FUSION FOR ENERGY

The European Joint Undertaking for ITER and the Development of Fusion Energy

THE GOVERNING BOARD

DECISION OF THE GOVERNING BOARD ADOPTING THE FIRST AMENDED 2017 WORK PROGRAMME OF FUSION FOR ENERGY

The Governing Board,

Having regard to the Statutes annexed to the Council Decision (Euratom) No 198/2007 of 27 March 2007 establishing the European Joint Undertaking for ITER and the Development of Fusion Energy (hereinafter "Fusion for Energy") and conferring advantages upon it[1], and in particular Articles 6(3)(d) and 11 thereof;

Having regard to Council Decision N° 791/2013 of 13 December 2013 amending decision 2007/198/EURATOM establishing the European Joint Undertaking for ITER and the Development of Fusion Energy and conferring advantages upon it[2]

Having regard to the Financial Regulation of Fusion for Energy[3] adopted by the Governing Board on 22 October 2007, last amended on 2nd December 2015[4] (hereinafter "the Financial Regulation"), and in particular Title III thereof;

Having regard to the Implementing Rules of the Financial Regulation[5] adopted by the Governing Board on 22 October 2007, last amended on 2nd December 2015[6] (hereinafter "the Implementing Rules"), and in particular Title III thereof;

Having regard to the comments and recommendations of the Administration and Management Committee and the Technical Advisory Panel;

Whereas:

(1) The Director should, in accordance with Article 8(4)(c), draw up an annual work programme;

(2) The Governing Board should adopt the work programme.

Has adopted this decision:

Article 1

The 1st Amended 2017 Work Programme of Fusion for Energy annexed to this Decision is hereby adopted.

1 OJ L 90, 30/03/2007, p. 58

2 OJ L 349, 21/12/2013 p.100-102

3 F4E(07)-GB03-11 Adopted 22/10/2007

4 F4E(11)-GB34-10c Adopted 02/12/2015

5 F4E(07)-GB03-12 Adopted 22/10/2007

6 F4E(13)-GB34-14.2 Adopted 02/12/2015

Article 2

The Governing Board hereby delegates to the Director of Fusion for Energy the power to make non-substantial amendments to the 1st amendment of the Work Programme approved by the Governing Board. Amendments are considered to be "non-substantial" if:

(a) they do not lead to an increase of:

i. more than 10% of the Financial Resources allocated to the corresponding Action in the Annex V of the annual Work Programme for the year, or more than EUR 0,2 million for Actions with allocation of below EUR 2 million for the year; and
ii. more than 3% of the total operational expenditure in Title 3 of the annual Budget for the given year

and if :

(b) any related changes to the scope of the annual Work Programme do not have significant impact on the nature of the Actions or on the achievement of objectives of the multiannual Project Plan.

Non-substantial amendments shall not lead to any increase in the total operational expenditure for Title 3 of the annual Budget approved by the Governing Board."

Article 3

This Decision shall have immediate effect.

Done at Cadarache, 4 July 2017

For the Governing Board

Joaquin Sanchez
Chair of the Governing Board

For the Secretariat

Romina Bemelmans
Secretary of the Governing Board

FUSION FOR ENERGY

1st Work Programme amendment

2017

Fusion for Energy

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Work Programme 2017 1st Amendment

1. Annual Programming

1.1. Executive summary for the annual work programme 2017 1st amendment

This Work Programme 2017 (WP17) 1st amendment offers an overview of the objectives of the European Joint Undertaking for ITER and the Development of Fusion Energy (F4E) for 2017 and also identifies the financial decisions for the actions that will have to be carried out in 2017 with the available budget.
It covers the work on both ITER and Broader Approach (BA) according to the tasks entrusted to the organization.
As for ITER, the task of F4E is to discharge EU obligations to deliver its share of in-kind components and cash contributions to the ITER project, about 45% of the total value of the project in the construction phase. This work is carried out under the coordination of the Central Team of the ITER Organization (IO-CT) and it creates many challenges both from the technical and from an organizational point of view. The Straight Road to First Plasma (SR2FP) exercise launched in early 2016 has focused F4E resources on the activities to achieve First Plasma (FP) in 2025 while slowing down other projects until after 2020. A suitable scenario was selected for the non-FP systems in order to avoid delays to the later machine phases and minimize over-costs. SR2FP has led to significant changes in the planning of non-FP systems and to a staged approach of the project.
As for the BA, the EU activities are carried out in the frame of the agreement, concluded with Japan, consisting in activities which complement the ITER project and accelerate the realization of fusion energy. Both parties contribute equally financially. The European resources for the implementation of the BA are largely volunteered by several participating European countries.
The 2017 objectives, the main milestones and the allocation of the human resources provide a good idea of the complexity of the tasks to be carried throughout the year and of the technical challenges they entail.

As for ITER, 2017 is mostly focused on the following activities:

- Magnets (FP): as for both Toroidal and Poloidal Field coils, all major contracts have been signed. The core of the work will be the follow-up of manufacturing, including the PF6 being built in China. For the pre-compression rings some contracts will be placed for the testing of mock-up produced during qualification. Specific contracts for inspection will be signed.
- Main Vacuum Vessel (FP): F4E will continue to drive the optimization of processes, management structures and competencies in the supplier organization as well as the addition of capacity to recover the massive delays and operational deficiencies of the past, with the objective of reaching the target dates required in the ITER schedule. This involves the use of a major engineering consultancy firm, amendments to the contract as well as the further increase of own personnel on site and tight management attention. On a more detailed perspective, it is anyway expected that, by the end of 2017, all five EU-VV sectors will have fully entered the manufacturing phase. Design activities for sector 4, in addition to sector 5, will be completed as well as the design activities for the regular poloidal segments for the sectors 2 and 3. Specific contracts for inspectors, design analysis in support of design changes generated by non-conformities, Deviation Requests and other support activities, including the follow up of the manufacturing activities, will be performed.

- Blanket System (non-FP): The main activities on the Blanket First Wall (FW) are related to the preparation of the FW Procurement Arrangement, in particular the implementation of several contracts related to design and fabrication activities for cost reduction, and the follow up of high heat flux testing activities as well as the three contracts for the FW Full Scale Prototypes. Investigations will be performed to reduce the cost of the raw material procurement and to streamline the manufacturing route for the more than 200 FW panels.
- Divertor (non-FP): The main activities in 2017 are related to the completion of the manufacture and acceptance tests of the cassette bodies (CB) full-scale prototypes, the preparation of the documentation for the launch of the CB series taking into account feedback experience gained so far and measure being investigated for the cost reduction and the signature of the contracts for the qualification of additional suppliers for the procurement of the Divertor Inner Vertical Target..
- Remote Handling (partly FP): In line with the SR2FP, only design activities will proceed with the framework contracts already in place for the four RH systems. The divertor remote handling (RH) system will continue with the preliminary design and an early start of the preparatory activities for the final design. As for the Cask and Plug RH system, the main bulk of activities for the preliminary design for one cask typology will start. For both systems the work will be mainly performed through specific contracts under on-going framework contracts. For the NB RH system in 2017 the preliminary design phase 1 will be completed and phase 2 will start. The In-Vessel Viewing system will start the main preliminary design effort by placing specific contracts under on-going framework contracts.
- Vacuum Pumping (FP): The completion of the manufacturing of the pre-production cryopump and warm regeneration lines are scheduled. The contract for the manufacturing of the MITICA cryopump will be awarded. The call for procurement of the cryostat and torus cryopump front end cryodistribution will be launched.
- Fuel Cycle: the design of the four water de-tritiation system holding and feeding tanks (FP) will be pursued and the manufacturing will be started.
- Cryoplant (FP): In 2017 the on-site installation and test phase of the ITER cryoplant will start upon building availability. For the MITICA Cryoplant contract, the preliminary design, final design and launch of the long lead items are planned to be performed in 2017.
- RF Heating & Current-Drive:
  For the Electron Cyclotron Upper Launcher (FP), a number of specific contracts are envisaged for mm-wave testing of Window, Valve and WG prototypes. Prototyping activities on the Isolation Valve (safety-important) will also continue by the signature of the prototype procurement contract. In addition, the mechanical mock-ups programme will start, with a framework contract for support and testing and a procurement contract for mock-ups manufacturing.
  For the Electron Cyclotron Control System (FP), the main activities for 2017 will cover design and prototyping.
  As for the Ion Cyclotron antenna (non FP), in the frame of SR2FP, the delay in the PA signature is used as an opportunity to implement staged R&D for the reduction of technical and cost risks (procurement preparation), especially for the development of the safety-important vacuum windows. The design work is complemented by specific contracts for the finalization of the Faraday Screen design and for the design of the connection between the US pre-matching system and the antenna.
- Neutral Beam Heating and Current Drive: Activities at the Test Facility in Padua proceed and integration amongst the SPIDER sub-systems will continue. l. The 1 MV High Voltage Deck and bushing, two important components for the MITICA experiment, will be delivered and installed and integrated with the interfacing component procured by the Japanese Domestic

Agency during 2017. The manufacturing of the MITICA VV will continue, in particular Beam Source Vessel will nearly be complete at the end of the year. The contract for the MITICA Beam Line Components (Calorimeter, Ions Dump and Neutralizer) is foreseen to be signed in 2017. In 2017 F4E will commit as cash contribution the 2018 NBTF Work Programme (WP) and a possible amendment of the 2017 NBTF WP.

