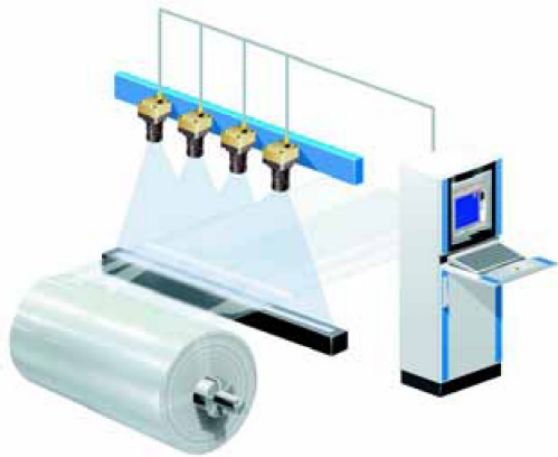


# Führende Online-Inspektionstechnologie zur Steigerung des Gewinns in der Nonwovens-Produktion



**ISRA**  
**V I S I O N**

# Führende Online-Inspektionstechnologie zur Steigerung des Gewinns in der Nonwovens-Produktion



- ▶ **Moderne Bahninspektionssysteme**
- ▶ **1. Gewinnung von Qualitätsdaten**
  - 100% Inspektion, Aufbau von Nonwoveninspektionssystemen
- ▶ **2. Lösungsorientierte Weiterverarbeitung aller Qualitätsdaten**
  - **NEU:** *Product Decision Intelligence*
- ▶ *pdi*: Zusatznutzen und Vorteile

## ▶ Kunden

- ArcelorMittal (USA, Spain)
- APM (Mexico)
- Corus (The Netherlands)
- Duferco (Belgium)
- Erdemir (Turkey)
- Heidtmann (USA)
- ISPAT (India)
- North American Stainless (USA)
- Outokumpu (Sweden)
- POSCO (Korea)
- Steel Warehouse (USA)
- Thainox (Thailand)
- ThyssenKrupp (Germany)
- USS POSCO (USA)
- USS PROTEC USA)
- Worthington (USA)

## ▶ Anwendungen

- |                         |    |
|-------------------------|----|
| ■ Coil Decision         | 33 |
| ■ Line Linking          | 14 |
| ■ Process Correlation   | 10 |
| ■ Material Reassignment | 6  |
| ■ WWW Reporting         | 9  |
| ■ Other                 | 11 |

**Die Quelle des Fortschritts:  
Kundenanwendungen**

## Automobil

Daimler-Chrysler, BMW, Volkswagen, Audi, Nissan, General Motors, Ford, Hyundai, ....

## Glas

Schott, ASAHI, Pilkington, St. Gobain, Guardian, PPG ....

## Kunststoff

DuPont, 3M, Renolit, Alcan,ac-Folien, Finotech, ...

## Druck/Papier

MAN Roland, Tetra Pak, M-Real, Stora Enso, Weyerhaeuser, Crane, UPM, Kimberly Clark, Georgia-Pacific, International Paper

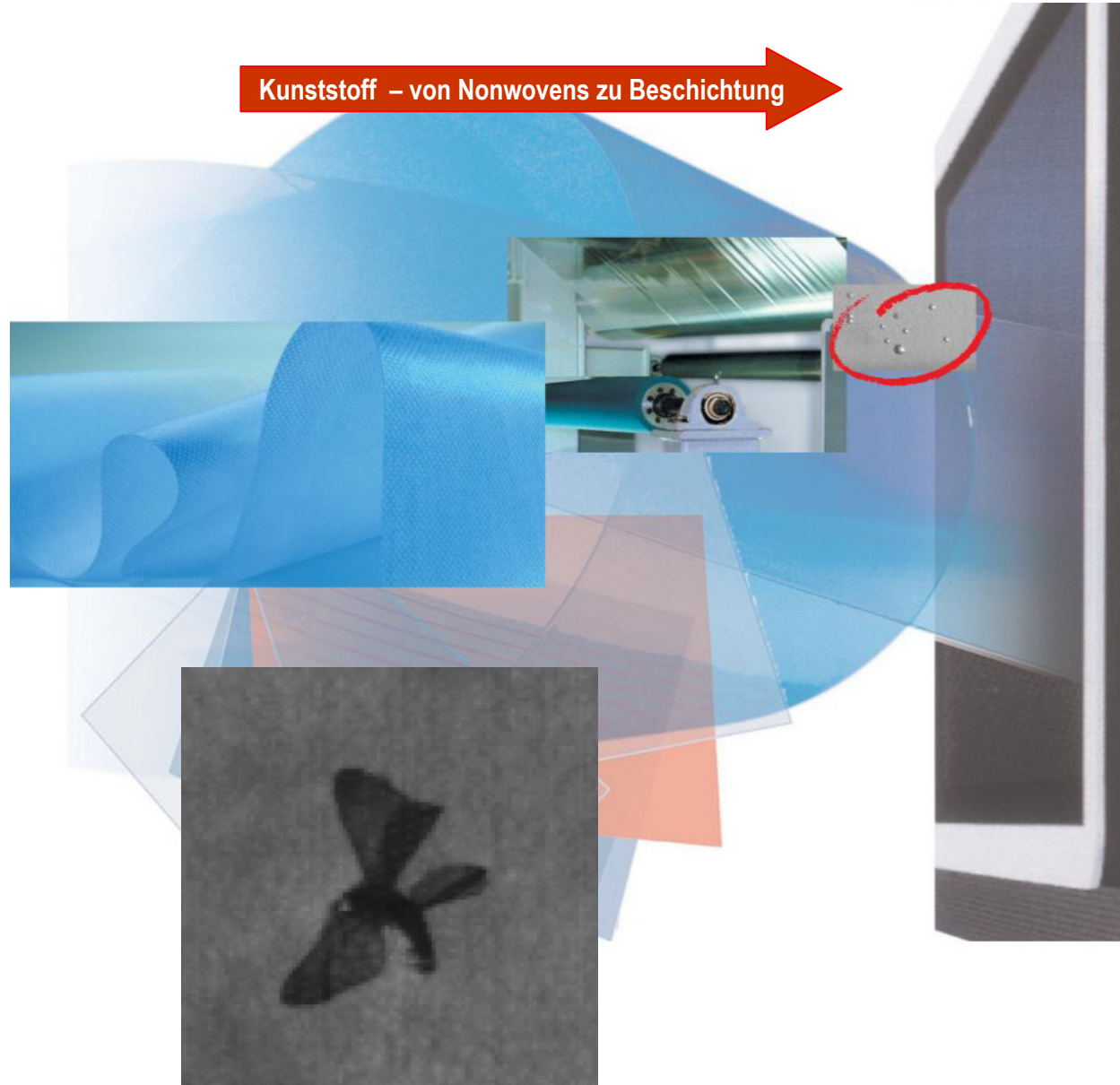
## Metall

Arcelor Mittal , Thyssen-Krupp, Corus, NUCOR, posco, BAOSTEEL, China steel, Nippon Steel Corporation,

