GRINM

General Research Institute for Nonferrous Metals

SEMINAR

R&D Laboratory on Industrial Demand

TOLMI

R & D DRIVEN BY DEMAND

Michael Kröning

Knowledge
Visions
Creativity

Innovation

Competitiveness
Profit
Social Processes

Services – Technologies – Products

Our Dream of Continuing Improvements

R & D Driven by Demand

Innovation Strategy

Problem: Return of Investment
(No NDT system is a mass product)

However: We may take advantage of today's technology mega-trends:

- Computing
- Micro-electronics
- Sensors
- Robotics

We share knowledge and risks through strategic innovation alliances

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How to Manage Efficiency – Effective Innovations?

Knowledge	Marketing	Competence	Management
Culture	Visions	Realization	Transfer
Technology	Viability	Ressources	Market

or

The Modern Challenge of Science

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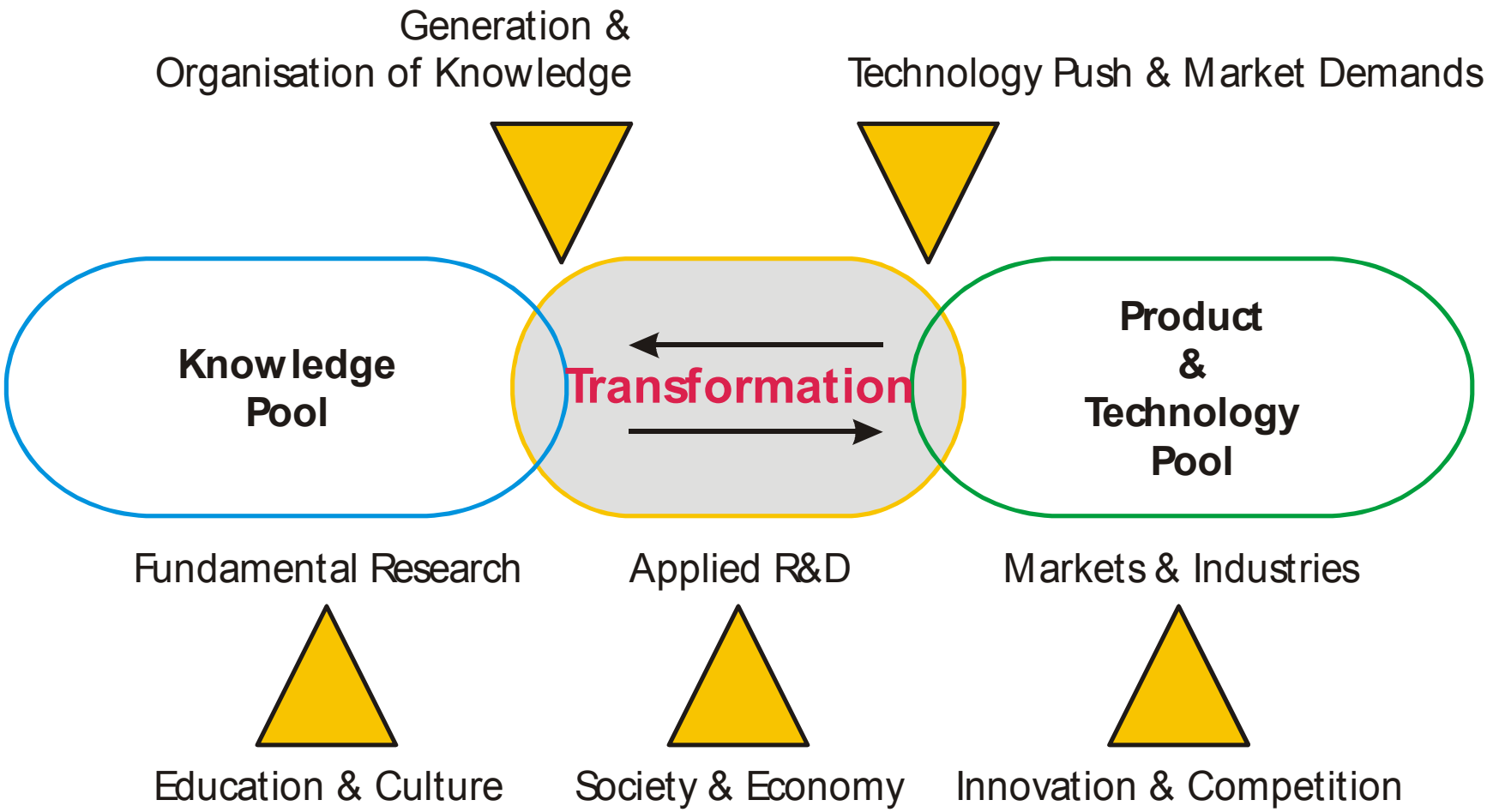
Ideas on Effective Applied R&D



