



# LaCam<sup>®</sup> Hot-Heel Tracking

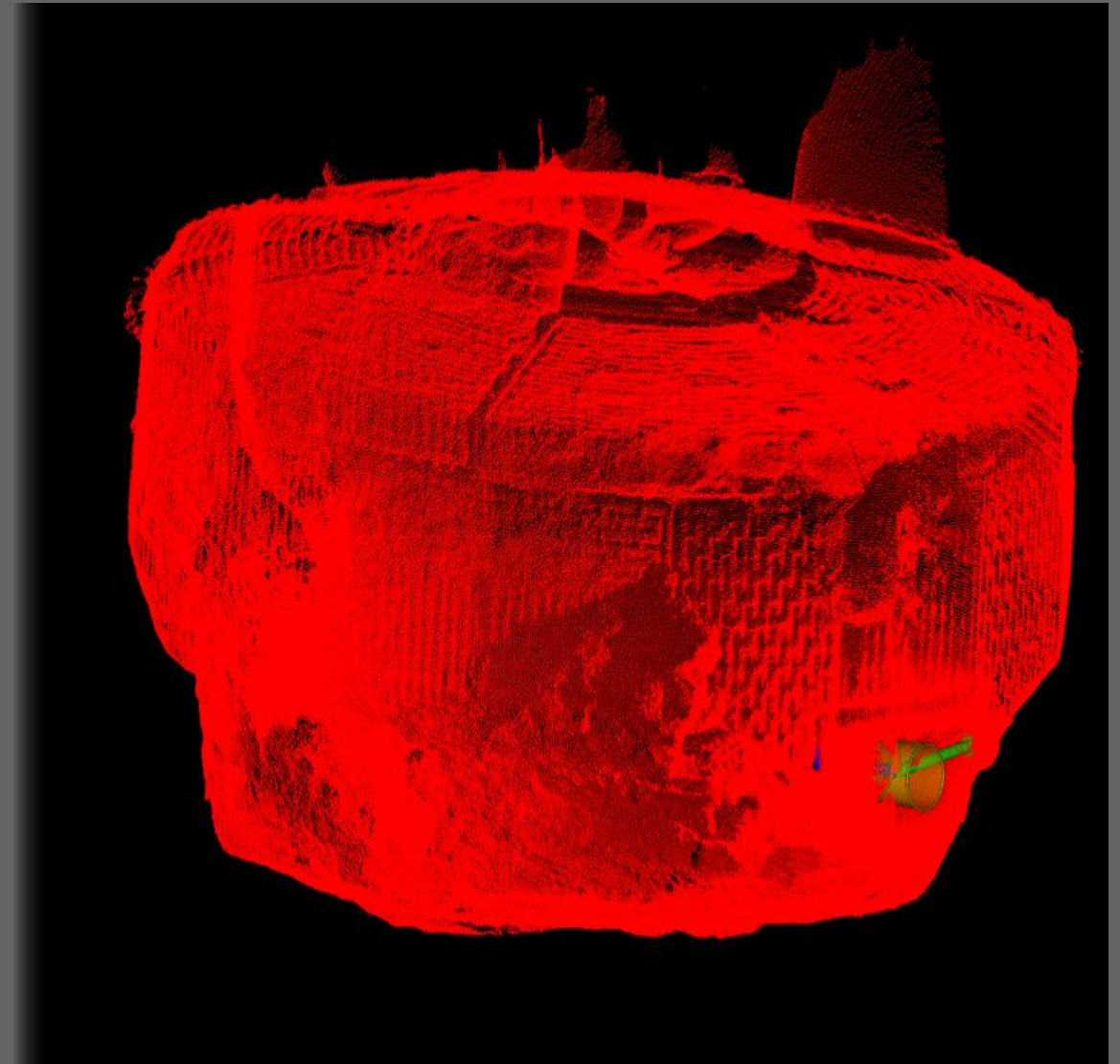
April 2025



The **LaCam**® Laser Profile Measurement System based on the well known LiDAR<sup>[1]</sup> technology in combination with a dual wave-lengths pyrometer.

In the beginning is a laser **point cloud** and a **radiometric temperature signal**, from which all other measured variables are derived.

