

The multi-camera station was designed to respond to a request that the market has been asking for for a long time: **a fast 360° control**. Despite an image capture technology that is not particularly complex in itself, the multi-camera station has never found large areas of application, and the reason is primarily due to the fact that the surface image analysis software did not meet expectations .

The gap between expectations and technical possibilities was filled in 2023 with the introduction of artificial intelligence in the analysis process of surface images, a tool with incomparable power compared to previous solutions.

Consequently, it was natural to apply new knowledge about AI to multi-camera analysis, and an opportunity was found with “La Mille”, a sorting machine designed in collaboration with ITW Rivex.

The results not only met expectations but also exceeded them, which led to the timely registration of the new station at the patent office and the related inclusion of the solution in the catalogue. Immediately consequently the solution was also applied to MCV6 and MCV3. However, it is not applicable to MCV1, due to simple incompatibility of dimensions.



La Mille: AI-powered 360° inspection

The multi-camera station is developed for **high-rate checking (up to 700 pcs/minute) of the thread of M6 screws in order to identify macroscopic production defects**.

These defects are caused by rolling, molding or impact problems and consist of dents, scratches, open cracks, burrs.

Since this is an application for screws, the metal table solution with hanging pieces is the most effective. At the same time, the high rate requirement imposes non-indexed movement of the pieces, i.e. continuously, and the bulk of the station requires mechanics with large spaces.

La Mille is a concept machine developed to celebrate the thousandth Dimac machine in collaboration with ITW Rivex to start the solutions that will be industrialized in the near future. In choosing the mechanical solution, we relied on the traditional design of the MCV4 machine, as it was fully adequate for all the previous requirements.

The multi-camera check consists of creating an array of three images which, overall, cover the entire external surface of the piece and which are processed by the system to intercept any defects. In the case of La Mille, three cameras are used installed under

CASE STUDY

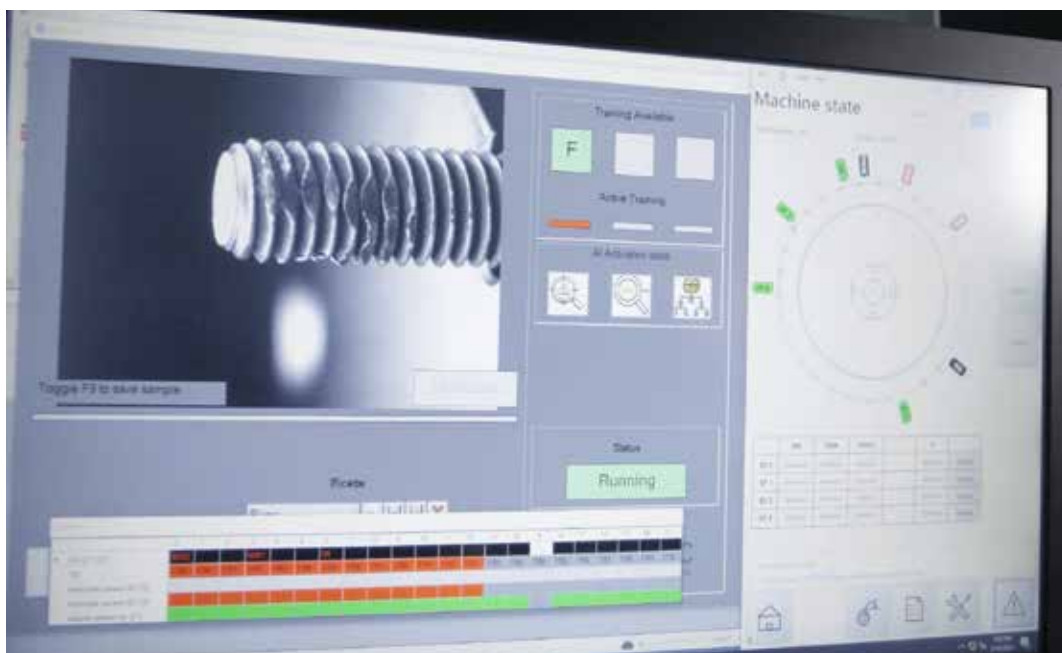


the rotating disk, at a mutual angle of 120° and fixed on an adjustable column which also supports a single circular illuminator coaxial to the piece to be checked.

Technical feature of the multi-camera station installed on La Mille

- 3 grayscale surface cameras 2MP resolution
- Viewing angle between cameras: 120°
- Distance from the framed object: approximately 150 mm, adjustable
- Circular illuminator, diameter 100 with continuous white light, adjustable intensity via software and adjustable position on the z axis, independently of the cameras.

The images from the cameras are processed on the central PC using software that was created as an evolution of the AI Tool (see AI Tools documents). The choice to use grayscale cameras with relatively low resolution is caused to find the best compromise between the



detail needs and the time necessary for image processing.

In this implementation, for example, the station, designed according to the specific needs of ITW Rivex, allows the passage of pieces with an underhead length of up to 50 mm, while the cameras are optimized for the M4-M8 dimensional range. The maximum controlled thread length is 40 mm.

In this machine, the multi-camera station is used on a 50-slot table with continuous rotation and in combination with three other stations: top camera, hardness station and side camera.



**Other applications:
multi-camera station on MCV6
for checking pinions**

The possible applications of the multi-camera station to other situations are many and varied, with little adaptations in terms of control concept but large in terms of external appearance.

The pinion in the figure, for example, is a typical part for a glass rotary-table sorting machine. In this case the request is to identify lack of material on the gear wheels and, to date, 360° control has not been available for glass table machines.

Compared to the previous case study, in the mcv6 the mechanics are completely different but the operation remains unchanged. Given the size of the piece, it is necessary to adopt 4 cameras, which are therefore spaced at 90° around the piece and arranged approximately 150 mm from the framed piece, with a viewing angle of 15°.

