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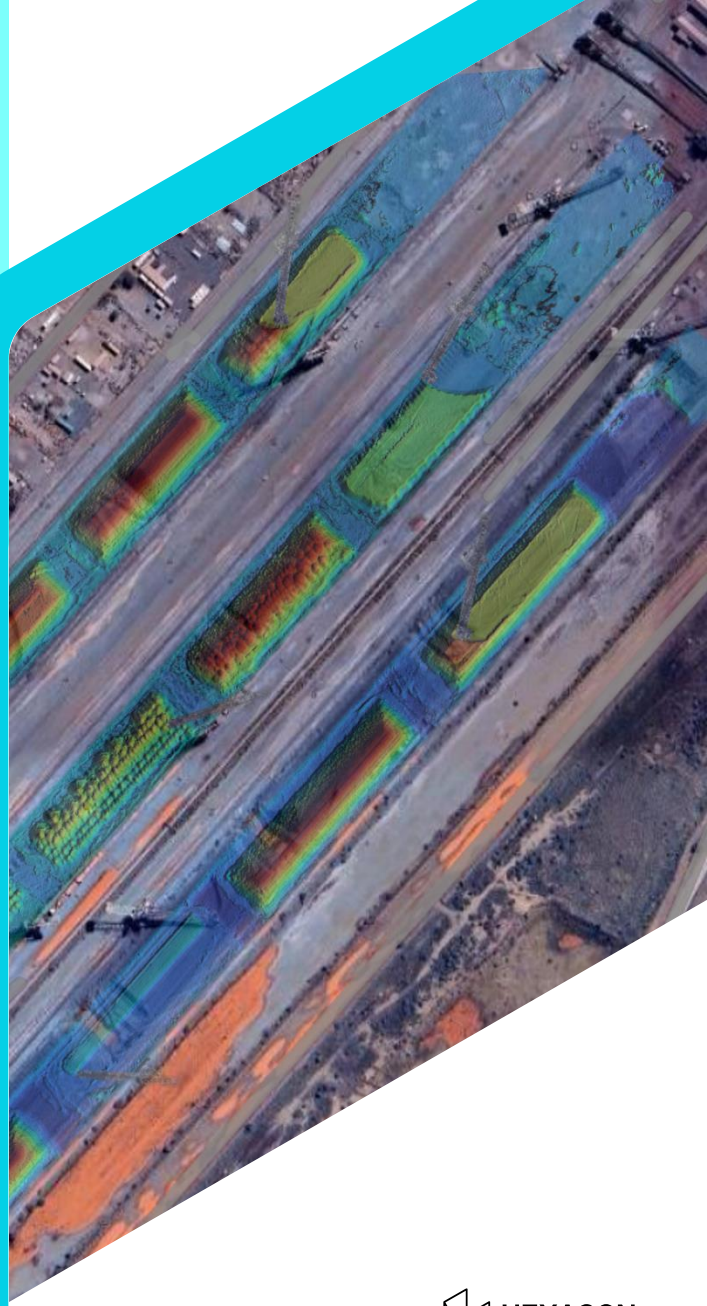
ABTO 2026

Improving operational decisions through inventory visibility



Agenda

- The inventory visibility challenge
- From periodic measurement to continuous information
- Turning inventory data into operational decisions
- A practical approach to automated stockpile monitoring
- Inventory visibility as an enabler for smart terminals



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The inventory visibility challenge

