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ERF Seminar: Future Access to European Research Infrastructures:
Benefits to Academia, Industry and Society

Summary of Parallel Session: Open versus Private Access Conditions

Aart Kleyn, FOM Rijnhuizen
Frank Lehner, DESY

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Presentations

- How can access to industry be made easier – a TOTAL point of view
  - Jean-Francois Minster, TOTAL
- How can strategic access foster technology advancement: Outcomes from the GENNESYS Study
  - Helmut Dosch, DESY
- How does a virtual network of theorists handle the request of industrialists and experimenters: Case Study of the European Theoretical Spectroscopy Facility
  - Anne Matsuura, ETSF Louvain University

- Chair: Aart Kleyn, FOM Rijnhuizen
- Attendants: ~40

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Industrial access – a TOTAL point of view by J.-F. Minster

- RIs are essential tools for the research organisation of an increasing variety of subjects
- RI provide important opportunities for innovation

- for a large group as TOTAL difficult to anticipate all the potential benefits of RIs beyond its R&D needs
- Spectrum of RIs is very broad (light sources, vessels and computational facilities)
- Develop approaches
  - to monitor public strategy of RIs (e.g. ESFRI)
  - Elaborating ways to access RI and data
    - Academic partnership focused on excellence
    - Research focused on industrial relevance

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Industrial access – a TOTAL point of view by J.-F. Minster

- Access and Cost
  - willing to pay full operational cost in industrial relevant cases
  - but not for public investments in the RIs
- Operational experience of TOTAL
  - industrial participation not more than 15%
  - has reasons from a RI management point of view
  - RI may lose scientific excellence

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Industrial access – a TOTAL point of view by J.-F. Minster

- Confidentiality and IPR
- Time to market is critical to determine course of actions
- Non-disclosure agreements mandatory and sometimes sufficient for collaboration
- Academic-type of research only a delay of publication (typically 3months) to investigate IPR issues
- Industrial partner is keen on getting patents and is ready to defend ownership
- When time to market is extremely short or data could be critical, research is carried using own resources

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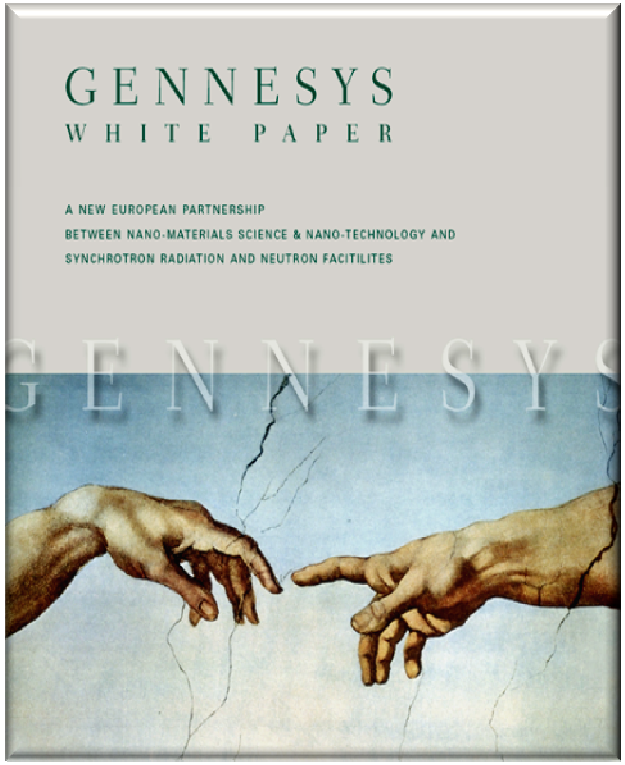
Strategic access – outcomes from GENNESYS by H. Dosch

- GENNESYS

Future Strategic Nanoscience
for Key Technologies in Europe:

- State of the Art
- Future Needs
- Key Barriers
- Role of RI‘s
- Conclusions/Recommendations



more than 600 authors/contributors from
Universities Research Labs Industry
Large Scale Facilities

