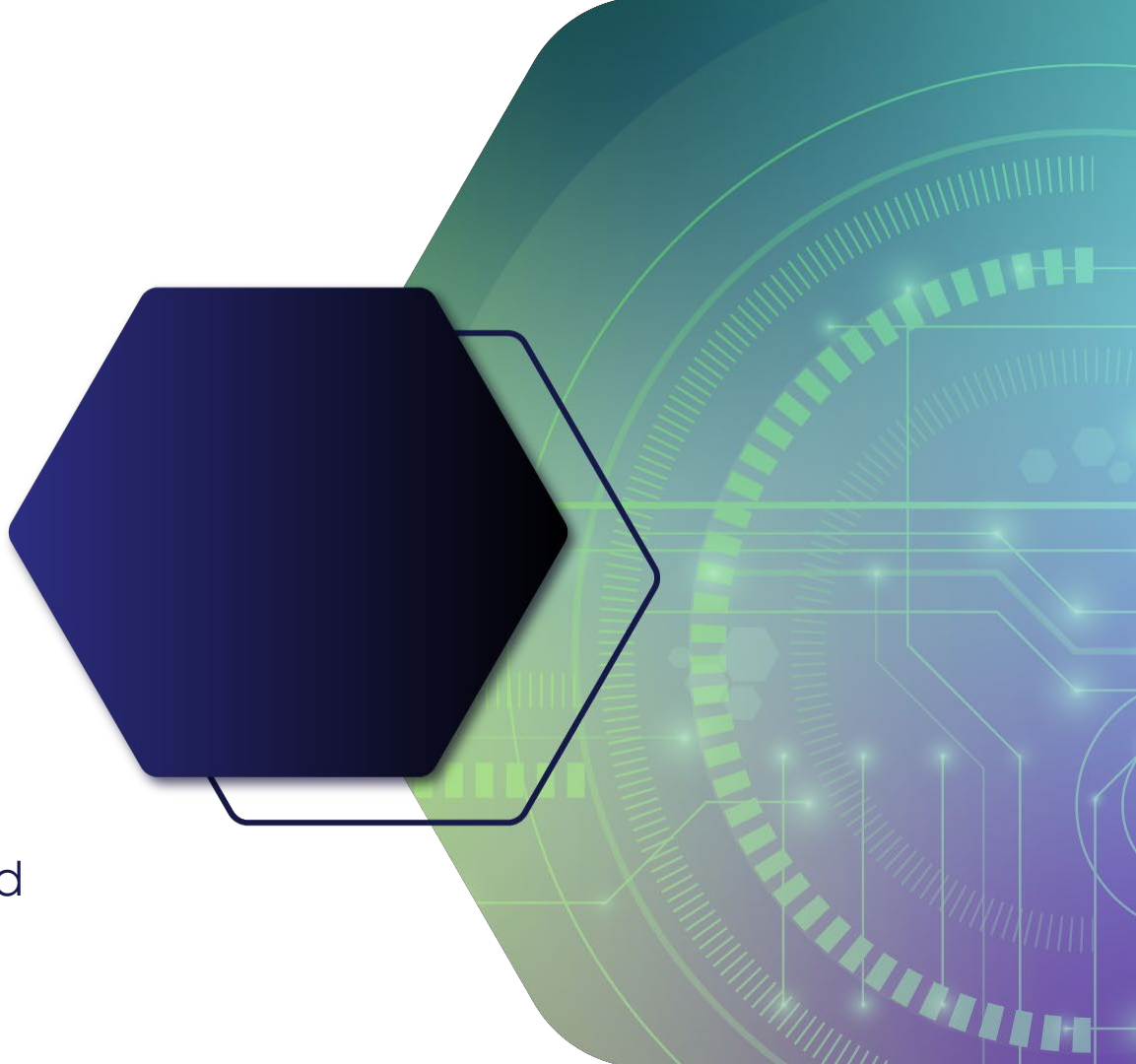


FeasiBoom

University of Oulu, Finland
LUT University, Finland





 **smart**
advanced manufacturing

ORGANISATION PROFILE

University of Oulu, Finland – Faculty of Technology, Machine and Vehicle Design (MVD) research group (Materials and Mechanical Engineering unit). The University of Oulu has 14,800 students across 8 faculties and 4,300 staff, with 347 M€ in total funding.

PROPOSAL INTRODUCTION (I)

Vision:

Enable systematic, requirement-driven and cost-aware selection of the most feasible mobile working machine boom design variant, deriving manufacturing, maintenance and operation cost directly from physics-based simulation. Link these simulation outputs directly to requirements and cost within a single framework.

Motivation:

Lighter boom structures made from high strength steel or other materials are increasingly wanted in load handling equipment that lifts timber and other cargo, to meet pressures for emission reduction, electrification and energy efficiency. But it is not always clear which variant is more worth it.