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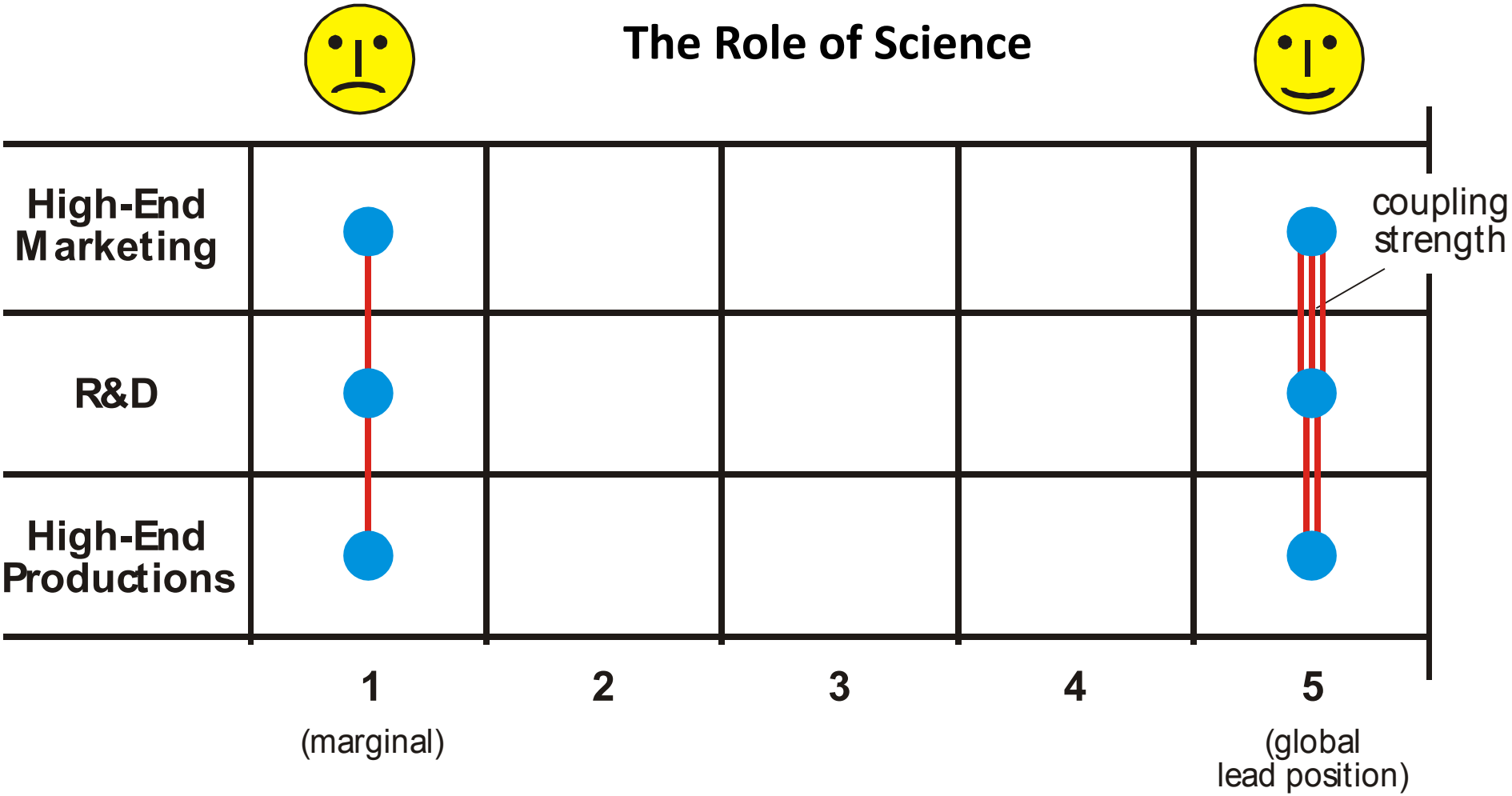

