

vintecC

Partners in Machine Software Development

Core Activities

- Digital Twins & Process Simulation
- Algorithm & Software Development
- Machine Diagnostics

Contact details

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CONTENT

- **Vintec**
- Virtual commissioning
- Virtual commissioning of an AGV using sensor simulation



DIGITAL TWINS & SIMULATION

- Process Simulation
- Virtual commissioning
- Automated testing



ALGORITHMS & SOFTWARE

- Process Control
- Sensor Technologies
- Code generation



MACHINE DIAGNOSTICS

- Component / System Diagnostics
- Data Analytics
- IoT

TRENDS

Faster Time-to-market

- ❑ ROI (+More resources for innovation)
- ❑ Early mover advantage

Machine Simulation

- ❑ Black/white box modeling
- ❑ Design verification (MIL/SIL/HIL)

Machine Software

- ❑ Control System development
- ❑ Auto Code Generation

Smart Sensors

- ❑ Vision
- ❑ Soft Sensors

Agile Development

- ❑ Rapid Prototyping
- ❑ Auto Code Generation
- ❑ Hardware Independent

System Safety / Quality

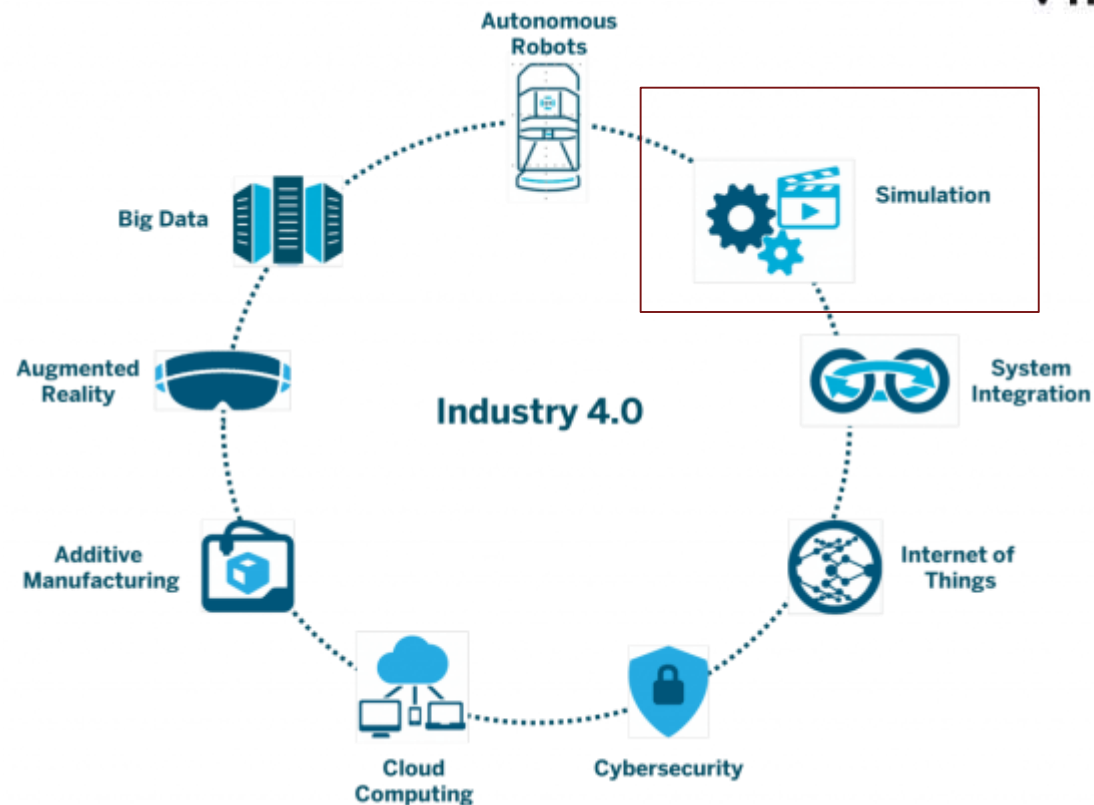
- ❑ IEC 61131-3 compliant code
- ❑ Requirements tracing&verification