Content:

- Formalise requirements and operation scenarios.
- Evaluate design variants against the requirements using machine and manufacturing simulation.
- Derive manufacturing cost, scenario-specific maintenance cost and operation cost directly from these simulations.
- Build interfaces that merge data and information across the manufacturing, fatigue, multibody dynamics and economic feasibility models, so results flow between them.
- Select the most feasible variant with a multi-criteria method, iterating back through design and simulation when needed.

PROPOSAL INTRODUCTION (II)

Expected outcome:

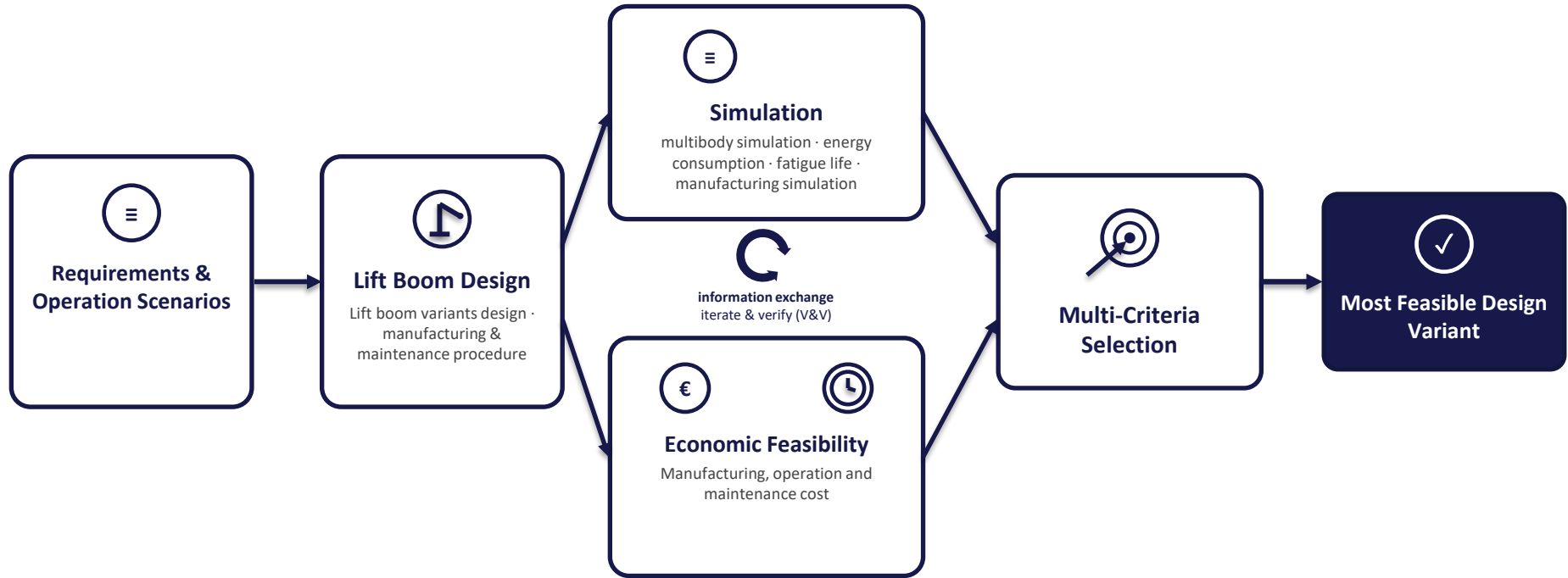
A traceable model links requirements to simulated dynamic behaviour, actuation energy demand and fatigue life, while an economic feasibility module derives manufacturing, maintenance and operation cost from the same simulations. A multi-criteria method then selects the most feasible variant, iterating through design, simulation and cost as needed.

Impacts:

- Faster, evidence-based design decisions for mobile-machine OEMs.
- Fewer physical prototypes and re-design cycles.
- Selecting the most feasible variant early in the design process results in machines that consume less energy and cost less to maintain in the field.
- Reusable methodology, transferable beyond lift booms to other mobile-machine subsystems and industries.

Schedule:

Proposed duration 36 months; target start Q1 2028.



PARTNERS

Current Consortium:

- University of Oulu (Coordinator) – Faculty of Technology, Machine and Vehicle Design (MVD) research group.
 - MBSE Framework, Requirements formalisation
 - Simulation of machines
 - Simulation of manufacturing process

Proposed:

- LUT Steel
 - Design of lift boom based on the requirements
 - Defining the manufacturing & maintenance procedure
 - Simulation of manufacturing process
- LUT Business
 - Calculation of the costs of the variants manufacturing
 - Calculation of the operation and maintenance costs.

Partner search: An industrial partner/OEM manufacturing lift booms or similar mobile-machine structures (forestry, mining, construction equipment) to provide use cases for the framework or university partners. Optionally a partner with MBSE tooling expertise. Open to partners from Finland and other Eureka SMART member countries.



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