



**dilapro**  
DIGITAL LASER PRODUCTION

# Project Presentation

Name/date/location



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# Digital **LA**ser **PRO**duction: Digital Twins of Laser Processing for Multi-Capability Manufacturing of Complex Components and Certification



**dilapro**



The consortium was composed of 12 partners from 8 countries across Europe:

- 4 SMEs
- 1 large industries
- 3 RTOs
- 2 universities
- 1 association

DILAPRO MEMBERS





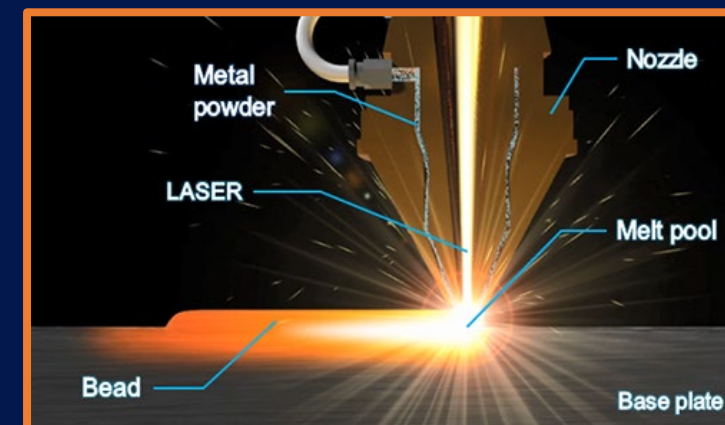
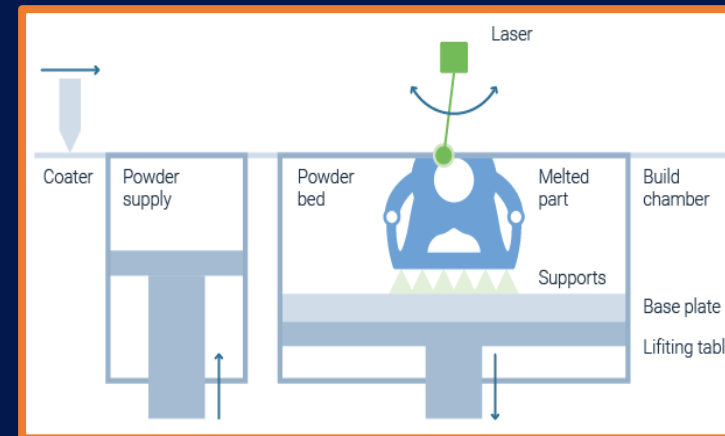


DILAPRO aim to enable **faster** implementation of **complex** product manufacturing and to ensure that the complex products created by laser technologies such as additive manufacturing **meet all industrial needs in terms of design, quality costs and sustainability.**



# Laser technologies

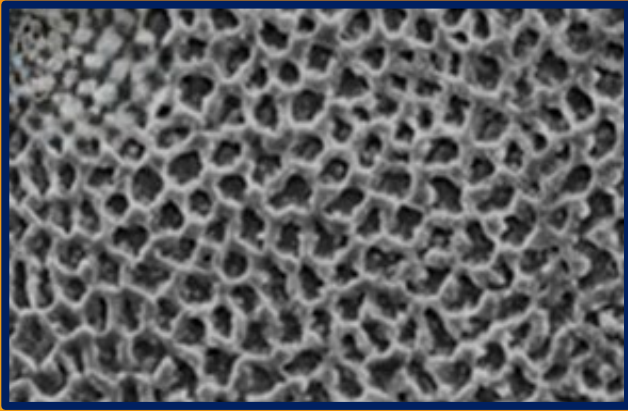
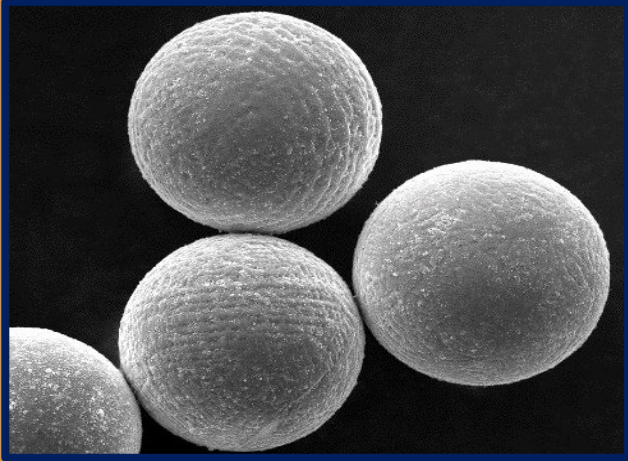
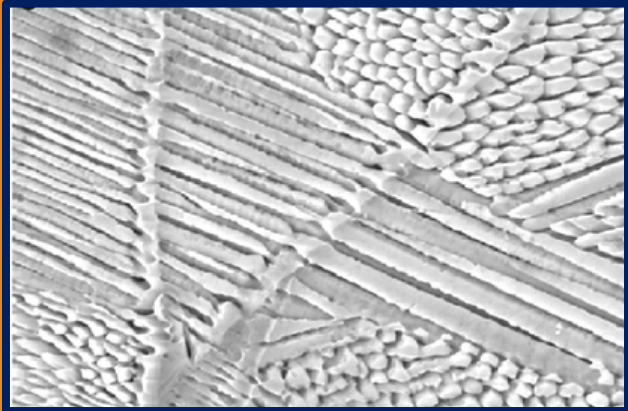
- PBF-LB
- DED-LB
- Laser Texturing





