

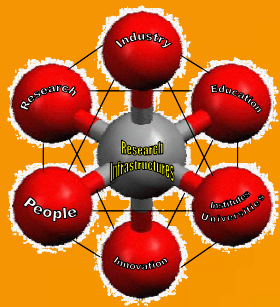


# **Shaping the Research Infrastructures Landscape in Europe**

Lars Börjesson  
Secretary General, Infrastructures,  
Swedish Research Council  
ESFRI executive board

# Outline

- Pan-EU Research Infrastructures and main issues
- Mission of ESFRI
- The ESFRI roadmap and prioritisation
- Concerted e-Infra actions



# Developing European excellence and increasing its returns

- **Pan-EU RIs are a backbone of the ERA**
- **Attractive ERA - effective use of Pan-RIs resources, avoiding fragmentation and speaking with one voice**
- **Commitments, scope and sustainability well beyond single Country's capabilities: need to pool resources, to respond to increasing requirements (but budgets are constant)**
- **This requires strong EU integration in resources and policy, building on experiences by CERN, ESA, ESO, ESRF, ....**
- **Here the e-Infrastructures become an asset**

# Pan-European Infrastructures

## A Pan- European RI should provide:

- **Scientific Excellence**, highest international level in research, technology, and training
- **Managerial excellence**, to deliver top-level services, attracting high-level international scientists
- **Open access**, competition based on excellence (service + data)
- **Access for training or proprietary research**, not interfering with peer-reviewed access
- **Clear pan-EU added value** : at least 30% of users coming from non-host, and/or uniqueness, and/or integration in distributed international facilities.

# A vast variety

- **Lifecycles:** from few years (computers, biolabs....) to centuries (libraries, collections....)
- **Use:** monodisciplinary to multipurpose, from subatom to life, environment, economics,... universe
- **Access:** personal to virtual, minutes to years
- **Industry interest:** from procurement to joint R&D use
- **User communities:** from small (<100) to large (>100000)
- **Topics and sites:** from single-sited to distributed
- **Costs:** from <10 to >1000 M€
- **In all cases “non economic”:** marginal commercial and/or non peer-reviewed use (e.g. training)
- **In the EU:**  $\approx 300$ , mostly nationally owned. Present expense:  $>\sim 100$  G€capital + 10-15 G€/year

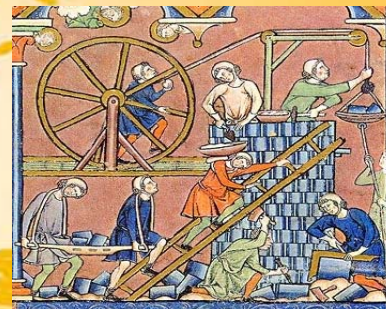


# Capacity building & Economy

- **Competitive in Science – competitive in technology and training**
- **Training of thousands of researchers and technicians in the most advanced technologies**
- **Brain – gain**
- **“Invent” to support “discovery”! Source of several new products: from the WWW to the CCD cameras, the PET scan.....etc.**
- **Direct inputs to industries, from marketing and tourism industries to new drugs – health – environment - related industries, new materials, new manufacturing, new devices, .....**

# Excellence and RIs

Europe has a long-standing tradition of excellence in research infrastructures, from the Middle Ages on...



- **Abbey-libraries: Centres of Research, Knowledge & Technology Transfer: the EU cultural roots**
- **More recently: CERN; EMBL; ESO; ESRF; ILL, etc., and opening national ones, with EU support**
- **Their success, due to uniqueness and quality, is the basis on which we can build an attractive ERA**

# Role of ESFRI

***Set up by the Council in 2002***

- **To support a coherent and strategy-led approach to policy making on RIs in Europe**
- **To facilitate multilateral initiatives leading to a better use and development of RIs**

***It brings together representatives of Ministers of the Member States, Associated States, and of the EU Commission.***

**ESFRI responds to the Council of Ministers making proposals to help programming jointly the ERA**





# ESFRI activities

- **The Roadmap** - a leading instrument to help Countries to evolve policies for existing and new RIs, through converging National Roadmaps pooling resources
- **Development of Regional Aspects** – Regional facilities as satellites to Pan EU- RI, assessing siting proposals;
- **Understanding Socio-Economic returns** - attracting local public-private involvement; Improving management and evaluation, helping use of financial tools (EIB, structural funds etc)