Complexity / Performance

- ❑ Closer interaction of multiple eng disciplines
- ❑ More automation = more sensors & software

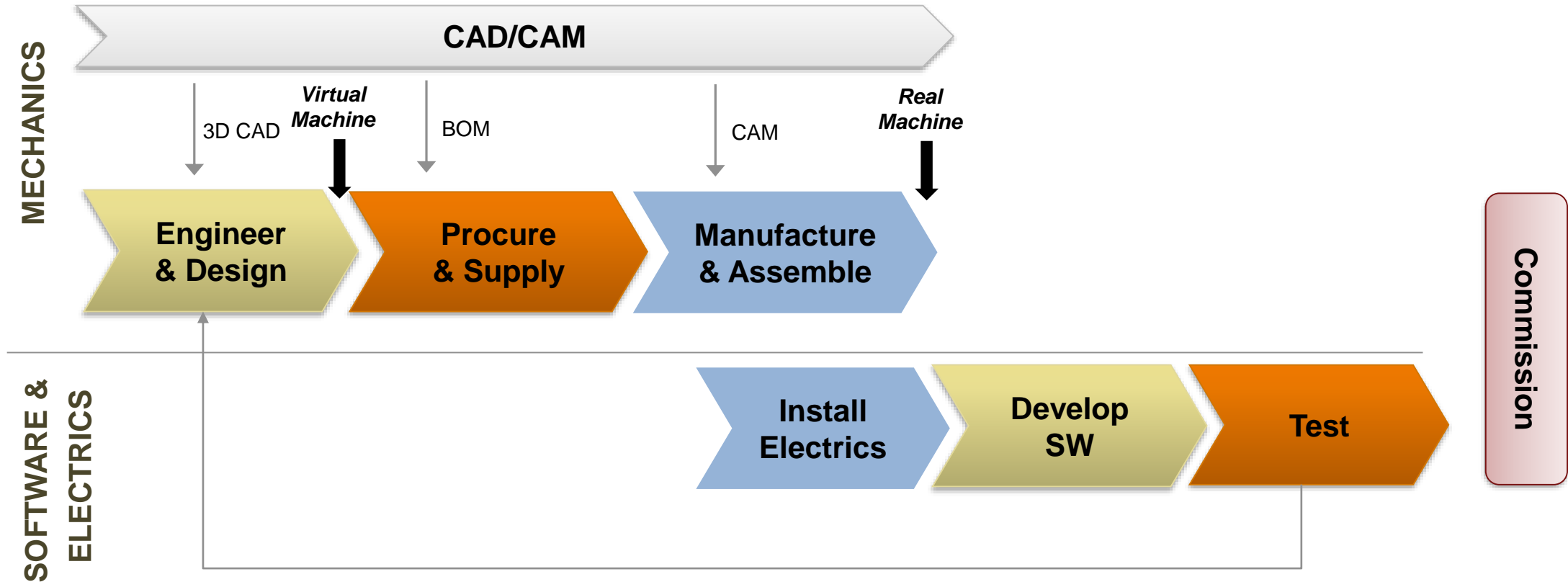


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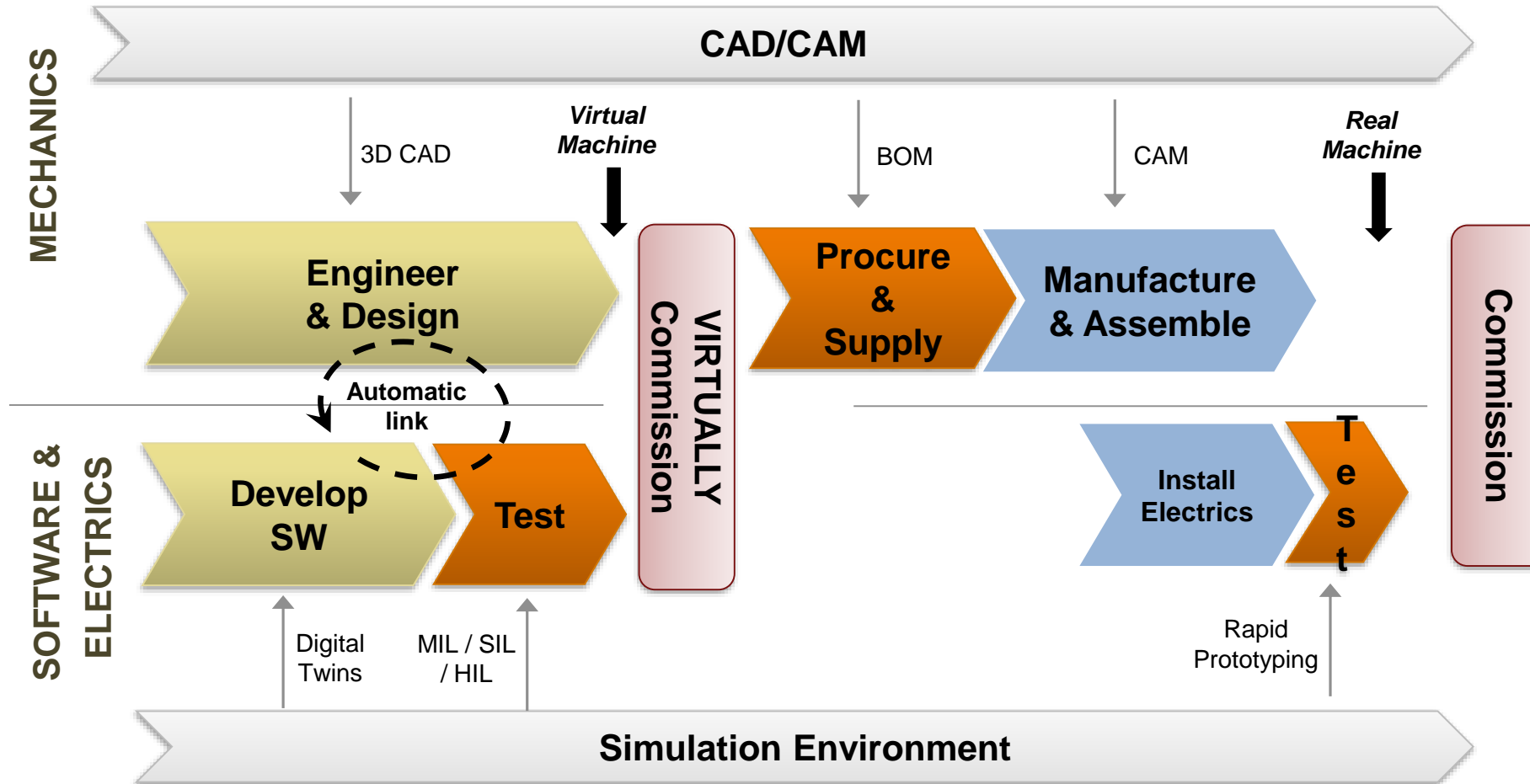


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VIRTUAL COMMISSIONING VS CONVENTIONAL SOFTWARE DEVELOPMENT



VIRTUAL COMMISSIONING VS CONVENTIONAL SOFTWARE DEVELOPMENT



VIRTUAL COMMISSIONING - WHY ?

Conventional software development

Software

Real Machine



VIRTUAL COMMISSIONING - WHY ?

Conventional software development

Physical Machine

- Availability
- Expensive and limited testing opportunity

Maintainability/complexity

- Every change is a risk of breaking something
- Struggle to deliver in time keeping up with competition

Sequential Development

- Switching costs increase exponentially
- Slow Iterative development cycles



VIRTUAL COMMISSIONING - WHY ?