<sup>[1]</sup> Light Detection and Ranging



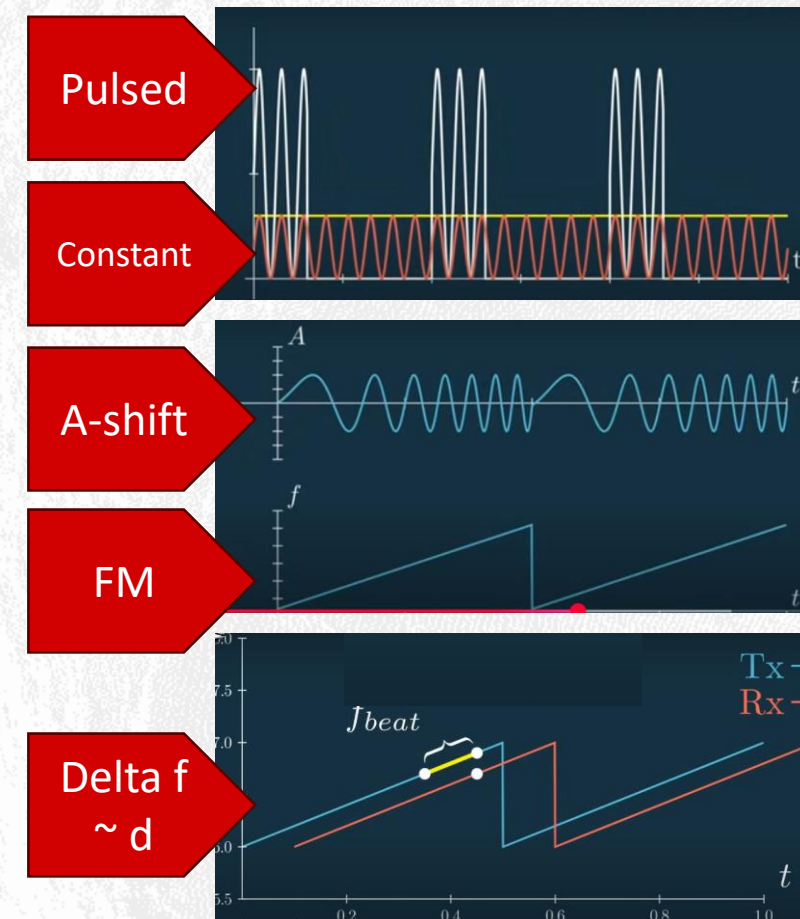
LaCam® point cloud of an EAF furnace with closed lid

FT-LevelNet is a non-contact, “Time-of-flight” (ToF) measuring system based on a non-guided **60GHz FMCW\*-Radar** featuring:

- Measuring distances from 0.5m up to 20m (max.)
- High accuracy:
  - from 0.75m - ~ 2m distance to target surface:  $\leq \pm 0.1$  mm,
  - from  $> \sim 2$ m - ~ 20m distance to target surface:  $\leq \pm 2.0$  mm
- Narrow antenna alignment and a **beam angle** of  $6^\circ$
- Active cooling systems using water

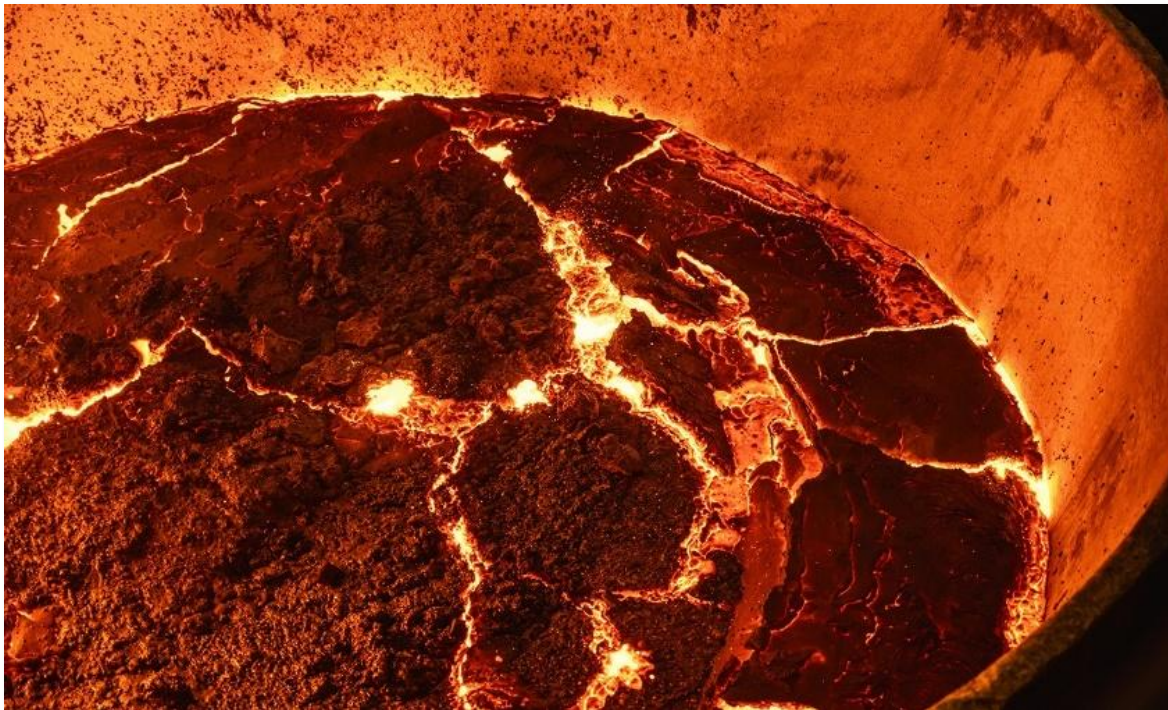
\* FMCW-Radar = frequency modulated, constant range radar