# Materials

- 316L
- IN718
- IN625



DILAPRO

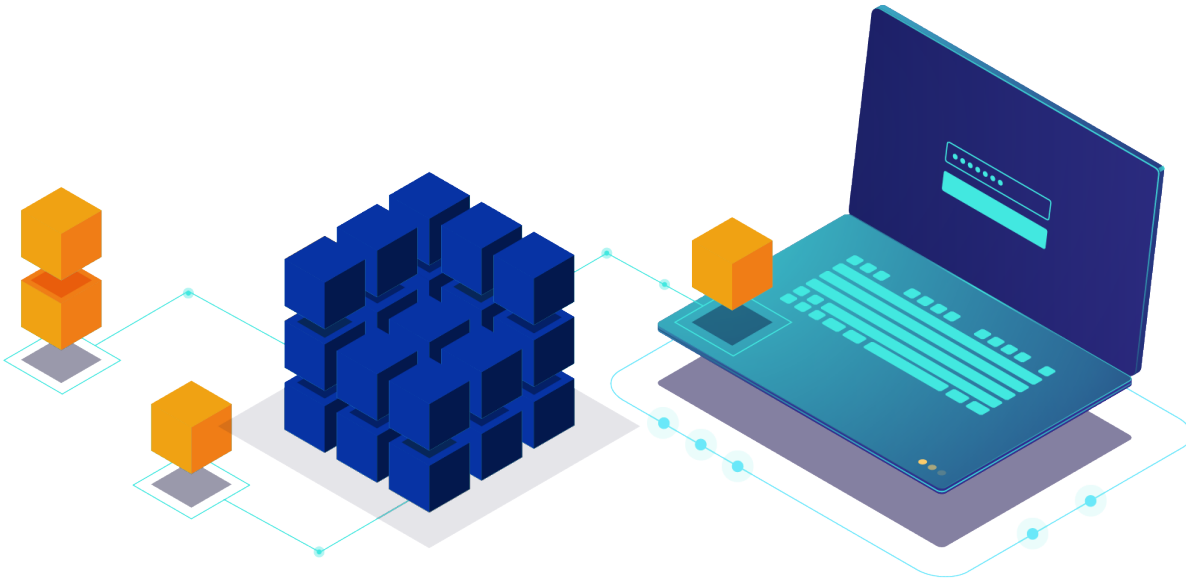


DILACERT

DILAFACT

# Digital Laser Factory for Optimized Production

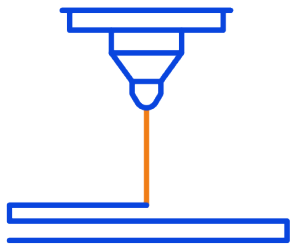
Enable data-driven production decisions to enhance efficiency, sustainability and quality



## Key Functions:

- Digital Twin
- In-situ monitoring
- Real-time adjustments for laser-based additive manufacturing

