



AI Panel Discussion: Forging the Future: AI's Impact on the Steel Industry – Realities, Trends, and Lessons Learned

Premier Sponsor

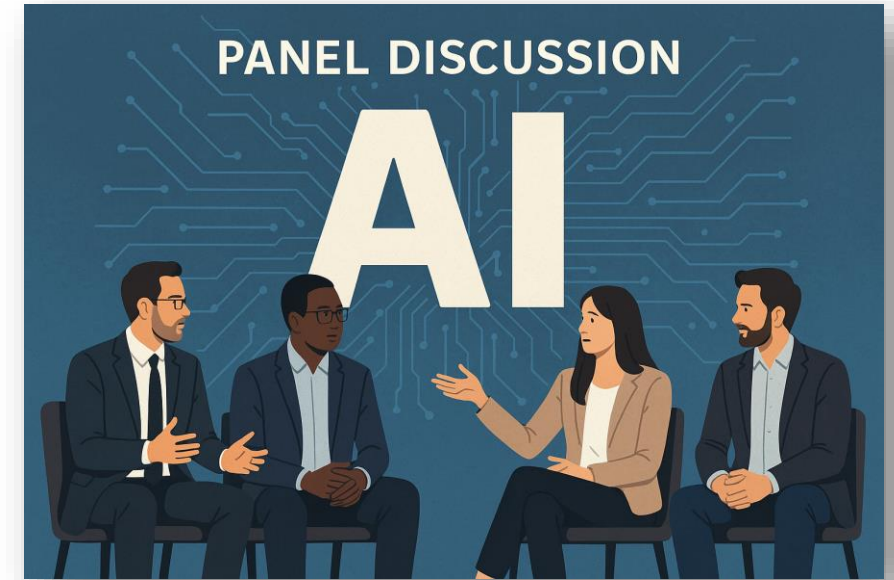


Event Sponsors



Agenda

- Context Setting & Overview 5'
- Panelists Initial Remarks 25'
- Panel Discussion 35'
- Q&A 20'
- Final Remarks (All Panelists) 5'



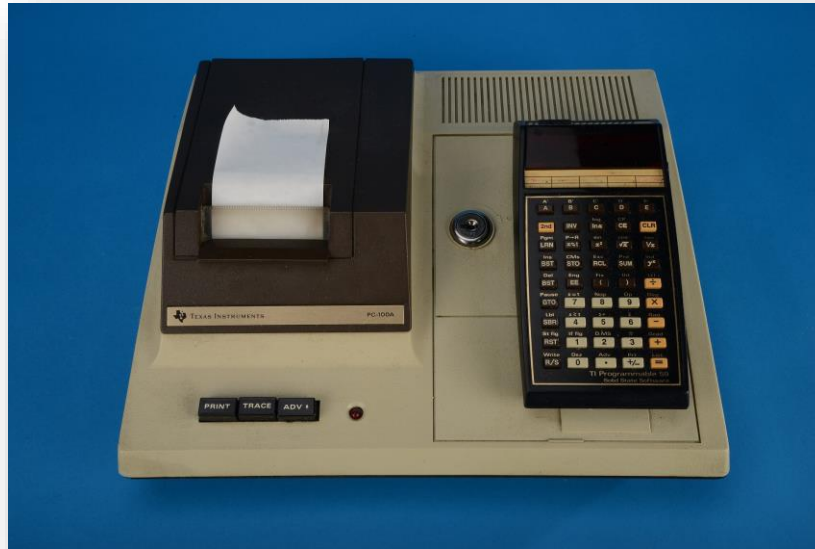
Panelists

Ed LaBruna – Janus Automation



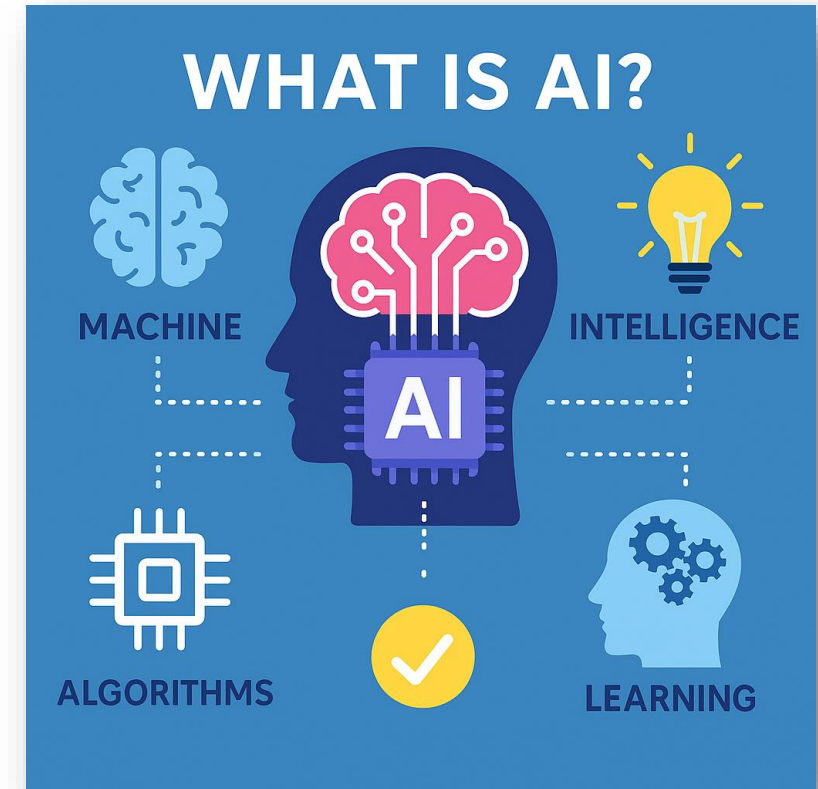
- Electronic Engineer Buenos Aires Institute of Technology
- More than 30 years of experience in Industrial Automation
- Based in Pittsburgh PA
- Private Pilot / RC Airplanes & Helicopters

Am I a Computer Nerd?



What is AI ?

Artificial Intelligence (AI) refers to the development of computer systems that can perform tasks typically requiring human intelligence. These tasks include learning from experience, recognizing patterns, solving problems, making decisions, and understanding natural language. AI is driven by algorithms and data, and it can be found in various applications like virtual assistants, self-driving cars, recommendation systems, and even medical diagnostics. AI aims to enhance efficiency, automate processes, and assist with complex decision-making.



