GRINM

General Research Institute for Nonferrous Metals

SEMINAR

R&D Laboratory on Industrial Demand

TOLMI

INTERNATIONAL NDT CENTERS

Michael Kröning

WHAT IS NDT?

METHODS & APPLICATIONS

MISSIONS of NDT CENTERS

FORMATION of GLOBAL NDT

ROLE of NDT

STRUCTURAL INTEGRITY

- DESIGN
- MATERIAL

OPERATION

- OUTAGE / MAINTENANCE
- RELIABILITY (HUMAN ERROR)

LIFE TIME

- MATERIAL DEGRADATION
- COMPONENT REPLACEMENT

NONDESTRUCTIVE TESTING (NDT):

Concerned with all methods of detecting and evaluating material flaws.
The essential feature of NDT is that the test process itself
produces no deleterious effects on the material or structure under test
BINDT (The British Institute of Non-Destructive Testing, UK)

NONDESTRUCTIVE EVALUATION (NDE):

Measurements that are more quantitative in nature.
For example, a NDE method would not only locate a defect,
but it would also be used to measure something about that defect
such as its size, shape, and orientation.
NDE may be used to determine material properties
such as fracture toughness, formability, and other physical characteristics
CNDE (Center for NDE, Iowa State University, USA)

STRUCTURAL HEALTH MONITORING (SHM):

Damage detection and characterization strategy for engineering structures .
Changes to the material and/or geometric properties of a structural system,
which adversely affect the system's performance are monitored.
The SHM process involves the observation of a system over time
using periodically sampled or continuously observed measurement data.
The extraction of damage-sensitive features from these measurements,
and their statistical analysis determine the current state of system health.
SHM systems are usually an integral part of structures and thus a matter of automation.

DGzfP (Deutsche Gesellschaft für zfP, Germany)

PROCESS MONITORING & CONTROL (PMC):

In-process sensors play a significant role in assisting manufacturing
systems in producing quality products at a reasonable cost and are
used to generate control signals to improve both the control and
productivity of manufacturing systems. Advanced integrated process control
systems are part of automated processes improving the manufacturing effectiveness.

David A. Dornfeld

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RESEARCH & DEVELOPMENT → DESIGN → Manufacturing & Production → Maintenance → (Waste Disposal)

INNOVATION DYNAMICS

QUALITY COSTS

STRUCTURAL INTEGRITY

(New) MATERIALS & JOINING TECHNOLOGIES → Components & Structures → Systems & Plants

