FUSION FOR ENERGY

# ANNUAL REPORT **2009**


FUSION FOR ENERGY

# Annual Activity Report 2009

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## FACT SHEET

| | |
|---|---|
| **Name:** | The European Joint Undertaking for ITER and the Development of Fusion Energy or "Fusion for Energy" (F4E) |
| **Location:** | Barcelona, Spain |
| **Established:** | 19 April 2007 for a period of 35 years |
| **Founding Legal Act:** | Council Decision No. 2007/198/Euratom of 27 March 2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it. |
| **Director:** | Dr Didier Gambier (from 1 October 2007 to 15 February 2010)<br>Dr Frank Briscoe (from 16 February 2010 to present) |
| **Governing Body:** | Governing Board (Chair: Professor Carlos Varandas, Members: 27 EU Member States, Euratom & Switzerland) |
| **Subsidiary Bodies:** | Executive Committee (Chair: Dr Karl Tichmann, 13 Members)<br>Technical Advisory Panel (Chair: Professor Minh Quang Tran, 13 Members)<br>Standing Coordination Group (Chair: Professor Carlos Varandas, 7 Members) |
| **Objectives:** | (a) Providing Europe's contribution to the ITER international fusion energy project;<br>(b) Implementing the Broader Approach agreement between Euratom and Japan;<br>(c) Preparing for the construction of demonstration fusion reactors (DEMO). |
| **Staff:** | 153 (Officials and Temporary Agents) and 58 (Contract Agents) |
| **2009 Budget:** | EUR 355 million |

**ACTIVITIES IN 2009**

| | |
|---|---|
| **Operational Contracts:** | 47 awarded for a total value of EUR 142.5 million (51 launched) |
| **Administrative Contracts:** | 5 for a total value of EUR 6 million (7 launched) |
| **Grants:** | 30 for a total value of EUR 15.9 million (30 launched) |
| **Budget Implementation:** | 98.9% in commitment appropriations (99% operational and 97.5% administrative)<br>65.3% in payment appropriations (65.5% operational and 64.2% administrative) |
| **Procurement Arrangements:** | 8 for the ITER Project (275.91 kIUA equivalent to approximately EUR 400 million out of a total of 994.95 kIUA foreseen for all the European in kind contributions)<br>3 for the Broader Approach (28.1 kBAUA equivalent to EUR 19 million out of a total of 236.4 kBAUA foreseen for all the European contributions) |
| **ITER Credit Awarded:** | 2.92 kIUA (equivalent to EUR 4.4 million) |
| **Meetings of Statutory Bodies:** | 4 of the Governing Board, 7 of the Executive Committee and 3 of the Technical Advisory Panel |

## LIST OF ACRONYMS

| | |
|---|---|
| **A/E** | Architect Engineer |
| **AASC** | Assembly of Agency Staff Committees |
| **ATO** | Analysis Task Order |
| **BA** | Broader Approach |
| **BAUA** | Broader Approach Units of Account |
| **BSM** | Blanket Shield Module |
| **BTP** | Build-to-Print |
| **CCFE** | Culham Centre for Fusion Energy |
| **CEA** | Commissariat à l'Énergie Atomique et aux Énergies Alternatives |
| **CIEMAT** | Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas |
| **CMM** | Cassette Multifunctional Mover |
| **CN-DA** | Chinese Domestic Agency |
| **CPRHS** | Cash and Plug Remote Handling System |
| **CREATE** | Consorzio di Ricerca per l'Energia e le Applicazioni Tecnologiche dell Elettromagnetismo |
| **CRPP** | Centre de Recherches en Physique des Plasmas |
| **CS** | Central Solenoid |
| **D** | Deuterium |
| **DA** | Domestic Agency |
| **DC** | Direct Current |
| **DEMO** | Demonstration Fusion Reactors |
| **DNV** | Det Norske Veritas |
| **DNB** | Diagnostic Neutral Beam |
| **DTP** | Divertor Test Platform |
| **EBBTF** | European Breeding Blanket Test Facilities |
| **EC** | Electron Cyclotron |
| **ECH** | Electron Cyclotron Heating |
| **ECRH** | Electron Cyclotron Resonance Heating |
| **ECWG** | Export Control Working Group |
| **EFDA** | European Fusion Development Agreement |
| **ELM** | Edge Localised Mode |
| **EPC** | Engineering Procurement Contract |
| **ESC** | Engineering Support Contract |
| **EU** | European Union |
| **EUROFER** | A 9% Cr reduced activation ferritic-martensitic steel |
| **EUROFER ODS** | Oxide Dispersion – Strengthened version of EUROFER steel |
| **EVEDA** | Engineering Validation and Engineering Design Activities |
| **ExCo** | Executive Committee |
| **F4E** | Fusion for Energy |
| **FC** | Framework Contract |
| **FPPC** | Fast Plasma Control |
| **FW** | First Wall |
| **FZK** | Forschungszentrum Karlsruhe |

| | |
|---|---|
| **GB** | Governing Board |
| **HCLL** | Helium-Cooled Lithium-Lead |
| **H&CD** | Heating & Current Drive |
| **HFTM** | High Flux Test Module |
| **HIP** | Hot Iso-static Pressing |
| **HNB** | Heating Neutral Beam |
| **HV** | High Voltage |
| **IAEA** | International Atomic Energy Agency |
| **IC** | Ion Cyclotron |
| **ICH** | Ion Cyclotron Heating |
| **IFERC** | International Fusion Energy Research Centre |
| **IFMIF** | International Fusion Materials Irradiation Facility |
| **IN-DA** | Indian Domestic Agency |
| **ITER IO** | ITER International Fusion Energy Organization |
| **IPP** | Max-Planck Institut fuer Plasmaphysik |
| **ISEPS** | Ion Source and Extraction Power Supplies |
| **ISS** | Isotope separation system |
| **IST** | Instituto Superior Técnico |
| **ITA** | ITER Task Agreement |
| **IUA** | ITER Units of Account |
| **IVT** | Inner Vertical Target |
| **IVVS** | In-Vessel Viewing System |
| **JAEA** | JA Implementing Agency |
| **JP-DA** | Japanese Domestic Agency |
| **KIT** | Karlsruhe Institute of Technology |
| **KR-DA** | Korean Domestic Agency |
| **Li** | Lithium |
| **$LN_2$** | Liquid Nitrogen |
| **MAC** | Management Advisory Committee |
| **MFG** | Motor Flywheel Generators |
| **NB** | Neutral Beam |
| **NBI** | Neutral Beam Injector |
| **NBTF** | Neutral Beam Test Facility |
| **ODS** | Oxide Dispersion Strengthened |
| **PA** | Procurement Arrangement |
| **PF** | Poloidal Field |
| **PrSR** | Preliminary Safety Report |
| **PS** | Power Supply |
| **PTC** | Prototype Torus Cryopump |
| **Q1/2/3/4** | Quarter |
| **QA** | Quality Assurance |
| **QMS** | Quality Management System |
| **QPC** | Quench Protection Circuit |
| **R&D** | Research & Development |
| **RAFM** | Reduced Activation Ferritic Martensitic |
| **RF** | Radio Frequency |

| | |
|---|---|
| **RH** | Remote Handling |
| **RMP** | Resonant Magnetic Perturbation |
| **RU-DA** | Russian Domestic Agency |
| **RWM** | Resistive Wall Mode Control |
| **SC** | Staff Committee |
| **SDC** | ITER SDC (Structural Design Criteria/Code) |
| **SHPC** | Safety and Health Protection Coordination |
| **SNU** | Switching Network Unit |
| **STAC** | ITER Science and Technology Advisory Committee |
| **STC** | Single Tender Contract |
| **STP** | Satellite Tokamak Programme |
| **SWG** | Special Working Group |
| **T** | Tritium |
| **TAP** | Technical Advisory Panel |
| **TBM** | Test Blanket Modules |
| **TF** | Toroidal Field |
| **US-DA** | USA Domestic Agency |
| **VC** | Voluntary Contributor |
| **VV** | Vacuum Vessel |
| **WBS** | Work Breakdown Structure |
| **WDS** | Water Detritiation System |
| **WP** | Work Programme |

# Foreword by the Chair of the Governing Board

I am very pleased to introduce the second Annual Report of Fusion for Energy (F4E) - the European Joint Undertaking for ITER and the Development of Fusion Energy - and to look back at the accomplishments during 2009 - a year in which F4E was fully operational.

During 2009 I am proud to have chaired four meetings of the Governing Board in which many important decisions were taken. I am pleased that several important Procurement Arrangements have been signed between F4E and the ITER Organization. In addition, F4E has placed many contracts and grants to launch the ITER construction.

On the international front, the main focus of activities for the ITER Council, which met twice in 2009 and supervises the ITER Organization, has been to develop a realistic schedule which is acceptable to all the ITER Members taking into consideration technical and cost risks. At the same time, F4E has been analysing the implications of the schedules proposed by ITER in close collaboration with the Governing Board and good progress was made during 2009.

In view of ensuring that F4E is capable of delivering the European contributions to ITER at reasonable cost and with acceptable risks, the Governing Board decided to create an ad-hoc group to carry out an assessment of F4E's ITER-related activity. I am indebted to the chair, Dr Wolfgang Meissner, the members and the scientific secretary for their dedication to this important task.

One of the recommendations of the Meissner ad-hoc group was to increase the efficiency of the decision-making processes for the Governing Board and I am pleased to note that the decision was taken already in 2009 to establish a Standing Coordination Group who are collaborating closely with the F4E Director.

I would like to express my appreciation for the continued support of the Members of the Governing Board. I would like also to thank the members of the Executive Committee and Technical Advisory Panel chaired by Dr Karl Tichmann and Professor Minh Quang Tran respectively. I should also like to express my appreciation to the Chair, Professor Fritz Wagner and members of the ad-hoc group that evaluated the possibility and implications an ECRH-dominated heating mix for ITER.

Finally, I should like to acknowledge the excellent collaboration and important work that has been carried out by the F4E Director, Dr Didier Gambier.

Carlos Varandas

*Professor Carlos Varandas*
*Chair of the F4E Governing Board*

# Executive Summary by the Former Director

This second F4E Annual Activity Report reviews the achievements during 2009 and F4E's contribution towards the international ITER and Broader Approach fusion energy projects.

In 2009, F4E consolidated its activities and structure. F4E positioned itself to achieve rapidly the maturity expected of such a large organisation and deliver on all its commitments, including exceptional ones imposed by the community and international environements.

In 2009 I am proud to report that F4E has decisively launched the construction of the ITER project with the signature of the first manufacturing contract for the superconducting magnets in April. By the end of the year F4E placed about 50 contracts for around EUR 100 million. I am proud to observe that this is the direct result of establishing a team management structure accross the technical and financial departments. This is also the result of the enthusiasm and dedication of the people involved.

On the international stage, F4E negotiated and signed eight Procurement Arrangements (PAs) with the ITER Organization with a credited value of around EUR 400 million in areas such as the Buildings, Magnets and Vacuum Vessel. In addition, F4E entered into 39 credited Task Agreements to carry out specific activities in support of the ITER project.

F4E conducted a thorough risk and cost analysis linked with the ITER construction design specifications and schedule. While doing its utmost to support a very aggressive schedule promoted by the ITER Organization, F4E concluded that the amount of risks and potential cost impact, were incompatible with the principle of sound engineering and cost containment. As a result a new schedule has been drafted with the international partners that is now an integral part of the ITER Baseline Design.

At the ITER site in Cadarache, the collaboration between F4E, the European Commission and Agence ITER France allowed to complete the site preparation, now fully levelled with the movement of more than two million cubic metres of soil and rock. A new race has begun: the construction of the buildings to be completed on schedule. To that effect the first contract for the construction of the Poloidal Field building was signed in December. The construction of the ITER buildings will be the single largest task of F4E in the years to come and will require a dedicated effort on the part of F4E and the ITER Organization.

For the Broader Approach, steady progress has been made, in particular for the JT60-SA Satellite Tokamak and the International Fusion Materials Irradiation Facility (IFMIF) projects and I am pleased to report that three PAs were signed with our Japanese counterparts for an equivalent value of just under EUR 20 million.

At home, F4E continued to grow and the staff complement rose to just over 200 by the year's end. Other important organisational milestones have been reached, including the implementation of quality management processes and the audit function, the establishment of the F4E Cadarache antenna for Site, Buildings and Power Supplies as well as the setting up of the Staff Committee.

I am also pleased to note that F4E hosted an ITER IO – Domestic Agencies Coordination meeting and welcomed several important dignitaries including José Montilla, President of Catalonia and H.M. King Carl XVI Gustaf of Sweden as the patron of the Royal Swedish Academy of Engineering Sciences.

To conclude, I would like to express my deep appreciation to Professor Carlos Varandas, Chair of the F4E Governing Board, as well as the Chairs of the Governing Board advisory bodies and the Members of F4E for their support to me as the first Director of F4E. I would also like to express my appreciation to the F4E staff who has demonstrated great professionalism in the face of many challenges. Through our joint effort, we succeeded in establishing F4E as an autonomous organisation and as a natural leader among the Domestic Agencies, always promoting the EU community approach in this unprecedented project.

*Dr Didier Gambier*
*Director of Fusion for Energy*
*(until 15 February 2010)*

# Introduction by the Director

I would like to begin by acknowledging the work carried out by my predecessor, Dr Didier Gambier, who oversaw the growth of F4E from a handful of staff to the organisation it is today.

Looking ahead, 2010 will be a challenging year in which it is expected that F4E, the ITER Organization and the other ITER Domestic Agencies will make a transition from the first phase of finalising the ITER design and setting up new organisations to a second phase of manufacturing the ITER components. In particular F4E will be bringing the delivery dates of the components to be supplied by Europe into line with the Improved Updated Schedule (IUS) proposed by ITER in view of allowing Euratom to support the adoption of a revised ITER baseline by the ITER Council.

An ambitious Work Programme for 2010 has been adopted by the Governing Board and it is expected that a number of important Procurement Arrangements will be signed with the ITER Organization in particular one of the largest for the Buildings. A number of contracts for critical path components (Buildings, Magnets and Vacuum Vessel) are also planned to be concluded.

Finally, I will be addressing the findings of the assessment of the F4E activities commissioned by the Governing Board in late 2009 and implementing a number of improvements to the management and organisation of F4E so that it is best able to meet the obligations of Euratom under the ITER and Broader Approach international agreements.

F. Briscoe

*Dr Frank Briscoe*
*Director of Fusion for Energy*
*(from 16 February 2010)*



# Chapter 1

# Introduction

# Fusion for Energy

The European Joint Undertaking for ITER and the Development of Fusion Energy or Fusion for Energy (F4E) is a type of European organisation known as a Joint Undertaking created under the Euratom Treaty by a decision[1] of the Council of the European Union.

F4E was established for a period of 35 years from 19 April 2007 and its offices are situated in Barcelona, Spain. The objectives of F4E are to implement the obligations of the European Atomic Energy Community (Euratom) stemming from two international agreements related to fusion energy research:

- Agreement for the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project (Euratom, China, Korea, India, Japan, Russia and the USA);
- Agreement between Euratom and the Government of Japan for the Joint Implementation of the Broader Approach Activities in the Field of Fusion Energy Research.

In the longer term, F4E will prepare and coordinate a programme of activities in preparation for the construction of a demonstration fusion reactor (DEMO) and related facilities including the International Fusion Materials Irradiation Facility (IFMIF).

## Legal Basis of the Annual Report

The statutes establishing F4E include the requirement under Article 14 for an Annual Activity Report which:

*"...shall record the implementation of the work programmes by the Joint Undertaking. It shall in particular outline the activities conducted by the Joint Undertaking and evaluate the results with respect to the objectives and the timetable set, the risks associated with the activities carried out, the use of resources and the general operation of the Joint Undertaking. The annual activity report shall be prepared by the Director, approved by the Governing Board and sent to the Members, the Commission, the European Parliament and the Council of the European Union."*

This Report is intended to meet this requirement and provides an overview of the technical and administrative status of F4E including the implementation of its Work Programmes. A complementary description of the technical activities of F4E can be found in the Technical Progress Report which is published separately.

For the 2009 exercise, F4E has taken on board the comments made by the Court of Auditors and the Governing Board about the 2008 Annual Report. In addition, the 2009 report has been reviewed for the first time by the subsidiary bodies of the Governing Board (Executive Committee and Technical Advisory Panel).


1 *O.J. L90, 30.03.2007, p. 58.*

*F4E Offices, Barcelona*

## Report Structure

The Report is essentially divided into four parts:

- A brief description of fusion energy research, the ITER and Broader Approach projects;
- A summary of the main technical achievements as described in more detail in the Technical Progress Report;
- The management, administration, resources and other support services of the organisation;
- A number of annexes providing information on the implementation of the F4E Work Programmes, the activities of its governing bodies, statistics on finances, staffing and contracts/grants.



## Chapter 2

# Fusion Energy Research, ITER and the Broader Approach

# Introduction to Fusion

*Fusion is the process that powers the sun and other stars and makes life on earth possible. As the name suggests, the process involves fusing together light atoms to make heavier ones and occurs at the extreme pressures and temperatures caused by the gravity in the sun. During fusion reactions a small amount of mass is converted into energy, in accordance with Einstein's well-known $E = mc^2$ equation.*

In face of the increasing global demand for energy and the economic, political and environmental risks of using fossil fuels, fusion energy has the potential to make a major contribution to a diverse, sustainable and secure energy supply system in a few decades from now.

To make fusion happen on earth, several approaches have been explored. One of these involves heating a gas to very high temperatures (100-150 million degrees centigrade) so that it becomes a plasma which can conduct electricity. Magnetic fields can then be used to contain this plasma long enough for fusion to occur.

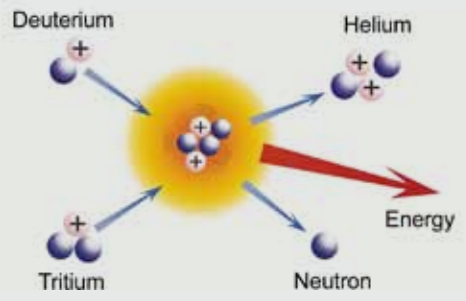
In fusion experiments, such magnetic confinement is achieved using a doughnut-shaped vessel with magnetic coils. Since the 1950s scientists and engineers from all over the world have been carrying out research to assess the most promising approach and the *tokamak* configuration has emerged as a leading contender.

The merits of fusion are the abundance on earth of the basic fuels (deuterium and lithium, the latter being used to make tritium – see box opposite), the lack of production of greenhouse gas emissions, a very low impact on the environment with no long-lasting radioactive waste and finally the inherent safety of fusion reactors, where no meltdown or runaway reactions are possible.

Europe is at the forefront in fusion research, largely due to the integration of national fusion programmes into a single coordinated Euratom fusion research programme, including the construction and operation of the Joint European Torus, JET, the world's leading fusion device now under the umbrella of the European Fusion Development Agreement (EFDA).

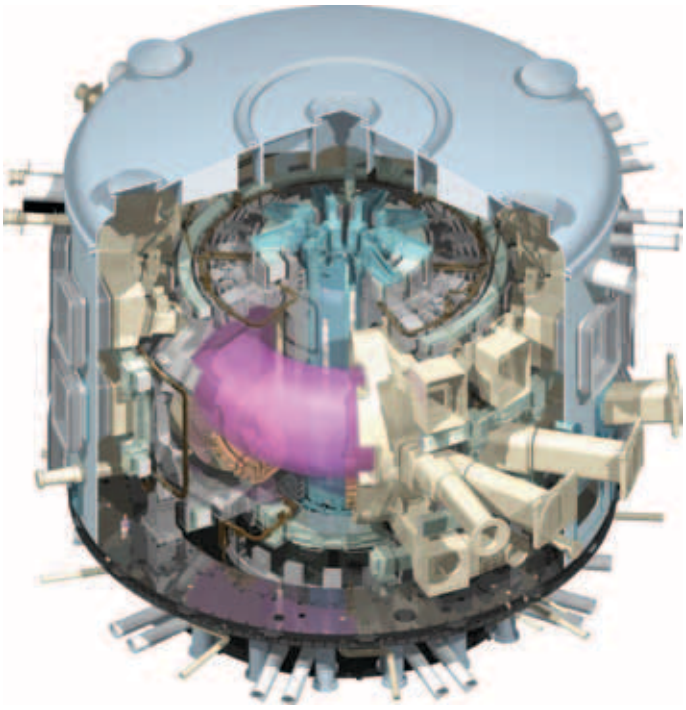
**FUSION REACTIONS**

The easiest fusion reaction to achieve is between the two heavy isotopes of hydrogen (deuterium and tritium). Most of the energy released in this reaction is carried away by a high speed neutron. The remaining energy goes to the alpha particle (a helium nucleus) which is also produced in the reaction. In a fusion reactor, a blanket around the reactor would slow down the neutrons and convert their energy into heat. This heat can be extracted to generate steam for conventional electricity generation. Lithium, in the blanket, is converted by the neutrons into tritium.




*(Image courtesy of EFDA)*

*A detailed cutaway of the ITER Tokamak, with the hot plasma, in pink, in the centre (Image courtesy of ITER)*



## ITER

While JET and other tokamak experiments have succeeded in producing significant amounts of fusion power albeit for short periods, none so far are capable of demonstrating fusion on a scale that would be needed for a reactor and a number of technologies that are needed to allow it to generate part of its own fuel and produce power on a more continuous basis.

**FUSION FUELS**

Since deuterium is a common and readily separable component of water, there is a virtually inexhaustible supply in the oceans. In contrast, tritium does not occur naturally and must be generated. In a fusion reactor this could be achieved by using reactions that occur between neutrons formed in the fusion reaction and the light metal lithium. There are sufficient reserves of lithium available to meet world electricity demand for several hundreds of years.

ITER – "the way" in Latin is the next major step in tokamak fusion research and is about twice as large as any existing reactor today. Its objective is *"to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes".*

With seven Parties participating in the project (the European Union also including Switzerland represented by Euratom), Japan, China, the Republic of Korea, the Russian Federation, India, and the USA). ITER is one of the largest international scientific projects of its kind and brings together countries representing over one-half of the world's population.

ITER aims to produce a significant amount of fusion power (500MW) for about 7 minutes or 300MW for 50 minutes. This venture began in 1985 as collaboration between the then Soviet Union, the United States, the European Union and Japan and a detailed design was agreed in 2001. On 24 October 2007, following ratification by the Parties, the ITER Agreement entered into force.

ITER is being constructed at Cadarache in the South of France. Europe, as the host party, and France, as the host state, have special responsibilities for the success of the project. In particular, Europe supports 45% of the construction cost and 34% of the cost of operation, deactivation and decommissioning of the facility as well as preparing the site.

Most of the components that make up the ITER facility are to be manufactured by each of the ITER Parties and contributed in kind to ITER through Domestic Agencies. F4E, as the European Domestic Agency, will provide components to ITER that amount to about one third of the overall value of the facility.

As well as agreeing upon the procurement sharing of components, the maturity of the packages to be handed over to the Domestic Agencies for their procurement by ITER was also agreed and categorised as "functional specifications", "detailed design" or "build-to-print" level. Each case implies a different level of preparatory work for the Domestic Agencies.

**PROCUREMENT SHARING**
To ensure a fair cost sharing of ITER by "value", around 90% of the project is built by in kind contributions. In-kind contributions have been classified into 85 procurement "packages" which were divided among the seven parties to the ITER Agreement. Some procurement packages are divided among several parties which introduces additional complexity to manage interfaces.

## Broader Approach

In February 2007 Euratom and the Japanese government signed the Broader Approach (BA) agreement. This aims to complement the ITER Project and to accelerate the realisation of fusion energy by carrying out R&D and developing some advanced technologies for future demonstration fusion power reactors (DEMO). Within the BA three main projects are being implemented:

The first BA project will complete the detailed and fully integrated engineering design of the **International Fusion Materials Irradiation Facility (IFMIF)**. Fusion as a major energy source will require materials which maintain their essential physical properties and which do not remain highly radioactive for extended periods of time after exposure to the harsh thermal and irradiation conditions inside a fusion reactor. IFMIF will allow testing and qualification of advanced materials in an environment similar to that of a future fusion power plant.

The second BA project is the Japan-EU **Satellite Tokamak Programme (STP**). During ITER construction, major experimental facilities will be required to develop operating scenarios and address key physics issues for an efficient start up of ITER experimentation and for research towards DEMO. The STP in Japan has been identified as a device which could fulfil these objectives. It will therefore be upgraded to an advanced superconducting tokamak and used by Europe and Japan as a "satellite" facility to ITER.

The third BA project is the **International Fusion Energy Research Centre (IFERC)**. The missions of the centre include the coordination of DEMO Design and R&D activities, large scale simulation activities of fusion plasmas by super-computer and remote experimentation activities to facilitate a broad participation of scientists into ITER experiments.

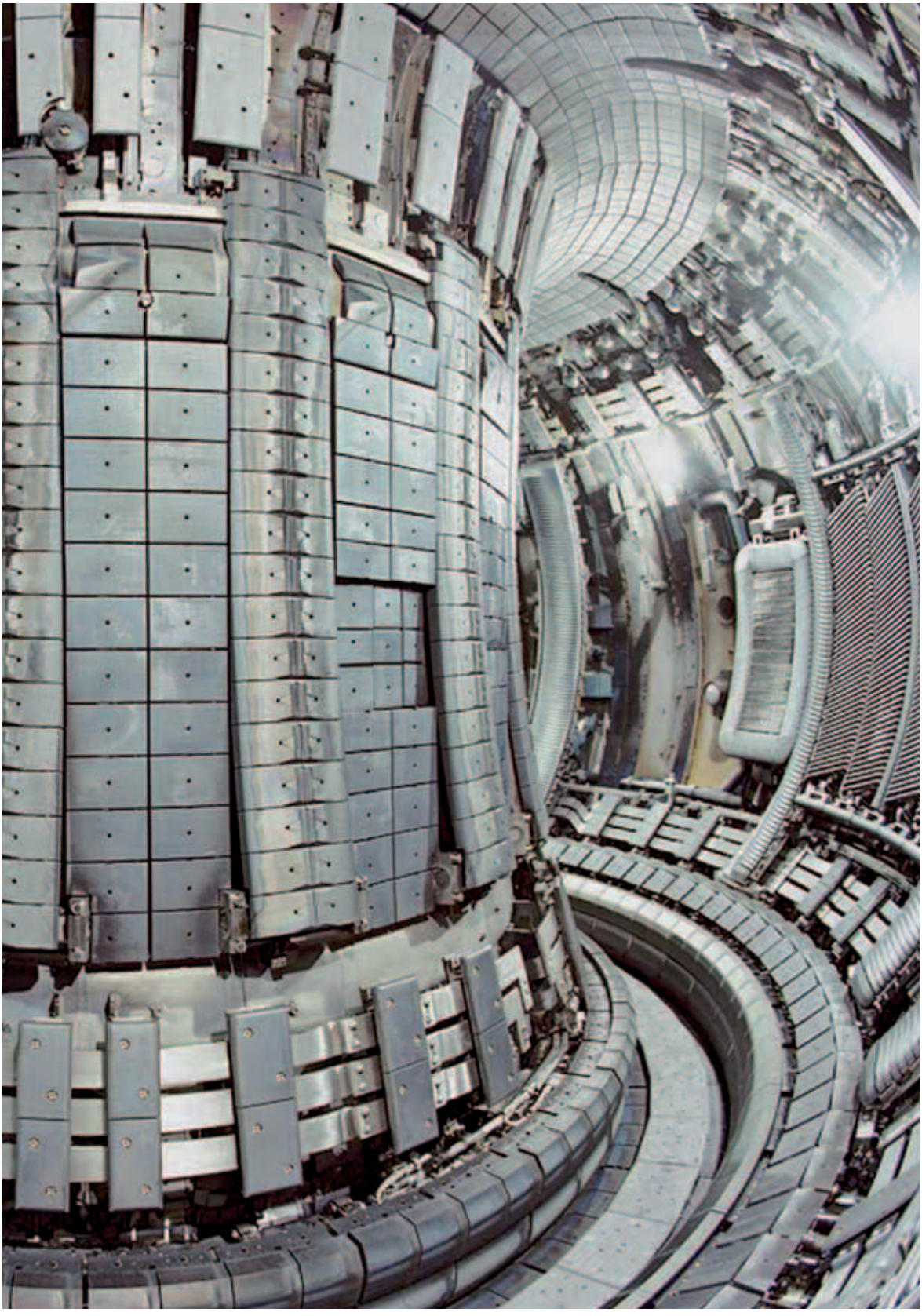
To develop synergy with its activities related to ITER, it was decided that F4E should also be the Implementing Agency of Euratom for the Broader Approach. The resources for the implementation of the Broader Approach will be largely provided on a voluntary basis from several participating European countries (Belgium, France, Germany, Italy, Spain and Switzerland).