NVIDIA



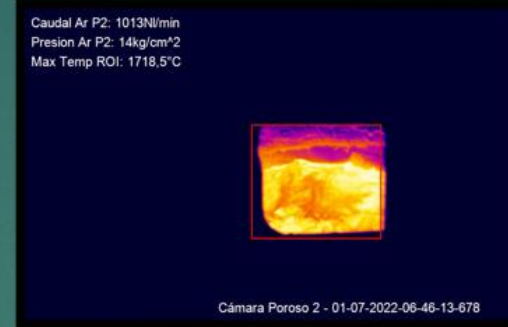
AI in the I&S



Environmental



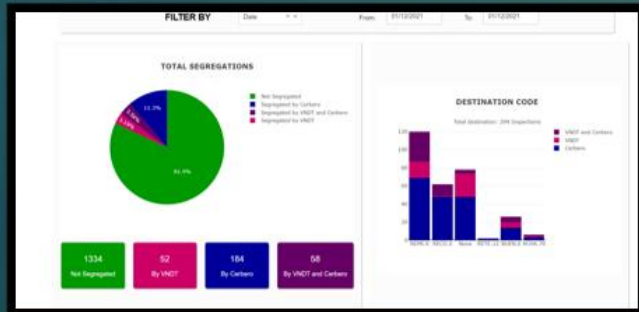
Operations
Support



Process Analysis



Safety



Big Data Analysis



Quality Control

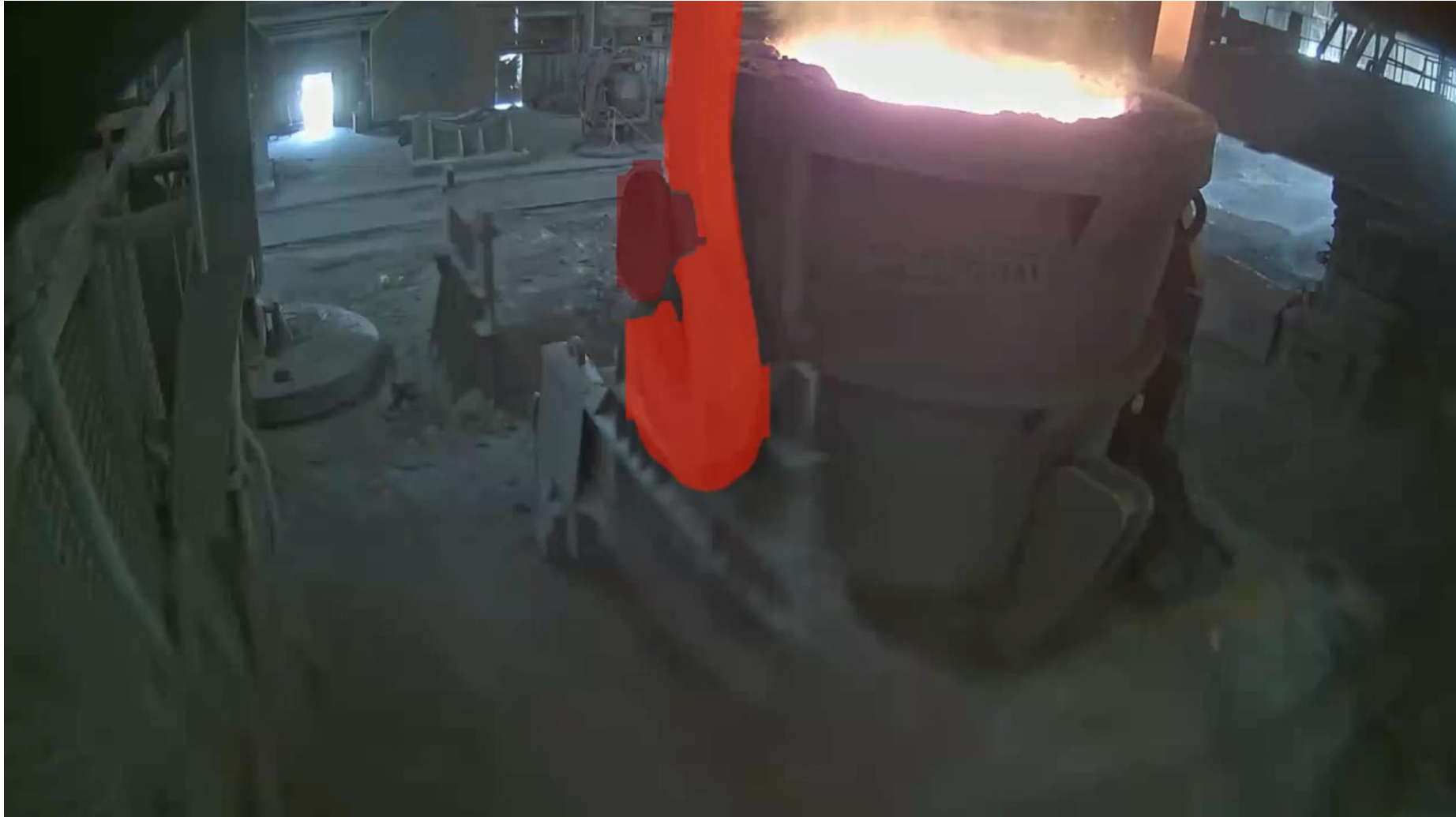


Identification

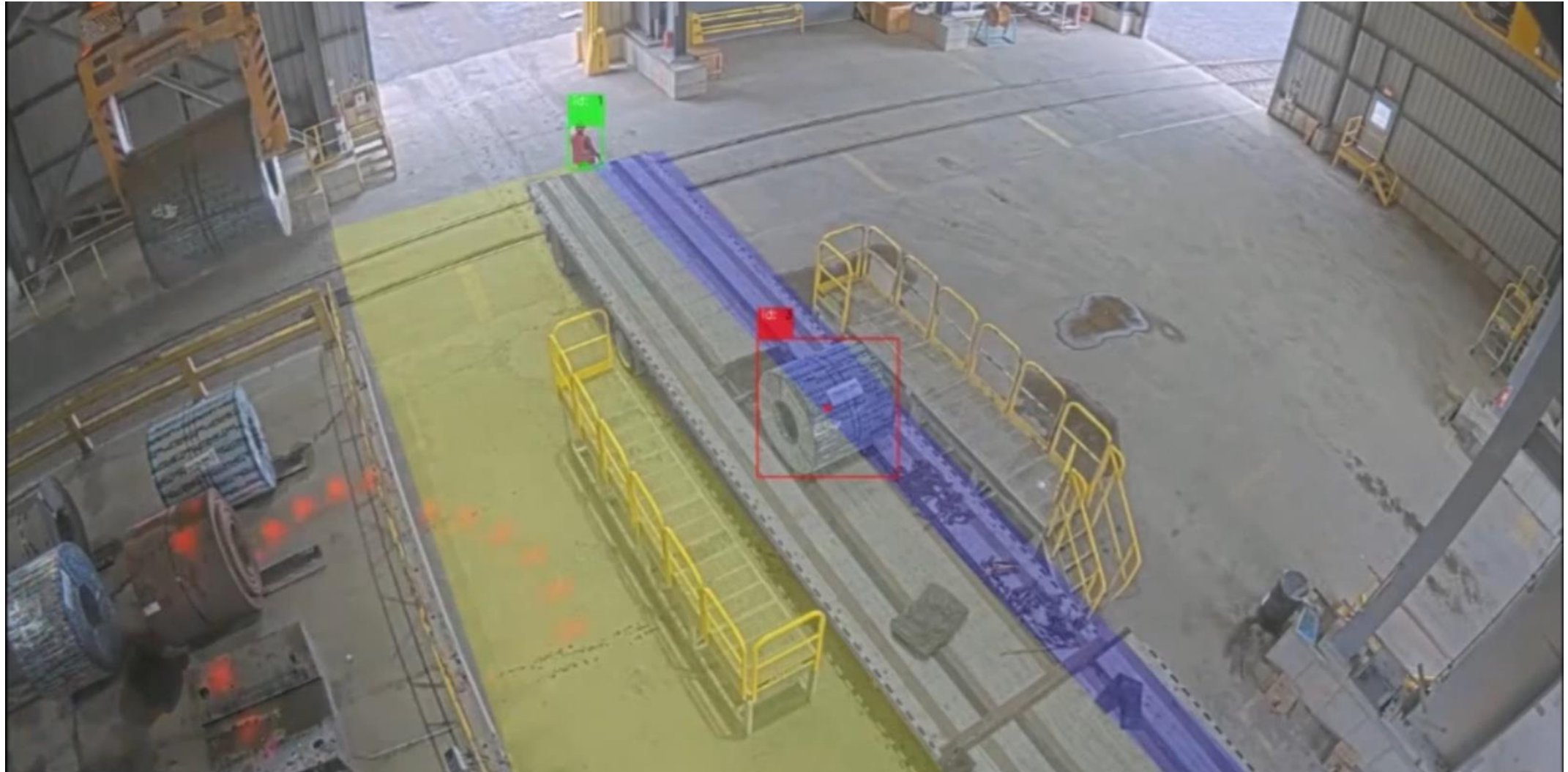


Tracking

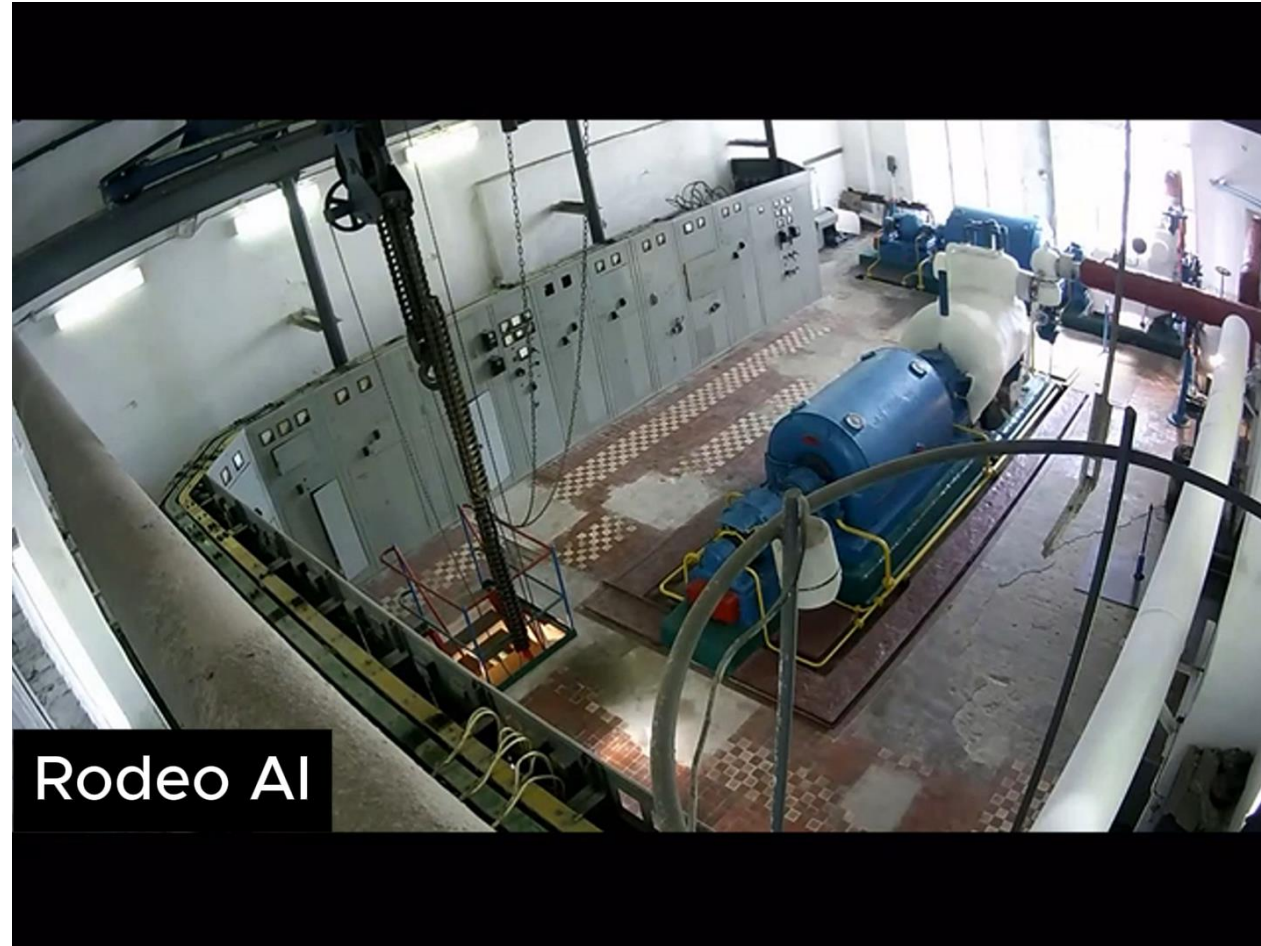
Safety



Safety & Operations



Leaks Detection

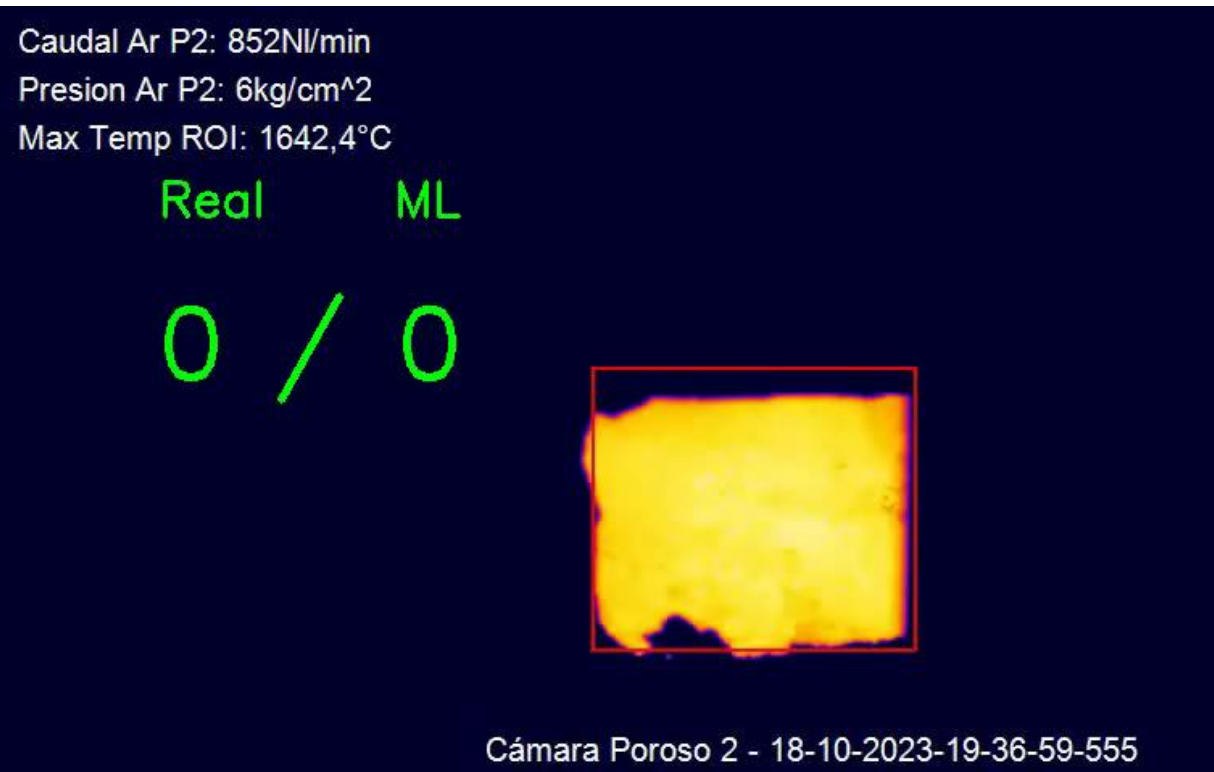


Rodeo AI

Tracking



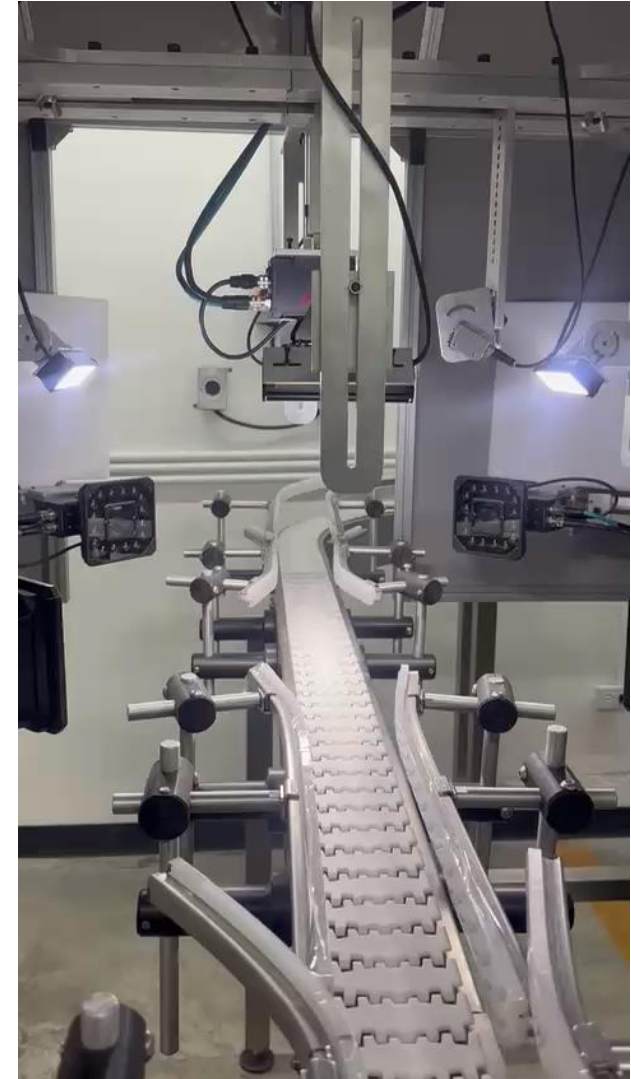
Process Control / Quality



AI Reach - Rovers / Robots / Drones



Other Industries



The AI's Thirst for Data

Example: Autonomous Driving

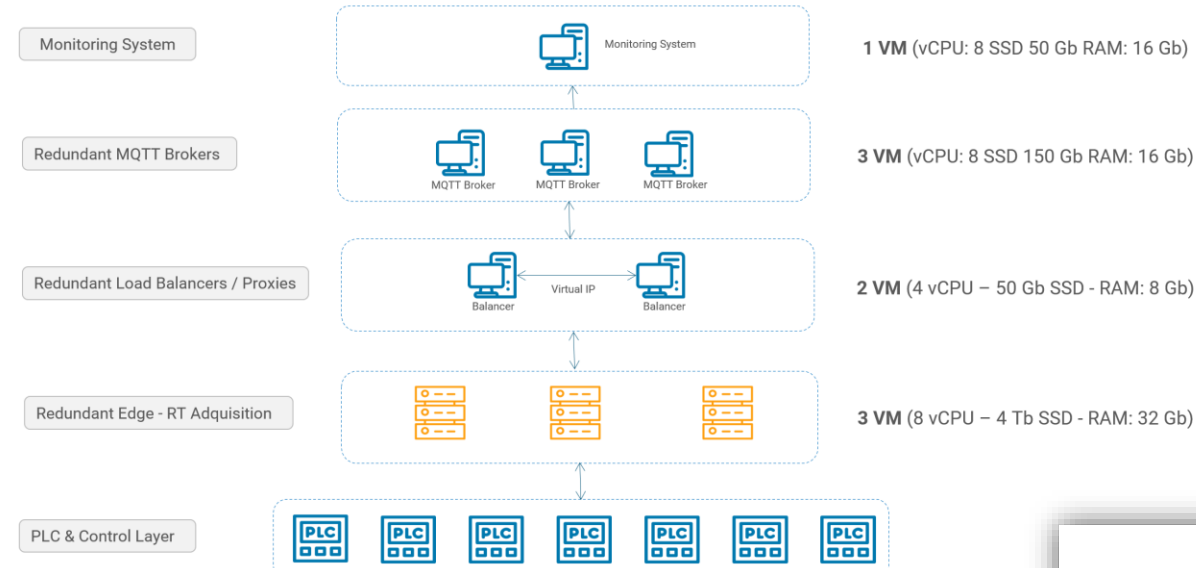


Apply cutting-edge research to train deep neural networks on problems ranging from perception to control. Our per-camera networks analyze raw images to perform semantic segmentation, object detection and monocular depth estimation. Our birds-eye-view networks take video from all cameras to output the road layout, static infrastructure and 3D objects directly in the top-down view. Our networks learn from the most complicated and diverse scenarios in the world, iteratively sourced from our fleet of millions of vehicles in real time. A full build of Autopilot neural networks involves 48 networks that take 70,000 GPU hours to train 🔥. Together, they output 1,000 distinct tensors (predictions) at each timestep.

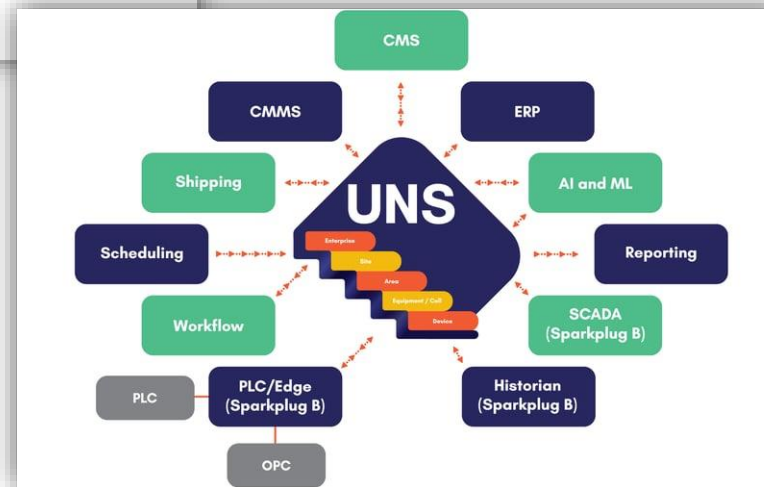
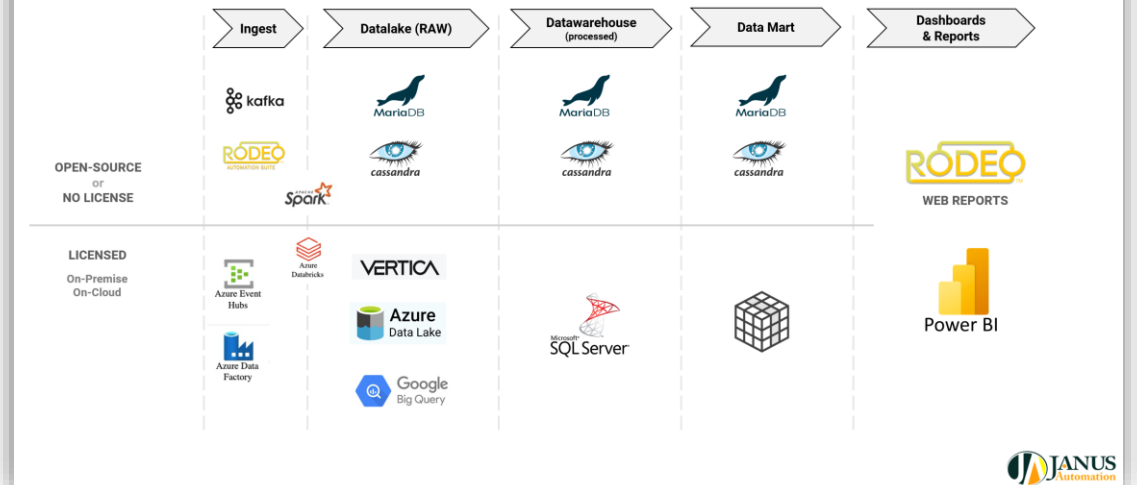


The AI's Thirst for Data

UNS | Architecture



Data Lake | Technologies



Trends: The energy paradox

The AI Energy Paradox:
AI's thirst for power is like a black hole's appetite for stars - insatiable and growing.

