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VERY LARGE SCIENTIFIC FACILITIES IN EUROPE: ANALYSIS OF LEGAL TEXTS GOVERNING INSTITUTIONAL CO-OPERATION

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

This document which was prepared by Madame Danielle Alloin may serve as a first introduction to the legal instruments that govern scientific co-operation in Europe for large-scale projects and programmes or as a brief résumé depending on the reader's previous knowledge of this corpus. All the large facilities discussed here are located in Western Europe. Concern for a homogenous presentation has led the author not to extend the analysis to the means of co-operation that have existed and still exist in the former Soviet Union. The Secretariat of the Megascience Forum considers that it may be useful to governments interested in participating in one of the European co-operative efforts, or those exploring new formulas for setting up entirely new co-operative programmes, to have access to a synthesis of procedures that have been used in Europe.

This document formed part of the documentation for Ministers in charge of research at the Meeting of the Committee for Scientific and Technological Policy (CSTP) at Ministerial level on 26 and 27 September 1995.

A similar initiative, restricted neither to Europe nor to megascience, was undertaken earlier, for the Science Ministers Conference on 3 and 4 October 1963, which resulted in the publication of a catalogue entitled "International scientific organisations" (OECD, 1965). However, the situation has changed considerably over the last 30 years and several legal formulas have been tested successfully since then, the more recent ones building on an analysis of the earlier ones, so as to settle even better the creation, financing and daily operation of European scientific organisations. The author has adopted a very rigorous analytical approach, and this document contains, in particular, all the legal aspects which have resulted in an explicit agreement among the contracting parties.

The author and the Secretariat wish to thank those responsible for the various scientific organisations discussed who have kindly communicated their remarks and corrections. A list of acronyms can be found at the end of this document.

VERY LARGE SCIENTIFIC FACILITIES IN EUROPE: ANALYSIS OF LEGAL TEXTS GOVERNING INSTITUTIONAL CO-OPERATION

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The field of big science with which the Megascience Forum is concerned is dominated by very large scientific facilities (referred to hereafter as VLF), whether devoted to a single discipline (e.g. large telescopes for astronomy, accelerators for particle physics) or suitable for various scientific purposes and hence used by researchers from several different disciplines (neutron beams, lasers).

Very large facilities appear where scientific, economic and political interests converge. The strength of each aspect varies from one VLF to another according to its objectives and the date of its establishment. There has been a perceptible change in the importance of each of these parameters since the beginnings of European unification and the present. The scientific parameter is of course central to each VLF, but they have also been able to serve other objectives, and political and economic goals are also to be found both in the founding texts of VLFs and in their organisational structure.

The founding texts of a certain number of VLF are examined here, in terms of their juridical basis, in terms of:

- the nature of the texts;
- scientific, economic and political objectives;
- organisation and operation, representation of partners;
- voting arrangements;
- the possibilities for the admission of new members and for change;
- industrial return, economic considerations.

The detailed scientific activities of VLFs (utilisation of facilities, scientific results, complementarity with other facilities) are not considered, since these depend more on the practices of the VLF than on the principles set out in founding texts; they also depend on the vitality and creativity of the scientific communities attached to each VLF and on developments in the fields of science concerned. However, the authorities responsible for VLFs in each member State carefully analyse the scientific return on their investment, in terms of the complement of scientific staff, the training of young researchers through post-doctoral grants, scientific publications, patent applications, if any, the participation of national teams in the installation of instruments, and the match between the needs of their scientific communities and the facilities offered by the VLF. As a result, control of the development and operation of VLFs is retained by the scientists using them.

International co-operation in the construction and operation of VLFs can be (and has been) organised in various ways:

- through international organisations founded on a specific intergovernmental convention (level I agreement), sometimes coupled with an inter-agency agreement (level II agreement)

and statutes setting out the detailed implementation of the convention or conventions (level III text);

- under the auspices of the European Atomic Energy Community (EURATOM);

- within a co-operative framework as part of a multilateral agreement on general scientific co-operation concluded at government level (level I), which provides a highly flexible way to reach bilateral or multilateral level II or III agreements between parties to the level I agreement;

- through flexible co-operative arrangements based on level II and III agreements.

Each of these legal structures offers both advantages and disadvantages and corresponds to the expectations expressed in the political, economic and scientific context of a given period. The considerable differences between the earliest and most recent texts reflect in particular a tendency on the part of governments to reduce their direct involvement in the operation of these institutions by delegating powers to functional authorities. The founding texts studied in this paper are:

- specific international organisations: European Organisation for Nuclear Research (CERN), European Southern Observatory (ESO), Institut Laue-Langevin (ILL), European Molecular Biology Laboratory (EMBL), European Space Agency (ESA), European Synchrotron Radiation Facility (ESRF);
- the joint large facility of the European Union: Joint European Torus (JET);
- a co-operative framework: Canary Islands Observatories;
- inter-agency collaboration: Canada/France/Hawaii Telescope Corperation (CFHT), European Incoherent Scatter Scientific Association (EISCAT), Institut de radioastronomie millimétrique (IRAM), Ultrasensitive Interferometer for the Detection of Gravitational Waves (VIRGO).

The main results of this study are set out below. They are based on the detailed analysis presented in Section 2,

1. Main results of the analysis of founding texts

Since the middle of the 20th century, scientists involved in basic research have had to build increasingly large scientific facilities in order to extend knowledge. As ever larger financial and human resources were required, co-operation in Europe developed naturally, especially after the end of the Second World War. The presence of very high-level scientists was essential to such co-operation, but it was also necessary to take account of the fact that the war had represented a serious drain on some countries' resources. These factors, together with an explicit determination to overcome historical enmities, encouraged the development of joint efforts. The 11 international organisations or VLFs studied here are illustrative of this situation. Seven were created between 1954 and 1975, six of them on the basis of level I conventions. Two points can be noted from the outset: first, countries with very different legal traditions were able to agree on relatively precise texts; second, the present trend is towards the creation of more flexible organisations based on inter-agency agreements, in some cases within the framework of a broad intergovernmental agreement (e.g. Canary Islands Observatories). This tendency doubtless reflects the effects of stronger ties between European countries and increasingly rapid developments in the economic situation. The questions chosen for this analysis make it possible to see how the situation has evolved.

To what extent do the founding texts of European scientific organisations express a political commitment to building a unified Europe?

The commitment to closer ties between the countries of Europe figures prominently in the organisations founded on intergovernmental conventions during the first phase of building a unifed Europe (CERN, 1954; ESO, 1962; ILL, 1967; EMBL, 1969; ESA, 1975), as well as in the joint undertaking (JET, 1978). France and Germany played a leading role; they have an equivalent share in all the VLFs and organisations studied here with the exception of CFHT and VIRGO, to which Germany does not contribute. This resolute expression of a political determination has become more muted (ESRF, 1988) as a unified Europe has become more and more of a reality, with political motives being replaced by cost-saving arguments. However, a reaffirmation of political will is likely to be needed if large-scale scientific facilities or organisations with full international -- and not merely European participation -- are to be established in the future.

There is little evidence of any political commitment in the founding texts of VLFs established on the basis of inter-agency agreements. There are generally fewer partners and their budgets, like their user communities, tend to be smaller. Agreements concerning these VLFs have limited ambitions and a closely focused scientific objective.

How are partners represented?

The intergovernmental organisations established before 1975 have almost all adopted the "one member State, one vote" principle. Only the EMBL provides for member States' votes to be weighted according to their financial contribution, especially for votes relating to the budget. This principle, which reflects the political commitment expressed in initial agreements, may become a source of functional problems when the number of member States increases and there is considerable disparity in the level of their financial contributions. The case of CERN, where contributions range between 25 per cent and less than 1 per cent, illustrates this difficulty. CERN got round the problem by adopting for the Finance Committee a rule whereby voting on budget matters was weighted according to financial contribution. The ESO is currently considering a similar amendment. JET has had a weighted voting procedure since 1978. ESRF, created in 1988, also uses weighted voting.

Most inter-agency organisations use a system whereby the number of a partner's representatives on the Council reflects their financial contribution, meaning that voting is automatically qualitatively weighted. As there are generally few partners, consensus is more easily achieved.

How can the continuing flexibility and adaptability of these organisations be ensured?

Amending the conventions on which intergovernmental organisations are founded is a long and difficult business. Operational flexibility can be achieved only through decisions taken at Council level, as in the case of the weighted voting proposed at CERN. Inter-agency agreements are more flexible, as amendments of their founding texts can be made by a decision at Council level.

The most recent of these large-scale organisations, the ESRF, founded in 1988, has been able to reap the benefit of previous experience. Its founding texts have two levels: an intergovernmental agreement which sets out the political will of the governments involved and ensures the durability of their commitment, and an inter-agency agreement establishing a corporation whose purpose is to construct and operate the ESRF, thus preserving flexibility and adaptability. Likewise, the ESRF has introduced weighted voting in budget matters and avoided excessive disparity in the financial contributions by

requiring a minimum contribution of 4 per cent. For that reason, certain member States have formed consortia (NORDSYNC and BENESYNC). This solution also has the advantage of making the organisation's functional structures less cumbersome by limiting the number of representatives on the Council.

Another flexible structure is that used for the Canary Islands Observatories, where a broad intergovernmental agreement (level I) provides the framework for a whole series of more flexible inter-agency agreements while ensuring a lasting common framework for the underlying infrastructure.

Inter-agency organisations operates fairly flexibly, given that there tend to be fewer partners and that their founding texts are signed at a more easily accessible level. Between 1950 and 1975, it seems to have been regarded as necessary to make choices in terms of Europe and to set up the large scientific facilities that Europe needed on the basis of intergovernmental agreements. Does this need still exist today? It probably no longer does at European level, but is perhaps beginning to emerge at a world level.

As regards personnel, workers at ESO, ESA, CERN, and EMBL have the status of international civil servants. The status of personnel at ILL, ESRF and other inter-agency organisations depends on local law.

How can the evolution of European scientific organisations be ensured in the context of the European Union?

In view of the progress towards a unified Europe (Maastricht Treaty, 1992) and the formation of broad scientific collaborative programmes by the European Commission, some intergovernmental organisations may have to evolve.

Article 130H of the Maastricht Treaty, by giving the European Commission the possibility of taking initiatives in favour of greater co-ordination, sets forth a project of "reciprocity of national and Community policies".

This leads certain intergovernmental organisations responsible for the development and operation of very large, high-cost facilities, such as CERN, to sign agreements in the form of administrative arrangements with the Commission. These organisations will doubtless continue to exist and prepare the next generation of large-scale research instruments. They attract growing numbers of scientists from all over the world and have a part to play with regard to the countries of Central and Eastern Europe. A consortium arrangement like the one used at ESRF could be one interesting way of preventing their operation from becoming unduly cumbersome as the number of partners increases.

As to intergovernmental organisations responsible for the operation of medium-large facilities, now also available in member States, whose primary purpose is to co-ordinate research efforts in Europe, they are likely to see their *raison d'être* fade away. Some of their initial objectives have been assumed by programmes run by the European Commission. The EMBL is one example. The new European context should lead to a reconsideration of these organisations with a view to ensuring complementarity in the structures and avoiding duplication of effort.

What links with industry?

The founding texts for VLFs and European international scientific organisations do not generally contain a fair return clause, except with regard to large-scale investment during the construction phase

(ILL, CFHT, ESRF, JET). One notable exception is the ESA, whose founding texts clearly state the need for a fair industrial return.

However, the notion of a fair industrial return has become more prevalent over the last ten years, especially with the development of major projects such as the Very Large Telescope [VLT (ESO)], the Large Hadron Collider [LHC (CERN)], ESRF. In practice, and although the notion is not always mentioned explicitly in founding texts, fair return is a parameter that is calculated and monitored over the years (ESA, CERN, ESO, ESRF, JET), with the aim of ensuring a fair distribution of contracts between member States according to their investment.

Another aspect of fair return, besides the purely financial one, concerns the development of advanced technologies. The technological challenges very often presented by leading-edge scientific equipment can act as a stimulus to industry. Here again, it is necessary to ensure that the distribution of contracts between member States is equitable.

Rather than examining fair return, organisation by organisation, it would doubtless be more instructive to review the situation at European level and approach a broadly satisfactory situation by seeking a geographically balanced distribution of VLFs.

The strict application of fair return clauses may entail additional costs for organisations since it would no longer be possible consistently to accept the lowest bid. The practice may also be regarded as contrary to the rules of the European Communities and of the General Agreement on Tariffs and Trade (GATT). Recent political and economic developments world-wide suggest that a wide-ranging review of these matters should be undertaken.

Towards greater openness for Europe and the rest of the world?

At a time when the countries of Central and Eastern Europe are considering membership of the European scientific organisations, and when world economic circumstances and problems with VLFs in a major country, the United States, favour co-operation rather than competition, what position should be adopted? The organisations themselves have already reacted in different ways. When the economic interests are great (ESA), limited and temporary agreements are concluded. In these cases, the flexibility of the status of non-European associate State and co-operating non-member State as a means of establishing fruitful co-operation becomes clear. Where basic research aspects tend to predominate, greater openness would appear rather easier, though still requiring consideration of matters such as entry fees, arrangements for voting and participation in the Councils, the breakdown of financial contributions, access to scientific installations. These issues are currently being raised at CERN, where member States have just approved its next large machine, the LHC. The United States and Japan are studying the terms of their participation in the LHC. As each organisation has its own history and its own operational methods, there can be no single rule in this area. Each organisation must find its own answers to the question.

2. Detailed analysis of the founding texts

2.1 International organisations

2.1.1 The European Organisation for Nuclear Research (CERN)

The European Organisation for Nuclear Research, founded in the early 1950s, is based on a level I agreement, a Convention signed in 1 July 1953 which took effect on 29 September 1954. It was

amended on 17 January 1971, in order to make possible the decentralisation of certain activities of the Organisation.

The Organisation has its headquarters in Geneva and CERN's facilities are located in Switzerland and France.

There were 19 member States of CERN at 1 January 1995: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, United Kingdom.

The annual budget (investment, operation, personnel) is approximately SF 936 million (1994).

The community of scientific users of CERN facilities (from CERN member States and others) numbers about 5 000 experimentalists.

CERN's scientific facilities are available to the community of member State researchers. Researchers from non-member States are given access to facilities through temporary appointments or participation in experiments.

Founding texts

They consist of an intergovernmental Convention and a Financial Protocol which set out the Organisation's purpose, conditions of membership, operational bodies, conditions for the appointment and dismissal of directors, arrangements for member States' financial contributions, arrangements for the admission of new members, relations with other organisations, the Organisation's legal status, arrangements for the submission and adoption of amendments, arrangements for settling any disputes that might occur, conditions for a member State's withdrawal, arrangements for dealing with a member State's failure to meet its obligations and, of course, all financial matters. The Convention was signed by representatives of the relevant governments and submitted to their parliaments for ratification as provided for by Article XVI.

The most recent amendments to the Convention were made in January 1971. Amending a level I agreement is a long and difficult process, given that the signatories are at ministerial level. The problems which CERN has faced since 1971 have been settled by Council decisions, obviating any need to amend the Convention.

There are also a number of texts relating to the Organisation's legal status: an agreement with the Swiss Federal Council dated 11 June 1955 and an agreement with the French government dated 13 September 1965, extended on 8 March 1973. These texts stipulate that the Organisation benefits from the immunities and privileges accorded to intergovernmental organisations by international law in order to facilitate the performance of their tasks. They recognise the Organisation's civil status and define each party's rights and duties with regard to administration, policing, justice, customs, taxes and the movement of persons.

