

FCC as a Very Large Research Infrastructure

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What is an Infrastructure?



What is
an Infrastructure?



It can serve many users and many uses.

It's designed with the future in mind.



What is a Research Infrastructure?

- A facility or a cluster of facilities for a specific discipline or generic purposes
- Multiple users/customers from multiple institutions
- Organizational management

What is a Research Infrastructure?

- A facility, resource and/or service that are used by the research communities to conduct research and foster innovation in their fields.
- It may include: major scientific equipment (or sets of instruments), knowledge-based resource, e-infrastructure.
- Accordingly, it is implemented along a specific organisational model, coordination and management of geographically distributed observatories or laboratories, remotely accessible resources.
- [from Article 2 (6) of the Regulation (EU) No 1291/2013 of 11 December 2013 for establishing Horizon 2020]

International Research Infrastructure

- An association or network of geographically-separated, distinct entities from more than one country that agree to jointly perform or sponsor basic research.
- It is a long-term enterprise.
- It represents a strategic investment that is indispensable for enabling and developing research.
- It has often broader socio-economic impacts.

Facilities for the Future of Science

A Twenty-Year Outlook



Office of Science
U.S. DEPARTMENT OF ENERGY



12 November 2021 Gyeongju Korea

Facilities for the Future of Science:

A Twenty-Year Outlook

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European Strategy Forum on Research Infrastructures (ESFRI)

What the ESFRI does, mandate, members, ESFRI roadmaps, reports and documents

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What is ESFRI?

ESFRI's mandate

ESFRI Roadmap

Members

Related documents

Contact

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What is ESFRI?

The European Strategy Forum on Research Infrastructures (ESFRI) plays a key role in policy-making on Research Infrastructures in Europe.

It is composed of national delegates nominated by research ministers of EU countries and countries associated with Horizon 2020. It also includes a Commission representative.

ESFRI is a self-regulated body, operating on a consensus basis and typically meets 4 times a year.

ESFRI's mandate

- establish a European roadmap for Research Infrastructures for the next 10-20 years, stimulate the implementation of these facilities, and update the roadmap as needed

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Research Infrastructures in the European Research Area

A report by the ESF Member Organisation Forum
on Research Infrastructures





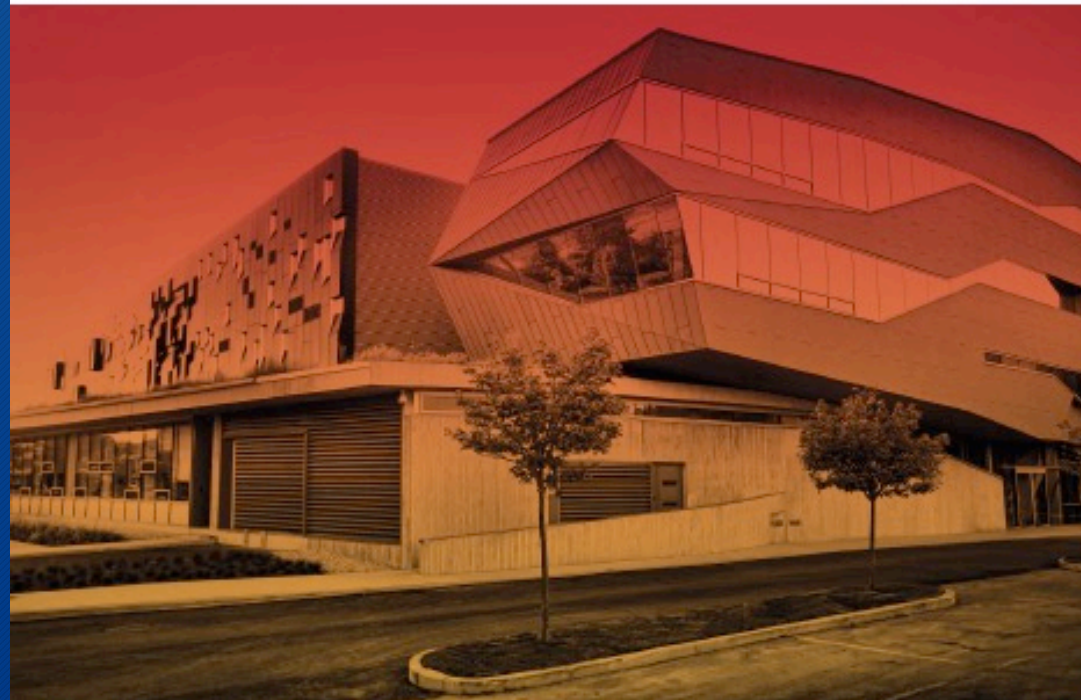
ICRI
CANADA
2021

CONNECTING
GLOBAL
RESEARCH

International Conference on Research Infrastructures

Proceedings Report

June 1-3, 2021



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Very Large Research Infrastructures

