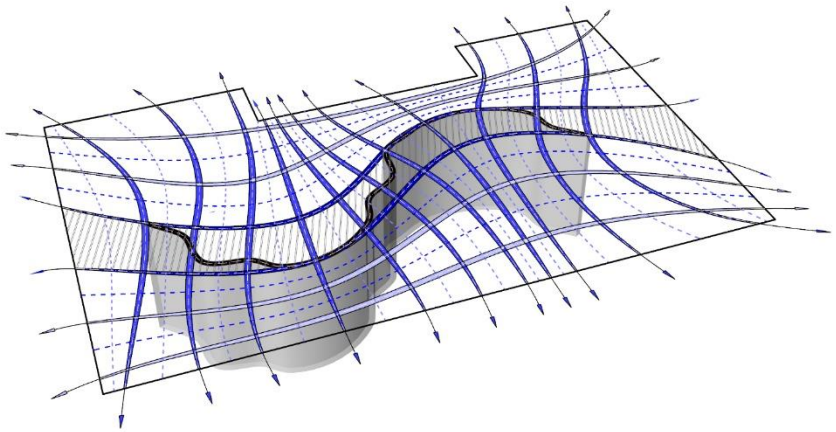
in cooperation with SOGECLAIR aerospace

Architecture – concrete ceiling

Concrete casting formwork



- **80 m² lightweight ceiling**
- **6,000 liters of 3D printed sand molds**
- **Integration of technical installations (sprinklers, lightning)**
- **Ornamental structures for architectural experience**









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Project partners

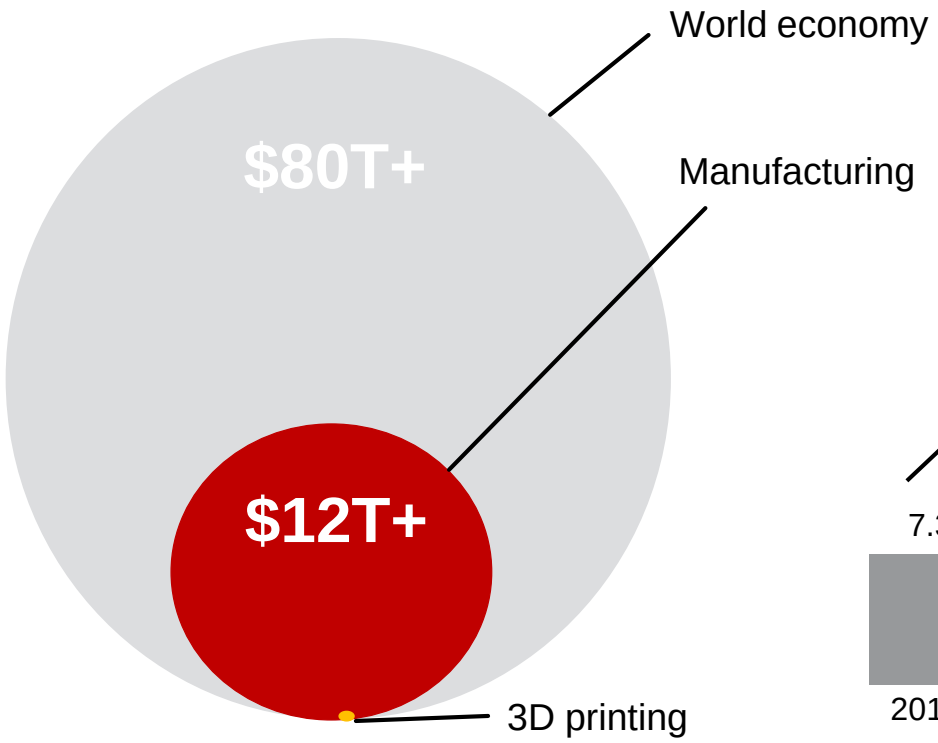
National Centre of Competence in Research Digital Fabrication

