



FERROTRON LaCam[®] Torpedo Solutions 2025



LaCam® High Temperature Laser Profile Measurement System based on the well known LiDAR^[1] technology in combination with a dual wavelength pyrometer.

It all starts with a laser **point cloud** for assessing the lining thickness of a torpedo cart which transport the hot iron from the blast-furnace to a converter.

Monitoring the refractory thickness is key to extend the campaign of a torpedo and guarantee safe operations.

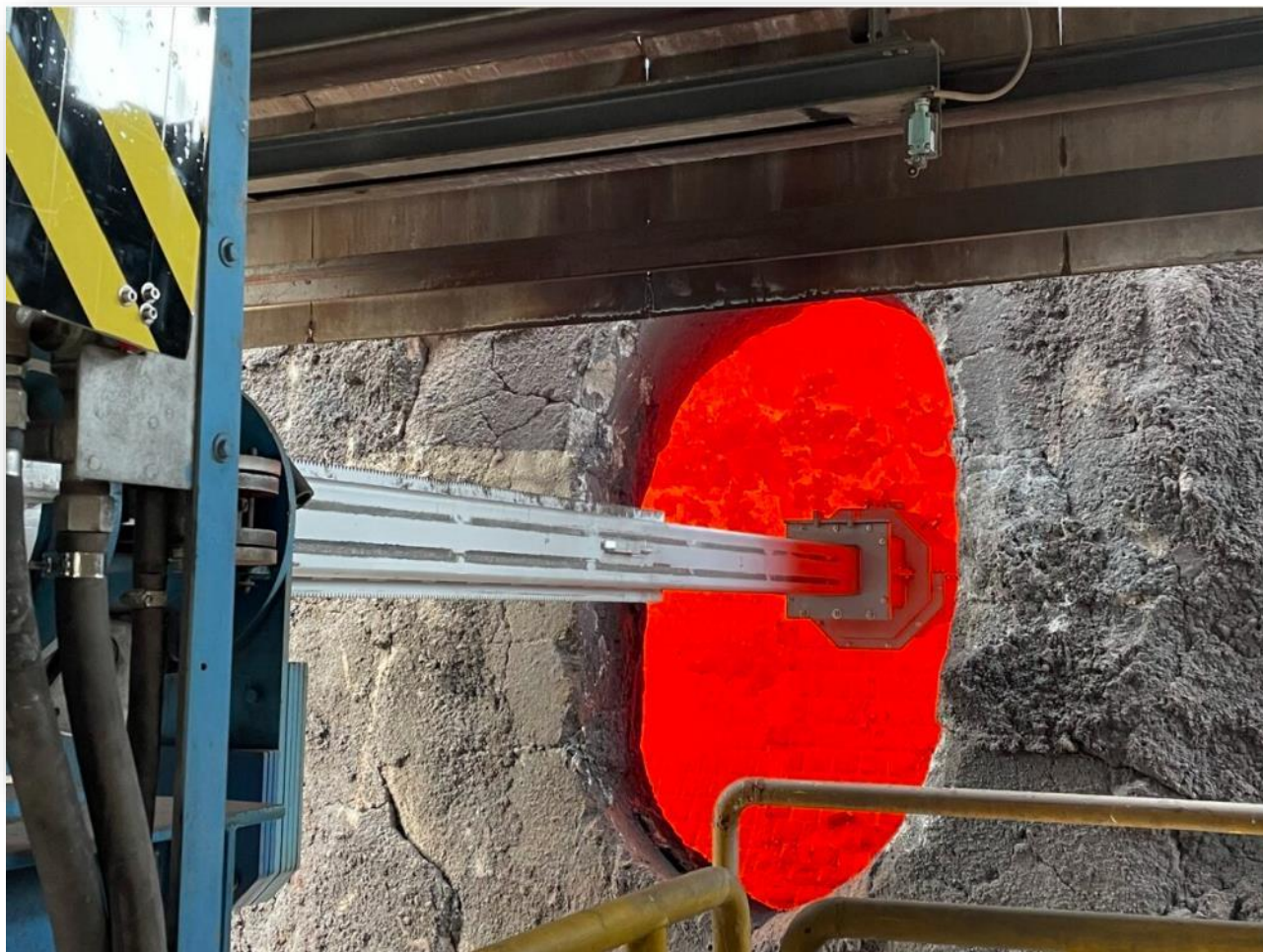
Both fixed and mobile solutions to measure the torpedo fleet are offered.

