

AI Applications in Industrial Logistics – Overview and Main Challenges

20th of March, San Jose

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Global Head of Central Quality Assurance and Field Compliance



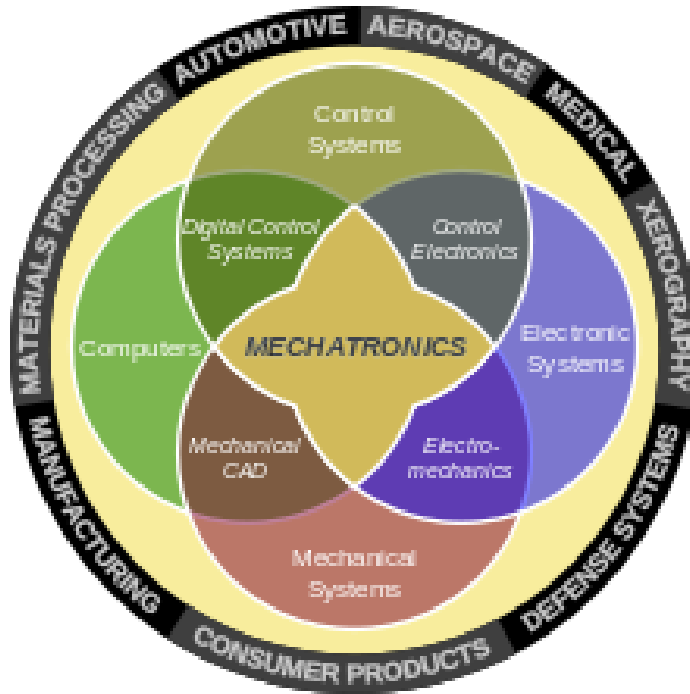
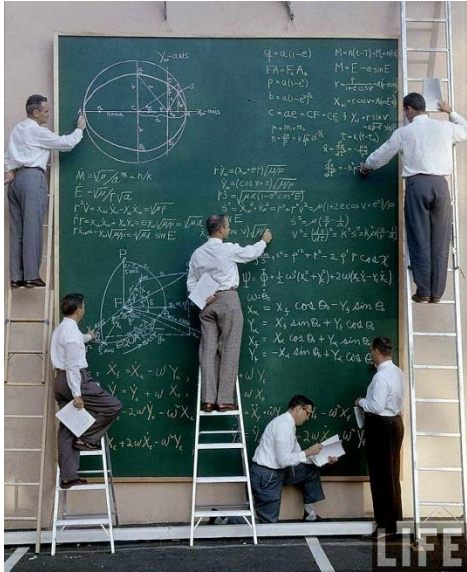
**Mechatronics
& Sustainable Packaging**

Agenda

- About myself
- Amazon Mechatronics and Sustainable Packaging – Quick Intro
- Industrial Logistics Evolution and Emerging Technologies
- Field Compliance Challenges: Machine and Functional Safety, SOTIF
- Integrated Safety Strategies in Industrial Logistics
- Simulation, Emulation, Digital Twins
- Emerging Technologies: Main Challenges



About myself

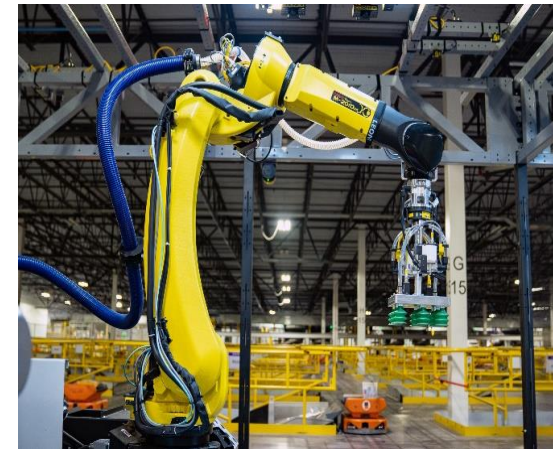
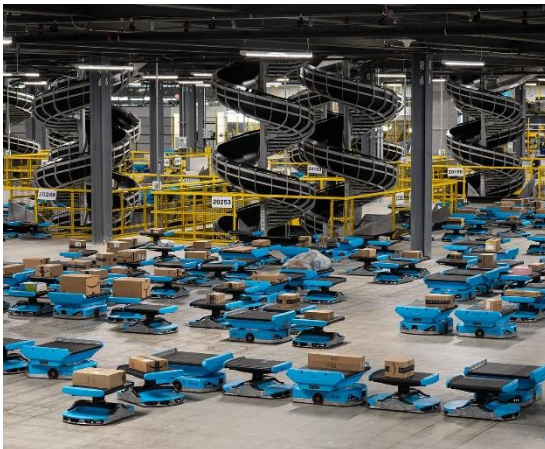