NEST | Empa eawag

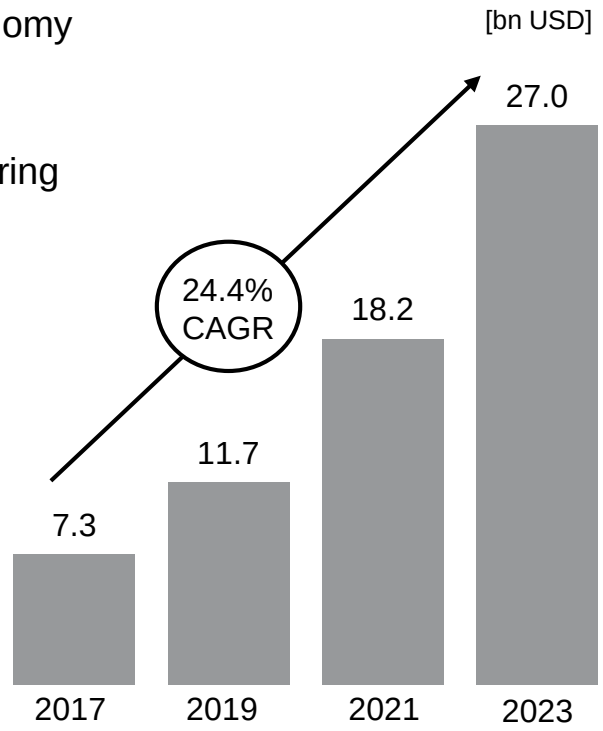
ETH zürich

Substantial addressable market for 3D printing

Manufacturing sector offers great potential for 3D printing

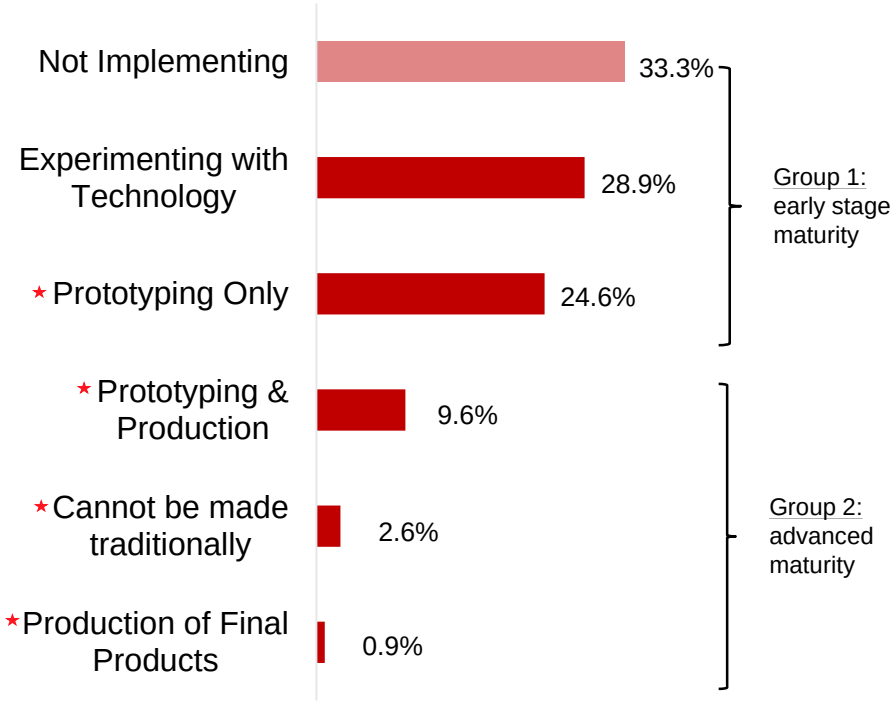


3D Printing market expected to continue strong growth



Industrial Uses

Significant Runway for Further Adoption



★ Targets for Systems sales

Source: Wohler's Associates (2018), HPQ, ATKearney, VJET

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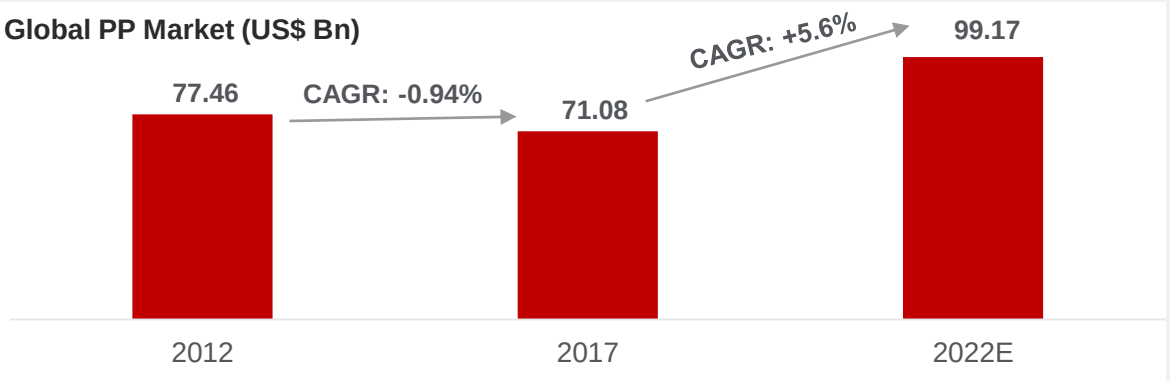
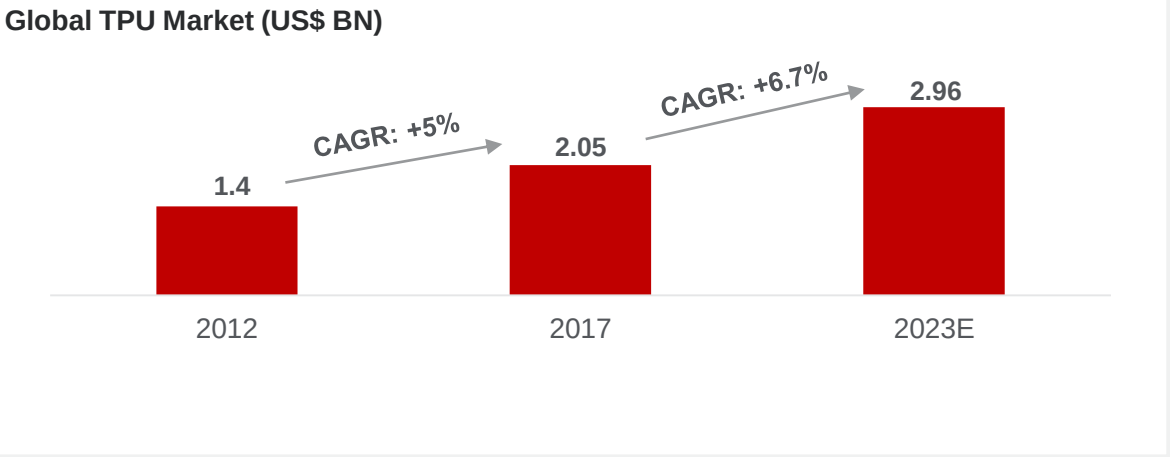
Opening up new market segments through innovations in HSS

Polypropylene (PP)



Thermoplastic Polyurethane TPU



Functional parts from High Speed Sintering (HSS)

voxeljet has proven that it is possible to use High Speed Sintering (HSS) with polypropylene (PP) and thermoplastic polyurethane (TPU) on larger platforms.