FEATURE BASED CONTROL OF AUTOMATED PROCESSES

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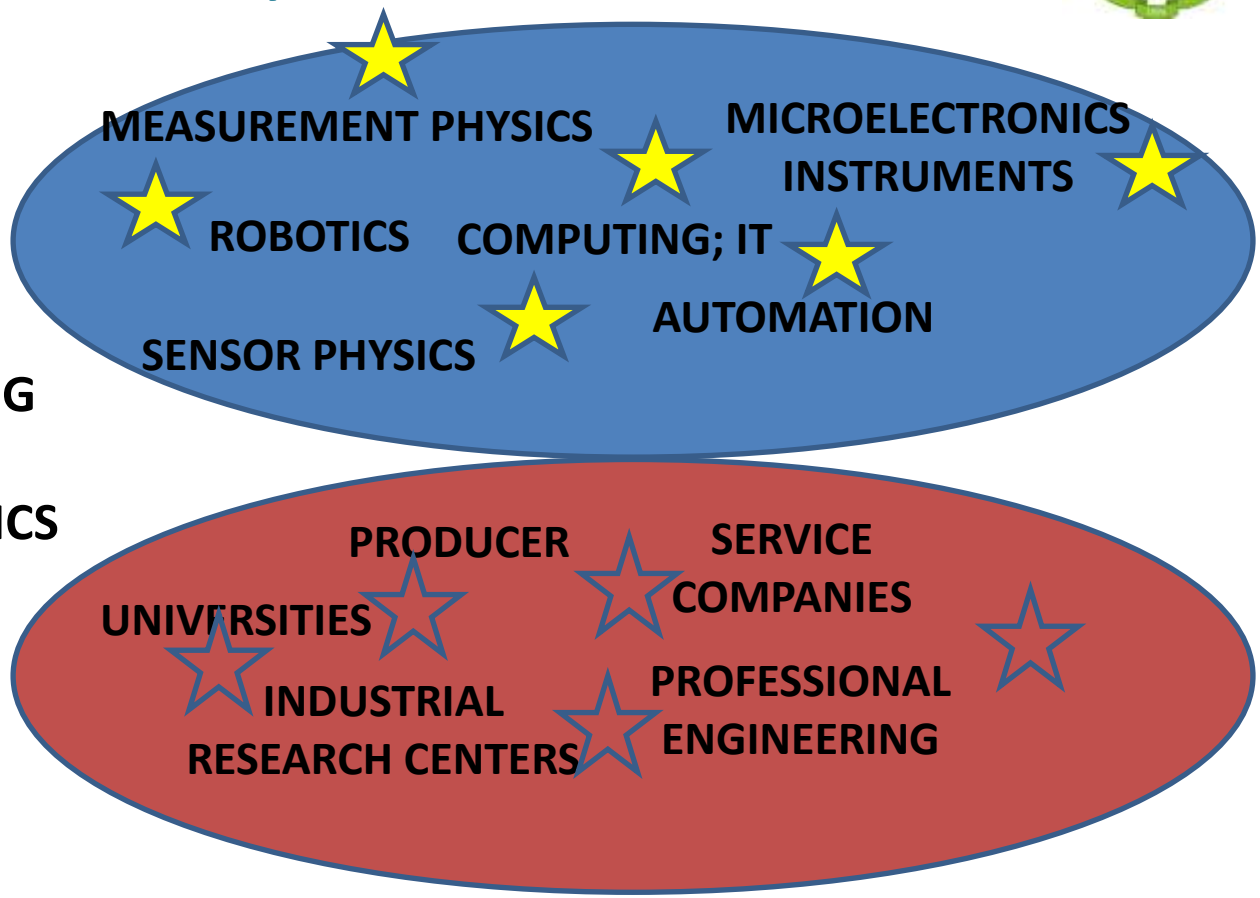

SYSTEM ENGINEERING
&
INNOVATION DYNAMICS

STRATEGIC NETWORKS
FOR PROFESSIONAL and COMPETENT
DEMAND DRIVEN DEVELOPMENT

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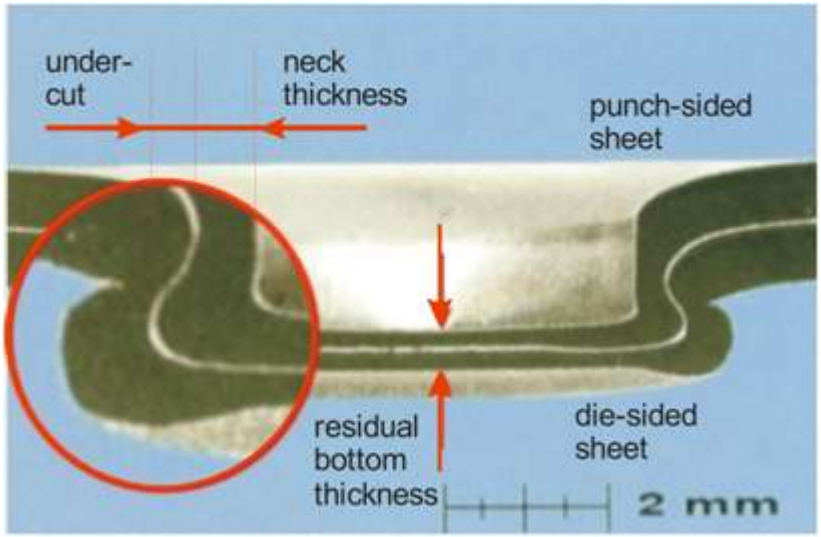
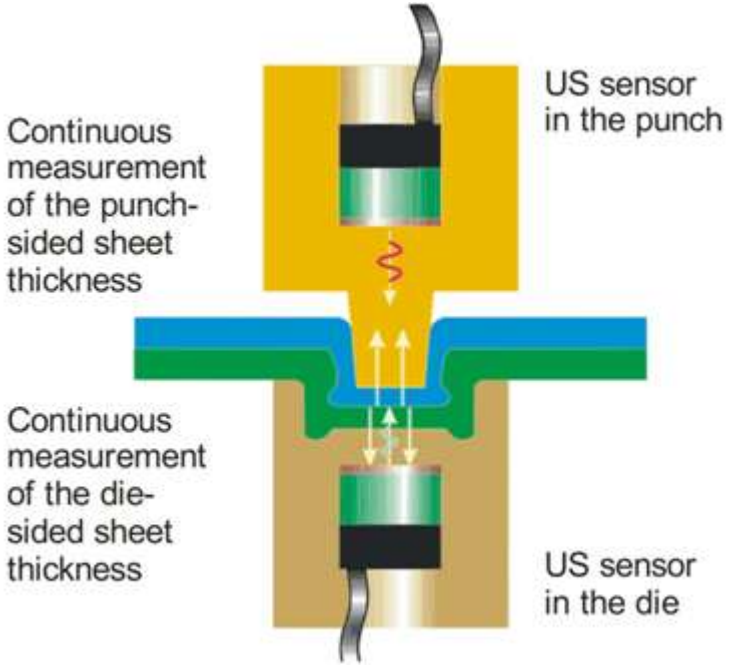
Accelerated Characterization in the course of Experimental Validation