FMCW-Technology:



FT-LevelNet measures distance in hot areas, e.g. steel and non-ferrous metals:

- Freeboard or bath level for ladles, EAF, tundish for steel shops
- Freeboards or levels for converters of steel shops
- Slag thickness on steel bath

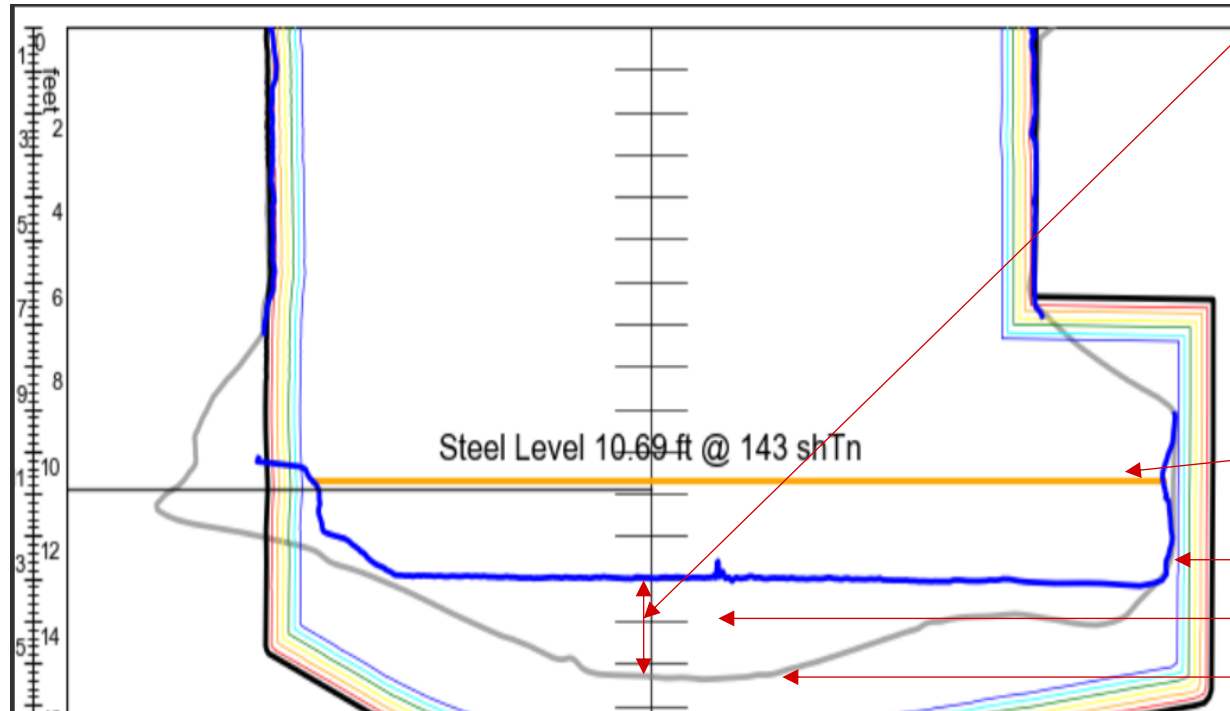


# LACAM<sup>®</sup>: EAF HOT-HEEL MEASUREMENT, EXAMPLE HEAT 607

EAF 2  
H.O.L. 3022  
Meas.No. 607  
Date 2025/02/23  
Time 08:00:45

Bath Level from Top 11.16 ft.  
Empty furnace date / (MeasNo): 20250223\_080045 / (607)  
Volume of heel [ft<sup>3</sup>]: 216.6  
Steel mass [tn. sh.] (80vol%): 37.3  
Slag mass [tn. sh.] (20vol%): 4.6  
Total Heel Tons [tn. sh.] 41.9

