

## MORE

An Innovative European Industrial Doctorate (EID) research and training programme for future experts in AI-driven robotisation, energy efficiency and process optimisation of next generation HDM machinery.

### Background

Ever-increasing demand for material and food, stricter emission regulations and continuous globalisation has put Europe's construction, logistics, and agriculture sectors under immense pressure. Dramatic improvements in their productivity and efficiency are the only answer to these global challenges. Heavy-duty mobile (HDM) machinery are crucial workhorses in these sectors. Europe's major HDM equipment companies (John Deere, Liebherr, Bosch Rexroth, HIAB, Volvo CE) have joined forces with four highly specialised academic groups to deliver MORE, a timely EU funded project in response to these urgent needs.

MORE will address these challenges by delivering innovative solutions driven by digitalisation and Artificial Intelligence (AI) in three areas: 1) Processes: environment modelling by combining machine-earth interaction with vision, and optimising material flow in construction sites, 2) Machines: creating efficient power-train solutions for heavy-duty booms and 3) Control: object classification and environment modelling to support long-term autonomy; obstacle avoidance in adverse conditions; innovative solutions on transfer-learning for earth moving and boom control to reduce operational and development costs, in different application areas.

MORE is an innovative European Industrial Doctorate (EID) research and training programme, the first of its kind that will address this need and fill the gap in related research and training. Eight early stage researchers (ESRs) will be equipped with a set of research skills including robotics, machine learning, energy systems, as well as transferable skills such as entrepreneurship and career management.

### Objectives

The overarching goal of MORE is to develop new concepts of processes, systems and components for HDM machinery, specifically using robotisation and AI, and to provide proof-of-concept by advancing hardware and software for representative cases with the aim of increased safety, fuel efficiency and productivity.

Training objectives are to provide ESRs with knowledge and experience in robotisation and automation; to train them in energy-efficiency-related topics with a particular focus on energy generation, power management, power transmission; and to equip them with business and transferable skills, including strategic thinking, scientific writing and ethics.

### Funding Programme

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Grant Innovative Training Networks Agreement No. 858101.



### Project Duration

01/01/2020 – 31/12/2023

### Project Budget

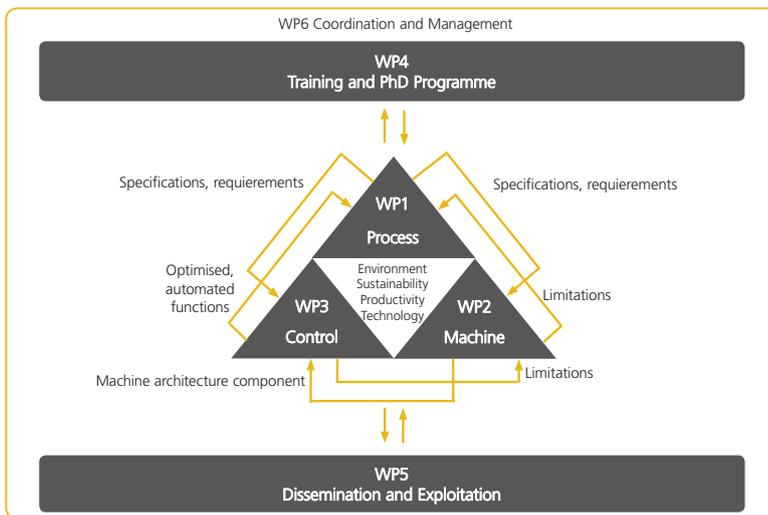
2.17 million euro

### Project Website

[www.more-itn.eu](http://www.more-itn.eu)

### Activities

The research objectives will be achieved within three main research work packages (WPs): Process, Machine and Control. Three additional WPs will cover complementary activities: training, outreach and management.



Each of the eight Early Stage Researchers (ESRs) will focus their research project in one WP. However, they will build synergies with the others as part of the network-wide scientific training workshops. ESRs will spend 75% of their studies with the industry partners, a crucial aspect of the collaboration between academia and industry in MORE.

### Impact

Our EID will provide ESRs with timely knowledge and practical experience in the fields of automation and energy-efficient systems to guide the development of next generation HDM machinery and enhance their career perspectives.

Collaboration of key partners from this industry and related fields of research will impact the wider society by contributing to the future competitiveness of an important European industry and strengthening the innovation capacity in technologies that are also highly relevant to other sectors and industries.

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- Project Partners**
- Karlsruhe Institute of Technology, DE
  - Örebro University, SE
  - John Deere Forestry Oy, FI
  - Novatron Oy, FI
  - Bosch Rexroth AG, DE
  - Hiab AB, SE
  - Liebherr- Werk Bischofshofen GmbH, AT
  - Volvo Construction Equipment AB, SE
  - GIM Oy, FI
  - Technische Universität Darmstadt, DE