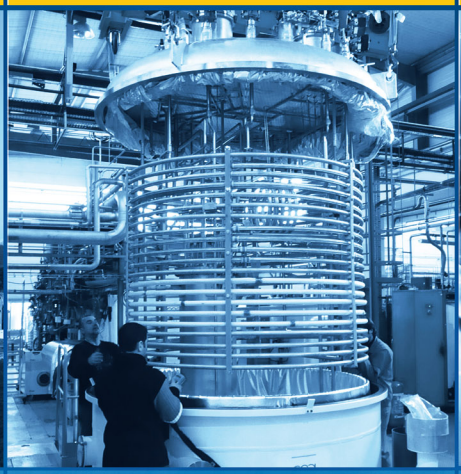
FUSION FOR ENERGY

ANNUAL REPORT 2010






FUSION FOR ENERGY

Annual Activity Report 2010

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ANNEX

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 FusionEnergy and conferring advantages upon it.
Directors:	Dr Didier Gambier (from 1 October 2007 to 15 February 2010) 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) Technical Advisory Panel (Chair: Professor Minh-Quang Tran, 13 Members) Standing Coordination Group (Chair: Professor Carlos Varandas, 7 Members) Audit Committee (Chair: Mr Stuart Ward, 5 members)
Objectives:	(a) Providing Europe's contribution to the ITER international fusion energy project; (b) Implementing the Broader Approach agreement between Euratom and Japan; (c) Preparing for the construction of demonstration fusion reactors (DEMO).
Staff:	185 (Officials and Temporary Agents) and 84 (Contract Agents)
2010 Budget	EUR 444 million in commitment appropriations EUR 242 million in payment appropriations

ACTIVITIES IN 2010

Operation Contracts:	44 awarded for a total value of EUR 826 million (42 launched)
Administrative Contracts:	7 awarded for a total value of EUR 6 million (5 launched)
Grants:	23 for a total value of EUR 8 million (16 launched)
Budget Implementation:	99.9% in commitment appropriations (99.8% operational and 99% administrative) 63.4% in payment appropriations (61.8% operational and 77% administrative)
Procurement Arrangements:	4 for the ITER project (384.44 kIUA equivalent to EUR 615 million (total of 803.7 out of 1135.9 kIUA or 66% of all the foreseen European in kind contributions) Five for the Broader Approach (98.4 kBAUA equivalent to EUR 66 million out of a total of 236.4 kBAUA foreseen for all the European contributions)
ITER Credit Awarded:	10.4 kIUA (equivalent to EUR 16.6 million)
Meetings of Statutory Bodies:	Six of the Governing Board, seven of the Executive Committee and four of the Technical Advisory Panel

Foreword by the Chair of the Governing Board

It is an honour to introduce the third 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 2010 - a landmark year in which ITER construction really began.

Looking back I think it is fair to say that 2010 was the most important year so far for both F4E and the ITER International Organization (ITER IO) and I am pleased to report that a number of important initiatives were taken and both the ITER and Broader Approach projects are on track.

During 2010 there were six meetings of the Governing Board (GB), seven meetings of the Executive Committee and three meetings of the Technical Advisory Panel. The GB's Standing Coordination Group (SCG) also met on many occasions and has helped to strengthen ties and exchange information between the F4E management and the GB.

In January the GB accepted the resignation of F4E's first Director, Dr Didier Gambier and appointed Dr Frank Briscoe as the new Director. I would like to take this opportunity to express my personal appreciation for the important work that Dr Gambier carried out to make F4E operational and wish him all the best for the future.

One of the main activities for the GB in the first half of 2010 was the development of a realistic schedule for the construction of ITER at acceptable cost and risk. I am pleased to report, in my other capacity as a member of the European delegation to the ITER Council, that the updated ITER Baseline (covering scope, schedule and cost) was approved by the ITER Council in July.

In 2010 the GB has reviewed the cost of the European in kind contributions to the ITER project on the basis of updated estimates from the F4E Director. In March the GB proposed a capping of the European contribution to EUR 6 000 million which was confirmed by the Council of the European Union in July.

Much attention has also been devoted by the GB to the further improvement of F4E by analysing a number of proposals made by the F4E Director. A new project-orientated organisational structure was approved in October and the GB welcomed steps being taken to implement industrial project management and reporting systems.

I am pleased to note that F4E's Internal Audit capability became operational during 2010 and the first audits on the internal financial management of F4E revealed scope for improvement in a number of areas. In this context, the GB took the initiative to establish an Audit Committee.

In line with the conclusions of the July meeting of the Council of the European Union concerning ITER, the GB continued to emphasise the need for cost containment and is monitoring the rebuilding of the contingency. The GB has also reflected upon a number of measures to improve its own governance.

To take the important matter of F4E improvement forward, the GB established a Working Group in December which has been charged with coming forward in the first half of 2011 with proposals for improvement. A Working Group charged with the preparation of F4E's Industrial Policy was set up.

For the ITER IO 2010 has been a year in which there have been several changes at management level and I would like to extend my best wishes to the former ITER Director General Ambassador Kaname Ikeda and the former Principal Deputy Director General Dr Norbert Holtkamp. In December the new ITER Director General, Professor Osamu Motojima, addressed the GB and I welcome the renewed spirit of collaboration that has developed between F4E and ITER IO.

I would like to express my appreciation for the valuable support of the GB Vice-Chair, Mr Stuart Ward, the collaboration and support from the GB members with particular relevance for the SCG members as well as of the members of the Executive Committee and Technical Advisory Panel chaired by Dr Karl Tichmann and Professor Minh Quang Tran respectively. I want also to thank the F4E Director, Dr Frank Briscoe and his staff for their continued dedication.

I have also to recognise and thank the collaboration and support that I received from the European Commission, in particular from Mr José Manuel Silva Rodríguez, former Director General for Research and Dr Octavi Quintana Trias, former Director of Energy (Euratom).

Finally, I am conscious that my mandate as GB Chair will end in mid-2011 and I would like therefore to take this opportunity to say how honoured I have been to have had the confidence of the F4E GB throughout my mandate and for the support that the GB Members have provided to me in this extremely important European and international venture that is ITER.

Professor Carlos Varandas
Chair of the F4E Governing Board

Executive Summary by the Director

I am very pleased to introduce Fusion for Energy's (F4E) third Annual Activity Report and describe how we have delivered Europe's contributions towards the international ITER and Broader Approach fusion energy projects during 2010.

Important achievements during 2010 include the successful production of full-size mock-ups of the radial plates for the ITER magnets. The production of all 62 tons of copper strand for the magnet conductor was completed six months ahead of schedule and the first 8 tons of superconducting strand was produced.

In terms of contracting, 2010 was a very busy year so far for F4E with around 50 contracts signed for a total awarded value of almost EUR 830 million. F4E also concluded seven grants, mostly to support R&D activities in support of procurement, for a total value of EUR 6 million. The follow-up of contracts signed in 2008 and 2009 has also been an important activity.

One highlight has been the signature of the contract of around EUR 300 million for the seven sectors of the Vacuum Vessel. Each steel sector is 13 metres high and 6.5 metres wide – once all seven sectors are welded together it will be the largest ITER component weighing about the same as the Eiffel tower. The contract for cabling and jacketing of the ITER and JT-60SA magnet conductors was also signed.

We have seen work progress on the ITER site and in July, after the site clearance and levelling work was completed, the ITER International Organization (ITER IO) handed over the site and authorised F4E to start construction. By August, construction of the Poloidal Field coils fabrication building had begun which is approximately 250 metres long, 45 metres wide and 17 metres high.

At the same time, work to excavate down to the required 20 metres depth for the tokamak building began. By the end of 2010 the profile at the base of the pit was being completed following the excavation of around 200 000 m^3 of rocks and almost 300 people (staff and external contractors) were working on-site.

An important activity of F4E during the first half of 2010 was to assess the feasibility of an updated ITER Baseline with the objective of a first plasma in November 2019. F4E carried out a number of scheduling studies to analyse manufacturing paths and to assess the cost and risk implications. I am pleased that the European representatives at the ITER Council were able to approve this Baseline in July.

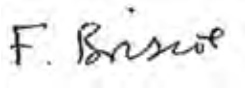
Our working level interactions with the ITER IO were intensive during 2010 and F4E participated in 12 Domestic Agency coordination meetings. F4E also supported Euratom at two meetings of the ITER Council and for the preparation of the associated MAC and STAC preparatory meetings.

An important task of 2010 has been to improve the capability of F4E to perform its tasks within the framework of a European public body and set in motion a number of initiatives to reinforce project management including agreeing with the Governing Board on a new organisational structure and making proposals for new reporting systems and processes. In the meantime F4E has continued to grow with the staff total complement surpassing 250 by the year's end.

I would like to echo the comments made by the Governing Board Chair concerning the former ITER Director General Ambassador Kaname Ikeda and the former ITER Principal Deputy Director General Dr Norbert Holtkamp as well as the former Director General for Research at the European Commission Mr José Manuel Silva Rodríguez, and Dr Octavi Quintana Trias, former Director of Energy (Euratom).

At the same time, I am looking forward to strengthening the cooperation between F4E and the ITER IO with the new ITER Director General, Professor Osamu Motojima. I am also seeking to work closely with the new Director-General for Research and Innovation at the European Commission, Mr Robert-Jan Smits as well as the new Director for Energy, Mr Raffaele Liberali.

To conclude, I would like to thank Professor Carlos Varandas, Chair of the F4E Governing Board, as well as the Chairs of the Governing Board's advisory bodies and the Members of F4E for the confidence they have placed in me. I would also like to express my appreciation for the F4E staff who continue to show great professionalism and patience in the face of many changes and challenges.



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:

- 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);
- Joint Implementation of the Broader Approach Activities in the Field of Fusion Energy Research (with Japan).

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 2010 exercise, F4E has taken on board the comments made by the Governing Board about the 2009 Annual Report. In addition, the 2010 report has been reviewed by the subsidiary bodies of the Governing Board (Executive Committee and Technical Advisory Panel).

Report Structure

The Report is divided into four parts:

- A brief description of fusion energy research, the ITER and Broader Approach (BA) projects;
- A summary of the main achievements in the implementation of the ITER and BA projects;
- The management, administration, resources and other support services of the organisation;
- Ten annexes providing information on:
    - Acronyms used in the Annual Report;
    - Implementation of F4E's work programme;
    - Risk management;
    - Composition of the F4E's bodies and committees;
    - F4E's Organisational Chart;
    - Implementation of F4E's 2010 Budget;
    - Allocation of credit from the ITER IO;
    - Statistics concerning F4E staffing;
    - Declaration of assurance by the Director;
    - Analysis and assessment of the Annual Report by F4E's Governing Board.

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

F4E Offices, Barcelona

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 the 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.

One way to make fusion happen on Earth is to heat 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 include the abundance on earth of the basic fuels (deuterium and lithium, the latter being used to make tritium – see box opposite), the absence 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 co-ordinated 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).

ITER

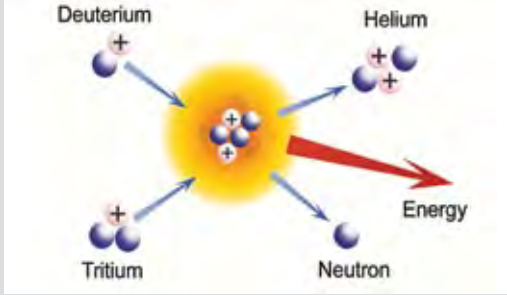
While JET and other tokamak experiments have succeeded in producing significant amounts of fusion power albeit for short periods, none so far are capable of demonstrating fusion on a scale that would be needed for a reactor and a number of technologies that are needed to allow it to generate part of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

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.

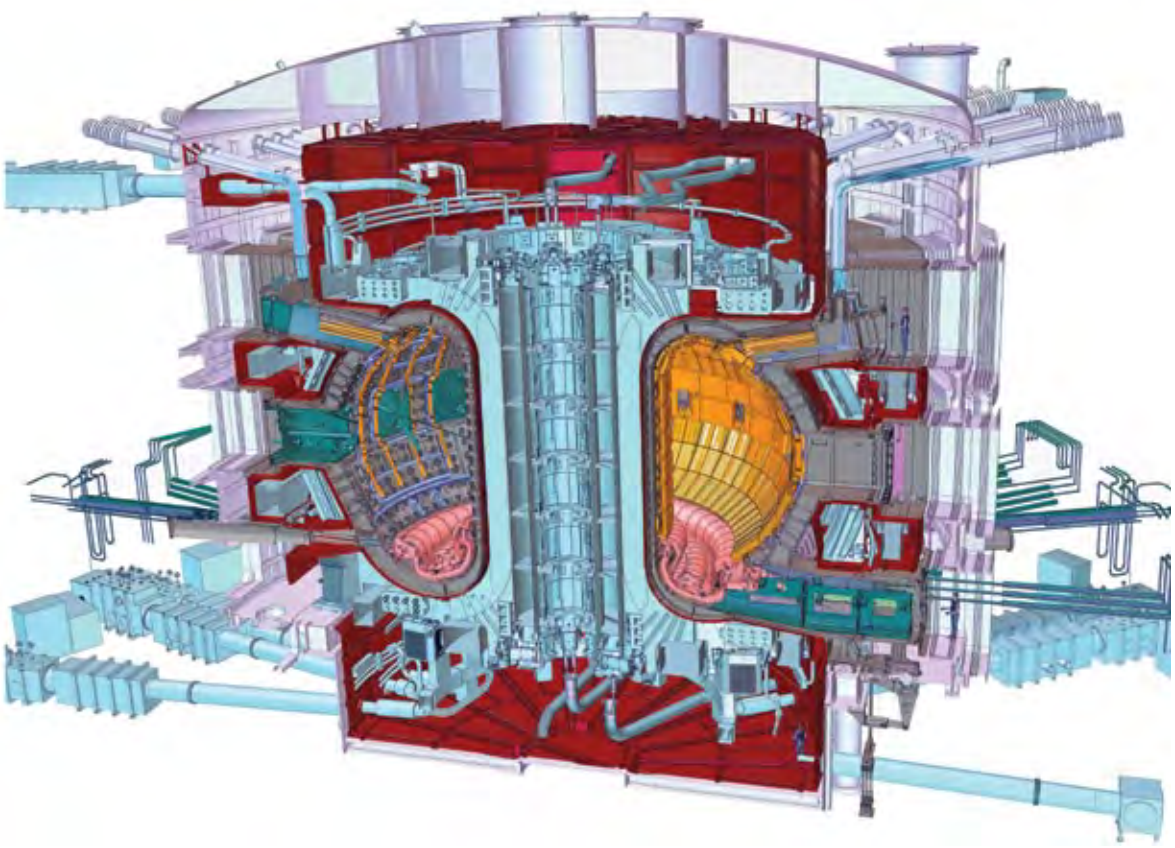
FUSION REACTIONS

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.



(courtesy of EFDA)

Fig. 1: A cutaway view of the ITER Tokamak (courtesy of ITER IO)



ITER aims to produce a significant amount of fusion power (500MW) for about 7 minutes or 300 MW for 50 minutes. This venture began in 1985 as a 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.

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 thousands of years.

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 project will generate a preliminary engineering design of the **International Fusion Materials Irradiation Facility (IFMIF)** validated by prototypes of key subsystem. 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.

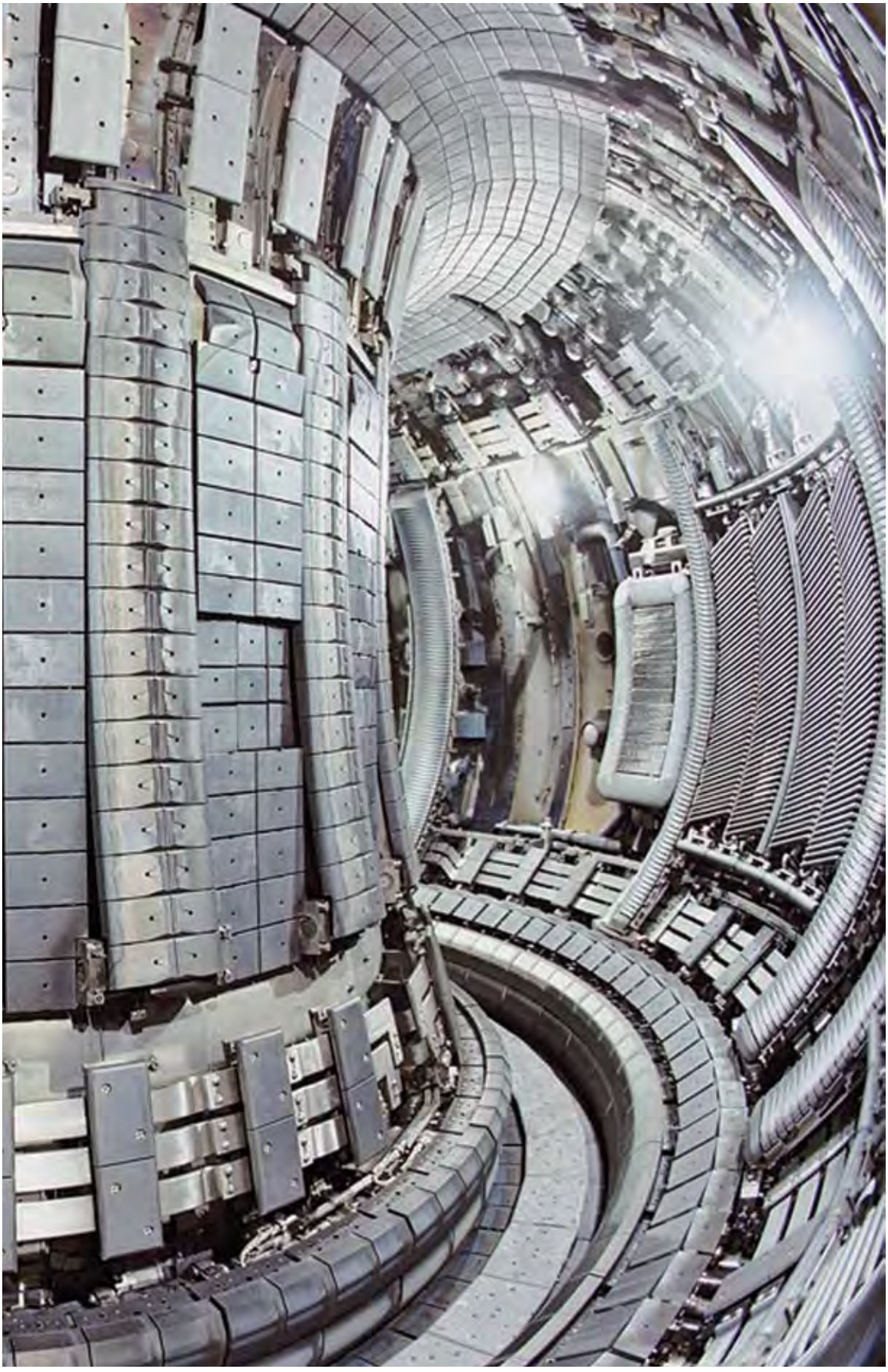
To develop synergy with its activities related to ITER, it was decided that F4E should also be the Implementing Agency of Euratom for the Broader Approach. The resources for the implementation of the Broader Approach will be largely provided on a voluntary basis from several participating European countries (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 (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 about one-half of the components that are required to construct ITER. These components, including the associated ITER credit[2], are as follows:

Magnets (186.36 kIUA)

- 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; and
- Nine fibreglass composite pre-compression rings.

Vacuum Vessel (92.06 kIUA)

- Vacuum Vessel - Seven sectors of the vessel and blanket coolant manifolds

In-Vessel Components (81.8 kIUA)

- Blanket first wall (FW) - 50% of the FW panels corresponding to the Normal Heat Flux FW (42.1 kIUA);
- The blanket cooling manifold (5.9 kIUA);
- Divertor - inner vertical target, cassette bodies and integration of plasma facing components, and divertor rails (33.8 kIUA).

Remote Handling (44.6 kIUA)

- Divertor Remote Handling;
- Cask transfer system;
- In-vessel viewing and metrology system;
- Neutral Beam Remote Handling.

Cryoplant and Fuel Cycle Systems

- Cryoplant - approximately one-half of the system (30.677 kIUA);
- Eight torus and two cryostat cryopumps, some cryopumps for the Neutral Beam system and other systems (15.22 kIUA);
- Tritium Plant consisting of the Water Detritiation System (WDS) and the Hydrogen Isotope Separation System (ISS) (18.216 kIUA).

Wave Heating Systems

- Ion Cyclotron Resonance Heating (ICRH) System (equatorial port plug incorporating one ICRH antenna and spares) (4.458 kIUA).
- Electron Cyclotron Resonance Heating (ECRH) System (Four upper port plugs incorporating launchers, 32% of the sources and 14% of the power supplies). As such, F4E is responsible for gyrotrons generating 8MW of RF power and 92% (presently being revised to 67%) of the power supplies for the ECRH system (37.245 kIUA).

Neutral Beam Heating System (83.35 kIUA)

- Neutral Beam Heating System (100% assembly and testing of compensation and active correction coils, ~50% of other components).
- The Neutral Beam Test Facility (NBTF) is also included in this package, after having been approved by the ITER Council as an Additional Direct Investment.

Diagnostics (35.487 kIUA)

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

2 Expressed in ITER Units of Account (IUA) where 1 kIUA is approximately EUR 1.6 million in 2011 values

Site, Buildings and Power Supplies

- Site infrastructure and all the concrete and steel frame buildings (454.17 kIUA);
- Power Supplies - pulsed power & steady state power supplies (31 kIUA).

Other Systems

- Waste Management and Storage (10.1 kIUA);
- Radiological Protection (4.2 kIUA).

An important activity of F4E concerns the **Test Blanket Modules (TBMs)** which are components that would allow the breeding of tritium in a fusion reactor. The TBMs are not among the items which are obliged to be provided by Europe to the ITER IO. Instead the TBMs are to be procured separately by the interested Parties and installed in ITER whereupon a TBM testing programme will be conducted by ITER.

In carrying out its tasks, F4E also carries out a number of **Technical Support Activities** which support the above-mentioned activities and cover the following areas:

- Plasma Engineering;
- Safety and Licensing;
- Leak Detection & Leak Localisation;
- Engineering Support;
- Nuclear Data;
- Quality Assurance Activities.

In some cases the necessary technologies are well established, but in many others R&D and design activities are required before a document, known as a Procurement Arrangement (PA), setting out scope of the procurement can be signed between ITER and F4E.

For activities prior to procurement, F4E provides support to the ITER IO through so-called Task Agreements and R&D activities are typically carried out in collaboration with European national fusion laboratories under the cost-sharing arrangement provided for by grants.

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 mitigate the risks. This may be complemented by Design Reviews carried out jointly with the ITER IO.

Highlights

One of the highlights of 2010 was the approval by the ITER Council in July 2010 of the updated ITER Baseline (scope, schedule and cost) for ITER operation in November 2019. F4E devoted significant internal resources to the development of this updated Baseline under the guidance of the F4E Governing Board (GB).

Overall the activities of F4E conducted during 2010 were according to the schedule defined in the updated ITER Baseline (Fig. 2). In cases where there were delays, these were either mitigated or did not adversely impact upon the critical path for ITER construction (i.e. no delay in the target date to begin ITER operations).

As concerns the 2010 Work Programme (WP 2010), the pie-chart in Fig. 3 below shows the situation at the end of the year whereby 54% of the foreseen procurement procedures were started or completed and a further 41% were under preparation (with earmarked “global” financial commitments) and only 5% cancelled.

Overall the activities of F4E conducted during 2010 were consistent with the updated ITER Baseline. In cases where there were delays, these were either mitigated or did not adversely impact upon the critical path for ITER construction (i.e. no influence on the November 2019 target to begin ITER operations).

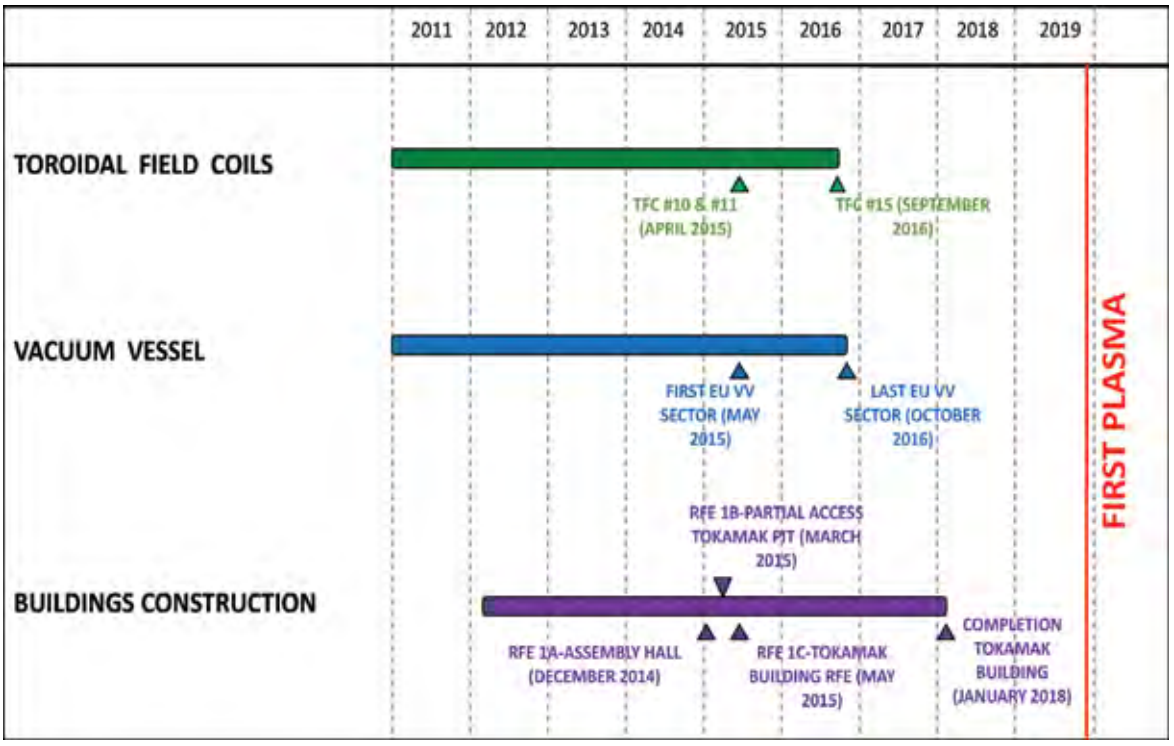
In 2010 F4E made important progress for in-kind procurements of components on the critical path for ITER construction by signing the contracts for the manufacturing of both the Toroidal Field coil Winding Packs and the Vacuum Vessel sectors, the latter being the largest contract awarded by F4E to date.