- Diagnostics: Procurement procedures for manufacturing of several Diagnostic components and systems essential for First Plasma will be launched and/or signed during 2017, including for manufacturing of in-vessel cables, clips and connectors outer-vessel coils and in-vessel attachments of the magnetics sensors and in-vessel attachments of the bolometer diagnostic. A specific contract will be signed covering preliminary design of the vacuum vessel feedthroughs, which are both First Plasma and PIC components, as well as advancing the design of the upper and equatorial port structures and associated integration of diagnostics from Europe, IO and five other Domestic Agencies. Design of the visible/IR camera system, plasma position reflectometer, bolometer diagnostic and other systems with deliveries for First Plasma, will continue during 2017 mainly in the form of specific grants under running Framework Partnership Agreements (FPAs), as will design activities on the remaining diagnostic systems needed after First Plasma, including launch of a design contract for the core-plasma Thomson scattering system.
- Test Blanket Systems (TBM):, the call for Tender of three new framework contracts will be published in 2017 mainly focused on carrying on the Preliminary Design of the TBM sets and of the Ancillary Systems and to perform safety and (if needed) accidental analysis to support the aforementioned activities.
- Buildings and Civil Infrastructures: Following agreement with IO-CT on the SR2FP, some activities have been delayed to beyond 2020. The procurement strategies for the Emergency Power Supply Distribution, for the buildings 71 and 75 have been redefined (aiming at reducing the pre-2020 financial commitments)., The procurement procedures for the Electrical Distribution Buildings 44, 45, 46 and 47 [TB13], for the Buildings 34, 37, 71(non-PIC part), 75(non-PIC part) [TB12] will start, and the Contract for the completion of works [TB11] will be awarded. The framework contract for engineering and contract management consultancy services (with special emphasis to cost and schedule assessment) will be awarded. Specific contracts for Building Human-Machine-Interface (HMI) development will be signed under ongoing framework contract and under a new framework contract. Tasks orders for services in support to the main activities (e.g. Facility management, Site Security and Reception Services), and for Engineering and contract management consultancy services will be signed in 2017. Final Design of the Tokamak Complex building services (TB04) should be completed.

As for Broader Approach, 2017 is mostly focused on the following activities:

- Satellite Tokamak (JT-60SA)**:** The actions will focus on fabrication, testing, transportation and on-site installation done either by Voluntary Contributors or F4E. The activities under the responsibility of F4E are carried out through task orders of existing framework contracts or existing/new supply and service contracts. Cash contribution will be made to the Common Fund for integration and commissioning activities.
- IFMIF-EVEDA Project: The main objective is to reach an advanced status in Phase B, allowing Beam commissioning in 2018, for the LIPAc (Linear IFMIF Prototype Accelerator) systems at Rokkasho. It will consist of the final positioning, assembly and alignment of the systems required for validating the accelerator line for a deuteron beam of up to 5 MeV. This will be supported through Voluntary Contributors and F4E contracts. For subsequent Phases C and D, which will start in 2018, components shall be contributed in 2017 through Voluntary Contributors and F4E contracts and shall provide first beam operation evidence to consolidate

the IFMIF Engineering Validation activities by early 2020. In addition, all commitments for the transport of the remaining systems will be placed through specific task orders within the existing transport framework contract. During all installation and commissioning phases, F4E will still be supported by experts, and on-site health and safety services to ensure safe operations funded respectively by F4E through expert contracts and specific contracts.

- International Fusion Research Centre: The IFERC project comprises three activities, CSC (supercomputer Helios), DEMO design and R&D activities, and REC (Remote experimentation Centre). These activities are in different phases of execution. The REC activities are fully under the financial responsibility of F4E, and are performed under F4E contracts to provide software and services, some of which will be completed in 2017 (site acceptance tests). One planned test (participation in the operation of a European Tokamak from Rokkasho) will need financing in 2017.

1.2. Introduction to the annual work programme 2017 1st amendment

The 1st amendment of the annual work program 2017 comprises the detailed objectives and expected results including performance indicators. These are expressed per action in sections 1.3.1.-1.3.14. The performance indicators comprise the following:

- Achievement of the annual objectives by the forecast date, and
- Achievement of the specified cumulative credit value, expressed in IUA

1.2.1. Main assumptions

ITER Project: following assumptions shall be considered as the basis of the Work Programme 2017 1st amendment:

- In the months following the ITER Council 17 (IC-17) of November 2015, it was decided to focus the ITER activities on the achievement of a First Plasma by the end of 2025 taking into account the financial resources available to all the Parties. In F4E the Director launched a project called 'Straight Road to First Plasma' (SR2FP) with the overall objective to concentrate resources (funding and staff) on the activities critical to the achievement of first plasma at end 2025 while slowing down or suspending other projects until after 2020. Due to the complex interdependencies of ITER components this resulted in an extensive re-planning exercise which required several iterations with the IO-CT. In parallel, IO-CT was developing the longer term schedule to Deuterium-Tritium [DT] operations based on a four phase approach from First Plasma at end 2025 through to DT operation in 2035. The 'Staged Approach' (also referred to as the 'Iteration Modeling Approach') was based upon incorporating research operation periods as early as possible in the schedule depending on the availability of the additional components procured by the DAs consistent with their annual and long-term budgets. Such approach was supported by the conclusions of a specific panel (the ITER Council Working Group on the Independent Review of the Updated Long-Term Schedule and Human Resources (ICRG)) in charge of reviewing the updated schedule together with the associated required IO resources. The result of the IC-18 in June 2016 was an endorsement of the approach by all Parties and the definition of a set of specific milestones up to 2025 in order to have a close monitoring of the performance of the project.
- The F4E schedule used for the preparation of this document is the one submitted to IO-CT at the end of March 2017, but including additional feedback from the teams until mid April.
- The F4E schedule supporting FP by the end of 2025 takes into account:
    - The latest input and developments of the schedules from the F4E suppliers.
    - The most realistic assumption of Procurement Arrangement (PA) signature dates based on the current status of the design of components and on the forecasted dates of the required design reviews prior to the PA signature.
    - The available manpower in F4E to take into account bottlenecks in specific areas where staffing is not sufficient to grant a prompt process of the work.

  - The available yearly budget for the work on the EU in-kind procurements until end 2020. It should be borne in mind that the current F4E budget is assigned only until the end of 2020 and therefore the achievement and completion of activities beyond this date depend on the availability of the required budget after 2020.
  - The most realistic assumptions on the data availability from IO to take into account the existing delays and the agreed dates of data delivery.
  - The information provided by the other DAs through their monthly Detailed Work Schedule (DWS) to take into account any possible delay in the delivery of items to F4E that can cause delays to the EU in-kind procurements.
- In order to achieve an improvement of the quality of the PAs that need still to be signed, a common F4E/IO effort is in progress to better identify the requirements that are linked to the specific procurement.
- The schedules from the F4E suppliers, taking into account the agreed fabrication routes and showing the real development of the work, are being reviewed every month and the main data, once analyzed, integrated into the overall F4E schedule in Primavera.
- Technically and commercially complex procurements will be implemented whenever appropriate through the competitive dialogue procedure or through the negotiated procedure, in order to improve the alignment of supply chain response to F4E needs and to proactively adopt cost containment measures. This will be done in compliance with F4E Implementing Rules.
- Grants related to recurring and sequential R&D activities, with a well-defined development path eventually leading to an EU procurement package, will be implemented whenever appropriate through the Framework Partnership Agreement (FPA), in order to streamline and channel R&D funding, improve its effectiveness and reduce administrative burden to beneficiaries and F4E alike.
- Procurements which encompass scope within the domain of both F4E and contracting authorities, or for which a very close coordination between F4E and other entities is needed, will be implemented whenever appropriate through the Joint Procurement procedure.
- All the activities described in the overview of each action are intended as credited by PA or ITA. If an action is not credited, then it is explicitly mentioned in the overview. This is not applicable for the action “Broader Approach” (i.e. not credited).
- F4E endorsement of the Japanese Procurement Arrangement that foresees an EU financial contribution will be preceded by a budgetary commitment for the entire amount of the F4E contribution.
- The revenue from the Reserve Fund are provisional and depend on the authorization of “changes to contracts” given by IO Director General.
- Regarding this 1st amendment WP2017 for Broader Approach, the main assumptions are that this is to be coherent with the individual BA Projects' Work Programmes and Project Plans as approved by the Broader Approach Steering Committee.
- Full Time Equivalent (FTE) values by action are as specified in the Work Programme adopted by GB37 in February 2017.
- The Art. 5 of the F4E Status states that the Joint Undertaking may award grants and prizes in accordance with the rules of its financial regulation. In this regard, Essential selection, award criteria and Upper funding limits are defined in Annex 3. To be considered that no priority has been given to the grants because they are in different technical area and they are all needed for the achievement of the objectives of their own WP action.