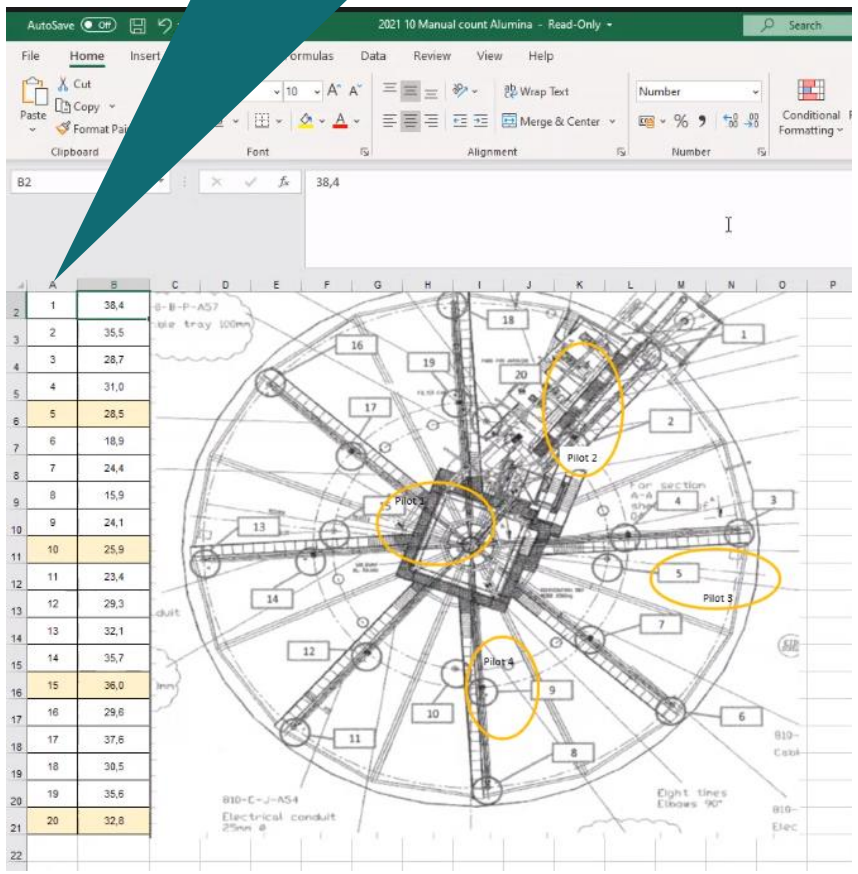
What operators need to know

- How much material is available and where?
- Where are the reclaimable stock and dead stock?
- How current is the information used for the next loading decision?

Reality

- Stock data taken by sight view
- Complex manual measurements

20 manual measurements points for silo volume calculation

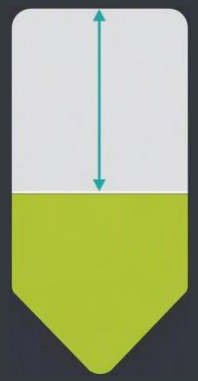


Errors within volume calculation leads to wrong decisions

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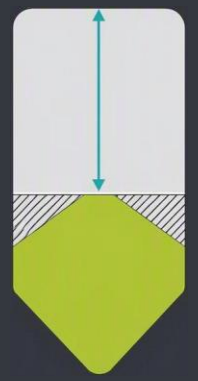
Common Challenges for Silos

Volume errors due to current 1D technologies



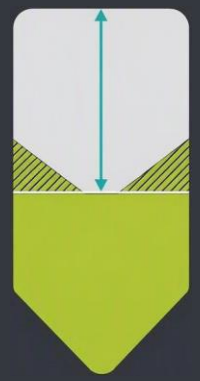
estimated volume 750 m^3

real volume 750 m^3



estimated volume 750 m^3

real volume 600 m^3



estimated volume 750 m^3

real volume 900 m^3

1D technologies often create volume errors amounting up to several truckloads.

