



# Mallenom Systems

Intelligent systems and technologies

[mallenom.com](https://mallenom.com)

# About



Mallenom Systems – development and implementation of computer vision systems and solutions for industrial video analytics.

Company profile: implementation of high-end IT solutions in the areas of transport, machine building, oil and gas, metallurgy, food, pharmaceutical, diamond mining, and other sectors.

At its own Research and Development Centre for Intelligent Systems, Mallenom Systems develops solutions based on neural networks and deterministic algorithms for image analysis. Besides, Mallenom Systems implements algorithms developed by the world leading companies in the field of machine vision.

[BROCHURE](#)

[WEBPAGE](#)

**2000+** implemented systems

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**50+** partners

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**80+** regular customers

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From 2012 to 2022 Mallenom System was the **sole official partner-integrator** for Cognex in Russia and the CIS countries.



In 2019, Mallenom Systems entered the **national rating of Russian fast-growing technology companies TechUp** held by the Russian Venture Company.



In 2022, Mallenom Systems has become the **official distributing and integrating partner** for Hikrobot company in Russia and the Eurasian Economic Union.

# Our team



**110 employees**

**strong R&D,**

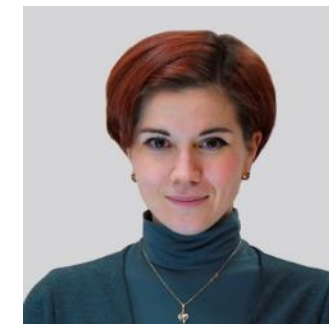
including:

1 Professor,

5 PhDs



**Founder  
Professor Leonid Malygin**



# Performed tasks



## Pre-design work

Preliminary research  
Formulation of technical tasks and  
other project documentation



## Delivery and setup of the hardware

Delivery, setup, commissioning and  
putting into operation of all  
supplied machine vision equipment



## Software development

Development from separate modules  
to allocated information systems with  
modern user interface



## Maintenance and warranty service

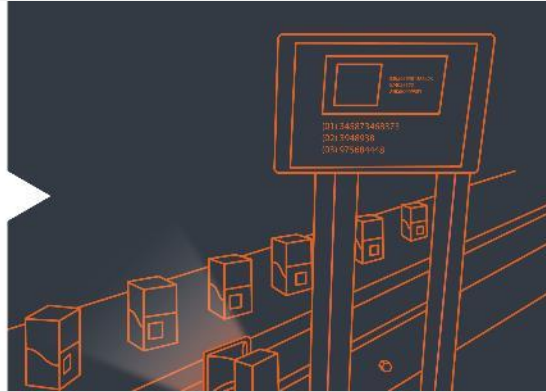
Consultation and engineering  
support. Warranty and post-  
warranty service



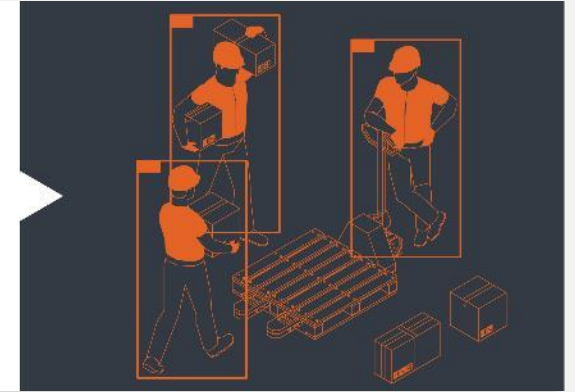


# Areas of expertise

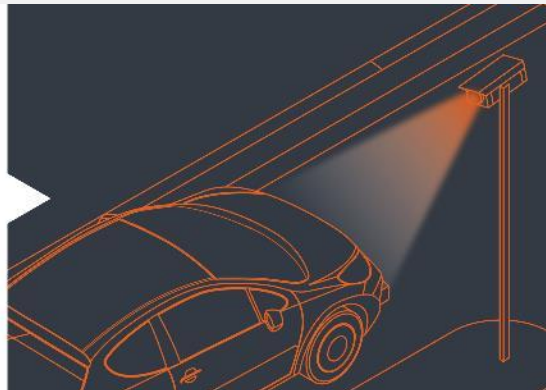
Machine vision  
for industry



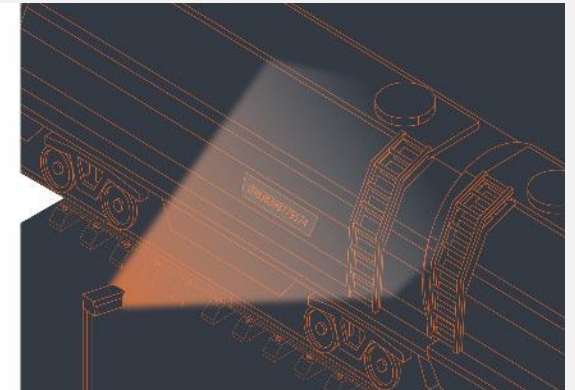
Detection and  
tracking of people  
and events  
on video



Video control  
of road transport



Identification and  
monitoring of rail  
transport



# Machine vision for industry

## QUALITY CONTROL SYSTEMS

- ✓ Supply of solutions ready for implementation
- ✓ Development of systems for specific tasks

Quality control of products, materials, packaging:



Defect detection



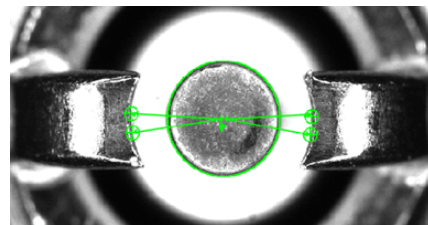
Surface inspection



Granulometric composition assessment



Assembly and placement verification



Measurements, tolerance checking



Examination and identification based on color



Procter & Gamble

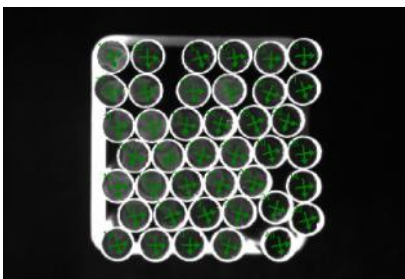


# Machine vision for industry

## TRACK AND TRACE SYSTEMS

- ✓ Supply of systems for barcode/alphanumeric marking reading and product counting
- ✓ Development of L1-L2 modules for industrial tracking systems
- ✓ Development of systems for specific tasks

## Tracking of items, containers and mechanical devices:



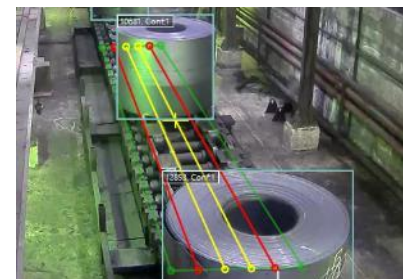
Item detection and counting



Marking-based identification (1D/2D codes, alphanumeric markings)



Identification based on external appearance, identification of the material state



Tracking of large-sized manufactured items, containers and mechanical devices

**MARS**



**NIPPON STEEL  
TRADING**





# Machine vision for industry

## TRACK AND TRACE SYSTEMS

Serialization, verification and aggregation  
as a part of national system for mandatory labeling of goods



**VISCONT.Alco**

excise stamp accounting of  
alcoholic beverages



**VISCONT.Pharma**

for pharmaceutical  
manufacturers



**VISCONT.Milk**

for dairy producers



# Video analytics for control of people and dangerous events

**EYECONT** – adaptable intelligent video analytics system that analyses video from IP cameras, detects people, monitors their conduct and movement, as well as entry of people into identified (hazardous) areas in real time.



## Control of PPE use

- Identification of more than 15 types of PPE: hard hat, work uniform, respirator, safety ear muffs, chin strap, high visibility safety vest and others
- Correct use of PPE



## Detection of hazardous conduct

- Smoking in the smoking-free areas
- Member of personnel that has fallen asleep
- Fall of person from a height



## Detection and tracking of people

- Face identification
- Detection of visual control performed by an operator of technological process
- Control for compliance with a work schedule



## Control of zones and dangerous events

- Identification when people enter hazardous zone
- Identification of fire and smoke
- Detection of left unattended objects

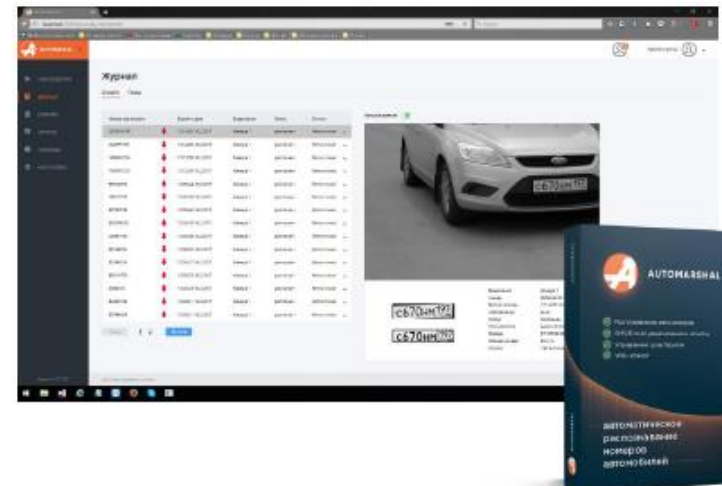
# Video control of road transport

## AUTOMARSHAL

Software for automatic recognition of the vehicle number plates for continuous traffic flow and controlled entrances

Recognition of the vehicle number plates is performed for the video footage streamed from the cameras. The software saves information about all passing cars into the database: time and date for the vehicle number recognised, vehicle direction of travel, vehicle image, vehicle number plate, name of the camera that supplied image for recognition, comments from system operator, etc.