Key is immersion to assess the refractory condition of the total torpedo from mouth, impact zone, bottom and walls to the far ends.

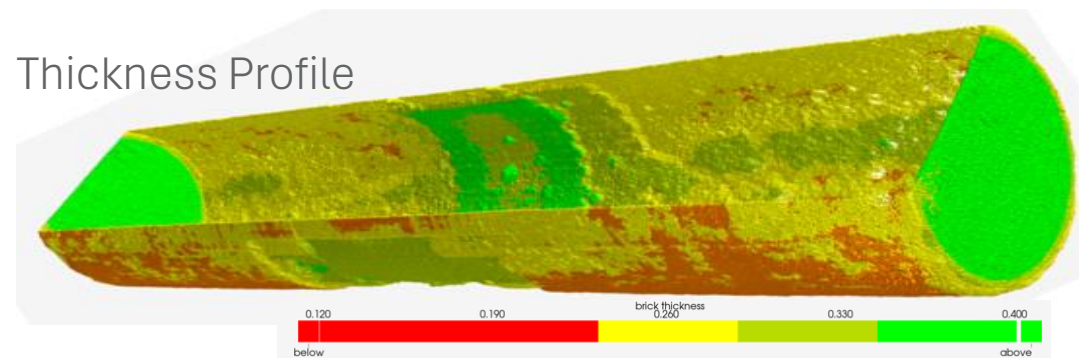
Point Cloud Image

Inspection of Torpedo Ladles Using a Fixed Installation

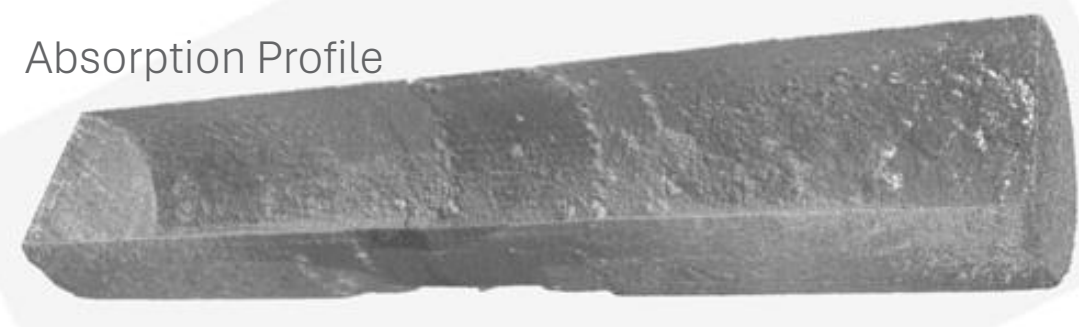
Fixed 3D Laser for torpedo ladle using $120^{\circ} \times 360^{\circ}$ scan



