



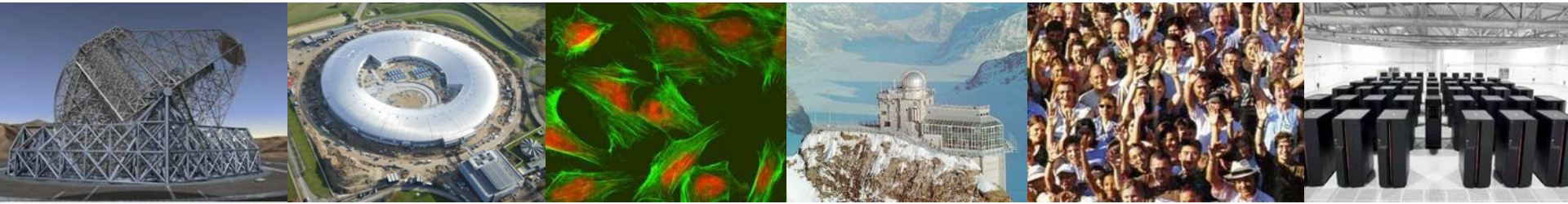
EUROPEAN
COMMISSION

Community research

Research Infrastructures (RI) *Challenges for EU actions*

Domenico Giardini, ETHZ

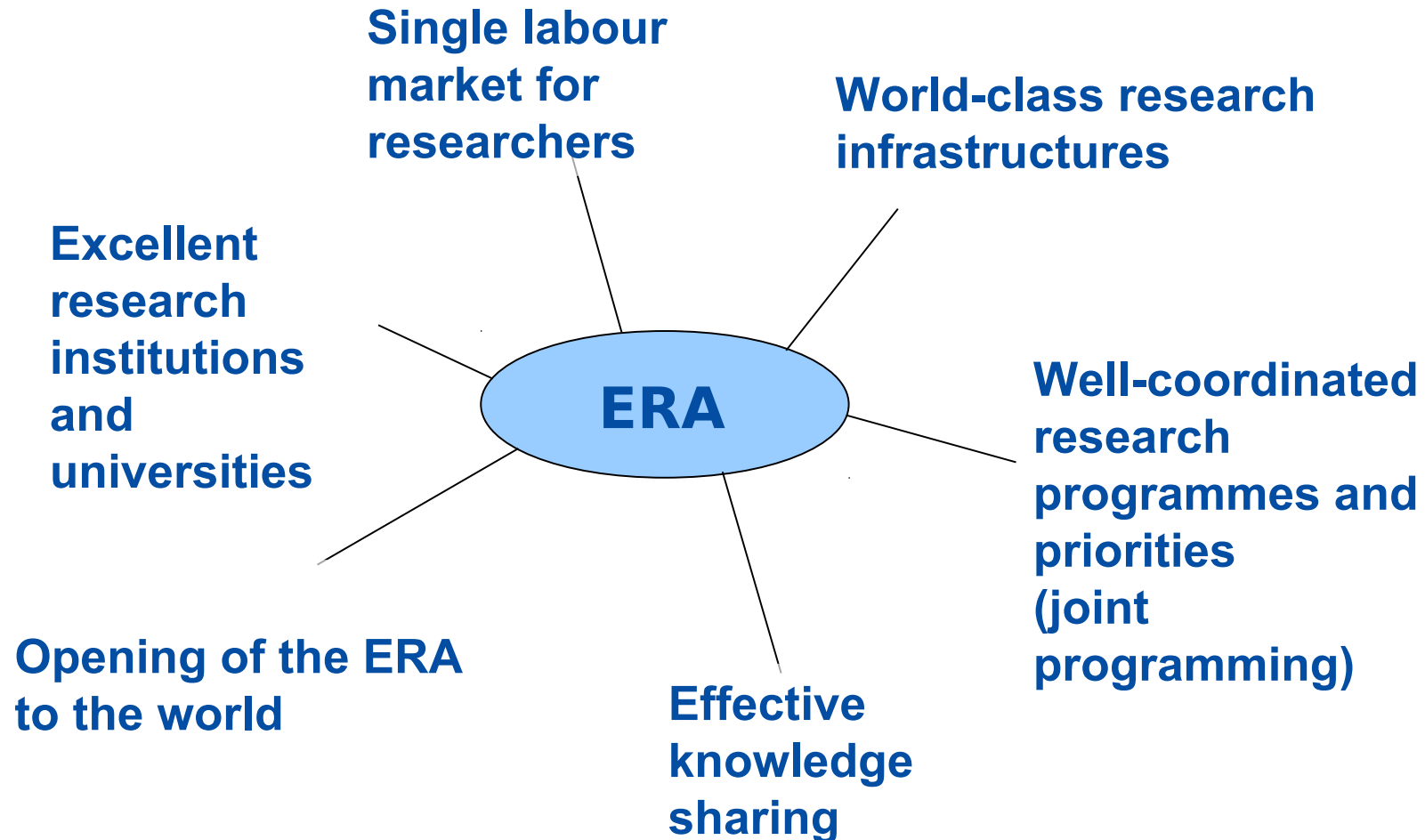
with contributions from
Hervé Péro, EC, DG Research & Innovation
Tim Kileen, NSF Major Infrastructures
Silvie Joussaume, ESRFRI ENV TWG



