

# Virtualization and simulation



## VISUAL COMPONENTS



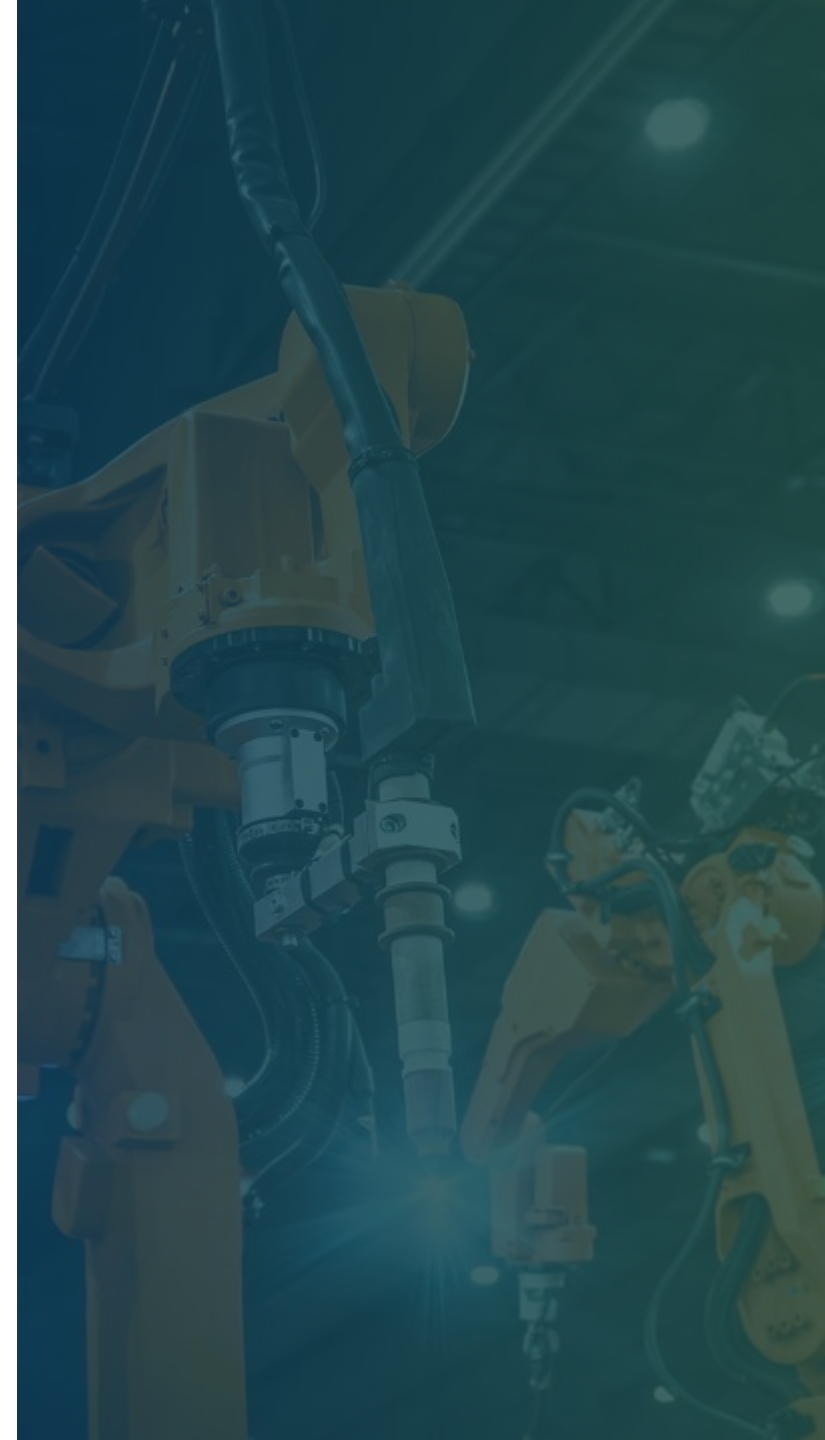
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The logo for OPTIMAI, featuring a stylized '@' symbol in a circle followed by the word 'OPTIMAI' in a bold, sans-serif font. The 'O' is white, and the rest of the letters are in a light blue color.

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# Introduction and Objectives

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# What is the purpose of this module?

In this module, you will learn about:

- › the software used to virtualize the manufacturing layouts for each of the OPTIMAI pilot sites;
- › How to use this software to design digital manufacturing models;
- › How the production virtualization and 3D simulation will contribute to improved and accelerated production planning.