(New) MATERIALS & JOINING TECHNOLOGIES

Fitness of Purpose by monitoring the material state and process performance



Structure of a clinching point



Functional principle of the US clinching tool

APPLICATIONS

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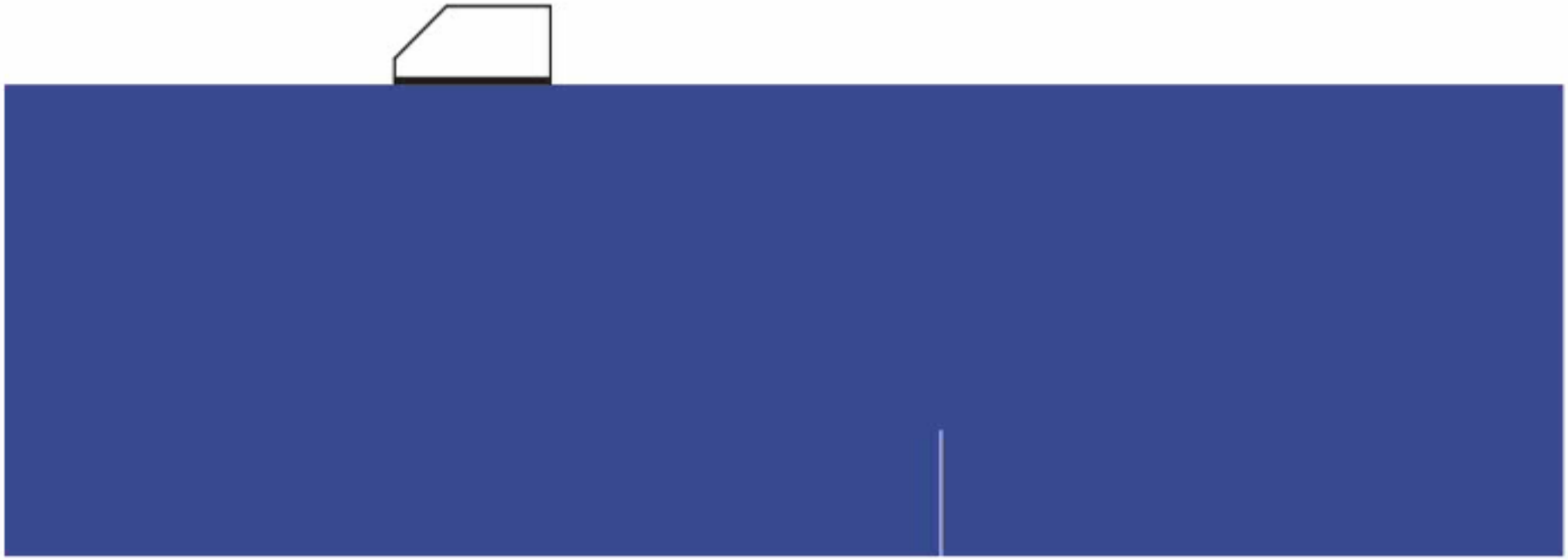