- Uniqueness: VLRI is unique or quasi unique worldwide and provides world-leading capabilities
- Complexity: VLRI is highly complex in its organisational structure, technology and/or operation. Its scale is usually very large in terms of the required human and/or capital resources
- International dimension: VLRI possesses an international dimension which is reflected in its governance, its operational footprint and/or user base.
- Diversity: various background of partners and their expectations.
- Long time span

Very Large Research Infrastructures

- CERN
- ALMA (Akatama Large Millimeter Radiotelescope Array)
- XFEL (European X-ray Free Electron LASER)
- ITER
- FCC
- Baikal GVD (Gigaton Volume Detector)
- ESS (European Spallation Source)
- FAIR (Facility for Antiproton and Ion Research)
- SKA (Square Kilometer Array), etc

Global Research Infrastructure

- It represents the research infrastructure with a full international dimension to serve common needs of the world scientific community, or the advanced collaboration among existing research infrastructures that share common efforts to pursue challenging upgrades needed for top research.

OECD Global Science Forum

Large Research Infrastructures



Report on
Roadmapping of Large Research Infrastructures
(2008)

Report on
Establishing Large International Research
Infrastructures: Issues and Options
(2010)

OECD Global Science Forum

Report on Roadmapping of Large Research Infrastructures

December 2008



OECD *publishing*

OPTIMISING THE OPERATION AND USE OF NATIONAL RESEARCH INFRASTRUCTURES

OECD SCIENCE, TECHNOLOGY
AND INDUSTRY
POLICY PAPERS

August 2020 **No. 91**

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Report on the Impacts of Large Research Infrastructures on Economic Innovation and on Society

CASE STUDIES AT CERN



PRELIMINARY VERSION

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Global Research Infrastructure

Creation

- ❖ Planning (Roadmapping)
- ❖ Internationalisation
- ❖ Establishing

Operation

- ❖ Operating costs
- ❖ Access to resources and to data
- ❖ Decommissioning

Assessment

- ❖ Scientific impact
- ❖ Economic impact
- ❖ Societal impact

Global Research Infrastructure

- Road-mapping:
 - may include non-scientific consideration,
 - can mobilise an entire scientific community,
 - promoting innovation in a competitive environment,
 - should encourage multi- and inter-disciplinarity.

