ISPE D / A / CH

AGV Stage 1 – Fully automated transportation and truck loading

BENJAMIN LEIMBACH

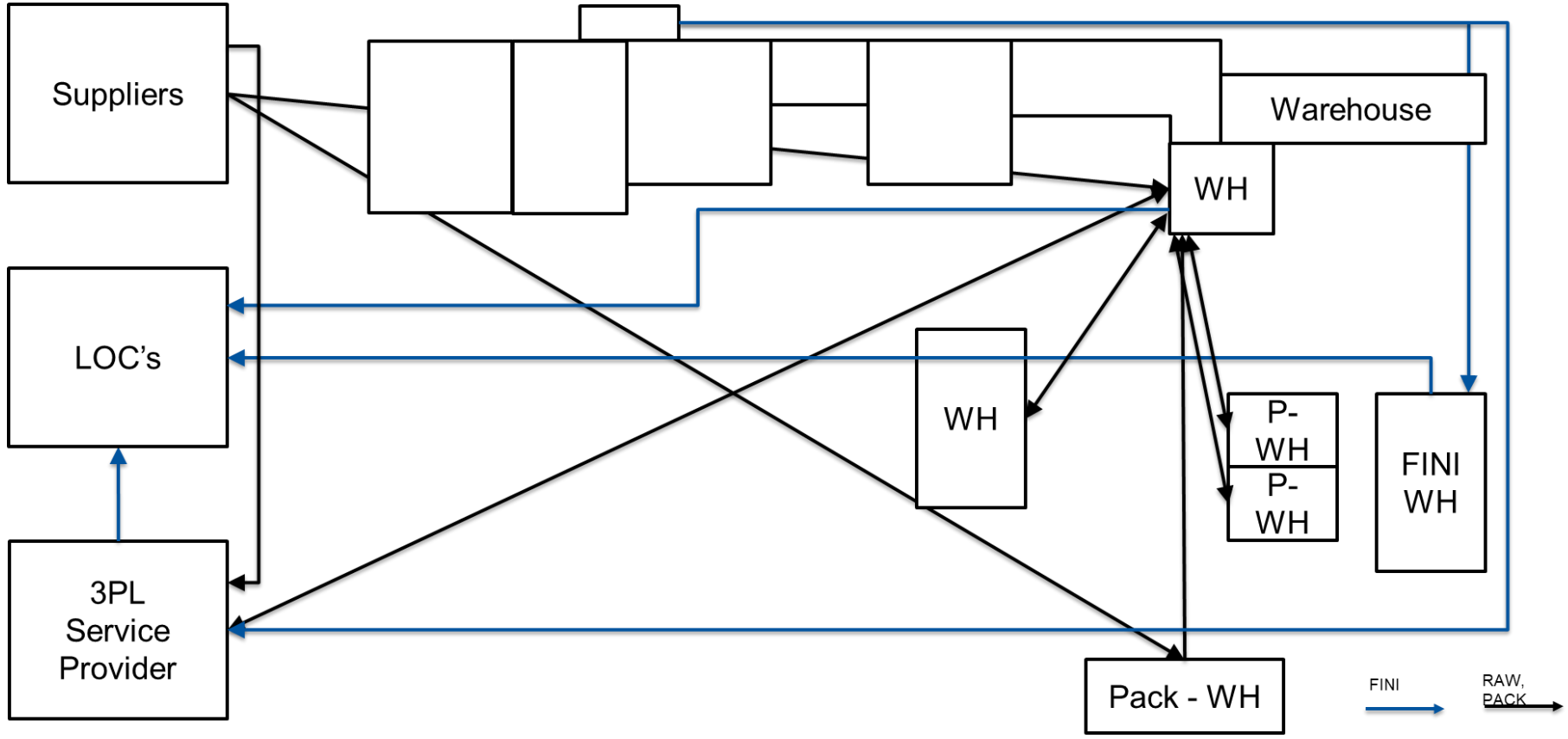
RAYA 2025 Finalist Event

Takeda

VisionNav Robotics

Logistics Footprint 2019

- Expansion of footprint lacking a long-term perspective
- Ineffective movement of goods
- Repeated handling of goods leading to extra transportation expenses
- Operators face lengthy travel times to reach warehouses
- Milk run requires extensive planning efforts



Manual Process

Process Start

Pick up from Conveyer

- The operator determines the location for unloading the goods.
- Large buffer zones result in poor stock visibility and pose safety hazards because of unclear areas.
- Handling items twice greatly lowers efficiency and raises the chance of transport-related damage.
- The operator neglected to register pallets in the WMS.

