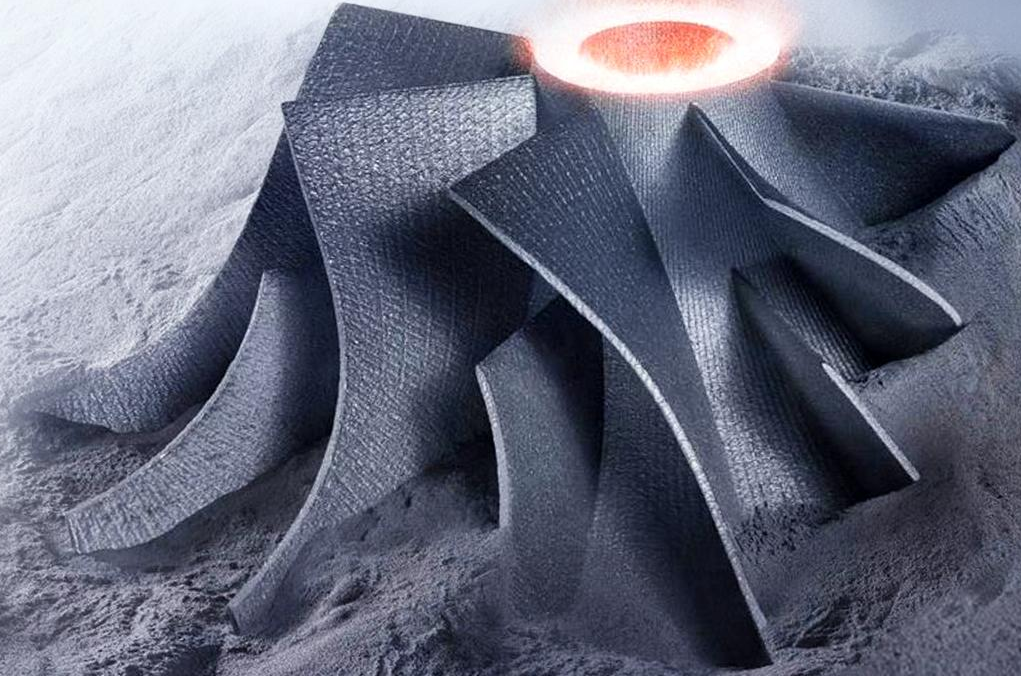


Industrial Additive Technologies –

the additive process chain with Laser Metal Fusion

Steffen Rübling
Application Engineer
Additive Manufacturing
Hannover Messe, 24.04.2018



TRUMPF is...



... a technology leader



Machine Tools



Laser Technology /
Electronics

... an independent family company



since **1923**

12.000

\$3.1b

11%

... close to the customer

71 subsidiaries worldwide
in over **40** countries






... an innovation promise



Additive
Manufacturing
LMD & LMF

Production Techniques in Comparison

Additive manufacturing as an extension to conventional methods

Production techniques in comparison				
Conventional methods				
01 Disjoining	02 Forming	03 Joining	04 Master forming	05 Additive
Shape adaptation through material reduction	Shape adaptation through heating or mechanical force	Connecting various components	Generating firm compounds by use of formless materials	Layer-by-layer connection of formless materials
e.g.: ✓ cutting ✓ grinding ✓ turning ✓ milling	e.g.: ✓ bending ✓ forging ✓ deep-drawing ✓ rolling	e.g.: ✓ welding ✓ screwing ✓ soldering ✓ gluing	e.g.: ✓ casting ✓ pressing ✓ extrusion ✓ electroforming	e.g.: ✓ metal 3D printing ✓ plastic 3D printing ✓ ceramic 3D printing
				