APPLICATIONS

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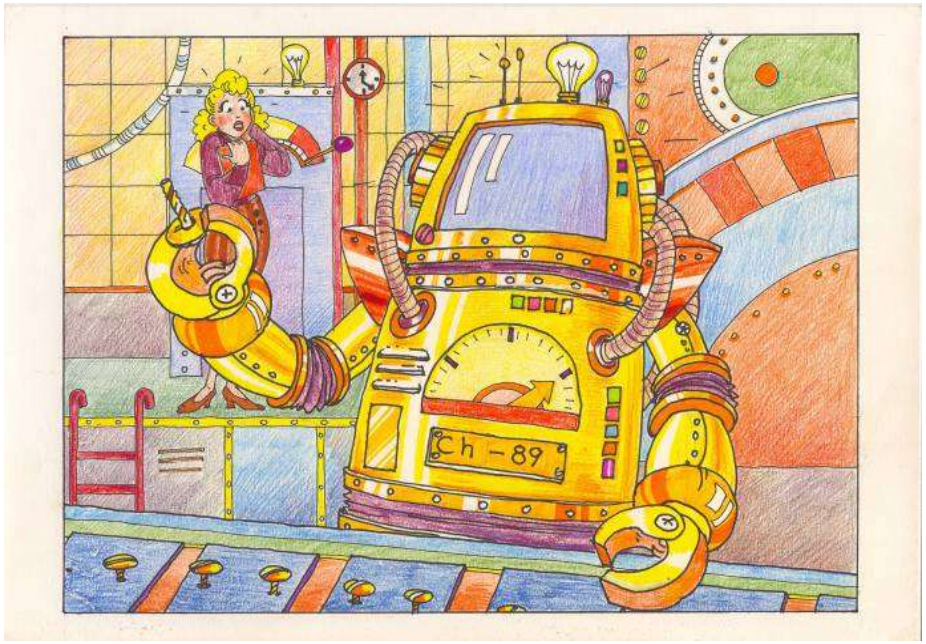
Quality Costs Savings by in-line Testing & Integrated Process Control (100% Inspection)

Manufacturing & Production

Testable Design; Pre-service Inspections by automated systems of Structural Materials