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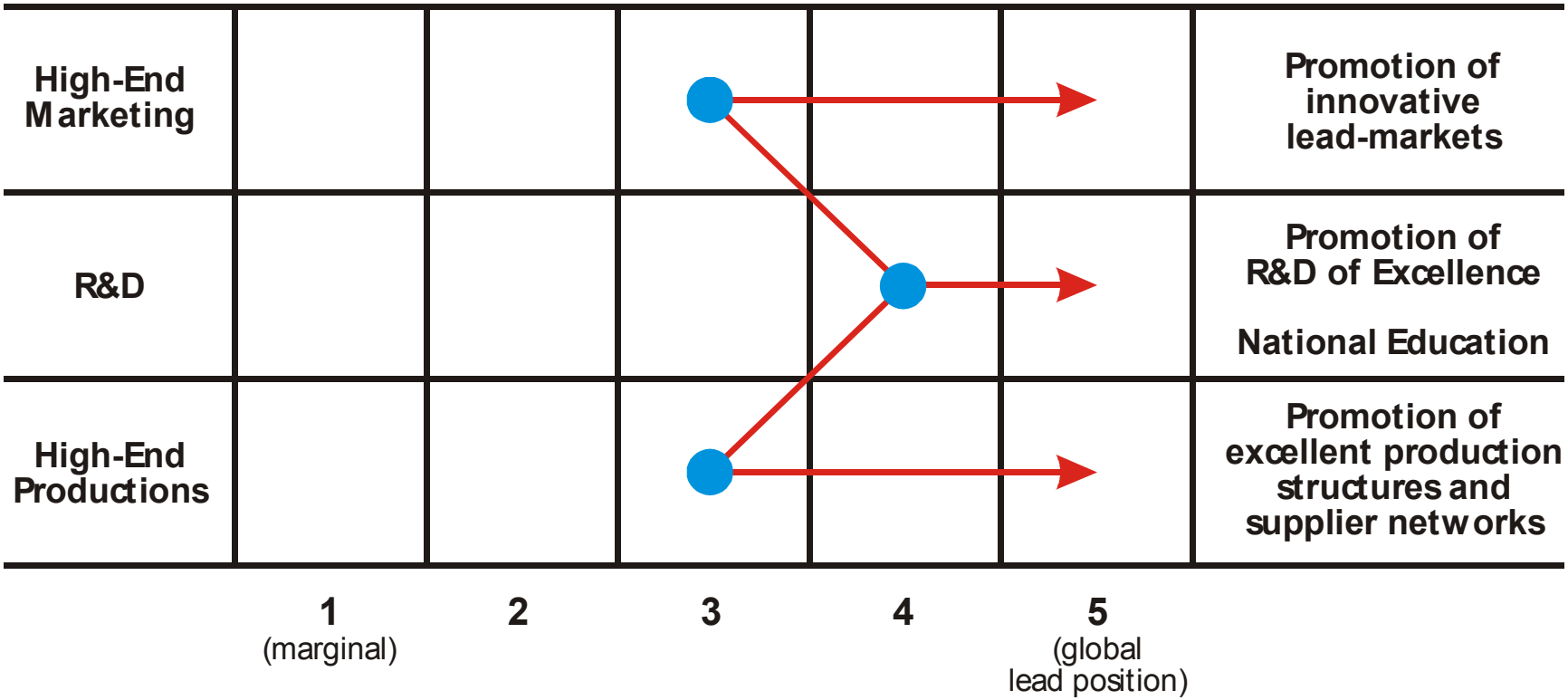
Public Role



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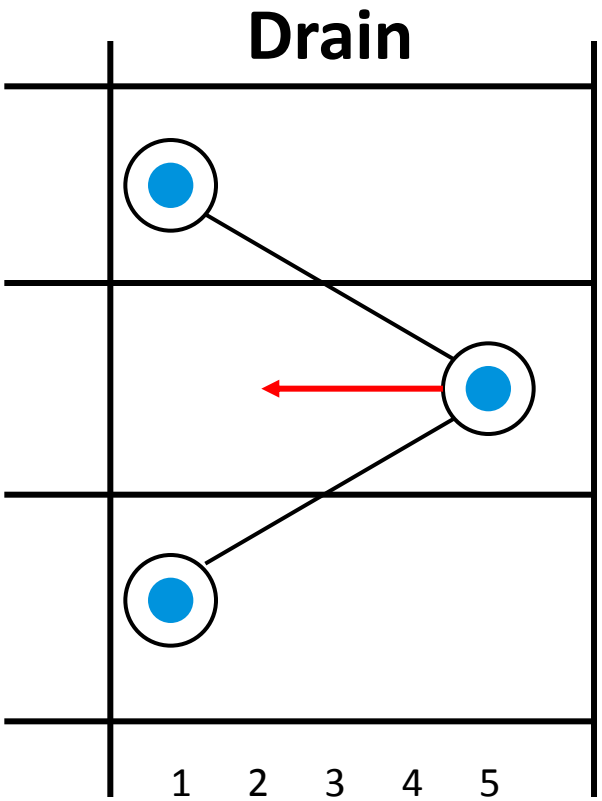
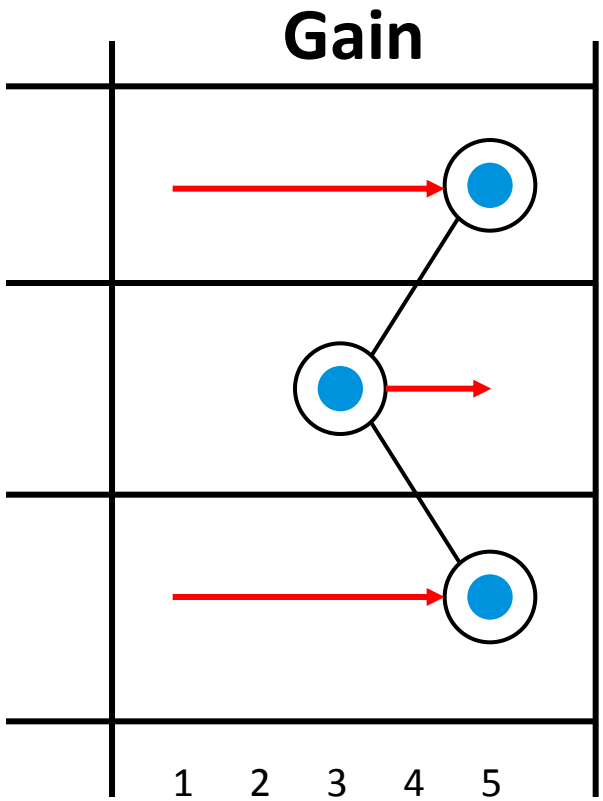
Brain Drain or Brain Gain