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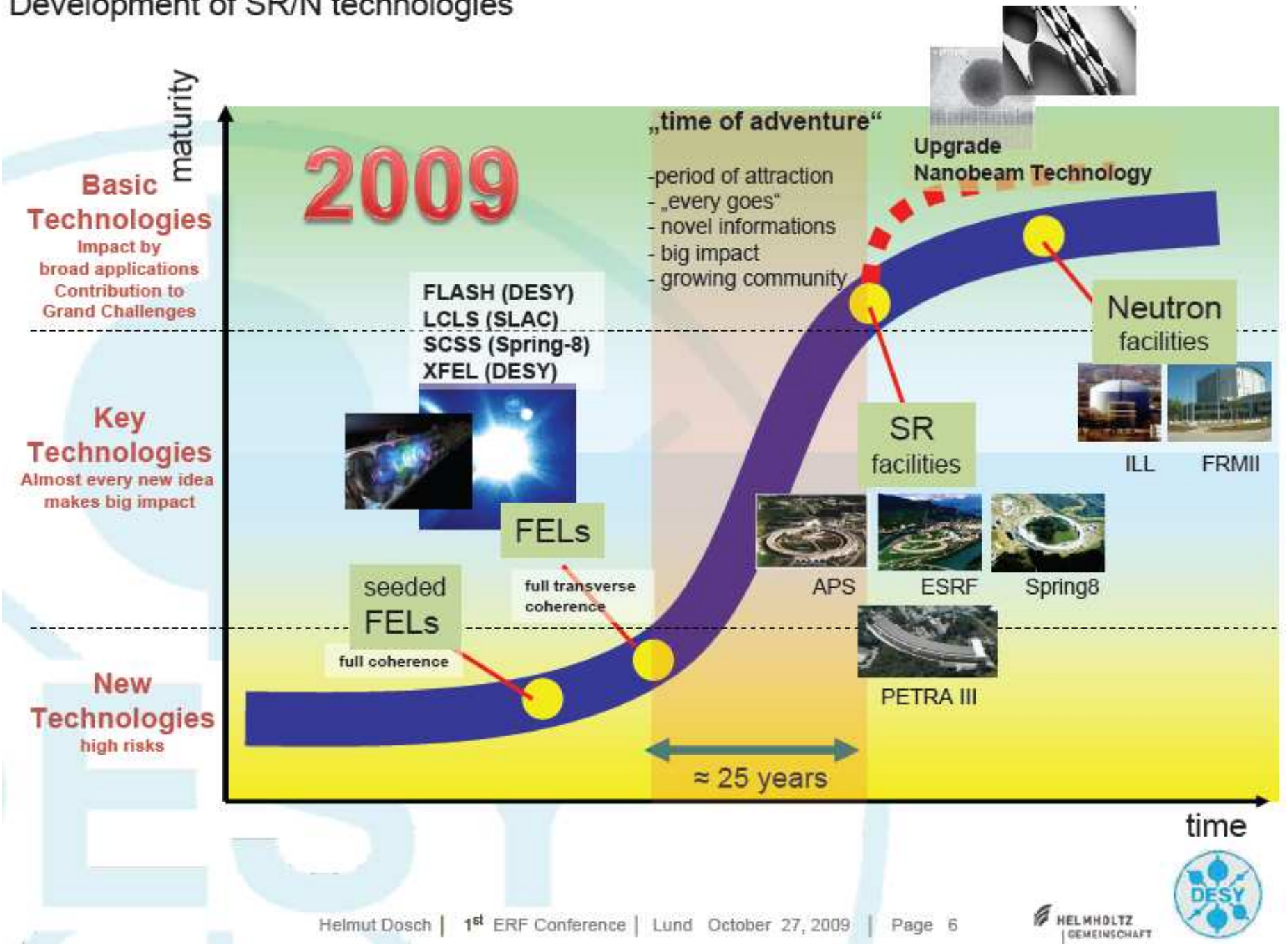
Strategic Access – Outcomes from GENNESYS by H. Dosch