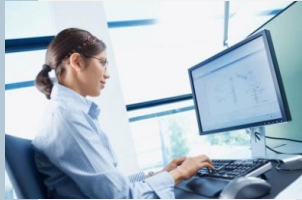
The way to the 3D printed part



AM Process Chain

From the idea to the finished 3D-printed part

Preparation



LMF Building process

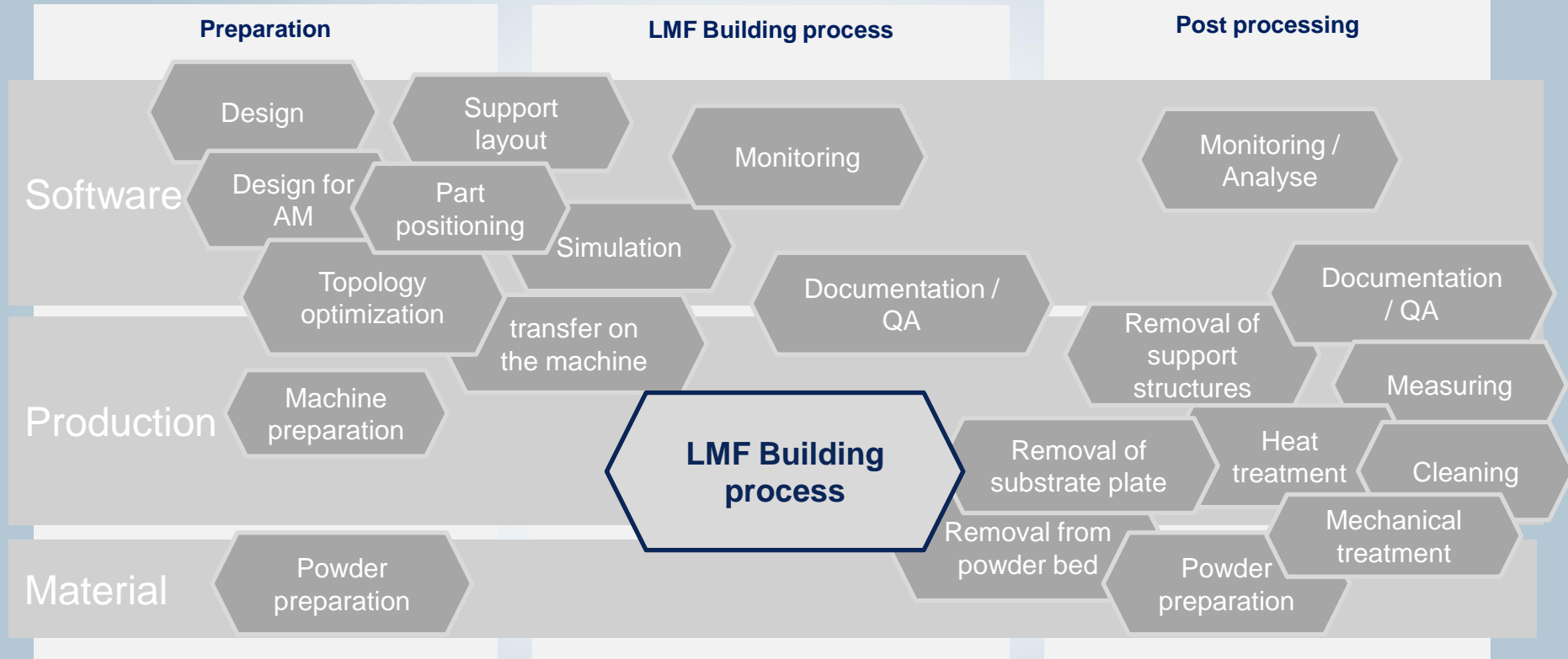


Post processing



AM Process Chain

From the idea to the finished 3D-printed part



AM Process Chain

From the idea to the finished 3D-printed part

Preparation

LMF Building process

Post processing

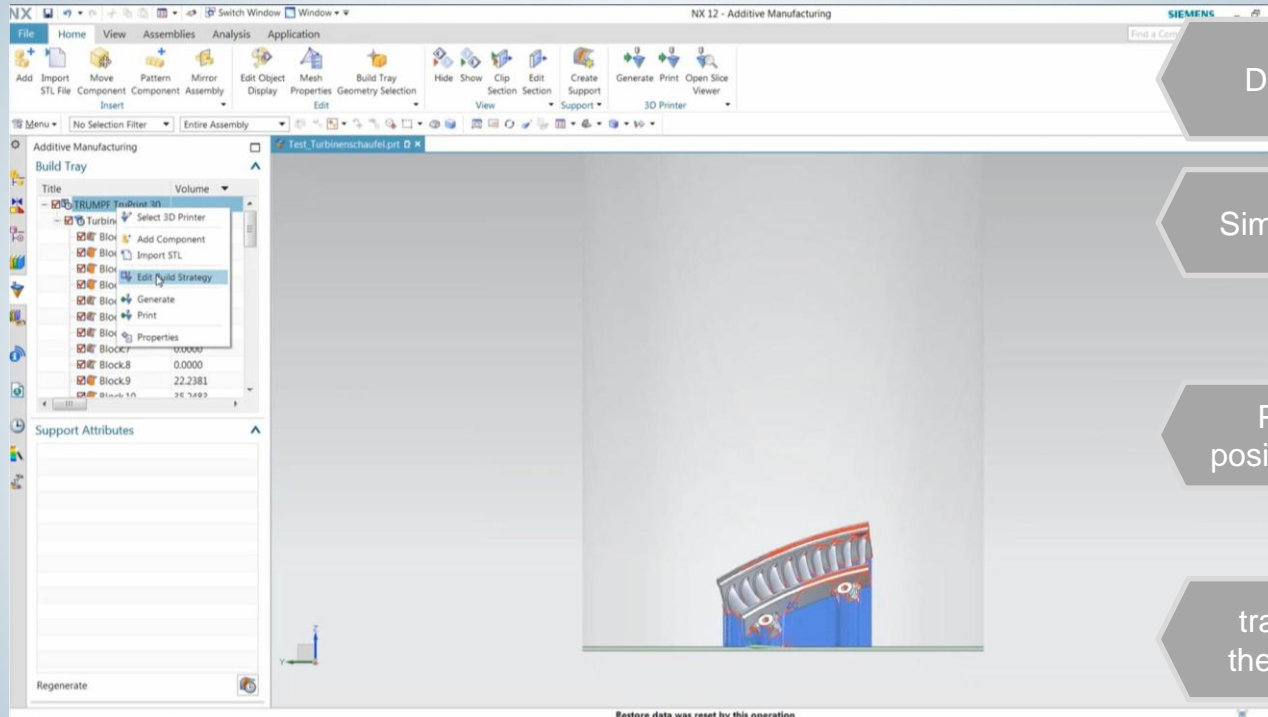
Software

Production

Material

Software

TruTops Print | Siemens NX



Design

Design for
AM

Simulation

Topology
optimization