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Look for knowledge

Feel the market demands

Look for partnership

Push the technology

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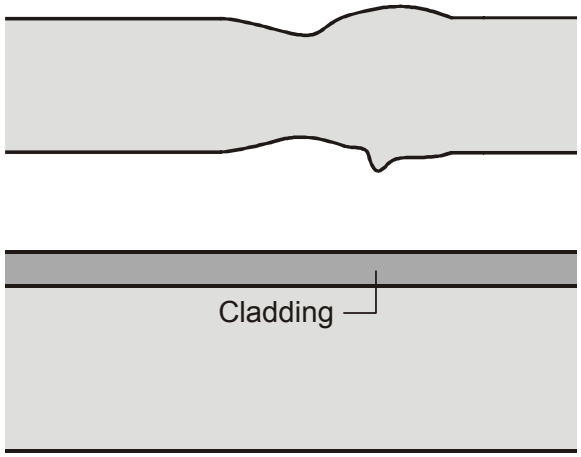
Case Studies: Surfaces

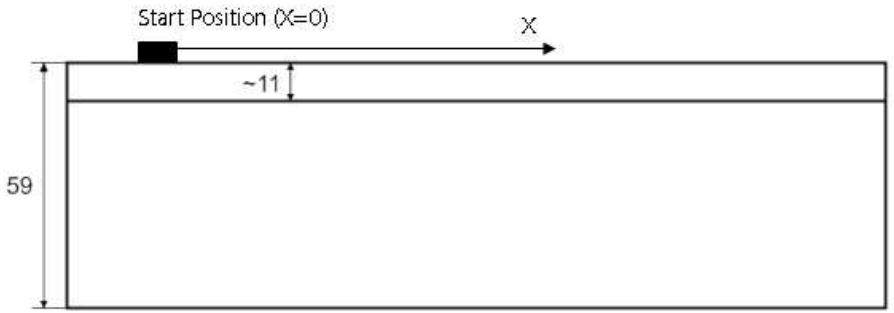


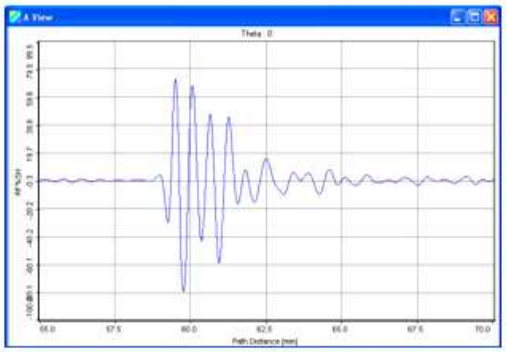
Surface Requirements:

Temperature	Contact
Roughness / Waviness	Coupling
Surface Layers	Sound Field Transmission

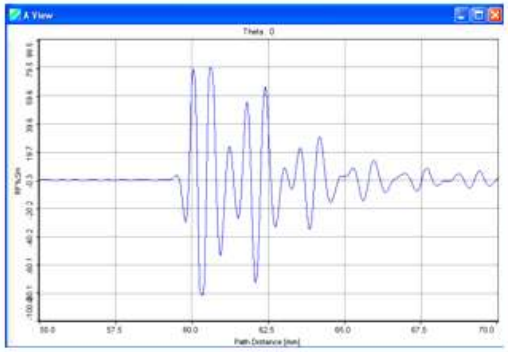
Can we inspect at high temperatures on rough or coated surfaces?