APPLICATIONS

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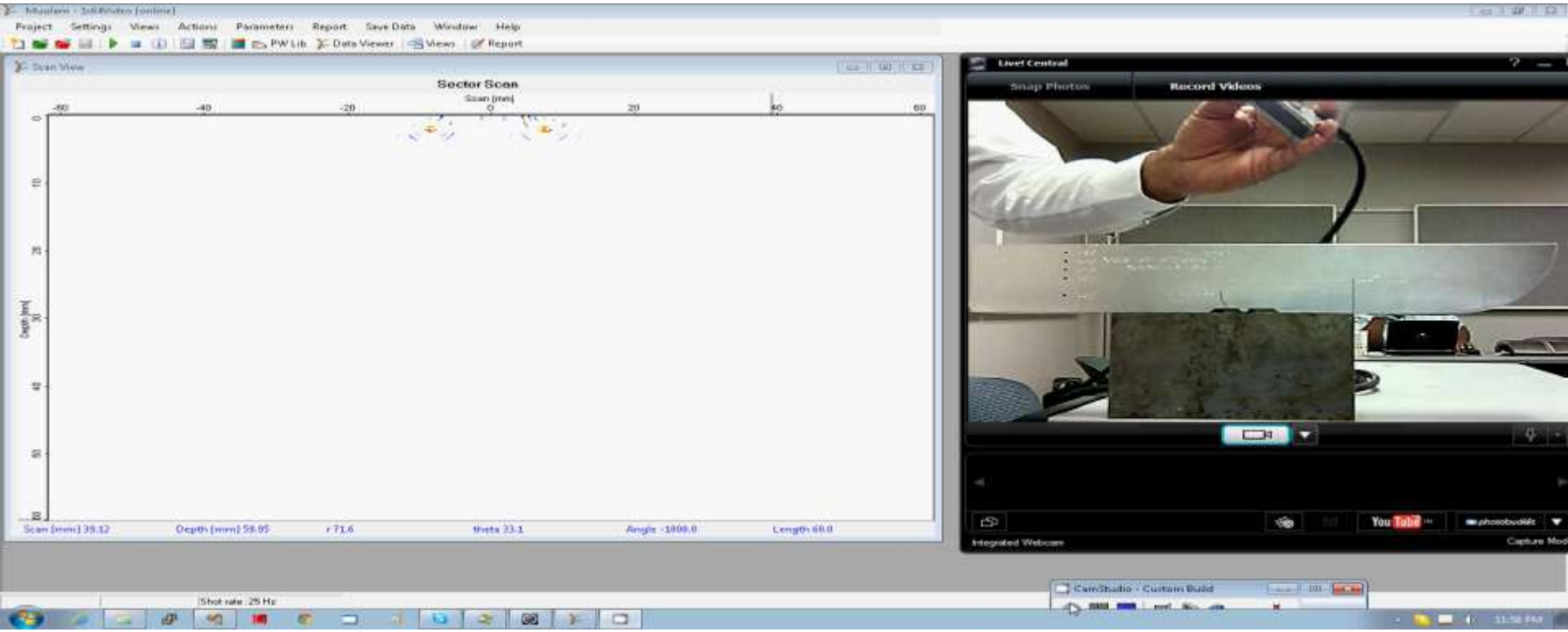
Flaw Detection
Defect State Assessment
Material Degradation
Health Monitoring

Maintenance

Structural Integrity
Life Time Assessment
Asset Management
Maintenance Strategies



APPLICATIONS

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MISSION


APPLIED SCIENCE
INDUSTRIAL MANDATE
INSTRUMENTS SYSTEMS
SERVICES INSPECTIONS
SERVICES VALIDATION
EDUCATION TRAINING
PUBLIC MANDATE
MISSION ELEMENTS

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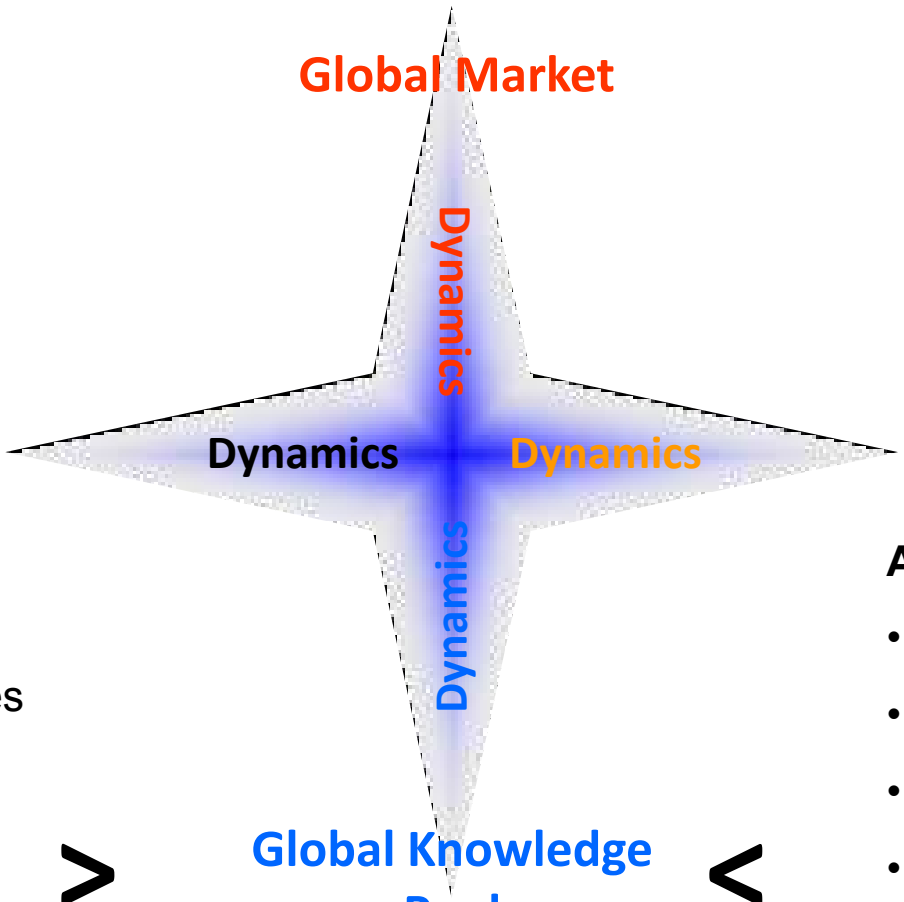