In total 44 contracts and 23 grants were awarded by F4E for values of EUR 826 and EUR 8 million respectively (see Annex II). All but one of the foreseen Procurement Arrangements with a value of 384.44 kIUA (equivalent to EUR 615 million) were signed with ITER IO bringing the total to 803.74 kIUA (Fig. 4).

In summer 2010, following the completion of the site clearance and levelling, ITER IO handed over the ITER platform to F4E. The excavations were started and construction of the Poloidal Field coils fabrication building began. At the same time the architect engineer started its work in 2010 to prepare for placing the construction contracts for the civil works and buildings.

A special effort was devoted to improve the overall F4E project management processes, in line with the proposals of the F4E Director approved by the Governing Board. Risk assessments were also carried out together with the identification of cost reductions and cost containment opportunities to be applied to all F4E activities.

Fig. 2: Schedule Summary of the Main European Components



Specific achievements for each of the main technical areas under F4E's responsibility in 2010 include:

Magnet Systems

- Award of a procurement contract for TF Nb_3Sn strands testing;
- Award of a procurement contract for PF strands testing and characterisation;
- Successful tests of EUPF1 and TRASEK samples conducted in the SULTAN facility;
- Award of a contract for cabling and jacketing of TF and PF conductors;
- Launch of a call for tender for P2-PF6 coils procurement;
- Launch of a call for tender for pre-compression rings procurement;
- Award of a procurement contract for TF WP - DP Prototype (TF Coils) and main tooling for series production.

Vacuum Vessel

- Award of a procurement contract for the supply of seven sectors of the Vacuum Vessel – the largest component of the ITER device.

In-Vessel Components

- Award of a grant for the development of powder-solid HIP CuCrZr;
- Award of a grant for the mechanical characterisation of irradiated and un-irradiated copper alloy;
- Award of a contract for the preliminary design and analysis of a FW panel;
- Award of a contract for the thermo-mechanical analysis of a normal heat flux FW panel;
- Award of a grant for the characterisation of an alternative carbon fibre composite (CFC) material and the award of a contract for the manufacture of mock ups using that material;

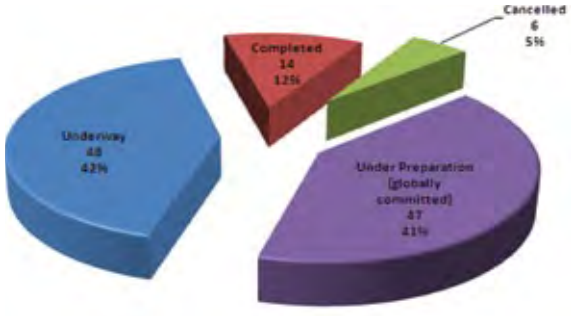
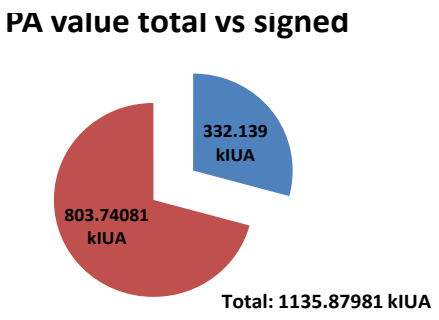


Fig. 3: Status of the implementation of the 2010 Work Programme (as last amended in December 2010)



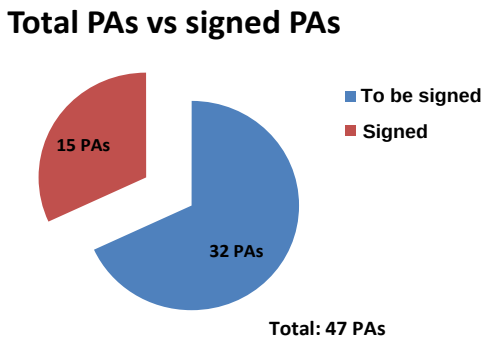


Fig. 4: Total value and number of Procurement Arrangements (PAs) signed between F4E and the ITER IO by the end of 2010

- Award of a contract for the manufacture of full tungsten monoblock mock ups and prototypes;
- Award of a contract for the manufacture of a CFC prototypical batch (SNECMA NB41).

Remote Handling

- Award of a grant for the continuation of Divertor Remote Handling design and test activities;
- Placement or preparation of task orders in support of the for the conceptual design of the Transfer Cask System;
- Placement of task orders and contracts in support of the design of the In-Vessel Viewing System conceptual design and R&D;
- Placement of task order and award of a grant in support of NB RH conceptual design.

Cryoplant and Fuel Cycle Systems

- Completion of a grants to upgrade the TIMO-2 facility for testing the pre-production cryopump under ITER relevant conditions;
- Completion of a contract for the pre-conceptual design of the large (200 m^3) tritiated water holding tanks of the WDS;
- Completion of two grants for the ISS: one for the experimental determination of liquid hydrogen holdup in the packing and another for assessing the 2001 ISS Baseline.

Wave Heating Systems

- Several grants and ITAs in the area of EC power supplies and sources have started.

Neutral Beam Heating

- Signature of the Procurement Arrangement for the NB Test Facility;
- Award of the procurement contract for the NB ion source power supplies.

Diagnostics

- Production of first prototypes for the earliest delivery (outer vessel discrete and continuous external Rogowski) magnetics sensors;
- Award of a grant for development of steady-state magnetic field sensors;
- Award of a grant for the pre-conceptual design integration of diagnostics in equatorial port plug 1.

Site, Buildings and Power Supplies

- Signature of the Procurement Arrangement for the buildings construction;
- Award of the Tokamak Pit Excavation and Ground Support Structure contract, followed by the start of the work;
- Delivery of the PF Coil manufacturing building detailed design and start of construction;
- Delivery of the Preliminary Design of all the ITER buildings, in accordance with the 2010 Baseline;
- Award of several contracts including architectural and engineering services for the buildings' design and works supervision, global insurance and the anti-seismic bearings.

Other Systems

- Signature of two ITAs covering activities for radioactive waste management and radiological and environmental monitoring systems;
- Implementation of grants in support to the ITER licensing programme for the in-vessel dust and tritium inventory measurement.

Technical Support Activities

- Award of a framework contract to support the characterisation of magnets materials;

Test Blanket Modules

- Award of a grant for the design and construction of a multipurpose laboratory scale apparatus for investigating hydrogen isotopes properties in PbLi and permeation technology;

- Award and completion of a grant for the study of the impact caused by the implementation of mitigation means for ITER TF TBM-induced ripple on TBMs design & test objectives;

- Completion of a grant for the upgrade of the DIADEMO PbLi/Helium test facility.

The information presented above and in the following is complemented by Annex II which describes the implementation of the 2010 Work Programme (WP 2010).

Magnet Systems

F4E is responsible for the in-kind procurement of the Toroidal Field Magnets, the Poloidal Field Magnets and the pre-compression rings.

Toroidal Field Magnets

In 2010 the first phase of full industrial implementation began. Progress in accordance with the WP 2010 has been achieved as follows:

- Signature of the contract for Manufacturing of ten Toroidal Field Winding Packs in July 2010 (F4E-OPE-053) and related activities including the definition of the supplier schedule, and the support to the supplier in drafting the technical specifications for the main tools (e.g. furnace and winding line – Fig. 5) and the manufacturing facility.

- Implementation of the procurement contract for the Full scale prototype of the Side Radial Plate (F4E-OPE-016-01) was an important activity during 2010 that required the implementation of corrective actions for the manufacturing procedure. Satisfactory tolerances have been reached on both types of mock-ups produced so far. By end-2010, the manufacturing equipment and procedures for the final prototype realisation were close to their finalisation.

- Implementation of the procurement contract for the Radial Plates full scale prototype (F4E-OPE-016-03) proceeded and the main manufacturing processes (welding, machining, dimensional checks and their qualification) were developed and the development, procurement

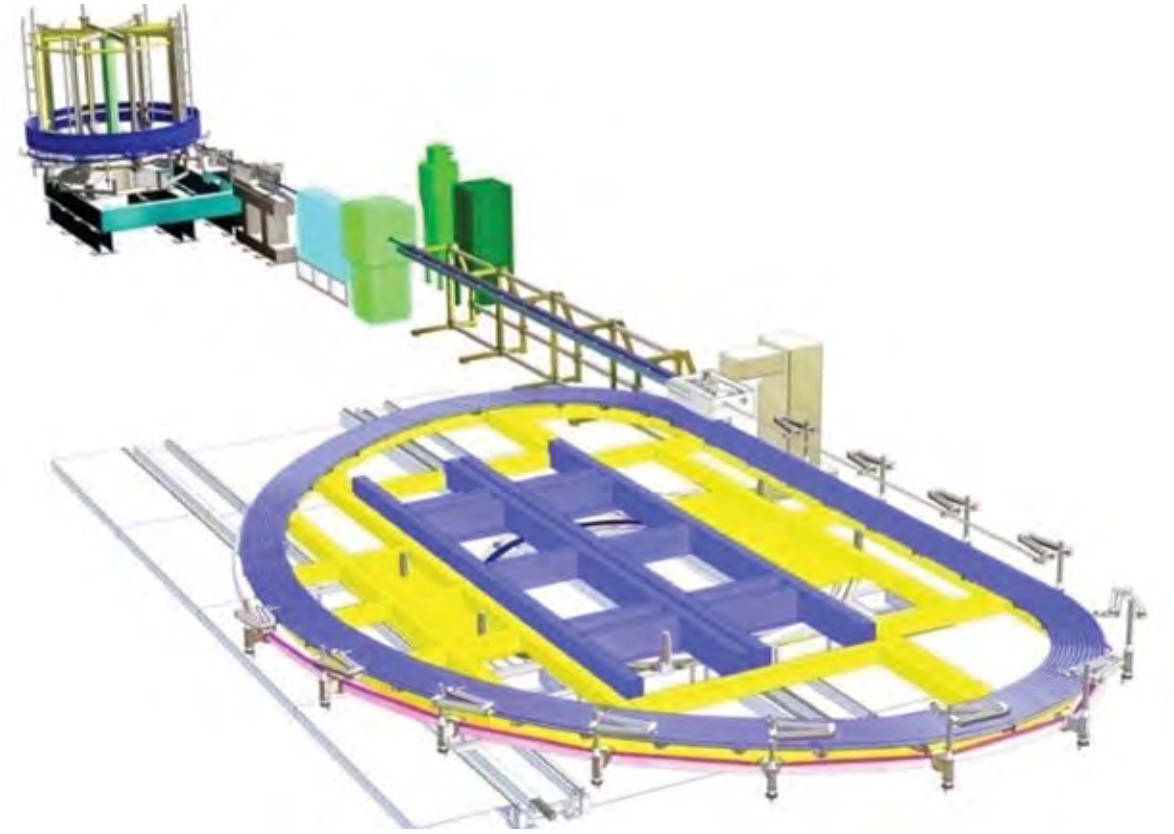
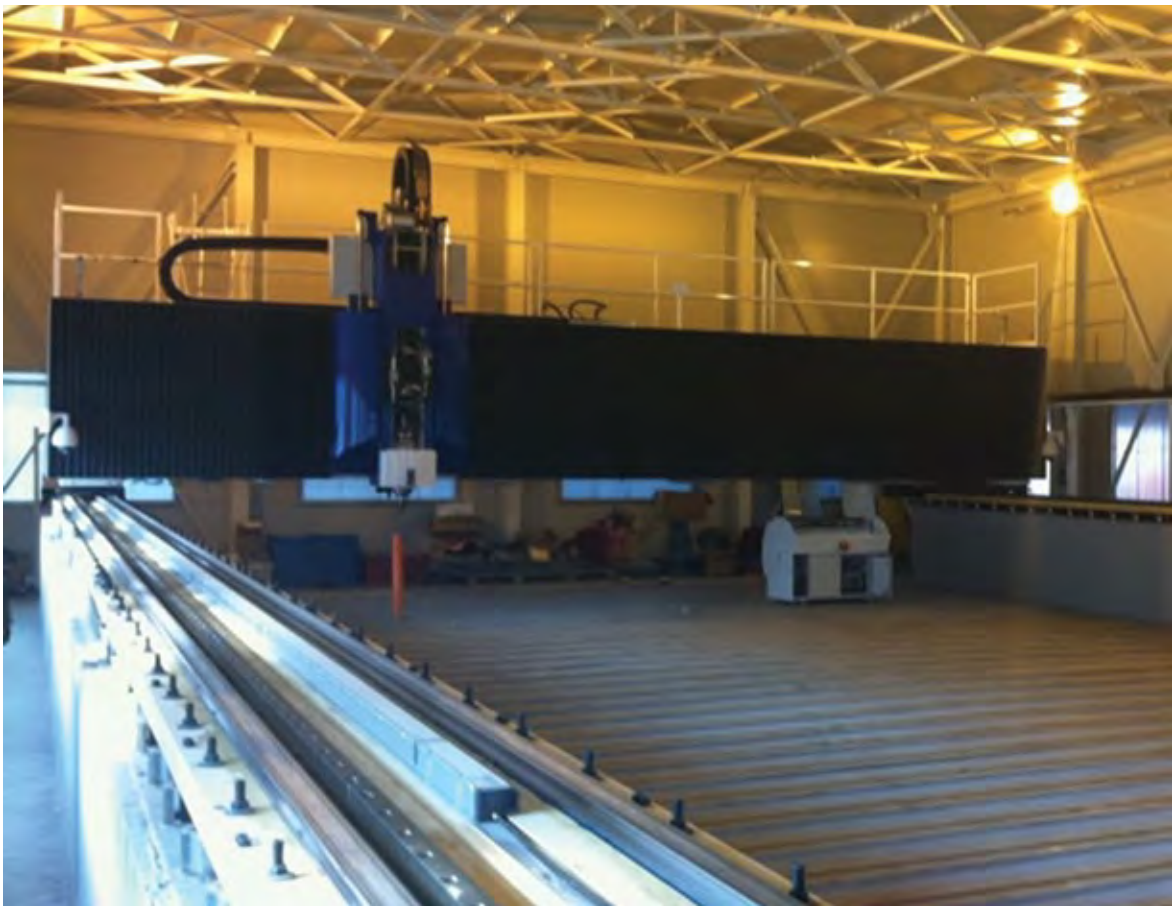


Fig. 5: The winding line for the Double Pancakes (courtesy of ASG)

Fig. 6: Portal Machine (courtesy of SIMIC)



and installation in the supplier's premises of the portal machine (Fig. 6) used for the radial plate final machining. By end-2010 the optimization of the complete manufacturing route was almost complete and two full size mock ups within tolerance were produced.

- Manufacturing of mock-ups to qualify the TF coil case welding closure commended in the framework of a procurement service contract for qualification and UT methods (F4E-OPE-049).

- The call for tender for engineering studies for Coil Cold testing and insertion was issued, the supplier chosen and the contract signed (F4E-OPE-142). The kick off meeting took place in December.

Side and the Regular Radial Plates

The prototypical activities will provide by the middle of 2011 clear indications on the best manufacturing technology in terms of cost optimisation, duration and associated risks for the series production of the 70 Radial Plates.

Poloidal Field Magnets

Significant progress in accordance with WP 2010 has been achieved with the publication of the call for tender for the manufacturing of five PF coils (F4E-OPE-086). Negotiations began to define the technical, contractual and financial aspects with the bidders in view of completing the evaluation in spring 2011.

Conductor

For the conductor the industrial production phase is underway, in particular:

- The supply of 62 tons of copper strand for TF conductor (F4E-OPE-001) was completed by Luvata Pori (Finland) 6 months ahead of the contractual schedule.

- The supply of 58 tons of Nb_3Sn strand for the TF conductor (F4E-OPE-005-1) is progressing and the production facility has been set up (Fig. 7). A QA audit by F4E was carried out in October 2010 and the first contractual deliverables (8 ton) have been produced.

- A second contract (F4E-OPE-005-2) for 37 tons of Nb_3Sn strand for TF conductor has progressed and the first deliverable was produced by the end of the year, including some strand necessary for the extra conductor length required for winding trials.

- A contract for strand characterisation of TF Nb_3Sn samples was signed (F4E-OPE-145).

- The first samples of TF strands have been successfully tested under extensive condition of field and strain in the testing stations of Twente and Durham universities (F4E-GRT-029) and the SULTAN tests of the European conductor samples (EUPF1 and TRASEK) have also been successfully completed.

- The contract for cabling and jacketing of the ITER TF and PF conductors, as well as the JT-60SA conductors, has been signed (F4E-OPE-018) and the first activities, such as the preparation of the QA related documents and manufacturing facilities, have begun.

Pre-compression Rings

The Procurement Arrangement for the manufacture of *nine pre-compression rings* has been signed with ITER IO the associated call for tender has been launched by end-2010 (F4E-OPE-150).

Overall implementation of the WP 2010 and Project Plan for TF, PF magnets and conductors has progressed according to the schedule, with the exception of delays in the cabling and jacketing contract signature due to litigation and in the production of the Radial Plates prototypes.

Vacuum Vessel

Important progress has been achieved with the signature of a contract for the first stages of the fabrication of seven sectors of the Vacuum Vessel (F4E-OPE-068) following extensive negotiations phase to optimise the technical, financial and technical aspects. Related achievements include:

- The procedure for the procurement of plate and forgings for the mock-ups started, and plate and forgings available from past EFDA contracts were made available to suppliers for mock-ups preparation.

- Analysis tasks in support of the ongoing manufacturing design were carried out, with the aim to prepare the necessary documentation to be submitted to ANB for approval.

- Technical cooperation meetings with KO-DA took place to define the detailed design and to agree on proposed manufacturing improvements.

- CAD tasks (OPE-017-01-10-10) in order to convert the CATIA 3D models provided by ITER IO from multi-body to multi-part were started to validate the models provided by ITER IO (Fig. 8).

Fig. 7: Manufacturing facility for Nb_3Sn strand drawing (courtesy of OST)

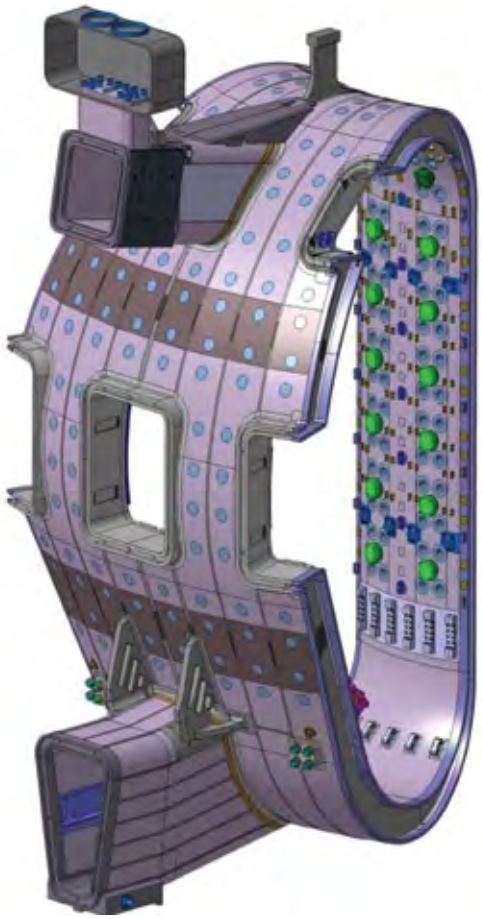


Fig. 8: CAD model of sector 5 of the Vacuum Vessel (courtesy of AMW)

- The overall progress has been in accordance with the WP2010 and Project Plan. However, some delays are being experienced due to delays resulting from ITER IO's ongoing efforts to improve the required drawings.

In-Vessel Components

During 2010 progress in the development of in-Vessel components were related to the Blanket Cooling Manifold, the Blanket First Wall (FW) and the Divertor components.

Blanket Cooling Manifold

Activities focused upon supporting preliminary design and integration studies of the multi-pipe manifold concept proposed by F4E, which has been accepted by ITER IO and which is proposed to be included into the Baseline.

Blanket First Wall

Achievements in the area of the Blanket FW may be grouped into three areas:

- R&D in support of the blanket FW procurement: award of a grant (GRT-038) for the development of Hot Isostatic Pressed CuCrZr alloy and the launch of another grant (GRT-043) on mechanical characterisation of irradiated and unirradiated CuCrZr alloy.

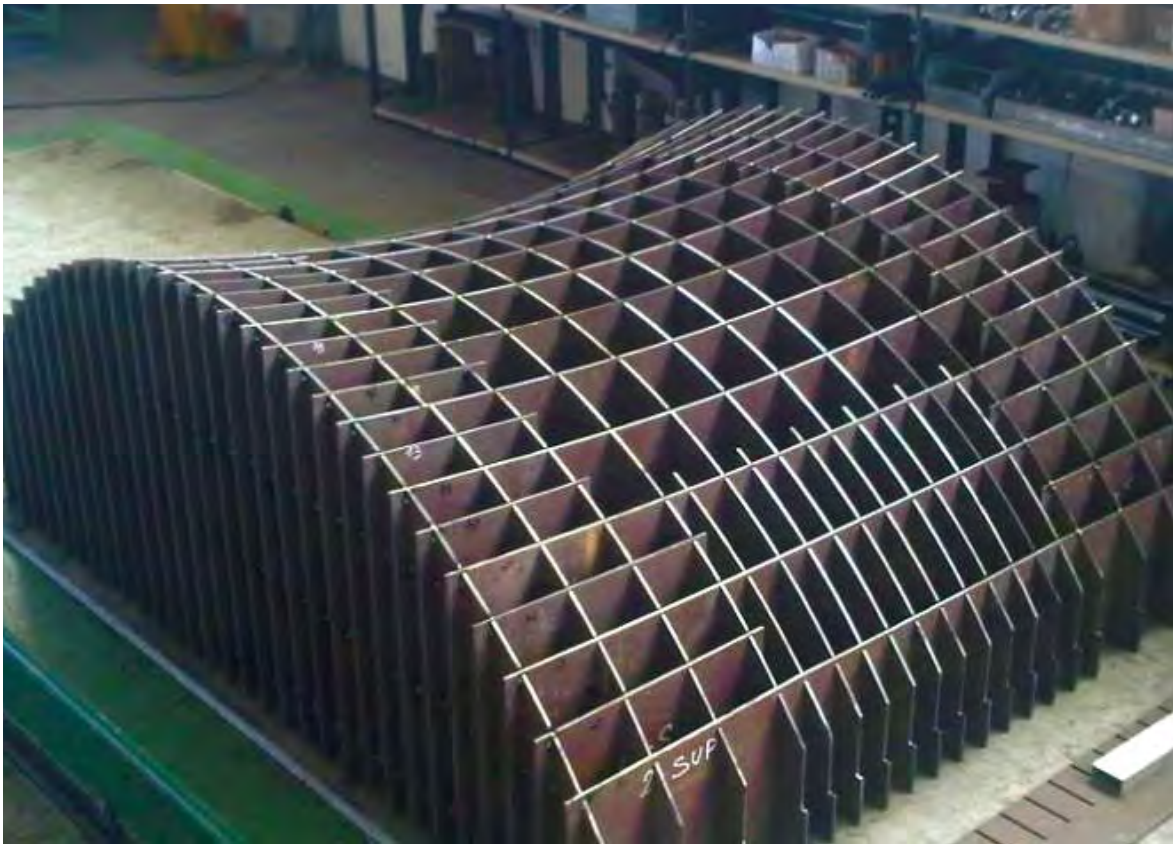


Fig. 9: Dies for hot forming tests for 60mm thick saddle-shaped VV plates

- Component design and analyses in support of the ITER IO in two areas:

  - Parametric studies (OPE-093), including thermo-mechanical analyses for the optimisation of the FW finger concept;

  - Design and analyses of the FW panel of M6 Modules (OPE-017-01-01-07) under an ITA and to be procured later by F4E.

- Second phase of the FW qualification programme to prepare for their procurement. The call for tender (OPE-097) for the semi-prototype manufacturing and the call for proposals (GRT-154) for the related high heat flux (HHF) testing activities were issued.

Divertor Components

The signature of the Inner Vertical Target (IVT) PA was an important step forward and associated achievements may be grouped into three areas:

- Continuation of the European industry pre-qualification activities on the use of alternative armour materials grades: awarding of contracts (GRT-036) to complete the characterisation of an alternative Carbon Fibre Composite (CFC) material and the manufacture of mock-ups with the above-mentioned CFC armour material (OPE-096).

- R&D for the divertor IVT. The activities included the awarding of a contract for the manufacturing of full tungsten monoblock mock-ups and prototypes (OPE-073). Other activities including the follow-up of contracts for thermal fatigue testing of high heat flux mock ups and prototypes (GRT-005 and OPE-012) and for the microstructural characterisation of tested armour-heat-sink joints (GRT-025) (Fig. 7).

- Start of the activities foreseen in the frame of the IVT PA, including the awarding of a contract for the manufacture of a CFC prototypical batch (OPE-91) and the preparation of a procurement contract for the manufacture of IVT full size prototypes (OPE-138).

The WP 2010 was implemented as foreseen with two exceptions: the contract for the manufacture of divertor mock-ups was delayed pending the completion of negotiations with the supplier about IPR issues; the second contract for the full size IVT prototypes was delayed due to design changes proposed by ITER IO after the signature of the PA. Nevertheless, the overall project is in line with the procurement schedules defined in the Project Plan.

Remote Handling

Important progress has been made to elaborate F4E's procurement strategy and define technical areas such as the Remote Handling Control System (architecture, interfaces and standardisation); the road map for selection and qualification of radiation tolerant components and the design of radiation tolerant multi-purpose electronic boards. Specific actions include:

Fig. 10: Manipulator on board the CMM in DTP2 (courtesy of TEKES-VTT-IHA)

Fig. 11: View of DTP2 control room (courtesy of TEKES-VTT-IHA)

- **Divertor RH**: completion of the first phase of the Divertor Remote Handling design and test activities at the DTP2 facility (GRT-001), and start up of a new Grant (GRT-143). The first remote handling test sequences on divertor cassette mock-ups have been successfully carried out and the water-hydraulic manipulator arm was integrated on board the cassette mover (CMM). On the design, new conceptual design activities were started (see Figs. 10 and 11).