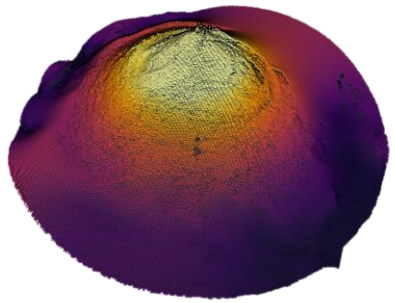


Periodic measurement and continuous information

The update method should match the pace of the operating decision

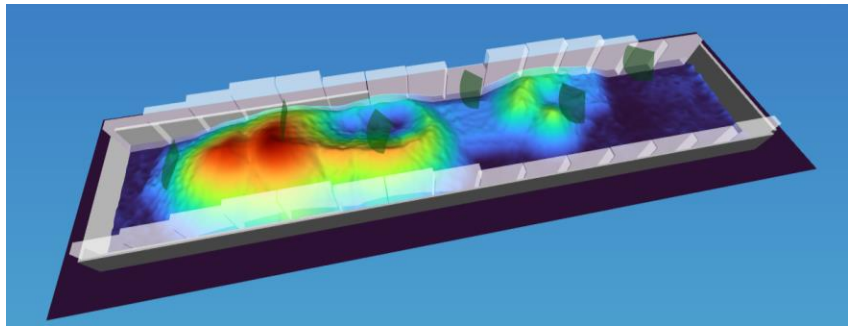
Periodic measurement

- A snapshot at the time of the survey
- Changes between surveys need reconciliation
- Useful as an independent validation point



Automated monitoring

- Fixed 3D scanners support 24/7 inventory control
- Machine-mounted scanning updates covered areas during movement
- Zone volumes and height maps support operating decisions



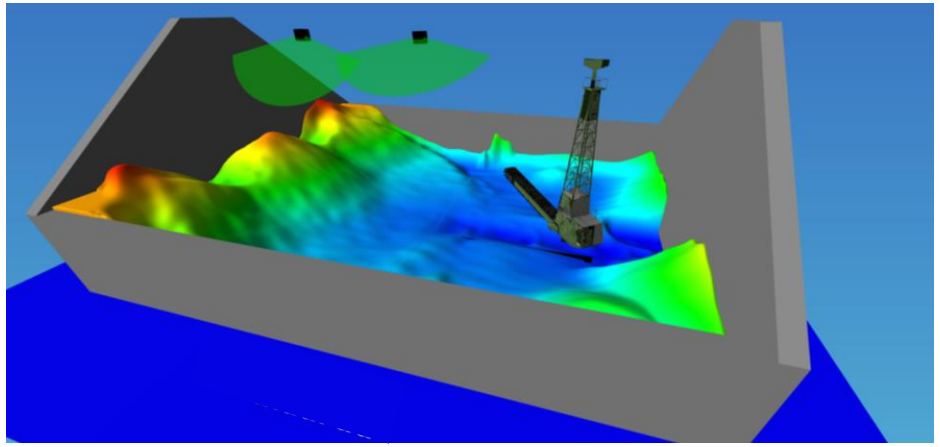
Inventory data in daily terminal decisions

Information	Operating decision	Check before acting
Volume by zone	Select stock for the next loading plan	Material identity and density for any mass estimate
Pile height and local coverage	Plan stacking and reclaiming	Coverage, blind spots and last update
Material above drawpoints	Support feeder and reclaim control	Site-specific thresholds and control interlocks
Historical inventory changes	Reconcile movements and investigate deviations	Compare with independent movement records

A practical approach to automated stockpile monitoring

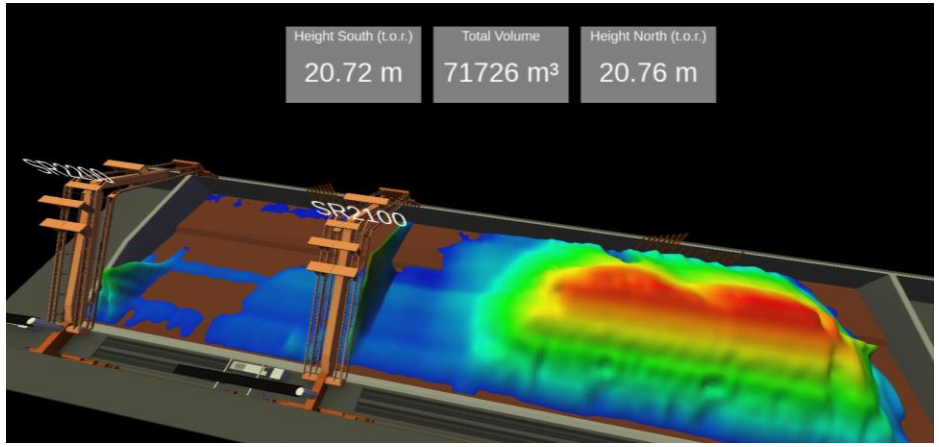
Fixed 3D Scanner

- Inventory Control 24 / 7
- Based on several 3D Scanner



Scanner on Stockpile Equipment

- Scanning on demand and while operation of device
- Further automation potential of device
- Based on some 2D and 1D Scanner