robotics

amazonrobotics



Mechatronics & Sustainable Packaging



amazon
Operations
Innovation Lab

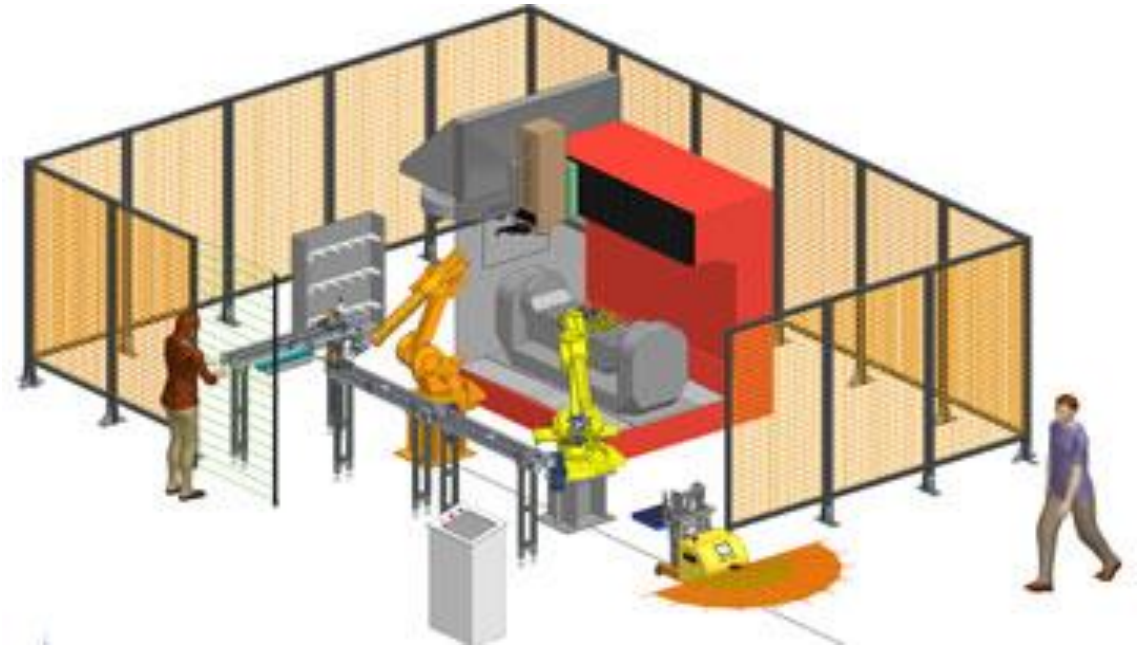
Mechatronics
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Amazon MSP: Mission

Identify, Acquire, Invent, Develop & Implement Next Generation

Technologies in advanced Mechatronics directed towards Autonomy **to improve Personnel Safety and Ergonomics.**



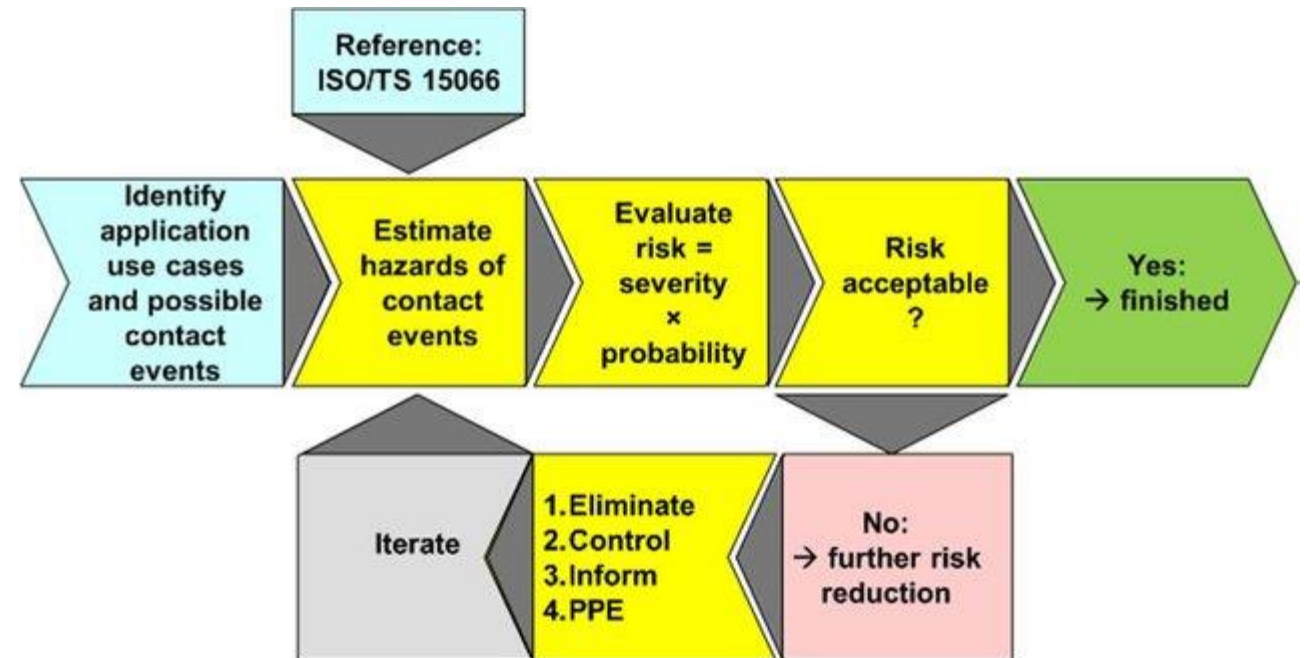
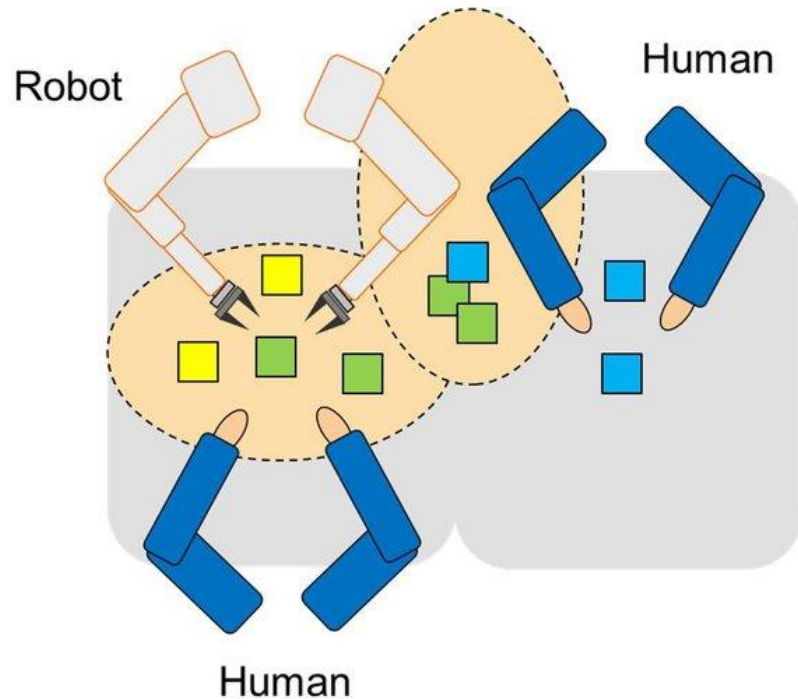
Evolution of Industrial Logistics – from Manual to Automated