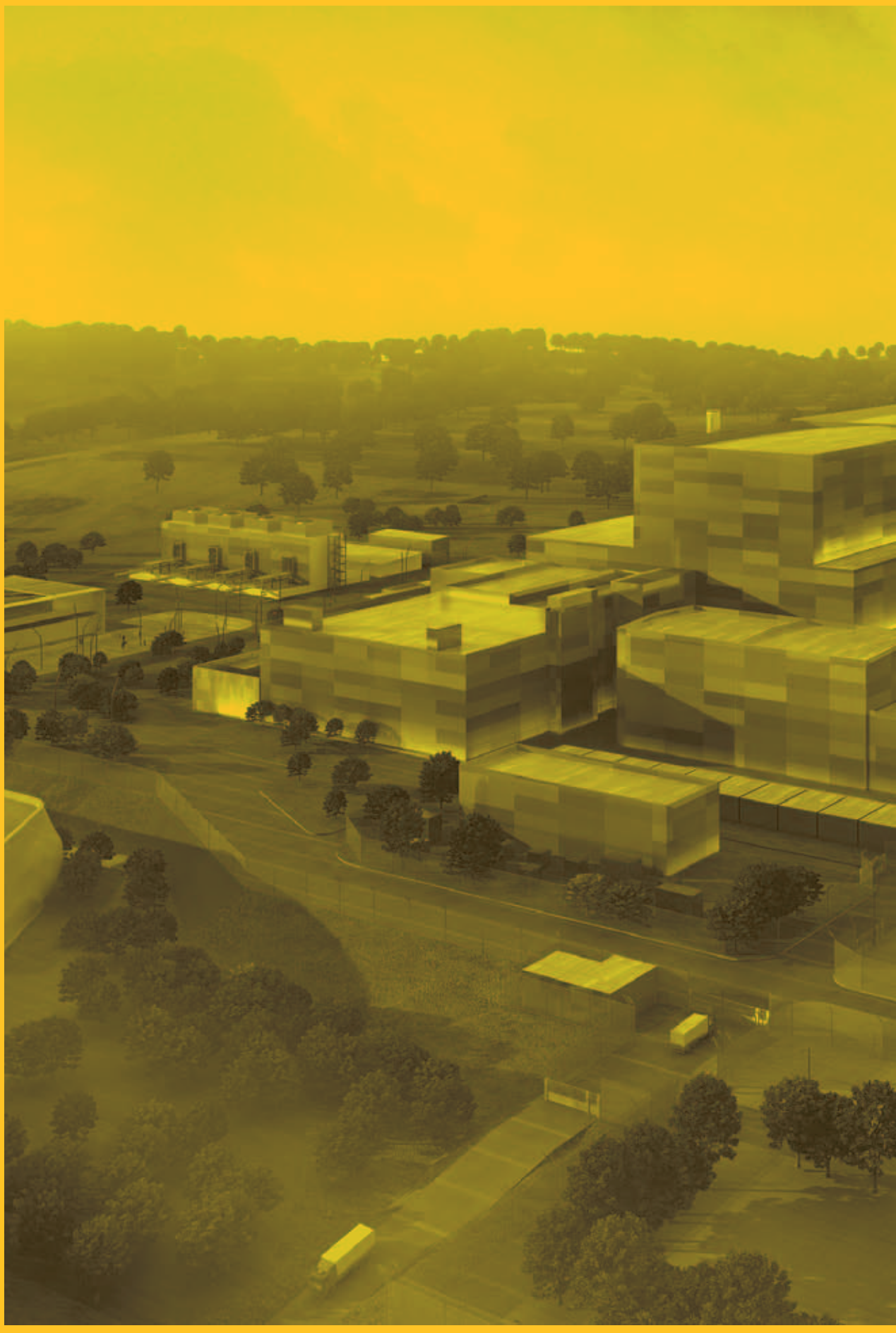
## Demonstration Fusion Reactors

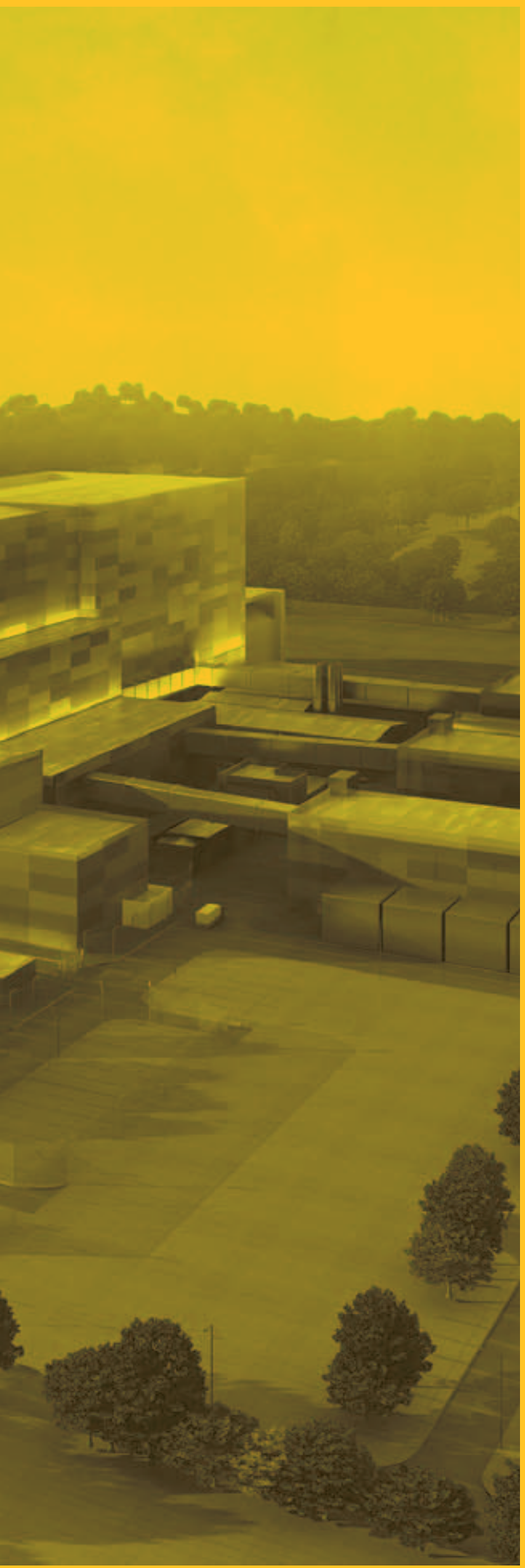
Beyond ITER, it is envisaged that demonstration fusion reactors could be constructed that can produce electrical power and thereafter be commercialised. To achieve this in the shortest timescale (the "fast track"), studies have shown that aside from the operation of ITER, a parallel programme of materials testing would be needed.

While the final design of DEMO will depend to a large extent on the results obtained from the exploitation of ITER and other fusion experiments, it is envisaged that in the longer term F4E will prepare and coordinate a programme of research and development activities in preparation for DEMO.

*The inside of the JET Fusion experiment (Image courtesy of EFDA-JET)*







# Chapter 3

# Main Achievements

# ITER

In its role as the European Domestic Agency for ITER, F4E is responsible for the preparation and coordination of the design, research and development (R&D) and fabrication of most of the high-technology components that are required to construct ITER including:

**Site and Buildings**

- Site infrastructure and all the concrete and steel frame buildings.

**Magnets**

- Ten Toroidal Field (TF) coils and 20% of the $Nb_3Sn$ conductor to be used in the TF coils;
- Five Poloidal Field (PF) coils and 11% of NbTi conductor for the PF coils;
- Nine fibreglass composite pre-compression rings.

**Vacuum Vessel and In-Vessel Components**

- Vacuum Vessel - Seven sectors of the vessel and blanket coolant manifolds;
- Blanket - 50% of the first wall modules according to the latest sharing;
- Divertor - cassettes and inner vertical target.

**Heating and Current Drive Systems**

- Ion Cyclotron Resonance Heating System (ICRH) System (equatorial port plug incorporating one ICRH antenna and spares);
- Electron Cyclotron Heating System (four upper port plugs incorporating launchers, 32% of the sources and 14% of the power supplies);
- Neutral Beam Heating System (100% assembly and testing and active correction, compensation coils and ~50% of other components. The Neutral Beam Test Facility is also included in this package, after having been approved by the ITER Council as an Additional Direct Investment).

**Diagnostics**

- 11 diagnostic-related systems and enabling of a further three.

**Test Blanket Modules**

**Remote Handling**

- Divertor Remote Handling;
- Cask Transfer System;
- In-Vessel Viewing and Metrology System;
- Neutral Beam Remote Handling.

**Ancilliary Systems**

- Vacuum Pumping and Fuelling (eight torus and two cryostat cryopumps, some cryopumps for the Neutral Beam system and other systems);
- Leak Detection & Leak Localisation (initially not considered and now included as an Additional Direct Investment. ITER IO will finance the R&D activities and the systems to be installed however F4E will be responsible for their procurement);
- Tritium Plant (hydrogen isotope separation & water detritiation systems);
- Cryoplant (approximately one half of the system);
- Power Supplies (pulsed power and steady state power supplies);
- Waste Treatment and Storage.

**Horizontal Activities**

- Radiological Protection;
- Materials Development;
- Plasma Engineering;
- Safety;
- Engineering Support;
- Nuclear Data;
- Quality Assurance Activities.

Note that in the case of CODAC (Control and Data Acquisition) the central system will be procured directly by the ITER IO but F4E is intending to provide support through specific Task Agreements. In contrast, the Instrumentation and Control is included in many of the separate Procurement Arrangements and horizontal support for this is being planned.

In some cases the required technologies are well established but in many others R&D and design activities are required before a document setting out scope of the procurement can be signed with ITER – a Procurement Arrangement (PA). Such R&D is normally carried out in collaboration with European national fusion laboratories under a cost-sharing arrangement with F4E, called “grant”.

While the specific requirements for each component will differ according to their complexity, F4E is also carrying out detailed risk assessments to identify any unresolved problems and risks with the design, manufacturing and assembly and to recommend actions to ameliorate them. This may be complemented by Design Reviews carried out jointly with the ITER IO.

## Highlights

During 2009 F4E was engaged in a number of important activities to support the preparation of the ITER site, analyse the risks and costs for Europe associated with different ITER construction schedules, launch the first construction activities and conclude a number of important contracts. The highlights, ordered as in the Introduction above, include:

**Site and Buildings**

- Support of the preparation and levelling of the ITER site where more than two million cubic metres of rock and soil were moved;
- Signature of four Procurement Arrangements for the buildings and power supplies:
  - Anti-seismic bearings,
  - Tokamak Excavation and Ground Support Structure,
  - Architect-engineer services (including Health & Safety),
  - Design of Pulsed Power electrical network and the Steady State electrical network.
- Launch of the Call for Tender for:
  - The contract for Architect Engineer Design and Works Supervision;
  - The contract for Health & Safety and Legal Inspection;
  - The contract for Tokamak Pit Excavation and ground Support structure;
  - The contract for Global Insurance of all design and construction works.
- Award of a contract for the design & construction of PF Coil manufacturing building;
- Award of a contract on the building Value Engineering;
- Completion of several studies of the cost and risks for Europe of different construction scenarios proposed by the ITER IO;
- Establishment of an F4E Site and Buildings Office at Cadarache.

**Magnets**

- Signature of two Procurement Arrangements associated with the Poloidal Field magnets;
- Award of two contracts for the manufacture of TF coil radial plates prototypes;

- Award of two contracts for the supply of Chromium Plated $Nb_3Sn$;
- Award of a contract for the Supply of 62 tons of Chromium Plated Copper Strand;
- Award of a grant for TF Conductor Testing in Sultan;
- Award of contract for the provision of TF Coil Case Closure Welding;

**Vacuum Vessel and In-Vessel Components**

- Signature of a Procurement Arrangement for the Vacuum Vessel sectors production;
- Award of contract for the provision of Ultrasonic Testing of Beryllium coated First Wall (FW) Mock-ups;
- Award of contract for the manufacture of FW mock-ups for the definition of acceptance criteria;
- Award of a contract for the High Heat Flux Testing of Divertor Components;
- Award of a grant for the Divertor Test Platform (DTP-2) facility operation and upgrade preparation.

**Heating and Current Drive Systems**

- Award of a grant on the detailed design of the ITER Ion Cyclotron Heating Antenna;
- Award of a contract for the supply of a Coaxial Gyrotron Development – Prototype 1, 170 GHz, 2MW, 1s, Refurbishment;
- Signature of a Procurement Arrangement for the Neutral Beam power supplies and related systems;
- Award of a grant for the components and infrastructure of the Neutral Beam Test Facility (NBTF);
- Award of a contract for the experiment on a Large Radio Frequency Ion Source with Extraction (ELISE).

**Test Blanket Modules**

- Award of the contract for the supply of EUROFER Steel Plates.

**Ancilliary Systems and Horizontal Activities**

- Award of a grant for upgrading the TIMO-2 Facility;
- Award a grant for the completion of final design for the Prototype Torus Cryopump and its testing in TIMO-2;
- Award of a contracts for Industrial Risk Analysis and Project Management.

Note that the information presented above and in the following is complemented by Annex I which describes the implementation of the Work Programmes. Taking into account that many activities were carried forward from 2008, the implementation of both the 2008 and 2009 Work Programmes is described for completeness.

## Site and Buildings

Activities for the reporting period include bringing the design of the ITER buildings a conceptual to a preliminary design level. The changes approved since 2001 as well as the safety requirements contained in the Preliminary Safety Report (now submitted to the Licensing Authorities) needed also to be systematically included in the design for Site and Buildings.

After the clearance of the site, the levelling work to achieve the final platform was completed with the movement of more than two million cubic metres of rock and soil and the site is now ready for the beginning of the excavations.

As far as the buildings are concerned, the outcome of the activity in this area during 2009 has been the preparation of the specifications to launch the Call for Tender for the Architect Engineer (A/E) of the Tokamak complex.

Procurement contracts have been either awarded or launched (see Annex I) in the following main areas:

- Seismic Isolation: covering a fundamental topic on the critical path for nuclear building;
- Tokamak pit excavation and drainage: for the early works of excavation of the time critical buildings in anticipation of the final design of the complex;
- Architectural and Engineering Services covering the preparation of the detailed specifications for all buildings and the support to the tender;
- Health and Safety Coordination Protection related to F4E responsibility (general rules and follow-up);
- Construction Insurance PF Coil Winding Building: the design and construction, including follow-up, of this building;
- Value engineering for ITER buildings and Tokamak excavations.

*An aerial view of the ITER construction site in Cadarache, France (Image courtesy of Agence ITER France)*

By the end of 2009 ITER IO has updated and frozen the Final Functional Requirements up to a level that allows the Architect Engineer to start the detailed studies. The start of the Tokamak building construction is foreseen to begin in 2012.

During 2009 a review of the overall cost for Buildings and Power Supplies was completed and the total costs estimated are in line with those estimated by ITER IO. The European Commission, through a panel of experts, carried out an independent assessment and came also to the conclusion that the cost estimates are reliable.

## Magnets

F4E is responsible for the in kind contribution of about one third of the ITER magnet components. The scope of supply is described in the introduction above.

The main technological challenges are due to the scale-up of production rate in the superconducting strand and the unprecedented size and complexity of the TF and PF coils according to stringent dimensional requirements. During heat treatment the conductors will experience different permanent deformation, which makes the transfer process into the radial plates one of the major technical challenge of this supply.

For the TF coils in particular, large windings in $Nb_3Sn$ conductor have to be heat treated, insulated and transferred into stainless steel radial plates. The conductors are manufactured according to different techniques and/or from different suppliers around the world due to the ITER in kind sharing arrangements.

In order to develop and qualify the manufacturing techniques, assess the feasibility of certain design solutions and decrease the risks, all supply contracts are staged with a first phase dedicated to the qualification and manufacturing of relevant mock-ups or full scale prototypes. Two separate contracts to manufacture full scale radial plate prototypes have been started. One contract is for a side radial plate prototype with CNIM and a second one with Simic for the fabrication of a central plate with an alternative manufacturing method. For the coils the first phase includes heat treatment of TF conductors from different suppliers as well as the manufacture of full scale dummy TF and PF double pancakes. The supply of the $Nb_3Sn$ strand for the TF conductors assigned to F4E has been awarded to two separate suppliers for a total of 95 tons) to provide redundancy and reduce risk of late delivery.

The contract for the supply of 62 tons of the Copper strand was placed with Luvata. Successful TF conductor qualification tests were carried out in the SULTAN facility. Testing was completed at the end of 2009. Three full-scale TF conductor samples were tested to qualify the pilot strand supplied by three

*Welding mock-up by CNIM*


*HIPped mock-up by Metso*

candidate $Nb_3Sn$ suppliers and two potential cable manufacturers.

As far as the contract for the supply of the ten winding packs is concerned, the call for tender was launched with the aim to sign the contract in 2010. By the end of 2009 the Procurement Arrangements for conductors and the coils have been signed. Eight contracts/grants have been signed in 2008-2009 for the Magnet area as described in Annex I.

## Vacuum Vessel and In-Vessel Components

The Procurement Arrangement (PA) for the production of the seven out of the nine Vacuum Vessel (VV) sectors was signed in November 2009. The VV is the double-walled steel container in the very centre of the ITER machine in which the plasma is contained.

Some of the activities for the VV defined in the 2008 and 2009 Work Programmeshave been delayed or cancelled due to the need of carrying out additional studies, together with ITER IO, to explore the potential of alternative designs (March-July 2009) and to the delay in the signature of the PA.

During the reporting period, the blanket activities related mainly to two components that are part of the system: the First Wall (FW) and the attachments of the Blanket Shield Modules (BSM) onto the VV. The activities may be subdivided into four areas:

1. R&D in support of the Blanket programme:

   A number of grants and procurements have been launched according to the Work Programme and are detailed in Annex I.

2. Component design in support of the ITER IO effort covering the following three areas:

   · The development of a welded solution for the design of the BSM attachments, to explore alternatives with respect to an ITER reference solution that was demonstrating a number of technical concerns;

   · The study of an alternative design of the Blanket system, proposed by the ITER IO, compatible with an alternative design of the VV;

   · The design and analyses (for the modules to be procured by F4E) in support of the Blanket Integrated Product Team (BIPT) effort to prepare for the conceptual design review of the wall-mounted BSMs.

3. Pre-qualification activities:

   The first phase of qualification for the procurement of the ITER FW panels was completed in 2009. The European qualification mock-ups have passed the high heat flux (HHF) tests without any damage and F4E was the first DA to pass this qualification phase.

*ITER Director-General, Kaname Ikeda, and the F4E Director, Didier Gambier, signed the Procurement Arrangement for the supply of seven of the ITER Vacuum Vessel Sectors in Cadarache*

A detailed programme of work was then elaborated for the second phase of the qualification programme consisting in manufacturing and testing FW panel semi-prototypes. The technical specifications for the fabrication of these semi-prototypes have been discussed with the ITER IO and issued.

4. Preparation of a procurement strategy in support of the PA and of the call for tender.

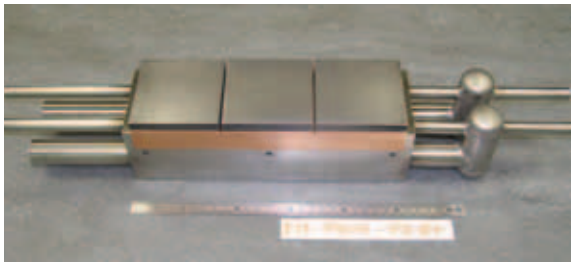
For the divertor system, the activities related to the Inner Vertical Target (IVT) and Cassette Body systems and addressed mainly the following key topics:

(1) Continuation of the qualification of the European industry for the divertor procurement and promotion of a competitive environment among potential industrial suppliers. Prototypes underwent an extensive successful ITER qualification program with final High Heat Flux (HHF) testing performed in the TSEFEY-upgrade electron beam facility at Efremov Institute-Russian Federation;

(2) Start of the R&D for the divertor target - full tungsten option;

(3) Preparation of the documentation for the IVT Procurement Arrangement.

The activities included in particular the preparation and the placement of both contracts and grants. A number of grants and contracts in this area were placed as described in Annex I. The revision of the IVT PA documentation was initiated in 2008 and finalised at the end of 2009.



*First Wall mock-up made from Copper-Chromium-Zirconium (CuCrZr) alloy and stainless steel bi-metallic structure with Beryllium (Be) armour tiles*

## Heating and Current Drive Systems

### ICH Antenna

In 2009 a call for proposals for the grant to cover the detailed design work was launched and the beneficiary is the CYCLE consortium of all the main European fusion laboratories with previous experience in ICH design, construction and operation (CCFE, CEA, ERM/KMS, IPP and ENEA/Polito). The work is due to start in the early months of 2010.

Two additional activities were agreed with ITER IO and signed after the joint decision with ITER IO to give priority

to the R&D on critical components: the RF vacuum window and the Faraday shield. These activities are linked to the design and therefore the delayed implementation of the design activities resulted in the R&D work being moved into 2010. In addition, and in particular for the R&D on the Faraday Shield, the ongoing changes of the ITER (wall) load specifications imply modifications to the design and technology of this component that will be assessed prior to any R&D.

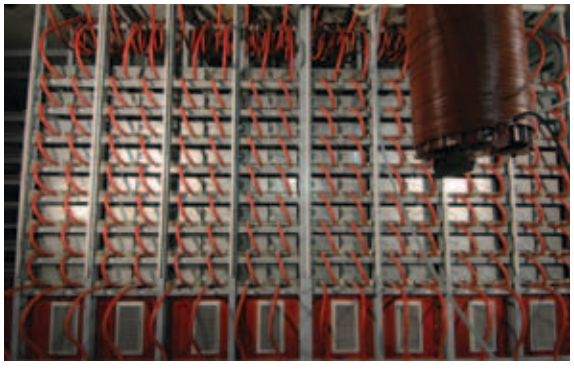
**Electron Cyclotron (EC) Upper Launcher**

On the basis of the preliminary design activity, the EC Upper Launcher design was developed during 2009 in order to carry out the Preliminary Design Review (PDR). The European contribution to the PDR was coordinated by F4E and financed via three contracts with European fusion laboratories. The continuation of the design and prototype work towards the final design and PA (supported by ITER IO via ITAs) has been moved to 2010 Work Programme.

**Electron Cyclotron RF Sources and Power Supplies**

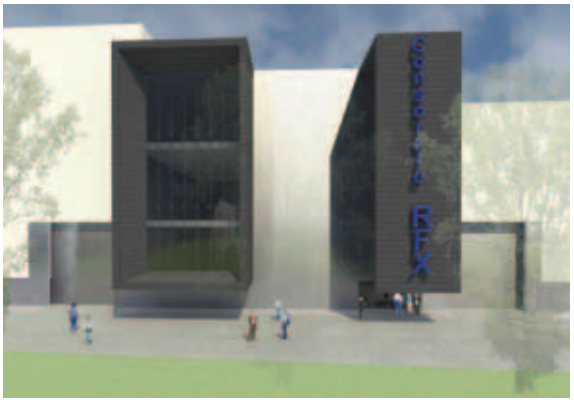
The Electron Cyclotron (EC) Heating and Current Drive (H&CD) Power Sources (5.2P3) are composed of gyrotron tubes, their superconducting magnets, RF Matching Units, and associated auxiliaries. Europe is developing a gyrotron capable of delivering 2 MW RF power at 170GHz in continuous operation (CW) for the ITER EC H&CD system.

Several contracts and grant agreements have been launched in 2009 for enhancing the CRPP European Test Facility with new equipment and for the operation during gyrotron testing planned for 2010. These tests will provide essential technical elements for the decision between continuing with the development of the 2MW coaxial cavity gyrotron for ITER and switching to the more conventional 1MW cylindrical cavity gyrotron as a fall back solution.



*The main High Voltage power supply for the 2MW European gyrotron for ITER installed at the European Electron Cyclotron Test Facility at CRPP (Lausanne, Switzerland), and successfully tested at full power on dummy load in 2009. (Image courtesy of OCEM)*

*Artist's impression of the Neutral Beam Test Facility Building*



**Neutral Beam System**

Europe is responsible for the in kind contribution pertaining to six Neutral Beam (NB) Procurement Packages including beam line components, some power supplies, and activities related to coils and assembly. A full scale Neutral Beam Test Facility (NBTF) on the basis of a new procurement package and the signature of the related PA is planned in July 2010. The NBTF was approved at the ITER Council in November 2009 as an ADI item.

In 2009 F4E has supported ITER IO in the activities leading to the preparation of the technical specifications at the required level of detail. This support included most of the design and R&D activities related to the ITER HNB system and the establishment of the Neutral Beam Test Facility.

A grant was awarded for the detailed design and the technical specifications of the components and infrastructure of the NBTF. In addition, the call for tender for the power supplies of the ion source test facility was launched and a grant was concluded for the operation of three RF ion source test facilities at the Max-Planck-Institut für Plasmaphysik (IPP) in Garching, Germany.

Finally, a service contract for the experimental activities on a large extraction area test facility, ELISE was awarded in 2009. The operation of ELISE is expected to start in the second half of 2011.

## Diagnostics

In 2009 two Grant Agreements were awarded for urgent R&D and design activities identified in the revised 2008 and 2009 Work Programmes. These grants cover prototyping of the ex-vessel magnetic sensors and design of the generic diagnostic equatorial port plug structure and radiation shielding modules, both of which were credited under ITAs, and system-level design of the complete magnetic diagnostic. Nine

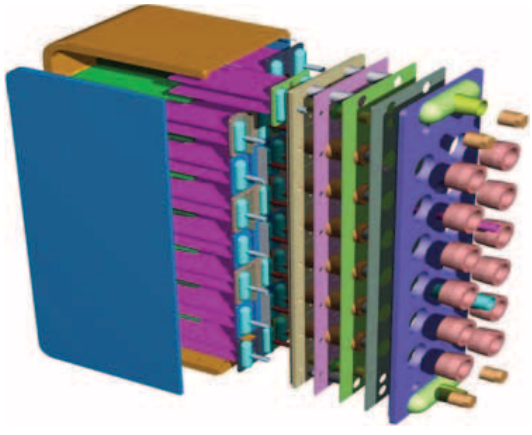
European fusion research laboratories and one SME are beneficiaries of the grants (in several consortia), together with a number of other organisations as third parties or subcontractors.

Two issues have impacted on the timely implementation of the Work Programmes. Firstly, discussions with ITER IO to conclude ITAs or PAs have been more complex and protracted than originally envisaged. As a result, several less urgent activities originally envisaged for 2008/2009 have been transferred to 2010. Secondly, it has taken longer than expected to arrive at proposals for grants that meet the requirements of the call.

## Test Blanket Modules (TBM)

During 2009 a total of seven grants have been awarded addressing the development of the European TBM Systems design, R&D and risk reduction. In particular, the design of the TBM Systems is being fully updated on the basis of detailed boundary conditions in ITER (space allocation, loadings, regulation, standards, maintenance strategy, etc.).

The level of technical information released by F4E on the European TBM Systems was judged sufficient by ITER IO to allow their integration in the ITER Preliminary Safety Report (PrSR). In 2009 the Interface Control Document and Interface Sheets establishing key integration elements of TBMs within the new ITER baseline have also been reviewed. One procurement of the 2009 Work Programme (EUROFER steel plates) has been closed.



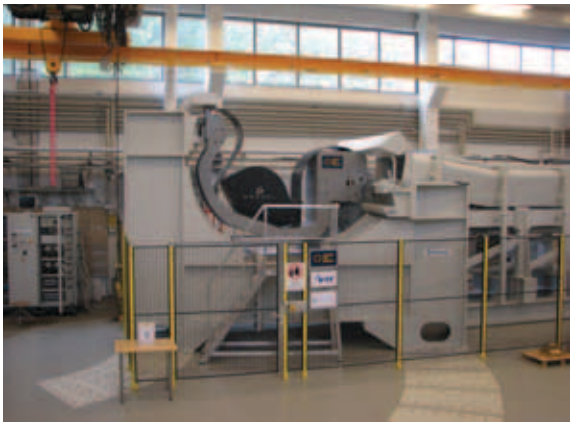
*Helium Cooled Lithium Lead (HCLL) Test Blanket Module (TBM) (Image courtesy of TBM Consortium of European fusion laboratories)*

## Remote Handling

The Remote Handling (RH) activities stemming from the 2008 and 2009 Work Programmes have focused on the definition of strategies and schedule of activities in support of the RH procurement packages allocated to Europe. Several F4E grants have been concluded as described in Annex I.

The main effort has been devoted to ongoing actions including the Divertor Remote Handling and in particular the Divertor Test Platform (DTP2) related tasks, but also in the Transfer Cask System and in the In-Vessel Viewing System have seen significant new developments in the last two years.

In the DTP2 facility, tests were carried out on a divertor cassette mock-up by using the Cassette Multifunctional Mover (CMM) Prototype. The tests have been successfully prepared and performed during 2008 and 2009, with a variety of hardware and software progressively put into operation.



*DTP2 Facility*

## Ancilliary Systems and Horizontal Activities

### Cryopumps

During 2009 progress has been achieved in the finalisation of the design of these components. Analytical predictions confirmed the pumping speed requirements of the pumps for operating and regeneration conditions. The performance of the activated charcoal used to pump helium with the Torus Cryopumps has also been experimentally demonstrated.

Several technological issues remain open and need to be addressed prior to the signature of the related PA. These include the demonstration of the performance of the integral vacuum valve incorporated in the Torus and Cryostat cryopumps, the experimental

determination of the fluid resistance in the cryopanels and 80 K thermal shield of the cryopumps to guarantee their pumping and fast regeneration, the protection of the pumps against accidents and RH provisions.