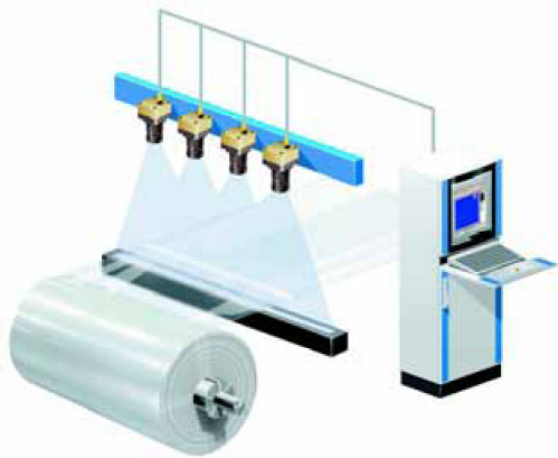
## Nonwovens, Beschichtung

- ➔ 100% Inspektion von Nonwovens
- ➔ Alle Produktionsschritte
- ➔ Signifikanter Marktanteil
- ➔ Spitzentechnologie für hochauflösende Anwendungen

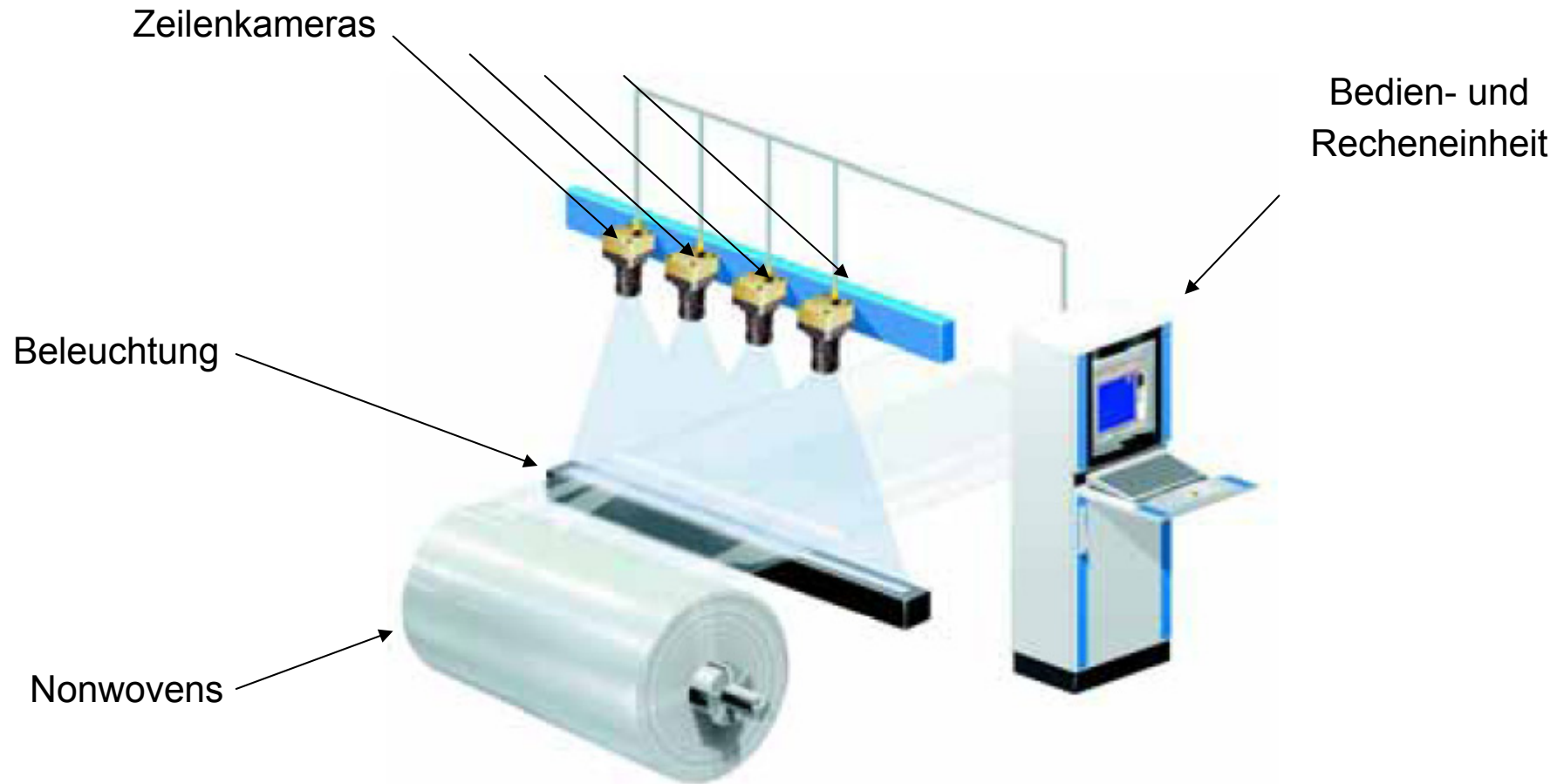
Kunststoff – von Nonwovens zu Beschichtung