- More than 2000 implementations in Russia, CIS, Europe and other countries
- More than 20 integrations with third-party systems
- SDK for easy integration
- Prompt technical support



BROCHURE

WEBPAGE



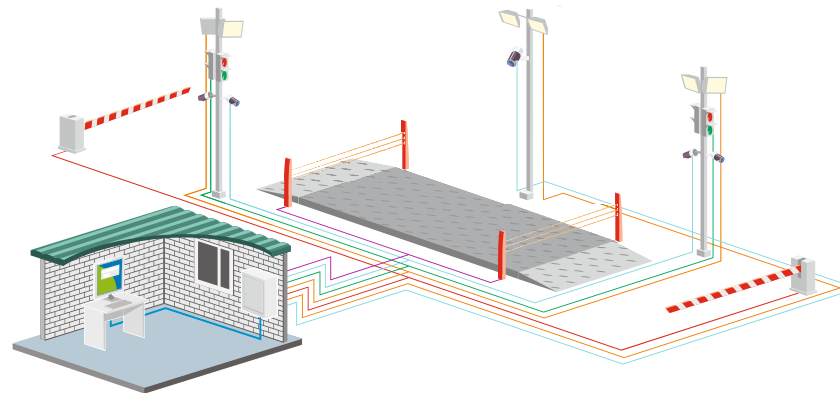
# Video control of road transport

## AUTOMARSHAL.WEIGHBRIDGE

Weighing automation system, designed to improve the operational efficiency and reliability of the vehicle weighing

When vehicle enters a weigh station, the system checks the vehicle positioning on the scales. In case the vehicle is correctly positioned, the system records the vehicle net weight, performs the recognition for the number plate and stores the data on the local MS SQL Server database.

- More than 40 implementations in Russia from Kaliningrad to Chukotka
- Easy adaptation to any weighing station
- Reliable data storage
- Switching between different weighing scenarios



BROCHURE

WEBPAGE



METTLER TOLEDO



# Video control of road transport

## VIRIS SMART CAMERA

All-in-one adaptive solution with Automarshall ANPR software at its core. VIRIS is equipped with infrared lighting, digital surveillance camera and build-in computer.

- The camera controls its hardware parameters on the go for maximum recognition quality
- Unlike conventional smart cameras with license plate recognition, VIRIS contains a full-fledged vehicle access control system on board.

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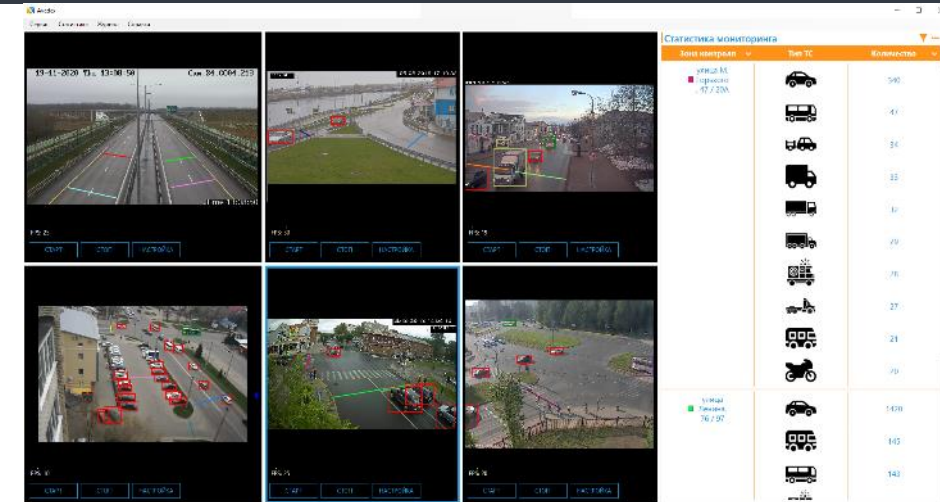


# Video control of road transport

## AVEDEX

Software for automatic analysis of vehicle and pedestrian traffic on video

AVEDEX is designed to count vehicles and pedestrians using camera feed or a video file. Vehicles are classified into categories, convenient display and export of the obtained statistical data is provided.



Support of different camera angles, including the one of a dashcam



Counting of traffic can be performed for live video stream or for pre-recorded video file



Accelerated video file processing mode



Processing of up to 8 video channels simultaneously



High performance with relatively low system requirements



Accuracy of assessment is up to 99% due to the use of deep learning neural networks

BROCHURE

WEBPAGE

# Video control of road transport

## ROAD BAILIFF

Hardware-software complex that uses ANPR technology which automatically identifies in the traffic flow vehicle owners with outstanding debt payments

Most often, the "Road bailiff" is used by employees of the Federal Bailiff Service and the traffic police during joint raids. The system is available in several configurations: stationary installation, unit for mobile deployment and the tablet options.

- Supplied in several modifications: from stationary installations to tablet PC options
- More than 10 years of successful operation in more than 50 regions of the Russian Federation and the CIS countries
- In most cases, the HSC pays off within 1-2 days

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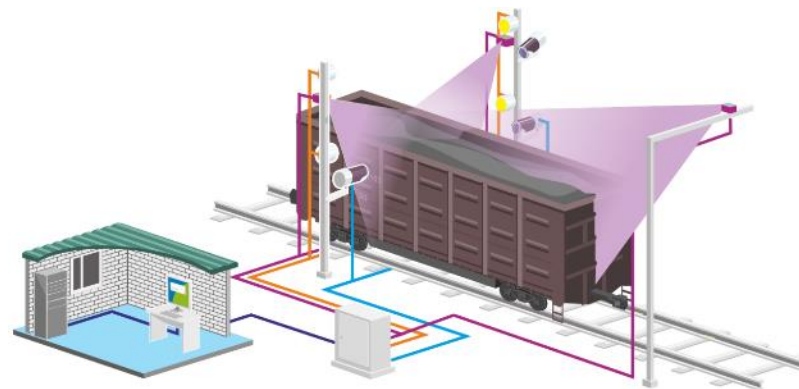
# Identification and monitoring of rail transport

## ARDIS

The line of solutions based on the railcar number recognition technology for identification and control of the railway transport – railcars, containers, tank cars

ARDIS automatically performs the recognition of identification numbers located on the frame and sides of the railcars. Additionally, ARDIS generates a report for each railcar that contains photo, video, identification inventory number, moving speed, date and time, number of axles, railcar type, etc. Furthermore, ARDIS can receive and aggregate information from the rail scales and other systems, archive data for the passing train, and send information to the external information systems.

- First railcar number recognition system in Russia, since 2006
- More than 50 implementations in Russia and the CIS
- Transportation of more than 50% of oil products in Russia is being monitored with ARDIS systems

