SEVENTH FRAMEWORK PROGRAMME
Research Infrastructures

INFRA-2007-2.2.2.1 - Preparatory phase for 'Computer and Data Treatment' research infrastructures in the 2006 ESFRI Roadmap

PRACE

Partnership for Advanced Computing in Europe

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D2.2.1
Report on Analysis of Adequate Governance Structure

Final

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Abstract:	The objective of the project Partnership for Advanced Computing in Europe (PRACE) within the INFRA-2007-2.2.2.1 - Preparatory phase for 'Computer and Data Treatment' research infrastructures in the 2006 ESFRI Roadmap is the establishment of a persistent pan-European high performance computing (HPC) service and infrastructure. This infrastructure will be managed as a single European entity. This document is the first deliverable of three on the governance structure for the PRACE organization, the final document will form part of the statutes of the PRACE organization. Work has proceeded under the general principle that form should follow function, and the responsibilities of PRACE serve as the starting point for the document. The objective and scope of the governance structure are discussed and an overview of the PRACE stakeholders is given. The governance structures of various different but comparable research infrastructures are described and analyzed with the needs of the PRACE organization in mind. The effect of the ESFRI/EC ERI legal initiative on the governance structure is also examined, as it is considered to be one of the desirable legal forms for PRACE. Finally, an initial idea for a governance structure is outlined and its compatibility with the different national and European legal forms is analyzed.

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References and Applicable Documents

[1] http://www.prace-project.eu
[2] "Proposal for a Council Regulation on the Community legal framework for a European Research Infrastructure (ERI)", Commission of the European Communities, 28/05/2008
[3] PRACE MoU
[4] PRACE Consortium Agreement
[5] Report of the Working group on Feasibility study on the creation of a European legal instrument for Pan-European research infrastructures and Background to March 2008 Meeting in Brussels concerning the legal aspects of Research Infrastructures.
[6] "Legal Status for Future Pan -European Research Infrastructures", JM Dufour, 1/12/06

List of Acronyms and Abbreviations

AHTP	Advanced HPC Technology Platform. To be created in this project as permanent groups to identify and work on future technologies for multi-petaflop/s systems.
DEISA	Distributed European Infrastructure for Supercomputing Applications. EU project by leading national HPC centres.
EGEE	Enabling Grids for E-sciencE; EU Grid project lead by CERN and successfully completed in 2004. Follow-up is EGEE-II.
ESFRI	European Strategy Forum on Research Infrastructures; created roadmap for pan-European Research Infrastructure.
ERI	refers to the Proposal for a COUNCIL REGULATION on the Community legal framework for a European Research Infrastructure (ERI) COM 2008/467 – 2008/0148
HET	High Performance Computing in Europe Taskforce. Taskforce by representatives from European HPC community to shape the European HPC Research Infrastructure. Produced the scientific case and valuable groundwork for the PACE project.
HPC	High Performance Computing; Computing at a high performance level at any given time; often used synonym with Supercomputing.
HPC-Europa	Consortium of six leading (HPC) infrastructures and five centres of excellence providing transnational access; EU project.
ITER	International Thermonuclear Experimental Reactor. Joint international research and development project that aims to demonstrate the scientific and technical feasibility of fusion power. Also used as the name for the reactor.
MB	Management Board, defined within the PRACE MoU and the PRACE Consortium Agreement
MoU	Memorandum of Understanding.

NDA	Non-Disclosure Agreement. Typically signed between vendors and customers working together on products prior to their general availability or announcement.
PPC	Principal Partner's Committee, defined within the PRACE MoU and the PRACE Consortium Agreement
GÉANT	Collaboration between National Research and Education Networks to build a multi-gigabit pan-European network, managed by DANTE. GÉANT2 is the follow-up as of 2004.
PRACE	Partnership for Advanced Computing in Europe; Project Acronym, now changed into PRACE.
Tier-0	Denotes the apex of a conceptual pyramid of HPC systems. In this context the Supercomputing Research Infrastructure would host the tier-0 systems; national or topical HPC centres would constitute tier-1.
TCO	Total Cost of Ownership. Includes the costs (personnel, power, cooling, maintenance, ...) in addition to the purchase cost of a system.

Executive Summary

This document is the first deliverable of three on the governance structure for the PRACE organization, the following two being the draft of the governance document due in month 12 and the final governance document due in month 24. The final document will form part of the statutes of the PRACE organization.

This deliverable provides the PRACE MB and PPC with an overview of the possible options and their implications for a governance structure for the PRACE organisation, based on:

- A description of the powers and responsibilities that the PRACE organisation will have, as work has proceeded under the general principle that form should follow function
- A clear idea of what a good governance structure in this context should ensure
- A definition of the scope of the PRACE governance structure
- A summary of the PRACE stakeholders, as the governance structure should take into account the multiple European HPC stakeholders and their needs
- An analysis of the governance structures of various different but comparable research infrastructures. Examples of international, European and national legal forms have been considered

An examination of how the future European Community Legal Framework for a European Research Infrastructure (ERI) may affect the governance structure.

Based on this analysis, a proposal for a possible governance structure is outlined and its compatibility with the different national and European legal forms is analyzed. The deliverable should promote an informed debate and allow further focus leading to the draft of the governance document in month 12 and the final agreed PRACE governance structure in month 24. It is also clear that progress on the deliverable on “Legal structure” is very strongly coordinated with the work on governance which we have outlined.

1 Introduction

This document has been written taking into account analysis already done under the ESFRI Working Group on Legal and Financial Issues for European Research Infrastructures[1], the European Conference on Research Infrastructures[2] and the HET High Performance Computing in Europe Taskforce[3].

The report on analysis of adequate governance structure is closely linked to deliverables 2.1.1, *Report on options for a legal entity* and 2.3.2 *Usage model document*. This report provides an analysis of the possible governance structures available to the pan-European organisation created to manage the Tier-0 distributed high performance computing infrastructure, taking into account the types of partners foreseen: initially 3-5 principal partners, around 10-12 general partners and possibly the European Commission. This is done in the context of the basic models currently being discussed (referred to as the Cycles and the Operator models), and fully described in section 2.5. Governance structures of various comparable research infrastructures, based on national, European and international law are examined. Finally a proposal for a possible governance structure is put forward.

The audience will be the PRACE PPC and MB, who will decide the preferred governance structure. The governance structure for PRACE will for a large part be defined within the statutes of the organization and so must be compatible with the legal form. As a result, this deliverable has been closely coordinated with D2.1.1 *Report on options for a legal entity*. D2.3.2 *Usage Model document* is also very relevant to the governance structure as usage will depend to some extent on where the funding for the PRACE organization comes from. This document shares with these 2 documents a common section “Relationship between partners” giving definitions to clarify the range of operation models under examination by the project. Decision power within the governance structure will be expected to reflect, at least to some extent, contributions made.

[1] http://cordis.europa.eu/esfri/policy.htm
[2] http://www.ecri2007.de/
[3] http://www.hpcineuropetaskforce.eu/

2 Scope and context of governance structure

PRACE will create a persistent pan-European high performance computing service and infrastructure. This infrastructure will be managed as a single European entity. European scientists and technologists will be provided with world-class leadership supercomputers with capabilities equal to or better than those available in the USA and Japan. The service will comprise three to five superior HPC centres strengthened by regional and national supercomputing centres working in tight collaboration through grid technologies.

In order to establish a common langage to deal with organisational abstractions, two extreme and oversimplified models are described in section 2.5: the Cycles and the Operator models. Under the **Cycles Model** the hosting partners would be delegated the responsibility for designing, acquiring and operating the facilities and the supercomputers, taking into consideration the strategic needs of PRACE. The PRACE entity would perform processes for service definition, high level requirement analysis and contracting with the hosting partner. Under the **Operator Model** the PRACE entity would be responsible for procurement and would own, house and operate the systems from its own budget.

The reader is also reminded that the aim of this text is to present in a easy to understand progression the various viewpoints that need to be considered, and a number of organisational devices which will permit to address the concerns. This is the reason for the quite systematic treatment of stakeholders in the following paragraphs. However, all questions that arise concerning the equilibrium between concerns or stakeholders cannot be dealt with as a matter of governance, some need structural answers in the legal structure statutes or in the definition of relations between cooperating entities.

2.1 Form Follows Function

The PRACE organisation will be responsible for providing access to a suite of Tier-0 systems for use by European research communities.

Regardless of the model for the organisation PRACE will need to be able to:

- **Define and implement a strategy** for providing a world class HPC infrastructure in Europe
- Manage the **formation of a suite of complementary Tier-0** systems in Europe
- Manage the **contributions** of partners
- Operate an open and fair access system based on **peer review** to the Tier-0 services
- Manage the interaction with **industrial organisations** wishing to access PRACE systems
- Perform **training** and **computational science R&D** activities
- Interact with multiple stakeholders in order to promote HPC in Europe with a long term and sustainable approach
- Deliver appropriate **accounting, administration, human resources, marketing** and **communication** activities
- Provide a **secretariat** to PRACE governance bodies

In addition to the general points above, under the Cycles[4] model PRACE will have to be able to:

- Delegate to the Partners or the Tier-0 hosting sites or organisations the responsibility to perform several of the tasks required.
- Implement and manage contracts held with Tier-0 hosting organisations

In addition to the general points above, under the Operator model PRACE will also have to be able to:

- **Procure** Tier-0 systems
- **Procure the accommodation** for the Tier-0 systems
- **Operate** the Tier-0 systems
- **Provide support** to the Tier-0 System users

These differences are summarised in the following table:

Responsibility	Under Cycles Model	Under Operator Model
Strategy definition and implementation	Yes	Yes
Procurement of Tier-0 systems	No	Yes
Housing Tier-0 systems	No	Yes
Operation of the Tier-0 systems	No	Yes
Computational science R&D for Tier-0 systems	Yes	Yes
Peer review and access to Tier-0 systems	Yes	Yes
Applications science and software	Yes	Yes
Business development, marketing and communication and technology transfer	Yes	Yes
Finances, accounts, administration, human resources, etc.	Yes	Yes
Training and education	Yes	Yes
Other R&D	Possible	Possible

Some of the important decisions that will have to be taken by the governing board include:

- Transforming a common vision into a coherent strategy, which is compatible with the long term goals of the infrastructure, its stakeholders and in particular the RI partners.

[4] Please refer to section 2.5 for a description of the possible models for PRACE.

- Decisions on the Tier-0 performance level objectives, type of Tier-0 architecture needed and the locations where the systems should be located
- Decisions on timing and extent of upgrades
- Decisions on the use of resources according to research areas
- Decisions concerning the evolution of the legal entity and its relations with its partners, including:
    - Modifications of the statutes
    - Decisions on the change of status of partners from general to principal and vice versa, and on the entry of new partners into PRACE

2.2 Objectives of Governance Structure

The PRACE Governance structure should:

- Provide sufficient freedom to innovate and deliver the mission of the organisation in a sustainable, efficient and effective manner
- Provide sufficient structure and accountability to ensure that a useful service is provided
- Provide sufficient central authority and engagement with partners to make binding decisions on technical merit rather then political considerations
- Provide sufficient structure and authority to ensure adequate coordination among the various project elements.
- Comply with relevant legal obligations
- Meet the accountability obligations of partner organisations for use of resources
- Have appropriate processes to manage conflicts of interest
- Identify clear decision making processes and key posts with details of their delegated authority
- Represent the interest of the shareholders of the infrastructure
- Promote appropriate involvement of PRACE stakeholders
- See that the infrastructure stays transparent, effective and trusted by the shareholders, funding governments and research communities.

It is most likely that member states shall be represented as shareholders either through an appointed research organization or directly by a government department or ministry. The European Commission may be a funding stakeholder, but its legal capability or willingness to participate as a shareholder is still not clear.

In this role, the governance should ensure long term sustainability, since its credibility and effectiveness will be major factors in the evaluation of the funding parties and key partners. Similar concerns have been reflected in the PRACE MoU[3] and Consortium Agreement[4].

However, the governance structure is also designed as a tool to deal with other issues:

a) Ensure that the interests of minority partners are respected,
b) Ensure that the Research Infrastructure deals properly with third parties, including suppliers, employees, scientific communities and users.
c) Ensure that the Research Infrastructure interacts with its environment in order to ensure the availability of key resources: HPC specialists, application specialists, motivated vendors, motivated and very competent hosting centres, ….

A large body of knowledge and practice is available from the governance structures of a large number of commercial and industrial companies. However, there are specific issues which make the governance structure for a Research Infrastructure quite different.

Similarities with commercial companies

The governance structure must:

a) organize the relationship between the shareholders and the management (agency issue between entity and shareholders). In effect, the management must be given enough freedom to direct the Research Infrastructure according to the common good of all shareholders, not being impeded by special requirements of individual shareholders.
b) Preserve interest of minority partners[5]
c) Ensure proper treatment of third parties, in particular suppliers and employees.

Marked variations from commercial companies

Shareholder value is produced through science in the form of validated data, peer reviewed scientific papers, trained scientists. It thus contributes to the public policies of the participating member states, and in the European Research and Innovation policy.

The shareholders of the RI only perceive indirect benefits when the designed products generate taxable profits for commercial firms, or when these products are used to implement public policies in areas like public health, mitigation of natural disaster, global resources and climate change, new energy sources. They also benefit by the enhanced scientific visibility and worldwide leadership, ability to innovate. Frontier science rendered accessible by the use of leading edge HPC also stimulates synergistically other scientific areas.

Therefore, special attention is given to the related stakeholders: scientific communities, topical networks (EFDA[6] in energy, ENES[7] and IPCC[8] in climatology,…)

[5] Mechanisms might include nomination of an independent director by a group of minority partners, right to be informed before certain decisions are made, observers on some boards or committees…..

[6] European Fusion Development Agreement, see http://www.efda.org/
[7] European Network for Earth System Modeling, see http://www.enes.org
[8] Intergovernmental Panel on Climate Change, see http://www.ipcc.ch/

2.3 Scope of Governance Structure

The final PRACE governance structure document, which will form part of the PRACE statutes, should describe in detail the following elements:

1. Accountability
2. A clear decision making hierarchy
3. The high level organizational Chart
4. A definition of role and mandate of each statutory position/organ
5. The composition and appointment of boards and committees
6. The rules of Procedure
7. Voting (including majorities needed)
8. Frequency of meetings
9. Period of appointments for key positions
10. Resolution of Disputes

The objective of this chapter is to describe the PRACE governance options and articulate them clearly with respect to management options – the exact organization of responsibilities should be left to the Director[9].

In practice, the responsibilities of the Director (or of the management team) include supervising day to day operations, representing the RI with respect to third parties, being responsible for the performance of the RI and the hierarchical superior for all employees. These aspects are not dealt with here, also there are obviously overlapping concerns.

The examples of the other research infrastructures will be analyzed with this objective in mind. The selected options will, in later deliverables, be implemented by suitable structures and measures contributing to the elements 1-10 described above within the PRACE statutes.

We shall now examine the scope of governance according to the various functions.

Shareholder

a) Ensure that the infrastructure performs according to shareholders expectations.

b) Resolve the agency issue with shareholders.
This is a quite usual role of corporate governance, and applies verbatim here. The shareholders (member states represented) and their agents (research organizations) will have agreed to the joint mission of PRACE. They still remain competitors in other areas of research, since a healthy level of competition is deemed effective at ensuring the high level of European science and engineering.
Therefore, some of the governance bodies (usually the General Assembly and the Board), do have to reconcile both perspectives, enable joint commitments and track deviations. In doing so, it will also need to deal in a quite general way with the "conflicts of interest" between shareholders, and in some cases with stakeholders.

[9] We do not wish to deal here with aspects of the organisation of the executive office. Thus the Director would also mean the General Director or Chief Executive in the hypothesis where an executive committee with several persons needs to be formed.

c) Build the basis to the equal treatment of all shareholders. All shareholders should enjoy benefits in proportion to their participation, although the evaluation of this proportion is not mathematical, but most likely also related to contractual matters, level of risk taken, level of expertise brought, participation to strategic development, and so on.
Special cases which are likely to be brought up to the competent organs within PRACE governance include value of non monetary contributions, conditions for entry and exit of partners and the like.

Key competencies,

It is of utmost importance that the Infrastructure entertains fruitful and motivating exchanges with partners with key competencies, in particular in the evaluation, design and deployment of leading edge hardware and software. Likewise, staying competitive at the worldwide level will require the involvement or advice of many specialists[10].

Depending on the direction in which the technology of supercomputer evolves, key areas may include with varying priorities: facilities, computer architecture, middleware, parallel languages and software, applications, and so on.

In addition to hosting sites, major supercomputing sites of general partners may contribute to the above, as well as in program code optimisation, user training, taking care of special needs of some communities, interfacing with key research groups, and so on.

These goals are usually pursued by the creation of several structures, including Scientific Advisory Committees, Machine Committees, and so on.

Hosting sites of principal partners

Hosting sites constitute important assets for the shareholders. Their commitment and motivation should be sought by ensuring their adequate representation in the governance and operative structure according to their competences.

The involvement and contributions of hosting sites are important for bringing the infrastructure into operations, for addressing special needs of some user communities (very large databases for instance, which need to be shared and curated). They may also contribute to the infrastructure by mutualisation of resources and personnel.

In order to bring the infrastructure into operation, the hosting centres are most likely to carry[11] large investment in facilities, power supplies and cooling equipment. It is of interest to several parties that these investments are used effectively until eventually fully amortised.

However, potential conflicts of interest also need to be appropriately managed within these structures and by special attention in the definition of PRACE governance.

[10] In view of the variety of expertise which ought to be considered, we have decided not to subsume this section with the next on hosting sites. For instance software engineering expertise may come from industry or specialised SMEs.
[11] We use this rather vague term, since this applies irrespectively of the actual source of funds.

Minority partners

The governance bodies constitute a set of forums where the interest of minority partners can be represented, beyond the only means provided by the statutes in terms of voting rights, exit privileges and terms. The proper design and operation of these governance bodies is therefore essential. However this does not mean that minority partners should be given excessive rights, since this may jeopardise the involvement of the majority partners. In the case of PRACE "majority partners" could mean a subset or all Principal Partners as defined in the PRACE MoU [3] and Consortium Agreement [4].

Third parties

The responsibility of the governance bodies include exercising adequate control and delegating tasks to the executive management in order for the legal entity to be able to enter into contractual relationship and other transactions with third parties. This includes ensuring solvency and discharging the entity's liabilities within the agreed limits.
Protection of third parties and relations with third parties are usually defined by law and dependent on the form of legal entity selected. Publication of the legal entity statutes also contribute.

Personnel

It may be useful to ensure the representation of personel in the governance structure. This is also required by some laws and regulations, depending on the country and the size of the legal body.

Scientific users and scientific communities

In terms of scientific development several factors are of concern here:

- Definition and implementation of a credible strategy, at the leading edge of HPC installations
- Allocation of resources to the most promising projects
- Credibility of the infrastructure in the views of all recognised scientific communities
- Construction of a long term perspective, usually in the form of strategy oriented whitepapers or roadmaps, which are then used by scientific communities, scientific planners within the government and research institution for planning and programming.