*View of TIMO-2 Facility at KIT being upgraded to provide 4.35 K supercritical He for testing the ITER Torus Cryopumps (Image courtesy of KIT)*

**Leak Detection & Leak Localisation**

In the leak detection package under Europe's responsibility, leak localisation was not initially included but is now added as an Additional Direct Investment (ADI) item. It is currently agreed that ITER IO will finance the R&D activities and the systems to be installed. However, F4E will be responsible for their procurement. A significant R&D effort will be required to define the technical details of efficient leak localisation methods.

In the frame of the 2008 and 2009 Work Programmes, activities were planned to support ITER IO in this R&D activity to define the procurement package for leak detection and localisation. A workshop was held in April 2009 with the aim of collecting input from experts coming from the various ITER parties. Following this event, a strategy was developed.

**Tritium Plant**

In the frame of the 2008 and 2009 Work Programmes, activities were foreseen to support ITER IO in the preparation of the PAs for Water Detritiation System (WDS) and Isotope Separation System (ISS). The first contracts and grants for this area were concluded in 2009 as described in Annex I. To reduce concerns linked to high hydrogen/tritium inventories, a review activity has been launched at the end of 2009 to assess the 2001 ISS baseline design and to try to optimise it in view of inventory reduction.

In relation to WDS, a contract has been placed to develop a conceptual design of the tritiated water holding tanks. Functional specifications for the tanks have been produced and are under review by F4E and ITER IO. A call for proposals was launched for R&D in support of the WDS design and to complete the conceptual design of the entire WDS and to develop the detailed design of the tritiated water holding tanks for their manufacture.

**Cryoplant**

In 2009, the cryogenic design activities of F4E focused on technical design issues, project management topics such as risk analysis, cost review, planning and support for design review in preparation of the procurement phase of the project. Several tasks have been defined within an Engineering Support Contract in order to support procurement preparation activities.

Other contracts foreseen in the 2009 Work Programme have not been placed since they fell under the responsibility of ITER IO following a sharing agreement signed in March 2009. According to this agreement, Europe will contribute in kind with the $LN_2$ plant, 80K loop and auxiliary components.

**Power Supplies**

Activities to prepare for the procurement of the Pulsed Power electrical network and the Steady State electrical network included:

i) direct support to PA activities as requested by ITER IO (finalisation of the technical requirements);

ii) qualification of components with respect of operation under magnetic field;

iii) refinement of costs and schedule analysis.

**Materials Development**

In 2009 the activities of the Materials Development focused on the EUROFER data base and the technical preparation of further grants and service contracts on EUROFER, EUROFER ODS and SiC/SiC composites to be launched in 2010.

**Plasma Engineering & Operation**

In the plasma engineering and operation area, the F4E activities are carried out on the basis of "competed" ITER Task Agreements (ITA): these are ITER calls for analysis which are launched for competition to all DAs and awarded on the basis of a technical and financial evaluation of the proposals.

In 2009 F4E competed in eight calls, won six and lost two. Six ITAs were signed by the F4E Director in November/December 2009 and sent back for

signature to ITER IO. In 2009 F4E responded also to an urgent call from ITER IO on the study and assessment of an alternative design for the vacuum vessel and blanket and was carried out in a timely manner via two service contracts.

**Safety & Licensing**

In 2009 two grants were awarded on combined $H_2$/dust explosion computer code development and on the detailed analyses of fire event scenarios. ITER related R&D activities focused on ongoing tasks dedicated to address open issues necessary to be solved to obtain the license to operate. These activities form part of the rigorous R&D plan outlined in the ITER Preliminary Safety Report (RPrS) for the in-vessel dust management and control.

**Analysis & Codes**

Activities in this area support the development of the ITER design as well as to specific EU procurement contracts. In addition, resources are devoted to the follow-up of the EDIPO project which aims to construct a 12.5T superconducting magnet to be manufactured in 2010 and to be installed and commissioned at CRPP-PSI the following year.

As far as the analysis work is concerned, this is mostly implemented via the placement of service contracts to qualified companies and in 2009 four Framework Contracts (FCs) were placed in the areas of mechanical analysis, electro-mechanical analysis, neutronic analysis and civil engineering structural analysis. Within the context of these FCs, 19 Task Orders were placed.

In addition to these four FCs, two contracts were placed in 2009 to carry out specific analyses that were requested, typically, before the above-mentioned FCs were in place. An additional contract was placed to supply further conductor lengths for the EDIPO project.

Two grants were concluded with European fusion laboratories for the development of nuclear data files through experimental as well as theoretical work. As far as the collaboration with ITER IO is concerned, this is implemented through three ITER Task Agreements and two Design Work Orders.

**Materials & Fabrication**

Activities in this area concern the development of materials, fabrication routes and qualification of material data. The main aim is to support other projects with material related issues through e.g. irradiation campaigns, thermal fatigue testing, assessment of corrosion parameters, assessment of materials data, etc. One grant was concluded in the area during 2009.

**Project Management & Schedule Studies**

In 2009 a number of important activities related to ITER project management and schedule studies were carried out. Firstly, a project management diagnostic of the ITER-related part of the F4E structure was carried out to identify the areas where improvements could be achieved.

Upon request of the F4E Governing Board at different times during 2008 and 2009, analyses were carried out for each of the three schedules that have been considered for the delivery of the EU in kind procurements:

A schedule and budget analysis of the ITER Scenario 1 (SC1) was performed from the point of view of the associated costs and risks. The F4E Governing Board considered the risks associated to the SC1 to be unacceptable and therefore a proposal was made for a modified schedule that would limit the manufacturing risks thanks to intermediate prototypes and mock-ups for the most challenging components.

In the last months of 2009, in close collaboration with ITER IO and the other DAs, studies were carried out on how to accelerate this modified schedule to allow a top-down target of first plasma in November 2019 (i.e. 12 months later than SC1).

F4E investigated (where possible with industries and experts) alternative fabrication procedures and concluded that a first plasma in November 2019, according to the ITER IO request, was achievable by some acceptable increases of both risk level and cost during manufacturing for both TF coils and Vacuum Vessel.

The work conducted in 2009 is intended to allow the Governing Board to agree in early 2010 upon the schedule to use as a working basis for F4E to continue optimisation and eventually to support the adoption of a new ITER baseline by Euratom in the ITER Council.

# Broader Approach

*Each of the Broader Approach (BA) projects is subdivided into several work packages, assigned to Europe or Japan, and detailed, for technical and management aspects, in the so-called 'Procurement Arrangements' (PAs), to be agreed and signed by F4E and its counterpart "Implementing Agency" in Japan.*
*The EU Voluntary Contributors (VCs) for BA, namely the Governments of Belgium, France, Italy, Germany, Switzerland, and Spain have pledged to contribute to one or more of the three BA projects, covering, with few exceptions, the Euratom commitments, in terms of personnel secondment, design, R&D, and the actual procurement of components, systems and services.*

## Satellite Tokamak Programme

The year 2009 required the resolution of important interfaces between the TF magnet and interfacing systems. Such work, together with some optimisation of the sharing in the EU, allowed the text of the Procurement Arrangement of the TF magnet to be finalised. In 2009 the technical level of the PA and the Agreement of Collaboration were agreed at the technical level between F4E and the voluntary contributor and the signature process began in December 2009.

At the same time, in order to save time, the calls for tender for the strand and cabling/jacketing contracts were launched in 2009 on the basis of the positive results obtained at the SULTAN tests in April 2009. After the redesign of the conductor in late 2007, a sample had been prepared with the same geometry as the reference design. This was made available by ENEA for testing at SULTAN in the summer of 2008 but regrettably, due to ITER higher priorities, only tested in the second quarter of 2009. However the test provided results matching the predicted performance and margins. Additional testing on one of the candidate joints was also successfully completed in summer 2009 in the SULTAN facility.

As planned, the magnet structures have also been redesigned to allow a clear sharing of work within the EU. The conceptual design work was completed in early 2009 with efforts since then devoted to the

*TF Coil Conductor Sultan Sample*

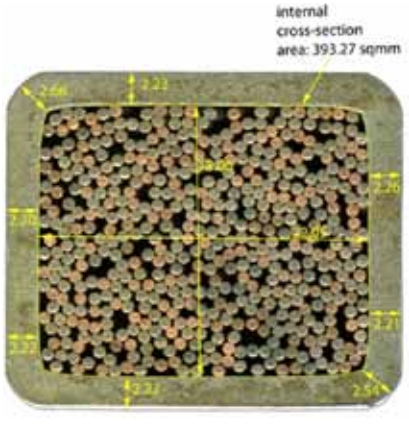
completion of details. The structures are now divided into two well-separated packages of approximately equal value: Coil-Casings (18 sets) and Outer Intercoil Structures plus Gravity Supports (18 sets). A precise sharing between Voluntary Contributors within the EU was agreed in the summer of 2009.

In the context of the JT-60SA Integrated Project Team, a formal review by external experts (panel chaired by R. Aymar) was also conducted in the summer of 2009. The panel concluded the review favourably and agreed that the design is mature to proceed with procurement initiation.

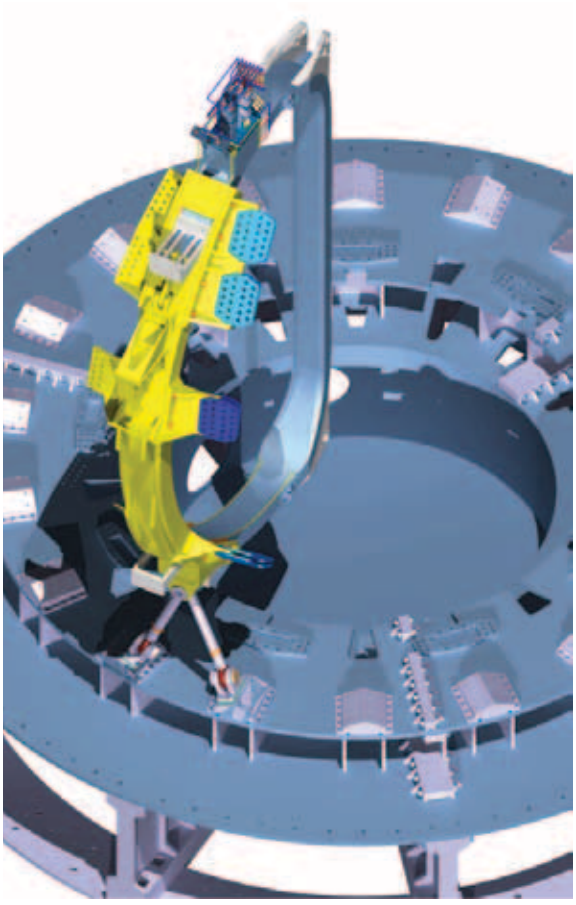
The technical specification for the High-$T_c$-Superconducting (HTS) current leads was completed and the interfaces were agreed with JAEA. The design of the current leads is largely based on the design for the current leads for the W7-X project. The final design review was successfully completed. High-Tc superconductor material was already ordered in advance because of its long delivery time. The technical level of the Procurement Arrangement and the Agreement of Collaboration was agreed between F4E and the Voluntary Contributors by the end of 2009.

In the field of Power Supplies, the European contributions for the JT-60SA Power Supply (PS) system include the Base PSs for the Toroidal Field Magnet, the CS and EF coils, High Voltage generators for CS1-4 modules to provide the requested voltage for plasma breakdown, Quench Protection Circuits (QPC) for all superconducting coils, PS for In-vessel coils for Fast Plasma Position Control (FPPC), and PS to control RWM.

In the course of 2009, the technical and procurement preparation activities have proceeded in accordance with the Work Programme and according to the reference schedule. Relevant interface documents were developed, details of the sharing were concluded and drafting and finalisation of the Technical Specifications documents has been progressing well leading to the conclusion of the Procurement Arrangement of the QPC as well as the finalisation of the Technical Specifications and PA material for the Base PS and High Voltage (HV) generators (the conclusion of which is planned for mid-2010).




*TF Coil Conductor Sultan Sample*



*View of JT60SA cryostat base and one TF Coil with structures*

A complete model of the JT-60SA Poloidal Field coil circuit including all the passive structures was developed. The model was updated on the basis of the new geometric data of the Vacuum Vessel and stabilising plates, and it was utilised to analyse the effects of plasma initiation, disruption and of QPC intervention in terms of over-current.

Two different complete models of the JT-60SA Base PS system (including Motor Flywheel Generators (MFG)) were developed to verify MFG compatibility with the JT-60SA electrical loads and the thyristor converter performance. The obtained active and reactive power waveforms are utilised to design the AC power system.

Development of the main characteristics of the JT-60SA Base PS and TF PS was defined together with the basic assumptions for the operational procedure in case of fault. The basic fault sequence was established based on utilising the crowbar and the QPC.

The circuit configuration of the switching network unit (SNU) for the HV generation at plasma breakdown was studied to keep the plasma operational flexibility and to minimise the construction cost. As a result, the resistor of the SNU was divided into four different resistances for stable breakdown with different pre-magnetisation, and a further two resistors were added to assist fast plasma current ramp-up phase. The maximum energy consumption at each resistor was also defined. In addition. the basic layout of the PS System in the JT-60 Rectifier Building and Extra Area of JT-60 Experimental Building was defined. The place to install the FPPC coil power supplies on the ground floor of the Rectifier Building was defined. The necessary area for the RWM control coil and EFC coil power supplies will be evaluated in 2010.

For the Cryostat, compared with the Work Programme defined for 2009, some delays were accumulated in the finalisation and conclusion of the cryostat base PA: the main issue being the resolution of some internal EU administrative matters as well as the need to define more details in the technical design and specifications. Work in 2009 hence led to much more precise technical specifications than originally thought and this allowed the call for tender, by CIEMAT, to proceed with a reduced delay after the conclusion of the PA. The formal signature of the PA was carried out in late 2009. Additionally intense design work on the cryostat main body has also been carried out in 2009 aiming to reduce costs, simplify assembly as well as reduce the complexity of the sharing between EU and JA. This latter issue was solved in late 2009 with a revised sharing of work which is deemed to be easier to implement by substantially reducing interface issues between potential industrial suppliers.

For the cryogenic system, technical and procurement preparation activities have proceeded in 2009 as originally planned within CEA and F4E. Design work in 2009 has focused on two main lines: design optimisation based on detailed analysis and industrial feedback, as well as simplification of interfaces between EU and JA. Based on such studies in 2009, the main interface with the cryogenic system became at the outlet of the Auxiliary Cold Box (ACB) in the RF Amplifier Room III. In 2009 two studies were performed by European industry to analyse in detail the refrigeration process. As part of these studies, the major components were dimensioned and a new layout of the cryogenic system was proposed. The warm compressor station will be placed in a new building next to the cryogenic hall. Warm gas storage vessels will be placed outside the main buildings. The refrigerator coldbox and the ACB are placed in a separate cryogenic hall which also holds the liquid helium storage. During plasma pulses the refrigeration powers show significant peaks which have to be handled by the refrigeration system. Studies have been conducted and measures were proposed by industry to keep the magnet temperatures within the required temperature range. All major interfaces with the Naka site were defined and estimates for the utilities, investment and operation resources have been provided.

*Conclusion of QPC PA*

## IFMIF/EVEDA Programme

The formation of the team in Rokkasho for the International Fusion Materials Irradiation Facility (IFMIF)/Engineering Validation and Engineering Design Activities (EVEDA) has been a challenge for two and a half years. However, following the start of the EVEDA, the Project Team has reached a reasonable size, also thanks to the EU achievement to realise its commitment to its entire extent. Thus recently the Project Team has been able to come

*Aluminium mock-up in Legnaro, used to check the tunability of the RFQ*

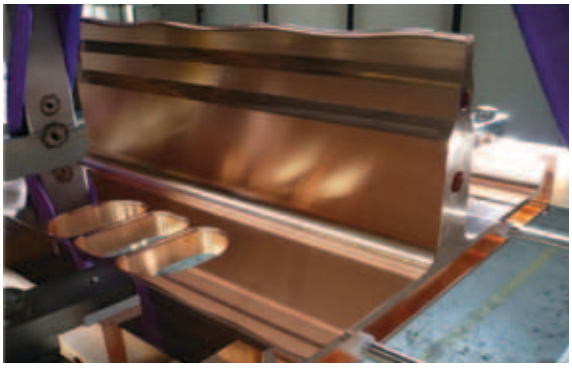
to a position to start one of its major tasks, i.e. the Engineering Design of the IFMIF plant.

With regard to the accelerator prototype, the construction of all its different components is progressing. The Injector is at the stage of manufacturing, the Procurement Arrangement (PA) has been signed and the first experiments in Saclay are foreseen to start before the end of 2010. Its delivery to Rokkasho is now planned for the spring 2012.

The detailed design review of the RFQ has taken place with satisfactory results. A full scale aluminium mock-up has been built and used for low power tunability tests in Legnaro, Italy. Full scale copper prototype modules have also been manufactured to check the brazing operation and cooling effectiveness. Preliminary design reviews of the SRF Linac and of the Beam Dump have taken place during 2009.

The EVEDA Lithium Test Loop, maintaining similarity with the final one for the relevant parameters of the liquid lithium, although at reduced width of the target (100mm instead of 260mm foreseen for the IFMIF plant), is being built and installed under JAEA responsibility at Oarai, a site with previous experience in liquid metals, with contributions from EU (ENEA, Italy) to the lithium monitoring system and a significant part of the Target Assembly. In parallel, erosion corrosion experiments are also initiated at the ENEA Brasimone centre on the Lifus 3 loop in advance of its operation.

The design and validation of the Test Facilities are predominantly conducted in EU with KIT (Karlsruhe, Germany) as the leading laboratory and contributions from CIEMAT (Spain), SCK-CEN (Belgium) and CRPP (Switzerland). Most of the design work during this phase has been performed with the objective of producing a new effective design of the Test Cell and of the related remote handling.



*One of the four vanes scale 1:1 of the mock-up manufactured to check the brazing procedure (required accuracy is better than a few tens of μm)*

*Picture of the Helium Low Pressure Loop at Karlsruhe (HELOKA-LP) that will be used to validate the High Flux Test Module thermo-hydraulic characteristics*

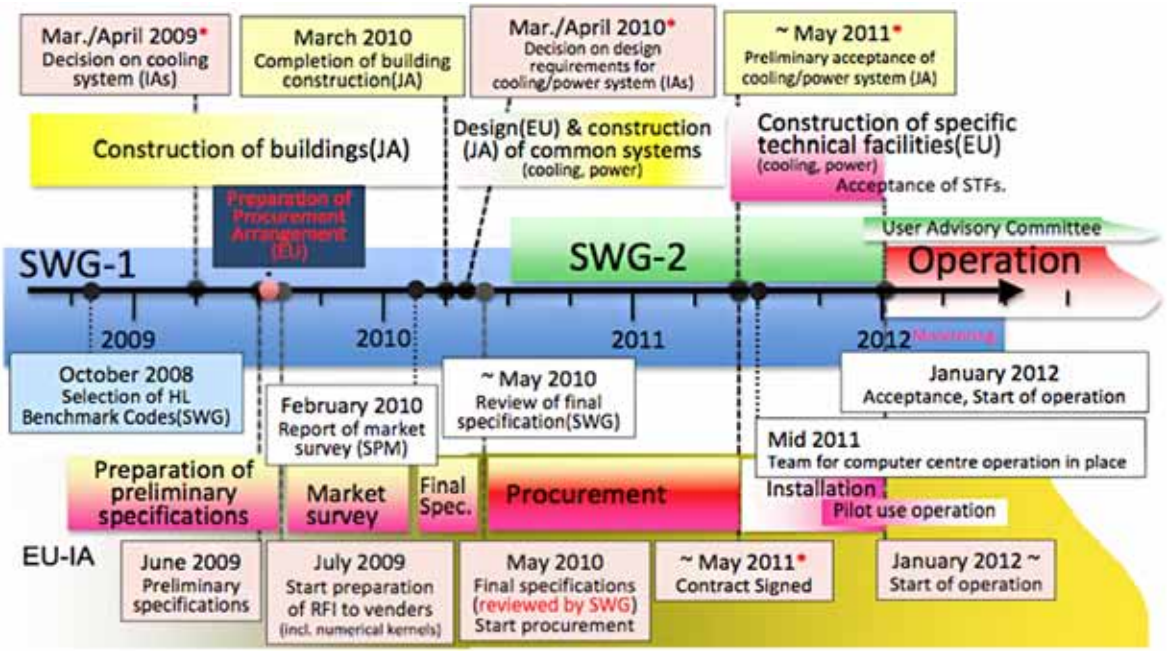
A number of different solutions have been investigated in order to optimise the operation of the facility. A mock-up of the vertical rig of the HFTM has been built, the Low Pressure HELOKA loop for test with helium cooling has been commissioned in Karlsruhe. Related capsules have been designed for a fission reactor irradiation at SCK-CEN (Mol, Belgium) to investigate the thermal behaviour of the rigs, which will start in the beginning of 2011. Design work has also been conducted on the Medium Flux Test Modules with the definition of a Creep Fatigue Test Module by CRPP and of a Tritium Release Test Module jointly by KIT and CIEMAT. All the remaining Procurement Arrangements foreseen for the Test Facilities are expected to be signed during the first half of 2010.

## IFERC Programme

The Computer Simulation Centre activities have progressed well in 2009. Work in the EU has focused on the definition of interfaces with JAEA, the establishment of a detailed schedule, and the preparation of the Technical Specifications of the Supercomputer Procurement Arrangement. The Special Working Group I (SWG1), created by the BA Steering Committee has selected the benchmarking codes to be used in order to evaluate and compare the performance of the possible different solutions available on the market, and contributed to the definition of general target performance of the supercomputer. This group will complete its tasks by monitoring the performance of the computer centre six months after the start of operation. It is now foreseen that for phase 2 of the CSC activity, a second Special Working Group (SWG 2) will be established in order define the utilisation rules of the supercomputer centre.

The DEMO design activities have so far consisted of joint workshops (Kyoto, February 2009, and Garching,

*CSC implementation plan*

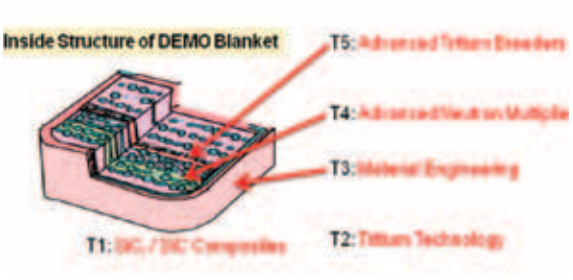



September 2009) for preliminary discussions to prepare the collaborative work that will start in 2011.

The DEMO R&D activities have progressed according to the schedule established in the Project Plan. On the breeding blanket, a pebble bed type blanket is considered as one of the most promising blanket concepts both in the EU and Japan. Considering the demanding requirements on this component in DEMO, the timely development of blanket structural materials and breeding/multiplying materials is essential. In this frame, a number of R&D Tasks have been proposed to be implemented through the BA DEMO R&D program: T1: SiCf/SiC Composites, T2: Tritium Technology, T3: Materials Engineering for DEMO Blanket (reduced activation ferritic/martensitic (RAFM) steels as structural material), T4: Advanced Neutron Multiplier for DEMO Blanket and T5: Advanced Tritium Breeders for DEMO Blanket.

The EU participates in all tasks except T2. Two workshops (Kyoto, February 2009 and Barcelona, October 2009) have taken place to evaluate the obtained data and to discuss future plans. The main achievements in the EU tasks in 2009 are:

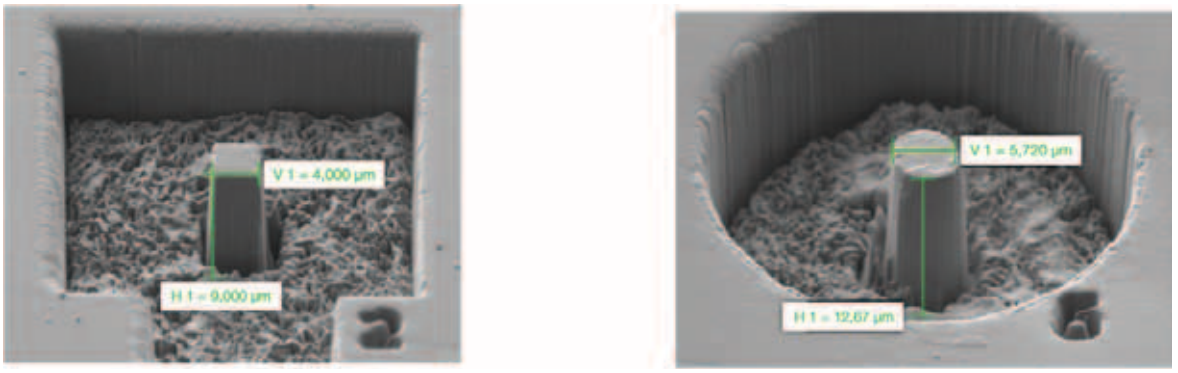
On T1, ENEA is developing a multiscale methodology for composite structural modelling and validation of modelling procedure by mechanical testing: a progressive failure method has been implemented into a general purpose finite element program, ABAQUS, which allows the user to define material




*Conclusion of QPC PA*

properties at a material point scale. ENEA also is completing a programme of determination of the thermal conductivity of SiC/SiC. CIEMAT is carrying out work to characterise basic properties of silicon carbide materials (SiC and SiCf/SiC). Studies include volume and surface electrical conductivity, H diffusion, and the effects of H and He on microstructure and electrical conductivity.

On T3, reduced activation ferritic/martensitic steels RAFMs are considered the main candidate materials for structural applications in DEMO. In 2009, KIT has continued the characterisation of the production and treatment of EUROFER 97-3 plates. The irradiation effects on the mechanical properties and microstructure are studied in CRPP using small specimen test techniques. Irradiation effects and specimen size and geometry effects on the

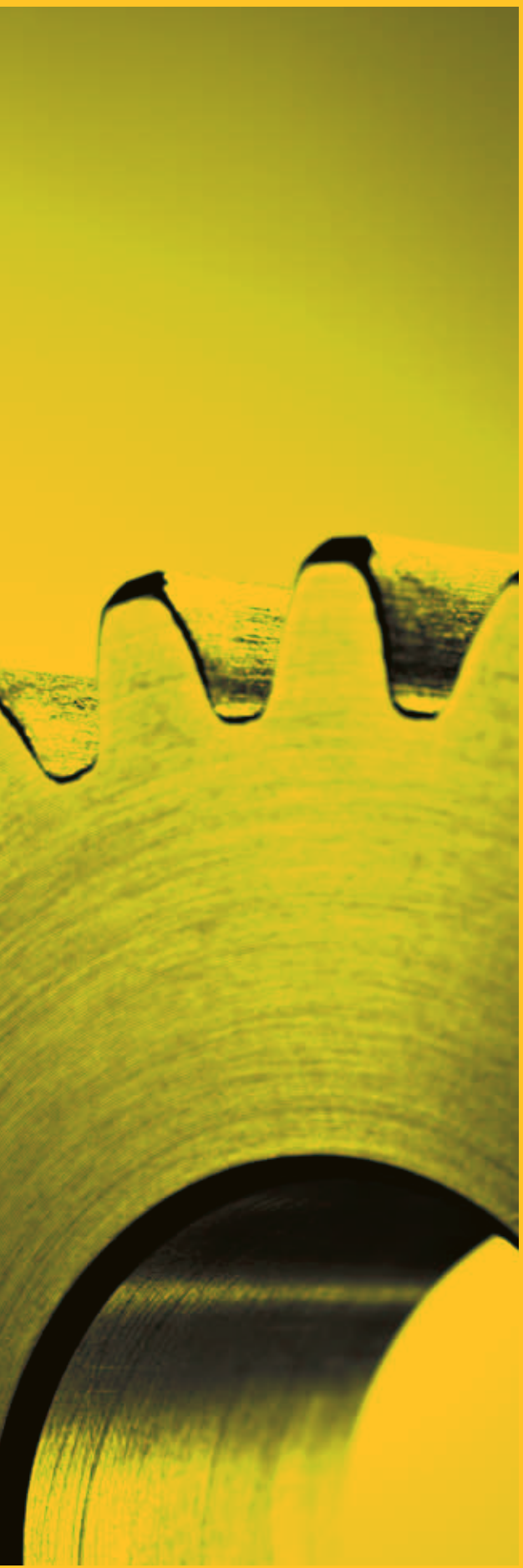



*Two types of EUROFER 97 micro-pillars prepared and tested*

mechanical properties are investigated by fracture toughness and tensile tests, and by microstructural analyses and finite element modelling.

On T4, the studies on fabrication and characterisation of metal beryllium and beryllium compound pebbles as neutron multipliers are carried out by KIT. In 2009, KIT has completed the refurbishment of a beryllium handling facility, and is assembling the equipment for the production of Be-Ti alloy rods. Commercially produced Be-Ti rods by Hot Isostatic Pressing (HIP) have been assessed and the fabrication of pebbles started. The ongoing activities include tritium release studies from pebbles and microstructural characterisation of specimens.

On T5, activities under this task concentrate on the fabrication of tritium breeder pebbles of $_{6}Li$ enriched $Li_2TiO_3$ and $Li_4SiO_4$. KIT is developing an enhanced melt based process for the production of advanced pebbles, and optimising the process to avoid the formation of cracks.