Process End

Drop on ATLS, Buffer or load trailer

Logistics Development Program

STAGE 0

STAGE 1

Finished goods are **automatically transported and loaded into trucks**

STAGE 2 — FY 26

Finished goods are **automatically picked-up from end of automated packaging lines**

STAGE 3 — FY 26/27

Material is **automatically transferred from automated high bay warehouse to packaging lines**

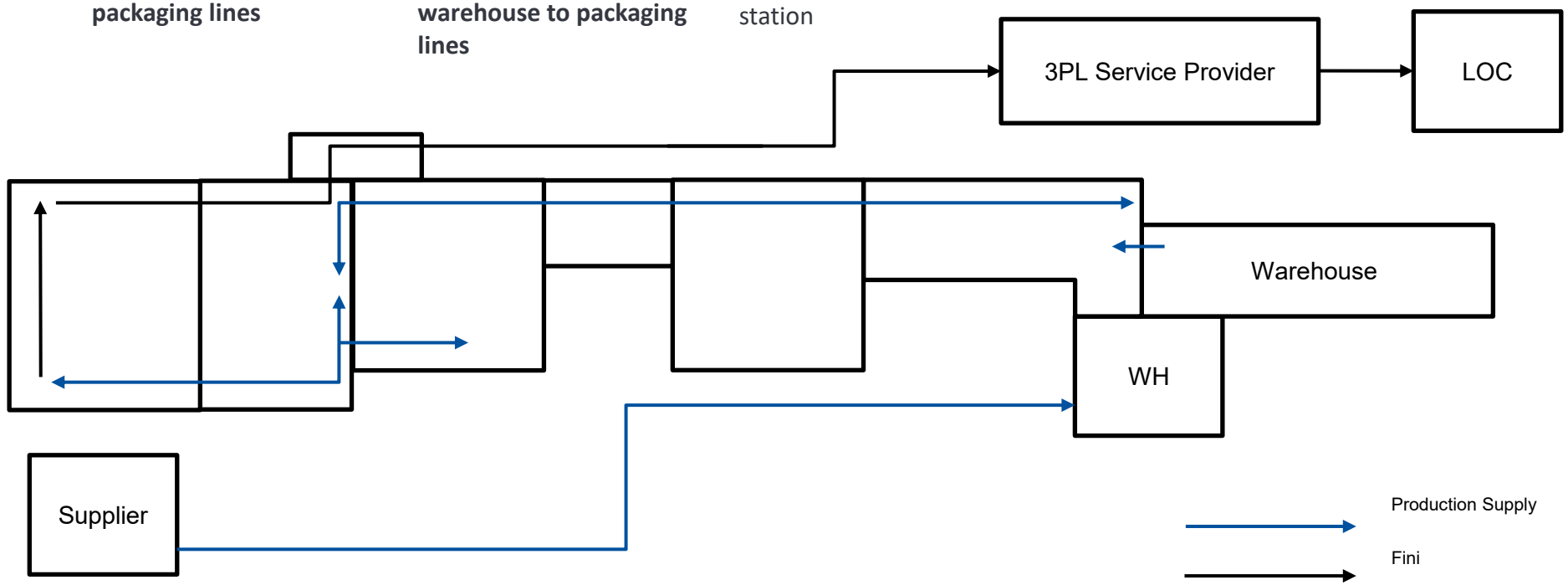
STAGE 4 — FY 27

Pharmaceutical waste is automatically picked-up and transported to central waste station