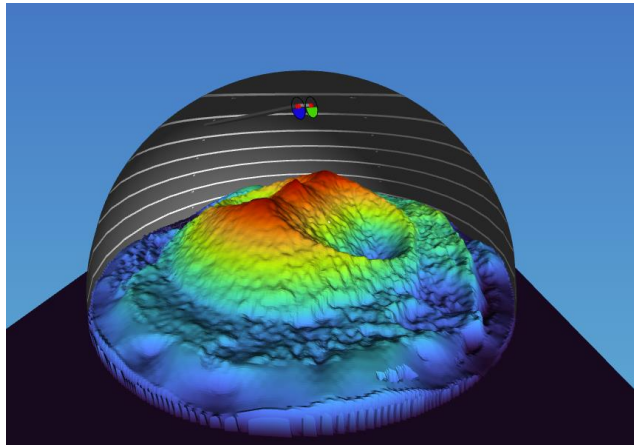


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Radar for continuous bulk material monitoring

Reliable measurements in dusty environments with minimal maintenance





Continuous information

Monitor changing material levels during operation.

Reliable in dust

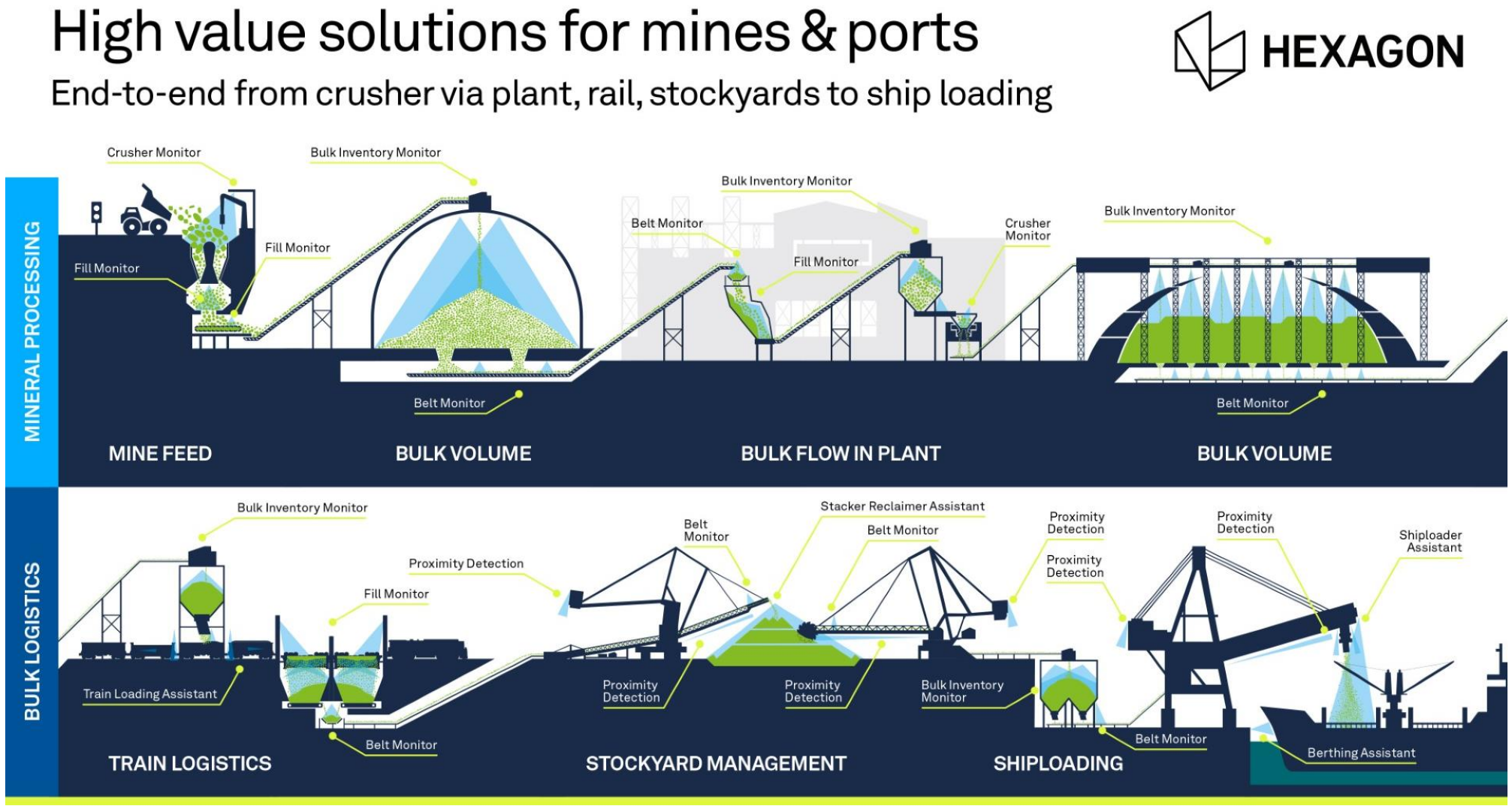
Non-contact measurement for demanding bulk solids applications.