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F	A	R	I	C	R	D	L	A	Q	F	S	E	S	V	V	I	L	D	Q	E	H	L	G	I	P	E	T	D	F	S	C	V	V	R	M	P	A	M	E	F	A	R	I	C	R	D	L	A	Q	F	S	E	S	V	V	I	DmPCNA
F	S	K	I	V	R	D	L	S	Q	L	S	D	S	I	N	I	I	D	A	D	F	L	K	I	E	E	L	Q	Y	D	S	T	L	S	L	P	S	S	E	F	S	K	I	V	R	D	L	S	Q	L	S	D	S	I	N	I	ScPCNA



A key component of the EU strategy for ERA, (Green Paper 2007)





Mandate

Competitiveness Council Conclusions, 25-26.11.2004

“In the context of developing research infrastructures of European interest, the Council of the European Union welcomes the development of a strategic roadmap for Europe in the field of research infrastructures and the role of the European Strategy Forum on Research Infrastructures (ESFRI) in this context.

This roadmap should describe the scientific needs for Research Infrastructures for the next 10-20 years, on the basis of a methodology recognized by all stakeholders, and take into account input from relevant inter-governmental research organizations as well as the industrial community. The Council stresses that this roadmap should identify vital new European research infrastructures of different size and scope ... as well as existing ones that need to be upgraded.”

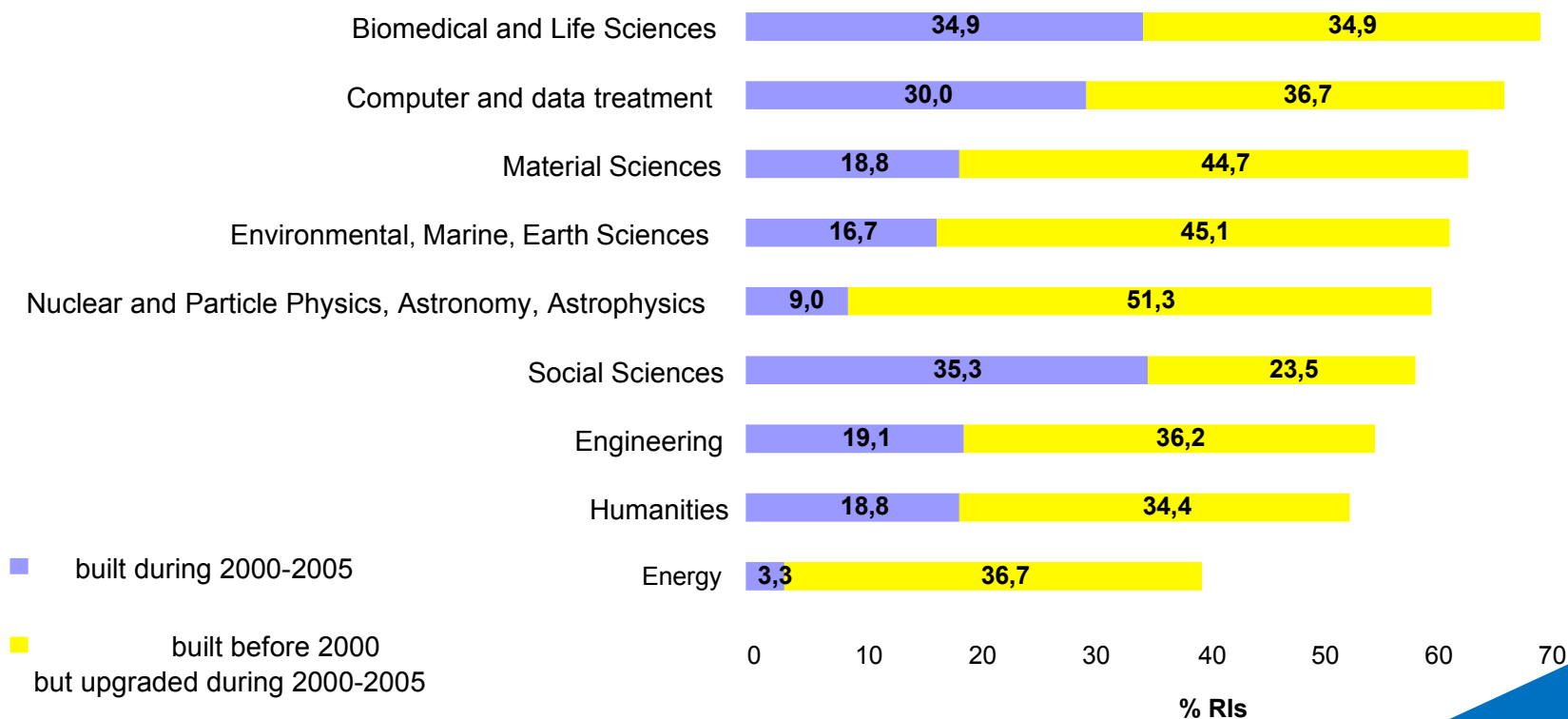
Competitiveness Council Conclusions, 21-22.5.2007