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STOW PALLET SHUTTLE

- The Company

- Averys group, 750 employees
- Worldwide service organisation
- Pallet racking and shelving systems



- The project

- Custom controller board and legacy code base preventing new feature development
- Conversion to full model-based software
 - Series product based on beckhoff target
 - Hardware independence due to model based workflow
 - Simulation (sensors, drives,...) allows to add new and complex features ... fast



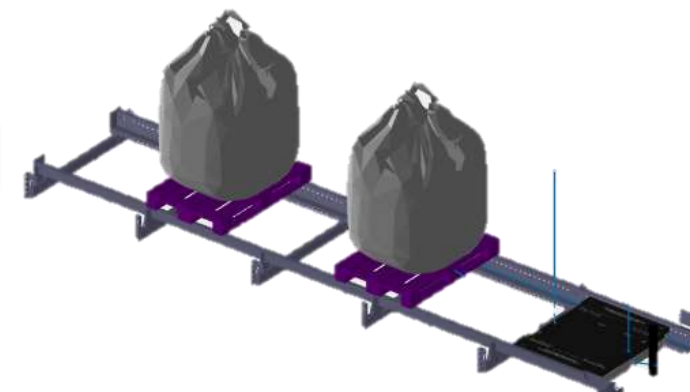
WHY ?

Conventional software development	Virtual commissioning
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Software



Virtual Machine



Actuators

Sensors



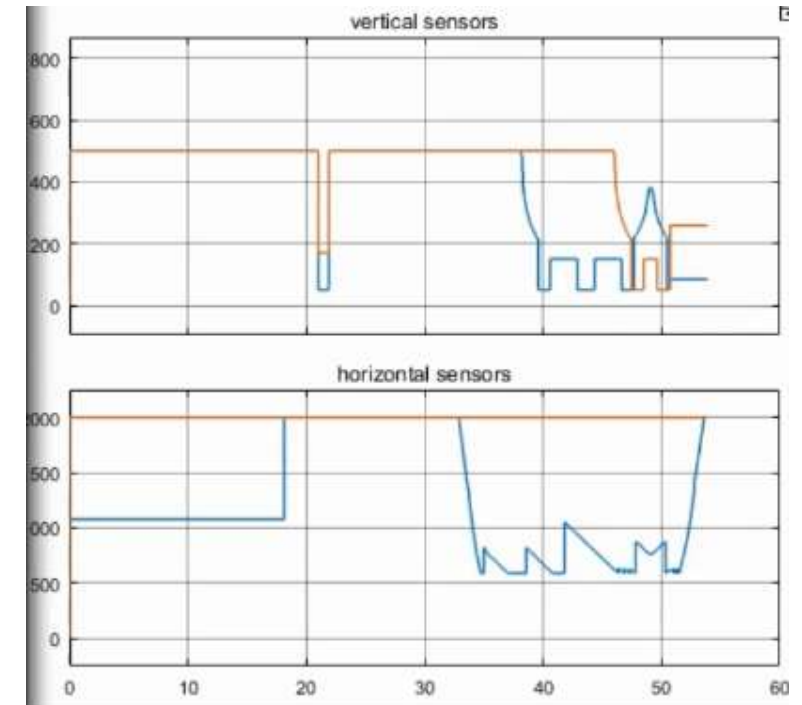
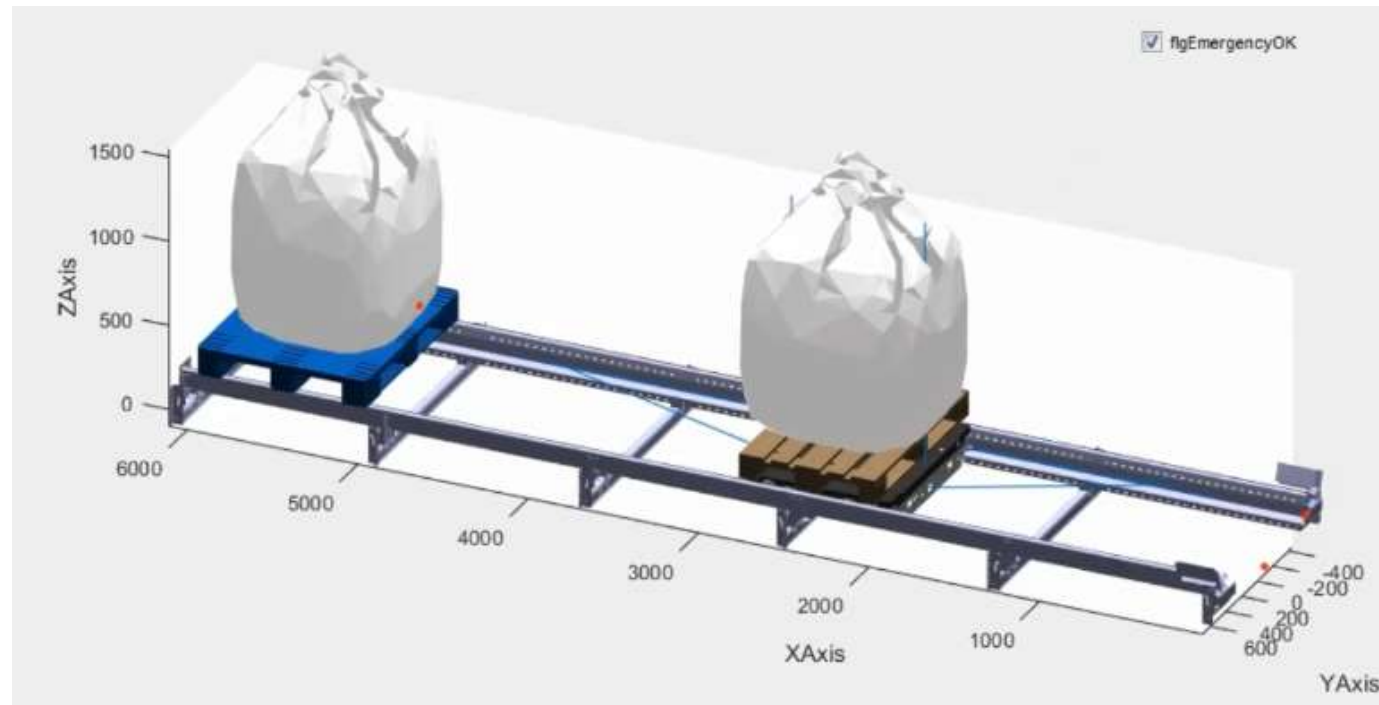
WHY ?

