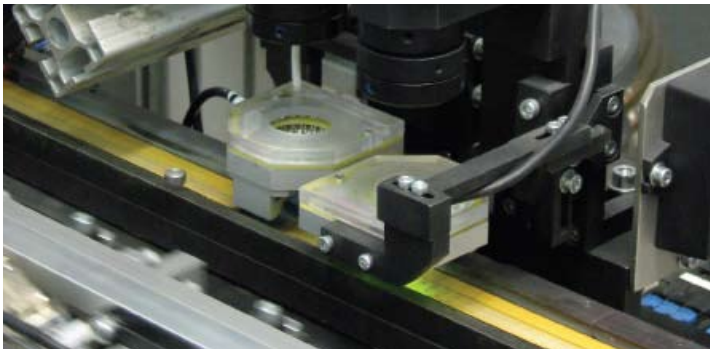


VISUAL INSPECTION SYSTEMS

CAMEA Visual Systems are based on the state-of-the-art and field-proven platform for creation of the industry inspection and traffic monitoring applications. All the key technologies used to create most innovative products are continuously being improved by CAMEA Ltd. They include: video-detection and image processing software, intelligent (smart) cameras, real-time processing units, lighting units, application software, etc.

Projects



Component Inspection

Component visual quality control of tantalum capacitors throughout the manufacturing process.

AVX Czech Republic, s. r. o.



Web Inspection

A set of line-scan cameras inspects non-woven textiles of varied grammages.

Pegas Nonwovens, s. r. o.



Bottle Inspection

Visual bottle inspection system for quality control and consistency of bottle walls, bases and necks, prior to filling.

NATE Chotěboř, a.s.,



Label Inspection

Visual inspection system measures the width and product orientation; the width of colour strip and its labels are compared to a reference label.

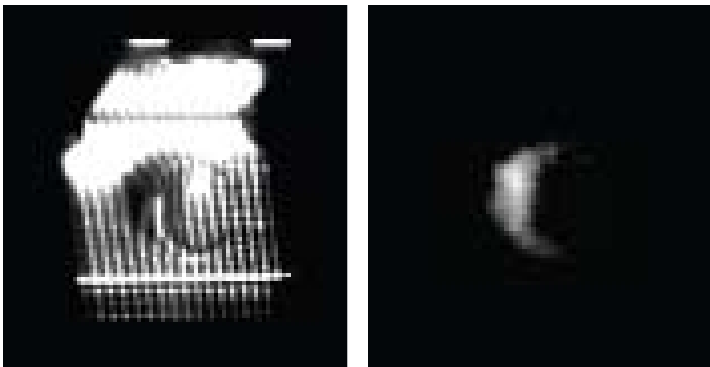
KOH-I-NOOR HARDTMUTH, a.s.

VISUAL INSPECTION SYSTEMS



Packaging Quality Control

Ensures correct product placement, shipping packaging integrity, blisters and joint weld quality. System also inspects barcodes and searches for missing components.
Hartmann - Rico, a. s.



3D Reconstruction

Object 3D surface reconstruction, volume measurement and surface area properties checking.
AVX Czech Republic, s. r. o.



Traffic Monitoring System

Unicam is the state-of-the-art and field-proven platform for creation of the multifunction intelligent transportation products dedicated for the road traffic market sector:

- » Section Speed Control
- » Red-Light Violation Monitoring
- » Lidar Speed Measurement
- » Intelligent traffic detectors
- » Automatic License Plate Reading

CAMEA Ltd.

