INCREASING LPBF MACHINES AVAILABILITY BY USING MACHINE TOOL DESIGN PRINCIPLES

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DMG MORI Additive GmbH

TECHNOLOGIES & MACHINES

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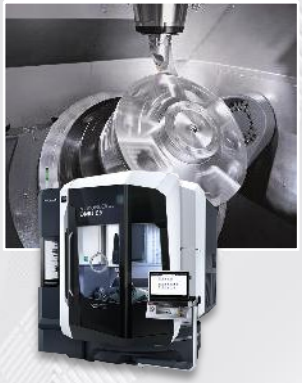
TURNING TECHNOLOGY

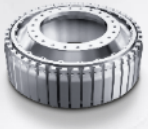
Drive shaft

Hydraulic component

MILLING TECHNOLOGY



Compressor disk



Landing gear

ULTRASONIC

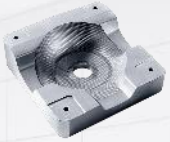
Gyroscope

Watch case

LASERTEC

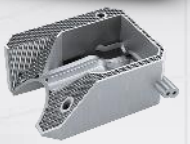
Turbine vane

Steering wheel cap mould



ADDITIVE MANUFACTURING

Blow mould



Heat exchanger

AUTOMATION

Robo2Go

AMR 2000

DIGITIZATION

TECHNOLOGY EXCELLENCE

TRAINING

SERVICE

CORPORATE HISTORY

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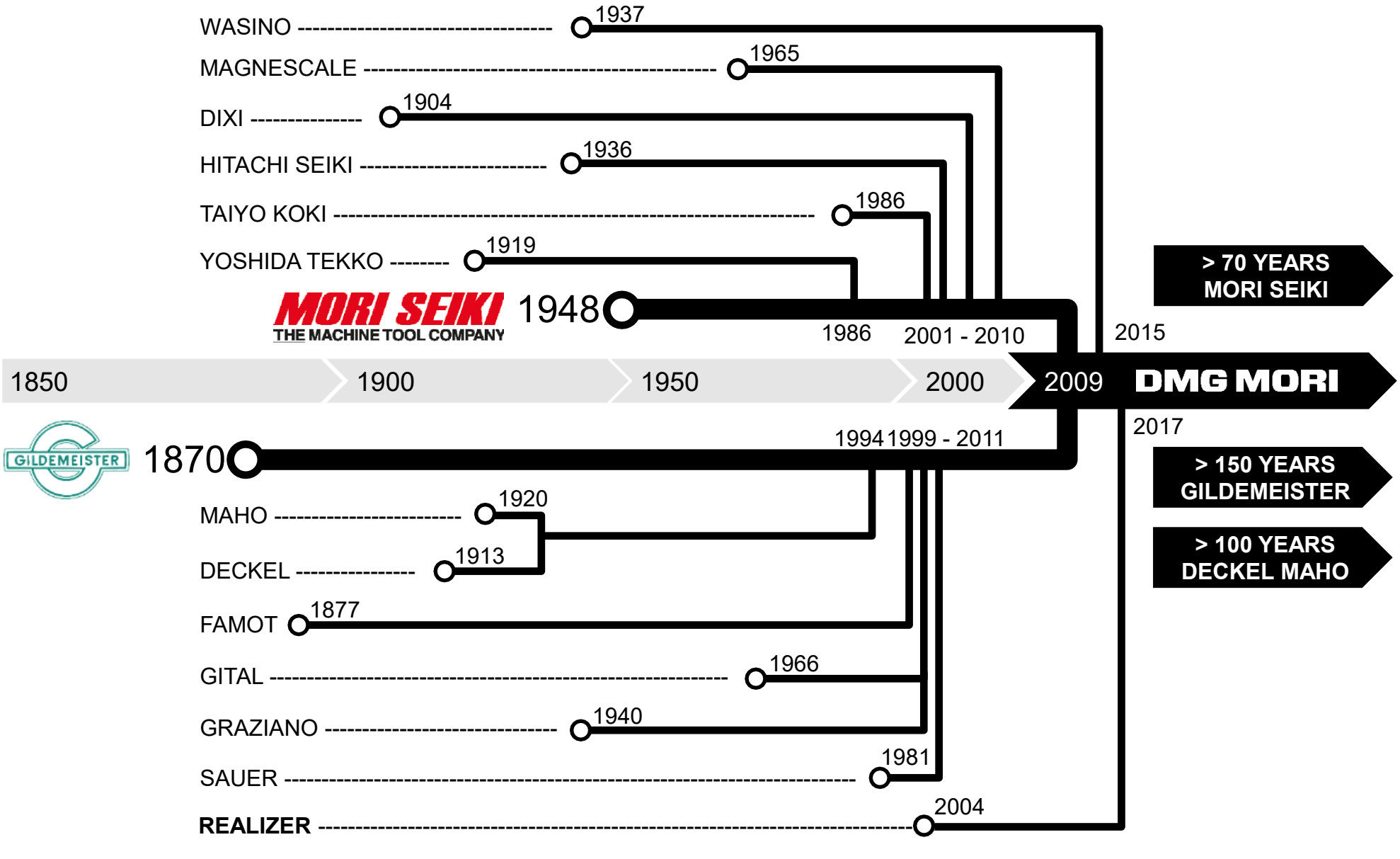

