Smart metrology for manufacturing

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Introduction

Metrology is an essential part of the manufacturing process to test conformance and ensure reliability. Traditional metrology is often carried out after the parts are manufactured, for example using contact measurement systems, gauge blocks or FARO arms, to measure the form or surface of a part; although essential for identifying and addressing any qulaity issues in the part, traditional metrology consumes time, holds up stocks and results in scraps/reworks. This causes real pain to manufacturers as they try to make faster lunches to the market and carry on-time deliveries.

Smart Metrology

With the recent advances in optical measurement capabilities, a smart-metrology system can be introduced to reduce lead times and provide reliable information for effective decision-making. A smart-metrology system integrates seamlessly with the manufacturing line to capture and analyse data in real-time without the need for stopping the manufacturing line.

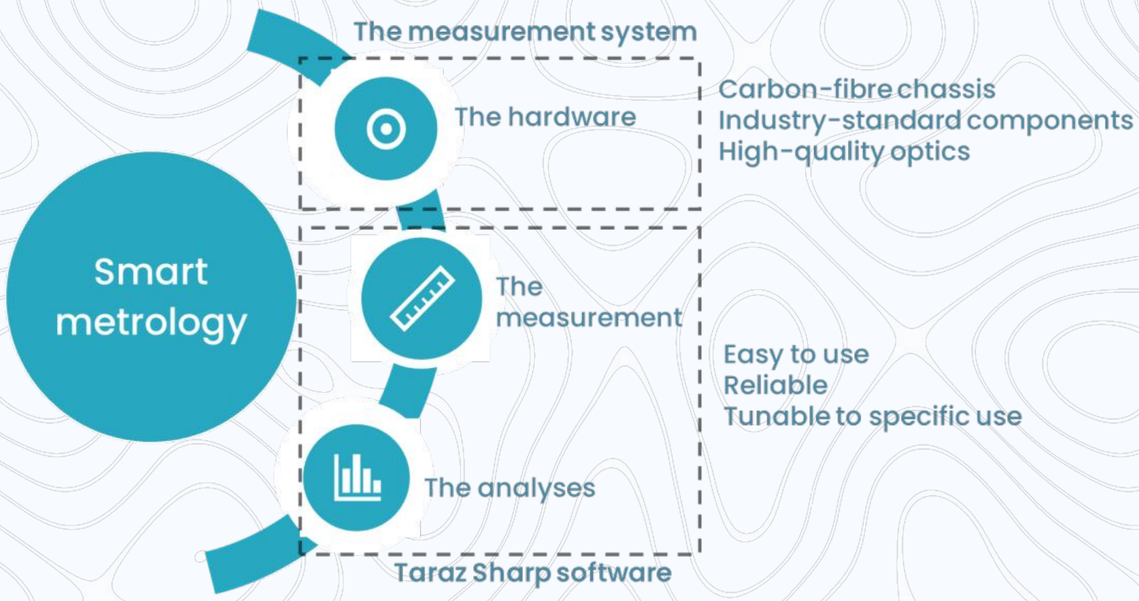

Fig 1. Diagram illustrating Taraz's implementation of a smart metrology system

Applications and use cases

- Height maps of different materials, including but not limited to composite, metallic and ceramic surfaces
- Profiles and dimensions of aluminium extrusions cross-sections
- Measurement of holes and countersinks
- Measurement and identification surface defects