- **A single** AI data center can consume as much electricity as **50,000 homes**.
- By the **end of the decade**, AI data centers might demand as much as **20-25% of the U.S. power** requirements.
- About 80% of AI's energy use is split between **computing (40%)** and **cooling (40%)**.
- Nuclear Power Plants under construction: **US 2 vs China 25**
- China unveils world's 1st **meltdown-proof nuclear reactor**

ENERGY

Oracle is designing a data center that would be powered by three small nuclear reactors



PUBLISHED TUE, SEP 10 2024 3:54 PM EDT | UPDATED TUE, SEP 10 2024 4:11 PM EDT

INDUSTRY

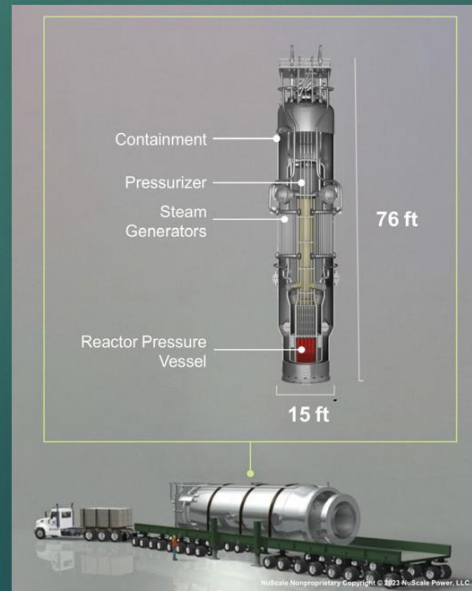
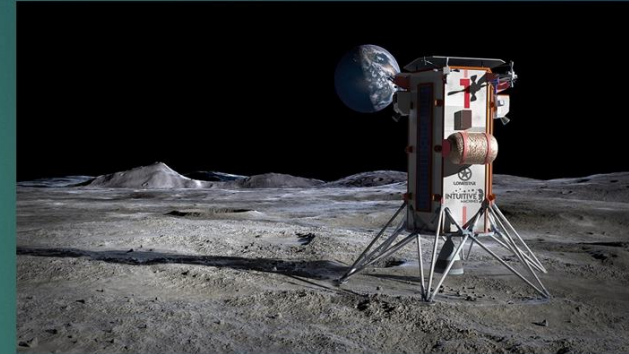
NuclearNewswire

Amazon buys nuclear-powered data center from Talen

Thu, Mar 7, 2024, 8:01AM | Nuclear News

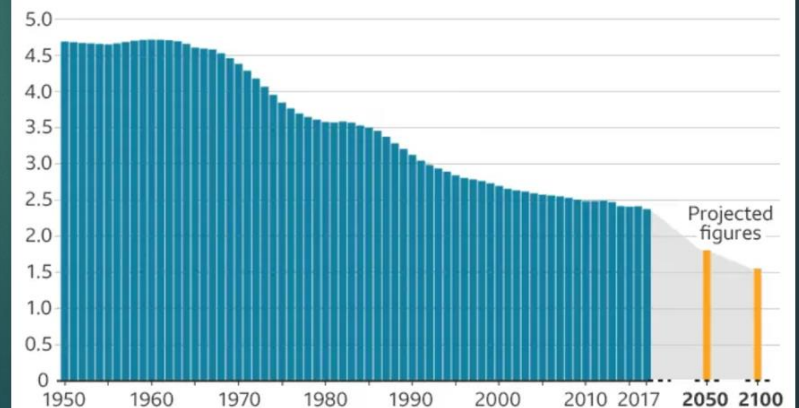
Trends

- Birthrate decline
- Space Technology Development
- Nuclear Power Development
- Digitalization



Women are having fewer children

Global fertility rate (livebirths per woman)



Source: Institute for Health Metrics and Evaluation at the University of Washington

BBC



Steffen Klawitter – Siemens Digital Industries
Head of Digital Services Operations & Chief Architect

- Strategic technology leader who partners with executives to deliver complex digital transformations
- Skilled at translating technical vision into measurable business value accelerating time-to-market, improving quality and reducing costs
- Track record of leading global, cross-functional teams to deliver business outcomes using enterprise and solution architecture, PLM, digital twins, virtual commissioning, IIoT, data integration and AI/ML.

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Status of AI

In industry, AI still has a way to go...