Objectives, political considerations

The Organisation's purpose is clearly stated:

"The Organisation shall provide for collaboration among European States in nuclear research of a pure scientific and fundamental character, and in research essentially related thereto (...). The results of its experimental and theoretical work shall be published or otherwise made generally available." (Article II of the Convention)

Given the large number of founding member States (12 in all: Belgium, Denmark, Federal Republic of Germany, France, Greece, Italy, Netherlands Norway, Sweden, Switzerland, United Kingdom and Yugoslavia), the Organisation reflects a political commitment to European unification. Its current openness towards the countries of Central and Eastern Europe is further evidence of this political will:

"The third and probably most important consideration is the political will of the Government in question (that of the State considering membership of the Organisation) not only to support basic research but also knowingly to join a common European enterprise in the field of particle physics." (Report by A. Abragam, 84th Meeting of the CERN Council, 18-19 December 1987, Annex 1)

As mentioned previously, CERN now has 19 member States. Austria and Spain joined in 1961, Portugal in 1986, followed by Finland, Hungary, Poland, the Czech Republic and Slovakia. Yugoslavia withdrew in 1961 and Spain was absent from 1968 to 1983.

Organisation and operation, representation of partners

"The Organisation shall consist of a Council and, in respect of each Laboratory, a Director-General, assisted by a staff." (Article IV of the Convention)

The Organisation defines the basic programme, after approval by the Council by a two-thirds majority of all member States. Within the basic programme, member States take part in all the programmes of activities. The Convention also provides for the possibility of complementary programmes, a formula which in practice is not used. The arrangements for determining and paying member States' financial contributions and the financial conditions of membership for new member States are set out in detail in the Convention and the Financial Protocol. The Council consists of two delegates at most from each member State, one of a more administrative/diplomatic nature and one of a scientific nature, both appointed at government level.

The Council sets the scale of member States' financial contributions every year, through a consensus of all member States, on the basis of an extrapolation of the national income of each member State during the last three years for which statistics are available. No member State can contribute more than 25 per cent. The Council controls expenditure and approves and publishes the Organisation's annual accounts, audited by Council-appointed auditors.

"Each member State shall have one vote in the Council." (Article V.4)

The Council also establishes additional bodies: a Scientific Policy Committee, a Committee of the Council and a Finance Committee. The Director General is appointed by a two-thirds majority of all member States (Article VI).

Voting arrangements

A unanimous vote of all member States is required in the following matters:

- admission of other States (Article III.2);
- adoption of amendments to the Convention (Article X.1).

A two-thirds majority of all member States, or possibly of member States represented and voting, is required in the following matters (in matters directly concerning a programme of activities, only member States taking part in the activity in question are entitled to vote):

- definition of programmes of activities;
- when a new member State joins, definition of the minimum initial participation period in a programme of activities, ceiling on expenditure incurred as a result of the programme (Article III.4);
- as a general rule, all budgetary matters;
- establishment and remit of auxiliary bodies;
- international co-operation.

All other matters are decided by a simple majority vote of member States represented and voting.

A member State loses its voting right if the amount of its unpaid contributions exceeds the amount of the contributions due from it for the current financial year and the immediately preceding financial year (Article V.8).

A quorum is constituted when a majority of member States entitled to vote on a matter is present.

The increase in the number of member States and the considerable imbalance between member States' contributions have caused difficulties in the Council's operation, especially as regards decisions in financial matters. If the two-thirds majority rule covering most financial decisions under the terms of the Convention and Financial Protocol were applied, four member States (Germany, France, Italy, United Kingdom) who between them contribute 69 per cent of the operating budget could be outvoted by the other 15 member States who between them contribute the remaining 31 per cent.

At its 101st meeting on 16 December 1994, and after having experimented a similar formula for three years, the Council therefore submitted a motion proposing a dual majority procedure (Annex II):

- Majority of two-thirds of member States represented and voting.
- Majority of member States' annual financial contributions according to the scale in effect. This financial majority has been set at 70 per cent (it had been 55 per cent since 1990).

This arrangement will make it possible, *de facto*, for certain combinations of two of the four member States making large contributions to block a financial decision. The contributions of these four member States are as follows:

- Germany 22.50 per cent (25 per cent, temporarily reduced by 2.5 per cent);
- France 17.50 per cent;
- Italy 15.26 per cent;
- United Kingdom 13.50 per cent.

Admission of new members and enlargement

A commitment to openness is contained in CERN's founding texts and reflects political, economic and scientific interests. The considerations to be taken into account for the admission of new members are clearly set out in A. Abragam's report (Annex I):

> *"The first essential condition is the existence in the country of a solid base in both theoretical and experimental particle physics (...).*
>
> *"The second major consideration is the existence in the country in question of an industry sufficiently developed to be able to tender for CERN contracts (...).*
>
> *"The third and probably most important consideration is the political will of the Government (...) knowingly to join a common European enterprise in the field of particle physics."*

This commitment to openness has led CERN recently to admit several new member States (Hungary, Poland, Slovakia and the Czech Republic) which all together for the time being contribute less than 1 per cent of the CERN's budget. In view of the difficulty, for these countries, of estimating the national product on the basis of which member States' contributions are determined, and in view of the weakness of their industrial base, which does not allow them to take part in the tender procedure, interim solutions regarding their financial contributions have been introduced for transition periods of five to ten years (Annex III). Likewise, they have not been asked to make any compensatory contribution for past investment by the other member States. However, they must undertake to develop scientific research in this field at national level.

What about the possible accession of a non-European country? Initially a dedicated European organisation, CERN today finds itself as part of the globalisation of very large scientific facilities. This is the case for the setting up of the LHC, for example, which Japan has just joined (*ad hoc* contribution approved by the Council in June 1995). As a result, Japan now attends the Council as an oberver. Formally, the Convention does not contain any detailed description of procedures, but it is customary to request a compensatory contribution for past investment. The nature and amount of such a contribution are negotiated and may depend on a broader context than just CERN. The Council is creating a non-European associate member category, as at ESA, where an associate State undertakes to contribute at least to studies for future projects. This type of status, which assumes that non-European States associated with CERN will make a long-term political and financial commitment, opens up many flexible and strong avenues for co-operation and allows organisations to adapt to rapidly changing situations.

Economic considerations, industrial return

The founding texts do not contain any condition relating to industrial return. As CERN has expanded, however, this factor (the amount of tenders awarded to a member State in relation to that member State's contribution) has been monitored more carefully with the aim of moving towards a fair return for member States. The return factor, calculated for capital goods (excluding consumption of energy and services) was highly favourable to the two member States, Switzerland and France, which host CERN's facilities. In order to ensure a fairer participation of know-how from all member States, especially know-how related to the development of leading-edge technologies, the Council has introduced a new rule in the tender award procedure. If the best bid, i.e. the bid that should be chosen, is submitted from a member State whose return is satisfactory, member States who do not enjoy an equitable return are informed of the bid and may submit a fresh bid at the same cost as the best bid. This rule led to a fairer distribution of tenders between member States in 1994, with return coefficients of 2.9 for Switzerland (compared with 5.02 for the period 1991-93), 1.08 for France (compared with 1.69 for 1991-93), 0.81 for Germany (compared with 0.63 for 1991-93), 0.77 for Italy (compared with 0.39 for 1991-93) and 0.76 for the United Kingdom (compared with 0.63 for 1991-93), from a total amount of SF 21.8 million.

In this way, a scientific organisation like CERN can contribute to technology transfers and help to raise the technological level of Europe as a whole. The commencement of work on increasingly expensive facilities like the LHC is without doubt a factor behind more insistent demands for a fair return to member States.

2.1.2 The European Southern Observatory

The ESO was created on 5 October 1962. It is based on a level I agreement, a Convention initially signed by five States. The ESO's current members are Belgium, Denmark, France, Germany, Italy, the Netherlands, Sweden and Switzerland. Portugal, currently preparing for membership, has a special status, governed by a co-operation agreement with the ESO; full membership is planned for 2000. Austria and Australia are both negotiating for membership.

The ESO has its headquarters at Garching (Germany), including workshops, design centre, computer centre, science unit and administrative services. The telescopes and observatory proper are in Chile, at La Silla and Paranal. A local Chilean headquarters is located at Santiago (Chile).

The ESO had a budget of approximately DM 150 million in 1994, including DM 60 million for the construction of the VLT at the Paranal site.

Around 2 000 European researchers use the ESO telescopes, the data collected from them, the data reduction centre and the ESO-ESA archives (ESO and Hubble space telescope data). Access for non-member State researchers to ESO facilities is decided by a telescope time allocation committee based on the scientific merit of proposals, and through the post-doctoral grants programme.

Founding texts

The ESO was established by an intergovernmental Convention, imitated from the CERN's Convention, signed at Paris on 5 October 1962 by the governments of the Federal Republic of Germany, the Kingdom of Belgium, the French Republic, the Kingdom of the Netherlands and the Kingdom of Sweden. Denmark became a member State in 1967, Italy and Switzerland in 1982. The Convention was submitted to the member States' respective parliaments for ratification.

The Convention refers to the need for international co-operation. It sets out the Organisation's initial programme and provides for the possibility of additional programmes *à la carte*, rather like CERN or ESA. The Convention sets out in detail the Organisation's operational framework, including its governing bodies (Council and Director), composition and role of the Council, appointment and responsibilities of the Director, member States' contributions, amendments to the Convention, disputes.

A Financial Protocol is attached to the Convention, instituting a Finance Committee and setting out financial regulations for the Organisation.

There is also a whole set of Protocols and Agreements, including:

- A Protocol establishing the ESO's privileges and immunities (Paris, 13 August 1974). The Organisation has legal personality. As a general rule, it enjoys jurisdictional immunity, privileges of inviolability, exemption from direct taxation.

- An agreement between the Chilean government and the ESO governing their relations (Santiago, 6 November 1963); assistance of the Chilean government for the ESO's installation in Chile, recognition of the ESO's status as an international organisation and recognition of the same immunities, prerogatives, privileges and facilities as those granted to the United Nations Economic Commission for Latin America (ECLA), exemption from customs duties, staff privileges similar to those granted to ECLA's experts and staff.

- The text of the Convention and supplementary and explanatory agreement between the Chilean Republic and ECLA (16 February 1953) are also attached to the ESO's founding texts.

- Supplementary Agreement to the Convention between the Chilean government and the ESO guaranteeing protection of the environment of the La Silla site with regard to mining (Santiago, 30 March 1966).

- Donation by the Chilean government of land in Santiago in order to establish the headquarters of the ESO's activities in Chile.

- Headquarters agreement between the government of the Federal Republic of Germany and the ESO for the establishment of the ESO's headquarters at Garching (Bonn, 31 January 1979).

Objectives, political considerations

The motives for setting up the ESO, as set forth in the Convention of 5 October 1962, are purely scientific. Reference is made to international co-operation out of a concern for efficiency:

"*Considering*

"*That the study of the Southern celestial hemisphere is much less advanced than that of the Northern hemisphere, (...)*

"That it is therefore urgent to install instruments in the Southern hemisphere comparable in power to those of the Northern hemisphere but that such a project can only be accomplished through international co-operation (...)".

The development of co-operation in astronomical research in Europe appears more as an expected result of the ESO than a starting point. Thus, the ESO's founding texts display relatively few traces of political vision. This is doubtless due to the fact that astronomical instruments in the 1960s were less expensive than they are now, allowing individual European countries, to a very considerable extent to develop their own observation programmes for the northern sky at the same time, and therefore to have a strong national policy.

Organisation and operation, representation of partners

As for the other organisations, the governing bodies are the Council and the Director. The Council consists of two delegates from each member State, one of a more administrative/diplomatic nature and one of a scientific nature, both appointed at government level. The Council determines the Organisation's policy in scientific, technical and administrative matters, is responsible, with the assistance of the Finance Committee, for budget matters, decides on the composition of the staff and approves the recruitment of senior personnel. The Council is assisted in its duties by a Scientific and Technical Committee. As well as the initial programme to which all member States subscribe by signing the Convention, the possibility exists for developing supplementary programmes, offering (in theory) great flexibility as to the scientific resources that each member State wishes to invest in the ESO.

The Director is appointed by the Council, by a two-thirds majority of member States.

Member States' financial contributions are determined according to a scale established by the Council every three years on the basis of net national income (procedure linked to the procedure established for CERN, CERN Convention of 1 July 1953). Contributions are currently as follows: Germany: 26.7 per cent; Italy: 25.16 per cent; France: 24.70 per cent; Netherlands: 6.01 per cent; Switzerland: 5.49 per cent; Sweden: 5.08 per cent; Belgium: 4.19 per cent; and Denmark: 2.62 per cent .

Each member State has a vote in the Council:

"*Each member State shall have one vote in the Council. However, a member State may vote on the implementation of a programme other than the initial programme set forth in Article II, paragraph 2, only if it has agreed to make a financial contribution to that programme or if the vote is concerned with installations to the purchase of which it has agreed to contribute." (Article V, paragraph 4)*

Voting arrangements

A quorum is constituted if the representatives of at least two-thirds of the member States are present.

A unanimous vote of member States is required *inter alia* for:

- admission of new member States;
- reduction of a member State's maximum contribution (currently 26.75 per cent) if new member States are admitted;
- adoption of amendments to the Convention.

A majority of two-thirds of the member States is required for:

- approval of a supplementary programme;
- approval of the budget;
- appointment and dismissal of the Director;
- establishment of the scale of member States' financial contributions;
- establishment of the amount of the initial contribution of new member States;
- dissolution of ESO.

An absolute majority of member States (represented and voting) is required for all other matters.

These arrangements were reviewed and defined at the 59th Council Meeting in 1990 (Annex IV).

Since the commencement of the VLT programme in 1987 (construction of a set of 8 m diameter telescopes on the Paranal site), difficulties have surfaced with regard to decision-making procedures in the Council as a result of non-weighted voting. Although three member States provide 75 per cent of the ESO's funding, budget decisions by a two-thirds majority in Council can be taken by a group of member States contributing less than 50 per cent of the Organisation's budget.

Clearly, not taking into account the "economic weight" of each vote in Council can cause operational difficulties if substantial financial interests are at stake. This primarily concerns large-scale investment, but the operating costs in relation to such investment also need to be scrutinised carefully.

The possibility of the ESO following CERN in changing voting arrangements in budget matters has therefore been raised (at Council) and discussions on this point are currently taking place.

Admission of new members and enlargement

The 1962 Convention states:

> "*The Council may, by the unanimous vote of the member States, approve the admission into the Organisation of States other than those covered by paragraph 1 of this Article." (Article XIII.4)*
>
> *"States becoming Members of the Organisation after the date on which this Convention comes into force shall be required to make a special contribution representing their share in capital investment and fitting-out costs already incurred in addition to their contribution to future capital investment and fitting-out costs and current operating costs. The amount of this special contribution shall be determined by the Council by a two-thirds majority of the member States".*

Denmark, Italy and Switzerland joined the ESO after the initial signature of the Convention according to the arrangements described in these articles.

In the case of Portugal, prevented from joining under this procedure for financial and scientific reasons, a preliminary co-operation agreement with the ESO was instituted. For ten years, the ESO offers Portuguese researchers access to all its equipment and a position as observer on the ESO's Council and committees, while Portugal is committed to develop astronomical research at national level.