- PP can be used in most plastics end-use markets; Exp. market size in 2022: 99.17bn USD[1)]
- TPU can be used in ultra-flexible products; Expected market size in 2023: 2.96bn USD[2)]

This expands the scope of HSS to new end markets such as

- Consumer goods & Electronics (sports equipment, footwear, prosthetics)
- Industrial & Services (enclosures, fluid & air ducts, pneumatic robotics)
- Automotive (customized interior parts, fluid vessels, snap fits and exterior components)

A large HSS printer for series production (sample drawing below) is currently under development and a first prototype is expected **to be presented in November 2019** at the Formnext show in Frankfurt.



(1) MarketsandMarkets: Polypropylene Market by Type, Global Forecast to 2022
(2) Market Research Future: Thermoplastic Polyurethane Market Research Report- Forecast to 2023

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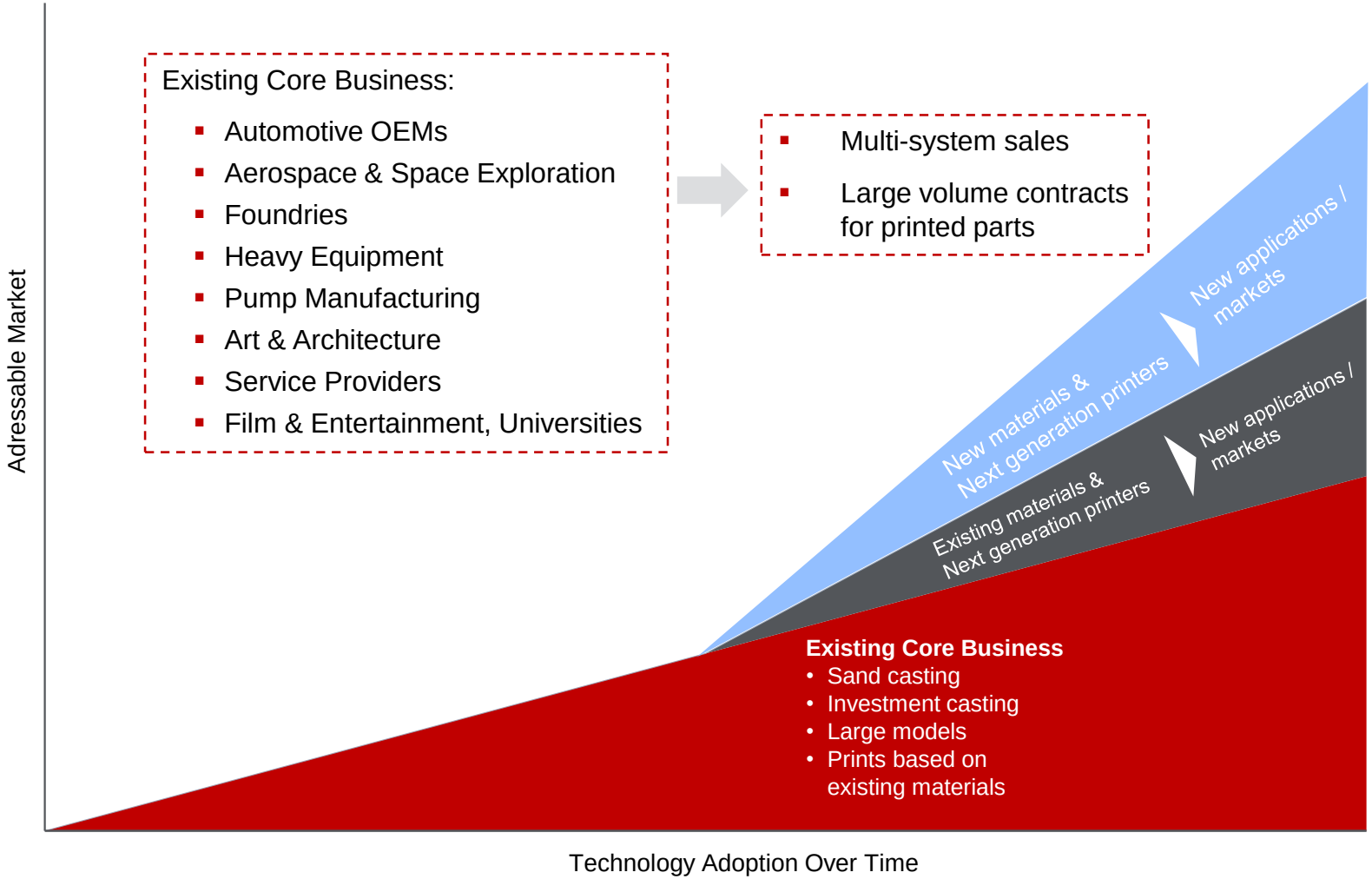
Our growth strategy remains unchanged



Comments

> **New materials:**

- For High Speed Sintering (HSS): polypropylene (PP), thermoplastic polyurethane (TPU), customer specific materials
- For sand casting: environmentally friendly binder system for zero emissions during casting

> **New applications for HSS**

- Consumer goods & Electronics (sports equipment, footwear, prosthetics)
- Industrial & Services (enclosures, fluid & air ducts, pneumatic robotics)
- Automotive (customized interior parts, fluid vessels, snap fits and exterior components)

> **Next generation printers:**

- From small series production to large-scale manufacturing via voxeljet X-technology

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- **VJET X – additive series production for leading German car maker**
- Financials