“The Council recommends that ESFRI updates this roadmap at regular intervals in order to cope with the rapid evolution of scientific and technological needs.”



RI pattern in Europe

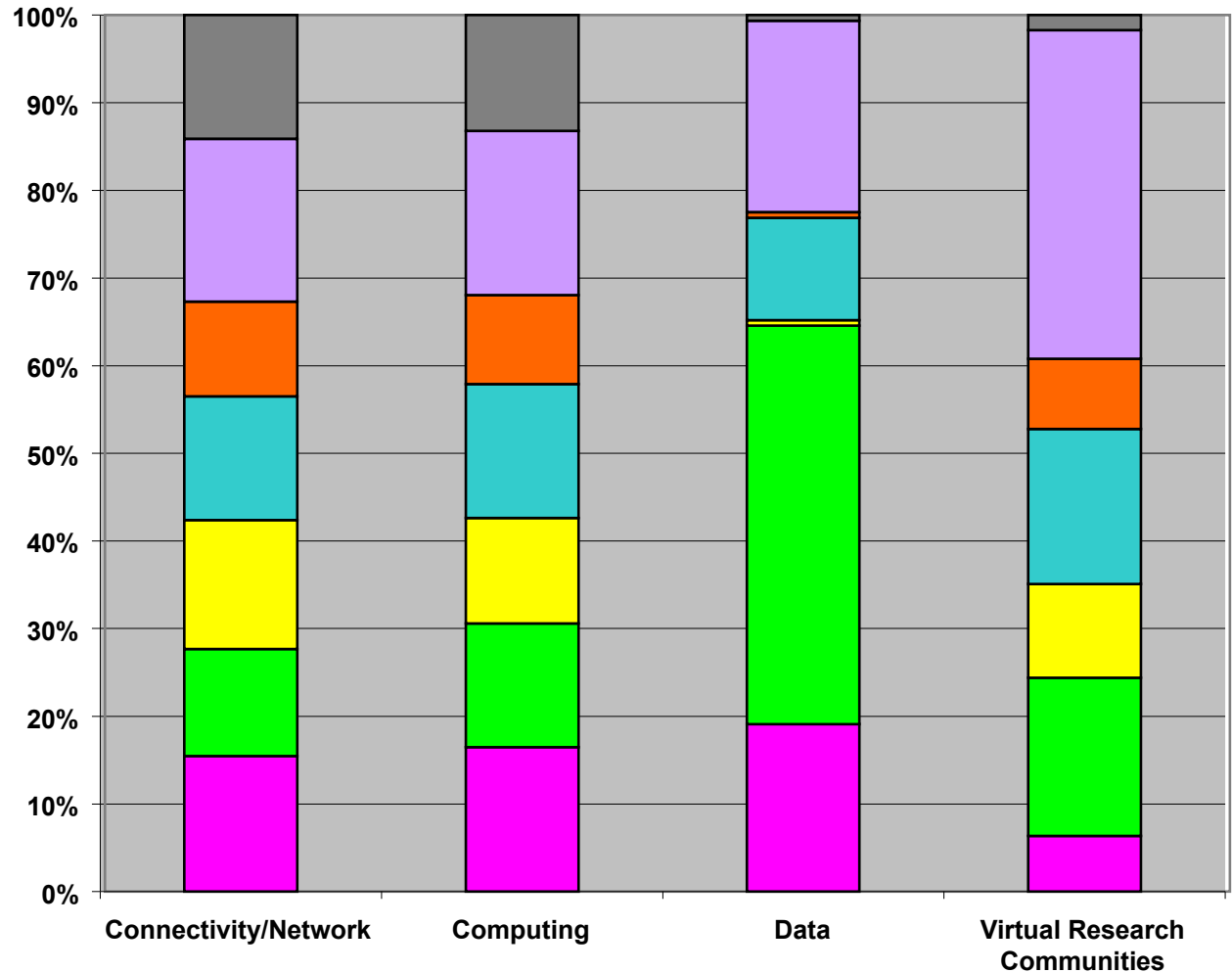
Share of RIs Built or Upgraded between 2000 and 2005 (EC-ESF survey)