Ultrasonic Inspection for Rough Surfaces

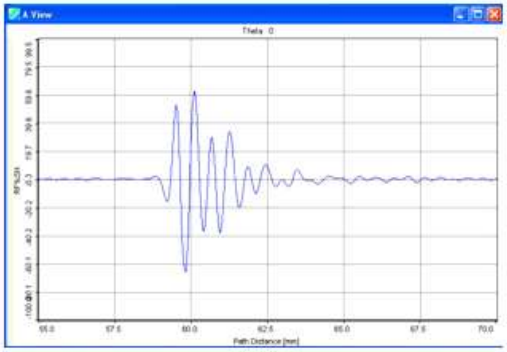




X = 10 mm



X = 30 mm



X = 60 mm

***A-Scans*: shifting of bottom echo**

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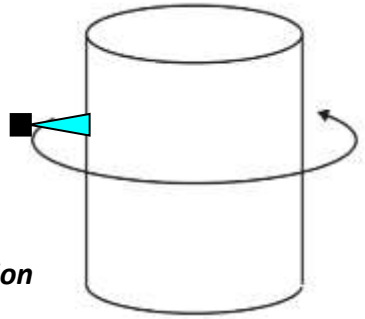
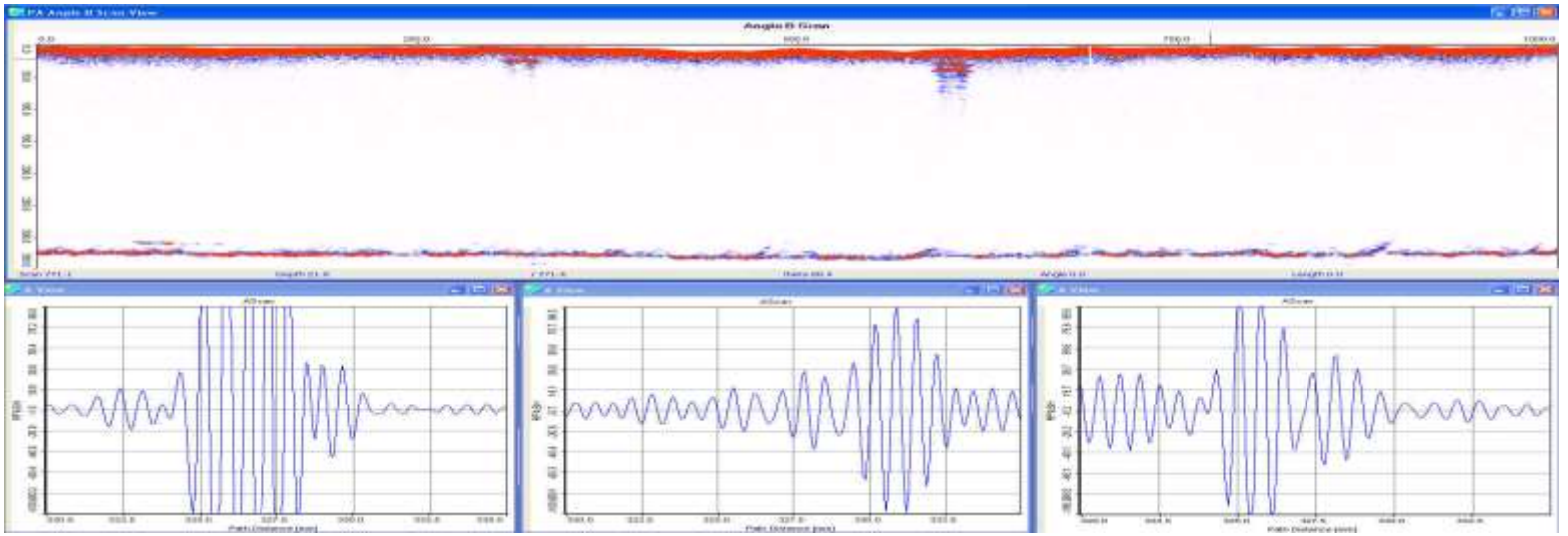
Ultrasonic Inspection for Rough Surfaces

Example: ***Raw-forged steel bar, diameter: 320 mm***
Transducer: 4 MHz, immersion technique