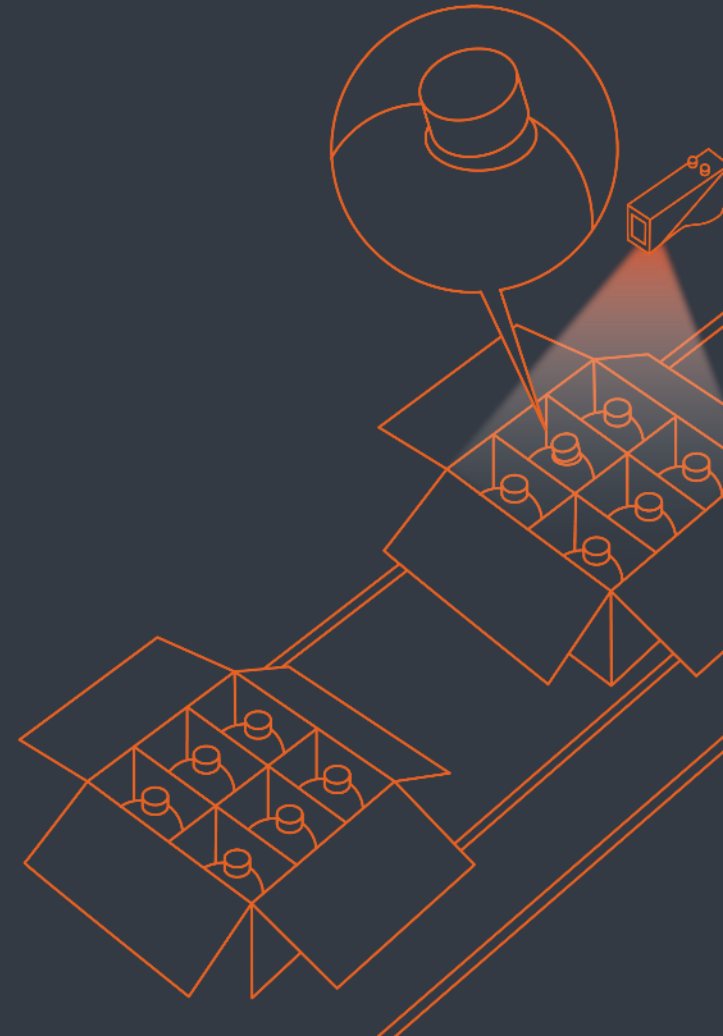


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# Implementations



# Diamond classification based on colour and shape

## Customer

ALROSA JSC

## Task

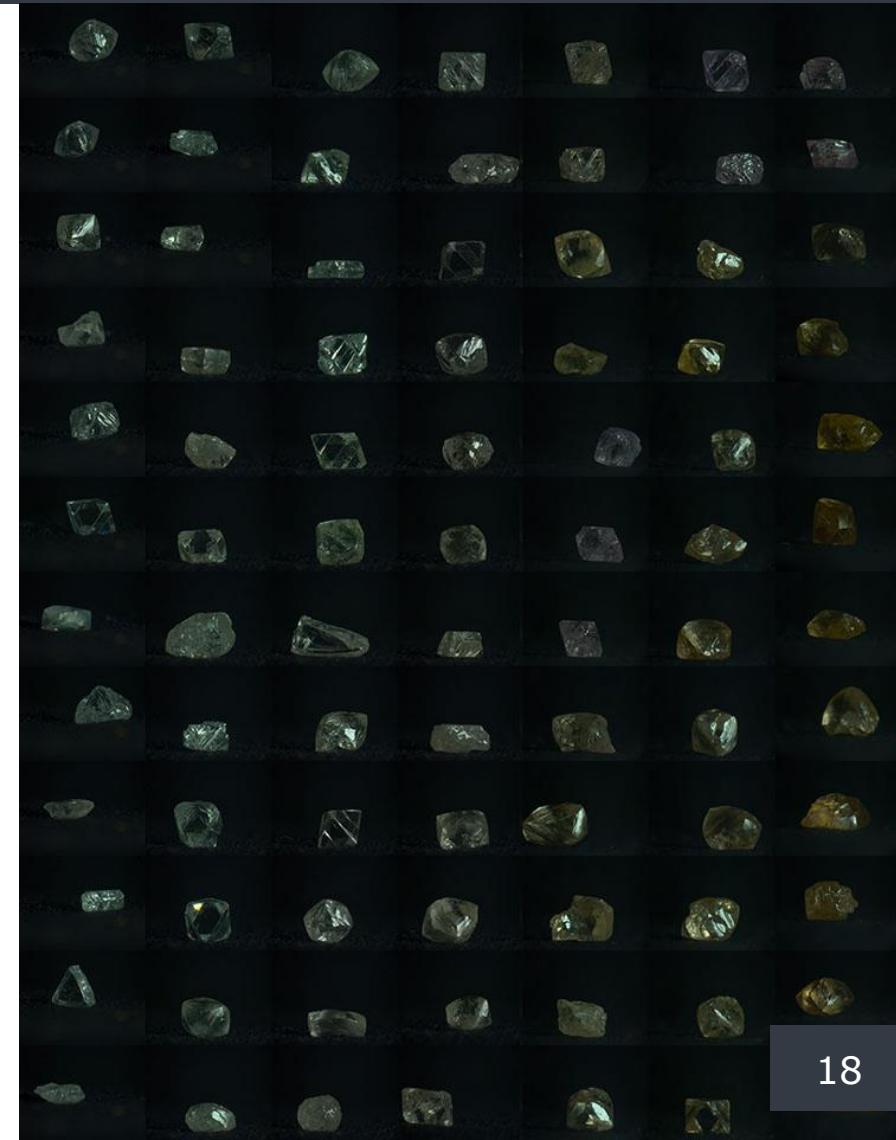
Development of system for automatic diamond sorting based on colour and shape at a rate of 20 diamonds per second and recognition rate of at least 95%.

## Solution

Machine vision cameras capture diamond while it is in a free fall. The software analyses properties of the diamond images received from all utilised cameras and performs classification based on machine learning models.

## Result

- ✓ Improvement of operational efficiency
- ✓ Decrease in the prime cost
- ✓ Minimisation of economic losses due to diamond misclassification





# Assessment of granulometric composition for bulk materials

## Customer

Central mining refinery plant (being implemented)

## Task

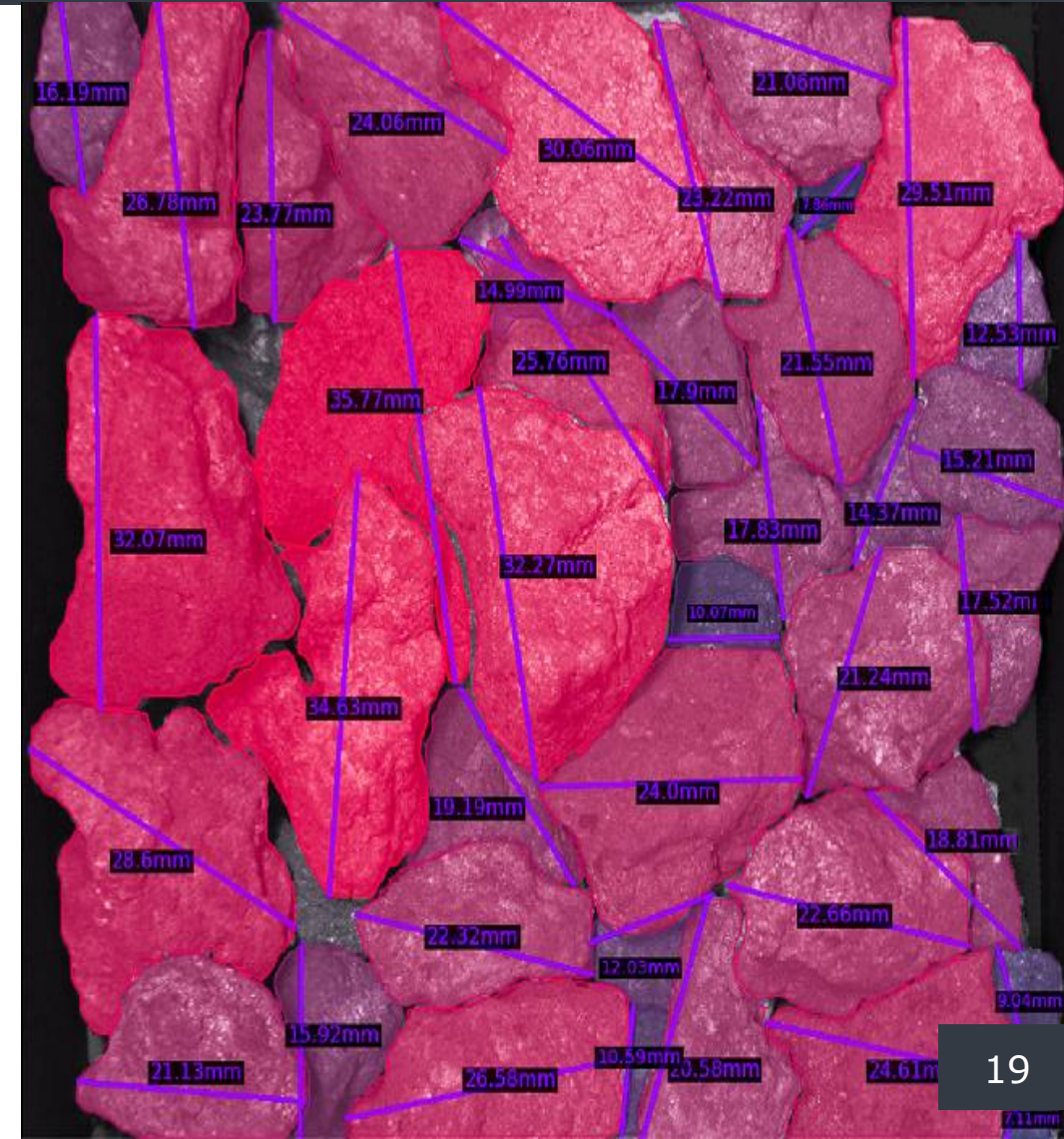
Control of granulometric composition of mined rock mass (coal), classification of detected granules based on the size classes, detection of oversized granules and identification of empty spaces at a conveyor belt.

## Solution

The system detects and classifies transported coal mass by a conveyor. It enables to identify the size, collect statistical data for the granulometric composition for the specified time period, and generate reports in a convenient form. As an option, the system can be configured to identify the type of coal.

## Expected result

- ✓ Minimisation of human factor
- ✓ Increase in the plant output
- ✓ Situational process management at the plant for refinery process



# System for monitoring of item carriers and transportation mechanisms

## Customer

Data-Center Automatica LLC for NLMK PJSC

## Task

Control for the movement of steel ladles and cranes, cast iron overflow and movement of cast iron ladle carriers at Pneumatic Steelmaking Facility 1 and 2; forming of the up-to-date data for their location and condition for dispatching system and optimization of technological processes

## Solution

System is based on IP cameras and recognition servers. The server hosts developed software for industrial video analytics that is based on neural networks. The system identifies and classifies objects in the video image, detects location and state of the transport container/mechanism, identifies markings if applied, visualizes data and video streams in the operator's workstation and transmits data and video streams to external information and control systems.

## Result

Supply of up-to-date data on the location and state of containers and transport mechanisms for the purposes of long-term planning and preliminary operational planning of technological processes





# Identification of pipes based on surface markings

## Customer

Major metallurgical plant

## Task

Optical identification of pipes for tracking across different production stages

## Solution

System based on machine vision camera and recognition server that performs optical recognition for the identification number from the surface of a pipe

## Challenge

Identification is performed under harsh industrial conditions for large diameter pipes (pipes constantly rotate along their axis while there are being transported by a conveyor). Additional complexity arises due to low quality of identification markings, large control area, high reflectivity and large variety of pipes

## Result

Provision of reliable data (with accuracy up to each single produced item) during tracking of manufactured items at different production stages (per client requirement to generate electronic IDs for each manufactured item)



# Control for positioning of hot-rolled coils

## Customer

Severstal PJSC

## Task

Control for the positioning of the hot-rolled coils on the production line and detect their offset.

## Solution

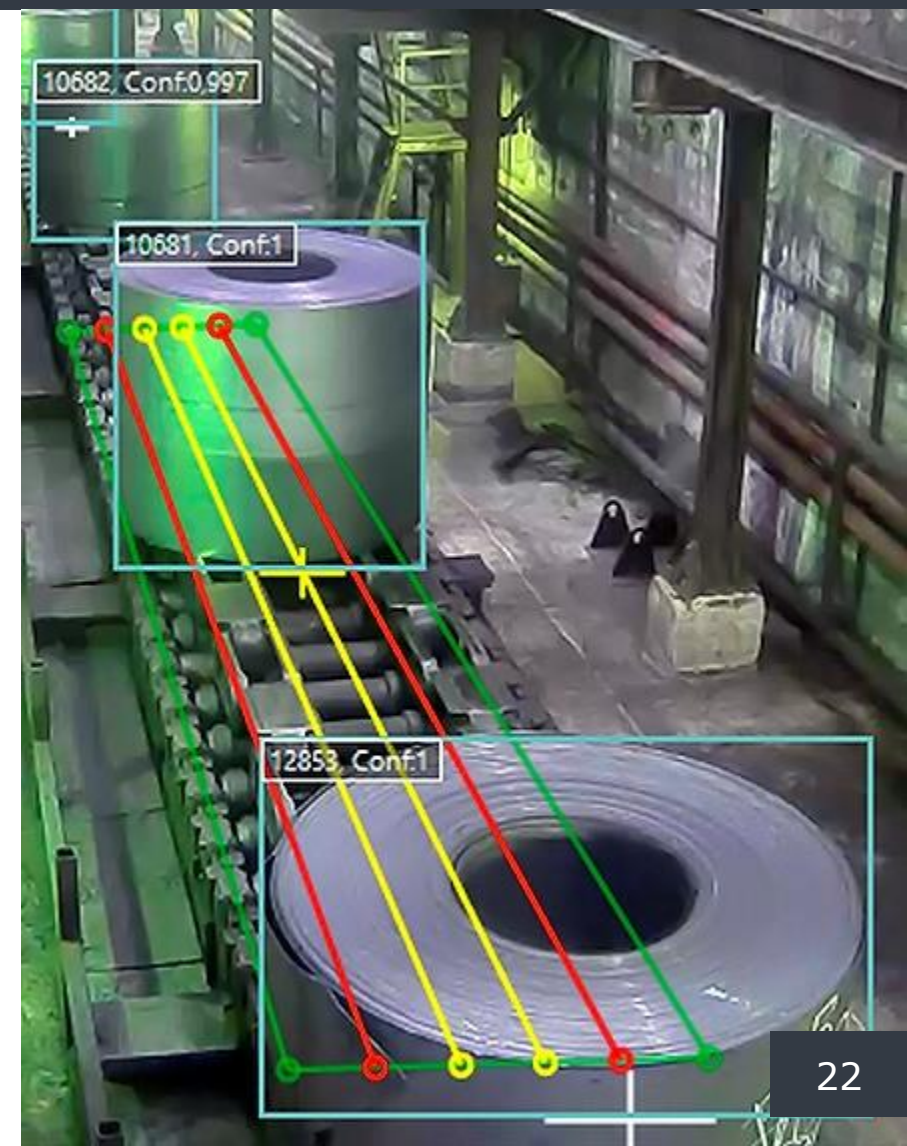
System utilizes the video stream from IP-cameras installed at the production facility. The software monitors the positioning of the coils at two control points simultaneously. The system assigns a status to each coil, which ranges from "safely positioned" to "dangerous offset" and "fallen". All changes in the coil status are recorded and saved into the database.

