



**Automation as a success factor for more productivity
and safety in powder bed based additive manufacturing**

Oliver Elbert, 18.10.2023, Additive Alliance, Hamburg

GRENZEBACH | GROUP

Facts and figures

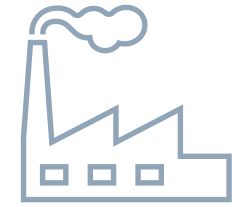


1,600

employees worldwide



Global **automation partner** of leading companies



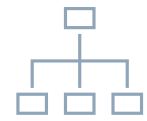
3,000

installed plants in

55 countries

11

business units



60+

years of automation expertise as family business



9

manufacturing and development locations

in China, Germany, Greece, India, Romania, and USA



24|7|365

service around the globe

3

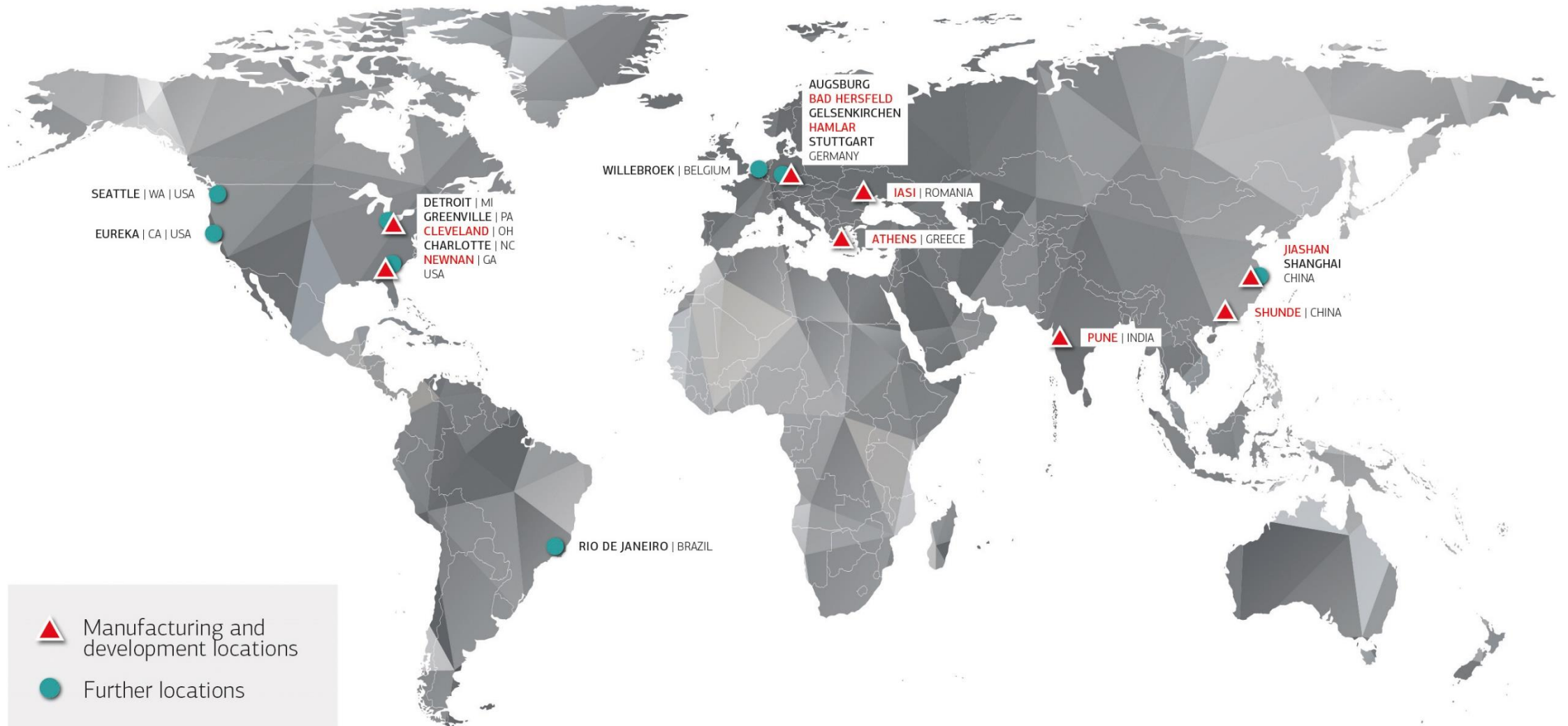
partner/subsidiaries within the corporate group