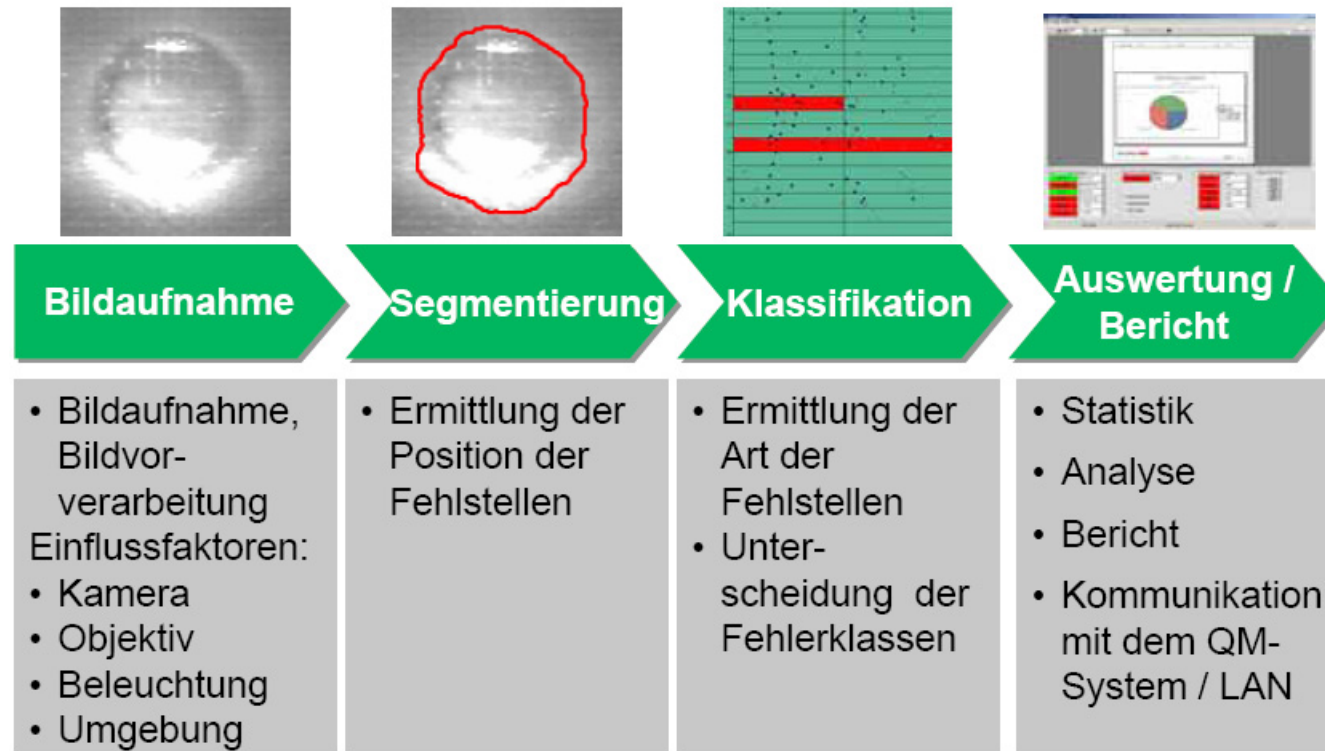


# Führende Online-Inspektionstechnologie zur Steigerung des Gewinns in der Nonwovens-Produktion



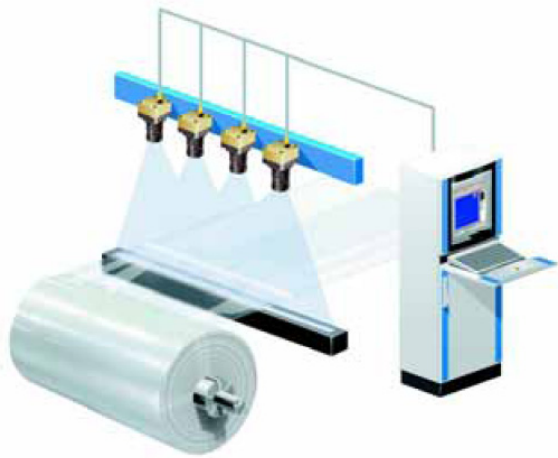
- ▶ **Moderne Bahninspektionssysteme**
- ▶ **1. Gewinnung von Qualitätsdaten**
  - 100% Inspektion, Aufbau von Nonwoveninspektionssystemen
- ▶ **2. Lösungsorientierte Weiterverarbeitung aller Qualitätsdaten**
  - **NEU:** *Product Decision Intelligence*
- ▶ *pdi*: Zusatznutzen und Vorteile







# Führende Online-Inspektionstechnologie zur Steigerung des Gewinns in der Nonwovens-Produktion



- ▶ **Moderne Bahninspektionssysteme**
- ▶ **1. Gewinnung von Qualitätsdaten**
  - 100% Inspektion, Aufbau von Nonwoveninspektionssystemen
- ▶ **2. Lösungsorientierte Weiterverarbeitung aller Qualitätsdaten**
  - **NEU:** *Product Decision Intelligence*
- ▶ *pdi*: Zusatznutzen und Vorteile

▶ **Spinnvlies, Nadelvlies, ...**

▶ **Beschichten**

- Bsp.:  
Verbund Nonwovens + Folie

▶ **Bedrucken**

- Bsp.:  
Bedrucken der Folie

- ▶ Gezielte Verbesserungen durch Identifikation von Prozessschwächen, die nur aus der **Vogelperspektive** sichtbar sind.
-

## **Materialentscheidungen / Ertragsmanagement**

- Zuordnung von Rollen zu Aufträgen
- Kontrolle / Ausschuß
- Rollenfreigabeprozess
- Längstrennung- und Schneidoptimierung
- ...

## **Für**

Qualitätsmanagement  
Verkauf und Service  
Geschäftsführung

## **Prozessoptimierung**

- Fehlerursachen
- Produktivität
- Prozessverlauf
- Wartung/Instandhaltung
- ...

## **For**

Prozessingenieur  
Qualitätsmanagement  
Produktionsleitung

**erfordert extrem  
flexible Software**

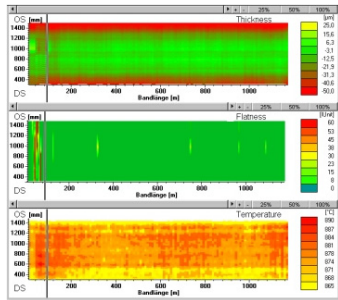
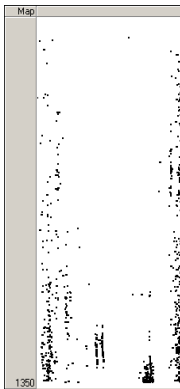
## Rohe Daten-Bits

Bahninspektionssysteme

Manuelle / Laborinspektionsdaten

Messdaten

Auftrags & Material-Spezifikation



Einfache und schnelle  
Transformation in  
umfassende  
Qualitäts-  
informationen

