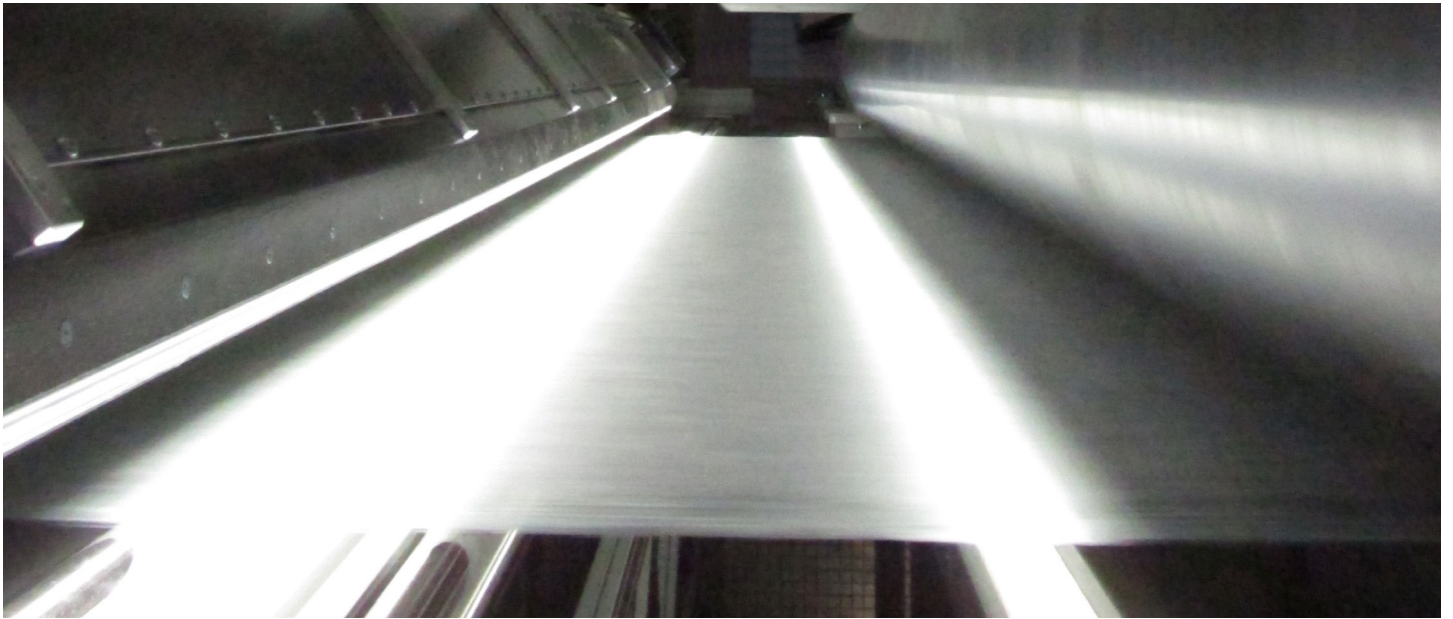


# Continuous strip inspection

## SURFSCAN - UniscanDETECTOR

SURFSCAN is a visual inspection system designed for defect detection on non-woven textiles, plastic foils, paper, metal plates, etc. System can detect defects as small as 0,1 mm<sup>2</sup> at speeds up to 2000 m/min. Maximum product width is 5 m. System is fully configurable according to customer's requirements and can be used in various phases of production process.



### Features

- » 100% inspection 24/7
- » Detection of periodic defects
- » Automatic detection of edges and width of material
- » Possible integration of alarms and marking systems
- » Slitting quality control
- » Real-time visualization of defects on several distributed stations
- » Export of statistics, print of output protocol
- » Easy integration due to modular design
- » Suitable for in-line systems and rewinders
- » Online support 24/7

### Purpose

- » Production efficiency improvement
- » Number of reclamations from customers decrease
- » Long-term overview of production quality due to simple export of statistics

