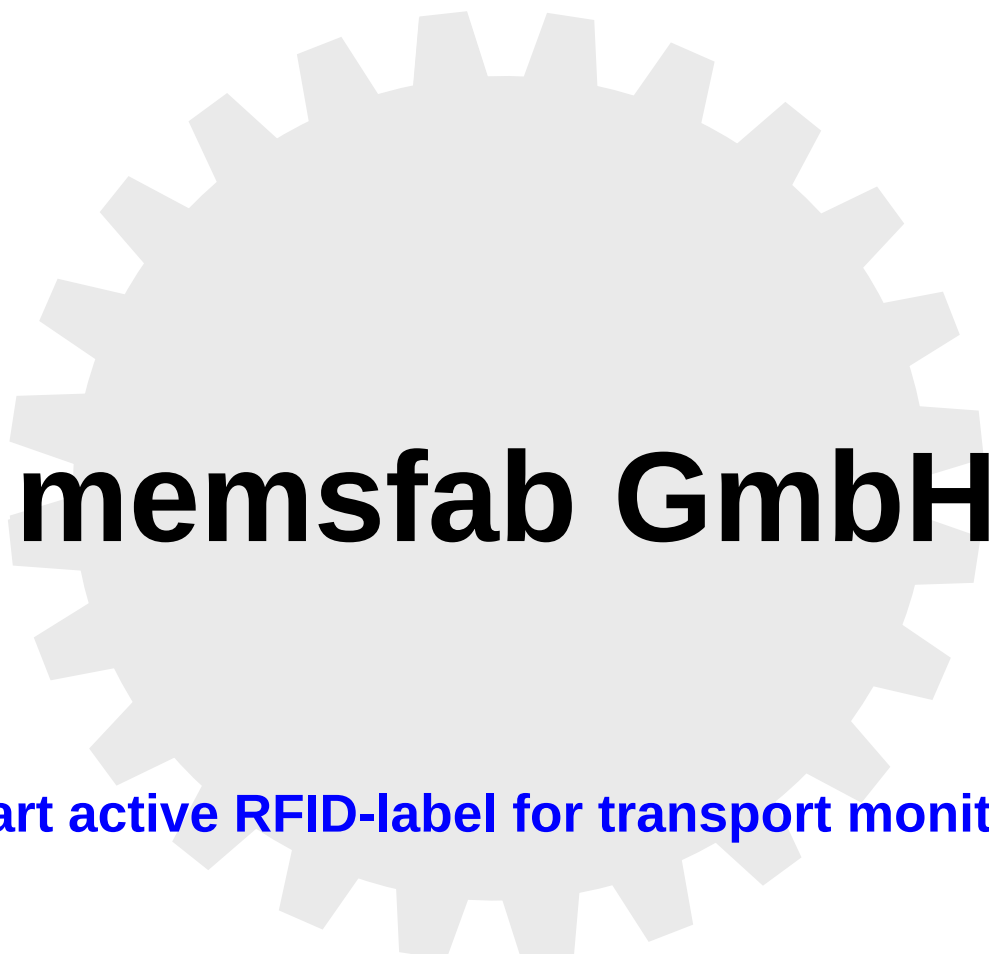
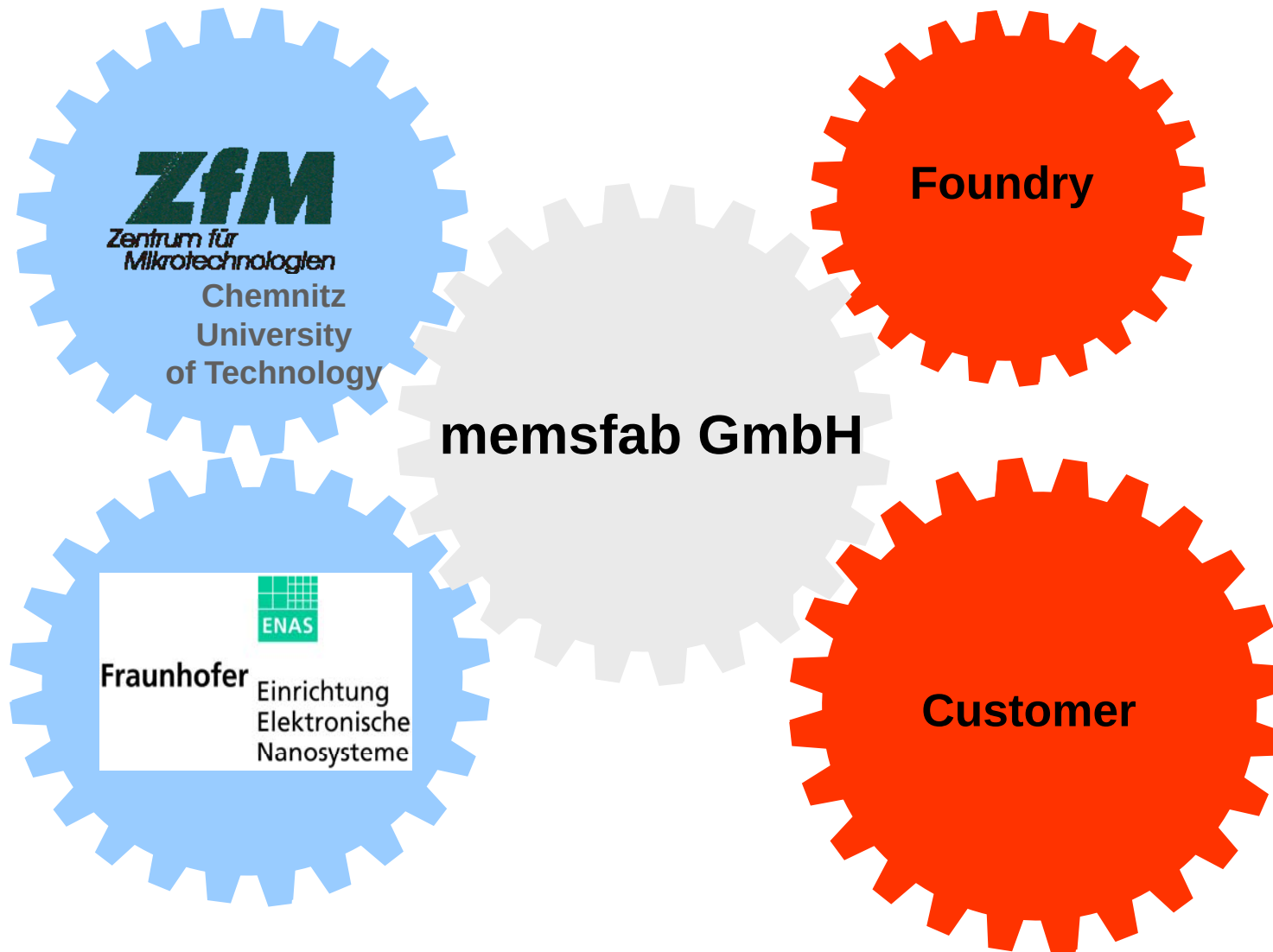