ONLY

16%

achieve their
AI-related goals¹



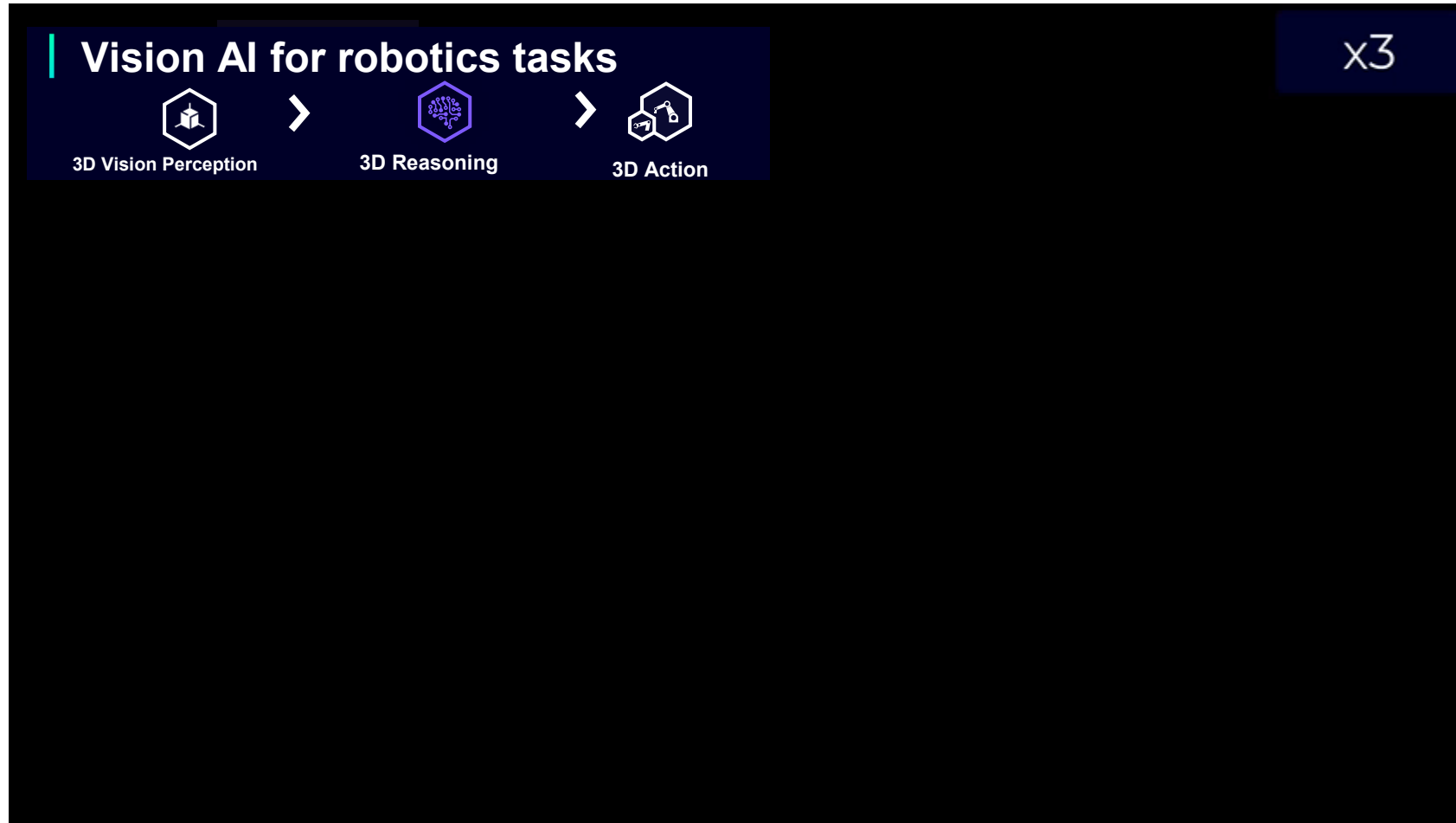
ONLY

5%

of GenAI initiatives deliver actual value
while most have little or no impact²

How to ensure success

Everything starts with the Use Case!



How to ensure success

Everything starts with the Use Case!

| CoPilots & Agentic AI

SIEMENS

How to ensure success

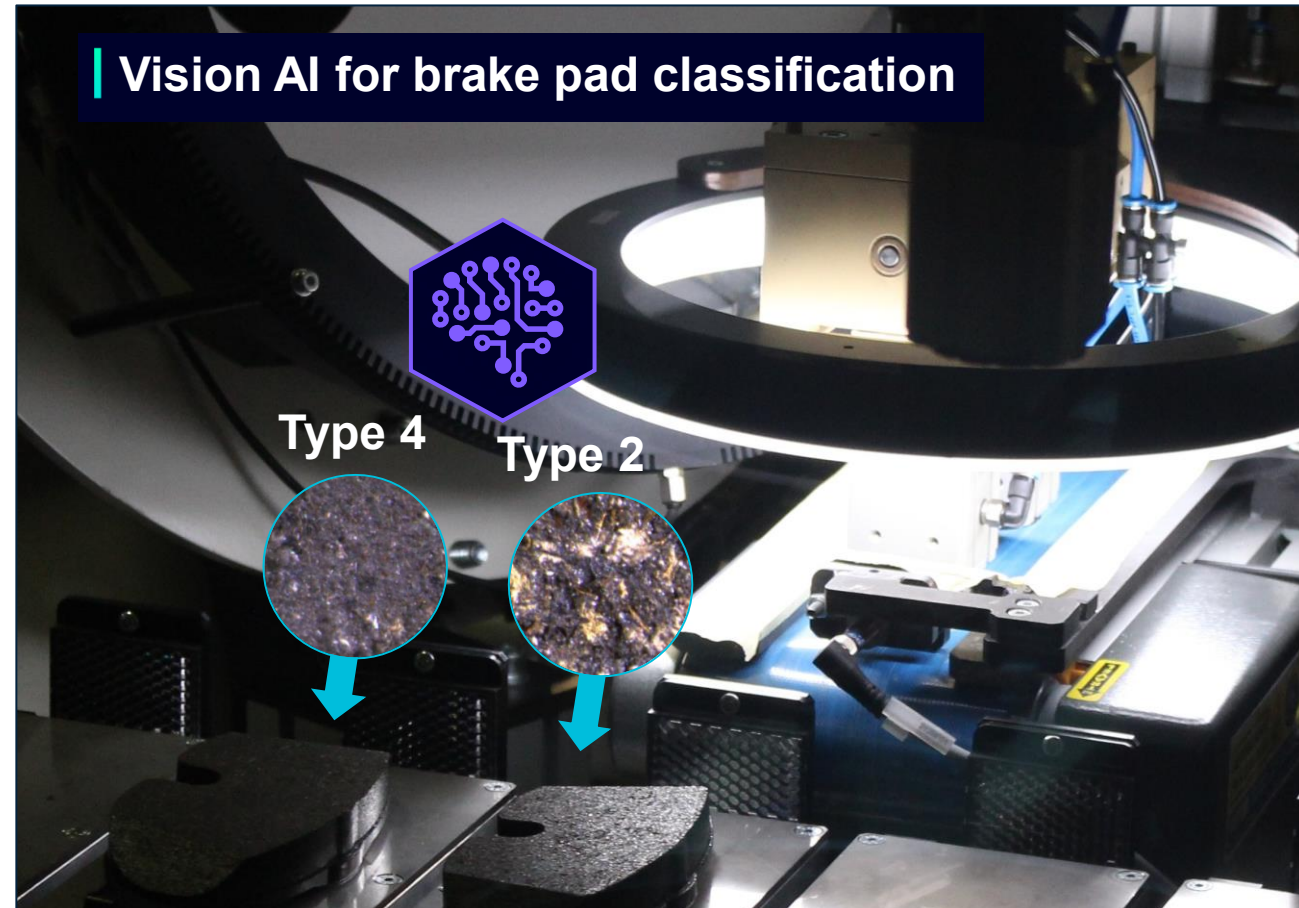
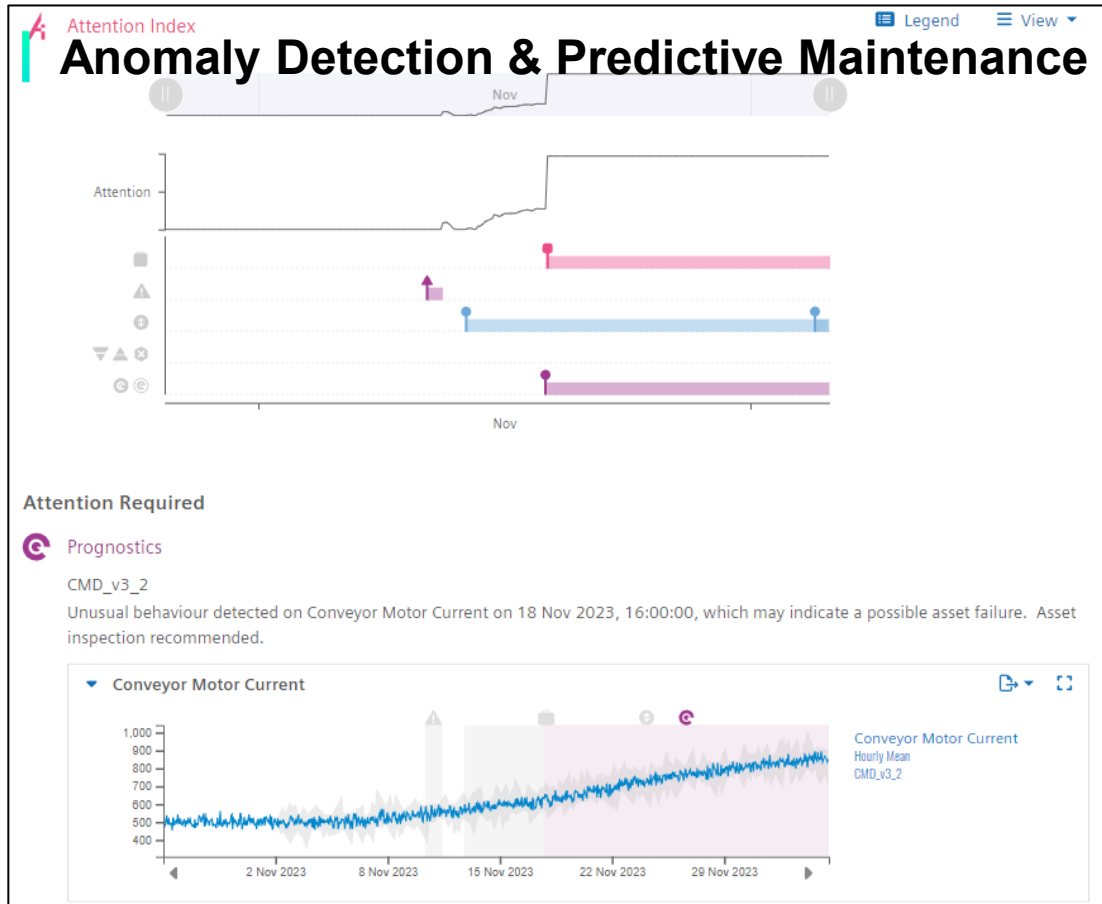
Everything starts with the Use Case!

Vision AI for packaging verification



How to ensure success

Everything starts with the Use Case!





