vintecc

CASEBOOK

Hey there
we are Vintecc

… and we are passionate about technology. We believe technology is a major game-changer in tackling tomorrow's challenges towards a smarter, more connected and more sustainable future. Our mission is to accelerate your industry in this digital journey.

This casebook is here to inspire you.
It showcases real-world examples from each of our solution domains and how our technology is contributing to create a difference that counts.

Please take a moment to review and to reflect. On what digital acceleration could mean for your industry. On how it can contribute to your growth and success. Transformation is happening now.

Feel free to reach out to our skilled, hands-on and innovation-driven team. We look forward to engage and to discuss your challenges and questions of tomorrow.

Most of all, let's collaborate and innovate together!

Sincerely yours,

The Vintecc team

www.vintecc.com

Our vision



smart

Everything we do at Vintecc - and the daily drive our team has for our clients' projects - is summarized in that one single word. Smart.
The term 'smart' describes the vision of Vintecc to synchronize people, machines, assets, systems, processes, data … etc. to work together in the best possible way, and to find the best answer to your challenges of tomorrow.

Accelerating your industry. Smart.

collaborative

Co-creation with our clients is at the center of our DNA. Combining your domain expertise with our cross-functional industrial knowledge can create technological fireworks. This approach and joint endeavor allows us to build the best performing custom software or AI-driven solution that works for you.

Accelerating your industry. Collaborative.





hands-on

We don't sit. We are hands on. We stand next to you from concept ideation to realisation and follow up.
We like doing things and become closely involved in managing and organizing a solution for your industrial challenge of tomorrow. We make sure you'll be able to take objective decisions and move forward.

We relate. We understand. We solve. You accelerate.

VINÇOTTE ISO 27001:2022 Certified

Vintecc
Digital Maturity Model

NORTH STAR

From captured data to intelligent autonomous solutions, Vintecc drives your digitization journey forward.



Our **solution layer**

From raw data to real-world impact

TAKE YOUR PICK

vintecc VISION

vintecc SIMULATION

vintecc MECHATRONICS

vintecc AI & DATA OPS

COMPUTER VISION

From data to objective reality

Computer Vision accelerates the leap from Connectivity & Visibility (1–2) to Intelligence (3), enabling machines to literally see what's happening and respond in real time.

SIMULATIONS

Make decisions before they cost you

Simulations bridge the gap from Intelligence (3) to Predictability (4) by testing what-if scenarios before implementation, helping you reduce risk and optimize outcomes.

MECHATRONICS

Turning autonomy into physical action

Mechatronics brings Autonomy (5) to life, translating intelligence into systems that move, adapt, and operate independently.

AI & DATAOPS

From insight to predictive, optimizing intelligence

AI & DataOps form the core of both Intelligence (3) and Predictability (4), paving the way to Autonomy (5) through continuous learning and real-time decision-making.

"True industrial impact happens when smart technologies convert data into foresight, action, and autonomy. That's the role of Vintecc's Solution Layer."

Computer vision
visual intelligence



Product Quality & Automated Inspection

Delivering objective, repeatable quality decisions at scale.
Consistent quality, zero-defect ambition, no operator variability.

Process Quality & Operational Efficiency

Revealing hidden process losses and performance constraints.
Higher throughput, better OEE, faster operational improvement.

Spatial Intelligence (3D) & Volume Analytics

Capturing real-world geometry, volume and spatial context.
Accurate planning, automation and operational decision-making.

Vision AI Platforms & MLOps (Retrofits & Lifecycle Management)

Managing vision intelligence across systems, sites and lifecycles.
Lower risk, longer lifespan, scalable vision performance.

Robotics & Vision AI

Enabling robots to perceive, decide and act autonomously.
Higher uptime, flexibility and reduced manual intervention.

Adaptive Quality Systems for High-Mix/low volume Production

Adapting quality control to continuous product variation.
Faster launches, lower changeover costs, less manual work.

AGRO / AGRICULTURAL MACHINERY

Potato Measuring System

The winning edge: Spatial intelligence (3D) & Volume Analytics combined with Adaptive Quality Systems for High-Mix/Low Volume Production



EXTERNAL LINKS

Loading machine at work

Labelled potato's

Randomization synthetic potato's

NORTH STAR LEVEL

2 Visibility

THE PROBLEM

- **Lack of objective yield insight**
  Potato volume and quality were estimated manually and inconsistently during harvesting.
- **High field variability**
  Changing lighting, dirt and crop conditions made reliable measurement difficult.
- **Limited decision support**
  Growers and processors lacked real-time data to steer harvesting and logistics.

OUR MISSION

- **In-field vision platform**
  Robust real-time detection of potatoes under harsh outdoor conditions.
- **3D volume measurement**
  Accurate calculation of shape, size and volume per potato.
- **Contextual data enrichment**
  Integration of GPS, timestamps and time-series data.
- **Scalable data output**
  Structured data ready for analytics and downstream services.

THE BUSINESS IMPACT

- Objective, real-time yield and quality insight
- Reduced reliance on manual sampling
- Better planning and pricing decisions

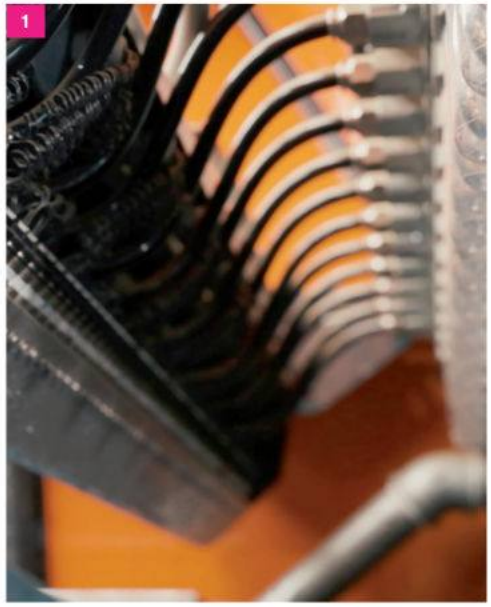
STRATEGIC VALUE

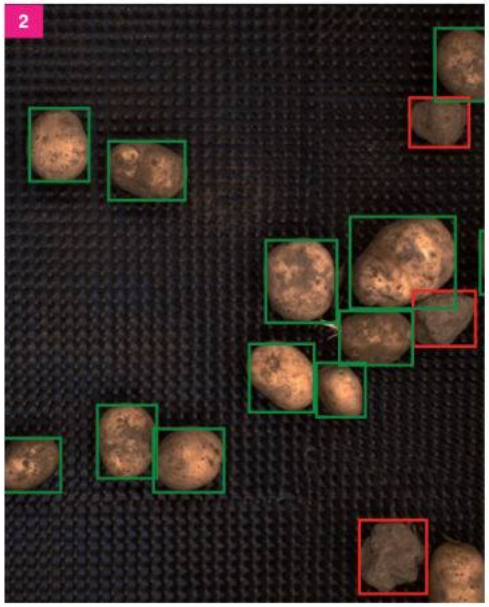
Data-driven harvesting becomes possible, laying the foundation for scalable smart farming services.

MACHINERY / AGRO-PROCESSING

Potato Inspection & Selection

The winning edge: Process Quality & Operational Efficiency









IMAGES

1. Air nozzle ejection
2. Recognition of potatoes and strange objects
3. Rejection system with air nozzles
4. Strange objects ejection

EXTERNAL LINKS

Optical potato sorting & selection

NORTH STAR LEVEL

2 Visibility

THE PROBLEM

⚠ **Inconsistent quality sorting at high throughput**
Mechanical sorting could not reliably separate subtle product differences.

⚠ **High dependency on manual intervention**
Quality control relied on operators, leading to variability, labour cost and limited scalability.

OUR MISSION

✓ **Vision-based real-time inspection system**
A computer vision solution detecting impurities and product deviations inline at full line speed.

✓ **Integrated rejection and tracking logic**
Detected defects automatically removed using air pressure, with full traceability per product stream.

THE BUSINESS IMPACT

- Higher and more consistent product quality
- Reduced manual labour and operational cost

STRATEGIC VALUE

Vision-driven sorting replaces mechanical approximation with data-driven precision, enabling scalable, low-maintenance quality control in high-throughput production environments.

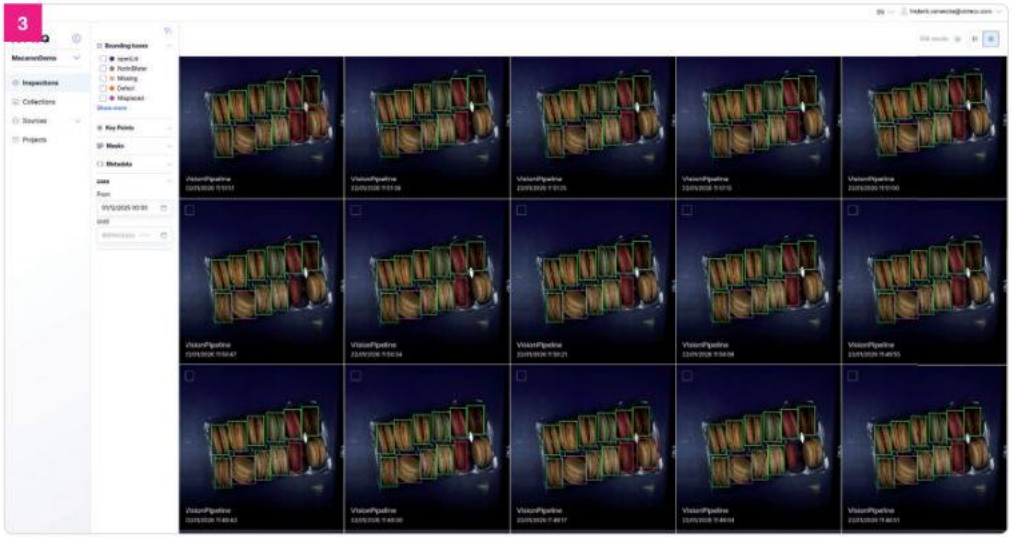
FOOD MANUFACTURING / BAKERY

Vision AI for Packaging Inspection

The winning edge: Adaptive Quality Systems for High-Mix/Low Volume Production







IMAGES

1. Inspection of the macarons in the packaging blister
2. HMI for In-line product inspection
3. iOPTIQ

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

⚠ **Subtle defects in fragile products hard to detect at speed**
Macarons are visually sensitive and physically fragile, making small shape or surface defects difficult to detect reliably at production speed.

⚠ **High variability in colours and recipes**
Frequent product changes increased the risk of inconsistent visual assessment and missed quality deviations.

OUR MISSION

✓ **High-precision vision inspection**
A computer vision system analysing shape and surface features on every product inline.

✓ **Adaptive inspection logic**
Inspection parameters dynamically adjusted to product variants without slowing down production.

THE BUSINESS IMPACT

- More consistent visual quality across fragile products
- Reduced scrap and manual inspection effort

STRATEGIC VALUE

Vision-based inspection enables scalable quality control for fragile, high-variability bakery products without compromising throughput.

FOOD MANUFACTURING / BAKERY AND SNACKS

Vision AI for High-Precision Cookie Quality Inspection

The winning edge: Product Quality & Automated Inspection + Spatial Intelligence (3D) & Volume Analytics





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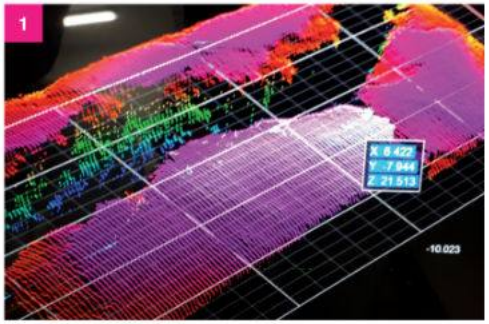

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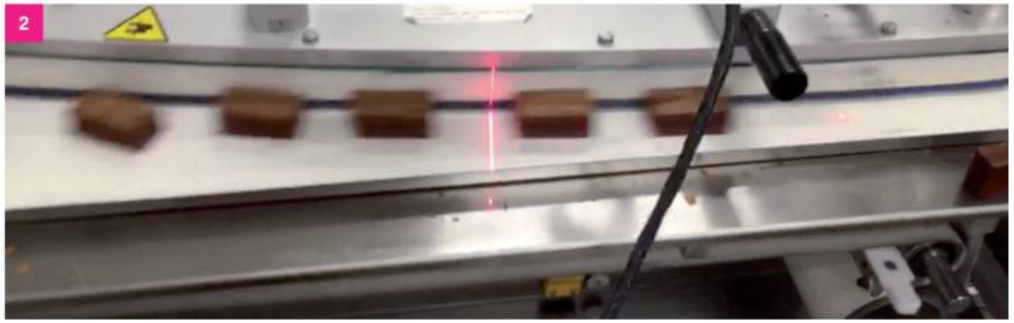


IMAGES

1. Detecting 'cracks' on the cookie
2. Quality inspection set-up at high speed
3. Reporting & alerting dashboard using Capture

EXTERNAL LINKS

High speed inspection

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

⚠ **Inconsistent product shape and volume at high throughput**
Small variations in brownie height, edges and volume were difficult to detect reliably at line speed.

⚠ **Limited objectivity in visual quality control**
Manual checks could not consistently assess subtle deviations across large production volumes.

OUR MISSION

✓ **3D vision-based product inspection**
A vision system measuring shape and volume of every product inline to detect subtle deviations.

✓ **Automated reject decision logic**
Out-of-spec products identified and removed without impacting line capacity.

THE BUSINESS IMPACT

- Improved consistency in product appearance and portioning
- Reduced scrap and manual quality checks

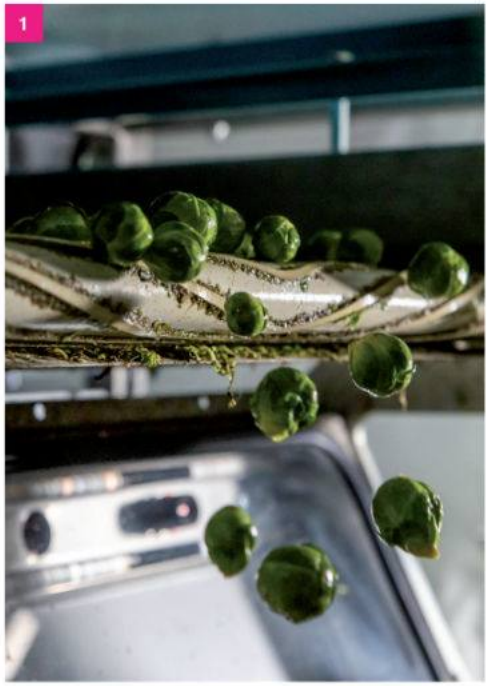
STRATEGIC VALUE

3D vision inspection establishes an objective, scalable quality foundation for high-volume bakery products where visual consistency directly impacts perceived quality.