For Austria, which submitted an application for membership of ESO in 1990, discussions are in progress in particular on the amount of the special initial contribution. Negotiations about possible membership are also under way with Australia. The special contribution rule may act as a deterrent to the admission of new member States. As the organisation has already been in existence for a relatively long time, the compensatory contribution for equipment already acquired may be rather high and its deterrent effect far from negligible. However, this arrangement has allowed the ESO to increase its group of instruments, and in particular to build the 3.5 m New Technology Telescope (NTT). As with CERN and ESA, associate status should perhaps be considered for certain programmes or facilities; this would make it possible to review the idea of a special contribution and allow greater flexibility.

The ESO, like CERN, is under heavy pressure from Central and Eastern European countries, some of which (Estonia, Hungary, Poland) have begun discussions with the ESO. A working party was set up to review this problem and its recommendations led to a proposal from the ESO's Director to the Council in December 1994. Gradual entry is envisaged, as regards both access to the ESO's facilities and payment of the financial contribution, inspired by the procedure used at CERN for the admission of the Czech Republic, Hungary, Poland, and Slovakia. Discussions on this matter are continuing at Council level.

The working party also recommended the institution by the ESO of an aid programme for Central and Eastern European astronomers, which started in 1993 for a three-year period with an budget of DM 500 000 for the first two years and of DM 250 000 for the third. The programme includes assistance with technical and instrument projects, research grants, visits by member State astronomers to Central and Eastern European observatories and institutes, the participation of Central and Eastern European astronomers in ESO conferences and exchanges of software. Its objective is to maintain active scientific communities.

Economic considerations, industrial return

There are no recommendations concerning industrial return in the ESO's founding texts, tenders being awarded to the lowest bidder. However, the Finance Committee closely monitors the distribution of large tenders and the demand for a balanced return has been expressed. This is the case in particular for the VLT project, where the notion of fair return must be borne in mind with regard to the awarding of industrial contracts for the construction of the telescopes and the awarding of instrument contracts to member State laboratories and institutes.

2.1.3 Institut Max Von Laue-Paul Langevin

ILL, established to develop and operate a very high neutron flux reactor, was founded by an intergovernmental Convention signed on 19 January 1967 and amended on 6 July 1971, 19 July 1974, 27 July 1976, 9 December 1981 and 25 March 1993. The present signatories to this Convention are the governments of the French Republic, the Federal Republic of Germany and the United Kingdom. Responsibility for operating the reactor, which is the purpose of the Convention, is vested in an association whose associates are scientific agencies of these three member States.

A number of scientific partnership agreements giving other communities access to the ILL facilities have also been concluded:

- on 12 December 1986 and on 10 February 1994 (for a participation presently set at 2.1 per cent), an Agreement between ILL and the Standing Committee of the Interministerial Science and Technology Committee of the Kingdom of Spain;

- on 13 May 1988 and 20 April 1994, an Agreement between ILL and the Swiss Federal Council, for a participation presently set at 3.5 per cent ;

- on 2 April 1990 and then on 14 December 1994, an Agreement between ILL and the Austrian Academy of Sciences, for a participation presently set at 2.1 per cent.

Thus, researchers from six European countries use the ILL reactor, representing a flow of around 2 000 visiting scientists a year.

ILL's facilities and headquarters are located at Grenoble in France.

Its annual budget is approximately FF 300 million (1994).

Founding texts

There are three levels of founding texts for ILL: a level I agreement (intergovernmental Convention of 19 January 1967, amended several times between that date and the most recent amendment in March 1993, setting out the basic principles; a level II agreement (Agreement between associates, i.e. the member States' scientific agencies, to constitute an association whose purpose is to operate the reactor); and a level III agreement (ILL's statutes, setting out in detail ILL's organisation and operation, contracts with third parties). To this should be added the above quoted scientific partnership agreements.

The Convention, initially signed on 19 January 1967 by the governments of the French Republic and the Federal Republic of Germany, was revised on 19 July 1974 to take into account the accession of the government of the United Kingdom. Various riders were added to the Convention, in order to revise construction costs (6 July 1971), to institute a clause on industrial return to the founder States during the construction phase (6 July 1971), to review arrangements for establishing the annual budget (27 July 1976) and to extend the minimum commitment period for the reactor (9 December 1981, then 25 March 1993).

The Agreement constituting a company under private law of the host country, whose purpose is to operate the reactor, was initially signed on 19 January 1967 (amended by a rider of 27 April 1972) by the associates: the French National Centre for Scientific Research (*Centre national de la recherche scientifique*, CNRS), the French Atomic Energy Commission (*Commissariat à l'énergie atomique*, CEA) and the German Society for Nuclear Research (*Gesellschaft für Kernforschung*, GfK). In order to take into account the UK government's accession to the Convention, an amended Agreement was drawn up on 19 July 1974 between the associates, CNRS, CEA, GfK and the Science Research Council (SRC). The company is governed by French civil law. The Agreement sets out the company's operating arrangements: Steering Committee, appointment of Directors and Deputy Directors, Science Council, associates' financial commitments (34 per cent for France, divided between the CNRS and the CEA, 33 per cent for GfK and 33 per cent for SRC), arrangements for establishing the budget, conditions for recruiting ILL staff and visiting scientists, rules for the awarding of tenders, rules for the provision of nuclear fuel and rules for intellectual and industrial property. The articles of the Agreement relating to the last point are

particularly detailed. Some of these rules have now fallen into disuse in practice, and the adaptation of ILL's rules has brought them closer to certain rules drawn up more recently by the ESRF (see below). Of course, the political, economic and scientific context in 1994 is very different from the situation when the initial Contract on ILL was drafted (1967); it was also initially intended as a bilateral agreement with a clearly stated concern to protect the balance between the associates. The rider to the Convention dated 25 August 1993 has revised the financial contributions of the associates. The share of the SRC is now 25 per cent and no longer 33 per cent, while the annual budget has been reduced.

The Convention on ILL's statutes (a level III text) is highly detailed. There are also texts and documents relating to tax matters (19 July 1974) and co-operation with other international bodies such as EMBL (18 March 1977) or national bodies like the *Centre d'études nucléaires de Grenoble* (CENG) (18 September 1984).

Objectives, political considerations

ILL's objective is to promote the use of the high neutron flux reactor in basic and civilian research for peaceful purposes. The intergovernmental Convention of 19 January 1967 is based on the provisions of the Franco-German treaty of 22 January 1963 relating to the development of scientific co-operation between the two countries. The creation of this very large facility displays a marked political commitment to building Europe from a Franco-German base.

ILL is also a basic nuclear installation and its reactor cannot be started up before publication of a ministerial decree issued by the French Prime Minister's office. Likewise, the provision of nuclear fuel and the storage of irradiated fuel are governed by a set of regulations within the framework of stringent contracts.

Organisation and operation, representation of partners

The organisation and operation of ILL are set out in the Agreement between associates (level II text) and the Statutes. The governing bodies are:

- The 12-member Steering Committee appointed by the associates (four representatives from each member State), which determines the company's general administrative policy (Article 5 of the Statutes), the scientific programme and the budget (Article 6 of the Statutes). The Steering Committee is assisted by a Science Council (18 members at most) which includes the representatives of the member States and the representatives of States associated to ILL through scientific partnership agreements (one for each associate State).

- The Director and Deputy Directors (the appointment procedure is set out in Article 3 of the Agreement: the Director is, in principle, a German or British national, nominated alternately by the GfK and the SRC. Exceptionally, the Director may be a national of another country. The nomination must be unanimously approved by the associates. There are two Deputy Directors, one appointed jointly by the CNRS and the CEA, the other appointed by the associate which did not nominate the Director).

- A six-member Audit Commission (two members for each member State) (Article 14 of the Statutes).

The associates' rights and obligations and their contributions are set forth in the Agreement and the Statutes; arrangements for the admission of other States (first by acceding to the Convention) and provisions for the winding-up of the company are set out in the Statutes (Articles 18 and 21, respectively).

Voting arrangements

According to Articles 9.6 and 9.8 of the Statutes, the Steering Committee may take decisions when at least two representatives of each of the member States are present (for France, one representative of the CNRS and one representative of the CEA). Most decisions are taken by a simple majority of the members present. However, all decisions concerning ILL's scientific programme and budget must be taken with the unanimous approval of the members present, each associate being represented.

Admission of new members and enlargement

The Convention provides for the admission of other States (Article IV):

> "*The present Convention shall be open to accession by third States. Any accession shall require the consent of the three Governments. The conditions of accession shall be the subject of an agreement between the three Governments and the Government of the acceding State.*
>
> *"If the other member States of the European Atomic Energy Community wish to accede to the present Convention, the three Governments will endeavour to place the activities of the Association in the framework of the research programme of this Community."*

If a scientific agency of a State that is not a signatory to the Convention wishes to join ILL, the government of that State must first accede to the Convention (Article 18 of the Statutes).

In practice, the accession of the UK government was prepared by a one-year association during which UK scientists took part in ILL's work.

An estimate is made of the amount that a new member State must pay in compensation of the costs incurred by the initial member States during the construction and operation of the reactor prior to the new member State's accession.

The possibility of scientific partnership with ILL, not linked to formal accession, offers considerable flexibility as regards access by other scientific communities to ILL's facilities. It enables States with modest scientific demands to circumvent the cumbersome administrative procedures involved in formal accession to the Convention and Agreement.

Economic considerations, industrial return

ILL's founding texts stipulate rules of return to member States for contracts relating to the construction of the reactor (Rider of 6 July 1971 to the Convention of 19 January 1967). A fair distribution of contracts was in fact achieved during this phase. They also provide that if member States wish to install a new source of intense neutron beams for co-operative purposes, the facility is to be located on the territory of the United Kingdom (Article 5 of the Convention of 19 July 1974).

Article 11.1 of the Agreement states that:

> *"(...) orders and contracts (...) shall be awarded to British, French and German organisations in proportion to be agreed upon between the associates and which shall take into account the fact that a considerable part of the current operating expenses of the Association are incurred at its location".*

These rules are not strictly applied, except for large investments, since they would cause excess costs of about 20 per cent for the company. However, insofar as possible, ILL seeks to maintain a balance in the returns to the partners.

2.1.4 European Molecular Biology Laboratory (EMBL)

In 1963, a number of pre-eminent scientists met to discuss the need to promote molecular biology research throughout Europe at a time when many of Europe's best scientists were being drawn away to the United States. Their main goal was to found a central European research facility for molecular biology, using CERN as a model. In order to build support for this laboratory and to promote ancillary activities, such as short and long-term grants, courses, seminars and visiting scientists programmes, the scientists formed the European Molecular Biology Organisation (EMBO).

On 13 February 1969 in Geneva, 13 states instituted a European Molecular Biology Conference (EMBC) with the aim of ensuring co-operation between European nations in basic research in molecular biology and other closely related fields. The EMBC was to collect its operating budget from its member States, the scale of contributions being drawn up in relation to each state's national product. In reality, the EMBC may be said to collect member State's contributions, while scientists from EMBL and EMBO provide expert advice for the utilisation of these funds.

In 1969, the paths of EMBL and EMBO separated, as not all EMBC member States were ready to commit themselves to the more expensive laboratory project. Twelve of the EMBC states pursued the laboratory project and formed an EMBL Council within the Conference. On 28 June 1972, the Conference approved the final proposals for a centralised laboratory with two outstations. EMBO took over responsibility for grants, courses, and other decentralised efforts to promote molecular biology in Europe. Over the years, EMBL and EMBO have continued to collaborate closely in promoting molecular biology, but they remain two distinct legal entities.

EMBL is based on a level I intergovernmental agreement signed at Geneva on 10 May 1973 between the following ten member States: Austria, Denmark, the Federal Republic of Germany, France, Israel, Italy, the Netherlands, Sweden, Switzerland and the United Kingdom. The agreement was submitted to the member States' parliaments for ratification and officially came into force on 4 July 1974. Greece and Finland would join EMBL later as member States in 1984, Norway in 1985, Spain in 1986 and Belgium in 1990.

The Laboratory's headquarters are at Heidelberg. There are currently three additional EMBL outstations at Hamburg (located at DESY), Grenoble (juxtaposed between the ILL and ESRF), and in Hinxton, England (next to the Sanger Centre and the MRC Resource Center). The annual operating budget is approximately DM 70 million (1995). The main contributors are Germany (22 per cent), France (17 per cent), Italy (16.2 per cent), and the United Kingdom (14.4 per cent).

Founding texts

Having elucidated the connections between the EMBO, EMBC and EMBL we shall focus on the EMBL. The EMBL is founded on an intergovernmental agreement which contains the following statement of purpose:

> "*The Laboratory shall promote co-operation among European States in fundamental research, in the development of advanced instrumentation and in advanced teaching in molecular biology as well as in other areas of research essentially related thereto, and to this end shall concentrate its activities on work not normally or easily carried out in national institutions.*"

Several level II and III agreements are attached to the intergovernmental agreement, including:

- a headquarters agreement between EMBC and the Federal Republic of Germany signed on 10 May 1973 in Geneva, setting out the particular contributions of the Federal Republic of Germany and the two parties' rights and obligations: land, legal status, collective facilities, immunities, tax exemptions, movement of persons;

- an agreement between EMBC and ILL signed on 18 March 1977 in Grenoble setting out the terms and conditions of co-operation between these two international organisations.

Objectives, political considerations

The clearly stated objective is to co-ordinate European research in molecular biology. With 15 member States, the EMBL is an integral part of the movement to build a scientifically competitive Europe.

Its four main objectives are to:

- create a multi-disciplinary centre of research excellence in an internationally collaborative environment;

- train young molecular and cell biologists for Europe's scientific work force;

- develop instrumentation for the European scientific community;

- provide services to the European scientific community, such as access to special equipment and resources otherwise unaffordable by individual member States.

Organisation and operation, representation of partners

The laboratory's governing bodies are the Council and the Director General. Each member State is represented on the Council by two delegates, one of a more administrative/diplomatic nature and one of a scientific nature, both appointed at government level. EMBC member States and EMBO representatives may attend Council meetings as observers. Each member State has one vote in the Council (Article VI.6.a).

The Council determines the laboratory's policy, approves the programme implementation plan (timetable, resources) and adopts the budget. The EMBL's financial resources are provided by the member States according to a scale based on each member State's national net income, averaged out over

three years. The texts provide for a 30 per cent ceiling and envisage a situation of special circumstances if a member State's national per capita income falls below a level determined by the Council. The Council appoints auditors to audit the laboratory's accounts. The Council approves and publishes the audited annual accounts, decides on the necessary complement of staff and adopts the Staff Regulations.

Two subordinate bodies have been instituted, a Scientific Advisory Committee and a Finance Committee.

The Director is appointed by a two-thirds majority of all the member States.

Voting arrangements

As each member State has one vote in the Council, a quorum is constituted when a simple majority of member States is represented. However, representatives of all the member States must be present for certain votes (see below).

A member State loses its voting right if the amount of its unpaid contributions exceeds the amount of the contributions due from it for the previous two financial years.

- Adoption of an amendment to the Agreement requires a unanimous vote of all the member States. Establishment of co-operation with a non-member State or with national bodies, acceptance of the presence of non-member States of the EMBC at Council meetings and changes to the programme require a unanimous vote of member States present and voting.

- Adoption of an indicative scheme, which sets ceiling on the amounts and duration of funding for the scientific programme of the laboratory, requires a unanimous vote of the member States present and voting. Annual budgets are determined within those ceilings.

- Adoption of the budget requires either a two-thirds majority of member States present and voting, provided that the total contributions of such member States constitute at least two-thirds of all contributions to the laboratory's budget, or a unanimous vote of member States present and voting minus one. (Article VI.3.c)

- Extension or termination of the Agreement requires a two-thirds majority of member States provided that the total contributions of such member States constitute at least two-thirds of all contributions to the laboratory's budget (Article XV.4.d and i).