A long term experience with multiple research infrastructures shows that "peer review" and established peer committees of excellent reputation are a key element for contributing to PRACE in order to achieve the above objectives. Making these committees independent is key for the credibility, and the basis for making them appear in the governance section.
The following governance bodies should therefore be investigated:

- Scientific oversight committee
- Scientific peer review committee
- Technical strategy committee

The purpose and charter of these bodies will be expanded later in the document.

Interests represented by independent members on board and committees

Independent members in the governance boards or committees, selected in view of their reputation and expertise, enable to constructively challenge and contribute to the development of a strategy. They could also scrutinise the performance of management in meeting agreed goals and objectives, or help in the compliance with complex regulations. Also some third parties or experts may be invited either permanently or when the subject at hand suggests.

2.4 PRACE Stakeholders

The PRACE organisation will have numerous stakeholders and a balance should be achieved between return on investment for stakeholders who financially contribute on the one hand, and a guarantee that the best European scientific and engineering projects will have access to the Tier-0 systems on the other. The diagram below describes the stakeholders considered.

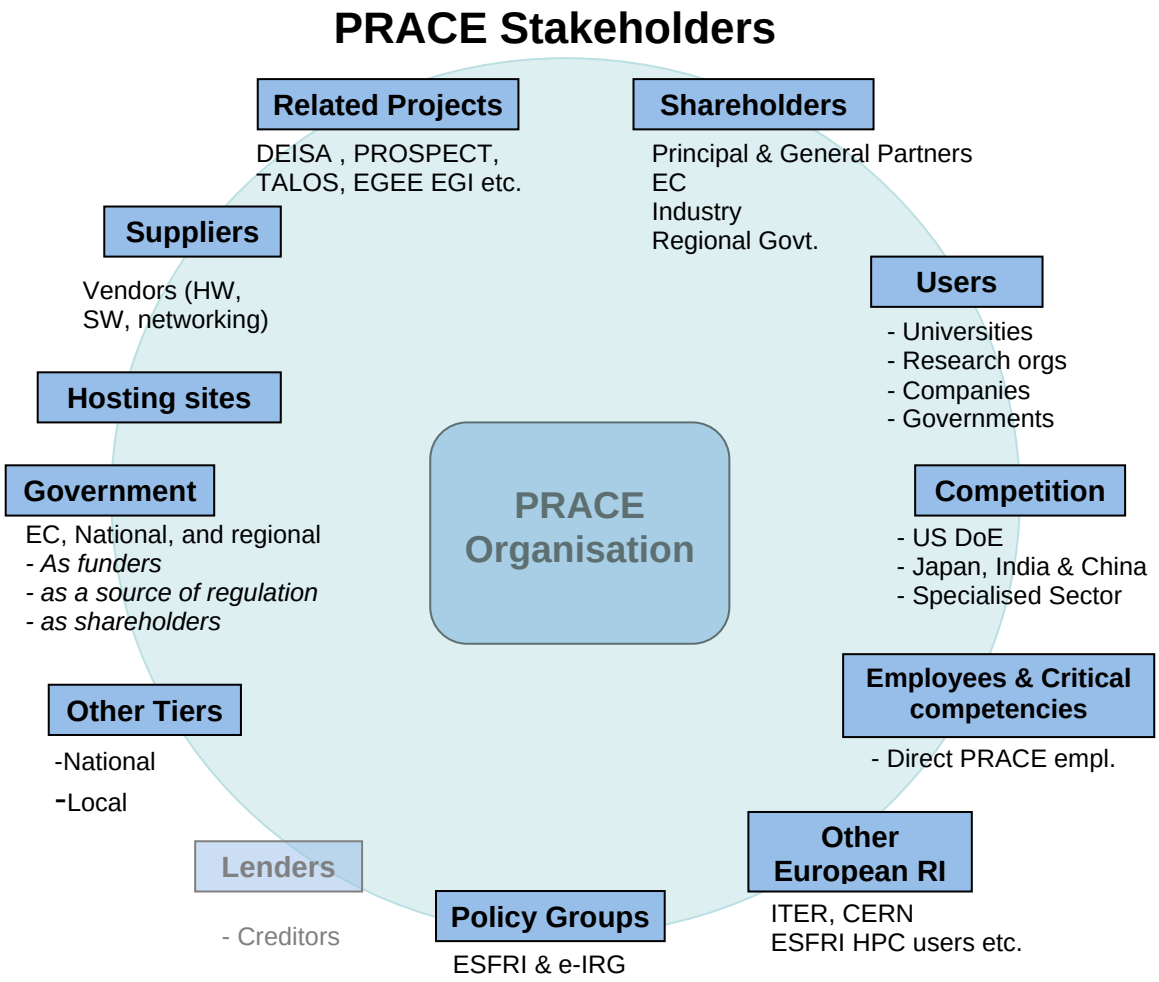

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Figure 1: PRACE Stakeholders

It is important to ensure that the legitimate interests of stakeholders are identified and taken into account in order to:

- Ensure credibility from the point of view of the research user communities
- Attract key employees
- Build key competencies within PRACE and within partners
- Facilitate good relations with other actors (Tier-1 and Tier-2, national research organisations and agencies)
- Ensure credibility from the point of view of funding and financing parties
- Ensure continued support from key policymakers, including member state governments and ministries in charge of research, European Commission.
- Ensure the common interest of all PRACE partners

Stakeholder interests must be balanced. This will be a compromise, since it is clear that different stakeholders have different objectives and interests. It should be emphasized that in order to deal with stakeholder interests, a variety of means are available, besides those embodied in the Governance.

- National and European laws and regulations[12],
- Enforcement of professional standards[13],
- Contractual means.[14]

With respect to these categories, most legal structures (national and European) are built with rather strict separation of concerns. The "Governance" and "Contract" deal with interests of specific parties, whereas the legal and standards means are of a general nature which can be appreciated with minimum knowledge of the specific involved parties.

The table below lists the stakeholders and briefly describes how they will be taken into account by PRACE governance. As a general rule, relations with stakeholders are greatly enhanced through transparency. Having the statues and rules of procedure of the governance bodies easily available (e.g. online) as well as information on financing and how the budget is divided and spent, annual reports etc.

Stakeholder	Interests and representation of stakeholder
Shareholders	Shareholders will be directly represented in the highest body of the governance structure
Users	Users will gain access through the peer-review process which will be monitored by the governance board as well as its results.

[12] Responsibilities, creditors, special accountability rules for using public (national or EC) funding.
[13] These are a ways to represent the interest of several stakeholders. Examples: accounting standards protect the interests of the treasury department (wrt taxes), human resources standards and regulations protect personnel etc.
[14] Examples may include cooperation contract (with supplier, other site, supplier of technology incl. DEISA, academic developers of know how, software, academic or industrial providers of training sessions etc.

	The science committee will also represent at a high level the interests of developing science in the long term and in a competitive fashion. This requires constructive interaction with the user communities, and will represent their collective long term interests.
Hosting Centers	Hosting centres bring important resources to the project, including expertise. Their investment in the national HPC resources will be leveraged by the project to reduce costs, avoid duplication of work, enable pre- and post- processing. The Hosting centres will receive facilities and other large investment of PRACE.
Competition	PRACE will monitor developments in the US and Asia through the Advanced HPC Technology Platform – reports will be made to the director and the governance board. PRACE is likely to seek cooperation with other large HPC research infrastructures, in areas of common interest.
Employees	Besides legal obligation and good practices in HR management, it is clear that the very ambitious goals of PRACE require motivating and managing a team of very talented people.
Key competencies	It is important for PRACE to interact with its environment and the European HPC ecosystem to ensure the development of key competencies. Methods vary: publishing requirements and specifications, tendering for prototypes and production systems, contractual risk sharing R&D. PRACE could also rely on, or influence, national and European policies in areas of R&D and higher education.
Other European RIs	PRACE will have contact with other European RIs through its participation in ESFRI, e-IRG and other forums hosted by the EC etc.
Policy Groups	Relations vary from PRACE using the information and views developed to compliance to policy framework. Also, PRACE should strive to be represented and to contribute to ICT and HPC related policy groups.
Other Tiers	National supercomputing centres are members of national and regional supercomputing networks and have close relationships with the other tiers.
Government	Governments shall be represented as shareholders/partners either through an appointed entity or directly by a governmental department or ministry.
Suppliers	Vendors will have no representation on the governance board, since it is expected to establish contractual relations with them. PRACE will establish/maintain contacts with vendors in order to represent long term needs, anticipate technological evolution, test new concepts and products, perform collaborative risk sharing projects including technology

	evaluation and development of innovative prototypes. Software and application code vendors: similar contacts and modes of interaction should be sought for Software and application code developers, including the private sector and notably innovative SMEs.
Related projects	It is anticipated that ad-hoc relations will be established with such projects.
Lenders	It is not yet clear whether lenders like the EIB will contribute to the PRACE budget. This may depend in the interest of funding shareholders to enter into such transactions.

2.5 Relationship Between Partners

PRACE will create a persistent pan-European high performance computing service and infrastructure. This infrastructure will be managed as a single European entity. European scientists and technologists will be provided with world-class leadership supercomputers with capabilities equal to or better than those available in the USA and Japan. The service will comprise three to five superior HPC centres strengthened by regional and national supercomputing centres working in tight collaboration through grid technologies.

The scope of this deliverable considers a range between two possible models for the PRACE organisation which have been discussed within WP2 and at the PRACE principal partners committee. These two extreme and oversimplified models are described in this section: the Cycles and the Operator models.
These models are very condensed by necessity and are only intended to help the project members visualize the manyfold parameters and their interactions, some being quantitative, others of organizational nature which will interact in evaluating any of the options. They have been included in the hope that they will be helpful to the readers and to establish a common language for collaborating on the project

Under the **Cycles Model** the hosting partners would be delegated the responsibility for designing, acquiring and operating the facilities and the supercomputers, taking into consideration the strategic needs of PRACE. The PRACE entity would perform processes for service definition, high level requirement analysis and contracting with the hosting partner.

Under the **Operator Model** the PRACE entity would be responsible for procurement and would own, house and operate the systems from its own budget.

The model used, or combination of models used will depend ultimately on a PRACE principal partners committee/management board decision. One possible situation is that the organisation would begin based on the cycles model and evolve in the general direction of the operator model in a period of 2-5 years.

General Model

The figure below represents the **General Model** for the funding and usage of PRACE and is compatible with both the Cycles and Operator models. The PRACE organisation may be relatively small, as in the cycles model or a lot larger including operational staff at each site, as in the Operator model.

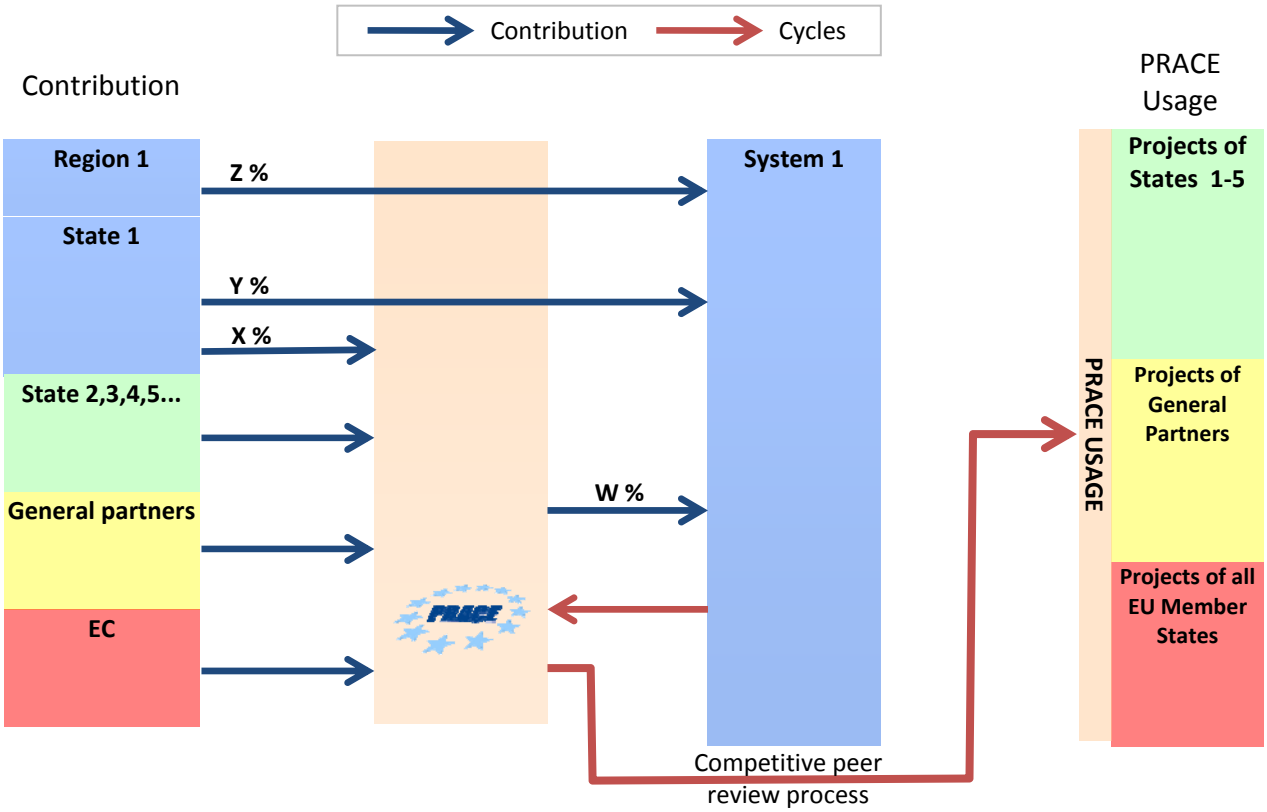


Figure 2: General Model

In both models, the following applies:

- System 1 will be followed by system 2, 3, 4, 5 etc. every x years, hosted by the principal partners on a rotational basis which will in time form a suite of 3-5 systems available at any one time to researchers.

- The contract signed between principal partners, general partners and EC will include clauses to cover obligations and rights of all partners (& EC) plus mechanisms to become or cease to be principal partner or general partner, as well as penalties for principal partners who leave PRACE under certain conditions.

- Within PRACE, there will be a single peer review processes for all proposals, but a) principal partners, b) general partners, c) all EU member states may have a proportion of PRACE computing time allocated to them. The details of this process will be defined within task 2.4 Establishment of the Peer Review Process.

- Contributions will be made by the principal partners, the general partners and the European Commission. Contribution may be in kind if appropriate and agreed. (e.g. software, work force etc.). Other contributions e.g. from industry may also be possible (not represented in the diagram), and will depend on the funding and usage model adopted.

Cycles Model

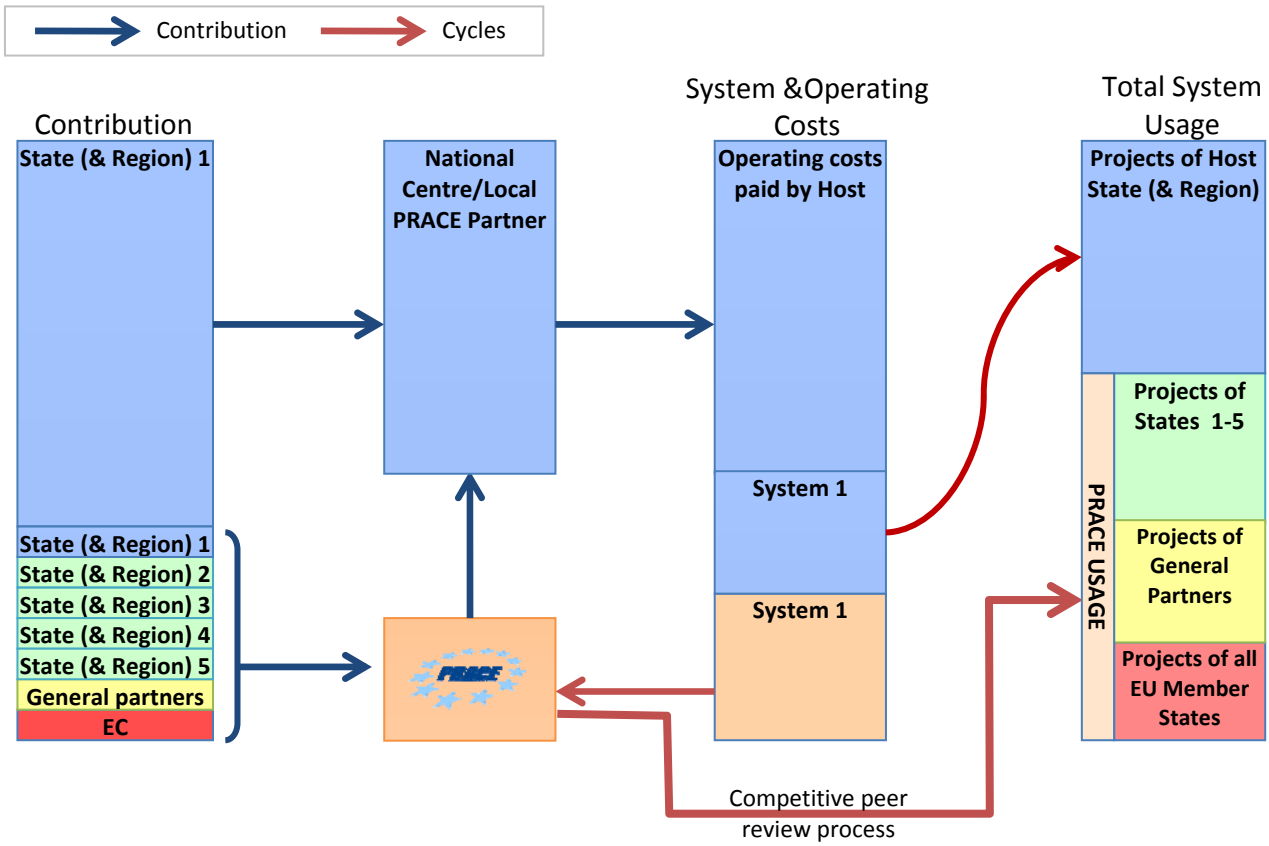


Figure 3: Cycles Model

- Procurement, installation and operation of each system mainly funded by host state (& regional govt. if appropriate) with contribution from EC and general partners.

- Principal partners give cycles to PRACE, not money. A certain percentage of each system's cycles will be kept for the host's national/regional use.

- PRACE will be responsible for:
  - managing the relationship with the host service provider,
  - peer review process for PRACE usage,
  - distributed system management.
  - Meeting user requirements as to which type of architectures are needed for PRACE infrastructure.