## Challenge

IP-video cameras are installed at a challenging for reliable recognition angle; challenging lighting conditions

## Result

- ✓ Control and early detection of emergencies at a production line
- ✓ Reliable data collection for monitoring of hot-rolled coils state



# Control for the cutting point of hot rolled metal

## Customer

Severstal PJSC

## Task

Control for the cutting point of hot rolled metal with flying shears

## Solution

System is based on a smart camera with specially designed water cooled casing. The camera captures the images of a mill in real time. When the rolled metal enters the camera view, the system measures the material visible width. When the certain conditions are met, the system issues control signal for the flying shears to perform a cut

## Challenges

The control point is located in challenging industrial environment with extreme temperature conditions

## Result

- ✓ Decrease in the number of rejected metal products
- ✓ Decrease in the risk of damage and emergency stop of machinery





# Quality control of agricultural produce

## Customer

RUSAGRO

## Task

Assessment of the sugar beets quality in the bed of delivery truck

## Solution

When the system registers the vehicle, it issues a signal to begin imaging of a truck's bed. Obtained images then are analysed with the help of neural networks. The system determines how dirty the sugar beets are; and detects the presence of chipping, beet tops and frost damage. Based on the overall results, the system classifies received shipment among quality categories

## Result

Minimisation of losses associated with long-term storage of low quality produce



# Quality control of the pilot holes on wooden blanks

## Customer

IKEA-Tikhvin

## Task

Control of the presence, location and size of the pilot holes on wooden furniture blanks

## Solution

At the production site, the wooden blanks move along a roller conveyor. When passing the control zone, two area scan cameras take pictures of the front and rear ends of the workpiece. The third, line scan camera is located under the conveyor and takes images of the bottom surface of the workpiece. The algorithms detect the presence of pilot holes and compare them with a template for the current type of workpiece. In the case of any detected deviations or defects, the system automatically informs the operator by issuing an alarm.

## Result

- ✓ Replacing selective manual control with automatic control of each unit of production
- ✓ Reduced number of defects and associated costs





# Detection of foreign objects in plastic containers

## Customer

ALPLA Chekhov

## Task

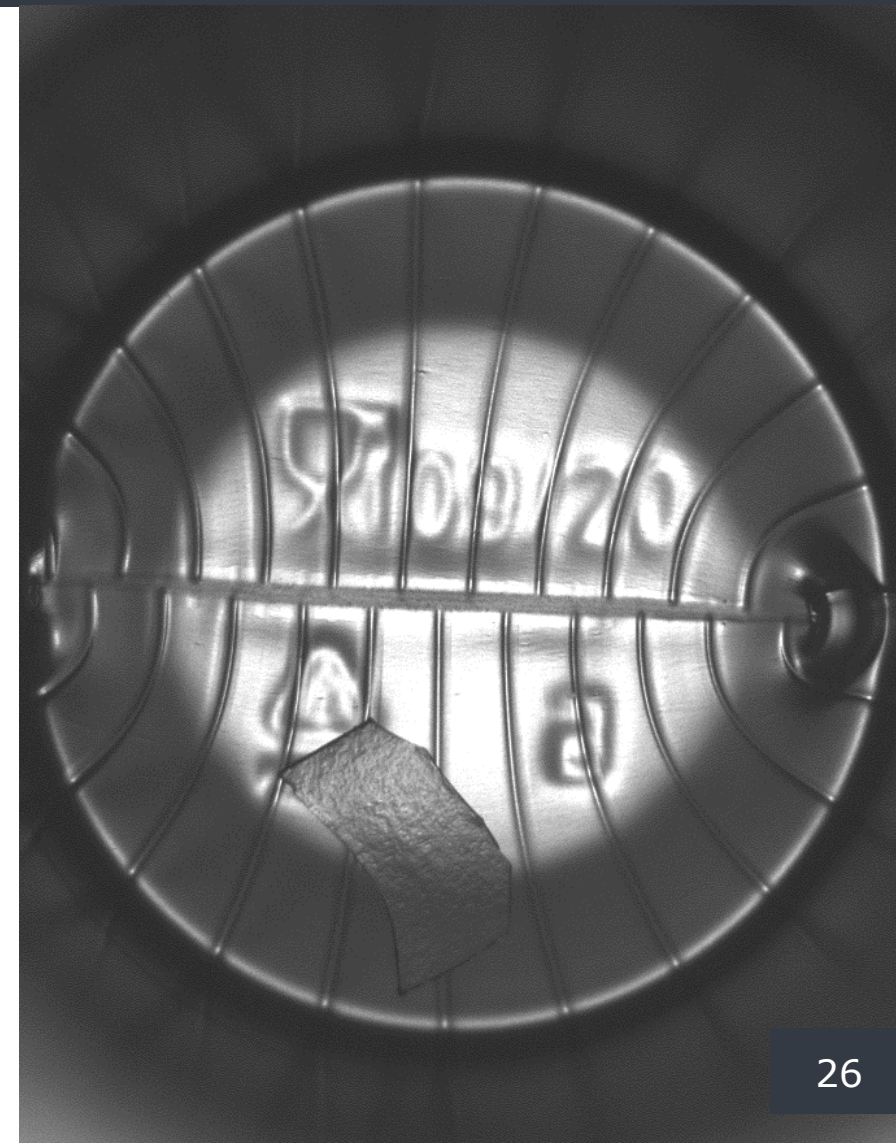
Control for the presence of foreign objects inside plastic containers including the objects that are identical in material and color to the controlled surface

## Solution

Smart camera searchers for plastic objects and any deviations in the brightness of bottom, such as influx of plastic or holes larger than 3 mm in diameter. Specialised background lighting was used in the final solution to aid with recognition.

## Result

- ✓ Improved quality of produced products
- ✓ Decrease in number of defects and associated expenses



# Control of the edge stain for laminate flooring panels

## Customer

Sinto for the manufacturer of laminated flooring panels

## Task

Control of the stain coating intensity for the edges of laminate flooring panels

## Solution

The solution features two sets of machine vision cameras with two cameras in each set for the quality control of laminate flooring panels both across their length and width for the overall total coverage of the panels' edge area. As each panel passes through the control zone, the algorithm detects the edge from image and identifies areas across the panel's edge that have been left unpainted. The system derives the overall stain quality of the panel's edge based on performed visual inspection and automatically rejects the flooring panels with the quality below the set threshold value.

## Result

- ✓ Improving the quality of manufactured products
- ✓ Reduced number of defects and associated costs



# Control for sealant application

## Customer

ThyssenKrupp System Engineering LLC for a major automotive manufacturer

## Task

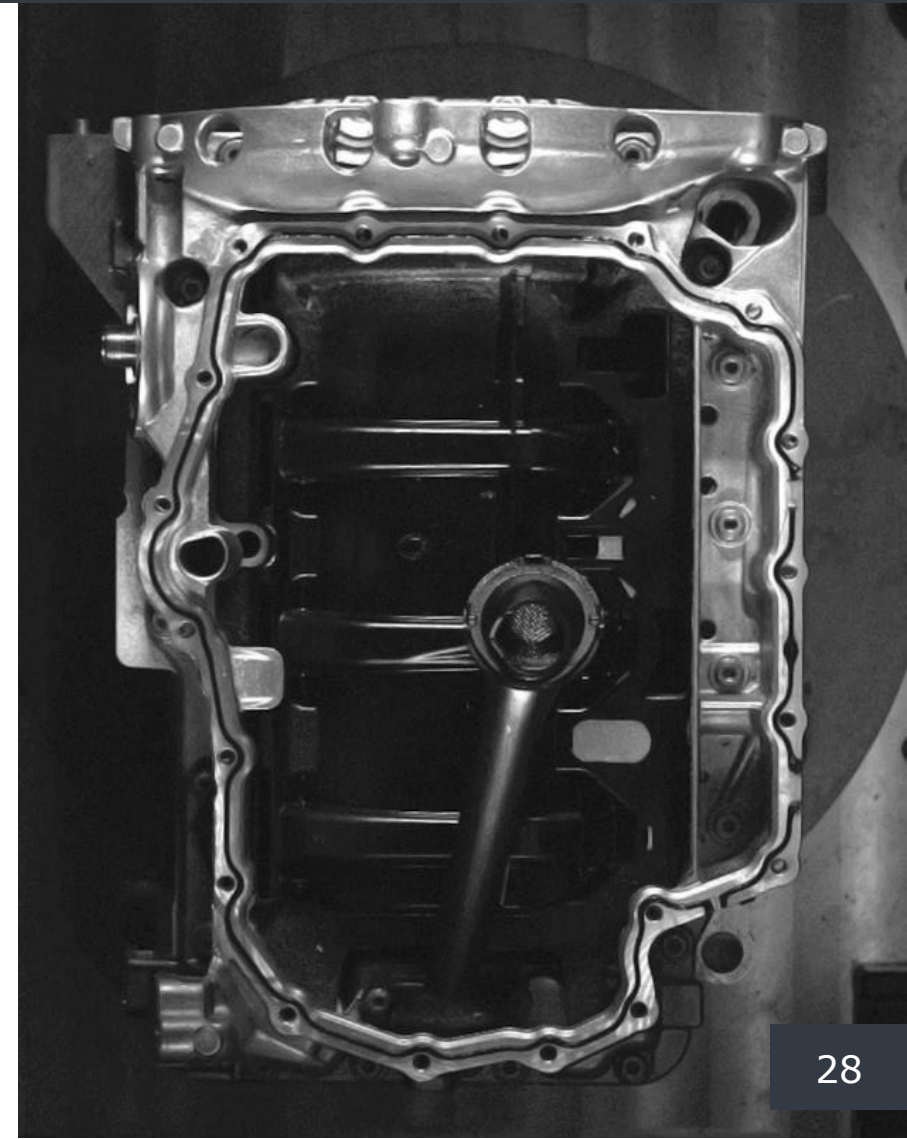
Control for the engine block sealant application