Evolution of Industrial Logistics – from Standalone Automation to Integrated Solutions

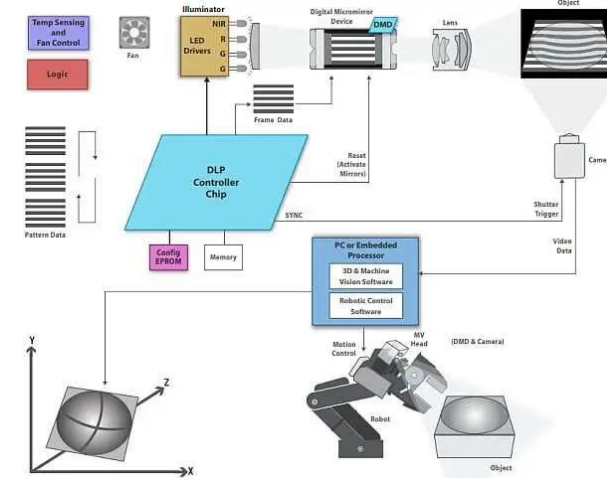
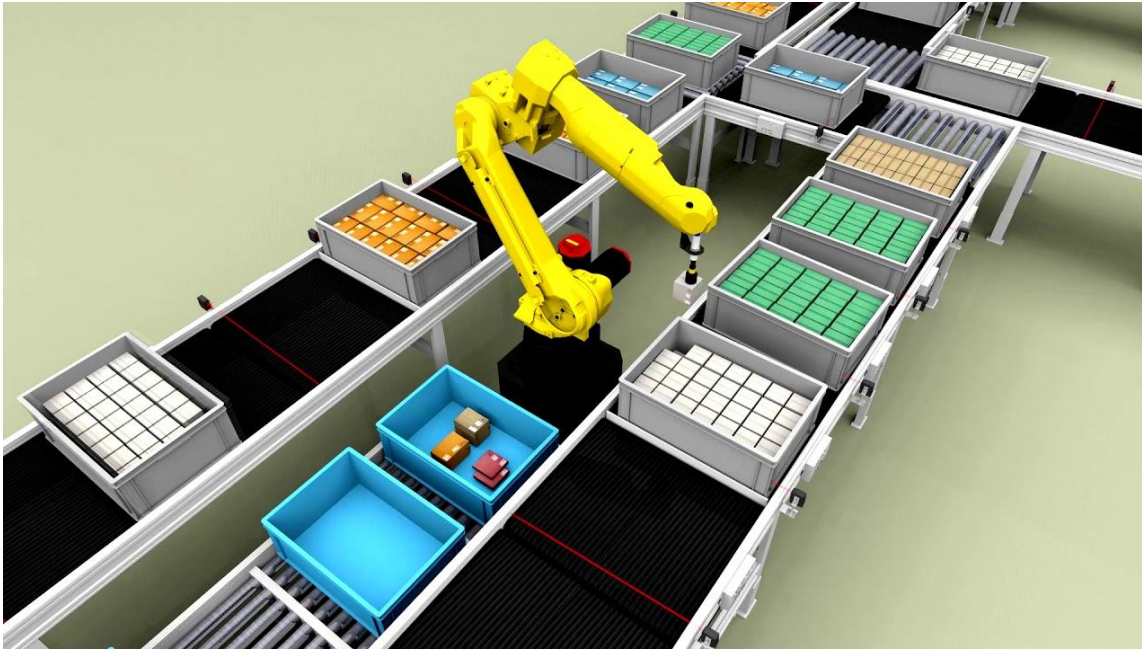