production technologies for numerous branches

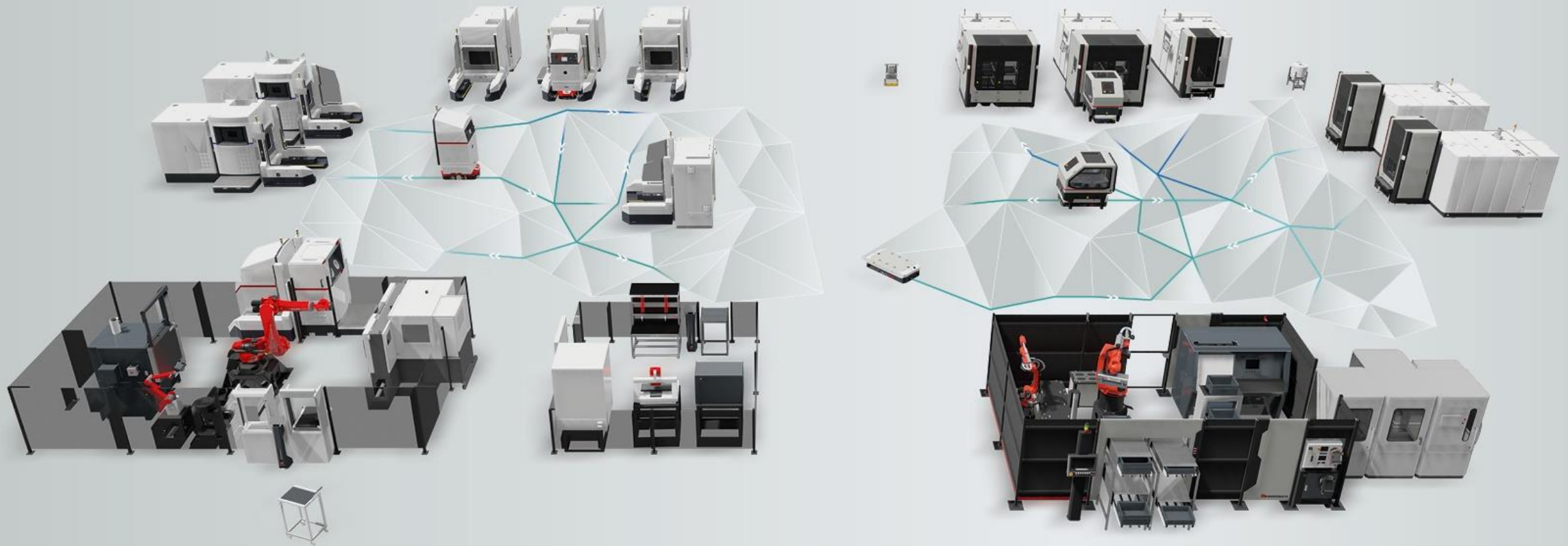
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Worldwide representation



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Introduction to Automation



Especially for your requirements, we automate and connect different process systems mechanically, electrically and digitally to