MACHINERY / AGRO MACHINERY / SORTING TECHNOLOGY

Optical Sorting & Quality Inspection For Brussels Sprouts

The winning edge: Process Quality & Operational Efficiency









IMAGES

1. Brussels sprouts on high-speed inspection belt
2. Optical sorting module
3. Multiple line setup
4. Standalone inspection unit

EXTERNAL LINKS

Optical sorting at Deman

NORTH STAR LEVEL

2
Visibility

THE PROBLEM

⚠ **Insufficient reliability of vision-based sorting**
Existing vision technology could not consistently detect defects at speed, making accurate Brussels sprout sorting commercially unviable.

⚠ **High sensitivity to product and process variation**
Variations in size, shape and trajectory reduced sorting accuracy and reproducibility.

OUR MISSION

✓ **Rebuilt vision and sorting pipeline**
A computer vision system with pixel-level defect detection combined with high-speed trajectory modelling.

✓ **Operator-friendly control and tuning**
Clear visual feedback and intuitive controls to stabilise performance in daily operation.

THE BUSINESS IMPACT

- Sorting performance exceeding market standards
- Vision-enabled machines became commercially viable

STRATEGIC VALUE

Robust computer vision transforms optical sorting into a reliable, scalable USP for high-end agro-sorting machinery.

HEAVY INDUSTRY

VisionTek Automated Cable & Rope Inspection

The winning edge: Product Quality & Automated Inspection

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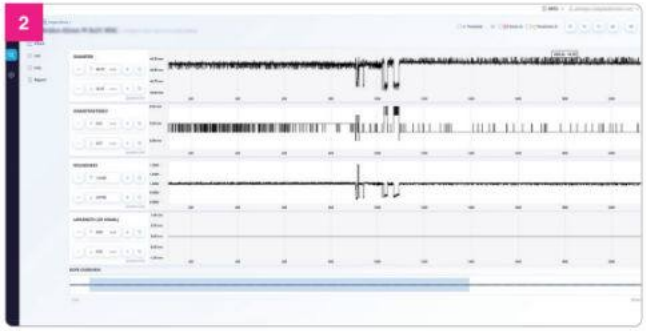

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4



5



IMAGES

1. Cable inspection machine
2. Inspection chart
3. Inspection overview per rope
4. Inspection report
5. Synthetic data of various wire defects

NORTH STAR LEVEL

2
Visibility

THE PROBLEM

⚠ **Subtle surface defects hard to detect inline**
At production speed, small surface imperfections on steel products were difficult to identify reliably using manual inspection.

⚠ **Delayed and subjective quality feedback**
Sampling-based checks introduced subjectivity and meant defects were often detected too late in the process.

OUR MISSION

✓ **Inline vision-based surface inspection**
A computer vision system continuously monitoring product surfaces during production.

✓ **Consistent defect detection and classification**
Automated evaluation using objective visual criteria, independent of operator judgement.

✓ **Production-ready industrial integration**
Stable inspection performance despite reflective materials and harsh production conditions.

THE BUSINESS IMPACT

- Earlier and more reliable defect detection
- Reduced scrap, rework and quality variation

STRATEGIC VALUE

Vision-based inspection turns surface quality control into a stable, scalable capability for high-volume steel production.

AUTOMOTIVE MANUFACTURING

Vision AI Quality Inspection of Automotive Audio Speakers

The winning edge: Product Quality & Automated Inspection









IMAGES

1. Synthetic training data
2. Synthetically created training data with misplaced sticker
3. Continuous inspection & defect detail
4. Overview inspected speakers

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

⚠ **Insufficient reliability of inline inspection**
At production speed, existing inspection methods could not consistently detect relevant product deviations.

⚠ **High impact of false rejects and missed defects**
Unreliable inspection led either to unnecessary scrap or quality risks further downstream.

OUR MISSION

✓ **Robust vision-based inspection system**
A computer vision solution designed for stable, continuous inspection under real production conditions.

✓ **Reliable defect detection and decision logic**
Consistent identification of defects with controlled sensitivity to avoid false rejects.

✓ **Industrial-grade integration**
Stable operation aligned with line speed and production constraints.

THE BUSINESS IMPACT

- Improved inspection reliability at line speed
- Reduced scrap and quality-related rework

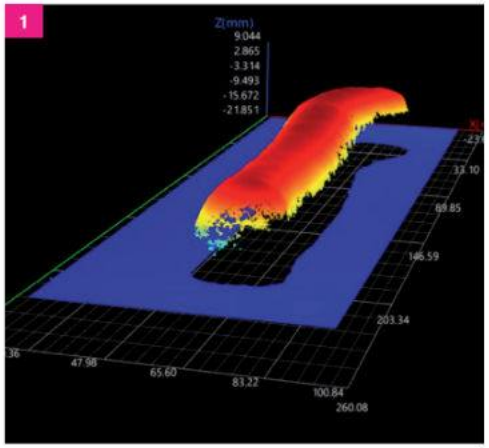
STRATEGIC VALUE

Vision-based inspection transforms quality control from a fragile checkpoint into a dependable, scalable production capability.

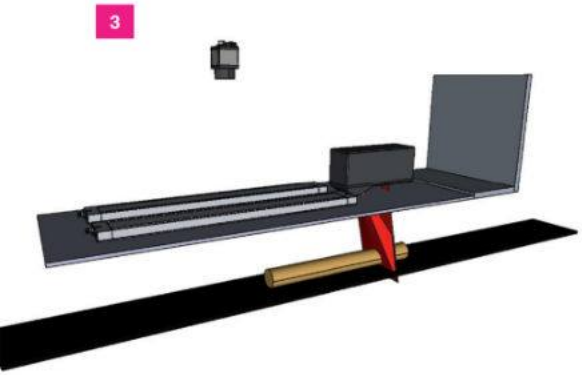
FOOD MANUFACTURING

Vision AI for High-Speed Frikandel Quality Inspection

The winning edge: Product Quality & Automated Inspection + Spatial Intelligence (3D) & Volume Analytics









IMAGES

1. Point cloud
2. Deformed sausage
3. Simulation of camera set-up
4. HMI

NORTH STAR LEVEL

2 Towards 3 Intelligence

THE PROBLEM

⚠ **Inconsistent visual quality at high production speed**
At line speed, manual checks could not reliably detect visual defects and inconsistencies in finished products.

⚠ **High pressure on downstream quality control**
Late detection of defects increased the risk of rework, scrap or customer complaints.

OUR MISSION

✓ **Inline vision-based product inspection**
A computer vision system inspecting every product in real time without impacting throughput.

✓ **Automated quality decision logic**
Objective pass/fail decisions applied consistently across products and shifts.

✓ **Production-ready deployment**
Stable inspection performance integrated into an existing high-volume production environment.

THE BUSINESS IMPACT

- More consistent product quality
- Reduced rework and quality-related losses

STRATEGIC VALUE

Vision-based inspection embeds objective quality control directly into high-volume food production, enabling scalable quality assurance without relying on manual checks.

HEAVY INDUSTRY

Automated Welding Quality Inspection

The winning edge: Product Quality & Automated Inspection + Spatial Intelligence (3D) & Volume Analytics

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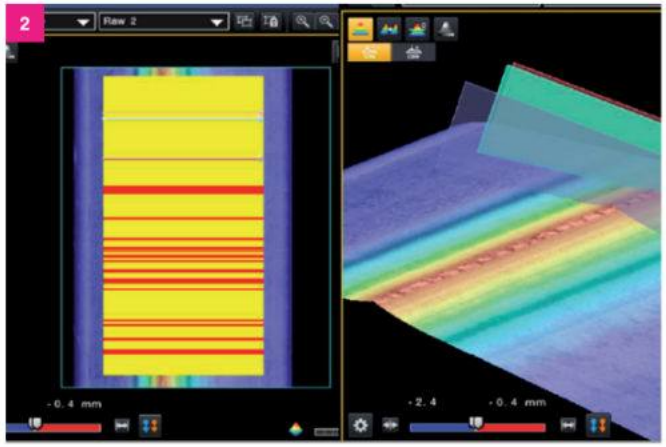
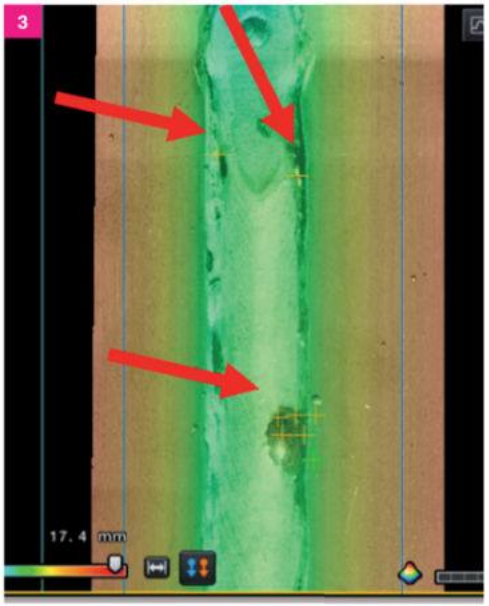


IMAGES

1. Continuous welding inspection
2. 2D & 3D measurements
3. Defect & flaw detection
4. Excess welding material + sagging
5. Position + presence of weld

3



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NORTH STAR LEVEL

2
Visibility

THE PROBLEM

⚠ **Limited visibility on welding quality during production**
At line speed, weld quality deviations were difficult to detect reliably, while defects could have structural consequences further downstream.

⚠ **Late and indirect quality feedback**
Quality issues were often discovered only after additional processing steps, increasing rework and scrap risk.

OUR MISSION

✓ **Inline vision-based weld inspection**
A computer vision system monitoring weld seams in real time during production.

✓ **Objective defect detection and classification**
Consistent identification of weld deviations based on visual quality criteria.

✓ **Production-integrated quality feedback**
Inspection results made available immediately to stabilise welding processes.

THE BUSINESS IMPACT

- Earlier detection of weld quality issues
- Reduced rework and scrap

STRATEGIC VALUE

Vision-based weld inspection transforms welding quality control from reactive checks into a stable, scalable capability embedded directly in the production process.

AGRO / FOOD PROCESSING

Vision AI for Spinach Stem/Leaf Ratio Inspection

The winning edge: Quality intelligence and autonomous systems enablement for in-field quality measurement

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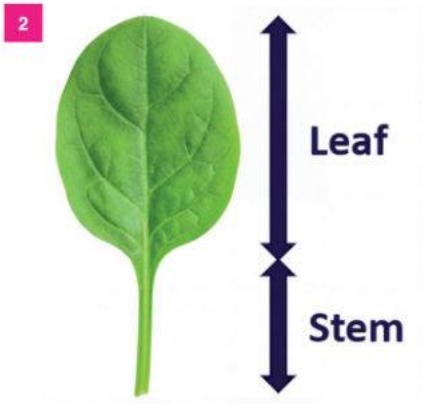

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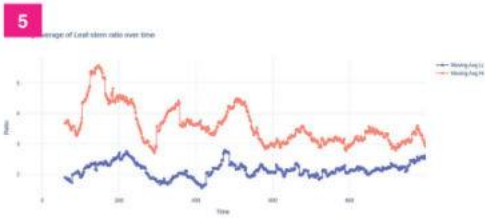

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IMAGES

1. Spinach harvester
2. Leaf-Stem ratio
3. Spine detection in spinach leaf
4. Camera set-up on harvester
5. Moving average of Leaf-Stem ratio over time
6. Example model predictions with model certainty and 5 key points

NORTH STAR LEVEL

1 Towards 2
Visibility

THE PROBLEM

⚠ **Quality depends on steel-to-leaf ratio during harvesting**
Small differences in cutting height strongly impact commercial quality and margin, yet adjustments are made manually based on driver experience.

⚠ **Lack of objective real-time feedback**
Drivers receive no objective quality signal during harvesting, leading to inconsistency across operators, fields and seasons.

OUR MISSION

✓ **On-machine Vision AI for real-time quality measurement**
A rugged, mobile vision system mounted on the harvester, measuring steel-to-leaf ratio directly on the product flow.

✓ **AI-based segmentation and ratio calculation**
Machine learning models segment leaf versus steel and calculate continuous and batch-level quality metrics.

✓ **Real-time driver feedback**
An intuitive on-machine interface provides direct feedback to optimise cutting height during harvesting.

THE BUSINESS IMPACT

- More consistent quality and higher batch classification
- Reduced dependency on operator experience

STRATEGIC VALUE

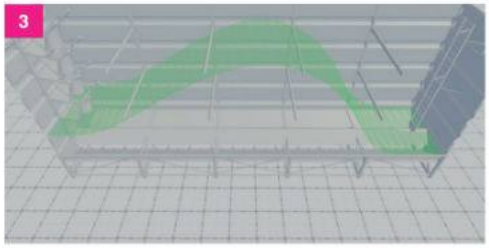
Vision-driven quality measurement enables data-driven precision harvesting and lays the foundation for autonomous cutting control in large-scale vegetable farming.