EVOLUTION OF LASERTEC SLM MACHINES

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First SLM Machine developed from scratch by **DMG MORI ADDITIVE**

LASER POWDER BED FUSION – STATUS QUO

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1st MATURITY LEVEL

Mechanical Feasibility

Enforce usability by increased material availability

2nd MATURITY LEVEL

Productivity

Reduce cost per part

3rd MATURITY LEVEL

Reproducibility

Apply machine tool design principles

MACHINE TOOL DESIGN PRINCIPLES

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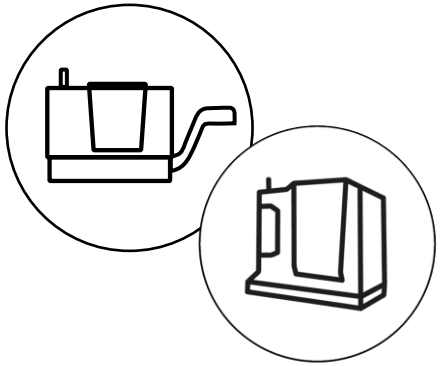

- Casting Frame
  - Gantry Concept
- Pallet Change
  - Path Planning
- Monitoring

CASTING FRAME
STIFFNESS

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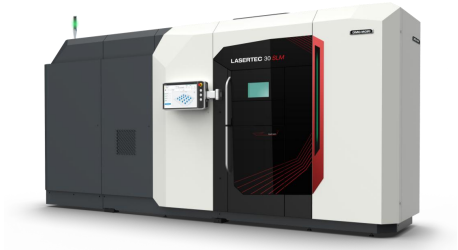
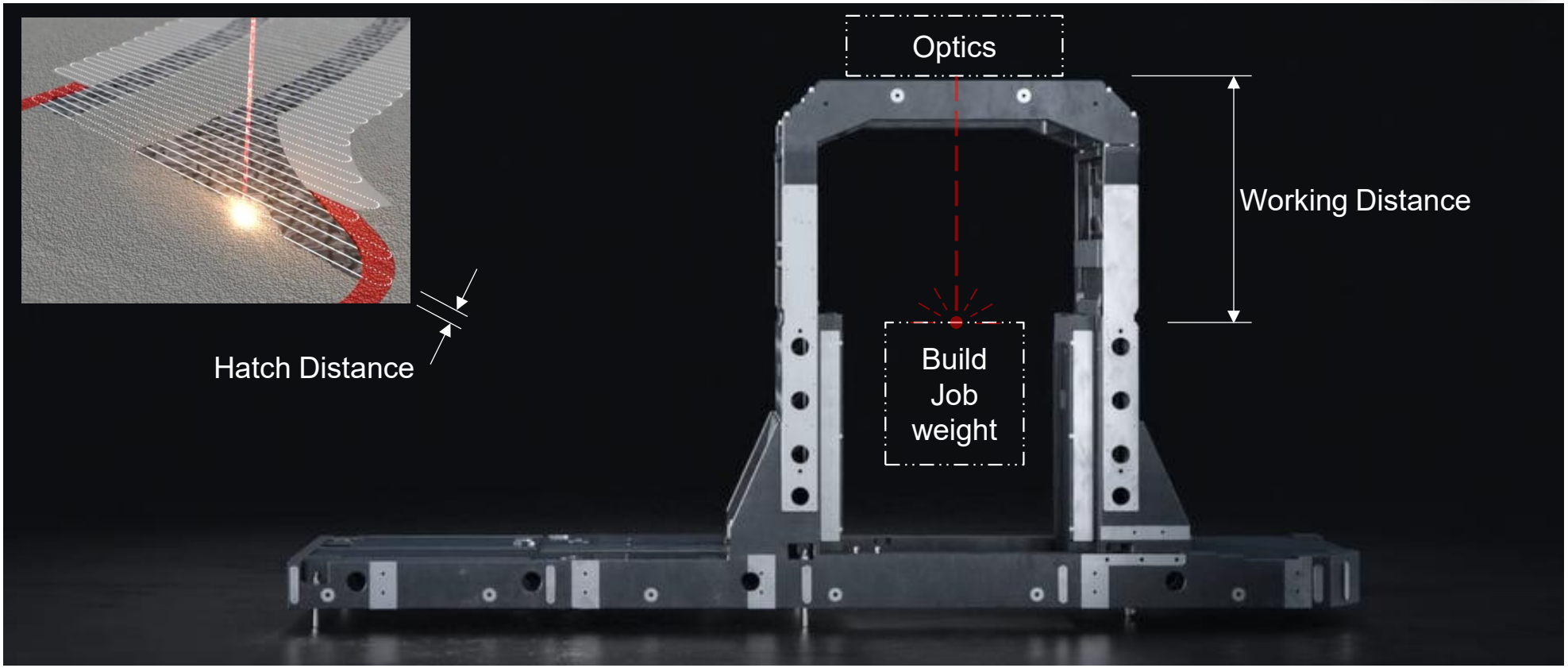
Casting frame for highest rigidity

