



TITECH Saturn Workshop

Dipl.-Ing. Frank van de Winkel
Sensor Based Sorting Conference
9th – 11th March 2010
Aachen



Innovation in Global Recycling

TiTech Group – *The leading provider of sensor based material sorting systems*



Owner of TiTech Group
Listed on
Oslo Stock Exchange
Annual turnover
400 Mill Euro

TITECH GROUP - 150 employees in 10 countries



RECYCLING

Plastics, paper, metals etc.



MINING

Minerals, gems, coal, etc.



FOOD

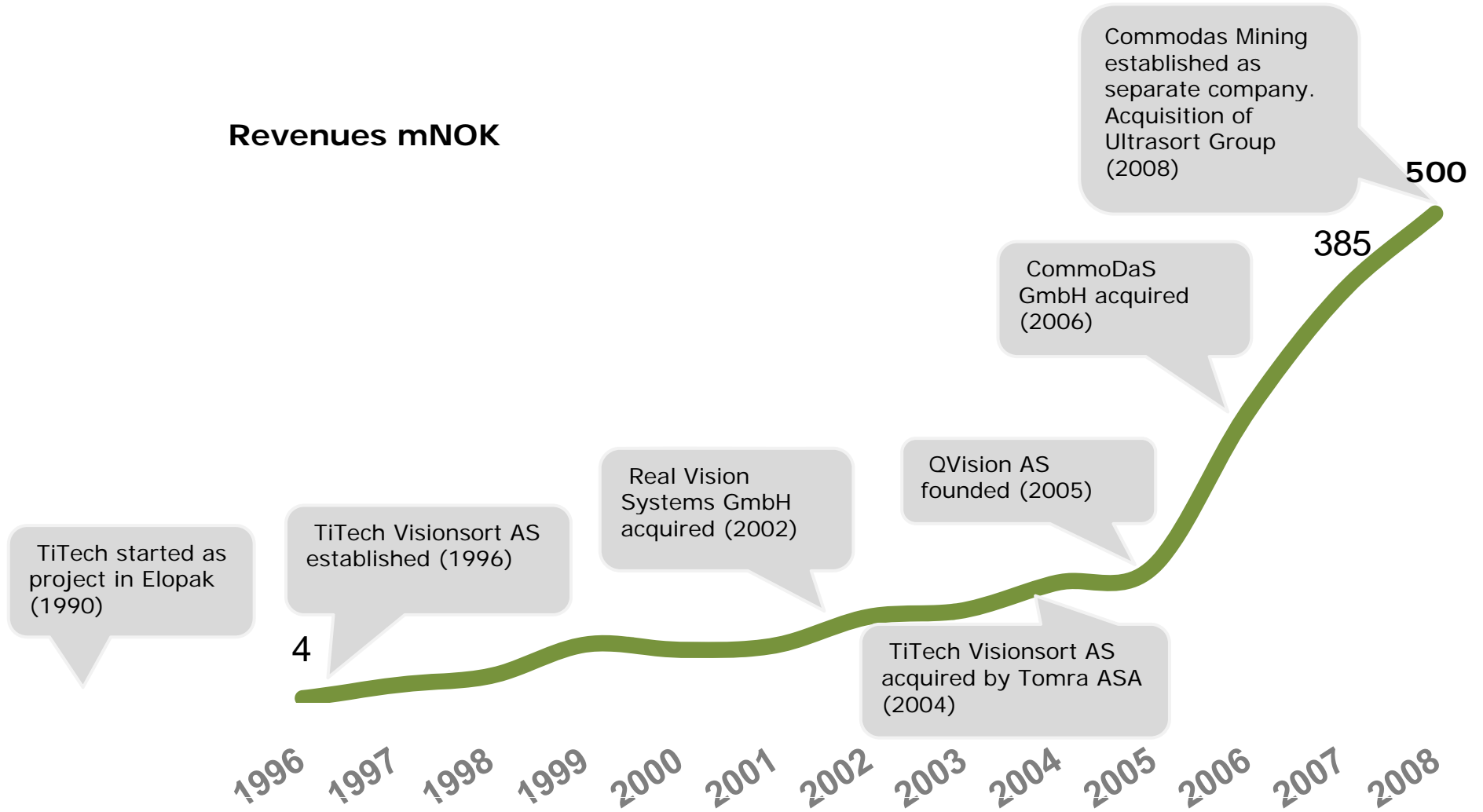
Meat and Seafood






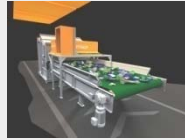

TiTech Group History



Revenues mNOK



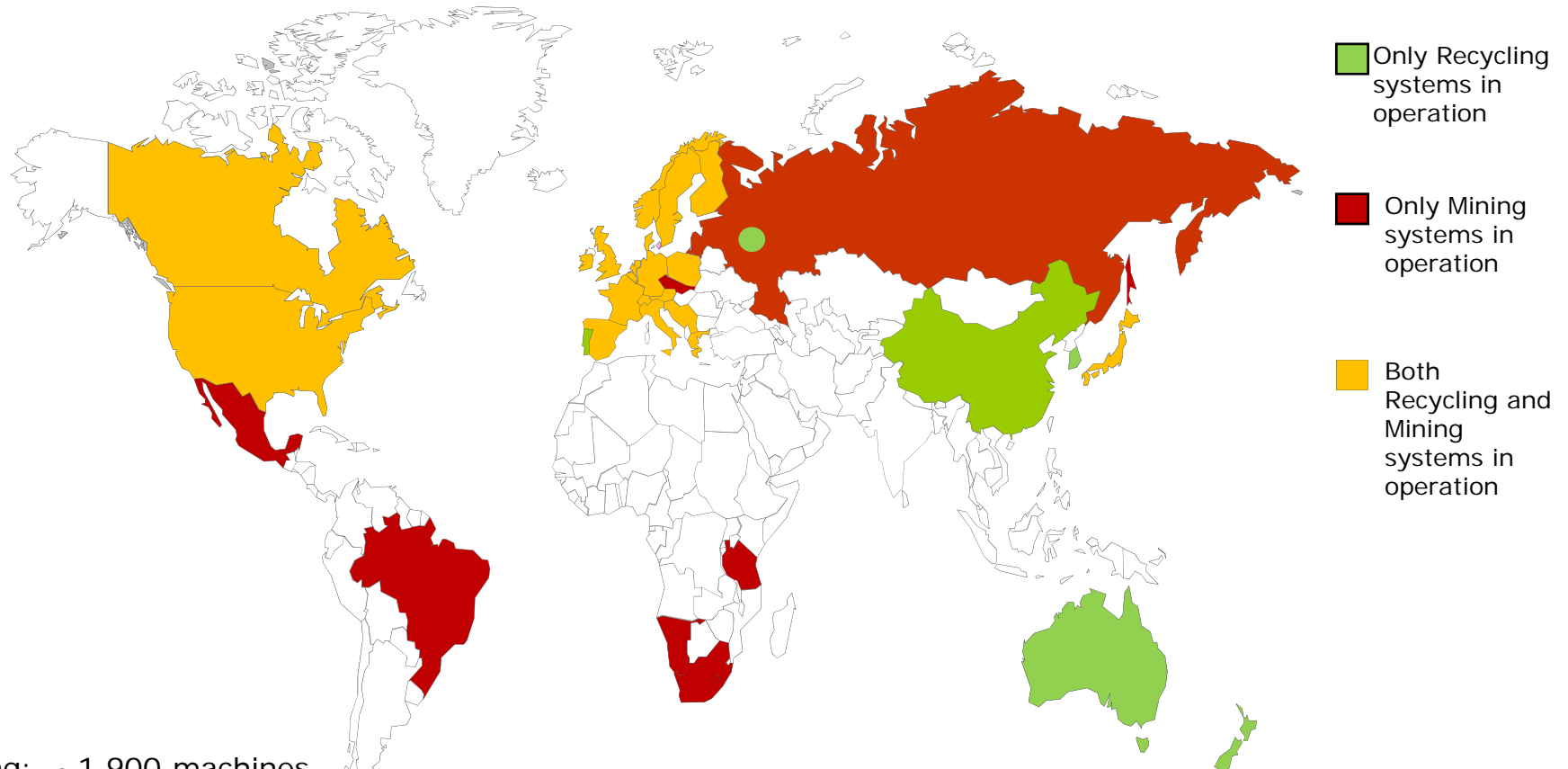
House of advanced sorting technology