- Fragmentation of Efforts between
  - disciplines, scientific communities, sectors
  - funding agencies („vertical structures meet horizontal challenges“)
  - members countries
- No Clear Research Strategy for Urgent Challenges
  - renewable energy, environment, climate change, …
- Underusage of European Research Infrastructure „Information Gap“
  - Insufficient Integration of Eastern European Member States
  - Inadequate Training Schemes and Unclear Research Careers
  - Awareness Dilemma : Importance of Materials
  - and others ……

Development of SR/N technologies



GENNESYS

Universities *Research Labs* *Industry*

Fundamentals **Materials** **Technologies**

Nano-Device

Training

Nanostructures

Dimensionality Effects

Proximity

Interfaces

Nanoconfinement
Quantum Effects

Thin Films Multilayers

Hierarchical Structures

Dynamics

Synthesis

Multiscale Modelling

STRUCTURAL

FUNCTIONAL

BIO

POLYMERS

COATINGS

INORGANICS HYBRIDS

Nanomechanical Engineering

Nanocorrosion Protection

Nanotribology Nano-Joining

INFORMATION COMMUNICATION

HEALTH/MEDICINE

FOOD Cosmetics

TRANSPORT

ENERGY

ENVIRONMENT CLIMATE CHANGE

CHEMICAL INDUSTRY

CATALYTIC PROCESSING

TOXICITY

SECURITY

Monitoring Systematics Discovery

Nano-Standardisation

Quality Assurance

Prenormative Research

Impurities

Nano-Compatibility

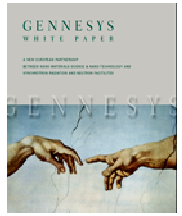
Failure Degradation Performance

Extreme Environments

Relevant Conditions

Nondestructive Insitu

Challenges for Synchrotron Radiation and Neutron Facilities



Grand Challenges in Nanoscience and Nanotechnology (selection)

Generic Challenges

Nano-Confinement
Proximity
Dimensionality
Interfaces

Hierarchical Structures

Quantum Phenomena

Materials-Specific Challenges

Taylored Design
Screening of Complex Multicomponent Materials
Impurity Control
Hybrid Architectures
Multiferroics
Smart Nanostuctures
Failure-Proof/Self-repairing Systems

Nanomaterials and –systems in extreme conditions
Nanostandards
Nanolubrication
Nanojoining

Technology Challenges

Novel nanomaterials for future -
- climate-friendly energy technologies
- pharmaceuticals, medicine,
- chemical industry, catalysis
- processing industry
- information technologies
- transport technologies
- cultural heritage
- …….

Better understanding of –
- toxic effects
- friction / wear at nanoscale
- corrosion / protection
- ……