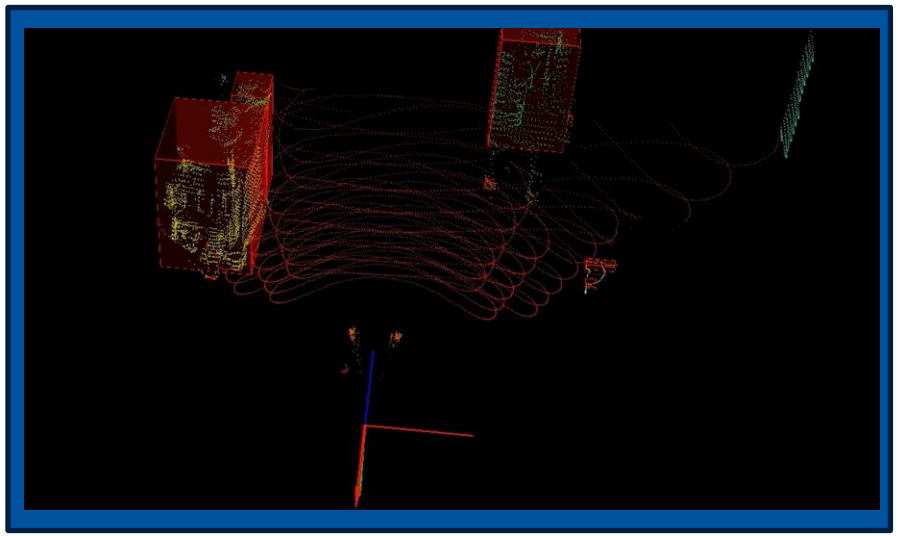
STAGE 5 — FY 28

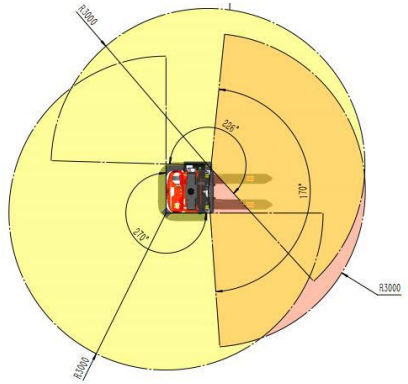
Production steps in **Bulk are connected by automated transport of containers**

- Optimized material flow with a standardized milk run approach
- Capacity configured for future needs
- Processes simplified by shifting complexity from operators into systems
- Identify future skill requirements and restructure the team accordingly



The AGV




R3000
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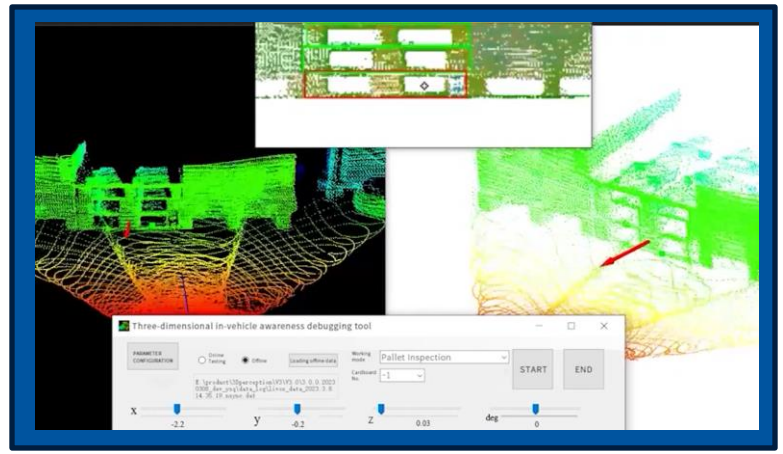
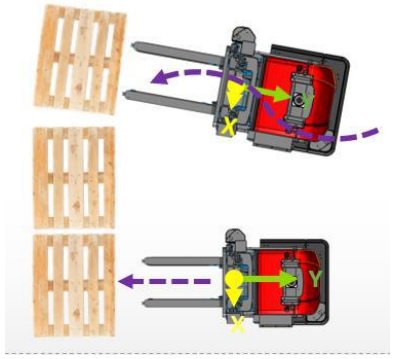
VisionNav


Three-dimensional in-vehicle awareness debugging tool
Pallet Inspection
START
END