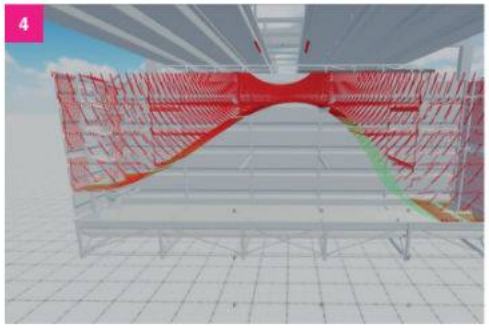
FOOD MANUFACTURING AND LOGISTICS / BULK HANDLING

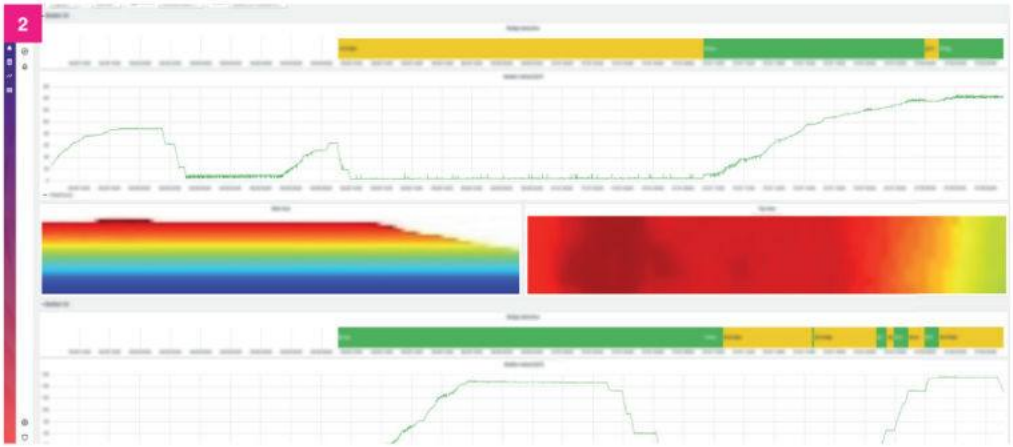
Real-Time Volume Scanning & Measuring

The winning edge: 3D spatial intelligence and volume analytics for operational decision-making









IMAGES

1. Real potato bunker
2. Image ingest in Capture to display and monitor results
3. Understanding filling flow using DUAL simulation
4. LIDAR simulation

EXTERNAL LINKS

Simulation bunker filling

Realtime bunker filling

NORTH STAR LEVEL

2 Towards 3 Intelligence

THE **PROBLEM**

⚠ **Inaccurate volume estimation in production and logistics**
Bulk volumes were estimated visually or logged manually, leading to errors in inventory, planning and logistics decisions.

⚠ **Lack of real-time, objective volume data**
Without reliable measurements, production planning and allocation relied on assumptions rather than facts.

OUR **MISSION**

✓ **Real-time 3D volume scanning**
A Vision Edge solution using 3D spatial intelligence to calculate accurate volumes of bulk materials, independent of shape or stacking.

✓ **Live operational insight and data integration**
Volume data displayed in real time, logged centrally and made available for MES/ERP integration and downstream workflows.

THE **BUSINESS IMPACT**

- Reliable, real-time inventory and planning data
- More efficient logistics and reduced planning errors

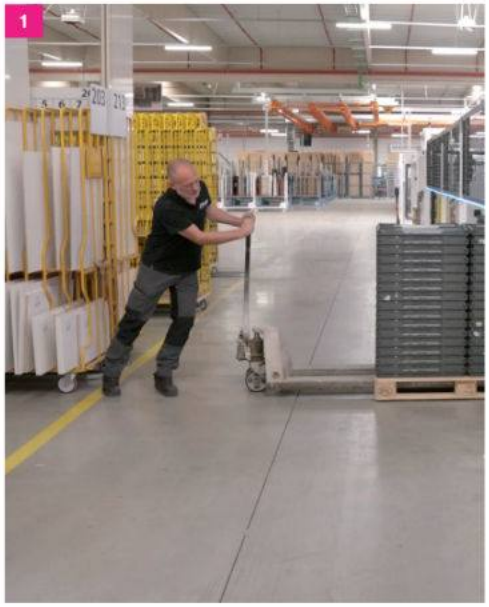
STRATEGIC **VALUE**

Objective, scalable volumetric intelligence replaces manual estimation, enabling data-driven planning and consistent operations across sites and workflows.

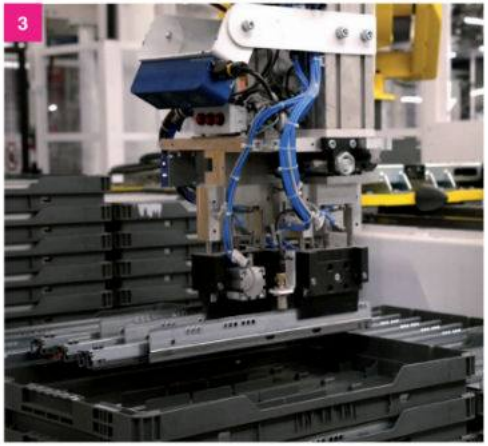
MACHINERY / WOODWORKING

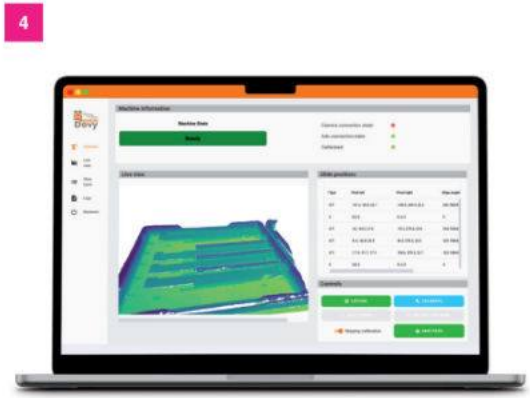
Depth Positioning for Robot (Vision-Guided Bin Picking)

The winning edge: Robotics & Vision AI + Spatial Intelligence (3D) & Volume Analytics









IMAGES

1. Full pallet loading
2. Robot arm
3. Robot arm picking up drawer runners
4. Dashboard in Capture

EXTERNAL LINKS

Bin-picking robot krijgt 'ogen'

NORTH STAR LEVEL

2 Intelligence

THE PROBLEM

⚠ **Unreliable robotic picking due to positional variability**
Drawer runners arrived in bins with varying position, orientation and stacking, causing frequent pick failures.

⚠ **High dependency on manual correction**
Operators had to intervene regularly, reducing throughput and undermining automation benefits.

OUR MISSION

✓ **3D vision-based bin picking**
A vision system detecting individual parts in bins and determining their exact 3D pose in real time.

✓ **Vision-guided robot positioning**
Accurate pose data directly driving robot motion for flexible, autonomous picking.

✓ **Production-ready integration**
Stable operation validated on a live robotic cell under real variability.

THE BUSINESS IMPACT

- Strong reduction in pick failures and robot downtime
- Increased throughput and operator independence

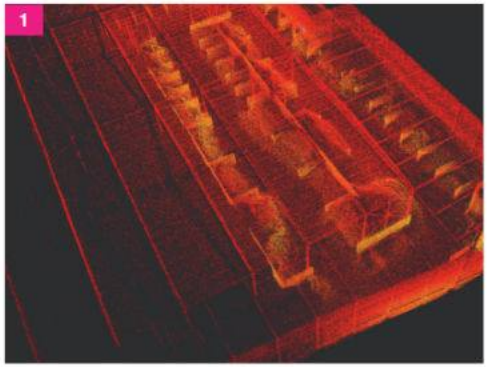
STRATEGIC VALUE

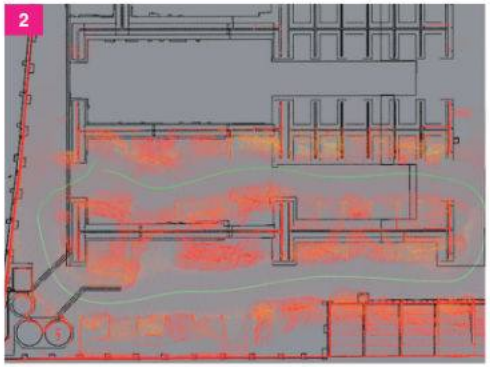
Vision-guided bin picking establishes a scalable blueprint for reliable robotisation in high-variability manufacturing environments.

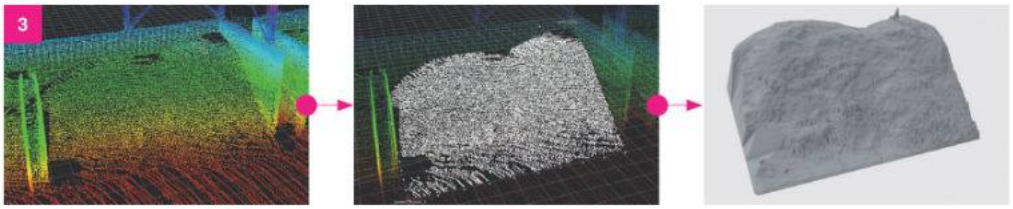
RECYCLING / METALS

Scrap Yard Mapping & Real-Time Bunker Volume Measurement

The winning edge: Spatial Intelligence (3D) & Volume Analytics







IMAGES

1. Edge filtering+SLAM
2. Matching with calibration map
3. Bunker/volume cutout and volume determination

EXTERNAL LINKS

Edge filtering+SLAM

NORTH STAR LEVEL

2 Towards 3 Scalable

THE PROBLEM

⚠ **Lack of real-time insight into yard inventory**
Scrap volumes stored in large, irregular bunkers were difficult to estimate accurately in a constantly changing yard environment.

⚠ **Manual and imprecise volume estimation**
Visual checks and periodic measurements introduced inaccuracies and planning uncertainty.

OUR MISSION

✓ **3D vision-based yard scanning**
A computer vision system continuously mapping bunker geometry and material volumes.

✓ **Real-time volumetric analytics**
Accurate volume calculations updated as material was added or removed.

✓ **Robust outdoor deployment**
Reliable operation in dusty, dynamic heavy-industry conditions.

THE BUSINESS IMPACT

- Accurate, real-time insight into yard inventory
- Improved logistics planning and material handling

STRATEGIC VALUE

Vision-based volumetric insight transforms yard management from estimation-driven decisions to data-driven logistics control at industrial scale.

CONSTRUCTION MATERIALS

Vision-Based Detection of Reinforcement in Concrete Moulds

The winning edge: Product Quality & Automated Inspection

1



2



3



4



5



IMAGES

1. Visual dashboard to check production status
2. Image ingestion in Capture along with time series data for evaluation and retraining
3. Visual inspection of presence of reinforcing net
4. Cattle slats
5. Potato slats

NORTH STAR LEVEL

2
Visibility

THE PROBLEM

⚠ **Late detection of critical errors**
Missing or incorrectly placed steel reinforcement was often only discovered after demoulding.

⚠ **Multiple mould types**
Different moulds require different reinforcement meshes, making manual verification error-prone.

OUR MISSION

✓ **Vision-based mould and reinforcement inspection**
Automated vision system identifying mould type and verifying correct reinforcement before pouring.

✓ **Robust detection under harsh conditions**
Industrial cameras and infrared lighting ensure reliable detection despite oil reflections, vibrations and changing light.

THE BUSINESS IMPACT

- Elimination of costly scrap before concrete is poured
- Consistent quality independent of operator judgement

STRATEGIC VALUE

Pre-process vision inspection structurally prevents critical quality failures, ensuring only correctly reinforced concrete products are produced.

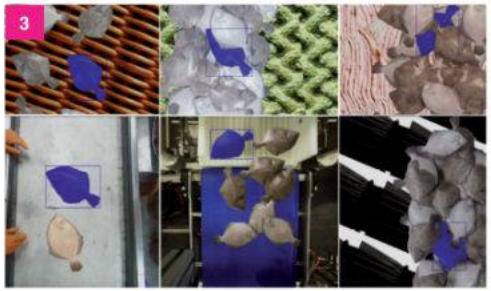
MARINE RESEARCH

Vision & AI-Driven Mapping of Optimal Fishing Grounds

The winning edge: Spatial Intelligence (3D) & Volume Analytics









IMAGES

1. Creating fish 3D assets using photogrammetry scanning
2. Training the AI-model using synthetic data
3. Simulating multiple scenario's with a lot of occlusion
4. Synthetically created 3D fish

EXTERNAL LINKS

DE TIJD

Virtuele vissen maken om echte vissen te herkennen

vrt nws

Virtuele vissen en AI moeten ons vertellen hoe het bij ons onder water gesteld is

NORTH STAR LEVEL

2 Towards 3 Intelligence

THE PROBLEM

⚠ **Lack of objective, repeatable visual measurements in research**
Experimental evaluations relied heavily on manual observation and qualitative scoring, limiting reproducibility and comparability of results.

⚠ **High variability across experiments**
Changing samples, conditions and parameters made consistent visual analysis difficult using ad-hoc methods.

OUR MISSION

✓ **Flexible vision-based analysis setup**
A computer vision system enabling objective visual measurements in experimental and pilot environments.

✓ **Quantitative feature extraction**
Automated extraction of visual characteristics to support structured analysis across experiments.

✓ **Adaptable configuration**
Inspection logic easily adjusted to different test setups and research questions.

THE BUSINESS IMPACT

- Faster and more objective experimental evaluation
- Improved reproducibility of research results

STRATEGIC VALUE

Vision-based analysis bridges research and industrial application by providing objective, data-driven validation that can scale from experiments to production environments.

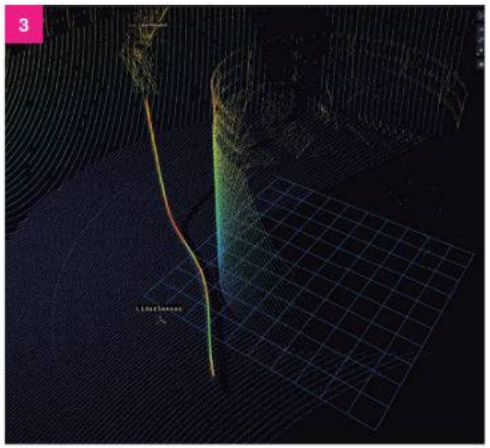
OFFSHORE/MARINE OPERATIONS (OEM)

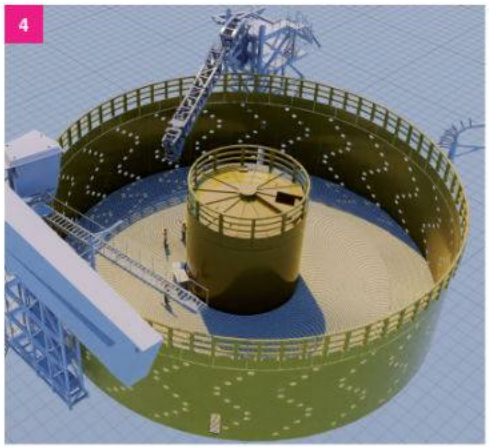
Vision-Based Control for Safe and Efficient Cable Loading

The winning edge: Robotics & Vision AI









IMAGES

1. Cable laying ship
2. Loaded cable on ship
3. Lidar point cloud
4. Simulation of cable loading

NORTH STAR LEVEL

4
Predictability

THE PROBLEM

⚠ **High risk of cable damage during loading**
During cable loading into the carousel, incorrect cable shape or tension could damage high-value subsea communication cables.