memsfab GmbH

a smart active RFID-label for transport monitoring

7. Leibnitzkonferenz „Sensorsysteme 2008“, 16. – 18. Oktober 2008



- 1. technology**
- 2. product**
- 3. market**

1. technology

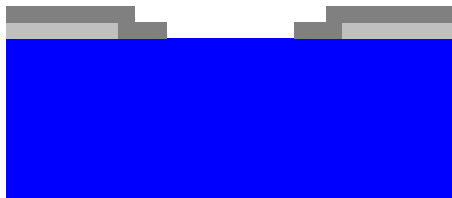
AIM* Process Flow (simplified) and Anchor Structure

* AIM = Airgap Isolation of Microstructures: DE 10029012C2; U.S.No.10/296,771; PCT/DE01/02237

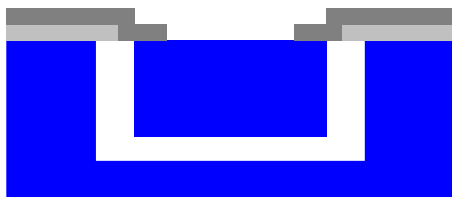
1. Isolator



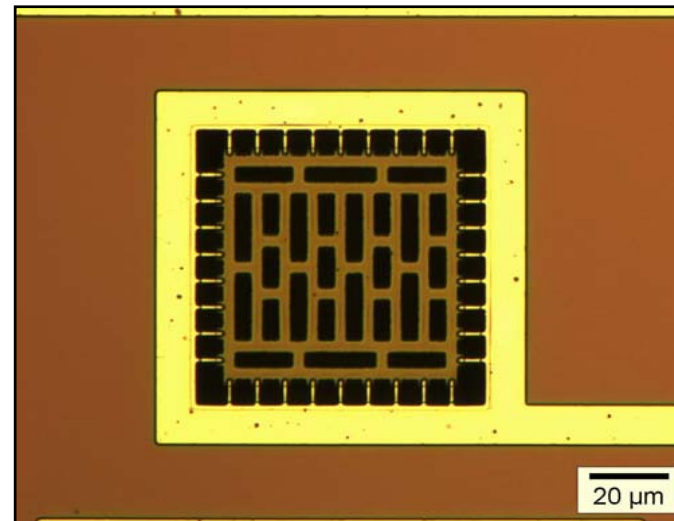
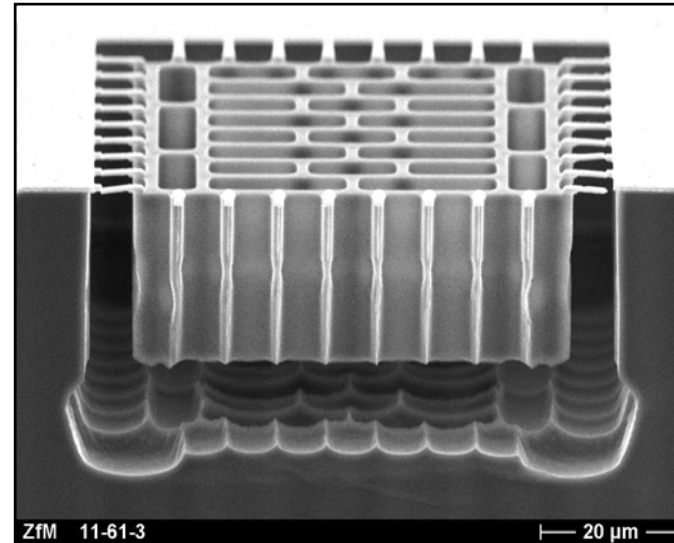
2. Metal