Operator Model

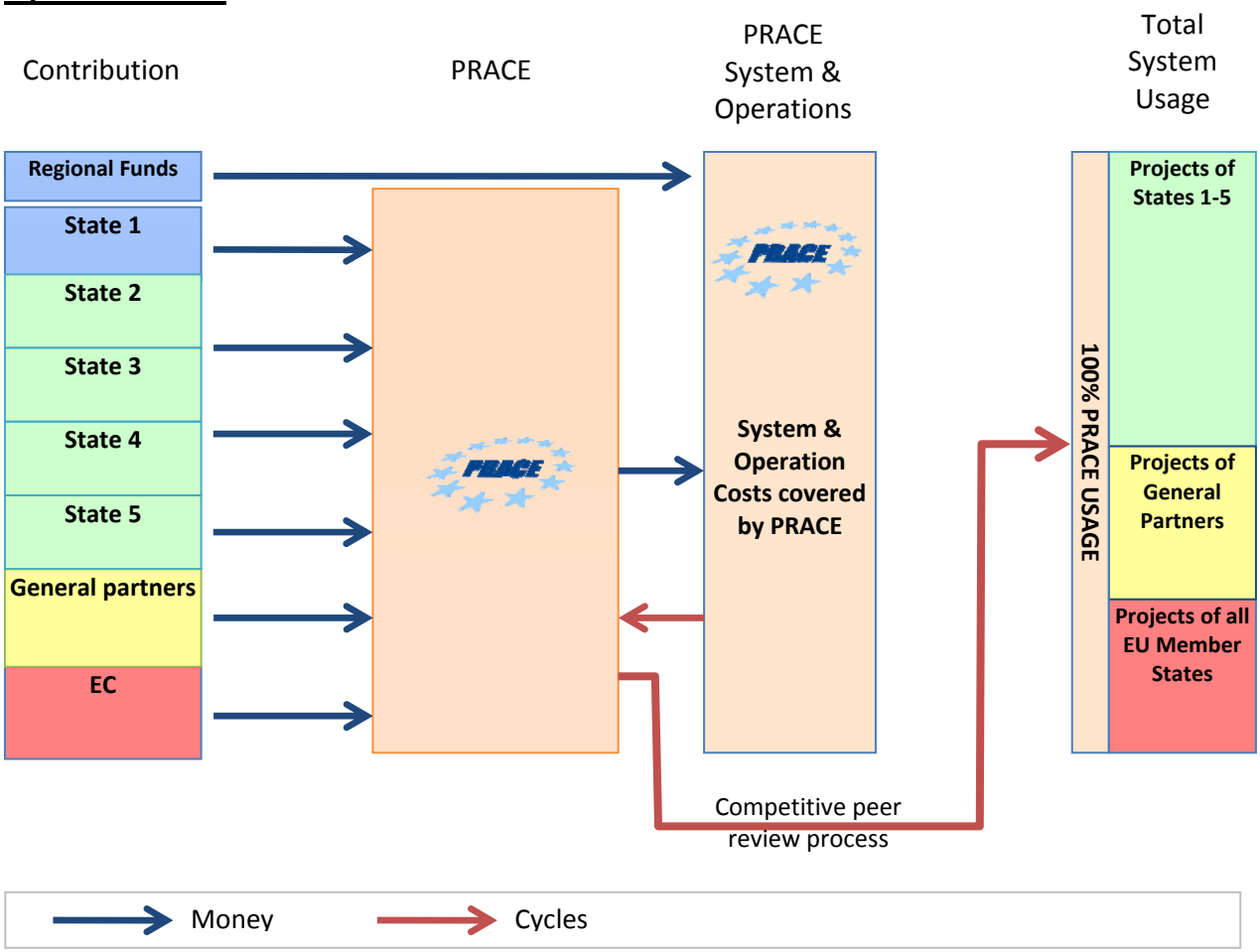


Figure 4: Operator Model

- PRACE will be responsible for:
  - procurement,
  - installation and operation of each system,
  - peer review process for PRACE usage,
  - distributed system management.
  - Meeting user requirements as to which type of architectures are needed for PRACE infrastructure.
  - Managing the above form yearly contributions from Principal and Genaral Partners and the EC.

- Part of contribution may be in kind if appropriate and agreed.

- Possible regional contribution may be used to top up national contribution for more expensive systems.

- Upgrades of systems would be funded by PRACE.

- If necessary, the distinction between principal and general partners may be replaced by a more suitable distinction better able to take into account the relative contributions of each member state. The usage distribution would then be modified accordingly.

2.6 Special Features of PRACE

The following two sections gather current facts on the PRACE partners that need to be borne in mind when considering a governance structure for PRACE. These facts will affect the ability of the members to take certain decisions quickly and autonomously and may be subject to change in the future.

2.6.1 *Organisational Aspects*

The PRACE infrastructure will be distributed across up to five different countries. Among the corresponding 3-5 principal partners of PRACE the present models of ownership and operation of supercomputers are also rather disparate.

a) Gauss (Germany)

The Gauss Centre for Supercomputing (GCS) is an alliance of the three national supercomputing centres into a virtual organisation enabled by an agreement between the Federal Ministry of Education and Research (BMBF) and the state ministries for research of Baden-Württemberg, Bayern, and Nordrhein-Westfalen from July 2006. It has the legal form of a "gemeinnütziger eingetragener Verein" (e.V.)[15].
Common activities and acquisitions require explicit agreements between the state and the federal governments. The GCS partners are the individual owners of the systems they acquire and they are separate partners in the PRACE project, but with only a single vote in the management boards and principal partners committee.

b) GENCI (France)

The Grand Equipement National de Calcul Intensif (GENCI) is a publicly owned organisation with private statutes ("Société Civile" under French law) half owned by the French state, CEA and CNRS hold 20% each and 10% are held by the universities. Concerning French national HPC systems for public research, GENCI finances the acquisition and owns the systems. In order to effect a transition with the situation before the creation of GENCI, interim solutions have been used whereby partners have granted GENCI in kind contribution in the form of bulk access time. Starting in 2009, GENCI will coordinates the peer review processes for access to these machines.

For the PRACE Project, GENCI coordinates the French partners and a specific agreement has been concluded for this purpose.

In order to propose a common site for the PRACE system to be hosted in France, CEA and CNRS have concluded an agreement also known as "Centre National Jacques Louis LIONS". One of the sites covered by this agreement, CEA/TGCC in Bruyères le Chatel, has been proposed by GENCI acting as the PRACE coordinator for France.

[15] Eingetragener Verein or e.V. ("registered association") is a legal status for a registered association in Germany. While any group may be called a Verein, registration as „eingetragener Verein" gives the legal personality.

c) EPSRC (Great Britain)

The Engineering and Physical Sciences Research Council (EPSRC) is the main UK government agency for funding research and training in engineering and the physical sciences, investing around £740 million a year in a broad range of subjects - from mathematics to materials science, and from information technology to structural engineering.
EPSRC, often working in partnership with other UK Research Councils, procures and funds the large national high performance computing services for academic usage. It subcontracts operation and user support to national supercomputing centres which are also third party subcontractors to PRACE. In 2008 EPSRC, along with NERC and BBSRC, was supporting two such national services HECToR and HPCx.

d) BSC (Spain)

Barcelona Supercomputing Center – Centro Nacional de Supercomputación (BSC-CNS) is the National Supercomputing Facility in Spain. The BSC is the only Spanish organisation involved in PRACE and acquires, owns, operates and supports their systems. The BSC is a public consortium with participation of The Spanish Ministry of Science and Innovation (51%), The Catalan Regional Government (37%) and the Technical University of Catalonia (12%). The BSC receives direct funding from the Ministry and the Generalitat and a significant part of its income comes from competitive projects funded at both national and European level as well as projects carried out with industry.

e) NCF (The Netherlands)

Nationale Computerfaciliteiten (NCF) is an independent foundation financed by the Dutch Organisation for Scientific Research - NWO. NCF is responsible for the strategy and development of the ICT infrastructure in The Netherlands. Procurement of systems is done in cooperation with SARA, the third party subcontractor that operates the largest national supercomputers and also gives support to users.

f) General Partners

Taking into account the PRACE general partners is essential to achieve the goals of PRACE of developing HPC in Europe. They are both an essential constituency, and are extremely important contributors both with respect to HPC operation and procurement and in the area of leading HPC application to science and technology. The contributions of the General Partners may vary, depending on the funding model chosen, with some general partners paying more into the budget than others and some consideration of the financial contribution given should be reflected in voting rights.

g) European Commission (EC)

It is not clear whether the EC will be represented in the governance bodies or not. This depends on the legal capacity of the Commission, and of its willingness to be directly involved or remain a separate source of funding. The current draft of the ERI [2] document gives the impression that they would not, since they would assume the roles

of evaluator and regulatory body. In the latter role, according to the same document, the EC would have to approve the PRACE statutes and any future amendments to them. The PRACE ERI would also be required to submit an annual report to the EC. If they were not satisfied with the report they would be able to request changes in the organisation, which if not fulfilled, could result in the ERI status being removed from PRACE.

2.6.2 *Operational Aspects*

The three to five European supercomputing systems that PRACE finally aims at lead to a quasi continuous procurement process. This differs from other large European organisations where large infrastructures are operated for many years.

PRACE is also quite singular among Research Infrastructures in the sense that it there are no impediments to collocate PRACE equipment at existing HPC facilities. This makes it desirable to use existing facilities as hosting centres, permitting sharing of expertise, competencies and some functions of the centres. This should facilitate setting up the PRACE infrastructure, since it is not required to build everything from scratch. However, it must be noted that the level of performance may only come with large computer rooms, electrical supplies and corresponding cooling equipment.

3 Governance Structures of Comparable Organisations

With the aim of examining the options available to PRACE, various organisations have been selected and grouped into international, European and national entities, and their governance structures have been analysed.

National examples have been included from the five principal partners, reviewing the governance structure of the legal form on the aspects considered most relevant for the PRACE organisation, in order to examine the extent to which the governance structure is conditioned by the legal form.

A short description of the governance structure of each example is followed by a diagram of the main bodies. A conclusion is then made including possible lessons learned which may be applicable to PRACE. An annex contains more information about the bodies, powers and procedures of the governance structure of each example.

3.1 International: governed by international laws

International organisations are established through an intergovernmental agreement and are governed by international law. Several partner countries draw up a treaty establishing the nature and powers of the new organisation. This form is required for very big projects supported by many countries including non-European ones, such as ITER. "Such treaty or convention results from heavy and lengthy procedures which can be justified only for very large international research infrastructures requiring very large investments. The governance structure (Director General and Council) is very robust with a clear line of authority and liability covering scientific, technical and administrative aspects of the facility."[16] CERN was the first European research organisation to be established under international law, in 1954. It seems doubtful that the international legal form is appropriate for PRACE, however, an examination of examples supplies information on proven governance structures for research infrastructures in which multiple countries participate.

3.1.1 *CERN*

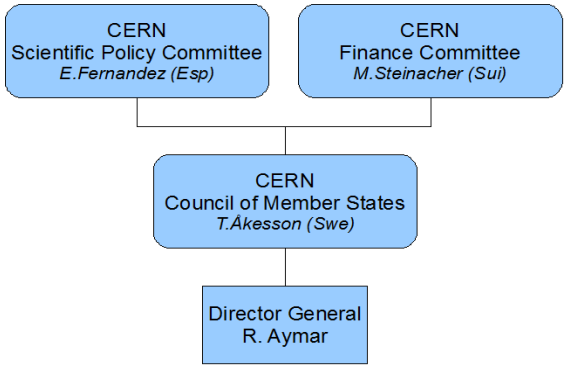
Objective/Activity	Particle physics research facility
Legal form	International Treaty
nº Countries involved	20 European member states
Contribution 2008	Germany 19.40%, United Kingdom 17.35%, France 14.92%, Italy 11.43%, Spain 8.34%, Netherlands 4.51%, Switzerland 3.03%, Belgium 2.74%, Norway 2.70%, Sweden 2.56%, Poland 2.30%, Austria 2.19%, Greece 1.83%, Denmark 1.82%, Finland 1.40%, Portugal 1.12%, Czech Republic 0.96%, Hungary 0.83%, Slovak Republic 0.37%, Bulgaria 0.20%
nº staff	2500
Annual Budget (2008)	910.9 million CHF
Physical Infrastructure	Situated in the northwest suburbs of Geneva on the Franco-Swiss border

[16] Report of the Workshop on the Legal forms of research infrastructures of pan-European interests 23 March 2006, Brussels - Organised by the European Strategy Forum on Research Infrastructures in collaboration with the European Commission, Directorate General for Research

a) Brief Description of Governance Structure

The CERN Council is the highest authority of the Organization and has responsibility for all-important decisions. It controls CERN's activities in scientific, technical and administrative matters. The Council approves programmes of activity, adopts the budgets and reviews expenditure.

The Council is assisted by the Scientific Policy Committee and the Finance Committee.
The Director-General, appointed by the Council, manages the CERN Laboratory. He is assisted by a Directorate and runs the Laboratory through a structure of Departments.



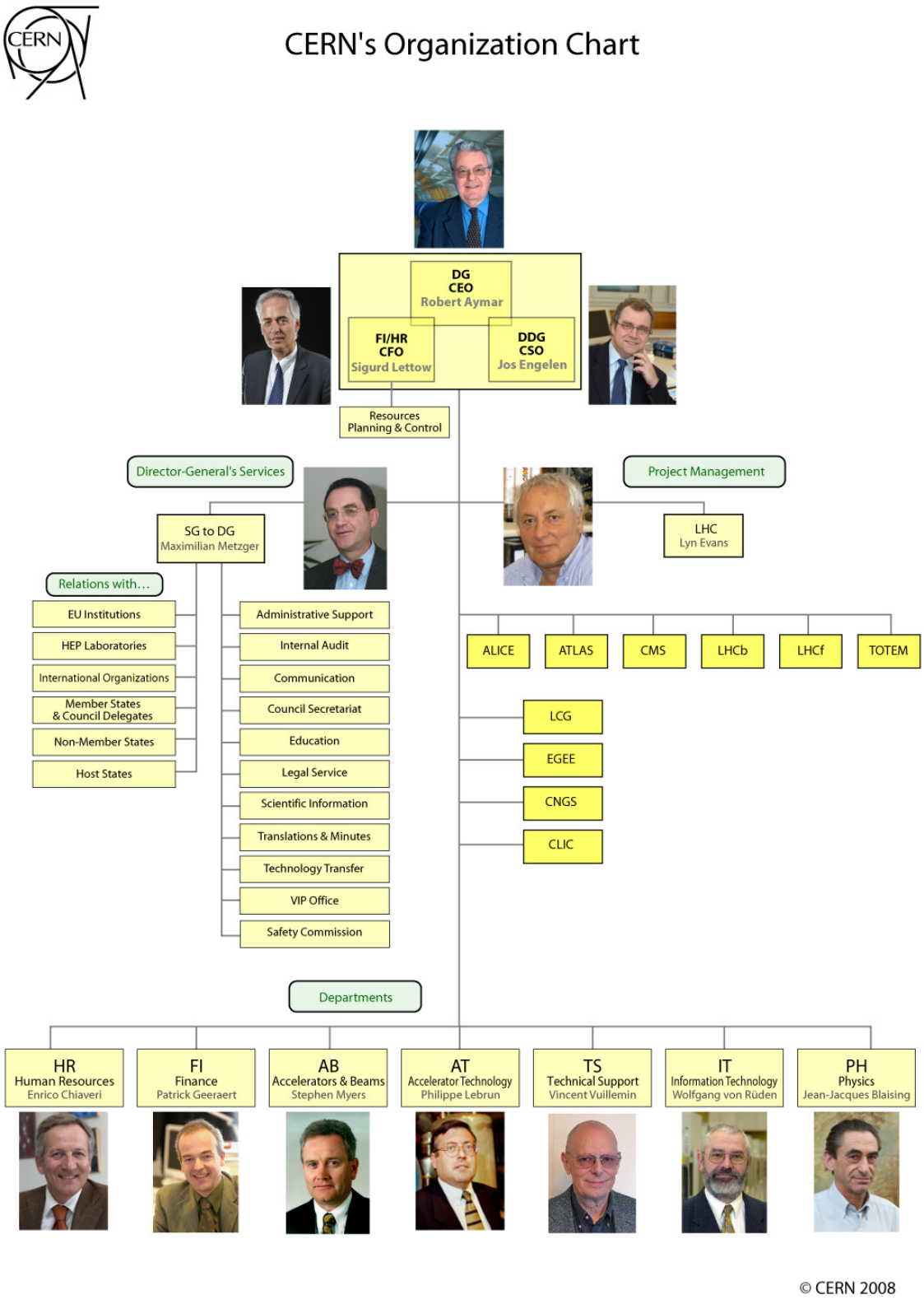
The **Member States** represented in the council, the scientific committee and the finance committee are listed below with their normalized contributions to the CERN budget in %. The 2008 Budget was 910.90 Million CHF.

Austria	2.19	Finland	1.40	Italy	11.43	Slovak Republic	0.37
Belgium	2.74	France	14.92	Netherlands	4.51	Spain	8.34
Bulgaria	0.20	Germany	19.40	Norway	2.70	Sweden	2.56
Czech Republc	0.96	Greece	1.83	Poland	2.30	Switzerland	3.03
Denmark	1.82	Hungary	0.83	Portugal	1.12	United Kingdom	17.35

Observer States and Organizations currently involved in CERN programmes are: the European Commission, India, Israel, Japan, the Russian Federation, Turkey, UNESCO and the USA. Observer status allows non-member states to attend Council meetings and to receive Council documents, without taking part in the decision-making procedures of the Organization.

Non-Member States currently involved in CERN programmes with no additional rights are: Algeria, Argentina, Armenia, Australia, Azerbaijan, Belarus, Brazil, Canada, Chile, China, Colombia, Croatia, Cuba, Cyprus, Estonia, Georgia, Iceland, Iran, Ireland, Lithuania, Mexico, Montenegro, Morocco, New Zealand, Pakistan, Peru, Romania, Serbia, Slovenia, South Africa, South Korea, Taiwan, Thailand, Ukraine and Vietnam.

b) Organization Chart



The currently active Physics experiments and large projects directly report to the DG's office.

c) Relevance to PRACE

The top governing body of CERN is the council of member states, with two dedicated bodies advising this body concerning finance and scientific policy. It makes sense for such a large organization to structure its governance in such a way, where the members in the council are usually funding bodies of the individual countries or decision makers on the political level. The internal structure of CERN is relatively flat, assuring short reporting lines. The DG's Services host all external services in one place.

Since there are just a few departments, these tend to be large and relatively disconnected from one another. There is a risk that this results in inefficiencies (like duplication of work) since the communication between these departments happens at the highest levels only. For the same reason there is a risk of uncoordinated communications and external interactions directly by the departments instead of through the DG's services.

Similarities

PRACE and CERN both have member states as their partners and the CERN council is very well connected to their state's ministries at the highest levels. Funding is approved every year by the council.

The CERN council is equivalent to the current PRACE management board. The highest governing body will be most probably also such a council in the future PRACE infrastructure. The idea of advising boards especially for finance should be also considered by PRACE, e.g. for HPC technology, infrastructure or science.

A relatively flat internal organization like for CERN could be a suitable model also for PRACE, especially since PRACE will be much smaller, so most risks and weaknesses stemming from this model would not be present.

Differences

Under the CERN cost model, the larger states pay the larger contributions whereas the size of a country is not a criteria on which you can become a Principal Partner in PRACE – it is the willingness and ability to host a Tier-0 centre. CERN has no concept of 'principal' partners, all partners have the same rights. But there is a mechanism of fairness, by which CERN acquisitions should follow the partner contributions, i.e. if possible, high-tech items will be ordered from industries in the member states such that in percentual distribution, they match the partner contributions.

There is no need for a peer review to allocate the resources as CERN serves a single scientific domain. The scientific policy committee will advise the council on matters of scientific relevance.