<u>Sensor type</u>	<u>Machine example*</u>	<u>Typical application</u>
Metal Sensor		TITECH FINDER Sorting of metal vs. non-metal and stainless steel vs. other Nfe-metals
X Ray (atomic density)		TITECH X-TRACT Sorting of aluminum from heavy metals
Color CCD Camera		TITECH COMBISENSE Sorting of metals or circuit boards by color
Near Infrared (NIR)		TITECH POLYSORT Sorting of polymers and fiber (paper/wood)
Visual (VIS)		TITECH COLORSORT Sorting of polymers by color, paper by grades

All core technologies are proprietary, protected with patents!

Installed base

More than 2.000 units in 35 countries*



*Recycling: ~1.900 machines
 Mining: ~ 130 machines
 Food: ~ 7 machines

Key market: Germany (~40% of installed base)
Other major markets: USA, Italy, Spain, Japan



iTech Group Service

40 people in service worldwide



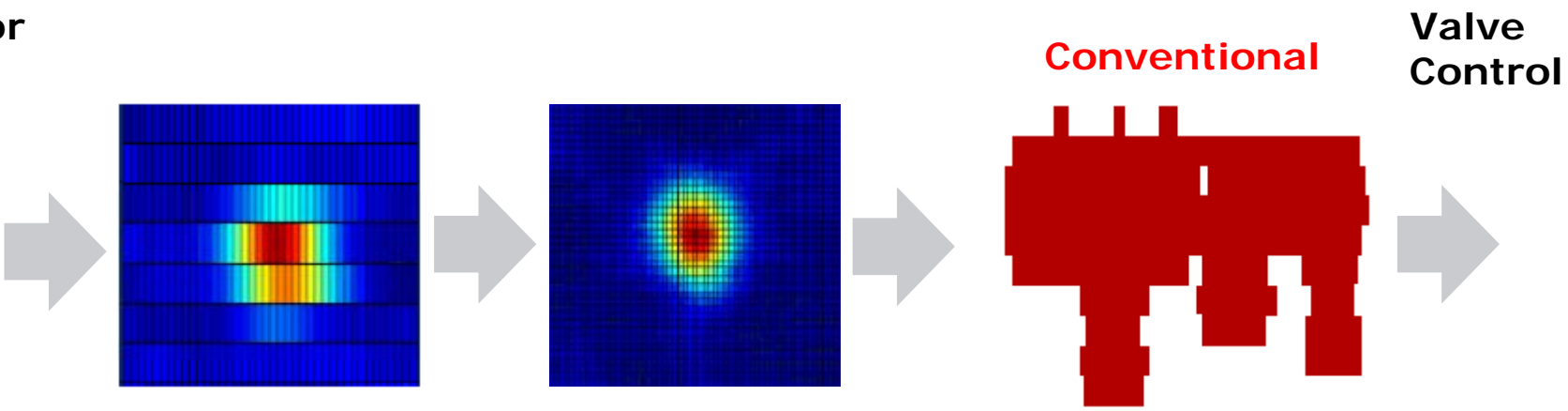
The new TITECH finder series



- New mechanical design, 600mm-3000mm width
- Digital dataprocessing
- Highest sensitivity
- Highest resolution
- Rotating Splitter
- Different Models for different applications

	Basic	Standard	Extended
EM Sensor Resolution	25mm	25mm	12,5mm
Sensitivity	Normal	High	High
Image Processing	Yes	Yes	Yes
SUPPIXX	Yes	Yes	Yes
Valvesystem Valveresolution	Eco 52/25 25mm	High Power, 52/12,5 12,5mm	High Res, 859/6,25 6,25mm

The *SUPPIXX*[®] Image Processing



Raw Image (15mm steel washer)

Enhanced Resolution Image (15mm steel washer)

