

## Visual inspection Systems

### Fraunhofer Institute of Optonics, System Technologies and Image Exploitation IOSB

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### Competencies and Portfolio

Our business division Sichtprüfsysteme (SPR; Visual inspection systems) develops and supplies automatic industrial inspection systems for industrial applications.

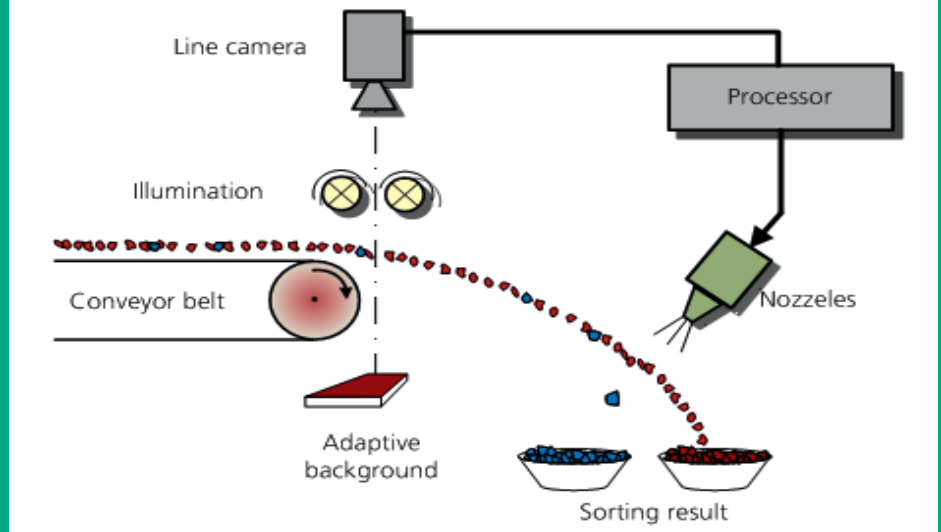
Currently the most important areas of application are the automatic inspection of blister packs used in the pharmaceutical industry, automatic sorting of bulk goods, inspection of surfaces, color measurement of granulates and inspection of printing quality. One common feature of all of these applications is that inspection is performed in realtime coping with the manufacturing process at high throughput rates. Correspondingly, the image analysis systems employed high processing performance.

High-resolution line scan-cameras of various types (color and grey tones) are used as imaging sensors. The equipment used for acquiring the images is customized to the

particular task whereas folded beam paths and LED flash illumination in particular are employed.

Products manufactured by this business division are used in industry throughout the world. Partner companies are for the most part responsible for marketing and service. Yet in some cases this business division also develops products directly for end users, taking over installation and service.

The business division operates an »image analysis center« and a multi-sensor laboratory for cross-application analysis which includes experimental apparatus for process clarification as well as systems for developing applications in a variety of areas.



## Projects and Products

**VisioChromHR:** Image analysis system for inspecting blister packing in the pharmaceutical industry (center)

**SpotInspect:** Image processing system for automatic detection of foreign matter (e.g. sugar)

**Purity:** Image analysis system for challenge to detect inclusion and air bubbles within transparent materials (e.g. flat glass, curved glass, lenses and spherical objects, granulates)

**MineralSorter:** System for sorting minerals

**FoodControl:** Image analysis system for detecting undesired materials in teas, herbs and dried vegetables (figure bottom)

**GranuControl:** System for sorting plastic granulates.

**GemStar:** System for automatic selection of diamonds from granular rock

**Clarity:** Image analysis system for sorting of waste glass cullet (figure above)

**ClarityHR:** Image analysis system for automatic sorting of heat-resistance glass

**MultiScan:** Image analysis systems for analyzing surfaces (e.g. coated steel coil, copper laminates)

**ColorControl:** System for detecting the color of granular products (e.g. plastic granulates)

## Infrastructure and equipment

Image analysis systems for industrial visual inspection are specially designed for a specific application or even customer. At the outset of most user projects, several questions need to be answered first, including whether an image analysis system will even be capable of accomplishing the required task, what the performance limits for detection will be and the costs to be expected in realizing the system. Conclusive answers to these questions can often only be obtained by experiment. Available equipment allows experiments to be carried out quickly and at reasonable expense.

The image analysis center as well as the cross-application multi-sensor laboratory at Fraunhofer IOSB have been established for the purpose of carrying out at little expense experiments for clarifying processes, specifically for applications in which line scan-cameras can or must be used to acquire images of moving objects. Other departments at IOSB or the research group at the University of Karlsruhe are consulted in such research if necessary. The image analysis center and multisensor laboratory additionally offer a wide variety of equipment for acquiring and analyzing images.

Materials can be analysed in the frequency range of ultra violet (UV) to near-infrared (NIR) in order to obtain optimal decision criteria for the inspection task. The findings of „hyperspectral imaging“ also flow directly into the working committee for multispectral data analysis, which is coordinated by SPR.