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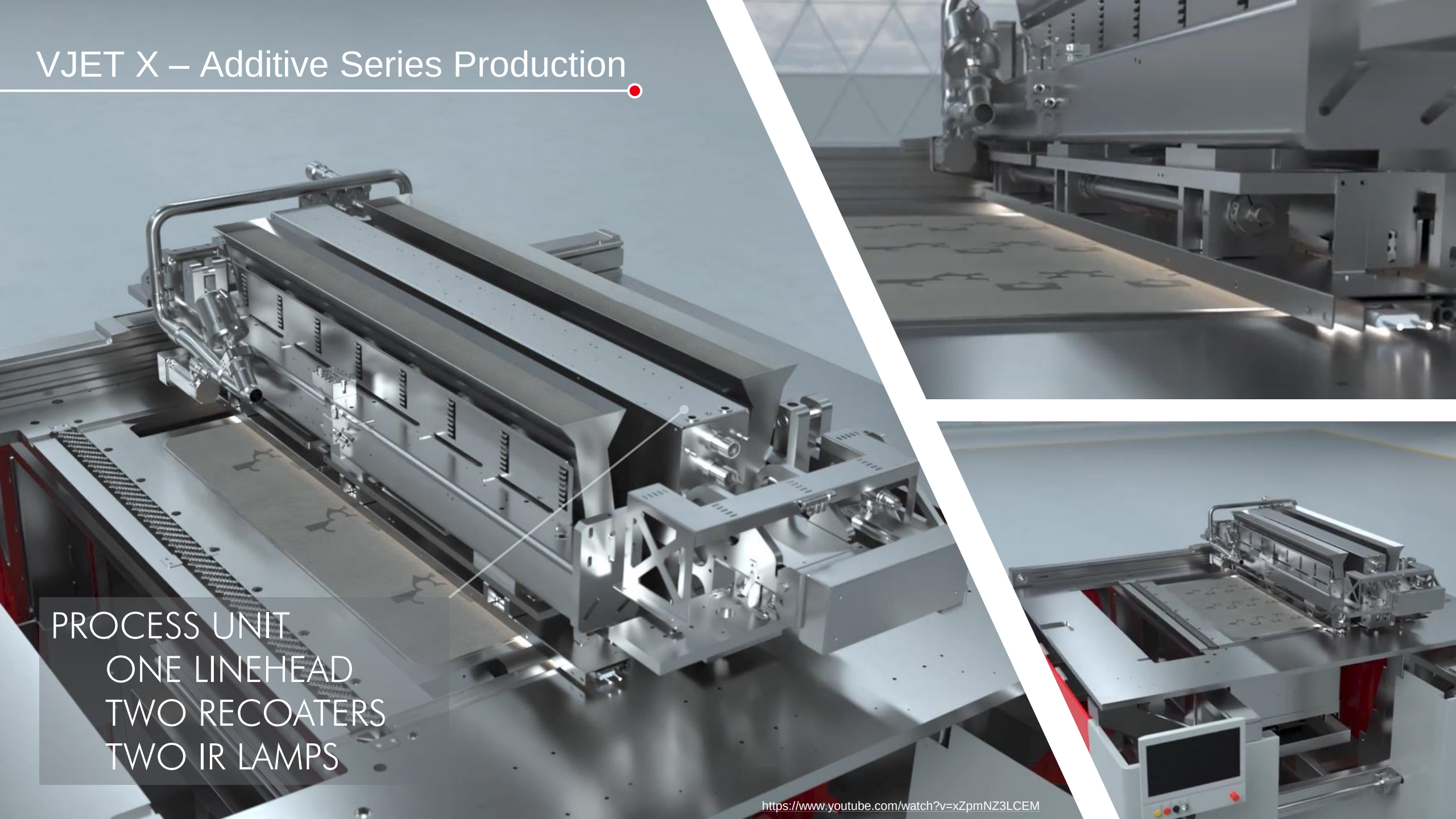
VJET X – Additive Series Production



PROCESS UNIT
ONE LINEHEAD
TWO RECOATERS
TWO IR LAMPS

https://www.youtube.com/watch?v=xZpmNZ3LCEM

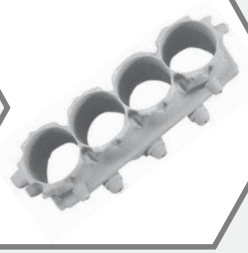
What is VJET X?

Conventional Manufacturing

Core Shooting Machines







Casting Line



- **Complexity restrictions**
  New vehicle components are too complex to be manufactured with core shooting machines. Individual parts would be required to be manufactured as multiple components and then assembled into a single piece.

+ Cost efficiency through integration into casting line
+ State of the art for production of simpler parts

Hybrid Additive Manufacturing (HAM)

3D Printer VJET X





Casting Line



+ No complexity restrictions
+ Functional integration
+ Printed as single piece
+ Cost efficiency through integration into casting line

Hybrid Additive Manufacturing (HAM) is a combination of 3D printing and casting:

HAM combines the advantages of 3D Printing **(product & process innovation)** with those of conventional manufacturing of metal parts via casting **(cost advantages, high degree of automation)**. This combination makes additive series production possible (more than 100,000 components per year).