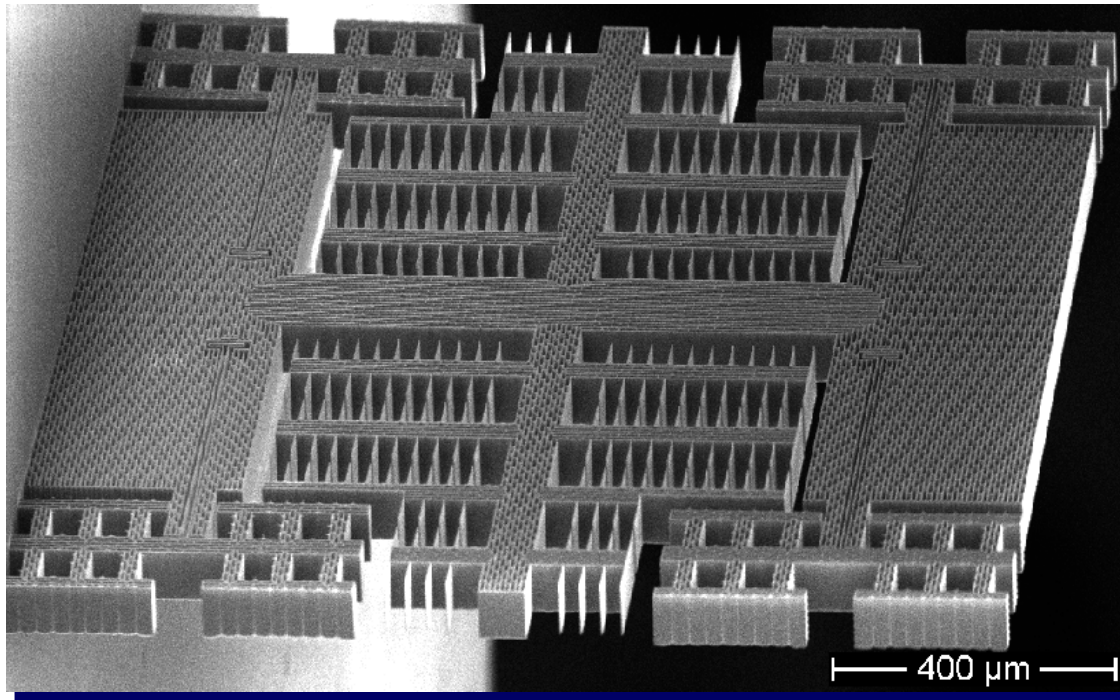
3. Silicon Component



■ SiO₂ ■ Al ■ Si

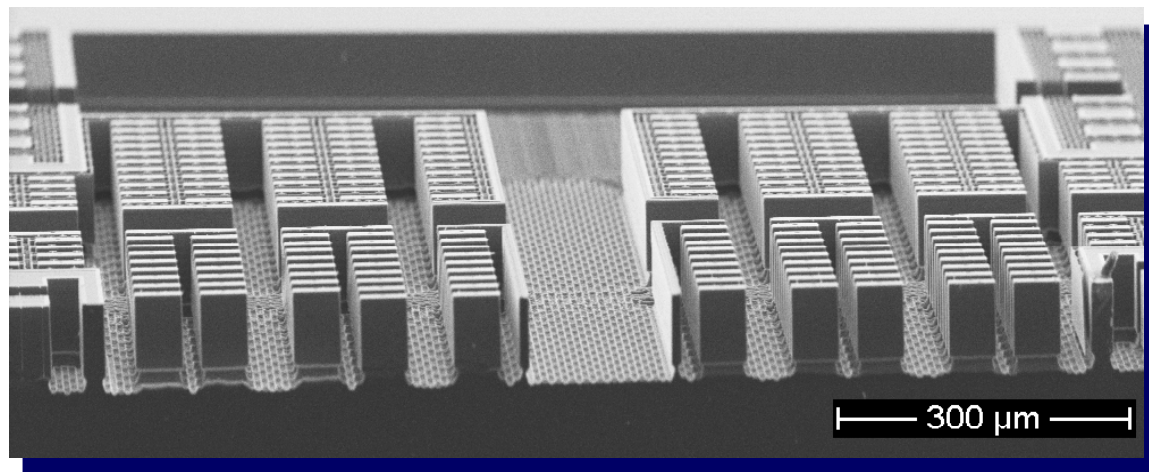


AIM7E– SEM of Seismic Mass and Counter Part

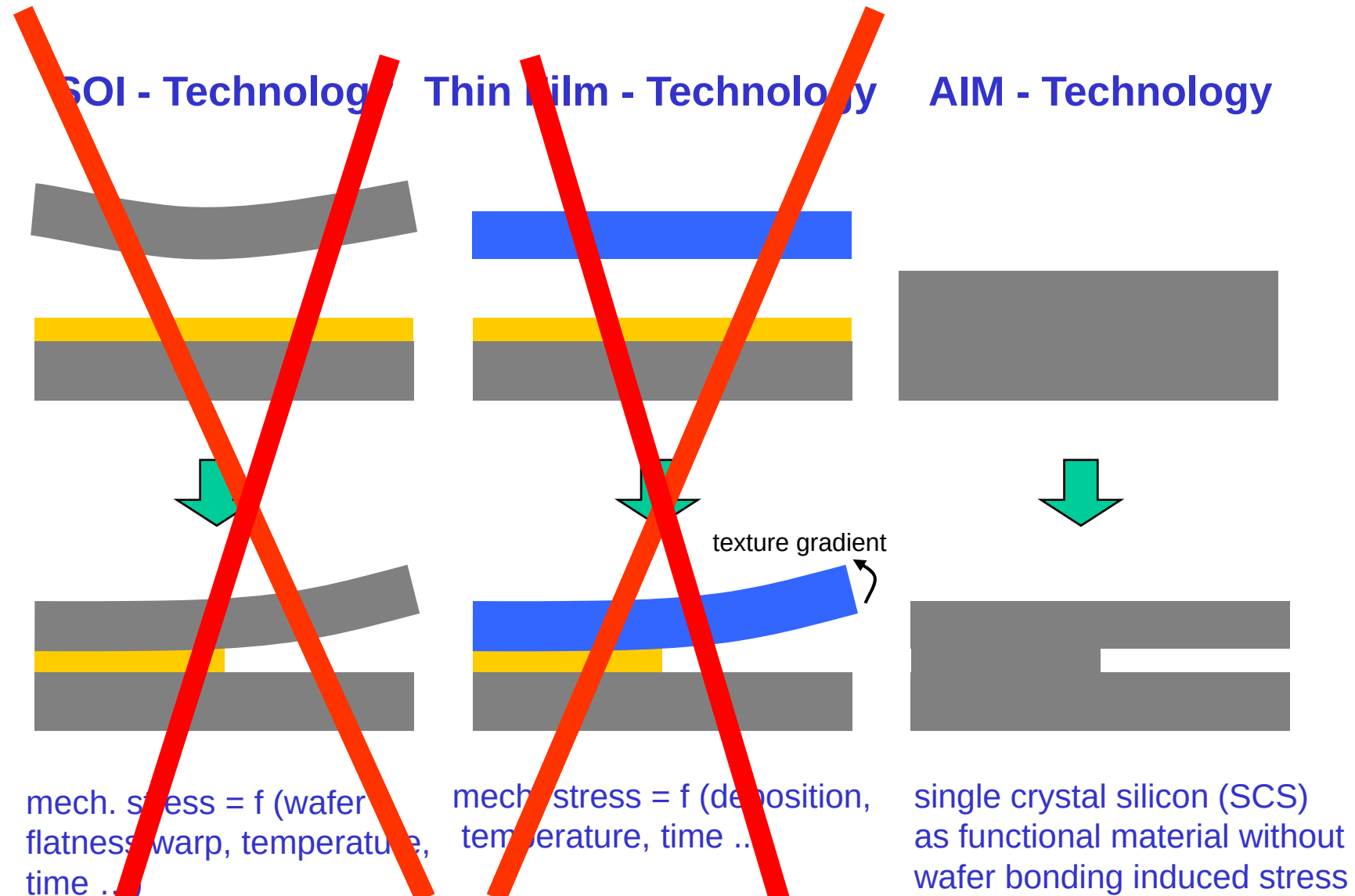


seismic mass

electrodes ...