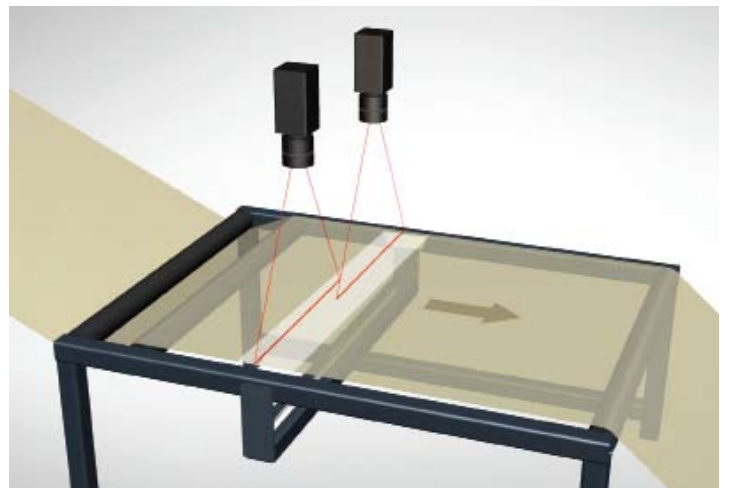
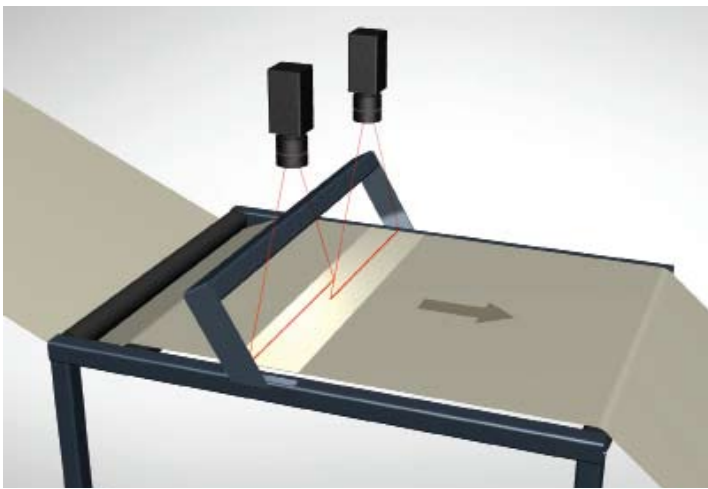
- » Founded in 1995 by a group of researchers focused on R&D in the field of image and signal processing, computer graphics and hardware accelerated real-time processing.
- » Active in R&D, manufacturing, selling, servicing, maintenance of components, systems, custom solution in areas of image processing for visual inspection in industry and traffic monitoring.
- » A strongly customer-focused company, which creates individual and project oriented customizations of CAMEA technology portfolio and performs R&D of unique systems according to the customers' needs.
- » Has produced and deployed around the world hundreds of visual systems with thousands of video cameras and real-time processing units for both industrial and traffic applications.
- » Has developed and installed most of the intelligent transport solutions that exploits image processing technology dedicated for the road traffic market sector in the Czech Republic.
- » Certified with ISO 9001:2001.
- » Headquarters are located at Kořenského 25, Brno, Czech Republic.
- » Branch offices are in Prague and in Lanškroun, CZ.

VISUAL INSPECTION SYSTEMS

Web Inspection CVT820

CVT820 is a visual web inspection and visualization system designed for defect detection on non-woven textiles, plastic foils, paper, metal plates, etc.

Typically defects sizes starting from 1 mm² at speeds faster than 1000 m/min over wide range of densities are detected. The system is configured according to customer requirements. Typical product width is 2 - 5 m.



Operation principle for material checking high density (diffused lighting) and low density materials (through illumination)

Suitable for

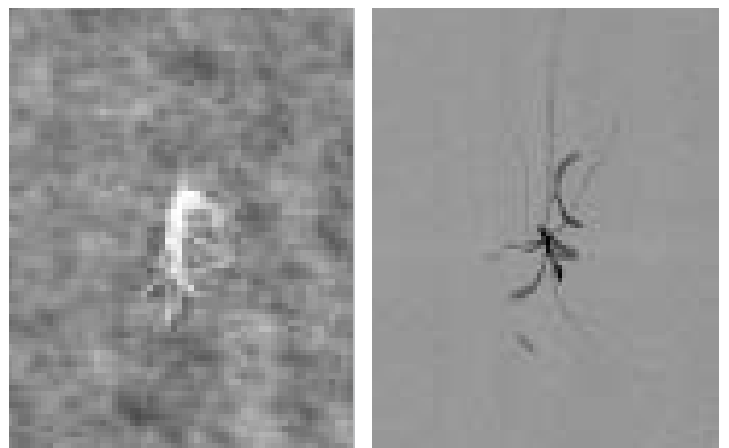
- » Non-woven textiles
- » Woven textiles
- » Metal plates
- » Paper rolls
- » Foils
- » Polycarbonate plates, etc.