## Solution

System is based on a high resolution machine vision camera and detects deviations in thickness of sealant application, its positioning and uniformity. Separate video camera controls for the presence of defects in the sealant ring

## Result

- ✓ Improved quality of manufactured products
- ✓ Reduced number of defects and associated costs





# System for identification and counting of cylindrical machinery parts

## Customer

Machinery parts manufacturer

## Task

Recognition of identification markings and counting of cylindrical machinery parts with 100% accuracy

## Solution

The system is based on machine vision camera, specialised lighting and software for counting and recognition of identification number from the product surface.

## Result

- ✓ Improved overall productivity
- ✓ Reduced influence of human errors during object identification and counting
- ✓ Reliable tracking of each individual manufactured part across entire production process



# Identification of type and sectionality of a heater based on visible properties

## Customer

Rifar

## Task

Identification of a heater type based on width, height, number of edges and curvature shape of the edges while heater travels along painting line

## Solution

The system is based on machine vision cameras, specialised lighting and software. It reliably identifies the heater type and sends the heater recognition code to the external system

## Challenges

The system needs to be able to recognise and distinguish between 40 types of heaters.  
The variation across different types of heaters can be miniscule

## Result

Information received by the system is utilised to track the heaters of different types and sectionality across remaining production stages up to the packaging of completed products



# Identification of bumper type

## Customer

Bumper manufacturer for major car brands (Volkswagen, Skoda, Mitsubishi and others)

## Task

Identification of a bumper type on a shelf in a painting room and its matching with RFID label located on the shelf. When identified bumper type does not correspond to RFID label, the system sends a signal to the external system

## Solution

Created system is based on smart camera and software for bumper identification. The system checks for the bumper presence and correspondence of the bumper type. The system integrates with the production line controller based on ProfiNet protocol. To meet the requirements, specialised high power and brightness lighting unit (700W and 64,000 lumens) was manufactured

## Result

Optimisation of the robotized painting procedures



# Measurement of a gap between electrodes for the spark plugs

## Customer

Robert Bosch Saratov OJSC

## Task

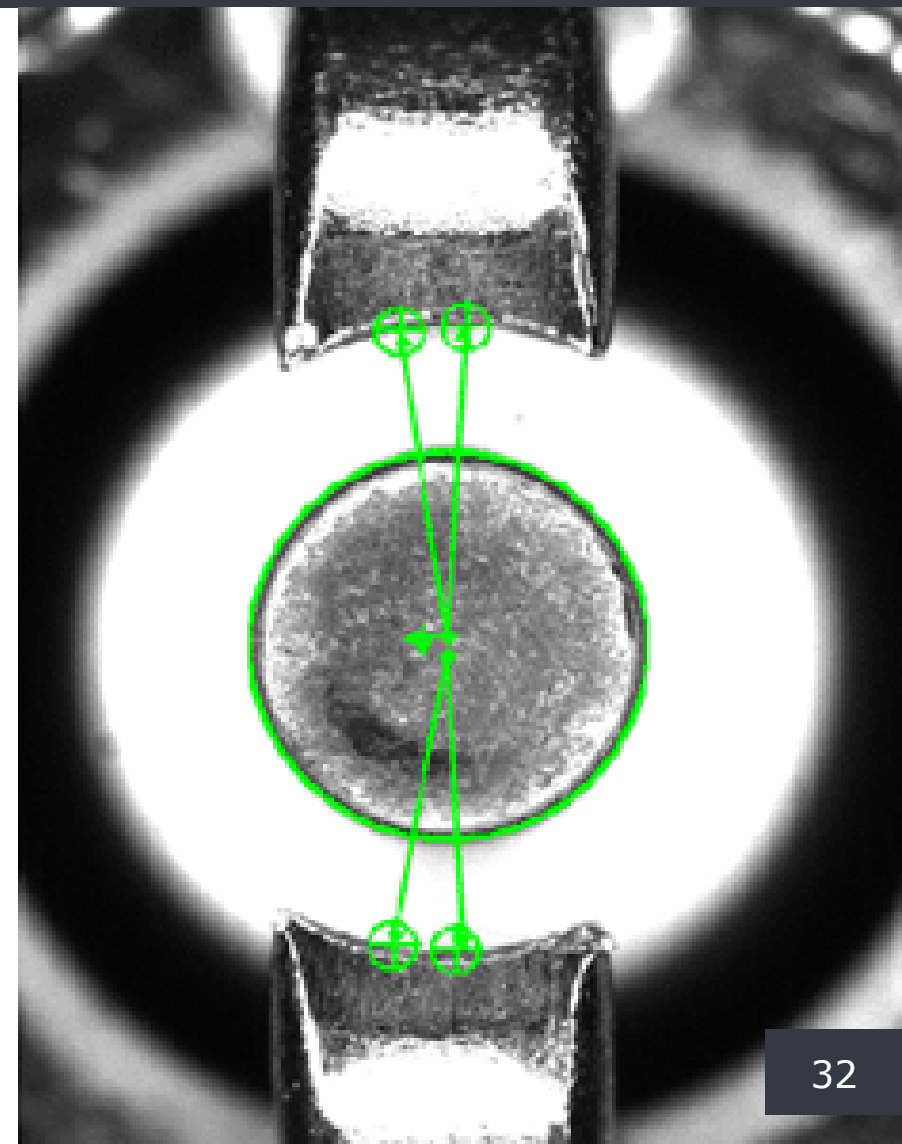
Identification and measurement of the gap between side and central electrode based on the spark plug image

## Solution

To eliminate influence of the perspective distortion on the measurement results, the telecentric lens is utilised. This type of lens creates parallel projection for control zone onto video camera CCD imaging sensor. The smart camera measures the gap between two electrodes. Stabilised power supply is used to stabilise the output of a light unit

## Result

- ✓ High measurement accuracy
- ✓ Substantial decrease in manufacturing time





# Control for the silicon plates juxtaposition

## Customer

Scientific and technical center MT LLC

## Task

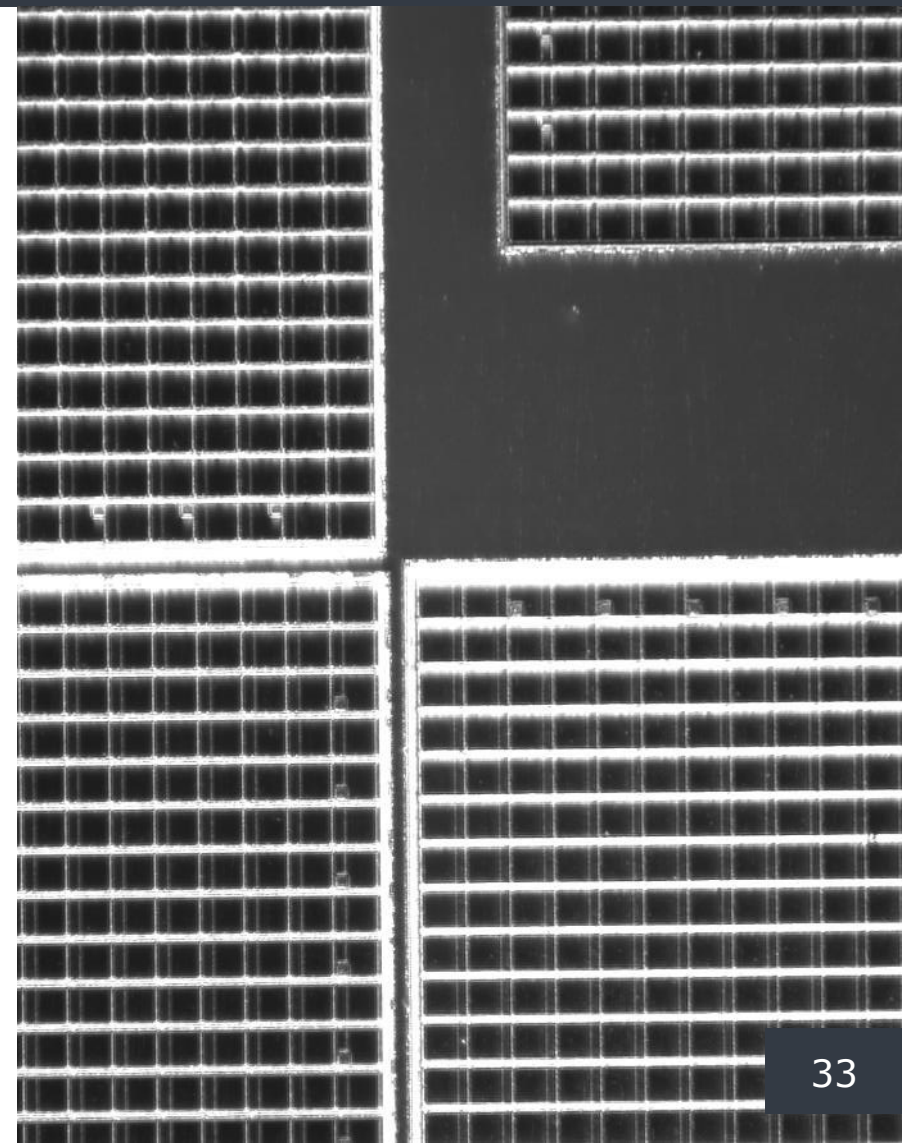
Visual control of technological equipment for assembly of mammography detector