3.1.2 *EMBL*

Objective/Activity	Molecular biology research facility
Legal form	International Treaty
nº Countries involved	20
Contribution 2007	Austria 2,2 %,Belgium 2,7 %,Denmark 1,7 %,Finland 1,4 %,France 15,9 %,Germany 21,9 %,Greece 1,5 %,Israel 1,2 %,Italy 13,0 %,Netherlands 4,4 %,Norway 2,0 %,Portugal 1,2 %,Spain 7,0 %,Sweden 2,7 %,Switzerland 3,3 %,United Kingdom 18,0 %,
nº staff	More than 1400 people from 60 nations currently work at EMBL
Annual Budget	2007 – almost 72 million Euros
Physical Infrastructure	The Laboratory operates from five sites: the main Laboratory in Heidelberg, and Outstations in Hinxton (the European Bioinformatics Institute), Grenoble, Hamburg, and Monterotondo near Rome.

a) Brief Description of Governance Structure

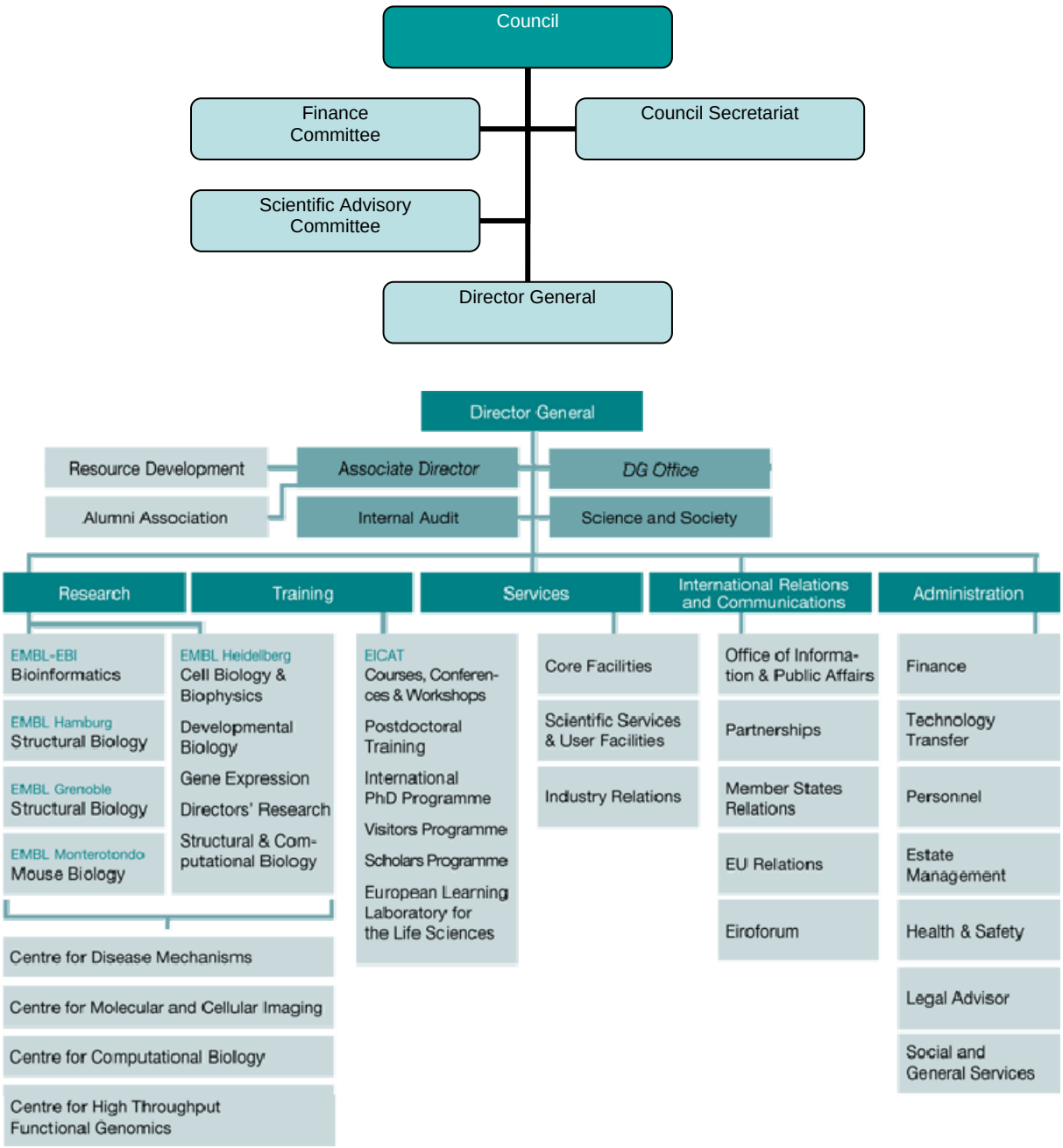
EMBL (The European Molecular Biology Laboratory) is an inter-governmental organisation with 20 member states and one associate member, that is led by the Director General, Prof. Iain Mattaj, appointed by the EMBL Council.

The Council is composed of all Member States of the Laboratory. Each Member State is represented by up to two delegates, who may be accompanied by advisers. The Council ensures that the financial requirements of the agreement establishing the EMBL and of the agreements with Host Member States are complied with.

The Finance Committee assists the Council in the financial management and control of the EMBL. The Council also establishes a Scientific Advisory Committee that gives advice to the Council, in particular with regard to proposals from the Director General on the realisation of the programme of the Laboratory. The Scientific Advisory Committee is composed of distinguished scientists appointed in their own right, not as representatives of Member States.

The Director General is supported by a Directorate.

b) Organization Chart



c) Relevance to PRACE

The Finance Committee is a feature PRACE could implement in order to improve the quality of the governance. The major difference is no principal partner or general partner classification for the member states. Decisions are taken in the Council assembly and are based on majority (the annual budget adoption needs a majority of two-thirds of member states present and voting, see governance description). There is no restricted committee where the major contributors take decisions. The Council is equivalent to the present MB of PRACE initiative.

3.2 National: companies and foundations

One example has been taken from each of the principal partner countries, given that, if the ERI legal form is not ready at the end of 2009 or is deemed to be inappropriate for PRACE, it is likely that the seat of PRACE will be in a principal partner country.

3.2.1 *ESRF (France)*

Objective/Activity	Synchrotron research facility
Legal form	Société Civile
nº Countries involved	18
Contribution 2007	27.5% France, 25.5% Germany, 15% Italy, 14% United Kingdom, 4% Spain, 4% Switzerland, 6% Benesync (Belgium, The Netherlands), 4% Nordsync, (Denmark, Finland, Norway, Sweden), 1% Portugal, 1% Israel, 1% Austria, 1% Poland, 0.47% Czech Republic, 0.2% Hungary
nº staff	Over 600
Annual Budget 2007	80 million Euro
Physical Infrastructure	Grenoble, France.

a) Brief Description of Governance Structure

The organs of the **ESRF** (*European Synchrotron Radiation Facility*) Company are the **Council** and the **Director General**. The Council is made up of eight delegations (B and NL on the one hand, DK, FI, N and S on the other have formed consortia BENESYNC and NORDSYNC, respectively) and acts as the assembly of the Members of the Société Civile.

An important option selected by ESRF was to require a minimum share and therefore contribution for participating, which has prompted the creation of consortia between small contributors (BENESYNC and NORDSYNC)[17].

It decides on important policy issues and the annual budget. The Council appoints the Director General and any further Directors, and may issue instructions to the Director General.

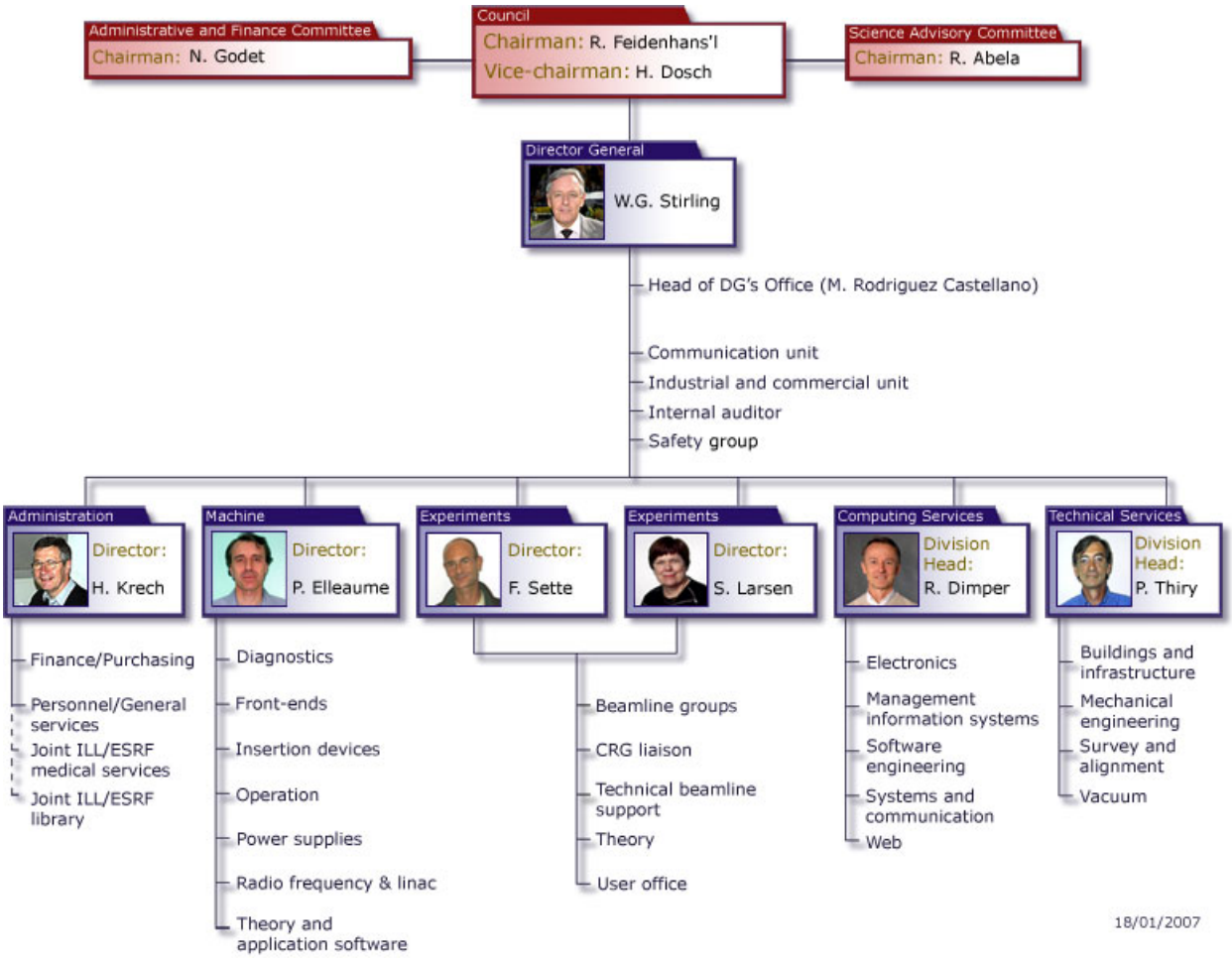
The Director General is the chief executive of the ESRF Company and its legal representative. He is assisted by the Directors (currently four: Machine, 2 × Research, Administration). Together with the Heads of the Computing Services Division and of the Technical Services Division, they form the Management Board of the ESRF.

The Council is assisted by an Administrative and Finance Committee (two delegates per Contracting Party), which now also assumes the roles of the in principle separate Purchasing and Audit Committees. Council and Management are assisted by a Science Advisory

[17] See http://www.esrf.eu/Decouvrir/Compagnie/Membres/MembresEtAssocies

Committee made up of 23 scientists, representing the various scientific areas covered by the ESRF.

b) Organization Chart



c) Relevance to PRACE

The use of the administrative and finance and science advisory committees help the Council in its decisions and help to guarantee good governance. Similarities with PRACE include the fact that many European countries are represented in the Council, however, the research facility is at a unique site at Grenoble. One feature which may be interesting to consider is the existence of consortia of smaller countries that would not be able to reach the minimum participation alone. This may be an option for smaller PRACE partners should a minimum participation limit be fixed.

3.2.2 *XFEL (Germany)*

Objective/Activity	X-ray laser research facility
Legal form	GmbH
nº Countries involved	14
Contribution 2007	
nº staff	
Annual Budget 2007	
Physical Infrastructure	The XFEL is planned to run 3.4 km underground from the DESY site, in the quarter Bahrenfeld of Hamburg, to the town of Schenefeld where a new XFEL research facility is to be constructed.

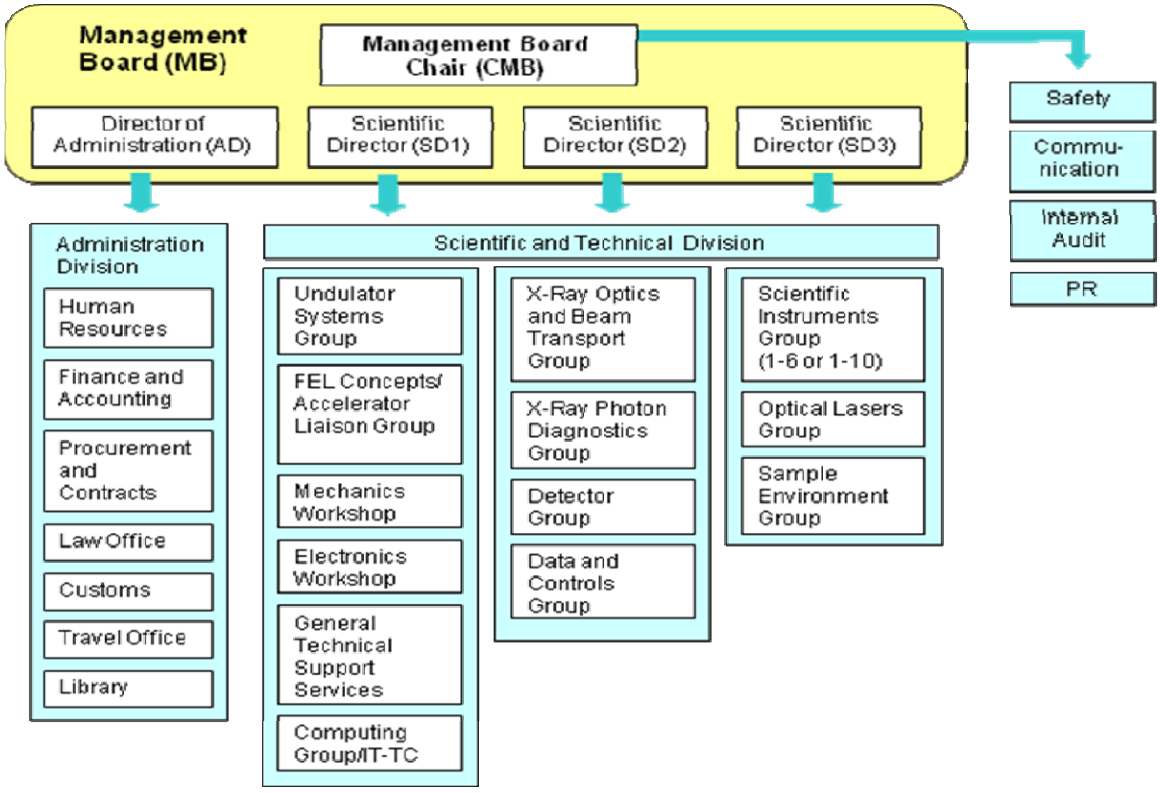
The XFEL is a new international large-scale research infrastructure to be built in the northwest of Hamburg, Germany. It shall enable extremely brilliant ultra-short pulses of spatially coherent X-rays with wavelengths down to 0.1 nm that can be exploited at ten experimental stations. Operated as a user facility, the XFEL is expected to provide novel results of fundamental importance in material sciences, plasma physics, planetary sciences and astrophysics, chemistry, structural biology and biochemistry, with significant effect on applied and industrial research.[18]

a) Brief Description of Governance Structure

According to the draft Convention and Articles of Association the organs of the XFEL Company shall be a Council (= Shareholders' Assembly) and a Management Board chaired by the Management Board Chair. The Council shall decide on important policy issues and the annual budget. The Council appoints the Management Board Chair and, if appropriate, further Scientific / Technical Directors and may issue instructions to the Management Board. The Managing Directors shall be the chief executives of the XFEL Company and its legal representatives. Council and Management shall be assisted by a Science Advisory Committee of up to 15 scientists representing the various scientific areas covered by the XFEL facility and by a Machine Advisory Committee of up to 10 members to give advice on relevant technical matters.
The 14 main partners will be: China, Denmark, France, Germany, Greece, Hungary, Italy, Poland, Russia, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

[18] **ATTENTION: Since the convention is still not signed by the shareholders, all information is provided with reservations.**

b) Organization Chart



c) Relevance to PRACE

XFEL is similar to PRACE in that many European countries are represented in the council and it is mainly financed by the member states. Differences include the fact that XFEL will be an international research infrastructure on a single site in Germany.

3.2.3 *Diamond Light Source (UK)*

Objective/Activity	Synchrotron research facility
Legal form	Joint Venture Company
nº Countries involved	Only UK UK Government via the Science and Technology Facilities Council, and by the Wellcome Trust in a ratio of 86%:14% respectively.
Contribution 2007-2008	86% STFC, 14% Wellcome Trust
nº staff	352
Annual Budget 2007	(Apr 2007 - Mar 2008) £51.8m (£27.1m for operations and £24.7m for construction)
Physical Infrastructure	Diamond is located on the Harwell Science and Innovation Campus near Didcot, Oxfordshire.

The UK Government via the Science & Technology Facilities Council (formerly CCLRC) and the Wellcome Trust agreed a partnership to build and operate the Diamond synchrotron on 27th March 2002. A Joint Venture Company (JVC), Diamond Light Source Ltd, was then established to run this mission led by its Chief Executive, Professor Gerhard Materlik.