## Who is this module aimed at?

- › The **primary target audience** is the OPTIMAI end-users who will be using the Visual Components 4.0 virtualization and simulation tools.
- › **Secondary target audiences** include other OPTIMAI partners as well as external stakeholders from any sector (manufacturing, health care, automotive, aerospace etc.) interested in virtualization and simulation applications.



The logo for Televes, consisting of the word "Televes" in a bold, black, sans-serif font with a registered trademark symbol (®) to its upper right, centered on a solid orange rectangular background.



# Roadmap to OPTIMAI Virtualization

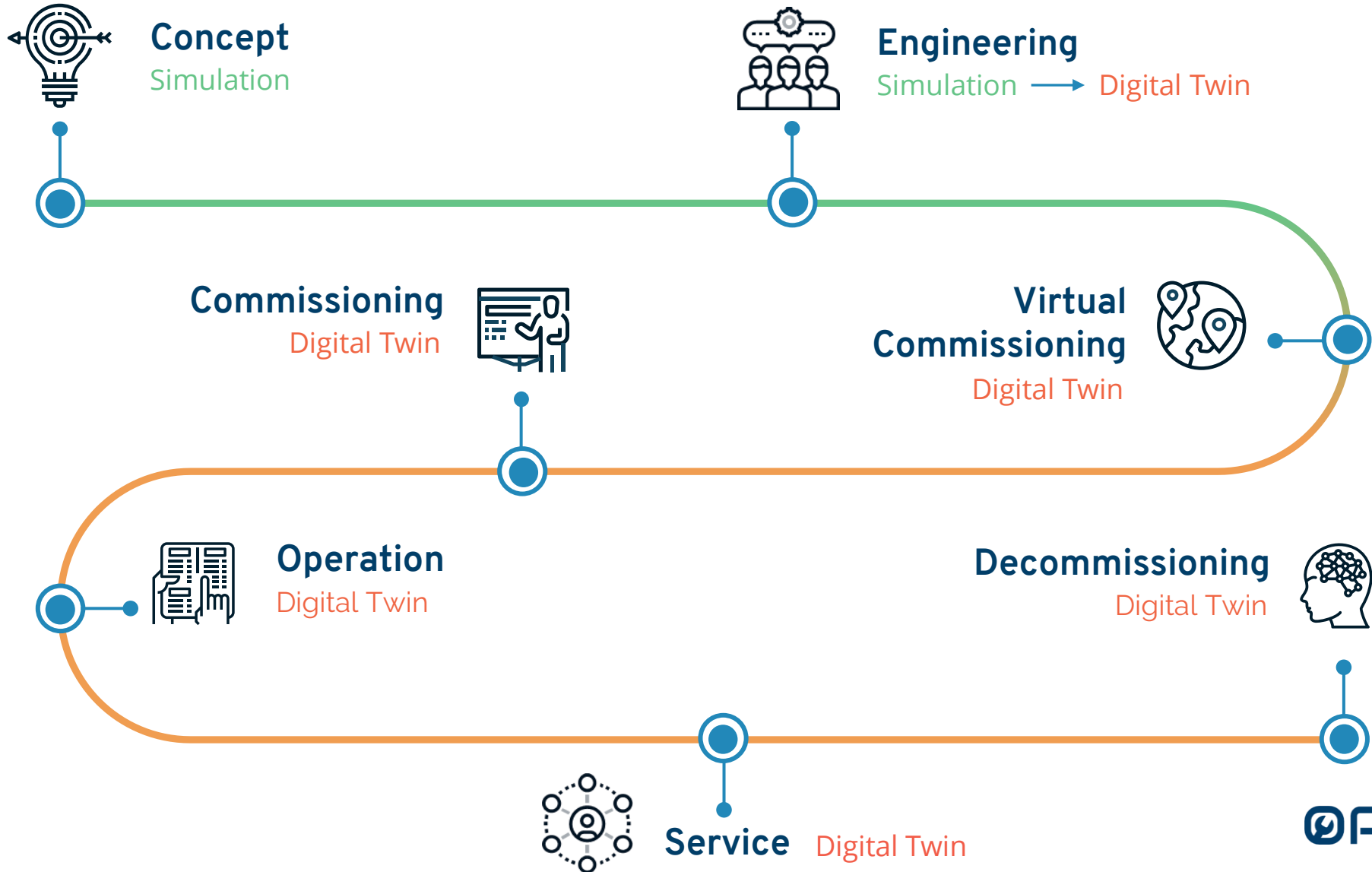
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# Roadmap to OPTIMAI virtualization

- › Building the virtual models in OPTIMAI follows a process aligned with the life cycle of the production system.
- › In OPTIMAI, the pilots are based on existing production systems. The roadmap for the virtualization of OPTIMAI allows for a rethinking of these systems from the concept, and for the identification and the introduction of OPTIMAI technologies from a very early stage.
- › The OPTIMAI roadmap describes the different phases in the life cycle of an existing production system where the different OPTIMAI technologies are being integrated.