\+ Ensure that the optics do not move during production

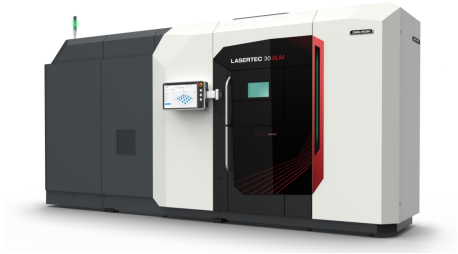


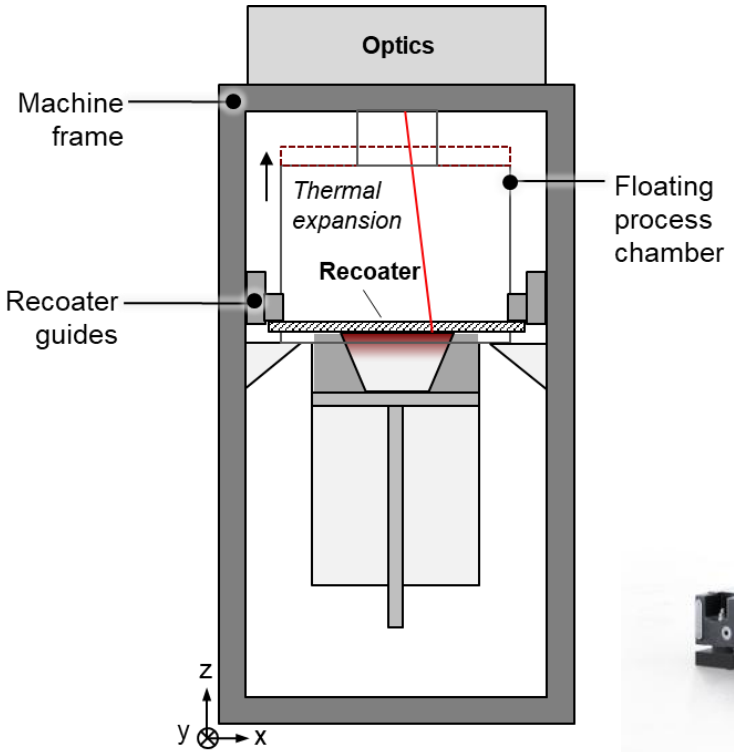


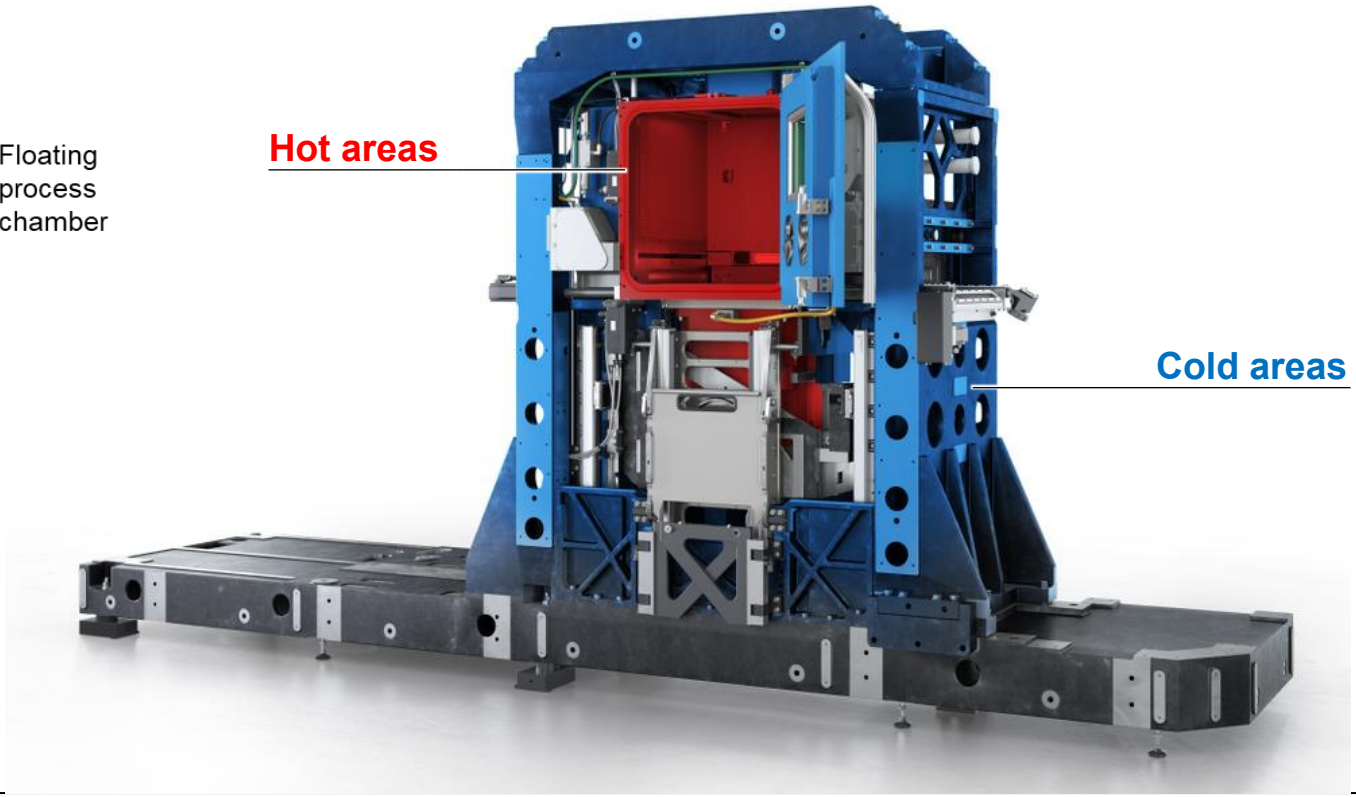
CASTING FRAME
THERMAL STABILITY

Thermo-symmetric frame design for highest thermal stability

+ Minimized thermally driven displacements and process instabilities
+ **Floating process chamber**
  decoupled scanner and recoater axis for highest accuracy