*production*

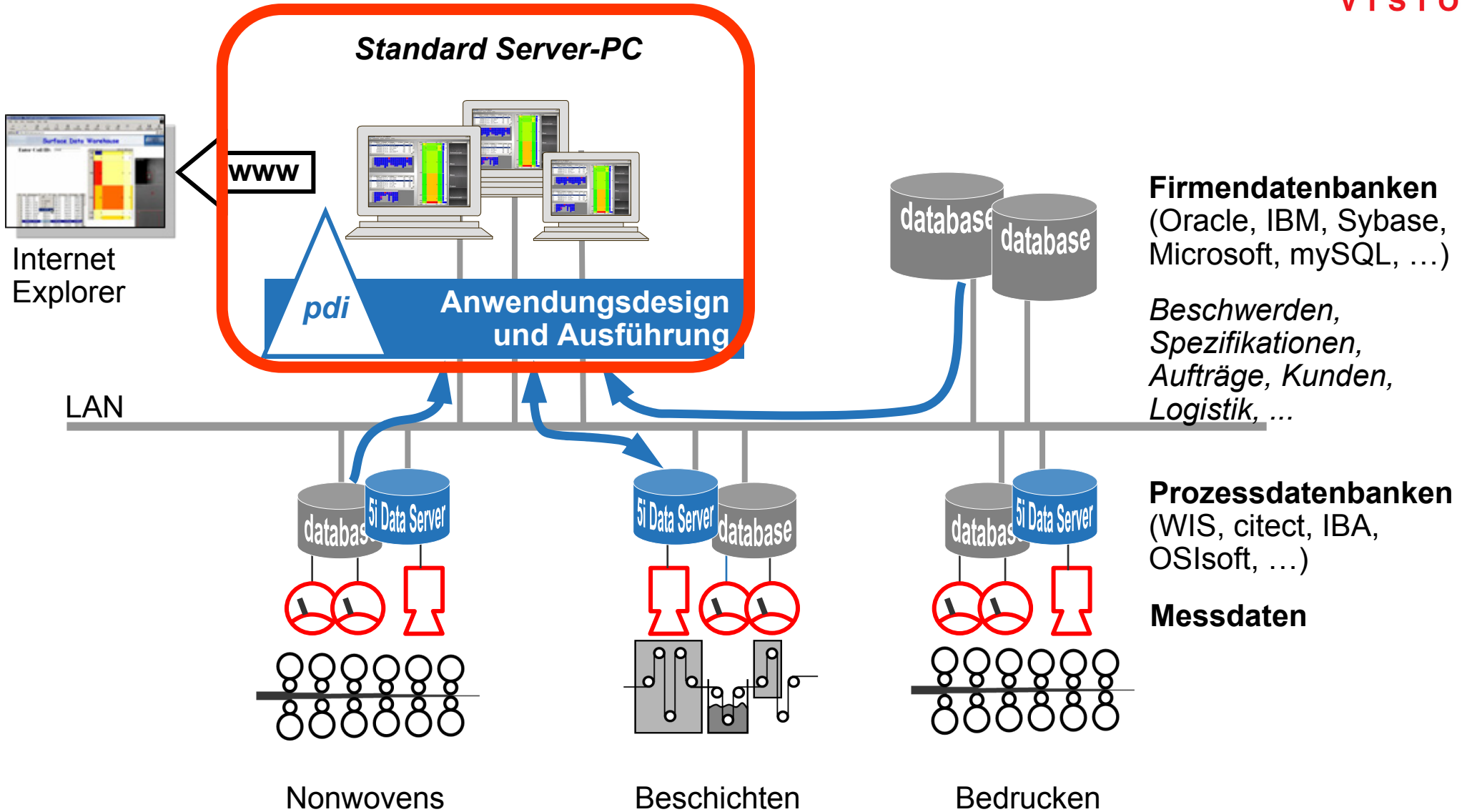
*decision*

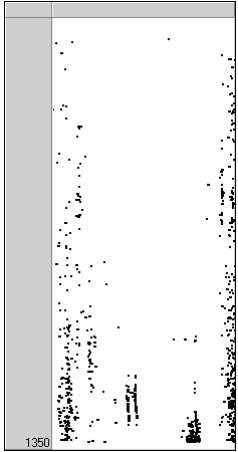
*intelligence*



MES

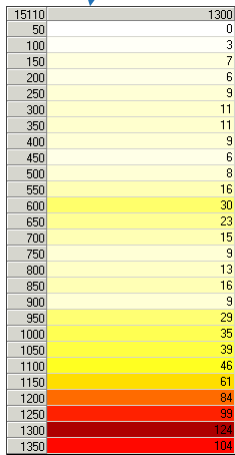
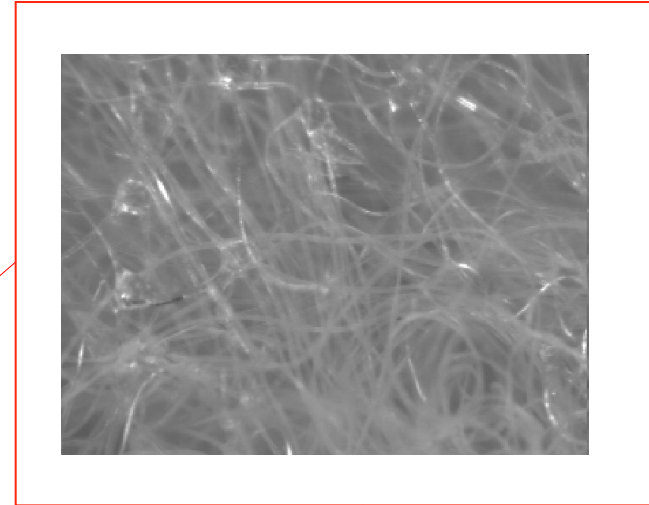
*pdi*



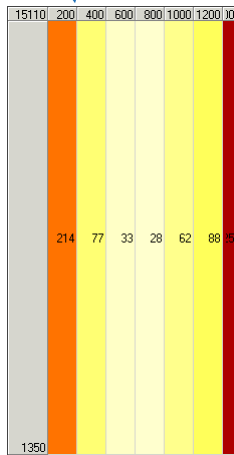


Gitter können darstellen

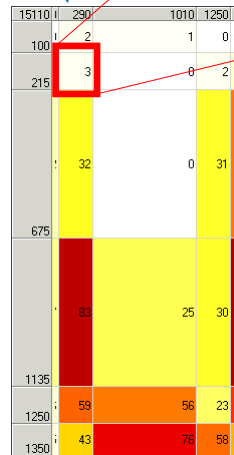
- Linien
- Charge
- Rolle



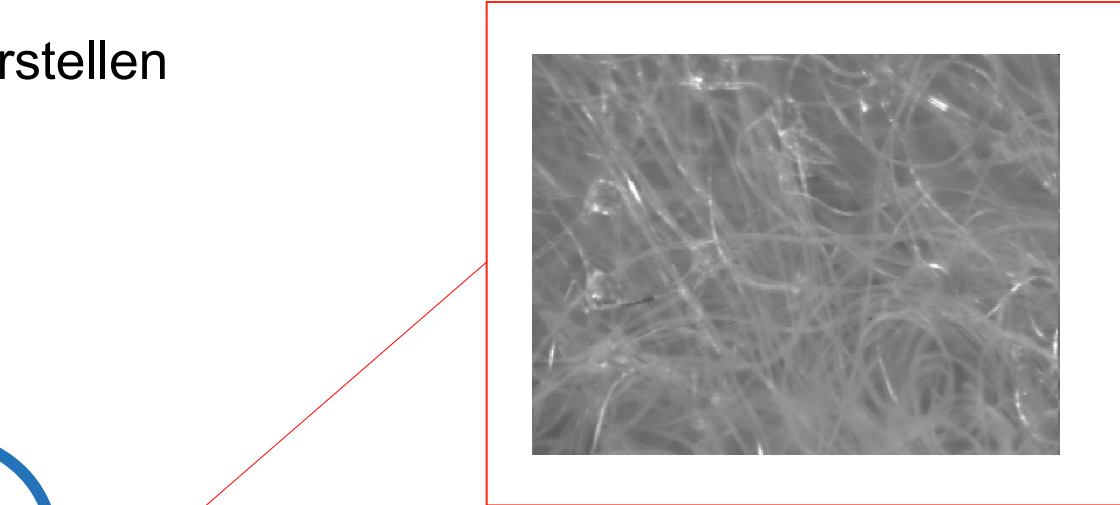
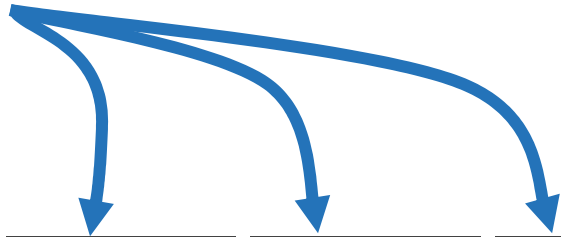
Quersegmente