# Product life cycle of a manufacturing system





# Introduction to Visual Components

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# Introduction to Visual Components

- › Visual Components provides each OPTIMAI end-user with a tailored solution for the virtualization of the factory that includes digital twin development.
- › Visual Components offers a 3D factory simulation suite that consists of a set of innovative tools which set the standard for modern simulation.
- › The powerful simulation suite consists of modular solutions packages which provide the optimal solution for every production unit from the sales to engineering.
- › The modular concept is extended with the utilization of reusable plug and play components which enable the creation of a virtual factory layout in minutes and for robot cells to be set up, configured and tested quickly.

# Introduction to Visual Components

You will find a standalone guide introducing Visual Components to OPTIMAI end users [here](#).

The introduction is divided into the following learning blocks:

## › User Interface overall

- |              |                    |
|--------------|--------------------|
| 1) Versions  | 6) Programme       |
| 2) File      | 7) Drawing         |
| 3) Home      | 8) Connectivity    |
| 4) Process   | 9) Help            |
| 5) Modelling | 10) Docking panels |

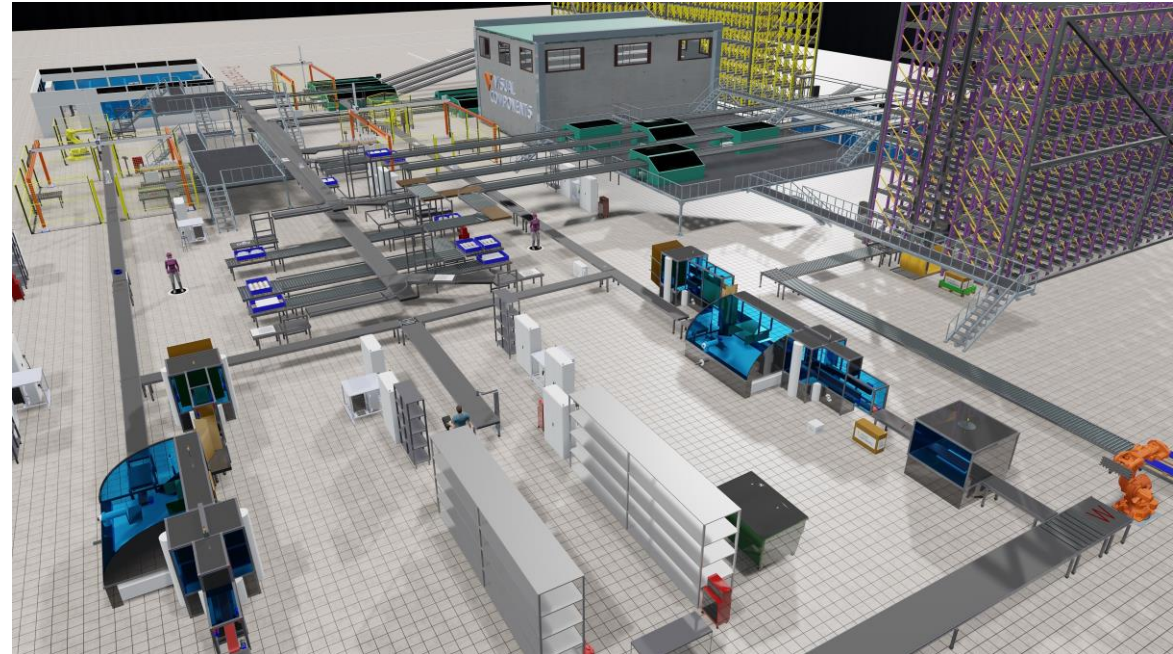


# Introduction to Process Modelling

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# Introduction to process modelling

- › **What is process modelling?**
  - › Process modelling is the graphical representation of a process or a workflow.
  - › Process modelling allows you to define:
    - › what products you want to have and create during a simulation;
    - › where those products need to go;
    - › how the products get there; and
    - › what happens to the products during a process.