- **Transfer Cask System** (aka CPRHS Cask and Plug Remote Handling System): first studies on cask trajectories, virtual reality, test facility and preparation of a second stage of activities under a grant (GRT-276); start of design activities on the Transfer Cask (OPE-017-03), start of studies on variants/alternatives to the CPRHS, preparation of the Conceptual Design of an Equatorial Port Plug Cask (OPE-017); start of irradiation studies on cask and divertor cassette movers (F4E-2009-EXP-032).

- **In-Vessel Viewing System** where actions included: (a) first design and test activities on the IVVS probe and of in-vessel mapping studies (GRT 015); (b) layout and mechanical analysis (OPE-07-02) of an IVVS plug; (c) electromagnetic analysis of an IVVS plug (OPE-06-01); (d) neutronic and gamma analysis of an IVVS plug (OPE-144); (e) design study on piezo-actuators for the IVVS probe (OPE-166).

- **Neutral Beam Remote Handling**: review of the existing NB RH technical documentation and interfaces (OPE-017-03), and start of conceptual design activities (GRT-051) for all NB RH subsystems, in liaison with the design activities of the other systems hosted in the NB cell and served by NB RH.

With respect to the WP 2010, some slippage of activities in the IVVS and NB RH areas occurred due to delayed input data from ITER IO and administrative issues for GRT-051. These delays impact to some degree the Project Plan implementation schedule but there is scope in the medium-long term to recover these delays.

Cryoplant and Fuel Cycle Systems

Cryoplant

In 2010, F4E focussed on preparing the "LN_2 and Auxiliary Systems of the Cryoplant" call for tender. The activities consisted of:

- Carrying out an extensive market survey of the industrial capability to optimise the scope of supply and set up a procurement strategy;

- Provision of assistance to ITER IO in the conceptual design of the cryoplant;

- Award of a contract (OPE-017-02-01-01) for assessing compressor technologies and selecting a cost-efficient LN_2 plant configuration;

- Preparation of two quotation requests for compressor technology validation (OPE-292) and 80 K loop configuration optimisation (OPE-017).

In this area the WP 2010 was implemented globally as planned, with some minor delays that had no impact on the overall schedule. The 2010 achievements are also in line with the Project Plan.

Cryopumps and Cryodistribution Lines

During 2010 major progress has been achieved in the completion of the design (GRT-018). All the design related R&D work is now complete and has resulted in:

- Experimental determination of the fluid resistances of the cryopanels and thermal shields (well within the ITER IO specifications);

- Estimation of the forces needed to guarantee the vacuum performance of the valve seal in the Torus and Cryostat cryopumps. Experimental results are well within the ITER IO specifications;

- The determination of the instrumentation needs for Cryopumps and Cold Valve Boxes.

Pre-Production Cryopump (PPC)

During 2010 the TIMO-2 facility (Fig. 13) has been upgraded (GRT-019) to be able to test the PPC and complete its design (GRT-018). Some technological issues remain open for the design of the pumps which will be addressed during PPC manufacturing and testing.

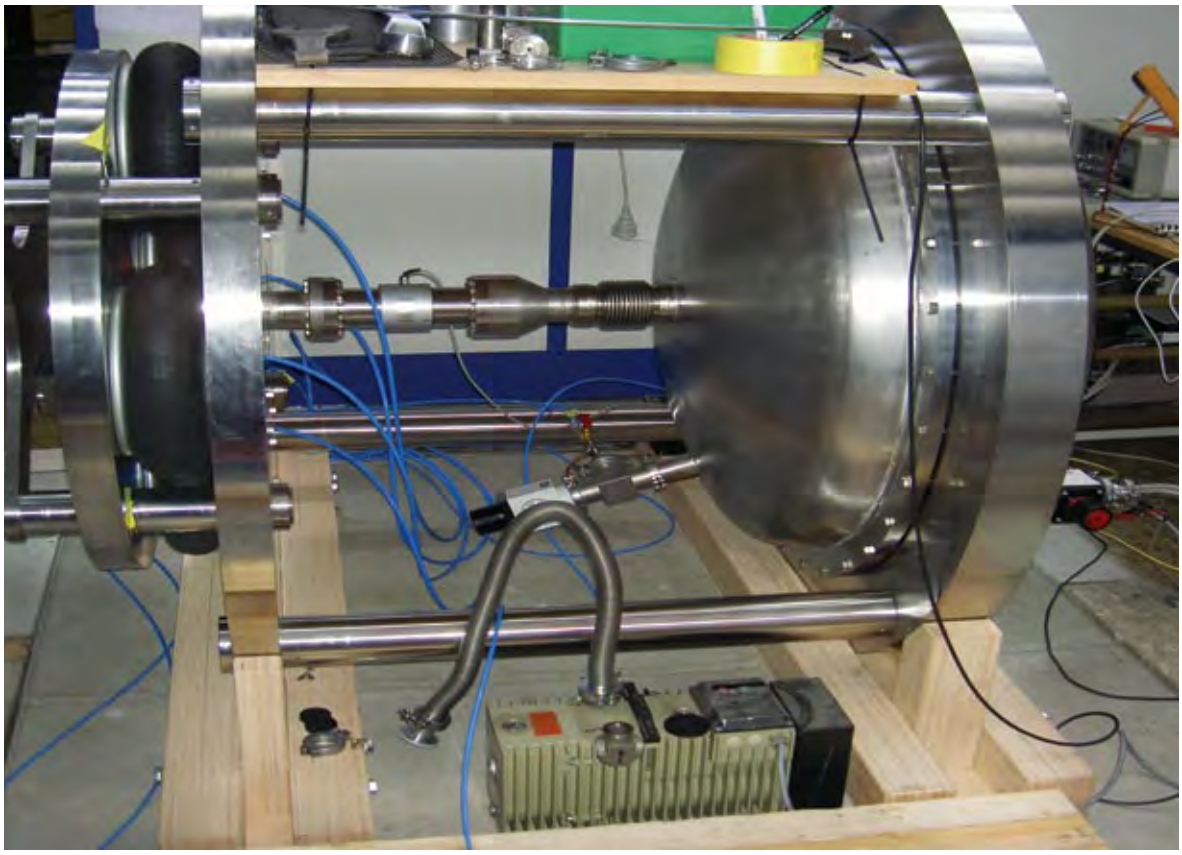


Fig. 12: Device used to determine the forces required to guarantee the performance of the integral vacuum valve seal of the ITER Torus and Cryostat cryopumps (courtesy of KIT)

Fig. 13: View of TIMO-2 Facility at KIT being upgraded to provide 4.35 K supercritical He for testing the ITER Torus Cryopumps (courtesy of KIT)

The WP 2010 and Project Plan have been implemented as foreseen albeit with some delays which may shift the early non-critical milestones. These delays are due to IPR issues, initial CAD exchange difficulties, cold leaks at TIMO-2 and it is expected that they can be recovered to a significant extent.

Tritium Plant

Water Detritiation System (WDS)

In 2010 the contract (OPE-017) covering the first phase of the conceptual design of the large tritiated water holding tanks was completed and the results were used as input to the grant (GRT-045) for:

- finalisation of the conceptual design of the entire WDS (tanks plus Liquid Phase Catalytic Exchange (LPCE) columns);
- detailed design of the tritiated water holding tanks;
- R&D needed to finalise the detailed design of the entire WDS.

Isotope Separation System (ISS)

The assessment of the 2001 ISS Baseline (GRT-046) and the experimental campaign to characterise the liquid hydrogen/tritium hold-ups in the ISS cryo-distillation columns (GRT-023) were completed and showed that the hydrogen/tritium inventories in ISS are larger than previously predicted.

Fig. 14: Insertion of Sulzer packing into the cryo-distillation column (courtesy of KIT)

Fig. 15: Typical assembly of the cryo-distillation system inside the cold-box (courtesy of KIT)

Overall, actions associated with the Tritium Plant were implemented in line with the objectives described in WP 2010 and Project Plan. However, two activities related to the detailed design of WDS and ISS were moved to 2011 due to changes in project priorities and in finalising ITAs.

Wave Heating Systems

Electron Cyclotron (EC) Upper Launcher

In 2010, F4E has concluded an ITA with ITER IO for providing European support to complete the final design of the EC Upper Launchers which is a Built-to-Print system. Significant effort was devoted to meeting the requisite high quality and nuclear safety standards and stabilising the requirements of ITER IO. The ITA provides the basis for a grant (GRT-161) which was launched in 2010.

F4E has been preparing in collaboration with ITER IO the technical requirements for prototype and testing actions in support of the PA preparation. Testing activity on the diamond windows started in 2010

Fig. 16: Window assembly fabricated as part of the contract (OPE-140) with KIT (Germany)

(OPE-140) to prepare for the manufacture and testing of an improved high power window design (Fig. 16). There is a delay in the implementation compared to WP 2010 and the Project Plan due to the re-schedule by ITER IO of the PA signature and delivery dates for the launchers.

Electron Cyclotron RF Sources and Power Supplies

In the frame of the grant agreements and contracts (GRT-08 and GRT-049), progress has been made in the understanding of the performance limiting factors of the European gyrotron and design improvements. The gyrotron is being refurbished (OPE-09) for an assessment in 2011 of the 2MW development (Fig. 17). A similar configuration was already experimentally validated at KIT and good results were obtained: 2.3MW of RF output power, 31% of efficiency without depressed collector, >96% of Gaussian content of the output beam.

All grant agreements and contracts foreseen in the WP 2010, related to the preparation, upgrading and testing of the EU gyrotron for ITER, and to the analysis of design issues for ITER (GRT-034 and GRT-0948), have been signed and work has started.

Fig. 17: Refurbished gyrotron prototype for ITER (from left to right): view of the coaxial gun (improved design), view of the beam tunnel internal structure designed to suppress parasitic oscillations, view of the upper part of the new high efficiency launcher.

Ion Cyclotron Heating

Development of the detailed design of the Ion Cyclotron Heating (ICH) antenna started under GRT-026 and included the preparation of the ITER Conceptual Design Review (CDR). The mechanical design of the antenna advanced in particular for the removable vacuum transmission line and solutions to supply services to antenna systems. The antenna performance was evaluated under a range of conditions. The electrical design progressed with grounding and arc detection studies. The disruption response of two different schemes for grounding of the antenna to the blanket was analysed.

One CDR issue concerned the RF window material and its qualification. During 2010 the work for CHITS resolution led to the decision to change the window material from Beryllia to Alumina and to modify the qualification requirements, in particular, the maximum thermal load on the Faraday Screen (from 2-5 MW/m^2). However, the detailed load specifications for the Faraday Screen, required to start the design of this component under GRT-026 were not provided on time by ITER IO. As a consequence, the F4E activity covered by the ITAs to qualify the window and Faraday Screen design was postponed to 2011 and is now on the critical path for the PA signature milestone. The remainder of the activities are in line with the Project Plan.

Neutral Beam Heating

F4E is in charge of the in-kind contributions related to six Neutral Beam (NB) Procurement Packages, which include beam sources, beam line components, confinement and shielding, coils, power supplies and assembly. The seventh major PA includes the European procurements for the establishment of the Neutral Beam Test Facility (NBTF) in Padua, Italy.

In 2010 F4E continued to provide support to ITER IO to prepare the NB technical specifications at the required level of detail. This support included most of the design and R&D activities related to the NB system and the design and the establishment of the NBTF. In particular:

- Conclusion of the PA with ITER IO for the European procurements associated with a full scale NBTF;
- Completion of the final design review of the Beam Source and Vacuum Vessel, the most crucial components of SPIDER - one of the two main NBTF test-beds (Fig. 18);
- Award of the first procurement contract for the power supplies of the SPIDER ion source (OPE-046) and the launching of the calls for tender for

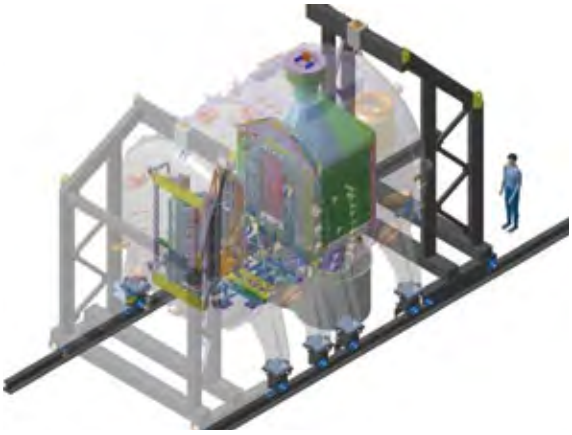


Fig. 18: SPIDER Vacuum Vessel and Beam Source, with supporting structure. Also represented the Calorimeter supplied by the IN-DA.

the NBTF cooling system and the SPIDER High Voltage Deck and Transmission line (OPE-141 and OPE-325);

- Launching of the procurement procedure for the SPIDER Beam Source and Vacuum Vessel and competitive dialogue for the 1 MV HV Deck and Bushing of MITICA - the second test bed at the NBTF (OPE-083);

- Preparatory and operational activities of the Test Facility ELISE in IPP-Garching (OPE-32) progressed. In particular almost all the main components were procured.

Overall WP 2010 has been implemented as foreseen apart from some procurements which were postponed until 2011 mainly due to the late finalisation of specifications which depend upon the outcome of R&D activities. In addition, the time required for the overall establishment of the NBTF impacts in general on the progress of these activities.

Diagnostics

Two grant agreements (GRT-024 and GRT-156) were awarded for urgent R&D and design activities identified in WP 2010. Six European fusion research laboratories are beneficiaries of the grants. These grants cover:

- pre-conceptual design integration of 8 diagnostics into equatorial port plug 1 (probably the most complex diagnostic port plug on ITER);

- engineering analysis and design of a 'generic' radiation shielding module for the equatorial port plugs;

- development of detailed designs for micromechanical magnetometers, part of the Magnetics Diagnostic, to measure the steady-state magnetic field outside the tokamak vessel.

Under ongoing grants, significant progress has been made on a number of fronts, in particular:

- Key aspects of the Magnetics Diagnostic system-level design (i.e. addressing the functional aspects relative to requirements and design basis of the whole diagnostic) have been developed (GRT-047);

- Prototypes of the outer vessel discrete and external Rogowski coils (Fig. 19), which will be the first diagnostic components to be supplied by F4E to ITER, have been manufactured and a testing plan defined (GRT-012);

- A conceptual design for the Diagnostics equatorial port plug structures has also been completed to conceptual level (GRT-024), together with associated engineering analyses, and favourably evaluated at an ITER IO Conceptual Design Review.

Discussions with ITER IO to conclude a schedule for a PA covering the European Diagnostics in-kind contributions did not reach a conclusion in 2010 and signature is now expected in autumn 2011, around nine months later than indicated in the Project Plan. As a result, many of activities originally envisaged for the WP 2010 have necessarily been transferred to the WP 2011.

Fig. 19: First prototypes of magnetic sensors have been produced in 2010. These include the outer-vessel discrete coils (left) and continuous external Rogowski coil (which will be mounted inside several of the main TF coils)

Site, Buildings and Power Supplies

Site and Buildings

In May 2010, ITER IO and F4E signed the PA on construction (PA 6.2.P2.EU.05), for a credit of about 350 kIUA, the largest of its kind. The PA deals with F4E management of the construction worksite, the interaction between F4E and ITER IO during construction, handover and follow-up. In July 2010, after the site clearance and the levelling work was completed, ITER IO handed over the ITER platform to F4E and authorised F4E to start construction.

In 2010, several important contracts were awarded and related activities started:

- The contract for the Design and Construction of the PF coils buildings contract (OPE-026) started in January 2010, and by August 2010, after six months of studies, the construction work started following the granting of the construction permit. By end-2010 the earthworks and related site preparation work was close to finalisation;

- The Tokamak pit excavation and support structure contract (OPE-095) provides for excavation of the time-critical buildings, in advance with respect of the final design date of the complex. The excavation work started in August and at the end of December the final rock profile was being executed following the excavation of around 200 000 m^3 of rock using blasting technologies;

- The contract for the 493 Anti Seismic Bearings contract (OPE-065) (bearings able to mitigate seismic effects on the Tokamak building) started in July. This contract is on the critical path for the nuclear buildings meaning that delays in this contract delay the overall schedule for the buildings. Prototype tests started and the production of the first bearings will start in New Year 2011;

- Architectural and Engineering Services contract (OPE-058), covering the preparation of the detailed design of all the buildings (based on the Final Functional Requirements), the tendering support, and the work supervision;

- After the contract signature in April, the Architect Engineer delivered the Preliminary Design of all the ITER buildings in September which was later reviewed by the Legal Inspection Services. This design takes into account the safety requirements of the Preliminary Safety Report. In parallel, the Architect Engineer started the Tender Design in order to be able to launch the call for tenders for the Tokamak building;

Fig. 20: Architectural view of the ITER Building (courtesy of the Engage Consortium)

Fig. 21: PF coil building progress December 2010 (courtesy of Altivue)

Fig. 22: General view of the ITER Site December 2010 (courtesy of Altivue)

- Global Insurance contract (OPE-302), covering all design activities and construction works;

- Support to the Owner contract (OPE-090), to support F4E in their day by day follow-up of contracts, studies and construction activities;

- Health and Safety Coordination and support in legal inspections contract (OPE-025), related to F4E responsibility (general rules compliance and follow-up).

By end-2010, almost 300 people were employed in the on-site excavation and construction activities. Health and Safety management of the on-site activities is of paramount importance and no major injuries were recorded. In 2010 the F4E Site and Building team moved to new offices.

Overall the Site, Buildings and Power Supplies activities were implemented as foreseen in the WP 2010 and in accordance with the Project Plan.

Power Supplies

In 2010 activities focused on the preparation for the procurement of the Pulsed Power electrical network and the Steady State electrical network, in particular:

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

- Qualification of components with respect of operation under magnetic fields (contracted experts);

- Refinement of costs and schedule analysis.

Other Systems

Waste Management and Storage

Activities during 2010 focused on the clarification of the scope, cost and schedule of the Radioactive Waste (Rad-waste) management system. ITER IO and F4E signed the first ITA in this area, whose main objective is the treatment and characterisation processes optimisation.

ITER IO and F4E agreed that urgent action was necessary so that the layout of the Rad-waste Building meet both the safety and process requirements. Following a F4E proposal, a Task Force has been set up to deal with this activity trying to minimise the impact on the building construction schedule. The ad-hoc Task Force will complete its mission by Q2/2011.

Radiological Protection

During 2010 F4E and ITER IO began collaborating on the development of the Radiological and Environmental Monitoring Systems (REMS). A first ITA to support ITER IO during the conceptual design phase has been signed in October. The following related tasks have been started:

- “Trade & Alternative Analysis”, to identify and assess the most balanced technical solutions to satisfy REMS requirements;

- “Collection of Engineering Data”, to define fire, heat, electrical loads for REMS components and equipment.

Test Blanket Modules (TBM)

The development of the European TBM Systems Conceptual Design (GRT-09) has made significant progress in 2010, resulting in the delivery of the first version of Design Description Documents (DDD) for most of the sub-systems and resolution of the key technical interfaces with ITER.

The upgrade of the DIADEMO Helium/PbLi European facility has been achieved, thus successfully closing the activities started with a grant in 2008 (GRT-06). This facility will be used for testing in a PbLi environment the key components of one of the TBM concept.

The impact of the TBM ferromagnetic structures on the ITER magnetic field ripple and the possible mitigation measures have been studied (GRT-037). Other activities in the area of development/ characterisation of TBM functional materials have progressed satisfactorily (GRT-030).

In 2010 three grants were awarded for tritium cycle modelling capabilities (GRT-254), construction of an experimental apparatus for the qualification of H/D properties in eutectic PbLi (GRT-041) and the upgrade of the European Breeder Blanket Test Facility (GRT-044) for future testing of TBM mock-ups.

In addition, two service contracts awarded in 2010 for the consolidation of interfaces with ITER machine in the area of neutron shielding and safety (OPE-02.01 and OPE-017).

Technical Support Activities

Materials Development

In 2010 activities in the area of materials development mainly focused on the EUROFER data-base, which was updated and upgraded (GRT-010) Data for the final engineering design analysis were made available

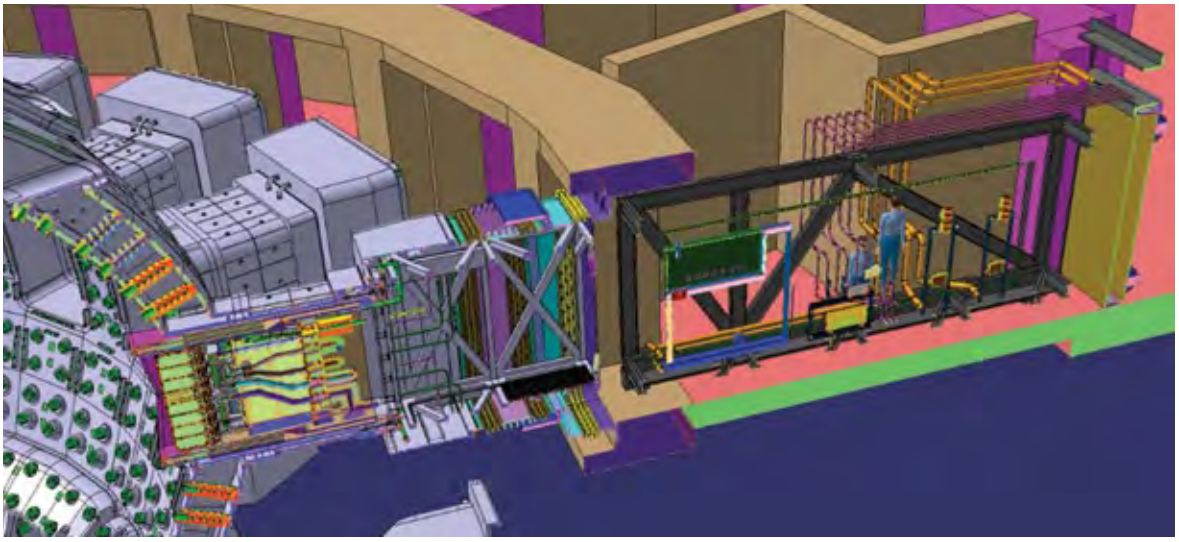


Fig. 23: European Test Blanket Modules Systems (TBS) in ITER equatorial port and port cell (courtesy of European TBM Consortium of Associates)

and technical and legal basis to make of EUROFER in a near future a code-qualified material were set-up. The analyses of the database set also the basis for the identification and prioritisation of EUROFER characterisation needs.

Leak Detection & Leak Localisation

A R&D programme is being carried out by ITER IO to define the leak detection and localisation system in advance of the PA. F4E has been supporting this programme by identifying efficient strategies, concepts and tools and a grant (GRT-158) was started in accordance with WP 2010.

Plasma Engineering

F4E activities are mostly carried out on the basis of "competed" ITER Task Agreements (ITAs), i.e. ITAs awarded as the result of competition between DAs. In 2010, F4E competed in six calls, and succeeded in all of them. These ITAs cover different areas of the ITER design:

- Four ITAs (C19TD45FE, C19TD46FE, C19TD47FE, C16TD52FE) deal with improving the estimate of ITER First Wall loads during normal and off-normal events. In particular, ITA C16TD52FE is for support in the engineering of the First Wall;
- ITA C19TD44FE deals with disruption studies (modelling for verification of electromagnetic loads on vessel and in-vessel components);
- ITA C19TD43FE is to support ITER in the upgrade of (EU) codes, required for the divertor design.

To implement ITAs F4E has awarded two grants (GRT-055, GRT-255) and two procurement contracts (OPE-148, OPE-258) involving several European fusion laboratories as beneficiaries (CEA, ENEA, FzJ Jülich, CCFE, Austrian Association, CRPP and IPP).

Other activities in the area of plasma engineering in 2010 included:

- Studies of the impact on machine operation and plasma control of the power supplies following their re-rating by ITER IO;
- Detailed review of the plasma breakdown strategy in ITER in connection with the previous bullet;
- Providing inputs on the plasma scenarios for the evaluation of the thermal loads on the magnet cryogenic system.

Some activities foreseen in WP 2010 were cancelled because the related ITAs were not issued by ITER IO and other activities were postponed due budget constraints of ITER IO. In general, the WP implementation for plasma engineering activities is dependent on ITAs being issued as foreseen by ITER IO.

Safety and Licensing

Important issues related to the future ITER licensing were addressed through R&D activities which are included in the R&D plan outlined in the ITER Preliminary Safety Report (RPrS) for the in-vessel dust and tritium management.

In 2010, three contracts on diagnostics for in-vessel dust inventory measurement were launched (F4E-GRT-50 Tasks 1-3) together with the contract (F4E-OPE-80) in support to ITER strategy for in-vessel tritium inventory control. The safety assessment of EU-TBMs based on design evolution (F4E-GRT-31) has been concluded.