Build mutual trust to improve quality of spending and respond to new needs



# The Roadmap

- **The roadmap identifies new pan-European Research Infrastructures or major upgrades, needed to integrate with the existing ones responding to the needs of EU research communities.**
- **From about 240 proposals, 44 projects have been identified through several review stages between 2006 and 2008.**
- **These are the “Tip of the Iceberg” of the Pan-EU RIs**
- **Includes some “main challenges”, but new updates now launched: in particular in Energy, Food**

# Criteria for entering the Roadmap

- **Proposal presented by Countries or international organisations**
- **Scientific Case:**
  - ✓ *Must be a major facility for the scientific community, responding to the functional definition of ESFRI*
- **Maturity of Concept:**
  - ✓ *must be technologically & financially feasible*

# ESFRI roadmap 2008

- **Social Science and Humanities** 5 Projects
- **Environmental Sciences** 10 Projects
- **Biomedical and Life Sciences** 10 Projects
- **Energy** 4 Projects
- **Physical Sciences and Engineering:** 8 Projects
- **Materials and Analytical Facilities:** 6 Projects
- **E-Infrastructures** *Wider input to all projects & 1 Project*

**Total**      **44 (~ 20 B€ in ~ 10 years)**  
**equal to ~ 2 B€ per year**  
**increase of ~ 20% on present investment**



# Social Science and Humanities



CLARIN

*Towards an integrated and interoperable  
research infrastructure of language resources  
and its technology enabling eHumanities*

*Easy access to Language Resources and Technology  
for the Humanities community*

CESSDA



Roadmap 2008  
5 Projects

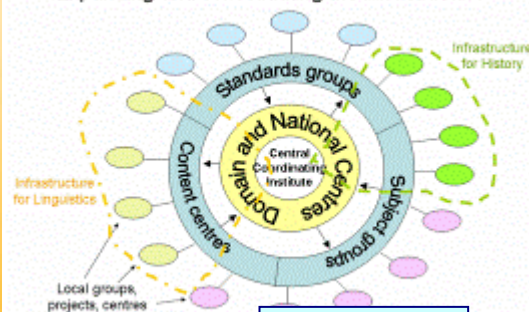


ESS

DARIAH



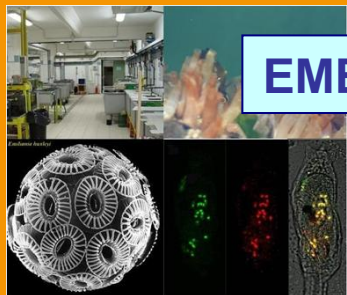
Expanding and consolidating the infrastructure