## Chapter 4

# Administration, Resources, Contracts and Procurement

# Contracts and Procurement

## Procurement Activities

### Grants

During 2009, a total of 30 grant award procedures (either as open call for proposals or unique beneficiary invitations) were issued, and 30 grants were awarded (see table in Annex I).

Grants remain the foundation of R&D activities performed by F4E in support of the projects.

### Operational Procurement

During 2009, a total of 51 procurement procedures were launched and 47 procurements were awarded (see table in Annex I). Major procurements were awarded in the area of Magnets and Buildings.

Seven procurements with a contract value above EUR 250 000 were negotiated in line with Article 100 of the Implementation Rules (see table Annex IV).

For the procurements listed in Annex I, the average number of calendar days from the submission of the offer by the applicant to the awarding of the procurement by F4E was 67 days. For the grants included in the overview below, the average number of calendar days from the submission of the proposal by the applicant to the awarding of the grant by F4E was 119 days.

According to F4E Financial Regulations, the implementation of 2008 Work Programme was concluded during the year 2009. On 31 December 2009, 93% of all procurements and grants related to the 2008 Work Programme were signed. The implementation of 2009 Work Programme will continue throughout 2010 and will be concluded by 31 December 2010.

### Administrative procurement

During 2009, a total of seven procurement procedures were launched, of which five (see table in Annex IV) were awarded within the year. In addition, 13 competitive tender procedures were awarded on the scope of the implementation of a competitive framework contract for Sharepoint development services from which 12 were signed in 2009. The majority of contracts signed were related to IT services which were mainly open procedures.

The negotiated procedures launched are justified in accordance with the rules on the basis of their amount or the characteristics of the service.

## Business Intelligence

F4E's Business Intelligence (BI) Group has intensified its interactions with industries and European fusion laboratories in 2009. Not less than four Industrial Liaison Officers (ILOs) meetings were organised in 2009; two in Barcelona, one in Brussels and one in Cadarache at the ITER site.

Both directly and through the ILOs, F4E is building up strong relationships with European industries. An estimated 250 companies met in 2009, either in face-to-face meetings or during plenary sessions where F4E had the opportunity to introduce its procurement activities. Apart from those plenary sessions, meetings with industries in Austria, France, Germany, Greece, the Netherlands, Poland, Spain, and Switzerland should be mentioned.

F4E also participated in events such as the International Business Forum for Fusion in Sapporo or the JEC exhibition on composite materials in Paris. F4E sees these efforts as key to reach a relevant and effective participation of companies, so as to achieve a best value for money result while fostering the creation of a European fusion industry.

### Supporting pre-procurement activities

In 2009, a key F4E activity was the support to pre-procurement and procurement preparation. In particular, F4E has coordinated or participated in meetings, seminars and information sessions as part of the preparation of procurement activities around the Vacuum Vessel, First Wall and Blanket, Remote Handling, Cryoplant, Codac Systems, and Architect Engineering.

The mapping of manufacturing processes and required skills for key procurement procedures has been finalised and distributed to potential sources of information like the ILOs.

### Supporting tools for Contracts and Procurement

F4E has implemented new tools for supporting its procurement activity. F4E Contracts & Procurement is now managing all operational tendering procedures of the Agency with the "Compass" database, developed and successfully tested by the end of 2009. The database is deemed to be a powerful tool for enhancing the efficiency and monitoring of the procurement activities.

2009 was also the preparatory year for the functional and technical specification of the coming F4E Industry Portal.

## Intellectual Property Management

F4E hosted the first meeting of the ITER Council Working Group on Intellectual Property Management and Dissemination of Information from 3-5 March 2009 which brought together experts from the Members and Domestic Agencies to exchange ideas with the ITER IO. During the three days a draft text for the "ITER Organization Rules on Intellectual Property Management and Dissemination of Information" was developed base on the ITER Agreement's Annex on Information and Intellectual Property. Discussions focused not only Discussions focused not only on near-term items such as protection of background intellectual property, publication rules and training needs, but also on longer term strategies such as what happens with the Intellectual Property Rights after dissolution of the ITER IO. A report was presented to the ITER Council meeting in June.

*The first meeting of the ITER Council Working Group on Intellectual Property Management and Dissemination of Information, Barcelona*

## Export Control

F4E participated in the third meeting of the ITER Council Working Group on Export Control, Peaceful Uses and Non-Proliferation (ECWG) in Washington, DC from 6-8 April 2009 under the chairmanship of Dr Mike Roberts. The ECWG devoted this meeting to a final review of the Terms of Reference and the proposals for an ITER Council Policy on Export Control and an ITER Council Policy on Peaceful Uses and Non-Proliferation. All three documents were tabled at the subsequent ITER Council meeting. The ECWG also discussed the ITER IO strategies to implement these Council policies. Technical discussions on export control lists and data classification systems for the ITER IO and the Domestic Agencies were also held during the meeting.

*The Export Control Working Group during its meeting in Washington DC*

# Human Resources

*The Staff Regulations and the Conditions of Employment of Other Servants of the European Communities apply to the staff of F4E. In addition, seconded experts are appointed under conditions that have been approved by the F4E Governing Board.*

## Personnel Policy: setting up a regulatory framework

The consolidation of the personnel policy framework was considered as one of the key priorities in the area of Human Resources. This framework comprises regulations and implementing rules as well as procedures, guidelines and decisions to be taken by the Director.

Steady progress was achieved in 2009 (and is expected to continue in 2010) in relation to the development of the Personnel Policy Regulatory Framework, with the collaboration of the F4E Governing Board, the European Commission and the F4E Staff Committee.

In the field of staff appraisal of performance and promotion in particular, all the preparatory work (draft proposals, extensive discussion with the Staff Committee representatives, organisation of information and training sessions, etc) took place on both topics during 2009, in order to enable the drafting of the required rules, with the objective to launch both exercises in 2010.

### Administrative Agreements with schools

In line with the provisions of the Staff Regulations and Conditions of Employment of Other Servants of the European Communities, F4E staff is entitled to financial support for the schooling of their children.

To this effect, and following a Governing Board Decision in August 2009, F4E signed Administrative Agreements with seven accredited schools and day-care centres allowing for all education, tuition and registration fees as well as transportation costs to be paid directly by F4E. It is foreseen that at least two more schools will follow in 2010.

In parallel, relaunched of the discussions on the feasibility of establishing a European Associated School has been fostered during 2009.

## Medical Expenses

The cost of medical care in Spain largely exceeds the ceilings established by the European Union's Joint Sickness and Insurance Scheme (JSIS). In order to partly alleviate the problem in the short-term, the F4E Staff Committee, in collaboration with the administration, reached a quick and effective solution by urgently negotiating additional medical coverage for staff via a healthcare insurance company. A long-term solution is under discussion with the JSIS and the Spanish authorities.

Other actions in view of facilitating the access of F4E staff to a better healthcare system have been launched (direct-billing with hospitals in Barcelona, increasing the visibility of F4E with regards to health actors locally, follow-up of discussions and meetings with Pay Masters Office in Brussels, etc).

## Training and Studentships

A Strategic Learning and Development Framework for F4E staff was established at F4E. This framework includes the establishment of individual training plan for each staff member and their annual revision.

In 2009, 139 staff members followed one of the language courses organised by F4E in 5 languages. All staff members have also followed training in other domains (technical, financial, IT, etc), either by following one of the 19 collective training sessions organised at the F4E premises or the 50 individual training sessions in Barcelona or abroad.

Furthermore, Summer Studentships were launched in 2009. This scheme allowed a total of 12 students to become acquainted with the ITER project and F4E. The success of this action in 2009 has prompted F4E to repeat it in 2010.

## Recruitment

The following table shows the number of staff recruited in 2009 distributed by status, category and department.

This sums up as a total of 8 Officials (FOs), 50 Temporary Agents (TAs) and 34 Contract Agents (CAs) recruited during the year 2009.

| | FO | TA | CA |
|---|---|---|---|
| **Office of the Director** | 2 AD<br>1 AST | - | 2 FG III<br>1 FG II |
| **ITER** | 1 AD | 26 AD<br>5 AST | 3 FG IV<br>2 FG III<br>4 FG II |
| **Broader Fusion Development** | 1 AD<br>1 AST | 3 AD | 1 FG VI<br>1 FG III |
| **Contracts & Procurement** | 1 AD<br>1 AST | 7 AD<br>4 AST | 2 FG III<br>8 FG II |
| **Resources** | - | 3 AD<br>2 AST | 3 FG III<br>7 FG II |

F4E's pace of recruitment has been and continues to be swift. As an example, the total number of staff in place in 2007 was five (recruited in December 2007) and it has reached 219 in 2009, averaging 107 staff recruited a year over the course of the last two years.

## Selections

During the year 2009, 41 Vacancy notices were published (6 FOs, 28 TAs and 7 CAs).

Out of these 41 selection procedures, 37 are completed and reserve lists have been established; the remaining will be closed during the year 2010.

Selection procedures were revised and simplified, allowing F4E to recruit more rapidly (in the case of Contract Agents) and also taking into account the establishment of the Staff Committee in F4E, which participation is compulsory in F4E selection procedures. A further step aiming at increasing professionalism and efficiency was given in 2009.

The establishment of an e-recuitment tool on line will contribute to the above objective. Such a tool is being currently finalised and will be implemented in early 2010.

| Staffing numbers on 31/12/09 | |
|---|---|
| FO/TA | 153 |
| CA | 58 |

## HR networks

Participation at the meetings organised by the European Commission and by the EU Agencies is essential to HR activities. Continuous exchange of information with the Institutions and Agencies based in Spain has also been in place in 2009.

Along these lines there has been further collaboration with ITER IO throughout 2009 especially for the development of the ITER IO e-recruitment tool. has intervened in 2009. A similar approach is foreseen with the rest of the Domestic Agencies in the HR field of activities.

## Fostering Social Dialogue

F4E's first Staff Committee was elected in February 2009 and has had a direct impact on HR activities during this period.

The HR sector has been particularly involved due to the nature of the issues under discussion. Meetings have been taking place on a regular basis. Two working groups, composed of representatives of the Staff Committee and of the Human Resources area, were also constituted, in order to discuss schooling issues and the difficulties linked to medical coverage. Positive results were indeed achieved, among which the signature of several administrative agreements with international schools or the completion of the first steps towards direct billing with Barcelona hospitals.

# Budget, Finance and Accounting

*The F4E budget for 2009 was initially adopted for the global amount of EUR 372.10 million in commitment appropriations and EUR 187.30 million in payment appropriations. This budget was successively amended at the next three meetings of the Governing Board. The final authorised F4E budget for 2009 comprised EUR 355.13 million in commitment appropriations and EUR 173.61 million in payment appropriations.*

## Implementation of the 2009 Budget

98.9% of the overall budget in commitment appropriations was implemented, of which 99.0% derived from operational budget appropriations (Title III of the expenditure) and 97.5% from administrative expenditures (Title I & II). 65.3% of the overall budget was implemented in payment appropriations, of which 65.5% came from the operational budget appropriations and 64.2% from the administrative expenditure.

## Financial Information System (ABAC)

F4E implements the ABAC system (Accrual Based Accounting) owned by the European Commission and used by many EU bodies.

Thanks to the ABAC/SAP full outsourcing scheme, F4E has benefited from a high standard financial system for a small fraction of its potential acquisition price.

2009, as the first full year of financial autonomy, was a year of consolidation in the use of the ABAC modules set up in 2008 (ABAC-SAP, ABAC Workflow and ABAC Assets); in particular regarding the full implementation of ABAC Assets to register all purchases and donations. This was critical to establish the 2009 Financial Statement. By being directly linked to the SAP central accounting system for both acquisition and retirement procedures, ABAC Assets ensures the cohesiveness of the overall ABAC system.

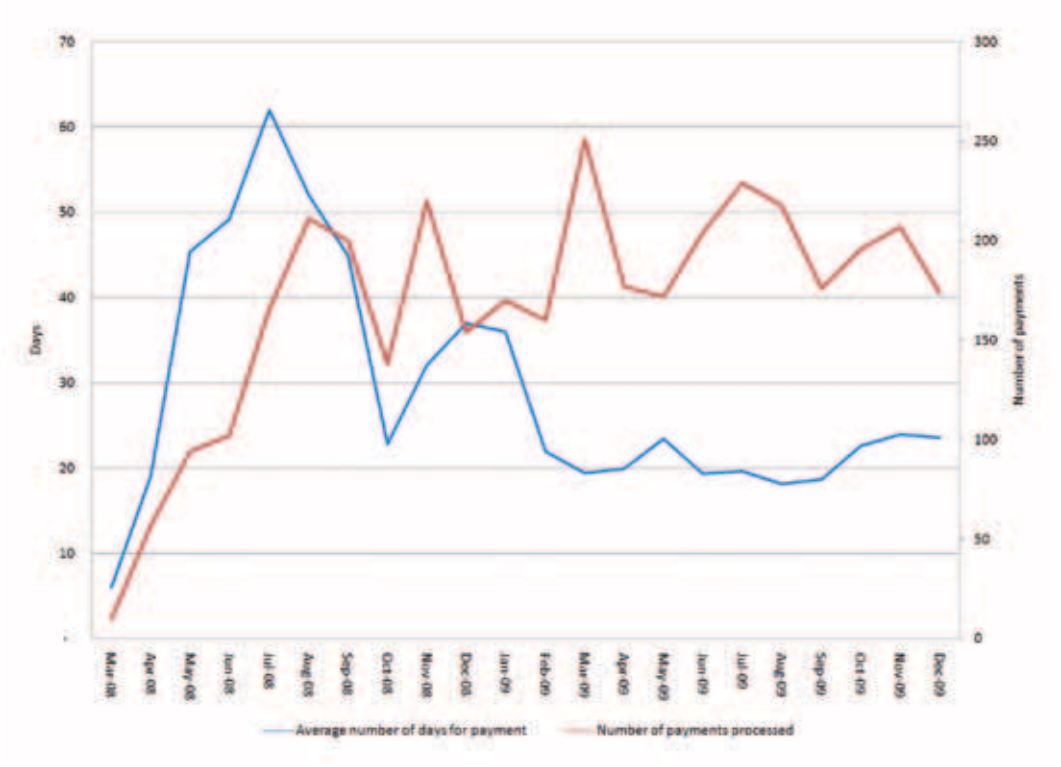
Other positive elements include a good control of the supply chain (ABAC Assets requires to place the order and record the goods reception via the system) and some modern means to manage inventory (infra-red bar code readers, etc.).

## Legal Framework – Accrual accounting standards in F4E

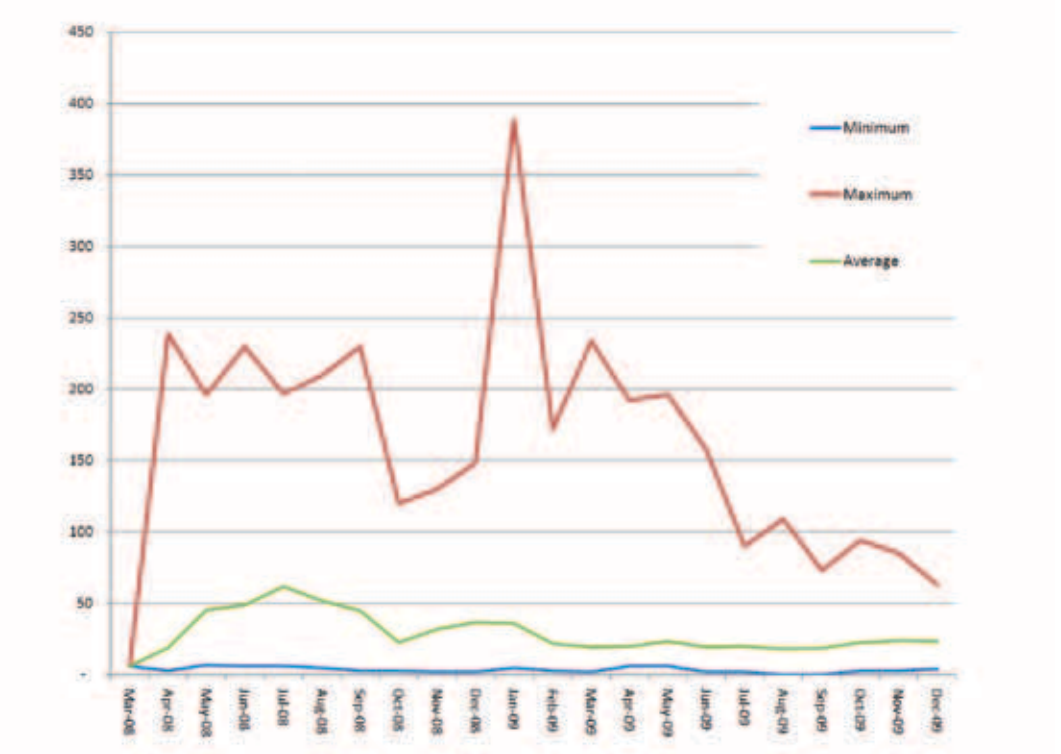
According to its statutes, the annual accounts of F4E are fully consolidated with those of the European Communities. The 2009 financial statement was established by using the consolidation package provided by the European Commission.

The accounting rules and regulations used in the annual accounts are also laid down by the European Commission. In addition they are on an accrual basis and are compliant with the International Public Sector Accounting Standards (IPSAS).

During 2009, the number of payments being processed by F4E continued to increase while the average time to pay from receipt of invoices fell to around 20 days which is within the 45 day period foreseen in the Financial Regulation.




*Time to process a payment vs. number of payments*




*Minimum, maximum and average times for F4E to pay invoices during the period until end-2009*

# Control Environment

## Internal Audit

The first Internal Auditor of F4E took up his duties on 1 July 2009. Since 1 November 2009, the Internal Audit function has been manned by two officials.

These first six months have been dedicated to capacity building and consulting activities, while still slightly less than a half of the auditors' available time was devoted to assurance work.

Beyond staff selection, induction and training, capacity building measures included the fine-tuning of the Internal Audit Charter in compliance with the 'International Standards for the Professional Practice of Internal Auditing'. The Charter sets out the mission, objectives, reporting and working arrangements essential to the proper fulfilment of the Internal Auditor's role in accordance with the F4E Financial Regulation. The Governing Board adopted the Charter on 27 November 2009. Furthermore, a reflection started on the creation of an Audit Committee. Regular contacts have been also established with professional auditors in other European Community bodies.

Assurance work included a first analysis of the control environment by the Internal Auditor, resulting in a high-level risk profile. The first Annual Audit Plan, covering the end of 2009 and 2010, was elaborated on this basis, and presented to the Governing Board on 27 November 2009. The Governing Board approved the Annual Audit Plan on 27 January 2010.

The first audit engagement, which had been prepared in the context of consulting work, was officially launched on 23 November, and the fieldwork carried over into 2010. The main purpose of the audit was to assess the compliance, effectiveness and efficiency of the Internal Control and Risk Management with respect to the design and implementation of the Financial Circuits in F4E since 1 April 2009.

On a recurring basis, the Internal Auditor provided advice on various issues in his areas of competence, i.e. Governance, Internal Control and Risk Management, in particular with respect to the revision of F4E Internal Control Standards in September, and the creation of a Working Group in charge of developing specific requirements and proposals for action implementing these standards.

## Internal Control Systems

A review of the Internal Control Standards (ICS) adopted in March 2008 has taken place in order to better align the overall control environment to the rapidly expanding organisation. This review resulted in the adoption on 30 September 2009 of an updated set of 15 ICSs:

| ICS N ° | Internal Control Standard | Control Group |
|---|---|---|
| 1 | Mission | Mission and Values |
| 2 | Ethical and Organisation Values | Mission and Values |
| 3 | Staff allocation and Mobility | Human Resources |
| 4 | Staff Evaluation and Development | Human Resources |
| 5 | Objectives and Performance Indicators | Planing and Risk Management Processes |
| 6 | Risk Management Process | Planing and Risk Management Processes |
| 7 | Operational Structure | Operations and Control Activities |
| 8 | Processes and Procedures | Operations and Control Activities |
| 9 | Management Supervision | Operations and Control Activities |
| 10 | Business Continuity | Operations and Control Activities |
| 11 | Document Management | Operations and Control Activities |
| 12 | Internal and External Communication | Information and Financial Reporting |
| 13 | Management Information and Reporting | Information and Financial Reporting |
| 14 | Assessment of Internal Control Processes | Evaluation and Audit |
| 15 | Internal Audit | Evaluation and Audit |

An Internal Controls Standards Working Group was established with representatives from departments and services of the organisation. This group has been put in charge of establishing an action plan for the implementation of the adopted standards, as well as formulating recommendations and assuring proper implementation throughout the organisation. Moreover, it has a specific task in creating internal control awareness among F4E staff.

The ICS Working Group's first monthly meeting took place in November 2009 where the mandate was confirmed to the members. It is important to mention that the Internal Auditor is present during each meeting as observer and may formulate recommendations regarding compliance and effectiveness.

A dedicated IT application is under development which will permit the ICS Working Group to establish and follow-up the Action Plan and to monitor implementation. This system also allows for reporting on progress to management.

Finally, 2009 actions were already defined in critical areas such as 'Missions and Values' and 'Operations and Control Activities'. Efforts to tighten the control framework will continue throughout 2010.

## Quality Management System

In 2009, F4E continued the implementation and development of the Quality Management System through 3 main activity areas:

- Establishment and Continual Improvement of the Quality System;
- Process Mapping development;
- Quality support to the Operational Projects.

**F4E QUALITY SYSTEM**

The development and establishment of a Quality System is part of the F4E overall management strategy included in obligations as ITER Project items provider (ITER IO and Host Country Authority Regulations requirements) and to assist the internal management in the Internal Control Standards compliance.

### Establishment and Continual Improvement

The status and roadmap of the Quality Management System (QMS) establishment and improvement is portrayed below:

| Area | Activity/Milestone |
|---|---|
| Overall QMS | Development of F4E Management Systems Manual |
| | Development F4E Process Map (face of QA Intranet) |
| | Preparation (with IT) of the QA-Helpdesk service |
| Quality Audit | Issue of the Quality Audit and Quality Surveillance Processes |
| | Quality Lead Auditor and Auditor Training (by DNV) |
| | Issue of the 2010 Quality Audit Plan |
| Documentation | Assist and promote the development of the Document Management System |
| | Development of Signature and Sign-Off Authority policies |
| | Development and Proposal of the Document Classification and Marking to the ICS workgroup |
| | Issue F4E General Documentation Policies |
| Risk Management | Issue the general Risk Management Process (methodology) |
| | Issue Project Risk Management Process (operational) |
| | Development of the Corporate Risk Management approach (Organisation) |

**Process Mapping development**

F4E is implementing a process approach in line with the IAEA GS-R-3 requirements (International Atomic Energy Agency Safety Requirements No. GS-R-3).

The Management System is more efficient as its capacity to meet F4E's requirements grows. This way the efficiency of the system is continually assessed and measured through the monitoring indicators of processes and the fulfilment of the specified objectives.

The F4E process map provides a quick, user-friendly and pragmatic gateway to procedures, instructions and documents.

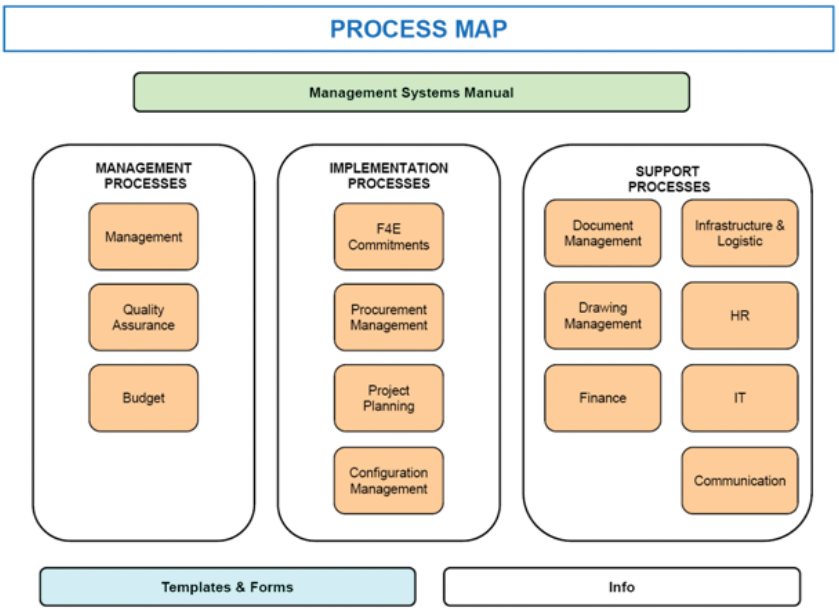
**Quality support to the Operational Projects**

One of the major QA activities is the support to the operational projects to ensure the correct implementation of the quality programme. These actives can be divided in:

- Support and review of the Procurement Arrangements and ITER Task Agreements to ensure conformance with the F4E QA Programme, IO-DA coordination meetings in quality and safety and issue of the implementation templates.
- Full support to the technical departments on quality issues of Contracts and Grants, verification of the calls documentation (including full review of the Management Specifications) for compliance with the F4E QA Programme and issue of the follow-up documentation templates;
- Verification of the Suppliers Quality Plans, Supplier quality audits and full support on QA to the kick-off meetings.

**Main Results**

- Management Systems Manual developed;
- Quality Audits framework for 2010 launched;
- Risk Management framework developed;
- 32 processes approved and being implemented (out of 90 identified); 13 processes under review/development; 10 support processes being developed under the new electronic Human Resources and Missions software;
- 70% of the Management and Implementation Processes done or in review.
- Development of Checklists for existing core processes and simplification of some existing processes creating a simplified entry scheme for each complex process.




*Overall F4E Process Map*

## Data Protection

F4E is committed to comply with the requirements of Regulation (EC) 45/2001 of the European Parliament and of the Council of 18 December 2000 concerning the protection of individuals with regard to the processing of personal data by the Community institutions and bodies (the Regulation). The main objective of the Regulation is to guarantee the lawfulness of the processing of personal data and its security and confidentiality.

In 2009, F4E made major steps in the implementation of the Regulation. The main achievements have been the following:

- Appointment of the Data Protection Officer (DPO) and his Deputy;
- The nomination of Controllers (the Heads of Department) responsible for the data processing within their departments;
- The nomination of Coordinators in each department, responsible for assisting the Controllers in the implementation of the data protection requirements in each department;
- The establishment of the Data Protection Network consisting of the Coordinators, DPO and Deputy DPO;
- Training session on data protection to the staff in the Resources Department;
- The composition of a template notification form for the notification of processing operations from Controller to DPO;
- The development of an electronic system for the notification of the processing operations and electronic database of the notified processing operations;
- The completion of a first draft of the inventory of processing operations which maps all processes within F4E that involve the processing of personal data;
- The analysis of current practises and policies in order to move towards further compliance with the Regulation.

**THE ROLE OF THE DATA PROTECTION OFFICER**

In compliance with the Regulation (EC) 45/2001 (the Regulation), F4E appointed a Data Protection Officer (DPO) on 1 June 2009 to ensure in an independent manner the internal application of the provisions of the Regulation and advise on the processing of the personal data. The DPO maintains a detailed register of the processing operations within F4E. The DPO notifies the European Data Protection Supervisor (EDPS) of the processing operations that involve the processing of sensitive personal data for his prior opinion on the lawfulness of the processing operations, and responds to requests from the EDPS. In crucial circumstances he may investigate matters and incidents on request or on his own initiative.

# Information Technology

In 2009, the focus gradually shifted from Infrastructure towards the:

- Overall improvement of service levels enjoyed by F4E staff;
- Development of the F4E management systems required to allow F4E to fulfil its mission, including the launching of the procurement tools and the execution of the phased development approach for F4EDocs (F4E Document Management System) and the other management systems (together and subject to the availability and input of the key internal clients for these);
- Formalisation of processes based on standards, methodologies and certifications;
- Stabilisation and further securing the F4E IT environment from incidents, mainly by – among other tasks – establishing a remote disaster recovery facility (signature of service contract).

It can be considered that F4E IT has completed the initial set-up phase and is fully operational, serving F4E on a day-to-day, business as usual basis, as needed.

Following with the development and implementation of the 2009 IT Work Programme, the following is a summary of the most important activities and deliverables reached and performed during the year 2009:

- F4EDocs (F4E Document Management System): the first 'staff driven' release of this tool (F4Edocs Phase 2) was rolled out;
- Industry Portal: web based solution that supports the Contracts and Procurement Departement in the internal preparation and execution of call for tenders. The final deployment of the Industry Portal is scheduled for February 2010;
- e-Recruitment Portal: web based application that supports the Human Resources Group in the management of staff recruitment;
- e-HR: solution that supports the Human Resources Group in the management of staff leave and missions. The final deployment of the e-HR application has been scheduled around mid-2010 in agreement with HR.
- F4E IT Disaster Recovery site: the tender for the provision of IT Disaster Recovery and related services was awarded and signed in December 2009. This service contract will allow developing and implementing a Disaster Recovery site for IT Business Continuity;
- IT Security and Remote Access: enhanced security for all users and services by the deployment of secure-ID and VPN remote access technologies.