Emerging Technologies in Industrial Logistics - Examples

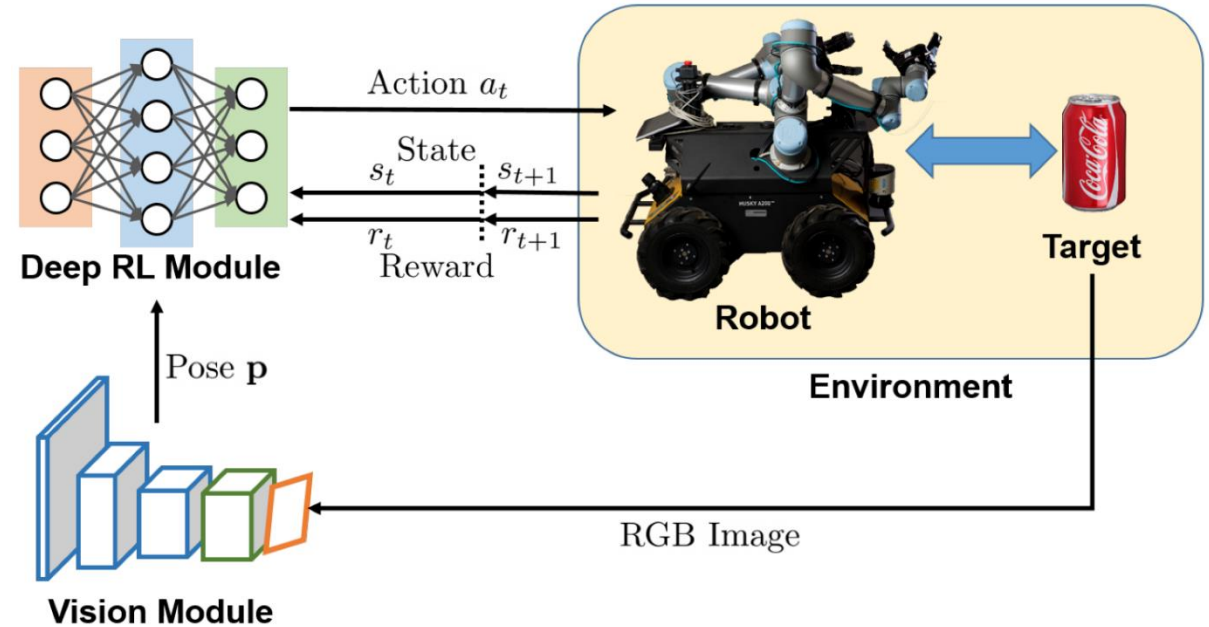


Emerging Technologies in Industrial Logistics - Examples

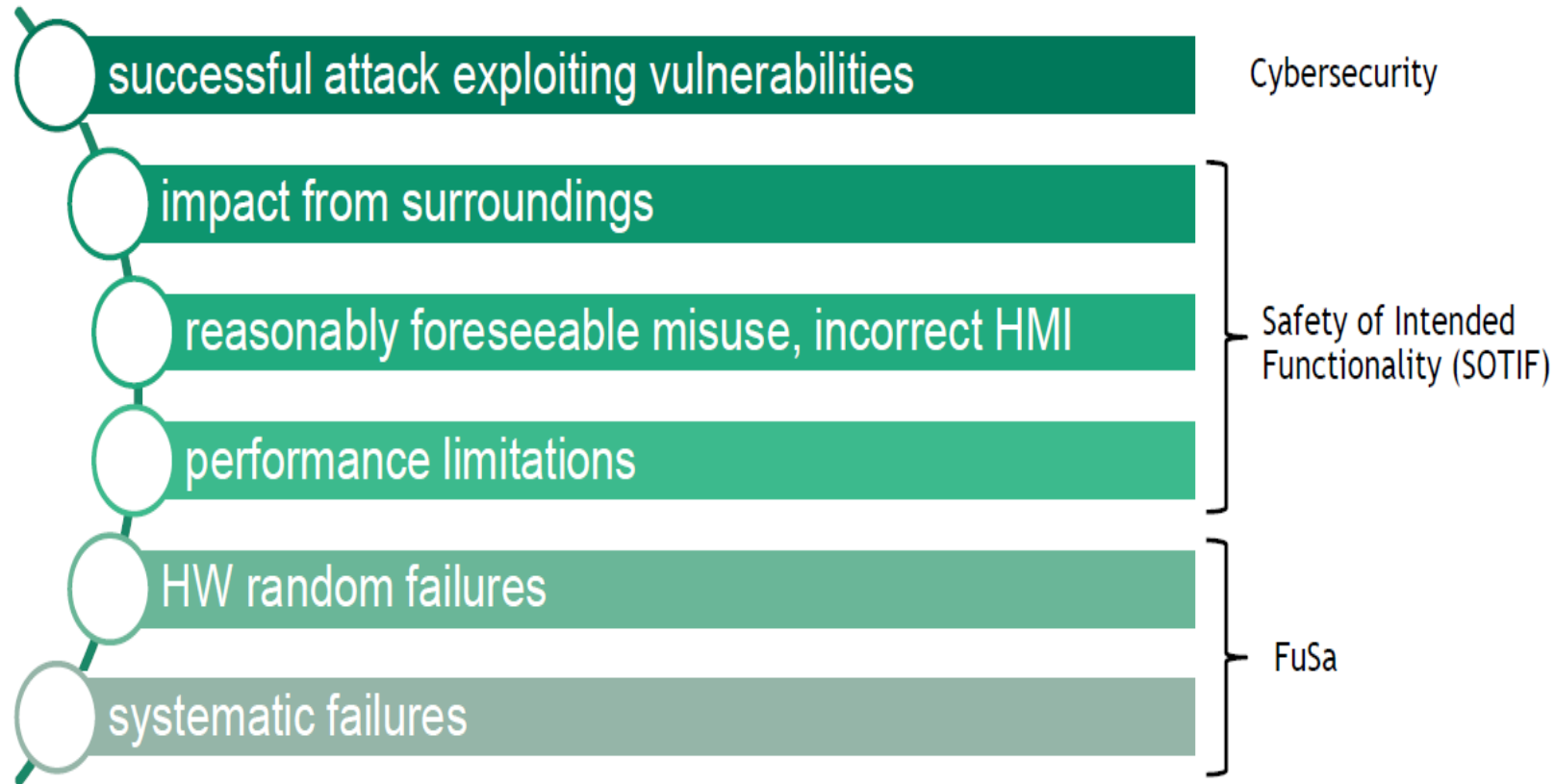