Längsbahn

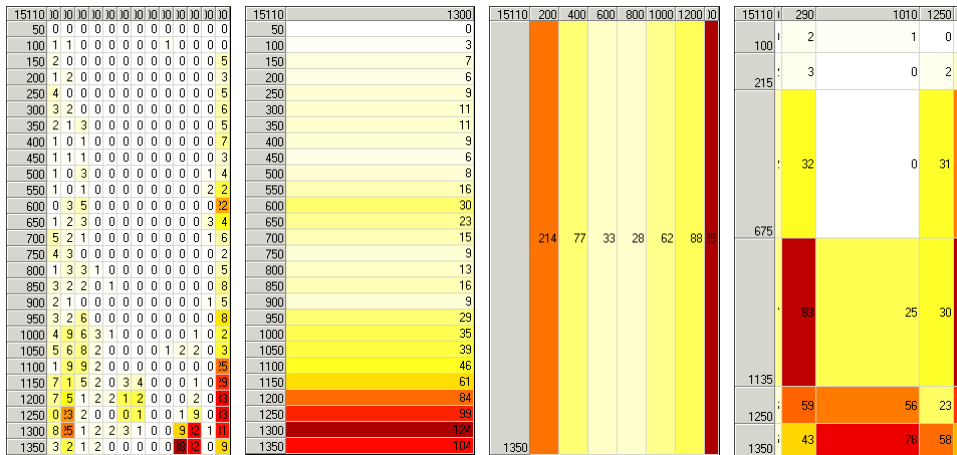
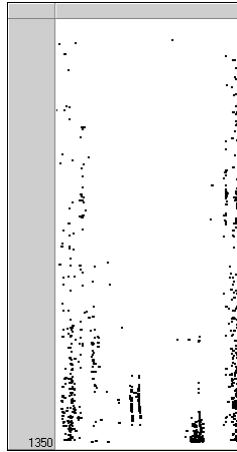


Stücke



# Berechnung kundenspezifischer Gitter

Einzelne  
Rolle



Rollensequenz

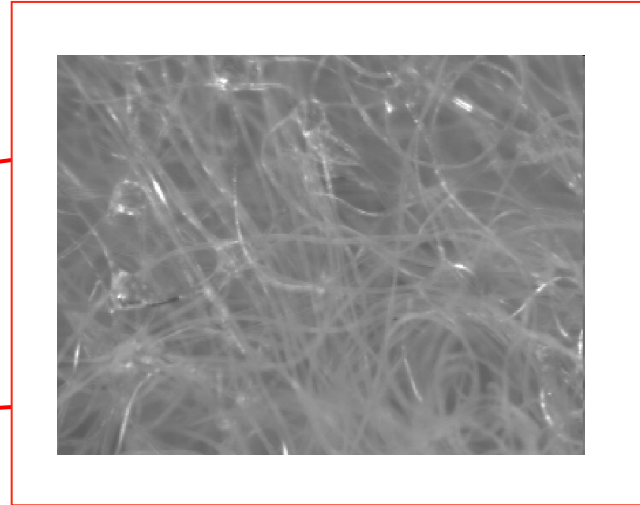
	0	150	300	450	600	750	900	050	200	350	500	650	800
150			2	1	4	2	4	5	1	2	1		
300			0	1	2	0	0	3	2	0	1		
450			3	1	1	0	0	0	1	3	1		
600			0	0	18	1	0	0	2	0	0		
750			1	0	0	1	0	2	2	1	0		
900			2	4	4	1	6	10	5	2	4		
150		0	0	1	69	27	0	0	0	4	5	1	
300		0	5	37	480	276	0	0	5	0	3	2	
450		0	2	6	64	21	0	0	2	0	0	1	
600		0	0	1	0	0	0	0	0	0	0	2	
750		0	2	0	0	0	0	0	2	0	0	2	
900		0	0	0	0	0	1	0	0	0	2	2	
1050		0	21	0	0	0	0	21	6	10	5		
150		0	0	2	3	0	3	4	10	3	0	0	
300		2	1	7	2	1	3	8	24	14	1	0	
450		8	2	4	1	4	7	5	12	11	2	6	
600		1	1	3	12	0	0	1	27	10	3	8	
750		2	2	6	10	2	6	1	38	5	0	1	
900		3	0	0	6	0	1	0	14	16	2	3	
1050		2	0	0	1	0	0	0	29	2	0	7	
150		0	0	1	29	38	8	67	0	7			
300		0	0	1	0	1	0	58	1	0			
450		0	1	0	0	0	0	37	0	0			
150		37	13	11	0	0	67	88	1	4			
300		1	0	6	0	1	58	97	4	6			
450		0	1	1	0	0	37	61	0	1			
150		3	80	7	1	5	35	9					
300		1	44	0	2	1	80	0					
450		1	51	7	1	5	44	4					
600		1	1	1	0	1	51	2					

	max 1610
2850	627
2850	287
3450	517
3400	290
3300	279
3800	164
2650	222
2550	70
3950	68
1800	116
3050	696
2500	346
850	344
1300	252
2250	28
3900	28
2500	133
1600	506
3300	21
3250	120
3150	82
3300	50
3200	21
2850	882
1350	28
1050	891
750	87
3400	374
1850	988
1500	215
3150	24
3100	191
3450	258
2300	141
1950	297
2500	132
1350	822

z.B. alle Rollen einer Kampagne, eines Auftrags, einer Sorte, ...



15110		290		1010
100		2		1
215		3		0
		32		0



Eine Zelle = ein Blatt Papier  
Zelleninhalte: Formel “=count (defects)”

Die Zahl repräsentiert die benötigte  
aggregierte Information: Defektanzahl,  
Formationsabweichung, ...)

Gitter = eine Anordnung von  
Zellen wie ein Arbeitsblatt mit  
Formeln und Werten

# pdi standardisiert und aggregiert Daten

Def	200	400	600	800	1000	1200
100	0	0	0	1	0	0
200	0	0	0	0	0	0
300	0	0	0	0	0	0
400	0	0	0	0	12	0
500	0	0	0	1	4	0
600	2	0	0	0	3	0
700	4	0	0	0	0	1
800	7	0	0	3	2	0
900	0	0	0	0	0	0
1000	1	0	1	4	6	0
1100	0	0	0	0	0	0
1200	3	0	0	0	3	4
1300	9	0	0	0	0	0
1400	13	0	0	0	2	0
1500	13	1	0	0	3	0
1600	9	0	1	5	6	0
1700	10	0	0	4	0	1
1800	6	1	1	1	4	0
1900	13	1	0	0	0	0
2000	6	0	0	0	0	0
2100	6	0	0	0	0	0
2200	9	0	0	0	1	0
2300	16	1	0	0	2	0
2400	6	0	0	0	1	0
2500	0	0	0	0	0	0
2600	2	1	0	0	0	0