- The following measures require a two-thirds majority of all the member States: institution of the Scientific Advisory Committee, Finance Committee or any other subordinate body, appointment of the Director General, determination of the scale of contributions, changes to a member State's contribution on the grounds of special circumstances, deprivation of the status of member State, determination of the amount of the special contribution for a State becoming a member State and acceptance of the headquarters agreement. A two-thirds majority of member States present and voting is required for: approval of provisional expenditure estimates, adoption of financial rules, adoption of staff regulations and the creation of laboratory groups and facilities outside its headquarters.

The EMBL is the first of the scientific organisations considered here to have introduced the notion of weighted voting into its founding texts, even though the financial stakes (especially as regards large-scale investment) are not as high as in other organisations such as CERN and ESO.

Admission of new members and enlargement

Through its close links with EMBO and EMBC, contained in its founding texts, the EMBL is an open and flexible European research organisation:

> "*The Laboratory may establish formal co-operation with non-member States, national bodies in those States, international governmental or non-governmental organisations (...)". (Article IV.2)*
>
> *"Any State member of EMBC not a signatory to this Agreement may accede at any later time". (Article XV.3.a)*

Any member State acceding pursuant to Article XV.3.a must pay a special contribution to the capital expenditure previously incurred by the EMBL. The amount of this special contribution is set by the Council.

From its founding texts and the fact that it is a medium-large facility, the EMBL has more the appearance of a European research laboratory and co-operative structure than a VLF in the sense of an installation housing large basic facilities that are unique in the scientific community.

Economic considerations, industrial return

For the reasons given above, it is understandable that the founding texts should make no mention of industrial return. However, the host country clearly enjoys the largest return factor as regards consumables and services. For an organisation of this type, it would doubtless be more appropriate to consider the scientific return for each member State.

It might be measured, for example, in terms of researchers working within EMBL, of the number of scientists trained at EMBL who have been repatriated to the member States (in most cases, staff at EMBL have contracts limited to a maximum of nine years), and of work carried out by visiting scientists on EMBL equipment in co-operation with EMBL's staff.

2.1.5 The European Space Agency

The Convention creating ESA was signed in Paris on 30 May 1975 by 11 States: Belgium, Denmark, Federal Republic of Germany, France, Ireland, Italy, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom. Two new States, Austria and Norway, acceded to the Convention in December 1986. Finland became a member State on 1 January 1995, having been an associate member since 1987. The ESA therefore now has 14 member States and one co-operating State, Canada. Since 1990, it also has co-operation agreements with Greece, Hungary, Poland, Romania and Russia.

Following preparatory work carried out in 1972 and 1973 (European space conferences), ESA was created, considering "*that the magnitude of the human, technical and financial resources required for*

activities in the space field is such that these resources lie beyond the means of any single European country".

The ESA has its headquarters in Paris, France. Its total annual budget (1994) is ECU 2.8 billion.

Founding texts

The level I intergovernmental Convention founding the European Space Agency was signed in Paris on 30 May 1975. The ESA has been operational *de facto* since 31 May 1975, though the Convention did not come into force until 30 October 1980 following ratification by the parliaments of the 11 founding member States. Austria and Norway became member States on 30 December 1986. Finland has recently become a member State, bringing the total number to 14.

The ESA Convention is an extremely comprehensive text that deals in detail with each of the points we shall analyse here. Certain matters raised in the Convention are given fuller treatment in separate annexes; these include privileges and immunities, financial provisions, optional programmes, internationalisation of national programmes and industrial policy. Others, related to developments in the political and economic situation in Europe, have been the subject of Council directives (the ESA's external relations, for example).

Objectives, political considerations

> "*The purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes, co-operation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems,*
>
> *a) by elaborating and implementing a long-term European space policy (...);*
>
> *c) by co-ordinating the European space programme and national programmes, and by integrating the latter progressively and as completely as possible into the European space programme (...);*
>
> *d) by elaborating and implementing the industrial policy appropriate to its programme and by recommending a coherent industrial policy to the member States"*.

From the outset, such a statement of objectives establishes strong links with the political and economic spheres. Of all the organisations examined here, the ESA has the closest connections with the world of politics. For example, the Convention states that the ESA's Council can meet at ministerial or at delegate level. Unquestionably, the ESA is a tool of both economic and science policy in Europe.

Organisation and operation, representation of partners

> "*The activities of the Agency shall include mandatory activities, in which all member States participate, and optional activities, in which all member States participate apart from those that formally declare themselves not interested in participating therein." (Article V.1.a)*

Mandatory activities include the scientific programmes and the dissemination of information, while optional activities are mainly connected with applications programmes (design, construction and launch of satellites; design and construction of launch systems and space transport systems).

The ESA's governing bodies are the Council and the Director General.

The Council meets at either ministerial or delegate level (ESA Council Bylaws, May 1976, amended in February 1979). Council meetings at ministerial level are held regularly in order to decide on the long-term space programme. Their purpose is to define programmes and budgets and in particular to draw up the five-year level of resources. Each member State is represented by two delegates at most, one of a more administrative/diplomatic nature and one of a scientific nature, both appointed at government level. The Chairman, elected for two years, is assisted by a Bureau. The Council sets up a scientific programme committee. The Council may create the subordinate bodies it deems necessary for the Agency's purposes.

The Director General is appointed by a two-thirds majority in Council.

> *"All staff shall be recruited on the basis of their qualifications, taking into account an adequate distribution of posts among nationals of the member States. Appointments and their termination shall be in accordance with the Staff Regulation." (Article XII.3.c)*

The Agency's mandatory activities and common expenses, which represent approximately 25 per cent of the total budget, are borne by all the member States. The costs of optional activities are borne by the member States taking part in each programme. Financial contributions are determined according to a scale adopted by a two-thirds majority in Council, reviewed every three years on the basis of each member State's national income.

Voting arrangements

> *"Each member State shall have one vote in the Council. However, a member State shall not have the right to vote on matters concerning exclusively an accepted programme in which it does not take part.*
>
> *"A member State shall have no vote in the Council if the amount of its arrears of contributions to the Agency (...) exceeds the assessed amount of its contributions for the current financial year (...)." (Article XI.6.a and b)*
>
> *"The presence of delegates from a majority of the member States shall be necessary to constitute a quorum at any meeting of the Council"(Council Bylaws, Article 18)*

The following matters require a unanimous vote of the member States:

- definition of industrial policy objectives other than those set out in the Convention (Article VII.1);
- establishment of the level of resources to be made available to the Agency during the forthcoming five-year period (Article XI.5.a.ii and iii).
- institution of co-operation agreements with non-member States and other international organisations (Article XIV.1);
- any amendment to the Convention (Article XVI.3);
- the accession of a new member State (Article XXII.1).

A two-thirds majority is required for most decisions, including:

- the drawing up of detailed rules concerning attainment of the Agency's objectives;
- the overall annual budget and programme budgets;
- financial arrangements;
- staff regulations;
- the institution of subordinate operational bodies;
- appointment of the Director General;
- adoption of the scale of contributions.

A two-thirds majority of votes and two-thirds of contributions are required to discontinue a programme (Article VI of Annex III, optional programmes covered by Article V.1.b of the Convention).

All other decisions are taken by a simple majority of member States represented and voting.

Admission of new members and enlargement

The principle of openness to new States is stated explicitly in Article XXII of the Convention.

> *"After the entry into force of this Convention, any State may accede thereto following a decision of the Council taken by a unanimous vote of all member States."*

The practical and financial arrangements are set out in Annex II (Article III.3), the main measure being a review of the scale of contributions. The ESA does not require financial compensation for investments made prior to a new State's accession.

However, the ESA's responsibilities in research and development matters, its strong links with industry and the fair return rule which is applied mean that any member State wishing to accede to the Convention must in fact be capable of playing this part.

The ESA Convention also provides for the conclusion of co-operation agreements:

> "*The Agency may, upon decisions of the Council taken by unanimous votes of all member States, co-operate with other international organisations and institutions and with Governments, organisations and institutions of non-member States, and conclude agreements with them to this effect. (...) Such co-operation may also take the form of according associate membership to non-member States which undertake to contribute at least to the studies of future projects under Article V.1.a.i." (Article XIV)*

Thus, the ESA has instituted the status of associate Member (Annex V) and of co-operating State which in fact corresponds to a standing co-operation agreement.

Being anxious to preserve its financial equilibrium, ESA currently offers States wishing to join a first stage, either as associate Member or within the framework of a co-operation agreement. The Council regularly reviews the Agency's policy with regard to international relations:

> "*Where the countries of Central and Eastern European are concerned, the Director General sees it as the Agency's role to set the process of co-operation in motion and to make some financial and human resources (seed money) available for that purpose, on the understanding that any*

extension of such co-operation would have to be funded by the States concerned or by European bodies set up to provide them with aid." (ESA, International Relations Committee, January 1991).

New co-operation agreements have recently been concluded with Greece, Hungary, Poland, Romania and Russia. All co-operation agreements must be given prior approval by a unanimous vote in Council.

Economic considerations, industrial return

The ESA's industrial policy role has quite naturally engendered a fair return rule which is clearly stated in the founding texts:

"The industrial policy which the Agency is to elaborate and apply by virtue of Article II.d shall be designed in particular to:

(...)

c) ensure that all member States participate in an equitable manner, having regard to their financial contribution, in implementing the European space programme and in the associated development of space technology; in particular the Agency shall, for the execution of its programmes, grant preference to the fullest extent possible to industry in all member States, which shall be given the maximum opportunity to participate in the work of technological interest undertaken for the Agency (...)". (Article VII.1)

An entire Annex to the Convention is devoted to industrial policy (Annex V of the latter text). It defines a member State's return coefficient and stipulates that return coefficients are to be calculated quarterly and reviewed formally every three years. A member State's aggregate return coefficient must not fall below 0.96 (value set for the three-year period from 1994 to 1996). A fair return clause is thus contained in the ESA's founding texts not as a mere recommendation but as an express condition.

2.1.6 European Synchrotron Radiation Facility

The ESRF, the most recent of the VLFs whose founding texts are examined here, was created to oversee the construction of an X-ray generator in the form of a 6 GeV accelerator and electron/positron storage ring. The ESRF has been responsible for its operation since the first electron beams came on stream in the summer of 1994.

The project's gestation and culmination are retraced in the final statement of the Plenipotentiary Conference meeting held in Paris on 16 December 1988 (Annex VI). This document provides a good illustration of the successive phases of scientific and political action and the steps that need to be taken in setting up a VLF.

The ESRF is founded on a level I intergovernmental Convention among 12 States, representing eight contracting parties (four Scandinavian States are grouped together in the NORDSYNC consortium and two States are grouped together in the BENESYNC consortium). The company responsible for the construction and operation of the ESRF is established on the basis of the Convention and a level II agreement, the company's Bylaws, signed by 15 scientific agencies or organisations of the States acceding to the Convention.

The ESRF's headquarters and facilities are located in Grenoble, France.

The ESRF's annual operating budget is approximately FF 400 million (1994).

Some 2 500 researchers are expected to visit and/or use the ESRF each year.

Founding texts

The founding texts are:

i) An intergovernmental Convention signed in Paris on 16 December 1988 by the governments of the Federal Republic of Germany, the Kingdom of Belgium, the Kingdom of Denmark, the Kingdom of Spain, the Republic of Finland, the French Republic, the United Kingdom, the Italian Republic, the Kingdom of Norway, the Kingdom of Sweden and the Swiss Confederation. The government of the Kingdom of the Netherlands acceded on 9 December 1991. The Convention marked the culmination of a scientific initiative launched under the auspices of the European Science Foundation (ESF) in 1977 and formalised at a political level by an Arrangement signed in Brussels on 10 December 1985 and a Protocol signed on 22 December 1987. The Convention acknowledges the need for a facility of this type at European level and establishes a company under private law of the host country to construct and operate it. The Convention outlines the company's broad operational framework (headquarters, governing bodies, financing, admission of new members).

ii) The Protocol of accession for the Netherlands (1991) also includes the resulting amendments to the Convention and Bylaws.

iii) A level III agreement, the Bylaws of the company, a *société civile* under French law, responsible for constructing and operating the ESRF, signed by the scientific agencies of the States acceding to the Convention.

The Bylaws set out the arrangements for the company's organisation and operation.

The number of signatory States to the Convention is relatively large (12), as is the number of agencies in the company (15). In order to ensure that the company's operation is not too cumbersome, countries with a low financial contribution have been grouped together in consortia:

> "*The number of shares of the Member or Members of a Contracting Party corresponds to its financial contribution to the operating costs. Each Member shall hold at least 4 per cent of the shares." (Article 19 of the Bylaws)*

Two consortia have been formed as a result: NORDSYNC (Denmark, Finland, Norway and Sweden), a single Contracting Party to the Convention of 16 December 1988, and BENESYNC, formed by Belgium and the Netherlands (12 November 1990 in Brussels) prior to the Netherlands' accession to the Convention.

Objectives, political considerations

As for other very large facilities, the European option is central to the creation of the ESRF, as stated in the Convention:

> "*Desiring to consolidate further Europe's position in research in the world and to intensify scientific co-operation across disciplinary and national boundaries (...)*".

It is also apparent, however, that the facility was being set up at a time when European unification was already well under way. Rather than affirming an existing political commitment to Europe, the text of the Convention for the first time sets out arrangements for the practical and functional operation of a European facility: Article 9 of the Convention, for example, concerns the educational needs of the children of ESRF staff having a different language and culture from those of the host country. In a similar spirit, the Bylaws include operational rules intended to ensure the rotation of scientific staff. The concern for a fair return is included in the Convention:

> "*If it appears to the Council that there is a lasting and significant imbalance between the proportional use made of the facility by the scientific community of a Contracting Party and the contribution of the Party's Members, then the Council may decide measures to limit that use, unless the Contracting Parties agree to an appropriate readjustment of the contribution rates set out in paragraph 3 above." (Article 6.4).*

Contribution rates to the ESRF, by Contracting Party, are as follows: France (27.5 per cent), Germany (25.5 per cent), Italy (15 per cent), United Kingdom (14 per cent), BENESYNC (6 per cent) Spain (4 per cent), NORDSYNC (4 per cent) and Switzerland (4 per cent). A hosting premium is to be paid by the host country.

Likewise, there is a determination that staff from all the member States acceding to the Convention should contribute to the ESRF: discussions along these lines took place before the Council meeting in November 1994.

With this VLF emerges the desire for and premises of European working arrangements.

Organisation and operation, representation of partners

The governing bodies are, as usual, a Council, assisted by two advisory committees (Scientific Advisory Committee and Machine Advisory Committee, the latter up to mid-1994), and the Director General.

Each contracting party may send three delegates at most to the Council, appointed by the contracting parties to the company (scientific agencies, for example). The Council takes all decisions concerning possible changes in shareholdings in the company, operating rules, scientific programme, budget, timeshare policy, choice of director, etc. Each contracting party has one vote.

Voting arrangements

The ESRF has instituted weighted voting procedures which take into account both the contracting parties (each has one vote) and their financial contribution in terms of their shareholding. The following arrangements have been defined:

- simple majority: half the capital, the number of unfavourable votes not exceeding half of the contracting parties;
- qualified majority: two-thirds of the capital, the number of unfavourable votes not exceeding half of the contracting parties;
- unanimity: at least two-thirds of the capital and no counter-vote by any contracting party, all the contracting parties having been given the opportunity to take part in the vote.