⚠ **Limited real-time insight into cable behaviour**
Operators lacked objective, real-time feedback on cable shape and dynamics during high-speed loading operations.

OUR MISSION

✓ **Vision-based cable shape monitoring**
Real-time visual tracking of cable geometry during the loading process.

✓ **Deviation detection and real-time alarms**
Immediate detection of unsafe cable behaviour during operation.

✓ **Closed-loop control integration**
Vision data used as input to actively control loading arm movement and carousel speed.

THE BUSINESS IMPACT

- Safer and more controlled cable loading
- Reduced loading time and operational risk

STRATEGIC VALUE

Vision-driven closed-loop control transforms cable loading from a manual, experience-driven operation into a predictable and repeatable industrial process.

Simulations
validation intelligence



Investing- & Strategic ROI decisions

Simulate future scenarios to guide investment and design choices.
Decisions based on facts, not assumptions or gut feel.

Virtual Design & Pre-Engineering

Test and validate system behaviour before anything is built.
No surprises after the first concept or lay-out

Virtual Commissioning & Test Automation Logic

Validate automation logic before real-world commissioning begins.
Faster ramp-up, fewer bugs, no night-time debugging.

Operational Performance & Throughput Optimalisation

Reveals bottlenecks and improves system flow efficiency.
More output, fewer delays, no costly downtime.

Autonomy, Safety & Control Simulation

Simulate smart system behaviour in complex environments.
Reliable autonomy, proven safe before going live.

MACHINERY / AGRICULTURAL EQUIPMENT (OEM)

Virtual Validation & De-risking of Autonomous Filling Systems

The winning edge: Virtual commissioning and integration assurance









IMAGES

1. Real machine
2. Automatically controlling the spout while driving
3. Simulating the ideal camera position on the spout
4. Adding visual disturbances virtually

EXTERNAL LINKS

Configuring the settings
Adding distortion
Optimal filling

Optimal filling

Real result

NORTH STAR LEVEL

3 Towards 4
Predictable

THE PROBLEM

⚠ **Need for skilled drivers**
Filling the trailer requires precision and skilled, experienced drivers.

⚠ **Late discovery of edge cases**
Software defects and edge cases only surfaced during field deployment.

⚠ **Risky iteration cycles**
Fixes caused regressions and testing relied on unsafe and slow field trials.

OUR MISSION

✓ **High-fidelity simulation framework**
A virtual environment representing machines, materials and operating conditions.

✓ **Virtual debugging of edge cases**
Safe reproduction and resolution of rare but critical failure scenarios.

THE BUSINESS IMPACT

- Faster debugging and stabilisation cycles
- Improved autonomy reliability
- Reduced dependency on risky field testing

STRATEGIC VALUE

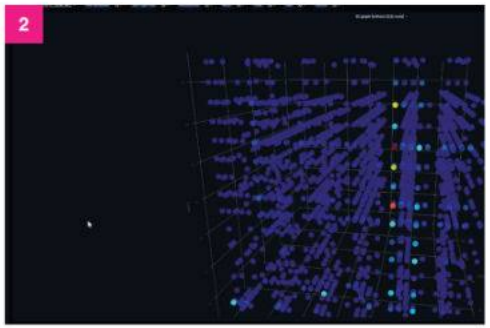
The organisation transitions from fragile to scalable autonomy, with an internally testable foundation that structurally reduces deployment risk for future autonomous features.

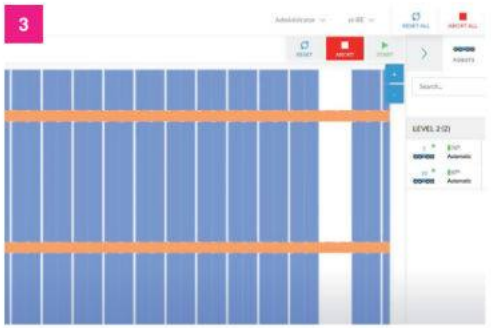
DISTRIBUTION / LOGISTICS AND RETAIL OPERATIONS

Objective Validation of a Strategic Investment

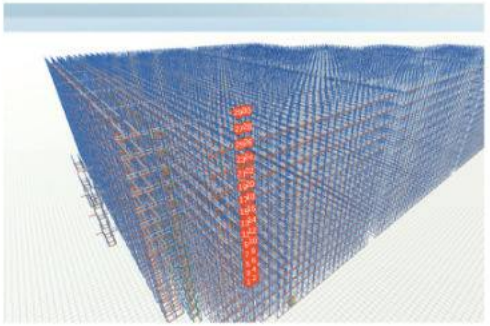
The winning edge: Decision support











IMAGES

1. The biggest autonomous shuttle warehouse in the world is situated in Belgium
2. 3D heatmap of issues
3. Real-time and web-based HMI

EXTERNAL LINKS

Fully automated warehouse

Real-time web-based HMI

NORTH STAR LEVEL

2 Towards 3 Intelligence

THE PROBLEM

- **Slow development**
  Iteration cycles with real life tests result in slow development.
- **Investment decisions driven by assumptions**
  Layout and capacity choices were based on estimates rather than validated system behaviour.
- **High cost of wrong decisions**
  Once implemented, logistics investments would be costly and difficult to reverse.

OUR MISSION

- **End-to-end logistics simulation model**
  A discrete-event model representing flows, layouts and operational constraints.
- **Faster commissioning**
  Simulation is used by integrators for faster commissioning.
- **Faster software updates**
  Simulation is used for faster software updates.

THE BUSINESS IMPACT

- Simulator as a sales tool
- Simulator as a tool for better preparation of new projects with integrators
- Faster development of new features

STRATEGIC VALUE

Simulation enables evidence-based scaling of logistics operations, turning strategic investment decisions from assumption-driven choices into validated, low-risk growth paths.

PORT LOGISTICS / BULK AND BREAKBULK TERMINALS

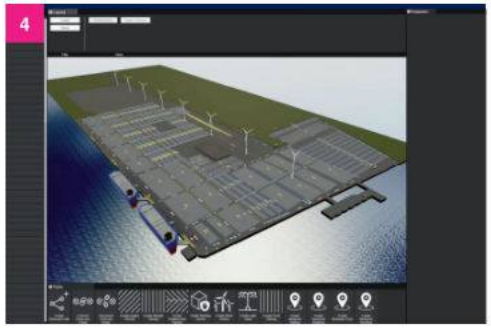
Data-Driven Terminal Optimisation and CO_2 Reduction via Simulation

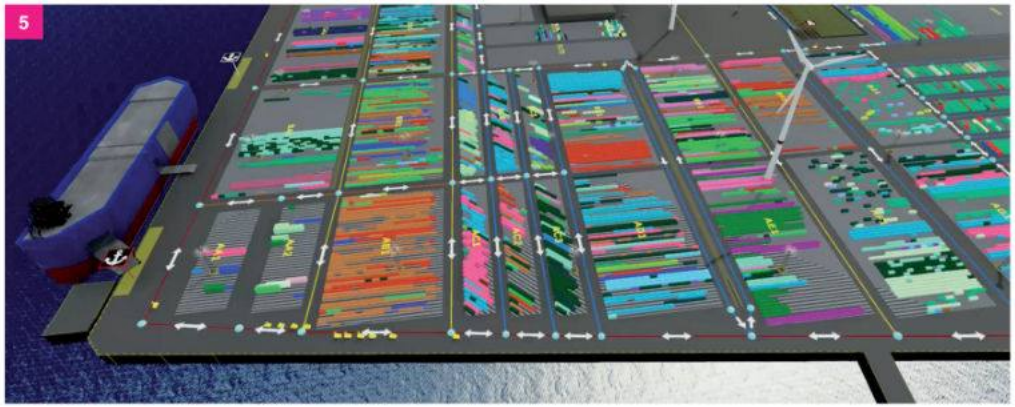
The winning edge: Investing- & Strategic ROI decisions











IMAGES

1. Scale and view of the complete terminal
2. Distance optimisation to reduce CO_2 emissions
3. Disembarking the cars from the vessel
4. Editor mode of the Digital Twin
5. Full throughput simulations.

EXTERNAL LINKS

Client casemovie

Simulation of the traffic concepts

Terminal editor

NORTH STAR LEVEL

3 Intelligence

THE PROBLEM

⚠ **Limited insight into terminal bottlenecks**
Throughput, waiting times and congestion were influenced by many interacting factors, without clear visibility on true constraints.

⚠ **Efficiency versus sustainability trade-offs**
Operational improvements risked increasing energy use and CO_2 emissions, making choices hard to assess objectively.

OUR MISSION

✓ **Detailed terminal simulation model**
A discrete-event model representing vessel flows, yard operations and equipment usage.

✓ **Scenario-based optimisation with CO_2 impact**
Operational strategies evaluated simultaneously on throughput, energy use and emissions.

THE BUSINESS IMPACT

- Clear identification of true operational bottlenecks
- Improved terminal performance without increasing emissions
- Objective insight into the impact of operational changes

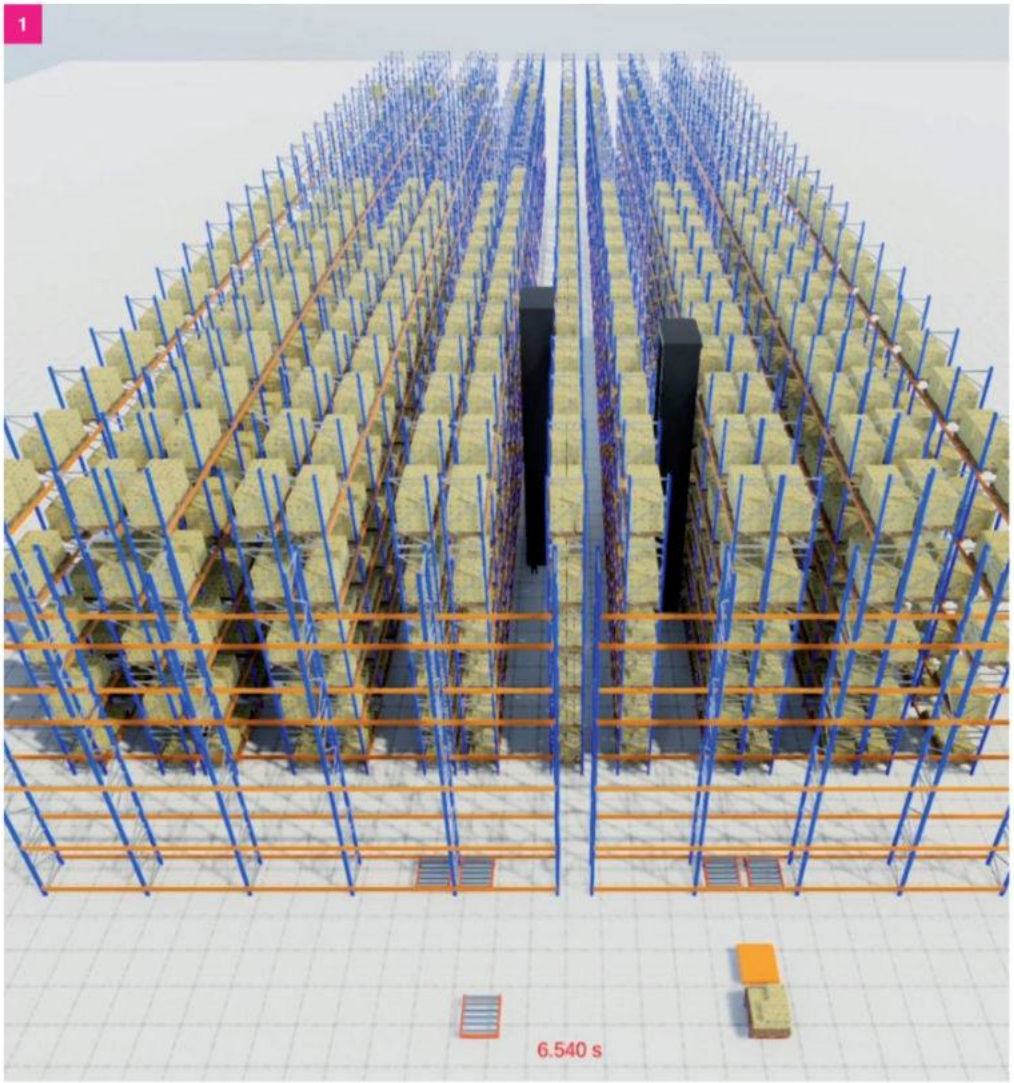
STRATEGIC VALUE

Simulation enables terminals to jointly optimise efficiency and sustainability, replacing trial-and-error decisions with validated, low-risk operational strategies

FOOD MANUFACTURING / INDUSTRIAL PRODUCTION

Model-Based Design and Accelerated Throughput Validation

The winning edge: Operational Performance & Throughput Optimalisation



IMAGES

1. Full throughput simulation based on real variables

EXTERNAL LINKS

Food processing - Warehouse throughput simulation

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

⚠ **Limited system-level insight during line design**
Warehouse design decisions were taken without clear visibility on how layout, buffers and control strategies would interact at system level.

⚠ **Late validation of design assumptions**
Throughput and stability risks only became visible after build or commissioning, when changes were costly.

OUR MISSION

✓ **System-level production simulation**
A simulation model representing material flows, buffers, machine behaviour and operational constraints.

✓ **Early validation of design choices**
Alternative layouts and control strategies tested virtually before physical implementation.