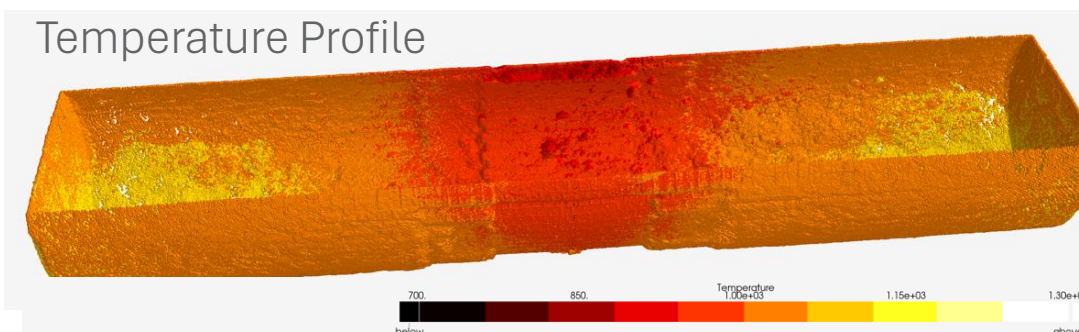
Thickness Profile



Absorption Profile



Temperature Profile



APPLICATION EXAMPLE VIDEO, TORPEDO – IMMERSIVE MEASUREMENT

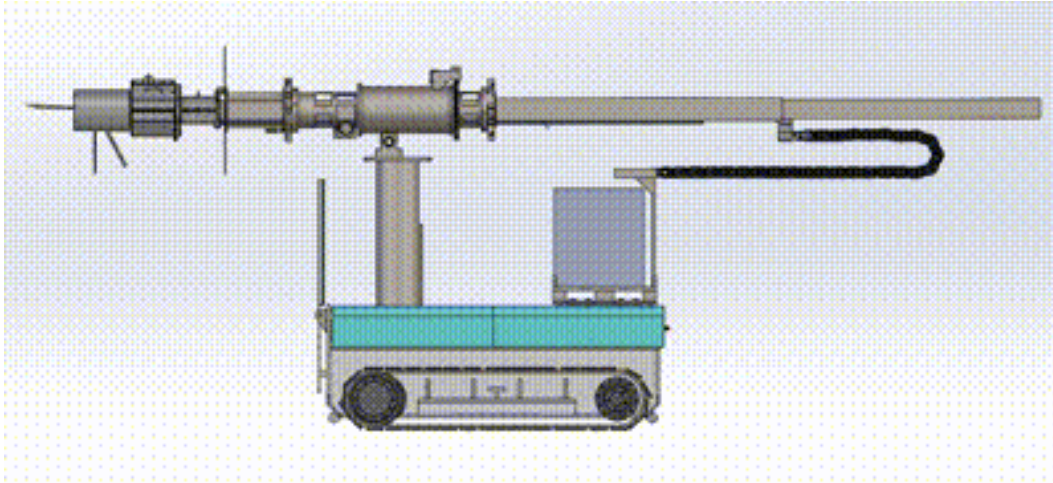
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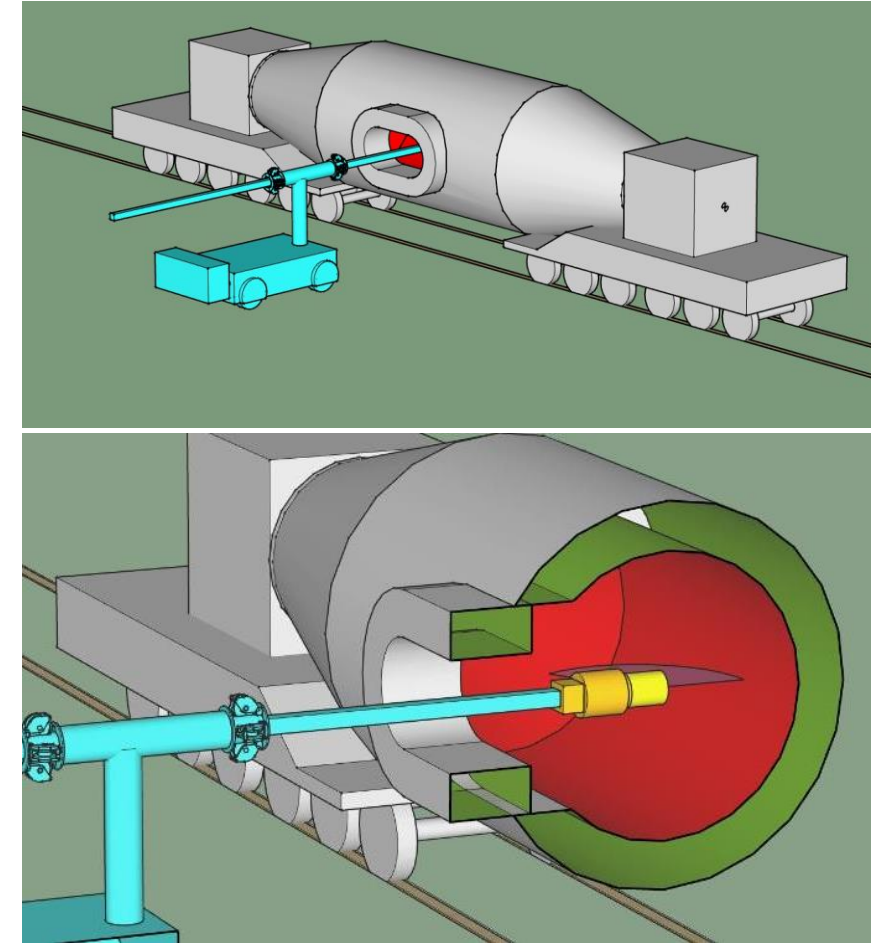
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Inspection of Torpedo Ladles Using a Mobile Installation