1.2.2. Definitions

1. The 2017 Work Programme takes into account to the extent possible the EU Commission guidelines for the Programming document as requested by the Financial Regulation.

2. "Action" for the purposes of work programme means “a coherent area of action with objectives and resources”. The mapping of the actions with correspondence to the F4E WBS level 3 is available in Annex IV.
3. Each action contains:
   (a) General overview that covers the scope of the procurements/grants and cash expenditures foreseen to be financed under the budget 2017. Furthermore:
      i. It includes provisions for, even if not explicitly mentioned, urgent general support tasks as cost/risk analysis, engineering support/analysis, I&C develop and support, quality assurance and quality control, nuclear safety, CE marking analysis, transportation, storage, material characterization and qualification activities, metrology and legal support, as needed[7]. These tasks will be mainly implemented through specific contracts under existing framework contracts.
      ii. It includes provisions, even if not explicitly mentioned, for payment of liquidated damages, late payment interests, cost escalation, claims, release of options, indexation and other financial compensations that F4E may be obliged to pay under its contracts.
      iii. It includes provisions for amendments to ongoing contracts covered by a previous financing decision(s) in accordance with the Implementing Rules.
   (b) The annual objectives. They are defined as:
      i. IC/GB milestones in 2017 (if applicable);
      ii. Milestones that will lead to the achievement of the future IC/GB milestones from the 2 earliest years (defined as predecessor of future IC/GB milestones) (if applicable).
      iii. Internal milestones (in case of none of the above are applicable).
   (c) Link with the ITER Project multi-annual objectives (defined as the whole set of IC/GB milestones):
      i. When a WP annual objective is predecessor of a multi-annual objectives (IC/GB milestones), it is clearly identify to which milestone is linked in the column “type of milestone”.
   (d) The expected results for the WP 2017.
   (e) Human resources assigned to the action. The value provided under each action of the Work programme 2017 (WP2017) is an indicative estimate of the Full Time Equivalent (FTE) staff assigned to that specific action to cover all operational tasks and activities carried out during 2017. On top of the FTEs related to the operational departments, that value also includes the staff from other departments (i.e. Project Management, Administration and Commercial) assigned to perform specific tasks in support of such operational activities described under the different actions. The sum of the FTEs covering all operational actions corresponds to 350.65 FTEs.
      The number of total positions requested by F4E in 2017 equal to 467. The difference (116.35 FTE) is performing tasks of more administrative nature and not to be directly related to the specific actions listed in the WP2017. The distribution among the F4E departments is as follows: Administration (76), Commercial (27), Director & Office of Director (7), Project Management (6.35).
   (f) The target for the WP2017 is defined, when applicable, as the cumulative CAS foreseen to be achieved at the end of 2017 and it is based on the CAS profile proposed to IO that at the moment is under approval process.

[7] In accordance to F4E WBS implementation rules, whenever a procurement activity is in support of a specific WBS L3, the related procurement should be implemented under the mentioned WBS L3. This is not the case for general support activities to multiple WBSs (e.g. external resource to support overall risk management, etc.). In this case, they are included under Action 13

(g) Procurement plan to be launched during the year 2017:

i. Main Procurement Initiatives[8]: the list is based on the current information at the time of writing of the Work Programme and could be subject to changes. During the implementation of the work programme activities, F4E may identify the need for new calls, group more activities in a single call or split one activity in more calls. This will in any case be performed preserving the scope and objective presented in WP2017. A change to this list shall be considered as a non-substantial for the purposes of the Article 32 point 4 of the F4E Financial Regulations if not affecting the available budget for 2017.

ii. The foreseen time of publication of calls, invitations dates are indicative only and based on the present understanding of the project development. For specific contracts and specific grants or use of Joint Procurements the foreseen time of publication of calls is not included (N/A in the Work Programme) as no formal publication will take place. Publication of the call for tender is intended as the date of publication on the Industry Portal (for open procedures/call for proposals) and the date of the Invitation letter to be sent out to the Suppliers (for negotiated procedures). For restricted procedures and competitive dialogues this milestone refers to the date of the call for expression of interest (first phase of the procedure).

iii. Certain activities have been moved from previous years into WP2017 due to changes in the overall planning and priorities: these items are included under the relevant WBS in the 2017 Work Programme. It is understood that the inclusion of these items in WP2017 cancels and supersedes any corresponding item in a previous year's WP, unless otherwise specified in this document.

iv. Additional activities for ITER Project, upon the approval of the relevant PCRs and deviations by the IO-CT Director General or his delegates in the frame of Reserve Fund Management Plan, will be implemented under the budget line 3.6. F4E will present to the final meeting of the GB each year, in an amendment to the Work Programme, a summary of the PCRs agreed within the year and the activities that the PCRs (including those agreed in previous years) have funded.

v. Grants and specific Grants are clearly identified and information is provided to fulfill art.58 of the Financial Regulation.

4. Procurement Arrangements list for each work programme action is available in Annex III.
5. Framework Partnership Agreements (FPA) or Framework Contracts (FWC) are included in the year of signature for clarification purposes only and do not constitute part of the financing decision.
6. Equivalence F4E OBS to F4E WBS level 3 is available Annex III.
7. Some of the Work Programme activities refer to provision for recurrent activities with the same ultimate objective of supporting the final achievement either of the design (e.g. CAD support, engineering analyses, etc.), the manufacturing process (e.g. QA/QC Inspectors, engineering support for deviations analyses, CE marking, etc.) as requested in ITAs/PAs, or the site support services (access control and security, Facility Management Services, etc.). Therefore the description in term of financing decision will be similar over the years.
8. Annex V presents an indicative value of financial resources corresponding to the actions defined in WP20171st amendment. F4E has evaluated the most likely total level of commitments planned for the projects/actions in 2017 by taking into account the progress and

[8] Defined as the two main procurement procedures with budgeted amount higher than 0.5 million Euros and all FwCs to be signed in the year 2017

the available manpower. This value is the target of the organization. Any additional budget required and exceeding the currently available one will consist of unused appropriations adjusted to match the final needs.

1.3. Actions

1.3.1. Action 1. Magnets

Action 1	Magnets

Overview on pre-compression rings and conductors

For the pre-compression rings the manufacturing contract is ongoing (qualification phase). In addition a tendering phase for the manufacture of a number of back-up PCRs utilizing an alternative technology, to be used in case the PCRs produced by the present manufacture fail, was launched. In 2017 the full scale prototype should be completed and the qualification should be accepted in order to start the series production of the PCRs. . A specific contract for inspection services will be signed in 2017 to follow up the manufacturing activities for this contract. Additional contracts will be placed for the testing of mock-up produced during qualification And for inspection services of qualification and manufacturing. Regarding the TF and PF conductors some final strand tests will be carried out in 2017 through specific contracts.

Overview on Toroidal Field Coils

All major contracts for production of Toroidal Field Coils have been signed. The manufacturing contract for Radial Plates is foreseen to finish by the end of 2017, with the completion of the last three Radial Plates (14, 17, and 18). Stage 2 of the Winding Pack contract will be concluded in 2017 with the delivery of the first WP to the insertion supplier. The 2nd and 3rd (out of 10) Winding Packs will also be delivered before the end of 2017. The coil insertion contract will complete all qualification and tooling activities during 2017 and the manufacturing of the first coil will have started. A specific contract for inspection services will be signed in 2017 to follow up the manufacturing activities for this contract.

Overview on Poloidal Field Coils

All major contracts for the Poloidal Field Coils have been signed, including the last two major contracts - Manufacturer (MFR) and Cold Test Facility (CTF). The main winding tooling for all PF Coils has been commissioned both in Europe, where it has been handed over formally to the MFR in Cadarache and in China, where ASIPP have wound a pre-dummy coil. In 2017, all remaining tooling will be delivered on-site. The qualification phase will be completed as well (with the exception of the large size (PF3/4) dummy Double Pancake). Hence, the series manufacturing will start in 2017, both in Europe and in China. Specific contracts for tests and a specific contract for inspection services will be signed in 2017 to follow up the manufacturing activities for this contract.

ANNUAL OBJECTIVES AND INDICATORS			
Milestone ID/ Objectives	**Scope Description**	**Forecast achievement date**	**Type of milestone**
EU11.3B.30920	HPC - IO Approval for Double Pancake Final Acceptance Document (DPFAD) on DP5 of PF5	Q3-2017	Predecessor of: PF Coil: EU PF 5 coil ready for cold test
EU11.1A.22480	Arrival of TFWP11 to the Simic workshop	Q2-2017	Predecessor of: IPL > Delivery of TF11 (EU 01) by EU-DA to ITER Site
EU11.3B.528590	After the impregnation of the first DP, it is moved and placed on the stacking tool. (DP9 for PF6 stacked on WP Stacking Station).	Q3- 2017	Predecessor of: PF Coil: Manufacturing Complete for EU PF 6 Coil and Delivery to Site

EXPECTED RESULTS, TARGET AND INDICATORS
PF5: Double Pancake #5 (4 of 8) wound and impregnated PF6: Double Pancake #9 (1 of 9) wound, impregnated and placed on the stacking tooling TF11: Winding Pack delivered to the site of the supplier that is responsible for the Cold Test and Coil Insertion The target for 2017 is the achievement of a cumulative value of 101,363.8 IUA (CAS).
HUMAN RESOURCES ASSIGNED TO THE ACTION
F4E will be supporting this action during the year 2017 with 41.93 FTEs.
PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
N.A.	N.A.	N.A.	N.A.