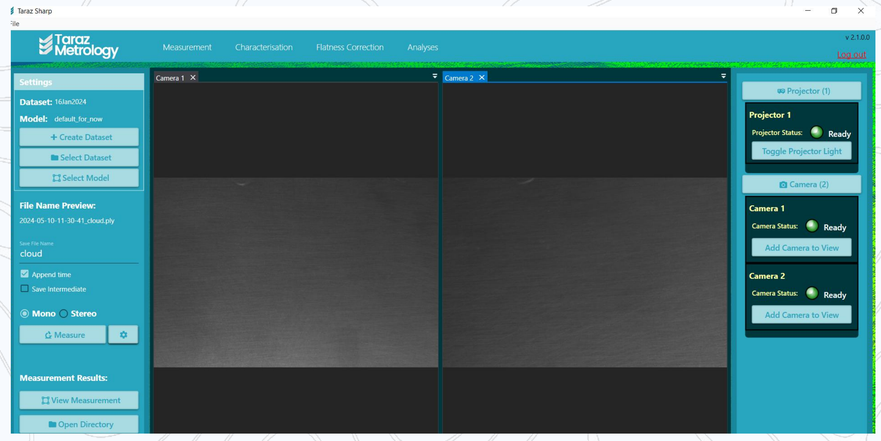

Fig 2. View from Taraz Sharp for measurement control of a metallic part

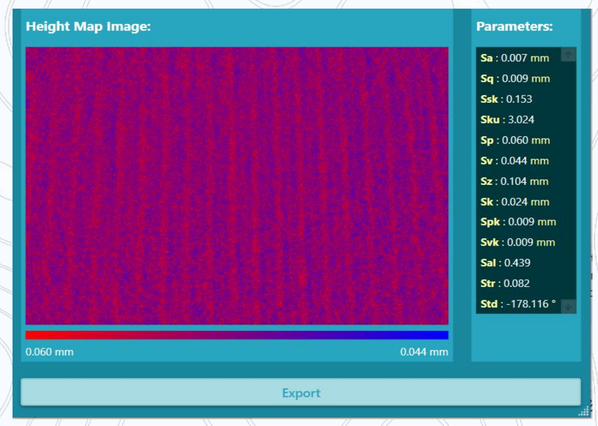

Fig 3. Surface measurement results of the metallic part as analysed with Taraz Sharp in accordance to ISO25178-600 standard

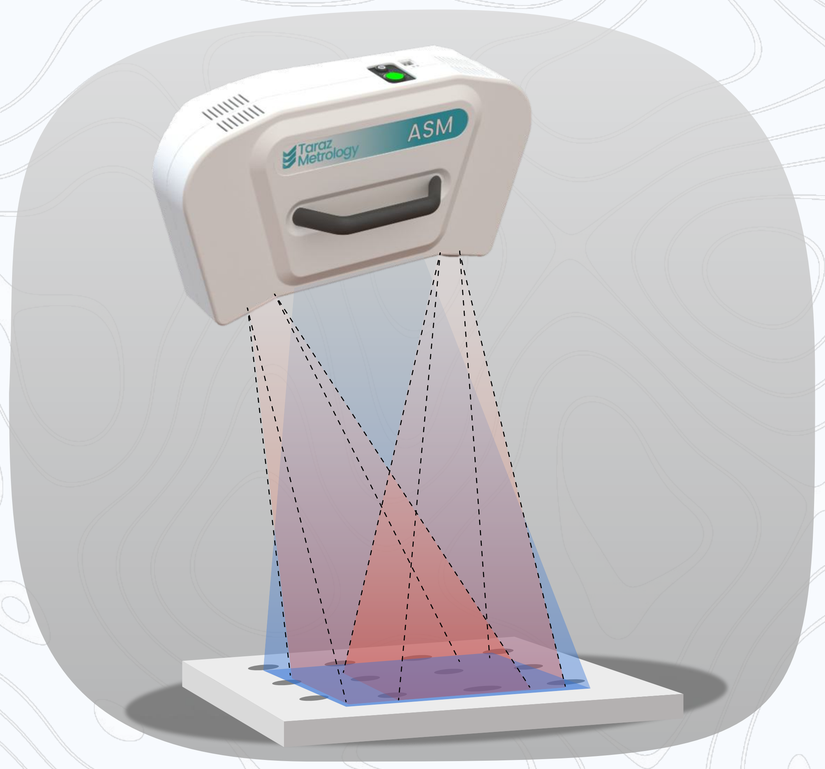

Fig 4. Taraz's ASM system and its optimal working area, where the projection area and camera viewing areas overlap