\*

Flat	200	400	600	800	1000	1200
100	40	10	10	10	25	50
200	10	10	10	10	10	15
300	50	10	10	10	10	10
400	10	10	10	10	10	10
500	10	10	10	10	10	40
600	10	10	10	10	10	10
700	10	10	10	10	10	10
800	40	10	10	10	10	10
900	35	20	10	10	10	10
1000	10	10	10	10	10	35
1100	10	10	10	10	10	10
1200	10	10	10	10	10	10
1300	10	10	10	10	10	10
1400	10	10	10	10	10	10
1500	10	10	10	10	10	10
1600	45	10	10	10	10	35
1700	10	10	10	10	10	10
1800	10	10	10	10	10	10
1900	10	10	35	35	40	10
2000	10	10	20	25	10	10
2100	10	10	10	10	10	10
2200	15	10	10	10	10	10
2300	35	10	10	10	10	10
2400	10	10	10	10	10	10
2500	15	10	10	10	10	10
2600	25	10	10	10	10	35

=

Result	200	400	600	800	1000	1200
100	1	0	0	0	0	1
200	0	0	0	0	0	0
300	1	0	0	0	0	0
400	0	0	0	0	1	0
500	0	0	0	0	0	1
600	0	0	0	0	0	0
700	0	0	0	0	0	0
800	1	0	0	0	0	0
900	0	0	0	0	0	0
1000	0	0	0	0	1	0
1100	0	0	0	0	0	0
1200	0	0	0	0	0	0
1300	1	0	0	0	0	0
1400	1	0	0	0	0	0
1500	1	0	0	0	0	0
1600	1	0	0	1	1	0
1700	1	0	0	0	0	0
1800	1	0	0	0	0	0
1900	1	0	0	0	1	0
2000	1	0	0	0	0	0
2100	1	0	0	0	0	0
2200	1	0	0	0	0	0
2300	1	0	0	0	0	0
2400	1	0	0	0	0	0
2500	0	0	0	0	0	0
2600	0	0	0	0	0	0

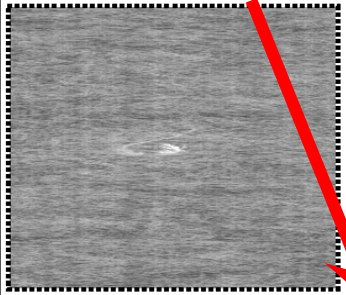
**Defekte** kombiniert mit **bsp. Formation** = **Qualität**

Falls Defekte > 10 und Formation > 40 *blockiere*, Rest: *liefere*

## Defekte (Anzahl)

#1	200	400	600	800	1000	1200
200	2	3	1	0	1	0
400	4	0	0	0	0	0
600	0	0	0	0	1	1
800	0	0	0	0	0	1
1000	0	0	0	0	0	0
1200	5	0	0	0	0	0
1400	1	8	0	0	0	6
1600	4	13	0	1	10	3
1800	3	0	0	0	0	0
2000	2	0	0	0	0	0
2200	2	1	0	1	0	3
2400	5	0	0	20	0	33
2600	1	0	0	0	0	20
2800	4	0	0	0	1	0
3000	14	3	0	0	1	3
3100	2	0	0	0	0	0

### Defektbilder



## Formation

	200	400	600	800	1000	1200
200	10.00	14.38	16.88	15.00	10.63	10.00
400	10.00	10.00	10.00	10.00	10.00	10.00
600	10.00	11.88	13.44	13.44	11.56	11.56
800	10.00	10.00	10.00	12.19	10.00	10.00
1000	10.00	10.00	10.00	10.00	11.25	12.81
1200	10.00	10.00	10.00	10.00	11.25	12.19
1400	10.00	10.00	10.00	10.00	10.00	10.00
1600	9.69	7.81	7.19	8.44	10.00	10.00
1800	11.88	1.00	10.00	9.69	10.00	10.00
2000	11.25	1.00	10.00	10.00	10.00	10.00
2200	12.19	1.00	9.06	8.75	9.38	10.00
2400	10.63	11.88	9.69	9.06	9.69	10.00
2600	12.81	10.00	9.38	7.19	7.19	10.00
2800	13.44	13.13	10.00	8.75	6.88	9.38
3000	10.94	10.00	10.00	10.00	10.00	10.00
3100	10.00	10.00	10.00	10.00	10.00	10.00

### Formation – „Rohe“ Daten

2	99	1849000	15
3	149	1849000	10
4	199	1849000	10
5	49	1899000	10
6	99	1899000	15
7	149	1899000	10
8	199	1899000	10
9	49	1949000	10
10	99	1949000	15
11	149	1949000	10
12	199	1949000	10
13	49	1999000	15
14	99	1999000	10
15	149	1999000	10
16	199	1999000	10

Setzen von Grenzen

- abhängig von Rollensorte
  - abhängig von Kunden
- und





- basierend auf

- Defektanzahl
- Defektdichte
- Defektposition
- Kombination von Defekten



# Komponenten für Anwendungen




## Data access

-  SIS Database Connection
-  Archive Database
-  CSV File
-  External Database




## Lists

-  Coil List
-  Defect List
-  Free List



## Selections

-  Coil Material Selection
-  Coil Date Selection
-  Defect Class Selection

## Grids

-  Coil Grid
-  Accu Grid
-  Gauge Grid


## Calculations

-  Calc Sheet
-  MS Excel Sheet




## Paper

-  QualityView
-  Area Map


## Graphics

-  Data Map
-  Coil Map



## Data editing

-  Coil Attributes
-  Defect Attributes
-  Element Attributes

## Reports

-  Report Page

## Imaging

-  Defect Chart
-  Defect Image

**Betriebsfertige  
Komponenten**

parsytec Si Surface Excel - [defectlist.xml\*]

File Edit View Window Tools Help

**Components**

- Coil List
- Coil Grid
- Accu Grid
- Gauge Grid
- Calc Sheet
- Quality View
- Area Map
- Defect List
- Defect Chart
- Defect Image
- Coil Map
- Data Map
- Statistic Grid
- Free List
- MS Excel Sheet

#	m	257 mm
100		8
260		6
900		25
1540		16
1700		5
1800		6

Coil	Material	Length	Width	Thickn...	Wei
1	15057 1 - DC	220 mm	0.80 mm	2	
2	15058 1 - DC	220 mm	0.80 mm	2	
3	15059 3 - ZSTE	205 mm	0.70 mm	2	
4	15060 3 - ZSTE	1380 mm	0.80 mm	2	
5	15061 3 - ZSTE	1315 mm	0.75 mm	2	
6	15063 3 - ZSTE	205 mm	0.70 mm	2	
7	15064 0 - special	2650.0 m	1260 mm	0.80 mm	2
8	15065 3 - ZSTE	2550.0 m	1110 mm	1.00 mm	2
9	15066 3 - ZSTE	3950.0 m	1205 mm	0.70 mm	2
10	15067 3 - ZSTE	1800.0 m	1135 mm	1.40 mm	2
11	15068 3 - ZSTE	3050.0 m	1610 mm	0.75 mm	2
12	15069 3 - ZSTE	2500.0 m	1110 mm	1.00 mm	2