## Key Applications



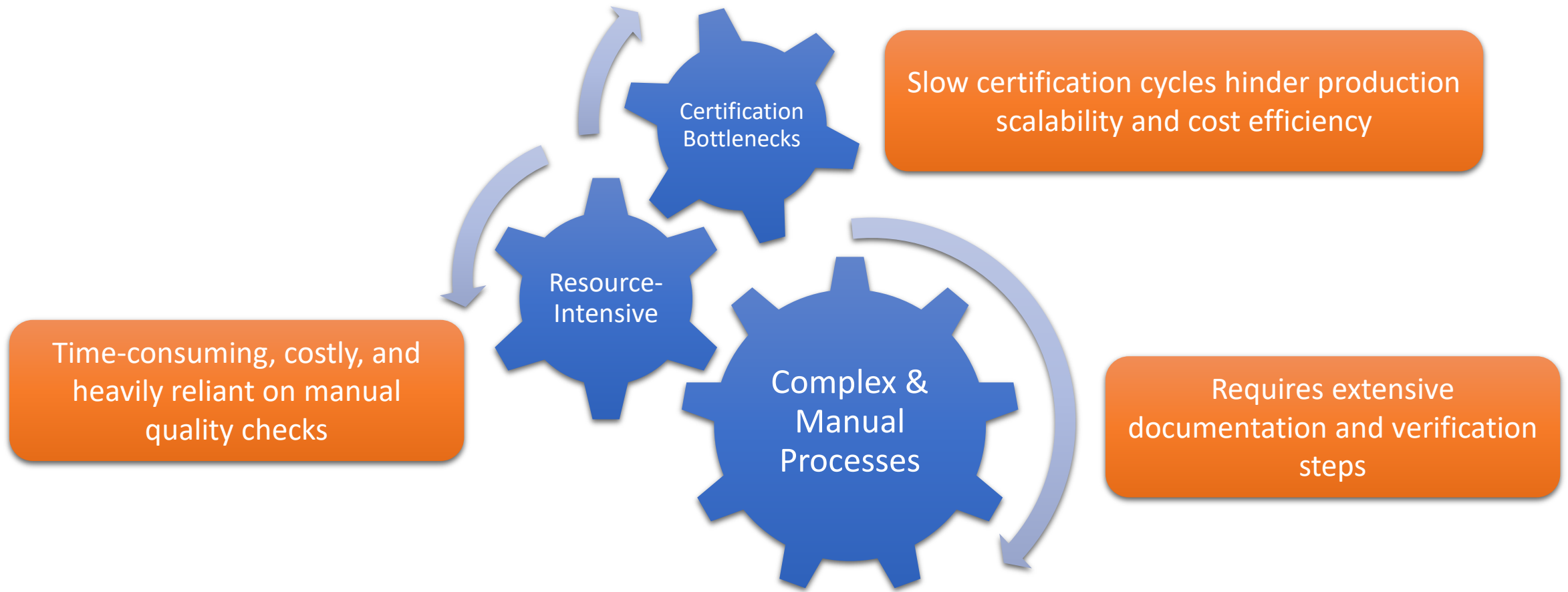
PBF-LB: Enables precision in melting and solidification