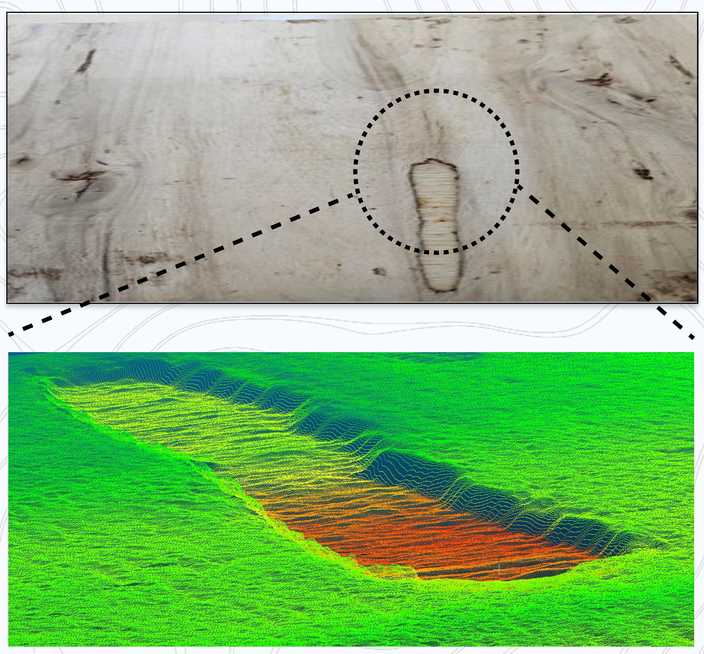

Fig 5. Measurement of surface defect on a wooden part

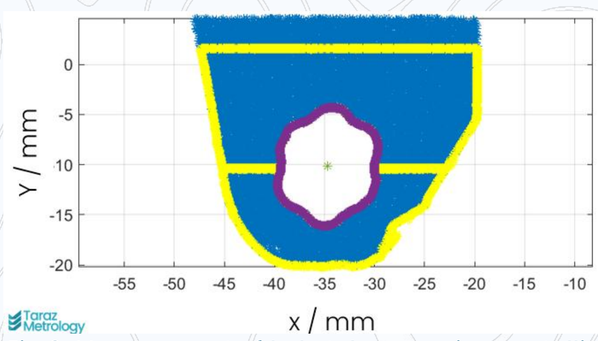

Fig 6. Measurement of hole tolerances in a metallic part

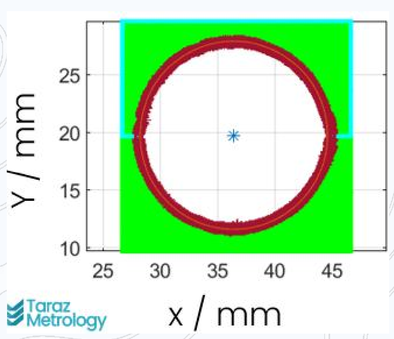

Fig 7. Measurement of drilled hole in a metallic part

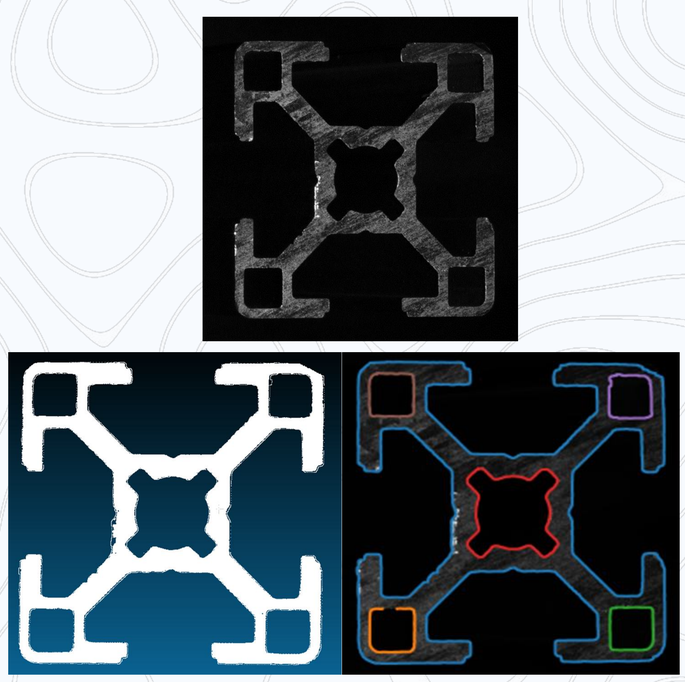

Fig 8. Measurement of cross-section of aluminium extrusion with enhanced edge-detection and automatic feature detection

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