## Solution

Video control for the process of four silicon plates juxtaposition starts from the distance of 2 millimetres to the target distance of 50 micrometres between edges of pixel areas with accuracy of  $\pm 2$  micrometres. The video control is performed from five angles (4 cameras at the edges of connected lines and 1 camera in the center of connected lines). The objective is to obtain cross-shaped connection line 50 micrometres wide in all directions

## Result

Improvement in precision of mammography detector assembly





# Identification of pore parameters for nano-filtration membranes

## Customer

Joint Institute for Nuclear Research (Dubna, Russia)

## Task

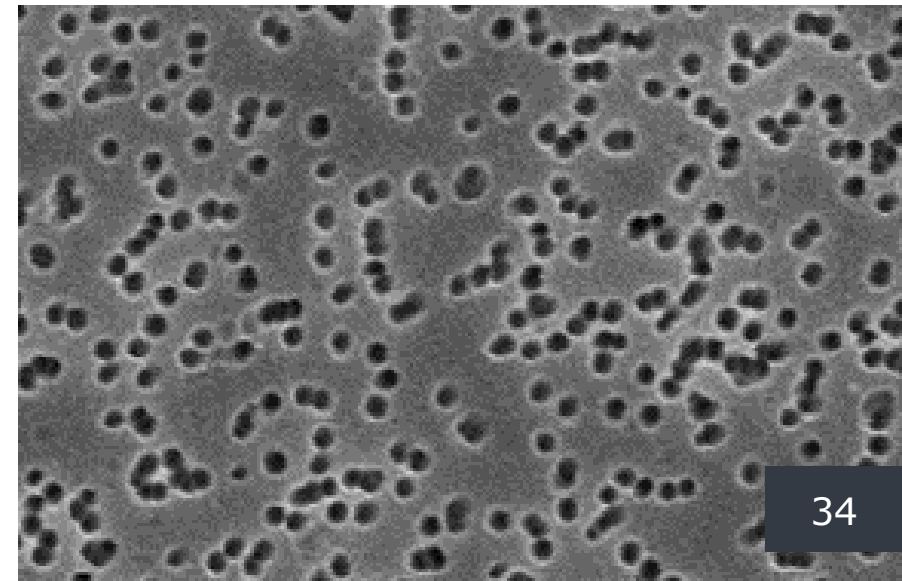
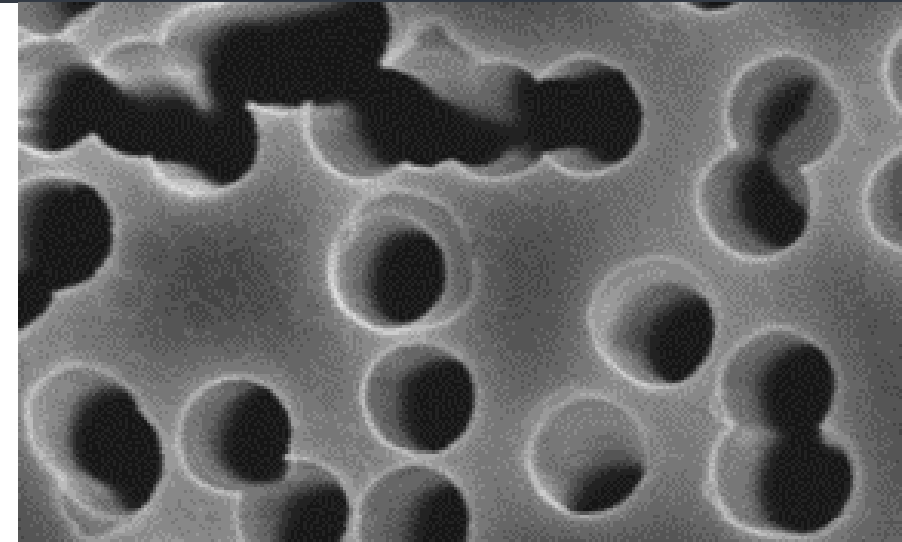
Identification of inadmissible sized holes obtained during neutron bombardment of the membranes. The size of the holes is measured in nanometres

## Solution

Specialised mathematical models and software allow to detect hole in the image of a membrane obtained with electronic microscope. Overall, developed solution performs the measurement for the size of each hole and detects holes of inadmissible size

## Result

Detection of low quality membranes



# Quality control for tablets and capsules placed in blister containers

## Customer

Pharmstandard OJSC, Ozon LLC

## Task

Control for the presence of tablets in blister containers; detection of tablets' surface chipping; detection of the foreign objects presence; detection of spots on the visible tablets' surface. Control at the production line should be performed at a rate of 250 tablets and capsules per second

## Solution

The smart camera performs automatic check for the presence and quality of tablets and capsules by analysing image of blister container. The system can easily accommodate different types of blister containers, sizes and colours of tablets.

## Challenges

High rate of control and large variety of types and sizes of controlled products

## Result

100% of control for all tablets and capsules



# Recognition of markings and aggregation of pharmaceutical products

## Customer

Biocad CJSC

## Task

Recognition of alphanumeric markings and DataMatrix code from secondary packaging of pharmaceutical products; multiple recognition of DataMatrix codes at product aggregation stage

## Solution

The smart camera performs recognition of alphanumeric markings and DataMatrix code from the packaging with subsequent validation at a production line. The high resolution smart camera performs multiple recognitions of DataMatrix codes from secondary package during product aggregation

## Result

- ✓ Developed solution is at the core of track and trace system of pharmaceutical products installed at production facility in accordance with government regulation



# Recognition of alphanumeric markings for heatsink units

## Customer

Nuclear industry enterprise

## Task

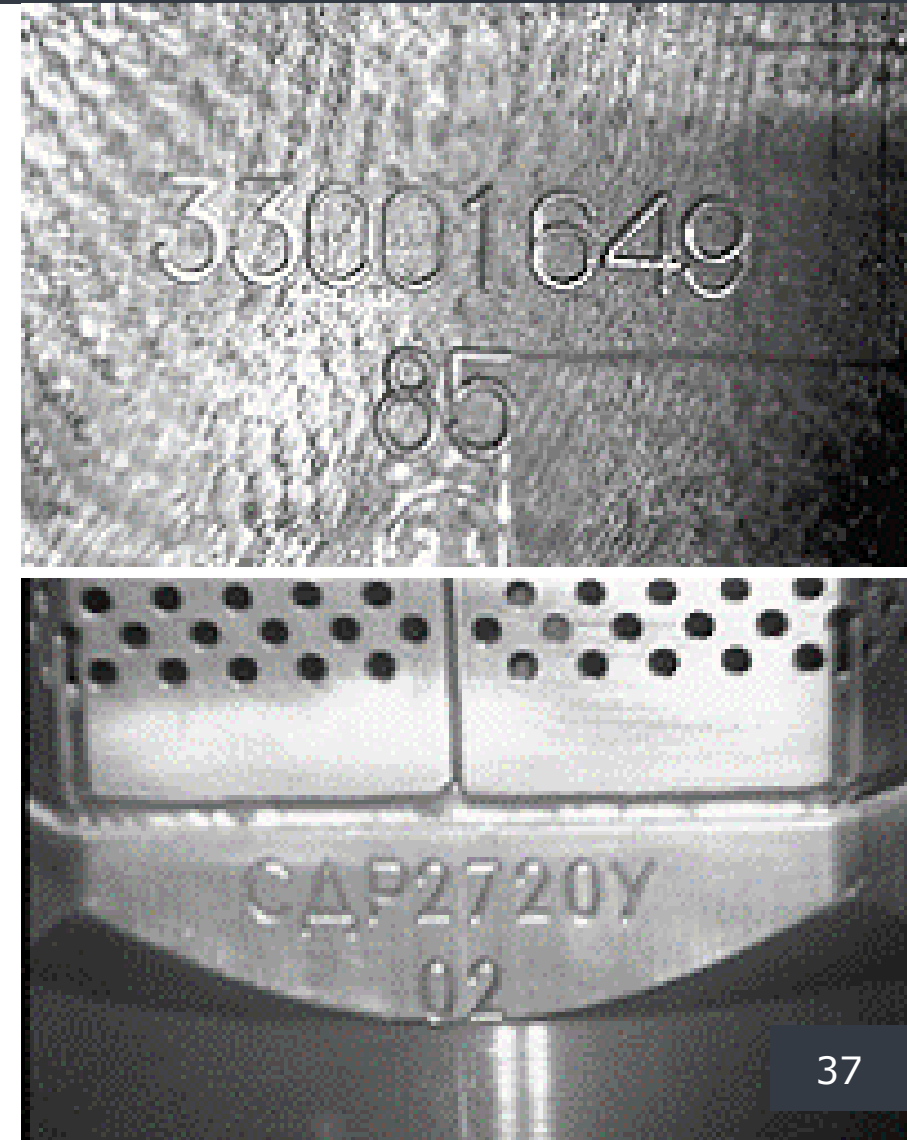
Recognition of alphanumeric markings from the surface of heatsink units with 100% accuracy

## Solution

System performs recognition of alphanumeric markings. The symbols are highlighted depending on the degree of recognition accuracy: high likelihood of recognition accuracy, low likelihood of recognition accuracy, and unrecognisable. When the automatic recognition is impossible, the operator enters identification markings manually

## Result

Achieved required recognition accuracy both at a pilot stage and the final implementation stage of the project