### Suitable for

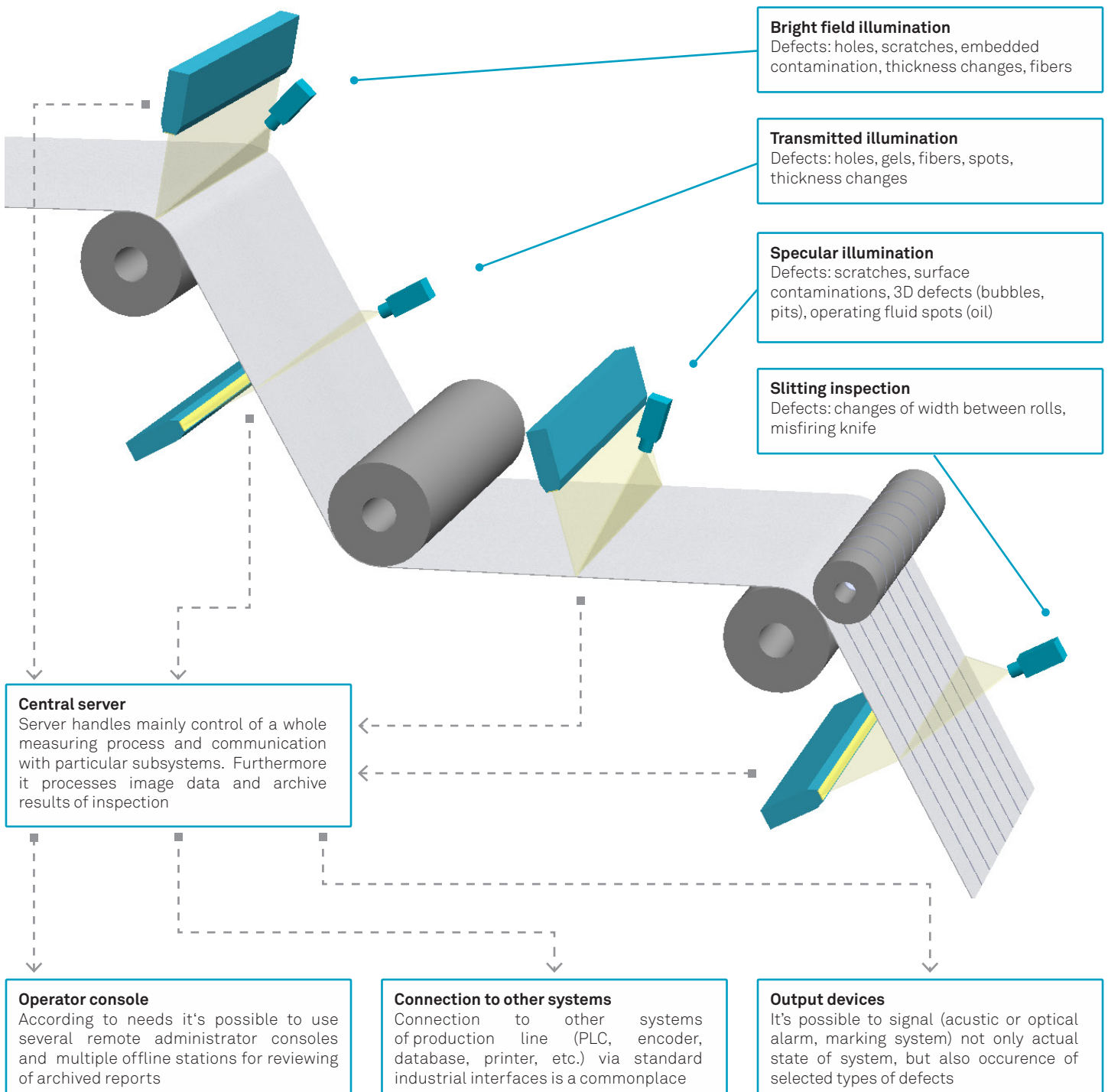
- » non-woven fabrics
- » metal plates
- » paper
- » foil
- » polycarbonate plates
- » products on conveyor belt

## System overview

System can detect many different kinds of defects, eg. holes, spots, foreign objects, changes of pattern, homogeneity of material, etc. These defects are then automatically classified using neural network algorithms into categories according to training samples in database.

To achieve best detection results system uses adjustable high-power LED illumination, high-speed linescan cameras and sophisticated lens control. It's applicable to wide range of thickness, colors and patterns of produced material.

Every part is designed as modular as possible, so it can be adapted to individual customer's requirements and limitations of given production line. System can be installed in different stages of production, ie. from primary material to final product for end customer.

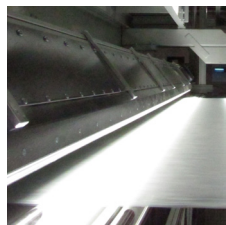


## Components



### Camera unit

System SURFSCAN uses state-of-the-art linescan cameras with high resolution sensors (up to 16 kpxl), outstanding signal/noise ratio and line frequency up to 200 kHz. Lens is mounted to camera using specially developed adapter, which allows remote control of lens aperture and focus.



### Illumination unit

To achieve best results of detection system uses adjustable high-power LED illumination. To highlight particular type of defects there are also variants with different wavelengths of light, eventually with special angle illumination.



### Rack unit

Core of the system is a rack unit containing computational units for data processing. It also provides a power supply for all subsystems. Using standard industrial interfaces (Ethernet, RS232/485, etc.) it can communicate with other systems. In case of operation under more demanding conditions, it can be equipped with air-conditioning or ventilation unit.