1.3.2. Action 2. Vacuum Vessel

Action 2	Vacuum Vessel

Overview

Considering the current difficulties in keeping the production on schedule (threatening the critical path towards the First Plasma), some significant changes have been investigated together with the main contractor (Enhanced project management, increased manufacturing capacity) and will be implemented in the course of the year to the existing contract which will translate into contract amendments. By 2017, all five EU-VV sectors will have fully entered the manufacturing phase. All four poloidal segments (PS) of the sector 5 will be under manufacturing including the completion of the sub-assemblies. Design activities for sector 4, in addition to sector 5, will be completed as well as the design activities for the regular poloidal segments for the sectors 2 and 3. A few activities related to arc and electron beam welding qualification and material procurement will still take place.
In support of the above, specific contracts for inspectors, design analysis in support of design changes generated by non-conformities or Deviation Requests and other support activities (including the transportation of all 5 sectors DDU to Cadarache, support to the schedule recovery plan and resources for the follow up of the manufacturing activities will)beimplemented .

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU15.1A.3011200	PS3 sector 5 First sub-assembly	Q3-2017	Predecessor of: IPL > Delivery of Sector 5 & all VV Splice Plates by EU-DA to ITER Site
EU15.1A.1138890	PS4 sector 5 First sub-assembly on triangular supports	Q3-2017	Predecessor of: IPL > Delivery of Sector 5 & all VV Splice Plates by EU-DA to ITER Site

EXPECTED RESULTS, TARGET AND INDICATORS

Completion of the first subassembly for the PS3 sector 5. PS3 ready for the next assembly steps.
Completion of the first subassembly for the PS4 sector 5. PS4 ready for the next assembly steps.
The target for 2017 is the achievement of a cumulative value of 64,560 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 34.22 FTEs.

PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type
FwC Signed for Quality&Surveillance Support Inspection for Manufacture for PIC components of ITER	Q3 2016	FWc	N.A

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
N.A.	N.A.	N.A.	N.A.

1.3.3. Action 3. In Vessel – Blanket

Action 3	In Vessel - Blanket

Overview

Blanket and First Wall Panels

The overall procurement consists in the supply of 215 panels of the Blanket First Wall.

The main activities on the Blanket FW are related to:

- Preparation of the FW Procurement Arrangement.
- Follow-up of the manufacture of the three full-scale prototypes (FSP) in the frame of the contracts F4E-OPE-443 Lots 1-3 (Manufacturing of full scale prototype), part of the ITA-169 on the manufacture and test of Normal Heat Flux FW Full Scale Prototypes.

A number of options for the OPE-443 contracts have been released, inter alia, cost containment studies, use of electro-plated/foil copper layer and Beryllium (Be) tile coating.

Quality Assurance and Quality Control support through a specific contract over the FWC will be continued for the aforementioned contracts.

In parallel, several semi-prototypes are being submitted to High Heat Flux (HHF) tests in different facilities.

Activities to verify by analyses the design improvements identified in the course of 2016 are on-going, as well as activities aimed at qualifying a different grade of beryllium.

An activity envisaged to identify possible solutions to repair a debonded tile has been concluded.

Main challenges in 2017 consist in achieving planned milestones per the schedule in the manufacturing of the three FSPs, while resolving manufacturing issues, continuing the FW pre-qualification programme with the HHF testing of the remaining FW semi-prototypes and launching the manufacturing of mock-ups to validate the design changes proposed in the cost saving plan.

With the aim to further reduce the fabrication cost, additional design improvements will be validated first via Finite Element Analysis (FEA) and then through the manufacturing and testing of additional mock-ups in 2017/18. This includes the activities envisaged for the qualification of new material grades and fabrication techniques.

The PA will be of type “build to print”. The signature, originally planned in 2015, has been postponed to 2017 also to allow the implementation of design changes for cost reduction.

A new contract aimed at developing the coatings needed on FW panel parts will be signed in the course of 2017, as part of ITA-169.

Beryllium Health & Safety issues are starting to have an impact on the planning and on the procurement strategy. Some expertise will be needed to address properly these topics in the frame of the ITER Beryllium Management Committee and to timely address the issues related to delivery, storage and handling of the FW panels at ITER site.

To support the design modifications implying the use of Electro Slag Remelted (ESR) material and to progress in the development work to increase competition and solve the technical issues on CuCrZr, contracts to procure material for development and to be provided to companies to manufacture the mock-ups to validate the design changes have been foreseen.

Insourcing activity has been foreseen for technical needs that might arise in 2018.

Blanket Cooling Manifolds

As a follow up of the FDR held in December 2015, detailed analyses have been implemented to develop an alternative BCM support design based on bolted supports. Technical specification will be prepared to place contracts in 2017 for the manufacturing and testing of a prototype to demonstrate the feasibility.

ANNUAL OBJECTIVES AND INDICATORS			
Milestone ID/ Objectives	**Scope Description**	**Forecast achievement date**	**Type of milestone**
EU.16.01.20490	NDE after CuCrZr HIP operation for FSP	Q1-2017	Predecessor of: HP Process qualification - Readness review for series manufacturing

EXPECTED RESULTS, TARGET AND INDICATORS
Successful NDE after CuCrZr HIP operation for FSP.

HUMAN RESOURCES ASSIGNED TO THE ACTION
F4E will be supporting this action during the year 2017 with 10.34 FTEs.

PROCUREMENT PLAN			
Main Procurement initiatives			
Scope description	**Time of call**	**Type of Contract**	**Credit type**
Manufacturing of Mock-ups for Qualification of new Beryllium grades	Q4-2017	P Supply	PA
Task Order Signed for Irradiation and PIE of In-Vessel material specimens (OFC-413-01-02)	Q2-2017	P Serv	PA
Grants and Specific Grants			
Scope description	**Time of call**	**Indicative Amount**	**Budgetary line**
N.A.	N.A.	N.A.	N.A.

1.3.4. Action 4. In Vessel – Divertor

Action 4	In Vessel – Divertor

Overview

The EU contribution to the procurement of the ITER Divertor includes two procurement arrangements (PA), namely the PA 1.7.1 for the procurement of the Cassette Bodies and the Integration of the Plasma Facing Components (PFCs) and the PA 1.7.2B for the procurement of the Inner Vertical Target (IVT).

The Divertor Cassette PA 1.7.1 was signed on 8 May 2012. The cassette bodies (CB) manufacturing feasibility is being addressed in the frame of two framework contracts for the manufacture of full size CB prototypes awarded to two EU companies. A similar contract awarded to a third company has been terminated at its early stage. The completion of this pre-qualification and readiness for series production is planned at beginning year 2018. The pre-qualification for the cassette assemblies (CA) integration will be launched in 2019.

The IVT PA 1.7.2B was signed on 10 March 2010. The manufacturing feasibility is being addressed by one company with the manufacture of a full size IVT prototype. Three other companies have been involved in the pre-qualification for the IVT procurement through the fabrication and testing of small scale mock ups. The successful candidates will compete for the subsequent pre-series qualification step by means of the manufacture of up to two full size IVT prototypes. The achievement of the pre-qualification and readiness for series production is planned in 2020.

Main challenges in 2017 consist in the completion of the manufacture and acceptance tests of the CB full-scale prototypes, the preparation of the documentation for the launch of the CB series and the signature of the contracts for the qualification of additional suppliers for the procurement of the Divertor Inner Vertical Target. Insourcing activity has been foreseen for technical needs that might arise.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU17.2B.10760	Delivery to Ansaldo Energia – Prototype PFUs	Q4-2017	Predecessor of: IPL > Delivery of W TA-IT-PROTO1-02 from EU-DA to RF-DA at IDTF Site (OPE-138#01)
EU17.01.6110	Published Call for Tender for CB Series	Q4-2017	Predecessor of: Completion of Stage I of the series production of Divertor Cassette Bodies

EXPECTED RESULTS, TARGET AND INDICATORS

Delivery to Ansaldo Energia – Prototype PFUs
Published Call for Tender for Cassette Bodies Series

The target for 2017 is the achievement of a cumulative value of 1,540 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 9.73 FTEs.

PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type
Full Scale Additional Prototype - IVT	Q2-2017	PSupply	PA

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
N.A.	N.A.	N.A.	N.A.

1.3.5. Action 5. Remote Handling

Action 5	Remote Handling

Overview

The procurement of the Remote Handling Systems (RHS) will mainly focus on the preliminary design activities.