Some activities including the grant for prevention and mitigation of in-vessel hydrogen/dust explosion – phase II envisaged in WP 2010 have not been implemented since ITER IO decided to postpone

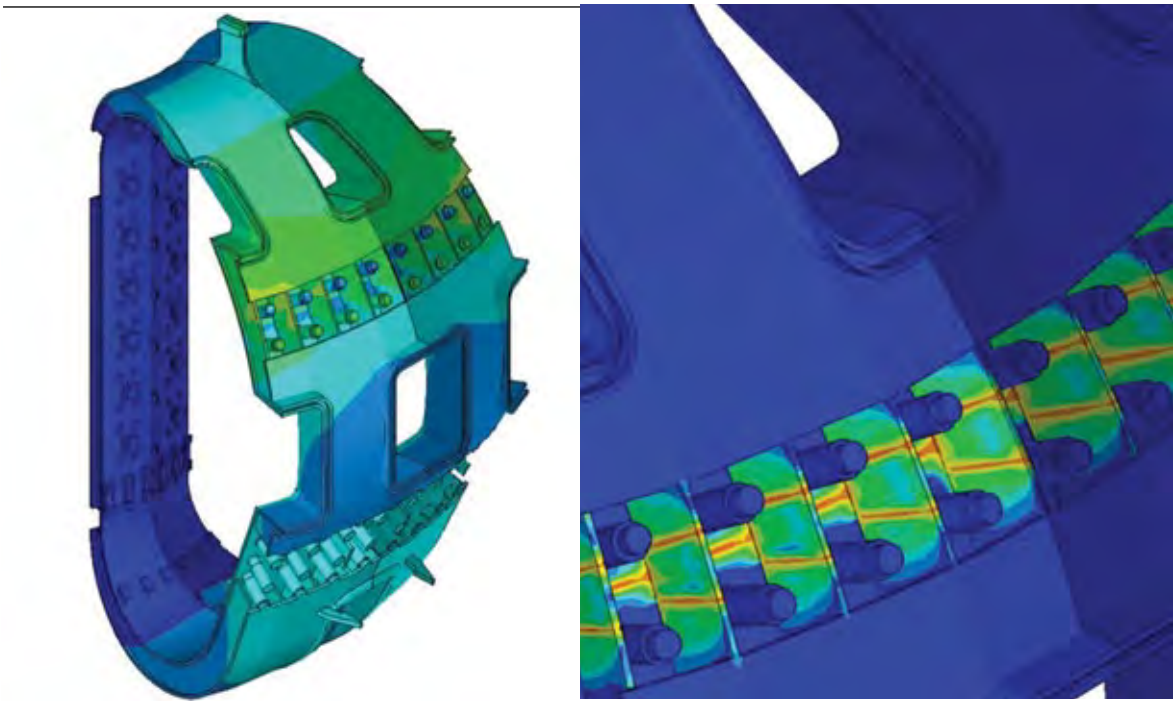


Fig. 24: Stress analysis of the Vacuum Vessel (left) and close-up (right)

those activities. Some others were cancelled as ITER IO decided to deal with this activity through a direct contract.

Analysis and Codes

Actions in this area focussed upon supporting the ITER design development and in kind procurement contracts. The analysis work is mostly implemented via the awarding of service contracts.

Within the four existing Analysis Framework Contracts (FC) which are related to mechanical (OPE-07), electromagnetic (OPE-06), neutronic (OPE-02) and civil engineering analysis (OPE-11), 16 Task Orders were placed in 2010. Moreover, 11 other Task Orders were placed and followed up as part of the more general engineering support Framework Contracts (OPE-017).

Support was provided for the preparation and management of the Architect Engineer contract in the field of structural design, analysis and expertise. Analysis task orders were also placed to support the Vacuum Vessel supplier, ITER IO and the ANB (preparation of the VV nuclear stress report, justification of deviation requests, etc). Additional actions include:

- The FC (OPE-031) for thermo-hydraulic studies (heat exchange in forced flow (1st lot) and more general fluid-dynamics calculations (2nd lot)) was awarded;
- Award of the nuclear data grant (GRT-056) to validate nuclear data libraries as well as to develop measurement techniques necessary for ITER;
- Two service contracts were signed to follow up the construction by a team of resident inspectors (OPE-085) and for specific neutronic studies (OPE-144);
- Participation in the international review of the Structural Design Criteria for In-Vessel Components. A service contract (OPE-033) was awarded for this purpose.

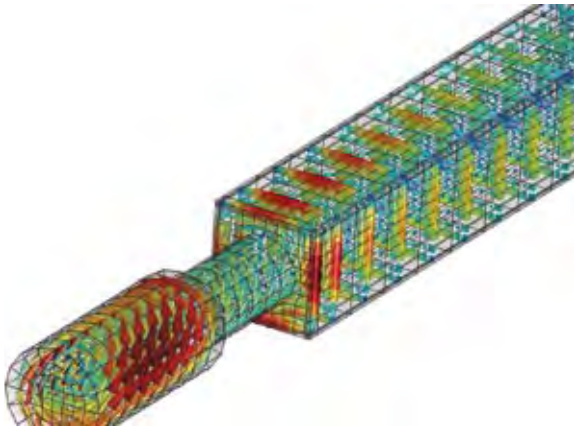


Fig. 25: Simulation of the Eddy currents in the IVVS system

Materials and Fabrication

During 2010 activities in this area included irradiation campaigns, thermal fatigue testing, assessment of corrosion parameters, assessment of materials data, non destructive testing, mechanical and physical characterisation of materials and joints.

Two ITAs were signed (ITA C16TD150FE and ITA C16TD159FE) for material qualification and assessment of materials data. Four grants were awarded to characterise In-Vessel materials (GRT-036, GRT-038, GRT-043 and GRT-243). The framework contract (OPE-084) was signed to support the characterisation of magnets materials.

Some tasks from WP 2010 were deferred to 2011 and these included: OPE-149, OPE-167, OPE-244 and GRT-268.

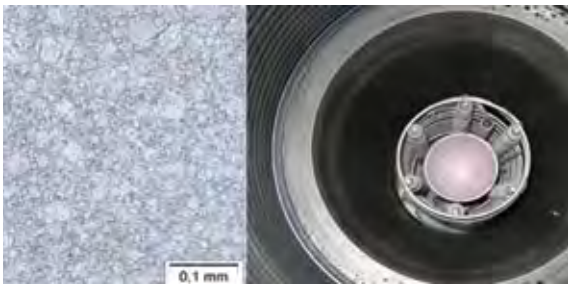


Fig. 26: SEM image of CuCrZr through Powder Metallurgy Hot Isostastic Pressing and the HIP facility at CEA Grenoble

Instrumentation and Control - CODAC

In this area, the preparatory work for a first I&C Engineering Services framework contract was completed: the contract is expected to be awarded during the third trimester of 2011.

Some actions aiming at cost reduction were started. Among them an agreement reached with ITER IO on the scope of those I&C activities that could be transferred to a single integrator.

Agreement was also reached between ITER IO and F4E to jointly look for the best way to manage cable procurement for the whole ITER. Work to define technical requirements, management and financial mechanisms was initiated.

Project Management and Schedule Activities

During 2010 F4E has carried out extensive activities covering multiple areas such as scheduling, configuration control, quality assurance and project management, including risk and monitoring tasks.

In view of the agreement reached in July 2010 for the ITER Baseline, scheduling studies were completed, including the analysis of possible manufacturing paths, to confirm that first plasma in November 2019 is achievable under the given assumptions and that the associated risk is limited.

Contributions to the overall risk analysis for schedule uncertainties and event risks carried out by ITER IO were prepared and an assessment of the technical risk was carried out and reported in the F4E Project Plan which is also provided in Annex III of this Report.

Support to ITER IO was also given in the identification of areas where cost reduction could be achieved and also cost containment actions were also defined.

Work on export control has progressed and an analysis of the components to be procured was carried out to identify possible items that will have to abide such rules. Preliminary contacts were made with the Spanish authorities and procedures are being defined in collaboration with ITER IO.

In the area of Quality Assurance (QA), quality officers have provided support to the in-kind procurement and to the R&D activities to make sure that the work is carried out according to the quality standards required by the project. Audits have also been carried out in both laboratories and industries.

A call was launched for the services of quality inspectors and the framework contract for this activity will be in place in 2011 to allow a better control of the manufacturing.

After an agreement at ITER Council level to have a framework contract at ITER project level manage components transportation with associated insurance and logistic organisation, a joint procurement between ITER IO and F4E was launched in this area.

Broader Approach

Each of the Broader Approach (BA) projects is subdivided into several work packages, assigned to the Europe or Japan, and detailed, for technical and management aspects, in the 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.

EU Contributions to the Satellite Tokamak Programme

The design of the Satellite Tokamak (JT-60SA) has reached a mature and stable status, this is described and managed in detailed in the Plant Integration Document (PID) and in a number of presentations and articles. In particular, the overall design of the TF magnets, based on innovative concepts in terms of gravity supports (GS) and structures to contain out-of-plane forces (OIS), has been completed. On this basis the TF magnet PA was signed in July 2010.

The detailed technical specifications for coils were prepared by F4E in collaboration with the EU Voluntary Contributors (CEA for France and ENEA for Italy, each committed to the procurement in-kind of 9 TF coils). On this basis CEA and ENEA launched the corresponding procurement tenders. The design of the OIS and GS has been reviewed at the end of 2010. The technical specification of the TF coils casing (to be procured by ENEA for Italy) was also issued in July 2010.

In parallel F4E proceeded with strand and cable contracts. The contracts for the superconducting and copper strands and for the TF coils conductor have been signed in December 2010.

The TF coils are foreseen to be tested prior to the shipment to Japan. For this purpose the creation of a specific facility (the TF Coil Test Facility) is underway, to which France, Italy and Belgium are committed to contribute. Following an internal review CEA decided to set up the test facility in Saclay and use partly existing facilities. Studies and a cryogenic test confirmed that the existing helium refrigerator is suitable and needs only minor adaptation. Supplementary tests at CEA Grenoble have verified the use of a cryogenic pump to circulate the helium. The Belgian contributor has started manufacture of the large cryostat vessel which will hold a TF coil and provide the insulating environment. Re-discussion of the share of work on the test facility has delayed conclusion of the PA for TF coil testing.

Design and construction of the High-Tc-Superconducting (HTS) current leads is continuing according to schedule. The layout of both types of current leads was completed and the main interfaces are agreed with JAEA. About 50% of the High-Tc superconductor material has already been delivered. Two prototype current leads for the W7-X project have been tested successfully and confirmed the expected performance. Since the JT-60SA current leads operate at 20 kA, the W7-X current lead design can be used with only minor modifications of the interfaces. In 2011 the cold and warm connections of the current leads to the feeders shall be designed in detail.

The European contributions for the JT-60SA Power Supply (PS) system include the Base PSs for the Toroidal Field Magnet, the CS and TF coils (Superconducting Magnet Power Supplies - SCMPS), the Switching Network Units (SNUs) for CS1-4 modules to provide the requested voltage for plasma breakdown, Quench Protection Circuits (QPCs) for all superconducting coils, PS for In-Vessel coils for Fast Plasma Position Control (FPPC), and PS system for the In-vessel Sector Coils (SC) for Resistive Wall Mode (RWM) Control.

In 2010, the general layout for all the components to be procured by F4E for JT-60SA has been agreed

Fig. 27: The dedicated test loop HELIOS (courtesy of CEA / SBT Grenoble)

with JAEA together with the related interfaces and the requests for auxiliaries. The general scheme and characteristics of the JT-60SA PS Control System have been defined together with the integration with it of the European PS (operation modes, preliminary list of signals to be exchanged and hardware interface main features).

An in-depth analysis of fault to ground conditions in the TFC circuit has been performed, using different codes and including the detailed electrical model of the coils, to define the values of the different grounding resistors in the circuit.

Specifically, for the Quench Protection Circuit, the analyses of the JT-60SA poloidal circuit operation in case of plasma disruption and fault conditions have been reviewed allowing identification of the maximum over-currents to be sustained by the circuit components including QPC. The conceptual design based on a hybrid circuit breaker (mechanical by-pass switch connected in parallel to a static circuit breaker) was further studied and assessed, also by means of experimental tests performed at Consorzio RFX laboratories. During the first semester of 2010, the detailed technical specifications for procurement were assessed and completed together with all the needed documentation for procurement call for tender and QA management. The contract was awarded in December 2010 and the contractual activities started with the kick-off meeting held in December 2010.

For the Switching Network Units, during the year 2010 the technical specification for the call for tender for the procurement contract has been finalised, together with more detailed technical analyses mainly regarding the hybrid (mechanical by-pass and static switch) switch design and the control sequences. The related PA between F4E and JAEA has been signed on 28 December 2010.

For the SCMPS, the procurement is shared by CEA (TFC PS and EF2-5 PSs) and ENEA (CS1-4 PS, EF1 and EF6 PSs, FPPC PSs). During 2010, the technical specifications for the procurement contracts have been agreed together with a number of more detailed analyses (fault conditions and protection, converter control, testing procedures and safety conditions). The related PA between F4E and JAEA is to be signed at the beginning of 2011.

In 2010, a joint activity was performed by JAEA and Consorzio RFX with the scope to define the RWM control system, considering both external and internal sector coils (SCs).

The procurement of the cryostat for JT60SA is now subdivided in four PAs: Cryostat base (EU), the Cryostat Vessel Body (EU), the Cryostat Lid (JA) and the material for Cryostat Vessel Body (JA). All the EU contribution is provided by Spain through CIEMAT. The Cryostat Base PA entered into force on 7 December 2009. CIEMAT awarded the contract for the construction of the Cryostat Base which has been signed by Felguera Costrucciones Mecanicas (FCM) on 1 July 2010. The contract kick-off meeting was held in July, 2010. FCM immediately ordered the long-lead stainless steel plates and started detailed design, fabrication process definition and qualification trials, but suddenly communicated the decision of FCM management to restructure the Oviedo plant and to transfer the fabrication of the Cryostat Base to another company. From late 2010 to early 2011, the negotiations with a replacement company were completed and the signature of a new contract with CIEMAT is foreseen by mid-March 2011.

As for the Cryostat Vessel Body, the first draft of the Technical Specification for CVB structure has been prepared and reviewed in December 2010. The 3-D Configuration Model is ready together with about 70% of detailed specification's drawings. The design of the cryostat port flange was developed. The flange has a double seal structure with Helicoflex and rubber O-ring to minimise the risk of vacuum failure. Fabrication tolerance and metrology point was discussed based on the requirements of technical and assembly aspects.

The structural analyses (static elastic analyses, buckling analysis and non-linear limit analysis) have allowed the verification of the CVB, according to ASME VIII, for all reference loading combinations. Additional analyses are still ongoing, for aspects related to verification of vacuum welds to be performed on site.

The detail specification of the cryostat vessel body material (AISI 304 with less that 0.05% wt content of Cobalt), which shall be procured by JAEA, was almost finalised. Minor adjustment of the plate size is needed after the completion of the structural analysis.

Technical and procurement preparation activities for the Cryogenic System have proceeded in 2010. Design work in 2010 has focused on the updating of the heat loads and the pressure drop requirements at the interface between the cryogenic system and the helium distribution system. Contingencies for the refrigeration capacities have been proposed based on Monte Carlo simulations and have been agreed with JAEA. All interfaces between the Cryogenic System and the JAEA facilities have been agreed. Utility requirements were fixed. The technical specification for the call for tender has been drafted. The call for tender will be published in spring 2011.

A dedicated test loop (HELIOS, see picture in Fig. 27) using a cryogenic pump and a liquid helium buffer has been set-up at CEA Grenoble to simulate the smoothing of the heat pulses which will occur during plasma pulses.

Fig. 28: Ion source and RF chain on HV platform

IFMIF/EVEDA Programme

With the Project Team reaching its full operational size, the quality management of the PAs has been brought up to maturity compliant with the progress in having the PAs for Engineering Validation tasks signed and the Engineering Design activities started. Given the increased certainty about the available man power and financial resources in the IFMIF/EVEDA, a rescoped Project Plan was worked out by all parties involved and agreed by the BA Steering Committee at its meeting on 15 December 2010 in Madrid. In essence, it reinforces the activities for the commissioning and initial operation of the accelerator prototype at the BA site in Rokkasho till 2017 and focuses the Engineering Design activities towards the production of an Engineering Design Report by end-2013 on the basis of a consistent Preliminary Design.

With regard to the accelerator prototype the construction of all its different components is progressing. The Injector is being assembled at its test stage at CEA Saclay (see Fig. 28) with the local control system development is in progress for the general Injector subsystem, which will allow the beam tests in the coming March allowing its delivery to Rokkasho in 2012.

The PAs for the all major subsystems of the accelerator prototype are now signed, including the ones for the RF Quadrupole and the High Power RF system. For the key elements of the RF quadrupole, i.e. the high precision modules, the tools necessary both for the internal construction and for the verification of the parts commissioned to industry have been proven. With the aluminum full size mock-up, the bead pulling measurements have been concluded, showing the validity of our tuning algorithms for such a long structure (see Fig. 29). As first components of the SRF Linac, two prototypes of the superconducting Half-Wave Resonators (HWR) were delivered to CEA in September and October 2010. One of these prototypes (P01) has been conditioned by chemical treatments and high pressure rinsing (see Fig. 30). The quality factor of this resonator, estimated from initial RF tests, is about 1.4×109 in fulfillment of the requirements.

The final design of the removable Back-Plate (BP) was agreed with JAEA together with the design of the frame of the Target assembly. By achieving the definition of a frozen design, the detailed thermo-mechanical analysis could be started as well as the procurement procedure of EUROFER for manufacturing the prototypes to be tested in the ELiTe (EVEDA Lithium Test) loop which has undergone successful installation by JAEA at Oarai.

For the High Flux Test Modules, being the key element in the Engineering Design and Validation of the Test Facilities, CFD analyses were performed based on a model with four compartments that include 12 rigs. It was proven, that the thermal requirements are met by the proposed design. In preparation of the single rig validation experiments, high temperature displacement sensors and strain gages allowing rig deformation measurements were qualified and the manufacturing of test sections, equipped for pressure profile measurements, was started.

For the validation of the High Flux Test Modules design in the horizontal (JAEA) and vertical design (KIT) in a typical reactor environment, providing the characteristic neutron and ionising radiation environment, 2-D thermal calculations for the rig final design to allow the irradiation at BR2 (SCK-CEN Mol) were completed.

The installation of the external parts to the irradiation rig and the instrumentation for both out-of-pile and in-pile systems were initiated by SCK-CEN allowing the start of the reactor irradiation experiment by

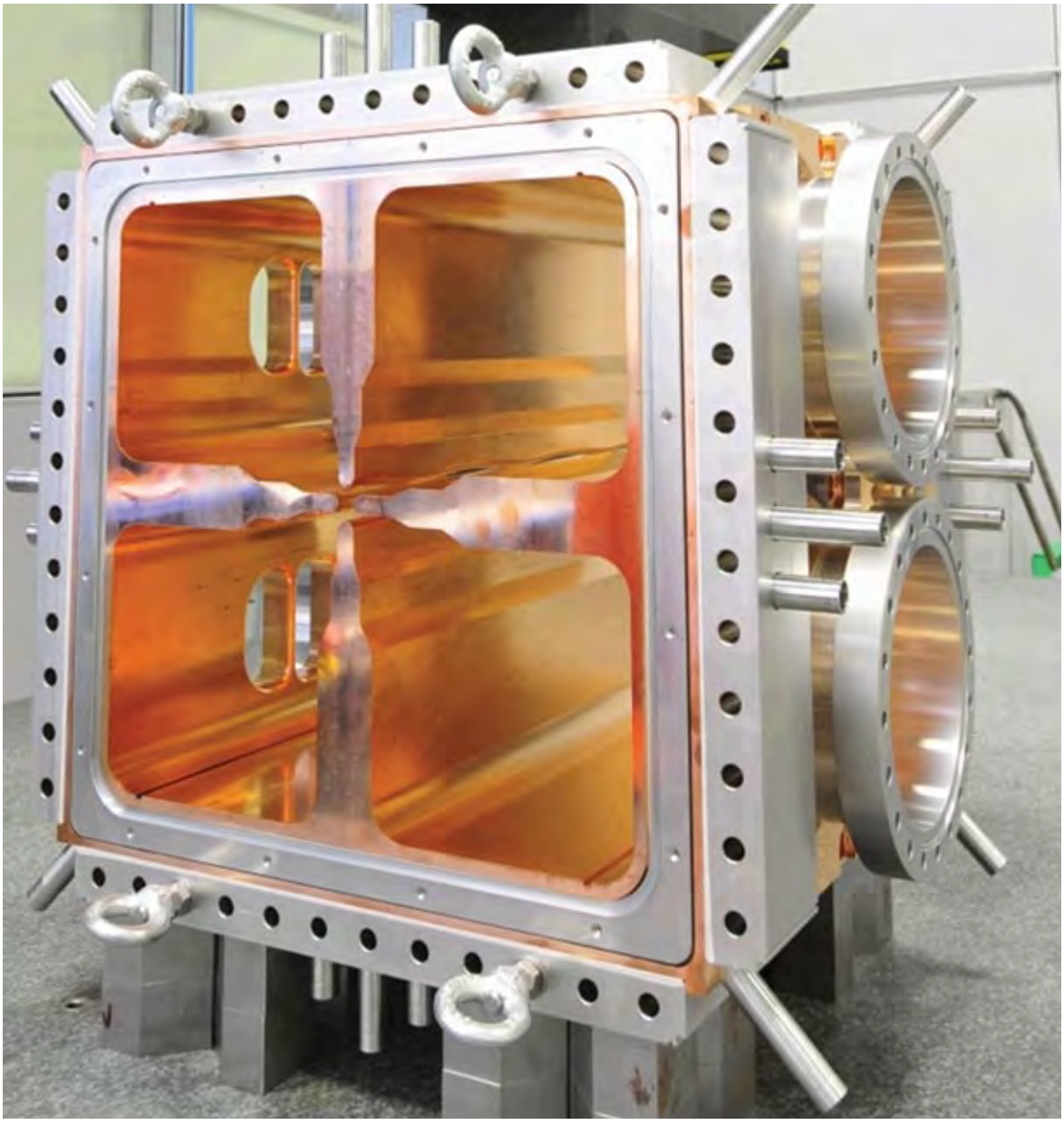


Fig. 29: Technological prototype of a half-module forming the building blocks of the RF Quadupole

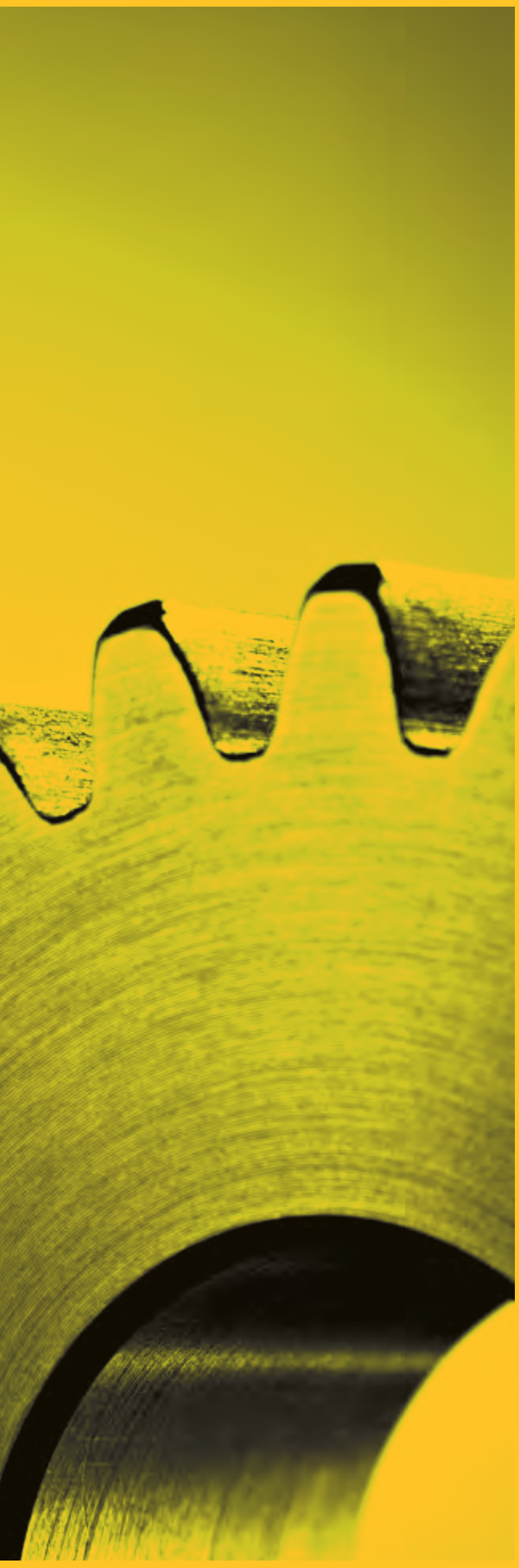
Fig. 30: High pressure rinsing of the Half-Wave Resonator prototype (P01) manufactured for the Superconducting RF Linac

summer 2011. Design work with participation of CIEMAT, CRPP, KIT, and SCK-CEN was conducted for a IFMIF Start-up Module, the Medium Flux Test Modules with the definition of a Creep Fatigue Test Module, a Tritium Release Test Module and a Liquid Breeder Validation Module as well as for a Low Flux Test Module.

IFERC Programme

In the IFERC Programme, the DEMO R&D activities in materials in the EU have been formalised in five PAs. Intensive preparations for the start of the joint activities in DEMO Design have culminated with the approval of the terms of reference for these activities, which will start in 2011, and will be performed in the EU in close collaboration with EFDA.

The Computer Simulation Centre activities have progressed in 2010 from the planning stage to the commercial procurement, with a final offers for the supercomputer (and operation and maintenance contracts) being submitted in December 2010, with very good results in the benchmark tests for computer performance. Work in the EU has focussed on the joint preparation of the operation period with JAEA. A second Special Working Group (SWG 2) was nominated by the BA Steering Committee in order to establish the user's rules for utilisation of the supercomputer centre before the start of operation, foreseen in early 2012.



Chapter 4

Administrative Activities

Contracts and Procurement

Procurement Activities

Procurement at F4E covers operational expenditure (i.e. those procurements which are associated with F4E's objectives) and administrative expenditure (i.e. those procurements supporting the internal working of the F4E). In addition F4E's places contracts with external expert and supports European participation in of calls for nomination issued by the ITER IO.

Operational Procurement

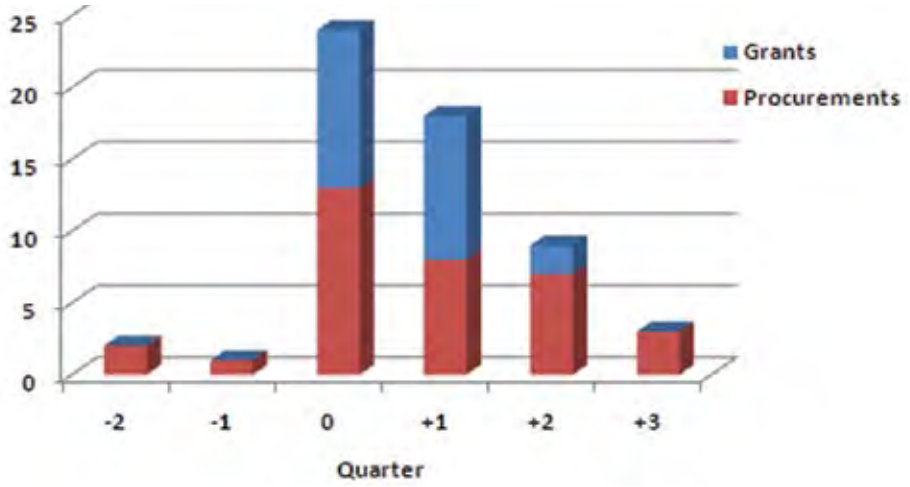
In 2010 the total volume (including options) of operational contracts awarded since the start of F4E's operation (2008-2010) was just short of EUR 1 billion, of which more than EUR 826 million was awarded in 2010 alone. Since the start of operations (in 2008) F4E has signed contracts or grant agreements with economic operators from 19 Member States and two Third Countries.