Robotic Item Picking



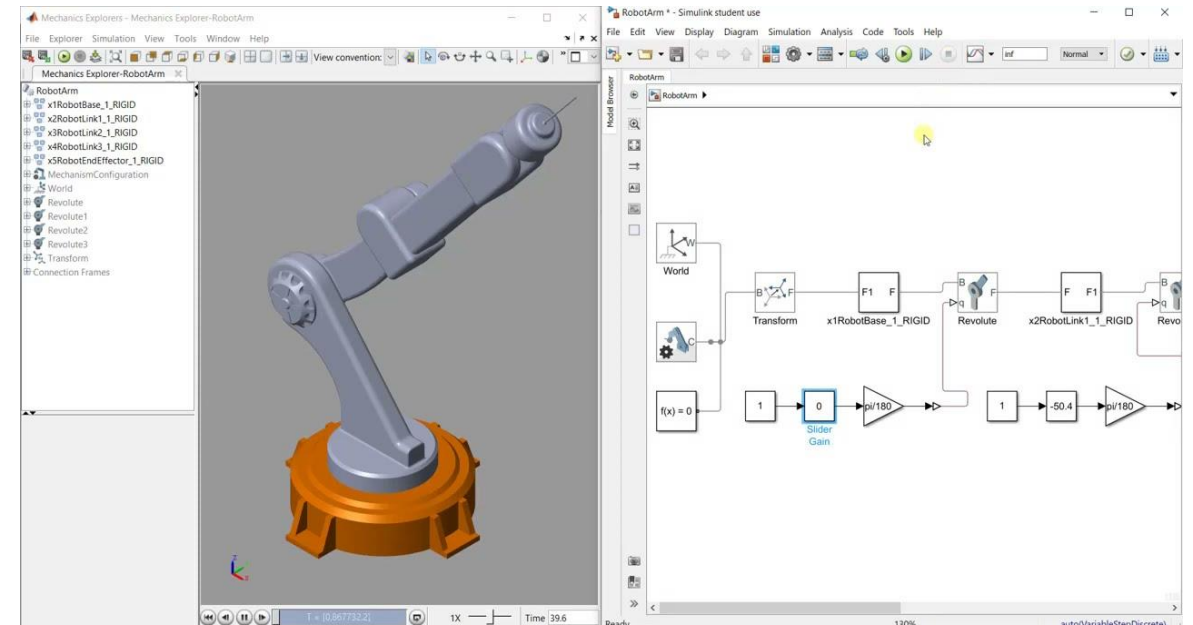
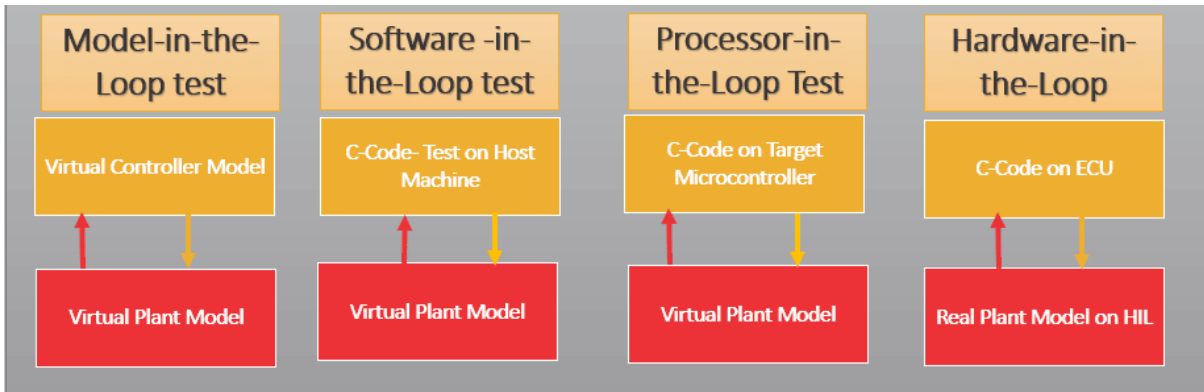
Emerging Technologies in Industrial Logistics - Examples