Low maintenance

No contact with the material reduces wear and servicing needs.

Up-to-date information for inventory and process decisions

Where can Hexagon support you with this Technology?



How Hexagon support his clients?

Full Vertical Solution Provider – Hardware, Software, Engineering

1. Sensor | 2. Processing | 3. Software | 4. Interfaces | 5. PLC

Unique Sensor Technology in-house Design & Manufacturing


iSDR-C (2D)


iSDR-M (2D)


iSDR-H (2D)


iLDR-M (1D)


iDVR (1D Speed)


iSDR-H-3D (3D)


iSDR-P (3D)

Radar Scanning
- 1D, 2D, 3D
- Speed

Processing Units Robust & Scalable


iRPU-indoor
High power



iRPU-outdoor
high power

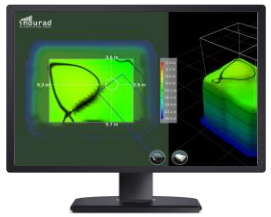

iRPU-indoor
Mini power



iRPU-field

Processor & Enclosure
- Industrial PC / Embedded
- Indoor / Outdoor
- Rail / Wall Mount

Industrial Software iFramework





Enhanced Software Features
- Filtering & Data Processing
- Machine Kinematics Model
- Logging & Simulation

Fieldbus Interface SCADA Visualization

ABB · SIEMENS · MITSUBISHI ELECTRIC
Schneider Electric · FANUC · Rockwell Automation
DeviceNet · EtherNet/IP · ControlNet · MatrikonOPC
PROFIBUS · PROFINET · Allen-Bradley

All Standard Interfaces Available
- Default Fieldbus: Modbus TCP/ IP
- 3D Graphical SCADA Interface iOAU