Mobile 3D Laser scanner inserted in the Torpedo ladle for 360° Scan

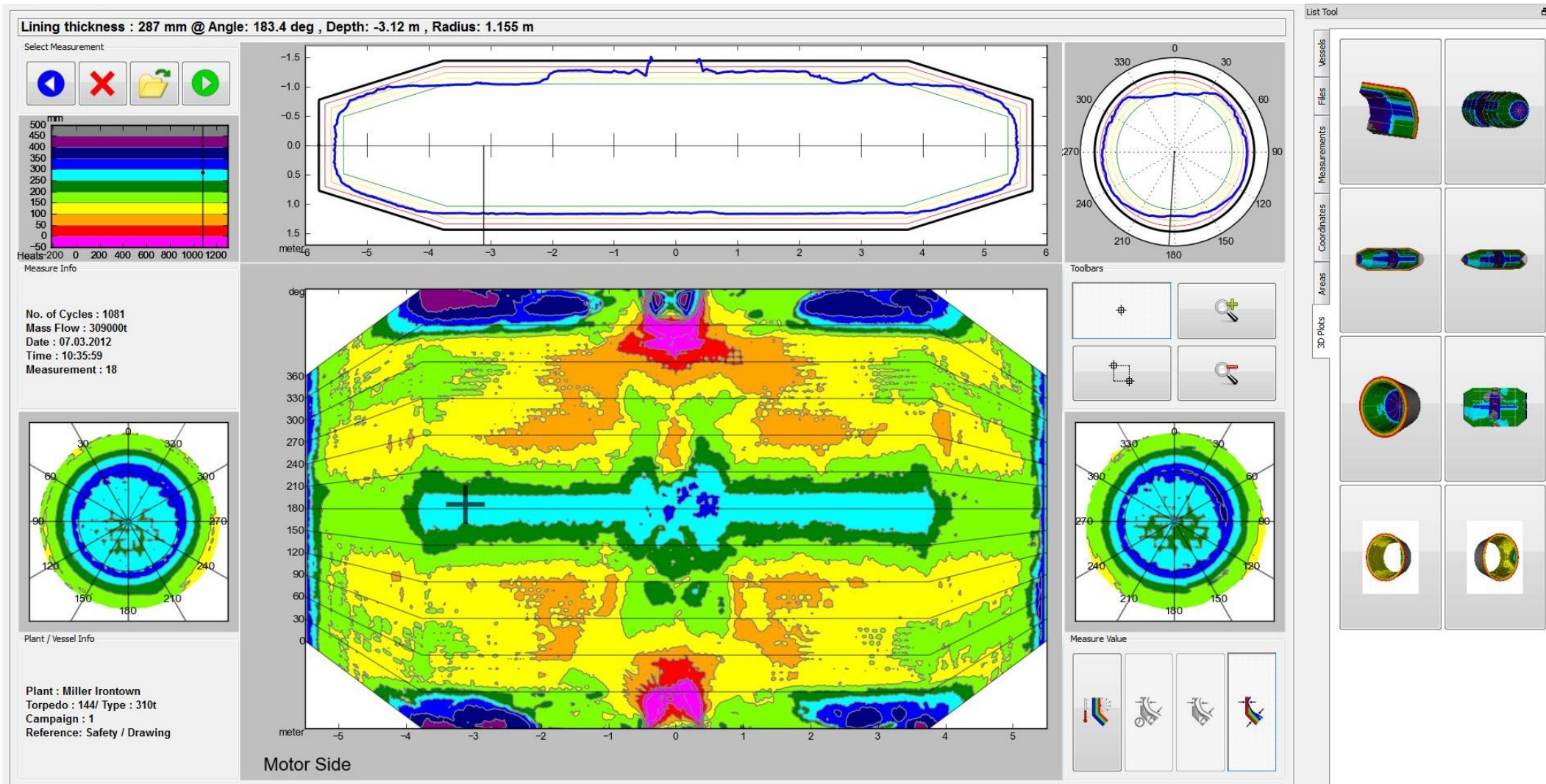


- LaCam Ti mobile is easy to maneuver and equipped with 5th Generation laser technology.
- Great flexibility, as the LaCam Ti mobile can travel through the