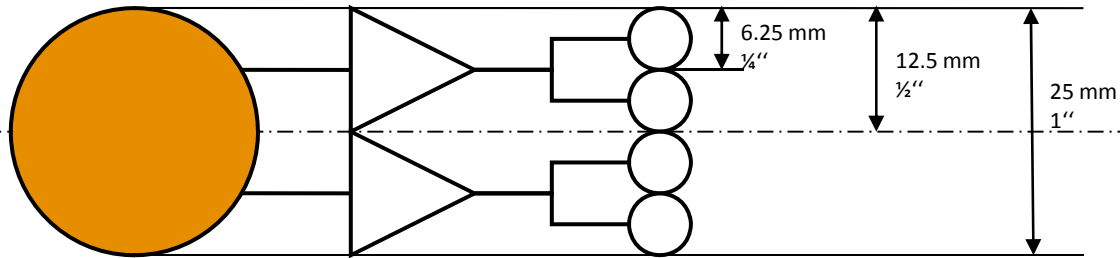
Valve control image, Test scenario



Finder Sensor / Valve Block Configurations

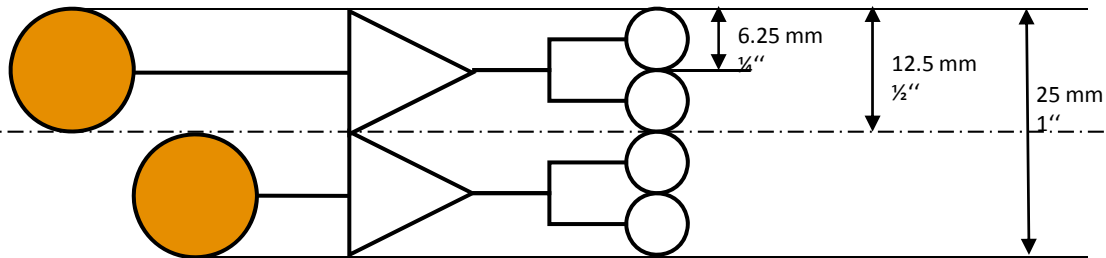
Sensor Valve Nozzle

**Standard
EM Sensor**



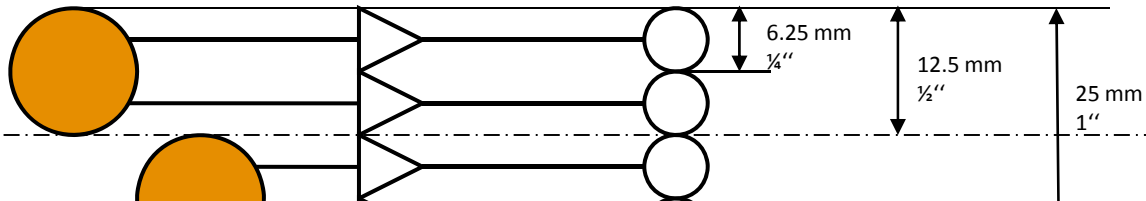
**High Power
Valve Block**

**High Res.
EM Sensor**



**High Power
Valve Block**

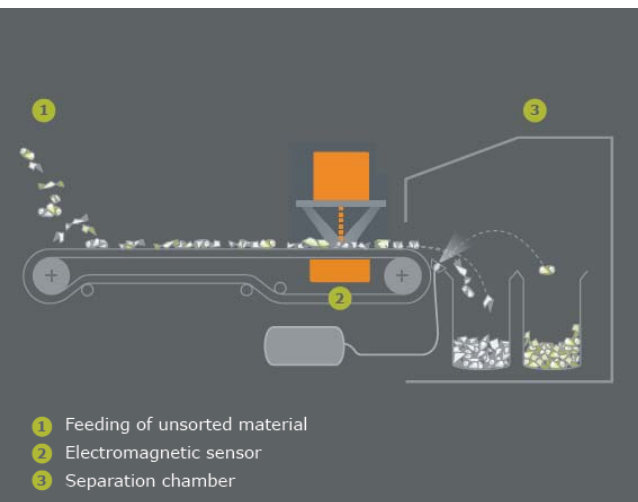
**High Res.
EM Sensor**



High Res.