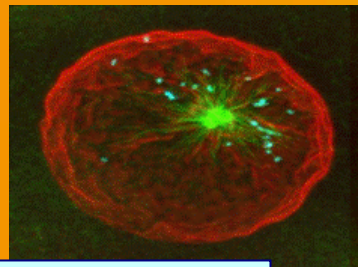
SHARE

# Biomedical and Life Sciences

## Roadmap 2008 10 Projects



EMBRC



INSTRUCT



ECRIN



BLS4

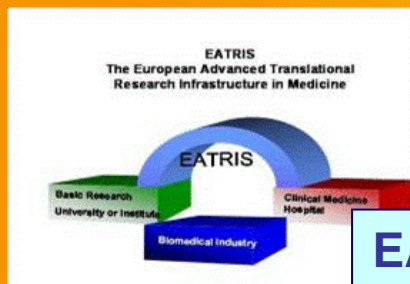


EU-Openscreen

Euro-Bio-imaging



BIOBANKS-BBMRI



EATRIS



INFRAFRONTIER



EBI-ELIXIR



# Environmental Sciences

## Roadmap 2008 10 Projects

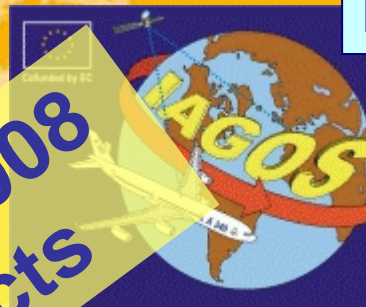
EURO-ARGO



SIAEOS



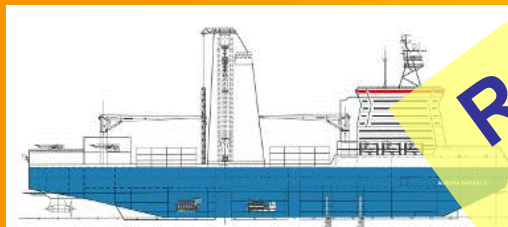
IAGOS-ERI



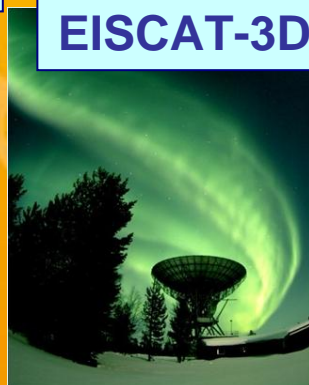
EUFAR-COPAL



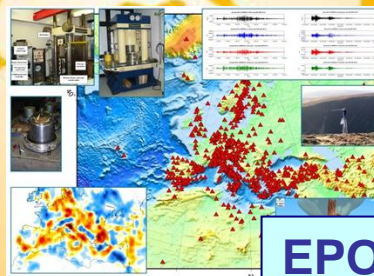
AURORA BOREALIS