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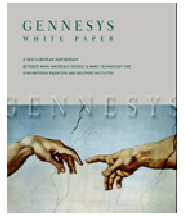
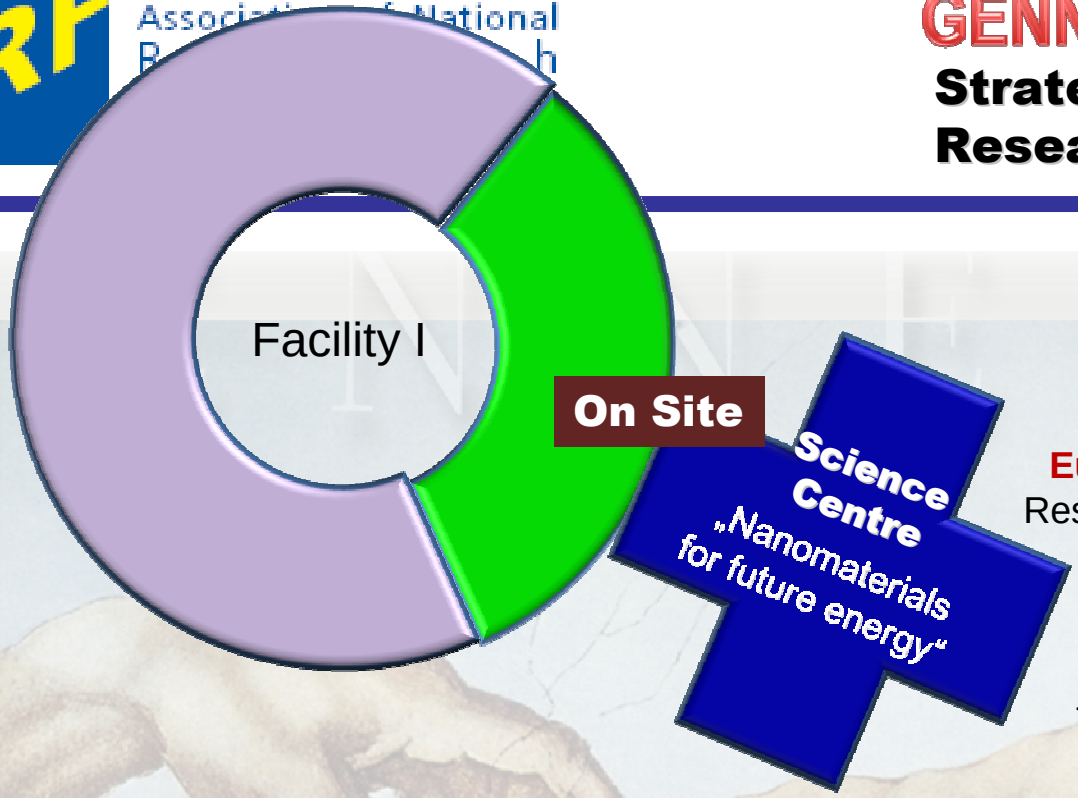
GENNESYS
Strategic Research





European HUB
Research Training
Strategy

Longterm commitment
to mastering a grand challenge in

Energy-environment
Medicine
Transport
Communication-information

together with key experts from
universities, research labs, industr

I³
Open Access Research

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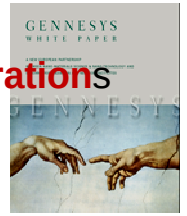
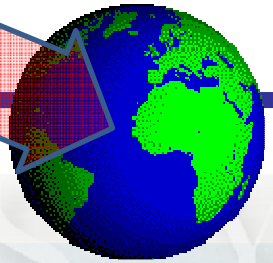
GENNESYS
Strategic Research



International Cooperations
US, Russia, Asia



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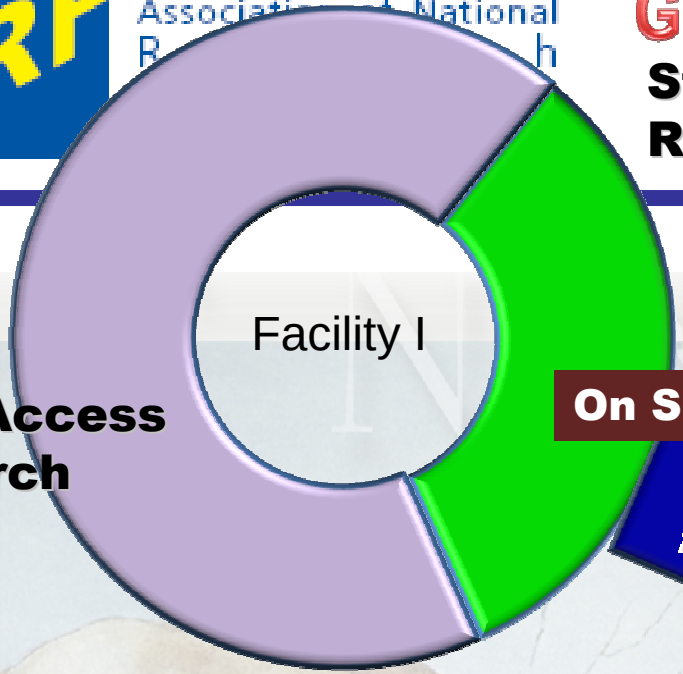
Open Access Research