increase productivity



ensure reproducibility



ensure health and safety



minimize manual effort



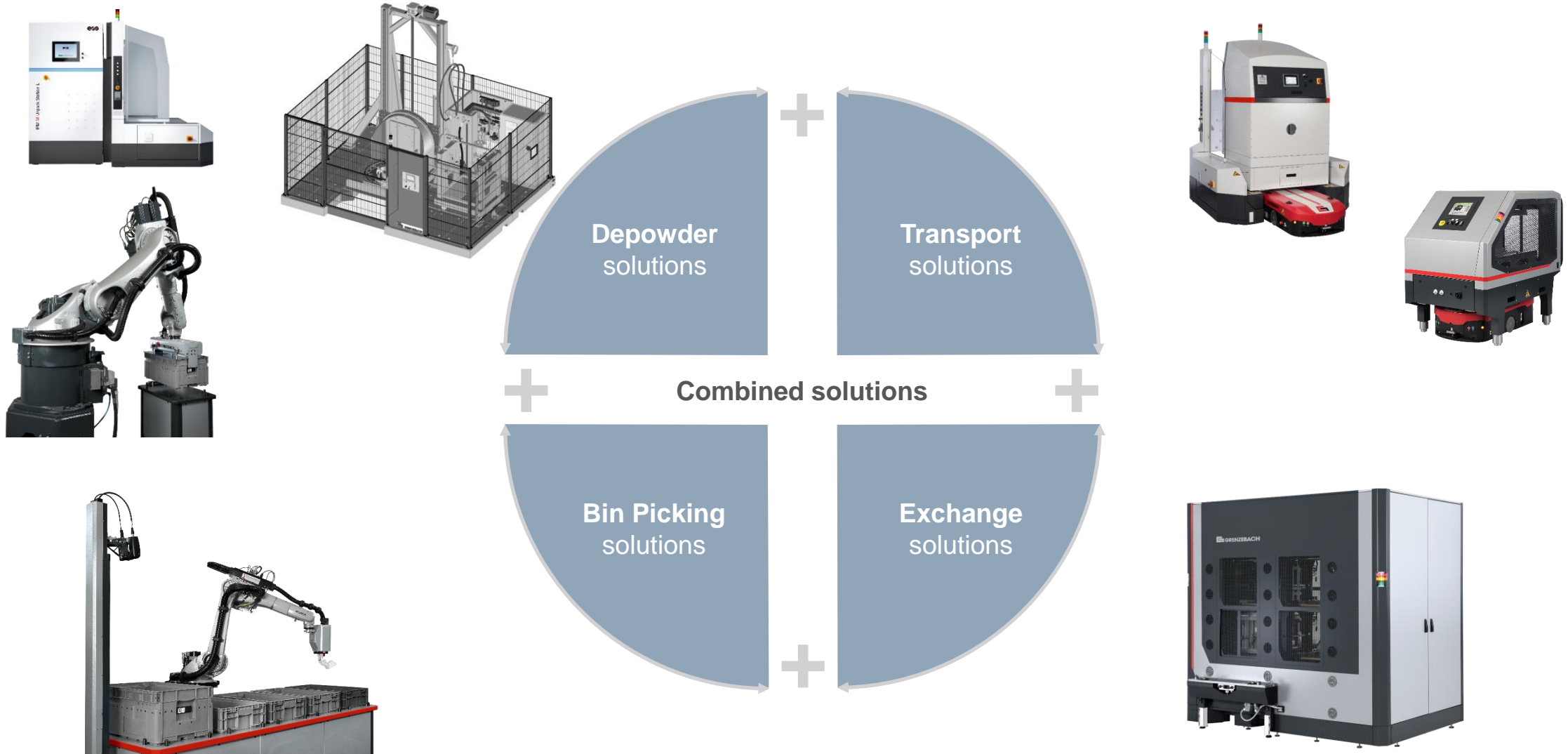
synchronize process chain



decrease cost per part

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Automation Solution Examples for Industrial 3D Printing



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Example for metal – EOS Shared Modules



EOS M 400-4 + Docking Station



EOS Unpack Station + Docking Station



EOS Setup Station + Docking Station

Exchange Frame:
Build Job & Powder

Exchange Frame:
Build Job



Exchange Frame: New build plate

Inert Gas Container + L1200S AGV



Inert Gas Container + forklift



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Product Introduction at Formnext 2022

Dual Setup Station for EOS M 400(-4) and EOS M 300-4

- » Fully **automatic loading and unloading** of the used EOS system with integrated conveyor system
- » Ergonomic **unpacking and setup** of the EOS system while the next build job is already running
- » **Increased productivity** and **reduced downtime** due to buffer position and handling of two exchange frames

- » **Benefits** for an EOS M 400-4 for build jobs between 16 and 60 h build time based on plant simulation:

Shift operation	Mean increased build jobs/year
1-shift	+44% ($\pm 13\%$)
2-shift	+36% ($\pm 10\%$)
3-shift	+32% ($\pm 10\%$)
24/7	+17% ($\pm 3\%$)