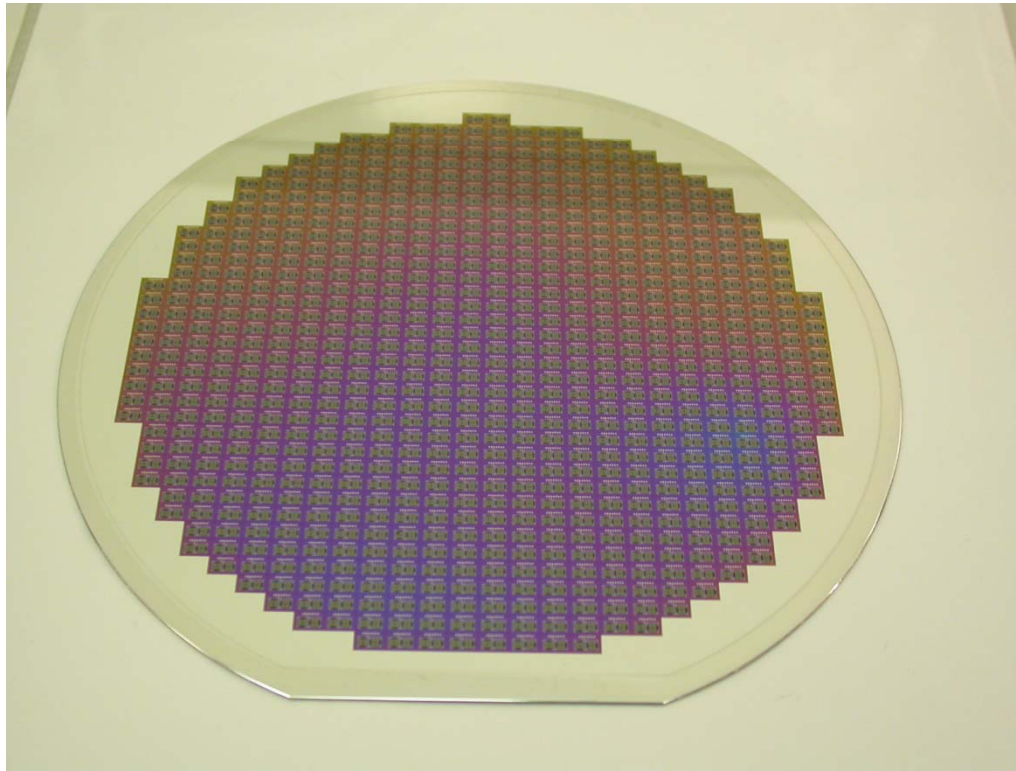


The AIM Benefit

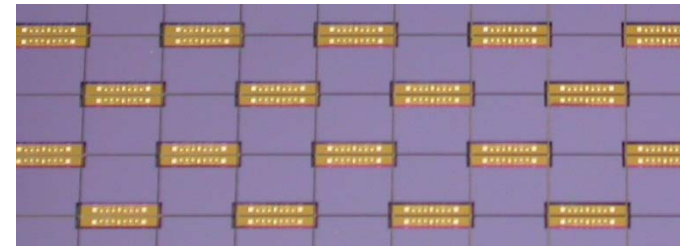


AIM7E Dual Axis *low g* Sensor

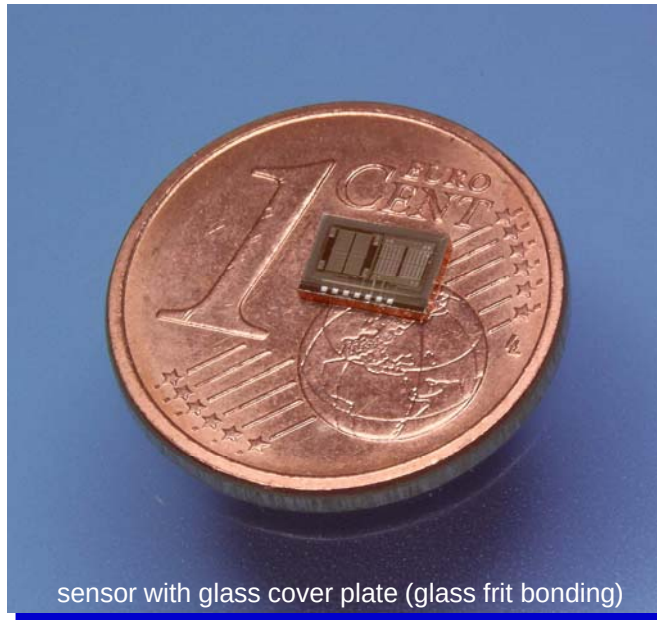
before capping ...



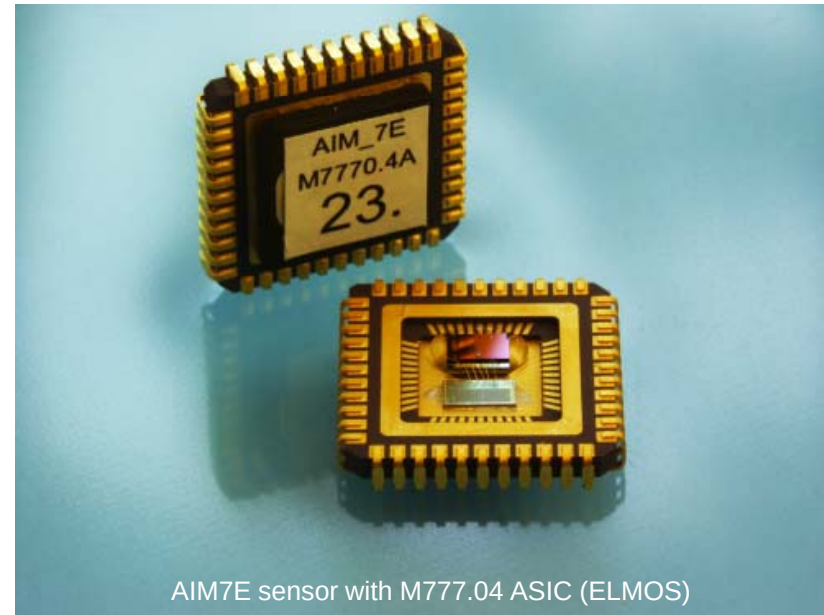
with cap wafer ...