Defects Detection

- » Holes, foreshots, insects
- » Folded materials and stains
- » Pressed-in foreign objects
- » Changes in surface texture
- » Material uniformity

Features

- » Adjustable sensitivity of detection
- » Configuration of smallest detection size
- » Defects classification (neural networks)
- » Direct link to production line (winch, cutter, etc.)
- » Statistics export, protocol printout
- » Quick and easy to expand
- » Automatic system diagnostics
- » User rights administration
- » Remote administration

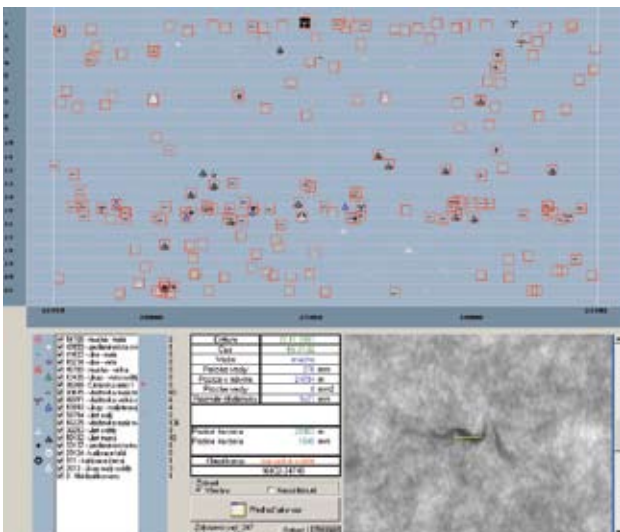


Examples of defects in non-woven textiles (left) and foil (right)

VISUAL INSPECTION SYSTEMS

Installations

Pegas Nonwovens, s. r. o., Fatra, a. s., JIP – Papírny Větrník, a. s.



Defects browser

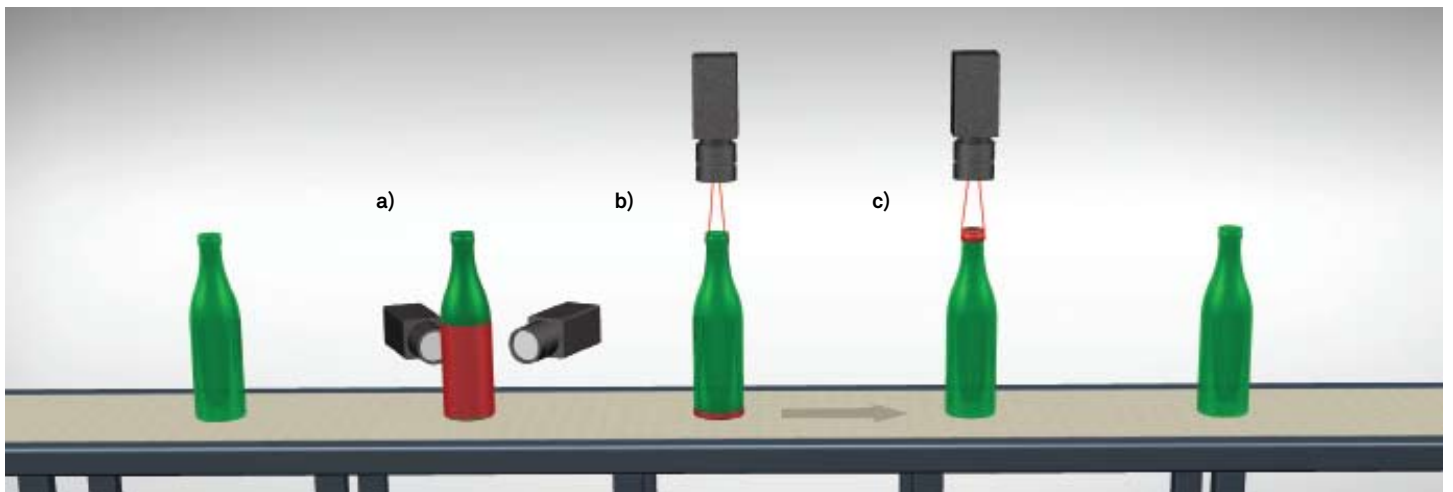
Line-scan cameras inspect the whole width (in this case 3.5m) of material. The detection area of production line is uniformly illuminated. Images from line-scan cameras are digitally processed by inspection software.