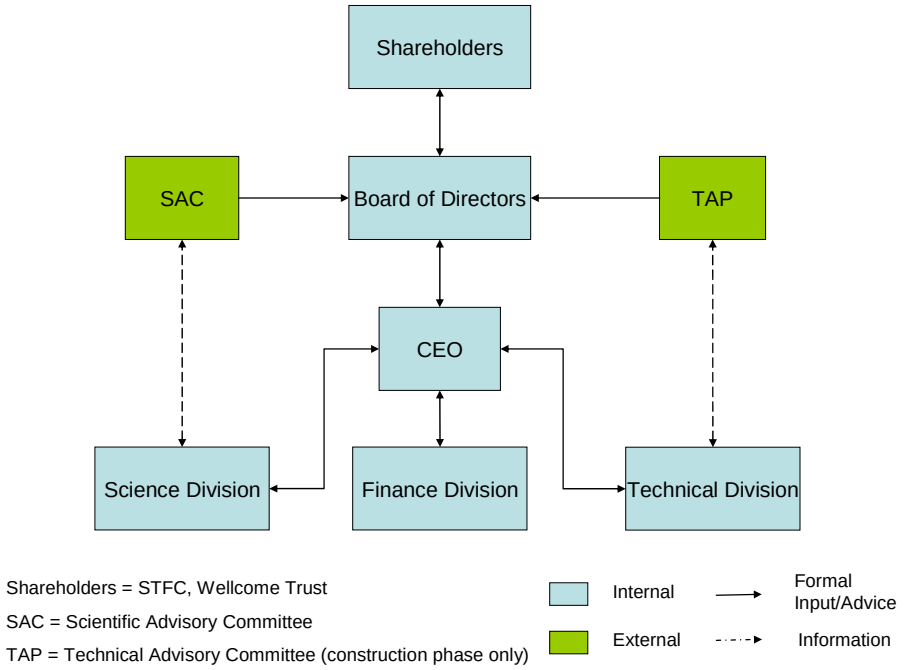
A JVC was chosen as it is a separate entity, limited by shares, which allows all potential funding partners to participate fully in the project in a manner which reflects their contributions. The shareholders of the company are the Science & Technology Facilities Council (STFC), who own 86%, and the Wellcome Trust, who own 14%.

a) Brief Description of Governance Structure

There is a Board of Directors who are appointed by the Shareholders. The Chair of the Board is independent of the Shareholders and the funders. The Board appoint the CEO as an executive member of the board. The Board receives input and advice from a Scientific Advisory Committee (SAC) and, during the construction phase of the facility, a Technical Advisory Panel (TAP). The Board makes recommendations to the Shareholders who make the final decision on matters relating to budgets and forward plans.

b) Organization Chart

The chart below summarises the organisation of the governance structure for the Diamond Light Source.



c) Relevance to PRACE

The shareholders within DLS are STFC (a UK research council, government funded non-departmental public body) and the Wellcome Trust (a UK biomedical research charity) which is the main distinction between PRACE and DLS. One consequence of having such an arrangement was that during the construction phase a European Court ruling led to a change in the tax status of the project (due to the fact that it was a company which involved a non-government funder) which led to Her Majesty's Revenue and Customs charging VAT on the entire phase 1 construction of the project.

Another potential difference is that within PRACE it is envisaged that the board will be primarily made up from the shareholders and there would be very few decisions that the board would have to refer to the shareholders to decide directly upon, whereas with Diamond the final sign off for many things is still carried out by the shareholders who are very much in the minority on the board.

The involvement of a non-government funding body led to a joint venture company being established, which then had tax repercussions for the construction phase of Diamond. It is not envisaged that any of the "shareholders" in PRACE will be non-governmental bodies and as such there may well be more suitable alternatives to the JVC approach.

3.2.4 *DNW German-Dutch Wind Tunnels (Netherlands)*

Objective/Activity	Aerodynamic and aero-acoustic testing facility
Legal form	DNW is a non-profit foundation under Dutch law
nº Countries involved	Two
Financial Contribution	
nº staff	120
Annual Budget 2008 (or 2007)	
Physical Infrastructure	Situated in a number of locations in the Netherlands and Germany: Noordoostpolder, Amsterdam, Braunschweig, Göttingen and Cologne.

a) Brief Description of Governance Structure

For efficient and flexible operations, DNW operates in a decentralized structure under a unified management and supervision. The seat of its Management is in the Noordoostpolder, The Netherlands, at the location of its largest wind tunnel. DNW's Board, the supervisory body of the Foundation, consists of representatives of the parent institutes - Dutch National Aerospace Laboratory (NLR) and German Aerospace Center (DLR), and is complemented by representatives of the relevant ministries from Germany and The Netherlands.

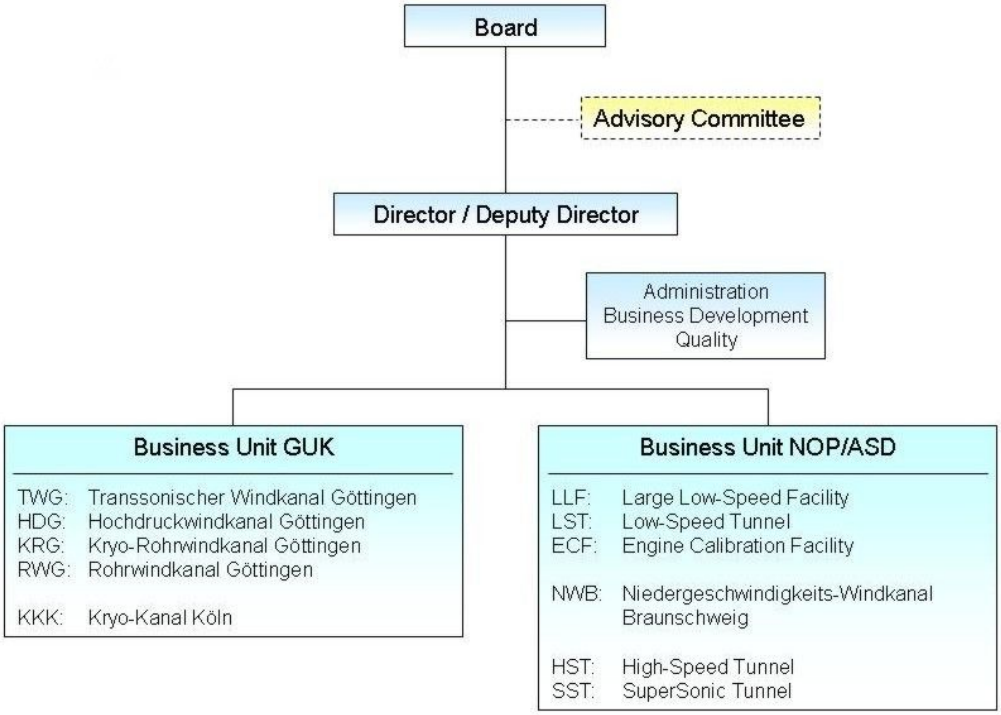
In order to assure the compatibility of DNW's development strategy with the long-term needs of the aerospace research and industry, an Advisory Committeee consisting of high-level representatives of participants of research and industrial actors provides strategic advice and information to DNW.

Board of DNW The Board of the Foundation is formed from members appointed by NLR, DLR, and the German and Dutch governments. At the end of 2007, the Board consisted of eight members plus a secretary.

Advisory Committee The Advisory Committee, representing the aerospace industry and research establishments, advises the Board of DNW about the industry's long-term needs. At the end of 2007, the Advisory Committee consisted of nine members.

Management DNW is managed by a Board of Directors consisting of a Director and a Deputy Director.

b) Organization Chart



c) Relevance to PRACE

The DNW infrastructure is divided over various sites and two countries as will the PRACE infrastructure. The existence of an advisory committee in DNW governance structure may also be an option for PRACE in order to make the board aware of research and industry's long-term needs.

3.2.5 *Instituto de Astrofísica de Canarias (Spain)*

Objective/Activity	Astrophysics research centre and operator of the International Observatories at the Canary Islands, Spain.
Legal form	The IAC is constituted administratively as a Public Consortium, created by statute in 1982, with involvement from the Spanish Government, the Government of the Canary Islands, the University of La Laguna and Spain's Science Research Council (CSIC).
nº Countries involved	The IAC is a Spanish public institution. However, in 1979 Spain internationalized the observatories of the IAC through the "Agreements on Co-operation in Astrophysics", and more than 50 research institutions from 19 countries (mainly European countries) have installed here their telescopes. This International community is well consolidated with committees and sub-committees and a common services budget.
Contribution 2007	The IAC budget is yearly supported by the Spanish National Government (around 70%) and the Regional Government of the Canary Islands (around 30%). Apart from this budgetary contribution, the IAC receives also every year an important contribution derived from its participation in national and international projects funded mainly by the National Programme for Research and Technology Development and the EC Framework Programmes for RTD. Some funds are also received as a result of contracts and services with external entities.
nº staff	Total: 372 (2007 figures) -. Researchers: 117 -. Engineers and technical satff: 136 -. Administration: 60 -. Graduate students: 59. There is own staff belonging and paid by the IAC as personnel of the Spanish National Public Administration, and staff directly paid by the other members of the IAC consortium: the Autonomous Community of the Canary Islands, the University of La Laguna and Spain's Science Research Council (Consejo Superior de Investigaciones Científicas, or CSIC).
Annual Budget 2007	Total 2007 expenditure budget: 26.390.430 EUR. Origin of this expenditure budget: • Budgetary funds: 58,1% (Spanish National Government and the Regional Government of the Canary Islands) • External funding (projects, contracts, services, …): 41,9%
Physical Infrastructure	The IAC has a main HQ in La Laguna (Tenerife), with offices, laboratories, workshops, etc; and another Headquarter, Centro de Astrofísica de La Palma (CALP), in Breña Baja (La Palma). La Palma supercomputer, one of the seven nodes of the Spanish Supercomputing Network (coordinated from the Barcelona Supercomputing Center – BSC), is located here, at the CALP. The IAC operates also two internationalised Observatories: Roque de los Muchachos Observatory (ORM, La Palma) and Teide Observatory (OT, Tenerife). Both are located around 2.400 metres above sea level, with excelent conditions for day- and night-time astrophysical observations.

The Instituto de Astrofísica de Canarias (IAC) is an internationalized Spanish research centre. It has two headquarters and two observatories set in an environment of excellent astronomical quality; constituting the European Northern Observatory (ENO).

a) Brief Description of Governance Structure

The organisation was created in 1982 as a Public Consortium, with its own legal personality and made up of the following participants:

- Administration of the Spanish State
- Regional Government of the Canary Islands
- University of La Laguna
- Spain's Science Research Council (Consejo Superior de Investigaciones Científicas, CSIC)

From the administrative point of view, but being an autonomous entity, the IAC is dependent from the Spanish Ministry of Science and Innovation.

Directive bodies of the IAC:

1. **Governance Board:** (decision-making body for administrative and economic matters), made up of:

   PRESIDENT: -. *Minister of Science and Innovation.*

   VOTING MEMBERS: -. *President of the Government of the Canaries.*

   -. *A representative of the National Government*

   - at least at the level of Undersecretary, nominated by the President of the IAC Board, following a proposal of the Ministry of the President of the National Government.

   -. *Rector of the University of La Laguna*

   -. *President of the CSIC.*

   -. *Director of the IAC* (acting also as Secretary).

- **Directorate** (the decision-making body for science and technology), the executive organ of the Board, which oversees the whole of the IAC.

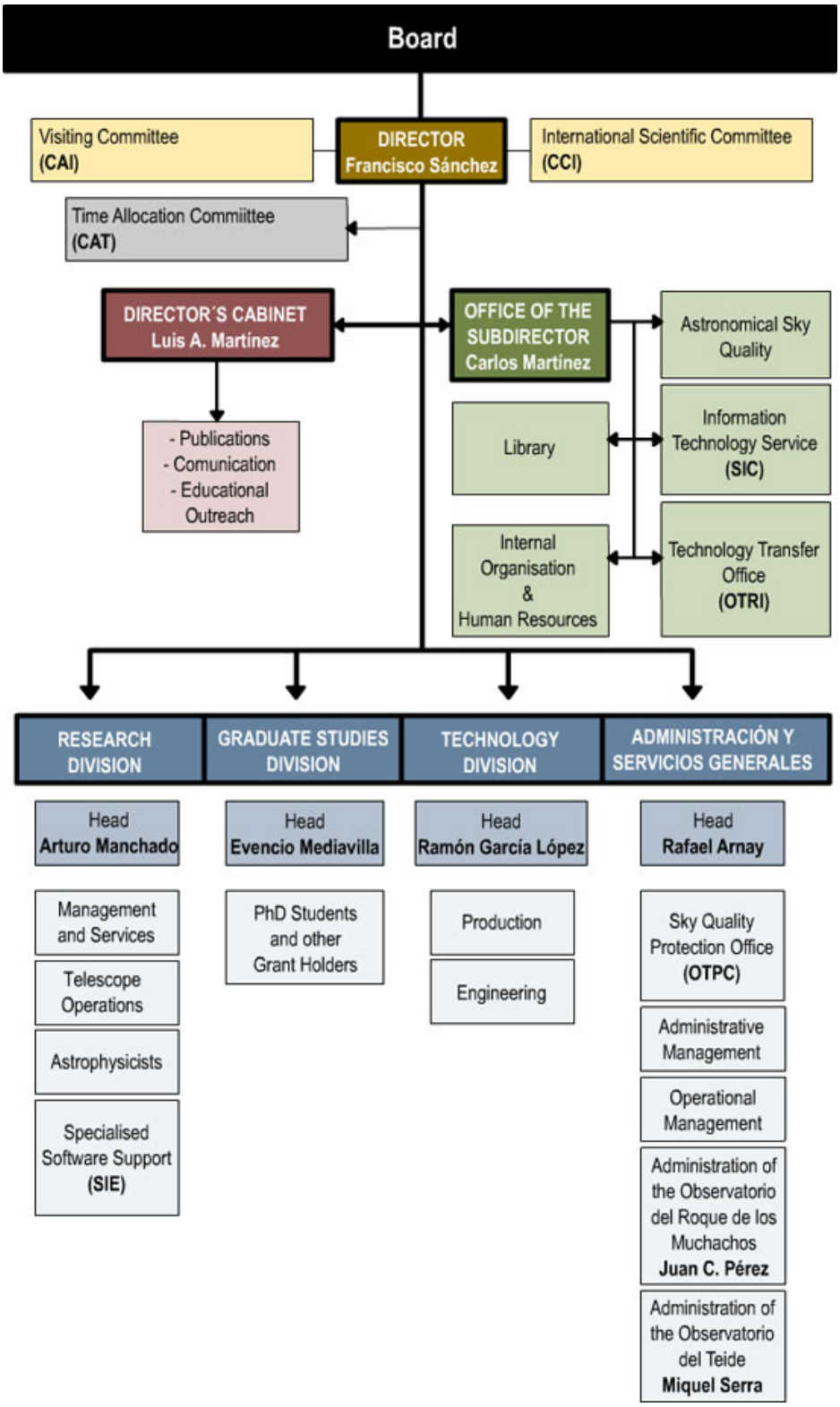
The IAC is structured into four different Divisions: Research, Technology, Graduate Studies and General Administration.

Four committees are created and foreseen by the statutes to support the Director of the IAC and to guarantee the fulfillment of the IAC objectives:

- **The Management Committee** (CD): leaded by the Director of the IAC, the Vice-Director and the Heads of the IAC Divisions.
- **The Research Advisory Committee** (CAI): the most senior consultative body for science and technology policy at the IAC, and made up of top-class qualified astronomers from all over the world.

- **The International Scientific Committee** (CCI): to oversee the activity of the User Institutions at the Canary Islands' Observatories, as a result of its internationalization through the Agreement on Co-operation in Astrophysics in 1979.
- **The Spanish Time Allocation Committee** (CAT): to allocate the 20% of the observing time available at each facility installed at the Observatories among the Spanish Community.

b) Organization Chart



c) Relevance to PRACE

Although the IAC is not an international organization, it is a very relevant research centre in the international community, with many visiting researchers and strong collaborations with research groups worldwide. The IAC operates the International Observatories of the Canary Islands, hosting an impressive battery of major research infrastructures for astrophysics, belonging to several European research bodies and institutions, including also the 10.4 m. Gran Telescopio CANARIAS, an Spanish initiative leaded by the IAC (to come into operation for regular observations next year).
More than 50 research institutions from 19 different countries have installed their large-scale facilities at the Canary Islands' Observatories. The Agreements on Co-operation in Astrophysics, to internationalize these Observatories in 1979, gives the Signatory Bodies an effective voice in the decision making through the International Scientific Committee (CCI).

Like the future PRACE infrastructure, the observatory is based on more than one site. In fact, the observatories of the Instituto de Astrofísica de Canarias (IAC) are an "astronomy reserve" distributed in two islands:

1. The Observatorio del Teide (OT, Izaña, Tenerife)
2. The Observatorio del Roque de los Muchachos (ORM, La Palma)
3. IAC's Instituto de Astrofísica (La Laguna, Tenerife)
4. Centro de Astrofísica en La Palma (Breña Baja, La Palma) and
5. the Gran Telescopio CANARIAS, to come into operation very soon, at ORM.

These centres, with all the facilities they bring together, make up the "European Northern Observatory" (ENO).

To install a telescope at these Observatories, becoming a member of this International Scientific Community, organizations must sign an international agreement which "confers on signatory organizations effective participation in the decision-making process" by means of an "International Scientific Committee". Under the terms of this agreement, Spain provides the site in return for a percentage (20%) of the available observing time at each of the telescopes or instruments housed at the Canary Islands. Apart from this time for the Spanish community, all telescopes offers and additional 5% to promote astronomical collaboration between European institutions. More than 2000 astronomers visit the Canaries each year to observe with the astrophysical facilities there installed.

The Canary Islands' Observatories are recognized by the European Commission as a major research infrastructure for astrophysics.

3.3 European Community

3.3.1 *Fusion for Energy*

a) Brief Description of Governance Structure

The European Joint Undertaking for ITER and the Development of Fusion Energy or 'Fusion for Energy' is a type of European organisation known as a Joint Undertaking created under the Euratom Treaty by a decision of the Council of the European Union.