On Site

Science Centre
„Nanomaterials for future energy"

European HUB
Research Training
Strategy

estimate:
construction costs
100 Mio € /SC

Offshore Institutes

A new integration scheme for ERA in strategic research

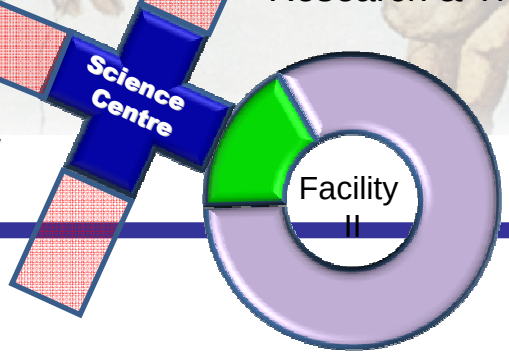
potential for step-wise implementation

requires major political decision
European coordination

GENNESYS provides all necessary
roadmaps
priority list

Strategic Cooperation
Research & Training

RIS
GENNESYS
Partners:
Synchrotrons
Neutrons
Lasers



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ETFS – European Theoretical Spectroscopy Facility by A. Matsuura

- ETSF – recently created knowledge center & distributed RI as theoretical counterpart to an experimental facilities
- carrying out state-of-the-art research on theoretical & computational methods for studying electronic and optical properties of materials.
- gathering experience & know-how of >200 researchers in Europe & US, facilitating collaborations and rapid knowledge transfer.
- ETSF offers its expertise and supplies services to experimental and industrial researchers
- Proposals to benefit from these services can be submitted at any moment, and are evaluated by international experts in the field to select top quality proposals

http://www.etfs.eu

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ETFS – European Theoretical Spectroscopy Facility by A. Matsuura

- ETFS - Objectives
  - Developing theory
  - Developing scientific software
  - Providing training in theoretical and computational methods
  - Undertaking scientific projects on demand
- Much in common with physical infrastructure
  - International Collaboration
  - Long-Term Projects
  - Cutting-Edge Science for a Large Community
  - Complex Organization

... integrates complementary skilled experts : developers, maintainers, practitioners, teachers ...

ETSF Beamlines:

The ETSF is structured in beamlines to ease access to its theoretical tools. The ETSF beamlines are:

+ Optics
+ Quantum Transport
+ Time-Resolved Spectroscopy
+ X-Ray Spectroscopy
+ Energy Loss Spectroscopy
+ Photoemission Spectroscopy

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Outreach to Experimental Users

- Strengthen ties between ETSF Nodes and experimental community
  - Look for new user communities
- Software E-library/Online publications
- Customized Training
- Workshops & Schools
  - Annual Users' Meeting

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ETFS - Ideas for Outreach to Industrialists

- Expand corporate connections that already exist with ETSF Nodes
  - Include corporate connections that ETSF Node Universities have (low-hanging fruit)
- Publicity for non-scientists
- Events such as Company Days
  - Consultancy sessions
- Partner with experimental facilities/resources to offer theory & experiment to industrial user

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Conclusions

- Excellent communication at all levels is necessary; talk & listen to each other; take time to understand each other
- Industry is willing to participate
  - in academic projects through open access
  - for industrial relevant projects pay full operational costs; in that number of requirements apply, such as level of services, access, timescales, confidentiality
- See a limit to industrial participation of ~15%, but perhaps this can grow as suggested by GENNESYS
- Current RIs are installation looking for problems, have to investigate more the needs of the fields as outlined by GENNESYS
- Need better integration of human capital at universities and small RIs throughout Europe at major RIs
- University partners are willing to act fast upon industrial requests.