Local Partners with Plant Knowledge

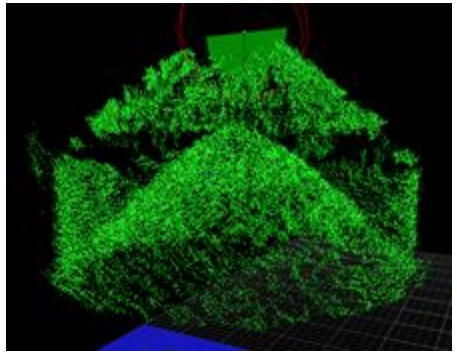


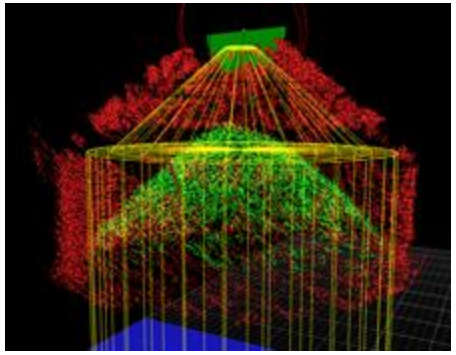
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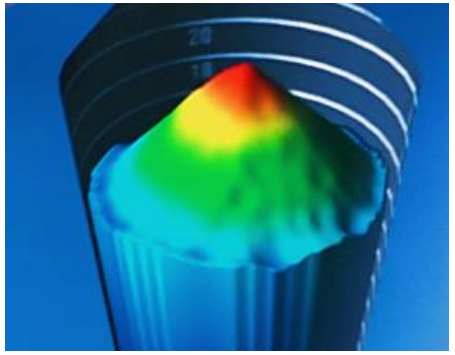
How Hexagon does Surface Reconstruction

Surface Reconstruction applied within different solutions

(2) 3D-Point Cloud → **(4) Classification & Filter** → **(5) Surface Reconstruction**

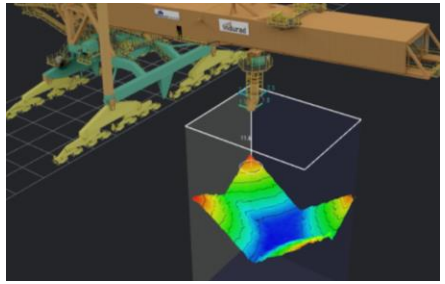




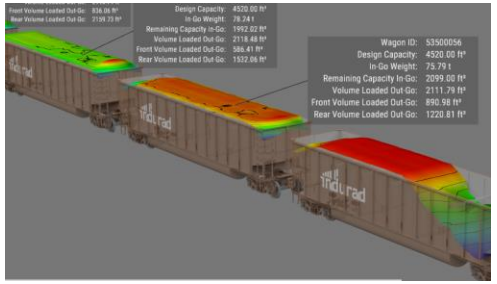


- 2D-surface reconstruction from 3D-Point Cloud
- Standardized interface and common code
- Surface interpolation and gap filling