Gianluca Maccani
CTO Polytec NA
20+ years of experience in
industrial automation robotics and
digitalization for steel industry

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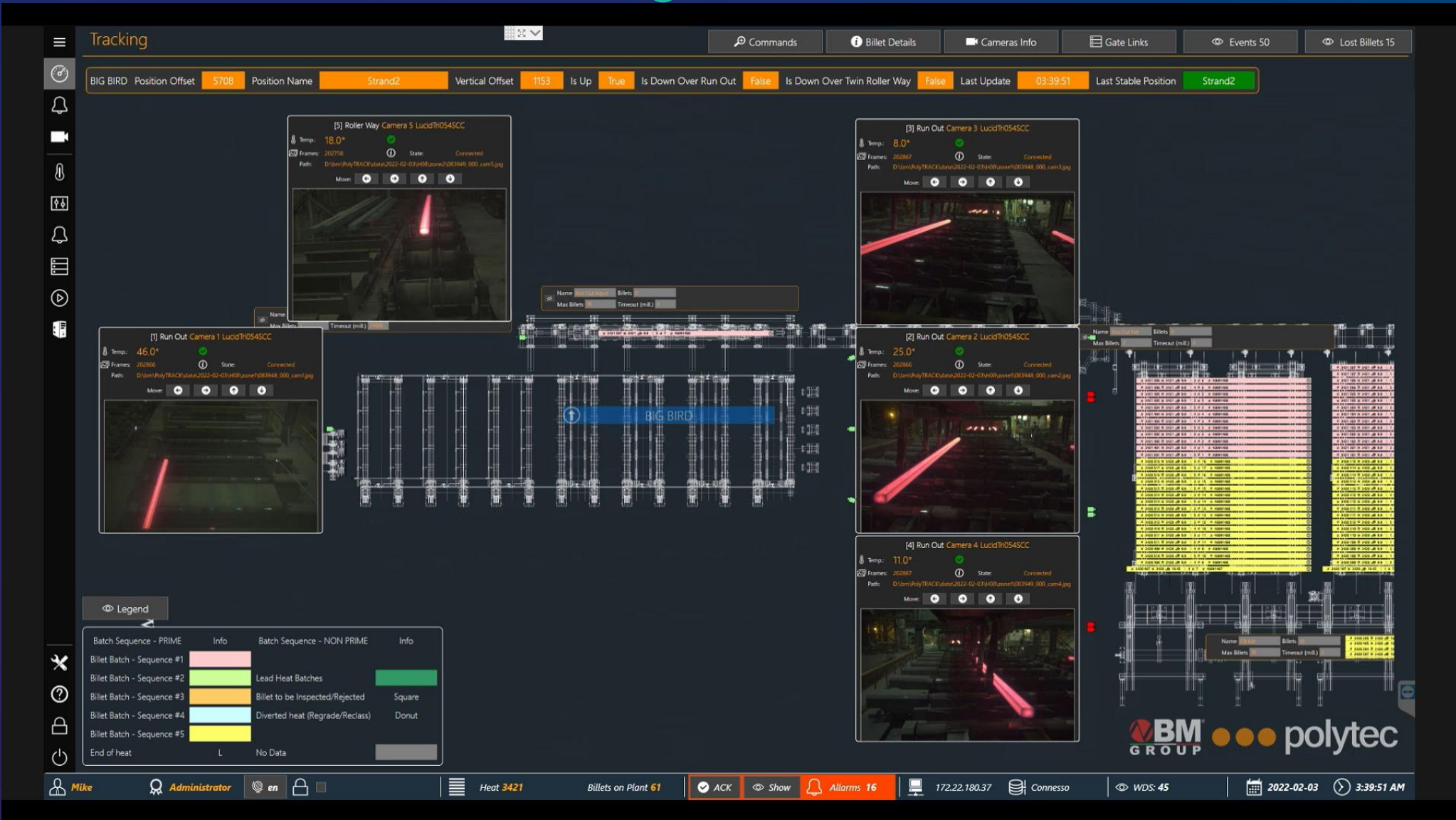
SUPERBOOTH

Agenda overview

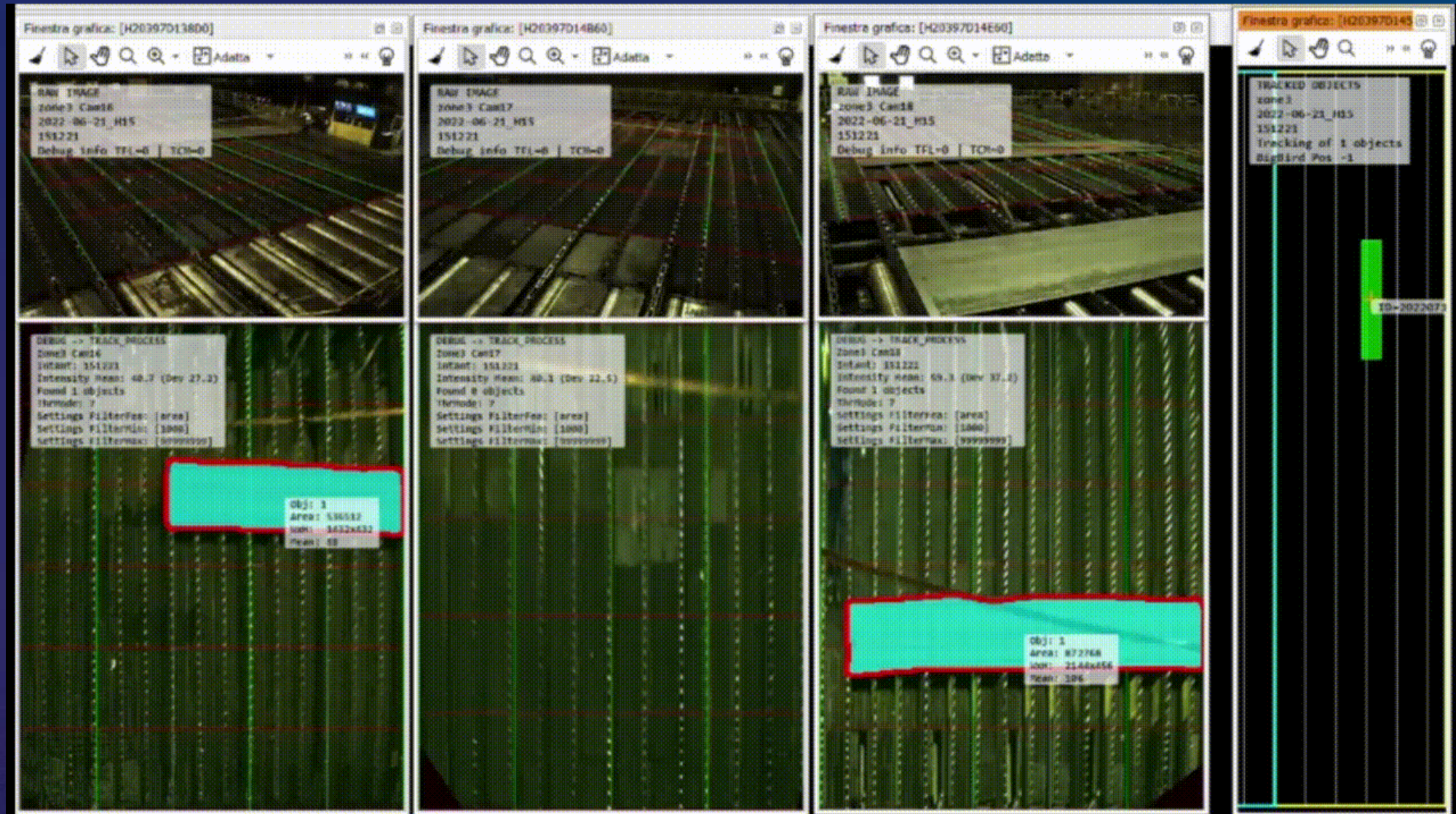
- Enhanced Material Tracking in harsh conditions
- Wire-rod, how AI can improve Quality assurance 24/7
- Methods for Scrap Management and Classification
- Combining Physical AI with Robotics in Manufacturing Facilities
- From Simulation to Implementation: Improving Operational Efficiency



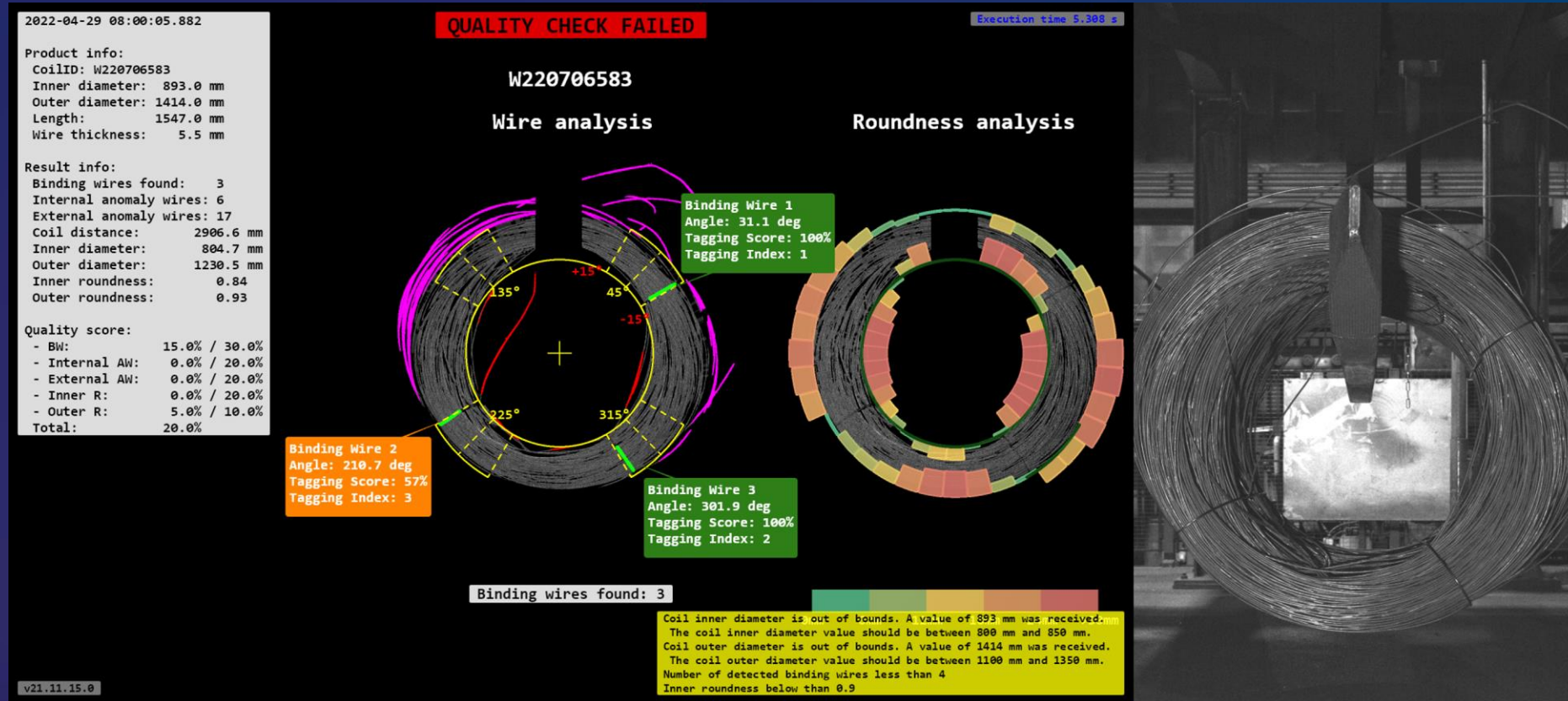
AI-Powered Material Tracking: From Billet to Finished Product