# Identification and control for pharmaceutical products markings

## Customer

Biocad CJSC

## Task

Verification of alphanumeric markings and 1D code on the different size packaging and rejected products with low-quality markings. The capacity of production line is 7200 packages per hour. There are several different formats for application of code and alphanumeric markings on the product packaging

## Solution

The system performs identification of alphanumeric markings and 1D code simultaneously that have been applied to the packaging at the previous production stage at high rate to meet capacity of production line

## Challenge

Variation in the print quality, unprecise positioning of packaging in control area

## Result

Rejection of packaging with low-quality markings





# Inventory of products at the packaging stage

## Customer

SteelEnamel LLC

## Task

Automatic identification of EAN13 barcode from the labels on boxes moving along production line

## Solution

Boxes with different products and of different sizes travel along the production line in random order. When the box enters the control area, the barcode reader identifies placement of the barcode and performs its recognition. Recognised code is logged into the facility database. When the label is absent from the box surface, or there are more than two labels on a single box, the system sends notification signal and the conveyor line is being stopped

## Result

100% inventory manufactured products



# Inventory of alcoholic beverage products based on labelling

## Customer

Cherepovets Distillery JSC, Glazov Distillery, Sarapulsky Distillery, Wine Arsenal CJSC and others

## Task

Serialization and aggregation of alcoholic beverage products based on recognition and interconnection PDF417 code placed on special federal label and DataMatrix code located on a cap of a bottle

## Solution

Codes issued by Federal Service for Monitoring and Regulation of Alcoholic Beverage Market (FSM) (DataMatrix and PDF417) are being identified from orientated bottles and from ones that have not been properly orientated. Additionally, the system recognizes DataMatrix code from the cap of the bottle and links it to the database with FMS codes for each individual bottle. After the bottles positioned into the box, the system reads DataMatrix codes from the bottle caps and aggregates FSM codes for the box. Afterwards, the system send identifier code for a box with individual codes for each bottle inside of a box to the Central National Automation and Identification System (CNAIS)

## Result

Meeting the federal legislation requirement for inventory of manufactured products with CNAIS



# Marking and tracking of pharmaceutical products

## Customers

Rester CJSC, KhimReaktivKomplekt Plant JSC, BIOTECH LLC, EDAS International Corporation LLC, Yaroslavl Pharmaceutical Factory, Valentis Pharma CJSC (Lithuania)

## Task

Create system to be able to comply with federal requirements for mandatory marking and labelling of pharmaceutical products

## Solution

System covers entire production process in accordance with Russian federal law for mandatory marking and labelling: beginning from receipt of codes for marking from Station for order management and code printing, to registration of all production stages with National System for Marking of Pharmaceutical Products (NSMPP)

The codes are printed on the labels. The labels are applied either manually or automatically. Serialization and aggregation can also be performed either manually or automatically

## Result

Meeting the federal legislation for inventory of manufactured products with NSMPP





# Control for the use of PPE and entry in hazardous areas

## Customer

Metallurgical plant

## Task

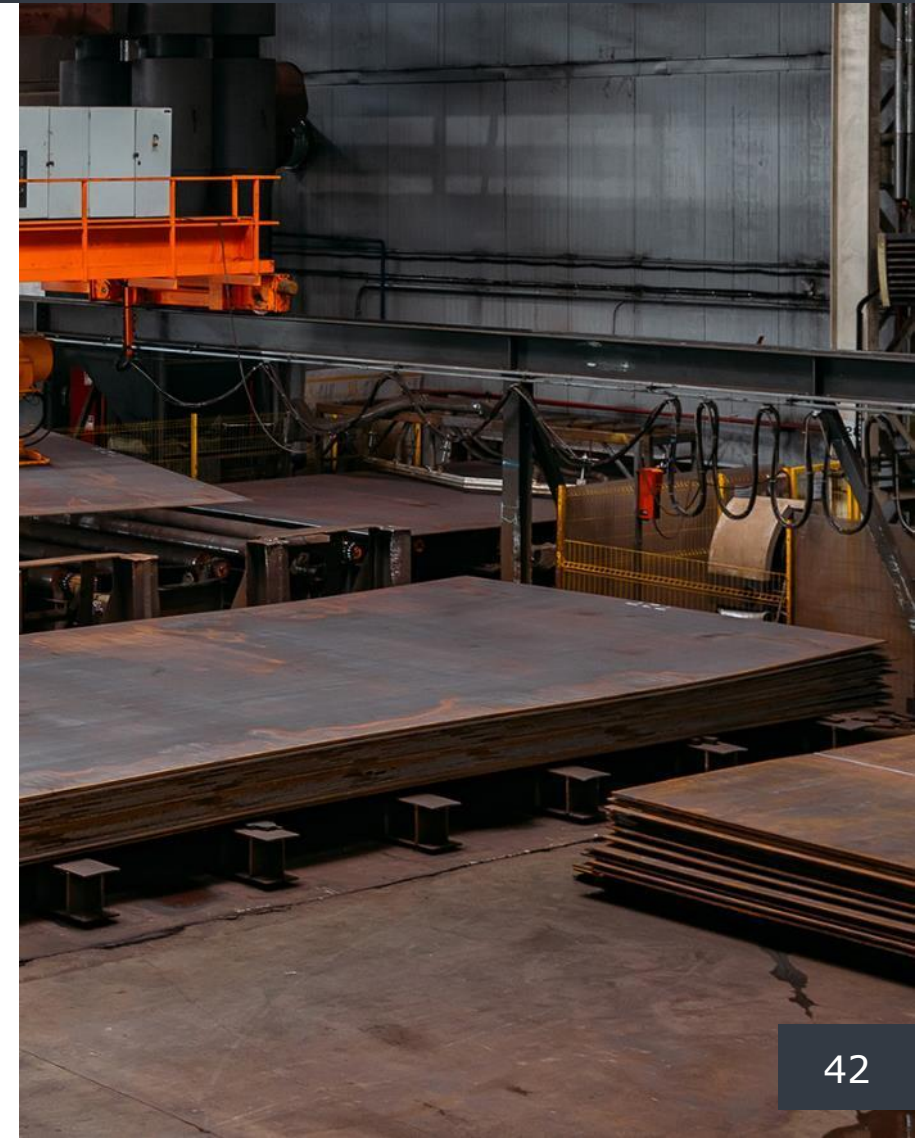
Video control for presence of people and tools and other objects left by the personnel at the inspection site

## Solution

Based on visual data received from surveillance cameras, the system performs detection of people in the inspection area. In case if person or foreign objects are detected during machinery operation at the inspection site, the safety system of the inspection area receives warning signal.

## Result

- ✓ Decrease of injury risks
- ✓ Reduction of equipment damage as a result of foreign objects presence





# Control for the use of PPE and entry into hazardous zones

## Customer

Elektronika PSC for Metallurgical Plant

## Task

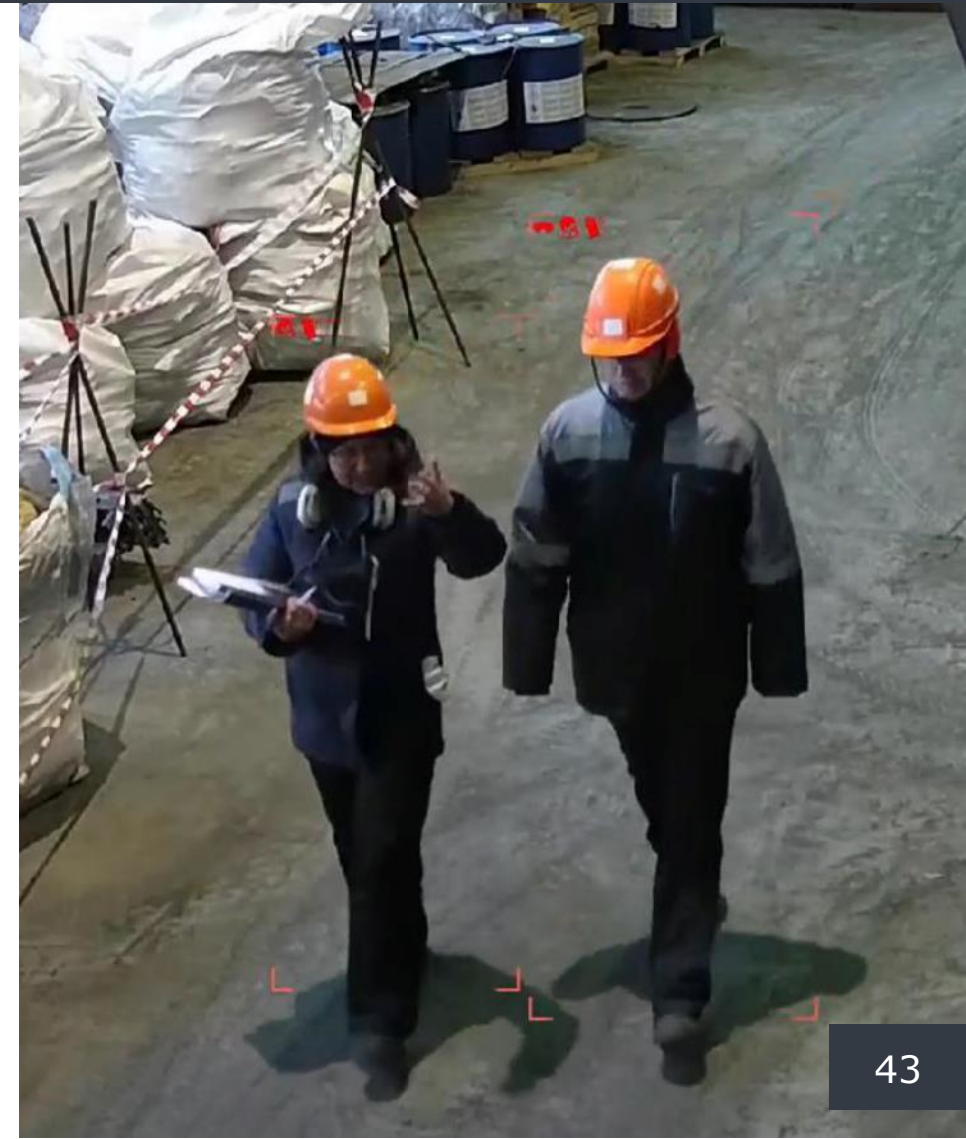
Prompt detection of violations in the utilisation of PPE;  
detection of personal entry in the hazardous areas

## Solution

Software-based PPE module for video analytics enables to identify 4 types of PPE utilised by personnel: hard hats, safety goggles, respirator, gloves of several colours. Control module detects the entry of personnel into selected hazardous areas from the camera frame of the facility.