Unanimous approval in Council is required for any change in the number of contracting parties and any amendment to the Bylaws or the operating regulations.

A qualified majority is required for budget decisions, the establishment of the scientific programme, the choice of director, the beamline timeshare policy and the institution of advisory committees.

All other decisions are taken by a simple majority.

Admission of new members and enlargement

A commitment to openness is apparent in the preamble to the Convention:

"*In the hope that other European countries shall participate in the activities which they intend to undertake together under this Convention"*

and in Article 12 of the Convention:

"After the entry into force of this Convention, any government or group of governments acting together may accede thereto with the consent of all the Contracting Parties. The conditions of accession shall be the subject of an agreement between the Contracting Parties and the acceding government or group of governments." (See also Article 20 of the Bylaws)

Article 8 of the Convention also mentions the possibility of access to the ESRF's facilities for "non-member" users and sets out the conditions for such access:

"*Arrangements for long-term use of synchrotron radiation by governments or groups of governments not acceding to this Convention, or by establishments or organisations thereof, may be made by the Company subject to the unanimous agreement of its Council."*

Economic considerations, industrial return

The notion of fair return is contained in Article 13.4 of the Bylaws:

"*(...) The Director General shall report to the Purchasing Committee and the Council regularly on the distribution of contracts. In the case of a significant imbalance in the value of contracts among the countries of the Contracting Parties in comparison with their contributions the Council shall upon request of any Contracting Party consider appropriate measures to be implemented by the Purchasing Committee and the Director General, having regard to [fair return]."*

In practice, return coefficients for the award of contracts (excluding civil engineering) in 1993 ranged between 1.1 and 1.3 for Switzerland, the United Kingdom and France, around 0.9 for Germany and NORDSYNC, between 0.6 and 0.7 for Italy and BENESYNC and 0.3 for Spain.

As the ESRF's facility is intended for use in both basic and applied research, the possibility of discoveries leading to a patent application is high. Consequently, intellectual property rights are covered in great detail in Article 14 of the Bylaws.

2.2 A joint undertaking, the Joint European Torus (JET)

The JET, is a VLF built under the European Atomic Energy Community's co-ordinated nuclear fusion research programme (the EURATOM Fusion Programme). It is the only VLF for which the European Community (EC) has sole responsibility. It is the only one located in the United Kingdom. The JET project was initiated by a decision of the Council of Ministers of the European Communities on 30 May 1978 as part of the Fusion Programme, with the aim of furthering research in the field of nuclear fusion and plasma physics. In order to implement the project, the EC Council established a Joint Undertaking (within the meaning of Chapter V of the Treaty Establishing the European Atomic Energy Community) for an initial period of 12 years from 1 June 1978. In July 1988 the EC Council extended this period to 31 December 1992 and in December 1991 accorded a further extension, this time to December 1996. An extension to the end of 1999 is being actively considered. The members of the JET Joint Undertaking include: EURATOM, participating States, and national research agencies. The community organisation and the countries participating in the project are: EURATOM, Belgium, Spain, France, Italy, Greece, Denmark, Luxembourg, Portugal, Ireland, Germany, Sweden, Switzerland, the Netherlands, and the United Kingdom.

The JET facility and its management structure are based in Culham (Oxfordshire).

The annual budget (equipment, operation, staff) is of the order of ECU 95 million (1993). The Community's total nuclear fusion research budget is ECU 200 million per year. If the research budgets of national scientific institutions in Europe are included, this brings the total to ECU 450 million a year.

Some 440 research staff, engineers and administrative staff are employed at the JET site, by the EC (150 temporary EURATOM posts), the United Kingdom Atomic Energy Authority (UKAEA) (approximately 230 posts) or through other channels (e.g. scientific institutions of partner countries). The JET project also runs a programme for visiting research scientists (25 per year) and students (70 per year) and can call on a network of consultants (200 per year).

2.2.1 Founding texts

The relevant texts issued by the EC Council of Ministers are: on the one hand, the Council Decision of 30 May 1978 on the establishment of the JET Joint Undertaking (decision 78/471 EURATOM); on the other hand, a series of later Council decisions setting EC funding ceilings and the number of posts allocated to EURATOM for the JET project. Finally, a number of Council decisions have approved amendments to the Undertaking's Statutes following the admission of Greece (14 June 1983), and of Spain and Portugal (2 June 1987) and the two consecutive decisions by the JET Joint Undertaking to extend the project until 31 December 1996.

The Joint Undertaking's activities are governed by its Statutes and these constitute the key text. They specify the location of its headquarters, its membership, scientific objectives and governing bodies

(Council, Director, Executive Committee of the Council and Scientific Council) and their duties, composition, procedures and the voting regulations of the Council and the committees, as well as the role and responsibilities of the Director. The Statutes and annexes thereto also cover all matters pertaining to the financing of the Undertaking and its financial regulations. The respective obligations of the host organisation (UKAEA) and the Undertaking are outlined briefly in the Statutes and in more detail in an annex agreement to the Statutes. Other articles in the Statutes cover dissemination of information, amendment procedures, admission of new members, duration of the Undertaking, winding up and disputes.

In addition to the above, there is also an agreement signed by members of the Joint Undertaking (set up by the EC Council).

A very detailed text on the Undertaking's financial regulations accompanies the Statutes.

The annex agreement to the Statutes between the JET Undertaking and the UKAEA, the host organisation, sets out their respective obligations (provision by the UKAEA of land, infrastructure, roads, communications, services) and specifies the costs of services. Another text stipulates the privileges and particularly the tax exemptions extended to the Joint Undertaking. Lastly, there are a number of detailed texts which relate to on-site staff and the procedures of the Council and its Executive and Scientific Councils.

2.2.2 Objectives, political considerations

The overall objective of the Jet Project is to produce and study plasma under physical conditions and time scales approaching those which would be required in a fusion reactor.

The quest for new energy sources, particularly a fusion-based energy source, is a challenge which requires an enormous research effort. The magnitude of the programme's political and economic implications explain and amply justify the fact that the European Community stands behind the programme. It is important to note that this is the first joint undertaking to be set up for a large facility.

Furthermore, it was intended from the outset that the Next European Torus (NET) would continue the research where JET left off; currently all the work conducted for JET is helping in the development of the ITER project (International Thermonuclear Experimental Reactor). The aim of the ITER project is to demonstrate the scientific and technical feasibility of peaceful applications of fusion energy. EURATOM and the governments of Japan, the Russian Federation and the United States have signed a co-operation agreement with this aim in view.

2.2.3 Organisation and operation, representation of parties

The bodies responsible for the project are, as is generally the case, the Council and the Director.

Every partner is represented on the Council by two delegates, one of whom has a scientific background. The Council consists of 30 members in all and is responsible for the overall management of the Joint Undertaking. It ensures collaboration between the associated laboratories and the Joint Undertaking in the development of JET. It decides on rules for the operation and exploitation of JET, concludes agreements with the host organisation and co-operation agreements with third countries or their institutions, nominates the Director and senior staff, approves the financial regulations, the budget and accounts. The Council sits at least twice a year.

It is assisted in the preparation of its decisions by an Executive Committee, whose chairman is nominated by the JET Council. The Executive Committee is primarily responsible for administrative and budgetary matters. It meets at least six times a year.

Lastly, there is the Scientific Council whose members and chairman are appointed by the Council. Its function is to advise the Council on any scientific or technical matters relating to the development, exploitation and long-term future of JET.

The Project Director is the chief executive of the Joint Undertaking and its legal representative. The Director is named by the Council and heads a team of managers.

The project is 80 per cent funded by EURATOM, 10 per cent by UKAEA and 10 per cent by associate members of EURATOM according to the scale of their contributions to the latter (see Table 1). The member countries therefore contribute in two ways to the JET budget, on the one hand through their contribution to EURATOM and on the other hand directly. Further, beyond its EURATOM contribution, the United Kingdom's contribution has two parts: 10 per cent as host country and 0.572 per cent as its direct contribution.

2.2.4 Voting arrangements

Votes on both the Council and the Executive Committee are weighted. The votes of both representatives of each partner are weighted as shown in Table 1.

Decisions by the Council and Executive Committee require 29 votes (out of 43) in favour.

2.2.5 Admission of new members and enlargement

The Council has full discretion to approve the conclusion of co-operation agreements with third countries and with institutions, firms or persons of third countries, or with international organisations (Article 4.2.2.c of the Statutes).

In practice, however, the vast majority of the members of the Joint Undertaking are EC member States or associate members of EURATOM. It is necessary to be at least an associate of EURATOM (the case of Switzerland) in order to participate. New members of the European Union (EU) can become members from the time of their accession, and the decision must be ratified by the Council of Ministers of the EU.

Table 1: **Weighting of JET Council representatives' votes**

Member	No. of representatives	Weighting	Financial contribution (%) (1993)
EURATOM	2	5	80
Belgium	2	2	0.214
CIEMAT (Spain)	2	3	0.272
CEA (France)	2	5	1.751
ENEA (Italy)	2	5	2.193
Greece	2	1	--
Risø (Denmark)	2	2	0.068
Luxembourg	2	1	0.0018
Ireland	2	1	--
JNICT (Portugal)	2	2	0.0682
KFK, IPP et KFA (Germany)	2	5	3.812
NFR (Sweden)	2	2	0.220
Switzerland	2	2	0.422
FOM (Netherlands)	2	2	0.405
UKAEA (United Kingdom)	2	5	10 + 0.572

Source: JET Statutes and Annual Report, 1993.

2.2.6 Economic considerations, industrial return

Regulations for the placing of contracts are given in detail in the Financial Regulations. With regard to returns, Article 11.3 of the Statutes stipulates:

> *"The Director of the project shall, in collaboration with the JET Executive Committee and the Members, strive to achieve as wide as possible a distribution of contracts, taking into account the Community nature of the project."*

In 1993, the distribution of JET contracts awarded (integrated for the period prior to 1984 and then from 1984 to 1993) is shown in Table 2. As April 1984 is the date of the inauguration of JET, contracts for construction activities were almost all awarded prior to that date.

Greece, Portugal and Spain, which acceded to the Joint Undertaking after the machine was built, are included under "other", along with extra-EU providers.

The host country (United Kingdom) which has benefited in particular from construction contracts, also has special obligations, as it will have to close down the Undertaking at the site, probably after 1999.

Table 2: **JET Contracts awarded (as a percentage of total contracts)**

Member	All contracts > 10 000 ECU	High-technology contracts (> 5 000 ECU)
United Kingdom	54.31	26.82
Germany	16.78	28.07
France	9.12	15.29
Italy	6.32	10.56
Switzerland	4.62	7.20
Denmark	1.35	1.47
Netherlands	1.73	3.08
Belgium	1.20	0.99
Sweden	0.71	0.90
Ireland	0.11	0.09
Other	3.75	5.53
Total	100.00	100.00

Source: JET Annual Report, 1993.

2.3 A co-operative framework: The Canary Islands Observatories

The Canary Islands site is operated for astronomical purposes under the terms of a Co-operation Agreement in astrophysics initially signed by the governments of Spain, Germany, Denmark, the United Kingdom and Sweden on 26 May 1979; the French government acceded on 18 April 1988. Its purpose is to encourage co-operation through the exchange of information, the exchange of scientists, experts and technical staff, the joint and co-ordinated implementation of technological research programmes, the joint and co-ordinated utilisation of scientific and technical instruments, the installation and utilisation of telescopes and instruments in the observatories of the Canaries Astrophysical Institute (IAC).

This level I general agreement acts as an umbrella for level II multilateral or bilateral agreements providing for the installation on the site of facilities of interest to certain of the parties. The most recent case involved the 90 cm vacuum solar telescope THEMIS, constructed and operated by the French and Italian scientific communities.

An arrangement of this sort permits considerable flexibility. The Agreement lays down the basic conditions for development of the site: infrastructure, conditions of access, amount and distribution of maintenance and operating costs for the observatories and host country guarantees. All matters relating to the installation and operation of specific instruments are covered in bilateral and multilateral agreements between agencies and the IAC. The Agreement offers the host country a substantial scientific return (20 per cent of access time on all telescopes).

The level I Agreement also provides from the outset that 5 per cent of access time is to be reserved for international programmes.

2.4 Inter-agency co-operation

The large facilities set up through level II inter-agency agreements tend to be rather smaller scientific facilities with more closely focused objectives. Their annual budgets are an order of magnitude less than those of the VLF examined above and in general the number of scientific agencies signing these agreements is lower than with VLF founded under level I agreements. The co-operative arrangements instituted in order to establish these facilities generally obey economic and scientific imperatives. Although they are *de facto* participants in the process of building a unified Europe by bringing scientific communities together around the same instruments, they do not reflect political ambitions as clearly as the organisations examined above.

2.4.1 Canada/France/Hawaii Telescope corporation (CFHT)

The decision to construct a large 3.6 m telescope on the Mauna Kea site (Hawaii, United States) was taken in June 1974 by the Canadian National Research Council (NRC), the CNRS and the University of Hawaii (UH) within the framework of a level II tripartite agreement.

The CFHT corporation has its headquarters at Waimea-Kamuela (Hawaii). Its annual operating budget in 1994 was approximately $6 million and some 150 researchers from the three communities use the facility. Access is open to the international community on the basis of scientific competition and through co-operative arrangements.

Founding texts

The main text is the Tripartite Agreement mentioned above, signed by the three partners on 20 June 1974 and amended on 11 July 1980 and 25 September 1985. The agreement establishes a corporation under Hawaiian law for the design, construction and operation of a 3.6 m telescope. The articles of incorporation of the TCFH corporation filed with the State of Hawaii (8 January 1974, amended on 17 December 1975) and the Bylaws of the corporation (20 June 1974, amended on 27 June 1984, setting out the corporation's operating arrangements) are attached to the Tripartite Agreement.

Organisation and operation, representation of partners

The corporation's governing bodies are the Board of Directors and the Director. The Board of Directors is assisted by a Scientific Advisory Committee. The Board of Directors includes four members appointed by the CNRC, four members appointed by the CNRS and two members appointed by the UH.

The Tripartite Agreement sets out the financial arrangements for both capital investment and operation. It also lists UH's contributions in terms of infrastructure and sets out the terms and conditions of employment for staff. The Bylaws recapitulate and detail the corporation's operational arrangements: role and composition of the Board of Directors, management, role and composition of the Scientific Advisory Council, arrangements for sharing observation time, etc. NRC and CNRS each contribute 42.5 per cent of the operating budget and UH 15 per cent. The accounts are audited, at the end of each exercise, by an audit commission. The Director of the CFHT is appointed by the Board and chosen alternately from the Canadian and French community according to established practice.

Voting arrangements

The Tripartite Agreement does not stipulate the "1 member, 1 vote" principle for Board decisions. The composition of the Board reflects a certain weighting according to the financial contribution of each agency, since NRC and CNRS each have four representatives, twice as many as UH.

Quorum conditions for the Board are as follows:

"Two directors appointed by NRC, two directors appointed by CNRS and one director appointed by UH constitute a quorum of the Board of Directors." (Bylaws, Article 3.6)

And for Board decisions:

"*The act of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board of Directors, provided that at least one of the directors appointed by each of the members of the Corporation joins in that majority." (Bylaws, Article 3.7).*

However, a unanimous vote is required for certain decisions:

- any amendment of the Bylaws;
- admission of new members, in which case the unanimous agreement of the agencies is required and not merely of their representatives on the Board.