DED-LB: Optimizes deposition rates and layer quality for complex geometries

**Process Compatibility:**  
Supports a range of laser-based AM techniques, enhancing versatility in manufacturing

# Challenges in Traditional AM Certification



# Automated Approach to Certification



Automates Data Collection & Analysis

Digital twins provide real-time insights on part quality



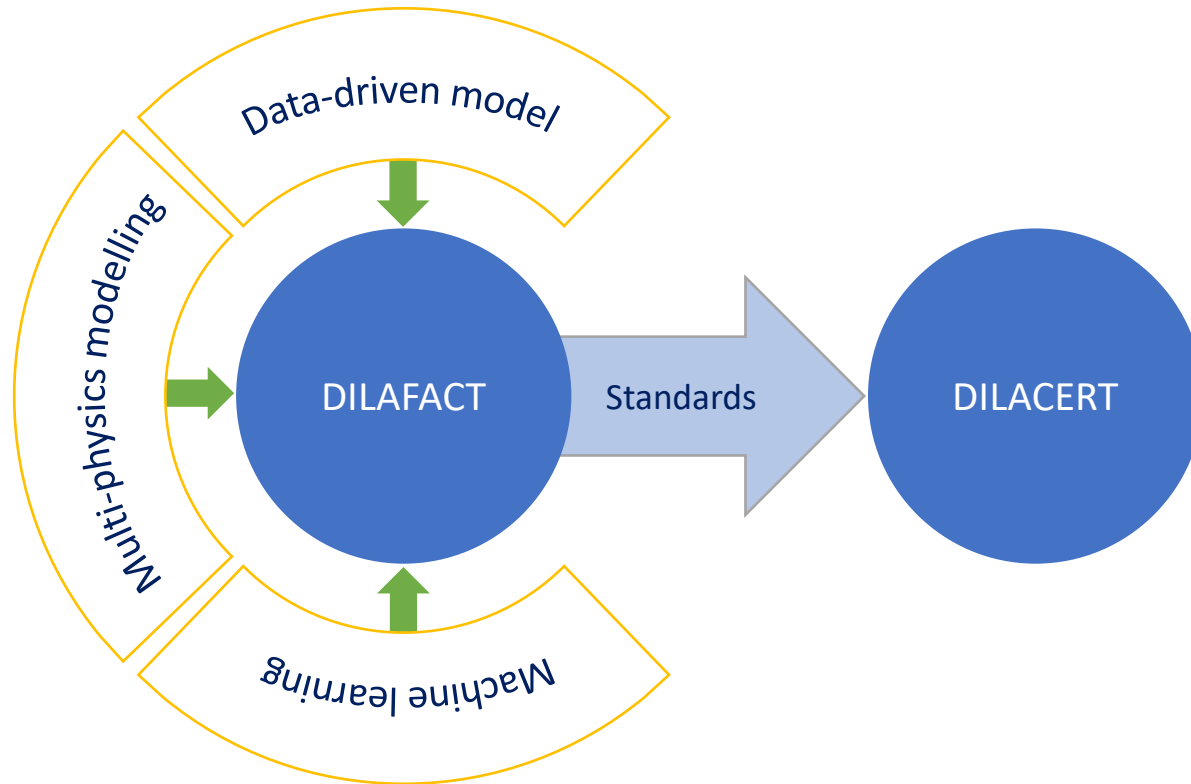
Ensures Compliance with Quality Criteria

Monitors parts against predefined standards throughout the production cycle

Faster certification cycles, reduced production costs, and consistent compliance with stringent standards

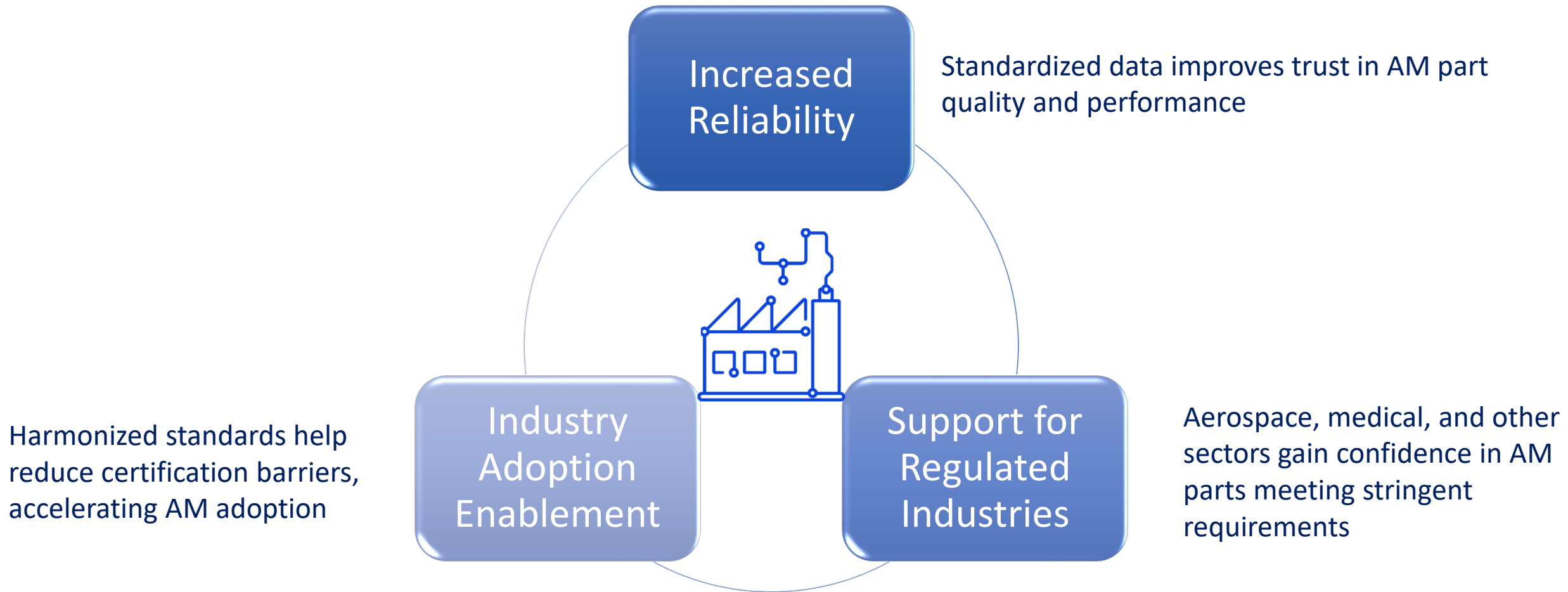
- The software tools will enable the correct choice of **laser manufacturing method and parameters**, and through **online monitoring and certification** ensure that these products live up to and push industry demands for design, quality, cost and sustainability