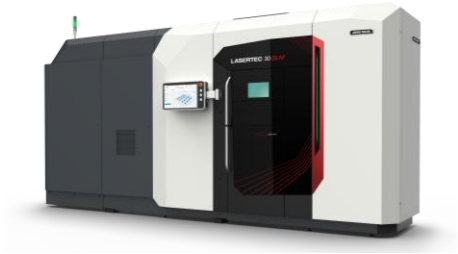


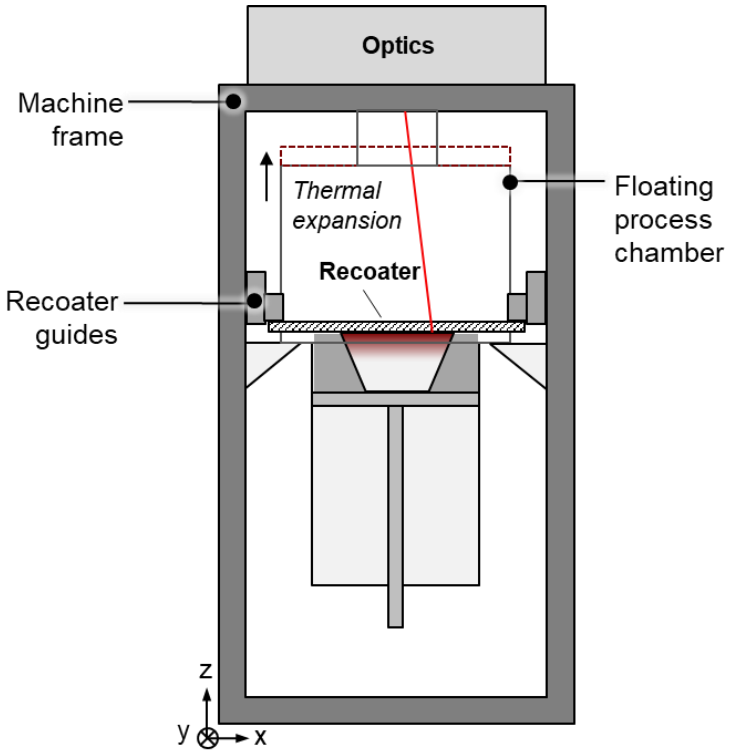


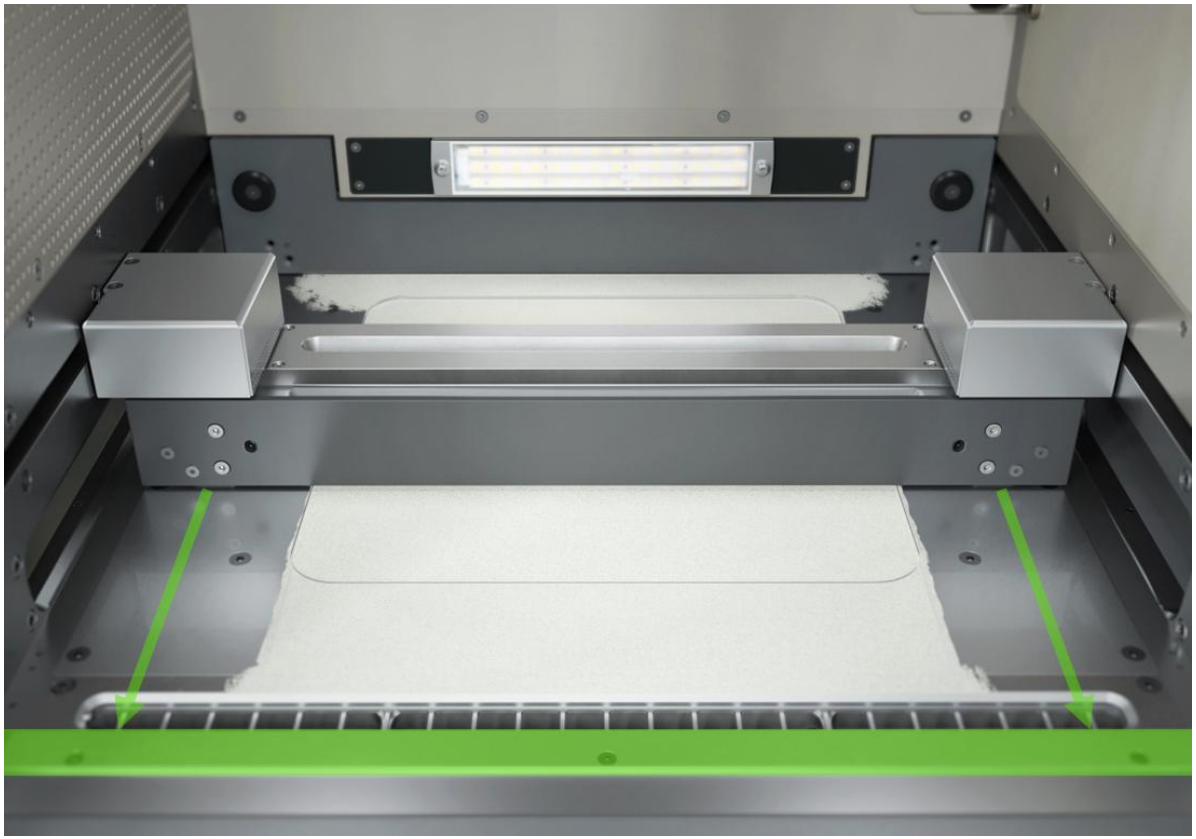
CASTING FRAME
THERMAL STABILITY

Reference surface for recoater alignment with optics

+ Scanner and recoater axis are decoupled from the process chamber
+ Defined and stable distance between optics and process
+ Thermal shifts without influence on workpiece accuracy







PALLET CHANGE

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+ Reduced setup times
+ No cool-down times in the machine