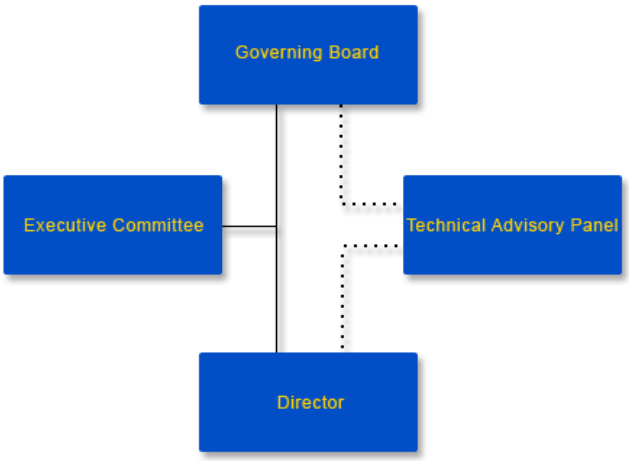
'Fusion for Energy' is established for a period of 35 years from 19th April 2007 and is situated in Barcelona, Spain. The organisation has the following Members which can be likened to “shareholders”:

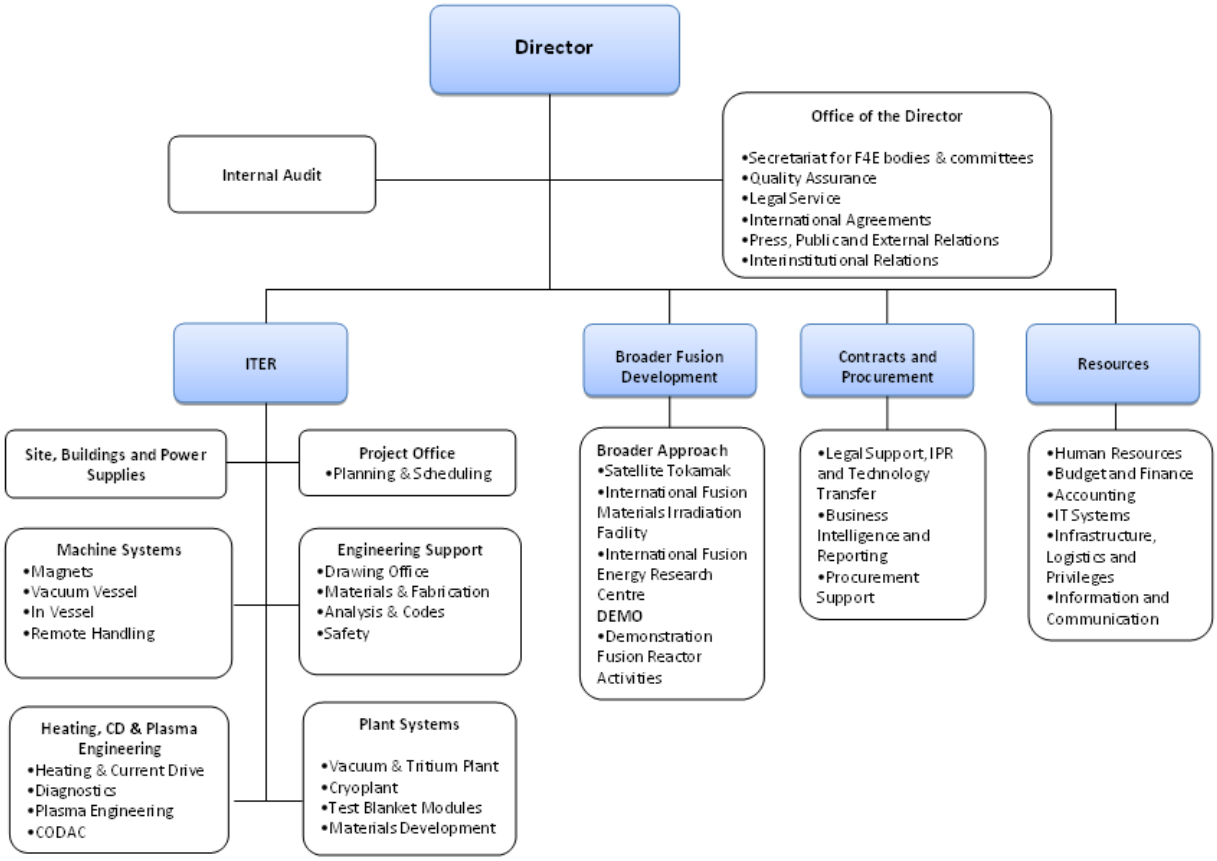
- Euratom, represented by the European Commission;
- the Member States of Euratom;
- third countries which have concluded cooperation agreements with Euratom in fusion that associate their respective research programmes with the Euratom programmes and which have expressed their wish to become Members.

The current Members are therefore the 27 Member States of the European Union, Euratom and, in the near future, Switzerland as a third country. Each Member sits in the Governing Board – the main body which supervises the Joint Undertaking. The Director is the Chief Executive Officer responsible for day-to-day management of the organisation.

An Executive Committee of thirteen members assists the Governing Board in a range of matters, in particular, approving the award of contracts. The Technical Advisory Panel also plays an important role in providing advice to the Governing Board and Director on the technical and scientific activities of 'Fusion for Energy'.

b) Organization Chart





F4E Organisational Structure – 1 April 2008

c) Relevance to PRACE

F4E is different from PRACE in that its primary function is to handle procurement for the European part of ITER. In addition, the majority of the budget comes from the EC, whereas in PRACE most of the money will come directly from member states. In kind contributions are accepted by ITER, and for Europe are managed by F4E, so far, in the form of physical parts for the infrastructure. In kind contributions are also being considered for PRACE, and could take the form of e.g. user support, user training, code porting and developing, program development and code optimization support etc.

The creation of a reduced technical executive committee which meets more frequently than the full council and allows more agile decision making for F4E could be a practical idea for the PRACE governance structure.

3.4 Synthesis of observations from existing Research Infrastructures

3.4.1 *Usage of Bodies and Mechanisms*

From the analysis above, it is clear that the role and the importance of the various bodies cannot be described in isolation, they come from the interplay with the entire governance structure. A critical design point is the definition of the body which has the most intiative: General Assembly, Management Board (when distinct from the General Assembly), or the Director General.

General Assembly

The general assembly has the major goal of enabling the legal structure to be distinct from its shareholders in terms of ownership, liability, business plan. The General Assembly is the top level decision making body of the organisation.

To achieve its goals, it has to resolve "agency problem" with the shareholders, ensure fair treatment of all shareholders.

Depending on the organisation, the General Assembly may delegate some of its responsibilities to the "Board of Directors" or the "Director General".

In research infrastructures, this type of structure comes with several names: Council (CERN, EMBL, ESRF, XFEL), Assembly (EDCPT-EEIG), Governing Board (FFE)

The General Assembly may have several committees, either as an informal advisory body (Advisory Committee), or as a statutory organ, with privileges like "proposition power" for some areas or concerns, and so on. The following types are found in research organisations

- Finance Committee(CERN,EMBL, ESRF)
- Scientific Advisory Committee(Diamond Light Source, EMBL)

Board of Directors / Management Board

The "Board of Directors" is delegated some of the powers of the General Assembly. Depending on the organisation, defining a Board of Directors has several advantages: it can meet as frequently as needed, some of the directors may be independent professionals who should be better attuned to the interest of the organisation and some of its stakeholders, some stakeholders may be represented (personnel), management may be represented on the board or invited to the meetings, and so on.

Belong to this category:

- Executive Committee (F4E)

Scientific Policy & Programmes

As discussed above, scientific decisions are often best prepared or taken by a scientific body, whose members are experienced and recognised scientists. Depending on the organisation and its project, some scientific decisions need to be forward looking and entail taking some risks. The scientific policy bodies need to operate in a way which ensures optimal decision making in face of such uncertainties.

The scientific policy bodies will in fact operate within guidelines set up by the other governance bodies, which are responsible, for instance for proper technical and budgetary planning and execution.

The following scientific organs have been found in the surveyed organisations:

- Scientific Policy Committee (CERN)
- Scientific Advisory Committee (EMBL: gives advice to the Council, XFEL), called Partnership Board in EDCPT

Technical committees

Technical committees enable the various organs to discharge their responsibilities towards technical issues. They are implemented in order to advise the General Assembly or the Board of Directors in Infrastructures where there is a significant technical risk in defining, procuring, implementing and operating the facility. Their nature depends on the organisation and its goals, as well as the community which can contribute without conflict of interest or excessive level of competition. For instance, one of a kind infrastructures like CERN or ITER may have international committees not limited to experts of the involved partners.

The following have been found in the surveyed organisations:

- Machine Advisory Committee (XFEL)
- Technical Advisory Panel (FFE)

Executive Management

The executive management is responsible for managing the organisation as a result of delegation from the shareholders. This also contributes to establishing the organisation identity as separate from its shareholders.

This separation between “Shareholders” and “Management” are the prime motivation for the control structure made of the “General Assembly”, the “Board of Directors” and several other bodies, processes or committees.

In the surveyed organisation, this takes the following forms

- Director General (CERN, EMBL,ESRF)
- Directorate (CERN, EMBL)

The Executive management and the operative structure may also use various committees to maintain suitable relations with several constituencies. Examples are “User Groups” which enable to collect evolving needs and publicise decisions like technical evolutions, priorities and dates for service improvement.

3.4.2 *Adaptation to PRACE of examples of existing research infrastructures*

From the examination of the various examples a selection of features which may be interesting for the future PRACE governance structure have been selected. Some of these will be incorporated into the proposal for the PRACE governance structure in section 5, or in the future documents where the details of the PRACE governance will be worked out.

- The use of a Science Advisory Committee to help the Council in its decisions and help establish sufficiently long term scientific and technical strategy. (see various examples). The Science Advisory Committee could be made up of scientists representing the various scientific areas covered by PRACE (see ESRF).

- A Technical Advisory Panel (TAP) may be used during the construction phase of the systems (see Diamond). This would need to be adapted for the TAP to be a permanent structure in the case of PRACE because of the requirement to permanently evolve the infrastructure because of the technological obsolescence of supercomputers.

- Existence of an Advisory Committee may also be an option to make Board aware of stakeholders (research and industry) long-term needs. (see DNW where aerospace research and industry are represented)

- The creation of an executive committee which meets more frequently than the full council and allows more agile decision making. (see F4E)

Board organization and membership

- Contribution and voting rights in function of percentage of budget paid (see CERN) or minority partners having voting rights greater than their contributions

- Observer status allowing non-member states to attend Council meetings and to receive Council documents, without taking part in the decision-making procedures of the Organization. (see CERN)

- Members of the council are funding bodies or political decision makers (see CERN). Members of the council are scientific and political (see F4E).

- Mechanism of fairness, by which acquisitions should follow the partner contributions, i.e. if possible, high-tech items will be ordered from industries in the member states such that in percentual distribution, they match the partner contributions (see CERN)

Experience with in kind contributions

- In kind contributions are accepted by ITER, and for Europe are managed by F4E, so far, in the form of physical parts for the infrastructure. In kind contributions are also being considered for PRACE, and could take the form of e.g. user support, user training, code porting and developing, program development and code optimization support etc.

Options for representing smaller countries:

- The existence of consortia of smaller countries who would not be able to reach the minimum participation alone is used effectively within ESRF. This may be an option for smaller PRACE partners, either for formal reasons or to better organize their access to PRACE.

Following are various findings from the organizations surveyed. They do not directly pertain to this document focused on "governance structure", and have been listed below for record.

- Splitting divisions up into Finance, Technical and Science could be an option for PRACE (see Diamond)
- Splitting divisions up into 4 Divisions**:** Research, Instrumentation, Education and General Administration may be another option (see IAC)

4 Relevance of ESFRI/EC ERI legal initiative

The European Commission is currently in the process of making an ad-hoc legal structure available for research infrastructures in order to facilitate the construction of European research infrastructures in pursuance of article 171 of the European Treaty. It would be called the ERI.

Since it is not a legal structure for which experience and examples exist, we have decided to present the ERI in a separate paragraph. This enables to deal more appropriately with yet unknown implementation considerations.

The genesis of the ERI concept

ESFRI working groups concluded only this on governance structure:

> **"Bodies of the infrastructure**
>
> These bodies should be basically defined in the statutes, but the minimum requirements will be set up in the framework regulation:
>
> **General Assembly** of members which should have the widest possible competences with at least 1 meeting per year (Control functions but at least: nomination of board members, vote of budget, approval of accounts) and,
>
> **An executive director** who implements the ERI's policies and is the ERI's legal representative. The Statutes could foresee that a board of directors is the executive body instead."
>
> Ref : Report of the Working group on Feasibility study on the creation of a European legal instrument for Pan-European research infrastructures and Background to March 2008 Meeting.

The document *Legal Status for Future Pan -European Research Infrastructures* came out of the ESFRI initiative on legal forms of research infrastructures of pan-European interest. In it, JM Dufour outlines the basic general design for ERI Governance structure :

> "A clear governance structure should be established directly borrowed from EIO (European Research International Organization):
>
> 1) a *Member States Council*, the sovereign body, composed of Member States Delegations, each with two Delegates (one scientist and one administrator), assisted by various subsidiary bodies (Scientific Policy Committee, Finance Committee, Industrial Committee …);
>
> 2) a *Director-General*, Chief Executive and legal representative, designated by the Council for a determined period and assisted by a Staff. Between them a clear sharing of competences and responsibilities: Member States framing and approving the general policy, the Director-General making proposals and implementing the Council's decisions. [19] "

Similarly, and again from the ESFRI initiative, the *Hans Jahreiss* *discussion paper*.
Proposal on the characteristics needed for a European legal form for Research Infrastructures states the following on the governance structure for ERI.

> **"Internal governance**
> The internal organization and the management structure of a large-scale facility is of utmost importance. Within the framework of the existing secondary European Community Law, rules are already provided for. Executive and supervisory powers are defined, albeit giving more freedom for the European public limited company (Societas Europaea) in which there is an option for a two-tier or a one-tier system**.**
>
> The basic principle for all entities should be to have an executive organ, a supervisory organ and the general assembly of members (or partner organisations) or member states. In line with the established principles of corporate governance, the assembly must have the final vote in terms of overall policy and strategy. The executive has to carry it out and is accountable for the results achieved. In view of the broad fields of scientific, engineering and administrative matters, I would strongly recommend to have an executive board with a distinguished scientist as chairperson and a small number of board members who have tasks and responsibilities which are clearly defined in internal rules of procedure or a document of similar or higher authority. [20]"

[19] JM Dufour Report Legal Status For Future Pan -European Research Infrastructures (1er December 2006)

[20] (p.26) European Strategy Forum on Research Infrastructures 2nd Workshop on "Legal forms of research infrastructures of pan-European interest" 14th December 2006 Discussion Paper by Hans Jahreiss

4.1 Proposed ERI Governance Structure under new Legal Form

The latest available draft of the *Proposal for a COUNCIL REGULATION on the Community legal framework for a European Research Infrastructure (ERI) COM 2008/467 – 2008/0148* defines the governance structure of the new ERI legal form very loosely:

> *Organisation of the ERI*
> The Statutes shall provide for at least the following bodies having the following competencies:
> (a) an assembly of members as the body having full decision-making competency, including the adoption of the budget;
> (b) a director or a board of directors, appointed by the assembly of members, as the executive body and legal representative of the ERI. The Statutes shall specify the manner in which the members of the board of directors legally represent the ERI.[21]

This leaves PRACE significant freedom to design the structure most suited to its needs.

However, it seems clear from the Annex (A) of the proposed COUNCIL REGULATION describing the Extract of the Statutes for which the European Commission's approval is required, that special attention needs to be given to several categories of stakeholders:

- Users.
  - Mentioned in (A-5) "Basic principles of access policy for users"
  - Also concerned with (A-6) " Basic principles of scientific evaluation policy"
- Employees
  - Point (A-7) describes "Basic principles of employment policy"
- Vendors
  - "Basic principles of procurement policy" are the subject of (A-8)

This is well in line with work being performed in several tasks of WP2, and the scope of the corresponding deliverables. These aspects are also covered by the rather systematic approach taken in this deliverable to address all the stakeholders in PRACE.

[21] Article 12 points a and b. Page 12.

5 Proposal for PRACE Governance Structure

Based on the mission of the organisation to be created, the scope and objectives defined for the governance structure, the stakeholders involved and the analysis of comparable organisations, a proposal for the PRACE governance structure follows below – the detail of which must be discussed and agreed by the PRACE principal partners committee and management board.

5.1 Description

Based on the preceding content of this document - the purpose of the organisation to be created; the scope and objectives defined for the governance structure; the stakeholders involved and the analysis of comparable organisations - , a proposal for the PRACE governance structure follows below. The details must be discussed and agreed by the PRACE principal partners committee and management board.

Therefore, the description of options in the next section is still quite general, and has been intended to put into perspective how some of the structures found in the surveyed Research Infrastructures might be used. The existence of a "Council" or "General Assembly" of shareholders is asserted as the means to ensure that the shareholders are suitably involved in major decisions and given the means to exercise their responsibilities. Likewise, the Executive Management embodies the legal personality of the Research Infrastructure and exercises the responsibilities of management and representation with respect to third parties.

5.1.1 *Brief Description of Governance Structure*

The PRACE **Council** will be the highest authority of the organization and will have responsibility for all important decisions. It will control PRACE activities in scientific, technical and administrative matters. The Council will approve programmes of activity, adopt the budgets and review expenditure.

The Council will be made up of:

i. Representatives of all PRACE member states and possibly the EC. Each member state will be represented by up to two delegates (one scientific and one administrator?). Voting rights will be roughly proportional to financial contributions made.

or

ii. One or two representatives of each principal partner and a total of x who will represent the collective general partners. Possible representative of the EC.

The Council may delegate a range of matters to an **Executive Committee**. The executive committee will meet more frequently than the full council and will allow more agile decision making.

The Council may be assisted by the **Scientific Advisory Committee** which will be composed of distinguished scientists, from academia and industry, representing the various scientific areas and industrial applications covered by PRACE. They will be appointed in person for their achievements and expertise, not as representatives of Member States or industrial concerns.

The Council may be also assisted by The **Financial Advisory Committee** on the financial management and control of PRACE.

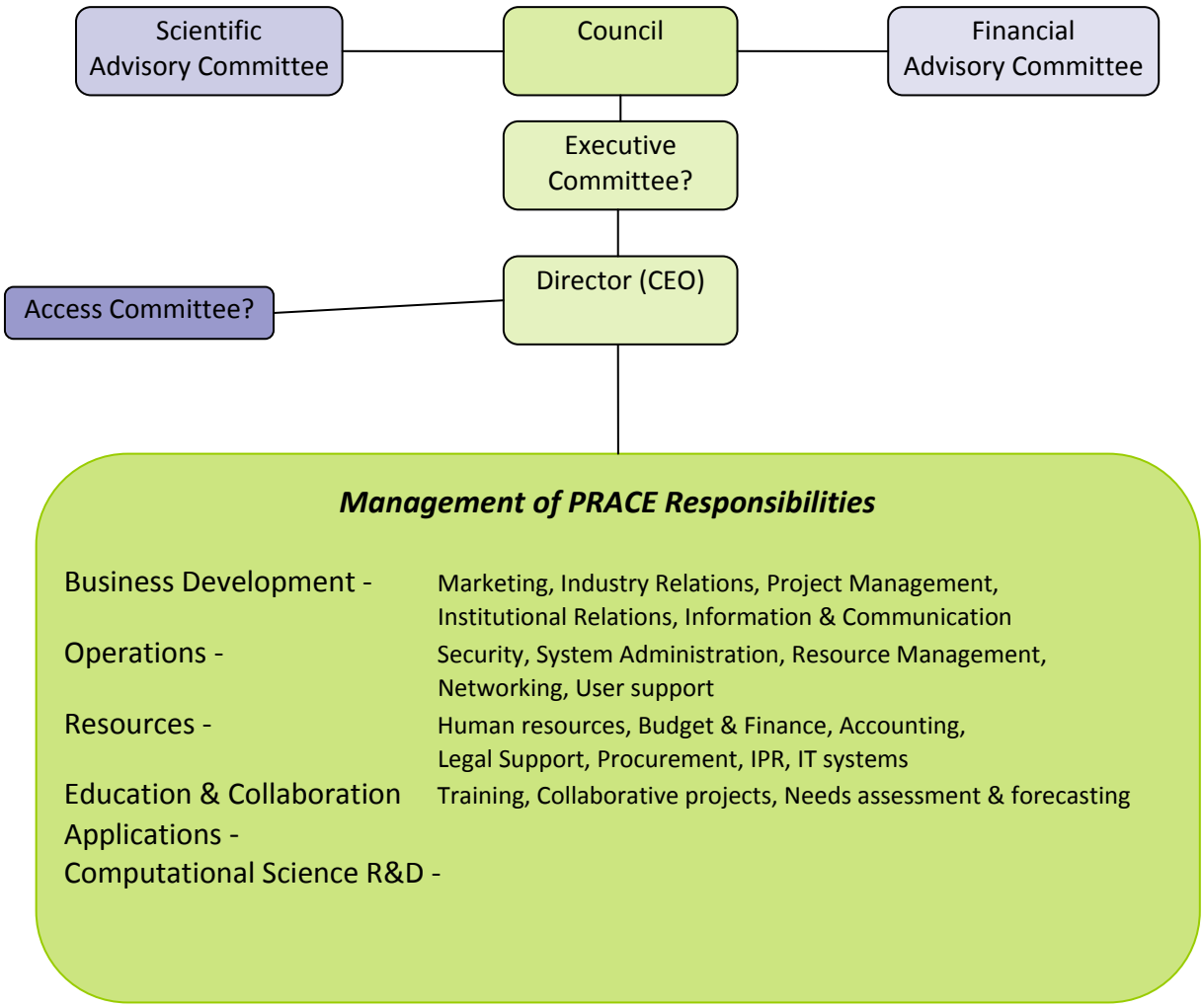
The Director will be chief executive and legal representative of PRACE, and will be designated by the Council for a determined period and assisted by a Staff. S/he will manage the infrastructure, implement the decisions made by the Council and make proposals to it. The Director will be accountable for the results achieved.