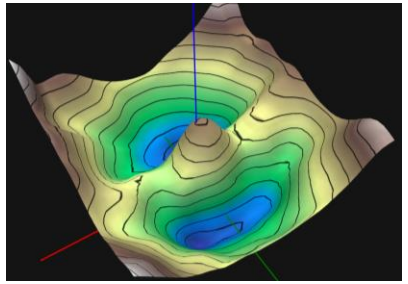
(5) Surface Reconstruction



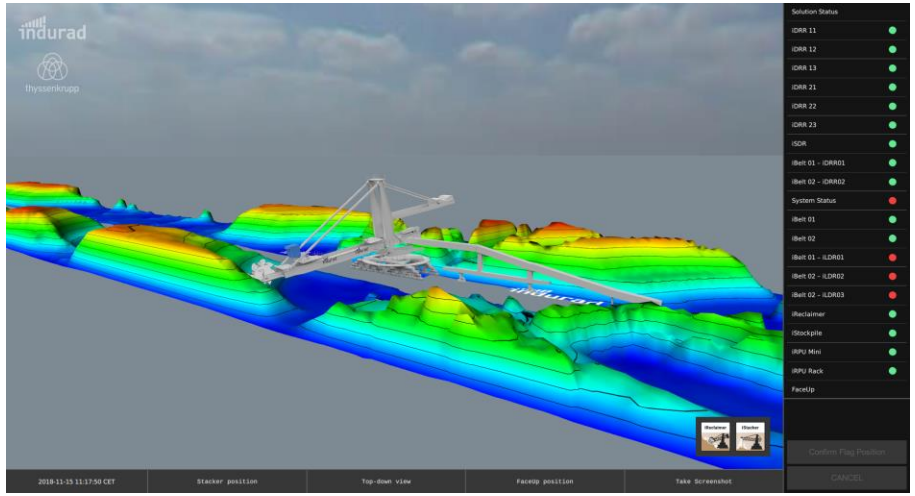
(5) Surface Reconstruction



(5) Surface Reconstruction



(5) Surface Reconstruction

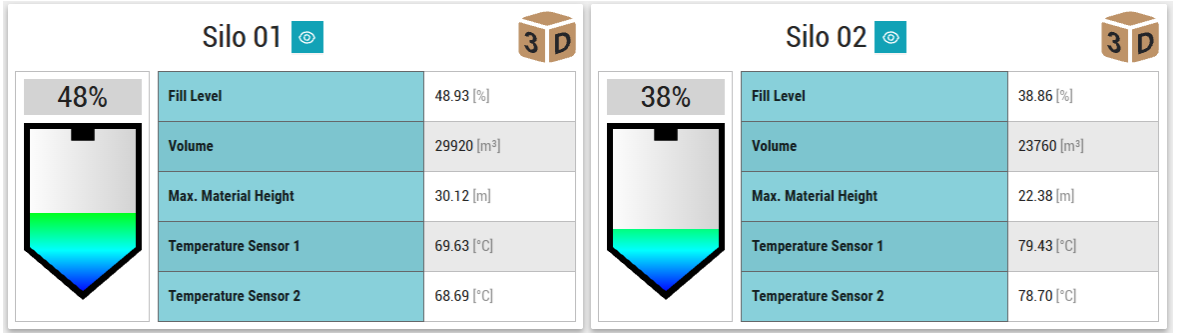


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Example of the industry

- **Oman project:** Alumina storage in silos approximately 50 m high and 30 m wide.
- **Actual inventory:** Determine the material quantity and available storage capacity.
- **Unloading readiness:** Confirm sufficient silo capacity before the vessel arrives.
- **Fewer interruptions:** Reduce the risk of unloading delays and additional vessel waiting time.
- **Quantity verification:** Compare inventory before and after unloading with the declared delivery quantity.





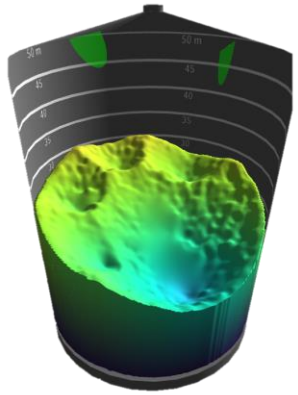
Achieved measurement accuracy of 99%

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Inventory data for operational decisions

OMAN

Vessel unloading

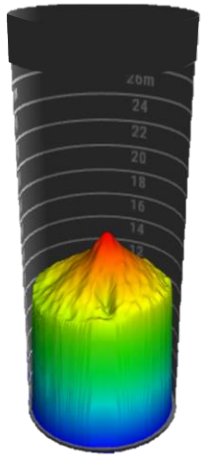


Can the next vessel unload?

Measured inventory shows the available silo capacity before unloading.

BELGIUM

Weekend supply

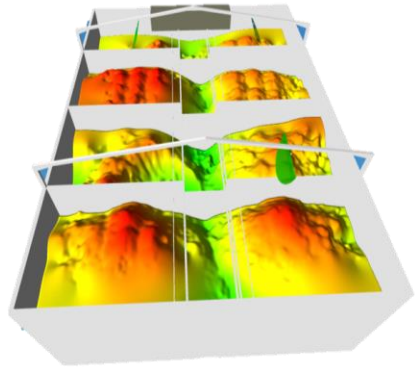


How much wood do we need for the weekend?

Inventory data supports planning the wood required for the weekend.

PORTUGAL

Digital Woodyard



Is the blending of the wood qualities correct?

3D radar measures stock volumes for digital woodyard decisions.

Reliable inventory data helps operators plan unloading and material supply.

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Thank you for time

Julien Pierre

Business Development Manager

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