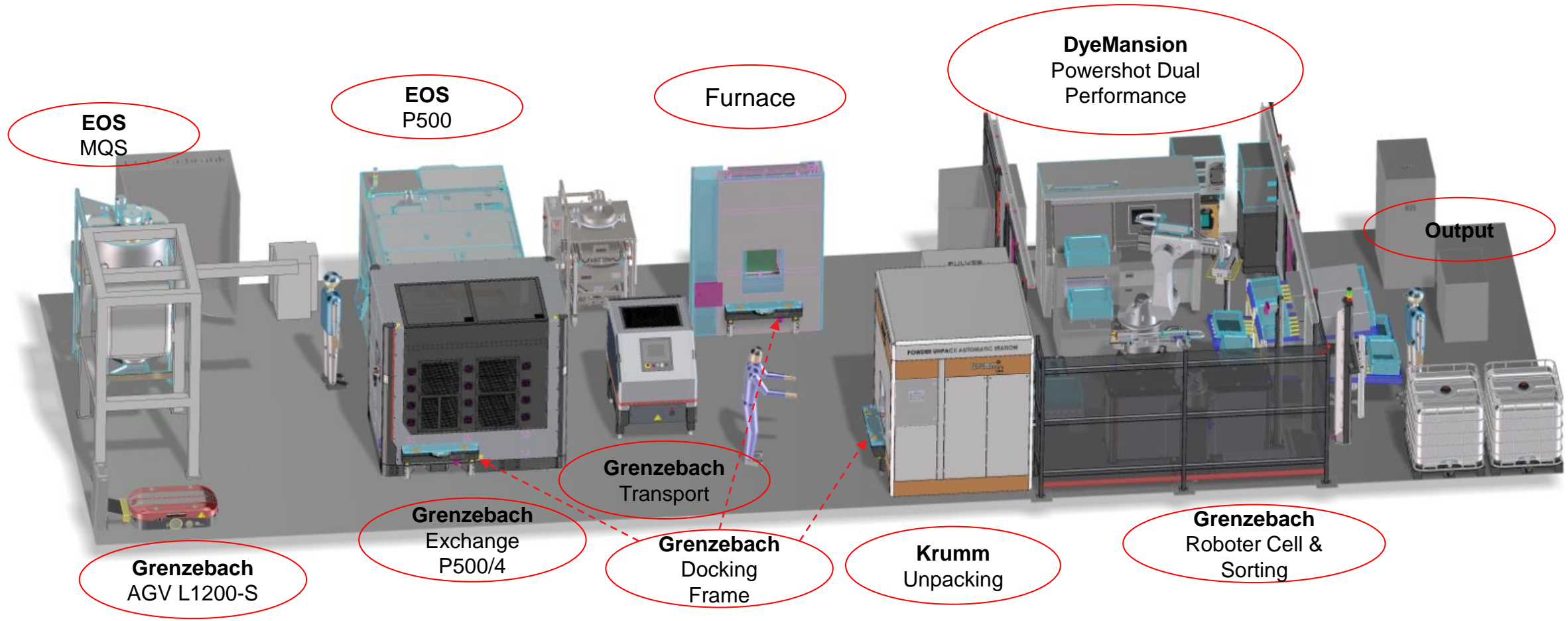
Reference: EOS GmbH, with special thanks to the Digital AM Solutions team

POLYLINE | Layout

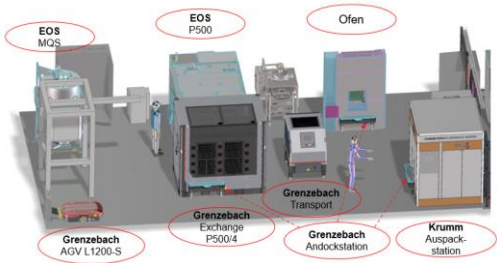
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» EOS P500 + Exchange P500/4



» L1200 S AGV



» Transport P500 + AGV

POLYLINE | Robot Cell

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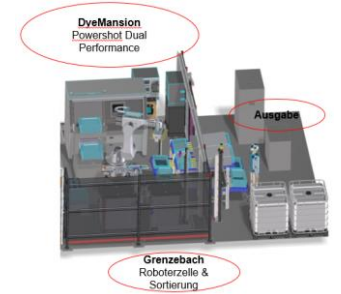
Federal Ministry
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» Bin Picking



» Sorting



» KLT Handling

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Example for polymer – Exchange Solutions

Exchange P 500

- » Increased productivity for **EOS P 500 Laser Sintering Systems** by reducing downtime.
- » Developed for research project **POLYLINE** to automatize the process chain for laser sintering
- » **Benefits** for an EOS P 500 for build jobs between 5 and 30 h build time based on plant simulation:

Shift operation	Mean increased build jobs/year	
	Exchange P 500/2	Exchange P 500/4
1-shift	+50% ($\pm 25\%$)	+78% ($\pm 40\%$)
2-shift	+26% ($\pm 11\%$)	+37% ($\pm 16\%$)
24/7	+12% ($\pm 5\%$)	+12% ($\pm 5\%$)



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Questions and Answers



Get in touch

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