- Import from CAD
- Sensor simulation

Virtual commissioning

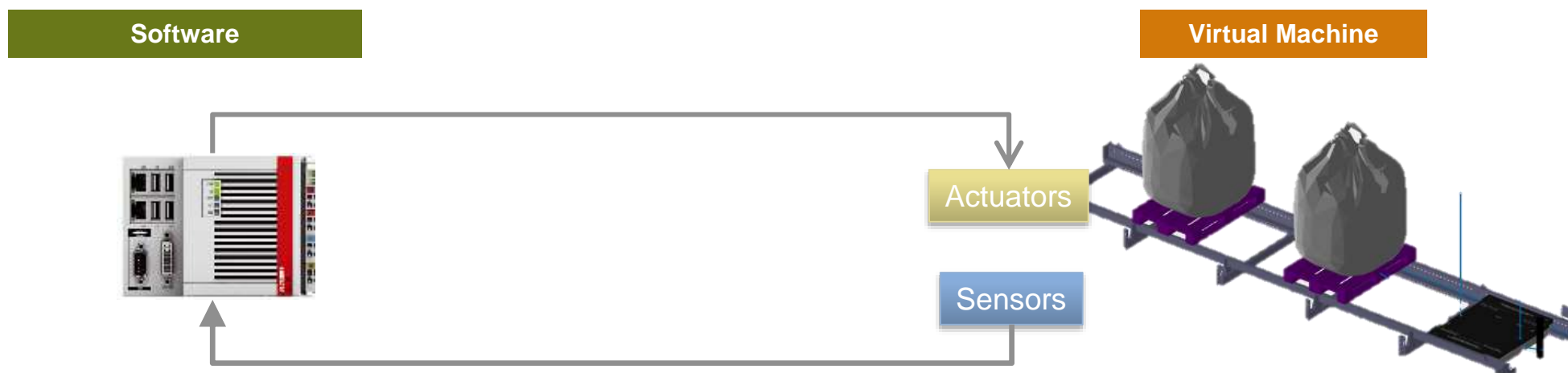
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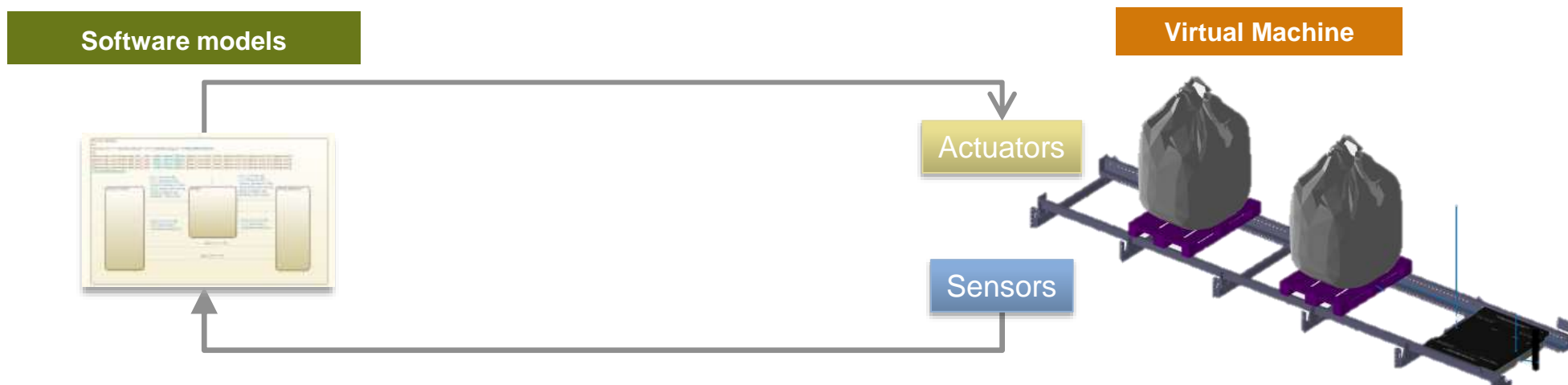
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WHY ?