# Infrastructure and Logistics

## Offices and Support Services

As F4E has grown, the main priority of Infrastructure and Logistics has been to develop and increase the infrastructure in order to install all the newcomers and to ensure a functional, comfortable, and safe workplace for all F4E staff.

During 2009, the main activity in the area of infrastructure was the full installation of two floors representing 1 500 additional $m^2$ and increasing the total surface available for F4E to 6 500 $m^2$.

This additional surface allowed us to install 60 people in new offices and to create two meeting rooms with capacity for 40 and 70 people together with their necessary telephone structure, IT network, and audio visual equipment. As a consequence, a complete reallocation of all F4E office spaces was necessary. A total of 129 moves were carried out.

In addition to these relocations, a first physical inventory of 4 600 items was concluded and environmental awareness was promoted by installing various recycling containers.

## Implementing the Host Agreement

Formal contacts were taken with the Spanish authorities and negotiations were conducted in order to be attributed a new and permanent building.

Contacts made with the Spanish Ministry of Foreign Affairs led to an accelerated and simplified process for obtaining visas for experts invited to F4E meetings held in Barcelona.

## Safety and Security

Priority was given to improving the physical security of the premises. To this end, an F4E Reception Desk was put in service on the ground floor, allowing all F4E visitors to be accredited by the F4E security (2 400 visitors were accredited in 2009).

From a safety point of view, a first-aid plan was developed and 20 F4E staff members were trained by the Red Cross.

# Social Dialogue

On the basis of the Governing Board's decision of 11 August 2008 establishing the Staff Committee (SC), elections took place on 26 February 2009 and the SC started its activities on 4 March 2009. The main role of the SC is to represent the interests of the staff vis-á-vis F4E and to provide a structured channel for the expression of their opinions. The activities undertaken by the SC during 2009 include:

- Setting up the SC within F4E including the provision of a secretariat, adoption of internal rules and procedures, developing internal websites for communication purposes, etc;
- Addressing the views of staff to F4E Management on matters such as internal reorganisations, contract renewals, implementing rules of the Staff Regulations, promotions/appraisals, etc;
- Establishing three Working Groups for areas that were considered to be a high priority for F4E staff members in collaboration with the F4E Resources Department and for which the following was achieved:
  - **Medical Issues**: Negotiating with clinics in Barcelona for the Direct Billing facility, promoting awareness about the implementation of the Joint Sickness Insurance Scheme in Spain while the SC alone negotiated and signed a contract with Sanitas to allow access to medical services at reasonable fees for staff. The SC is currently managing this contract on behalf of F4E staff;
  - **Schooling**: Negotiated a solution to help parents support the school fees of their children in Barcelona which was approved by the F4E Governing Board. F4E has concluded agreements with five schools and is currently undertaking negotiations with the other international schools in Barcelona;
  - **Selections**: One key role of the SC is to ensure that the principles of equal treatment, transparency, non-conflict of interest and correctness of the selection procedures are respected and to that end has provided SC representatives for selection committees.
- Promoting social activities among staff so as to enhance the team spirit and working relationships through sporting activities, blood donation campaigns, summer camps for children, anti-stress activities and Catalan cultural activities;
- Establishment of a special Working Group on Structural Issues which aims to improve the efficiency of F4E by proposing ways to streamline its internal procedures, minimising hierarchical fragmentation, maximising F4E's tools and efficiency etc;
- Ensuring the representation of F4E at AASC


*The Staff Committee with the former F4E Director.*
*From left to right: P.Rosado, A.Apollonatos, V.Saez Lopez-Barrantes, C.Ortiz-Schousboe, D.Gambier, G.Saibene, A.Bardenhewer-Rating, F.Cauvard, A.Portone*

(Assembly of Agency Staff Committees) which is composed of the SCs from all EU Agencies and bodies for which two meetings took place in 2009 and has served as a platform to share information on many of the issues mentioned above;

- Engaging in solidarity actions including blood donations and the organisation of charitable donations from staff during 2009 to the Arbuzzo and Haiti earthquakes.

# Information,Communication and External Relations

*The key objective in the field of external information and communication was to increase the visibility of F4E, both at European and national level, through different events and effective media coverage. In parallel, the evolution of a coherent corporate style and the establishment of a communication culture were identified as milestones of key importance for our internal communication.*

## External communication instruments

The redesign of the external and internal websites began with particular focus on usability, presentation and content in order to use the internet as a first class communications tool. In order to keep external users and members of staff up to date with latest developments, the frequently updated content of the F4E sites resulted in more than 40 articles.

F4E News, the external quarterly newsletter, was launched targeting more than 1,000 readers from industry, SMEs, European policy-makers and the fusion community. The production of new publications such as the Annual Report, the Industry and SMEs brochure and new F4E leaflets offered newly updated information.

Media reporting about F4E generated more than 100 articles describing the mission of the organisation, the science behind fusion, the ITER project, spin-offs and procurement opportunities. Moreover, six television clips were produced and four radio clips were recorded. The coverage offered by business/ innovation and economic supplements as well as the awareness campaign in scientific media in collaboration with ITER IO and other Domestic Agencies, merit separate reference.

The participation of F4E in 12 high profile events targeting scientists, policy-makers, media and the general public offered an opportunity to raise awareness about Europe's contribution to ITER, the scientific breakthroughs and the respective business opportunities. For instance, F4E co-organised with the European Commission the DTP2 (Divertor Test Platform) media technical briefing, participated at the Research Connections Conference under the auspices of the Czech EU Presidency, contributed to the Franco-Spanish ITER Business meeting and was represented at the Catalan Education Fair and Science Day. F4E was also responsible for the organisation of the Annual ITER-DAs Communications meeting, which took place in Barcelona. An official visit to F4E was made by a delegation consisting of the Royal Swedish Academy of Engineering and H.M. King Carl XVI Gustaf of Sweden.


*F4E Newsletter*

*H.M. King Carl XVI Gustaf of Sweden on his visit to Fusion for Energy*

## Internal communication instruments

The constitution of a Communication Group, bringing together representatives from all Departments in F4E, laid the foundations of an internal communication culture which offered feedback mechanisms on the different initiatives undertaken across different Departments.

Efforts were also made to promote a coherent corporate look and feel in publications (reports, posters, calendars) and IT applications.

## European and International organisations

In addition to its formal cooperation with the European Commission, F4E launched the basis of an active cooperation with the European Parliament by, inter alia, informing the Institution's competent committee (Industry, Research and Energy - ITRE) of its activities.

Throughout the year, F4E also participated actively in the EU Agencies network, including that of the Heads of Agencies and developed bilateral relations with other industry-oriented Agencies (OHIM - Office of the Harmonisation for the Internal Market - Alicante, ECHA - European Chemical Agency - Helsinki) to identify areas of common interest.

Finally, F4E Management had a first meeting with the European Organisation for Nuclear Research (CERN) and the European Space Agency (ESA) to explore venues for possible cooperation.

## State, regional and local authorities

A structured partnership was launched with Barcelona's local authorities through regular meetings organised with Barcelona City Hall, including with the Mayor and Deputy Mayor.

An official visit to F4E was made on 4 June by the President of the Government of Catalonia, José Montilla.

Finally, F4E has strengthened bilateral relations with the Catalonian Energy R&D Institute (IREC) that it is creating a Fusion Division, independently of ongoing cooperation with the Spanish Energy R&D Centre, CIEMAT and its "Laboratorio Nacional de Fusion".

*Visit of the President of the Government of Catalonia, José Montilla*

*Nuclear Fusion and ITER: Challenges and opportunities for French and Spanish industry*

*Erkki Leppavuori, Norbert Holtkamp, Didier Gambier and Octavio Quintana Trias pressed the button that set the first full-size prototype for ITER into motion*

# Chapter 5

# Statutory Bodies

# Governing Board

*The F4E Governing Board*

*The Governing Board usually brings together representatives from all the Members of F4E twice per year and takes a number of important decisions and supervises its activities. The Governing Board is responsible for the overall supervision of F4E and takes decisions on a wide range of matters, in particular it:*

- *Appoints the Director;*
- *Adopts the Financial Regulation and its Implementing Rules;*
- *Adopts the annual Work Programmes and Budgets;*
- *Adopts the Project Plan and Resource Estimates Plan;*
- *Adopts the Staff Establishment Plan and the Staff Policy Plan.*

## Representatives

Each Member of F4E is represented in the Governing Board by two Representatives, one of which has scientific and/or technical expertise in the areas related to its activities. The list of representatives on 31 December 2009 is provided in Annex II.

## Chair and Vice-Chair

The Governing Board elects its Chair and Vice-Chair from among its members upon a proposal from Euratom. Professor Carlos Varandas and Professor Niek Lopes Cardozo were re-elected as Chair and Vice-Chair of the Governing Board respectively for a second and last term of two years effective 17 July 2009.

## Summary of Decisions

**9th Governing Board Meeting, 12 March 2009, Barcelona**

The Governing Board (Chaired by Professor Carlos Varandas):

- Took note of a report from the Ad-Hoc Group established by the Director on the Heating and Current Drive Systems Mix for ITER;
- Took note of a final report on the 2008 Budget execution;
- Took note of the 2008 provisional annual accounts;
- Adopted the amended 2009 Budget;
- Adopted a decision to establish the F4E Site and Buildings Office and approved the terms of an agreement with the ITER IO;
- Renewed the mandate of the following members of the Executive Committee for two years, non-renewable, starting from 1 July 2009: Michel Bedoucha, Robert Freeman, Adelbert Goede, Lisbeth Grønberg, Reinhard Maix, Karl Tichmann and Kari Torronen;
- Appointed the following persons as new Executive Committee members for a period of two years, renewable once, starting from 1 July 2009: Clara Reyero Catalá, Georgios Nicolaou, Giuseppe Mazzitelli, Krzysztof Jan Kurzydlowski and Pedro Manuel Brito da Silva Girao;
- Thanked the following outgoing members of the Executive Committee for their valuable services to the Committee and F4E: Alberto Coletti, Antonio Cruz Serra, Jose Doncel, William D'Haeseleer and Andreas Werthmüller;
- Appointed Karl Tichmann and Lisbeth Grønberg respectively as Chair and Vice-Chair of the Executive Committee for two years, non-renewable, starting from 1 July 2009;
- Endorsed a paper on the status of the negotiations between the representatives of the Voluntary Contributors and F4E on the provision of the voluntary contributions for the Broader Approach pending an agreement to be reached during a meeting of the Contact Persons, F4E and Euratom on the issues of liabilities and Intellectual Property Rights and with an understanding that: F4E will cover from its budget the costs associated with the transportation of the components (excluding packaging) to Japan; and an appropriate funding scheme for the above costs covered by F4E needs to be agreed between the Voluntary Contributors and Euratom;
- Endorsed a report from the Joint F4E/CCE-FU Ad-Hoc Group on the JT60-SA Rebaselining;
- Invited its Members to submit candidates for the establishment of a reserve list for the Technical Advisory Panel.

**10th Governing Board Meeting, 9 July 2009, Barcelona**

The Governing Board (Chaired by Professor Carlos Varandas):

- Re-elected Professor Carlos Varandas and Professor Niek Lopes Cardozo as Chair and Vice-Chair of the Governing Board respectively for a second and last term of two years effective 17 July 2009;
- Requested that F4E assesses the costs and risks associated with the phased approach to ITER construction and also explores alternative EU cost constrained scenarios;
- Invited F4E to present the above cost and risk assessment to the Board before its next meeting together with an opinion from the Ad-Hoc Group on cost assessment;
- Endorsed a report on Heating and Current Drive Systems;
- Decided to conduct an assessment of the F4E ITER-related activities;
- Adopted the 2nd amended 2009 Budget;
- Adopted the amended 2009 Work Programme;
- Took note of a presentation from the recently appointed F4E Internal Auditor;
- Adopted thirteen Implementing Provisions of the Staff Regulations;
- Approved the Annual Activity Report subject to the inclusion of additional information requested by the Board;
- Mandated the Chairs of the Governing Board and Executive Committee together with Euratom to make an analysis and assessment of the Annual Activity Report;
- Took note of a presentation on the revised draft of the Project Plan and invited the Director to proceed on this basis;
- Re-elected Professor Minh Quang Tran and Dr Derek Stork as Chair and Vice-Chair of TAP respectively for a second and last term of two years effective 22 October 2009;

- Adopted amended Rules of Procedure for the Governing Board;
- Approved amended Rules of Procedure for the Executive Committee and TAP and invited those bodies to adopt them;
- Took note of information on the schooling situation for the children of F4E staff;
- Took note of the positive outcome of the written procedure for the approval of the final Annual Accounts.

**11th Governing Board Meeting, 13 October 2009, Barcelona**

The Governing Board (Chaired by Professor Carlos Varandas):

- Welcomed a paper from F4E on preliminary estimates of the risks and costs associated with the contributions to ITER under Scenario-1 as presented by the ITER IO and endorsed the conclusions;
- Took note of the Executive Summary of the report from the Expert Group for the Assessment of the F4E ITER-related activities.

**12th Governing Board Meeting, 26-27 November 2009, Barcelona**

The Governing Board (Chaired by Professor Carlos Varandas):

- Invited the Director to study jointly with the ITER IO and the Domestic Agencies, how to optimise the modified Scenario 1 and to evaluate the implications in terms of costs and risks for Euratom;
- Adopted the Project Plan on the understanding that the detailed description (per WBS) establishes the framework and provides a reference for the monitoring of the implementation of the F4E activities;
- Adopted the Resources Estimates Plan;
- Took note of the report from the Expert Group for the Assessment of the F4E ITER related activities;
- Established a Standing Coordination Group of the Governing Board;
- Endorsed the strategy presented by F4E for the Implementation of ITER Task Agreements;
- Adopted the 2010 Work Programme;
- Adopted the amended 2009 Work Programme;
- Adopted the amended 2009 Budget;
- Adopted the 2010 Budget;
- Took note of the report from F4E on the implementation of the recommendations of the Ad-Hoc Group on Funding Schemes;
- Adopted the Internal Audit Charter;
- Took note of a proposal to establish the Audit Committee and the 2009/2010 Audit Plan;
- Took note of the observations of the Court of Auditors on the F4E annual accounts;
- Appointed Dr Mathias Noe as a member of the Technical Advisory Panel and renewed the appointments of the existing members for further terms of two years.

**Ad-Hoc Groups**

During 2009 the Governing Board set up two Ad-Hoc Groups. The lists of members of the Ad-Hoc Groups are presented in Annex II:

- The Working Group to Evaluate an ECRH-Dominated Heating Mix for ITER - by decision of the Governing Board Chair of 23 April 2009 to evaluate the scientific and technical basis for the construction, operation and exploitation of an ECH-only or ECH-dominated ITER heating mix;
- The Ad-Hoc Group for the Assessment of the F4E ITER Related Activities – by decision of the Governing Board of 9 July 2009.

# Executive Committee

*The Executive Committee brings together 13 members appointed by the Governing Board from among persons of recognised standing and professional experience in scientific, technical and financial matters (see Annex II).*

*The Committee is responsible for approving the award of contracts, providing comments upon the documents related to the Work Programme and Budgets as well as other tasks delegated by the Governing Board.*

## Chair and Vice-Chair

The Chair and Vice-Chair of the Executive Committee are appointed by the Governing Board for a period of two years, renewable once. Dr Karl Tichmann and Mrs Lisbeth Skovsgaard Grønberg were both re-elected by the Governing Board as Chair and Vice-Chair respectively for a second and last term of two years effective 1 July 2009.

## Summary of Decisions

The Executive Committee met on seven occasions in 2009 and the main activities including the approval of contracts and grants above the financial thresholds defined in the Implementing Rules of F4E's Financial Regulation. Other activities of the Executive Committee included:

- Upon the initiative of Euratom in accordance with Article 7(3)(c) of the F4E Statutes, submitted to the Governing Board the proposal for the Director to modify the AIF site preparation arrangement;
- Approved the amendments to the model grant agreements proposed by the Director for management costs in accordance with the recommendations of the Governing Board's Ad-Hoc Group on Funding Schemes;
- Approved the amendment to the Model Grant Agreement for Single and Multiple Beneficiaries concerning liabilities;
- Approved a joint Procurement between F4E and the ITER IO, for the provision of global insurance services;
- Adopted the amended Rules of Procedure for the Executive Committee;
- Made a recommendation to the Governing Board on how to deal with Procurement Arrangements;
- Provided comments and recommendations on:
  - The Project Plan;
  - The Resources Estimates Plan;
  - The 2010 Work Programme;
  - The amended 2009 Work Programme on two occasions;
  - The 2010 Budget;
  - The amended 2009 Budget on two ocassions.


*The F4E Executive Committee*

# The Technical Advisory Panel

*The Technical Advisory Panel (TAP) assists the Governing Board and Director in engineering, scientific and technological matters in particular, by providing comments and recommendations on the Project Plan and Work Programmes. The TAP is composed of 13 members appointed by the Governing Board (see Annex II).*

## Chair and Vice Chair

The Governing Board re-elected Professor Minh Quang Tran and Dr Derek Stork as Chair and Vice-Chair of the TAP respectively for a second and last term of two years effective 22 October 2009.

## Summary of Discussions

The TAP met on three occasions during 2009 and the main activities included:

- Monitoring the progress of the implementation of F4E technical activities and reporting to the Governing Board;
- Providing comments and recommendations to the Governing Board on the 2009 and 2010 Project Plan and Work Programmes as well as subsequent amendments thereto;
- Participating in a Joint Working Group established by the CCE-FU and the F4E Governing Board to conduct an assessment on the urgent elements of fusion energy research activities and facilities required during the timeframe of the ITER construction to acquire the knowledge necessary to build the first demonstration fusion power plant (DEMO).

*The F4E Technical Advisory Panel*

# Annex I

# Implementation of the Work Programmes

## ITER PROCUREMENT ARRANGEMENTS

| MAGNETS | | | |
|---|---|---|---|
| **System** | **Title** | **ITER Credit (kIUA)** | **Signature** |
| **EU11** | 1.1.P6A.EU.01 - Toroidal Field Coils Conductors | 43.39 | Dec 2007 |
| **EU11** | 1.1.P1A.EU.01 - Toroidal Field Coils | 89.74* | Jun 2008 |
| **EU11** | 1.1.P6C.EU.01 - Poloidal Field Magnet Conductors | 11.23** | May 2009 |
| **EU11** | 1.1.P3A-B.EU.01 - Poloidal Field Coils PF2 to PF6 | 41.40** | Jun 2009 |

** Sum of TF Windings package credit from WBS 1.1.1A plus insertion in the case from Magnet Structures WBS 1.1.2A.*

*** Updated credit values awarded through PCR-164 for two double pancakes added to PF2 and PF6 coils and bilateral agreement with RF-DA (to be approved by next ITER Council).*

| VACUUM VESSEL | | | |
|---|---|---|---|
| **System** | **Title** | **ITER Credit (kIUA)** | **Signature** |
| **EU15** | 1.5.P1A.EU.01 - Vacuum Vessel Sectors Production | 92.06 | Nov 2009 |

| POWER SUPPLIES | | | |
|---|---|---|---|
| **System** | **Title** | **ITER Credit (kIUA)** | **Signature** |
| **EU41, EU43** | 4.1.P1A-P8B.EU.01 - Detailed design of the SSEN and PPEN | 7.00 | Oct 2009 |

| NEUTRAL BEAM SYSTEMS | | | |
|---|---|---|---|
| **System** | **Title** | **ITER Credit (kIUA)** | **Signature** |
| **EU53** | 5.3.P6.EU.01 - Procurement of NB power supplies and related systems | 19.52 | Jul 2009 |

| BUILDINGS | | | |
|---|---|---|---|
| **System** | **Title** | **ITER Credit (kIUA)** | **Signature** |
| **EU62** | 6.2.P2.EU.01 - PF Coil Fabrication Building (B55) | 12.80 | Nov 2008 |
| **EU62** | 6.2.P2.EU.04 - Tokamak Complex Anti-Seismic Bearings Supply | 6.20 | May 2009 |
| **EU62** | 6.2.P2.EU.03 - Tokamak Excavation & Support Structure | 31.00 | May 2009 |
| **EU62** | 6.2.P2.EU.02 - Architectural and Engineering Services | 54.70 | May 2009 |

## BROADER APPROACH PROCUREMENT ARRANGEMENTS

| Title | Credit (kBAUA) | Signature |
|---|---|---|
| **Procurement Arrangement for the supply of the Accelerator Prototype Injector for the IFMIF/EVEDA Project** | 4.58 | Dec 2009 |
| **Procurement Arrangement for the supply of the Quench Protection Circuits for the Toroidal and Poloidal Field Coils for the Satellite Tokamak Programme** | 19.15 | Dec 2009 |
| **Procurement Arrangement for the supply of the Cryostat Base for the Satellite Tokamak Programme** | 4.348 | Dec 2009 |

## CONTRACTS AND GRANTS

### MAGNETS

WORK PROGRAMME 2008 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-OPE-016-01-01 (MS-MG) LOT 1** | LOT 1 - Supply of one regular radial plate prototype for TF coils, 3 mock-ups of radial plate section, special tooling and optimised manufacturing plan | Q1 2009 | 02/03/2009 | 11/08/2009 |
| **F4E-2008-OPE-016-03-01 (MS-MG) LOT 3** | LOT 3 - Supply of one regular radial plate prototype for TF coils, 3 mock-ups of radial plate section, special tooling and optimised manufacturing plan | Q1 2009 | 28/07/2009 | 23/11/2009 |
| **F4E-2008-OPE-005-01 (MS-MG)** | LOT 1 - Supply of 58.2 tons of Chromium Plated $Nb_3Sn$ | Q3 2008 | 18/03/2009 | 29/06/2009 |
| **F4E-2008-OPE-005-02 (MS-MG)** | LOT 2 - Supply of 37.1 tons of Chromium Plated $Nb_3Sn$ | Q3 2008 | 18/03/2009 | 28/10/2009 |
| **F4E-2008-OPE-001-01 (MS-MG)** | Supply of Chromium Plated Copper Strand | Q1 2008 | 18/03/2008 | 13/02/2009 |
| **F4E-2008-OPE-043-01 (ES-AC)** | Supply of Conductor Samples for Cryogenic Tests | Q2 2009 | 19/05/2009 | 25/05/2009 |
| **F4E-GRT-001 (MS-MG)** | Conductor Testing in Sultan 2008/2009 | Q4 2009 | 09/06/2008 | 11/09/2008 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-OPE-021 (MS-MG)** | Provision of PF Conductor Sample | Q2 2009 | 10/06/2009 | 08/07/2009 |
| **F4E-2009-OPE-049-01 (MS-MG)** | Provision of Toroidal Field Coil Case Closure Welding | Q3 2009 | 04/08/2009 | 11/11/2009 |
| **F4E-2009-GRT-029 (MS-MG)** | Extended characterisation of ITER strands | Q2 2009 | 20/05/2009 | 20/10/2009 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) |
|---|---|---|---|
| **F4E-OPE-018 (TF-PF)** | Cabling and jacketing of TF & PF conductor lengths | Q2 2009 | 04/08/2009 |

## VACUUM VESSEL

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-021 (MS-VV)** | Corrosion Issues | Q1 2009 | 09/03/2009 | 30/06/2009 |
| **F4E-2008-OPE-037-01 (MS-VV)** | The Contribution to the Assessment of Acceptability for Closure Weld with Backing Strip for the Outer Wall of Containment Vessels for Fusion Energy Experiments and a concept method for manufacturing | Q2 2009 | 20/04/2009 | 30/04/2009 |
| **F4E-2009-OPE-038-01 (MS-VV)** | Manufacturing Design Study of Torus-Shaped, Double-Shelled Large Pressure Vessels with Water-Cooled Interspaces and External High Vacuum | Q2 2009 | 20/04/2009 | 30/04/2009 |

WORK PROGRAMME 2009 - OTHER

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **PE-017-01-01-01** | Engineering analysis also for alternative VV proposal design | Q2 2009 | N/A | Several tasks launched in 2009 under this budget |

## BLANKET

WORK PROGRAMME 2008 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-OPE-003-01 (MS-IV)** | Provision of Ultrasonic Testing of Beryllium coated First Wall Mock-ups | Q1 2009 | 02/04/2009 | 30/06/2009 |
| **F4E-2009-OPE-071 (MS-IV)** | Manufacture of FW mock-ups for the definition of acceptance criteria | Q3 2009 | 16/11/2009 | 15/12/2009 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-OPE-056 (MS-IV)** | Cost comparison study between the 1MW/m2 design and the 5MW/m$^2$ design of the ITER First Wall Panel | N/A | 11/08/2009 | 07/09/2009 |
| **F4E-2009-OPE-039-01 (MS-VV)** | Manufacturing and Costing Study of a large Shield block concept for an alternative ITER Blanket design | N/A | 03/05/2009 | 08/05/2009 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Comments |
|---|---|---|---|---|
| **F4E-GRT-038** | CuCrZr powder-solid HIP development | Q2 2009 | Q4 2009 | Delays due to ITA delay |
| **F4E-GRT-042** | Irradiation and testing of powder HIPped 316L SS material and joints | Q3 2009 | Q3 2009 | Delays due to ITA delay |
| **F4E-GRT-043** | Mechanical characterisation of irradiated and unirradiated CuCrZr alloy | Q3 2009 | Q3 2009 | Delays due to ITA delay |

## DIVERTOR

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-005-01 (MS-IV)** | Monitoring, infrared SATIR examination and analysis of divertor components to be heat flux tested ("HHFTEST-PREP") | Q4 2008 | 23/06/2008 | 19/01/2009 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-025 (VTQP)** | Destructive Examination of European Divertor Vertical Target Qualification Prototypes | Q1 2009 | 17/03/2009 | 29/06/2009 |
| **F4E-2008-OPE-012-01 (MS-IV)** | Supply of High Heat Flux Testing of Divertor Components | Q4 2008 | 05/05/2009 | 02/07/2009 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Comments |
|---|---|---|---|---|
| **F4E-GRT-036** | Characterisation of alternative CFC material | Q3 2009 | Q3 2009 | Evaluation of the offers done. Contract signed by FZJ received on 19.05.2010 |
| **F4E-OPE-040** | Manufacturing of mock ups with alternative CFC grade | Q2 2009 | Q3 2009 | The tender procedure has been cancelled since no acceptable offer has been received. F4E-OPE-096 has been awarded to Ansaldo for the first LOT. Negotiations with Plansee about general rules of the contract for the second LOT ongoing |

## REMOTE HANDLING

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-001-01 (MS-RH)** | DTP2 facility operation and upgrade preparation | Q3 2008 | 04/06/2008 | 11/09/2008 |
| **F4E-2008-GRT-016-01 (MS-RH)** | Activities related to the development of an Air Transfer System prototype and Cask Transfer System Virtual Mock-up | Q4 2008 | 18/08/2008 | 05/02/2009 |
| **F4E-2008-GRT-015-01 (MS-RH)** | Activities Related to the Development of an In-Vessel Viewing System Prototype | Q4 2008 | 18/08/2008 | 24/02/2009 |

## VACUUM PUMPING AND FUELLING

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-018-01 (PNS-VTP)** | Completion of final design for the PTC and testing of PTC in TIMO-2 to qualify the design | Q1 2009 | 02/02/2009 | 26/06/2009 |
| **F4E-2009-GRT-019-01 (PNS-VTP)** | Upgrading of TIMO-2 Facility | Q1 2009 | 02/02/2009 | 20/04/2009 |

WORK PROGRAMME 2009 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-021-01 (PNS-VTP)** | Instrumentation for ITER Cryopumps and Cold Valve Boxes | Q2 2009 | 29/06/2009 | 06/08/2009 |

## TRITIUM PLANT

WORK PROGRAMME 2009 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-046 (PNS-VTP)** | Assessment of Hydrogen Isotope Separation System 2001 Baseline Design | Q3 2009 | 31/07/2009 | 09/09/2009 |
| **F4E-2009-GRT-023-01 (PNS-VTP)** | Functional and performance evaluation of Sulzer CY packing in view of ITER ISS | Q1 2009 | 11/12/2008 | 25/03/2009 |

## ION CYCLOTRON H&CD ANTENNA

WORK PROGRAMME 2009 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-026-01 (PMS-PE)** | Detailed Design of the ITER ICH Antenna | Q1 2009 | 13/02/2009 | 16/12/2009 |

## ELECTRON CYCLOTRON UPPER LAUNCHER

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-OPE-051-01 (PMS-H.CD)** | Production of the ITER EC Upper Port Plug Preliminary Design review documentation (structural, diamond window and integration) and completion of welding tests for the port plug structure | Q4 2009 | 28/07/2009 | 07/09/2009 |
| **F4E-2009-OPE-052-01 (PMS-H.CD)** | Preparation of the documentation for the ITER EC Upper Launcher Preliminary Design Review for launcher performance analysis, launcher control and support to mm-wave design | Q4 2009 | 28/07/2009 | 07/09/2009 |
| **F4E-2009-OPE-050-01 (PMS-H.CD)** | Completion of the preliminary optical design and preparation of technical documentation (mm-wave design & components) for the ITER Upper Launcher Preliminary Design Review | Q4 2009 | 28/07/2009 | 07/09/2009 |