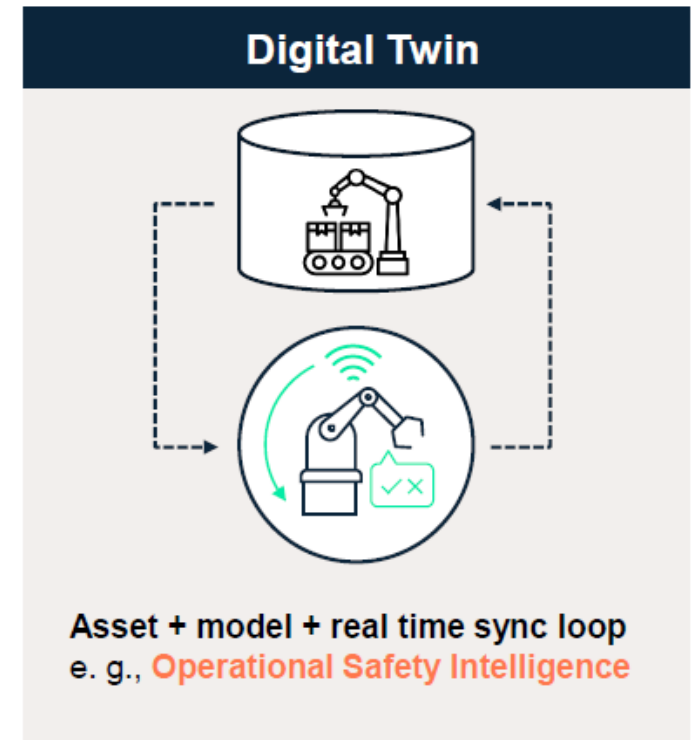
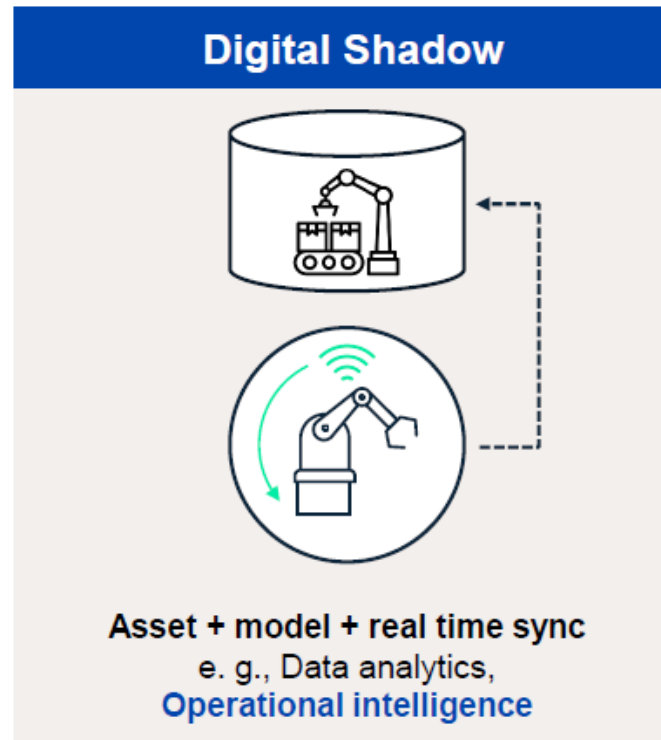
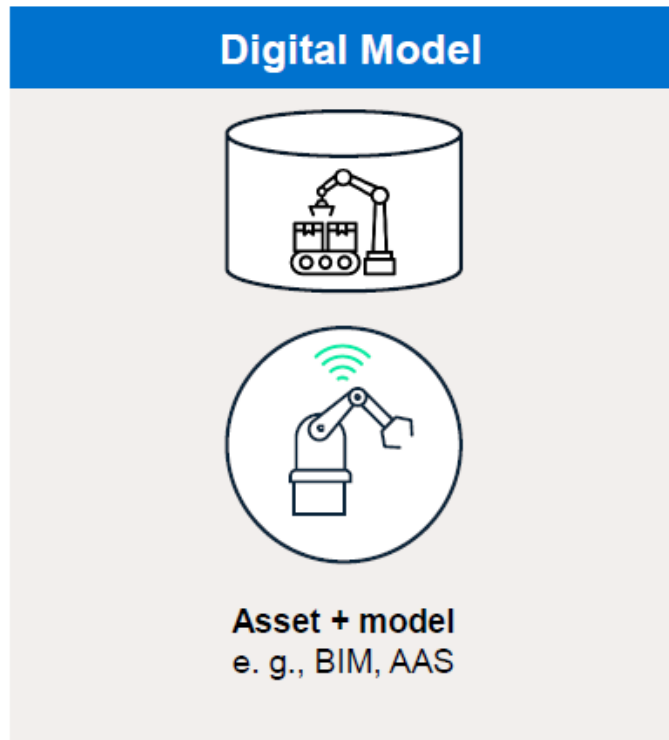
Functional and Machine Safety, SOTIF, Cybersecurity



Integrated Safety Strategy: Enabling Technologies



Integrated Safety Strategy: Enabling Technologies

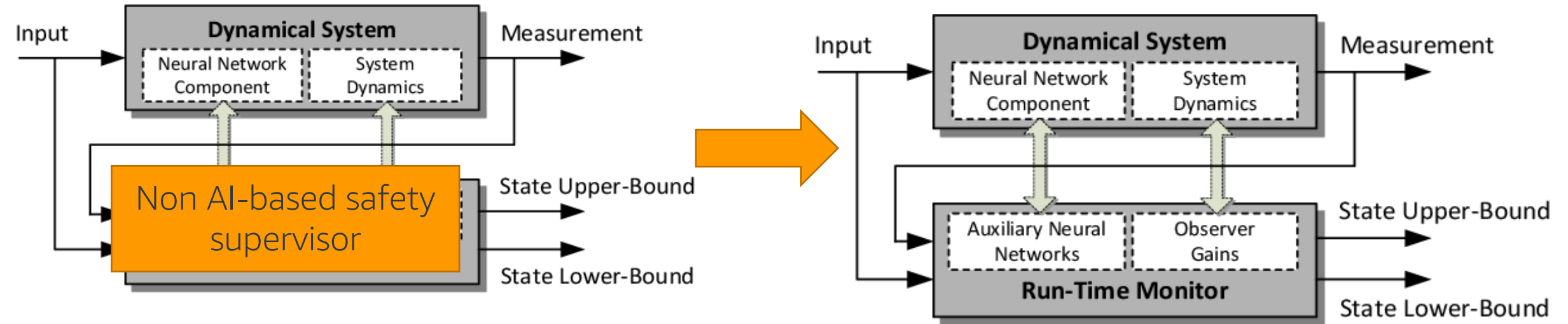


Integrated Safety Strategy: Enabling Technologies

Application	ML Algorithm Type	Tasks	Product Family	Products	Safety Critical
Feature/status identification	Supervised	Classification	Robotics, Mechatronics	Item Sorters, Robotic Pickers/Manipulators	N
Personnel vs Object Detection	Supervised, Reinforcement	Classification, Feature recognition	Autonomous Mobility	AMR, AGC	Y
Object Clustering	Unsupervised	Clustering	Robotics, Pack Automation	Robotic Pickers/Manipulators	N
Object Manipulation	Reinforcement	Classification, Feature recognition	Robotics	Robotic Manipulators	Y (in case of collaborative scenario)
....					