AIM Dual Axis *low g* Sensor



sensor with glass cover plate (glass frit bonding)



AIM7E sensor with M777.04 ASIC (ELMOS)

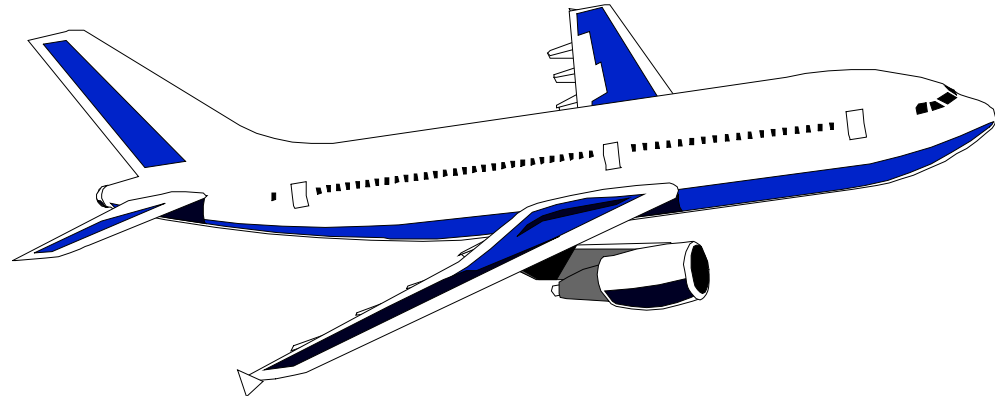
AIM7E System –Available Data

	AIM7E (2 axis)	Unit	AIM7E-System (2 axis; digital readout)	Unit
Measurement Range	1.0	g	1.0	g
Sensitivity (measured)	150	fF/g	400/800/1600	counts/g
C ₀	1.15	pF		
Nonlinearity FS		%	< +-67 ⁽³⁾	mg
Cross Axis Sensitivity ⁽¹⁾	<< 0.5	%	<3	%
0 g Offset @ RT ⁽¹⁾			<25	mg
0 g Offset vs. Temp. ⁽¹⁾ 20...70° C		[mg/K]	+/-0.06	mg/K
Sensitivity Change vs. ⁽¹⁾ Temperature			0...0.025	%/K
Noise Density ⁽²⁾	50	µg/Hz ^{1/2}	⁽³⁾	µg/Hz ^{1/2}
Bandwidth ^(3dB, overdamped)	150	Hz	0...150	Hz
Shock Survival (x,y,z)	2000	g	>2000	g
Long term stability ⁽⁴⁾			+ - 1	count
Dimensions (L x w)	3.87x2.97	mm	CLCC44	
(h)	0.8	mm		

(1) without system calibration
 (2) calculation data
 (3) characterization in progress
 (4) according to IEEE Stand1293-1998
 drift not detectable

2. product

passive RFID-tags for transport monitoring



mechanical shock and tilt sensors for transport monitoring



**1 tilt sensor and 2
shock sensors**

Shock and tilt sensor



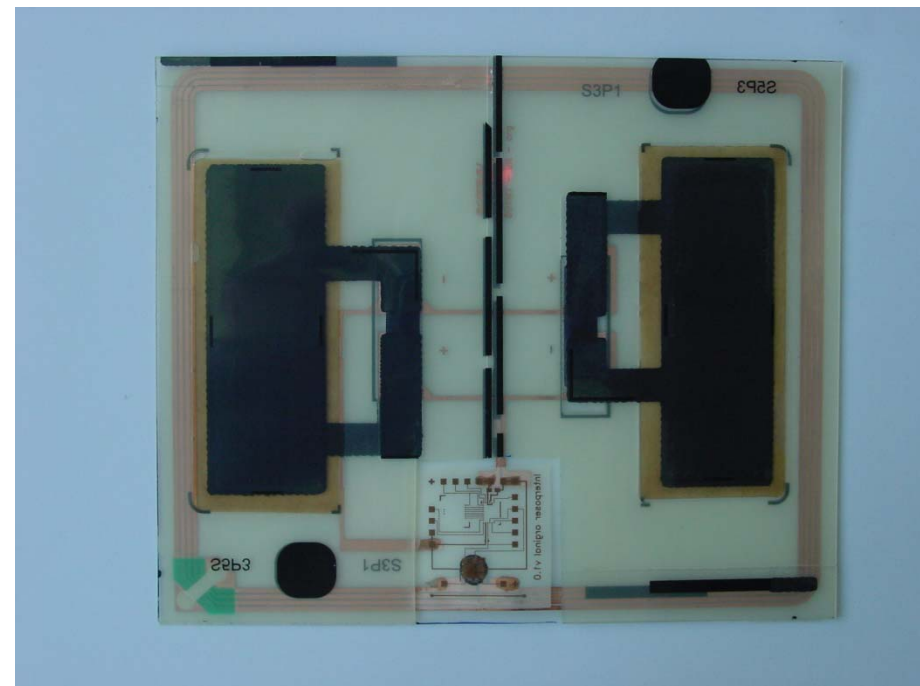
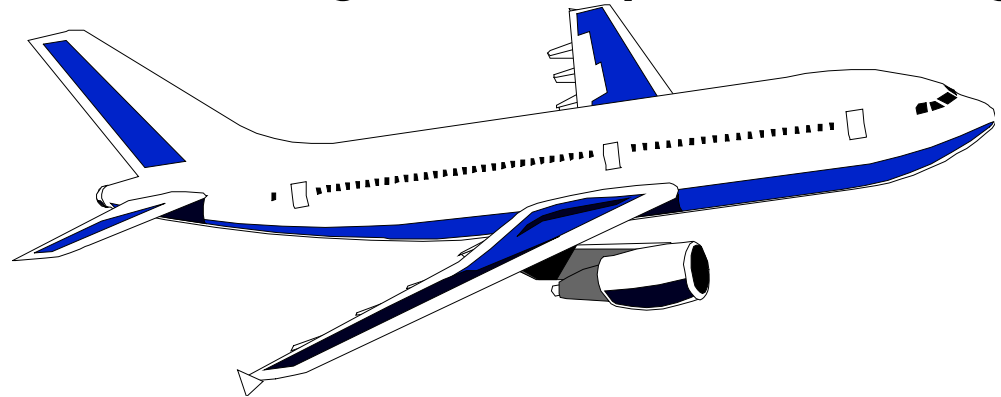
Shock sensor
price 3,50 Euro each