Admission of new members and enlargement

"*After completion of the construction phase (...) any corporation, association or organisation interested in becoming a member of the Corporation shall submit in writing a signed application (...). Each application so received shall be considered by the Board (...) which shall recommend approval or disapproval of the applicant to the members. The Board of Directors shall set forth such conditions for membership as they deem to be in the best interests of the Corporation."*

Economic considerations, industrial return

The Tripartite Agreement sets out rules of return during the construction phase:

"*In as equal a fashion as possible, maximum use will be made of French and Canadian industrial capacity in the design and construction of the telescope, its basic instrumentation, its dome and associated buildings, and in the production of high-technology components."*

A certain balance in the matter is maintained during the operational phase.

2.4.2 European Incoherent Scatter Scientific Association

The EISCAT association is a European organisation formed in 1975. Six countries have built and jointly operate an incoherent scatter ionospheric probe with facilities located in Finland, Norway and Sweden. The association's headquarters are at Kiruna (Sweden). The partners are Germany, France, the United Kingdom, Sweden, Norway and Finland. About a hundred researchers in Europe use its equipment or the data obtained with EISCAT for international scientific programmes. EISCAT's annual operating

budget is Skr 26 million (1994). Access to EISCAT facilities is open to the international community through co-operative arrangements and measurement programmes co-ordinated at international level.

Founding texts

A level II Convention was signed on 23 December 1975 by government scientific agencies from six countries, their present names being CNRS (France), Max-Planck Gesellschaft (MPG) (Germany), Particle Physics and Astronomy Research Council (PPARC) (United Kingdom), Naturvetenskapliga (Sweden), Norges forskningsrad (Norway) and Suomen Akatemia (Finland).

The Convention institutes an association under Swedish law which is responsible for the construction and operation of the probe. Bylaws and Financial Regulations setting out the workings of the association are attached to the Convention. The Convention, Bylaws and Financial Regulations were amended when the partners undertook the construction of an additional antenna at Svalbard. The new text of the Convention is expected to be signed in spring 1995.

Organisation and operation, representation of partners

The governing bodies of the association are the Council and the Director.

> "*The Council is made up of Delegations consisting of up to three delegates appointed by each Associate. Each Delegation has one vote." (Convention, text of 27 December 1994)*

The Council is assisted by an Administrative and Financial Committee and a Scientific Advisory Committee. The Director is appointed by a two-thirds majority in Council. Associates' contributions to the operating budget are currently: CNRS, MPG and PPARC, 25 per cent each; Naturvetenskapliga and Norges forskningsrad, 10 per cent each; Suomen Akatemia, 5 per cent. As of 1 January 1997, when the operational phase of the Svalbard antenna begins, these percentages may vary depending on possible increases in some Associates' contributions.

Voting arrangements

The initial 1975 Convention stipulated the presence in Council of three delegates from each associate making a high contribution (25 per cent) and of two delegates from each of the other three associates. This introduced *de facto* weighted voting by the amount of each associate's financial contribution.

In 1994 the "1 member, 1 vote" principle was taken up in the new Convention. In the event of a tie vote, however, "*the weight of each vote is accounted according to the percentage observing time of the Associates as defined in Article 6 of the Agreement*", given that this percentage depends on the combined contributions to investment and operating budgets of each associate. Quorum conditions are as follows:

> "*The Council shall be competent to take decisions when at least all except one of the Associates are represented. However, for decisions requiring a majority of two-thirds or more, each Associate must be represented.*"

The following decisions require a unanimous vote:

- annual budget and staff complement;
- five-year budget forecasts;
- conclusion of contracts with third parties for the utilisation of EISCAT facilities;
- patent and industrial property matters;
- changes in contributions;
- admission of new associates;
- amendments to the Convention.

A two-thirds majority is required for decisions concerning:

- appointment of the director;
- establishment of detailed financial regulations.

A simple majority of all the Associates is required for all other decisions.

Admission of new members and enlargement

> *"Other Associates may be admitted to the Association under conditions that shall be agreed by unanimous decision of the Associates" (Convention, Article 14).*

The formula for calculating each associate's observation time explicitly provides for this possibility. Japan is currently considering membership of EISCAT.

Economic considerations, industrial return

The founding texts do not contain any fair return requirement, except as regards access time to EISCAT's scientific facilities. In practice, it is a consideration borne in mind for major investments.

2.4.3 Institut de radio astronomie millimétrique

IRAM was created in 1979 by two scientific agencies, CNRS (France) and MPG (Germany), joined in 1990 by *Instituto Geografico Nacional* (National Geographic Institute, IGN) (Spain). IRAM operates as a *société civile* under French law. The company's headquarters are at Grenoble (France). IRAM's facilities include:

- a 30 m radiotelescope at Pico Veleta (near Granada, Spain);
- an interferometer with five 15 m antennae on the Plateau de Bure (near Grenoble, France);
- workshops and offices at Grenoble (France) and Granada (Spain).

The annual operating budget is approximately FF 60 million (1994).

The facilities are used by a community of some 150-200 researchers. The international community has access to the facilities through co-operative arrangements and on the basis of scientific merit.

Founding texts

On 2 April 1979, under the auspices of two level I scientific co-operation agreements between the government of Spain and the government of the Federal Republic of Germany on the one hand and the government of France on the other, MPG and CNRS signed a level II agreement creating IRAM and establishing a private company under French law, to construct and operate the facility. On 16 May 1980, IGN and IRAM signed a Protocol governing matters relating to the contributions and benefits of the host country (Spain, for the Pico Veleta site). Article XI of the Protocol states:

> "*As of the entry into service of IRAM's facilities, IGN may ask for negotiations to be opened with a view to its admission as a new associate of IRAM.*"

The Protocol was therefore amended on 28 September 1990 when IGN, pursuant to the above mentioned article, became a full associate of IRAM.

A new agreement was drawn up, redefining the associates' contributions, their return in terms of access time and the company's operational arrangements. New bylaws were also drawn up.

Organisation and operation, representation of partners

The Company's capital is divided into 100 shares, CNRS and MPG each having 47 and IGN 6. The Company's governing bodies are the Board of Directors, assisted by a Scientific Advisory Council, and the Director. The Board has nine members (three appointed by each of the Associates) and has all the usual responsibilities of a Board of Directors:

> *"(...) it is responsible for drawing up the rules by which the Company is managed and for monitoring such management"*.

The Scientific Advisory Committee gives opinions to the Council and the Director on scientific and technical matters relating to the purposes of the Institute.

The Associates appoint an Audit Commission.

The Director and Deputy Director are appointed by the Board of Directors with the unanimous agreement of the Associates. They are responsible for the proper management of the Company.

The Associates contribute to the operation of the Company in proportion to their shares: 47 per cent for CNRS and MPG and 6 per cent for IGN.

The return in terms of telescope time is 42 per cent for CNRS and MPG and 6 per cent for IGN.

Voting arrangements

> "*The Board of Directors is competent to take decisions when each Associate is represented by at least one of its members.*"
>
> *"The Board of Directors shall take decisions by a two-thirds majority."*

With regard to the budget, accounts closing, the contraction of loans, movements of assets, sureties and financial guarantees, participation in other bodies, the establishment of rules for the management of funds and the acquisition or disposal of patents, the two-thirds majority must correspond to the representation of associates in proportion to their share of the capital. In this case, each associate has a vote in the Board's deliberations.

A unanimous vote in Council is required for the appointment of the Director and Deputy Director and for any amendment to the Bylaws.

Admission of new members and enlargement

There is no specific provision in the Agreement regarding the admission of new members. It is merely stated that *"any disposal of shares to a third party by an Associate is subject to the prior approval of the other Associates." (Agreement, Article 4)*

Economic considerations, industrial return

Article 5 of the Agreement states:

> *"For capital goods, all contracts shall be put to tender and shall, as far as possible, be concluded with firms from the Associates' countries, provided that, from a technical and financial standpoint, these firms' tenders are sufficiently competitive to ensure the best possible utilisation of the Associates' funds."*

2.4.4 Ultrasensitive Interferometer for the Detection of Gravitational Waves (VIRGO)

Since 1991, contacts have been pursued between several European partners with a view to co-ordinating the development of instruments for detecting gravitational waves:

- expression of common interest, signed by the Italian *Istituto Nazionale de Fisica Nucleare* (INFN) and the CNRS on 27 September 1991;

- expression of common interest signed by the INFN/CNRS and the MPG on 16 April 1992, instituting a tripartite monitoring and co-ordination committee, to which an observer from the British community is also invited.

Parallel to this co-ordination initiative, the CNRS and INFN signed an agreement on 27 June 1994 concerning the joint construction of a first antenna, VIRGO. Until it acquires legal personality, the VIRGO antenna is placed under the responsibility of INFN (which has its headquarters at Frascati, Italy) in accordance with Italian law.

The site for the antenna is at Cascina, near Pisa (Italy).

Estimated construction costs are ECU 82 million (excluding staff) and 695 man-years.

This level II agreement has been concluded for the duration of the construction phase. One year before the end of the construction phase, a new agreement covering the first five years of operation will be instituted. The current Agreement sets out the terms and conditions for the co-operation, the advantages

contributed by the host country, the sharing of costs -- excluding staff -- (55 per cent for INFN, 45 per cent for CNRS), financial arrangements and each partner's staff complement.

The Agreement provides for the institution for four years of a six-member Council (three members from each party). The Council monitors progress on the project, decides scientific policy, approves financial rules and the budget, gives its opinion on the accession of new partners to the Agreement, appoints the project Director and Deputy Director. Decisions are taken by a unanimous vote in Council. The Agreement provides for and encourages the accession of new partners.

The Agreement does not contain any express provisions concerning industrial return. However, the distribution of research and development work between the two parties corresponds to a *de facto* fair return rule.

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- Bylaws of the Canada-France-Hawaii Telescope Corporation (1974) and amendments.
- Staff regulations.

EISCAT

- EISCAT Convention (1975 and 1994).
- Bylaws of the EISCAT Association (1975 and 1994).

IRAM

- Agreement between Associates CNRS-MPG-IGN (1979).
- Bylaws of the IRAM Corporation (1979 and 1990).
- Protocol between IGN and IRAM (1980 and rider of 28 September 1990).

JET

- Decision of the Council of Ministers of the EC (30 May 1978 and later).
- Statutes of the Joint Undertaking JET and related texts.
- JET Annual Report, 1993.

VIRGO

- Agreement concerning construction of the VIRGO ultrasensitive interferometer for the detection of gravitational waves (1994).
- Rules of procedure for the VIRGO Council (1994).

CANARY ISLANDS OBSERVATORIES

- Intergovernmental Co-operation Agreement regarding astrophysics (1979), accession of the Government of the French Republic (1988).
- Inter-agency co-operation protocol regarding astrophysical research in Spain (1979) and amendments (1983, 1988).

General references:

- Memorandum of the voting rights of member States in some international scientific organisations (Ministry of Research and Technology, TOEE/GDS/206, Paris, May 1991).
- *Grands Équipements et Science lourde* (French Ministry of Higher Education and Research, September 1992).
- *Annual report of the Conseil des Grands Équipements Scientifiques* (French Ministry of Higher Education and Research, June 1994).
- Rembser, J. "Intergovernmental and international consultations/agreements and legal co-operation mechanisms in megascience", *Megascience Policy Issues*, OECD, 1995.

ANNEX 1

Annex III.I
of CERN Final Evaluation Report
(Report A. Abragam, 1987)

NEW MEMBER STATES FOR CERN

The 12 founding States of CERN in 1953-1954 were Belgium, Denmark, France, Germany (Federal Republic), Greece, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom and Yugoslavia. They were parties to the Convention signed in Paris on 1 July 1953 which entered into force on 29 September 1954. Subsequently Austria joined the Organization in July 1961, while Yugoslavia withdrew at the end of 1961. Spain joined in 1961, left in 1968 but joined again as from November 1983; Portugal joined in 1986, so that there are now 14 Member States.

1. General and legal considerations

It is useful to enumerate some general considerations to be borne in mind when any State contemplates joining CERN as well as the rules governing the accession of a State.

1.1 General considerations

The first, and an essential one, is the existence within the country of a strong basis in elementary particle physics, both theoretical and experimental, which is adequately funded both for the support of research within the country and also for payment of travel and living expenses to enable the scientists concerned to participate in the CERN programmes.

The second major consideration is that industry in the country concerned must be sufficiently developed to tender for contracts with CERN and to have a reasonable chance of success. Experience has shown that it takes considerable efforts to educate industry about the opportunities offered by CERN not only simply to gain contracts but also to acquire technological know-how, often at a very sophisticated level.

Third, and probably most important, is the political will of the Government in question not only to support basic research, but also consciously to join a common European endeavour in the field of elementary particle physics.

1.2 Legal provisions: membership and observers

The conditions for the accession of a State to CERN are defined by the Convention establishing the Organization dated 1 July 1953, as amended on 17 January 1971, the Financial Protocol attached thereto and the Rules of Procedure for the Council. Under these provisions, the accession of a State to membership of CERN entails an admission procedure and obligations on the part of the new Member States.

The procedure for the accession consists of three steps: the application for admission by the State concerned (Article III.2.b of the Convention), the decision of Council, which must be unanimous (Article III.2.a), and finally, the admission to membership of the Organization when the State accedes to the Convention (deposit of Instrument of Ratification).

1.2.1 The Member State's obligation

The Convention lays two kinds of obligations upon the Member State, one concerning its participation in the Organization's programme of activities, and the other concerning its financial contributions.

Compulsory participation in the Organization's basic programme

Article III.3 of the Convention states:

"...No State shall be entitled to become or to remain a member of the Organization unless it participates in at least one of the programmes of activities forming part of the basic programme."

The Convention specifies various programmes (Article II.3) but it allows the possibility of adding other programmes (II.3.d), re-defining programmes by a two-thirds majority (II.5) and dropping, apparently, all programmes except the SPS from the basic programme (II.6). In February 1979 Council decided unanimously that the SC, PS and SPS would constitute a single programme of activity, being the basic programme of CERN. Then in 1981 it was further decided that, during the construction period, the LEP project should be an integral part of the basic programme, because of the serious consequences for the other parts of the programme of financing LEP within a constant overall budget.

All members may vote on the definition of programmes and on general questions, such as the appointment of the Director-General, but otherwise (Article V.7):

"(...) no Member State shall be entitled to vote in regard to any matter falling within the limits of a programme as defined by the Council by virtue of Article II unless it participates in that programme or unless that matter affects directly any programme in which it participates".

Financial contributions

The Convention requires each new Member State to make two financial contributions, which (Article VII.2):

"shall be calculated in respect of, and applied only to, the programmes in which it participates".

-- The annual contribution

Under the provisions of Article VII.1.b:

"Each Member State shall contribute both to the capital expenditure and to the current operating expenses of the Organization: (...) in accordance with scales which shall be decided every

three years by the Council by a two-thirds majority of all the Member States, and shall be based on the average net national income at factor cost of each Member State for the three latest preceding years for which statistics are available."

The annual contribution may be reduced in "special circumstances". Under the provisions of Article VII.1.b.ii:

"The Council may decide, by a two-thirds majority of all the Member States, to take into account any special circumstances of a Member State and adjust its contribution accordingly(...)".

-- The special contribution towards capital expenditures

Under the provisions of Article VII.4.a and b:

"The Council shall require States which become parties to this Convention after the thirty-first of December 1954, to make a special contribution towards the capital expenditure of the Organisation already incurred in respect of the programmes in which they participate, in addition to contributing to future capital expenditure and current operating expenses. The Council shall require a similar contribution from Member States in respect of any programme in which they first participate after its commencement. The amount of this special contribution shall be fixed by the Council by a two-thirds majority of all the Member States.