THE BUSINESS IMPACT

- Reduced risk of performance issues after commissioning
- Fewer late-stage design changes

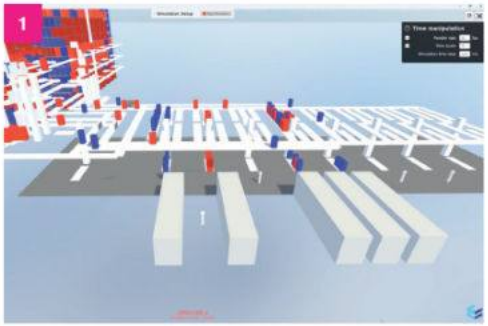
STRATEGIC VALUE

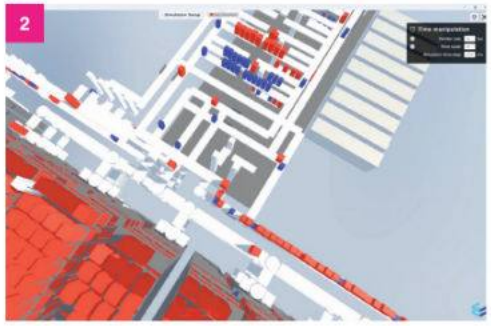
Simulation embeds validation early in the engineering process, shifting production system design from assumption-driven choices to predictable, model-based decisions.

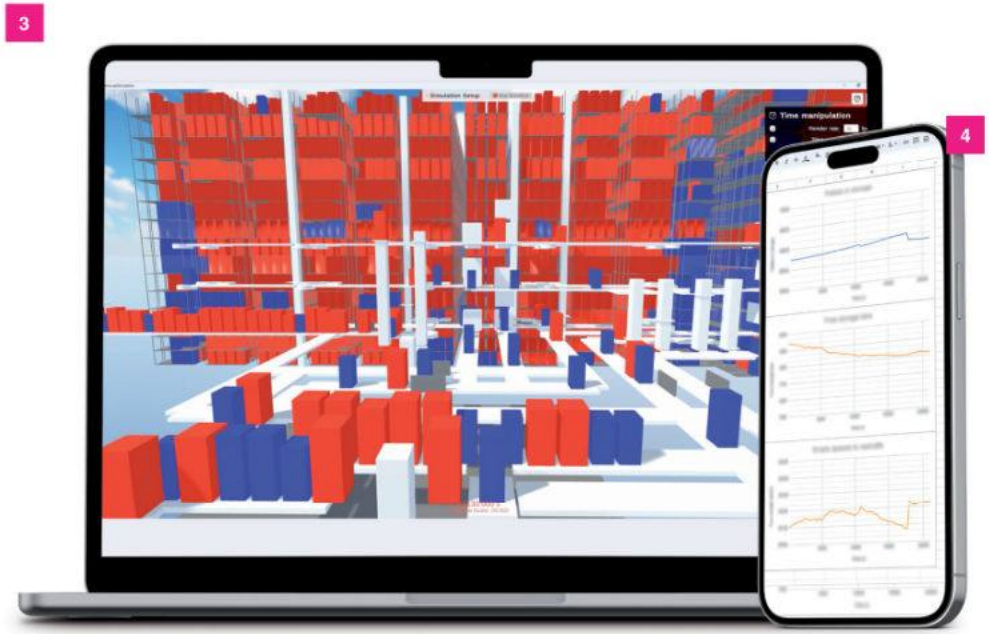
FOOD MANUFACTURING / INTRALOGISTICS

Warehouse Dimensioning and Highbay Flow Optimisation

The winning edge: Investing- & Strategic ROI decisions







IMAGES

1. Throughput analysis from warehouse to loading docks
2. Different view angles
3. Adding traffic based on historical data
4. Conclusions and recommendations

EXTERNAL LINKS

Throughput simulation

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

⚠ **Uncertain warehouse dimensioning under growth**
Future volume growth created uncertainty around required storage capacity, layout and internal material flows.

⚠ **High risk of irreversible design choices**
Decisions on highbay automation and layout would be costly and difficult to change after build.

OUR MISSION

✓ **End-to-end warehouse simulation**
A discrete-event model covering inbound flows, highbay storage, automation and outbound operations.

✓ **Scenario-based dimensioning validation**
Warehouse sizes, layouts and growth paths tested virtually to identify capacity limits.

THE BUSINESS IMPACT

- Reduced risk of over- or under-dimensioning
- Increased confidence in automation investments

STRATEGIC VALUE

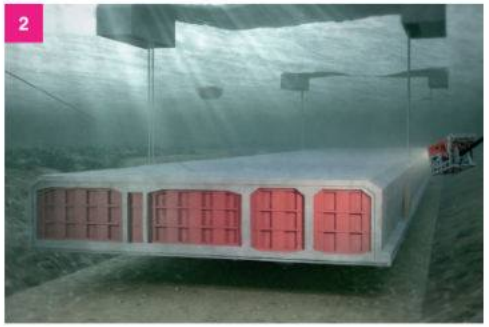
Simulation enables evidence-based warehouse design by validating scalability and performance before committing capital.

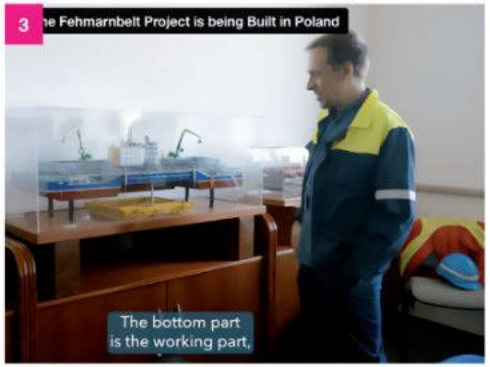
HEAVY INDUSTRY / OFFSHORE AND INFRASTRUCTURE ENGINEERING

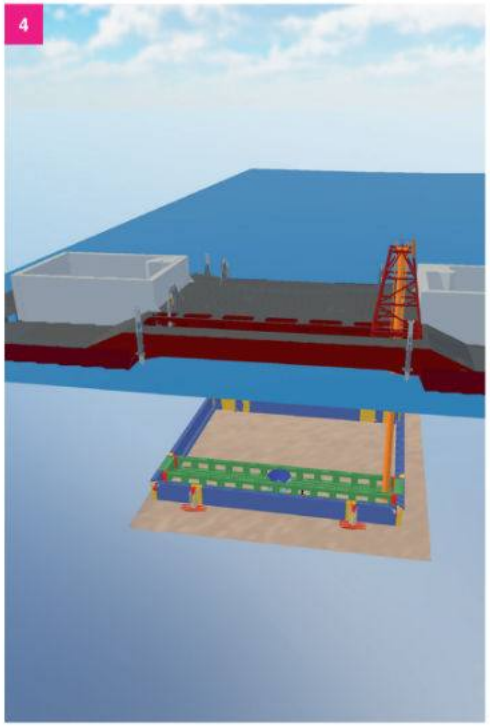
Virtual Commissioning and Risk Mitigation for the Fehmarnbelt Tunnel Project

The winning edge: Virtual Commissioning & Test Automation Logic











IMAGES

1. 18km tunnel between Fehmarn (D) and Lolland (DK)
2. Transported tunnel segment put in place
3. The unique vessel construction
4. Natural waves simulation on vessel

EXTERNAL LINKS

Vessel casemovie

Vessel simulation

Building the tunnel

NORTH STAR LEVEL

4
Predictable

THE PROBLEM

⚠ **Low predictability in complex tunnel construction**
Interdependent activities such as excavation, logistics and installation made it difficult to reliably predict throughput and project duration.

⚠ **High cost of planning errors**
Small misalignments in sequencing or resource allocation could cause significant delays and cost overruns.

OUR MISSION

✓ **Integrated tunnel construction simulation**
Physical model of how tunnel segments are lowered.

✓ **Scenario-based execution planning**
Virtual commissioning simulation

THE BUSINESS IMPACT

- Improved predictability of construction timelines
- Reduced risk of schedule overruns

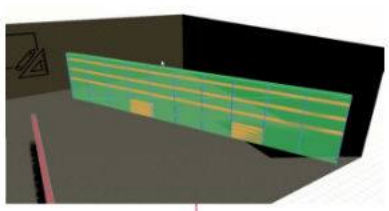
STRATEGIC VALUE

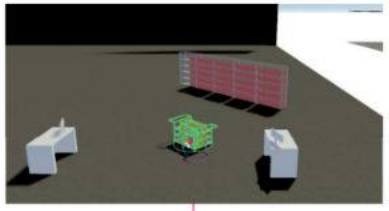
Simulation enables risk-aware planning of complex tunnelling projects by validating execution strategies before mobilisation.

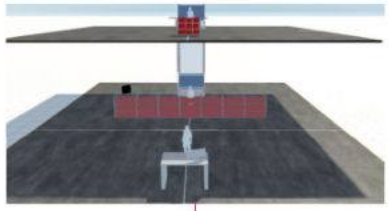
LOGISTICS CONSULTING / WAREHOUSING

Optimisation of Warehouse Flows and Workforce Interaction via Simulation

The winning edge: Operational Performance & Throughput Optimalisation





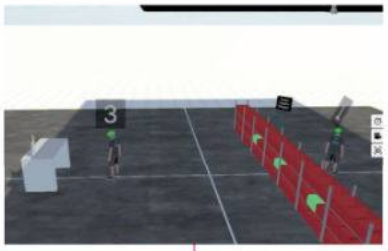


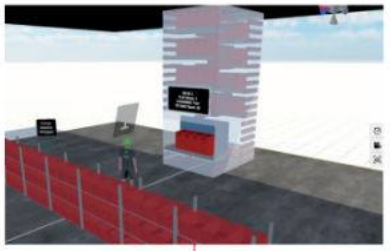
START

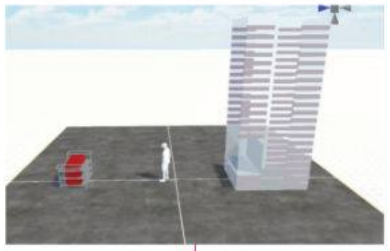
Assembly of large scene objects

Configuration of operator details

Configuration of lift







ANALYZE

Step 3 - Packing

Step 2 - Picking

Step 1 - Binning

EXTERNAL LINKS

Multiple configuration set-up

NORTH STAR LEVEL

2 Towards 3 Intelligence

THE PROBLEM

⚠ **Human behaviour as a critical system factor**
Operational performance depended strongly on human decisions, reactions and workload distribution, which were not captured by traditional, purely technical system models.

⚠ **Risk of unrealistic process design**
Process changes validated on paper often underperformed once exposed to real operator behaviour in daily operations.

OUR MISSION

✓ **Human-in-the-loop simulation model**
A simulation environment combining material flows with realistic representations of human tasks, decisions and response times.

✓ **Virtual validation of operational changes**
Alternative workflows and support concepts tested virtually to assess performance, robustness and operator impact before implementation.

THE BUSINESS IMPACT

- More realistic validation of operational changes
- Reduced risk of performance loss after go-live

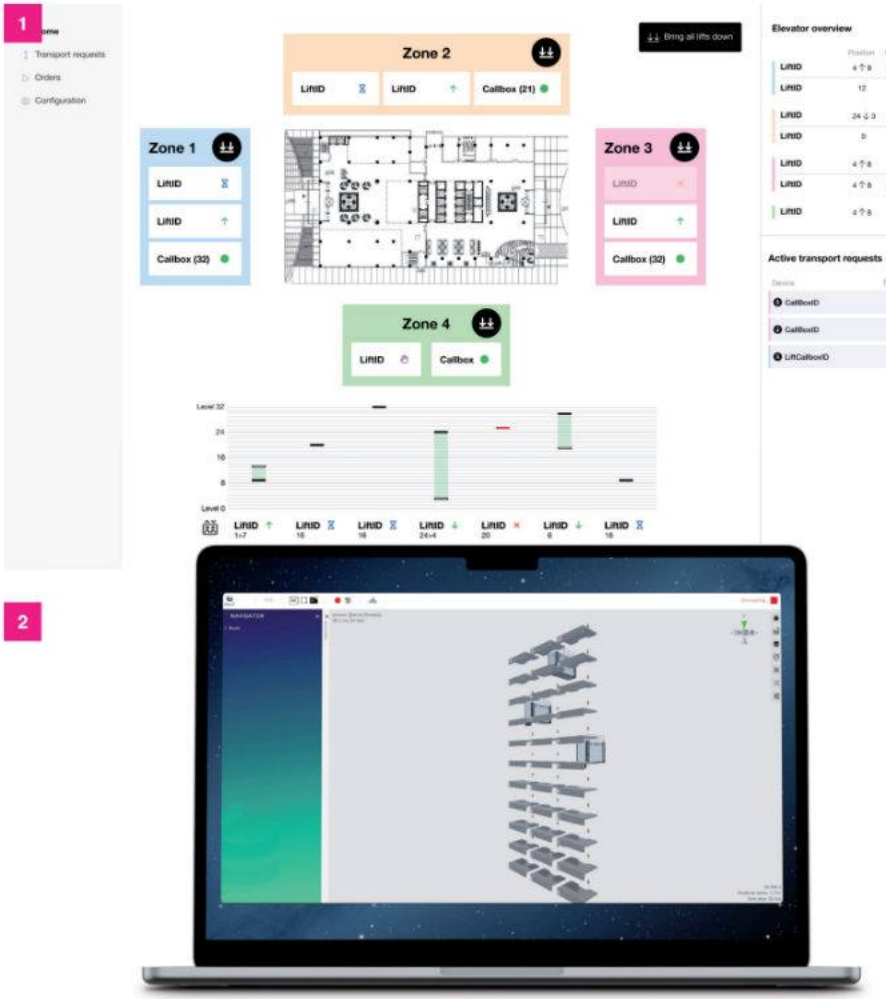
STRATEGIC VALUE

Human-in-the-loop simulation enables operational designs that remain robust in practice by explicitly accounting for human behaviour as part of the system.

SMART CONSTRUCTION EQUIPMENT

Centralised Digital Control System for Smart Lifts & Vertical Logistics

The winning edge: Pre-engineering, virtual commissioning and test automation logic



IMAGES

1. Dashboard
2. Virtual simulation of smart lift control

NORTH STAR LEVEL

3
Intelligence

THE **PROBLEM**

⚠ **Complex interaction between lifts, users and traffic rules**
Vertical transport performance depended on the combined behaviour of lift mechanics, dispatching logic and human usage, making throughput hard to predict.

⚠ **Uncertainty during system design and configuration**
Design choices on lift capacity, control rules and layout could not be validated reliably before installation.

OUR **MISSION**

✓ **System-level simulation of vertical transport flows**
A discrete-event simulation modelling lift dynamics, control logic and user behaviour across realistic demand scenarios.

