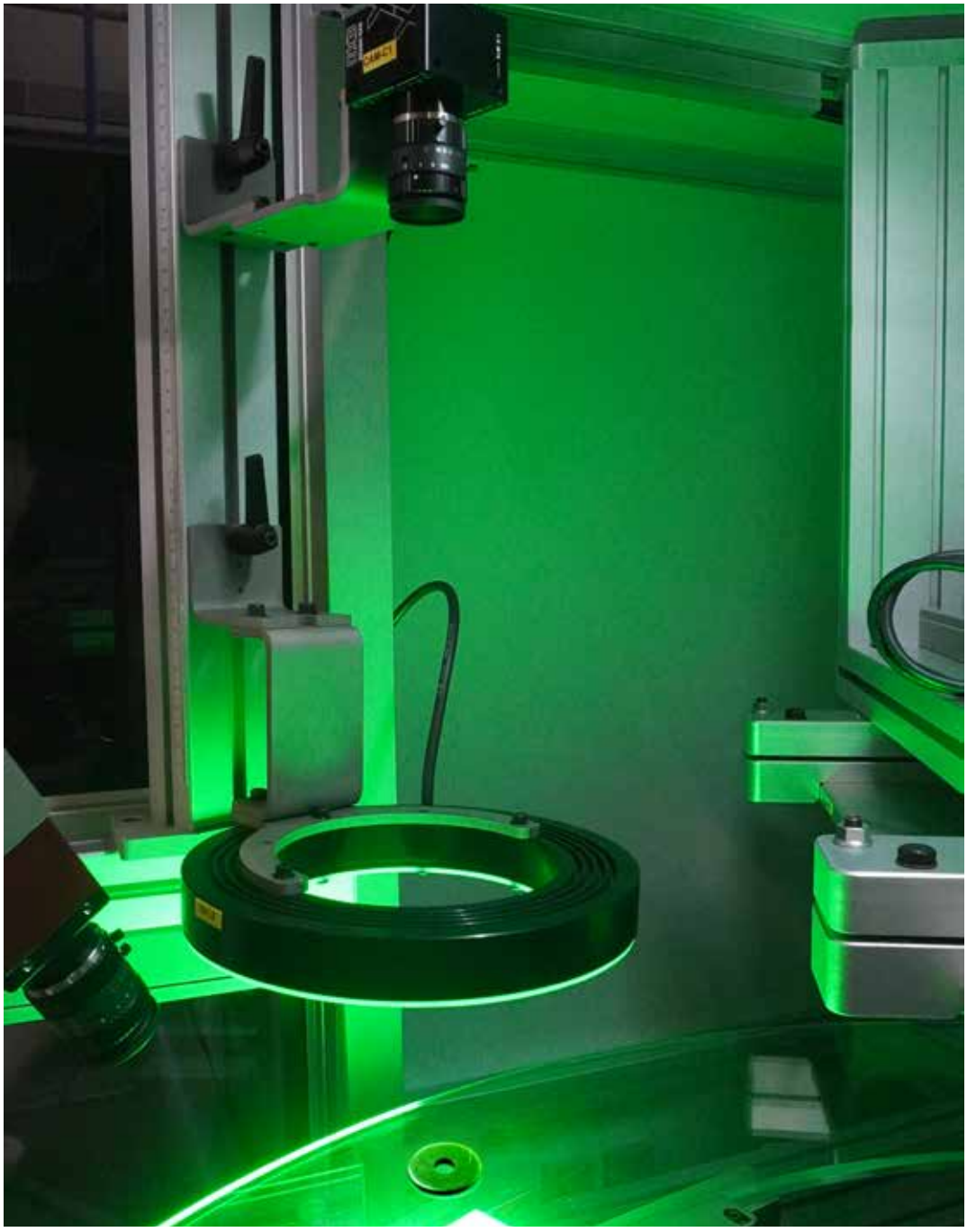
DIMAC
SFS CS

CASE STUDY



The SFS (Surface Fault Scan) station was designed to control **raised or recessed surface defects on flat faces.**

The technique gives its best performance in when the selection must not be influenced by variations in the surface reflection of the material, both between different pieces and within the same surface subject to control. For example, the control is not influenced by stains, non-homogeneity in the color of the piece, type or appearance of the surface coating, both within the same production batch and when the variations are between different production batches.

The most interesting applications are washers, flat heads of screws, coins, upper and lower surfaces of nuts, and fine blanking plates.

