

Virtual Commissioning and Model-Based Design

- ◇ Identify and eliminate design errors early in the process
- ◇ Reduce development and validation time
- ◇ Reduce risk and potential damage during commissioning of the physical system
- ◇ Rapidly and nondestructively test a wide variety of operation scenarios

1. Modeling and desktop simulation

- ◇ Design controls model and plant models of the physical system, including CAD import
- ◇ Prototype new functionality in combination with legacy machine software
- ◇ Optimize parameters

2. Hardware-in-the-Loop and Real-Time Testing

- ◇ Emulate the behavior of the physical system (plant model) in real time
- ◇ Design and test hardware-independent functionality
- ◇ Debug real-time algorithms directly from Simulink

3. Code Generation for PLC Platforms

- ◇ Generate C/C++, IEC 61131-3, or HDL code
- ◇ Integrate automatically generated code into the PLC software through the vendor's IDE
- ◇ Perform online debugging from Simulink and Stateflow

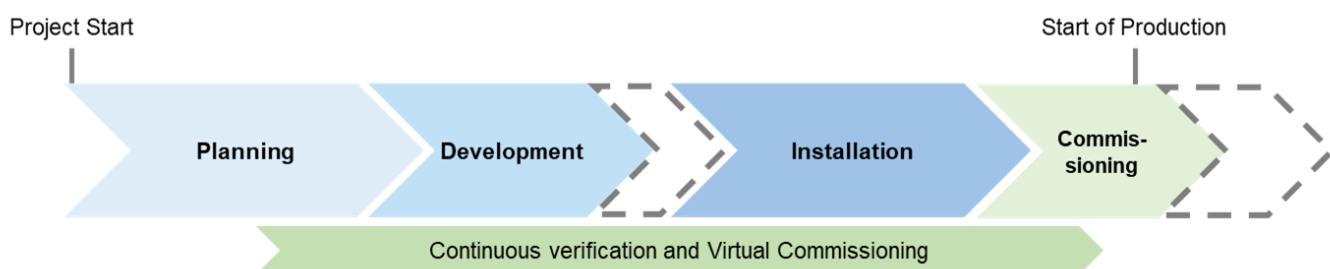
4. Digital Twin Use in Operation

- ◇ Perform model-based health monitoring and predictive maintenance
- ◇ Reproduce errors from field data
- ◇ Train operators on new systems

Traditional workflow: sequential development without Virtual Commissioning



Parallelizing engineering and development with Virtual Commissioning



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