Simulink generated components

Application

Application components: Hardware board, 3D cube, and a yellow box labeled **SAFETY**.

Drivers

Driver components: Calculator, globe, hardware board, and a box labeled **DS402**.

Utilities

Utility icons: Location pin, LOS, USB drive, warning sign, and gear.

Legacy

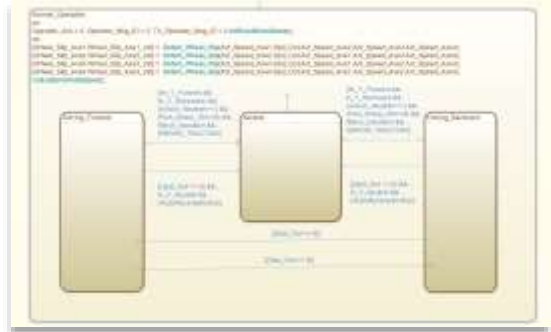
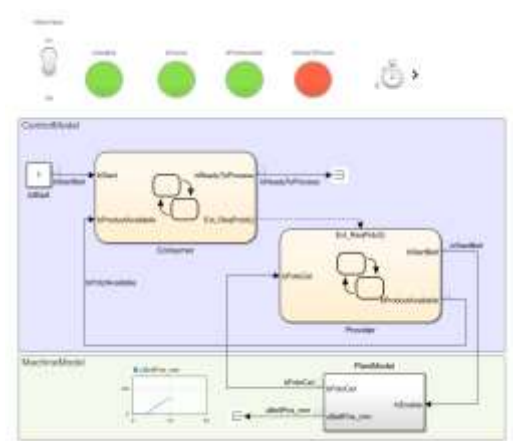
Physical IO

Physical IO components: IOLINK, Canopen, DIO, RS232, and a yellow box labeled **SAFETY**.