e-infrastructures

User community support per infrastructure layer



Data

- Security/Civil protection
- Physical Sciences and Engineering
- Materials and Analytical Facilities
- Biological and Medical Sciences
- Energy and transports
- Environmental Sciences
- SSH





Vision 2030

High-Level Expert Group on Scientific Data

“Our vision is a scientific e-Infrastructure that supports seamless access, use, re-use and trust of data.

In a sense, the physical and technical infrastructure becomes invisible and the data themselves become the infrastructure, on which science, technology, the economy and society can advance”

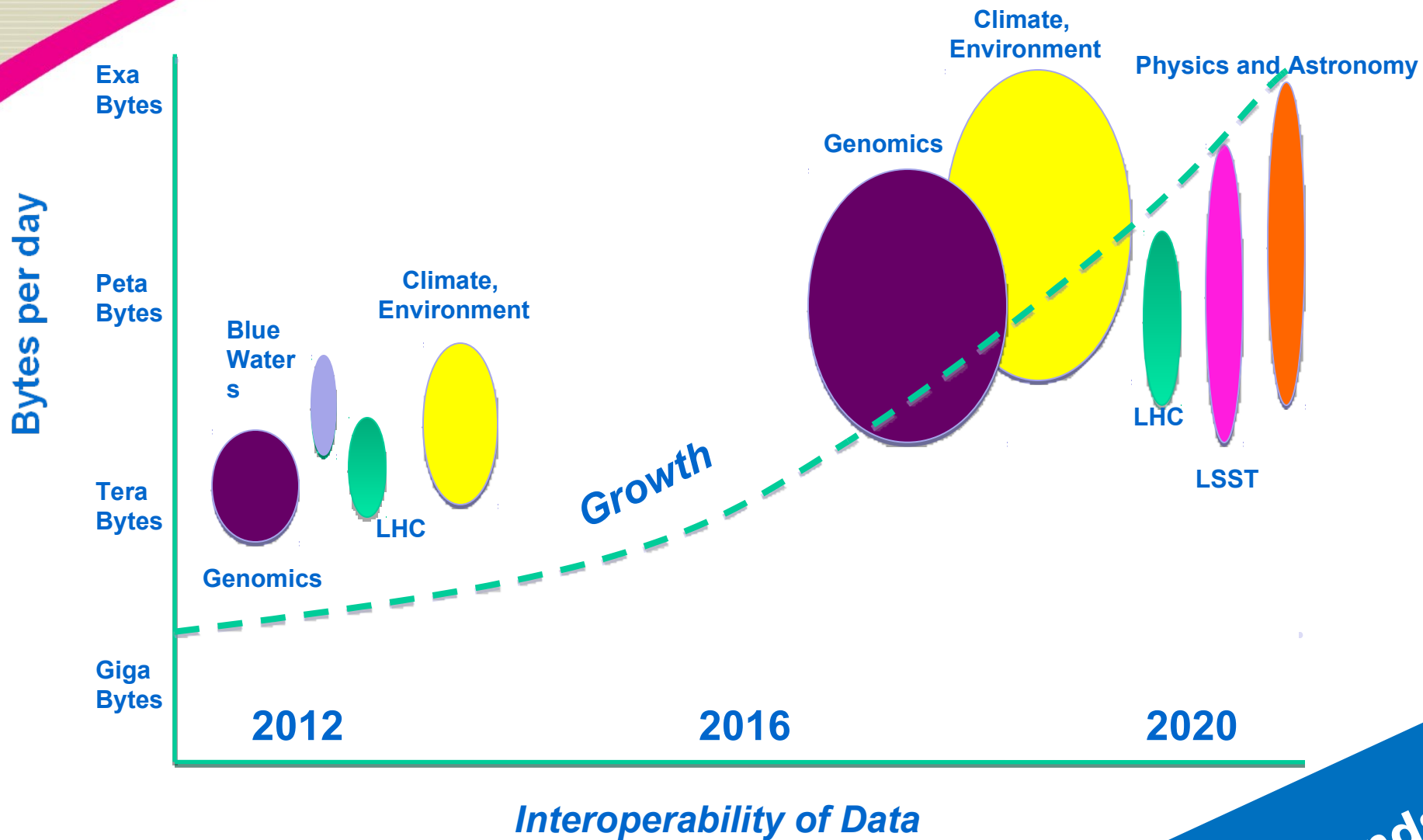




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Data Challenges



Interoperability of Data

Trends

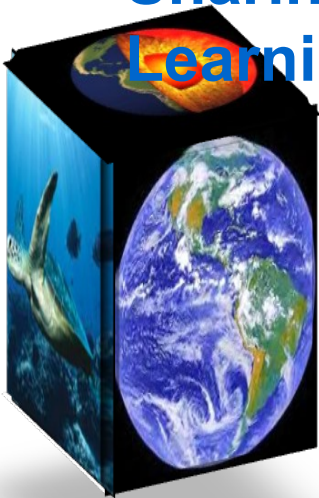


Understanding the Earth's interface with life