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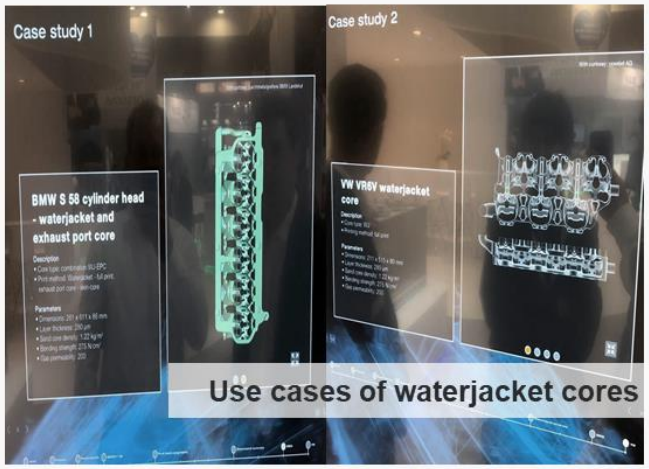
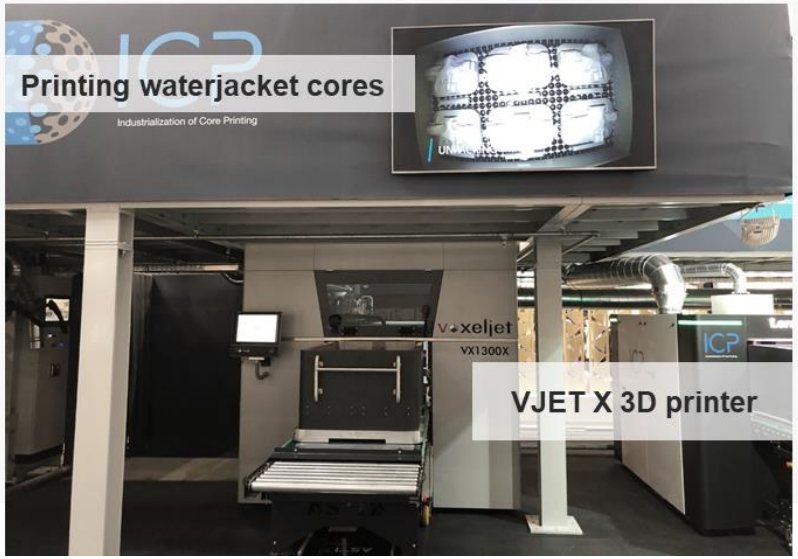
First presentation of VJET X at GIFA show (June 2019)













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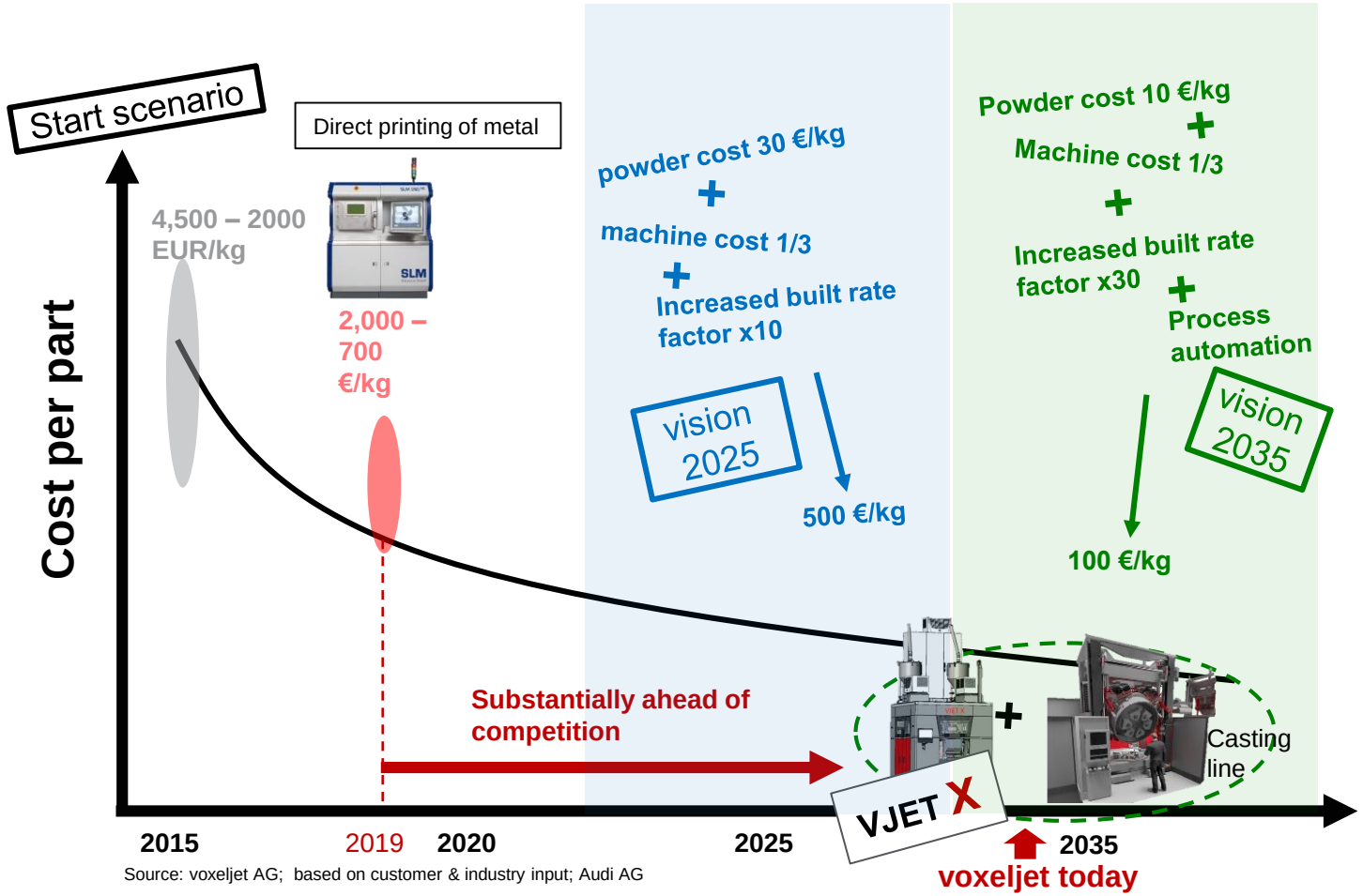
Why is this important?