✓ **Virtual validation of design and control choices**
Alternative configurations and dispatching strategies tested to assess throughput, waiting times and robustness.

THE **BUSINESS IMPACT**

- Clear insight into realistic system performance
- Reduced risk of underperforming lift installations

STRATEGIC **VALUE**

Simulation enables predictable, model-based design of vertical logistics systems, reducing integration risk and supporting scalable, software-driven lift solutions.

Mechatronics & Automation

physical intelligence



Robotics & Unmanned Vehicles (UxV)

Making machines move autonomously through any environment.
From manual control to reliable, scalable autonomy.

Model-driven system design & Integration

Designing systems as a whole, not in parts.
Faster integration, fewer surprises, better performance.

Simulation-first Engineering

Test and tune virtually before building anything real.
Accelerates development and reduces failure risk.

INTRALOGISTICS / ROBOTICS OEM

Autonomous Pallet Shuttle for Intralogistics

The winning edge: Robotics & Unmanned Vehicles (UxV)

1



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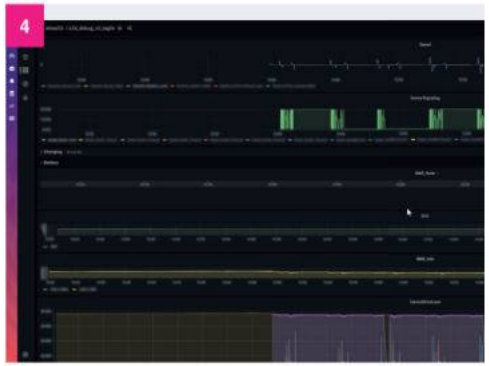
3



4



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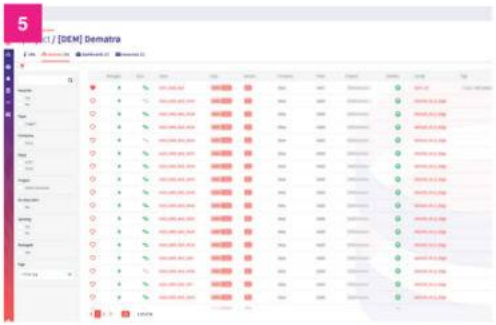


6



IMAGES

1. STOW - Atlas 2D
2. Development debugging - 2ms samplerate @ 20-40k rows/s
3. STOW - eScala
4. Shuttle status - for fast and remotely debugging
5. Detailled fleet overview per location/site - Allowing updates
6. Workflow analytics

EXTERNAL LINKS

Using data to check behavior

Movu Robotics Full range

NORTH STAR LEVEL

5
Autonomy

THE PROBLEM

⚠ **Fleet coordination complexity**
Accurate motion control and coordination across a full shuttle fleet were difficult to scale reliably.

⚠ **Reproducibility risk**
Control behaviour needed to remain stable and predictable across different customers and projects.

⚠ **Time-to-market pressure**
New functionality had to be deployed faster without increasing system risk or operational instability.

OUR MISSION

✓ **Real-time control stack**
Robust low-latency control software with tight sensor and motor integration.

✓ **Scalable traffic control**
Centralised coordination logic enabling safe and efficient multi-shuttle operation.

✓ **System integration**
Seamless integration with WMS, logging and simulation tooling.

✓ **Virtual validation**
Simulation-based strategy validation prior to on-site deployment.

THE BUSINESS IMPACT

- Faster rollout of new shuttle functionality
- Higher system reliability in complex customer projects
- Flexible deployment across multiple intralogistics environments

STRATEGIC VALUE

A proprietary control foundation enables scalable, self-optimising shuttle intelligence and strengthens long-term differentiation as an intralogistics OEM.

OFFSHORE / MARINE INFRASTRUCTURE

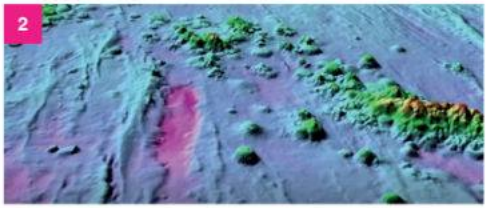
Autonomous Crawler

The winning edge: Robotics & Unmanned Vehicles (UxV)

1



2



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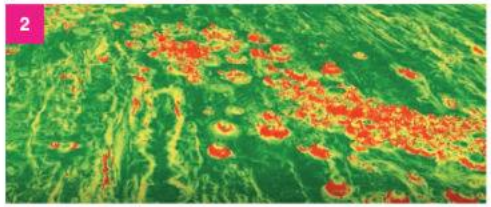

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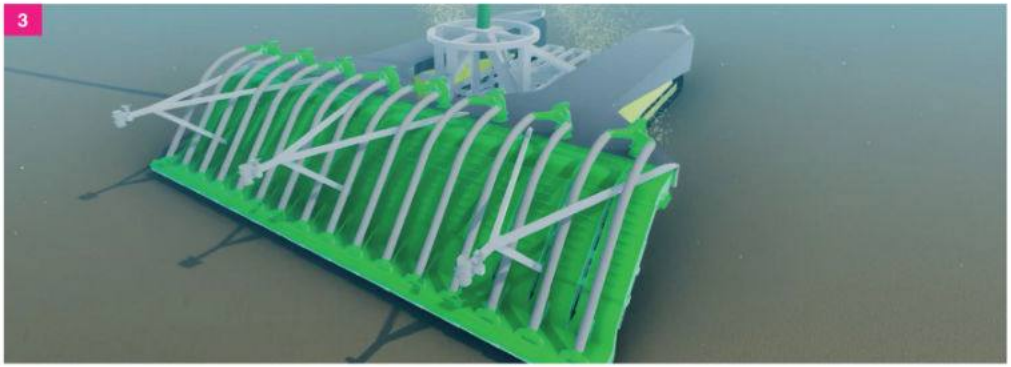


IMAGES

1. Scale of the UW-robot
2. operating area
3. Simulating path of the robot

EXTERNAL LINKS

Simulation

NORTH STAR LEVEL

5
Autonomy

THE PROBLEM

- **High operational risk**
  Subsea inspection and intervention required human supervision in hazardous environments.
- **Labour-intensive operation**
  Manual and remotely operated systems limited scalability and efficiency.
- **Limited autonomy**
  Existing solutions lacked the intelligence to operate reliably without continuous operator input.

OUR MISSION

- **Autonomous control software**
  Motion and navigation control enabling independent crawler operation.
- **Sensor fusion**
  Integration of sonar, IMU and odometry for robust localisation and perception.
- **Fail-safe recovery logic**
  Autonomous recovery mechanisms for loss-of-signal and edge-case scenarios.
- **Digital twin validation**
  Simulation of crawler behaviour and sediment plume effects.

THE BUSINESS IMPACT

- Reduced operational risk
- Fewer interventions and lower operational cost
- Higher-quality inspection data

STRATEGIC VALUE

Autonomous subsea capability becomes a scalable competitive advantage in offshore infrastructure operations.

OFFSHORE / MARINE ENGINEERING

Anti-Heeling Software

The winning edge: Simulation-first Engineering

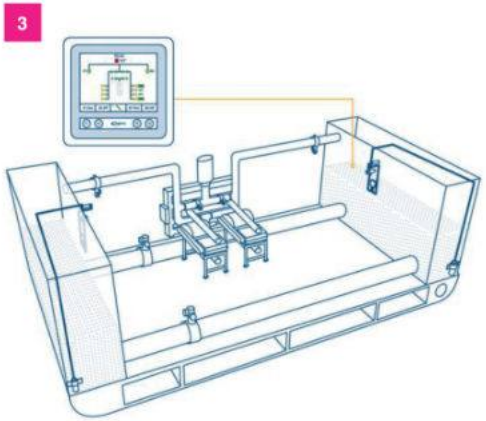
1



2



3



IMAGES

1. Integration in full mission simulator
2. Orion 1 at work
3. Principal of anti-heeling concept

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

⚠ **Risky physical validation**
Testing heeling control systems on real vessels involved significant operational risk.

⚠ **Limited edge-case coverage**
Physical tests could not realistically cover all operating conditions.

⚠ **Slow validation cycles**
Iterative improvements were time-consuming and costly.

OUR MISSION

✓ **Digital heeling model**
Accurate simulation of vessel behaviour under varying load conditions.

✓ **Automated controller validation**
Virtual testing of control logic using FMUs.

✓ **CI/CD pipeline**
Continuous integration of software changes with automated validation.

THE BUSINESS IMPACT

- Faster and safer validation cycles
- Improved preparation for edge cases
- More efficient R&D process

STRATEGIC VALUE

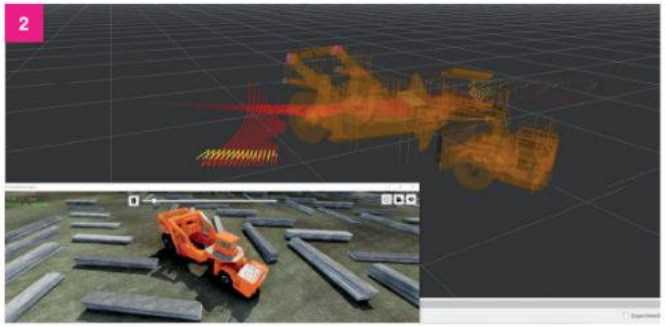
Virtual commissioning becomes a structural capability for reducing risk in complex marine control systems.

HEAVY INDUSTRY / STEEL PRODUCTION

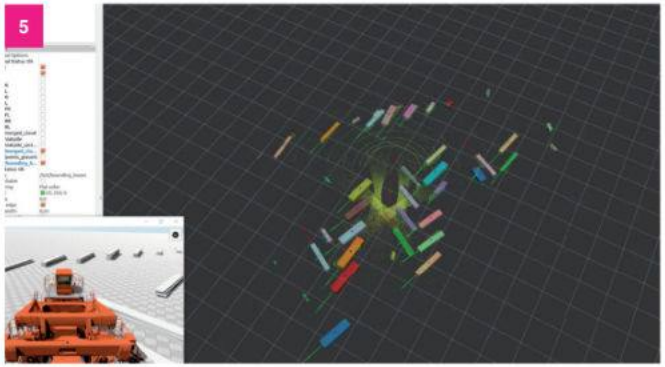
Autonomous Slab Carrier

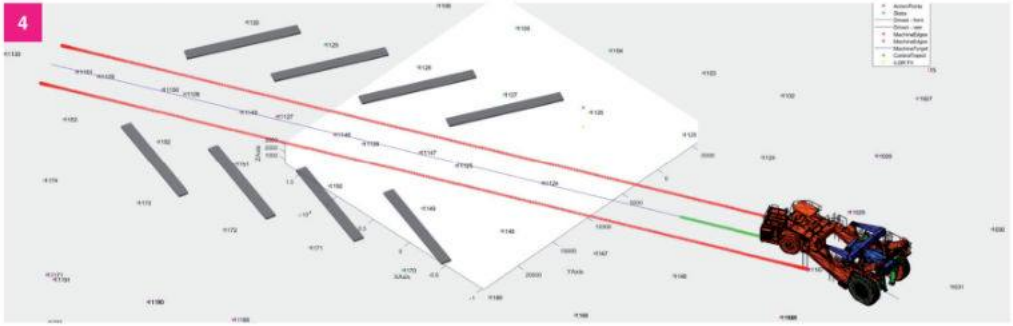
The winning edge: Robotics & Unmanned Vehicles (UxV)











IMAGES

1. Scale of the autonomous slab carrier
2. Pile scanning to position/park the carrier before lifting
3. LIDAR sensors at work
4. Absolute & relative navigation
5. Slabyard object detection & tracking

EXTERNAL LINKS

Driving & slab tracking

Object tracking

Navigation absolute & relative

NORTH STAR LEVEL

5
Autonomy

THE PROBLEM

- ⚠ **Extreme operating conditions**
  Slabs at 900 °C had to be transported safely in a 24/7 production environment.
- ⚠ **High safety risk**
  Continuous human supervision increased risk and labour cost.
- ⚠ **Limited autonomy maturity**
  Autonomy in heavy industry was largely unproven.

OUR MISSION

- ✓ **Obstacle detection and navigation**
  Autonomous perception and path planning in an outdoor industrial environment.
- ✓ **Digital twin proof of concept**
  Virtual validation of autonomous behaviour before deployment.
- ✓ **Driver assistance logic**
  Gradual transition from assisted to autonomous operation.

THE BUSINESS IMPACT

- Improved operator safety
- Reduced dependency on continuous human supervision
- Demonstrated feasibility of autonomy in heavy industry

STRATEGIC VALUE

The organisation positions itself as a pioneer in autonomous steel production with future-ready OT integration.

SMART AGRICULTURE

Boom Stability

The winning edge: Robotics & Unmanned Vehicles (UxV)









IMAGES

1. Controlling a spray boom of 57m
2. Simulation of scenarios and environmental factors in DUAL
3. Mapping the behavior of the spray boom using our data framework Capture

EXTERNAL LINKS

Digital Twin

Machine at work

NORTH STAR LEVEL

4
Predictable

THE PROBLEM

- **Terrain-induced oscillations**
  Uneven terrain caused spray booms to oscillate during operation.
- **Inconsistent spraying quality**
  Oscillations led to uneven application and quality loss.
- **Operator fatigue**
  Manual correction increased workload and reduced comfort.

OUR MISSION

- ✓ **Predictive motion control**
  Anticipation of boom movement based on vehicle dynamics.
- ✓ **Real-time oscillation correction**
  Active compensation of movement during operation.

THE BUSINESS IMPACT

- Higher spraying accuracy
- Reduced rework and chemical waste
- Improved operator comfort

STRATEGIC VALUE

Agricultural machinery evolves towards semi-autonomous systems that dynamically adapt to field conditions.

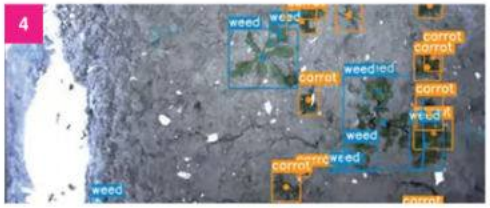
AGRITECH / ROBOTICS

Autonomous Weeding Robot

The winning edge: Robotics & Unmanned Vehicles (UxV)









IMAGES

1. The mechanical weeding robot
2. Operating arm removing the detected weed
3. Dashboard of the weed data
4. Visual weed detection

EXTERNAL LINKS

Visual weed detection

Robot&arm @work

The project

NORTH STAR LEVEL

4
Predictable

THE PROBLEM

⚠ **High system cost**
Standard industrial hardware made early robot versions commercially unviable.