Virtual commissioning

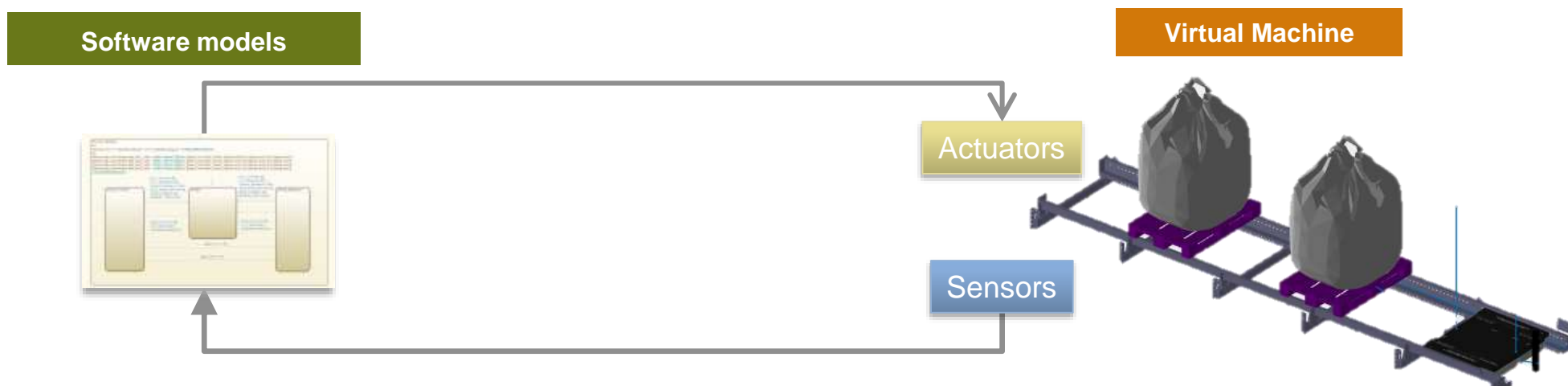
Graphical programming

- Graphical state machines
- Software as a competitive advantage



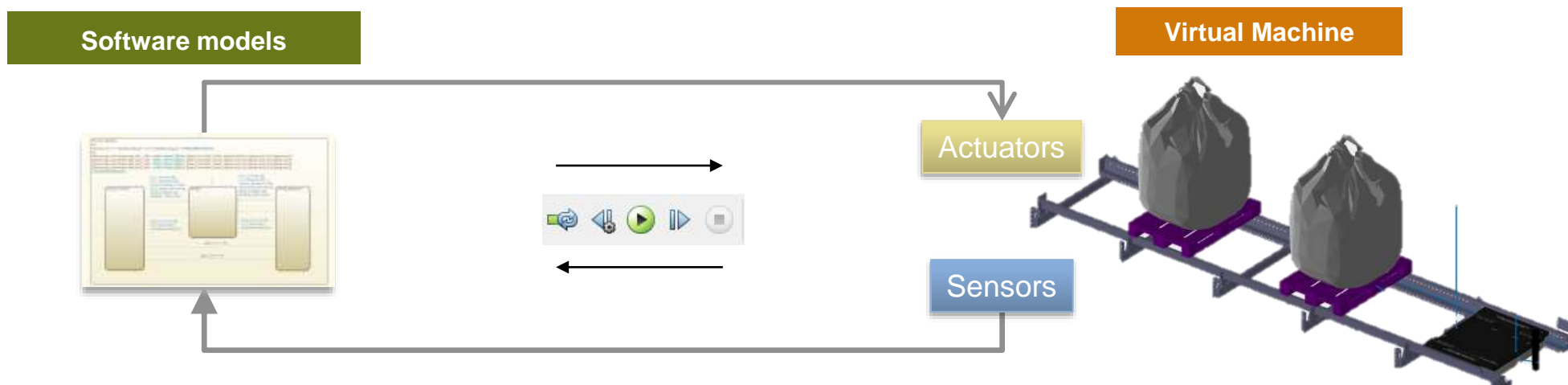
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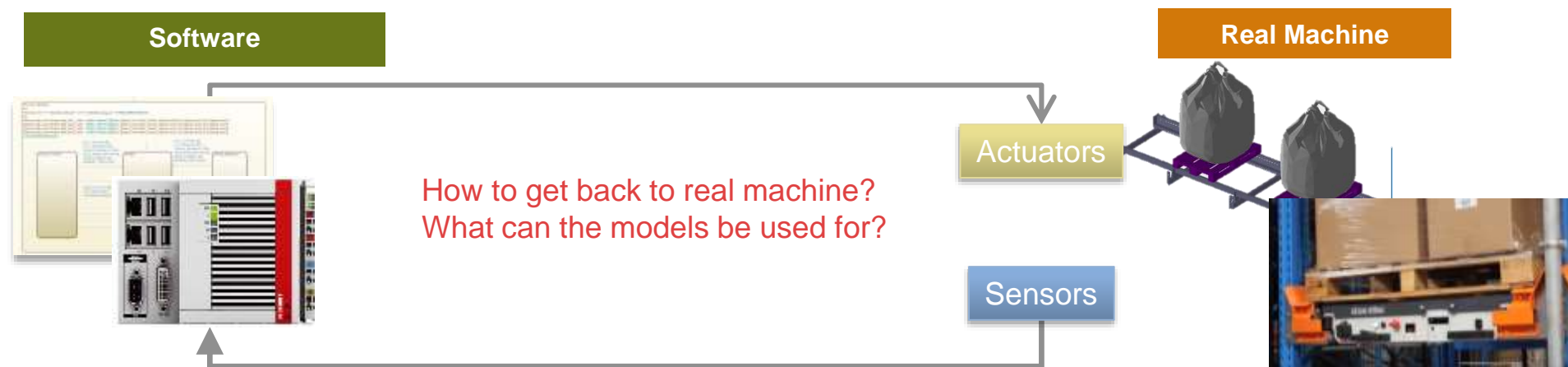
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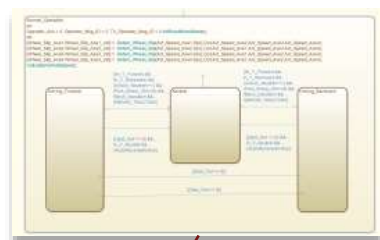
INTEGRATION ?