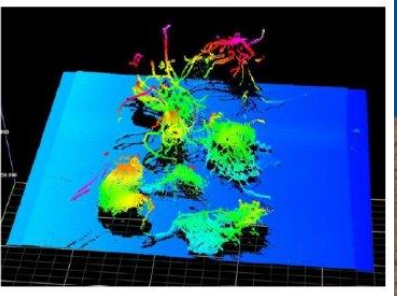
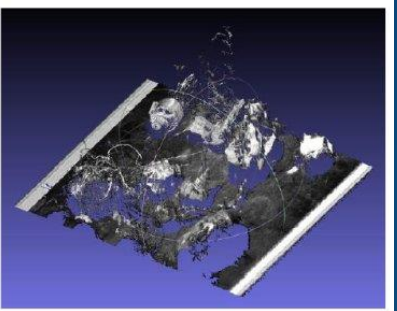
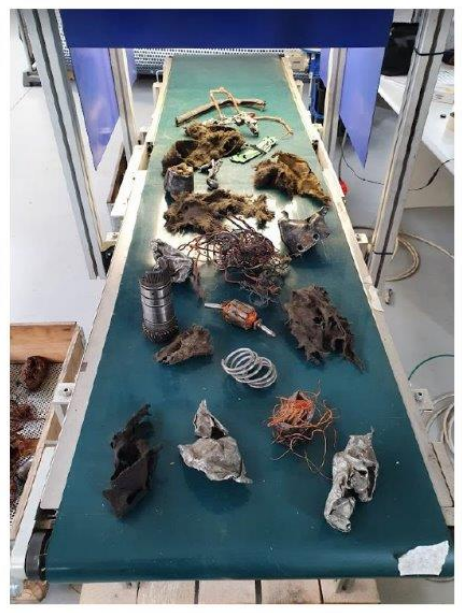
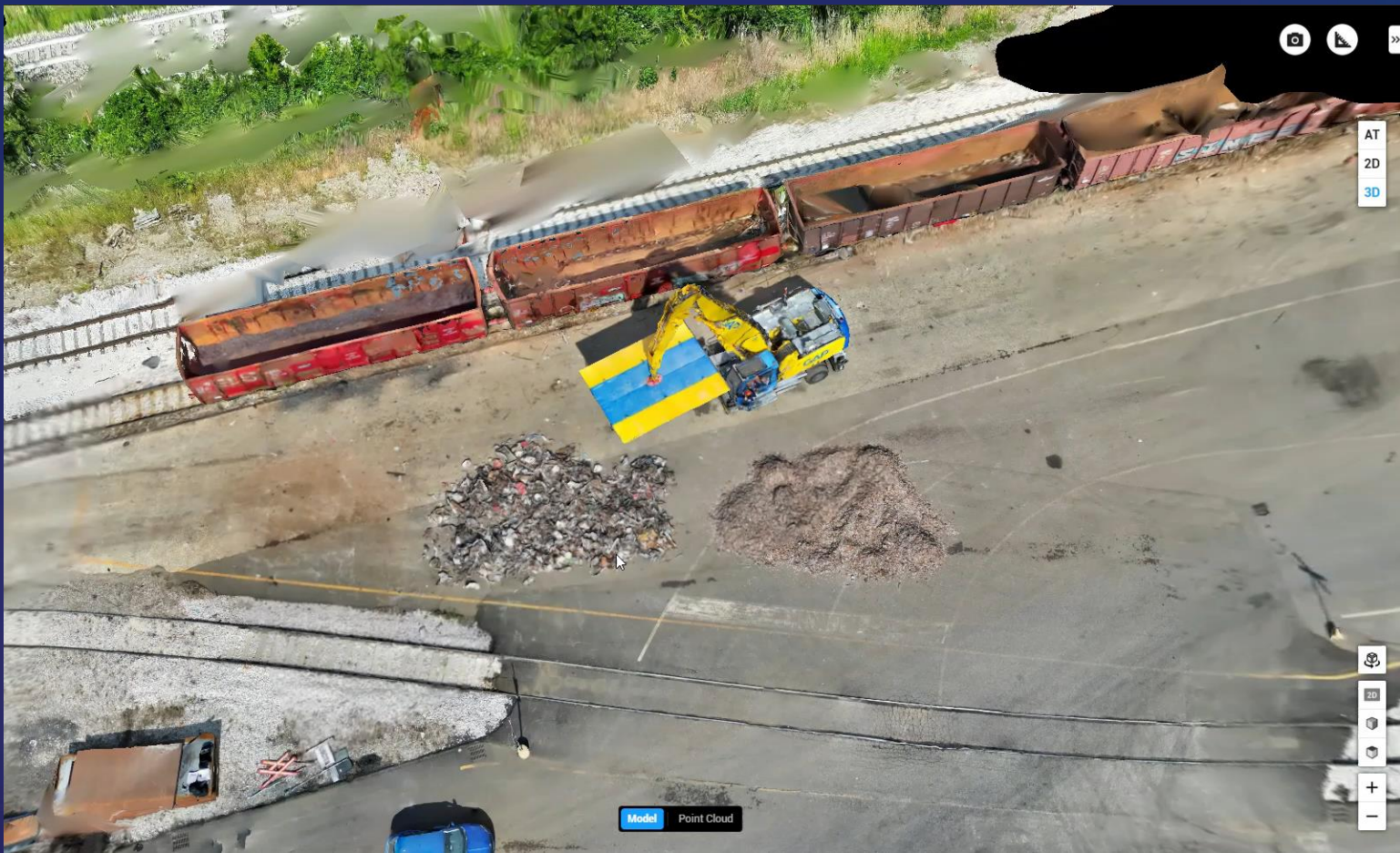
AI-Powered Material Tracking: From Billet to Finished Product



Quality Assurance: Reducing process issues and improve quality through advanced visual inspection.



Scrap volume & classification



B
M

GROUP

polytec

ENERGY

2025/10/16 23:56:59

NOZZLE ARM

2025-10-16 23:55:35.901
Order Number: BMO00128_nozzle_and_lance
Data info:
Result info:
> Nozzle pose:
X: -29.1, Y: 93.3, Z: -48.8 mm
RX: 359.7°, RY: 0.6°, RZ: 337.4°
Matching score: 0.44
> Lance pose:
X: -32.6, Y: 96.1, Z: -11.2 mm
RX: 359.5°, RY: 1.1°, RZ: 259.1°
Matching score: 0.46
Translation in X,Y:0.004 m,-0.003 m

NOZZLE FOUND

FILTER box: 43 ms
FILTER noise: 15 ms
MODEL NOZZLE load from disk: 1 ms
FIND get surface model NOZZLE: 192 ms
FIND search NOZZLE: 1880 ms
EST ROB TOOL POSE: 0 ms
FIND LANCE TASK: 202 ms
OUTPUT set values: 0 ms
TOTAL TIME: 2336 ms

BOTTOM VIEW

SIDE VIEW

v25.8.13.0

Model has 1212 points! (smaller than 10000)

LOG VISION OPERATION

[23:54:57 INF] GetDeviceTemperature...
[23:55:29 INF] TestConnectionsWorking...
[23:55:29 INF] GetDeviceTemperature...
[23:55:34 INF] FindLance command received!
[23:55:34 INF] #####
[23:55:34 INF] Performing FindLance task...
[23:55:34 INF] Connecting to camera...
[23:55:34 INF] TestConnectionsWorking...
[23:55:34 INF] Configuring camera...
[23:55:34 INF] TestConnectionsWorking...
[23:55:34 INF] LoadParametersFromFile...
[23:55:34 INF] Grabbing data...
[23:55:34 INF] Grab Data...
[23:55:35 INF] Rototraslating data...
[23:55:35 INF] Rototraslating using file pose: X: 2.5378, Y: -1.2797, Z: 2.0354, RX: 213.7, RY: 1.1, RZ: 337.4
[23:55:35 INF] Loading parameters...
[23:55:35 INF] Executing main procedure...
[23:55:38 INF] Sharing results...
[23:55:38 INF] Extracting results...
[23:55:38 INF] Nozzle found 1, Lance found 1, Lance out of bounds 0
[23:55:38 INF] Displaying results...
[23:55:38 INF] Saving data to disk...
[23:55:38 INF] Parameters saved!
[23:55:38 INF] Point cloud in scanner CS saved!
[23:55:39 INF] Point cloud in robot CS saved!
[23:55:39 INF] FindLance command lowered
[23:56:00 INF] TestConnectionsWorking...
[23:56:00 INF] GetDeviceTemperature...
[23:56:31 INF] TestConnectionsWorking...
[23:56:31 INF] GetDeviceTemperature...

INFO

CMD FIND NOZZLE	OFF
CMD FIND ARM	OFF
CAMERA CONNECTION	OPEN
CAMERA TEMPERATURE	35.1°C 11:56:31
CONNECT	DISCONNECT
FIND NOZZLE	FIND NOZZLE FROM FILE
FIND ARM	FIND ARM FROM FILE
FIND LANCE	FIND LANCE FROM FILE
FIND CALIB OBJECT	FIND CALIB OBJECT FROM FILE

HOME

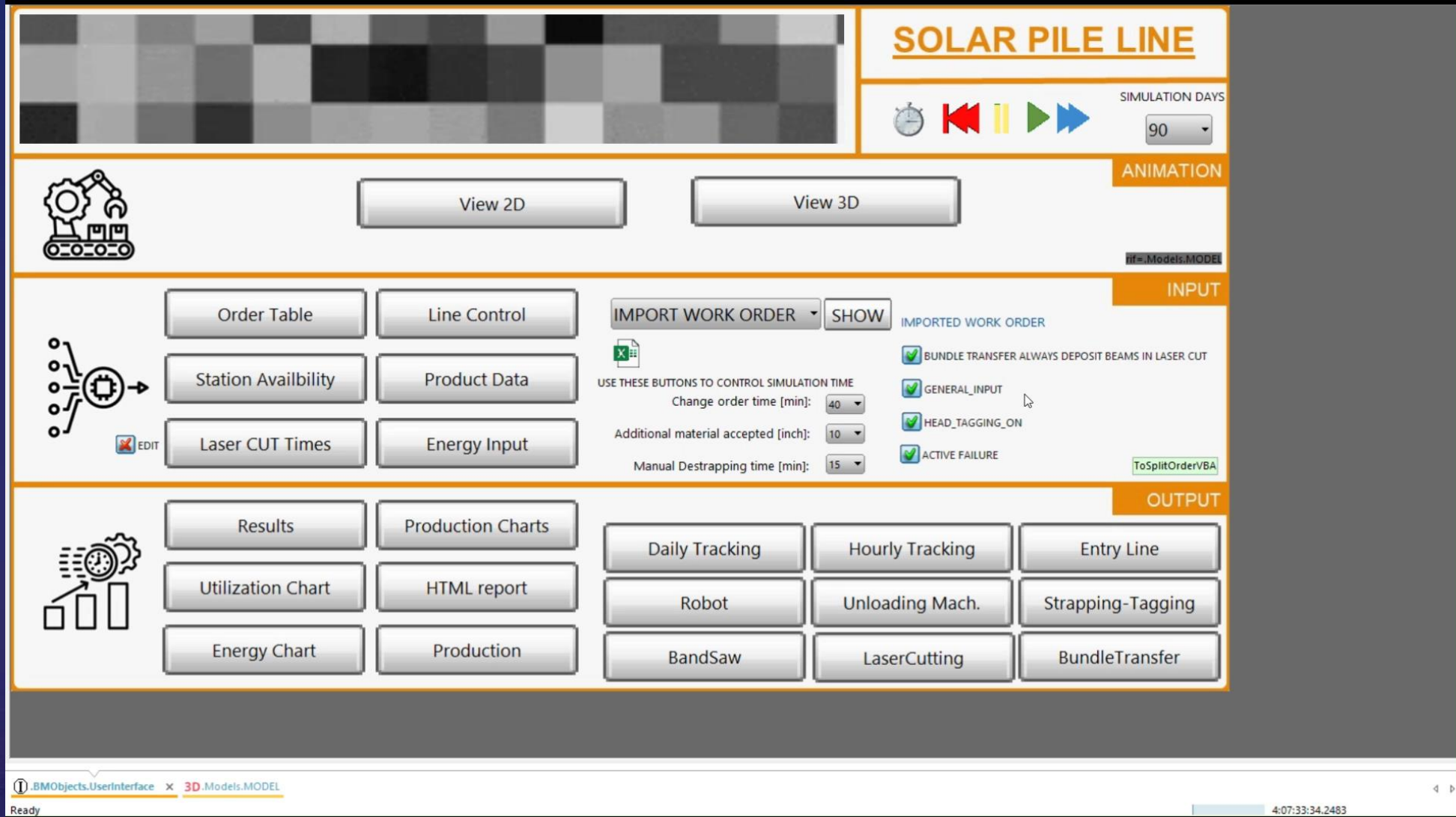
VISION

SETTINGS

PLC

MAINTENANCE

From Plant simulation to production



The screenshot displays the 'SOLAR PILE LINE' simulation software interface. The top section features a grayscale image of a solar pile line and a control panel with a clock icon, a red double arrow, a yellow double arrow, a green double arrow, and a 'SIMULATION DAYS' dropdown set to 90. Below this, the 'ANIMATION' section includes 'View 2D' and 'View 3D' buttons. The 'INPUT' section contains a grid of buttons: 'Order Table', 'Line Control', 'Station Availability', 'Product Data', 'Laser CUT Times', and 'Energy Input'. It also includes an 'IMPORT WORK ORDER' dropdown, a 'SHOW' button, and a list of checkboxes: 'BUNDLE TRANSFER ALWAYS DEPOSIT BEAMS IN LASER CUT', 'GENERAL_INPUT', 'HEAD_TAGGING_ON', and 'ACTIVE FAILURE'. The 'OUTPUT' section features a grid of buttons: 'Results', 'Production Charts', 'Daily Tracking', 'Hourly Tracking', 'Entry Line', 'Utilization Chart', 'HTML report', 'Robot', 'Unloading Mach.', 'Strapping-Tagging', 'Energy Chart', 'Production', 'BandSaw', 'LaserCutting', and 'BundleTransfer'. The bottom status bar shows the file path '.BMOjects.UserInterface x 3D.Models.MODEL', the status 'Ready', and the timestamp '4:07:33:34.2483'.