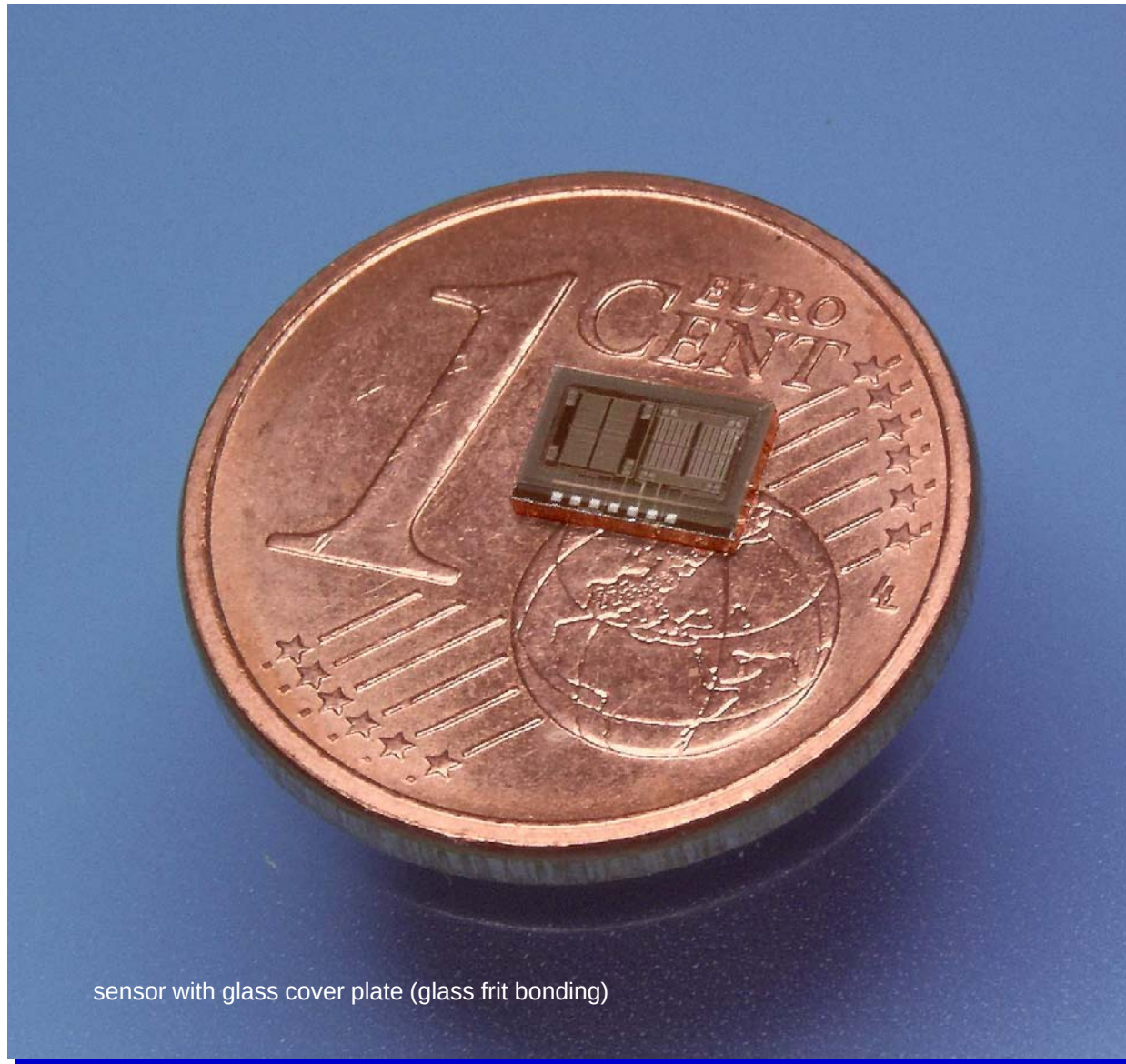
Shock and tilt sensor



tiltsensor for 20, 30, 40, 50,
60, 70 and 80 ° inclination
left and right
price 3,50 Euro each