Partnerships are essential

**Not just More – but Different
For**

**Discovery
Sharing
Learning**



**observation
collaborating
informing**



**simulation
training
partnerships**



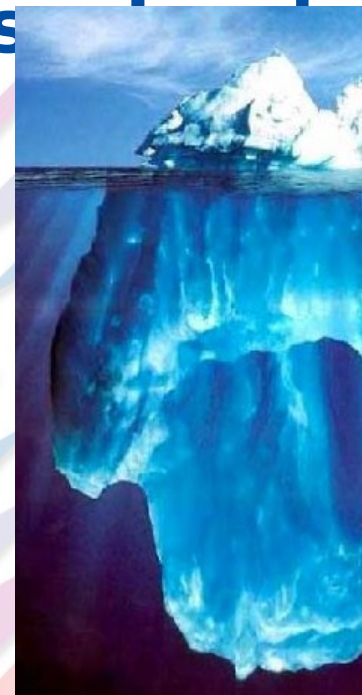


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For new or existing RIs, the EU needs to pave the way towards an efficient research 'eco-

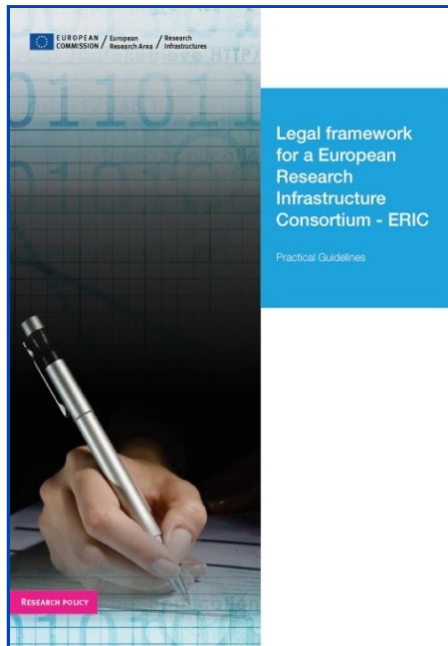
- a) Large facilities
- b) Distributed European Facilities
- c) Regional Partner Facilities
- d) Network of national facilities
- e) Linked with EU and national programmes, universities & schools
- f) Network of industrial suppliers / users



Without the joint involvement of the scientific communities and the actors on e-infrastructures, the EU will not succeed in developing an efficient management of this 'eco-system'



The European legal landscape is also changing...