## Result

- ✓ Decrease of injury risks
- ✓ Ensuring the compliance with industrial health and safety rules by the personnel



# Safety control at the power distribution substations

## Customer

“Elektroset” Municipal Power Utility Company

## Task

Control for the presence of PPE and its correct use depending on the personnel category and specialisation

## Solution

Software module for video analytics enables to detect the absence of PPE used by personnel (e.g. hard hat, work uniform, safety goggles, non-conductive gloves and boots) and also the cases when such PPE is utilised improperly (e.g. unfastened jacket, rolled sleeves of the uniform, non-conductive gloves covered by the jacket, etc.). In the case of detected violation, the system immediately informs responsible bodies about such violations taking place.

## Result

Decrease the risk of injuries and industrial accidents when conducting maintenance work at the distribution substations





# Safety control at the power distribution substations

## Customer

“Elektroset” Municipal Power Utility Company

## Task

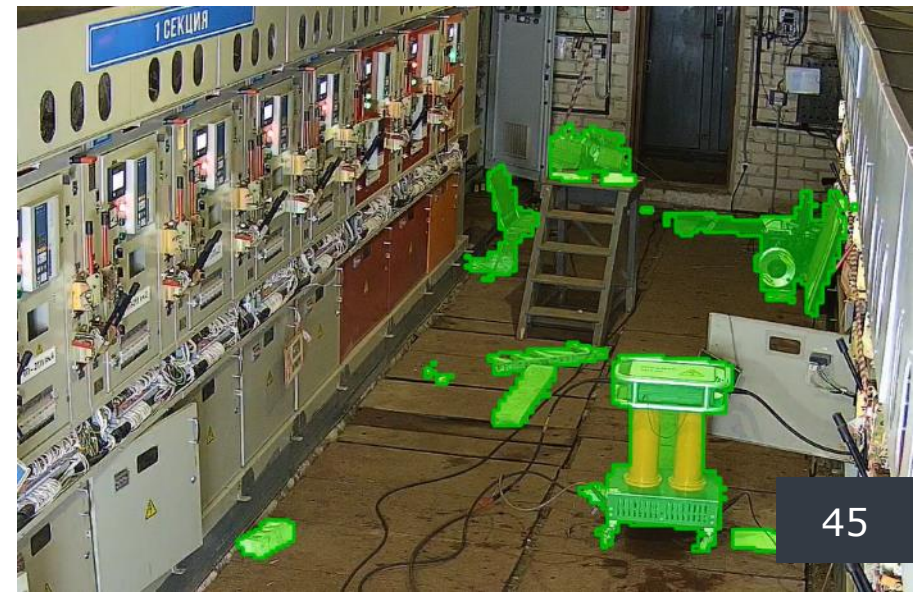
Detection of left opened doors of power distribution cabinets and cells, and left objects in a walkway space between cabinets and cells after performed works

## Solution

Software module enables to detect left opened cabinets and cells of the power distribution equipment and also detect left spare parts, replaced parts and equipment in a walk space between cabinets and cells after performed works by the personnel. When system detects these violations of safety regulation, it instantaneously informs responsible bodies

## Result

Improvement of compliance with occupational health and safety regulations at the power distribution stations by the personnel



# Physical safety control in municipal and educational facilities



## Customer

Milutin I.A. Municipal Public School, Cherepovets, Russia

## Task

Creation of the means for ensuring physical security at the educational facility by performing identification of potential security risks, automatic notifications of security services and access control on the premises.

## Solution

Video analytics system provides vehicle access control, control for the presence of security personnel at security station, detection of firearms and left unattended objects.

## Result

- ✓ Login security violations and threats from multiple viewing angles simultaneously
- ✓ Minimization of human factor and mistakes due to the loss of system operator's concentration during long time of video wall viewing
- ✓ Improvement of the personnel's work ethic and generation of the database with accidents and events for their further analysis
- ✓ Automatic notification of the responsible bodies in real time





# Automarshal



## Customer

Pikanta™, Russia

## Task

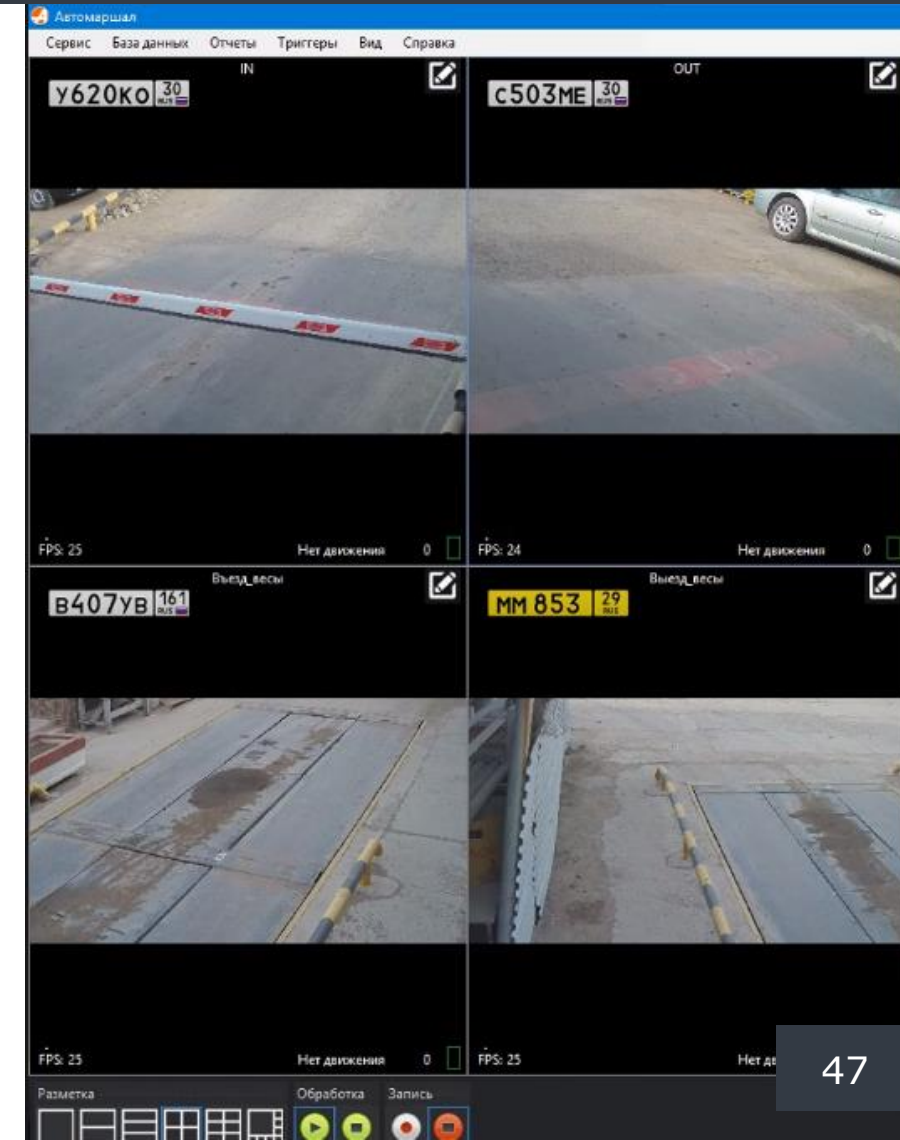
Vehicle access control at the enterprise

## Solution

When vehicle enters the premises at the checkpoint equipped with induction loops, Automarshal performs number plate recognition and checks the number plate against created access lists. If the vehicle is authorized to enter, the system opens the traffic barrier. Otherwise, security guard decides on the vehicle access. The system is also equipped to situate a reverse entry of the vehicle.

## Result

- ✓ 100% control of all vehicle passages due to the use of induction loops at every entry checkpoint
- ✓ Integration with 1C software



## Customer

Center for Municipal Information Resources and Technologies

## Task

Optimisation of the vehicle traffic in Cherepovets, Russia

## Solution

The software is based on the deep learning neural networks. For the traffic analysis AVEDEX uses the video stream from observational cameras installed across the city. The software automatically counts vehicles and classifies them among different categories.

## Result

- ✓ Improvement of traffic capacity
- ✓ Assessment of traffic intensity and compositional structure
- ✓ Forecasting of road surface quality



# Automarshall.Weighbridge

## Customer

Processing and enrichment plant of the Polar Branch of Norilsk Nickel Mining and Metallurgical Industry OJSC in Norilsk, Russia

## Task

Optimisation of operational expenses and time for vehicle weighing

## Solution

Vehicle weighing stations located in two separate areas and based on Mettler Toledo truck scales.

Identification of vehicles is based on RFID system. First, the system identifies vehicles with RFID tags. Then Automarshall.Weighbridge receives the vehicle data, links it with vehicle weight, determines the type of weighing and displays the vehicle net weight.

## Result

- ✓ Reduction in time required for control of arriving and departing vehicles from the premises
- ✓ Automation of the workflow
- ✓ Improvement of transparency at all stages of product delivery/dispatch





## Customer

Bashneft, Russia

## Task

Development of system for recognition of the railcar identification numbers for automated allocation system for commercial inventory of oil products transported by the railway transport.

## Solution

ARDIS system for recognition of the railcar identification numbers has been implemented together with automated ARDIS.OilAccount system for inventory of the oil products. Overall, the system consists out of 84 IP video cameras, 24 servers and 25 automated workstations.

## Challenge

Integration of system for recognition of the railcar identification numbers together with multitude of systems and equipment at 21 dispatch stations.

## Result

- ✓ Increase in the degree of enterprise computerisation, improvement of the overall operational efficiency and creation of additional security for commercial inventory of oil products







[welcome@mallenom.com](mailto:welcome@mallenom.com)

[www.mallenom.com](http://www.mallenom.com)