Megatrends

- µ/n-Techologies
- Bio-Technologies
- Information
- Computing
- Sensor Physics

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Adaptability

- Information
- Training
- Education
- R&D

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The **World Federation of NDE Centers** is located in Ames, Iowa, USA (www.wfndec.org). Through this forum, NDE centers match the global cohesion of markets and technologies.

World Federation of NDE Centers

AN AMBIGIOUS MISSION STATEMENT

The Center for Quantitative Nondestructive Evaluation at IITM will strive to be a world leader in NDE research, education, training and information through the development of the means to achieve and enhance important NDE engineering methodologies, measurement techniques and interpretive models for more reproducibility, reliability and life extension of materials, structures and processes.

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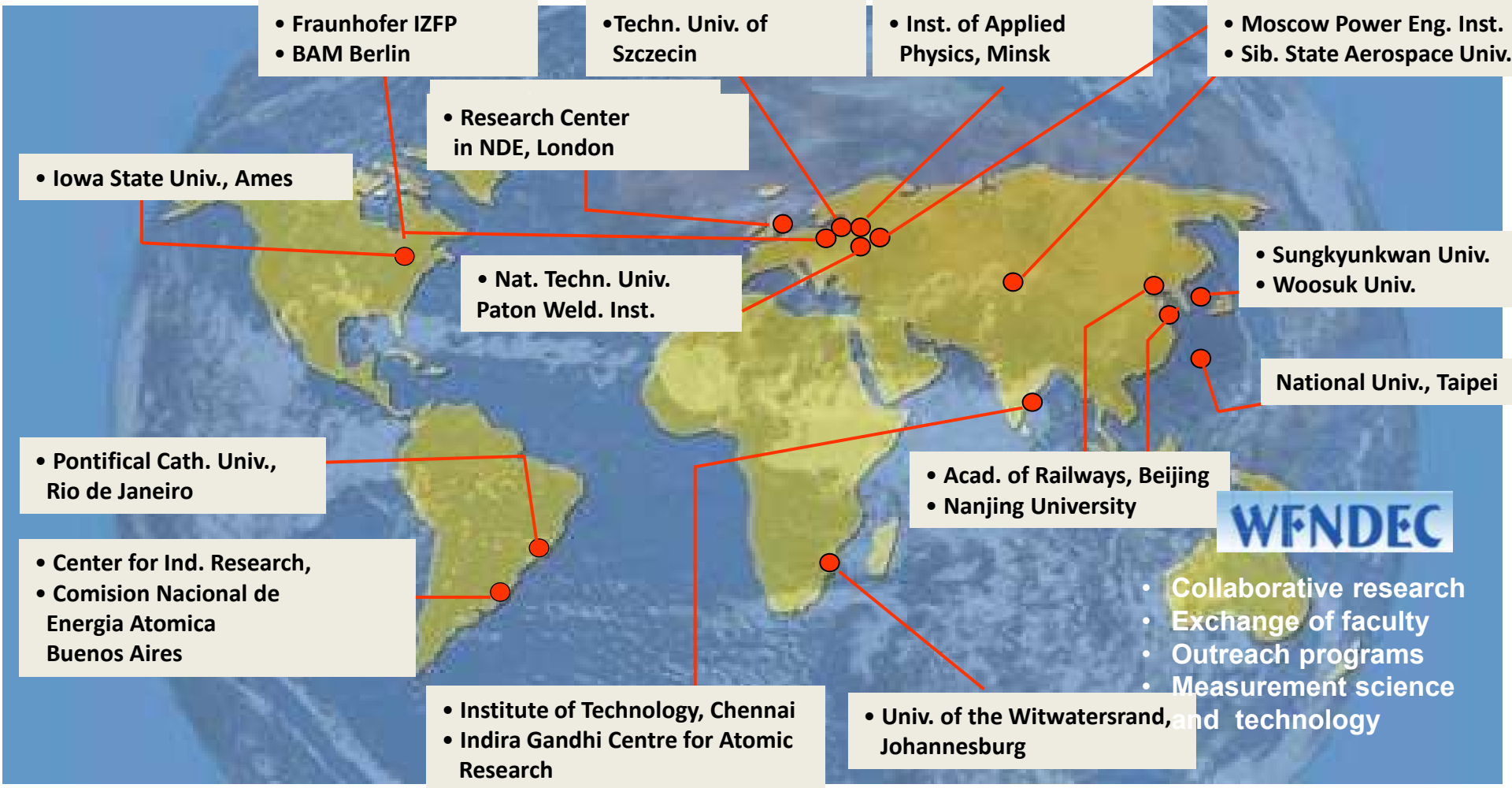