- ✓ The Commission has awarded **the first ERIC (European Research infrastructure Consortium) status to SHARE** on 17 March 2011
- ✓ About ten ERIC applications are currently under preparation
- ✓ These concern mainly distributed facilities and data services in the domains of life sciences (biological, medical), environment and social sciences and humanities

The roadmap: one of the roles of ESFRI

48 new - or major upgrade of - Research Infrastructures of pan-European interest

(+ 3 additional projects from the CERN Council strategic roadmap for particle physics*)

Social Sc. & Hum. (5)	Life Sciences (13)		Environmental Sciences (9)		Energy (7)	Material and Analytical Facilities (6)	Physics and Astronomy (10)		e-Infra-structures (1)
SHARE	BBMRI	ELIXIR	ICOS	EURO-ARGO	ECCSEL	EUROFEL	ELI	TIARA*	PRACE
European Social Survey	ECRIN	INFRA FRONTIER	LIFEWATCH	IAGOS	Windscanner	EMFL	SPIRAL2	CTA	
CESSDA	INSTRUCT	EATRIS	EMSO	EPOS	EU-SOLARIS	European XFEL	E-ELT	SKA	
CLARIN	EU-OPENSCREEN	EMBRC	SIAEOS	EISCAT_3D	JHR	ESRF Upgrade	KM3NeT	FAIR	
DARIAH	Euro BioImaging	ERINHA BSL4 Lab		COPAL	IFMIF	NEUTRON ESS	SLHC-PP*	ILC-HIGRADE*	
	ISBE	MIRRI			HiPER	ILL20/20 Upgrade			
	ANAEE				MYRRHA				

Distributed research infrastructures

Single sited research infrastructures

More ESFRI Activities ...

ESFRI is engaged in an “incubator role” in line with its mission to support policy-making on pan-European and Global RIs; this includes:

- Regional Perspectives, rebalance East/West
- Support of international cooperation
- Siting and Hosting Issues
- Management Aspects
- Socio-economic returns
- Use of new instruments, e.g. EIB/RSFF
- e-Infrastructures and data (with the e-IRG)
- Scientific landscapes & forward looks



Role of the FP's Research Infrastructures actions

- Optimising the use and balanced development of the best **existing research infrastructures** in Europe
- **Structuring ERA** and helping to create in all fields of S & T **new & upgraded research infrastructures** of pan-European interest
- **Stimulating innovation**, including the **scientific instrument EU market**
(worth more than 5B€ per year in Europe)
- Supporting **policy development**
 - e.g. ESFRI, e-IRG, impact studies
 - international cooperation





FP7 INFRA Preparatory Phase projects for ESFRI

Project	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Health Sub themes and Translational							
CLARIFY							
CLARIFY							
CLARIFY							
CLARIFY							
CLARIFY							
CLARIFY							
Environmental Sub themes							
ADAPTING TO CLIMATE CHANGE (ADAP)							
ADAP							
ADAP							
ADAP							
ADAP							
ADAP							
ADAP							
ADAP							
ADAP							
ADAP							
Energy							
ENER							
ENER							
ENER							
Other Health Sub themes							
HEAL							
HEAL							
HEAL							
HEAL							
HEAL							
HEAL							
Materials and Nanotechnology							
MATN							
MATN							
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MATN							
MATN							
Physical Sciences and Engineering							
PHYS							
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PHYS							
Information and Communication Technologies							
INFORM							





a coordinated call between NSF and the EU by end 2011

... aiming at developing for example...

- ❖ a Common data policy and standards relevant to global ENV research infrastructures, notably on space weather (based e.g. on EISCAT, AMISR), deep sea observatories (based e.g. on EMSO, OOI), GHG observatories (ICOS, NEON), solid-Earth monitoring (EPOS, EarthScope) and any other fields ready for globally coordinated actions
- ❖ Common e-infrastructure foundations, allowing interoperability of solutions and services to support scientific cooperation under the above mentioned topics

Basis: draft EC 2012 work programme



... our countries are developing innovative projects, often with parallel activities (T. Kileen, AAAS, Feb 2011)