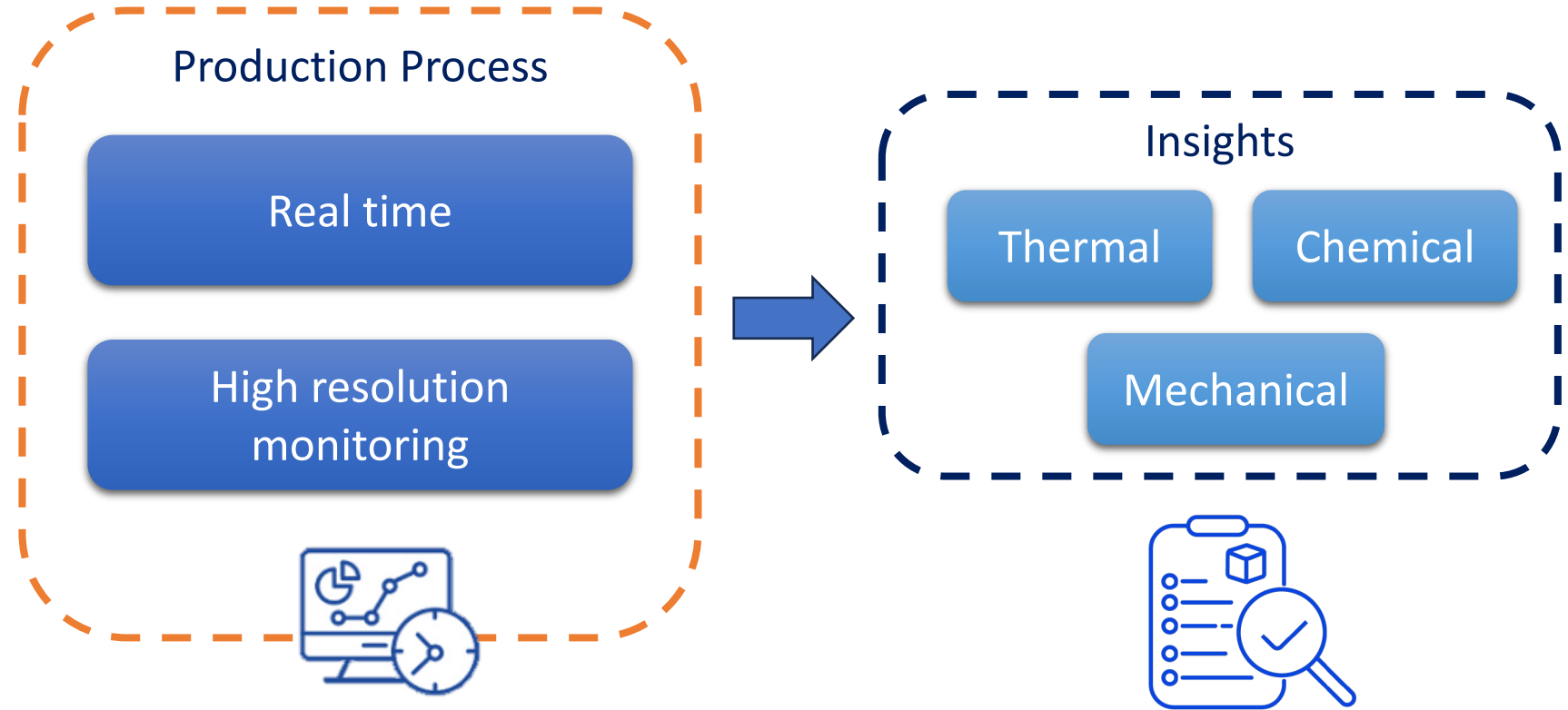
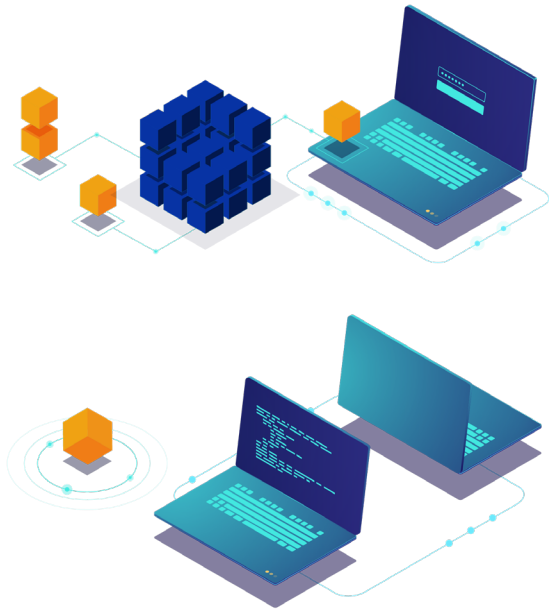