Innovative combination of mems and RFID-tags for transport monitoring

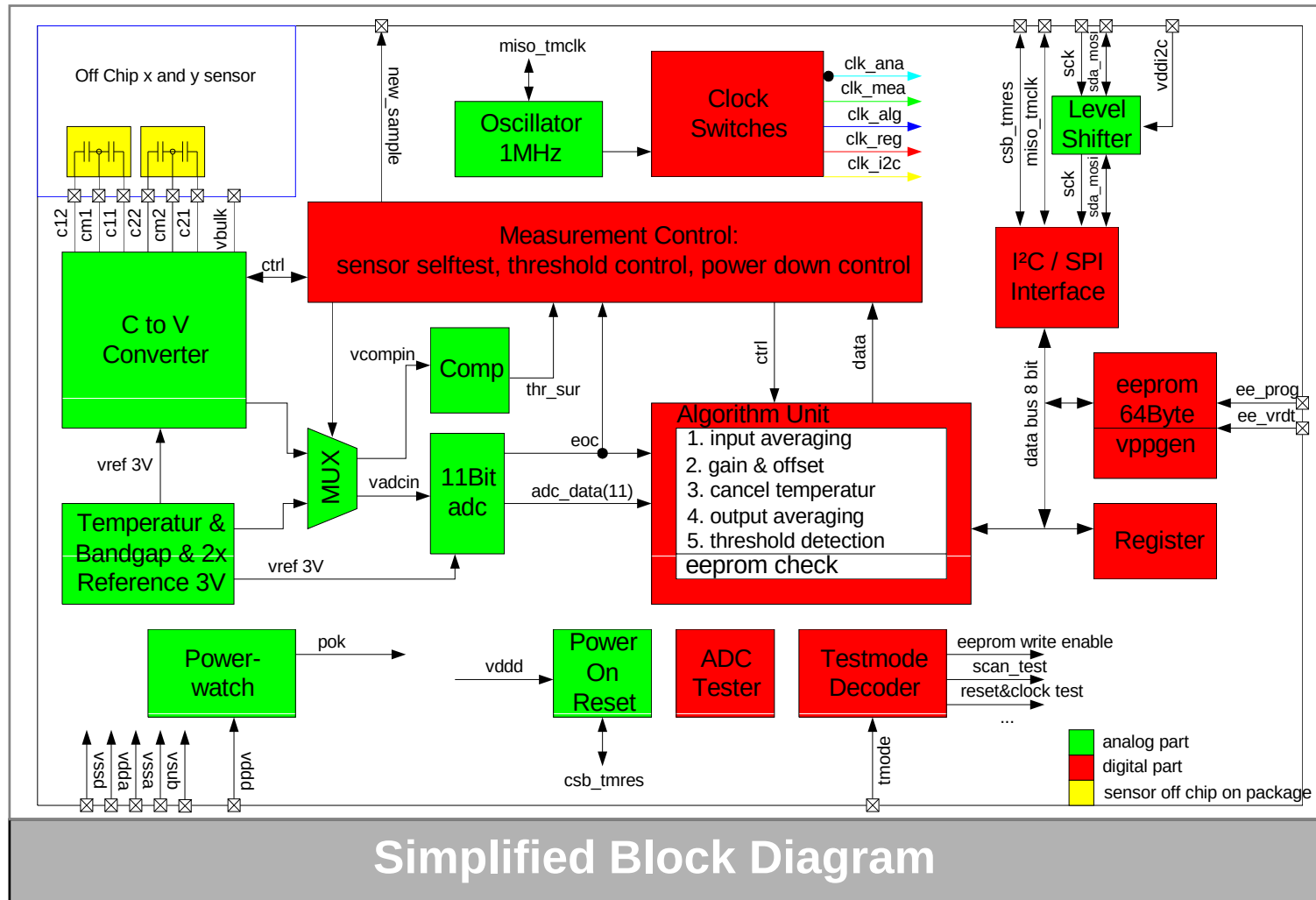




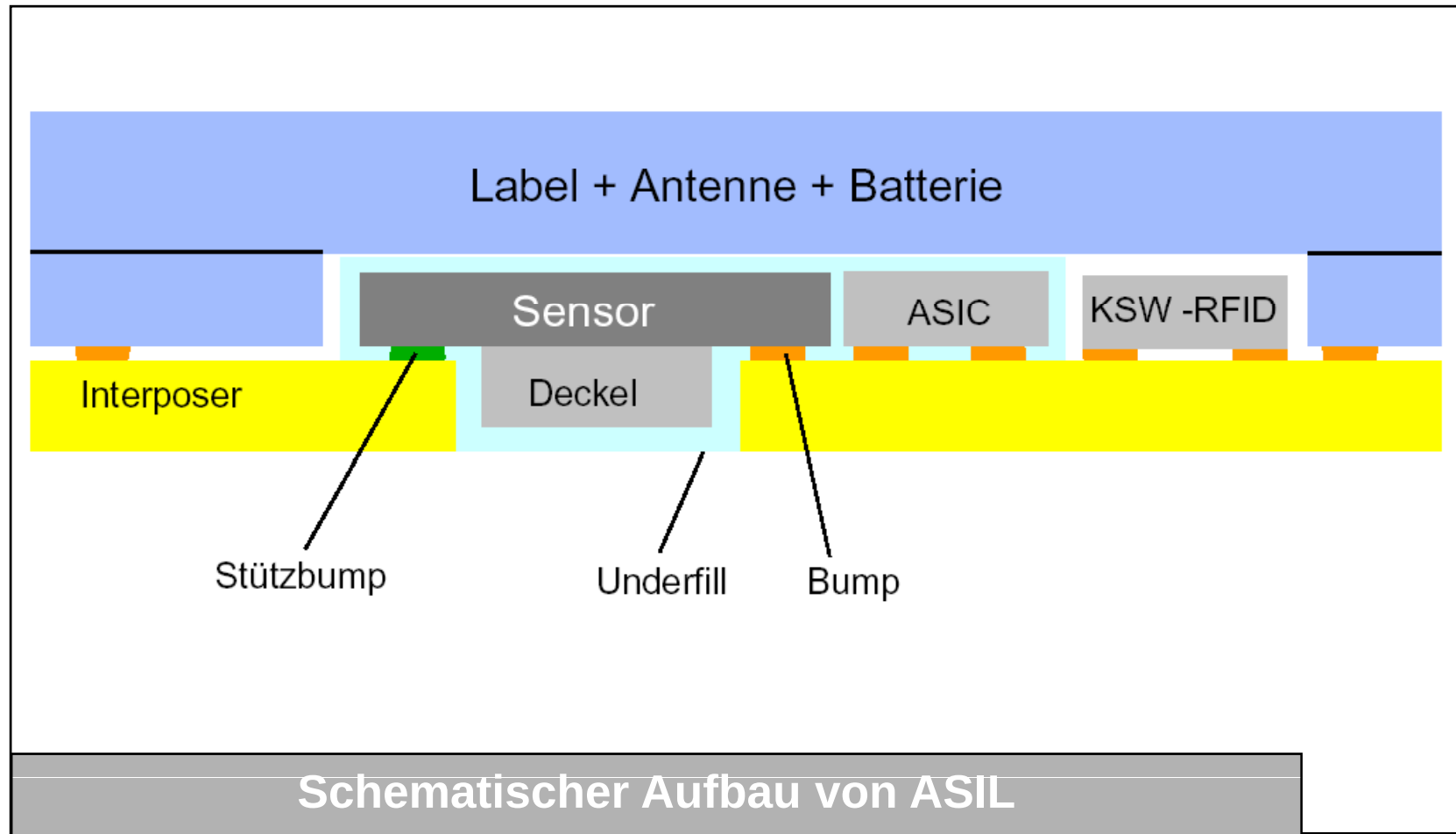
**dual axis inclination
sensor element**

sensor with glass cover plate (glass frit bonding)