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TOLMI

TPU, TOMSK

POLYTECHNIC UNIVERSITY

INSTITUTE NONDESTRUCTIVE TESTING

RUSSIA

APPLIED SCIENCE

Fraunhofer IZFP

IzfP, SAARBRÜCKEN

FRAUNHOFER GESELLSCHAFT

INSTITUTE NONDESTRUCTIVE TESTING

GERMANY

CNDE

IIT, MADRAS

INDIAN INSTITUTE of TECHNOLOGY

CENTER for NONDESTRUCTIVE EVALUATION

INDIA

CNDE

ISU, AMES IA

IOWA STATE UNIVERSITY

CENTER for NONDESTRUCTIVE EVALUATION

UNITED STATES

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PUBLIC MANDATE

INDUSTRIAL MANDATE

BAM Federal Institute for Materials Research and Testing

EPRI ELECTRIC POWER RESEARCH INSTITUTE

BAM, BERLIN

FEDERAL INSTITUTE for MATERIALS RESEARCH AND TESTING

GERMANY

SAFETY - HEALTH - ARTS

EPRI NDE CENTER, CHARLOTTE

ELECTRIC POWER RESEARCH INSTITUTE

UNITED STATES

APPLIED RESEARCH

PROCEDURE VALIDATION

CERTIFICATION & TRAINING

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INDUSTRIAL LABORATORY

Empowered by Technology.

It is our continuous objective to be the world's most competitive provider of a wide range of products and services especially around the integrity continuation of complex engineering structures like oil and gas pipelines, plant & infrastructure facilities, etc.

INSTRUMENTS	SERVICES	SYSTEM & SERVICES
➢ GE	➢ PIPELINES	➢ AREVA/iNDT
➢ OLYMPUS	➢ ELECTRIC POWER	➢ ….
➢ DEUTSCH	➢ PETROCHEMISTRY	➢ ROSEN AG
➢ …	➢ …	
	➢ (ADDED VALUE)	