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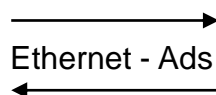
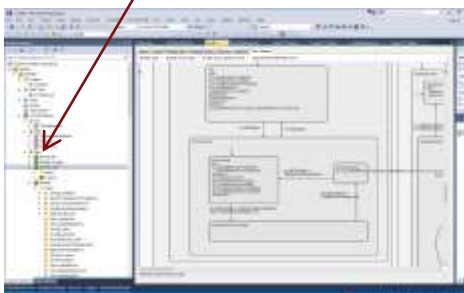
VIRTUAL COMMISSIONING – WORKFLOW – REUSE OF MODELS

1. Simulation



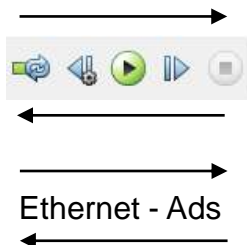
Statemachines
Sensor simulation
3D/2D/1D
Static vs dynamic
Scopes
Breakpoints

2. Real time testing



External mode
Twincat measurement
Breakpoints
ADS interface/soft realtime

3. Automated testing (HIL / PIL /MIL)



Row	Column	Value	Color
1	3008	1000	Red
2	3008	1000	Green
3	3008	1000	Red

Database of scenarios



SENSOR SIMULATION – 3D

- Sensor simulation not limited to 1D



CONCLUSION – VIRTUAL COMMISSIONING – WHY ?

1. Decrease development time

- Fast development of complex machine/features
 - Start when no hardware is available (or variant not available)
 - "One-click" from Concept Validation to Rapid Prototyping

2. Manage complexity

- Graphical programming
 - Easy to understand & explain
 - Manage Statemachines
 - Self – Documenting (generate HTML)
- Auto-Code generation
 - Avoid manual coding mistakes

3. Increase maintainability

- Hardware independent software
 - From Model to PLC / C / C++ code
- Reproduce in-field scenarios
 - Special scenario's (safety!)
 - Test particular situation that occurred at customer
- Training of customers & service engineers

... and many other use cases

CNI
INDUSTRIAL



stow 
MEMBER OF
AVERYS GROUP



—innovators in agriculture—



SOLERAS
advanced coatings



Atlas Copco



PICANOL
YOU ARE ALWAYS AHEAD



DUCO
Ventilation & Sun Control



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punch
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Thanks for your attention

AND TELL US ABOUT YOUR PROJECT!