SOLAR PILE LINE

View 2D View 3D

Order Table Line Control

Station Availability Product Data

Laser CUT Times Energy Input

IMPORT WORK ORDER SHOW

USE THESE BUTTONS TO CONTROL SIMULATION TIME

Change order time [min]: 40

Additional material accepted [inch]: 10

Manual Destrapping time [min]: 15

BUNDLE TRANSFER ALWAYS DEPOSIT BEAMS IN LASER CUT

GENERAL_INPUT

HEAD_TAGGING_ON

ACTIVE FAILURE

Results Production Charts

Utilization Chart HTML report

Energy Chart Production

Daily Tracking Hourly Tracking Entry Line

Robot Unloading Mach. Strapping-Tagging

BandSaw LaserCutting BundleTransfer

.BMOjects.UserInterface x 3D.Models.MODEL

Ready 4:07:33:34.2483



Paul Thurber – SVP of Sales *Everguard.ai*

- ✓ >25 Year Safety Professional
- ✓ >18 Year in or around Steel/Iron
- ✓ 2X Past Chair of the AIST SHTC
- ✓ >40 Year Career in Taking Care of People (Pre & Post Injury)

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BALTIMORE
AIRCOIL COMPANY



SUPERBOOTH

Who I really am...

- Husband of 40+ Years
- Father to 7 Children & 8+ Grands
- Deacon & Community Activist
- Disaster Relief Volunteer
- Patriot and First Responder (EMT-P)



**American
Red Cross**



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We drive industry

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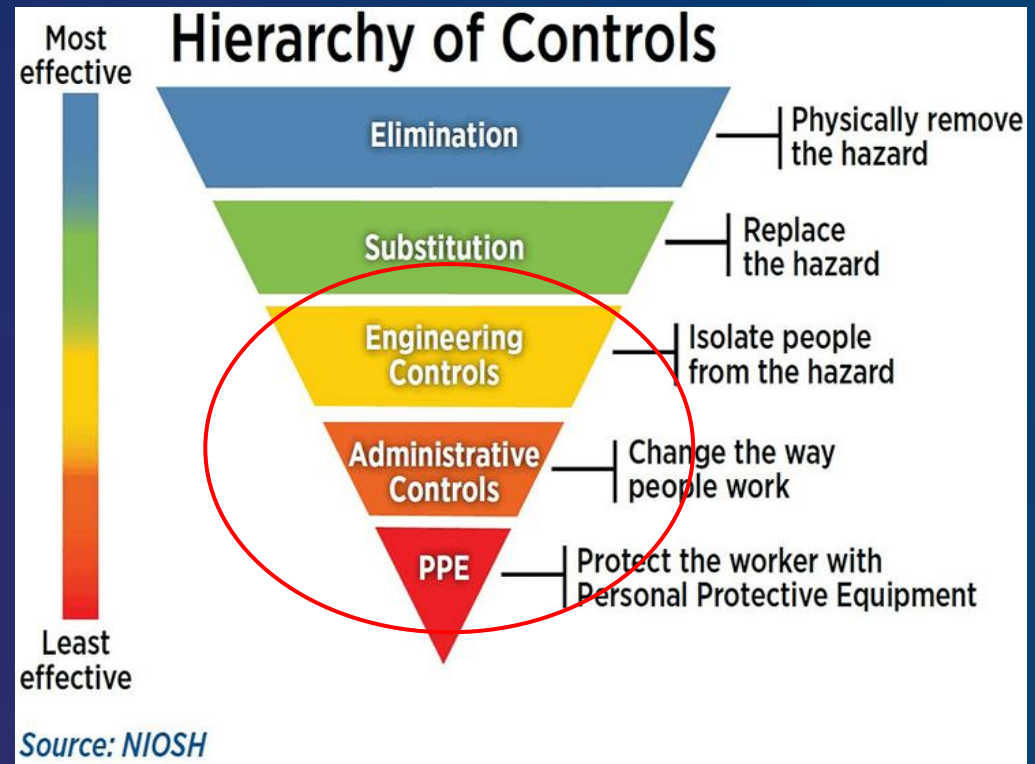
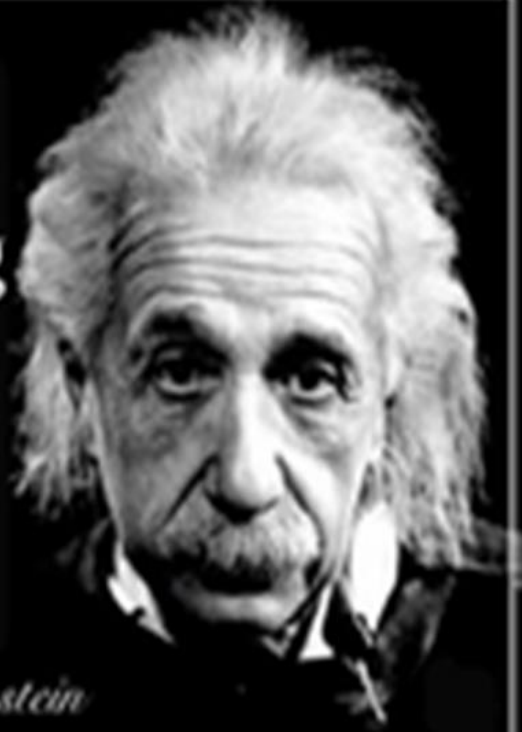


Berry
• METAL CO. •

SUPERBOOTH

Insanity:
doing the same thing
over and over again
and expecting
different results.

-Albert Einstein



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SUPERBOOTH

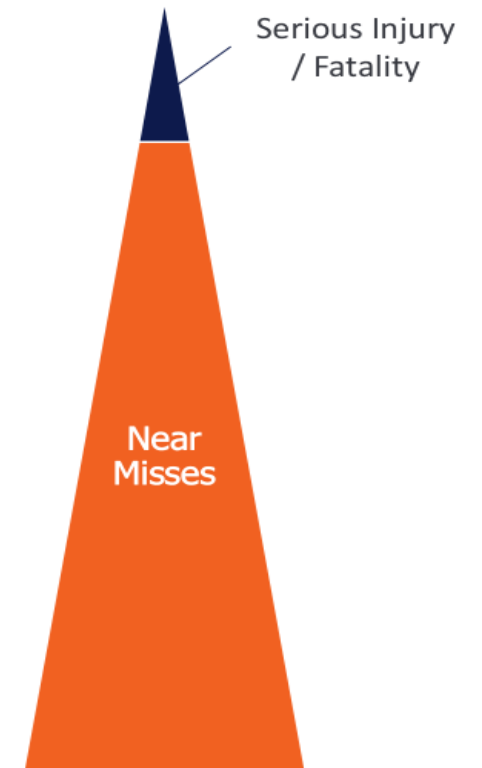
What if we
can **prevent**
'Unsafe Acts' using **AI?**

What if we
can **reduce**
'Low Frequency/High
Severity' events using **AI?**

'Unsafe Acts' precede 'Serious Accidents.'
Reactive safety approaches have limits.



Safety Pyramid



Low Frequency/High Severity
Event Pyramid



PPE Alert!





CraneSafe!

Dashboard

Events

Coaching

Configuration

Ops Portal

Dashboard

Feedback

4

1 Aug 23 12:00 AM [Pacific Time] ...

Irvine

Area (2)

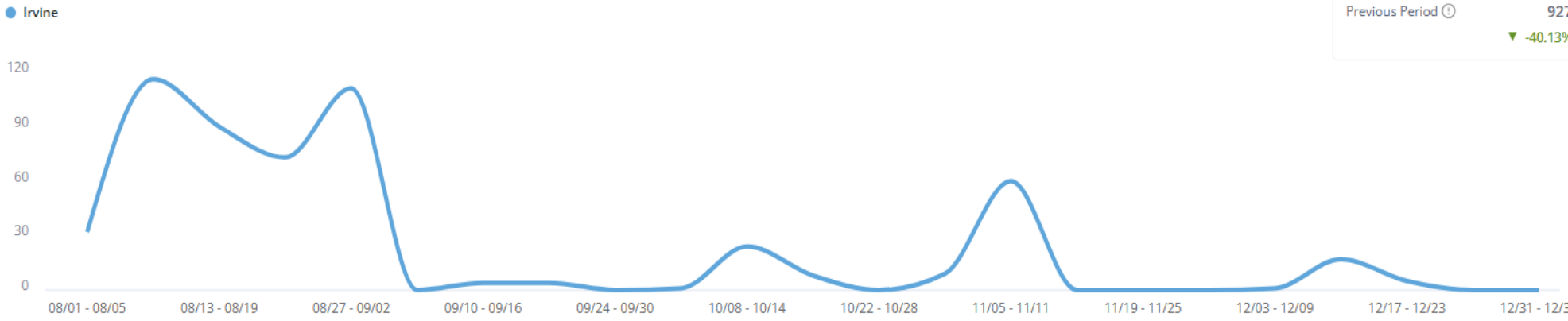
Zone (7)

Event Type (27)

Event Status (4)

Event Analytics

Irvine



Total Events

555

Previous Period ⓘ

927

-40.13%

Event Type

Crane - Worker Proximity Infraction

264

Missing Safety Sign

159

Unsafe Safety Net

124

Vehicle speeding

7

Geofence Infraction

1

Event Prone Zones

Default Zone

555

Notice Board

9 Jan 24

Dashboard analytics

Please use larger date range to view analytics as this portal rarely receive s events

Posted By - Viraj Upadhyay

Edited

9 Jan 24

Example notice

This is a demo portal.

Posted By - Viraj Upadhyay

0

70

140

210

280

0

150

300

450

600

sentri360



- ✓ Proven, Deployed & Making a Difference
- ✓ If you can see it with your eyes – it can be modeled to detect and more
- ✓ Never gets distracted nor takes a break, sees all events objectively
- ✓ Works in addition to our teams and for our teams NOT instead of our teams

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We drive industry

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Berry
METAL CO.

SUPERBOOTH

Advancing Smart Steel Manufacturing and Workforce Skills

Chenn Q. Zhou

NIPSCO Distinguished Professor
of Engineering Simulation

Founding Director, Center for Innovation through
Visualization and Simulation (CIVS)

Founding Director, Steel Manufacturing Simulation
and Visualization Consortium (SMSVC)

Purdue University Northwest, Hammond, IN

czhou@pnw.edu



- **40+** years in Modeling
- **25+** years in Steel Industry
- **15+** years in Digital Twins
- **10+** years in AI Application

Academia-Industry Partnership is essential

Steel Industry

- Real-world technical know-how and needs
- Input & validation data
- Implementation
- Internships & jobs

Academia

- **Research and Development**
 - New AI models and Algorithms
 - Industry-driven projects
- **Future Workforce**
 - Degrees & certificates
 - Short courses
 - Experiential learning
 - Authentic virtual training

A Powerful Ecosystem: Ideas move rapidly from research to implementation; Talent is continuously developed; and AI technology is fast growing

Our Journey to Smart Manufacturing – Integration of Technologies

Steel Manufacturing Simulation and Visualization Consortium (SMSVC)



2023 & beyond:
Life Cycle Analysis (LCA)
+ Techno-Economic Analysis (TEA)
+ Smart sensor
+ IVP Simulators....