⚠ **Prototype instability**
Software architecture limited performance and robustness.

⚠ **Limited scalability**
Transition from prototype to production was difficult.

OUR MISSION

✓ **Real-time Linux architecture**
Deterministic IPC-based software platform.

✓ **ROS2 integration**
Modular communication and scalability.

✓ **Validation tooling**
Automated testing to support industrialisation.

THE BUSINESS IMPACT

- Lower cost per robot
- Improved performance and stability
- Production-ready software platform

STRATEGIC VALUE

A scalable robotics software foundation enables global rollout and long-term product evolution.

HVAC / OEM PRODUCT DEVELOPMENT

Model-Based Software for HVAC Condensation

The winning edge: Simulation-first engineering

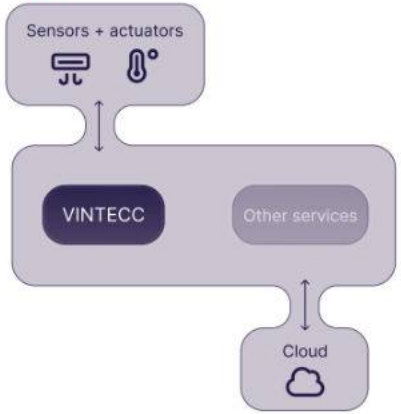
1



2



3



IMAGES

1. Heatpumps
2. Smart control of heatpumps
3. Vintecc's role within the infrastructure

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

- **Late defect detection**
  Software issues were discovered late in the development cycle.
- **Manual validation effort**
  Testing relied heavily on physical setups.
- **Slow innovation cycles**
  Iterations took too long to support rapid product evolution.

OUR MISSION

- **Model-based workflows**
  Software development driven by simulation models.
- **Automated testing**
  Unit and integration tests executed virtually.
- **Simulation environments**
  Early validation of control logic.

THE BUSINESS IMPACT

- Earlier defect detection
- Faster release cycles
- Higher software reliability

STRATEGIC VALUE

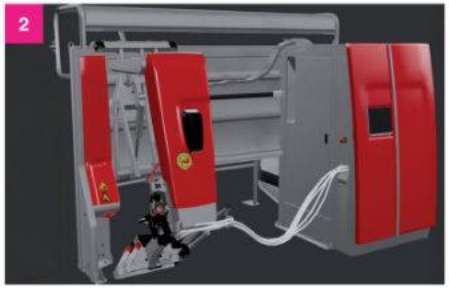
Predictive engineering replaces static development, reducing risk and accelerating innovation.

AGRITECH / DAIRY AUTOMATION

Centralised Control Architecture for Large-Scale Milking Robotics

The winning edge: Model-driven system design & Integration









IMAGES

1. Cow being milked
2. 3D-model of milking robot
3. Centralised cooling tank
4. Milking robot connected to centralised system

NORTH STAR LEVEL

4
Predictable

THE PROBLEM

⚠ **System-level redesign requirement**
A new architecture was needed to centralise milk storage and related functions at farm level across multiple milking robots.

⚠ **Cost pressure per robot**
Reducing cost per milking robot required centralising functionality without compromising performance or reliability.

⚠ **Development complexity**
Validating new control strategies across a variable number of robots was difficult using physical setups alone.

OUR MISSION

✓ **Model-based development approach**
Introduction of simulation-driven design to enable rapid prototyping and early validation of control strategies.

✓ **Simulation-backed control development**
Development of robot control logic directly against a dynamic simulation model.

✓ **Dynamic HMI for test environments**
A flexible HMI supporting testing and validation with a variable number of milking robots.

THE BUSINESS IMPACT

- Faster development cycles
- Reduced need for physical prototypes during early development
- More efficient validation of new control concepts

STRATEGIC VALUE

Milking robot behaviour is elevated to an industrial, predictable level, enabling large-scale dairy operations and positioning Lely as a benchmark for precision agriculture and next-generation milking robotics.

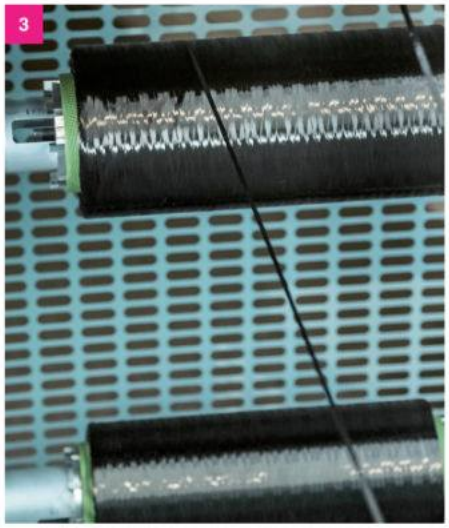
TEXTILE MACHINERY

Technical Textile Weaving Machine

The winning edge: Model-driven system design and integration









IMAGES

1. Tape yarn or fibre feeding machine
2. Woven (technical) fabric
3. Bobbin on the unwinder
4. Tension Arm

NORTH STAR LEVEL

5
Autonomy

THE PROBLEM

⚠ **Twist sensitivity**
Even minimal yarn twist caused quality defects.

⚠ **Dynamic operating conditions**
Tension control had to remain accurate at high speeds.

⚠ **Limited control precision**
Conventional systems lacked the required responsiveness.

OUR MISSION

✓ **Iterative learning control**
Continuous improvement of tension control behaviour.

✓ **High-precision regulation**
Stable, twist-free yarn supply.

THE BUSINESS IMPACT

- Higher textile quality
- Increased production speed

STRATEGIC VALUE

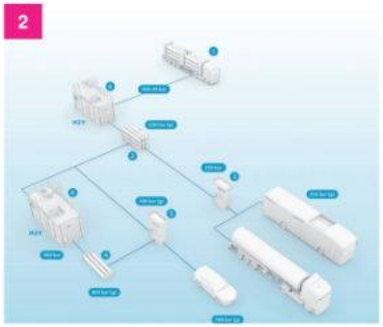
Autonomous control elevates weaving machine performance in competitive textile markets.

HYDROGEN TECHNOLOGY

High-Pressure Hydrogen Compressor

The winning edge: Model-driven system design and integration











IMAGES

1. Compressor set-up
2. Hydrogen compressor integrated in Hydrogen Refueling Station
3. Plug-and-play hydrogen compressor
4. Hydrogen Refueling Station (HRS)
5. Safe hydrogen handling

NORTH STAR LEVEL

5
Autonomy

THE PROBLEM

⚠ **Multi-stage coordination**
Compression stages required precise synchronisation.

⚠ **Safety constraints**
Hydrogen handling imposed strict operational limits.

⚠ **Efficiency losses**
Suboptimal control increased energy consumption.

OUR MISSION

✓ **Model-based control**
Accurate coordination of compression stages.

✓ **Virtual test environment**
Safe validation prior to physical commissioning.

THE BUSINESS IMPACT

- Stable and safe compressor operation
- Reduced energy consumption
- Lower commissioning risk

STRATEGIC VALUE

Advanced control technology supports scalable, safe hydrogen solutions for clean mobility.

AI & Data Ops
operational intelligence



Operational Assistant

Always the right and optimal settings.
Automated, no guesswork or gut feel.

Machine Observer

Giving your machines a sixth sense.
Detecting issues before they cause downtime, scrap or quality loss.

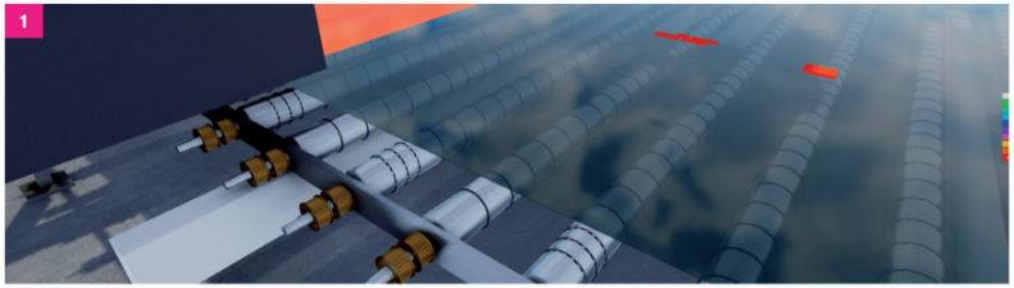
Advanced Planning

Building smart production and delivery plans respecting all constraints. Get more done with less stress and fewer errors.

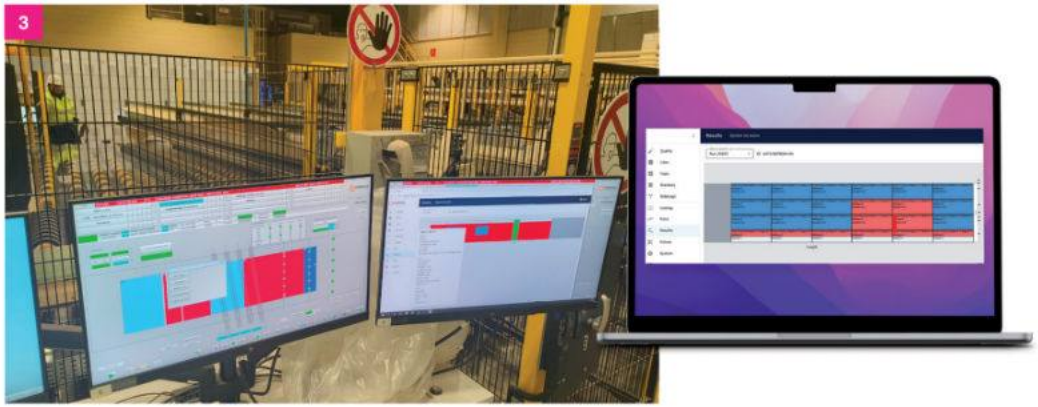
MATERIALS / MANUFACTURING

Product Optimizer (Glass Cutting Optimisation)

The winning edge: Advanced Planning







IMAGES

1. Quality inspection of glass marking all defects
2. Cutting the glass
3. HMI to set full range of cuttings specs and define the optimal cut-outs.

EXTERNAL LINKS

Optimizer

NORTH STAR LEVEL

5
Autonomy

THE PROBLEM

⚠ **Complex parameter interaction**
Cutting quality depended on a complex interaction between glass composition, dimensions and multiple machine parameters.

⚠ **Material scrap**
Suboptimal cutting strategies caused excessive raw material losses.

⚠ **Operational instability**
Inefficient setups led to downtime and frequent line interruptions.

OUR MISSION

✓ **Self-learning optimisation model**
Continuous optimisation of cutting strategies based on real-time production context.

✓ **Real-time decision making**
Automatic selection of the most efficient cutting strategy per glass type and order.

✓ **Autonomous deployment**
Direct application of optimised strategies to the production line without operator intervention.

THE BUSINESS IMPACT

- Higher raw material utilisation
- Reduced scrap and rework
- Shorter cycle and setup times
- Fewer line interruptions

STRATEGIC VALUE

This solution enables a decisive step towards autonomous production, where cutting decisions are continuously optimised by AI models that adapt in real time to changing production conditions.

MATERIALS / QUALITY ASSURANCE

Seal Inspection (Integrated Across 3 Plants)

The winning edge: Machine Observer







START — FINISH

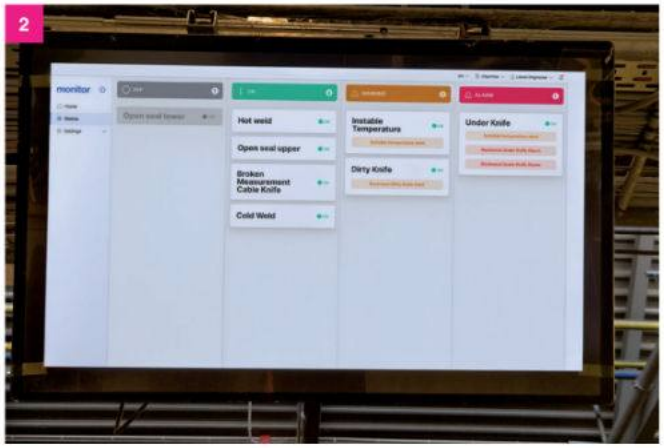
Substrate slab is merged with plastic foil

Seal in length

Short separation seal



1



2

IMAGES

1. Crop-specific range of substrate slabs used as a vegetable solution
2. HMI

NORTH STAR LEVEL

4
Predictable

THE PROBLEM

- **Manual inspection limits**
  Seal inspection relied on manual checks, leading to operator dependency.
- **Late defect detection**
  Deviations were often detected too late in the process.
- **Quality inconsistency**
  Variations between shifts and plants increased scrap risk and customer complaints.

OUR MISSION

- **Inline AI inspection**
  Continuous, real-time inspection of seal quality during production.
- **Automatic deviation detection**
  Immediate identification of defects without slowing down the line.
- **Operator feedback loop**
  Visual and digital feedback supporting fast corrective action.
- **Scalable deployment**
  One solution rolled out consistently across multiple production sites.