TOWARDS A **COMMON STRATEGIC FRAMEWORK** FOR EU RESEARCH AND INNOVATION – GREEN PAPER

Key Drivers

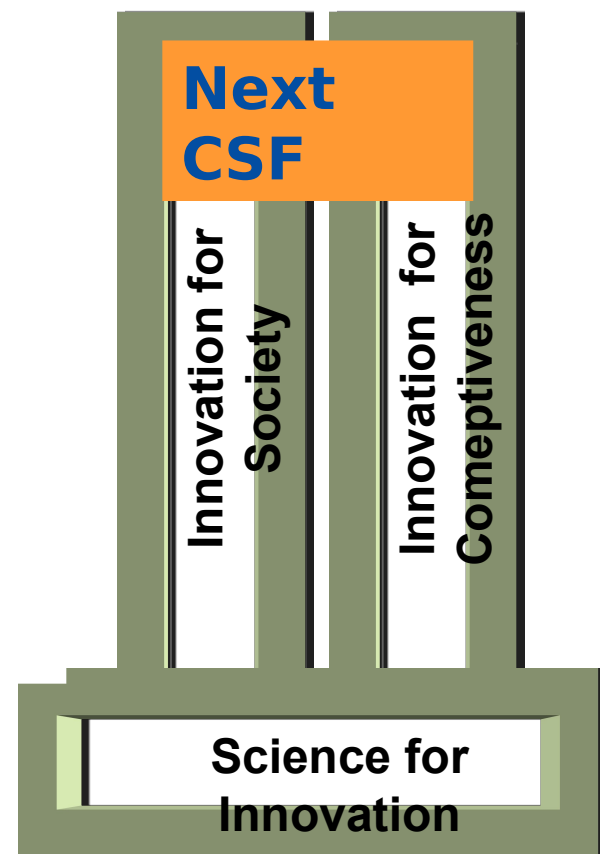
- Underpin Europe 2020 & Innovation Union
- Address grand challenges, links to thematic policies
- Strengthen the science base & contribute to the European Research Area
- Couple research and innovation & contribute to increased competitiveness
- A globalised context
- To be driven by objectives, not instruments



Common Strategic Framework A systems' approach

- Three main components
- RIs would be placed under “science for innovation”
- Milestones:
 - 10 June: Event concluding consultation
 - July: First draft legislative proposal
 - Nov/ Dec: Final legislative proposals

Do not hesitate to contribute !
<http://ec.europa.eu/research/csfri>





Strong potential support to RIs related to the Innovation Union objectives

- ✓ Opening and integration of Member State operated research infrastructures to the full benefit of the European user community
- ✓ By 2015, the Member States with the Commission, should have completed or launched the construction of the priority research infrastructures, ESFRI projects.
- ✓ The European Union should step up its cooperation on the roll-out of the global research infrastructures

The Digital Agenda Flagship also highlights the importance of e-infrastructures



Partnership & collaboration

Bringing existing and new pan-European and global ENV RIs in closer cooperation

Effective coordination mechanisms with key actors at global level such as Brazil, China, India, Japan, Russia or the USA

European research should be built at least on 4 key pillars:

1. Fundamental scientific research
2. Long-term observations
3. Integration of scientific results
4. High quality European level training



Next steps...

- ❖ A strong support from the EC and at G8+O5 level
- ❖ Draft WP 2012-13 (EC) ready by mid April 2011
- ❖ Launch of the EC calls by July 2011
- ❖ (from the US side) “Dear colleagues letter” by summer 2011
- ❖ ENV workshop in Brussels on 14 September
- ❖ International conference on 20 March 2012 in Copenhagen
- ❖ Several other bilateral actions (EU-RU, EU-AUS, EU-CN)
- ❖ Start of the new projects by summer 2012
- ❖ First monitoring workshop by autumn 2012

... clearly a multi-annual action...



Landscape of ENV challenges

Global warming
Climate change

Food supply
Energy supply
Chemicalisation

Human challenges
Epidemic diseases



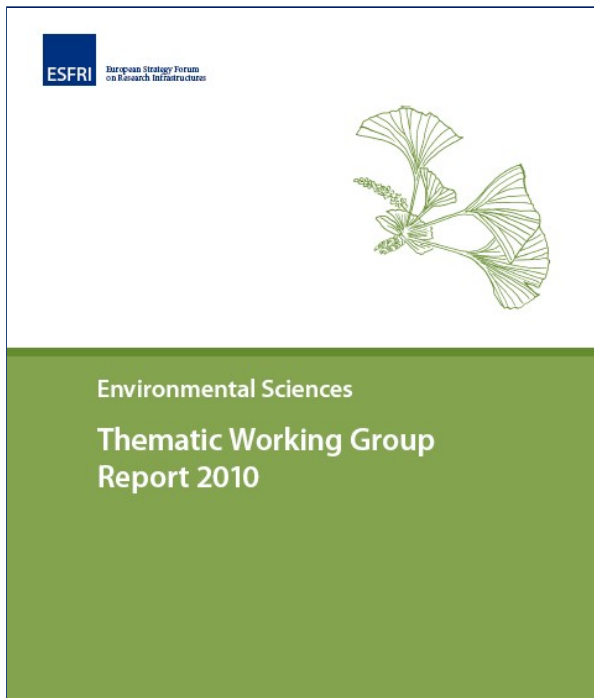
Ocean acidification
Air quality
Fresh water

Earthquakes
Volcanoes

Deforestation
Biodiversity loss



ESFRI ENV: Environnemental Research Infrastructures



ESFRI ENV Roadmaps

Roadmap 2006

Roadmap 2008 ENV

Working Group

Roadmap Implementation

Report 2009

Roadmap 2011 ENV

Thematic WG



A large range of fields:

**Geosciences
Solid Earth
Atmosphere, Oceans,
Land**

**Ecology Environmental
 engineering**

Key role for science:

**Observations / Modelling /
Experimentation**

Key role for society:

natural Hazards / Climate / Water / Ecosystem services



GEOSS

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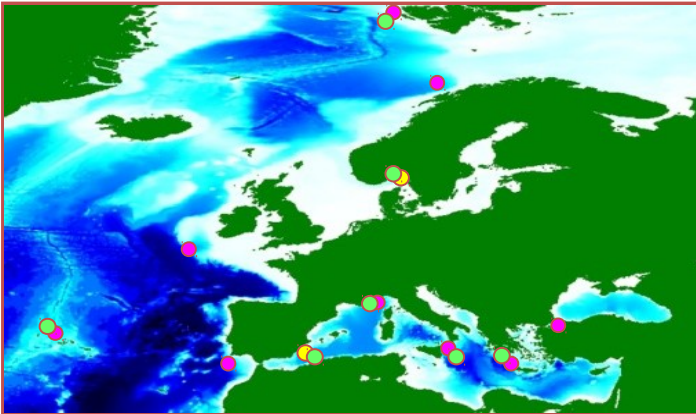
GMES



ENV RI: Roadmap 2006 - I



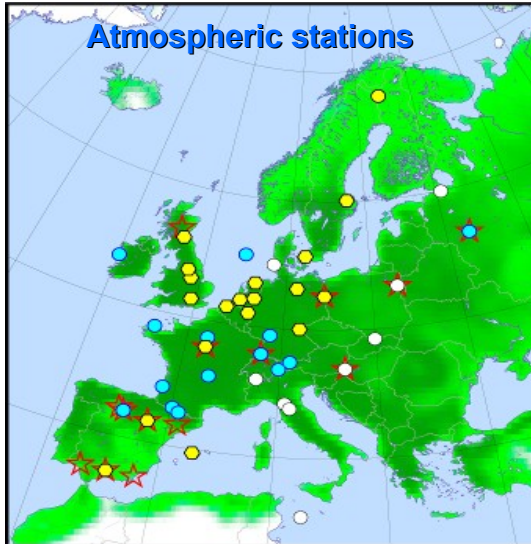
AURORA BOREALIS
European research
icebreaker
www.eri-aurora-borealis.eu



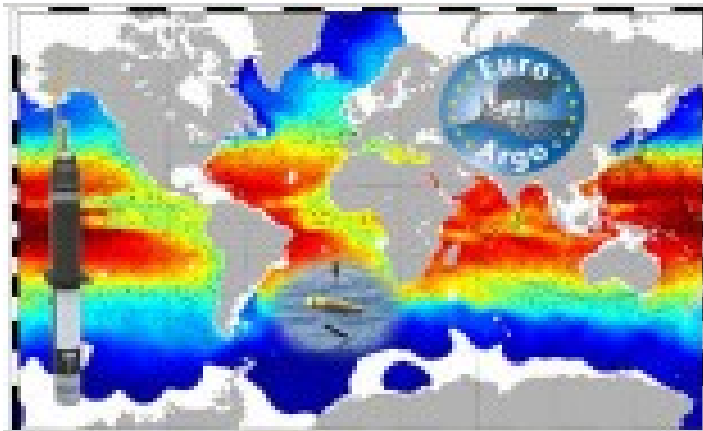
● Running S&T
activities

● Permanent infrastructures ●

EMSO
European Multidisciplinary
Seafloor Observatories
www.emso-eu.org



ICOS
Integrated Carbon
Observation System
www.icos-infrastructure.eu



EURO-ARGO
Research infrastructure for
ocean science and
observations
www.euro-argo.eu



IAGOS

In-service Aircraft for a
Global Observing
system www.iagos.org



COPAL

COmmunity heavy-PAYload Long
endurance Instrumented Aircraft for
TroPospheric Research in
Environmental and Geo-Sciences



www.eufar.net

LIFEWATCH

Science and technology
infrastructure for biodiversity
data and observatories
www.lifewatch.eu

ENV RI: Roadmap 2008 - I



SIOS
**Svalbard Integrated Arctic
Earth Observing System**
www.sios-svalbard.org



EISCAT
**The next generation European
incoherent scatter radar system**
www.eiscat.se



EPOS European Plate Observing System www.epos-eu.org