PolyFinder Product Line



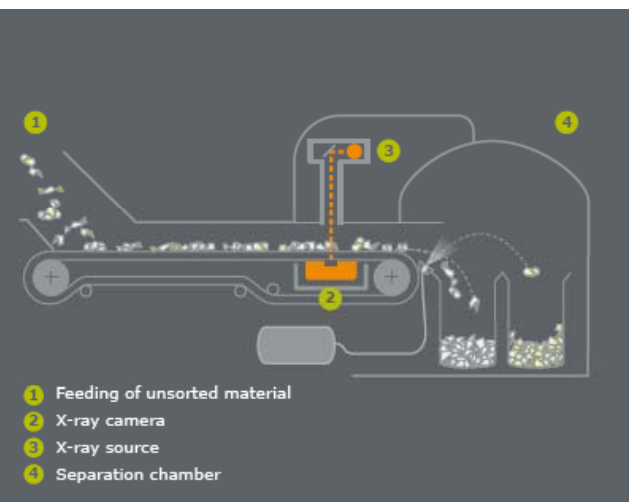
- Highest resolution NIR scanner
- EM sensor with SUPPIXX[®] Resolution enhancement
- Combined material classification by polymer type and conductivity
- Same mechanical platform as Finder series
- Robust field proven machine

CW Lines 1 to 5



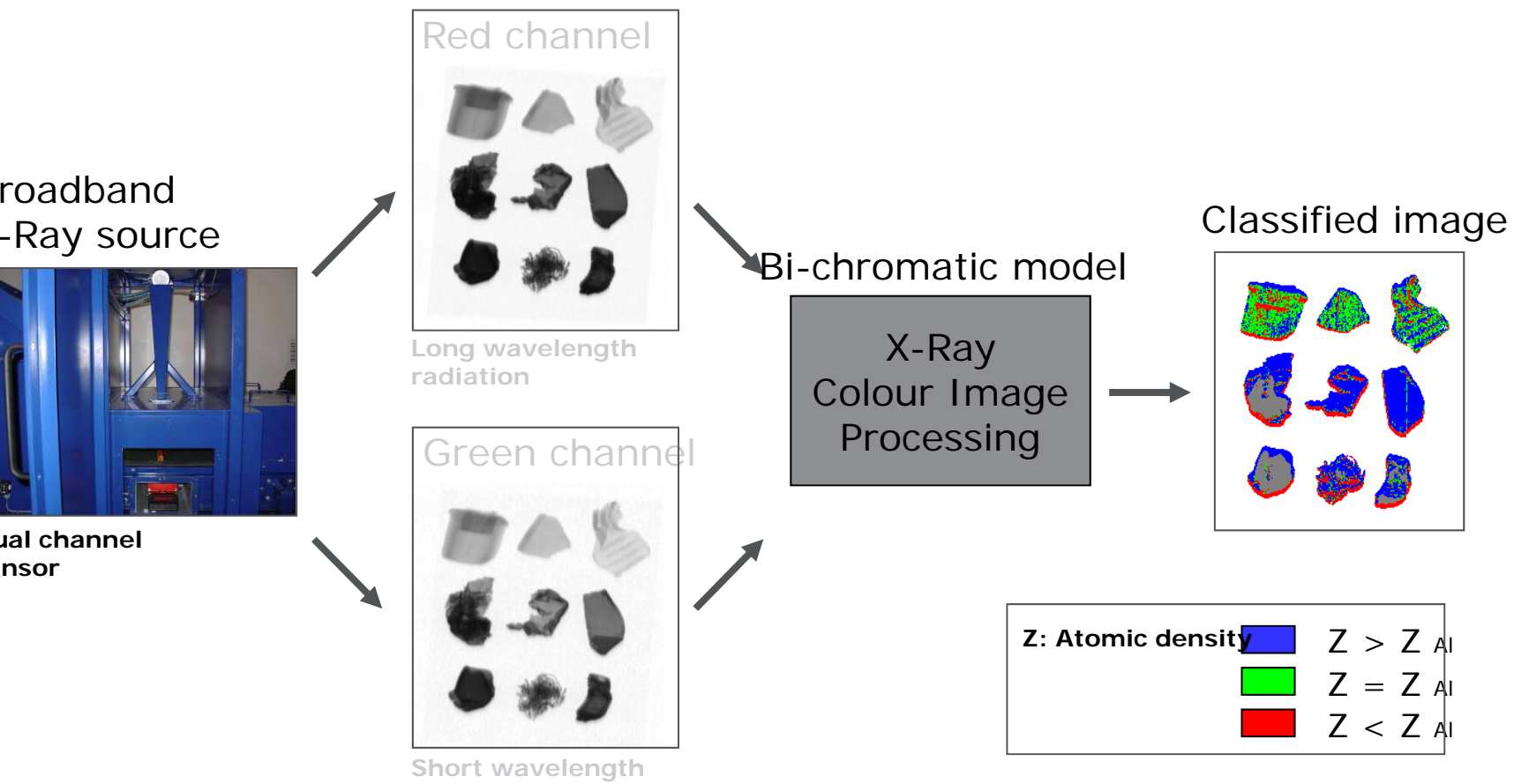


X-Tract DE-XRT Sorter Product Line



- Density separation with high selectivity
- Identification independent of surface quality
- Precise separation behavior
- Very high throughput
- Very Robust design
- Highest safety standard
- Good adaptability to customers requirements

Principle of X-Ray image processing



The bi-chromatic model Classification by Element Order

Example:
Pure Al can be distinguished
from alloy of 98% Al + 2% Cu

	I	II	IIIb	IVb	Vb	VIb	VIIb	VIIIb	IX	X	XI	XII	13	14	15	16	17	18
1	1 H 1,007																	2 He 4,002
2	3 Li 6,941	4 Be 9,012											5 B 10,81	6 C 12,01	7 N 14,00	8 O 15,99	9 F 18,99	10 Ne 20,17
3	11 Na 22,98	12 Mg 24,30											13 Al 26,98	14 Si 28,08	15 P 30,97	16 S 32,06	17 Cl 35,45	18 Ar 39,94
4	19 K 39,09	20 Ca 40,07	21 Sc 44,95	22 Ti 47,88	23 V 50,94	24 Cr 51,99	25 Mn 54,93	26 Fe 55,84	27 Co 58,93	28 Ni 58,69	29 Cu 63,54	30 Zn 65,39	31 Ga 69,72	32 Ge 72,61	33 As 74,92	34 Se 78,96	35 Br 79,90	36 Kr 83,8