+ Lids for build container and process chamber provided within the working area to maintain inert gas atmosphere

MONITORING
PROTECTIVE GLASS MONITORING

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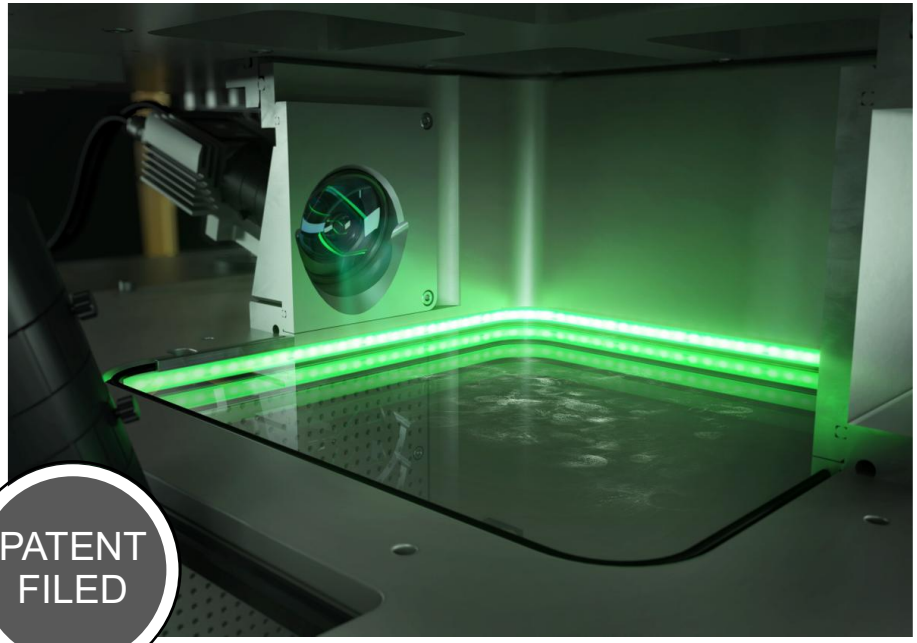
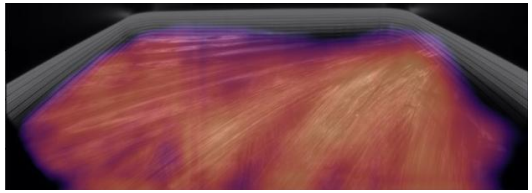
+ Detection of smoke residues and weld penetrations on protective glass
+ Illumination of protective glass to support operator during cleaning



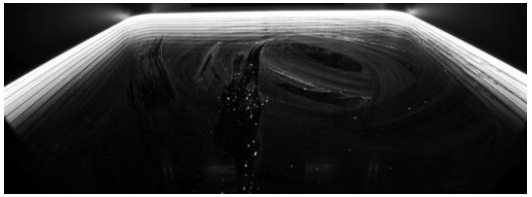
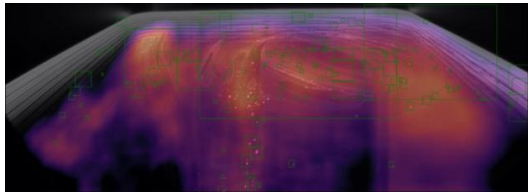
PATENT FILED