The Director will be assisted by a **Directorate** and a structure of **Departments** (e.g. Business Development, Operations, Resources, R&D and Education, Applications etc.)

Depending on the foreseen difficulty in decision making and in procuring world class equipment , a Technical Advisory Committee may be formed, either to advise the Council or the General Director. Its major area of concern would be to clarify the technical objectives (performance level, architecture) and the technological soundness of innovative directions.

Also of importance is the “Access Committee”, whose responsibilities are to make proposals for the utilisation of the infrastructure. This document uses a generic name (Access Committee), as this point is studied more extensively in the separate “Peer Review” deliverable.

5.1.2 *Organization Chart*



5.1.3 *Further steps*

The preliminary nature of this document should be borne in mind, since many aspects still need further investigation for which corresponding deliverables and milestones are defined. Based on this information, decisions will need to be taken, either within this Work Package, or more often at the level of the Management Board or the Principal Partner Committee.

For the convenience of the reader, the expected major steps are summarised here:

- In depth review of legal issues, including structure, employment, taxes, rights and responsibilities of shareholders, aspects related to applicable European or national laws and regulations. This should result in the definition of fully detailed alternatives. The project will use the legal expertise available within its partners as well as external legal advice.
- Proposal for governance structure
- Proposal for legal structure

Also, the interaction of concerns in the deliverables D2.1.1, D2.2.1, D2.3.2 will be further investigated. This should also permit to study the possible relevance of multi-level organisations, like those proposed for Research Infrastructure which operate at national and European level. An example of such a situation would be the Electronic Communication network for research and education (DANTE/GEANT , national networks) .

6 Annexes

6.1 Annex 1 - Description of each Main Bodies of Example Governance Structures

6.1.1. *CERN*

Body or Position:	**CERN Council of member states**
Brief Description:	The CERN Council is the highest authority of the Organization and has responsibility for all-important decisions.
Composition:	Two official delegates of each member state. One represents his or her government's administration; the other represents national scientific interests.
Appointed by:	Member state
For a period of:	
Mandate:	It controls CERN's activities in scientific, technical and administrative matters. The Council approves programmes of activity, adopts the budgets and reviews expenditure
Positions within Body:	CERN Council Strategy Group; Chairperson (1 year term); Vice-Chair (1 year)
Voting rights and Majorities needed:	Each Member State has a single vote and most decisions require a simple majority, although in practice the Council aims for a consensus as close as possible to unanimity.
Frequency of Meetings:	2 ordinary session per year; less formal meetings between the ordinary sessions as required

Body or Position:	**CERN Scientific Policy Committee**
Brief Description:	The Scientific Policy Committee evaluates the scientific merit of activities proposed by physicists and makes recommendations on CERN's scientific programme.
Composition:	Members are scientists elected by their colleagues on the Committee and appointed by Council on the basis of scientific eminence without reference to nationality. Some members are also elected from non-Member States.
Appointed by:	Scientific Policy Committe and CERN Council
For a period of:	3 years
Mandate:	Advisory role to CERN council
Positions within Body:	Chairperson (1 years); Vice-Chair (1 year)

Voting rights and Majorities needed:	Delegates do not represent their countries as in the CERN Council and in the Finance Committee but are nominated as individuals

Body or Position:	**CERN Finance Commitee**
Brief Description:	The Finance Committee deals with all issues relating to financial contributions by the Member States and to the Organization's budget and expenditure.
Composition:	Composed of representatives from national administrations.
Appointed by:	Member states
Mandate:	Advisory role to CERN council; control of CERN operations
Positions within Body:	Chairperson (1 year); Vice-Chair (1 year)
Voting rights and Majorities needed:	A double majority procedure applies to the Finance Committee recommendations to Council, whereby in addition to the formal majorities established by the Convention and by the internal Rules of the Organization, these recommendations are based on a majority of the annual financial contributions of the Member States, according to the scale of contributions in force
Frequency of Meetings:	

Body or Position:	**CERN Director General**
Brief Description:	The Director-General manages CERN
Appointed by:	CERN council
For a period of:	5 years
Mandate:	The Director-General manages CERN and is assisted by a Directorate, whose members he proposes to Council. The Director-General reports directly to the Council. He can also propose to Council any adjustment he deems necessary to meet the evolving needs of the research programme.

6.1.2 *EMBL*

Body or Position:	**EMBL COUNCIL**
Brief Description:	The Council is composed of all member states of the Laboratory. The Council determines the Laboratory's policy in scientific, technical and administrative matters, in particular by giving guidelines to the Director General.
Composition:	Each Member of EMBL is represented in the Council by a maximum of two representatives.

Appointed by:	The shareholders
Positions within Body:	The Council elects a chair and two vice-chairs who hold office for one year and may be re-elected on no more than two consecutive occasions.
Voting rights and Majorities needed:	Each member state has one vote in the Council. Council approves unanimously the indicative scheme for the realisation of the scientific programme and specifies its duration. Council adopts the annual budget by a two-thirds majority of the member states present and voting provided that, either the contributions of such member states constitute not less than two-thirds of the total contributions to the laboratory, or that affirmative votes are cast by all but one of the member states present and voting.
Frequency of Meetings:	There are normally two Council meetings per year – one in summer and one in winter. The meetings take place at the EMBL headquarters or at one of the EMBL outstations. It may also meet in extraordinary session.

Body or Position:	**EMBL DIRECTOR GENERAL**
Brief Description:	The Council appoints the Director General who is responsible for the implementation of the Council guidelines. The Director General is assisted by a Directorate.
Appointed by:	The Council.
Mandate:	Implementation of the Council guidelines.

Body or Position:	**EMBL FINANCE COMMITTEE**
Brief Description:	The Finance Committee assists the Council in the financial management and control of EMBL. The Council ensures that the financial requirements of the agreement establishing the EMBL and of the agreements with host member states are complied with.
Appointed by:	Appointed by the Council
Mandate:	The committee examines the budget estimates and report thereon to Council, lays down the terms on which contributions of member states shall be paid, decide on the form of budget estimates and accounts, examines the annual

	accounts and receives the reports of the internal and external auditors and report thereon to Council, approves the carrying forward of provisions, authorises the establishment and defines the purpose and conditions [including investment conditions where appropriate] of all funds and accounts, notifies Council of the consequences of currency fluctuations and makes recommendations for remedial measures where such fluctuations are likely to disturb the balance of the budget, reports to Council on the financial implications of the admission of new member states, considers matters which, in accordance with the provisions of the staff rules and regulations, require the approval of the committee or recommendations from it to the Council, approves equipment purchases and building and engineering works valued at more than €250,000, authorises payments 10% in excess of contract prices, authorises writing off of losses of cash, stores or other assets of a value greater than €5,000 per loss. The committee undertakes duties and responsibilities as may be attributed to it by Council and exercises on behalf of Council authorities delegated to it.
Positions within Body:	The Council elects the chair and the vice-chair of the committee.

Body or Position:	**EMBL SCIENCE ADVISORY COMMITTEE**
Brief Description:	The Council establishes a Scientific Advisory Committee [SAC] which shall give advice to Council. SAC is composed of distinguished scientists appointed in their own right, not as representatives of member states. Membership of the committee is drawn from scientists in a wide range of relevant fields of science in order to cover as far as possible both the field of molecular biology and other appropriate scientific disciplines.
Appointed by:	The Council
Mandate:	The SAC gives advice to Council, in particular with regard to proposals from the Director General on the realisation of the programme of the Laboratory.

6.1.3 *ESRF*

Body or Position:	**ESRF COUNCIL**
Brief Description:	It's the board. The Council shall decide important issues of Company policy.
Composition:	Each Member of ESRF is represented in the Council by two or more representatives. Consortia permit the participation and therefore representation in the board of contributors deemed too small individually (BENESYNC and NORDSYNC).
Appointed by:	The shareholders
Mandate:	-the admission of new Members; -transfer of shares among Members of different Contracting Parties, and increase in the capital; -the Council's rules of procedure; - the financial rules; -amendment of these Statutes; -the election of its Chairman and Vice-Chairman; -the medium term scientific programme; -the annual budget and medium term financial estimates; -the closure of the annual accounts; -the appointment and termination of the appointments of the Director General and the Directors; -the establishment and terms of reference of advisory or other committees, notably an Administrative and Finance Committee; -the appointment of the chairman and the vice-chairman of each advisory or other committee; -the policy for the allocation of beam time; -short and medium term arrangements for use of the ESRF by national or international scientific organisations;
Positions within Body:	The Council shall elect a Chairman and a Vice-Chairman for two years.
Voting rights and Majorities needed:	Each Contracting Party shall have a single indivisible vote exercisable by the delegate designated for this purpose by the relevant Members. Most decisions are taken by a qualified majority (means two-thirds of the capital), or simple majority. The following matters shall require the unanimous approval of the Council: -the admission of new Members;

	-transfer of shares among Members of different Contracting Parties, and increase in the capital; -the Council's rules of procedure; - the financial rules; -amendment of these Statutes;
Frequency of Meetings:	The Council shall meet at least twice a year.

Body or Position:	**ESRF DIRECTOR GENERAL**
Brief Description:	The Director General shall be the chief executive of the Company and its legal representative. The Director General shall be assisted by the Directors.
Composition:	-
Appointed by:	The Director General and, after consultation with the Director General, the Directors shall be appointed by the Council for a period not exceeding five years.
For a period of:	5 years
Mandate:	• Draws up the project plan, resource estimates plan, work programmes, annual budgets, staff establishment plan and staff policy plan; • Implements the work programmes and the budget, keeps the inventory and draws up the annual accounts; • Defines the organisational structure of ESRF; • Draws up the annual activity report and any other reports requested by the Council and committees; • Assists the Council

Body or Position:	**ESRF Administrative and Finance Committee**
Brief Description:	The Administrative and Finance Committee assists the Council in the preparation of its financial and administrative decisions.
Composition:	25 persons. Each Member of ESRF is represented in the Council by 1 person.
Appointed by:	appointed by the Council
Mandate:	The Administrative and Finance Committee assists the Council in the preparation of its decisions. In particular it: • comments and makes recommendations on the resource estimates plan, annual budget

	and accounts; • approves the award of contracts in accordance with the financial regulation; • makes recommendations about call for tender, purchasing
Positions within Body:	The Chair and Vice-Chair of the Executive Committee are appointed by the Governing Board for a period of two years, renewable once
Frequency of Meetings:	twice a year.

Body or Position:	**ESRF SCIENCE ADVISORY COMMITTEE**
Brief Description:	The Science Advisory Committee shall give its opinion on relevant scientific work.
Composition:	21 persons. The Members of each Contracting Party together holding at least 10 % of the capital may nominate two scientists of the Committee. The Members of each Contracting Party together holding less than 10 % of the capital may nominate one scientist of the Committee The Council shall appoint a further ten scientists
Appointed by:	The Council
Mandate:	The Science Advisory Committee shall give its opinion on relevant scientific work, in particular by: • Preparing recommendations on the objectives of project plans, work programmes and their possible revisions; • Providing advice or recommendations on specific engineering, scientific and technological issues;
Positions within Body:	The appointment of the chairman and the vice-chairman of the Committee is made by the Council.
Frequency of Meetings:	Twice a year.

6.1.4 *XFEL*

Body or Position:	**XFEL Council**
Brief Description:	The Council shall decide on important policy issues and the annual budget. The Council appoints the Managing Director Chair and, if appropriate, further Managing Directors and may issue instructions to the Management Board
Composition:	Each Member of XFEL is represented in the Council with up to two representatives
Appointed by:	The shareholders
For a period of:	to be determined
Mandate:	• The appointments and termination of the appointments of the Managing Director Chair and the Managing Directors • The annual budget and medium term financial estimates • Scientific policy and strategy • Management, supervision and controlling of all financial and other resources made available by the shareholders or through collaboration contracts
Positions within Body:	The Council shall elect a Chairperson and a Vice-Chairperson for up to two years
Voting rights and Majorities needed:	• Each 50 (fifty) € of the share capital entitles its holder to one vote. Each shareholder may only cast all of its votes indivisibly and combined, exercisable by the delegates designated for this purpose by the relevant shareholder. Shareholders nominated by a single Contracting Party may only jointly cast their votes, indivisibly and combined • Most decisions are taken by a qualified majority (means of at least 77% of the capital) or simple majority (means of at least 50% of the capital) • The following matters shall require the approval of the Council by unanimous vote: o Admission of new shareholders o Share capital increases o Amendment of these Articles of Association o Mergers or splits of the Company o Dissolution of the Company o the Financial Rules of the Company o Arrangements for long-term use of the XFEL Facility by Governments or groups of Governments not acceding to

	the XFEL Convention, or by establishments or organizations thereof
Frequency of Meetings:	The Council shall meet at least twice a year

Body or Position:	**XFEL Management Board**
Brief Description:	The authorisation of management comprehends all activities entailed by standard operation of the company
Composition:	At least two Managing Directors, if appropriate, additional Science / Technical Directors
Appointed by:	Council
For a period of:	Not exceeding 5 years
Mandate:	Manage the Company
Positions within Body:	Management Board Chair acts as chief executive of the XFEL Company and its legal representative

Body or Position:	**XFEL SCIENCE ADVISORY COMMITTEE**
Brief Description:	The Science Advisory Committee shall give its opinion on relevant scientific work
Composition:	Up to 15 scientists, representing the various scientific areas covered by the XFEL facility
Appointed by:	Council
Mandate:	The Science Advisory Committee shall give its opinion on relevant scientific work, in particular by: • Preparing recommendations on the objectives of project plans, work programmes and their possible revisions • Providing advice or recommendations on specific engineering, scientific and technological issues
Positions within Body:	The appointment of the chairman and the vice-chairman of the Committee is made by the Council
Frequency of Meetings:	Twice a year

Body or Position:	**XFEL MACHINE ADVISORY COMMITTEE**
Brief Description:	The Machine Advisory Committee shall give its opinion on relevant technical matters
Composition:	Up to 10 members
Appointed by:	Council
Mandate:	The Machine Advisory Committee shall give its opinion on relevant technical work, in particular by: • Preparing recommendations on the objectives of project plans, work programmes and their possible revisions

	• Providing advice or recommendations on specific engineering, scientific and technological issues
Positions within Body:	The appointment of the chairman and the vice-chairman of the Committee is made by the Council
Frequency of Meetings:	Twice a year

6.1.5 *Diamond Light Source*

Body or Position:	**DLS Board of Directors**
Brief Description:	Responsible for the supervision of Diamond Light Source Ltd in the implementation of its activities. It makes recommendations to the Shareholders/ funders and takes decisions on a wide range of matters
Composition:	STFC are entitled to appoint up to 4 Directors, one of whom can be an STFC employee. The Wellcome Trust can appoint one Director. The Chair of the Board is independent of the shareholders/funders. The Chief Executive is an executive board member. The current list of Directors is available here
Appointed by:	The Shareholders (STFC, Wellcome Trust)
Mandate:	• Delegates authority to the Chief Executive • Discuss with the CEO the terms of the: o Operating principles o The annual budget o Five year forward plan • Make recommendations to shareholders/funders for funding for approval. • The board can approve the operating budget but not the funding for it (this must be done by the Shareholders/funders).
Positions within Body:	Chair and Directors.
Voting rights and Majorities needed:	All Directors (including the Chair) present at meetings have one vote. The Chair has no casting vote. Decisions will be taken by majority vote. In the event of deadlock the Board will require the Shareholders to call a shareholder meeting.
Frequency of Meetings:	At least every 3 months

Body or Position:	DLS Chief Executive Officer
Brief Description:	The chief executive officer is responsible for the day-to-day management of Diamond Light Source Ltd and its legal representative.
Appointed by:	Formally appointed by the Board.
For a period of:	5 years initially with the possibility to extend.
Mandate:	• Prepare an Annual Budget for each Financial Year • Present the Annual Budget for the next following Financial Year to the Shareholders for approval. • Prepare a Five Year Forward Plan, covering five consecutive Financial Years of the Company, in each Financial Year with the first such Five Year Forward Plan covering the Financial Years 2003/04 to 2007/08 • Present the five year forward plan covering that financial year and the next four financial years to the shareholders. • Manage the day-to-day business of the Company in each Financial Year in accordance with the General Principles and the Annual Budget for that Financial Year as approved by the Shareholders. • Prepare the Operating Principles by such date being 12 months from the date of this Agreement, and submit them to the Shareholders for approval. • Prepare in relation to defined capital investment projects or programmes a projected expenditure profile (a discrete project plan). • Present each Discrete Project Plan to the Shareholders for approval. • Responsible for health & safety on the site.
Positions within Body:	Executive member of the Board of Directors
Voting rights and Majorities needed:	CEO is voting member of board

Body or Position:	DLS Scientific Advisory Committee
Brief Description:	The SAC provides Diamond with advice on scientific opportunities and progress in fields of relevance to the facility. Membership of the SAC is available here.
Composition:	Up to 15 members from across Europe and the US, all of whom are external to Diamond and are experts in their field.

Appointed by:	Suggested by the Executive, appointed by the Board.
For a period of:	3 years, possible to extend.
Mandate:	The role of the SAC is to advise Diamond on: • Progress relating to the design of approved beamlines; • The scientific and technical questions impacting on the design and operation of Diamond; • The scientific merits of new beamlines that have been proposed; • Where different areas of science are going so that beamline proposals can be considered in relation to the requirements of the user community; • The experimental and user support facilities; • The range of opportunities for scientific exploitation of the facility.
Frequency of Meetings:	Up to three times per year (flexible depending on need).

Body or Position:	**DLS Technical Advisory Panel**
Brief Description:	The Technical Advisory Panel (TAP) advised the Board of Directors and Shareholders during the construction phase of the project. Now that the facility has moved into its Operational phase the TAP has been disbanded, since it is not needed now that the DLS is operative.
Composition:	The Technical Advisory Panel was composed of external members (similar to SAC) from among persons of recognised standing and professional experiences in engineering, scientific and technical matters relevant to Diamond.
Appointed by:	Project design team prior to formation of the Board.
For a period of:	The duration of the construction & commissioning phases.
Frequency of Meetings:	Up to 4 times per year.