EISCAT-3D



EPOS



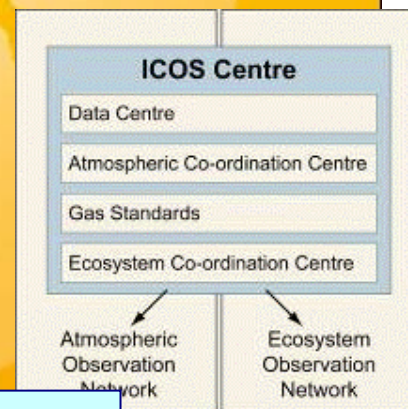
EMSO



LIFEWATCH



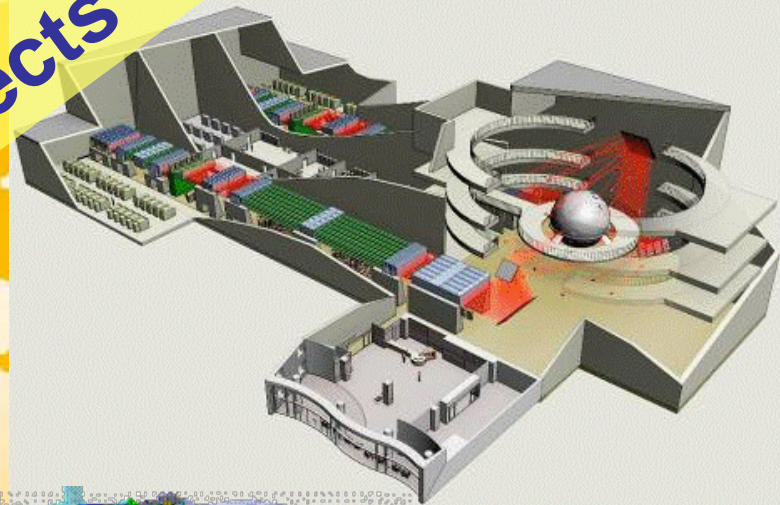
ICOS





## Roadmap 2008 4 Projects

IFMIF

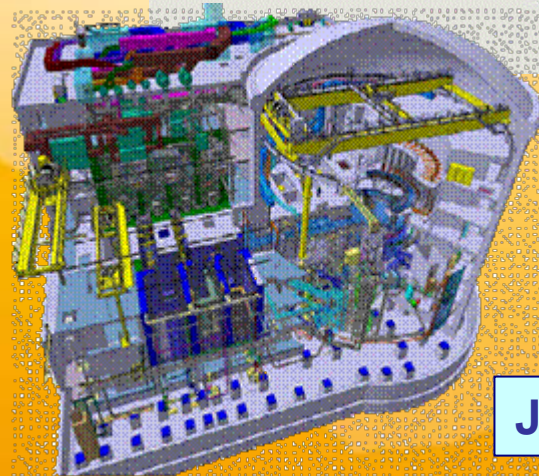


HiPER

ECCSEL



JHR





# Materials and Analytical Facilities

XFEL



EMFL



IRUVX-EUROFEL

ESS



ESRF



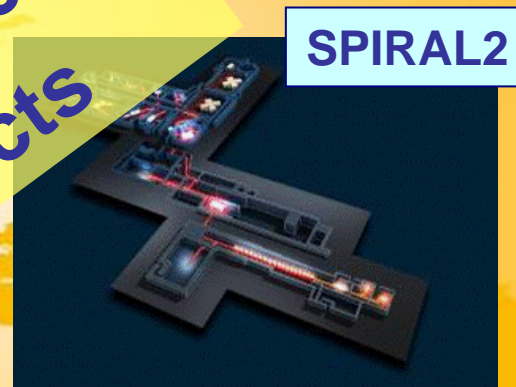
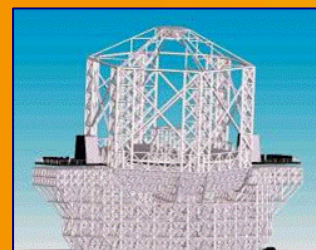
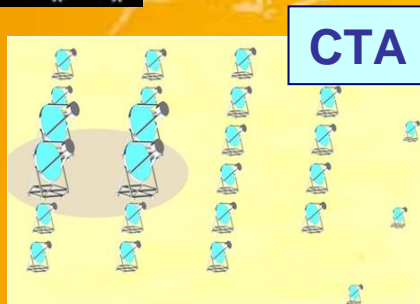
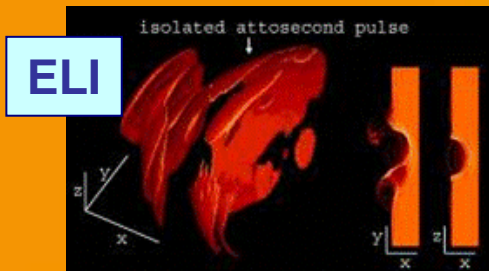
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Roadmap 2008  
6 Projects