Hot-heel for heat 607 is two ft of height



EBT

Orange: Max. level of steel bath limited by slag door

Blue: Measured bath level / slag level

Hot Heel area

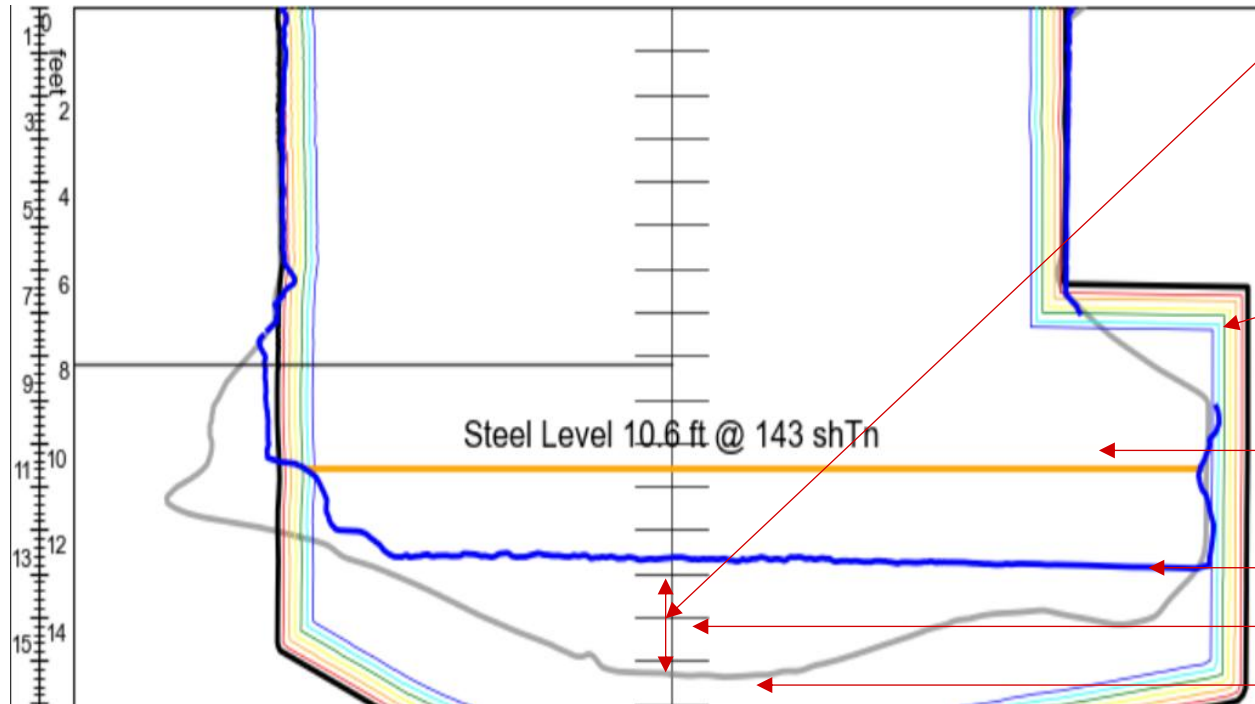
Grey: Bottom of empty EAF

# LACAM<sup>®</sup>: HOT HEEL MEASUREMENT, EXAMPLE HEAT 612

**MINTEQ**

EAF 2  
H.O.L 3135  
Meas.No. **612**  
Date 2025/02/27  
Time 02:16:12

Bath Level from Top 11.47 ft.  
Empty furnace date / (MeasNo): 20250227\_021612 / (612)  
Volume of heel [ft<sup>3</sup>]: 239.4  
Steel mass [tn. sh.] (80vol%): 41.3  
Slag mass [tn. sh.] (20vol%): 5.1  
Total Heel Tons [tn. sh.] **46.3**



**46.3** Hot-heel is for heat 612 more than two ft of height, correlating to the calculated hot-heel volume

EBT

Orange: Max. Level of steel bath limited by slag door

Blue: Measured bath level / slag level

Hot Heel area

Grey: Bottom of empty EAF

- One “reference” measurement is needed e.g. once per week to assess the bottom dimensions of an empty EAF
- The following heats are measured after tapping, which gives the remaining bath/slag level.
- The LaCam<sup>®</sup> system calculates the **hot-heel volume** as delta between bottom reference measurement and bath/slag level measurement
- The hot-heel volume can be tracked per heat