Industrial systems for Visual Quality Inspection forms the base of CAMEA Ltd. development. Systems are designed to individual customer requirements using all key technologies, video-detection, image processing software, intelligent (smart) cameras, real-time processing units, lighting units.

VISUAL INSPECTION SYSTEMS

Bottle Inspection BTCAM612

BTCAM612 is a visual inspection system for high-speed checking of bottles and glasses prior to their filling. Typically it is applied in food industry (breweries, distilleries, spirits industry, drinks production lines, etc.) as part of health and safety checks. The system verifies the bottle necks, bases, walls and at the same time scans each object from up to four angles to achieve maximum performance and quality control.



Operation principle on a bottling line - a) bottle wall inspection, b) checking bottle bases, c) checking bottle necks

Suitable for

- » Wide range of bottle types and sizes
- » Prevention of impurities and defects
- » Bottling line quality control

Defects Detection

Defects from sizes of $2 \times 2 \text{ mm}^2$ are being detected at bottling line speeds over 40 000 bottles per hour:

- » Contaminant (e.g. fungi) on the wall at the bottom
- » Foreign objects inside bottles (drinking straws, glass fragments, foils, bottle tops, etc.)
- » Missing bottle parts (broken or cracked bottles)
- » Chipped or contaminated bottlenecks

Features

- » Fine-tune each inspection
- » Configure defect's detection size
- » Configurable for a varied bottle types
- » System flexibility
- » Statistics export
- » Automatic system diagnostics
- » User rights management
- » Remote control
- » Remote administration



Detected defects on a bottle neck (left) and inside a bottle (right)

VISUAL INSPECTION SYSTEMS

Installations

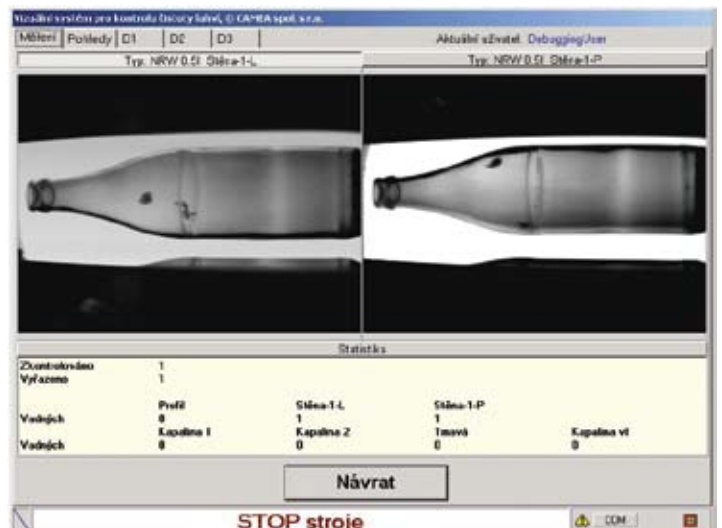
Brewery Litovel, Pepsi Americas, Brewery Hlinsko, Brewery Protivín, Korunní, Brewery České Budějovice, Kirov (RUS), Liepaja (LVA), Jurajska (POL)