shopfloor as per requirement driven by remote control.
- Takes less than 2 mins to complete an entire measurement cycle and deliver the report immediately in required format.



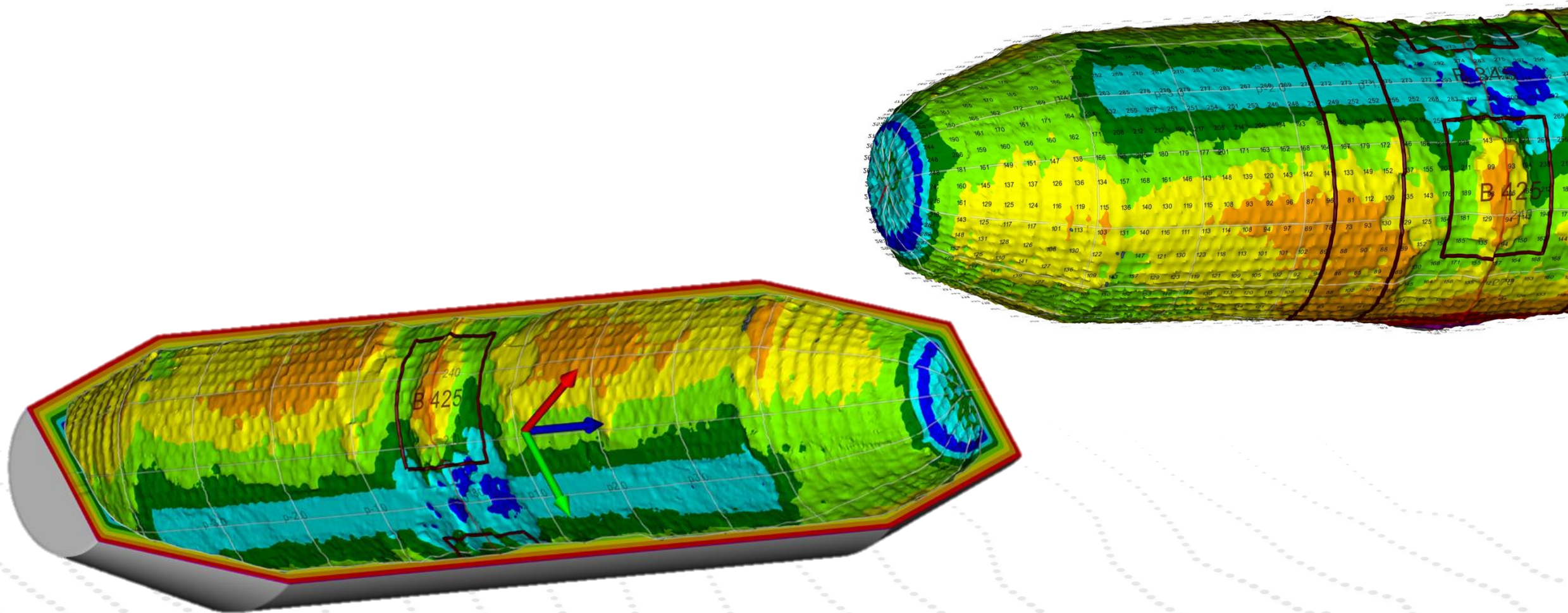
Powerful 3D graphics - Graphical User Interface