### I/O module

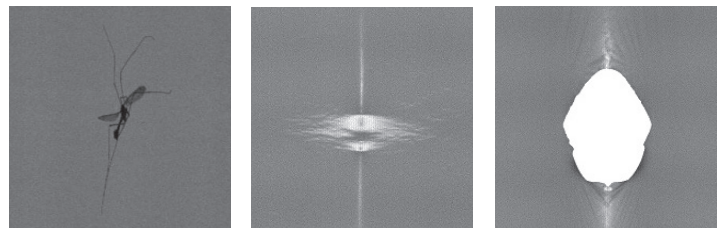
Expansion I/O module PULSIO allows connection of output signals to other systems (signalling, marking, etc.) and also custom input signals (start/stop, material break, etc.). Programmable logic inside can also act as a state machine of production line and share this information with central server which controls whole inspection accordingly.

## Other features

- » Customization of SW according to customer needs
- » Control of detection sensitivity
- » Setting of minimum defect's size
- » Self-learning classifier
- » Automatic compensation of illumination intensity
- » Classification of defects to categories
- » Communication with systems on production line
- » Possible integration of other sensors
- » Automatic system diagnostic
- » Users' rights management
- » Low operating costs

## Examples of defects

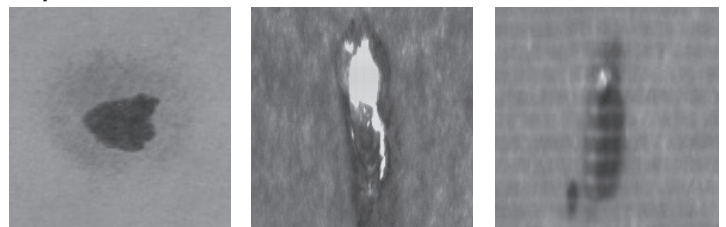
### Foil



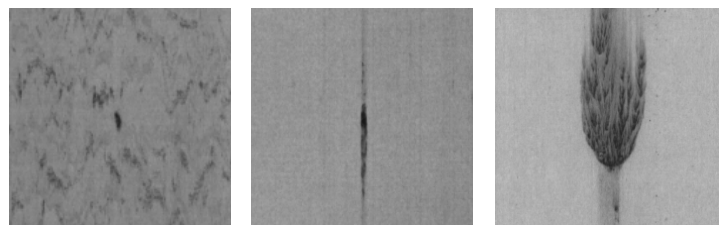
### Non-woven fabric



### Paper



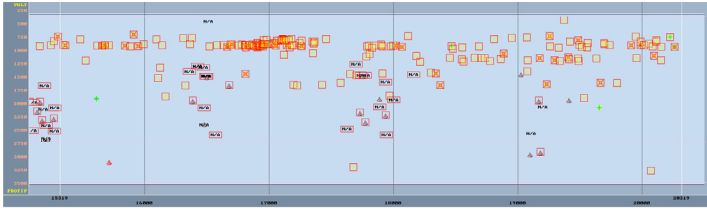
### Metal



# SURFSCAN

# Continuous strip inspection

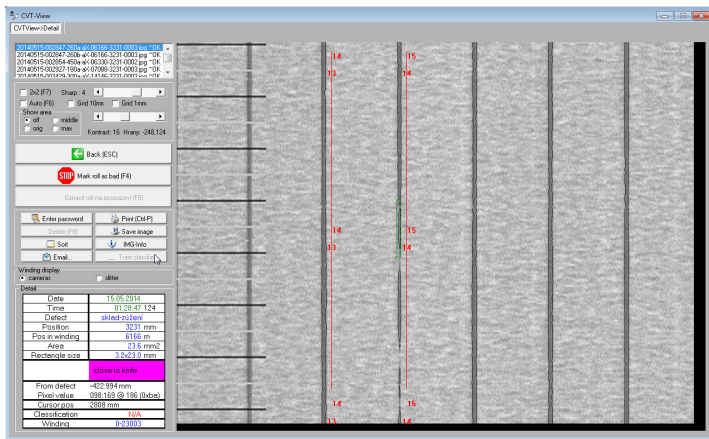
## System outputs



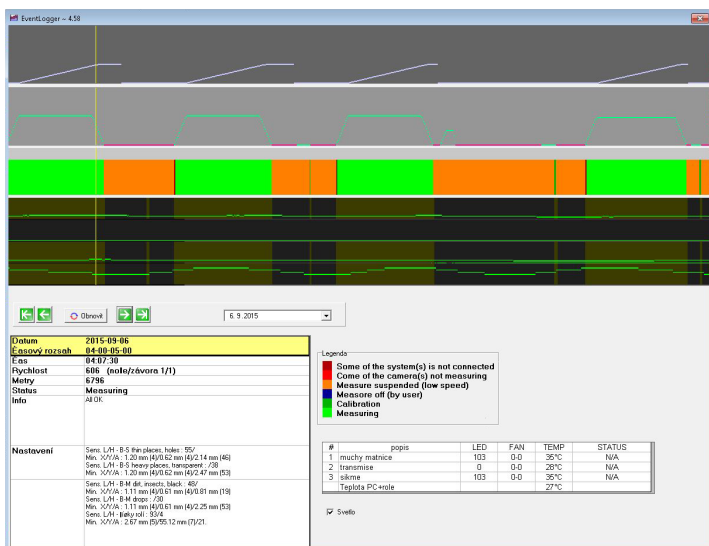
Graphical distribution of defects in reel

C	Coš	Datum	Měly min #	X	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	k	sum #	special	memo				
1	21.18-00.00	02.05.15	20001	163	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	1	nové bobiny	VO-Roll no 8.15.16 scrapped		
2	00:20:00.00	02.05.15	20001	21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	2	nové bobiny	VO-Roll no 22.23 scrapped		
3	00:20:00.01	02.05.15	20001	20	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	890	3	nové bobiny	VO-Roll no 22.23 scrapped		
4	00:45:00.01	02.05.15	20001	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	4	nové bobiny	VO-Roll no 22.23 scrapped		
5	01:01:24.21	02.05.15	20001	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	5	nové bobiny	VO-Roll no 4.22.23 scrapped		
6	01:26:42.02	02.05.15	20001	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	6	nové bobiny	VO-Roll no 4.15.23 scrapped		