Additive manufacturing of aluminum



Source: voxeljet AG; based on customer & industry input; Audi AG

Comments

> voxeljet has developed a new high-speed 3D printer: VJET X

> New environmentally friendly binder system creates zero emissions when casting the sand cores

> When combining VJET X and conventional casting lines, voxeljet can already today mass manufacture complex metal parts (aluminum, magnesium, etc.) at a fraction of the costs of other additive manufacturing (AM) players in the market

> With tightening regulation on pollution and fuel consumption, the evolution of CO_2 regulation remains the main driver for changes in vehicle technology

> Use of lightweight materials like aluminum in manufacturing is expected to double by 2030

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VJET X in automotive series production

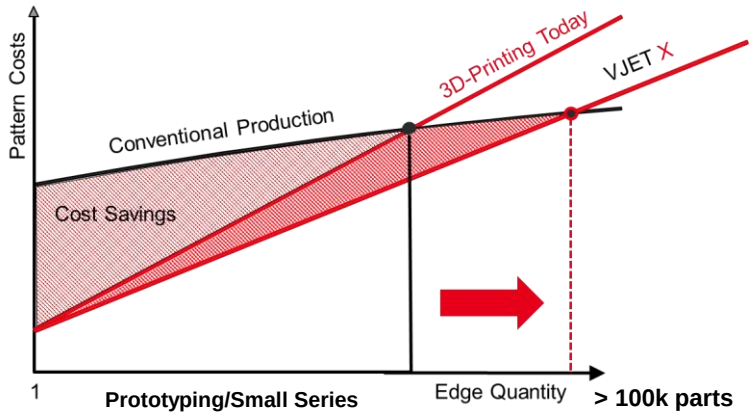
Dilemma for car manufacturers

> Increasing fuel-efficiency requirements mean that engines are becoming more complex (“downsizing”)

> Therefore, R&D departments of automotive OEMs developed new components for more efficient cooling of engines or batteries in EVs

> **BUT** the production departments could not produce them at scale: conventional production does not work because the component is too complex

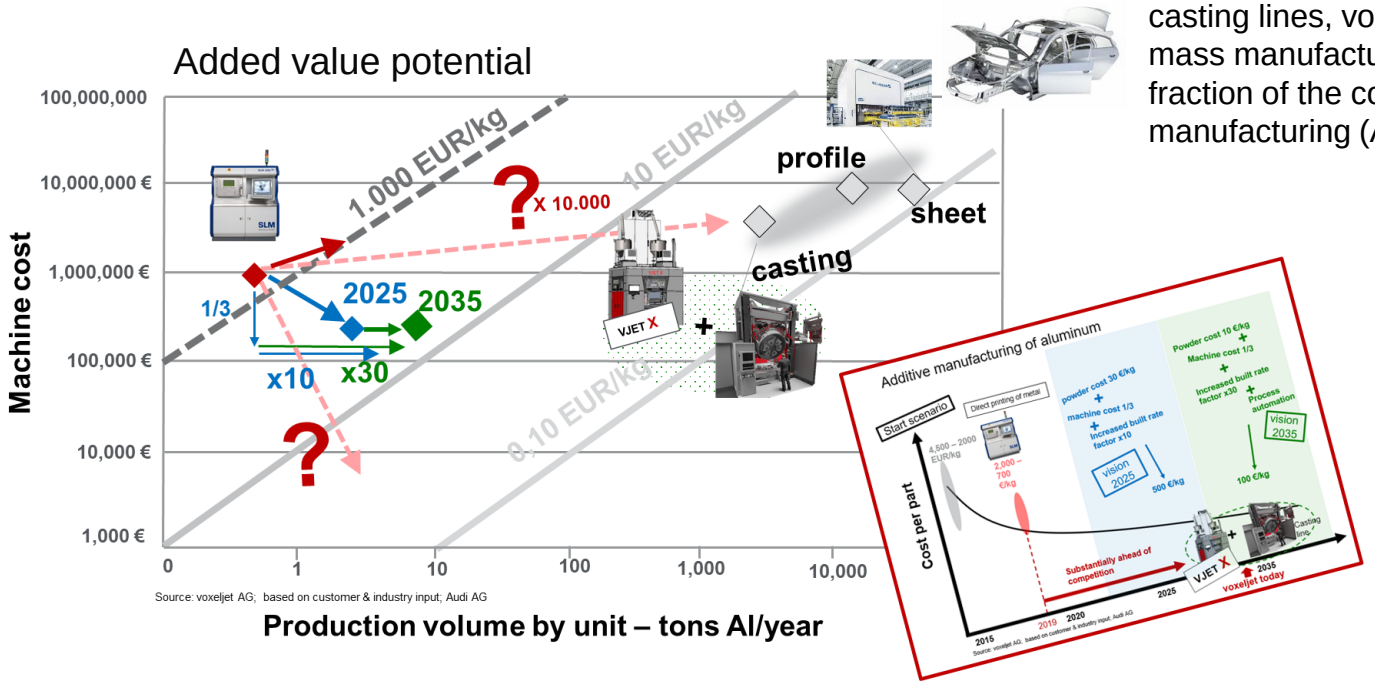
> Direct metal printing is too expensive/slow for series production



voxeljet solution: VJET X

> Because AM makes more complex geometries possible, these metal components have new features: applied to car production for example, components are lighter and have optimal geometric shapes for heat control: this can help to reduce vehicle CO_2 emissions substantially

> When combining VJET X and conventional casting lines, voxeljet can already today mass manufacture complex metal parts at a fraction of the costs of other additive manufacturing (AM) players in the market