Main Challenges - AI/ML functional safety standardization



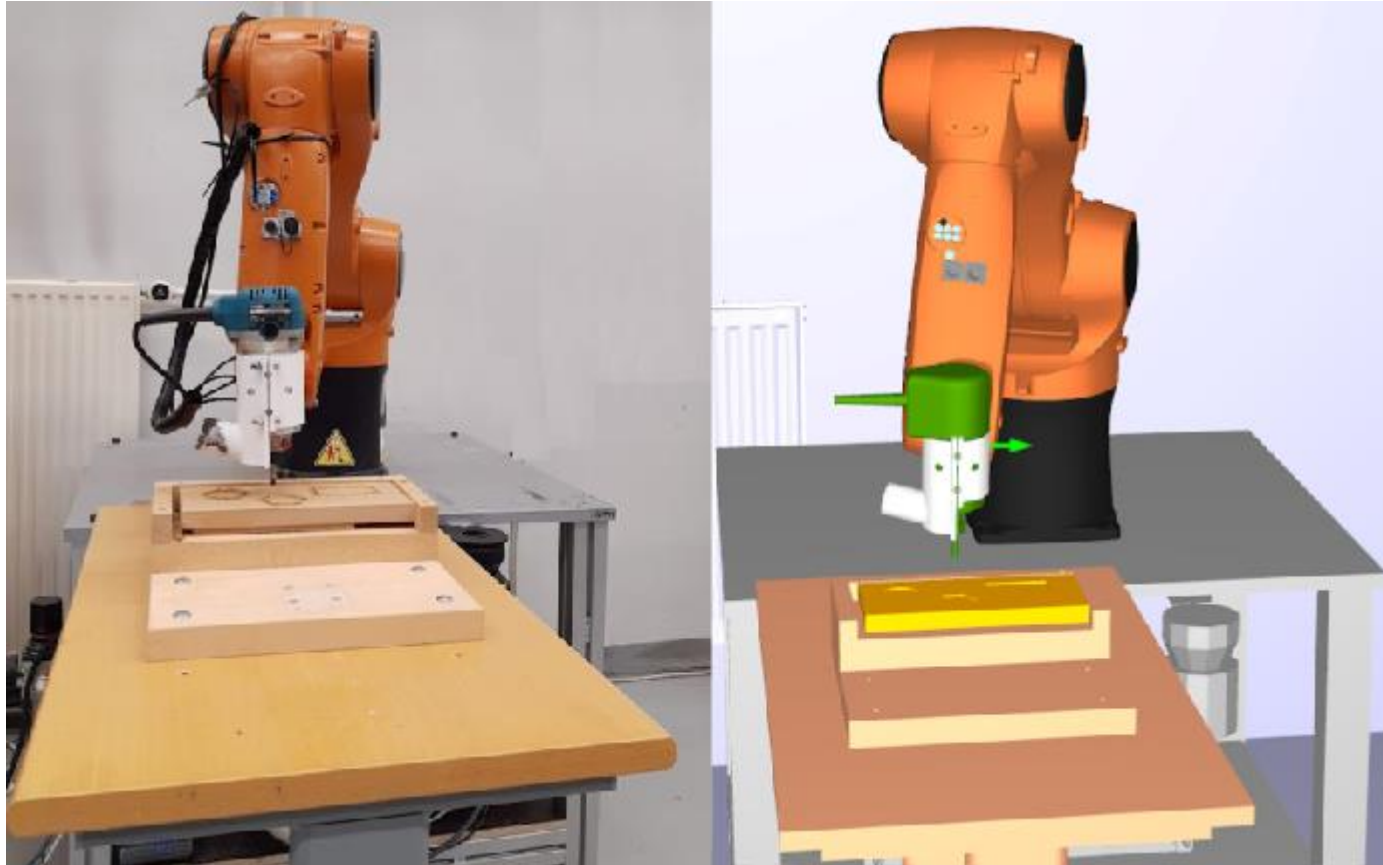
ISO/IEC TR 5469:2024

Artificial intelligence

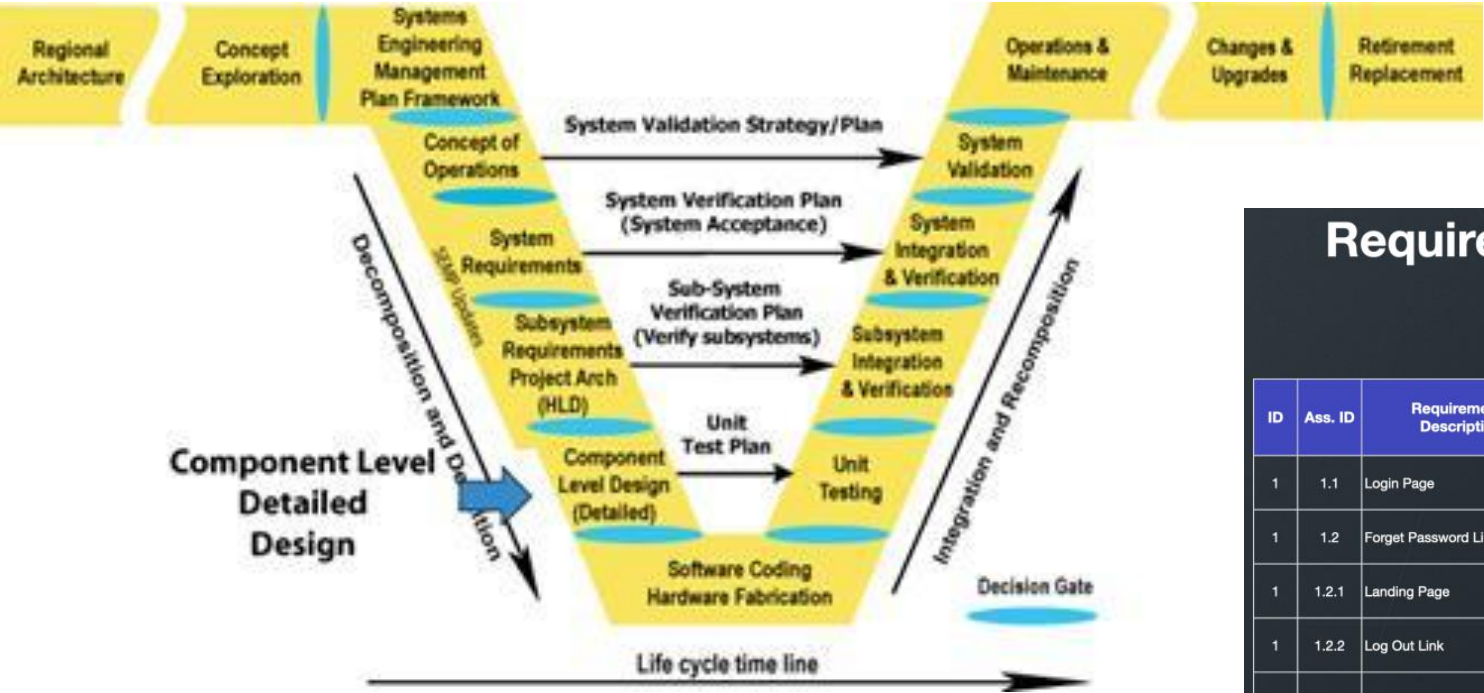
Functional safety and AI systems



Main Challenges – Digital Twin Certification



Main Challenges – Requirement Lifecycle Management

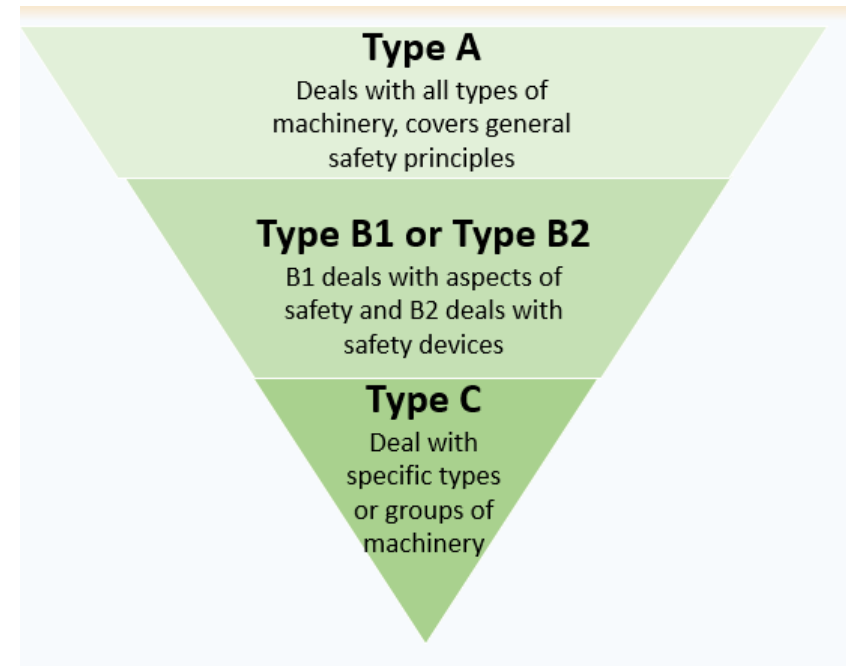
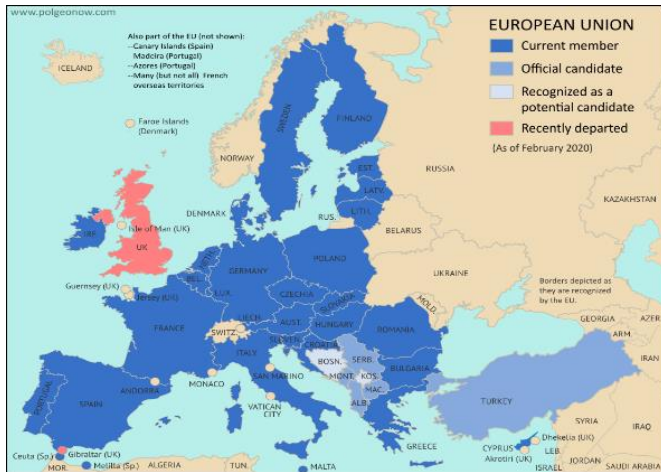


Requirements Traceability Matrix Template										
Template Is In The Description (.xlsx)										
ID	Ass. ID	Requirements Description	Business Need, Justification	Project Objective	Requested By	Department	WBS Element	Specification	Design	Test Cases
1	1.1	Login Page	Clients need way to access protected content	Create Minimum Viable Program	Dmitriy N.	Content	2	Finished	Finished	1001
1	1.2	Forget Password Link	It will greatly reduce workload of support team	Create Minimum Viable Program	Dmitriy N.	Content	2.1	Finished	Finished	1002, 1003
1	1.2.1	Landing Page	A must-have starting point for a client.	Create Minimum Viable Program	Dmitriy N.	Content	3	Finished	In Progress	
1	1.2.2	Log Out Link	For security reasons we need to log out users.	Create Minimum Viable Program	Security Officer	Technical Control	2.2	Not Started	Not Started	
2	2.1	Welcome Email Sequence	A must-have initial information after purchase	Create Minimum Viable Program	Dmitriy N.	Content	3	Not Started	Not Started	
2	2.2	Unsubscribe Link	Required by anti-spam act.	Create Minimum Viable Program	Email Service Provider	Control	3.1	Not Started	Not Started	
Project Management Basics										

MSP Product Development and Standardization



- ▶ Products entering the European Union governed by legislation called directives (e.g. Machinery Directive)
- ▶ NA products: NRTL process, Field Labelling, UL ratings and standards



Thanks for your kind attention!