X
Y
Y
X

EPAL - Process

US Pallet - Process

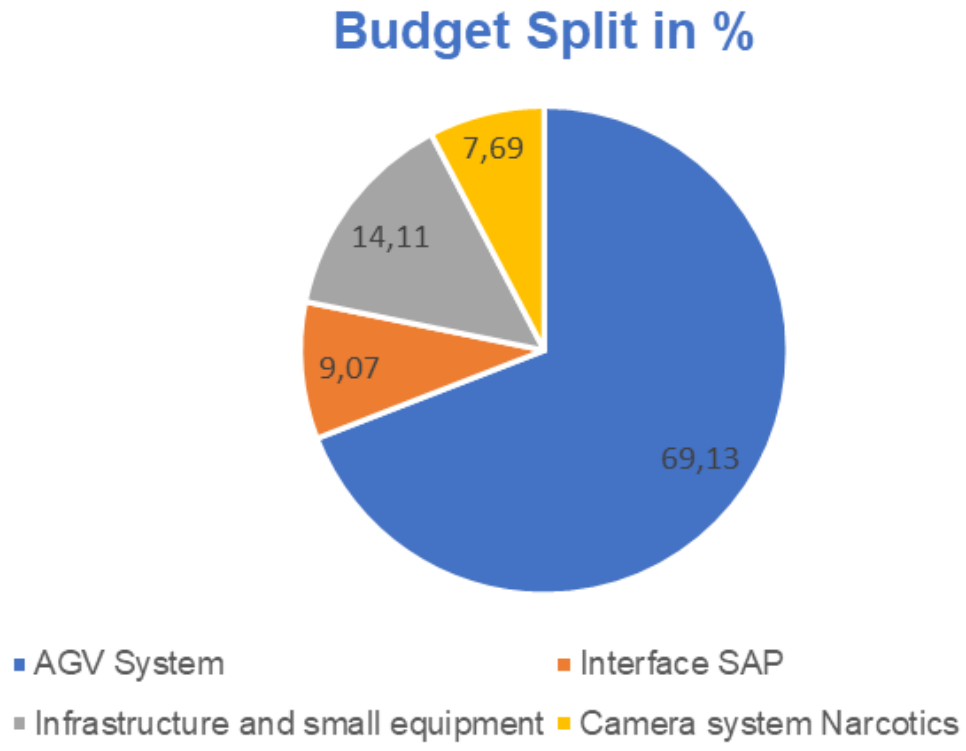
Attractivity

- Seamless brownfield integration and retrofit compatibility, enabling cost-effective adaptation to existing facilities and equipment.
- Advanced IT integration and digital twin capabilities reduce implementation time, site risks, and operational disruptions.
- Automated truck loading and dynamic fleet management optimize logistics and lower energy and operational costs.
- Predictable, rule-based robot movements and remote diagnostics enhance workplace safety and minimize downtime.
- Eco-friendly operations are ensured through smart charging, reducing energy consumption and supporting sustainability goals.

This video shows the stacking process of our application

Cost Effectiveness

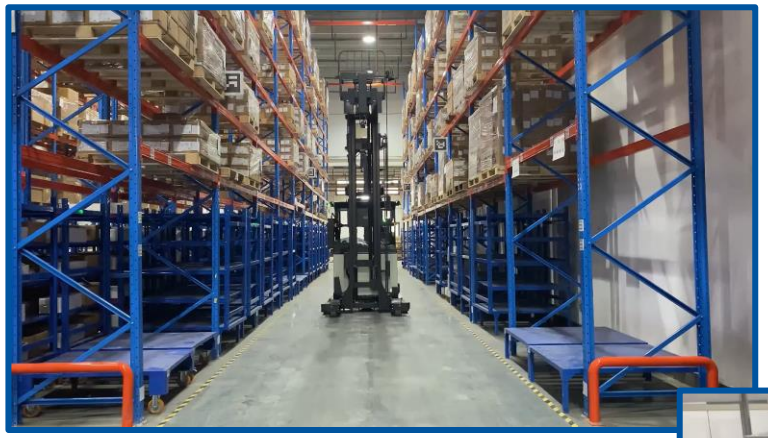
- ROI Achievement: The project achieved a return on investment (ROI) of **4.2 years** by automating a three-shift operation.
- Optimized Brownfield Context: Implementation took place in a brownfield environment that had already achieved a 30% cost reduction due to process optimization in 2021.
- Enhanced ROI: Including forklift robots and their interfaces only reduced the ROI **to under 3 years**. Due to prior optimization, the incremental efficiency gain from automation was less pronounced than it would be in a non-optimized setting.
- Additional Savings: The automation enabled a further 90% reduction in process effort, significantly boosting overall performance.