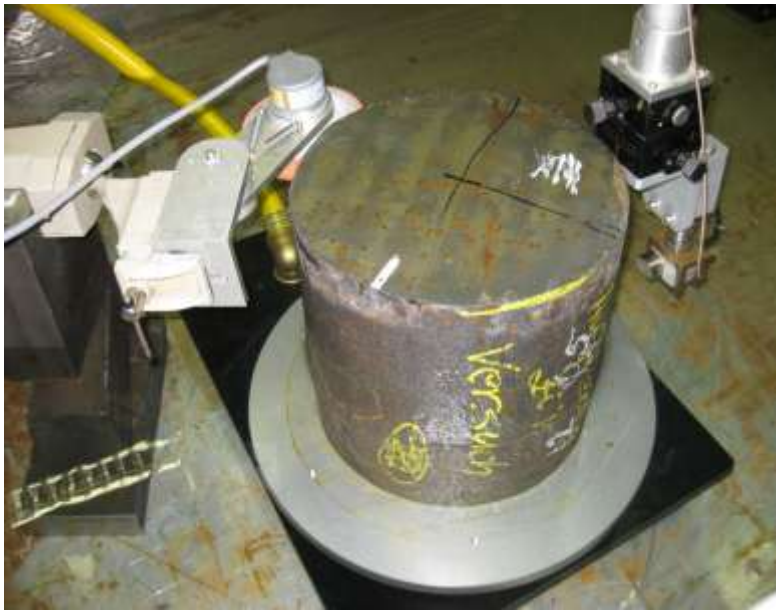




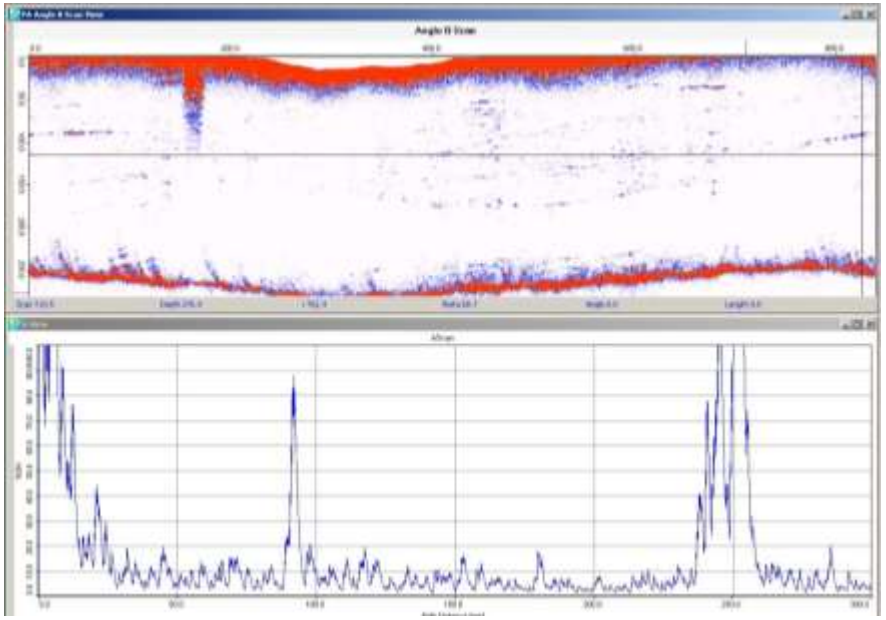
A-Scans: shifting of bottom echo

Ultrasonic Inspection for Rough Surfaces

***Specimen**: Raw-forged steel bar with artificial flaws*



***Inspection results**: C- and A-Scans*



New methods of signalprocessing allow a high sensitivity testing raw-forged surfaces

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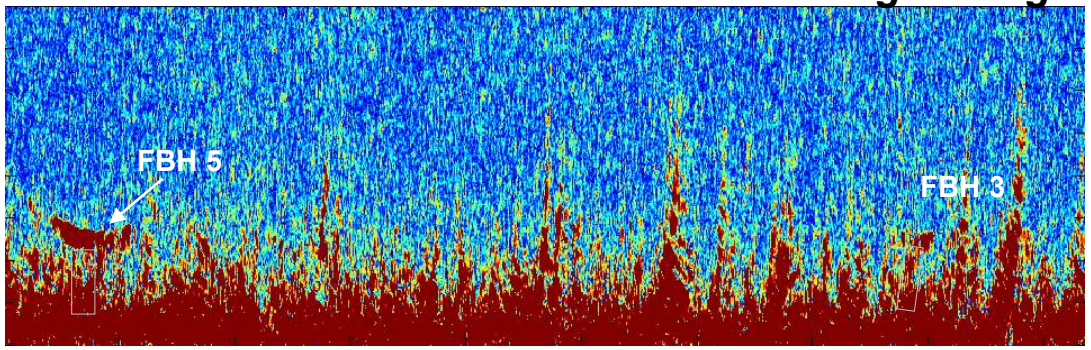
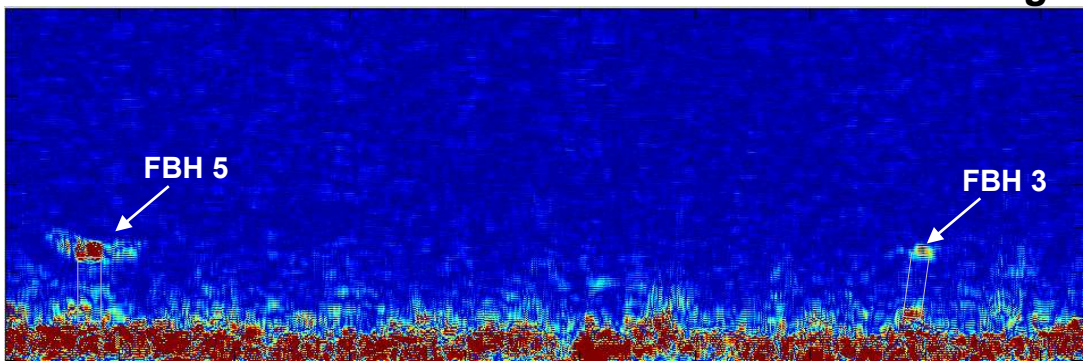
Ultrasonic Inspection for Rough Surfaces

Virgin Image



Denoised Image



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Coarse Grain Steel Test Sample