## ELECTRON CYCLOTRON POWER SOURCES AND EC POWER SUPPLIES

WORK PROGRAMME 2008 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-008 (PMS-H.CD)** | Development of the European Gyrotron CCGDS6 | Q4 2008 | 21/07/2008 | 19/01/2009 |
| **F4E-2008-OPE-009-01 (PMS-H.CD)** | Supply of a Coaxial Gyrotron Development – Prototype 1, 170 GHZ, 2MW, 1S, Refurbishment. | Q4 2008 | 30/09/2008 | 11/03/2009 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-OPE-055-01 (PMS-H.CD)** | Power Supplies for the Superconducting Magnet for the European ITER Gyrotron Prototype | Q4 2008 | 17/08/2009 | 17/12/2009 |
| **F4E-OPE-072** | Auxiliaries for CRPP-EC Test Facility - Spares for the PS system | Q4 2008 | 20/11/2009 | 11/01/2010 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) |
|---|---|---|---|
| **F4E-GRT-049** | Grant for Design & Development of EU Gyrotron (2010-2011) | Q3 2009 | Q4 2009 |
| **F4E-GRT-034 (PMS-H.CD)** | Support to ITER IO for the EC H&CD Gyrotrons (Task Agreement) | Q2 2009 | Q3 2009 |

## NEUTRAL BEAM SYSTEM

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-007-01 (PMS-H.CD)** | Continuation of the Development for the RF Ion Source | Q4 2008 | 16/07/2008 | 24/02/2009 |
| **F4E-GRT-011 (PMS-H.CD)** | Design, development and specification of the NBTF system | Q3 2008 | 11/08/2008 | 17/11/2008 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-032-01 (PMS-H.CD)** | Components and Infrastructure of the NBTF (incl. design of cryopumps) | Q2 2009 | 08/06/2009 | 04/11/2009 |
| **F4E-2009-OPE-032-01 (PMS-H.CD)** | Experiment on a Large RF Ion Source with Extraction (ELISE) | Q2 2009 | 20/04/2009 | 14/09/2009 |
| **F4E-2009-GRT-022-01 (PMS-H.CD)** | Neutral Beam Injector HNB1 & HNB2 Development Support for Components Outside the Scope of NBI Test facility | Q1 2009 | 23/01/2009 | 25/11/2009 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) |
|---|---|---|---|
| **F4E-OPE-046** | Ion source test facility (power supplies - ISEPS) | Q3 2009 | Q3 2009 |

## DIAGNOSTICS

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-012 (PMS-DG)** | Magnetics diagnostics | Q4 2008 | 11/08/2008 | 16/03/2009 |

WORK PROGRAMME 2009 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-GRT-024-01 (PMS-DG) ACTION 1** | ACTION 1 - Detailed design of a representative equatorial port plug | Q1 2009 | 02/02/2009 | 28/07/2009 |
| **F4E-2009-GRT-024-02 (PMS-DG) ACTION 2** | ACTION 2 -Equatorial port plug diagnostic integration analysis | Q1 2009 | 02/02/2009 | 18/12/2009 |
| **F4E-2009-GRT-047 (PMS-DG) Tasks 1-3** | System-level optimisation of the ITER Magnetics Diagnostic and R&D/Design of magnetic sensors assemblies – Part A - Subtasks 1-3 | Q3 2009 | 29/09/2009 | 18/12/2009 |

## SITE AND BUILDINGS

WORK PROGRAMME 2008 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-OPE-015 (SB.PS)** | Revision of cost estimates and construction schedule of ITER buildings | Q4 2008 | 16/10/2008 | 17/09/2009 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date | Comments |
|---|---|---|---|---|---|
| **F4E-2009-OPE-020 (SB.PS)** | Support in tendering the Design and Build (DB) contract, Safety and Health Protection Coordination (SHPC) contract, Legal Inspection (LI) contract and Support-to-the-Owner (OS) contract for the ITER PF fabrication building | Q2 2009 | 19/02/2009 | 07/04/2009 | |
| **F4E-OPE-089** | Legal Assistance with the Negotiations for the Award of the Support to the Owner Contract | N/A | 14/12/2009 | 17/12/2009 | |
| **F4E-2009-OPE-026-01 (SB.PS)** | Design & Construction of PF Coil Building | Q2 2009 | 02/10/2009 | 17/12/2009 | |
| **F4E-2008-OPE-011-01-01 (ES-AC) LOT 1** | LOT 1 - Seismic analyses | Q1 2009 | 09/12/2008 | 10/06/2009 | 1 Task Order launched |
| **F4E-2008-OPE-011-02-01 (ES-AC) LOT 2** | LOT 2 - Effect of explosions and impacts | Q1 2009 | 09/12/2008 | 10/06/2009 | 1 Task Order launched |
| **F4E-2008-OPE-011-03-01 (ES-AC) LOT 3** | LOT 3 - Structural analyses of ITER buildings | Q1 2009 | 09/12/2008 | 10/06/2009 | 3 Task Orders launched |
| **F4E-OPE-087** | Legal Assistance with the Negotiations for the Award of the Architect Engineer Contract | N/A | 14/12/2009 | 17/12/2009 | |
| **F4E-2009-OPE-030-01 (SB.PS)** | Building Value Engineering (Phase III) | Q1 2009 | 07/04/2009 | 04/06/2009 | |

| WORK PROGRAMME 2009 - LAUNCHED | | | | |
|---|---|---|---|---|
| **Contract Reference** | **Contract Description** | **Time of Call (Foreseen)** | **Time of Call (Actual)** | **Comments** |
| **F4E-OPE-025** | Health and Safety Protection Coordination & Legal Inspection for ITER Buildings | Q2 2009 | Q4 2009 | |
| **F4E-OPE-090** | Support to the Owner Contract | Q2 2009 | | |
| **F4E-OPE-058** | Contract for Architect Engineer Design and Works Supervision | Q2 2009 | Q4 2009 | Contract signed |

## MATERIALS DEVELOPMENT

| WORK PROGRAMME 2009 - LAUNCHED | | | | |
|---|---|---|---|---|
| **Contract Reference** | **Contract Description** | **Time of Call (Foreseen)** | **Time of Call (Actual)** | **Award Date** |
| **F4E-GRT-2008-010 (PNS-MD)** | EUROFER Material Database | Q3 2008 | 07/08/2008 | 27/08/2009 |

## TEST BLANKET MODULES

| WORK PROGRAMME 2008 - AWARDED | | | | |
|---|---|---|---|---|
| **Contract Reference** | **Contract Description** | **Time of Call (Foreseen)** | **Time of Call (Actual)** | **Award Date** |
| **F4E-2008-GRT-006 (PNS-TBM)** | Upgrade of the DIADEMO facility | Q3 2008 | 07/09/2008 | 24/11/2008 |
| **F4E-2008-GRT-009 (PNS-TBM)** | Design and development of the European TBM Systems | Q3 2008 | 21/07/2008 | 24/11/2008 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-OPE-047 (PNS-TBM)** | Supply of EUROFER Steel Plates | Q2 2009 | 29/07/2009 | 09/09/2009 |
| **F4E-2009-GRT-041 (PNS-TBM)** | Design and construction of a multipurp. Lab. scale apparatus for investigating hydrogen isotopes in PbLi and permeation tech. | Q2 2009 | 31/08/2009 | 07/12/2009 |
| **F4E-2009-GRT-044 (PNS-TBM)** | Design and Implementation of the Data Acquisition and Control System of the European Breeding Blanket Test Facility (EBBTF) | Q2 2009 | 01/09/2009 | 07/12/2009 |
| **F4E-2009-GRT-031 (ES-EF)** | Continuation of the safety assessment of EU-TBMs based on design evolution | Q3 2009 | 28/05/2009 | 06/08/2009 |
| **F4E-2009-GRT-030 (PNS-TBM) ACTION 3** | ACTION 3 - Post Irradiation Examination of Be materials irradiated in HIDOBE-01 campaign | Q2 2009 | 24/04/2009 | 29/11/2009 |
| **F4E-2009-GRT-037 (PNS-TBM)** | Study of the impact caused by the implementation of mitigation means for ITER TF TBM-induced ripple on TBMs design & test objectives | Q3 2009 | 10/07/2009 | 07/12/2009 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Comments |
|---|---|---|---|---|
| **F4E-2009-GRT-030 (PNS-TBM) ACTION 1** | ACTION 1 - Elaboration of the development / qualification/procurement plan for functional materials | Q2 2009 | 24/4/2009 | Awarded |
| **F4E-2009-GRT-030 (PNS-TBM) ACTION 2** | ACTION 2 - Screening of an alternative production route/capacity for Be Pebbles | Q2 2009 | 24/4/2009 | Being awarded |
| **F4E-OPE-044 (PNS-TBM)** | Development of fabrication procedure specifications. Fabrication of TBM box components feasibility/test mock-up | Q2 2009 | 03/05/2010 | Call for tender published |

## PLASMA ENGINEERING

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-017 (PMS-PE)** | Plasma Scenarios and Poloidal Field Coils System Analysis and Optimisation | Q4 2008 | 30/09/2008 | 23/01/2009 |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2009-OPE-42 (PMS-PE)** | ITER vessel and SBM design: Plasma Control and scenario analysis | Q3 2009 | 19/05/2009 | 03/06/2009 |

## SAFETY

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date | Comments |
|---|---|---|---|---|---|
| **F4E-2008-GRT-001-01 (ES-SF) ACTION 1** | ACTION 1 – Combined hydrogen and dust explosion and mitigation experience model development. Validation and application to ITER | Q4 2008 | 10/06/2008 | 10/03/2009 | |
| **F4E-2008-GRT-001-02 (ES-SF) ACTION 2** | ACTION 2 – Detailed analyses of Fire Reference Event Scenarios | Q4 2008 | 10/06/2008 | 10/03/2009 | Grant Closed TAR emitted |
| **F4E-2008-GRT-002 (ES-SF)** | Supporting safety analyses to follow up ITER design evolution and licensing process - Analyses of LOCA Reference Event Scenarios | Q3 2008 | 10/06/2008 | 13/08/2008 | |

## ENGINEERING SUPPORT

WORK PROGRAMME 2008 - AWARDED

| Agreement Reference | Agreement Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-2008-GRT-014-01 (ES-AC) ACTION 1** | ACTION 1 - Improvement of Nuclear Data, development of tools and experiments/validation in support of ITER activities - WP08/ND/01 | Q4 2008 | 14/08/2008 | 16/04/2009 |
| **F4E-2008-GRT-014-02 (ES-AC) ACTION 2** | ACTION 2 - Nuclear Data studies/experiments in support of TBM activities" (Nudata_Exper) - WP08/ND/02 | Q4 2008 | 14/08/2008 | Under negotiation |
| **F4E-2008-OPE-008 (ES-AC)** | ITER Blanket Shield Module Electromagnetic Benchmarking Program | 2008 | 11/08/2008 | 27/10/2008 |
| **F4E-2008-OPE-010 (ES-AC)** | Mechanical and Electromagnetic Detailed Analyses of the ITER VV | 2008 | 02/08/2008 | 24/01/2009 |

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date | Comments |
|---|---|---|---|---|---|
| **F4E-2008-OPE-007-01 (ES-AC) LOT 1** | LOT 1 – VV analyses | Q3 2008 | 02/08/2008 | 24/01/2009 | 1 task launched in 2009 |
| **F4E-2008-OPE-007-02 (ES-AC) LOT 2** | LOT 2 – In-Vessel Components | Q3 2008 | 02/08/2008 | 24/01/2009 | 3 tasks launched |
| **F4E-2008-OPE-007-03 (ES-AC) LOT 3** | LOT 3 - Magnets | Q3 2008 | 02/08/2008 | 24/01/2009 | |

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date | Comments |
|---|---|---|---|---|---|
| **F4E-2008-OPE-006-06 (ES-AC) LOT 1** | LOT 1 - Electromechanical analysis of ITER components | Q3 2009 | 30/07/2008 | 08/05/2009 | 7 tasks ongoing |
| **F4E-2008-OPE-006-01 (ES-AC) LOT 2** | LOT 2 - DC and AC Electromagnetic analysis of super-conducting magnets | Q3 2009 | 30/07/2008 | 26/03/2009 | |
| **F4E-2008-OPE-006-04 (ES-AC) LOT 3** | LOT 3 - Error field electromagnetic analysis | Q3 2009 | 30/07/2008 | 26/03/2009 | |
| **F4E-2008-OPE-002-02 (ES-AC)** | LOT 2 - MCNP parametric modelling of components to support design and procurement process | Q3 2009 | 17/07/2008 | 12/02/2009 | 5 tasks ongoing |
| **F4E-2008-OPE-002-03 (ES-AC)** | LOT 3 - Several tasks related to codes and models such as development of an accelerated reference source with angular resolution to be used in MCNP and ATTILA | Q3 2009 | 17/07/2008 | 12/02/2009 | |
| **F42-2008-OPE-002-01 (ES-AC)** | LOT 1 - Reviewing and validate the neutronic calculations for ITER components and systems with MCNP | Q3 2009 | 17/07/2008 | 12/02/2009 | |
| **F4E-2008-OPE-017-02-01 (ES-AC) LOT 2** | LOT 2 - Plant Systems | Q1 2009 | 11/02/2009 | 07/07/2009 | 11 tasks ongoing |
| **F4E-2008-OPE-017-03-01 (ES-AC) LOT 3** | LOT 3 - Remote Handling | Q1 2009 | 11/02/2009 | 07/07/2009 | |
| **F4E-2008-OPE-017-04-01 (ES-AC) LOT 4** | LOT 4 - Nuclear and Safety Engineering | Q1 2009 | 11/02/2009 | 07/07/2009 | |
| **F4E-2008-OPE-017-01-01 (ES-AC) LOT 1** | LOT 1 - General Mechanics | Q1 2009 | 11/02/2009 | 10/07/2009 | |
| **F4E-2009-OPE-034-01 (ES-DO)** | Alternative Vacuum Vessel - Mechanical Design | Q2 2009 | 23/04/2009 | 15/05/2009 | |
| **F4E-2009-OPE-043** | Procurement of conductor samples for cryogenic tests | 2009 | 19/05/2009 | 25/05/2009 | |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) |
|---|---|---|---|
| **F4E-OPE-033** | Structural design criteria for In-Vessel components | Q1 2009 | Q3 2009 |

## QUALITY ASSURANCE & PROJECT MANAGEMENT

WORK PROGRAMME 2009 - AWARDED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-OPE-033** | Support in Industrial Risk Analysis | Q3 2009 | 07/08/2009 | 09/09/2009 |
| **F4E-OPE-033** | F4E Project Management Diagnostic | Q3 2009 | 08/09/2009 | 25/09/2009 |
| **F4E-OPE-033** | Support to the specification of the F4E ITER CAD Data Management System (F4E SmarTeam) | N/A | 02/12/2009 | 09/12/2009 |

WORK PROGRAMME 2009 - LAUNCHED

| Contract Reference | Contract Description | Time of Call (Foreseen) | Time of Call (Actual) | Award Date |
|---|---|---|---|---|
| **F4E-OPE-085** | Inspector follow up of EDIPO procurement | Q3 2009 | 04/12/2009 | 19/01/2010 |

## ITER TASK AGREEMENTS

| Task Number | TA Title | F4E Signature Date | IO Signature Date | Value ITER Credit |
|---|---|---|---|---|
| **C51TD37FE** | ITER IC Antenna R&D programme: Faraday Shield | 12/12/2008 | 15/12/2008 | EUR 740 k |
| **C51TD38FE** | ITER IC Antenna R&D programme: Vacuum Window | 12/12/2008 | 15/12/2008 | EUR 990 k |
| **C51TD39FE** | ITER IC Antenna R&D programme: Explosion of Antenna Low Power Mock-up | 12/12/2008 | 15/12/2008 | EUR 225 k |
| **C53PP42FE** | Design activities for ITER Neutral Beam Injector | 12/12/2008 | 12/01/2009 | 1870 IUA |
| **C53PP37FE** | Development of codes for applications in the ITER NB&DNB injectors (5.3EU3) | 12/12/2008 | 12/01/2009 | 1 ppy |
| **C16PP141FE** | BLANKET EM BENCHMARKING ANALYSES | 05/03/2009 | 23/03/2009 | 250 IUA |
| **C23PP47FE** | In-vessel viewing system (IVVS) conceptual design | 22/04/2009 | 18/05/2009 | 1000 IUA |
| **C81TD36FE** | Detailed Analyses of Reference Event Scenarios (2) | 09/07/2009 | 17/08/2009 | 0.25 k IUA |
| **C52PP36FE** | Preparation work for gyrotron integration and for the associated Procurement Arrangement | 16/07/2009 | 17/08/2009 | 2ppy |
| **C53TD52FE** | Design of the components for the neutral beam system | 22/07/2009 | 17/08/2009 | 1749 IUA |
| **C55TD29FE** | Generic Diagnostic Equatorial Port Plug Preliminary Design | 17/09/2009 | 01/10/2009 | 150 IUA |
| **C23PP48FE** | Cash and Plug Remote Handling System (CPRHS) design related activities: air transfer system conceptual design and requirement definition | 18/09/2009 | 01/11/2009 | 3 ppy |
| **C53TD55FE** | Neutral Beam Injector HNB1 & HNB2 Development Support for Components Outside the Scope of NBI Test Facility | 01/10/2009 | 23/10/2009 | 1293 IUA |
| **C55TD31FE** | Detailed Design, prototyping and testing of ex-vessel magnetic sensors for ITER | 08/10/2009 | 23/10/2009 | 101 IUA |
| **C52TD37FE** | Preparation work for the Procurement Arrangement for EC power supply system | 14/10/2009 | 27/10/2009 | 67 IUA. |
| **C76TD07FE** | Electro-Magnetic Analysis and Mechanical Loads Analysis for TBM Port Plug Frame Conceptual Design | 23/10/2009 | 09/11/2009 | 45.04 IUA |
| **C31TD16FE** | ITER Vacuum System: Updating and completion of the design of the Pre-Production Cryopump | 06/11/2009 | 18/11/2009 | 133 IUA |
| **C31TD17FE** | ITER Vacuum System: Installation, Commissioning and test campaign of the Pre-Production Cryopump | 06/11/2009 | 18/11/2009 | 227 IUA |
| **C53TD56FE** | Design of the NBTF Components | 06/11/2009 | 18/11/2009 | 1940 IUA |
| **C11TD178FE** | Eddy Current Analysis of the Magnet Structures | 17/11/2009 | 25/11/2009 | 160 IUA |
| **C11TD179FE** | Analysis of the error fields induced in the magnet system of ITER | 17/11/2009 | 25/11/2009 | 100 IUA |
| **C16TD144FE** | First Wall Blanket Panel Manufacturing Cost Assessment of Enhanced Heat Flux v Low Heat Flux Technology (EU) | 17/11/2009 | 25/11/2009 | 30 IUA |

| | | | | |
|---|---|---|---|---|
| **C23TD50FE** | Neutral beam remote maintenance system conceptual design | 17/11/2009 | 25/11/2009 | 270 IUA |
| **C32TD29FE** | Design and R&D work for development of detailed design of the Water Detritiation System | 17/11/2009 | 25/11/2009 | 626.76 IUA |
| **C74TD16FE** | Update of the Structural Design Criteria for In-Vessel Components (SDC-IC) | 17/11/2009 | 25/11/2009 | 392.16 IUA |
| **C19TD33FE** | Task on magnetic reconstruction of the plasma boundary | 26/11/2009 | 01/12/2009 | 117 IUA |
| **C19TD34FE** | Task on analysis of Resistive Wall Mode control by in-vessel (RMP) coils | 26/11/2009 | 01/12/2009 | 137 IUA |
| **C19TD35FE** | Task on self-consistent simulations of plasma scenarios | 26/11/2009 | 01/12/2009 | 157 IUA |
| **C19TD36FE** | Task on the study of plasma start-up | 26/11/2009 | 01/12/2009 | 137 IUA |
| **C19TD37FE** | Task on the study of control of plasma current, position and shape | 26/11/2009 | 01/12/2009 | 137 IUA |
| **C19TD41FE** | Task on the study of power and particle fluxes to plasma-facing components during ELM control by in-vessel coils in ITER and evaluation of plasma response effect | 04/12/2009 | 09/12/2009 | 131 IUA |
| **C76TD06FE** | Fusion Component Failure Rate Database | 07/12/2009 | 13/01/2010 | 62.58 IUA |
| **C51TD37FE AMENDED** | ITER IC Antenna R&D programme: Faraday Shield | 08/12/2009 | 14/12/2009 | EUR 370 k +239.08 IUA |
| **C51TD38FE AMENDED** | ITER IC antenna R&D programme: Vacuum Window | 08/12/2009 | 14/12/2009 | EUR 495 k + 319.85 IUA |
| **C51TD39FE AMENDED** | ITER IC Antenna R&D programme: Exploitation of antenna Low Power mock-ups | 08/12/2009 | 14/12/2009 | EUR 112,5 k + 72.69 IUA |
| **C16TD148FE** | Determination of acceptance criteria for defects in the NHF FW panels | 09/12/2009 | 13/01/2010 | 945 IUA |
| **C51PP36FE** | Built to Print Design of ITER IC Antenna (5.1EU2) | 09/12/2009 | 16/12/2009 | 2070 IUA |
| **C23TD49FE** | DTP2 operations – Phase 1 | 14/12/2009 | 13/01/2010 | 0.9 kIUA |
| **C76TD08FE** | Deuterium desorption from Be layer | 14/12/2009 | 13/01/2010 | 21.6 IUA |

## ITER CALLS FOR NOMINATIONS MANAGED BY F4E

| Reference | Title | Closing Date |
|---|---|---|
| **026 ITER/C4N/09/61/OKA** | ITER Vacuum Vessel Assembly (Welding) | 24/03/2009 |
| **027 ITER/C4N/09/62/PMT** | Support for Preparation of ITER Machine Operation Phase | 06/04/2009 |
| **028 ITER/C4N/09/63/PMT** | Specifications for Explosion Risk Analysis in Support of the Completion of the ITER RPrS | 06/04/2009 |
| **029 ITER/C4N/09/66/CZ** | Framework Contract for Engineering Support Buildings and Site Infrastructure | 20/04/2009 |

| | | |
|---|---|---|
| **030 ITER/C4N/09/67/PB** | QA/QC (Quality Assurance/Quality Control) Services for Electrical, Power Conversion and Power Electronics Components | 04/05/2009 |
| **031 ITER/C4N/09/74/BEY** | Framework Contract for Central Interlock and Safety (I&S) Systems Engineering Services | 15/05/2009 |
| **032 ITER/C4N/09/73/OLT** | Contract for CODAC (Control, Data Access and Communication System) Core Software Engineering Support | 15/05/2009 |
| **033 ITER/C4N/09/79/OKA** | Development of High Voltage Instrumentation Feedthroughs for the ITER Superconducting Magnet Systems | 19/06/2009 |
| **034 ITER/C4N/09/77/OKA** | R&D Contract for Assessment of Tritium Removal from Co-Deposited Beryllium Layers by Flash Heating | 24/06/2009 |
| **035 ITER/ C4N/09/4300000007** | Conceptual Design of the Five Auxiliaries Cold Boxes (ACB), the Cold Compressor Box (CCB), the Thermal Shield Cooling System (TSCS) of ITER Project | 13/07/2009 |
| **036 ITER/C4N/09/80/IJ** | Global Insurance Programme for Construction and Erection | 16/07/2009 |
| **037 ITER/RT/09/82/PMT** | Cryoscope IV Studies and Analysis Work for the ITER Cryogenic System | 23/07/2009 |
| **038 ITER/C4N/09/84/GOI** | Research and Development - Absolute Valve - Prefeasibility Study for the Design, Test Programme and Equipment Required | 05/08/2009 |
| **039 ITER/C4N/09/1378** | Development and Qualification of Productive Welding Technology for Application to In-Situ Assembly Welds | 19/08/2009 |
| **040 ITER/C4N/09/87** | Product Lifecycle Management (PLM) System | 25/08/2009 |
| **041 ITER/C4N/09/90/PMT** | Development of Method for Highly Tritiated Water Handling in ITER Tritium Plant Phase 1 | 01/09/2009 |
| **042 ITER/C4N/09/088/LCN** | People Management Training | 10/09/2009 |
| **043 ITER/C4N/09/1542/ MME** | Simulation Studies to be Performed Describing Water Flow Through Crevices and Water Spatial Pressure Evolution Around ITER First Wall Blanket Shielding Modules | 29/09/2009 |
| **044 ITER/C4N/09/91/OKA** | Third Part Inspection of Mechanical Structures, Systems and Components | 06/10/2009 |
| **045 ITER/C4N/09/92/OKA** | The Development of the ITER Process Quality Management System | 06/10/2009 |
| **046 ITER/ C4N/09/10001559** | Cryogenic, Electrical and Mechanical Tests of High Voltage Equipment for the ITER Magnet Systems | 05/10/2009 |
| **047 ITER/C4N/09/1137/ OKA** | Detailed Design and Integration of Tritium Plant Building Layout and Sub-Systems | 13/10/2009 |
| **048 ITER/C4N/09/95** | Provision of Support Services for Procurement and Contract Division | 16/10/2009 |
| **049 ITER/C4N/09/96/MME** | Spectroscopic Method of Water Leak Micro-Leak Localisation | 23/10/2009 |
| **050 ITER/C4N/09/94/PBS** | SAP Application Maintenance Service | 27/10/2009 |
| **051 ITER/C4N/09/1738/ RMTS** | Instrumentation and Control Technology Integration Support | 16/11/2009 |
| **052 ITER/CFT/09/97/OLT** | Prototyping Safety Control System | 19/11/2009 |
| **053 ITER/CFT/09/98/OLT** | Prototyping Interlock Control System | 19/11/2009 |
| **054 ITER/C4N/09/1822/RTS** | Integration of TBS Components in TBM Cryostat Interspace and Port Cell Areas and Associated Assembly/Maintenance Operation Sequences IN-Situ and in the Hot Cell Facility, including Required Transport | 27/11/2009 |
| **055 ITER/C4N/09/1823/RTS** | Design of Interfaces between Test Blanket Systems (TBSs) and ITER Tokamak Complex | 04/12/2009 |
| **056 ITER/C4N/09/102/RTS** | Design and Implementation of an Integrated Modelling Infrastructure | 24/12/2009 |

## STATUS OF EFDA CONTRACTS

| Status | Contracts/Task Transferred to F4E April 2008 | Contracts Closed 31/12/2009 | Contracts Ongoing 31/12/2009 | Invoices Proceesed | |
|---|---|---|---|---|---|
| | | | | Number | EUR Million |
| **Art. 7.** | 40 | 27 | 13 | 107 | 15.9 |
| **Art. 7 (ESC)** | 27 | 23 | 4 | | |
| **Art. 5.1b** | 331 | 249 | 82 | 139 | 15.3 |
| **Art. 5.1a** | 203 | 111 | 92 | - | - |
| **Total** | 601 | 410 | 191 | 246 | 31.2 |

# Annex II

# Composition of the Bodies and Committees[2]



2 On 31st December 2009

COMPOSITION

# THE GOVERNING BOARD

**MEMBERS**

| | | | | |
|---|---|---|---|---|
| **Chair** | Carlos | Varandas | | |
| **Euratom** | The Director General for Research of the European Commission | | The Director of Energy (Euratom) of the Research DG of the European Commission | |
| **Austria** | Harald | Weber | Daniel | Weselka |
| **Belgium** | Theofiel | Van Rentergem | Eric | Van Walle |
| **Bulgaria** | Tzvete | Delcheva | Matey | Mateev |
| **Cyprus** | Panicos | Demetriades | Leandros | Nicolaides |
| **Czech Republic** | Pavel | Pavlo | Jan | Kysela |
| **Denmark** | Gorm | Bramsnaes | | |
| **Estonia** | Rein | Kaarli | Ergo | Nömmiste |
| **Finland** | Seppo | Karttunen | Reijo | Munther |
| **France** | Bernard | Bigot | Christian | Cavata |
| **Germany** | Harald | Bolt | Beatrix | Vierkorn-Rudolph |
| **Greece** | Christos | Vasilakos | Anastasios G. | Youtsos |
| **Hungary** | Ilona | Vass | Sándor | Zoletnik |
| **Ireland** | | | | |
| **Italy** | Aldo | Pizzuto | Romano | Toschi |
| **Latvia** | Maija | Bundule | | |
| **Lithuania** | Sigitas | Rimkevičius | Stanislovas | Žurauskas |
| **Luxembourg** | Pierre | Decker | Léon | Diederich |
| **Malta** | | | | |
| **Netherlands** | Leo | le Duc | Niek J. | Lopes Cardozo |
| **Poland** | Łukasz | Ciupiński | Leszek | Grabarczyk |
| **Portugal** | Fernando | Serra | Francisco | Sepúlveda Teixeira |
| **Romania** | Florin | Buzatu | Gheorghe | Popa |
| **Slovakia** | Stefan | Matejcik | Jozef | Pitel |
| **Slovenia** | Jože | Duhovnik | Bojan | Jenko |
| **Spain** | Montserrat | Torné | Joaquín | Sánchez Sanz |
| **Sweden** | James R. | Drake | Sven Anders | Flodström |
| **Switzerland** | Bruno | Moor | Minh Quang | Tran |
| **United Kingdom** | Steve | Cowley | Stuart | Ward |
| **Secretary** | Raymond | Monk | | |