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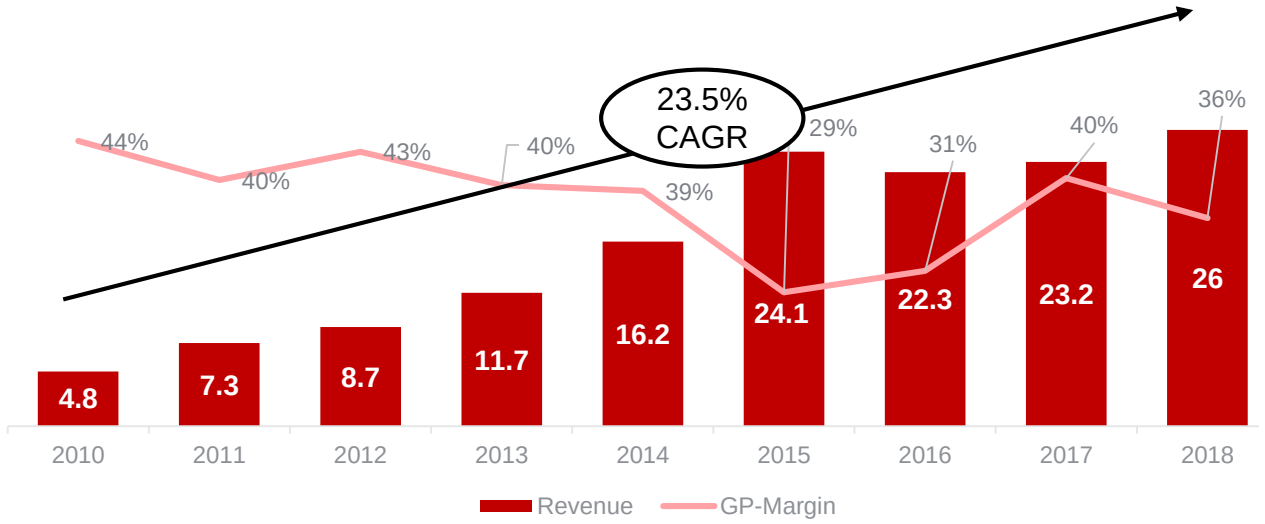
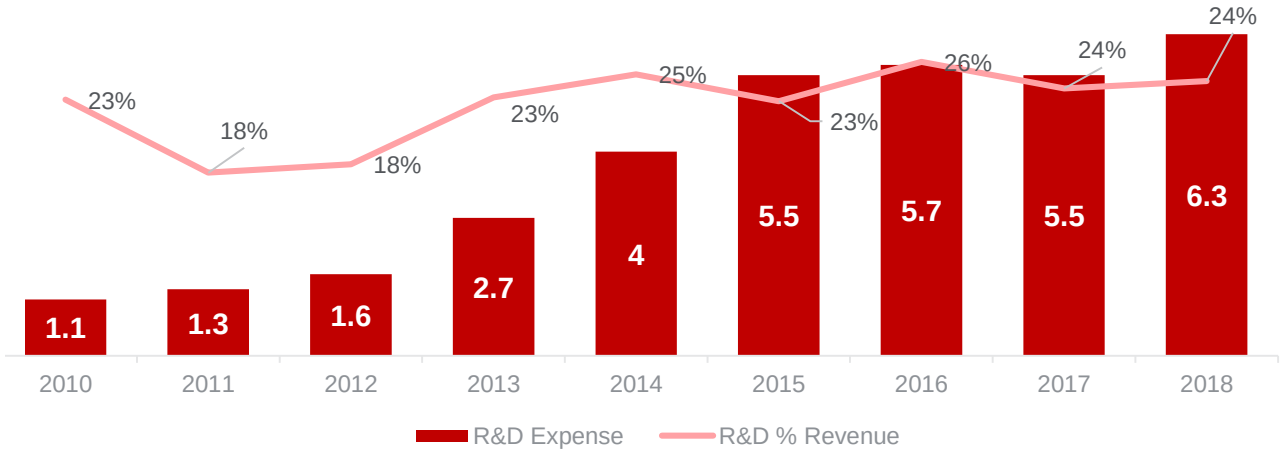
Long-term revenue growth supported by strong R&D

Long-term revenue growth

(€ in Millions)



Strong commitment to R&D



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Balance sheet (selected items)

Thousands of EUR (except per share data)	06/30/2019	12/31/2018
Cash and cash equivalents	5,986	7,402
Financial assets (bond funds)	9,104	12,905
Liquidity	15,090	18,659
Trade receivables	4,502	6,030
Inventories	12,174	10,064
Property, plant and equipment	30,849	27,675
Total debt and finance lease obligations	21,783	17,171
Equity	41,080	46,475
Weighted average shares outstanding	4,836,000	3,940,636
Weighted average ADSs outstanding	24,180,000	19,703,180

Comments

- Recent investment in infrastructure including the new Chinese service center requires little additional infrastructure investment in the near future
- Total debt of 21.8 million euros consists of 20.4 million euros of long-term debt, which includes 10 million euros from the EIB's *Horizon2020* venture debt program and 4.2 million euros of lease liabilities as a result of initially applying the IFRS 16 standard. These lease liabilities were previously classified as operating leases

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Projected long-term operating model 2025

- Expected revenue growth **15-20% p.a.**
- Projected gross margin **> 40%**
- Projected operating expenses