In particular, the divertor RHS (DRHS) will continue with the PD, foreseen to finish in 2018, while an early start of the preparatory activities for the Final design will ensure a smooth transition across the procurement phases. These tasks will be mainly performed through specific contracts under on-going framework contracts.

During the first half of the year, for the Cask and Plug RHS (CPRHS) it is foreseen to complete the preparatory activities and to start the main bulk of activities for PD for one cask typology, foreseen to be finish in 2018. Like for the DRHS, also in this case the implementation will be through specific contracts under on-going framework contracts.

NBRHS also is presently focused on the PD that is handled in phases in a similar way to the other packages, i.e. through specific contracts. By the first half of the year it is foreseen to finish PD phase 1 and start the phase 2.

The IVVS finally will finish preparatory activities for PD and it will start the main design effort during the first half of the year by placing specific contracts under on-going framework contracts.

Complementary design, control system, prototyping and qualification in various RH technologies will be performed in support of the main operational activities, where needed.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU23.03.90710	Preliminary Design (single variant) for CPRHS	Q1-2017	Predecessor of: Task Order Signed for Manufacturing for CPRHS

EXPECTED RESULTS, TARGET AND INDICATORS

Activity started of CPRHS Preliminary design (single variant) for the preparation of the submission of the regulatory file to ASN.

The target for 2017 is the achievement of a cumulative value of 3,400 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 20.66 FTEs[9].

PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type
Preliminary Design Phase 2 first-priority items for NBRHS	N.A.	SC	PA
Preliminary Design (single variant) for CPRHS	N.A.	SC	PA

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
N.A.	N.A.	N.A.	N.A.

[9] 1 FTEs is assigned to specific IO tasks.

1.3.6. Action 6. Cryoplant and Fuel Cycle

Action 6	Cryoplant and Fuel Cycle

Overview

Following the award of the contract in 2016, the design of the four water de-tritiation system holdings and feeding tanks will be pursued and the manufacturing will be started. No F4E involvement is expected for the isotope separation system which is still in the conceptual design phase under IO-CT responsibility.

In the frame of the design PA for REMS (Radiological and Environmental Monitoring Systems), the preliminary design review of REMS for Tokamak will take place then the final design phase of the beryllium monitors will start. Those activities will be carried out in house, without any contract placed.

The type A radwaste development is currently in the conceptual design phase managed by IO. F4E will resume the negotiations with IO-CT with the view to transferring the procurement of the type A radwaste to IO-CT.

The activities in the field of vacuum pumping will grow quite significantly. The completion of the manufacturing of the pre-production cryopump and warm regeneration lines are scheduled mid-2017 and end of 2017 respectively. Credited by a built-to-print PA signed in Mid-2016, the contract for the manufacturing of the MITICA cryopump will be awarded and signed in 2017.

After signature of the detailed design PA, the call for procurement of the cryostat and torus cryopump front end cryodistribution will be launched.

Furthermore a contract for the procurement of Johnson couplings will be signed in 2017.

Overview on Cryoplants

Most of the LN2 Plant and Auxiliary Systems components will have been delivered on site by the end of 2016. Furthermore a contract will be signed for the Quench line header for LN2 Plant and Auxiliary Activities.

So in 2017 the contracts for on-site installation and test phase of the ITER cryoplant will be signed and activities start upon building availability. For the MITICA Cryoplant contract (signed in August 2016), the preliminary design, final design and launch of the long lead items are planned to be performed in 2017.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU31.01.10550	< IPL PA 3.1.P1.EU.03 Documentation received from IO (18-Sep-17)	Q3-2017	Predecessor of: IPL > Delivery of Torus & Cryostat Cryopumps by EU-DA to ITER Site
EU31.03.10120	< IPL PA 3.1.P3.EU.01 Primary Leak Detection & Localization System Signed	Q3-2017	Predecessor of: IPL > Delivery of Primary Leak Detection and Localisation by EU-DA to ITER Site

EXPECTED RESULTS, TARGET AND INDICATORS

Start of LN2 Plant and Auxiliary Systems installation.
Signed award decision for MTICA cryopump contracts.
Preliminary Design Review for REMS for Tokamak.

The target for 2017 is the achievement of a cumulative value of 25,710.3 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION			
F4E will be supporting this action during the year 2017 with 20.20 FTEs			
PROCUREMENT PLAN			
Main Procurement initiatives			
Scope description	**Time of call**	**Type of Contract**	**Credit type**
Mechanical, piping and test for installation of the LN2 Plant and Auxiliary Systems	Q1-2017	PServ	
Contract Signed for Procurement of the MITICA Cryopump Assembly	Q3-2017	PSupply	PA
Contract Signed for Procurement of the MITICA Cryopump Charcoal Coating	Q3-2017	PSupply	PA
Grants and Specific Grants			
Scope description	**Time of call**	**Indicative Amount**	**Budgetary line**
N.A.	N.A.	N.A.	N.A.

1.3.7. Action 7. RF Heating and Current Drive

Action 7	RF Heating and Current Drive

Overview

Ion Cyclotron Antenna– not FP

The PA signature for the IC antenna has been delayed to 2022 as a result of SR2FP. This is used as an opportunity to implement staged R&D for the reduction of technical and cost risks (procurement preparation), especially for the development of the safety-important vacuum windows.

The ICH antenna project is in final design phase, implemented through a Framework Contract signed in 2014. The work for the final design also includes prototyping/testing and R&D for the Faraday Screen and the RF vacuum window. Challenges are found in interfaces and requirements not yet stabilised, as well as in redesign of some components for compliance with loads and improved manufacturability. Design work will be implemented in 2017 by specific contracts for design simplification, finalisation of the Faraday Screen design, design of the connection with the components outside the port plug, and requirement management and verification, as well as necessary support contracts. Options for one of the RF vacuum window R&D contracts (qualification of the rotary friction welding of Titanium to Stainless Steel) are also planned for 2017.

Electron Cyclotron (EC) Upper Launcher and ex-vessel equatorial launcher - FP

The EC Upper Launcher project is in the final design phase. The SR2FP has required re-planning of FDR and procurement stages, to meet the budget constraints up to 2020, and therefore re-adjustments in WP 2016 (on-going) and 2017. Main on-going activities are related to design, prototype fabrication and testing as well as qualification and requirements identification & verification. Management of interface changes and technical complexity and diversity of launcher components are the main challenges. Final design work is carried out under a long-term grant, already in place, which will go on during 2017, as well as additional design work for cooling systems that will be performed through specific contracts under an existing framework contract. Support for Build-to-print design will also be started during 2017 in view of the first FDRs for critical components. On prototyping, specific contracts under the recently signed framework contract for setup and operation of the EC components test facility (FALCON) are envisaged in 2017, including mm-wave testing of Window, Valve and WG prototypes, and procurement and testing of Mirror and Steering Mechanism prototypes. A separate contract for Valve prototype procurement will be signed. The mechanical mock-ups programme will start with a framework contract for support and testing and a procurement contract for mock-ups manufacturing. On engineering support, a framework contract and initial specific contracts for nuclear safety, analysis and engineering verification will be signed, as well as other specific contracts under existing TSS frameworks as needed (i.e. on metrology).

Electron Cyclotron Gyrotrons, Power Sources and Power Suppliers (PS)

For the EC Power Sources (Gyrotrons), due to the realignment with the Straight Road to First Plasma, in 2017, the European programme should be stopped after the completion of the testing of the 1st CW Gyrotron prototype and of the preliminary auxiliary designs. For the EC Power Supplies, the 1st set, composed of one main and two body HV power supplies, will be delivered to ITER, in 2017, after completion of the factory acceptance tests. The production of the sets 2-4 (out of 8 in total) will progressively start.

Electron Cyclotron Control System - FP

The Electron Cyclotron Control System is in Final design phase. During 2016, the main activities have been related to the collection and consolidation of the requirements. The main challenge in the EC Control System activity consists in the clear definition of the interfaces. An interesting opportunity will come from the synergies with the development of the control system for the ECT-Falcon facility (see EC

UL) which will allow testing extensively the concepts developed for the EC Plant Controller.
The main activities for 2017 will regard to design and prototyping. On design, a contract will be launched for support in the FDR preparation of the ECCS, as well as a framework and a specific contract for development of the conceptual design of the EC Upper Launcher subsystem control unit. On prototyping, a contract for development and testing of the most critical hardware component will be signed.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU52.01.302215	Pressure tests of EC UL diamond disk brazed mock-up finished and report approved	Q3-2017	Predecessor of: GB MS: Manufacturing of 1st batch of Diamond Disks for EC Upper Launcher 1 finished
EU52.01.305145	Manufacturing drawings for EC UL corrugated waveguide mock-ups ready	Q3-2017	Predecessor of: GB MS: Manufacturing of 1st batch of Waveguides for EC Upper Launcher 1 finished

EXPECTED RESULTS, TARGET AND INDICATORS

Pressure test report of EC UL diamond disk brazed mock-up delivered and approved by F4E. Test results confirm suitability of disk design.
Manufacturing drawings for EC UL corrugated waveguide mock-ups produced and approved by F4E
The target for 2017 is the achievement of a cumulative value of 5,043 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 19.26 FTEs.

PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type
Mechanical Mock-ups for the EC UL 9	Q4-2016	P Supply	ITA
Testing of Waveguide and Taper prototypes	Q1-2017	SC	PA/ITA
Task Order Signed for Design simplification of the ICH Antenna (TO 02)	Q2-2017	PServ	ITA
Provision of support services in the area of nuclear safety for ITER ECH and ICRH Antennas	Q4-2016	FwC	NA
Support to Mechanical Mock-ups, Testing & Qualification	Q4-2016	FwC	NA
Support to EC control plant design and operation	Q2-2017	FwC	NA
Technical Follow-up of the Procurement of Body PS & Main HV PS	Q2-2017	FwC	NA
Final Design and PA preparation for ICH Antenna	Q2-2017	FwC	NA

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
Amendment n.2 Signed for Amendment of 2nd EU Gyrotron Prototype (EU 1MW CW Gyrotron Prototype)	N.A.	77,827 euros	3.1+3.5
Modelling of ITER scenarios to assess the application of ITER heating, fuelling and impurity seeding	Q2 2017	240 k€	3.1

1.3.8. Action 8. Neutral Beam Heating and Current Drive

Action 8	Neutral Beam Heating and Current Drive

Overview

Test facility at RFX-Padua:

In 2017, the latest equipment's (Beam Source, Cooling Plant, CODAS) will be delivered and their site acceptance tests completed for SPIDER experiments foreseen to start mid-2018 after nine months of integrated commissioning. For MITICA, 2017 will see the delivery of the first components and equipment as the Vessel, the Vacuum and Gas Injection System, the SF6 Handling Plant, the Ion Source Extraction PS (ISEPS), the Acceleration Grid PS (AGPS) and Ground Related PS (GRPS) and the High Voltage Deck 1 & Bushing followed by the start of the MITICA on-site assembly. The contract for the MITICA Beam Line Components (Calorimeter, Ions Dump and Neutraliser) is foreseen to be signed end 2017 after completion of its final technical specification in December 2016. For the MITICA diagnostics the activities of design will be concluded, still in 2017, by a Final Design review. To reduce the risk, the challenging design, of the MITICA Beam Source, started mid-2016 by three companies in competition, will continue up to end 2017 with the final F4E/IO designs assessment.

The agreement on the Neutral Beam Test Facility with the Consorzio RFX is implemented through cash contribution both credited and not-credited. In 2017 F4E will commit as cash contribution the 2018 NBTF Work Programme and possible amendment of the 2017 NBTF WP.

Neutral Beam at ITER-Cadarache

The activity of the year will be the negotiation and the signature of the two PAs: PA 5.3.P4 HNB (Beam Vessels, Drift Duct, Fast Shutter, PMS, Exit Scraper, Lead Wall) and PA 5.3.P5.HNB ACC Coils. The finalization and approval (signature foreseen end of 2017) of those PAs, defined at Detailed level for most of the components, is mainly driven by IO.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU53.TF.04482	All Parts of the SPIDER Beam Source delivered at Factory (where they will be assembled) (M.40a) and Accepted by F4E	Q2 2017	Acceptance / Contractual

EXPECTED RESULTS, TARGET AND INDICATORS

- Acceptance of all Parts of SPIDER Beam Source (BS)delivered at Factory
- Signature of procurements for MITICA Beam Source and for the Assembly Tools & Testing Equipment of PRIMA Plant.

The target for 2017 is the achievement of a cumulative value of 23,490 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 21.02 FTEs.

PROCUREMENT PLAN			
Main Procurement initiatives			
Scope description	**Time of call**	**Type of Contract**	**Credit type**
Procurement of MITICA Beam Source	N.A.	SC	PA
Assembly Tools & Testing Equipment of PRIMA Plant (with Assembly)	N.A.	SC	PA
Grants and Specific Grants			
Scope description	**Time of call**	**Indicative Amount**	**Budgetary line**
N.A.	N.A.	N.A.	N.A.

1.3.9. Action 9. Diagnostics

Action 9	Diagnostics

Overview

Procurement procedures for manufacturing of several Diagnostic components and systems essential for First Plasma will be launched and/or signed during 2017, including for manufacturing of in-vessel cables, clips and connectors, , outer-vessel coils and in-vessel attachments of the magnetics sensors and in-vessel attachments of the bolometer diagnostic.

A specific contract will be signed covering preliminary design of the vacuum vessel feedthroughs, which are both First Plasma and PIC components, as well as advancing the design of the upper and equatorial port structures and associated integration of diagnostics from Europe, IO and five other Domestic Agencies. Design and prototyping (when needed) of the visible/IR camera system, plasma position reflectometer, bolometer diagnostic and other systems with deliveries for First Plasma, will continue during 2017 mainly in the form of specific grants under running Framework Partnership Agreements (FPAs), as will design activities on the remaining diagnostic systems needed after First Plasma with the exception of the core-plasma Thomson scattering system, for which a design contract will be launched in 2017. Most of the systems are now in the process of revisiting conceptual design solutions and analysing architecture options for optimisation against requirements, cost and schedule, together with the process of thoroughly justifying and documenting baseline design solutions and demonstrating manufacturability and compatibility with cost and schedule constraints. This design effort will culminate in 2017 with the signature of Procurement Arrangements for all the systems relevant to First Plasma, as well as a majority of the remainder, allowing preliminary design to continue.

A significant number of contracts for engineering analysis, manufacturing and testing of prototypes and production of manufacturing specifications will be signed in 2017 to support of the design of Diagnostics systems. The procurement procedure for a Framework Contract for the production of the build-to-print drawings and manufacturing specifications will be completed, and some task orders under this contract will be signed for systems with First Plasma relevance.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU55.06.691380	Specific contract for Design for Feedthroughs for Tokamak Services	Q3-2017	Predecessor of: IPL > In-V Elec Feedthroughs Delivered to ITER Site
EU55.01.300325	Contract for Analysis Software Algorithm Design	Q3-2017	Predecessor of: IPL > Electronics and Software for Magnetics Delivered to ITER Site

EXPECTED RESULTS, TARGET AND INDICATORS

Signature of specific contract for Port Plug design - Preliminary Design
Signature of specific contract for Design for Feedthroughs for Tokamak Services
Signature of contract for Analysis Software Algorithm Design
The target for 2017 is the achievement of a cumulative value of 698.09 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 22.89 FTEs.

PROCUREMENT PLAN			
Main Procurement initiatives			
Scope description	**Time of call**	**Type of Contract**	**Credit type**
Port Plug design - Preliminary Design 9	NA	SC	PA
Design for Feedthroughs for Tokamak Services	NA	SC	PA
Grants and Specific Grants			
Scope description	**Time of call**	**Indicative Amount**	**Budgetary line**
		10,742,484 euros	31
Specific grants for design activities for the Low Field Side Collective Thomson Scattering diagnostic.	N.A.		
Specific grants for design activities for the Core-Plasma Charge Exchange Recombination Spectrometer diagnostic	N.A.		
Specific grants for design activities for the Equatorial Visible-IR Wide-Angle Viewing System diagnostic	N.A.		
Specific grants for design activities for the Bolometer diagnostic	N.A.		
Specific grants for design activities for the Radial Neutron Camera - Gamma Spectrometer diagnostic	N.A.		
Specific grants for design activities for the Plasma Position Reflectometry diagnostic	N.A.		

1.3.10. Action 10. Test Blanket Module

Action 10	Test Blanket Module

Overview

Following the approval of the Conceptual Design Phase in 2017 the Preliminary Design phase, Review, will start in 2017 for the TBM Sets, the Ancillary Systems and the Preliminary Welding Procedures Specification.

The five Framework Contracts (FwC) launched in 2012 for the TBM Sets Conceptual Design will expire toward the end of 2016. Only three new FwCs will be launched in 2017 mainly focused on carrying on the Preliminary Design of the TBM sets and of the Ancillary Systems and to perform safety and (if needed) accidental analysis to support the aforementioned activities. The FwCs call for tender publication is foreseen in Q4t 2017 while their signature is plannedQ2-2018.

A transport contract is planned to cover the needed transfers to the storage facility of the EUROFER batch #4 from the production site and the EUROFER and 9Cr steel samples and mock-ups of TBM components and left-over from contractor sites

Other complementary activities planned for 2017 are new developments of the ECOSIMPRO code for Tritium transportation (Grant Unique Beneficiary: Consortium CIEMAT and Empresarios Agrupados International S.A.) and), the handling and storage of EUROFER (Specific Contract

In addition a FwC will be launched for rad-waste management feasibility studies for the final disposal of TBM rad-waste in ANDRA.

Maintenance activities will not continue in 2017 while the activities on Preliminary Welding Procedures Specifications will be completed with a Specific Contract that will be launched in Q1-2018.