Global Research

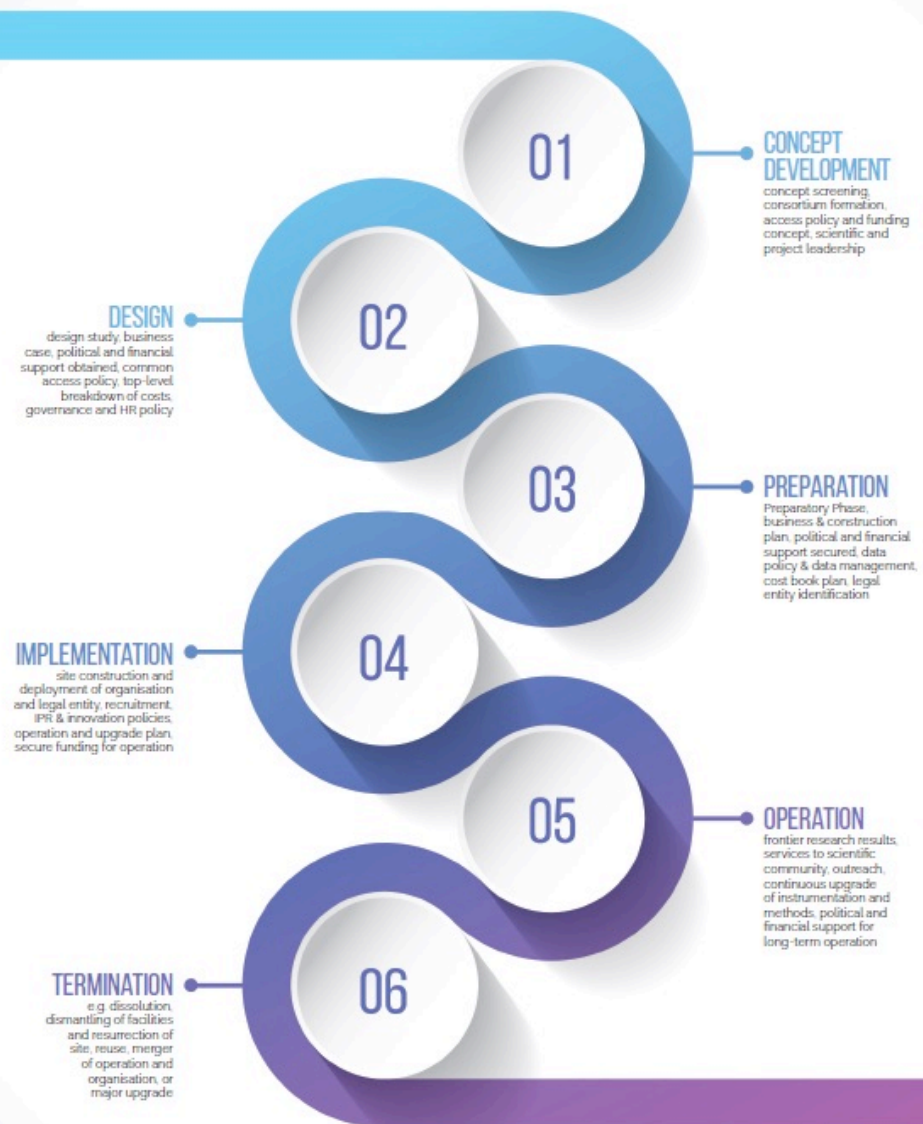


FIGURE 1.
Lifecycle approach

Global Research Infrastructure

- Science policy issues are important regarding:
 - the role of existing infrastructures,
 - balancing supply and demand of research resources,
 - understanding the size of the overall effects,
 - comparing infrastructure costs,
 - access rules and policies,
 - and workforce issues.

Global Research Infrastructure

- Some caveats:
 - stress on science budgets because of its expensiveness
 - potential neglect of small and medium projects
 - inflexibility of long-term commitments
 - national/regional/global interference
 - confusion from proliferation of diverse roadmaps

Some issues

- Legal and administrative
- Funding and contributions
- Project management
- Equipment
- Personnel

Some issues - legal and administrative

- International Organisation
[archetype models: ITER, CERN]
 - Limited Liability Company (LLC) under national law
[archetype models: ESRF, XFEL]
 - Association of independent national or regional infrastructures [archetype model: ALMA]
 - Ex-post-facto collaborating infrastructures
[archetype models: LIGO/VIRGO/GEO]
 - Foundation under national law [archetype model: JIVE]
 - European Research Infrastructure Consortium
 - *A digression: the HEP detector model*
- Allocating the right tasks to the right negotiators
 - Scope and organisation of the negotiations
 - Bi-lateral or multi-lateral?
 - The role of “Science Cases”
 - The language issue

Some issues – funding and contributions

FUNDING AND CONTRIBUTIONS

- Host premium and host benefits.
- Cash vs. In-Kind: deciding the best proportion of each, the pros and cons.
- In-Kind: methods for assigning value, dividing up assignments among Partners.
- *Juste retour*: theory and practices.
- Operating costs and scientific access
- Risk Analysis. Contingencies and cost overruns. Quality control. Openness and accountability.
- Contracting by the Organisation (esp. in Partner countries).

Some issues - project management

PROJECT MANAGEMENT

- Relationship to Risk Analysis, and to generic issues of accountability, authority and communication between the chief actors (the Organisation and the Partners).
- Examples of scope of PM (e.g., purchasing, contracting, hiring). Use of commercial software and of external contractors. Role of experienced individuals.
- Data availability and quality issues, especially access to information held by Partners.
- Possibility of adopting agreed international standards.
- Special vulnerability issues in the start-up phases.
- Special challenges to international scientific communities, especially when transitioning to large infrastructures.

Some issues - equipment and personnel

PERSONNEL

- Recruitment and contracts
- Organisation hires vs. secondees.
- Staff regulations (incl. issues of authority).
- Conflict of interest.
- Family issues.

EQUIPMENT

- Responsibility for testing, acceptance and transfer of ownership.
- Liability in case of malfunction.
- Disposition at decommissioning.
- IPR

Some issues - funding and contributions

- Some caveats:
 - stress on science budgets because of its expensiveness
 - potential neglect of small and medium projects
 - inflexibility of long-term commitments
 - national/regional/global interference
 - confusion from proliferation of diverse roadmaps

Korean participation

- Suppose that Korean HEP community reaches a consensus, and Korean government agrees to support.
- At what stage?
-
- How much should Korea be involved?

Merci !