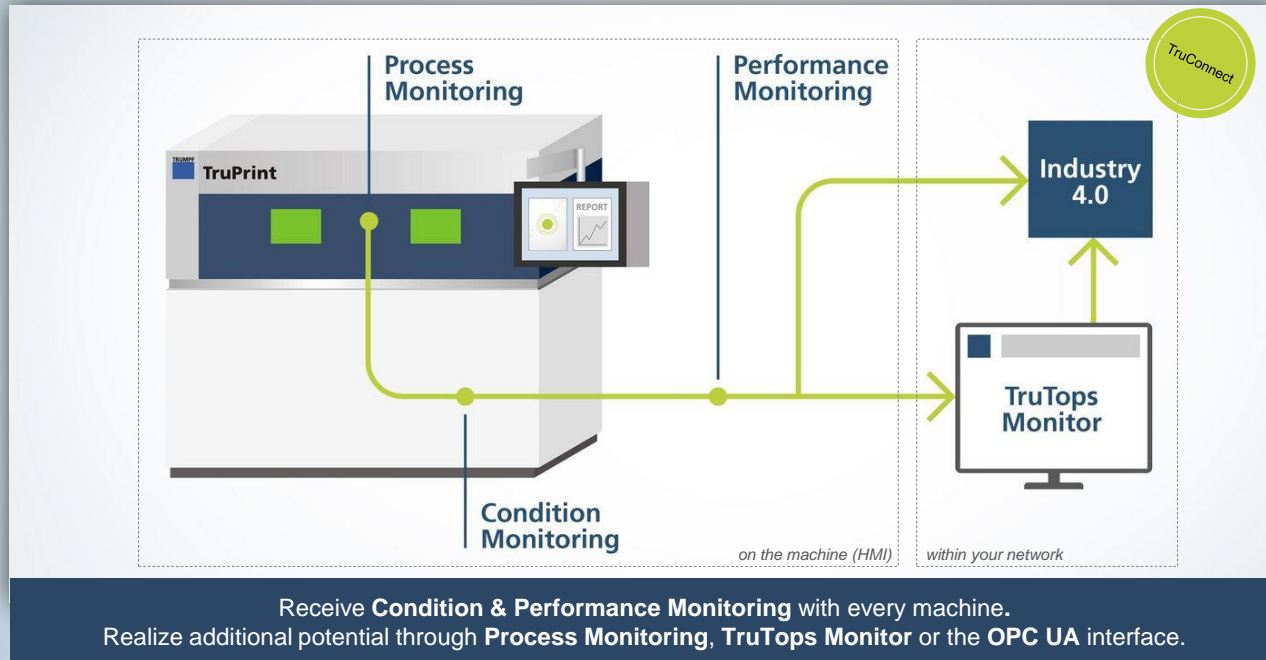
Part
positioning

Support
layout

transfer on
the machine

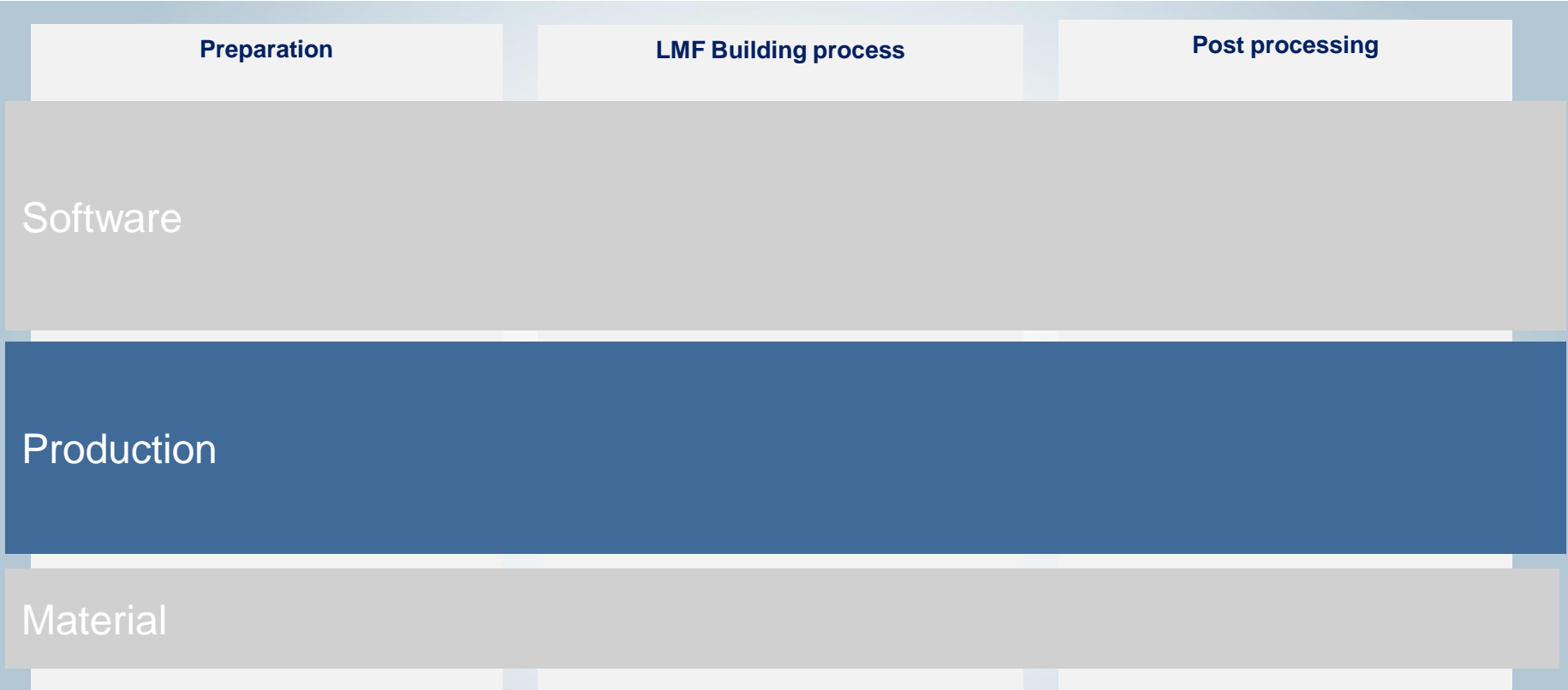
Software

Monitoring & Analysis



AM Process Chain

From the idea to the finished 3D-printed part



Production

TruPrint 5000

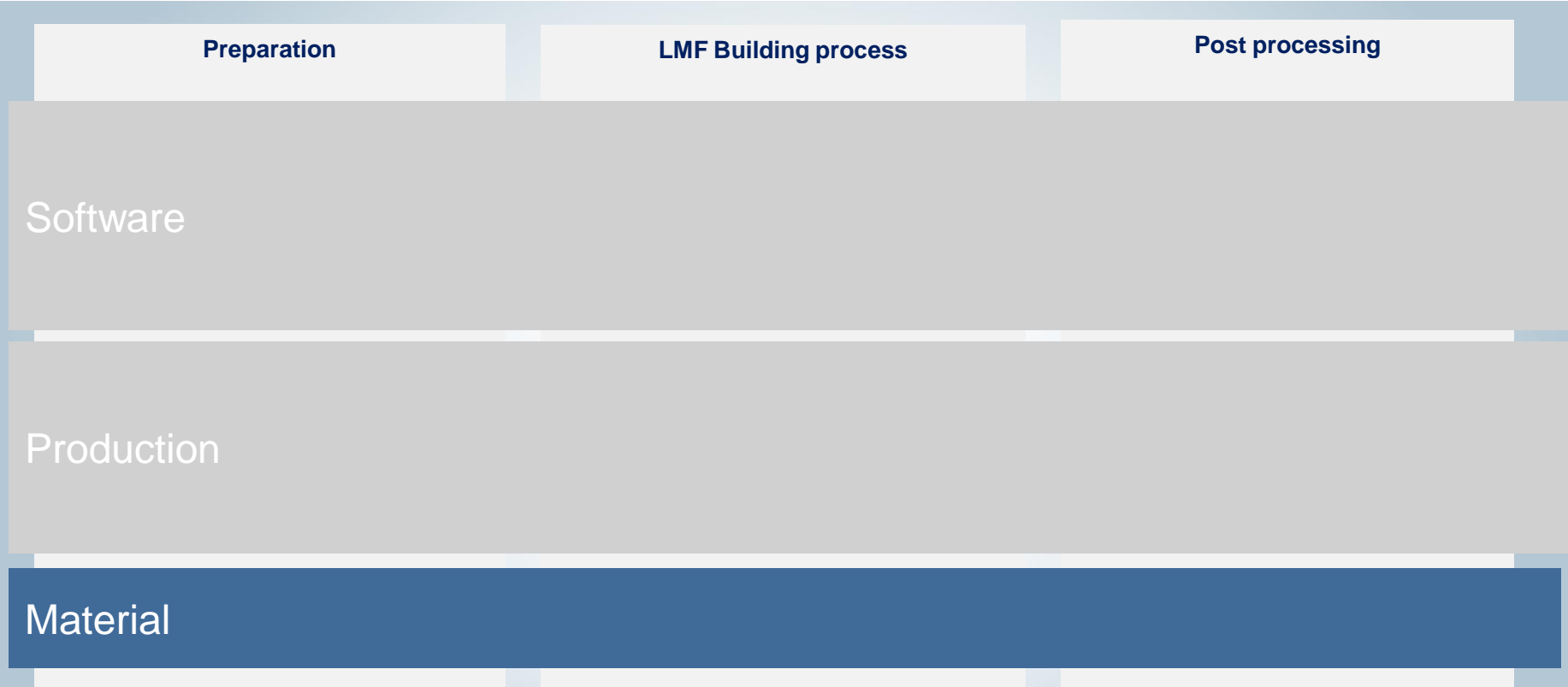


Machine
preparation

**LMF Building
process**

AM Process Chain

From the idea to the finished 3D-printed part



Material

Industrial Part and Powder Management



Removal from
powder bed

Cleaning

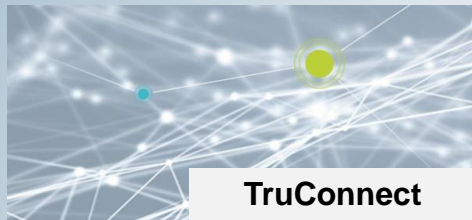
Powder
preparation

Removal of
substrate plate



TRUMPF Industrial Additive Technologies

Product Portfolio



TruConnect

- **TruTops Print with Siemens NX** – Industrial software solution for the entire CAD/CAM/CAE process chain
- **TruTops Monitor** – Industrial monitoring solutions
 - Process Monitoring
 - Performance Monitoring
 - Condition Monitoring
- **AXOOM** – Industrial open platform solution to organize the smart factory
- **OPC UA interface** – to connect customer software suite



Machines & Lasers

- **LMF**
 - TruPrint 1000
 - TruPrint 3000
 - TruPrint 5000
 - Industrial part and powder management
- **LMD**
 - TruLaser Cell
 - TruLaser Robot
- **Laser**
 - Fiber laser
 - Diode laser



TruServices

- **Financing** – TRUMPF Bank with financial professionals who also understand your business
- **Technical Service** – Service engineers around the globe and professional service systems
- **Spare Parts** – highest standard logistic processes ensure 24/7 spare parts service
- **Powder & Parameters**
- **Training & Consulting** – Customized training und consulting offers in TRUMPF training centers



Industrial Additive Technologies



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Visit us at **AXOOM** booth
hall 8, booth F12

AXOOM