THE BUSINESS IMPACT

- Significant reduction in quality issues and scrap
- Higher first-time-right ratios
- Time savings in quality inspection
- Consistent quality across three plants

STRATEGIC VALUE

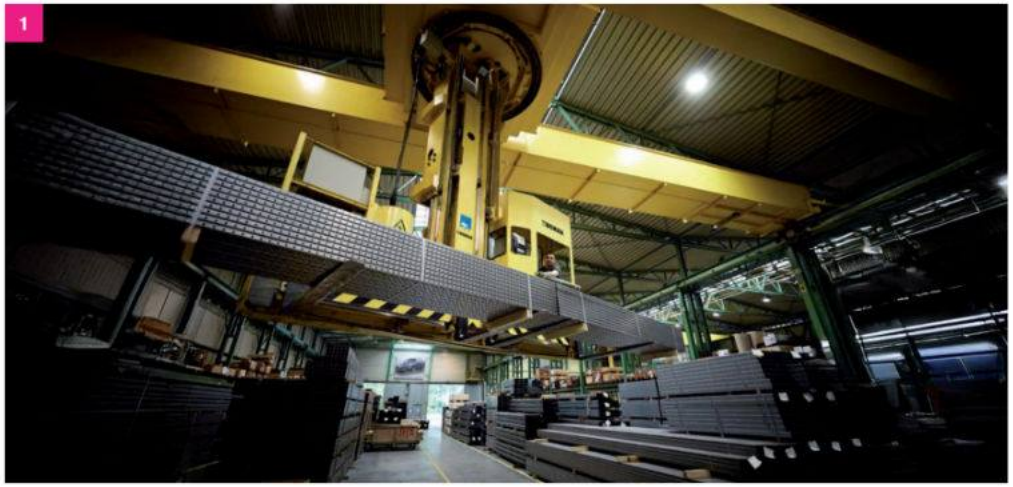
A standardised, multi-site quality system is established that embeds knowledge in the process itself, reducing operator dependency while ensuring predictable quality across locations.

MANUFACTURING / MAINTENANCE

Hydraulic Anomaly Detection

The winning edge: Machine Observer

1



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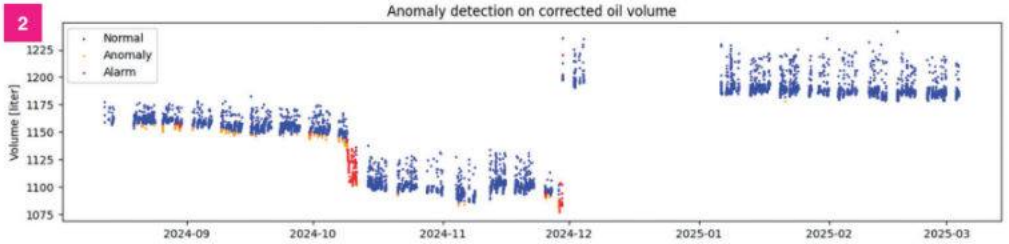

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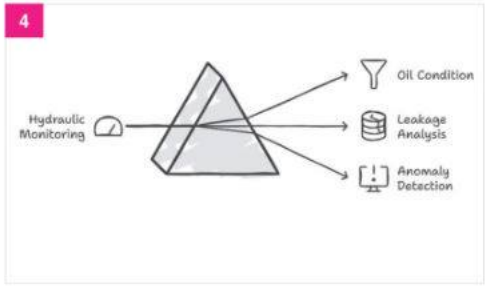


IMAGES

1. Hydraulic machine at work
2. Anomaly detection on corrected oil volume
3. Variables over time
4. Different aspects of hydraulic monitoring

NORTH STAR LEVEL

3
Intelligence

THE PROBLEM

- **Invisible degradation**
  Wear and micro-deviations in hydraulic systems were not visible during operation.
- **Unplanned downtime**
  Failures occurred suddenly, causing production stops and quality loss.
- **Reactive maintenance**
  Lack of early warnings prevented proactive intervention.

OUR MISSION

- ✓ **Data-driven anomaly detection**
  Continuous learning of normal hydraulic behaviour and early deviation detection.
- ✓ **Signal pattern analysis**
  Identification of subtle changes in pressure and flow signals.
- ✓ **Automated alerts**
  Real-time notifications to technical teams when anomalies occur.
- ✓ **Contextual reporting**
  Machine-level insights enriched with operational context.

THE BUSINESS IMPACT

- Increased uptime of critical machines
- Reduced unplanned downtime
- Faster and better-informed maintenance actions

STRATEGIC VALUE

Maintenance shifts from reactive firefighting to predictive control, strengthening operational continuity and protecting product quality with minimal additional operator effort.

FOOD MANUFACTURING / INLINE PROCESS CONTROL

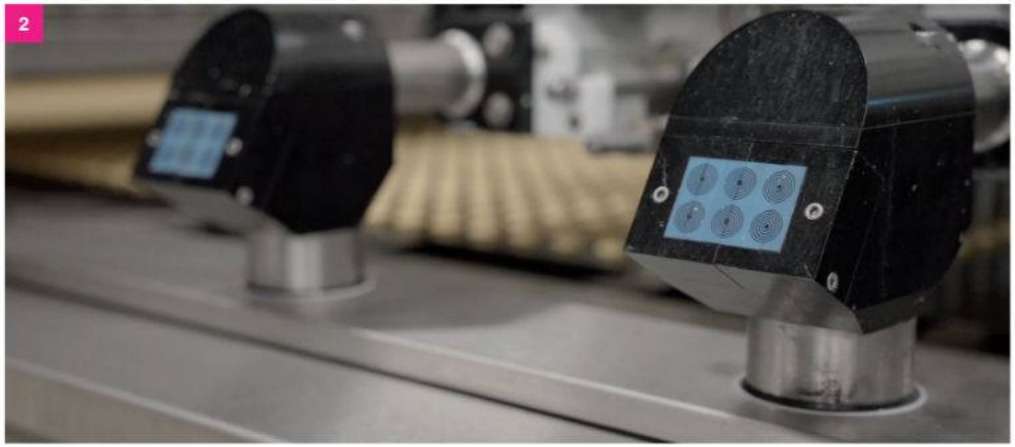
Raw Material Dosing Optimisation

The winning edge: Operational Assistant

1



2



IMAGES

1. Consistent dosing
2. Dosing Machine

NORTH STAR LEVEL

4
Predictable

THE PROBLEM

- **Dosing variability**
  Variations in liquid dosing caused weight deviations and quality fluctuations.
- **Structural overdosing**
  To stay within specs, raw materials were consistently overdosed.
- **Shift dependency**
  Product quality varied between batches and operators.

OUR MISSION

- **Inline AI dosing model**
  Real-time calculation of optimal dosing volume and timing.
- **Process feedback integration**
  Continuous feedback based on line speed, flow and viscosity.
- **Closed-loop control**
  Direct adjustment of dosing parameters during production.

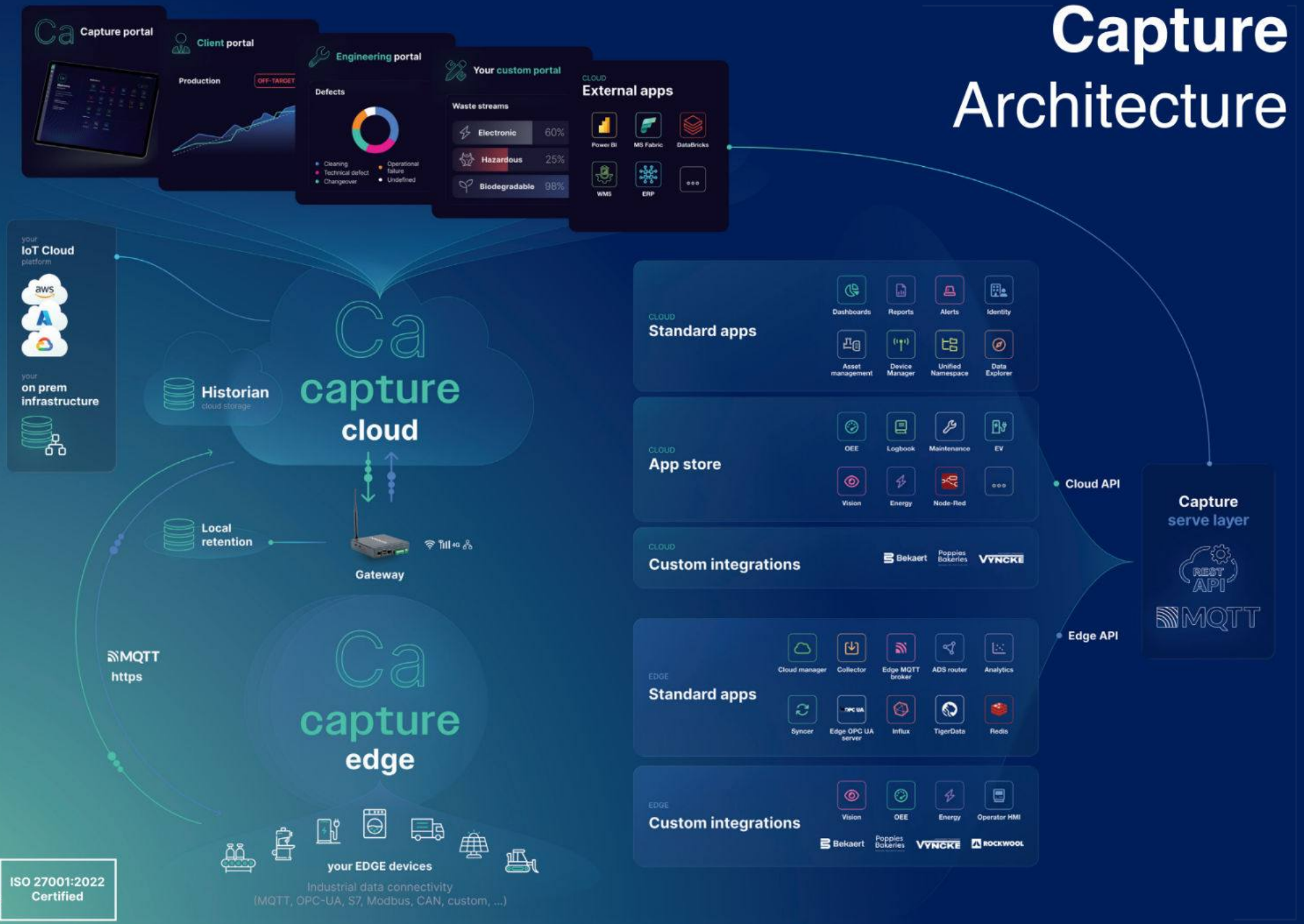
THE BUSINESS IMPACT

- Reduced raw material waste
- Stable product weight and quality
- Lower cost per unit without loss of throughput

STRATEGIC VALUE

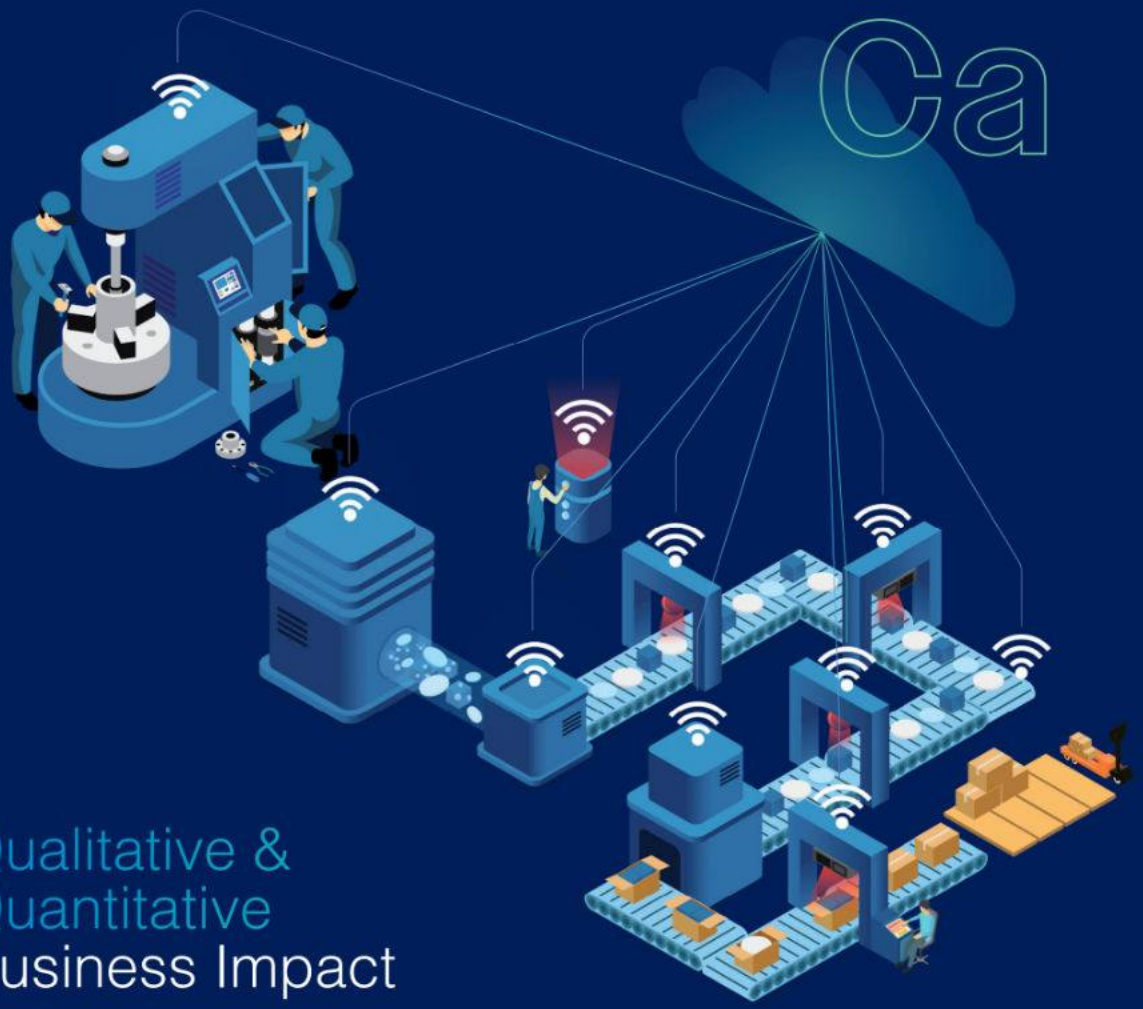
An autonomously adjusting dosing process standardises performance across all shifts, minimises waste and safeguards premium product quality in high-speed food production.

Capture Architecture



ISO 27001:2022 Certified
VINÇOTTE

Capture
Business Impact



Qualitative & Quantitative Business Impact

Based on all our previous analyses and use cases

Enabling AI	the starting point for any AI or third-party application
Energy	5–15% monitoring savings
OEE	8-20% improvement within 6 months
Less scrap	better insight into process deviations
Downtime	10-40% reduction
Reporting	30-50% less time spent on reporting
Operators	become active owners of KPIs
Root-cause	from hours to minutes
Assets	track asset data without hunting for information

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Industrial intelligence that works