During 2010, a total of 42 operational procurement procedures were issued, 43 procurement evaluations were completed, 44 procurement contracts were awarded and 43 procurement contracts were signed. Major operational procurements were awarded in the area of Buildings, Magnets and Vacuum Vessel. In particular the Vacuum Vessel sectors contract is the largest single contract signed by F4E to date.

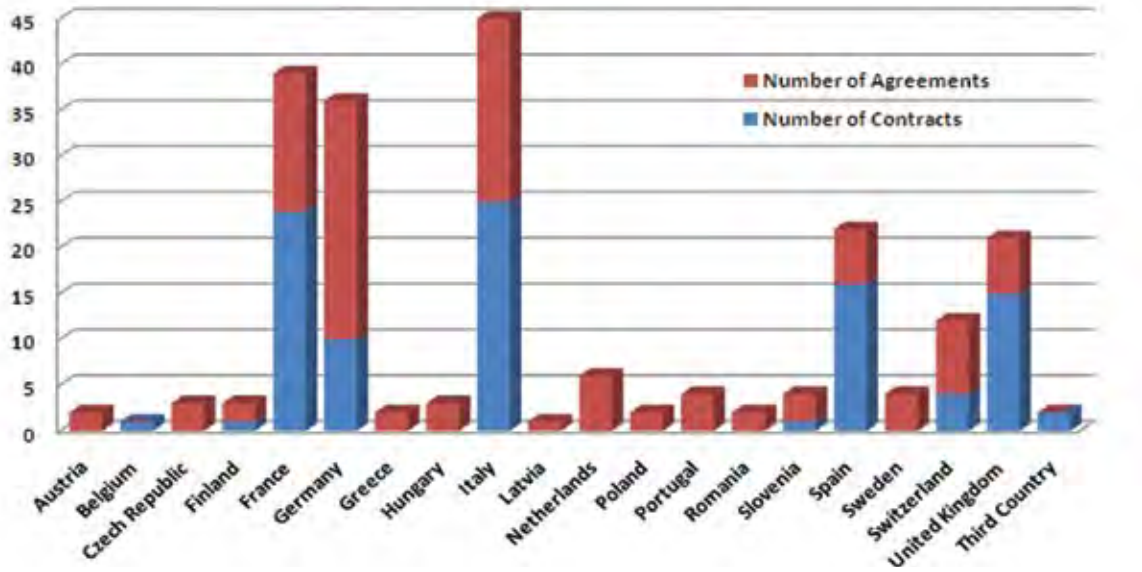
In addition, a significant number of less prominent but still significant contracts for ITER and Broader Approach were awarded and signed during the year: these ranged from the contract for the construction of the first operational building on ITER platform (the Poloidal Field Coils building), the Construction and Erection All Risk (CEAR) insurance and the cabling of the toroidal and poloidal conductors.

Implementation of grants for R&D activities continues to have a high strategic importance for Europe's capability to deliver its contribution to the ITER project and to positively exploit its scientific and technological results albeit a smaller activity in financial terms. During 2010, a total of 16 grant procedures were issued, 21 evaluations were completed, 23 agreements were awarded and 29 agreements were signed.

Eight operational procurement contracts with an awarded value above EUR 250 000 were negotiated in line with Article 100 of the Implementing Rules. In particular the negotiated procedures for the ITER Vacuum Vessel Sectors and for the Architect Engineer Services for ITER Buildings were notable in terms of complexity of the scope and related awarded value.



Time difference between planned and actual time of call for tender or call for proposal (in quarters, operational calls)



Geographical distribution of operational procurement contracts and grant agreements awarded by F4E during the period 2008-2010

For the procurements listed in Annex II, the average number of calendar days from the submission of the tender to the awarding of the contract by F4E was 71. For the grants listed in the same Annex, the average number of calendar days from the submission of the proposal to the awarding of the grant agreement by F4E was 117.

According to F4E Financial Regulations, the implementation of the WP 2009 was concluded during the year 2010. On 31 December 2010, all procurements and grants related to the final WP 2009 were signed. The implementation of the WP 2010 will continue throughout 2011 and will be concluded by 31 December 2011.

Administrative Procurement

Although less visible than operational procurement activities, F4E is also required to place administrative contracts in order to ensure its proper internal functioning and provide the necessary support to the projects. Among these are also Joint Procurement procedures with the European Commission and Service Level Agreements (SLA) with different EU bodies.

During 2010, a total of five administrative procurement procedures were issued, seven procurement contracts were awarded and six procurement contracts were signed. The contracts awarded include one for medical services which should speed up recruitment process, a four year framework contract for software and another for legal services.

Business Intelligence

In 2010 F4E's consolidated its interactions with industries and associations and four Industrial Liaison Officers (ILOs) meetings took place. These meetings have supported wide dissemination of information on on-going and future procurement needs for the fulfilment of Europe contribution to ITER.

Both directly and through the ILOs, F4E is building up strong relationships with European industries. An estimated 250 companies were met in 2010, either on face-to-face meeting or during plenary sessions where F4E had the opportunity to introduce F4E procurement activities and ways forward.

An increase in pre-procurement activities has taken place in 2010 and F4E has managed or contributed to the over 15 meetings, seminars and information sessions as part of the preparation of procurement activities in several areas.

A first series of nine mappings has been developed to describe European capabilities in view of forthcoming calls for tenders. This exercise is done using channels such as ILOs, F4E Industry Portal and meetings with industries.

In 2010 the F4E Industry & Associations Portal was launched with the aim of delivering dynamic information on F4E's procurement activity through its call workspace and its announcement section.

The Portal (https://industryportal.f4e.europa.eu) includes the F4E Supplier database where more than 800 potential suppliers have already registered and initiated the generic pre-qualification process.

Legal Matters

Optimisation of F4E's procurement processes

Taking into account the specific nature of the procurements, grants and other activities managed by F4E, its budgetary and schedule constraints as well as experience from contract negotiations and feedback from the ILOs, F4E:

- Proposed to modify the Implementing Rules (IR) of the Financial Regulation upon which basis the Governing Board (GB) doubled the threshold for Executive Committee (ExCo) approval of grants to EUR 400 000;

- Launched several actions to optimise the contractual clauses in its model contracts to better take into account the nature of F4E's activities and the market situation.

Litigations in front of the European Court of Justice (ECJ)

In 2010 F4E was faced with the first litigation following the award of the contracts for the TF Winding Packs and Cabling and Jacketing of TF and PF Conductors. In both cases, unsuccessful tenderers introduced applications for interim measures which were dismissed by the ECJ without hearings. The TF Winding Packs complaint has since been withdrawn.

Framework Partnership Agreement (FPA)

Regarding grants, in 2010 the F4E Executive Committee adopted the Model Framework Partnership Agreement (FPA). The use of FPAs will allow for a more stable and longer-term relationship between F4E and grant beneficiaries and reduce the number of open calls, thus simplifying the grant management.

The 1st Intellectual Property Associations Network Meeting, October 2010

Intellectual Property Management

During 2010 F4E has further implemented its tools for supporting its Intellectual Property (IP) activity. Together with the European Commission, F4E is setting up a database that will allow the on-line management of IP information being used in its contracts and should enhance the efficiency and monitoring of IP within F4E's activities.

Based on the experience gained to date, F4E has refined its approach to IP management so as to better protect its own interests as well as those of its contractors while adhering to the IP provisions of the ITER Agreement. F4E has proposed a more flexible position as regards the ownership of IP assets so as to facilitate the exploitation of the results by F4E contractors. This revised approach is proposed to be embodied in F4E's future Industrial Policy.

Budget, Finance and Accounting

Budget Establishment

The F4E budget for 2010 was initially adopted for the global amount of EUR 447.44 million in commitment appropriations and EUR 254.90 million in payment appropriations. Following budget amendments agreed with the GB, the final authorised F4E budget for 2010 was EUR 444.14 million in commitment appropriations and EUR 241.70 million in payment appropriations.

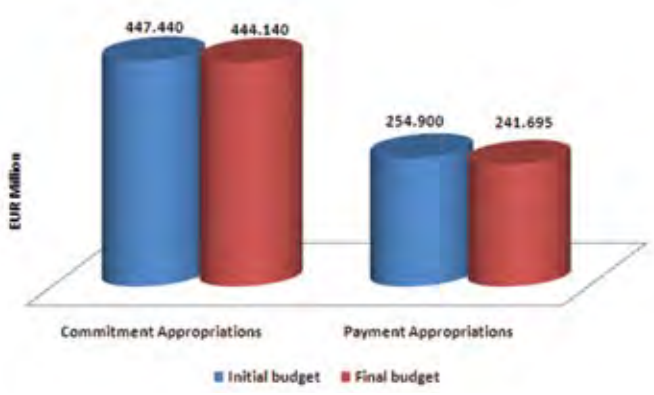
Budget Implementation

The results of the implementation of the second full year since F4E's financial autonomy are as follows and also shown in more detail in Annex VI to this Report:

By 31 December 2010, EUR 162 million was paid by F4E on the operational budget out of a total budget of EUR 210 million in payment appropriations (or which EUR 13.6 million were from the ITER Host State). The difference between the budgeted and actual implementation of payments is mainly due to four payments which could not be executed as follows:

- A delay in the signature of the Cabling and Jacketing Contract for which the pre-financing payment could therefore not be made;
- Delays in the completion of contractual deliverables for three contracts (Excavation, Architect Engineer, Winding Packs) for which the associated payments could not be made.

Revenue	94.2% collected	
Commitments	99.8% implemented	
	99% of administrative expenditure	99.8% of operational budget (of which 77% individual and 23% global commitments)
Payments	63.4% implemented	
	77.0% of administrative expenditure	61.8% of operational budget
Unused Payment Appropriations	Automatic carry-over: 52%	Cancelled: 48%



Initial and final 2010 Budgets

In the case of the administrative budget, the payments not executed in 2010 were due to a delay in the reception of invoices from CIEMAT – the F4E Host State organisation which provides administrative support.

Payments on Time

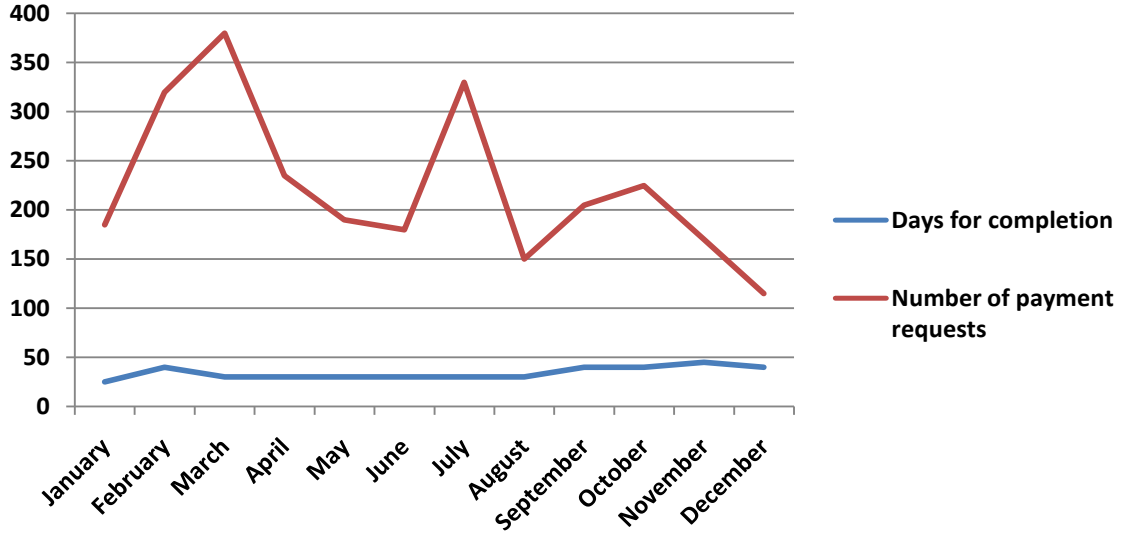
During 2010, the number of payments being processed by F4E continued to increase. A total of 2 850 payment operations were carried out corresponding to an increase of 16% over 2009. The average time to pay from receipt of invoices was around 30 days, which is within the maximum 45-day period foreseen in the Implementing Rules of the Financial Regulation.

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 2010 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).

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.



Number of payments processed by F4E (red) and the average time to execute those payments (blue)

Human Resources

Personnel Policy

During 2010, F4E finalised the necessary provisions in respect of several key Human Resources (HR) issues, notably in the field of career development. The first staff performance appraisal and promotion exercise was launched for the period 2008 and 2009.

Consolidation of the HR Implementing Rules progressed and rules for part-time work and grading were prepared for adoption by the GB. In addition, and guidelines regarding contract agents (e.g. contract duration and renewal) were approved by the Director.

Due to the implementation of the reorganisation of F4E in 2010, it should be noted that personnel policy initiatives (in particular those linked to the managerial structure or to contractual aspects) were postponed.

Personnel Selections

During 2010, 44 vacancy notices were published (13 for Officials, 15 for Temporary Agents and 16 for Contract Agents). Out of these 44 selection procedures, 32 were completed.

A new e-recruitment on-line tool was launched in 2010 in order to improve the efficiency of the recruitment process by making the procedures less rigid, user friendly and less time consuming.

Recruitment

During 2010, a total of 6 Officials, 44 Temporary Agents and 37 Contract Agents were recruited. The following table shows the breakdown of the type of contract, category and department.

As of 31 December 2010, the total number of staff working at F4E was 185 Officials and Temporary Agents, and 84 Contract Agents. In addition, F4E benefited from 27 interim staff and 6 Seconded Experts. Additional statistical information concerning F4E staff is provided in Annex VIII.

Department	Officials	Temporary Agents	Contract Agents
Office of the Director	1 AST	1 AD	1 FGII
ITER	2 AD	32 AD 1 AST	11FGIV 1 FGIII 2 FGII
Broader Approach & DEMO	-	3 AD	3 FGIII
Administration	1 AD 2 AST	4 AD 3 AST	5 FGIV 1 FGIII 13 FGII

Accelerated Recruitment Process

The average time-to-recruit decreased from 9.5 months in 2009 to 7.5 months in 2010 (from publication of the vacancy to the taking of up duties). The corresponding time-to-offer (the period necessary for F4E to offer a position) was 6 months in 2009 and dropped to 4.5 months in 2010. With the establishment of a medical service in Barcelona (see below), the above times are expected to decrease by the order of one month.

F4E's Medical Service

A call for tender to establish an F4E medical service has been prepared, launched and evaluated in 2010. This service will progressively replace the use of the Brussels medical service, shortening therefore the delays associated to the latter, reducing mission expenses and offering an in-house medical counselling. Deployment of this medical service will be deployed as from 2011.

Support for International Schooling

The negotiation of new administrative agreements with a number of international schools continued in 2010. F4E has now concluded agreements with most of the international schools in the Barcelona area ensuring that a vast majority of F4E staff is able to access good quality, multilingual education at the school of their choice.

Social Dialogue

This year, social dialogue was dedicated in particular to the appraisal and promotion framework to be applied to F4E staff. This encompassed a thorough consultation process with the Staff Committee. In addition, at the request of the Staff Committee, the Human Resources team directly addressed staff on several occasions to inform on different policy issues of interest to F4E staff.

Training and Studentships

In 2010, F4E reached an average of five training days per staff member (typically covering technical, financial, information technology and languages). A Strategic Learning and Development Framework was established which provides for individual staff training plans and their annual revision. Summer Studentships allowed five students to get acquainted with F4E in 2010.

Control Environment

Internal Audit

The Internal Audit function within F4E provides auditing and advisory services by issuing independent opinions on governance, risk management and control processes, and recommendations for improving the implementation of operations and promoting sound financial management. 2010 has been the first full year for this function, which is supported since 1 May 2010 by a team of three Officials. In 2010, 77% of the available time resources were dedicated to business assurance, and the remaining to consulting activities and capacity building.

The first audits had to deal with complex, often not stabilised business processes; they also had to meet high expectations in a context of review of F4E governance and processes. This resulted in a clear priority given to the quality and specificity of recommendations; hence also, with resources partly absorbed by additional engagements, some delays in the execution of the first annual audit plan as endorsed by the Governing Board on 27 January 2010.

Audits engagements covered the compliance, efficiency and effectiveness of F4E Financial Circuits, and of Grants Management. Related to this, action plans were set up in response to the 67 accepted recommendations (in total; acceptance rate 98.5%), which will be subject of a systematic auditor's follow-up. Two audits, launched in September and October 2010, have been carried over to 2011.

The Governing Board established an Audit Committee in F4E on 10 June 2010, for an initial period of two years; it is composed of five members nominated by the Board on 5 October. As an advisory committee to the Board, it provides an oversight of Financial Reporting and Accounting; Governance, Internal Control and Risk Management matters; External Audit and Internal Audit.

Internal Control Systems

During the first half of 2010 considerable work was invested in developing the Internal Control Action Plan and moving towards its implementation, together with a Working Group, composed of representatives of all F4E Departments. This work was suspended by mid-2010 pending the completion of F4E's reorganisation.

The establishment and implementation of the F4E "Internal Control Standards for Effective Management" remains a priority, as it can contribute substantially to addressing some of the weaknesses identified by the Court of Auditors and/or the Internal Auditor, as well as to the overall strengthening of the operations of F4E. In addition, the implementation of the Action Plan will promote and establish a common approach and administrative culture.

Progress has been achieved in relation to the further development of the non-financial control framework in particular for job descriptions, ethical and organisational values, staff evaluation and development, processes and procedures, business continuity, document management, Internal Audit.

As concerns financial controls, the internal audit on the financial circuits of F4E addresses a number of cross-cutting issues linked to financial management. An Action Plan has been established which, among others, aims at ensuring the necessary separation of duties for financial and operational activities. The implementation of this action plan started in 2010.

Quality Management System

In 2010, F4E continued the implementation and development of the Quality Management System through 4 main activity areas:

- Establishment and Continual Improvement of the Quality System;
- Process development and reviewing;
- Quality Audits (internal and external);
- Quality support to the Operational Projects.

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	Issue the intranet QA webpage
	Issue of the F4E standard "Supplier Quality Requirements" and related templates
	Issue simplified processes: PA Signature, ITA Signature, Nonconformity Control, Deviation Control, Procurements
	Preparation for core Processes Review (including inputs from quality audits and the internal audit results)
	Issue the Process Owner Charter and the Process Owner Nomination
	Issue the Quality Policy Commitment by Management
	Issue of the General Principles of QA in F4E and QAO distribution
Quality Audit	Preparation and execution of the year quality audits
	Issue of the 2011 Quality Audit Plan
Configuration	Deviation and Nonconformity Control Processes Updated
	Issue F4E-ITER IO Project Configuration Management Plan
	Issue Project Change Request Process
Documentation	Implementation of a new Electronic Document Management System: idm@F4E
	Sign-Off Authority Policies Issued: QA Documentation, Deviation and Nonconformity and ITER Project
	Issue of the Document Classification and Marking
	Development of idm@F4E usage policy
	Updated the Document Control process
Risk Management	Development of the Corporate Risk Management approach (Organisation)

Process development and reviewing

F4E continued the implementation of the process approach in line with the IAEA GS-R-3 requirements (International Atomic Energy Agency Safety Requirements No. GS-R-3). The F4E process map provides a quick, user-friendly and pragmatic gateway to procedures, instructions and documents.

General Process Map development (new processes) has been put on hold due to the Auditor report on the Financial Circuits action plan and the ongoing reorganisation.

Processes Status	Approved	In Review	Drafted	Software tool based
	32	9	9	10

Taking into account the recommendations from the above report and the Director's Note on Adequacy of the Processes, the urgent reviews and development were triggered to the process owners, including:

- Review of 10 core processes (PA, ITA, Document Control, Procurement, etc)
- Development of financial processes (Roles, Commitments, Payments, Credit, etc)

Quality Audits

F4E has established a Quality Audit framework since the end of 2009:

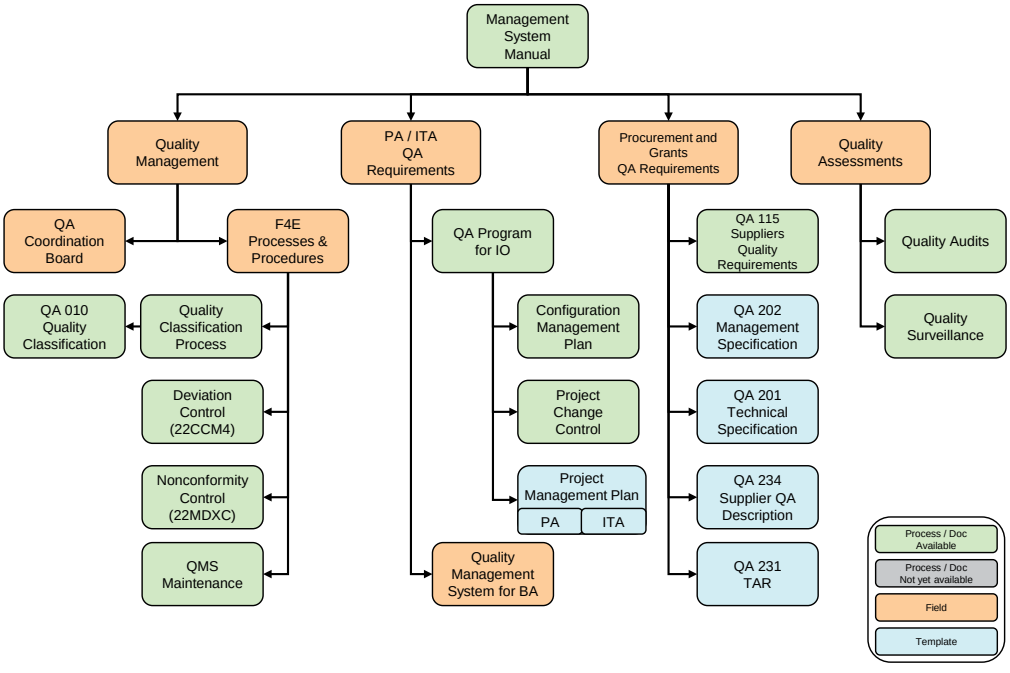
- The framework provides F4E and its stakeholders (e.g. ITER IO) with the assurance that our suppliers are being monitored and that quality is adequately being implemented;
- The implemented Annual Quality Audit Plan for 2010 included internal (F4E activities) and external (Supplier activities) quality audits.

Main Results
Issue of the standard "Suppliers Quality Requirements" (F4E-QA-115)
Implementation of a Electronic Document Management System (idm@F4E) to archive, review, approval and distribute F4E documentation
Configuration management framework established
Implementation of process ownership and start of the process review as an improvement measure
F4E-ITER IO Agreement of Understanding on QA
Inclusion of the Checklists has part of the quality system

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 PAs and ITAs to ensure conformance with the F4E QA Programme, ITER 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, all the contract implementation quality documentation, Supplier quality audits and full support on QA to the kick-off and progress meetings.



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 2010 F4E continued to take further steps in the implementation of the data protection requirements stipulated in the Regulation. The main achievements have been the following:

- The finalisation of the development of an electronic system for the notification of the processing operations involving personal data and the electronic database for notified processing operations;

- The publication of information sections on the F4E intranet and the public website in order to ensure awareness of the application of the data protection requirements by F4E , including specific privacy notices which inform the data subjects about the processing of their data specifically related to a particular processing operation;

- The inventory of processing operations involving personal data, which identifies all F4E processes and details how personal data will be processed by F4E, was completed and sent to the European Data Protection Supervisor (EDPS);

- The notification concerning the processing of one of the most sensitive forms of personal data (the selection of F4E staff) was submitted to the F4E Data Protection Officer ("F4E DPO") and subsequently notified to the EDPS for his opinion;

- The F4E DPO represented F4E in two regular meetings with the EDPS and the DPOs of the European institutions and bodies.

Information Technology, Infrastructure and Logistics

Information Technology

In 2010, the focus of F4E's IT activities moved from quickly delivering services to a young growing organisation into establishing the foundations for a mature IT structure. To this end, the IT services were organised into three groups Project Office, Managed Services and Infrastructure.

The IT Service Management (ITSM) framework was adopted during 2010 and staff certified in ITIL Foundation V3. In addition, Incident Management, Service Requests and Problem Management processes were put in place. A first version of the IT Service Catalogue was also published.

In terms of noteworthy IT projects were the following:

- **Migration to IDM:** the ITER Document Management System for electronic document storage, tracking and interaction. The content from the previous document management platform was migrated;
- **LeaMa,** the HR leave management tool was launched which provides a completely paperless platform for requesting, approving and overall management of staff leave;
- **Project Space,** a fully featured project management platform which conforms to the F4E quality management system was released and is being actively used to support the management of F4E contracts.

Infrastructure and Logistics

Offices and Support Services

With the continuous growth of F4E, effort was needed to adapt the existing infrastructure and provide sufficient office space. The first F4E User Satisfaction Survey on logistics and infrastructure was carried out which solicited very positive feedback with 88% of the respondents "very satisfied" and "satisfied".

Over 3000 external visits

As an indicator for the substantial growth of activities in the logistics area and F4E in general, it may be noted that the number of visitors accredited in 2010 grew by 46% in relation to the previous year, while the number of meetings organised in F4E premises rose to 3 424 representing an increase of 36%.

Implementing the Host Agreement

Several meetings were held with the Spanish authorities to discuss administrative and procedural matters linked to the implementation of F4E Host Agreement. A network within the Spanish administrations has been developed to facilitate regular interactions with F4E.

Safety

To help ensure the safety of the personnel at work, F4E acquired a cardio defibrillator device (AED) and the First Aid Workers received AED-related training. Refresher trainings for F4E Fire Pickets were also organised.