# Introduction to process modelling

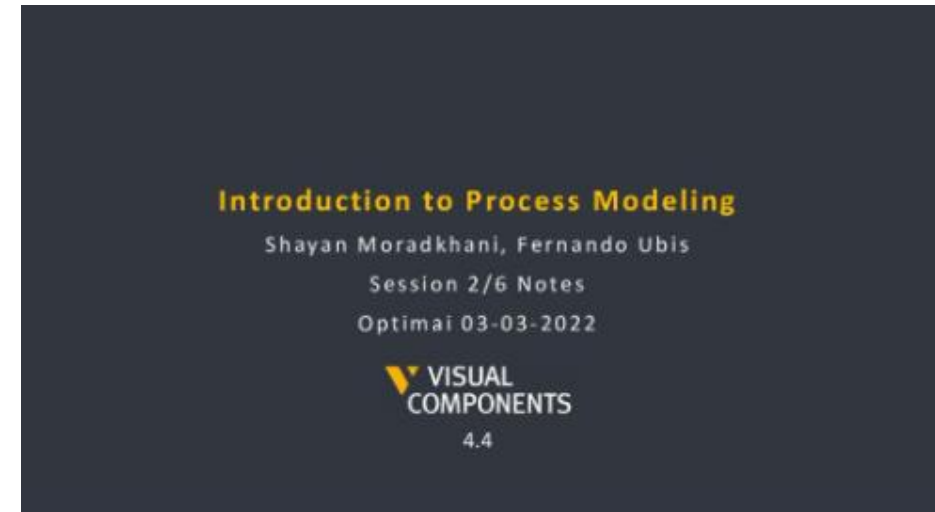
- › The simulation modules developed within OPTIMAI to build a digital twin support a fast concept of the process model to be created within the virtual environment.
- › The modules are highly configurable and easy to use by a wide variety of users independent of their technical background.
- › The open interface based on Python allows for further customization to user needs for highly experienced users with programming skills.
- › The process model simulation components facilitate the virtualization of the production system and the production workflow.
- › The virtual layout is connected to the production facility enabling the digital twin.

# Introduction to process modelling

You will find a standalone guide introducing Process Modelling to OPTIMAI end users [here](#).

The introduction is divided into the following learning blocks:

- 1) Introduction
- 2) Process Tab
- 3) Flow Groups
- 4) Product Type
- 5) Assemblies
- 6) Process Statements
- 7) Process Routines
- 8) Resource Controllers
- 9) Transport Graph
- 10) Flow Sequence
- 11) Process's Source



# Introduction to Robotics and Automation

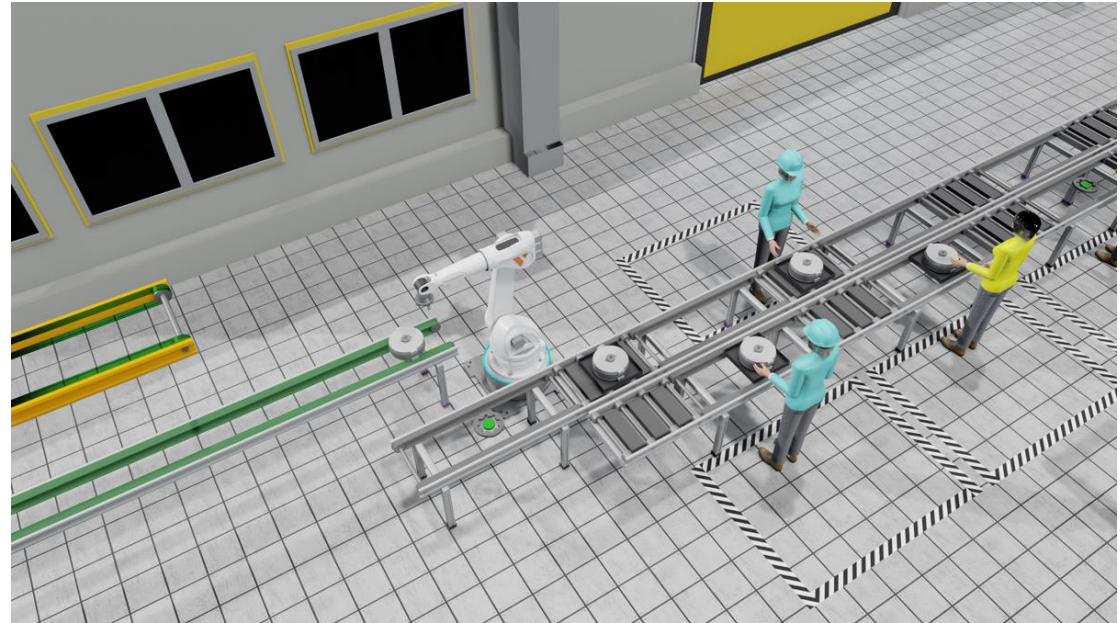
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# Introduction to robotics and automation

