



Information-Rich Metrology Explainer

Information-rich metrology (IRM) is a highly innovative technology, defined as the use of any type of available, **additional information** to improve a measurement process.

For additive manufacturing applications, the inherent complexity of component geometry combined with the relatively high surface roughness of printed parts causes significant challenges for conventional industrial metrology, whether contact or non-contact. The consequences include a reduction in the level of surface data acquisition, limited accuracy of results, and increased measurement cycle times. Taraz Metrology uses IRM to address these challenges.

IRM works by bringing together all of the existing information we have about a measurement application:

- Existing measurements
 - Calibration files, measurements of similar materials, etc.
- Instrument attributes
 - Optical performance, measurement data processing, effects of environmental conditions
- Instrument-surface interactions
 - Modelling the physics of instrument performance when measuring a sample made of a given material and subject to known manufacturing processes
- Sample surface properties
 - CAD models, simulation, etc.

All of the above information is combined with the measurement result using artificial intelligence/machine learning techniques to deliver an improved measurement result, and the following user benefits:

- Improved metrological quality
- Greater surface coverage
- Reduced measurement cycle times, for each of these key steps:
 - Set-up
 - Data acquisition
 - Post-processing
 - Analysis

IRM has been researched and developed by the Manufacturing Metrology Team (MMT) at the University of Nottingham, where Taraz Metrology was established in 2018. For more information on IRM and other MMT research, please see the team's website:

<https://www.nottingham.ac.uk/research/groups/advanced-manufacturing-technology-research-group/research/manufacturing-metrology-team/index.aspx>