Area of Application

- Forklift Robot enables automation of all classic manual forklift transport processes in brownfield environments without requiring major building modifications.
- Its advanced positioning and pallet recognition ensure high accuracy and eliminate the need for additional machines or equipment.
- With truck loading/unloading capabilities and optional specialized devices, Forklift Robot is suitable for logistics, packaging, production supply, and handling special loads.
- Safety Framework based on ISO3691-4
- Stainless steel shell available as option, further GMP requirements could be developed depending on project needs

This videos show different vehicles and use cases of the supplier VisionNav and not our project !



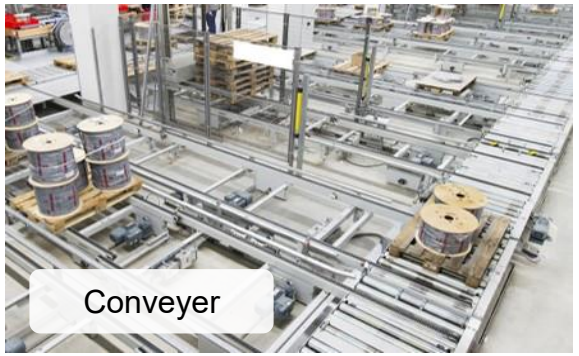
Rack handling

Stacking / Unstacking

Loading / Unloading

Flexibility

- Forklift Robot's precise pallet positioning allows for increased process tolerances by adjusting the driving angle during goods pickup.
- The free fork design enables the Forklift Robot to pick up items from conveyors or the ground without specialized equipment.
- The system supports retrofitting existing setups and handling special racks or frames, based on proven practices from other industries.
- IoT sensor integration enhances connectivity, enabling real-time monitoring, diagnostics, and seamless coordination with warehouse management systems for scalable and flexible operations.
- Support VDA 5050


Conveyer


Gates


Elevator


Robot Arms


ASRS


AMRs

Easiness to Integrate

Category 3: Applicable with relevant customization

- The Forklift Robot can be equipped with use case–specific special equipment, while standard vehicles are available without customization for various applications.
- Before commissioning, a digital twin and Lidar-based mapping allow pre-adjustment of sensors and seamless integration with doors, conveyors, and warehouse systems using state-of-the-art interfaces.
- Integration with the fire alarm system ensures safe operation by preventing AGVs from blocking critical areas, fully complying with local safety regulations and insurance requirements.

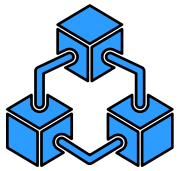
UPPER SYSTEM — **System-WMS/MES/ERP**

SOFTWARE — **RCS**
(Robot Control System)

Docking with:
Automated Equipment
Elevator, Automatic Door
Roller Conveyor, Button/ Tablet

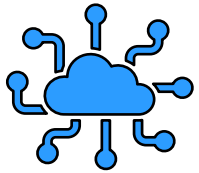
HARDWARE — **Automated Guided Vehicles**

Final



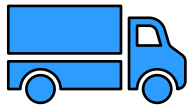
High Automation Level

The project achieves exceptional automation with minimal changes to the existing infrastructure, maximizing efficiency.



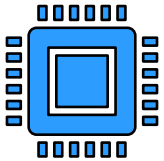
Intelligent System Integration

Existing systems like conveyor belts, loading facilities, fire alarm system and warehouse management are seamlessly interconnected.



Full Automated Loading Process

Automated loading processes use current trailers without the need for complex modifications, keeps flexibility and avoid cost.



Innovation Driving Future Logistics

The solution exemplifies how innovation and economic benefits combine to shape the future of -not only- pharmaceutical logistics.