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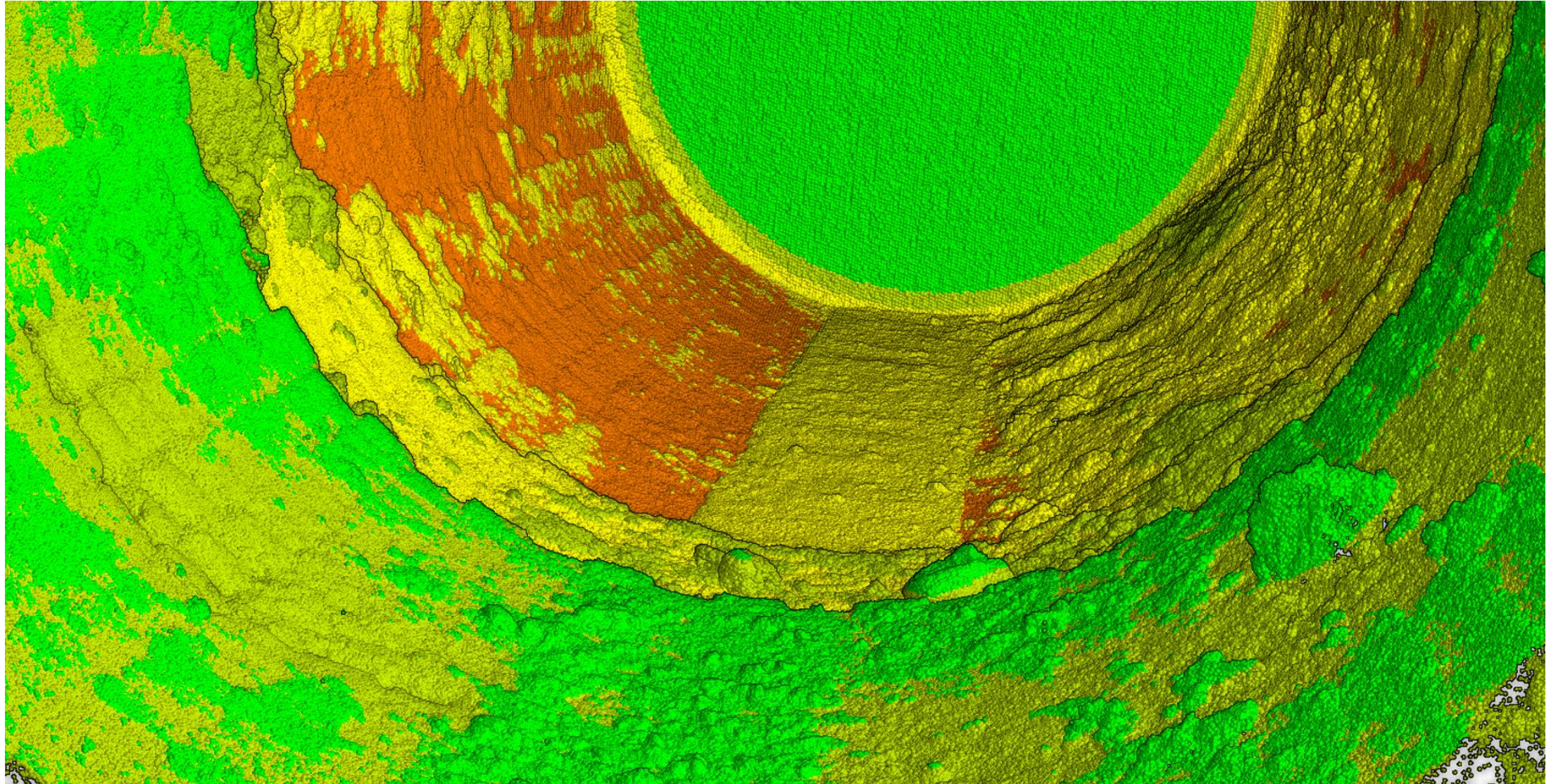