with Rough Surface & of High Attenuation

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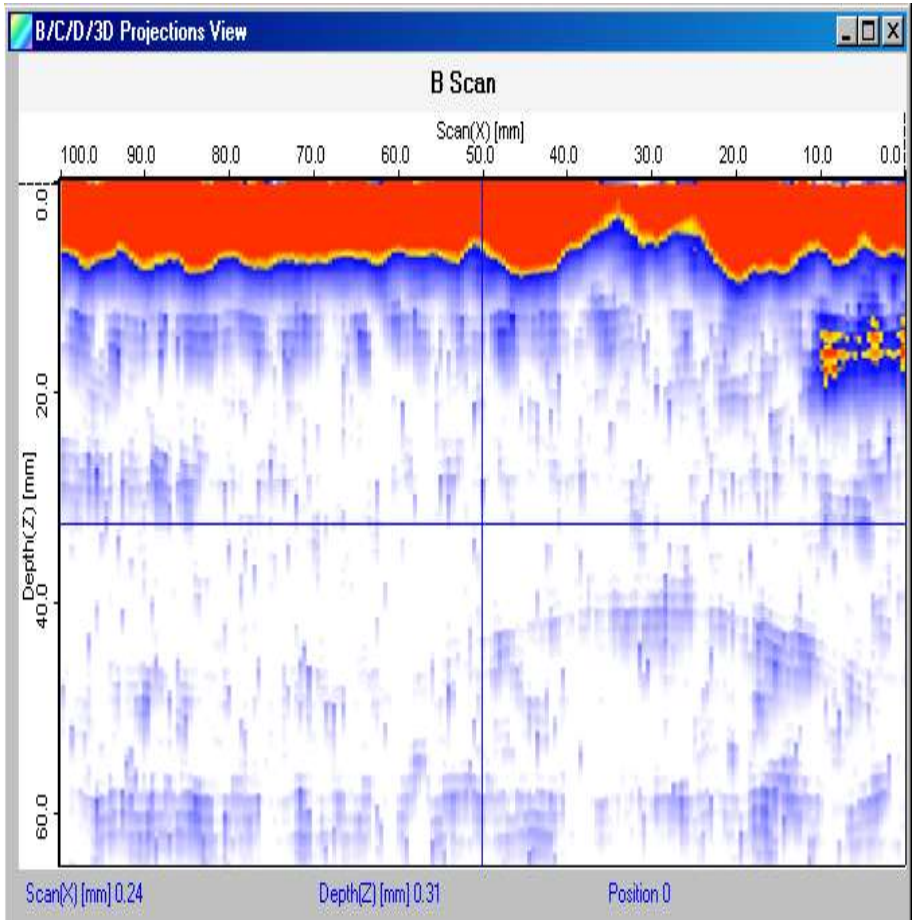
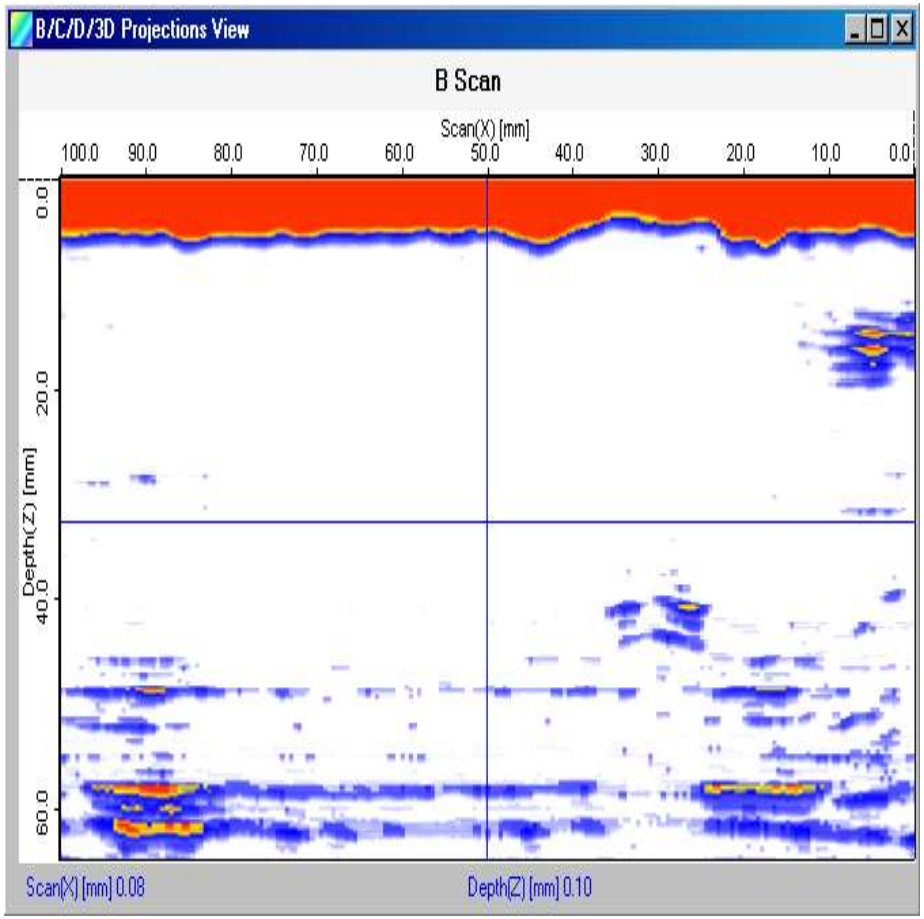
Denoising by Entropy Algorithms

Transducer: MSEB2(E)

Sound Attenuation: 40 db/m





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Strategic Alliances

Fundamental	Applied	Industry	Systems	Market
TPU – Tomsk Russia	NDT Centers		Lucid Software (India)	Lead Companies
RAS	IIT Madras (India)		TEK Automation (Russia)	Industry Sectors
Germany, India, USA	BAM Berlin (Germany)	TPU/INDT TOLMI	Microelectronics, Sensor-Technology	Professional Organizations
PHYSICS	Methods		Technology	Applications

Excellence **Relevance**

R & D Driven by Demand

Magic Temporary Keywords (in Publications and Programs)

Market & Technology Uncertainties

Information Systems

Benchmarking
Trend Analysis

Competence based adaptability

Sectional and Crossectional Networking

International cooperation
Key technologies
Competence centers
Innovation teams
Customer-producer alliances