"All contributions made in accordance with the provisions of sub-paragraph a) above shall be applied in reducing the contributions of the other Member States in respect to the programmes concerned."

1.2.2 The status of observer

States which are not, or are no longer, able to participate in CERN's activities may become Observers to the CERN Council. This status is designed to allow Observers to become or to remain informed about the activities of CERN. International organizations may also be given the benefit of such a position (UNESCO, EC). The status of Observer is not mentioned in the Convention but is provided for in Rule 4 of the Council's Rules of Procedure:

"Attendance of Observers from non-Member States

"The Council may by a two-thirds majority of all Member States permit at its sessions the attendance of duly accredited Observers from non-Member States".

Apart from the status of full member and Observer, no other form of membership is provided for in the basic official documents of the Organization*:* partial or associate membership, such as exists in other international organisations, is not provided for explicitly.

Three States have so far been admitted to Observer status*:* Turkey, on 2 June 1961; Yugoslavia, on 13 June 1962, following its withdrawal from CERN of which it had been a founder member; and Poland, on 20 June 1963.

1.2.2 The status of "Associate State"

This status exists in ESA. It is not provided for in the ESA basic Convention; its source is a decision of the Council.[1] The reason for such a status in ESA is that this Organization has developed programmes of activities in many separate fields (astronautic technology, satellites, communications). This status in ESA provides the Associate State with the right to participate and to vote on the programme in which it takes part. Its financial contribution is defined by the Organization, after negotiations.

If the activities of CERN were broken up into many programmes, members who participated in only a few programmes would be in a similar situation to Associates of ESA, with the important differences that Associates of ESA do not participate in the Council and that the scale of their contributions is fixed by special agreement, rather than by rules specified in the Convention.

2. European countries which are not Member States of CERN

Several European countries which are not present Member States have considered the possibility (either formally or informally) of establishing closer associations with CERN in one way or another.

2.1 Finland

Finnish scientists have a tradition of scientific co-operation with CERN dating back to 1968. More recently, following a number of discussions between the Director-General and various Finnish officials, a Memorandum of Understanding between CERN and the Academy of Finland was signed on 29 January 1985. Articles 3 and 4 of the Memorandum state:

"The two parties to the present Memorandum acknowledge that the practical collaboration now established between Finland and CERN has reached a stage at which a more formal statement of willingness to maintain and develop the existing scientific co-operation may facilitate the collaboration, in particular in view of the long time-scales for experiments at the $p\bar{p}$ collider and at LEP.

"This Memorandum is therefore to be considered as such a statement with the aim of further promoting the participation of Finnish scientists in the research programme of CERN and in related technological fields of interest to Finnish applied physicists and engineers in both academic and industrial circles."

Several Finnish ministers and high-ranking industrialists have visited CERN in recent years. The Finnish Ministry of Education has set up a special working group for "evaluating the needs of expanding the collaboration with CERN both in basic research and in technology and, if necessary, for making proposals in order to develop the collaboration with CERN further". This group visited CERN on October 22 and 23, 1987, and is supposed to report by the end of 1987.

2.2 Ireland (Eire)

Physicists form Ireland, particularly from the Dublin Institute of Advanced Studies and University College Dublin, have participated in experiments at CERN since the early 1960s. The possibility of Ireland becoming a Member State of CERN was raised some 15-20 years ago but came to

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1. Note by the OECD Secretariat: Contrary to the statement made here, the status of associate members is considered in Article XIV of ESA's Convention.

nothing. However, since the Autumn of 1986 a group of both theoretical and experimental physicists in Ireland have become seriously interested in re-opening the question. In particular they are putting special emphasis on the industrial benefits which Ireland could obtain by being a Member State and they have had contacts with the Irish Export Board, the Industrial Development Authority (IDA) and the National Board of Science and Technology (NBST). An *ad hoc* committee has been set up by the physicists concerned (and which now meets regularly in Dublin) with the aims of:

- drawing up a document making the case for joining CERN (for ultimate presentation to the Government);

- investigating the possibility of obtaining support directly from industrial firms.

Contacts with the CERN Management at the present time have been limited to requests for information.

2.3 Turkey

In November 1985 a Turkish delegation visited CERN. They expressed the wish to convert Turkey's status as an Observer into full membership. The reasons given were similar to those of Spain and Portugal: stronger participation in the scientific programme of CERN, development of industrial technology and integration into Europe.

The Director-General visited Turkey in May 1986. He was given to understand that the Turkish authorities were considering setting up a "centre of excellence" in order to concentrate their efforts in the field, possibly at the Middle East Technical University (METU) at Ankara.

The interest of the Turkish Government in CERN was further expressed by the Turkish Government at the June 1986 Session of the CERN Council. On the practical level discussions are now in progress between a small nucleus of Turkish experimentalists and members of one of the collider experiments (UA 8) at the SPS, with the aim of including the Turkish group in the future work of the experiment. It is not yet clear if sufficient funding will be available from the Turkish side for this to become a reality. In any case the development of high-energy physics in Turkey will take a long time.

3 Other countries participating in the CERN programme

3.1 Canada

Canada has decided to engage in two major projects in high-energy physics in Europe which represent a non-negligible part of the Canadian budget for basic research: OPAL at LEP and a participation in HERA at DESY. Groups from Carleton University, Montreal University and Ottawa (NRC) are contributing to the OPAL facility at LEP. The University of British Colombia at Vancouver and the Victoria University are also involved in the ASTERIX and the OBELIX experiments respectively at LEAR.

As long ago as October 1983 the possibility of Canada applying for Observer status at CERN was discussed between the Director-General and the Chairman of the Council of the Institute of Particle Physics of Canada, with the support of the National Sciences and Engineering Research Council (NSERC). Observer status was considered as a transitory status to a more definite association with CERN.

Early in 1984, the Director-General visited several Universities and Institutes in Canada that are active in high-energy physics. He had further discussions with officials of the two bodies mentioned above and of the National Research Council (NRC). A delegation including the President of NSERC visited CERN in February 1987. A visit of the President of the NRC has been announced. Further activities in elementary particle physics in Canada will be influenced by the pending decision on a K-factory proposed for TRIUMF. The main problem is financial since Canada is spending a relatively small percentage of its GNP on R&D. Canada is considering the possibility of participating in a large hadron collider either at CERN or in the United States.

3.2 People's Republic of China

Following a number of contacts and exchanges of delegations between China and CERN as from 1973 onwards (described in detail in CERN Yellow Report 81-14) a formal exchange agreement was signed between the Director of the Institute of High-Energy Physics in Beijing and the Director-General of CERN on 30 September 1981, governing the three-year period 1982-1984. This was renewed for a further three-year period (1985-1987) in May 1984 but this time in the form of a Protocol on Co-operation between CERN and the Chinese Academy of Sciences. This Protocol has to be extended in 1988.

The majority of Chinese scientists at CERN are working on two of the LEP experiments, namely ALEPH and L3, with a relatively large contribution in equipment to the latter. They are supported by the Academia Sinica and also by several American universities. A small number is admitted to the CERN Associates Programme. Individual experts work in the accelerator divisions in fields related to the construction of the BEPC 2.6 GeV e^+e^- accelerator in Beijing.

3.3 Israel

The formal collaboration with Israel which began around 1973, consisted at first principally of visits by individual scientists, but gradually it became an organised collaboration between CERN and Israeli universities and institutes under the auspices of the Israeli High-Energy Physics Commission. At one stage Israel envisaged asking to become a Member State of CERN, but after receiving a negative response, it did not pursue the matter further. In recent years, as a result of the interest of Israeli scientists in participating in LEP experiments, an exchange of letters took place, in the Summer 1983, between the Director-General and the Israeli Minister of Science and Development. This letter forms the basis for the present participation of Israeli scientists in the CERN programme, particularly in the OPAL experiment. No further steps are foreseen at the present time.

3.4 Japan

Although there have been a few Japanese scientists at CERN since the early days, it is only quite recently that there has been substantial participation in the experimental programme, first at the European Hybrid Spectrometer (EHS) and then in the OPAL experiment at LEP. There are no agreements apart from exchanges of letters with the Director of the Japanese National Laboratory for High-Energy Physics (KEK) and Memoranda of Understanding for LEP experiments.

3.5 United States of America

Some 200-300 US physicists are involved in the CERN experimental programme from a very large number of universities and institutes. This collaboration has existed since the very beginnings of CERN without the need on either side for any formal agreements at governmental level. In recent years the substantial sums of money given by the Department of Energy for US participation in LEP experiments has of course led to specific agreements (Instruments of Understanding) within the contexts of the individual experiments. Depending on the decisions which will probably be made in the next two or three years on future accelerator facilities, both in Europe and in the USA, one might reasonably expect this extensive collaboration to develop still further. After mutual participation in experiments the next step could be an agreement on contributions to accelerator projects, in cash or in kind.

3.6 USSR

Collaboration with the Soviet Union dates back to 1956 and has developed steadily over the years, until the present time when Soviet scientists play an important role in the preparation of LEP experiments (for the early history see CERN Yellow Report 75-77). Following the establishment of the Institute of High-Energy Physics at Protvino, near Serpukhov, and the decision to build a 76 GeV proton accelerator there, an exchange agreement between CERN and the USSR State Committee for the Utilization of Atomic Energy was signed on 4 July 1967. This provided for CERN help with the construction of the beam facilities of the accelerator and for reciprocal facilities for participation in joint experiments by physicists from Western Europe and from the USSR, both at Serpukhov and at CERN. This initial agreement has subsequently been extended twice, the last Protocol of October 1983 covering future experimentation at LEP and at UNK in the USSR. Soviet physicists have recently expressed interest in establishing still closer links with CERN, including possible collaboration in future projects.

3.7 Other contacts: Brazil, Hungary, India, Jordan, Pakistan, Poland

There are limited scientific contacts with all these countries. Brazil and Hungary have (or had) exchange agreements with CERN at Academy of Science level. A few scientists from India and Pakistan are now participating in LEP experiments and there have been some expressions of interest from both of these countries, as well as from Jordan, in establishing more formal scientific links with CERN. Poland is a special case in that not only is it an Observer but it also has a well-developed home base in high energy physics, and a relatively large number of Polish scientists come to work at CERN.

ANNEX 2

CERN/2074/FINAL; ORIGINAL: ENGLISH, 20 FEBRUARY 1995

CERN -- EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

COUNCIL, HUNDREDTH SESSION, GENEVA, 16 DECEMBER 1994

COUNCIL RESOLUTION CONCERNING A DOUBLE MAJORITY PROCEDURE FOR CERTAIN FINANCE COMMITTEE RECOMMENDATIONS TO COUNCIL

COUNCIL,

CONSIDERING

The proposal by the Committee of Council that the financial decisions of the Organisation should be satisfactorily supported in terms of budgetary contributions;

The recommendation of the Committee of Council to Council to introduce a double majority procedure, as expressed in Document CERN/CC/1887;

Its Resolution CERN/1902 and the recommendation of the Committee of Council to revise Articles 3 and 4 of this resolution;

The CERN basic Convention, in particular Article V;

DECIDES

1. A double majority procedure shall apply 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 Organisation, these recommendations shall be based on a majority of the annual financial contributions of the Member States, according to the scale of contributions in force;

2. This procedure shall apply to the recommendations of the Finance Committee relating to the Bannier procedure, the annual Budget and the Cost-Variation Index (CVI);

3. The percentage of contributions applicable for the financial majority of this procedure is set at a level of 70 per cent of the Member State’s contributions, according to the scale of contributions in force;

4. This Resolution, which replaces Resolution CERN/1902, shall apply from the date of its approval until the construction of the Large Hadron Collider is completed. Before the end of a period of three years starting from this date, Council shall conduct a review of the operation of this procedure and decide whether it should be modified.

ANNEX 3

CERN/2069 ; ORIGINAL: ENGLISH, 28 NOVEMBER 1994

CERN -- EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

COUNCIL, HUNDREDTH SESSION, GENEVA, 16 DECEMBER 1994

RESOLUTIONS ON THE RESPECTIVE CONTRIBUTIONS OF THE CZECH REPUBLIC, HUNGARY, POLAND AND THE SLOVAK REPUBLIC

On the recommendation of the Committee of Council following its meetings held on 29 September 1994 and 15 December 1994, Council is invited to adopt the attached Resolutions concerning the transition contribution arrangements for the Czech Republic, Hungary, Poland and the Slovak Republic.

According to Article VII.1.b.ii of the Convention, the decision is to be taken by a two-thirds majority of all the Member States.

At the time of their admission to CERN membership, the Czech Republic, Hungary, Poland and the Slovak Republic were individually granted by Council a transition arrangement including in particular an annual reduced contribution to the CERN Budget. It was also decided to examine in the course of 1994 the exact rate of increase of the contribution of each country.

At its Two-hundred-and-sixteenth Meeting, on 29 September 1994, the Committee of Council discussed a paper (CERN/CC/2061) concerning the contributions of these Member States. The principles outlined in document CERN/CC/2061 were accepted: contributions to reach their full values in 2002; a linear rise to 100 per cent from common baseline, which should be reached as early as is reasonably possible; savings, resulting from a reduction relative to the figures envisaged at the times of admission, to be invested in the strengthening of the domestic particle physics infrastructures in the countries concerned. However, at the September meeting of the Committee of Council the Delegations of these Member States mentioned the difficulties that too fast a progression of their contributions could cause them.

Taking these facts into consideration, the Committee of Council agreed that for each of these Member States, a baseline of 40 per cent should be reached in 1998, rather than in 1997 as proposed in CERN/CC/2061, and confirmed that each transition arrangement should end in the year 2002 with the full rate of contribution.

As was remarked during the discussion of the Committee of Council on 29 September 1994, the proposal put forward then, on the basis of the views expressed in June 1994, represented a total reduction of some 20 MCHF [million Swiss francs] relative to the level of contributions envisaged when these countries became Member States of CERN. The proposals presented here would provide a further reduction of some 10 MCHF, so that the global loss to the CERN Budget over the period 1995-2002, compared to the situation initially envisaged (second table on page 5 of CERN/CC/2061), is of the order of 30 MCHF. The reductions correspond to a saving of some 130-150 per cent of a full year's contribution for each of the countries concerned.

This document complements and amends CERN/CC/2061.

Council has to approve the transition contribution arrangements for each of the Member States concerned. To that end, four Draft Resolutions concerning the transition contribution arrangements for the Czech Republic, Hungary, Poland and the Slovak Republic are submitted herewith.

Council is invited, on the recommendation of the Committee of Council, to adopt these Draft Resolutions. According to Article VII.1.b.ii of the Convention, the decision is to be taken by a two-thirds majority of all the Member States.

1. Resolution on the contribution of the Czech Republic

THE COUNCIL,

CONSIDERING

That the Czech Republic, as a successor to the Czech and Slovak Republic, was granted transition arrangements in the form of a reduced annual contribution to the CERN Budget when it was admitted to membership of CERN on 25 June 1993 (CERN/1982), and that these arrangements were scheduled to end in the year 2000 with the full rate of contribution;

The intention expressed in 1993 to examine in the course of the year 1994 the exact rate of increase of its contributions to the CERN Budget and the discussion on this question (CERN/CC/2061) in the Committee of Council at its meeting held on 29 September 1994;

The recommendation of the Committee of Council at its meeting held on 15 December 1994;

Article VII.1.b.ii of the CERN Convention;

DECIDES

1. That for the years 1996 to 2002, the Czech Republic's annual contributions to the CERN Budget will rise according to the following progression, with 100 per cent subsequently:

1996	1997	1998	1999	2000	2001	2002
26%	33%	40%	55%	70%	85%	100%

2. That the Czech Republic should use the additional savings resulting from the extension of the transition period to strengthen its domestic infrastructure in high-energy physics.