Clean - No Defects


Contamination - Reversible

Burn in - Irreversible

VISION: INTEGRATION
INTO FLEXIBLE AUTOMATION ECO-SYSTEM

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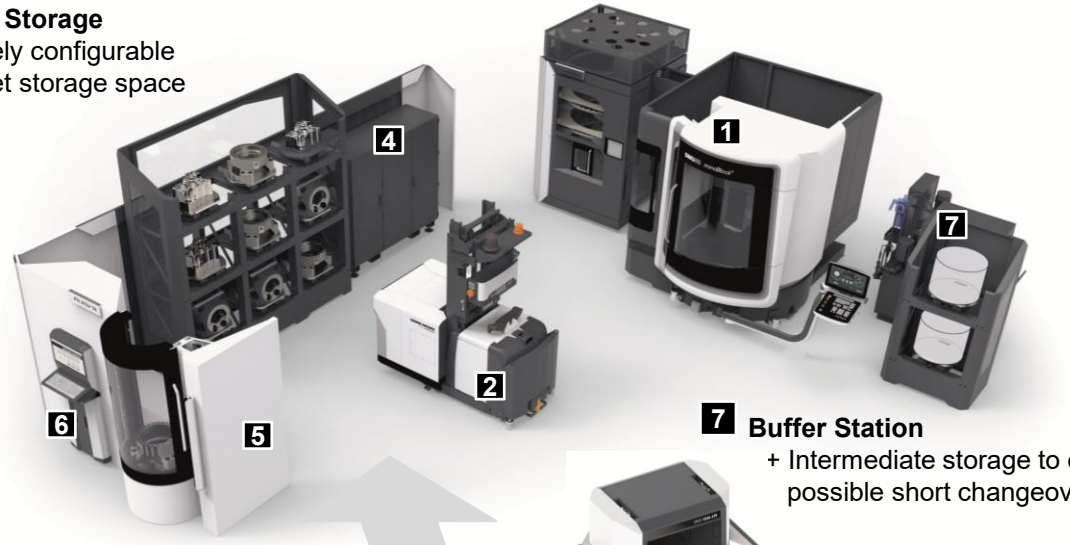
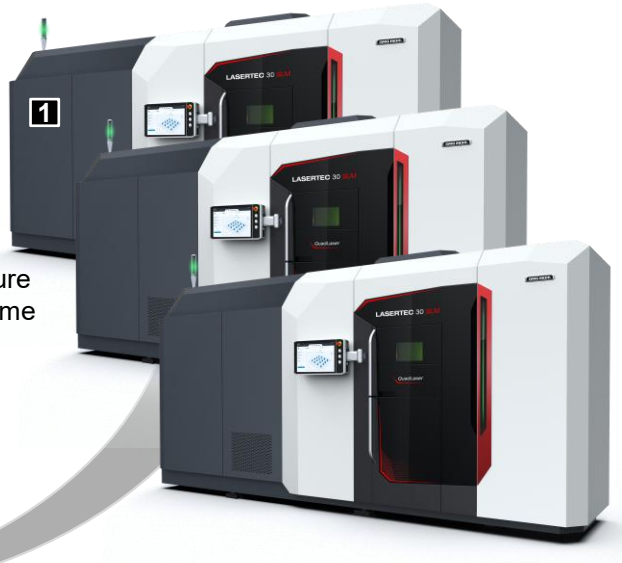
4 Pallet Storage
+ Freely configurable pallet storage space



1 Machine Integration
+ Automation of different machines in one system



7 Buffer Station
+ Intermediate storage to ensure possible short changeover time

5 Setup Station
+ Flexible Integration in customer specific layouts

6 Control Panel
+ easy operation of the system via central control

3 Unpacking Station
+ Contactless Powder removal of the component from build container

2 AGV
+ Automated guided vehicle for automatic component transport

Thank you for your attention

Dr.-Ing Guido Adam
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rePLUG FLEX
Flexible powder exchange
in one powder module