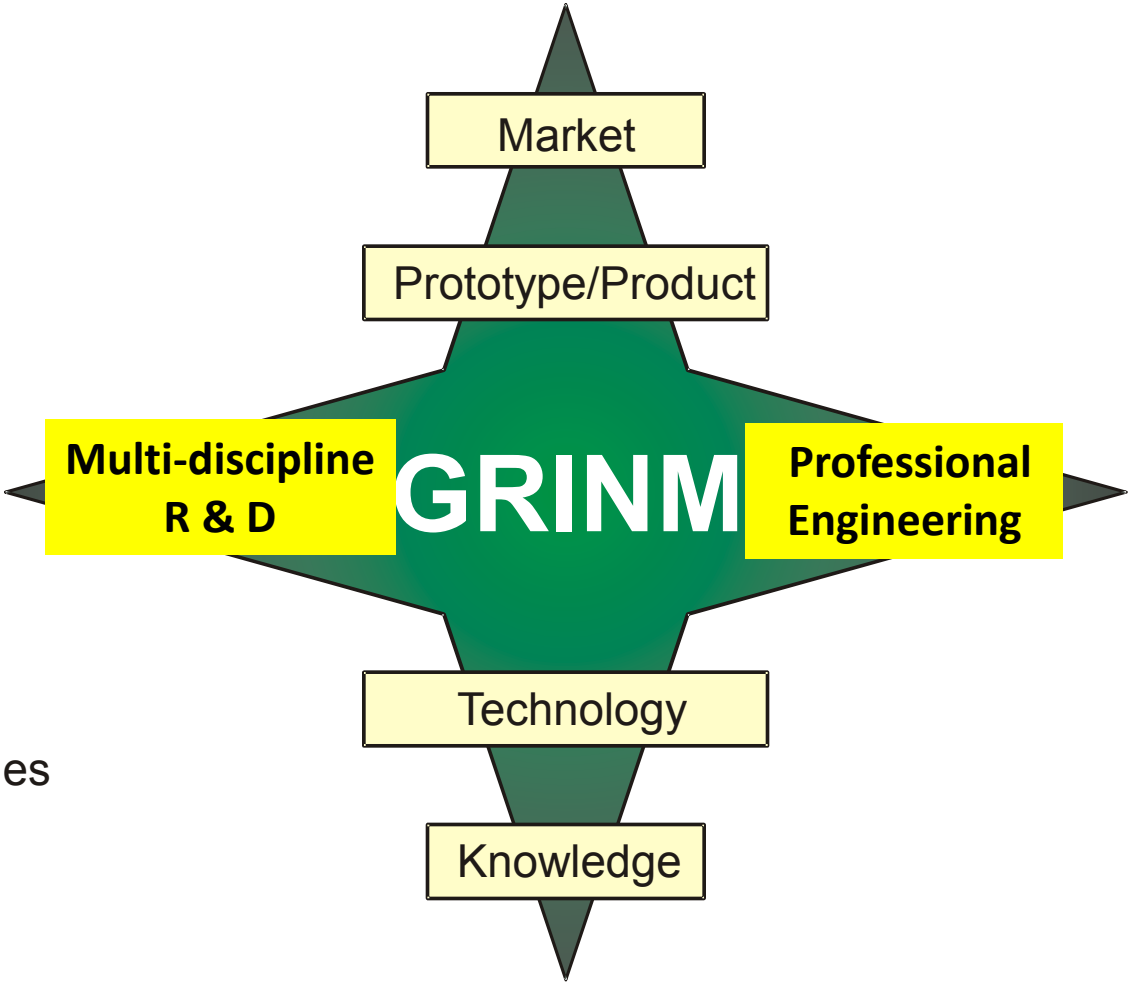
International NDT Centers

Horizontal Co-Operation

- Technology barriers
  - New solutions
    - Efficiency

Vertical Co-Operation

- Relevance
  - Efficiency of innovation cycles
    - Strategical orientation



CONCLUDING MESSAGE

NDT LABORATORIES SERVE THE BEST THEIR COUNTRY
BY
INTERNATIONAL COOPERATION

INNOVATIONS
QUALITY
SAFETY
SECURITY
RELIABLE INFRASTRUCTURE
HAVE BECOME GLOBAL ISSUES

THANK YOU FOR YOUR ATTENTION

PLEASE, FEEL FREE FOR ANY QUESTION

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PROGRAM Proposal

Day 1:	Mission, Goals, and Conditions	Speaker
9.00	Welcome Address	NN
9.15	Round Tour	All
10.30	Round Table Discussions : Mission, Goals, Opportunities, Cooperation	to be appointed
12.30	Minutes of Results	to be appointed
13.00	Lunch Break	
14.00	The Future GRINM NDT Laboratory	NN
14.30	The Institute for NDT at TPU	Klimenov
15.00	International NDT Centers	Kröning
15.30	Coffee Break	
16.00	Mandatory Requirements	Kröning
16.30	Concluding Minutes	to be appointed
17.00	End of First Day	