# Erstellen von Anwendungen mit ISRA VISION *pdi*:

The main interface displays a 'Components' sidebar on the left with options like Coil List, Coil Grid, Accu Grid, Gauge Grid, Calc Sheet, Quality View, Area Map, Defect List, Defect Chart, Defect Image, Coil Map, Data Map, Statistic Grid, Free List, and MS Excel Sheet. The central area features a grid of defect counts with columns for coil numbers (1, 2, 3, 4, 5, 6) and rows for coil lengths (100, 260, 900, 1540, 1700, 1800 mm). A 'Coil List' table is visible at the bottom left:

Coil	Material	Length	Thickn...	Weight
1	15057 1 - DC	220.0 m	0.80 mm	20880 kg
2	15058 1 - DC	220.0 m	0.80 mm	21020 kg
3	15059 3 - ZSTE	205.0 m	0.70 mm	23230 kg
4	15060 3 - ZSTE	380.0 m	0.80 mm	28030 kg
5	15061 3 - ZSTE	315.0 m	0.75 mm	23730 kg
6	15063 3 - ZSTE	205.0 m	0.70 mm	24980 kg
7	15064 0 - special	2650.0 m	1.260 mm	21770 kg
8	15065 3 - ZSTE	2550.0 m	1.110 mm	20790 kg
9	15066 3 - ZSTE	3950.0 m	1.205 mm	25970 kg
10	15067 3 - ZSTE	1800.0 m	1.135 mm	21380 kg
11	15068 3 - ZSTE	3050.0 m	1.610 mm	28640 kg
12	15069 3 - ZSTE	2500.0 m	1.110 mm	20510 kg

Image analysis windows include 'EdgeCrack', 'Emulsion', and 'ScaleFit'.

## Betriebsfertige Anwendungen

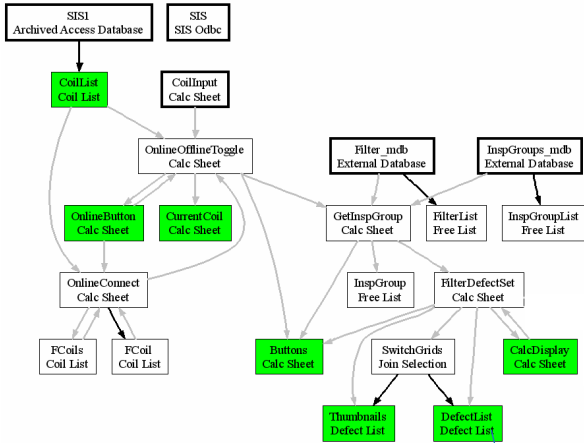
A collage of various application screens generated from the main interface, showing different views of defect data, charts, and control panels. The screens include:

- Defect list and action panels with buttons like 'OK', 'REPAIR', and 'NO ACTION'.
- Graphs showing defect trends over time or across coils.
- Control panels with 'Send call to' options and 'Action' buttons.
- Multiple panels for different coils (e.g., Coil 01, Coil 02, Coil 03) showing defect images and data.

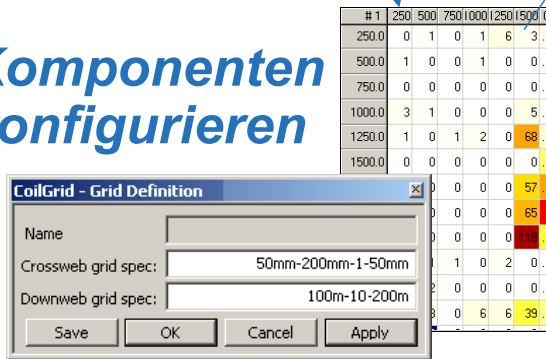
## Betriebsfertige Komponenten

oft benutzt, Z.B. Tambourlisten, ...

## (1) Komponenten verbinden



## (2) Komponenten konfigurieren



## (3) Excel Formeln

```
=count (defects)
=max (defects, "SizeCD")
```

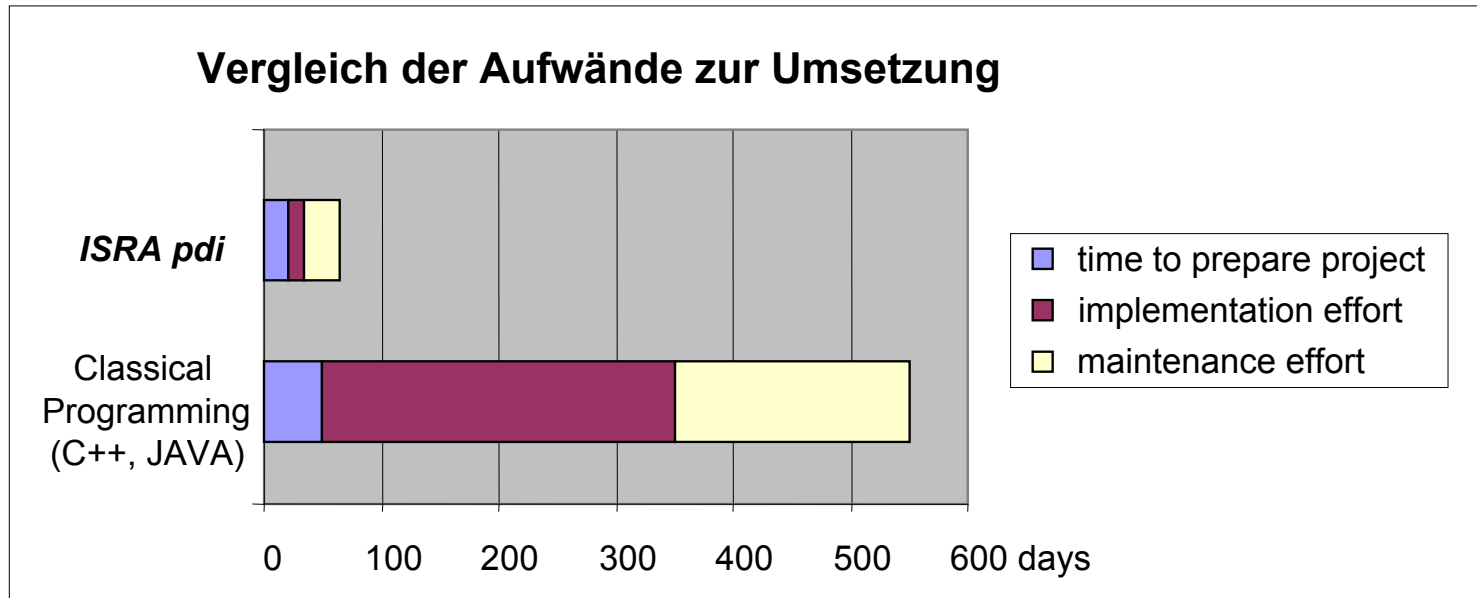
## (4) Scripte

```
// translate defects of individual
// coils to their position on welded coil

_outCoils = []; _offset = 0; _offcenter = 0;
for (_i = 0; _i < _count; _i++) {
    _coil = _coilArr[_i];
    _offcenter = (_maxWidth - _widthArr[_i])/2
    _coil = Translate(_coil, _offcenter, _offset);
    _outCoils += [_coil]; _offset += _lengthArr[_i];
}
_out_coils = _in_coils.ArrayToSet(_outCoils);
}_out_coils
```