2021: Integrated Virtual Process (IVP) Simulators: AI + CFD + Reduced Order Model (ROM) + AR/VR

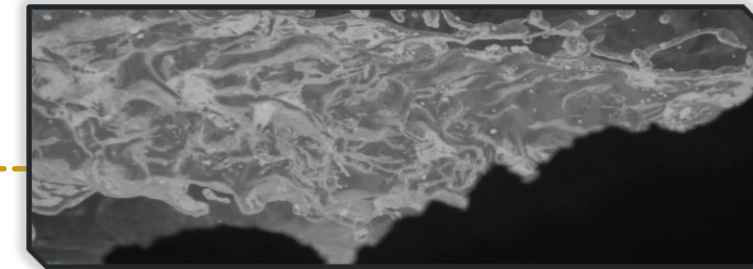
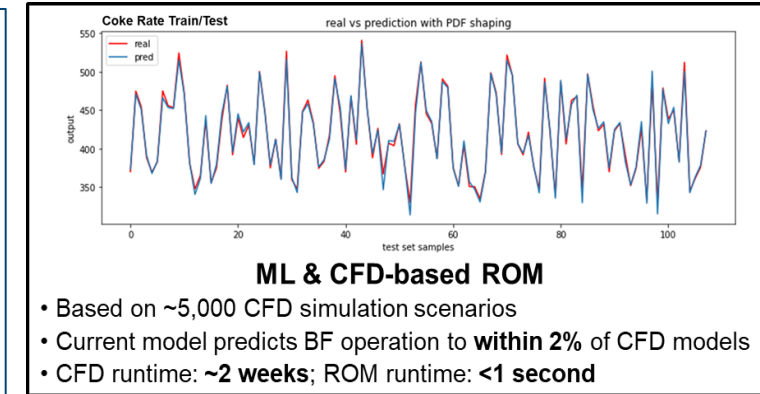
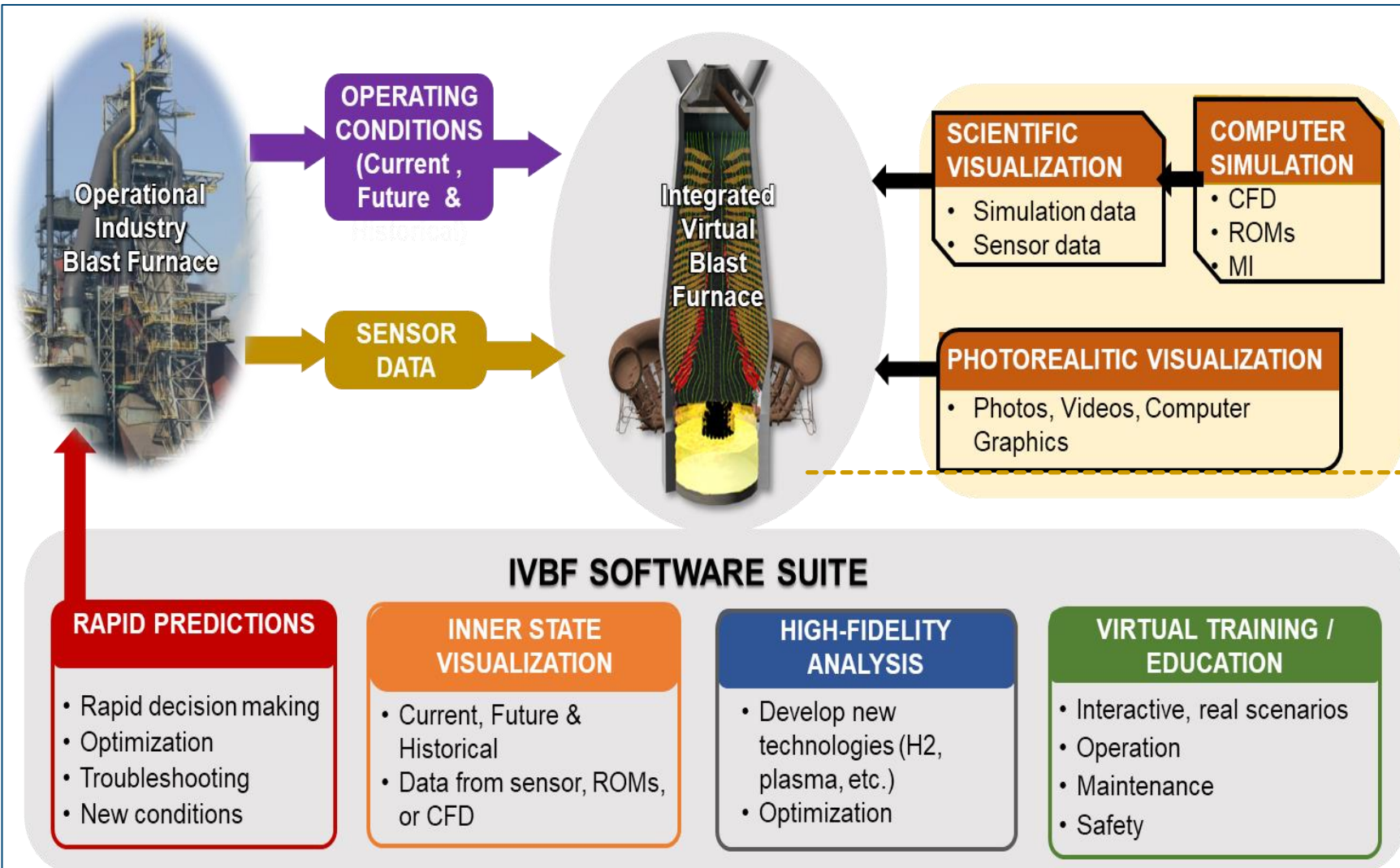
2017: Smart Processes

2016: SMSVC
AI + CFD+FEA +AR/VR +Digital Twins

2009: CIVS: CFD+FEA +AR/VR +Digital Twins

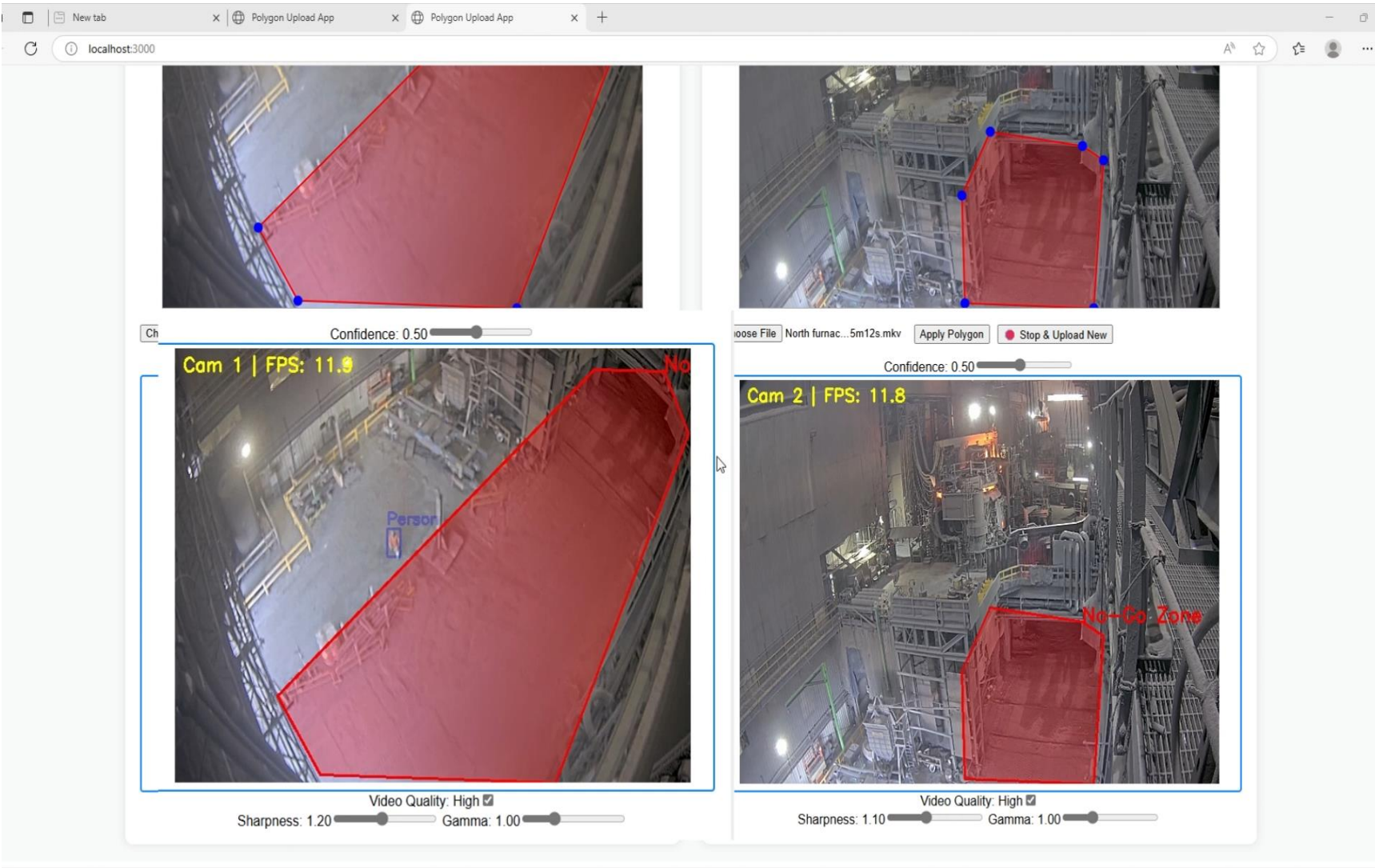
1994: Computational Fluid Dynamics (CFD)

Physics-based & Data-driven Integrated Virtual Blast Furnace (IVBF)



AI/Data-driven Sensors & Forecasting Tools

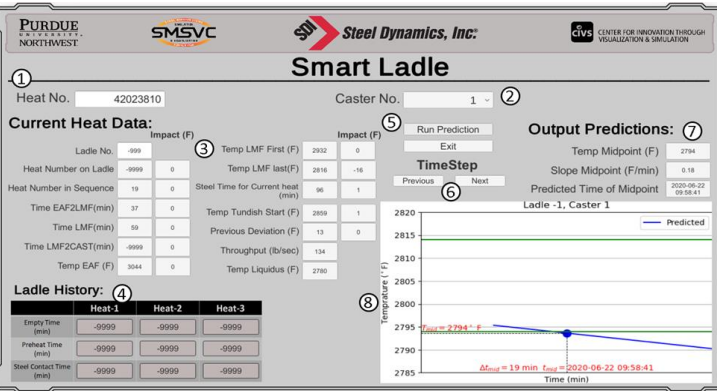
- Reduced Order Model (**ROM**)
- Hot metal Si forecasting
- Casting rate camera
- Stability & health indices



AI Hazard Recognition for Real-time Monitoring



AI Safety Chatbot to Report and Analyze Incidents



Smart Ladle to improve operational responses for casting temperature

AI is Not Another Wave - It is the Ultimate Wave!

Technology Waves:

- 1960: semiconductor wave
- 1990s: internet revolution
- 2010: mobile wave
- Now - 60 years of acumination:

AI Wave



AI for Good Summit 2024 in Geneva

Photo: ITU / Rowan Farrell / CC BY-NC-SA 2.0

“Artificial intelligence is not a substitute for human intelligence; it is a tool to amplify human creativity and ingenuity” – Fei-Fei Li