sensor-ASIC



packaging technology



first field tests at Schenker sites

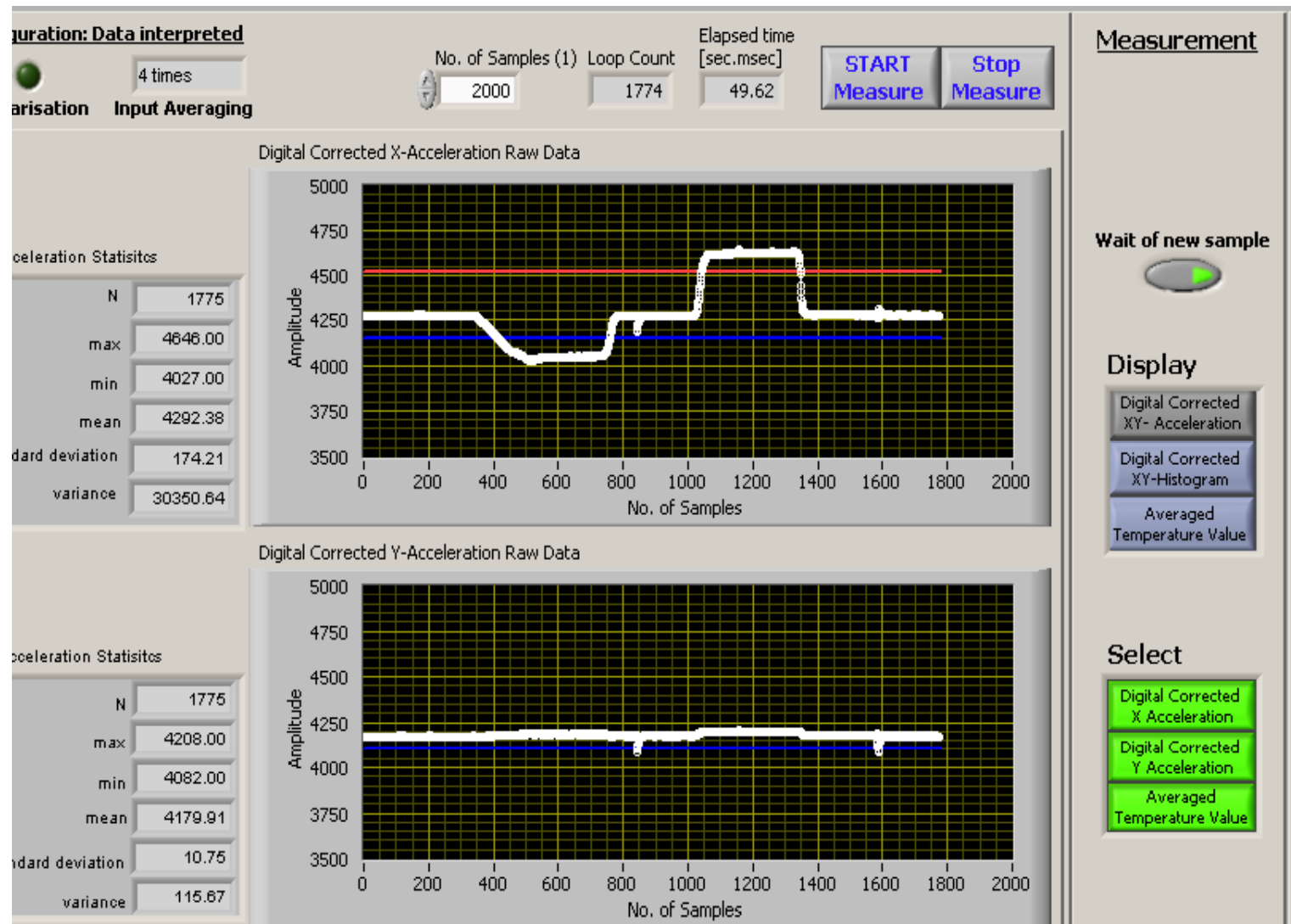


tilt movement

up, down

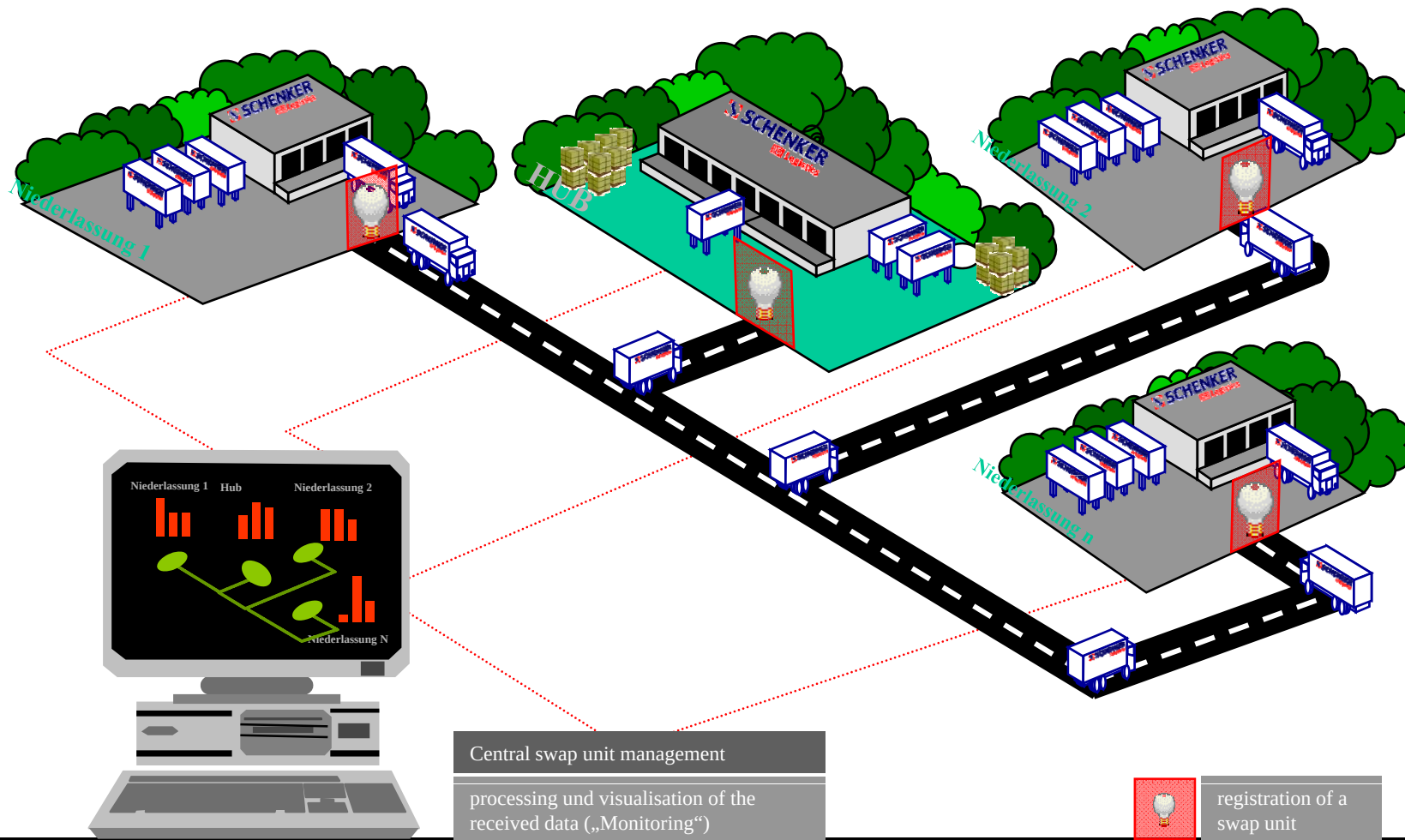
shocks

Example of a monitored tilt movement



3. market

transport logistics - swap body identification



Equipment Logistics Dresden

Our consulting services

- Schenker consults for dock areas and their technical facilities
- Weight capacity, size and technical requirements of elevators
- Dimensions and capacity of grey-rooms and warehouses
- Move-in and move-out procedures, uncrating and packing
- Relocation procedures
- Special unloading equipment
- Design and size of move-in path
- Special clean-room solutions
- Transport containers,



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