2. Resolution on the contribution of Hungary

THE COUNCIL,

CONSIDERING

That Hungary was granted transition arrangements in the form of a reduced annual contribution to the CERN Budget when it was admitted to membership of CERN on 26 June 1992 (CERN/1928) and that these arrangements were scheduled to end in the year 2000 with the full rate of contribution;

The intention expressed in 1992 to examine in the course of the year 1994 the exact rate of increase of its contributions to the CERN Budget and the discussion on this question (CERN/CC/2061) in the Committee of Council at its meeting held on 29 September 1994;

The recommendation of the Committee of Council at its meeting held on 15 December 1994;

Article VII.1.b.ii of the CERN Convention;

DECIDES

1. That for the years 1996 to 2002 Hungary's annual contributions to the CERN Budget will rise according to the following progression, with 100 per cent subsequently:

1996	1997	1998	1999	2000	2001	2002
25%	30%	40%	55%	70%	85%	100%

2. That Hungary should use the additional savings resulting from the extension of the transition period to strengthen its domestic infrastructure in high-energy physics.

3. Resolution on the contribution of Poland

THE COUNCIL,

CONSIDERING

That Poland was granted transition arrangements in the form of a reduced annual contribution to the CERN Budget when it was admitted to membership of CERN on 14 December 1990 (CERN/1839) and that these arrangements were scheduled to end in the year 2000 with the full rate of contribution;

The intention expressed in 1990 to examine in the course of the year 1994 the exact rate of increase of its contributions to the CERN Budget and the discussion of this question (CERN/CC/2061) in the Committee of Council at its meeting held on 15 December 1994;

The recommendation of the Committee of Council at its meeting held on 15 December 1994;

Article VII.1.b.ii of the CERN Convention;

DECIDES

1. That for the years 1996 to 2002 Poland's annual contributions to the CERN Budget will rise according to the following progression, with 100 per cent subsequently:

1996	1997	1998	1999	2000	2001	2002
16%	25%	40%	55%	70%	85%	100%

2. That Poland should use the additional savings resulting from the extension of the transition period to strengthen its domestic infrastructure in high-energy physics.

4. Resolution on the contribution of the Slovak Republic

THE COUNCIL,

CONSIDERING

That the Slovak Republic, as a successor to the Czech and Slovak Republic, was granted transition arrangements in the form of a reduced annual contribution to the CERN Budget when it was admitted to membership of CERN on 25 June 1993 (CERN/1984) and that these arrangements were scheduled to end in the year 2000 with the full rate of contribution;

The intention expressed in 1993 to examine in the course of the year 1994 the exact rate of increase of its contributions to the CERN Budget and the discussion of this question (CERN/CC/2061) in the Committee of Council at its meeting held on 29 September 1994;

The recommendation of the Committee of Council at its meeting held on 15 December 1994.

Article VII.1.b.ii of the CERN Convention;

DECIDES

1. That for the years 1996 to 2002, the Slovak Republic's annual contributions to the CERN Budget will rise according to the following progression, with 100 per cent subsequently:

1996	1997	1998	1999	2000	2001	2002
35%	35%	40%	55%	70%	85%	100%

2. That the Slovak Republic should use the additional savings resulting from the extension of the transition period to strengthen its domestic infrastructure in high-energy physics.

ANNEX 4

EUROPEAN SOUTHERN OBSERVATORY
ORGANISATION EUROPÉENE POUR DES RECHERCHES ASTRONOMIQUES DANS L'HÉMISPHÈRE AUSTRAL

COUNCIL, 59TH MEETING, ONSALA/GÖTEBORG, JUNE 6 AND 7, 1990

RULES OF PROCEDURE FOR THE ESO COUNCIL

Following the remarks and suggestions made to Doc. Cou-422 at the last Council meeting on 4/5 December 1989, attached is a correspondingly revised version of this document, modifications underlined or, in case of deletions, indicated in the margin.

Further proposals to amend Rule 7, paragraphs 3 and 5 and Rule 8 paragraph 3 have not been included since

1. the quorum is defined in Art. V paragraph 5 of the ESO Convention and cannot be modified;

2. there seems no need to define the implications of abstentions in case of a required <u>two-thirds majority of Member states</u>, because, in case negative votes and abstentions exceed one third of the votes, the required majority is not obtained;

3. the written procedure, as a rule, should lead to a simplification and should not be complicated by imposing special conditions, in particular, delegations have all opportunity to co-ordinate their views and arrange, if considered necessary, through the Chairperson, for an extraordinary meeting as provided for in Rule 3 paragraph 3.

Rule 7 -- Voting

1. Each Member State shall have one vote in Council (V 4) except

   (a) on questions concerning exclusively an accepted supplementary programme in which it does not participate (VII 5)

   (b) if the instrument of ratification or accession has not yet been deposited (XIII 4).

2. A non-Member State may have a vote if provided in the arrangement concluded between this State and the Organisation.

3. The presence of delegations (at least one of the two delegates) from two-thirds of the Member States shall be necessary to constitute a quorum at any meeting of the Council (V 5).

   On questions relating exclusively to a supplementary programme a quorum shall be constituted by the presence of two-thirds of the participating Member States.

4. The Council shall vote under the majority conditions provided for in the Convention (Annex 1).

5. Delegations shall normally vote by a show of hands, except that any delegate may request a roll call, which shall then be taken in the French alphabetical order of the names of the Member States, beginning with the delegation which requested the roll call.

   In order to determine unanimity or the majorities stipulated, account shall not be taken of a Member State not having the right to vote.

   When a decision is to be taken by the absolute majority of the Member States represented and voting (V 6), an abstention shall not count as a vote.

6. A vote "ad referendum" will be considered as a provisional affirmative vote. It has to be confirmed to the Director General, who will inform the Chairperson and the Member States not later than at the next meeting of the Council.

   If a vote "ad referendum" is confirmed, it will be considered as a positive vote, otherwise as a negative one.

   A vote "ad referendum" cannot result in a partial or conditional acceptance of the decision concerned.

7. Council may decide that decisions be taken by secret ballot upon request of at least two delegations present.

ANNEX 5

29 OCTOBER 1985

EUROPEAN SPACE AGENCY COUNCIL

GUIDELINES FOR ASSOCIATE MEMBERSHIP

1. Features

1. The status of associate member referred to in Article XIV.3 of the Convention may be accorded by the Council to a European or non-European non-member State. When examining the State's application, the Council shall ensure that it provides adequate guarantees for concluding that this association will contribute to achievement of the objectives of both parties.

2. Conferment of the status of associate member shall not prejudice any Council decision relating to a subsequent application from a European State for accession to the Agency under Article XXII of the Convention.

3. Conferment of associate membership shall not prejudice any Council decision on a request to participate in an Agency programme (referred to in Article V.1.a or V.1.b), which shall be governed by Article XIV.2 of the Convention. Rights and obligations as a participating State shall be defined in a separate Agreement.

2. The terms

The terms include the following: the list is not intended to be exhaustive.

1. The associate State shall undertake to comply with the objectives of the Convention (space exploration and utilisation activities for exclusively peaceful purposes).

2. The associate member shall pay a contribution to the Agency's general budget (and thus to the studies on future projects) representing a uniform fraction of what it would have paid had it been a Member State.

3. The associate member shall not have the right to participate in the basic technology research programme (TRP).

4. The associate member may participate in projects conducted under the Agency's scientific programme by providing experiments or observation facilities. It shall receive calls for ideas.

5. The associate member may have access to facilities and services of the Agency for its own needs provided that the regular functioning of the activities and programmes of the Agency and the Member States so permit. It shall bear the costs incurred by the Agency in accordance with the rules and procedures applicable to the Member States.

6. The associate member shall have observer status on the Council with respect to items of common interest. Upon authorisation by the Chairman, it may make comments. It may be invited to attend certain meetings of subsidiary bodies of Council (SPC, AFC, IPC, IRAC) with respect to items of common interest. It shall not have voting rights. The rights and obligations of a co-operation agreement under Article XIV.2 of the Convention shall however remain unchanged (see section I.3 of this Annex).

7. The associate member and the Agency shall keep each other informed on their space programmes.

8. The associate member may be entrusted with the execution of work under the Agency's programmes without having any guarantee, referred to in Annex V to the Convention, of industrial return on its financial participation.

9. The associate member shall favour the use of European space transportation systems and the facilities and products of the Agency for its own needs and such use by the international organisations/institutions to which it belongs.

10. Associate membership shall be accorded in principle for a period of five years. It may be extended for a subsequent period by formal written agreement. The exchange of letters expressing this agreement shall take place at least six months before the expiry of the current association period. Either party may denounce the association Agreement by giving written notice of at least one year.

ANNEX 6

FINAL ACT OF THE CONFERENCE OF PLENIPOTENTIARIES FOR THE ESTABLISHMENT OF A EUROPEAN SYNCHROTRON RADIATION FACILITY

1. In 1977 the General Assembly of the European Science Foundation (ESF) approved the report of the ESF working group recommending a feasibility study for an advanced European synchrotron radiation laboratory. The ESF set up the ad hoc Committee on Synchrotron Radiation and two sub-groups for the machine and instrumentation in order to prepare the recommended feasibility study. In 1979 the results of the feasibility study were published in a four-volume document called the "Blue Book".

   In 1983 an intergovernmental Progress Committee was created, composed of representatives of Austria, Denmark, Finland, France, the Federal Republic of Germany, Italy, the Netherlands, Sweden, the United Kingdom and Yugoslavia.

   A study group prepared a Report ("Green Book") describing in detail the scientific goals, the machine and the experimental facilities, and the time schedule for construction.

   At the end of 1985 the Governments of France, the Federal Republic of Germany and the United Kingdom signed the "Memorandum of Understanding", the legal basis of the ESRF Foundation Phase. Italy and Spain joined early in 1986.

   On the basis of the Foundation Phase Report ("Red Book") prepared by the ESRF team the Governments of France, the Federal Republic of Germany, Italy, Spain, the Swiss Confederation, the United Kingdom, and the Governments of Denmark, Finland, Norway and Sweden acting together, signed in Paris on December 22, 1987 a protocol enabling the beginning of the first phase of the construction period on January 1, 1988.

2. At the invitation of the Government of France, a Conference of Plenipotentiaries for the establishment of a European Synchrotron Radiation Facility met at the Ministry for Research and Technology in Paris on December 16, 1988.

3. The following governments were represented by delegates:

   the Kingdom of Belgium, the Kingdom of Denmark, the Republic of Finland, the French Republic, the Federal Republic of Germany, the Italian Republic, the Kingdom of Norway, the Kingdom of Spain, the Kingdom of Sweden, the Swiss Confederation, and the United Kingdom of Great Britain and Northern Ireland.

4. The Chairman of the ESRF Council received from the Plenipotentiaries their Full Powers which he examined and recognised to be in correct and proper form.

5. The Conference heard a report from the Chairman of the ESRF Council established on the basis of the Protocol dated December 22, 1987. The Conference took note that the construction of the European Synchrotron Radiation Facility had already begun as of January 1, 1988. The Conference appreciated the work done so far by the Director-General and the ESRF team and invited them to continue their efforts in order to establish this facility within planned time schedule and budget.

6. The Conference of Plenipotentiaries adopted the text of the Convention concerning construction and operation of a European Synchrotron Radiation Facility and the text of the Statutes of the ESRF Company (*société civile*). The Convention includes four Annexes which form an integral part thereof.

7 In addition the Conference adopted the five attached Resolutions.

8 The Conference invited all the signatory Governments to complete as soon as possible their constitutional procedures, if any, with a view to the entry into force of the Convention and to inform the depositary Government accordingly.

In witness whereof, the Plenipotentiaries have signed this Final Act.

Done in Paris on December 16, 1988 in the Dutch, English, French, German, Italian, and Spanish languages, all texts being equally authentic, in a single original, which shall be deposited in the archives of the Government of the French Republic, which shall transmit certified copies to the Governments having signed this Final Act and to the Governments that become parties to the Convention.

ACRONYMS

AFC	Administrative and Finance Committee (ESA)
BEPC	Beijing Electron-Positron Collider (China)
CEA	Commissariat à l'énergie Atomique (France)
CENG	Centre d'études nucléaires de Grenoble
CERN	European Organisation for Nuclear Research
CFHT	Canada/France/Hawaii Telescope Corporation
CIEMAT	Centro de Investigaciones Energeticas Medioambientales y Tecnologicas (Spain)
CNRC	Canadian National Research Council
CNRS	Centre national de la recherche scientifique (France)
DESY	Deutsches Elektronen Synchrotron (Germany)
EC	European Community
ECLA	United Nations Economic Commission for Latin America
EHS	European hybrid spectrometer (CERN)
EISCAT	European Incoherent Scatter Scientific Association
EMBC	European Molecular Biology Conference
EMBL	European Molecular Biology Laboratory
EMBO	European Molecular Biology Organisation
ENEA	Ente per le Nuove Tecnologie, l'Energia e l'Ambiente (Italy)
ESA	European Space Agency
ESF	European Science Foundation
ESO	European Southern Observatory
ESRF	European Synchrotron Radiation Facility
EU	European Union
EURATOM	European Atomic Energy Community
FOM	Stichting voor Fundamenteel Onderzoek der Materie (Netherlands)
GATT	General Agreement on Tariffs and Trade
GfK	Gesellschaft für Kernforschung (Germany)
GNP	Gross national product
HERA	Hadron Elektron Ring Anlage (DESY, Germany)
IAC	Canaries Astrophysical Institute (IAC)
IDA	Industrial Development Authority (Ireland)
IGN	Instituto Geografico Nacional (Spain)
ILL	Institut Max Von Laue-Paul Langevin (Grenoble)
INFN	Instituto Nazionale de Fisica Nucleare (Italy)
IPC	Industrial Policy Committee (ESA)
IPP	Institut für Plasmaphysik (Germany)
IRAM	Institut de radio astronomie millimétrique

ITER	International Thermonuclear Experimental Reactor
JET	Joint European Torus (Culham, United Kingdom)
JNICT	Junta Nacional de Investigaçao Cientifica e Tecnológica (Portugal)
KEK	Japanese National Laboratory for High-Energy Physics
KFA	Forschungszentrum Jülich (Germany)
KFK	Kernforschungszentrum Karlsruhe (Germany)
LEAR	Low Energy Antiproton Ring (CERN)
LEP	Large Electron-Positron Collider (CERN)
LHC	Large Hadron Collider (CERN)
METU	Middle East Technical University (Ankara)
MPG	Max-Planck Gesellschaft (Germany)
NBST	National Board of Science and Technology (Ireland)
NET	Next European Torus
NFR	Swedish Natural Science Research Council
NRC	National Research Council (Canada)
NSERC	National Sciences and Engineering Research Council (Canada)
NTT	New Technology Telescope
PPARC	Particle Physics and Astronomy Research Council (United Kingdom)
SPC	Science Programme Committee (ESA)
SPS	Super Proton Synchrotron (CERN)
SRC	Science Research Council (United Kingdom)
THEMIS	Solar telescope (France, Italy)
TRP	Technology Research Programme (ESA)
UH	University of Hawaii
UKAEA	United Kingdom Atomic Energy Authority
UNK	Accelerating and Storage Complex (Russia)
VIRGO	Ultrasensitive Interferometer for the Detection of Gravitational Waves (France, Italy)
VLF	Very large scientific facility
VLT	Very Large Telescope