Bottling line equipped with bottle inspection system



BTCAM612 visual inspection system applied in industry



User interface

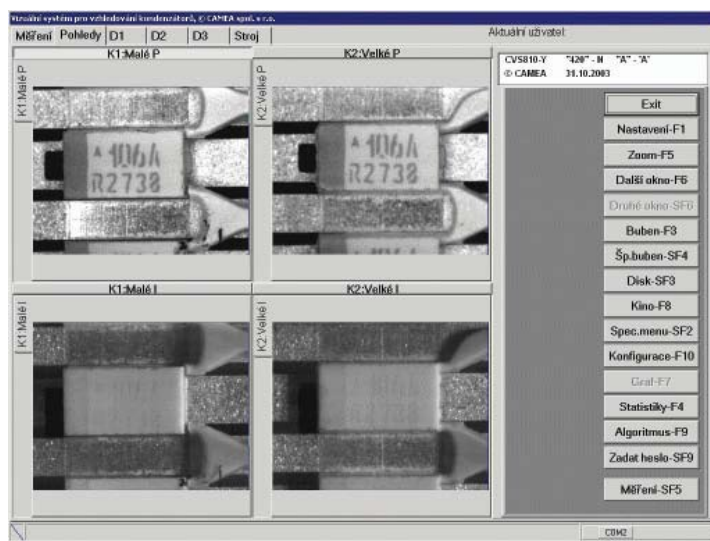
BTCAM612 visual inspection system is a part of EXAN system - a solution for bottling lines checking bottle quality manufactured by NATE Chotěboř, a. s. More detailed information may be found at www.nate.cz.

Industrial systems for Visual Quality Inspection forms the base of CAMEA Ltd. development. Systems are designed to individual customer requirements using all key technologies, video-detection, image processing software, intelligent (smart) cameras, real-time processing units, lighting units.

VISUAL INSPECTION SYSTEMS

Component Inspection CVS

CVS series are designed for visual product quality control during manufacturing of a broad range of components. Components are scanned by as many cameras as required. The system is adaptable in terms of verifying incomplete polarity markings, cracks and chippings, etc. Special illumination is used to highlight 3D defects, simultaneously suppress characters and enhance production defects, e.g. microscopic holes, contamination. Further quality control consists of comparing contact's shapes and rejecting defective components.



Quality control user interface for 3D defects

Suitable for

- » SMD components
- » Different component shapes
- » Items orientation
- » Colours and structure
- » Weld quality
- » Contacts, etc.

Features

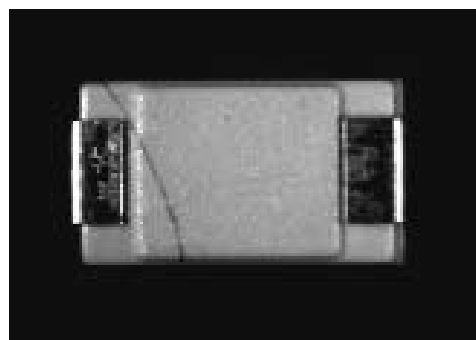
- » Fine-tune each inspection
- » Configure defect's detection parameters
- » System flexibility
- » Statistics export
- » Automatic system diagnostics
- » User rights management
- » Remote control



Defects detection

Defects from sizes of microns at rates of dozens of components per second are detected.

- » Cracks
- » Fragments
- » 3D surface defects
- » Contamination
- » Gauging components sizes



Detected crack on a component casing

VISUAL INSPECTION SYSTEMS

Installations

AVX Czech Republic, s. r. o.