5	37 Rb 85,46	38 Sr 87,62	39 Y 88,90	40 Zr 91,22	41 Nb 92,90	42 Mo 95,94	43 Tc 98,90	44 Ru 101,0	45 Rh 102,9	46 Pd 106,4	47 Ag 107,8	48 Cd 112,4	49 In 114,8	50 Sn 118,7	51 Sb 121,7	52 Te 127,6	53 I 126,9	54 Xe 131,2
6	55 Cs 132,9	56 Ba 137,3		72 Hf 178,4	73 Ta 180,9	74 W 183,8	75 Re 186,2	76 Os 190,2	77 Ir 192,2	78 Pt 195,0	79 Au 196,9	80 Hg 200,5	81 Tl 204,3	82 Pb 207,2	83 Bi 208,9	84 Po 208,9	85 At 209,9	86 Rn 222,0
7	87 Fr 223,0	88 Ra 226,0		104 Rf 261,1	105 Db 262,1	106 Sg 263,1	107 Bh 262,1	108 Hs 265	109 Mt 266	110 Ds 269	111 Uuu 272	112 Uub 277						
	57 La 138,9	58 Ce 140,1	59 Pr 140,9	60 Nd 144,2	61 Pm 146,9	62 Sm 150,3	63 Eu 151,9	64 Gd 157,2	65 Tb 158,9	66 Dy 162,5	67 Ho 164,9	68 Er 167,2	69 Tm 168,9	70 Yb 173,0	71 Lu 174,9			
	89 Ac 138,9	90 Th 140,1	91 Pa 140,9	92 U 144,2	93 Np 146,9	94 Pu 150,3	95 Am 151,9	96 Cm 157,2	97 Bk 158,9	98 Cf 162,5	99 Es 164,9	100 Fm 167,2	101 Md 168,9	102 No 173,0	103 Lr 174,9			

Metall- Eigenschaften
 ■ Metall
 ■ Halbmetall
 □ Nichtmetall
 Aggregatzustand bei 25°C
 ■ Feststoff
 ■ Flüssigkeit
 ■ Gas

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Non-Ferrous scrap processing

Separation of aluminum from the mixed heavies