## What is robotics and automation?

- › **Robotics** is a branch of technology that deals with the design, construction, operation and use of robots. In the Visual Components robotics training, you will learn about the key motion types, frames and configurations used in robotics.
- › **Automation** refers to a wide range of technologies where automatic equipment is used or introduced in a manufacturing or other process or facility. In the Visual Components automation training, you will learn about automation through mobile robots that can move around in an environment and perform tasks.

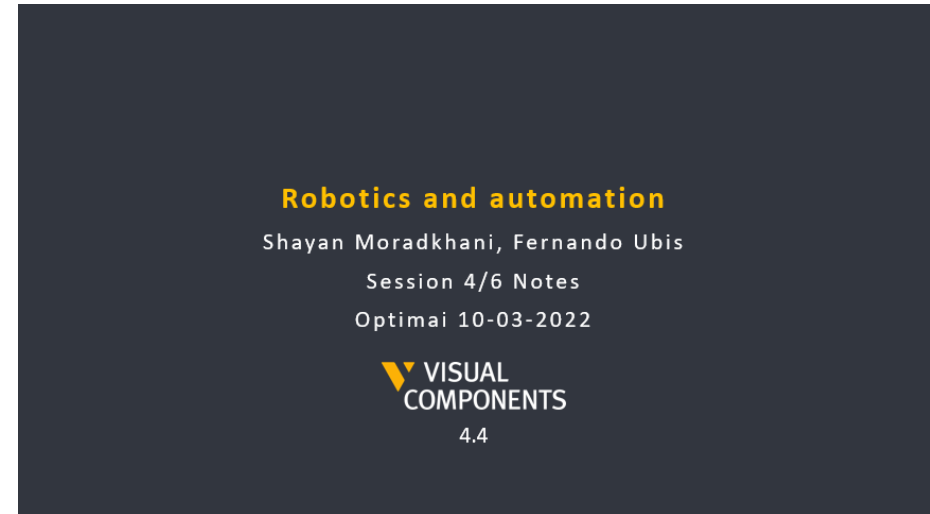


# Introduction to robotics and automation

You will find a standalone guide introducing robotics and automation to OPTIMAI end users [here](#).

The introduction is divided into the following learning blocks:

- 1) Teaching target points
- 2) Ptp vs lin
- 3) Move vs jog
- 4) Editing target points
- 5) Tool centre point and base
- 6) Mapping signals to robot actions
- 7) Grasping
- 8) Releasing
- 9) Multi grasping and releasing
- 10) Points reference
- 11) Signals
- 12) Sequences
- 13) Routine properties and variables
- 14) Statement properties
- 15) Saving a robot program





# Additional Visual Components 4.0 Training Resources

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# Visual Components 4.0 training courses

- › The first phase of OPTIMAI has focused on the creation of the simulation. In the following phases, this will be extended with the digital twin.
- › Visual Components 4.0 is the 3D simulation platform used to create the digital models.
- › Training courses that prepare you for the creation of the simulation and eventually for the creation of the digital twin include:
  - [Basics of Simulation](#)
  - [Introduction to Layout Configuration](#)
  - [Navigation](#)
  - [Selection](#)
  - [Introduction to Process Modeling](#)
  - [Create a Simple Robotic Cell](#)
  - [Editing Product](#)
  - [Introducing a New Product](#)
  - [Introducing a New Flow Group](#)
  - [Destination and Source](#)
  - [Creating a Simultaneous Flow of Products](#)
  - [Introduction to Using Resources](#)

# Next Steps

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## Next steps

- › The simulation engine for production planning will be finalised
- › In all three pilot sites, next steps include:
  - › Simulation of production scenarios; testing using not only virtual counterparts of the machinery but also virtual sensors providing a complete virtual production environment;
  - › Production planning combining digital twins with AI models that map design choices to the units' performance and any related defects.





# OPTIMAI

Thank you!

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