- DILAPRO will research the material-laser interaction happening in i.e. AM to build a data-driven model, and combine it with machine learning and multi-physics modelling to create a **digital twin**
- The on-line monitoring will feed into a standardisation system to achieve digital certification of individual parts during production – which is especially helpful for production “off the track”, i.e. off-shore and in the field
- Main output: DILAFAC T and DILACERT

## DILAPRO's Impact on AM Certification

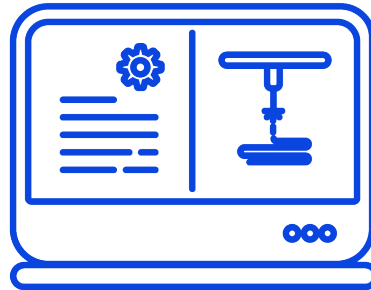


## Digital Twins



## Industry Benefits

Manufacturers



Reduces risk of non-compliance

Shortens certification timelines

Regulators



Simplifies validation processes

Ensures adherence to international standards

## Advancing Digital Certification Standards

### DILACERT's Collaborative Approach

#### Integration with Testing and Inspection Bodies:

- Ensures alignment with industry-specific requirements
- Develops a framework that evolves alongside technological advancements

### Benefits of Collaboration

#### Regulators:

Clearer, more comprehensive guidelines for AM certification

#### Manufacturers:

Simplified compliance processes, boosting productivity

### A Unified Vision for AM

#### Focus on Interoperability:

Facilitates global standardization for AM components and processes

#### Driving Widespread Adoption:

Paves the way for AM in aerospace, healthcare, and energy sectors

## Validating DILAPRO Innovations Across Industries



Resource Efficiency

Industries Benefiting from  
DILAPRO

- **Reductions in material waste**, up to **64%** savings in PBF-LB and DED-LB techniques
- **Energy consumption** reduced by **27%**, aligning with sustainability goals

- Certified, lightweight, high-performance components



- Customized implants and tools with assured quality



- High-durability parts for critical operations



## Shaping the Future of AM



## A Vision for the future

DILAPRO's work is pivotal in:

- Ensuring safe, reliable, and high-quality AM products
- Supporting the widespread adoption of laser-based AM technologies
- Pioneering certification practices that meet the demands of evolving industry regulations

DILAPRO is leading the way toward a digitally enabled, sustainable future for additive manufacturing!

# Any Questions?

Thank you!



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