7	01:42:04.04	02.05.15	20001	27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	7	nové bobiny	VO-Roll no 5.16.17.18.20.24.25 scrapped		
8	00:14:07.07	02.05.15	20001	21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	8	nové bobiny	VO-Roll no 18.19 scrapped		
9	00:37:05.05	02.05.15	20001	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	9	nové bobiny	VO-Roll no 18.19 scrapped	
10	00:58:03.16	02.05.15	20001	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	10	nové bobiny	VO-Roll no 18.19 scrapped
11	02:18:02.38	02.05.15	20001	18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	11	nové bobiny	VO-Roll no 18.19 scrapped
12	03:38:03.58	02.05.15	20001	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	12	nové bobiny	VO-Roll no 18.19 scrapped
13	03:58:04.18	02.05.15	20001	19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	13	nové bobiny	VO-Roll no 18.19 scrapped
14	04:18:04.37	02.05.15	20001	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	14	nové bobiny	VO-Roll no 18.19 scrapped	
15	04:55:05.15	02.05.15	20001	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	15	nové bobiny	VO-Roll no 18.19 scrapped	
16	05:15:05.35	02.05.15	20001	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	890	16	nové bobiny	VO-Roll no 4.24 scrapped	

## Production overview



Detail of slitting defect



Diagnostical output of system (report of windings, cuts, speeds, temperatures, sensitivities, etc.)

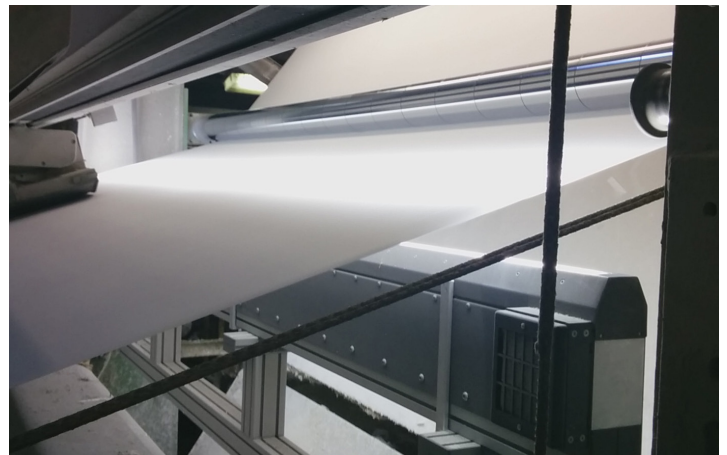
## Specification

Power supply	230 V AC
Operating temperature	5 - 60°C
Production speed (max.)	2000 m/min
Material width (max.)	5 m
Defect size (min.)	0,1 mm <sup>2</sup>
Image resolution (typ.)	0,1 mm/pxl

## Installations



Inspection system implemented to production line



High-power linear LED illumination

## References

- » Fatra, a.s.
- » PEGAS NONWOVENS s.r.o.
- » JIP – Papírny Větrník, a.s.
- » Balsac papermill s.r.o
- » OP papírna, s.r.o.
- » TRIBOMETAL (now MAHLE s.r.o., Slovakia)

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