6.1.6 *DNW German-Dutch Wind Tunnels*

Body or Position:	**DNW BOARD**
Brief Description:	DNW's Board, the supervisory body of the Foundation, consists of representatives of the parent institutes NLR and DLR, and is complemented by representatives of the

	relevant ministries from Germany and the Netherlands.
Composition:	Made up of of representatives of the parent institutes NLR and DLR, and is complemented by representatives of the relevant ministries from Germany and the Netherlands. At the end of 2007, the Board consisted of representants of: NLR (2), DLR(2), BMBF(1),Netherland Agency for Aerospace Programs (NIVR)(1), German Ministry of Defence(BMVg)(1), Dutch Ministry of Defence(1).
Appointed by:	NLR, DLR, and the German and Dutch governments
Mandate:	• Supervisory functions
Positions within Body:	Chairman and vice-Chariman

Body or Position:	**DNW ADVISORY COMMITTEE**
Brief Description:	The Advisory Committee, representing the aerospace industry and research establishments, advises the Board of DNW about the industry's long-term needs.
Composition:	Representatives of the aerospace industry and research establishments. At the end of 2007, the Advisory Committee consisted of representants of: NLR, Eurocopter France, Airbus Deutschland GmbH, Stork Fokker, Airbus, DLR (2), EADS Deutschland, EADS CASA
Positions within Body:	Chairman

Body or Position:	**DNW BOARD OF DIRECTORS**
Brief Description:	The DNW management reports to the board, but has full authority for the daily management of the organisation (entering into contracts, hiring and firing of personnel, etc.).
Composition:	DNW is managed by a Board of Directors consisting of:a Director and a Deputy Director.
Appointed by:	Board
Mandate:	• Daily management of the organisation (entering into contracts, hiring and firing of personnel, etc.).
Positions within Body:	Director and Deputy Director

6.1.7 *Instituto de Astrofisica de Canarias*

Body or Position:	**IAC BOARD (CONSEJO RECTOR)**
Brief Description:	The decision-making body for all administrative and economic matters at high level. It makes also recommendations and takes decisions on a wide range of matters affecting the main goals of the IAC. This Board meets one or twicea year.
Composition:	The IAC Board is made up by representatives of the four institutions integrating the IAC Consortium: The Spanish National Administration, the Regional Government of the Canary Islands, the University of La Laguna and the Spain's Science Research Council (CSIC). These representatives are: • Minister of Science and Innovation. • President of the Government of the Canaries. • Undersecretary of the Ministry of the President of the Government of Spain. • Rector of the University of La Laguna. • President of the CSIC. • Director of the IAC.
Appointed by:	The formal members of the IAC Consortium
For a period of:	-
Mandate:	• To guarantee the fulfillment of the objectives of the IAC. • To design, develop and approve the basic organizational structure • To approve the operational regulation and implementing rules. • Adopts and approves the annual work-programmes and budgets for exploitation and investments to be proposed to the Spanish Government for formal approval. • To agree, in accordance with the Spanish General Budgetary Law, about the disposition of goods and values affecting its patrimony. • To agree and accept the incorporation of new staff from other entities. • To act on those other issues and matters affecting the IAC and clearly being a responsibility of the IAC Board.
Positions within Body:	The President of the IAC Board is the Minister of Science and Innovation. There are also one representative from each one of the four members of the IAC Consortium, and the IAC Director, who is also a voting member and acts as the Secretary of the IAC Board.
Voting rights and Majorities needed:	Decisions need to be taken by absolute majority of representatives attending the meeting. The vote of the

	President is considered in case of non majority is reached.
Frequency of Meetings:	One or twice a year on regular basis. It is also possible an extraaordinary meeting of the IAC Board if it is formally requested by at least two of its four members.

Body or Position:	**IAC DIRECTOR**
Brief Description:	The IAC Director, its legal representative, is the executive arm of the IAC Board, responsible for the day-to-day management affecting scientific, technical and administrative issues, following the indications of the IAC Board.
Composition:	-
Appointed by:	The IAC Board, following a joint proposal from two of its four members: University of La Laguna (ULL) and Spain's Science Research Council (CSIC).
For a period of:	-
Mandate:	• To solve and decide about scientific, technical and administrative issues affecting the goals and the day-to-day activity of the IAC. • To act on any other tasks which the IAC Board may delegate to. • Acting as Secretary of the IAC Board. • President of the Research Advisory Committee (CAI) • Secretary of the International Scientific Committee. • President of the Spanish Time Allocation Committee (CAT). • Member of the National Committee for Astronomy and member of the Committee for the Co-ordination of Public Research Bodies. • Proposes to the IAC Board the adoption of the following decisions: - Definition and approval of the organizational structure for the IAC. - The regulation of operation and implementation of work-programme and budget to be proposed to the Ministry of Finance and the Economy for formal approval. - To agree, in accordance with the Spanish General Budgetary Law, about the disposition of goods and values affecting its patrimony. - To agree and accept the incorporation of new staff from other entities • IAC staff depends functionally from the IAC Director.
Positions within Body:	-
Voting rights and Majorities needed:	-
Frequency of Meetings:	The IAC Director takes part in the IAC Board meetings, and also in the meetings of the Advisory Committees.

Body or Position:	**IAC MANAGEMENT COMMITTEE (COMITE DE DIRECCIÓN)**
Brief Description:	The IAC Management Committee (Comité de Dirección, CD) is constituted to help the IAC Director in the day-to-day activity of the institute.
Composition:	It brings together the IAC Director, the Vice-Director and the Heads of the four IAC Divisions, plus the Head of the Directors' Cabinet (this last one with voice but not voting rights, acting as Secretary of the Committee).
Appointed by:	This Advisory Committee is foreseen and appointed by the IAC Board.
For a period of:	No personal nominations of its members, but related to their responsibility and positions at the IAC. The IAC Director is directly appointed by the IAC Board; the Vice-Director was elected following a public call by designation; the Heads of the IAC Divisions are nominated by the IAC Director (and formally approved by the IAC Board) and, in the case of the Research, Technology and Graduate Studies Divisions they are appointed for a period varying from 3 to 5 years.
Mandate:	The Management Committee assists the IAC Director in the fulfillment of his functions and responsibilities. In particular: - Defines and approves the IAC budget proposal and its distribution. - Defines and approves the Annual Implementation Plan. - Responsible for the implementation of the IAC policy on Research and Technology Development and Training of Researchers. - Studies and decides about any particular issue as proposed by its members or by other member of the IAC staff.
Positions within Body:	The IAC Director acts as President of the Committee, being substitute by the IAC Vice-Director in his absences.
Voting rights and Majorities needed:	Although all its members have voting rights except the Head of the Directors' Cabinet (acting as Secretary of the Committee, with voice but not voting rights), this Committee is a Consultant Body for the IAC Director..
Frequency of Meetings:	Weekly.

Body or Position:	**IAC INTERNATIONAL SCIENTIFIC COMMITTEE (COMITÉ CIENTÍFICO INTERNACIONAL)**
Brief Description:	In 1979 Spain internationalized the observatories of the IAC through the Agreements on Co-operation in Astrophysics. These Agreements are structured in three levels: the "first-level" corresponds to the governments; the "second-level" to the national research councils; which become the "Signatory Bodies" and finally the "User Institutions" (UIs); universities and scientific organizations signing the "third-level" with the IAC. The Agreements gives the Signatory Bodies an effective voice in the decision making to all those issues affecting the observatories, through the International Scientific Committee (CCI).
Composition:	Representatives of the Signatory Bodies. There are also one representative from University of La Laguna (ULL), one from the Spanish Commission for Astronomy, one from the Spain' Science Research Council (CSIC), the IAC Director, and a top-class researcher from a country different of those signing the Agreement (this one with voice but not voting). Current list of representatives.
Appointed by:	Country Members. Current list of CCI members.
For a period of:	-
Mandate:	• To debate and to propose to the IAC the adoption of those actions related to the maintenance and improvement of the scientific, technical and logistical conditions related to the common services and facilities needed for the optimal operation and exploitation of the telescope facilities at the Canary Islands' Observatories. There are four sub-committees to assist the activity of the CCI: - Finance sub-committee. - ORM operation sub-committee - OT operation sub-committee - Site properties sub-committee Current list of members of these sub-committees. • Approval of the annual common budget and other financial agreements. • Approval of the new agreements for the installation of new facilities, in the case of particular issues affecting other User Institutions. • Coordinate activities for the provision of the 5% observing time awarded through the International Time Programme to major collaborative projects. • The preparation of Annual Reports about the scientific activities and technical improvements of their facilities at the Observatory. • To prepare the rules of procedure about the joint allocation of the 5% observing time as estipulated by

	the Agreement on Co-operation in Astrophysics. • To debate and to propose actions to the IAC for those other issues affecting the optimal exploitation of the capabilities of the observatories and their facilities there installed.
Positions within Body:	The President and Vice-President of the CCI are elected by the CCI, being normally for a period of two years.
Voting rights and Majorities needed:	Agreements require unanimity.
Frequency of Meetings:	Twice a year.

Body or Position:	**SPANISH TIME ALLOCATION COMMITTEE (COMITE DE ASIGNACION DE TIEMPO)**
Brief Description:	To guarantee the appropriate distribution of the Spanish observing time available at the telescope facilities installed at the Canary Islands' Observatories. Each telescope installed at the IAC Observatories, following the Agreement on Co-operation in Astrophysics, and as a return to Spain for hosting the telescopes, provide 20% of the observing time for the Spanish Community. This time is distributed following open calls among the Spanish Community on the basis of scientific merits and technical feasibility of the proposals. The Time Allocation Committee (CAT) is responsible for the evaluation of these proposals and for the allocation of observing time among the successful ones. **N.B.:** Apart from the Spanish Time (representing 20% of the total observing time at each telescope) and the 5% jointly distributed by the International Scientific Committee for major collaborative projects, there are national panels for the distribution of the remaining time at each telescope. This National Time Allocation Committees are appointed by the User Institutions owning and/or operating the specific facility, following rules and procedures of the owner institutions.
Composition:	Taking into account both the observational and instrumental differences existing between solar and night-time observation, the CAT works in two parallel panels (with the same general principles and a common member), in order to establish their respective processes for the call for proposals for the nocturnal and solar telescopes. CAT members are qualified astrophysicists, who subscribe to the lists of eligible candidates in accordance to their fields of research. The IAC Director acting as President of the CAT (or representative), two researchers form the IAC for the night-time CAT and one for the solar CAT, 3 qualified researchers form the Spanish Community (only 2 for the solar CAT), one foreign researcher (acting as Vice-President, appointed by the International Scientific Committee), 1 technical expert from the Isaac Newton Group of Telescopes (with no vote/occasionally). In the case of the night-time CAT, there are three Panels instead

	of the former group of six members, each of those representing a specific field of Astrophysics: **Galaxies & Cosmology, Galaxies & Stars** and **Stars & Planets.** Each Panel is constituted by a Commissioner, a Vice-commissioner and three members. The task of each of the three Panels is to meet during two days in order to study the proposals corresponding to their field of research and make up a scientific report which will be presented by the Commissioners and Vice-commissioners to the President and Vice-president. These eight CAT members meet during two more days, and this way easy the difficult task of allocating CAT time. List of current members of the night-time CAT. List of current members of the solar CAT.
Appointed by:	The CAT is appointed by the IAC Board. At the end of each CAT meeting, a public draw is held to replace the corresponding member, depending either on the speciality or field of the vacancy, or on the less represented field, with the purpose of replacing all the members one by one. The CAT Secretary periodically updates the lists of eligible candidates classified by the following fields: Solar Physics, Stellar Structure and Evolution; Galaxies and Cosmology and Interstellar Medium.
For a period of:	CAT members will remain no longer than 4 consecutive evaluation meetings or semesters (2 years). They can be re-elected after 6 years.
Mandate:	Evaluation of proposals following an open and competitive call, and distribution of the Spanish observing time available among successful proposals, which needs to be formally approved by the IAC Director.
Positions within Body:	The President of the CAT is the IAC Director (or a nominated person) and the Vice-President is the representative from the International Scientific Committee.
Voting rights and Majorities needed:	Consensus.
Freq. of Meetings:	The solar CAT meets once a year. The night CAT meets twice a year.

Body or Position:	**ADVISORY RESEARCH COMMITTEE (COMISIÓN ASESORA DE INVESTIGACIÓN)**
Brief Description:	The Advisory Research Committee (CAI) of the IAC is the supreme body for consultation, whose prime aim is to advise the IAC on scientific and technical research policy, and in planning of its activities, which are co-ordinated with the previsions contained in the National Plan for Research and Development. This Committee will propose to the IAC Board the research lines and the procedures for the follow-up of the scientific and technical activities at the Institute.
Composition:	The Director of the IAC, six members of acknowledged scientific prestige, appointed by the IAC Board, covering a broad range of research areas in Astrophysics, and the Head of the IAC Research Division (acting as CAI Secretary with voice opinion but not cast votes).

Appointed by:	The IAC Board.
For a period of:	They are normally appointed for just one meeting of the CAI.
Mandate:	• To provide a critical judgement on the situation and evolution of the technical and scientific activities of the Institute, as well as put forward recommendations about its policies on technical and scientific research. • At any time, on its own initiative, or upon request by the IAC Board, it may make proposals to the IAC on matters related to scientific and technical research.
Positions within Body:	The IAC Director acts as the Chairman of the CAI.
Voting rights and Majorities needed:	The CAI meetings are structured as follows: • Adoption of the agenda proposed in advance by the Chairman. As much information as necessary on the subjects included in the agenda will be delivered. Presentation of the goals envisaged by the National Plan for R+D, related to Astronomy. • The six members elected by the IAC Board meet separately to elect a Rapporteur, who will lead the Committee in the absence of the Chairperson and will take the responsibility for drafting the final documents. • The six members meet separately to study the proposed matters and prepare their comments and recommendations. They may have interviews with, or presentations by, Institute members upon request. They can also request all information they consider necessary for their report. • The six members prepare and draft the documents. • Full meeting of all CAI members for discussion and comments.
Frequency of Meetings:	They CAI meet when appointed by the IAC Board (normally after a period of several years since previous CAI meeting).

6.1.8 *Fusion for Energy*

Body or Position:	**F4E Governing Board**
Brief Description:	Responsible for the supervision of 'Fusion for Energy' in the implementation of its activities. It makes recommendations and takes decisions on a wide range of matters
Composition:	Each Member of 'Fusion for Energy' is represented in the Governing Board by two representatives, one of which has scientific and/or technical expertise in the areas related to its activities. The current list of representatives (April 2008)
Appointed by:	Members (states & euratom)

Mandate:	• Appoints the Director; • Approves the basic organisational structure; • Adopts the financial regulation and its implementing rules; • Adopts the annual work programmes and budgets; • Adopts the five-year rolling project plan and resource estimates plan; • Adopts the staff establishment plan and the staff policy plan; • Appoints the Chairman and members of the Executive Committee; • Establishes the Scientific Programme Board(s) and appoint their members; • Approves the annual accounts and annual activity reports; • Adopts the implementing provisions for the Staff Regulations; • Adopts rules for making human resources available to ITER and the Broader Approach; • Approves the host agreement between the Joint Undertaking and Spain; • Adopts rules on industrial policy, intellectual property rights and the dissemination of information in agreement with the Commission; • Approves the conclusion of agreements with third countries and with institutions, undertakings or persons of third countries or with international organisations;
Positions within Body:	Chair and Vice Chair, elected by Governing board from its members for period of 2 years.
Voting rights and Majorities needed:	The voting rights of the Members of the Governing Board are set out in Annex I of the statutes of the Joint Undertaking. Most decisions are taken by two-thirds majority or simple majority. The Governing Board adopts its own rules of procedure and also approves the rules of procedure of the Executive Committee. Normally the Director and the Chair of the Executive Committee take part in Governing Board meetings
Frequency of Meetings:	Twice a year

Body or Position:	**F4E Director - Chief Executive Officer**
Brief Description:	The Director is the chief executive officer responsible for the day-to-day management of 'Fusion for Energy' and its legal representative.

	He also appoints and manages the staff working for 'Fusion for Energy'.
Appointed by:	Governing Board, on the basis of a list of candidates proposed by the Commission.
For a period of:	5 years. After an evaluation of his performance, the Governing Board may extend his appointment for up to five more years.
Mandate:	• Draws up the project plan, resource estimates plan, work programmes, annual budgets, staff establishment plan and staff policy plan; • Implements the work programmes and the budget, keeps the inventory and draws up the annual accounts; • Defines the organisational structure of 'Fusion for Energy'; • Ensures the application of sound financial management and internal controls; • Draws up rules on intellectual property rights and industrial policy, and on the dissemination of information; • Draws up the annual activity report and any other reports requested by the Governing Board or Executive Committee; • Assists the Governing Board, the Executive Committee and any subsidiary bodies by providing their secretariat; • Draws up rules for making human resources available for ITER the Broader Approach.
Frequency of Meetings:	Normally the Director takes part in the meetings of the Governing Board, Executive Committee and Technical Advisory Panel.

Body or Position:	**F4E Executive Committee**
Brief Description:	The Executive Committee brings together 13 persons who represent collectively the Governing Board and are responsible for approving the award of contracts, providing comments upon the documents related to the work programme and budgets as well as other tasks delegated by the Governing Board.
Composition:	13 members from among persons of recognised standing and professional experience in scientific, technical and financial matters. One Member of the Executive Committee is Euratom.

Appointed by:	appointed by the Governing Board
For a period of:	two years
Mandate:	The Executive Committee assists the Governing Board in the preparation of its decisions and shall carry out any other tasks which the Governing Board may delegate to it. In particular it: • approves the award of contracts in accordance with the financial regulation; • comments and makes recommendations on the project plan, work programmes, resource estimates plan, annual budget and accounts; • submits to the Governing Board, upon request by Euratom or a majority of members, decisions on the awarding of contracts or any other decisions entrusted to it.
Positions within Body:	The Chair and Vice-Chair of the Executive Committee are appointed by the Governing Board for a period of two years, renewable once
Voting rights and Majorities needed:	Each member in the Committee has one vote and decisions require nine votes in favour. Subject to the prior approval of the Governing Board, the Executive Committee shall adopt its rules of procedure. Decision of the Executive Committee adopting its Rules of Procedure
Frequency of Meetings:	about six times per year

Body or Position:	**F4E Technical Advisory Panel**
Brief Description:	The Technical Advisory Panel (TAP) advises the Governing Board and the Director, as necessary, on the adoption and implementation of the project plan and work programmes of 'Fusion for Energy'.
Composition:	The Technical Advisory Panel is composed of 13 members from among persons of recognised standing and professional experiences in engineering, scientific and technical matters relevant to ITER, the Broader Approach and DEMO.
Appointed by:	The Governing Board
For a period of:	2 years

Mandate:	The TAP assists the Governing Board and Director in engineering, scientific and technological matters related to ITER, the Broader Approach and preparations for demonstration fusion reactors (DEMO), in particular by: • Preparing opinions and recommendations on the objectives and content of project plans, work programmes and their possible revisions; • Monitoring the technical implementation of the project plans and work programmes and providing reports to the Governing Board at appropriate intervals; • Promote coherence with the activities of the Associations, in particular within the frame of the European Fusion Development Agreement (EFDA); • Providing advice or recommendations on specific engineering, scientific and technological issues upon request of the Director or the Governing Board; • Performing any other functions as may be delegated to the Scientific Programme Board by the Governing Board.
Positions within Body:	Chair and Vice chair. Both for period of 2 years.