The Test Blanket Module procurement plan is not in response of PAs or ITAs.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
EU56.01.130080	FwC for Preliminary Design of TBMs set signed Call for Tender published	Q4-2017	Used as WP17 milestone
EU56.01.1230160	FwC for Preliminary Design of Ancillary Systems Call for Tender published	Q4-2017	Used as WP17 milestone
EU56.01.1232560	FwC for Safety Analysis in support of TBS Preliminary DesignCall for Tender published	Q4-2017	Used as WP17 milestone

EXPECTED RESULTS, TARGET AND INDICATORS

Publication of the call for tender of the Framework Contracts for Preliminary Design for TBMs set and, Ancillary Systems

This action as it is not credited does not follow a credit scheme.

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 8.69 FTEs.

PROCUREMENT PLAN			
Main Procurement initiatives			
Scope description	**Time of call**	**Type of Contract**	**Credit type**
Grants and Specific Grants			
Scope description	**Time of call**	**Indicative Amount**	**Budgetary line**
New developments of the simulation tool, based on the EcosimPro platform, for tritium migration through HCLL and HCPB-TBS Unique Beneficiary: Consortium CIEMAT and Empresarios Agrupados International S.A.)	Q1-2017	105 k€	3.2

1.3.11. Action 11. Buildings Infrastructures and Power Supplies

Action 11	Buildings Infrastructures and Power Supplies

Overview

Electrical Power Supply and Distribution: Delivery of the first Load Centre's and Building 36 is expected. The procurement of the first part of the Emergency Power Supply Distribution started for the Distribution Buildings.

Buildings and Civil Infrastructures: The completion of Construction Design for the remaining levels of the Tokamak Complex with civil works construction works continuing up to L3. Building Services installation continuing with RFE milestone achieved in a number of Auxiliary Building.

In terms of procurement, following the redefinition of the procurement strategy for the Emergency Power Supply Distribution, the procurement of the Electrical Distribution Buildings 44,45, 46 and 47 [TB13], the Buildings 34, 37, 71(non-PIC part), 75(non-PIC part) [TB12] should start , aThe Contract for the completion of works [TB11] will be awarded.

Specific contracts for Building HMI Development will be signed under ongoing framework contract and under a new framework contract for which the signature is foreseen in 2017.

Furthermore, other specific contracts for procurement of services in support to the main activities will be signed in 2017. This includes, for example, Facility management, Site Security and Reception Services, Engineering and contract management consultancy services (with special respect to cost and schedule assessment) and consultancy for advice on interpretation of French Regulatory Law 2017.

Changes and exercise of options to the ongoing services and construction contracts in relation with PCRs, input data delays, and re-allocation of scope between contracts, which will be implemented through amendments to the ongoing contracts in line with the provisions of the Financial Regulation.

Cash contribution will cover the ITER site host agreement and the ITER site Services agreement.

Overview on TB 03

In 2017 the final Construction Designs for Level 5 and the roof will be delivered for review with the construction of level L3 of the civil works of the Tokamak and Diagnostic Building's starting and level L2 due to start in the Tritium Building.

The civil works are due to be completed in the Auxiliary Buildings B15 and B51/52.

Overview on TB 04

In 2017 the approval process for the Final Design of the Tokamak Complex building services should be completed. Installation works within B13, B17 and B61 should be complete (RFE) with the works continuing in B15 and due to commence in B51/52.

The installation of Load Centre's 03, 05 and 14 should be complete. The Assembly and Installation Design Reviews for the other Load Centres within the TB04 scope should be completed.

Overview on Architect engineer

In 2017 the last level of the Construction Design for the Tokamak Complex will be delivered, passed in Manufacturing Readiness Review, and delivered to the Contractor.

Overview on Remaining TBs

TB05: In 2017 the RFE of Buildings 32, 33 and 38 should be achieved.

TB06: In 2017 the installation works for electrical distribution will continue (Load Centres and Building 36 for completion), with as main challenge, the connection to the RTE (400 kV) grid.

TB07: In 2017 the RFE of Buildings 67, 68A and 69 should be achieved.

TB16: In 2017 the infrastructure works will continue on zone by zone basis with design and construction works. The foundations for Load Centres 03, 05, 06 and 14, in addition to Medium Voltage centres 01, 03 and 05, should be completed ready for the installation of the Load Centre equipment by others.

ANNUAL OBJECTIVES AND INDICATORS			
Milestone ID/ Objectives	**Scope Description**	**Forecast achievement date**	**Type of milestone**
EU41-43.106040	HPC - IO approval of PBS 43 1st HV Transformer (Unit 4) SAT	Q1-2017	IC/GB milestone
EU62.05.050	IPL > Assembly Building (13) RFE 1A (RFE #1)	Q2-2017	IC/GB milestone
EU62.05.604050	Cryostat Crown Civil Work Completed	Q4-2017	IC/GB milestone
EU62.05.20910	NPC - RFOC Tokamak Building (11) level B2	Q4-2017	IC/GB milestone
EU62.05.65840	NPC - RFOC Access Cryoplant Compressor Bldg (51)	Q3-2017	Predecessor of: IPL > Cryoplant Compressor Building (51) RFE (RFE #8B)
EU62.603400	NPC - Start of construction of Tokamak Building (11) level L3	Q1-2017	Predecessor of: IPL > Tokamak Building (11) RFE 1B - Stage 2 (RFE #1)
EU62.05.65890	NPC - RFOC Cryoplant Coldbox Bldg (52)	Q3-2017	Predecessor of: IPL > Construction of Cryoplant Coldbox Building (52) Completed

EXPECTED RESULTS, TARGET AND INDICATORS

The completion of Construction Design for the remaining levels of the Tokamak Complex with civil works construction works continuing up to L3. Building Services installation continuing with RFE milestone achieved in a number of Auxiliary Building, particularly the assembly building.
Delivery of the first Load Centre's and Building 36 is expected. The procurement of the first part of the Emergency Power Supply Distribution is due to begin for the Distribution Buildings

The target for 2017 is the achievement of a cumulative value of 233,764.98 IUA (CAS).

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 58.48 FTEs.

PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type
TOs for AMF-0796 Eng & contract management consultancy services with special respect to cost and schedule assessment	Q2-2017	PServ	N.A
Site Security and Reception Services for the ITER Site 2017 signed	Q1-2017	PServ	N.A

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
N.A.	N.A.	N.A.	N.A.

1.3.12. Action 12. Cash Contributions

Action 12	Cash Contributions

Overview

Cash Contribution to IO-CT

In accordance with the ITER Agreement, the financing of the ITER Organization is ensured through contributions made to IO in the form of cash (10%) or in kind (90%) from Members. Cash contributions from ITER Members to IO are determined annually, based on estimates of the IO budget for the following year. The final figure is approved or modified by the ITER Council.

Cash Contribution to Japan

According to the ITER Agreement, there is a transfer of procurement responsibility from EURATOM to Japan under the supervision of the ITER Organization. This is financed through a cash contribution from EU to Japan paid by F4E. An update of the schedule of payments is provided by the Japanese Domestic Agency (JA DA) twice a year.

ANNUAL OBJECTIVES AND INDICATORS

	2017	2018	2019
Cash to IO – Commitment (in MEuros)[10]	187.46	204.1	242.09
Cash to Japan – Commitment (in MEuros)	0	3.9	34.44

EXPECTED RESULTS, TARGET AND INDICATORS

The expected result is to pay to IO the contribution as agreed by the ITER Council and to Japan as defined in the schedule for the relevant credits assigned to JA DA for those components transferred by the EU to them.

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 0.33 FTEs.

PROCUREMENT PLAN

Cash Contribution

Scope description	Amount (in MEuros)
Cash Contributions to ITER Organization	187.46
Cash Contribution To Japan for the signature of the PA3.2.P4.JA.01	0

[10] The cash contribution required by IO-CT for the year N is committed by F4E at the end of the year (N-1). E.g. the commitment shown here in 2017 is the cash contribution to IO-CT for 2018.

1.3.13. Action 13. Supporting Activities

Action 13	Supporting Activities

Overview
The procurement of the supporting activities are mainly performed through Framework contracts and specific contracts related.

Engineering Support activities
Technical expertise in the key domains of engineering and fusion technologies such as Design office activities, Analysis (Mechanical, Structural Dynamics, Civil engineering, Fluid Dynamics, Electro Magnetism, Nuclear Analyses), Design Codes and Standards; Instrumentation and Control; Metrology. Beyond the preparation of specific contract, the procurement activities will be mainly focused on renewing Framework Contract providers, for keeping the same level of support to project teams both for ITER and BA.

Material and Fabrication
Technical expertise in the domains of Materials Science, Materials Technologies and Manufacturing Processes mainly supervising: the development and qualification of material; collection of material data; and qualification of joining technologies. It mays support the materials procurement on demand.

Transportation
During 2017, the technical aspects, on the F4E side, of the joint procurement with IO for the transportation of ITER components to the site in Cadarache will be managed. The scope includes the transportation of all ITER Components from the port/airport of entry (Fos or Marignane) to ITER site. In 2017 the IO-DAs framework contract in place should be renewed, as to ensure continuity of the service.

