Photogrammetry and Fringe Projection Explainer

What is photogrammetry?

Photogrammetry is a method used to get three-dimensional data from a series of two-dimensional images. Traditionally used for the measurement of very large items (e.g. buildings, aircraft), close-range photogrammetry can be used effectively for smaller-scale applications requiring form measurement.

The advantages of photogrammetry are well understood - it is an easy to use and low-cost technology, acquiring data quickly and to high accuracies. Limitations of the technology have included small depth-of field (for close-range photogrammetry applications), slow reconstruction speeds and a high dependence on material type (low-contrast textured surfaces can be difficult to measure).

Taraz Metrology has overcome each of these limitations to deliver an optical form measurement technique which is fast, flexible and accurate:

- The IRM toolkit of techniques has significantly improved measurement cycle times
- Smooth-textured parts (e.g. calibration artefacts, post-processed components) can be measured successfully with smart data-fusion with active scanning methods
- The optimised measurement path ensures a fine resolution throughout the measurement volume, regardless of the depth-of-field.

What is fringe projection?

Taraz Metrology's fringe projection technology consists of two main elements – a high specification digital projector and a number of industrial cameras, each of which are controlled by Taraz Software. Sequential patterns of dark and light fringes are projected onto the component's surface, and the patterns generated are captured by the system cameras.

Taraz Metrology Software then models the shape of the component surface from the scan data, which is displayed on-screen in the form of a point cloud. This data can then be exported in a range of widely used file formats for analysis, e.g. comparison to CAD data or topography assessment.

Taraz Metrology has taken the traditional capabilities of fringe projection and delivered significant additional user benefits through the use of IRM and related techniques:

- Surface topography, normally a challenge for fringe projection systems, can be better captured using projector/camera pose optimisation
- Measurement cycle time is reduced using high-speed 3D reconstruction algorithms
- Voids within the point cloud are minimised as a result of high-density data acquisition