# AD-HOC GROUPS

## THE WORKING GROUP TO EVALUATE AN ECRH-DOMINATED HEATING MIX FOR ITER

| | | |
|---|---|---|
| **Chair** | Fritz | Wagner |
| **Member** | Minh Quang | Tran |
| **Member** | Gabriella | Ramponi |
| **Member** | David | Ward |
| **Member** | Boris | Sharkov |
| **Member** | Masanori | Murakami |
| **Member** | Walter | Henning |
| **Member** | Alan | Kaye |
| **Member** | Yutaka | Kamada |
| **Secretary** | Ferran | Albajar |

## THE AD-HOC GROUP FOR THE ASSESSMENT OF THE F4E ITER RELATED ACTIVITIES

| | | |
|---|---|---|
| **Chair** | Wolfgang | Meissner |
| **Member** | Ezio | Andreta |
| **Member** | Joan | Bordas |
| **Member** | Colin | Carlile |
| **Member** | Marcel | Jaquemet |
| **Member** | Thomas | O'Hanlon |
| **Scientific Secretary** | Hardo | Bruhns |

COMPOSITION

# THE EXECUTIVE COMMITTEE

## EXECUTIVE COMMITTEE (UNTIL 30 JUNE 2009)

| | | |
|---|---|---|
| **Chair** | Karl | Tichmann |
| **Vice-Chair** | Lisbeth | Grønberg |
| **Member** | The Head of Unit of J.3 of the Research DG of the European Commission | |
| **Member** | Michel | Bedoucha |
| **Member** | Alberto | Coletti |
| **Member** | Antonio | Cruz Serra |
| **Member** | Jose | Doncel |
| **Member** | William | D'Haeseleer |
| **Member** | Robert | Freeman |
| **Member** | Adelbert | Goede |
| **Member** | Reinhard | Maix |
| **Member** | Kari | Törrönen |
| **Member** | Andreas | Werthmüller |

## EXECUTIVE COMMITTEE (AFTER 1 JULY 2009)

| | | |
|---|---|---|
| **Chair** | Karl | Tichmann |
| **Vice-Chair** | Lisbeth | Grønberg |
| **Member** | The Head of Unit of J.3 of the Research DG of the European Commission | |
| **Member** | Michel | Bedoucha |
| **Member** | Robert | Freeman |
| **Member** | Pedro Manuel Brito da Silva | Girão |
| **Member** | Adelbert | Goede |
| **Member** | Krzysztof Jan | Kurzydlowski |
| **Member** | Reinhard | Maix |
| **Member** | Giuseppe | Mazzitelli |
| **Member** | Georgios | Nicolaou |
| **Member** | Clara | Reyero Catalá |
| **Member** | Kari | Törrönen |
| **Secretary** | Raymond | Monk |

COMPOSITION

## TECHNICAL ADVISORY PANEL

| | | |
|---|---|---|
| **Chair** | Minh Quang | Tran |
| **Vice-Chair** | Derek | Stork |
| **Member** | Enrique | Ascasíbar |
| **Member** | Paola | Batistoni |
| **Member** | Horacio | Fernandes |
| **Member** | Fedor | Gömöry |
| **Member** | Remmelt | Haange |
| **Member** | Gabriel | Marbach |
| **Member** | Vincent | Massaut |
| **Member** | Jaroslav | Mizera |
| **Member** | Olaf | Neubauer |
| **Member** | Mathias | Noe[3] |
| **Member** | Marek | Rubel |
| **Secretary** | Susana | Clement Lorenzo |

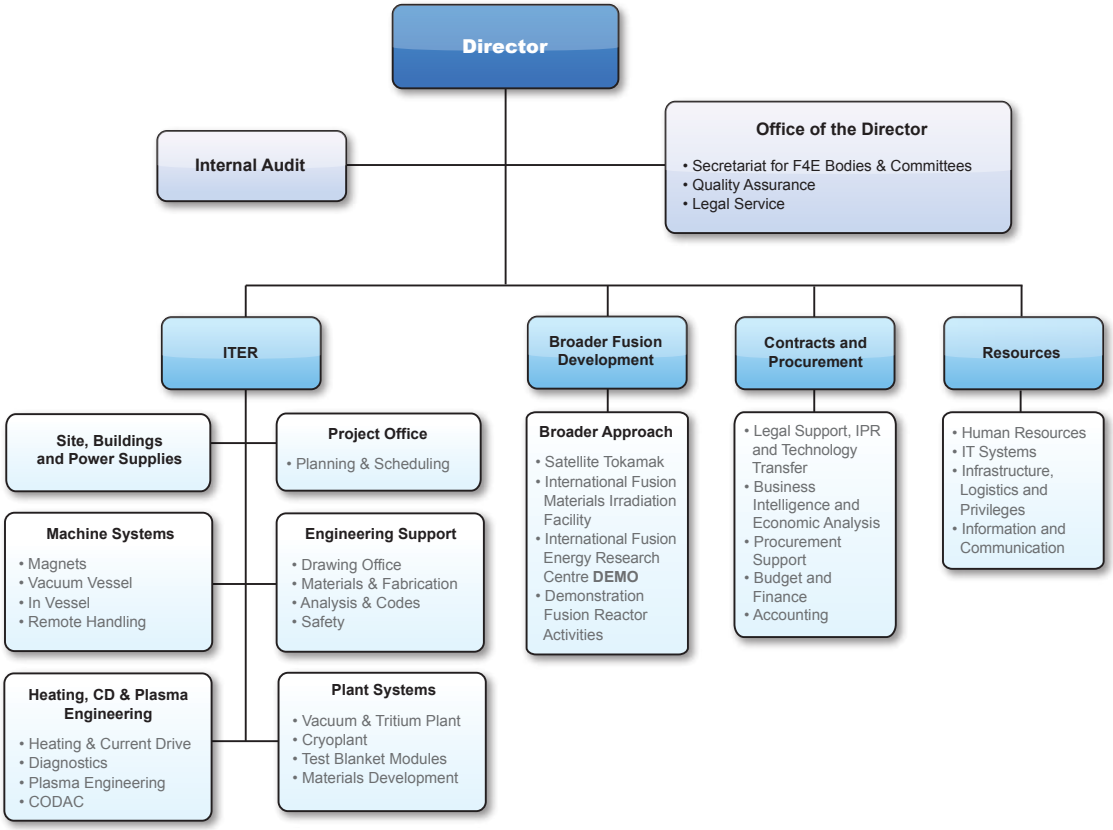


*3 Replaced Thomas Ilhi on 27 November 2009*

# Annex III

# Organisation and Staff

# ORGANISATION



# STAFF

| | | |
|---|---|---|
| **Director** | Didier Gambier[4] | |
| | Antonella Clissa | Ines Cecere |
| **Office of the Director** | | |
| | Raymond Monk | Vincenzo Esposito |
| | Susana Clement | Radoslav Hanak |
| | Manuel Szapiro | Melanie Nolan |
| | Diogo Tavares Rodrigues | Angel de Goya Castroverde* |
| **Internal Audit** | Regis Durand | |
| | Radoslav Sinkovic | |
| **ITER Department** | Maurizio Gasparotto* | |
| | Gianfranco Federici | Minerva Pont Sola |
| | Fabienne De Brouchoven | Anna Chieppa |
| | Silvia Madrid Pariente | Maria Ligia Negulici |
| **Machine Systems Division** | Marcello Losasso | |
| | Monica Ghiringhelli | |
| **Magnets Group** | Carlo Sborchia | |
| | Alessandro Bonito Oliva | Robert Harrison |
| | Hannu Rajainmaki | Eugen Bratu |
| | Thierry Boutboul | Peter Readman |
| | Boris Bellesia | Marc Cornelis |
| | Eva Boter Rebollo | Alexander Vostner |
| **Vacuum Vessel Group** | Lawrence Jones | |
| | Vassilis Stamos | Alexandru Trentea |
| | Jean-François Arbogast | Gonzalo Micó Montava |
| **In Vessel Group** | Patrick Lorenzetto | |
| | Francesco Zacchia | Pierre Gavila |
| | Bruno Riccardi | Boris Bellin |
| **Remote Handling Group** | Carlo Damiani | |
| | Luigi Semeraro | Carmen Gonzalez Gutierrez |
| | Darren Locke | Salvador Esqué Solé |



*4 Until 15 February 2010 and replaced by Frank Briscoe from 16 February 2010.*

| | | |
|---|---|---|
| **Plant Systems Division** | Rainer Lässerl | |
| | María Blanca Gómez de Isidro | |
| **Vacuum & Tritium Plant Group** | | |
| | Giovanni Piazza | |
| **Cryoplant Group** | | |
| | Jarl Buskop | Marc Simon |
| **Test Blanket Modules Group** | Yves Poitevin | |
| | Milan Zmitko | Laurent Guerrini |
| | Italo Ricapito | |
| **Materials Development Group** | Eberhard Diegele | |
| **Heating, CD & Plasma Engineering Division** | Paul Richard Thomas | |
| | Katty Camino Garcia | |
| **Heating Current Drive Group** | Tullio Bonicelli | |
| | Gilbert Agarici | Ferran Albajar |
| | Antonio Masiello | Muriel Simon |
| **Diagnostics Group** | Glen Counsell | |
| | Lars Christian Ingesson | Fabien Seyvet |
| | Arshad Shakeib | |
| **Plasma Engineering Group** | Gabriella Saibene | |
| | Roberta Sartori | Mario Cavinato |
| **CODAC Group** | Filippo Sartori | |
| **Engineering Support Division** | Pierre-Yves Chaffard | |
| | Montse Gutiérrez Gomez | |
| **Drawing Office Group** | Mark Mills | |
| | Alessandro Lo Bue | Claudia Delgado Torres |
| | Angel Moreno Larriba | Elena Alvaro Franch |
| | Eckhard Warschewski | Jose Miguel Pacheco Cansino |
| **Materials & Fabrication Group** | | |
| | Stefan Wikman | Samuli Heikkinen |
| **Analysis and Codes Group** | Alfredo Portone | |
| | Jesus Izquierdo | Didier Combescure |
| | Elena Fernandez Cano | Dieter Leichtle* |
| | Pietro Testoni | |

| | | |
|---|---|---|
| **Safety Group** | Werner Gulden | |
| | Lorenzo Perna | Fédéric Le Guern |
| **Project Office Division** | Federico Riccardo Casci | |
| | Yasmine Chtouki | Paula Harghel |
| | Eric Pangole | Carmela Annino* |
| | Aurélie Cardon | |
| **Planning and Scheduling Group** | Marco Ferrari | |
| | Esther Barbero Soto | Nadia Merli |
| | Maria Ortiz de Zúñiga | Montse Felip Hernando |
| | Roberto Campagnolo | |
| **Site, Buildings and Power Supplies** | Laurent Schmieder | |
| | Sonia Dominguez | Rafael de la Calle |
| | Gaston Hanna | Enrique Rodriguez |
| | Ben Slee | Romaric Darbour |
| **Broader Fusion Development Department** | Pietro Barabaschi | |
| | Enrico Di Pietro | William Spears |
| **JT60-SA** | | |
| | Mario Verrecchia | Bernard Teuchner |
| | Guy Phillips | Lionel Meunier* |
| | Marc Peyrot | Manfred Wanner* |
| | Valerio Tomarchio | Alberto Coletti* |
| | Daniel Duglue | Louis Zani* |
| | Nandor Hajnal | |
| **IFMIF** | | |
| | Roland Heidinger | |
| **Contracts and Procurement Department** | Philippe Corréa | |
| | Jean-José Lopez | Katy Keeble |
| | Fanny Cauvard | Charlotte Langan |
| | Roberta Rubbino | |
| **Legal Support, IPR and Technology Transfer Group** | Chris Guirado | |
| | Victor Saez Lopez-Barrantes | Angela Bardenhewer |

| | | |
|---|---|---|
| | Walter Schuster | Audrey Verpont |
| | Anne Schepens | Dovile Kirkilaite |
| **Business Intelligence and Economic Analysis Group** | Benjamin Perier | |
| | Mehdi Daval | Fabrizio Bertora |
| **Procurement Support Group** | Leonardo Biagioni | |
| | Anne-Kathrin Preis | Kristel Tans |
| | Stefano Galvan | Laura Romano |
| | Pilar Rosado | Nathalie Devos |
| | Jorge Caballero | Cristina Ortiz Schousboë |
| | Valerie Casarin | Hashim Ludin |
| | William De Cat | Romina Bemelmans |
| | Paul Marshall | Ivo Lobmaier* |
| | Graham Strickleton | |
| **Budget and Cost Control Group** | | |
| | Lucile Sampoux-Chaplet | Fatiha Ammari |
| | Dimitrina Ivanova | |
| **Financial Management of Contracts & Missions Group** | Tzeitel Schuster | |
| | Sandra Kunz Glass | Mauro Venturi |
| | Susana Llopis Gonzalez | Baljeeta Devi |
| | Layla Saji | Sergio Beltra Martinez |
| **Accounting Group** | Roberto Abad Villanueva | |
| | Sara Herrero Molinos | Maryse Kuypers |
| **Resources Department** | Stavros Chatzipanagiotou | |
| | Robert Van Der Plas | Emilie Bauwin |
| | Thierry Malengreau | |
| **Human Resources Group** | Paloma Alvarez Hidalgo | |
| | Carina Lindberg | Maria Mourouzidou |
| | Caroline Georges | Christine Konrath |
| | Isabel Garcia Tintó | Ylenia Blok |
| | Vinciane Callebaut | Luís Correia |
| | Haydée Vila Amigo | Marcel Dolieslager |
| | Eeva-Liisa Sihvola | |

| | | |
|---|---|---|
| **IT Systems Group** | Thomas Bousios* | |
| | Jordi Vallés Foix | Jesus Pena-Cotarelo |
| | Cathal Thorne | Gaël Nolard |
| | Iacopo Ianniello | Isabelle Harion |
| | Francisco Javier Cáceres Cotarelo | Cristina Ranea Lopez |
| | Walter Schiller | Stefano Bracco* |
| | Anca-Mihaela Grozea | |
| **Infrastructure, Logistics and Privileges Group** | Osmar Naredo Lopez | |
| | Rafael Delgado Gomez | Estelle Defois |
| | Bénédicte Liégeois | Fabrizio Bruno |
| | Massimiliano Maglienti | Manuel Martins Alves |
| | Raquel Ferrer | Javier Martinez Zamora |
| | Sandra Cenera | |
| **Information and Communication Group** | Aris Apollonatos | |
| | Samina Shamsie | Martial Boulguy |
| | Christos Papachristodoulou | |



** Indicates those who are seconded experts*

FUSION FOR ENERGY

# Annex IV

# Financial Reports

ANNUAL REPORT 2009

## OPERATIONAL BUDGET

| Procedures | Number | Amount (in EUR) |
|---|---|---|
| **Open** | 13 | 19.0 million |
| **Restricted** | 4 | 38.8 million |
| **Negotiated*** | 30 | 84.7 million |
| **Total** | **47** | **142.5 million** |

**Noting that there were seven negotiated procedures above EUR 250 000 amounting to EUR 83.3 million of which four arose from the cancellation of a previous competitive procedure with a value of EUR 76.6 million.*

## ADMINISTRATIVE BUDGET

List of contracts awarded during 2009, on Budget 2009 (excluding real estate contracts, joint procurement with the Commission, administrative support contracts from Host State, contracts < EUR 25 000, specific contracts on implementation of previous framework contracts signed)

| Type of Contract | Count | Amount (in EUR) |
|---|---|---|
| **Supply** | - | |
| **Services** | 5 | 6 072 500 |
| **Works** | | |
| **Total** | **5** | **6 072 500** |

| Procedures | Count | Amount (in EUR) |
|---|---|---|
| **Open** | 2 | 5 900 000 |
| **Restricted** | 0 | |
| **Negotiated (Art. 126 & 127 IR)** | 2 | 147 500 |
| **Other (negotiated low value = or >EUR 25 000)** | 1 | 25 000 |
| **Total** | **5** | **6 072 500** |

NEGOTIATED PROCEDURES

## OPERATIONAL BUDGET ABOVE EUR 250 000

| Reference Number | Contract Title | Contractor | Amount (in EUR) |
|---|---|---|---|
| **F4E-OPE-005-01** | Supply of 58.2 tons of Cr plated $Nb_3Sn$ strand | Oxford Superconducting Technology | 40.443 million |
| **F4E-OPE-005-02** | Supply of 37.1 tons of Cr plated $Nb_3Sn$ strand | Bruker EAS GmbH | 24.486 million |
| **F4E-OPE-009-01** | Refurbishment of the first gyrotron prototype 170 Ghz, 2MW, 1s. | Thales Electron Devices S.A. | 649 100 |
| **F4E-OPE-012-01** | High heat flux testing of divertor components | AREVA NP | 891 200 |
| **F4E-OPE-016-03-01** | Supply of one regular radial plate prototype for TF coils, 3 mock-ups of radial plate section, special tooling and optimised manufacturing plan | SIMIC S.p.a. | 10.399 million |
| **F4E-OPE-030-01** | Building Value Engineering (Phase III) | Jacobs Nucléaire SAS | 2 million |
| **F4E-OPE-032 -01** | Experiments on a large radiofrequency ion source with extraction (ELISE) | Max-Planck-Gesellschaft zur Förderung der Wissenschaften eV - Institut fuer Plasmaphysik (IPP) | 4 million |
| **Total** | **7** | | **83.276 million** |

INDIVIDUAL PROCUREMENTS

## ADMINISTRATIVE BUDGET

| Reference Number | Contract Title | Type of Contract | Amount (in EUR) | Launch Date | Award Date |
|---|---|---|---|---|---|
| **F4E-2009-ADM/HR-01** | Provision of Interim Services | Service Framework | 5 million | 09/02/2009 | 03/07/2009 |
| **F4E-2009-ADM/CP-03** | Legal Advice for Buildings | Direct Service | 105 000 | 03/04/2009 | 02/05/2009 |
| **F4E-2009-ADM/IT-05** | IT Disaster Recovery Services | Direct Service | 900 000 | 05/08/2009 | 03/11/2009 |
| **F4E-2009-ADM/CP-08** | Provision of Reports on Companies | Service Purchase order | 25 000 | 19/10/2009 | 18/12/2009 |
| **F4E-2009-ADM/CP-09** | Additional Legal Advice for Buildings | Direct Service | 42 500 | 18/09/2009 | 28/09/2009 |

INDIVIDUAL PROCUREMENTS

## NEGOTIATED PROCEDURES
## ADMINISTRATIVE BUDGET ABOVE EUR 60 000

### Art. 126 and 127 of Implementation Rules

| Reference Number | Contract Title | Contractor | Type of Contract | Amount (in EUR) |
|---|---|---|---|---|
| **F4E-2009-ADM/CP-03** | Legal Advice for Buildings | Debevoise & Plimpton LLP | Direct Service | 105 000 |
| **F4E-2009-ADM/CP-09** | Additional Legal Advice for Buildings | Debevoise & Plimpton LLP | Direct Service | 42 500 |

## AWARDED GRANTS

| Activity Area | Title | Amount (in EUR) | Beneficiary | Launch Date | Award Date |
|---|---|---|---|---|---|
| **Safety** | Combined hydrogen and dust explosion and mitigation experience and model development. Validation and application to ITER. | 758 808 | Forschungs-zentrum Karlsruhe (FZK) Commissariat á l'Énergie Atomique (CEA) Ente per le Nuove tecnologie, l'Energia e l'Ambiente (ENEA) | 10/06/2008 | 10/03/2009 |
| **Safety** | Detailed Analyses of Fire/ Explosion Reference Event Scenarios | 50 000 | Studsvik Nuclear AB | 10/06/2008 | 10/03/2009 |
| **Divertor** | Monitoring, infrared SATIR examination and analysis of divertor components to be heat flux tested (HHFTEST-PREP) | 189 017 | CEA | 23/06/2008 | 19/01/2009 |
| **Neutral Beam System** | Continuation of the Development for the RF Ion Source (RFSDE) | 288 000 | Max-Planck- Institut fuer Plasmaphysik (IPP) | 16/07/2008 | 24/02/2009 |
| **Electron Cyclotron Power Sources** | Development of the European Gyrotron CCGDS6 | 736 138 | Ecole Polytechnique Fédérale de Lausanne (EPFL) - Centre de Recherches en Physique des Plasmas (CRPP) FZK Research Unit of the Association Euratom - Hellenic Republic (HELLAS) Istituto di Fisica del Plasma - Consiglio Nazionale delle Ricerche (CNR) ENEA | 21/07/2008 | 19/01/2009 |
| **Materials Development** | EUROFER Material Database | 100 000 | CEA | 12/08/2008 | 29/09/2009 |

| Activity Area | Title | Amount (in EUR) | Beneficiary | Launch Date | Award Date |
|---|---|---|---|---|---|
| **Diagnostics** | R&D on Ex-Vessel Magnetics and Construction of Magnetics Test | 160 000 | ITERMAG consortium:<br>EPFL - CRPP<br>CEA<br>Consorzio RFX | 11/08/2008 | 16/03/2009 |
| **Nuclear Data** | Improvement of Nuclear Data, development of tools and experiments/validation in support of ITER activities - Action 1 | 165 000 | United Kingdom Atomic Energy Authority<br>FZK<br>Nuclear Research and Consultancy Group (NRG)<br>Horia Hulubei National Institute of Physics and Nuclear Engineering (IFIN HH)<br>Technische Universtität Wien (TU Wien)<br>Jozef Stefan Institute (JSI) | 14/08/2008 | 16/04/2009 |
| **Nuclear Data** | Nuclear Data studies/ experiments in support of TBM activities (Nudata_Exper) - Action 2 | 135 000 | ENEA<br>FZK<br>AGH-University of Science and Technology (AGH-UST)<br>JSI<br>Nuclear Physics Institute of the ASCR vvi (NPI) | 14/08/2008 | 16/04/2009 |
| **Remote Handling** | Activities Related to the Development of an In-Vessel Viewing System Prototype | 470 800 | ENEA | 18/08/2008 | 24/02/2009 |
| **Remote Handling** | Activities related to the development of an Air Transfer System prototype and Cask Transfer System Virtual Mock-up | 172 060 | Instituto Superior Técnico (IST)<br>Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) | 18/08/2008 | 05/02/2009 |
| **Plasma Engineering** | Plasma Scenarios and Poloidal Field Coils System Analysis and Optimisation | 236 060 | Consorzio di Ricerca per l'Energia e le Applicazioni Tecnologiche dell 'Elettromagnetismo (CREATE) | 30/09/2008 | 23/01/2009 |
| **Vacuum Pumping and Fuelling** | Completion of final design for the PTC and testing of PTC in TIMO-2 to qualify the design | 540 000 | FZK | 02/02/2009 | 26/06/2009 |
| **Vacuum Pumping and Fuelling** | Upgrading of TIMO-2 Facility | 60 000 | FZK | 02/02/2009 | 20/04/2009 |
| **Vacuum Pumping and Fuelling** | Instrumentation for ITER Cryopumps and Cold Valve Boxes | 70 000 | FZK | 29/06/2009 | 06/08/2009 |
| **Vacuum Vessel** | Corrosion Issues | 235 680 | Studsvik Nuclear AB | 09/03/2009 | 30/06/2009 |

| Activity Area | Title | Amount (in EUR) | Beneficiary | Launch Date | Award Date |
|---|---|---|---|---|---|
| **Neutral Beam System** | Neutral Beam Injector HNB1 & HNB2 Development Support for Components Outside the Scope of NBI Test facility | 2 371 470 | United Kingdom Atomic Energy Authority (CCFE) | 23/01/2009 | 25/11/2009 |
| **Tritium Plant** | Functional and performance evaluation of Sulzer CY packing in view of ITER ISS | 30 000 | FZK | 11/12/2008 | 25/03/2009 |
| **Diagnostics** | Detailed design of a representative equatorial port plug | 151 880 | NRG<br>Numerical Analysis Technologies S.L. (NATEC) | 02/02/2009 | 28/07/2009 |
| **Diagnostics** | Detailed design of a representative equatorial port plug | 197 019 | CEA<br>IST<br>ENEA<br>CIEMAT<br>Research Institute for Particle and Nuclear Physics of the Hungarian Academy of Sciences (KFKI-RMKI) | 02/02/2009 | 18/12/2009 |
| **Divertor** | Destructive Examination of European Divertor Vertical Target Qualification Prototypes | 92 559 | Forschungszentrum Jülich (FZJ) | 17/03/2009 | 29/06/2009 |
| **Ion Cyclotron H&CD ANTENNA** | Detailed Design of the ITER ICH Antenna | 1 750 426 | Cycle Consortium:<br>CCFE<br>CEA<br>Patrimoine de l'Ecole Royale Militaire- Koninklijke Militaire School (ERM)<br>IPP<br>Politecnico di Torino (POLITO) | 13/02/2009 | 16/12/2009 |
| **Magnets** | Extended characterisation of ITER strands | 599 557 | University of Twente (UT-LT)<br>Durham University (DU) | 20/05/2009 | 20/10/2009 |
| **Test Blanket Module** | Post Irradiation Examination of Be materials irradiated in HIDOBE-01 campaign - Action 3 | 220 062 | NRG<br>Karlsruhe Institute of Technology (KIT)<br>Instituto Tecnologico e Nuclear<br>Institute of Solid State Physics (ISSP) | 24/04/2009 | 29/11/2009 |
| **Test Blanket Module** | Continuation of the safety assessment of EU-TBMs based on design evolution | 60 500 | Studsvik Nuclear AB | 28/05/2009 | 06/08/2009 |
| **Neutral Beam System** | Components and Infrastructure of the NBTF | 5 991 340 | Consorzio RFX | 08/06/2009 | 04/11/2009 |

| Activity Area | Title | Amount (in EUR) | Beneficiary | Launch Date | Award Date |
|---|---|---|---|---|---|
| **Test Blanket Modules** | Study of the impact caused by the Implementation of mitigation means for ITER TF TBM-induced ripple on TBMs design & test objectives | 38 837 | KIT<br>CEA | 10/07/2009 | 07/12/2009 |
| **Test Blanket Modules** | Design and construction of a multipurpose laboratory scale apparatus for investigating hydrogen isotopes in PbLi and permeation technology | 99 990 | KIT<br>CEA<br>ENEA | 31/08/2009 | 07/12/2009 |
| **Test Blanket Modules** | Design and Implementation of the Data Acquisition and Control System of the European Breeding Blanket Test Facility (EBBTF) | 99 680 | ENEA | 01/09/2009 | 07/12/2009 |
| **Tritium Plant** | Assessment of Hydrogen Isotope Separation System 2001 Baseline Design | 44 000 | FZK | 31/07/2009 | 09/09/2009 |

FINANCIAL YEAR 2009

# IMPLEMENTATION OF THE BUDGET

| Revenue | | | | Expenditure | |
|---|---|---|---|---|---|
| Origin of Revenue | | Revenue entered in the final budget for the financial year | Revenue collected | Allocation of expenditure | |
| Community subsidies | - CA | 29.028 | 139.758 | Title I Staff | |
| | - RO | 139.928 | | | |
| Membership contributions | - CA | 2.900 | 2.797 | Title II Administration | |
| | - RO | 3.285 | | | |
| ITER host state contribution | - CA | 61.200 | 0 | Title III Operating actvities | - CA |
| | - RO | 30.400 | | | - PA |
| Other revenue | - CA | pm | 421 | Earmarked revenue(*) | - CA |
| | - RO | pm | | | - PA |
| TOTAL | - CA | 355.128 | 142.977 | TOTAL | - CA |
| | - RO | 173.613 | | | - PA |

RO = Entitlements established
CA = Commitment appropriation
PA = Payment appropriation



** Expenditure on earmarked revenue are cumulative amounts*

(in EUR 1 000)

| | Appropriations under the final budget | | | | | Appropriations carried over from the previous financial year | | |
|---|---|---|---|---|---|---|---|---|
| | Entered | Committed | Paid | Carried over | Cancelled | Available | Paid | Cancelled |
| | 21.949 | 21.312 | 17.275 | 1.843 | 2.831 | 2.063 | 556 | 1.507 |
| | 7.389 | 7.289 | 1.564 | 5.724 | 100 | 5.289 | 3.013 | 2.276 |
| | 264.590 | 264.590 | - | 0 | 0 | 0 | | |
| | 113.875 | - | 107.573 | 0 | 6.302 | 0 | | |
| | 110.229 | 106.571 | - | 3.659 | 0 | 978 | - | - |
| | 55.629 | - | 3.464 | 52.166 | 0 | 24.865 | - | - |
| | 404.157 | 399.761 | - | 11.226 | 2.931 | 8.329 | | |
| | 198.842 | - | 129.876 | 59.733 | 9.233 | 32.217 | 3.568 | 3.784 |