Visual surface defects inspection on a production line



CVS visual systems benefit from custom designed optics



System illumination units

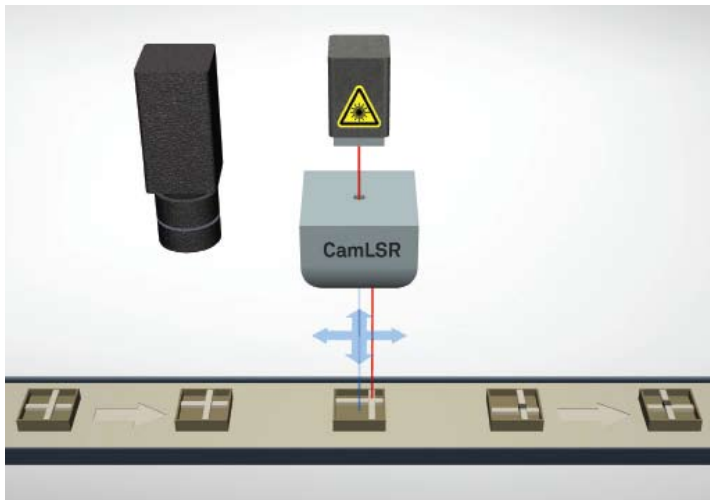
CVS visual systems are used during production as well as quality control for manufacturing tantalum and niobium capacitors. Millions of components are inspected daily.

Industrial systems for Visual Quality Inspection forms the base of CAMEA Ltd. development. Systems are designed to individual customer requirements using all key technologies, video-detection, image processing software, intelligent (smart) cameras, real-time processing units, lighting units.

VISUAL INSPECTION SYSTEMS

Laser Beam Deflector CamLSR

CamLSR optical system is intended for precise and fast laser beam deflection. The deflector is designed for applications requiring accuracy within microns, such as miniature contacts welding, cutting and carving. Due to system's small size it is possible to insert it in between the output of a laser beam and machined component. CamLSR may be enhanced with an intelligent camera system for image processing. This solution consists of advanced algorithms for automatic object targeting, system calibration and other features. Applications benefit from correction of errors caused by manufacturing tolerances, product mounting during on the fly contacts welding, etc.



Operation principle of laser beam deflecting

The system consists of two parts, measurement section and laser section. Measurement part (in this case the camera system) performs exact positioning measurement (for welding) on each component. This acquired data is transferred to the laser section, CamLSR controls the laser beam deflection on the supplied positioning data.

Suitable for

- » Accurate laser deflection
- » Laser welding
- » Laser carving
- » Laser cutting

Features

- » Very fast and accurate deflecting
- » Suitable for a wide laser product range

Open camera system (optional)

- » Supports variety of products
- » Turnkey solution
- » Automatic system diagnostic
- » User rights management
- » Remote control is available
- » Statistics export

Specifications

- » Max. laser beam deflection : preset setting ± 0.1 to ± 0.3 mm, in both axis
- » Angular resolution: 0.1 % of max. range
- » Thermal stability: < 0.005 %/°C of the range
- » Thermal stability of zero: < 0.007 %/°C of the range
- » Time for adjustment > 20 ms for transition between limits
- » Wavelength: 400 – 1300 nm, dependant on used laser
- » Interface: RS232, I/O interface, custom
- » Dimensions (W×H×D): 110 × 45 × 110 mm