# Physical Sciences and Engineering

## Roadmap 2008 8 Projects



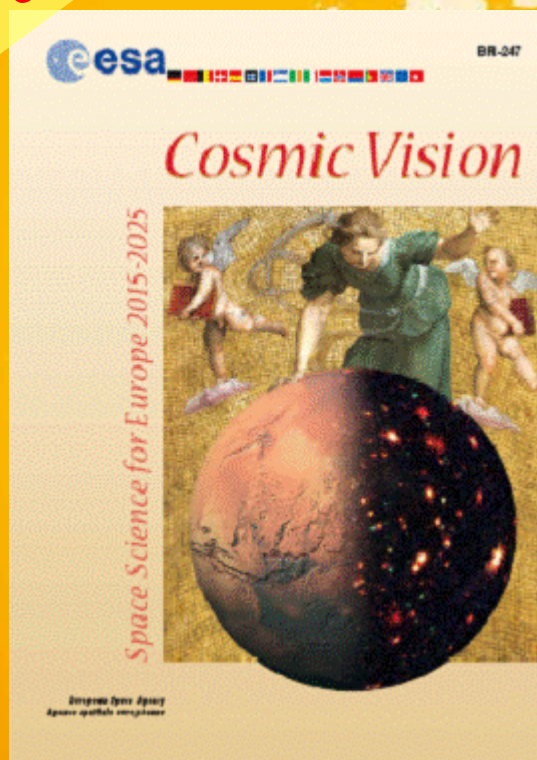


**No changes in the Roadmap 2008**  
**+ Increase of e-Infra aspects in all**

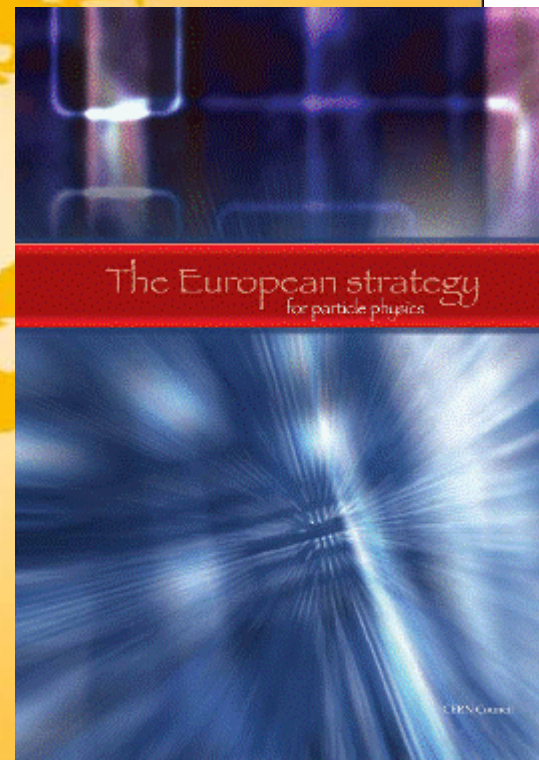
# e-Infrastructures & others



**PRACE  
(ex-EU-HPC)**



The ESA Cosmic Vision



The CERN Council strategy for particle physics



# Global Dimension

- Strategic impact of RIs is now recognised worldwide, thanks also to ESFRI's activities
- G8 Science Ministers now discuss RIs:
  - ✓ Roadmaps and priority setting
  - ✓ Identification of new areas of cooperation
  - ✓ Promotion of mutual use of existing RIs
  - ✓ Ensuring “Open competitive access”
- This adds urgency to the need of the ERA to speak with one voice and have executive capability, like other Nations (India, China, Russia,....USA)



# Prioritisation

- Roadmap – selection of scientifically highly valuable RI for Pan-European level
- Funding for construction on member state level
- Member states make own roadmaps and prioritise their funding
- Sufficient funding from member states – construction and operation of RI

# Swedish priorities

- Roadmaps 2006 and 2008 for national and international RI
- Government bill 2008-2009
- Funding for
  - European spallation source
  - XFEL, FAIR
  - MAX IV synchrotron facility (not ESFRI)
  - Biobank infrastructure
  - Bioinformatics
  - LifeWatch
  - A few more, decision to be taken during autumn

**Similar procedures in all other countries !**

# Critical Issues

## Implementation of Roadmap:

- **International agreements – legal issues**
- **Financing of Construction + initial procurements**  
- integrating National and Regional funds, including EIB, local/private funds
- **Project finance is possible only if operation cost's sustainability is ensured: recurrent costs of open access need increased EU funding integrated with national funding: i.e. the ERA**
- **An ERA budget is critical for sustainability**

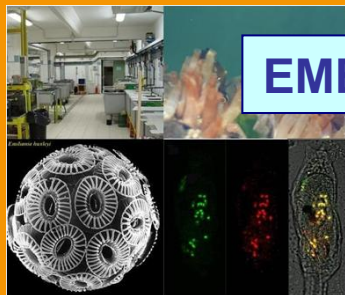
# e-Infrastructure aspects of RI

- ESFRI decided to ask e-IRG to assist in developing systematic e-Infrastructures approaches for all Pan-Eu RIs
- This means integrating, in a cost effective way, the potential of e-Infra's for RI e.g.:
  - Data collection, curation and open access
  - Remote access, operation, training, design, project management, testing, industry access.....
  - Integration of distributed Infrastructures, outreach to Regions and the world
  - Access to data and knowledge distribution, also on multidisciplinary basis, for the “great challenges”

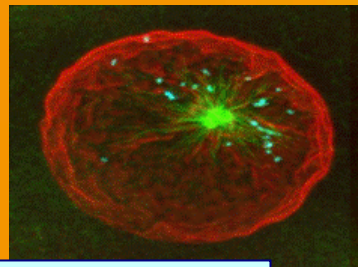


# Example of Biomedical and Life Sciences

Roadmap 2008  
10 Projects



EMBRC



INSTRUCT



ECRIN



BLS4

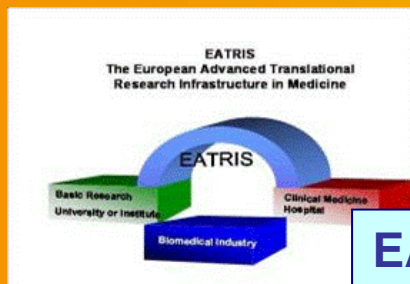


EU-Openscreen

Euro-Bio-imaging



BIOBANKS-BBMRI



EATRIS



INFRAFRONTIER



EBI-ELIXIR

# e-Infra aspects in bio- and medical RI

- Distributed infrastructures – some with nodes in all countries
- Integration of large data streams, analysis, storage, curation
- Federation of databases
- Integration between different RI
- Ethical and legal issues - authorization
- Security
- Access

Requirements individual for each RI !!

# Summary - Important issues

- Implementation of the roadmap
- Improve ERA-wide prioritisation and expenditure - high level evaluation
- Improve management and strengthen socio-economic returns and regional aspects
- **Use effectively the e-Infra opportunities**
- Extend connection to “main Challenges” (Food, Environment, Health, Energy)
- ....and avoid the effects of the crisis!!!