The aim of the inspection can be both the search for defects in volume in relief such as **bubbles, surface coating deposits, burrs,** and the search for defects in the recess, such as **scratches, nicks and open cracks.** Using the same tool it is also possible to verify the presence of **bas-relief drawings** (for example the superficial inspection of coins), as well as verify the presence of **holes, bosses, markings and writings.**

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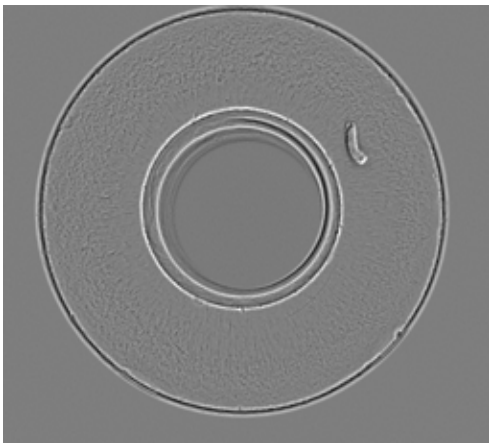
The stain on the surface of the coin interferes with the top camera control generating waste. The control of the same coin with SFS station is free from the problem.

Scratches on washers



Cracks on flange nuts

SFS technology allows you to reconstruct the three-dimensional surface of a flat surface, highlighting rised and recess elements.

The basis of the acquisition technique is the sequenced illuminator. These are specific illuminators divided into 4 sectors that can be turned on independently, so as to illuminate the piece with grazing light from four different directions, commonly identified with the four cardinal points (North, South, East, West). The camera therefore takes a sequence of 4 frames, each characterized by its own lighting.

The viewing software processes the four images as a whole, recreating a single image that superimposes the shadows of each of the individual images. This measure makes any inhomogeneities in the material irrelevant and enhances every minimal raised or recess

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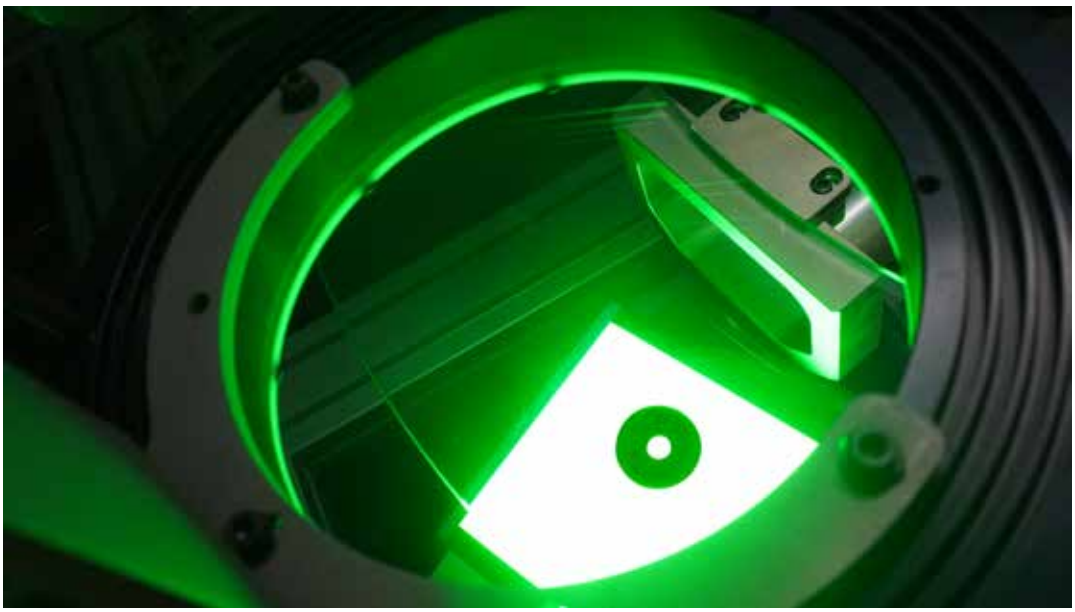
geometric variation. The artificial image generated is then interpreted using Dimac's usual Artificial Intelligence tools to sort the defective parts from the compliant pieces.

The system is therefore capable of detecting hollows or small reliefs, while it is not suitable for the internal examination of holes or slots, such as thread checking.

The system has autonomous vision software, currently based on AI.



MCV6 application

In the application on MCV6, the SFS station is generally aimed at controls of **components obtained from metal strip by fine blanking, such as the washers** shown in the previous images.

Unlike machines with indexed movement, the use of the station on a machine with a continuous movement disk takes into account the fact that the movement of the piece under the camera in the time in which the four frames are captured is not negligible. In particular, in addition to greater complexity in software management, this has repercussions on the maximum speed of movement of the disk and on the effective useful area within the area framed by the camera.

The same station can also be used for the acquisition of traditional surface images to be interpreted with AI tools. In this mode of use, the four sectors of the illuminator are turned on synchronously and the image obtained can be useful for example for the control of the internal collars of flanged nuts as in the figure below.

Broken collar on flange nut