Social Actions

In 2010 several social actions were organised, including the F4E Staff Blood Donation and a Christmas Toys Collection which were donated to under-privileged children living in Barcelona.

Information and Communication

One of the main developments in 2010 was the launch of the new external F4E website which aimed to offer a more dynamic platform to engage with different audiences. To accompany the wealth of technical details, more images and videos were included.

With the new F4E website the average number of visitors on the site was 23 000 per month, mostly from Europe (25% Spain, 13% France, 5% Italy). The total view of pages increased to three per user, reaching a total number of 66 000 pages per month. Around 70 articles were published on the F4E internal and external websites.

F4E News, our quarterly newsletter, celebrated its first year targeting industry, SMEs, European policymakers and the fusion community. The newsletter, available both electronically and in print format, was distributed to the EU Institutions and external stakeholders including the Cadarache visitors' centre.

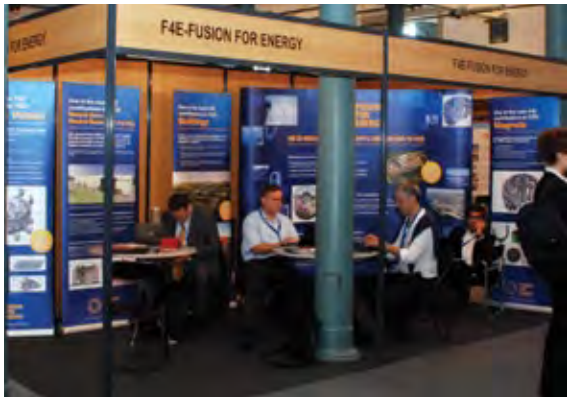
During 2010 F4E participated in 24 events reaching out to scientists, policy-makers, media and the public, in order to increase its visibility and better communicate its mission. These include:

- The signing ceremony of the Architect Engineer contract;
- The MEPs ITRE Committee representation visiting F4E;
- The media trip to F4E and ITER under the Spanish Presidency;
- The participation in the Catalan Saló de l'Ensenyament and Día de la Ciència;
- The Monaco ITER International Fusion Energy Days conference.

A new F4E scientific stand presenting Europe's contribution to ITER was designed and unveiled for the Symposium on Fusion Technology (SOFT) 2010.

The publication of articles describing the mission of F4E, the science behind fusion, the ITER project, spin-offs and procurement opportunities doubled compared to last year compared to the previous year reaching 190 clippings in total. Moreover, three television clips were produced and four radio clips were recorded.

The new F4E website



From top to bottom:
The group of journalists during the Spanish Presidency visiting F4E and ITER; F4E staff with the Batek Batucada group at the Catalan Saló de l'Ensenyament; MEPs from left to right: R.Bütikofer, P.Rübig, N.Glante, H.Reul during the visit of the ITRE Committee to F4E; F. Briscoe, F4E Director and S. Aubarbier, Engage consortium, during the Architect Engineer signing ceremony; the new F4E stand unveiled at SOFT 2010.

External Relations with Institutional Actors

European and International Organisations

During 2010 F4E continued to pursue its structured cooperation with the Commission (DG Research and Innovation - RTD), including via regular meetings of the joint budget coordination committee.

On 17 February, F4E received a high-level delegation from the European Parliament's competent committee (ITRE – Industry Research and Energy). The presentations given on that occasion by F4E Governing Board Chair, F4E Director and Euratom Director at RTD were followed by a lively debate on the project. F4E Director also participated to ITRE and joint COBU (budget committee) / COCOBU (budget control committee) hearings on the ITER project.

Throughout the year, F4E also participated actively in the EU Agencies network, including that of the Heads of Agencies. On 17-18 June, it hosted the yearly meeting of EU Agencies Procurement Officers Network (NAPO) which allowed for fruitful exchange of experiences and best practices with regards to EU procurement.

In December the Chair of the F4E Governing Board and F4E Director welcomed the new ITER Director General, Professor Osamu Motojima at the F4E Offices. Interactions with the ITER IO were intensive during 2010 and F4E participated in 12 Domestic Agency coordination meetings. F4E also supported Euratom (represented by the Commission) at two meetings of the ITER Council and for the preparation of the associated MAC and STAC preparatory meetings.

Finally, F4E pursued its bilateral contacts at technical level with European Space Agency (ESA)/ European Space Research and Technology Centre (ESTEC) and the European Organisation for Nuclear Research (CERN) to exchange experience on issues of common interest.

State, regional and local authorities

Throughout the year, good cooperation continued with F4E main institutional interlocutors at respectively local, regional and national level: the Barcelona Technological Foundation/Diagonal-Besòs Campus (b-TEC), the Catalonian Energy R&D Institute (IREC) that is setting up a Fusion Division, the Spanish Energy R&D Centre (CIEMAT) and its "Laboratorio Nacional de Fusion". In addition:

- F4E further developed its structured partnership with Barcelona's local authorities through regular meetings organised with Barcelona City Hall, including one with the Deputy Mayor;

- At the end of the year, a visit was paid to F4E by the Catalonian Government (Generalitat) Secretary General for the European Union.

The GB Chair, Professor Carlos Varacndas and the F4E Director, Dr. Frank Briscoe, receiving professor Osamu Motojima, Director General of the ITER IO

Staff Committee

The Staff Committee's (SC) was active during 2010 on several fronts which can be summarised as follows:

- Providing recommendations on the evaluation and promotion framework and the rules of the engagement of Contract Agents;
- Participating in 55 personnel selection committees as well as an internal Task Force on the F4E reorganisation;
- Completing an analysis of processes and procedures at F4E in view of streamlining them, in particular, for low value/risk operations;
- Conducting a survey regarding the professional background and experience of F4E staff, in particular, in project management;
- Managing a contract for complementary health insurance on behalf of 203 staff members and their family members;
- Setting up a working group to identify ways to improve the interactions with staff based in the two F4E antennae;
- Organising 14 activities and events to foster interactions among staff outside the office.

F4E staff raised 1.953,90 EUR and donated the amount to the Disasters Emergency Committee (DEC) for the victims of the earthquake in Haiti. © istockphoto

F4E staff volunteering to give blood during the campaign organised by Catalan Department of Health. © istockphoto

Chapter 5

Statutory Bodies

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 2010 is provided in Annex IV.

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 was re-elected as the Chair of the Governing Board for a second and last term of two years from 17 July 2009. Mr Stuart Ward was elected, and replaced Professor Niek Lopes Cardozo, as the Vice Chair by the Governing Board on 27 January 2010 for a period of two years.

Summaries of Decisions

13th Governing Board Meeting, 7 January 2010, Barcelona

- Decided, in agreement with Dr Didier Gambier, to accept his resignation as F4E Director effective from 15 February 2010;
- Thanked Dr Gambier for the important work he has carried out during his mandate as the first F4E Director;
- Appointed Dr Frank Briscoe as Director of F4E ad interim effective from 16 February 2010 for a period of one year in order to allow the appointment of a new Director;
- Invited the Standing Coordination Group, to present a proposal for the technical job description and requirements for the post of the new F4E Director to the forthcoming Governing Board meeting on 27 January 2010.

14th Governing Board Meeting, 27 January 2010, Brussels

- Took note of an address by the incoming F4E Director;
- Endorsed a paper and noted an oral presentation concerning schedule options for ITER components on the critical path to be supplied by Europe;
- Invited the F4E Director to launch the call for tender for the Vacuum Vessel;
- Approved the Audit Plan 2009/2010;
- Took note of the draft Technical Job Description for the post of F4E Director;
- Elected Mr Stuart Ward as Vice Chair of the Board.

15th Governing Board Meeting, 30-31 March 2010, Barcelona

- Took note of a presentation from the F4E Director on the ITER Improved Updated Schedule;
- Concerning the updates F4E cost estimates:

The F4E Governing Board

- Welcomed the paper from the F4E Director on the revised cost estimates for F4E until 2020 according to the ITER Improved Updated Schedule (IUS) and including all commitments for ITER construction;

- Understood the methodology used by F4E to arrive at the revised cost estimates;

- Carefully considering all the budget lines:

  - Acknowledged that the 5% increase to the 2008 revised cost estimates for the European in-kind contributions to ITER are required to comply with the IUS proposed by the ITER IO as part of the ITER Baseline to achieve first plasma in ITER during 2019;

  - Noted, with satisfaction, that the resource estimates for the Broader Approach and F4E administration have remained stable for the last two years and that the latter constitutes only 5% of the total F4E budget;

  - Understood that many of the costs are determined by the proposals made by the ITER IO and are to be discussed and agreed by the European delegation in the ITER Council.

- Recommended that, in order to address the requirement of the Competitiveness Council for cost containment, F4E and the ITER IO do their utmost to reduce the overall costs for Europe by an amount of EUR 600 million.

- Adopted an amendment to the WP 2010;

- Appointed Dr André Grosman as a member of the Technical Advisory Panel for a term of two years effective immediately and approved Dr Noud Oomens for the reserve list;

- Approved the job description for the F4E Director;

- Welcomed a presentation from the F4E Director on cost containment measures and urged F4E to continue to pursue such measures in the future.

16th Governing Board Meeting, 10 June 2010, Barcelona

- Approved the award of the contract F4E-2009-OPE-053 (MS.MG) "Supply of the ITER Toroidal Field Coils Winding Packs";

- Approved amendments to the Executive Committee's Rules of Procedure and invited the Executive Committee to adopt them;

- Approved a proposal for an amendment to the F4E Statutes and invited the Commission to make a proposal to the Council for the approval of this amendment in accordance with Article 50 of the Treaty;

- Adopted an amendment to the Implementing Rules of the F4E Financial Regulation;

- Welcomed the Management Improvement Plan of the F4E Director and invited him to submit an Action Plan for its implementation as soon as possible as well as proposals concerning the industrial policy and procurement rules;

- Approved an agreement with the ITER IO to make available offices for the F4E staff and its contractors;

- Took note of the 2009 Annual Report from the Internal Auditor and requested the Director to immediately implement measures to address the findings and to report to the Governing Board on a regular basis;

- Decided to establish an Audit Committee for the period of two years;

- Decided to launch a written procedure for the approval of the 2009 Annual Accounts as soon as the report of the Court of Auditors will be received;

- Approved the 2009 Annual Report and adopted its analysis and recommendations;

- Adopted the second amendment to the WP 2010;

- Adopted the first amendment to the 2010 Budget;

- Adopted the Staff Policy Plan;

- Took note of a report from the Chair of the Joint CCE-FU-F4E Working Group on DEMO;

- Took note of a paper concerning cooperation between F4E and EFDA and endorsed an action;

- Endorsed the estimated commitment required by F4E for the years 2012 and 2013 and took note of the associated payments.

17th Governing Board Meeting, 5 October 2010, Barcelona

- Approved the new basic organisational structure for F4E based on the proposal submitted by the F4E Director;

- Invited the F4E Director to:

  - Immediately start the recruitment procedure for the positions of Head of Departments for "EU-ITER" and "Administration" as well as the Head of the Financial Service;

  - Nominate within one month, in an acting capacity, suitably qualified staff from within the current F4E complement to start the implementation of the new organisational structure;

  - Proceed as soon as possible with the recruitment procedures to fill the positions referred to in the previous bullet;

  - Present, within one month, to the Standing Coordination Group a document showing the foreseen issues in relation to the implementation of the new organisational structure and, if necessary, ask for the support of the Governing Board including any decisions on organisational changes that may need to be taken;

  - Present a progress report on the implementation of the new organisational structure to the new organisational structure to the next Governing Board meeting.

- Encouraged the F4E Director to consider making use of external expertise for the implementation of this new organisational structure;

- Expressed it strong support for the F4E Director for the overall implementation of the new organisational structure;

- Approved the proposal to introduce an industry standard project management system;

- Took note of the proposals concerning project control processes and reporting mechanisms;

- Took note of the actions in relation to the improvement of other processes at F4E including the assignment of owners and continuous review/ improvement procedures;

- Concerning the cost containment and reduction plan submitted by the F4E Director:

  - Took note of the progress achieved in the period March to September 2010;

  - Endorsed the actions proposed to be taken at the level of F4E;

  - Encouraged F4E to advise the European members of the ITER Council instances on the proposals of the ITER IO.

- Approved the nomination of the members of the F4E Audit Committee for a period of two years effective immediately;

- Nominated Stuart Ward as the Chair of the Audit Committee for a period of two years effective immediately.

The 18th meeting of the Governing Board

18th Governing Board Meeting, 1-2 December 2010, Barcelona

- Concerning the improvement of the way in which the Commission, the Member States and F4E implement their responsibilities and tasks:
  - Took note of the Staff Working Paper from the European Commission "Towards a robust management and governance of the ITER project";
  - Took note of four paper from the GB Chair on governance, staff and finance, relations between F4E and the Commission and relations between F4E and the European fusion laboratories;
  - Approved the terms of reference and membership of a working group which is requested to present proposals to the next GB meeting.
- Decided to renew the contract of the F4E Director, Dr Frank Briscoe, for a period of 18 months (from 16 February 2011 to 15 August 2012);
- Decided to propose to the Commission the participation of GB Vice Chair as an observer in the selection committee for the new F4E Director;
- Decided to advertise the position of the new F4E Director no later than September 2011;
- Adopted the third amendment to the WP 2010;
- Adopted the second amendment to the 2010 Budget;
- Adopted the Project Plan (Edition 2010);
- Took note of the proposed Resource Estimates Plan (Edition 2010);
- Adopted the WP 2010;
- Adopted the 2011 Budget (ad referendum by the European Commission);
- Took note of the proposal F4E Industrial Policy and approved the terms of reference and membership of a working group to assist the F4E Director;
- Adopted an amendment to the Implementing Rules of the F4E Financial Regulation concerning international tendering;
- Approved the Framework Agreement between Euratom and F4E on Access Rights and Management of Information and Intellectual Property related to Fusion Activities.

Ad-Hoc or Working Groups

During 2010 the Governing Board set up the following two subsidiary bodies (Ad-Hoc or Working) Groups (the lists of members are presented in Annex IV):

- The Working Group on the F4E Industrial Policy – by decision of the Governing Board of 2 December 2010;

- The Working Group on F4E Improvement – by decision of the Governing Board of 2 December 2010.

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 IV).

The Committee meets about six times per year and 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 2010, including a joint meeting with the Technical Advisory Panel. The main activities included the approval of 14 contracts (including one by written procedure) and 12 grants above the financial thresholds defined in the Implementing Rules of F4E's Financial Regulation. Other activities of the Executive Committee included:

- Taking note of information from F4E on the procurement strategies for the following items: Vacuum Vessel, Poloidal Field Coil, and the European contribution to the ITER Divertor Targets;
- Approving the model Framework Partnership Agreement and invited the F4E Director to present the FPA to the EFDA Associates;
- Upon proposal of Euratom and according to Rule 9 (4) of the Executive Committee's Rules of Procedure, submitting the decision on the approval of the award of the contract F4E-2009-OPE-053 (MS.MG) "Supply of the ITER Toroidal Field Coils Winding Packs" to the Governing Board;
- Adopting the second amended Rules of Procedure for the Executive Committee;

The F4E Executive Committee

- Providing comments on the draft paper on industrial policy, intellectual property and dissemination of information;

- Approving the use of the ITER IO's rules for joint procurement for the operation of the SULTAN test facility and sample manufacture;

- Providing comments and recommendations on:

  - Three amendments to the WP 2010;

  - Two amendments to the 2010 Budget;

  - The final 2009 Annual Accounts;

  - The 2009 Annual Activity Report;

  - Modifications to the Implementing Rules of the F4E Financial Regulation to make provision negotiated procedure with prior publication of a contract notice and to raise the threshold for the approval of the award of grants by the Committee;

  - The Project Plan (Edition 2010);

  - The WP 2011;

  - The Resource Estimates Plan;

  - The 2011 Budget.

Technical Advisory Panel

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

Chair and Vice-Chair

The Chair and Vice Chair of TAP are Professor Minh Quang Tran and Dr Derek Stork, for their last term ending in October 2011.

Summary of Discussions

The TAP met on four occasions during 2010 (including a extremely successful meetiwng with the Executive Committee) and the main activities included:

- Taking note of information from F4E, and discussing the procurement strategies as outlined in the Project Plan, with particular emphasis on diagnostics, heating and current drive systems and TBMs;
- Discussing and endorsing the outcome of assessments performed by the three ad-hoc groups created on request of the F4E Director and the Governing Board and composed of TAP members and external experts, on DEMO activities, Cold Test strategies for the ITER coils and ELM suppression and mitigation in ITER;
- Providing comments on the draft paper on industrial policy, intellectual property and dissemination of information;
- Providing comments and recommendations on:
    - Three amendments to the WP 2010;
    - The 2009 Annual Activity Report;
    - The Project Plan (Edition 2010);
    - The WP 2011.

The F4E Technical Advisory Panel

Annex I

List of Acronyms

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	le 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

Annex II

Implementation of the Work Programmes

ITER PROCUREMENT ARRANGEMENTS

Reference	Title	Signed	Value (kIUA)
1.1.P2A.EU.01	Pre-Compression Rings	12/05/2010	0.60000
1.7.P2B.EU.01	Inner Targets	12/03/2010	20.20000
5.3.P9.EU.01	Neutral Beam Test Facility Components	27/10/2010	27.00000
6.2.P2.EU.05	Building Construction	14/05/2010	336.64000

BROADER APPROACH PROCUREMENT ARRANGEMENTS

Reference	Title	Signed	Value (kBAUA)
IFERC-T1PA01-EU.CIEMAT	Procurement Arrangement for the DEMO R&D Activities on SiC/SiC Composites for the IFERC Project	14/12/2010	2.849
IFERC-T3PA01-EU.CRPP	Procurement Arrangement for the DEMO R&D Activities in DEMO Blanket for the IFERC Project	14/12/2010	0.510
IFERC-T3PA01-EU.SCK.CEN	Procurement Arrangement for the DEMO R&D Activities in DEMO Blanket for the IFERC Project	14/12/2010	0.885
IFERC-T3PA01-EU.KIT	Procurement Arrangement for the DEMO R&D Activities in DEMO Blanket for the IFERC Project	14/12/2010	2.647
IFERC-CSCPA01-EU.CEA	Procurement Arrangement for the supply of the supercomputer and peripheral equipment for the IFERC Project (CSC activity)	28/04/2010	91.5

BROADER APPROACH AGREEMENTS OF COLLABORATION

Reference	Title	Signed	Value (kBAUA)
AoC-F4E-CIEMAT IFERC-T1PA01-EU.CIEMAT	Procurement Arrangement for the DEMO R&D Activities on SiC/SiC Composites for the IFERC Project	16/11/2010	2.849
AoC-F4E-CRPP-IFERC-T3PA01-EU.CRPP	Procurement Arrangement for the DEMO R&D Activities in DEMO Blanket for the IFERC Project	16/11/2010	0.510
AoC-F4E-SCK.CEN-IFERC-T3PA01-EU.SCK.CEN	Procurement Arrangement for the DEMO R&D Activities in DEMO Blanket for the IFERC Project	25/11/2010	0.885
AoC-F4E-KIT-IFERC-T3PA01-EU.KIT	Procurement Arrangement for the DEMO R&D Activities in DEMO Blanket for the IFERC Project	25/11/2010	2.647
AoC-F4E-ENEA-IFERC-T1PA01-EU.ENEA	Procurement Arrangement for the DEMO R&D in Sic/Sic Composites for the IFERC Project	25/11/2010	0.442
AoC-F4E-CEA-IFERC-CS-CPA01-EU.CEA	Procurement Arrangement for the supply of the supercomputer and peripheral equipment for the IFERC Project (CSC activity)	23/04/2010	91.5

Operational Procurement Contracts

Summary by Type of Procedure

Procedure	Number of awarded contracts	Total awarded value (in kEUR)
Open	10	272.910
Restricted	3	22.828
Negotiated	31	530.313
Grand Total	44	826.052

Negotiated Procedures (above EUR 250 000)

	Number of awarded contracts	Total awarded value (in kEUR)
Negotiated above threshold	8	529.117
(of which due to cancellation of previous competitive procedure)	3	218.260

Awarded Contracts

(rows shaded in blue indicate Negotiated Procedures)

Contract Reference	Contract Title	Contractor	Awarded Value (in kEUR)
F4E-2009-BAO-002-01	Supply of 10200 km of NbTi strand and 5100 km of Cu strand for the JT-60SA TF Coils	Furukawa Electric Co. Ltd.	5 782
F4E-2009-OPE 018 (MS-MG)	Supply of 20km TF Conductors, 22 km PF Conductors (PF1 and PF6) and 28 km JT60SA TF Conductors	Italian Consortium for Applied Superconductivity (ICAS) Società Consortile a responsabilità limitata (S.C.r.l.)	49 163
F4E-2009-OPE-031-01 (ES-AC)	Framework Contract - Provision of Engineering support to F4E in the area of thermohydraulics	Politecnico di Torino	400
F4E-2009-OPE-031-02 (ES-AC)	Framework Contract - Provision of Engineering support to F4E in the area of Fluid Dynamic Analysis	IDOM Ingeniería y Sistemas SA	400
F4E-2009-OPE-033-01 (ES-AC)	Revision of the Structural Design Criteria for In-vessel Component (SDC-IC) to Fusion for Energy	Consortium SDC-IC:Numerical Analysis Technologies S.L. (NATEC) Ingeniería Idom Internacional S.A.	400
F4E-2009-OPE-046-01 (PMS-H. CD)	Supply of Ion Source and Extraction Power Supplies	O.C.E.M. S.p.A.	19 447
F4E-2009-OPE-053 (MS-MG)	The supply of one SIDE prototype Double Pancake (DP), one Full Size Joint Sample, several mock ups needed for processes and tooling qualification and 10 (ten) ITER Toroidal Field (TF) Coils Winding Packs (WP)	Consortium Iberdrola Ingenieria y Construccion SAU, ASG Supercon-ductors SpA and Elytt Energy SL.	156 320

Contract Reference	Contract Title	Contractor	Awarded Value (in kEUR)
F4E-2009-OPE-058-01	Provision of Civil Engineering and Construction Consultancy Services in connection with the ITER Project	Consortium Engage SNC:Assystem France SAS WS Atkins International LTD Empresarios Agrupados Internacional, SA IOSIS Industries	190 265
F4E-2009-OPE-065-01 (SB-PS)	Supply of Anti-Seismic Bearings and associated devices for the Tokamak complex	NUVIA Travaux Spéciaux (NTS) SAS	14 715
F4E-2009-OPE-072-01 (PMS-H. CD)	Spares for the High Voltage Power Supply System of the European Electron Cyclotron Test Facility	O.C.E.M. S.p.A.	26
F4E-2009-OPE-073 (MS-IV)	Supply of 15 W Monoblock Mock-Ups and 2 Vertical Target Qualifications Prototypes and the Special Tooling	Ansaldo Nucleare S.p.A	620
F4E-2009-OPE-074-01 (ES-DO)	Mechanical Computer Aided Drawing for the purpose of the Vacuum Vessel procurement	Ingeniería Idom Internacional S.A.	35
F4E-2009-OPE-085 (ES-AC)	Inspection support to the manufacturing of the superconducting dipole magnet (EDIPO)	M&G s.r.l.	50
F4E-2010-OPE-068-01 (MS-VV)	Supply of 7 (seven) ITER Vacuum Vessels Sectors (Sectors 5, 4, 3, 2, 9, 8, 7)	AMW Consortium (Ansaldo Nucleare S.p.A., Mangiarotti S.p.A., Walter Tosto S.p.A.)	293 843
F4E-2010-OPE-070 (PMS-CD)	Review of ITER I&C Specification	United Kingdom Atomic Energy Authority (CCFE)	50
F4E-BAO-003-01 (MS-MG)	Quality Control Monitoring of NbTi Strands for JT-60S4 TF Coils: "DC + geometry"	Commissariat à l'Énergie Atomique (CEA)	50
F4E-BAO-004-01 (MS-MG)	Quality Control Monitoring of NbTi Strands for JT 60SA TF Coils: "DC + AC"	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA)	50
F4E-BAO-005 (MS-MG)	Quality Control Monitoring of NbTi Strands and Conductor for JT 60SA TF Coils: "Extended Geometry"	National Institute of Research and Development for Lasers, Plasma and Radiation Physics (NILPRP)	24
F4E-OPE-025-01	Contract for the provision of Health and Safety Protection Coordination and Legal Inspection Services for the Construction of the ITER Buildings	Ceten Apave International	12 634
F4E-OPE-059	Expert Support on Decennial Insurance Offer and Contracting	SIACI Saint Honore	48
F4E-OPE-069 (Policy 7400019343)	Construction and Erection All Risk Insurance	Zurich Insurance plc	9 794
F4E-OPE-075-01	Legal Advice and assistance for the adjudication of the Winding Pack Contract	Cuatrecasas	50
F4E-OPE-080 (ES-SF)	Experimental data on the desorption of Deuterium	Max-Planck-Institut für Plasmaphysík (IPP)	36
F4E-OPE-084-01 Lot 1 (ES-MF)	Framework Contract - Provision of Material Characterisation at Cryogenic Temperatures	Karlsruhe Institute of Technology (KIT)	2 000
F4E-OPE-088-01 (MS-MG)	Conductor Testing in SULTAN 2010	Ecole Polytechníque Fédérale de Lausanne (EPFL) Centre de Recherches en Physíque des Plasmas (CRPP)	520
F4E-OPE-090 (SB-PS)	Provision of Civil Engineering and Construction Consultancy Services in connection with the ITER Project (Support-to-the-Owner)	Energhia Consortium	27 375
F4E-OPE-091-01 (MS-IV)	Supply of Carbon Fibre Composite (Sepcarb ® NB41 grade)	Snecma Propulsion Solide S.A.	1 520