VISUAL INSPECTION SYSTEMS

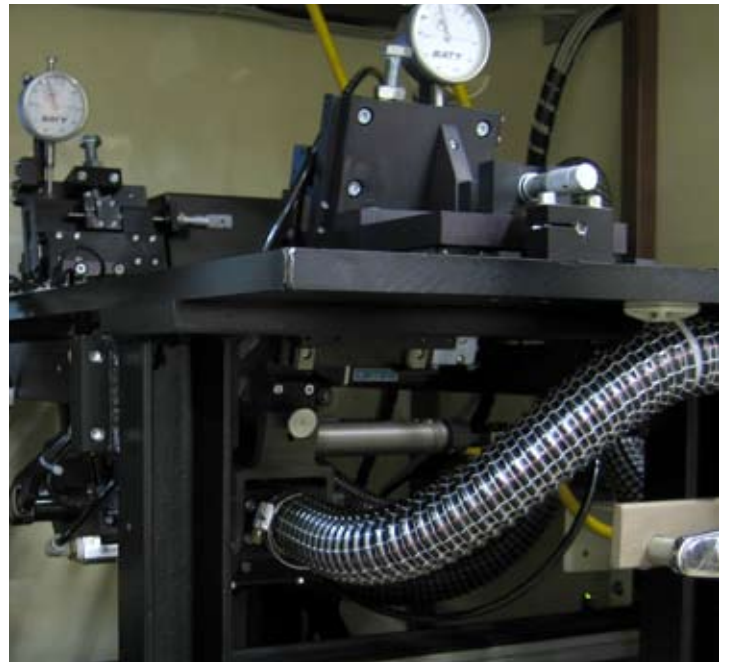
Installations

AVX Czech Republic, s. r. o.

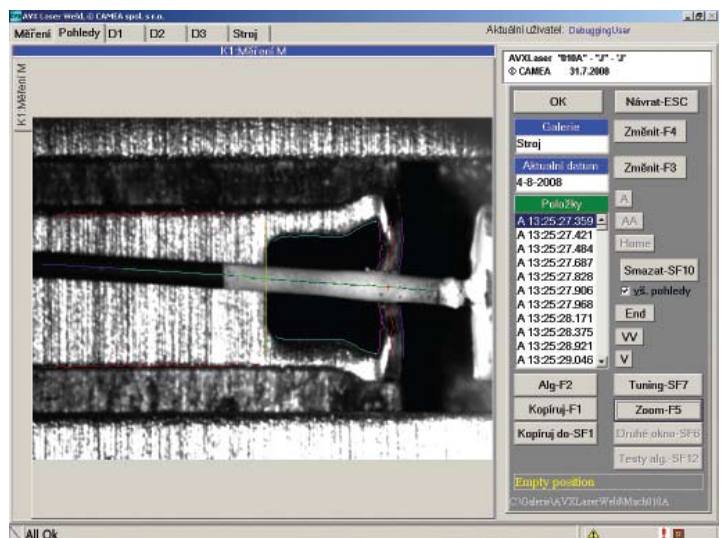
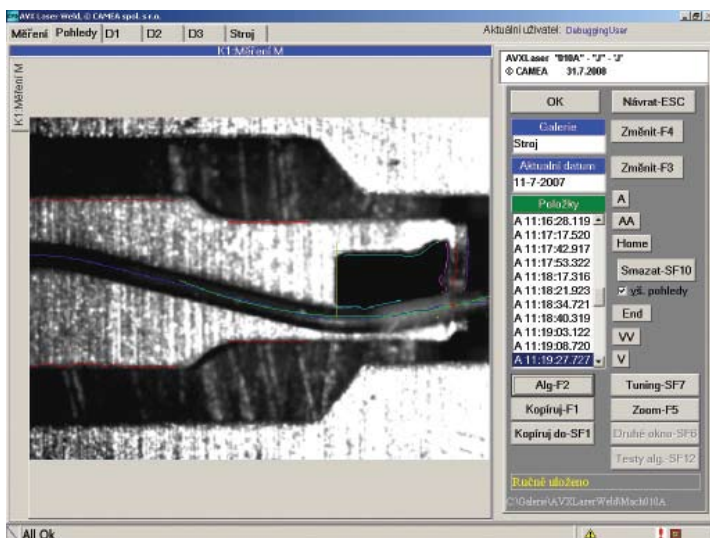
The production of tantalum capacitors uses the visual system during leadframe capacitor connector anode welding stage.



Positioning measurement taken with cameras and stroboscopic illumination system



Deflector CamLSR system integrated into the welding machine.



Images from visual inspection system – localization of connection leads enables accurate laser beam aiming

Industrial systems for Visual Quality Inspection forms the base of CAMEA Ltd. development. Systems are designed to individual customer requirements using all key technologies, video-detection, image processing software, intelligent (smart) cameras, real-time processing units, lighting units.