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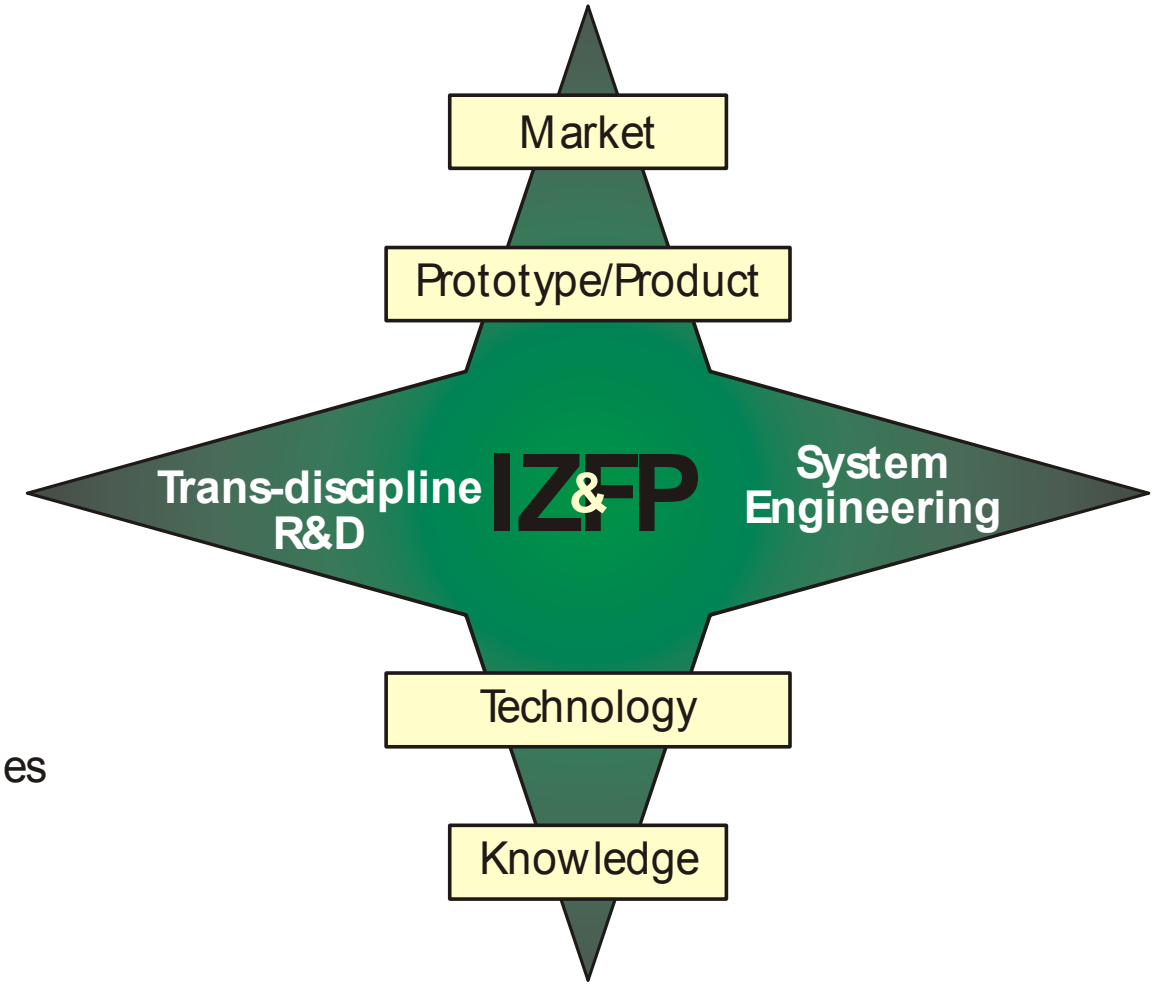
Horizontal Co-Operation

- Technology barriers
- New solutions
- Efficiency

Vertical Co-Operation

- Relevance
- Efficiency of innovation cycles
- Strategical orientation



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Day 2:	Organization and Networks	Speaker
9.00	Welcome Address with Minutes of Last Day	NN
9.30	Recommended Laboratory Structure of Activities	Kröning
10.00	Human Resources – Ethics, Responsibilities, Education, Training and Certification	Klimenov
10.30	Coffee Break	
11.00	Methods I - ET, MT, PT, TT, VT	Vavilov
11.30	X-ray, Betatron	Klimenov
12.00	UT, µ-NDT, NDT Systems	Kröning
12.30	Open Round Discussion (Questions)	all
13.00	Lunch Break	
14.00	Applied Technologies and Capability Networks	Kröning
14.30	Knowledge Strategies and Education	Klimenov
15.00	Coffee Break	
15.30	Added Value Chain in Applied Science	Vavilov
16.00	R&D Driven by Demand – a Project Analysis	Kröning
16.30	Concluding Minutes	to be appointed
17.00	End of Second Day	

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Day 3:	CASE STUDIES & NEXT STEPS	Speaker
9.00	Welcome Address with Minutes of Last Day	NN
9.30	Case Studies: Betatron for NDT	Klimenov
10.00	Advanced UT and New Instruments	Kröning
10.30	Coffee Break	
11.00	Thermography for Surface Characterization	Vavilov
11.30	NDT System for In-line NDT	Kröning
12.00	International Cooperation Practice	Klimenov
12.30	Open Round Discussion (Questions)	all
		NN
13.00	Lunch Break	
14.00	Next Steps and Seminar Evaluation	
16.00	End of Third Day	