2009

## BALANCE SHEET (ASSETS)

| ASSETS | | 31/12/2009 | 31/12/2008 | Variation |
|---|---|---|---|---|
| **A. NON CURRENT ASSETS** | | | | |
| **Intangible fixed assets** | | **0.00** | **0.00** | **0.00** |
| **Tangible fixed assets** | | **1,469,592.00** | **483,472.00** | **986,120.00** |
| | Plant and equipment | 1,412.00 | 0.00 | 1,412.00 |
| | Computer hardware | 938,193.00 | 109,759.00 | 828,434.00 |
| | Furniture and vehicles | 423,560.00 | 299,690.00 | 123,870.00 |
| | Other fixtures and fittings | 106,427.00 | 74,023.00 | 32,404.00 |
| **TOTAL NON CURRENT ASSETS** | | **1,469,592.00** | **483,472.00** | **986,120.00** |
| **B. CURRENT ASSETS** | | | | |
| **Stocks** | | **0.00** | **0.00** | **0.00** |
| **Short-term pre-financing** | | **45,581,310.23** | **6,513,159.60** | **39,068,150.63** |
| | Short-term pre-financing | 45,581,310.23 | 6,513,159.60 | 39,068,150.63 |
| **Short-term receivables** | | **78,769,196.84** | **41,711,738.27** | **37,057,458.57** |
| | Current receivables | 30,884,333.92 | 384,900.00 | 30,499,433.92 |
| | Sundry receivables | 23,691.38 | 42,579.70 | -18,888.32 |
| | Other | 47,859,173.77 | 41,171,589.75 | 6,687,584.02 |
| | Accrued income | 21,850.82 | 67,621.95 | -45,771.13 |
| | Deferred charges | 11,561.95 | | 11,561.95 |
| | *Deferrals and Accruals with consolidated EU entities* | 47,825,761.00 | 41,103,967.80 | 6,721,793.20 |
| | *Short-term receivables with consolidated EU entities* | 1,997.77 | 112,668.82 | -110,671.05 |
| **Cash and cash equivalents** | | **42,006,329.34** | **58,980,569.87** | **-16,974,240.53** |
| **TOTAL CURRENT ASSETS** | | **166,356,836.41** | **107,205,467.74** | **59,151,368.67** |
| **TOTAL ASSETS** | | **167,826,428.41** | **107,688,939.74** | **60,137,488.67** |

2009

## BALANCE SHEET (LIABILITIES)

| LIABILITIES | | 31/12/2009 | 31/12/2008 | Variation |
|---|---|---|---|---|
| **A, NET ASSETS** | | **141,334,701.94** | **66,534,076.61** | **74,800,625.33** |
| **Accumulated surplus/deficit** | | **66,534,076.61** | **0.00** | **66,534,076.61** |
| **Economic result of the year - profit+/loss-** | | **74,800,625.33** | **66,534,076.61** | **8,266,548.72** |
| **B, NON CURRENT LIABILITIES** | | **59,141.81** | **977,500.00** | **-918,358.19** |
| **Provisions for riskd and charges** | | **59,141.81** | **0.00** | **59,141.81** |
| **Other long-term liabilities (Pre-financing received from consolidated EU entities)** | | **0.00** | **977,500.00** | **-977,500.00** |
| **TOTAL A+B** | | **141,393,843.75** | **67,511,576.61** | **73,882,267.14** |
| **C, CURRENT LIABILITIES** | | **26,432,584.66** | **40,177,363.13** | **-13,744,778.47** |
| **Accounts payable** | | **26,432,584.66** | **40,177,363.13** | **-13,744,778.47** |
| | Current payables | 22,013.68 | 187,019.94 | -165,006.26 |
| | Sundry payables | 117,798.19 | 645.65 | 117,152.54 |
| | Other | 15,737,971.04 | 13,088,518.54 | 2,649,452.50 |
| | *Accrued charges* | 15,729,174.97 | 12,961,554.46 | 2,767,620.51 |
| | *Deferrals/accruals with consolidated EU entities* | 8,796.07 | 126,964.08 | -118,168.01 |
| | Accounts payable with consolidated EU entities | 10,554,801.75 | 26,901,179.00 | -16,346,377.25 |
| | *Pre-financing received from consolidated EU entities* | 977,500.00 | 25,406,415.22 | -24,428,915.22 |
| | *Other accounts payable* | 9,577,301.75 | 1,494,763.78 | 8,082,537.97 |
| **TOTAL C,CURRENT LIABILITIES** | | **26,432,584.66** | **40,177,363.13** | **-13,744,778.47** |
| **TOTAL ASSETS** | | **167,826,428.41** | **107,688,939.74** | **60,137,488.67** |

2009

## ECONOMIC OUTTURN ACCOUNT

| | 2009 | 2008 | Variation |
|---|---|---|---|
| **Revenues from administrative operations** | 127,753.25 | 562,323.48 | -434,570.23 |
| **Other operating revenue** | 173,051,744.81 | 123,739,884.44 | 49,311,860.37 |
| **TOTAL OPERATING REVENUE** | **173,179,498.06** | **124,302,207.92** | **48,877,290.14** |
| | | | |
| **Administrative expenses** | -23,269,644.09 | -11,821,558.13 | -11,448,085.96 |
| All Staff expenses | -16,700,197.54 | -8,635,888.07 | -8,064,309.47 |
| Fixed asset related expenses | -536,857.86 | -125,464.55 | -411,393.31 |
| Other administrative expenses | -6,032,588.69 | -3,060,205.51 | -2,972,383.18 |
| **Operational expenses** | -75,368,074.02 | -46,162,378.07 | -29,205,695.95 |
| Other operational expenses | -75,368,074.02 | -46,162,378.07 | -29,205,695.95 |
| **TOTAL OPERATING EXPENSES** | **-98,637,718.11** | **-57.983.936,20** | **-40,653,781.91** |
| | | | |
| **SURPLUS/(DEFICIT) FROM OPERATING ACTIVITIES** | **74,541,779.95** | **66,318,271.72** | **8,223,508.23** |
| | | | |
| **Financial revenues** | 263,223.14 | 216,304.89 | 46,918.25 |
| **Financial expenses** | -4,377.76 | -500.00 | -3,877.76 |
| **SURPLUS/(DEFICIT) FROM NON OPERATING ACTIVITIES** | **258,845.38** | **215,804.89** | **43,040.49** |
| | | | |
| **SURPLUS/(DEFICIT) FROM ORDINARY ACTIVITIES** | **74,800,625.33** | **66,534,076.61** | **8,266,548.72** |
| | | | |
| **ECONOMIC RESULT OF THE YEAR** | **74,800,625.33** | **66,534,076,61** | **8,266,548.72** |

2009

# BALANCE OUTTURN ACCOUNT

| | | 2009 | 2008 |
|---|---|---|---|
| **REVENUE** | | | |
| Euratom contribution | + | 139,758,000.00 | 122,457,297.35 |
| ITER Host State and Membership contributions | + | 2,797,298.55 | 26,298,100.00 |
| Other revenue | + | 421,494.27 | 1,013,682.94 |
| **TOTAL REVENUE (a)** | | **142,976,792.82** | **149,769,080.29** |
| **EXPENDITURE** | | | |
| *Title I: Staff* | | | |
| Payments | - | 17,274,747.27 | 9,050,469.06 |
| Appropriations carried over | - | 1,843,396.63 | 2,063,062.49 |
| *Title II: Administrative Expenses* | | | |
| Payments | - | 1,564,361.71 | 223,048.21 |
| Appropriations carried over | - | 5,724,180.02 | 5,288,722.23 |
| *Title III: Operational Expenditure* | | | |
| Payments | - | 111,037,211.15 | 82,873,869.37 |
| Appropriations carried over | - | 52,165,502.73 | 24,865,000.00 |
| **TOTAL EXPENDITURE (b)** | | **189,609,399.51** | **124,364,171.36** |
| **OUTTURN FOR THE FINANCIAL YEAR (a-b)** | | **-46,632,606.69** | **25,404,908.93** |
| Cancellation of unused payment appropriations carried over from previous year | + | 3,783,512.48 | |
| Adjustment for carry-over from the previous year of appropriations available at 31.12 arising from assigned revenue | + | 24,865,000.00 | |
| Exchange differences for the year (gain +/loss -) | +/- | -7,210.67 | 1,506.29 |
| **BALANCE OF THE OUTTURN ACCOUNT FOR THE FINANCIAL YEAR** | | **-17,991,304.88** | **25,406,415.22** |

2009

## ESTABLISHMENT PLAN

| GRADE | 2009 | | | |
|---|---|---|---|---|
| | Authorised under the EU Budget | | Filled as of 31/12/2009 (including job offers done) | |
| | Permanent Posts | Temporary Posts | Permanent Posts | Temporary Posts |
| AD 16 | | | | |
| AD 15 | | | | |
| AD 14 | | 1 | | 1 |
| AD 13 | 1 | 1 | | |
| AD 12 | 8 | 8 | 15 | 3 |
| AD 11 | 12 | | 7 | |
| AD 10 | 4 | 10 | | |
| AD 9 | 10 | 38 | 4 | 31 |
| AD 8 | 4 | | 1 | |
| AD 7 | | 10 | 1 | 1 |
| AD 6 | 2 | 47 | | 57 |
| AD 5 | | 4 | 3 | 3 |
| AD total | 41 | 119 | 31 | 96 |
| AST 11 | 1 | | | |
| AST 10 | 1 | | 1 | |
| AST 9 | 1 | | 2 | |
| AST 8 | | | 1 | |
| AST 7 | 1 | | 1 | |
| AST 6 | 1 | | 2 | |
| AST 5 | 6 | | | |
| AST 4 | 2 | | 1 | |
| AST 3 | 1 | 25 | | 17 |
| AST 2 | | | | |
| AST 1 | | | 1 | |
| AST total | 14 | 25 | 9 | 17 |
| TOTAL | 55 | 144 | 40 | 113 |
| | 199 | | 153 | |

# Annex V

# ITER Credit Allocation

2009

## ITER CREDIT ALLOCATION

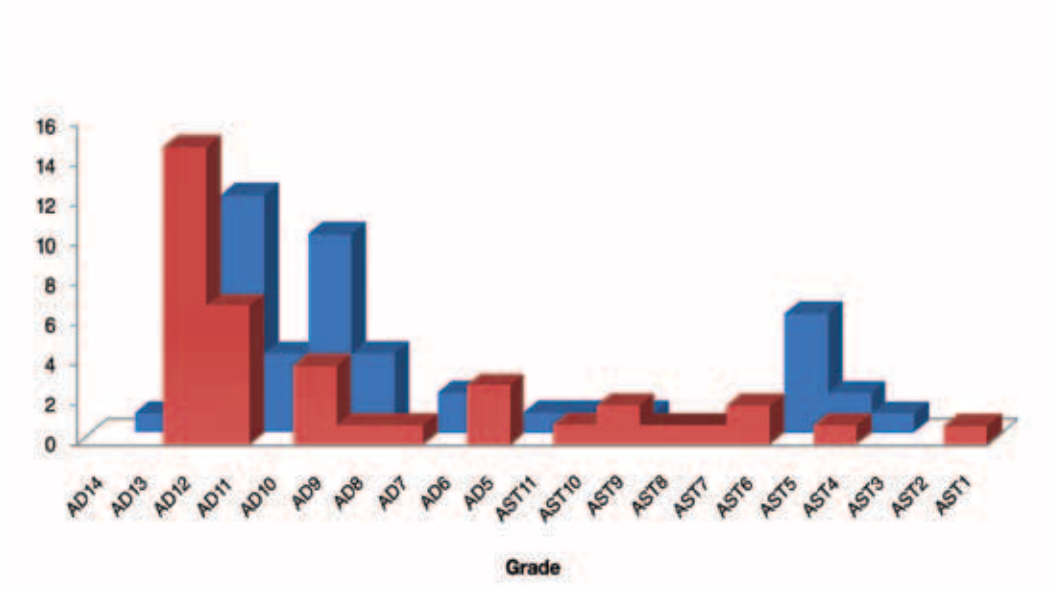
| | Description | Date of Credit Notification | Credit Allocated in IUA |
|---|---|---|---|
| 1 | EU Seconded staff first quarter 2009 | 5 May 2009 | 639.8803 |
| 2 | EU Seconded staff second quarter 2009 | 22 July 2009 | 648.33601 |
| 3 | EU Seconded staff third quarter 2009 | 22 January 2010 | 777.75848 |
| 4 | EU Seconded staff fourth quarter 2009 | 22 January 2010 | 675.40228 |
| 5 | Regularisation of credits allocated in 2008 | 5 May 2009 | -6.99019 |
| 6 | Regularisation for the final IUA/Euro rates 2007 and 2008 | 5 May 2009 | -4.40679 |
| 7 | Regularisation for the final IUA/Euro rates 2009 | 22 July 2009 | -7.43004 |
| 8 | Task Agreement No: C81TD32FE | 23 February 2009 | 200.00000 |
| 9 | Total | | 2 922.55005[5] |

*5 ~EUR 4.4 million*

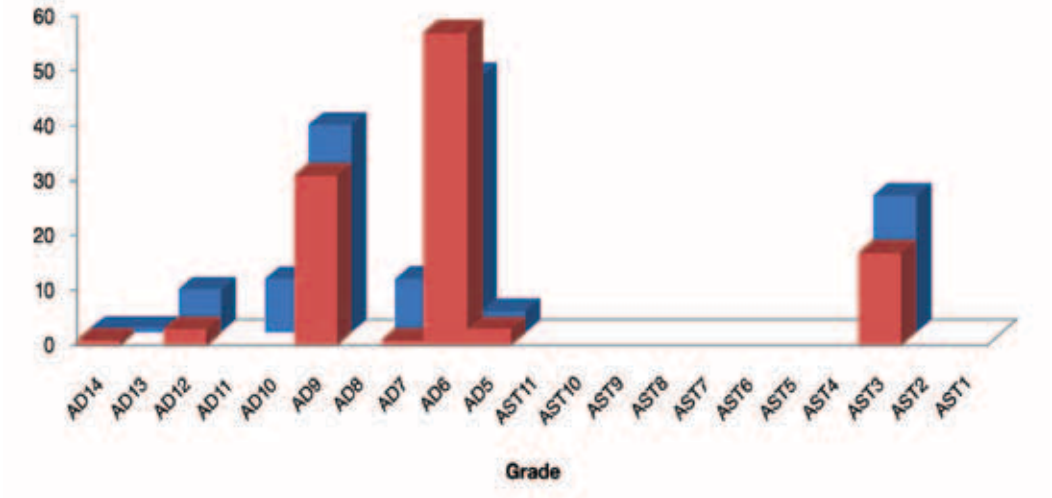
# Annex VI

# Staffing Statistics

PERMANENT POSTS FILLED INCLUDING JOB OFFERS (RED) COMPARED WITH ESTABLISHMENT PLAN (BLUE)



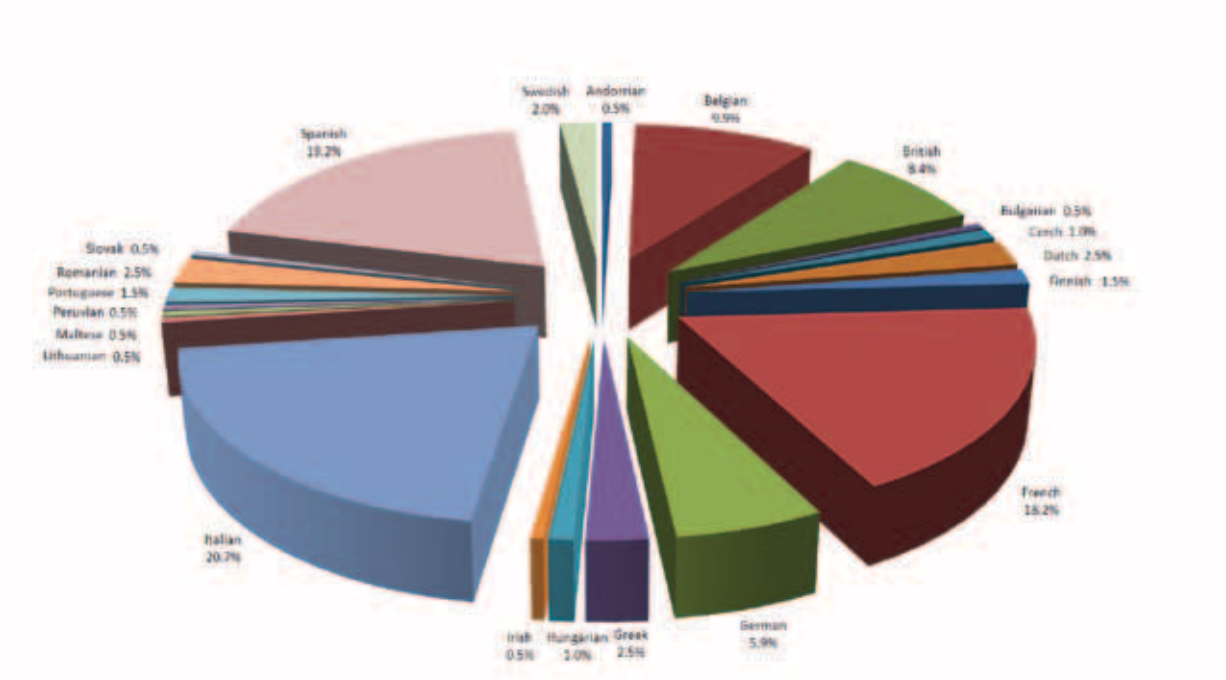

TEMPORARY POSTS FILLED INCLUDING JOB OFFERS (RED) COMPARED WITH ESTABLISHMENT PLAN (BLUE)



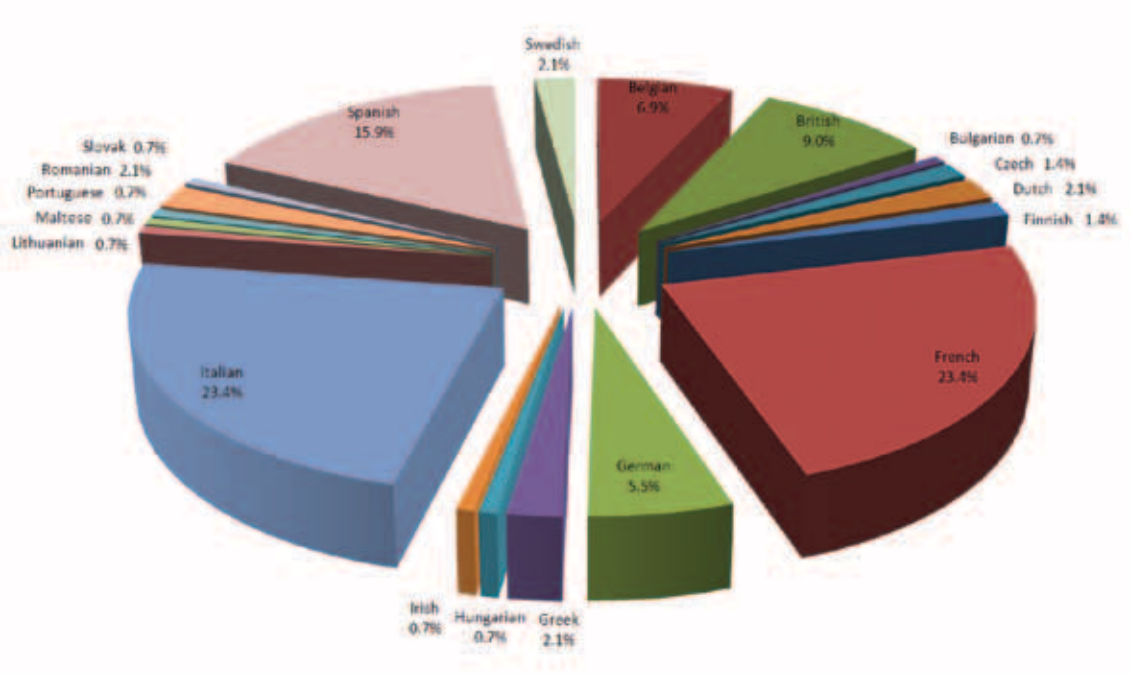

CONTRACT AGENTS PER GRADE

| Grade | Number |
|---|---|
| **I** | 2 |
| **II** | 30 |
| **III** | 16 |
| **IV** | 10 |

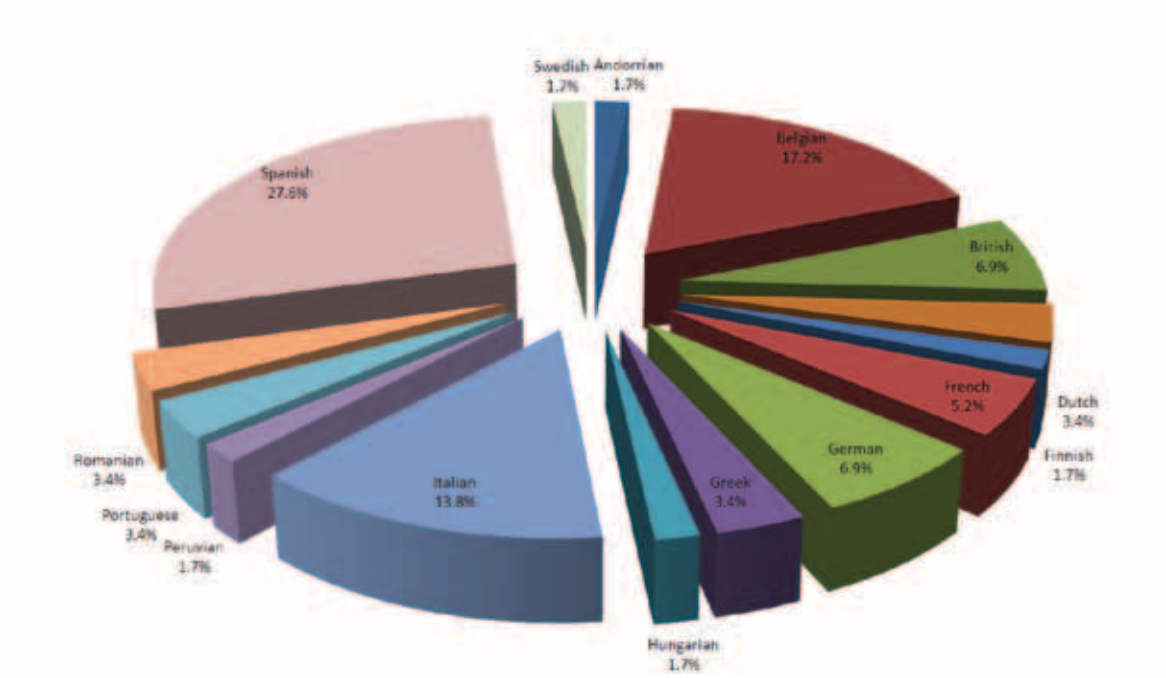
NATIONALITY BREAKDOWN – ALL STAFF



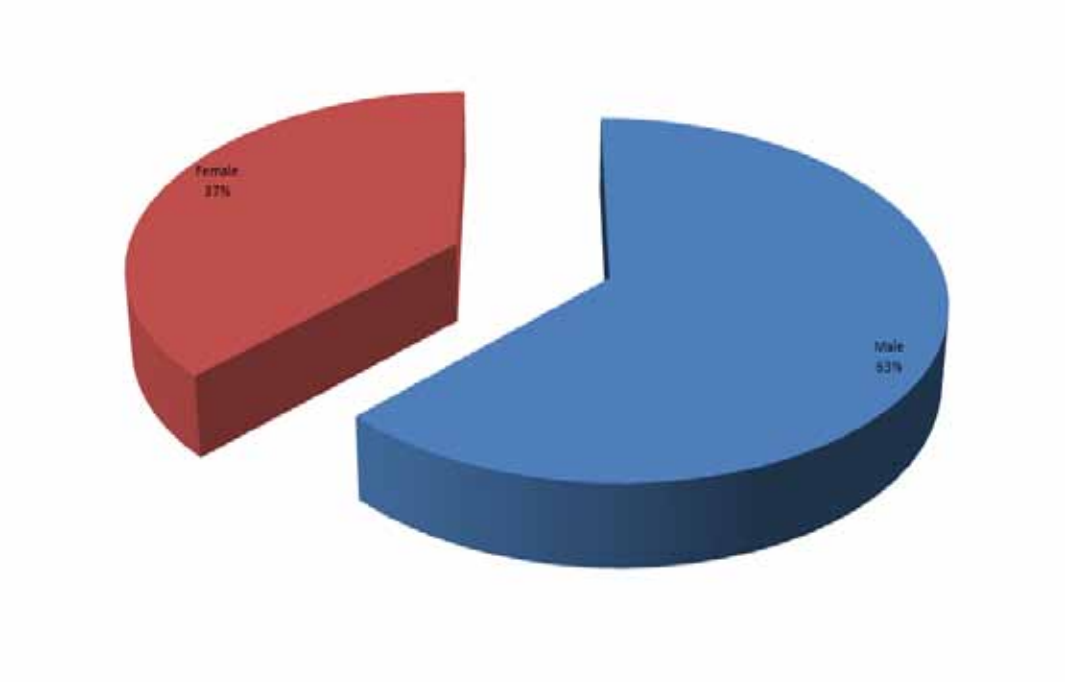

NATIONALITY BREAKDOWN – OFFICIALS AND TEMPORARY AGENTS



NATIONALITY BREAKDOWN – CONTRACT AGENTS




BREAKDOWN ACCORDING TO GENDER OF ALL STAFF



# Annex VII

# Declaration of Assurance

I, the undersigned, Frank Briscoe, Director of the European Joint Undertaking for ITER and the Development of Fusion Energy (Fusion for Energy or "F4E") in my capacity as authorising officer:

Declare that the information contained in this report gives a true and fair view*;

State that I have reasonable assurance that the resources assigned to the activities described in this report have been used for their intended purpose and in accordance with the principles of sound financial management. This reasonable assurance is based on my own judgement and on the information at my disposal since taking up my duties on 16 February 2010 including my predecessor's hand-over note;

Based on the preliminary observations of the Court of Auditors and the conclusions of the Internal Auditor in his audit report on the financial circuits of F4E (completed May 2010), make the following reservations: the Internal Control Systems in place at F4E are not yet fully implemented and do not provide reasonable assurance regarding the achievement of the ojectives assigned to financial circuits. Measures are being taken by F4E to address the weaknesses identified by these audits;

Confirm that I am not aware of anything not reported here which could harm the interests of F4E and the European Institutions in general.

F. Briscoe

**Dr Frank Briscoe**
Director of Fusion for Energy

** True and fair in this context means reliable, complete and correct view on the state of affairs in the service.*

# Annex VIII

# Analysis and Assessment by the Governing Board

THE GOVERNING BOARD:

1 Welcomes the results presented in the second Annual Activity Report (hereinafter "the Report") of the Authorising Officer and the strong commitment and contribution of Fusion for Energy (F4E) and its staff to its operations;

2 Congratulates the management and the staff of F4E for the hard work done, in particular the contribution towards the definition of an acceptable ITER Baseline and the update of the costs for the European contribution to the ITER project;

3 Welcomes the placing of 30 grants and 47 contracts by F4E in 2009 signing the start of some major construction activities, in particular in the magnets and buildings areas;

4 Welcomes the detailed information on the grants and contracts placed in 2009 and on the main achievements;

5 Observes that the difficulties F4E has faced during the year, both internal and external, in efficiently fulfilling its mission in relation to the ITER project have not been identified or commented on nor are the actions described that are being taking in order to overcome the difficulties;

6 Instructs F4E to define its annual overall objectives with greater clarity and precision and to develop and implement key performance indicators. This will enable, inter alia, F4E to measure and report on the implementation of the Work Programme including an Earned Value Management system;

7 Asks the Director to include in future Reports the main elements of the overall progress in the implementation of the Project Plan and an analysis on any encountered difficulties and deviations;

8 Notes that EUR 355 million in operational commitment appropriations (over 98% of plan) were placed and EUR 173 million in operational budget appropriations (over 79% of plan) were spent during 2009;

9 Notes that, despite the 96 staff recruited during 2009, F4E has not yet reached the amount of posts foreseen in its Establishment Plan;

10 Acknowledges the progress made by F4E in the areas of Quality Assurance, Internal Audit, Information Technologies, Logistics and Infrastructure as well as Information and Communication;

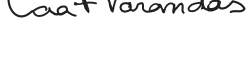
11 Notes the creation of a Staff Committee and the expansion of activities in Social Dialogue;

12 Notes that, beyond the risk analysis for the procurement packages in the Project Plan, no overall analysis of the risks associated with the activities carried out by F4E was performed;

13 Notes the outcome of the management assessment by an expert group and the report of the Internal Auditor, and invites the Director to put forward an action plan in response to the recommendations.

*Done at Barcelona, 10 June 2010* *For the Governing Board*

**Carlos Varandas**
*Chair of the Governing Board*



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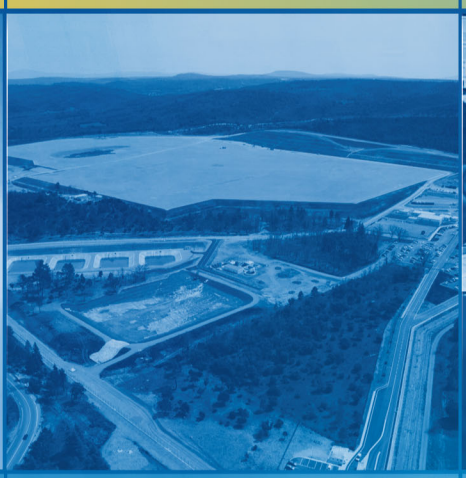


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