Powerful 3D graphics - Graphical User Interface

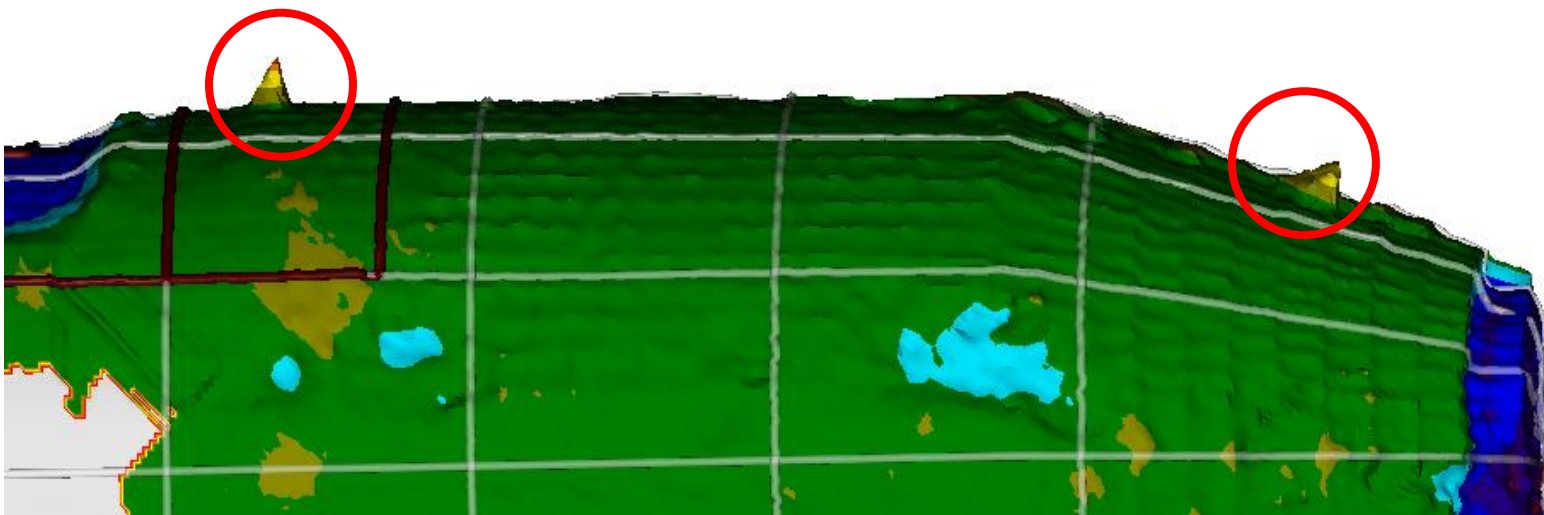
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Torpedo Ladles with LaCam® Torpedo: Details Distance



Reality Check: Successful Accuracy Test



- LaCam Ti systems measure all openings from within geometrically.
- In cold condition the openings can be checked classically and compared to the hot measured results.





Enhance Safety by preventing dangerous break-out (which could stop of the entire steel plant)



Reduce the frequency of cold-inspection; increase **Torpedo availability**. Torpedo capacity increase (thinner lining) could be utilized judiciously.



Cost Saving in Energy and Material Maintenance. Scan data will reduce ad-hoc or general time-based maintenance, which will optimize material consumption and reducing cold inspection will save energy cost. (Heating Torpedo is a cost)



Extended Refractory life. We have witnessed 5-7% of life improvement, which reduces 3.5-4 torpedo lining / year (Saving almost \$350,000 per year)



Increase of Torpedo availability would allow to **reduce the No. of ladle fleet**.
Reduction of torpedo would pay off the investment of scanner quickly.

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FERROTRON
A **MiNTEQ** DIVISION