## (5) .NET Programmierung neuer pdi Komponenten und Formeln

- ▶ Eingebaute Nonwovens Semantik
- ▶ Effektiste Umsetzung



- ▶ **Geschwindigkeit ./.** Defektaufkommen
  - ▶ **Materialdicke ./.** Defektaufkommen
  - ▶ **Materialfeuchte ./.** Defektaufkommen
  - ▶ **Formation ./.** Defektaufkommen
-



Σ 26	Name	Material	Defects	Length
12	29251 MN06849	31 - C091TM	3058	774.9 r

Kundensicht

Alle Fehler

Rolle mit Fehlern

Quality View  
 Default: COMMERCIAL (13)  
 Car B Exterior

15110	36	72	08	44	80	16	52	88	24	6x
67	0	0	0	0	0	0	0	0	0	0
135	2	1	0	0	0	0	1	0	1	0
202	2	0	0	0	0	0	0	0	0	0
270	0	0	0	0	0	0	0	0	1	8
337	5	0	0	0	0	0	0	0	0	10
405	0	4	0	0	0	0	0	0	2	0
472	2	4	0	0	0	0	0	0	1	0
540	0	2	0	0	0	0	0	0	9	0
607	1	8	0	0	0	0	0	0	9	10
675	2	5	0	0	0	0	0	0	8	10
742	5	1	0	0	0	0	0	0	1	10
810	5	4	2	0	0	0	0	0	0	6
877	2	1	2	0	0	0	0	0	1	10
945	4	3	2	0	0	0	0	0	1	10
1012	7	10	5	1	0	0	3	3	3	10
1080	5	10	15	0	0	0	0	0	0	20
1147	7	10	9	0	5	0	0	1	2	40
1215	13	16	3	6	29	0	0	2	1	40
1282	25	24	3	2	17	0	0	41	4	30

822 Fehler

15110	36	72	08	44	80	16	52	88	24	6x
67	0	0	0	0	0	0	0	0	0	0
135	1	0	0	0	0	0	0	0	0	0
202	0	0	0	0	0	0	0	0	0	0
270	0	0	0	0	0	0	0	0	0	0
337	1	0	0	0	0	0	0	0	0	0
405	0	0	0	0	0	0	0	0	0	0
472	0	0	0	0	0	0	0	0	0	0
540	0	0	0	0	0	0	0	0	1	0
607	0	0	0	0	0	0	0	0	0	0
675	0	2	0	0	0	0	0	0	2	0
742	1	0	0	0	0	0	0	0	0	0
810	0	1	1	0	0	0	0	0	0	0
877	0	0	0	0	0	0	0	0	0	0
945	0	0	2	0	0	0	0	0	0	1
1012	1	1	2	0	0	0	0	3	3	0
1080	0	1	0	0	0	0	0	0	0	0
1147	1	1	1	0	4	0	0	1	0	0
1215	1	1	0	6	27	0	0	2	0	0
1282	3	6	1	0	17	0	0	35	0	0

214 **relevante** Fehler  
 (z.B. Kunde, den kleinere Löcher nicht stören)

QualityView - Quality view preset edit

Name: Standard

Width [mm] > 0.00

Length [mm] > 20

Area [mm²] > 10

Side: Both

Grade

Class

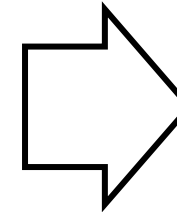
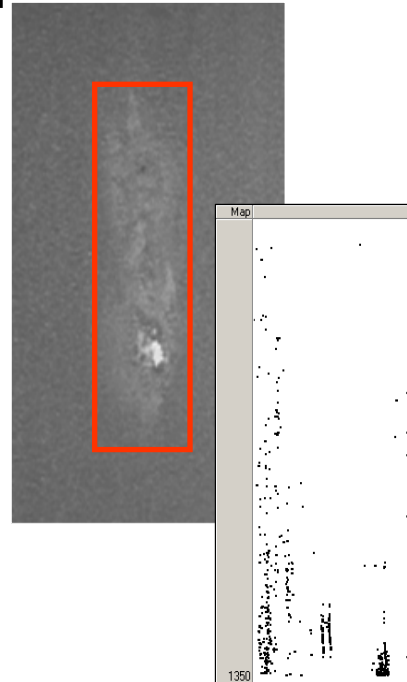
- Edge
- Emulsion
- Hole
- Rollmark
- Scale
- Scratch
- Grind
- PicklingScratch
- Scratch
- Shell
- Welding

Buttons: All, None, OK, Cancel, Apply

Qualitäts Spezifikation  
 (z.B. für Kunden B)

- ▶ **synchronisiert Daten**
  - ▶ **arbeitet mit geographischen Daten  $[(x_1; y_1) (x_2; y_2)]$  von allen Rollen**
  - ▶ **integriert Bilder**
  - ▶ **nutzt Nonwovens Semantik (Formation, Dünnstellen, Faserbündel ...)**
  - ▶ **unterstützt die Entscheidungsfindung: verarbeitet Regeln**
-

## Surface Inspection Systems hilft Gewinn zu steigern – → datenbasierte Entscheidungen



### The 610,000 \$ Case

- recoiling volume, initial	12,600 t/year
- recoiling volume, with Parsytec	8,200 t/year
- decrease by	4,400 t/year
- recoiling cost	40 \$/t
- savings: 40 \$/t x 4,400 t	<b>176.000 \$</b>
- claims:	
- before Parsytec installation	2,900 t/year
- after Parsytec installation	1,200 t/year
- claim cost (including labor cost, verification/analysis cost and price deductions)	120 \$/t
- savings: 1,700 t x 120 \$/t	<b>204.000 \$</b>
- reduced personnel	4 shifts
1 person	55,000 \$/person
- savings:	<b>220.000 \$</b>
- reduced secondary grades	400 t/year
- price reduction for secondary	80 \$/t
- increased scrapping	120 t/year
- delta to scrap value	180 \$/t
- value: 400 t/year x 80 \$/t - 120 t/year x 180 \$/t	<b>10.000 \$</b>

### The 1,200,000 \$ Case

- coil breaks per month (more than 60 minutes downtime):	7
- coil breaks caused by faulty material:	4
- cost per event: (downtime, repair, production loss)	25,000 \$
- coil breaks eliminated:	4
- savings: 4 events/month x 12 months x 25,000 \$/event	<b>1,200,000 \$</b>

Neben präziser Fehlerfindung ...:

... Qualitätssteigerung, höhere Verkaufspreise

Schneidoptimierung, Prozessoptimierung

Vielen Dank für Ihre Aufmerksamkeit



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