  R&D: 12.5% Revenue
  Sales: 10.0% Revenue
  Admin: 7.5% Revenue

- Expected EBITDA margin **20-22.5%**
  Expected EBIT margin **12.5-15.0%**

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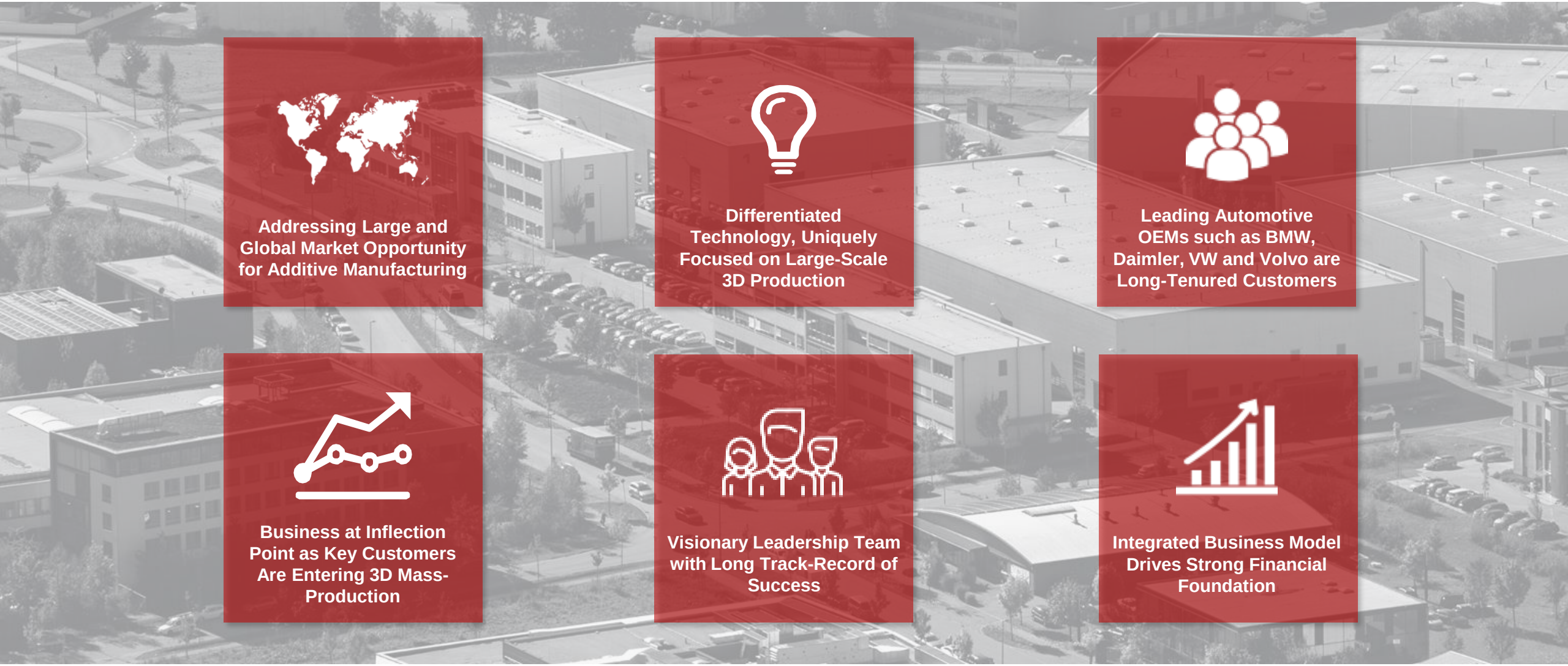
Investment highlights



Addressing Large and Global Market Opportunity for Additive Manufacturing

Differentiated Technology, Uniquely Focused on Large-Scale 3D Production

Leading Automotive OEMs such as BMW, Daimler, VW and Volvo are Long-Tenured Customers

Business at Inflection Point as Key Customers Are Entering 3D Mass-Production

Visionary Leadership Team with Long Track-Record of Success

Integrated Business Model Drives Strong Financial Foundation

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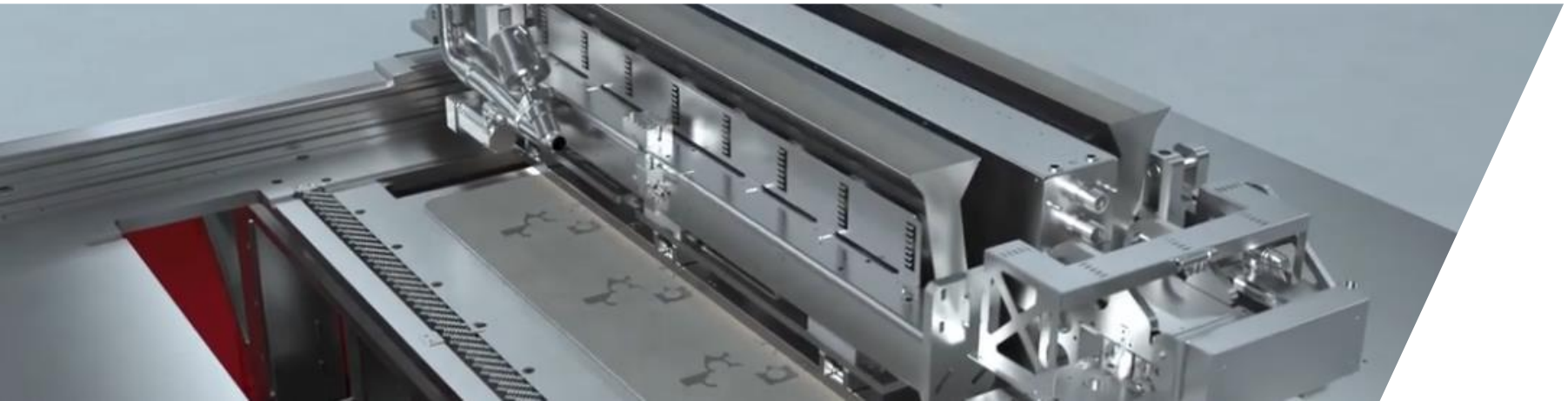
Industrial 3D Printing



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