Contract Reference	Contract Title	Contractor	Awarded Value (in kEUR)
F4E-OPE-092 (MS-VV)	Provision of an estimation of development and fabrication costs of VV Sectors as well as a guide of best practices in cost engineering estimation to be implemented at F4E	Price Systems Limited	41
F4E-OPE-093 (MS-IV)	Provision of Thermo-mechanical analyses of the normal heat flux first wall (NHF FW)	Commissariat à l'Énergie Atomique (CEA)	50
F4E-OPE-094-01 (PMS-H.CD)	Supply of Mirrors for the Radio Frequency Conditioning Unit (RFCU)	Ecole Polytechníque Fédérale de Lausanne (EPFL) Centre de Recherches en Physíque des Plasmas (CRPP)	47
F4E-OPE-095	Construction of the Tokamak Complex Seismic Isolation Pit	GTM Sud SAS	36 356
F4E-OPE-096-01 Lot 1 (MS-IV)	Supply of CFC Monoblock Mock-Ups and the special tooling	Ansaldo Nucleare S.p.A	184
F4E-OPE-099	Provision of legal services to assist with negotiations of the Construction PA	Debevoise & Plimpton LLP	50
F4E-OPE-100	Legal Assistance for Vacuum Vessel Contract	Gomez Acebo y Pombo Abogados S.L.P.	36
F4E-OPE-140-01 (PMS-H.CD)	Testing at Low and High Power of a Window for the EC Upper Launcher (Concept Testing)	Karlsruhe Institute of Technology (KIT)	50
F4E-OPE-142	Engineering Study of the Cold Test and Coil Insertion Process	Babcock Noell GmbH	241
F4E-OPE-144-01 (ES-AC)	Neutronics Analysis of the IVVS/GDC	Karlsruhe Institute of Technology (KIT)	20
F4E-OPE-145	Framework Contract - Testing of TF Nb3Sn strands	University of Durham	2 800
F4E-OPE-146	Provision of legal assistance	Lovells LLP	16
F4E-OPE-166-01	Supply a piezo actuator test vehicle with a test programme	ACAL BFI Iberia SL	43
F4E-OPE-258-01 (PMS-PE)	SOLPS Development for ITER Design Work : Upgrading from SOLPS4 to SOLPS5	Forschungszentrum Jülich GmbH	141
F4E-OPE-261	Provision of legal assistance	Hogan Lovells International LLP	260
F4E-OPE-262	Provision of legal assistance for the PF Coils Contract	Gide Loyrette Nouel A.A.R.P.I.	60
F4E-OPE-270	Expert Support on Decennial Insurance Market Analysis	Daniel Faisantieu Consultants	41

Administrative Procurement Contracts

Summary by Type of Procedure

Procedure	Number of awarded contracts	Total awarded value (in kEUR)
Open	2	4.600
Restricted	0	
Negotiated	5	1.282
Grand Total	7	5.882

Negotiated Procedures (Articles 126 and 127 of the Implementing Rules, above EUR 60 000)

Contract Reference	Contract Title	Contractor	Type of Contract	Awarded value (in kEUR)
F4E-2010-ADM/HR-01.01	Provision of Medical Services – Medical Centre	Creu Blanca	Framework Service	400
F4E-2010-ADM/HR-01.02	Provision of Medical Services – Medical Advisor	Preving	Framework Service	450
F4E-2010-ADM/HR-01.03	Provision of Medical Services – Doctor for Absences	Preving	Framework Service	150
F4E-ADM-269	Legal Service court case T410	Hogan Lovells	Direct Service	259

Contract Reference	Contract Title	Type of Contract	Awarded value (in kEUR)	Award Date
F4E-2010-ADM/HR-01.01	Provision of Medical Services – Medical Centre	Framework Service	400	1/12/2010
F4E-2010-ADM/HR-01.02	Provision of Medical Services – Medical Advisor	Framework Service	450	1/12/2010
F4E-2010-ADM/HR-01.03	Provision of Medical Services – Doctor for Absences	Framework Service	150	1/12/2010
F4E-2010-ADM/IC-02	Provision of Media Monitoring Services	Framework Service	600	13/07/2010
F4E-2009-ADM/IT-06	Software acquisition channel	Framework Supply	4.000	14/06/2010
F4E-ADM-263	SOFT conference	Direct service	23	19/09/2010
F4E-ADM-269	Legal Service court case T410	Direct Service	259	01/10/2010

Grants

(Rows shaded in blue indicate Unique Beneficiaries)

Agreement Reference	Agreement Title	Beneficiary	Amount (in kEUR)
F4E-2009-GRT-030-01 (PNS-TBM)	Elaboration of the development/qualification/procurement plan for functional materials	Karlsruhe Institute of Technology (KIT), Commissariat à l'Énergie Atomique (CEA), Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA)	84
F4E-2009-GRT-030-02 (PNS-TBM)	Screening of an alternative production route/capacity for Be pebbles	Karlsruhe Institute of Technology (KIT), Instituto Tecnológico e Nuclear	73
F4E-2009-GRT-034-01	Analysis of Design Issues, Interfaces and Preparation of the Procurement Arrangement for the ITER Gyrotron	Karlsruhe Institute of Technology (KIT), Ecole Polytechníque Fédérale de Lausanne (EPFL) - Centre de Recherches en Physíque des Plasmas (CRPP)	182
F4E-2009-GRT-036 (MS-IV)	Characterisation of alternative divertor material measurement of the physical and mechanical properties of CFC and Tungsten	Forschungszentrum Jülich GmbH (FZJ), Nuclear Research and Consultancy Group (NRG)	107
F4E-2009-GRT-038 (MS-IV)	CuCrZr powder-solid HIP Development for ITER First Wall Panels	Commissariat à l'Énergie Atomique (CEA), Le Bronze Industriel	250
F4E-2009-GRT-043 (MS-IV)	Irradiation and post irradiation mechanical characterisation of CuCrZr / 316L stainless steel joints	Nuclear Research and Consultancy Group (NRG), Hungarian Academy of Sciences KFKI Atomic Energy Research Institute (AEKI)	389

Agreement Reference	Agreement Title	Beneficiary	Amount (in kEUR)
F4E-2010-GRT-045 (PNS-VTP)	Finalisation of the system capacity, enhancements studies and detailed design of WDS components including HAZOP studies	Karlsruhe Institute of Technology (KIT), Commissariat à l'Énergie Atomique (CEA), Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA), National Institute of Research and Development for Cryogenics and Isotope Technologies (ICIT)	430
F4E-2009-GRT-047 (DV-GP)	System-level optimisation of the ITER magnetics diagnostic and R&D/ Design of magnetic sensors assemblies - Part A - Subtasks 1-3	C.R.E.A.T.E. (Consorzio di Riserca per L'Energia e le Applicazioni Tecnologiche dell 'Electtromagnetismo), Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA)	1 400
F4E-2009-GRT-048-01	Design Verification of the Electron Cyclotron Power Supply System for ITER	Ecole Polytechníque Fédérale de Lausanne (EPFL), Centre de Recherches en Physíque des Plasmas (CRPP), Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA)	129
F4E-2009-GRT-049-01	Design and Development of the European Gyrotron	Karlsruhe Institute of Technology (KIT), Ecole Polytechníque Fédérale de Lausanne (EPFL) - Centre de Recherches en Physíque des Plasmas (CRPP), Research Unit of the Associatíon E uratom-Hellenic Republíc (HELLAS), Istituto di Fisica del Plasma, Consiglio Nazionale delle Rícerche (CNR)	916
F4E-2010-GRT-050 Task 1 (ES-SF)	In-Vessel Dust Management: Development of In-Vessel Dust Measurement Techniques -Task 1 (DEM)	Commissariat à l'Énergie Atomique et aux Energies Alternatives (CEA)	144
F4E-2010-GRT-050 Task 2 (ES-SF)	In-Vessel Dust Management: Development of In-Vessel Dust Measurement Techniques - Task 2 (CDM)	Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V - Institut für Plasmaphysik (IPP)	215
F4E-2010-GRT-050 Task 3 (ES-SF)	In-Vessel Dust Management: Development of In-Vessel Dust Measurement Techniques - Task 3 - Hot Dust Measurement (HDM)	Karlsruhe Institute of Technology (KIT)	95
F4E-GRT-051-01 (MS-RH)	Activities related to the design of the ITER Neutral Beam Remote Handling System	United Kingdom Atomic Energy Authority (CCFE)	541
F4E-GRT-054-01 (PMS-H.CD)	Tests with the Refurbished 2 Mw 1st Prototype Gyrotron	Ecole Polytechníque Fédérale de Lausanne (EPFL), Centre de Recherches en Physíque des Plasmas (CRPP)	318
F4E-GRT-055-01	Study of Power and Particle Fluxes to plasma-facing components during ELM Control by in-vessel coils in ITER and Evaluation of plasma response effects	Forschungszentrum Jülich GmbH (FZJ)	243
F4E-GRT-056 ACTION 2 (ES-AC)	Nuclear Data Experiments and Techniques	Consortium for Nuclear Data studies/experiments in support of TBM activities (ENEA, KIT, AGH-UST, JSI, NPI)	280
F4E-GRT-143	Divertor RH design updates and DTP2 Phase 2 testing	Valtion teknillinen tutkimuskeskus (VTT), TUT-Foundation (Tampere University of Technology)	1 235
F4E-GRT-156 (SB-PS)	R&D / Design of sensors for the ITER Magnetics Diagnostic: Design of the Outer Vessel steady state discrete sensor system	VTT Technical Research Centre of Finland	170
F4E-GRT-158 (PNS-VTP)	Analysis of TCWS PHTS in relation to leak localisation strategies	Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA)	126
F4E-GRT-243 (ES-MF)	Corrosion assessment for water cooled components	Studsvik Nuclear AB	101

Agreement Reference	Agreement Title	Beneficiary	Amount (in kEUR)
F4E-GRT-254 (PNS-TBM)	Tritium Migration Modeling and Conceptual Design of the Tritium Accountancy Systems for the European Test Blanket Systems: Action I: Determination by modeling of the amount of tritium accountable per unit time in HCLL and HCPB-TBS; Action II: Development of the conceptual design of the tritium accountancy systems for HCLL and HCPB-TBSs	Karlsruhe Institute of Technology (KIT), Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile (ENEA)	172
F4E-GRT-255-01 (PMS-PE)	Self Consistent Simulations of Plasma Scenarios in ITER	United Kingdom Atomic Energy Authority, Culham Centre for Fusion Energy (CCFE), Commissariat à l'Énergie Atomique et aux Energies Alternatives (CEA), Consorzio di Ricerca per l'Energia e le Applicazioni Tecnologiche dell'elettromagnetismo (C.R.E.A.T.E), Ecole Polytechnique Fédérale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP), Technische Universität Wien (TU Wien)	264

ITER TASK AGREEMENTS

Reference	Title	Credited Amount (in kEUR)	Actual Closed Date
C11PP168FE	Eddy Current Analysis of the Magnet Structures (1.1EU5)	1.2	08/04/2010
C11PP169FE	Support for Conductor Analysis (1.1EU1, 1,1EU2)	1	29/11/2010
C11TD162FE	Modelling Work to Support the ITER Conductor Tests in Sultan	80	29/09/2010
C16PP141FE	Blanket EM Benchmarking Analyses	2.5	26/08/2010
C16TD144FE	First Wall Blanket Panel Manufacturing Cost Assessment of Enhanced Heat Flux v Low Heat Flux Technology (EU)	30	11/03/2010
C19TD15FE	EU Physics Tasks on Plasma-Wall Interactions	13.4	11/03/2010
C19TD17FE	EU Physics Tasks on Sideways Force during Asymmetric VDEs		08/03/2010
C19TD19FE	Task on Control of Resistive Wall Modes		07/12/2010
C23TD42FE	Neutral Beam Remote Maintenance System Design	2	25/03/2010
C23TD49FE	DTP2 operations – Phase 1	900	08/12/2010
C51PP34FE	Integration of RF system components (5.1EU1)	0.3	31/08/2010
C52TD24FE	Design Analysis and Testing of the Upper Launcher and Port Plug for the ITER ECH&CD System		22/01/2010
C53PP37FE	Development of codes for applications in the ITER NB&DNB injectors(5.3EU3)	1	28/01/2010
C53PP42FE	Design activities for the ITER Neutral Beam Injector	18.7	26/07/2010
C53TD52FE	Design of the components for the neutral beam system	1749	06/04/2010
C55PP26FE	Detailed design of the in-vessel magnetic sensor common mechanical and electrical platform (5.5EU3)	0.5	25/10/2010
C81TD33FE	Complementary Activities to ITA 81-15 for ITER Licensing	820	22/01/2010
C81TD36FE	Detailed Analyses of Reference Event Scenarios (2)	250	27/09/2010
DWO-11-183-JKR-EU	CAD-Eng-EU: Cad/Engineering works to support the ITER procurement arrangement specification (EU)	70	30/11/2010
DWO-23-114-JPR-EU	TA-CAD/Eng-EU: CMM + SCEE configuration model	7	17/09/2010
DWO-23-115-JPR-EU	TA-CAD/Eng-EU: IVVS Design	21	17/09/2010
DRWG6-EU-01	Study and resolution of Issue Cards on Electron Cyclotron Launcher design, performance and (on-site) testing	0.8	23/04/2010
DRWG6-EU-03	Technical Analysis of the Critical Issues associated with the Electron Cyclotron Transmission Lines	0.2	27/05/2010
G15TD65FE	Fabrication and testing of the back-side protection of the VV/Port field joints (Phase1)		29/09/2010
G15TD66FE	E-Beam welded Vacuum Vessel Poloidal Segment		29/09/2010
G16TD118FE	Qualification of the Blanket FW fabrication methods (Part 1)		22/01/2010
G17TD28FE	Preparations to writing of divertor specifications. Development of acceptance criteria for HHF elements		13/04/2010
G17TD33FE	Effects of ELMs on ITER Divertor Armour Materials	4	11/03/2010
G17TD38FE	Continue 1) characterisation of effects of ELMs and disruptions on ITER divertor armour materials; 2) damage of low-Z materials (to mimic Be) arising during ELMs, VDEs and disruptions.	5.8	11/03/2010
G17TD42FE	Continue investigation of mixed-material effects.	1.4	11/03/2010
G17TD47FE	Manufacture of Qualification Vertical Target Prototypes for ITER		28/01/2010
G74TD04FE	R&D on in-vessel materials qualification		25/08/2010

Reference	Title	Credited Amount (in kEUR)	Actual Closed Date
G81TD26FE	Preparation of the three mandatory regulatory files allowing to obtain the ITER construction permit (DAC: Décret d'Autorisation de Création) and the authorization for water intake and effluent emission (AARPE: Arrêté d'Autorisation de Rejets et Prélèveme	28.4	22/01/2010
G81TD28FE	Occupational safety to ensure worker safety and preliminary assessments to support licensing		19/08/2010
N11TD138FE	Conceptual Design of HTS Current Leads for the ITER TF, CS, OF and CC Coils	0.5	13/01/2010
N11TD157FE	Design Study of a Nb3Sn P1/P6 Coil for ITER	1.5	03/09/2010
N11TD158FE	Stress Analysis for the ITER Coils	2	18/10/2010
N53TD32FE	Detailed design of an absolute valve between the torus and the ITER Neutral Beam Injector	1.25	08/03/2010
N53TD34FE	NBI cell maintenance design change proposal; study on access constraint and dose estimates	1	08/03/2010

ITER CALLS FOR NOMINATION OR EXPERTISE MANAGED BY F4E

F4E Ref. No.	ITER Ref. No.	Title	Deadline
57	ITER/C4T/09/1766	"Framework contract to develop tools to support CODAC self-description"	15/01/2010
58	ITER/C4N/10/106	"Provision of Engineering Models for Plasma Feedback Control and Protection"	22/02/2010
59	ITER/C4N/10/105	"Provision of Network and Security Solutions including Services"	15/02/2010
60	ITER/C4T/10/2310	"Project Management Support"	02/12/2010
61	ITER/C4N/10/106	"Support to the ITER Finance and Budget Division"	17/02/2010
62	ITER/C4N/10/115/RTS	"Laboratory studies of material damage on and dust generation from beryllium and beryllium coated surfaces under transient plasma heat loads"	26/02/2010
63	ITER/C4T/10/2551/OKA	"Experimental validation of replacement of molecular sieve driers with scrubber columns in the ITER atmosphere Detritiation System"	13/04/2010
64	ITER/C4N/10/118/PMT	"Cryogenic thermometers of resistive type for ITER magnets"	14/04/2010
65	ITER/C4N/10/119/PMT	"Strain gage and displacement potentiometer measuring chains for ITER magnets"	14/04/2010
66	ITER/C4T/10/061/OKA	"Vacuum Vessel Assembly"	14/04/2010
67	ITER/C4N/10/120/PMT	"Optical Sensors for ITER Magnets"	05/05/2010
68	ITER/CFN/I0/2751	"Radiation maps"	05/06/2010
69	ITER/C4T/10/2822/OKA	"Cable Engineering Support Services"	16/05/2010
70	ITER/C4N/10/121/RMN	"IT consultancy and assistance"	16/05/2010
71	ITER/C4N/10/127/BGD	"Services to design and supply Instrumentation & Control Technology for Mini-CODAC, Network" Equipment, Plant System Host and Fast Controller	30/05/2010
72	ITER/C4N/10/126/RTS	"Investigation of laser spectroscopic methods and applicability to ITER for Leak Localisation"	28/05/2010
73	ITER/CFN/10/130/BGD	"Web Application Development Support for ITER IO"	17/06/2010
74	ITER/CFN/10/128/BGD	"Services to provide Internal Configuration Guidelines of I&C Cubicles and Supply small batch of I&C Cubicles"	24/06/2010
75	ITER/C4N/10/131/RTS	"Detailed design and Integration of Tritium Plant building layout and sub-systems"	06/07/2010
76	ITER/C4N/10/132/RTS	"Concept Design - Fast Deployment Device for ITER"	06/08/2010
77	ITER/CFT/10/2912/RTS	"Conceptual design of Tritium Plant Automatic Control system"	20/06/2010
78	ITER/CFT/10/2756/RTS	"Development of Tritium Accountancy and Tracking Programme"	22/06/2010
79	ITER/C4N/10/133/IJC	"Global logistics service provider and transport insurance"	07/09/2010
80	ITER/C4N/10/135/RTS	"Development of a water flow restrictor for ITER "	07/08/2010
81	ITER/C4N/10/134/RTS	"Design, Fabrication, Installation and Commissioning of the Helium Refrigerators for ITER"	15/07/2010
82	IO/10/CFN/3444/CFN	"Framework contract - Engineering support for machine assembly and installation "	17/08/2010
83	ITER/CFN/10/138/PBS	"New telephony infrastructure for ITER IO site of Cadarache"	18/08/2010
84	IO-CFN-10-3262	"Conceptual Design of the Analytical System"	09/03/2010
85	ITER/CFT/10/3552/JPK	"Test Programme and Qualification Trials of Shear Keys in the Inner Intercoil Structure"	27/09/2010
86	ITER/10/3429/CFE	"Engineering Work and Monitoring Manufacture of the TF Coils and Feeder system"	10/07/2010
87	ITER/10/3446/CFE	"Safety and Licensing document support"	22/10/2010
88	ITER/C4N/10/3751/JTR	"A Dependability Analysis and Software Tools for the ITER Central Interlock System"	18/10/2010

F4E Ref. No.	ITER Ref. No.	Title	Deadline
89	IO/I0/3287/CFN	Blanket Support System Customisation	18/10/2010
90	ITER/10/3002/CFE	“Technical Officer for Integration and Diagnostics Support on the ITER Diagnostics”	28/10/2010
91	ITER/10/3906/CFE	“Support Services to ITER Diagnostics on extended sensors”	17/11/2010
92	ITER/10/3908/CFE	“Support Services to ITER Diagnostics on discrete sensors”	17/11/2010
93	ITER/10/3980/CFE	“Remote Handling System R&D Engineer Services”	01/02/2011
94	ITER/CFN/10/3902/PBS	"Support of the Finance & Budget Division"	29/11/2010
95	IO/I0/4072/CFE	Expert Welding Support	26/11/2010
96	ITER/CFE/10/3999/JTR	"Diagnostics Physicist-Engineer to work on ITER"	22/11/2010
97	ITER/CFE/10/3998/JTR	“A specialist diagnostics Expert for Edge Physics on ITER”	24/11/2010
98	ITER/CFE/10/4008/JTR	“Specialist Diagnostics Expert for Neutrons and Fusion Products on ITER”	29/11/2010
99	ITER/IO/10/4074/CFE	“Engineering Work for the Instrumentation of Coils and Feeders from the ITER Magnet System”	30/11/2010
100	ITER/CFN/10/4226/CZN	“Framework contract for the Design, Procurement Assistance, Support of Access Control and Security Systems”	12/09/2010
101	ITER/10/1000/CFE	“Integration and Engineering support”	12/10/2010
102	IO/CFE/10/4017/CFE	“Engineering Work for the HTS current leads for the ITER”	12/10/2010
103	IO/10/4040/CFN	"Engineering Support for Electrical Engineering Division”	01/10/2011
104	IO/10/4339/CFE	“Support of safety design conformance with requirements”	15/12/2010
105	IO/10/4197/CFN	"Systems and Services to support the Assembly, Commissioning, Start-Up and Operations phases of ITER"	17/01/2011
106	IO/10/4255/CFE	“RH Mechanical System Engineer Services”	17/01/2011

STATUS OF EFDA CONTRACTS

Status	Contracts / Tasks transferred to F4E in April 2008	Contracts Closed by 31/12/2009	Contracts Closed by 31/12/2010	Contracts Ongoing on 31/12/2010	Invoices Processed (MEUR)
Art. 7	40	27	33	7	19.3
Art. 7 (ESC)	27	23	27	0	
Art. 5.1b	331	249	300	31	21.6
Art. 5.1a	203	111	155	48	-
Total	601	410	515	86	40.9

Annex III

Risk Management

RISK MANAGEMENT

The risk management activity for the ITER project includes three main parts: (i) the analysis of event risks, (ii) the risks assessments for the different systems, (iii) the schedule uncertainty analysis. As far as the event risk analysis is concerned, in 2010 F4E identified the following top 10 event risks for the ITER project.

ITER Risk No.	Category	Risk	Risk Score (normalised)
5	Management and Management Systems	Systems to govern and manage the project are ineffective (separation of responsibilities for design and financing)	1
5 BIS	Management and Management Systems	Systems to govern and manage the project are ineffective (separation of responsibilities for design and schedule)	1
45	Work Scope and Schedules	Lack of contingency in the schedule in a number of critical issues	1
11	Management and Management Systems	Safety Regulations / License Conditions are breached, causing delays or cost over runs	0.8
56	Design and Engineering Integration	Designs are not frozen following final design review	0.64
56 BIS	Design and Engineering Integration	Designs are not completed in time for scheduled manufacture	0.64
57	Design and Engineering Integration	Poor interface definition leads to integration failure	0.64
24	Management and Management Systems	Change process is slow and delays project	0.64
63	Design and Engineering Integration	Drawings and models will be produced and delivered late	0.64
37	Work Scope and Schedules	Lack of scope clarity will cause the schedule or cost estimate to be exceeded	0.6

As far as the risk scores are concerned, F4E is following a methodology proposed by the ITER IO in which values were assigned to the likelihood of occurrence, cost impact, schedule impact and technical impact according to the following tables. The normalisation was calculated by normalising each score to the highest score achieved.

Risk Probability / Impact Matrix (PID)			
Consequence Category	**Definition**		
	Cost: Impact on project costs	**Schedule: Impact on project schedule**	**Technical: Impact on performance**
Crisis	Cost estimates unacceptably exceed the budget. There is a potential for a >40% kIUA impact of a procurement arrangement allocation budget or cost change (i.e. either increase or decrease) in the Construction or life-cycle cost of an individual subsystem.	Any impact to a Milestone (Level 0) > 40% delay in delivery of an item ON the project's Critical Path	Catastrophic threat to facility(s), mission, environment, or people, possibly causing loss of mission, long-term environmental abandonment and/or death.
Critical	Cost estimates seriously exceed the budget. There is a potential for a >20% kIUA impact of a procurement arrangement allocation budget or cost change (i.e. either increase or decrease) in the Construction or life-cycle cost of an individual subsystem.	Any impact to a Milestone (Level 1). > 10% but < 20% delay in delivery of an item ON the project's Critical Path, or > 20% but < 40% of the time allocated to an activity NEAR the Critical Path.	Serious threat to facility mission, environment, or people, possibly completing only portions of the mission or requiring major equipment redesign or rebuilding, extensive environmental remediation or intensive medical care for life-threatening injury.
Significant	Cost estimates significantly exceed budget. There is a potential for a >10% kIUA impact of a procurement arrangement allocation budget or cost change (i.e. either increase or decrease) in the Construction or life-cycle cost of an individual subsystem.	Any impact to a Milestone (Level 2). > 1% but < 10% delay in delivery of an item ON the project's Critical Path, or > 10% but < 20% of the time allocated to an activity NEAR the Critical Path.	Significant degradation in modification/project technical performance. Significant threat to facility mission, environment or people, requires some equipment redesign or repair, significant environmental remediation or causes injury requiring medical treatment. Project goals may not be met (essential performance parameter not met).
Marginal	There is a marginal impact in Construction or life-cycle cost between 1 - 10% of Negotiated kIUA. Costs marginally exceed budget.	Activities on the Critical Path, Milestones are NOT affected, but activities near the Critical Path or Level 3 milestones could be affected. (i.e. deal > 1% but < 10%)	Marginal performance shortfall, but workarounds available; risks might impact project goals if not mitigated.
Negligible	There is negligible increase in Construction or life-cycle cost (i.e. < 1% of Negotiated kIUA).	The effects of this risk would only be felt by activities not near the Critical Path, and the impacts are mitigated below Level 3 milestones. Schedule impacts can be covered with available float. (i.e. delay < 1%)	Negligible degradation, performance falls below upper end of goal; project goals can still be met.

