

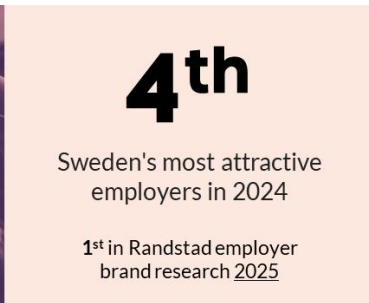
OPTIMA

Optimised Additive
Manufacturing with AI





RISE Research Institutes of Sweden



PROPOSAL INTRODUCTION (I)

Vision:

OPTIMA enables PBF-LB of complex parts by fusing multi-physics simulation with federated AI to generate manufacturable, high-performance designs.

- Real-time AI generative design (thermal/mechanical/CFD + manufacturability)
- Privacy-preserving learning across OEMs
- Impact: -60% material waste, -40% time-to-production, TRL 6-7

Motivation:

Generative design is a computationally intensive approach that explores numerous design alternatives through simulation and optimization. While AI can streamline and accelerate this process by learning from previous designs and predicting outcomes, the effectiveness of AI models is often limited by the availability of high-quality, domain-specific data. Additionally, the complex geometries produced by generative design can pose challenges for manufacturing, particularly when using conventional fabrication methods.

Content:

A connected toolchain from use-case definition to industrial validation.

- Federated learning infrastructure + data governance
- Scalable multi-physics simulation & reduced-order models
- AI generative + manufacturability-aware design
- PBF-LB process development, builds, post-processing, QA, and pilot validation
- Coordination, training, and dissemination

PROPOSAL INTRODUCTION (II)

Expected outcome:

- AI design suite: generative + manufacturability-aware predictors (geometry & process params)
- Federated learning toolkit with governance/anonymization; cross-OEM "super-model"
- First-time-right PBF-LB on pilot components
- Printed, tested, validated demonstrators with QA and functional performance (TRL 6–7)

Impacts:

Industrial: faster design optimization, First-time-right manufacturing, resilient supply chains

Economic: lower material/energy use, fewer prints and tests

Environmental: significant waste and energy reductions aligned with EU green deal

Data & trust: privacy-preserving collaboration on AI across OEMs

Schedule:

TBD.



PARTNERS

Current Consortium

RISE Research Institutes of Sweden
Alfa Laval AB
ScaleOut AB

Partner search:
TBD



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