Event Risk Assessment Matrix [Level of THREAT]					
	Impact				
Likelyhood of Occurrence	Negligible	Marginal	Significant	Critical	Crisis
	[1]	[2]	[3]	[4]	[5]
Very Likely [5]	Medium	High [IODA]	High [IODA]	Very High [MAC]	Very High [IC]
Likely [4]	Medium	Medium	High [IODA]	High [IODA]	Very High [MAC]
Possible [3]	Low	Low	Medium	High [IODA]	High [IODA]
Unlikely [2]	Very Low	Low	Low	Medium	Medium
Very Unlikely [1]	Very Low	Very Low	Low	Low	Medium

Annex IV

Composition of the Bodies and Committees[1]

1 *On 31 December 2010*

COMPOSITION OF THE GOVERNING BOARD

Chair	Carlos	Varandas		
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	Peter	Sloth	Gorm	Bramsnaes
Estonia	Rein	Kaarli	Ergo	Nömmiste
Euratom	The Director General for DG Research and Innovation of the European Commission		The Director of the Directorate Energy of the European Commission	
Finland	Seppo	Karttunen	Juha	Linden
France	Bernard	Bigot	Florent	Staley
Germany	Harald	Bolt	Beatrix	Vierkorn-Rudolph
Greece	Anastasios	Youtsos	Christos	Vasilakos
Hungary	Erika	Jároli	Sándor	Zoletnik
Italy	Romano	Toschi	Aldo	Pizzuto
Latvia	Maija	Bundule	Andris	Šternbergs
Lithuania	Sigitas	Rimkevicius	Stanislovas	Žurauskas
Luxembourg	Léon	Diederich	Pierre	Decker
Malta	Ian	Gauci Borda	Nicholas	Sammut
Netherlands	Cor	Katerberg	Niek	Lopes Cardozo
Poland	Łukasz	Ciupinski	Leszek	Grabarczyk
Portugal	Carlos Matos	Ferreira	Maria Helena Alves	Ramos
Romania	Florin	Buzatu	Florin	Spineanu
Slovakia	Stefan	Matejcik	Jozef	Pitel
Slovenia	Jože	Duhovnik	Milan	Cercek
Spain	Joaquín	Sánchez Sanz	Carlos	Martinez-Riera
Sweden	James	Drake	Sven Anders	Flodström
Switzerland	Andreas	Werthmueller	Minh Quang	Tran
United Kingdom	Steve	Cowley	Stuart	Ward
Secretariat	Raymond	Monk		
Assistant	Melanie	Nolan		

COMPOSITION OF AD-HOC GROUPS

F4E Industrial Policy Working Group		
Chair	F4E Director	
Member	Adelbert	Goede
Member	Chris	Ibbot
Member	Lisbeth	Grønberg
Secretariat	Raymond	Monk

F4E Improvement Working Group		
Chair	Stuart	Ward
Member	Euratom	
Member	Cor	Katerberg
Member	Florent	Staley
Member	Beatrix	Vierkorn-Rudolph
Member	Carlos	Martinez-Riera
Secretariat	Raymond	Monk
	Giancarlo	Sordon

COMPOSITION OF THE EXECUTIVE COMMITTEE

Member	The Head of Unit of J3 of the Research Directorate General of the European Commission	
Chair	Karl	Tichmann
Vice-Chair	Lisbeth	Grønberg
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
Secretariat	Raymond	Monk
Assistant	Melanie	Nolan

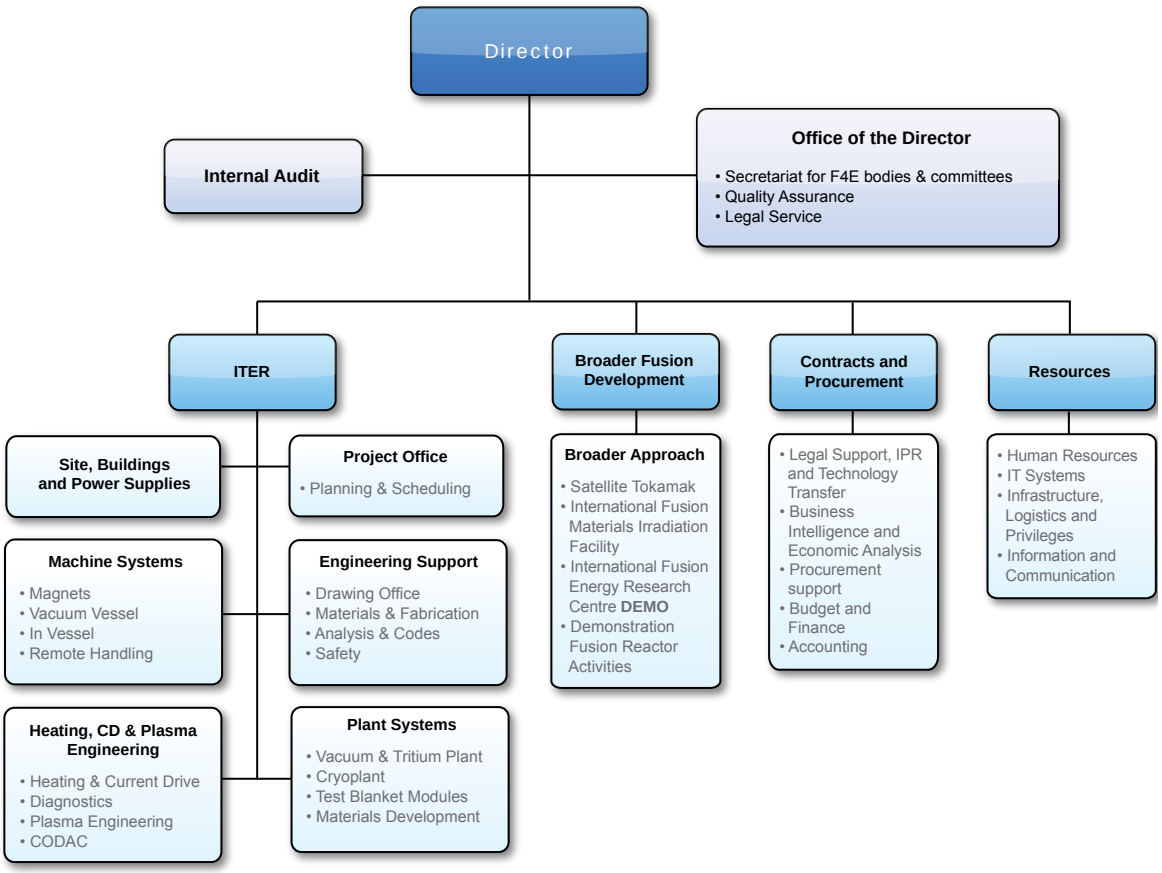
COMPOSITION OF THE TECHNICAL ADVISORY PANEL

Chair	Minh Quang	Tran
Vice-Chair	Derek	Stork
Member	Enrique	Ascasíbar
Member	Paola	Batistoni
Member	Horacio	Fernandes
Member	Fedor	Gömöry
Member	Remmelt	Haange
Member	André	Grosman
Member	Vincent	Massaut
Member	Jaroslav	Mizera
Member	Olaf	Neubauer
Member	Mathias	Noe
Member	Marek	Rubel
Secretariat	Susana	Clement
Assistant	Cali	Raynaud

Annex V

Organisational Chart

ORGANISATIONAL CHART *(on 31 December 2010)*



Annex VI

Implementation of the 2010 Budget

Revenue				Expenditure										
Origin of Revenue	Revenue entered in the final budget for the financial year		Revenue collected	Allocation of expenditure		Appropriations under the final budget					Appropriations carried over from the previous financial year		
						entered	committed	paid	carried over	cancelled	available	paid	cancelled
Community subsidies	CA	374 240	224 696	Title I Staff		25 367	25 246	22 557	1 901	908	1 843	1 168	676
	RO	224 696											
Membership contributions	CA	3 400	2 946	Title II Administration		6 266	6 084	1 814	4 270	183	5 724	4 252	1 473
	RO												
ITER host state contribution	CA	66 500	8 000	Title III operating activities	CA	346 007	346 007	-	0	0	0	-	-
	RO	13 600			PA	196 462	-	145 749	0	50 713	0	-	-
Other revenue	CA	pm	141	Earmarked revenue (*)	CA	173 370	172 288	-	1 082	0	3 659	-	-
	RO				PA	65 870	-	16 266	49 604	0	52 166	-	-
TOTAL	**CA**	**444 140**	**235 782**	**TOTAL**	**CA**	**551 010**	**549 625**	**-**	**7 254**	**1 091**	**11 227**		
	RO	**241 696**			**PA**	**293 966**	**-**	**186 386**	**55 776**	**51 804**	**59 734**	**5 419**	**2 148**

(*) Expenditure on earmarked revenue are cumulative amounts over the years

RO - Entitlements established

CA - Commitment appropriation

PA - Payment appropriation

Annex VII

ITER Credit Allocation

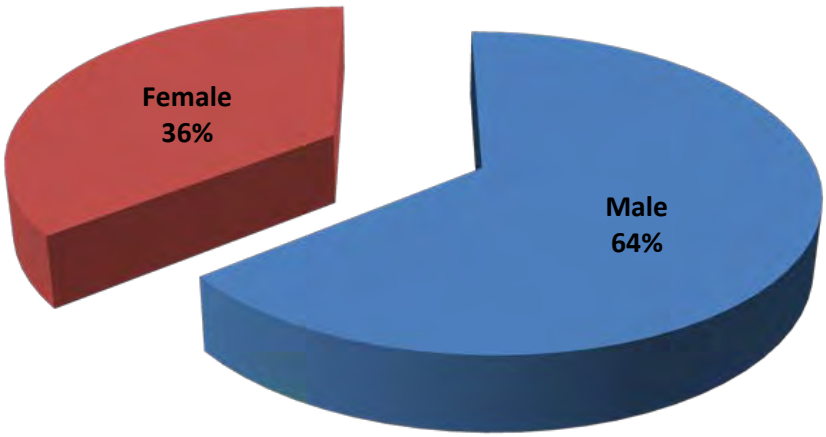
ITER CREDIT ALLOCATION

	Description	Date	Credit (IUA)
1	EU Seconded Staff first quarter 2010	21 Apr 10	609.91
2	EU Seconded Staff second quarter 2010	19 Jul 10	586.83
3	EU Seconded Staff third quarter 2010	22 Oct 10	531.78
4	EU Seconded Staff fourth quarter 2010	20 Dec 10	533.32
*	EU Seconded Staff EUR/IUA rate correction for previous years	31 Dec 10	7.12
5	Task Agreement No: C16TD144FE	13 Apr 10	30.00
6	Task Agreement No: C53TD52FE	13 Apr 10	1749.00
7	Task Agreement No: C81TD33FE	13 Apr 10	820.00
8	Task Agreement No: CAD - Eng-EU	22 Sep 10	28.00
9	Task Agreement No: C81TD36FE	29 Sep 10	250.00
10	Task Agreement No: C11TD162FE	30 Sep 10	80.00
11	Task Agreement No: C23TD49FE	09 Dec 10	900.00
12	Task Agreement No: CAD - Eng-EU	10 Dec 10	21.00
13	Procurement Arrangement No: 6.2.P2.EU.02	28 Apr 10	2740.00
14	Procurement Arrangement No: 6.2.P2.EU.03	28 Apr 10	1550.00
	TOTAL		**10 436.96**

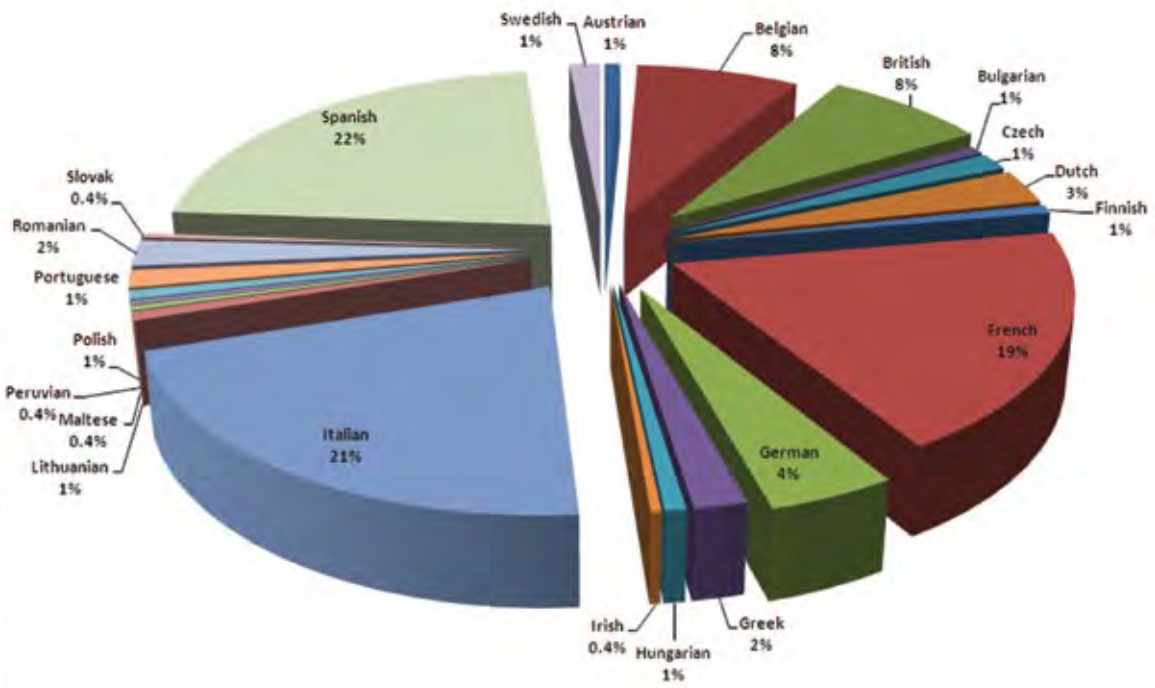
Annex VIII

Staffing Statistics

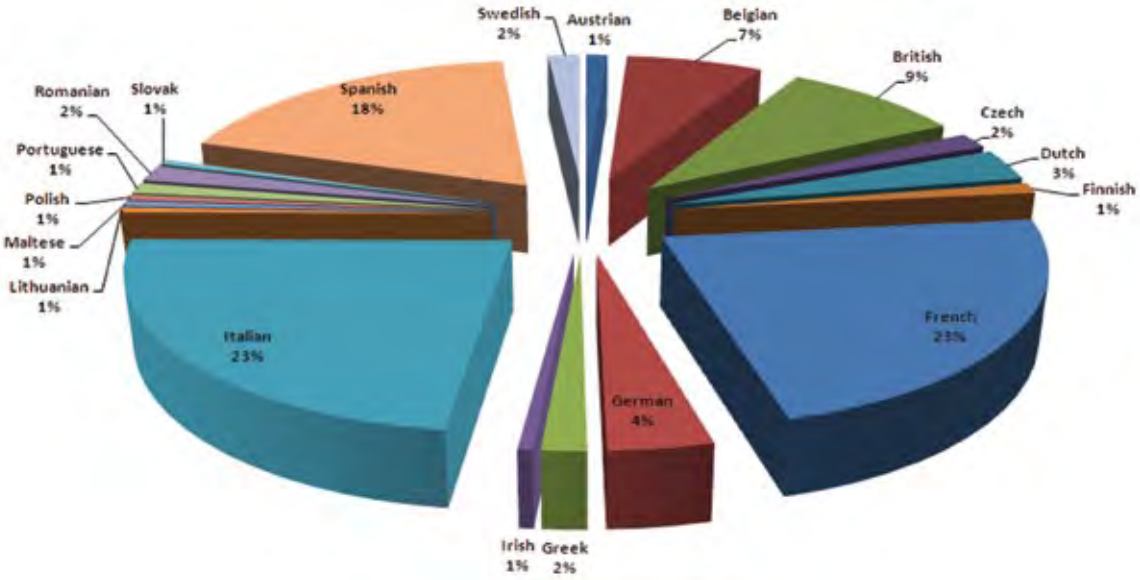
GENDER - ALL STAFF



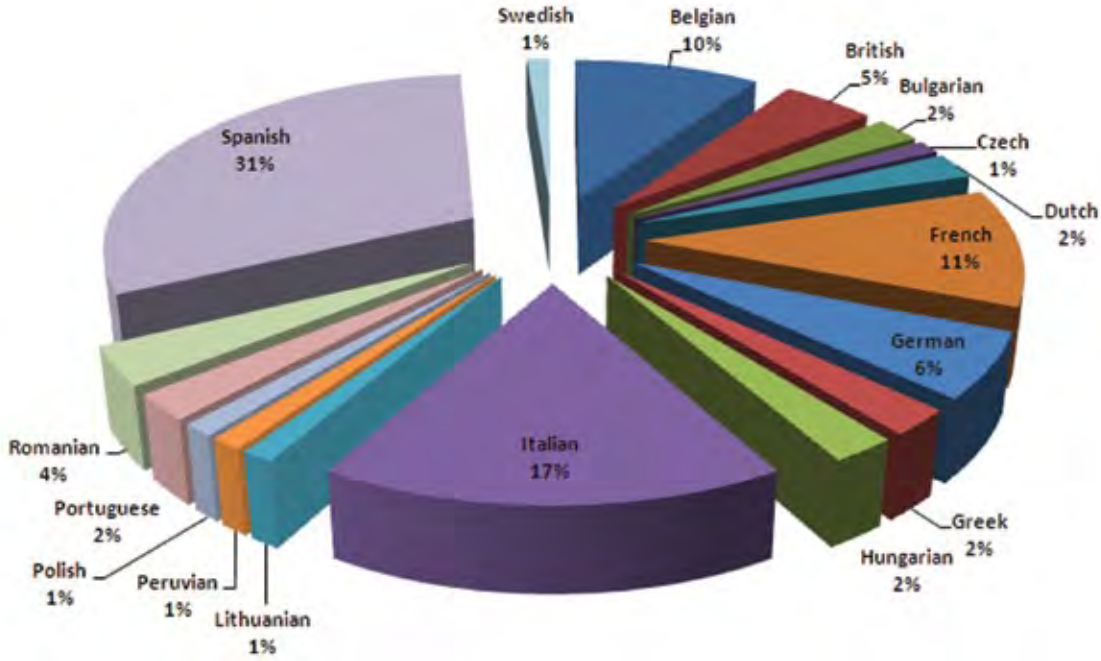
NATIONALITY - ALL STAFF



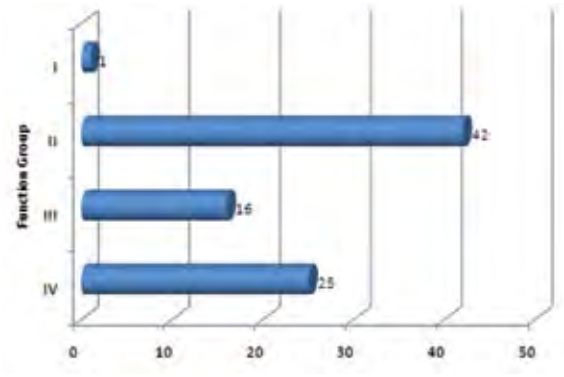
NATIONALITY - OFFICIALS AND TEMPORARY AGENTS



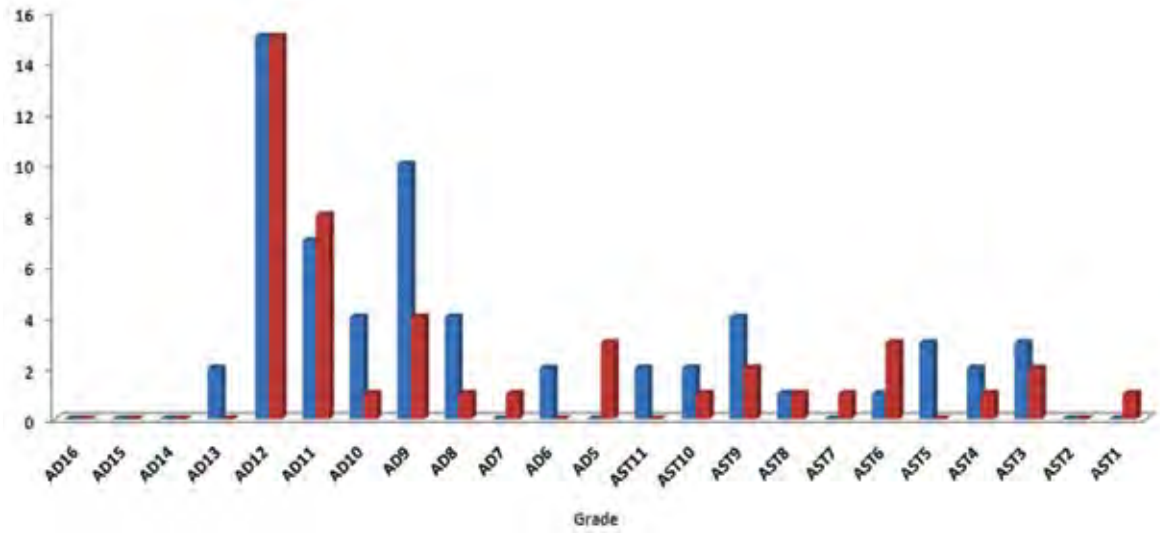
NATIONALITY - CONTRACT AGENTS



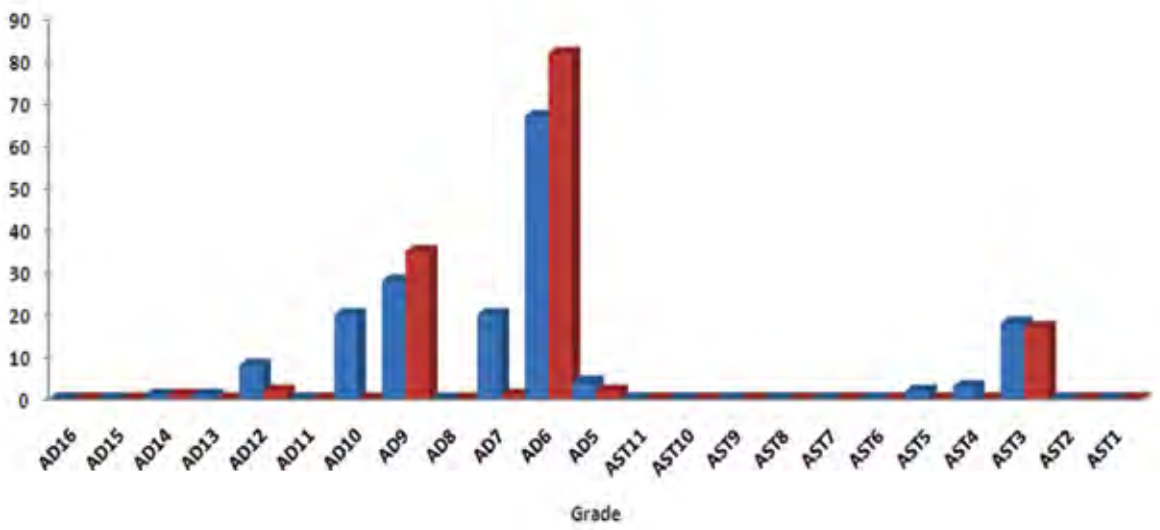
CONTRACT AGENTS BY FUNCTION GROUP



OFFICIAL POSTS - OCCUPIED (RED) VS AUTHORISED (BLUE)



TEMPORARY AGENTS - OCCUPIED (RED) VS AUTHORISED (BLUE)



Annex IX

Declaration of Assurance

DECLARATION OF ASSURANCE

I, the undersigned, Frank Briscoe, Director of the European Joint Undertaking for ITER and the Development of Fusion Energy 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 judgment 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 lessons learnt from the annual reports of the Court of Auditors for the two years prior to this declaration, the preliminary observations of the Court of Auditors for 2010, the work of F4E Internal Auditor, in particular the internal audit report on F4E financial circuits (completed in May 2010) and the reports by F4E's authorising officers by delegation on the building blocks to the declaration of assurance, make the following reservation:
- Although, by the end of 2010, an action plan was developed in response to the aforementioned internal audit report and its implementation started, the Internal Control Systems in place at F4E were not yet fully implemented and thus did not as yet provide reasonable assurance regarding the achievement of the objectives assigned to financial circuits.
- 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
30 May 2011

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

Annex X

Analysis and Assessment by the Governing Board

ANALYSIS AND ASSESSMENT BY THE GOVERNING BOARD

THE GOVERNING BOARD OF FUSION FOR ENERGY:

HAVING REGARD to the opinions of the Technical Advisory Panel and Executive Committee during on the draft 2010 F4E Annual Report during their meetings of 5 and 12 May 2011 respectively,

- Acknowledges the overall achievements presented in the 2010 Annual Activity Report of Fusion for Energy (F4E) and the strong commitment shown by the Director and staff during a challenging period;
- Acknowledges the progress made with the ITER site preparation notably the completion of levelling and start of excavations as well as the beginning of the construction of the Poloidal Field coil fabrication building;
- Acknowledges the work conducted by F4E to analyse the implications of the updated ITER schedule and to update its own plans leading to approval by the Competitiveness Council of a revised budget, which ultimately allowed Euratom to approve the revised ITER schedule in the ITER Council in November 2010;
- Welcomes the efforts being made by the F4E Director to implement a more project-orientated organisation, develop industry-standard reporting tools and processes as well as to contain costs and rebuild F4E's contingency;
- Notes the increased level of contracting in 2010 with the placing of 51 contracts and 23 grants for a total awarded value of EUR 840 million and the conclusion of nine Procurement Arrangements for ITER and the Broader Approach;
- Notes that while the budget for commitments was almost fully implemented at 99.9%, the level of budget implementation for payment appropriations is below 65% and urges F4E to make improvements and to ensure that all the necessary monitoring systems are in place;
- Acknowledges that more information on progress is presented by F4E, but urges F4E to make further improvements in this area including the use of earned value reporting and additional key performance indicators;
- Notes the event risk analysis that is presented for the ITER project, and invites F4E to review its own high-level corporate risk register and put in place appropriate mitigation plans;
- Notes that the model Framework Partnership Agreement was approved by the Executive Committee and urges F4E to make full use of this new tool;
- Encourages F4E to continue its close collaboration with the ITER IO and in particular with the newly appointed Director General and his management team;
- Invites F4E for the 2011 Annual Report to propose to the Governing Board ways to improve the complementarity of the financial information presented in the Annual Report and the Annual Accounts.

For the Governing Board

Professor Carlos Varandas
Chair of the F4E Governing Board
1 June 2011

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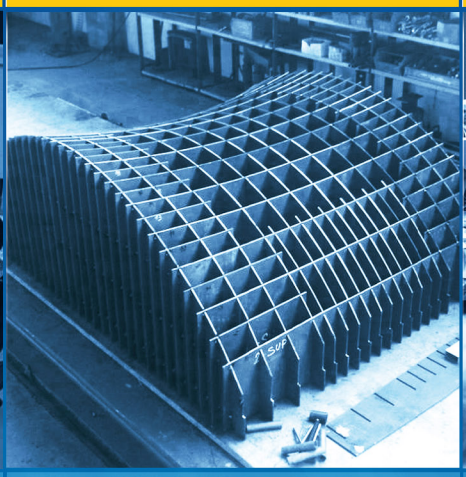

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