The main cost driver is for Highly Exceptional Loads (HEL) that follows the dedicated ITER itinerary. During 2017, this activity will mainly cover transportation of some NON EU loads between Fos and Cadarache (EU-leg): the main part of the HELs is the Assembly tooling components supplied by KO-DA. In 2017 focus will be as well put on the reduction of the number of HELs and the related number of convoys, this jointly with IO, all DAs and Daher.

Plasma Engineering (PE)
A relevant part of the PE activity responds to (often urgent) requests and hence is difficult to plan in advance. PE group in 2017 is going to focus on transversal activities in support to F4E procurements.

Nuclear Safety
Support to the project teams, by providing the expertise in the field of Nuclear Safety that could be required during the design and/or the manufacturing of Protection Important Components.

Quality Assurance, Quality Control
Ensure that F4E's QA processes are properly followed in the development of the different ITER projects and that the requirements are correctly propagated.

CE marking

The scope includes the support to the project teams in providing assessments, for each PBS, of the compliance with CE marking directives & regulations (mainly the Construction Product Regulation, the Machinery Directive, the Low Voltage Directive and the Electromagnetic Compatibility Directive).

Systems Engineering, Configuration Management and Technical Integration

The main scope of this area is to develop both Configuration Control and Configuration Management activities according to Quality Assurance requirements - including managements of Deviation Requests (DR), Non Conformities (NC) and Project Change Requests (PCR) – and System Engineering tools and processes. As well as Technical Integration plays an essential role to define and coordinate cross-system design activities of the F4E procurements and to systematically manage transversal engineering requirements and activities like commissioning or maintenance.

To this aim, within the first quarter of the year an FwC will be signed to provide a transversal and consistent support both for Barcelona and Cadarache.

Assembly Integration and Validation (AIV)

Support to Configuration Management in the expected upcoming set of PCRs/Deviation related to AIV scope of work; support to F4E teams in relation to logistics responsibilities on site (e.g. deliveries portal); supporting decisions on transfer of F4E AIV responsibilities to IO.

Programme Management

Main focus will be the performance monitoring and reporting, the maintenance and update of the costing, the further improvement of the risk registers in all project areas through the link to the activities in Primavera, the increase in the number of standard reports available to the organization the implementation of the Internal Compliance Programme for export control.
A general provision is foreseen for experts and consultancy service (e.g. participation to specific committees, support/advice to F4E Management, technical support) as well as provision for interim management services and audit.

Information and Communication Technology

Provision of ICT support (hardware, software and services) for the specific benefit of the operational activities.

ANNUAL OBJECTIVES AND INDICATORS	
Area	**Scope Description**
Engineering Support activities	On the top of regular support to the teams, renewing Framework Contract providers.
Material and Fabrication	The focus for 2017 will be Magnets and Vacuum Vessel projects
Transportation	On the top of regular support to the teams, renew of IO-DAs framework contract in place to ensure continuity of the service.
Plasma Engineering	On the top of regular support to the teams, in particular for the Electron Cyclotron and Ion Cyclotron heating systems.
Nuclear Safety	According to the project needs, this expertise will consist in providing advices or preparing positions on key Nuclear Safety issues, reviewing critical documentation, interacting with IO Safety, promoting the Nuclear Safety culture within F4E and fostering good practices.

Quality Assurance, Quality Control	Providing support to the project teams, in particular in performing audits, ensuring correct functioning of the nonconformity control process, managing the F4E inspector's contracts
CE marking	Regular support to project teams as needed
Systems Engineering, Configuration Management and Technical Integration	Improvement of the transversal support for both Barcelona and Cadarache.
Assembly Integration and Validation (AIV)	Regular support to project teams as needed
Programme Management	Management of risk, schedule, reporting (both internal and external), budget, cost.
Information and Communication Technology	Software licenses provisioning and maintenance, Project management platform support,

EXPECTED RESULTS, TARGET AND INDICATORS

N.A.

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 51.04 FTEs.

PROCUREMENT PLAN

Main Procurement initiatives

Scope description	Time of call	Type of Contract	Credit type
Convention 6 for Real Convoys for Gendarmerie Services	N.A.	SC	PA
Convention 7 for Real Convoys for Gendarmerie Services	N.A.	SC	PA
Engineering Support to Antennas and Plasma Engineering (In-sourcing)	Q4-2016	FwC	NA
Provision of Instrumentation and Control Integration Services	Q4-2016	FwC	NA
Mechanical analyses of ITER components	Q1-2017	FwC	NA
Maintenance calibration and Certification of metrology equipment	Q1-2017	FwC	NA

Grants and Specific Grants

Scope description	Time of call	Indicative Amount	Budgetary line
N.A.	N.A.	N.A.	N.A.

1.3.14. Action 14. Broader Approach

Action 14	Broader Approach

Overview

JT-60SA

In 2017, a large share of EU contribution will be delivered to the JT-60SA site. The actions will focus on fabrication, testing, transportation and on-site installation done either by Voluntary Contributors or F4E. The activities under the responsibility of F4E are carried out through task orders of existing framework contracts or existing/new supply and service contracts. Substantial progress is expected with the majority of the TF coils being transported by F4E and assembled by QST. The installation and commissioning of the first half of the ENEA contribution to the Super Conducting Magnets Power Supplies, as well as the remainder of such work on the Switching Network Units. The High Temperature Super Conducting Current Leads and the Cryostat will be delivered to site. The Electron Cyclotron Resonance Heating power supplies are expected to reach an advanced stage in manufacturing. On the basis of risk assessment, it is identified the possible need to perform actions in the area of re-machining of components, replacement of parts and systems on short notice, execution of on-site repairs and re-tests. F4E on site presence for the follow-up of the activities of installation of systems and components will continue to be supported by experts and health and safety services to ensure safe operations. Engineering and other auxiliary activities in support of the integrated assembly and commissioning are also planned.

Cash contribution will be made to the Common Fund for integration and commissioning activities. funds are also reserved for possible compensation/reimbursement to EU VCs according to the provisions of the respective Agreement of Collaborations. A reimbursement is also foreseen regarding the amendment of the Agreement of Collaboration on Cold Test Facility.

IFMIF/EVEDA

Of the 4 key objectives of the IFMIF/EVEDA Project (Engineering Design, Li Target Prototyping, High Flux Test Module Prototyping, and Accelerator Prototyping), all committed tasks for the first 3 objectives were completed in 2016. Therefore in 2017, all work will be devoted to the installation and commissioning of the LIPAc (Linear IFMIF Prototype Accelerator) systems at Rokkasho implemented through Voluntary Contributors and F4E contracts. After the first phase (Installation and commissioning of the Injector), the main objective is to reach an advanced status in Phase B allowing beam commissioning in 2018. It will consist of the final positioning, assembly and alignment of the systems required for validating the accelerator line for a deuteron beam of up to 5 MeV. This will be supported through Voluntary Contributors and F4E contracts. The subsequent Phases C and D will start in 2018, and will see the integrated installation of the full LIPAc facility adding the high-energy part of the accelerator line. Selected components shall be contributed in 2017 through Voluntary Contributors and F4E contracts, and shall provide first beam operation evidence to consolidate the IFMIF Engineering Validation Activities early 2020. In addition, all commitments for the transport of the remaining systems will be placed through specific task orders within the existing transport framework contract. These systems are presently under manufacture in Europe through the Voluntary Contributors with specific engineering support provided through F4E contracts. During all installation and commissioning phases, F4E will still be supported by experts, and on-site health and safety services to ensure safe operations funded respectively by F4E through expert contracts and specific contracts.

Cash contributions, will be made to maintain project team common expenses (e.g. missions) and common funds (e.g. repairs and spare parts).

IFERC

The IFERC project comprises three activities, CSC (supercomputer Helios), DEMO design and R&D activities, and REC (Remote experimentation Centre). These activities are in different phases of execution. The supercomputer Helios (provided by France as voluntary contributor) will stop operation in December 2016 and will be the dismantled in the first six months of 2017, completing the credit under two PAs. The DEMO design activities are at the pre-conceptual design level and are performed by EUROfusion acting as a Voluntary Contributor. The REC activities are fully under the financial responsibility of F4E, and are performed under F4E contracts to provide software and services, some of which will be completed in 2017 (site acceptance tests). One planned test (participation in the operation of a European Tokamak from Rokkasho) will need financing in 2017.

ANNUAL OBJECTIVES AND INDICATORS

Milestone ID/ Objectives	Scope Description	Forecast achievement date	Type of milestone
STP-EU-TFC	Transport and Delivery of TF coils and accessories - 2017 part	Q4-2017	Used as WP17 milestone
STP-EU-SNU	Delivery and installation of the SNUs	Q4-2017	Used as WP17 milestone
STP-EU-CR02	Transport of the Cryostat Vessel Body Cylindrical Section	Q4-2017	Used as WP17 milestone
Integrated Commissioning and Initial Operation	Common activities required to support JT-60SA activities, not covered under specific WBS sub elements of JT-60SA - 2017 Part	Q4-2017	Used as WP17 milestone
IFMIF-EU-PA-10-B	Phase B: Completion of commissioning @ 5 MeV	Q4-2017	Used as WP17 milestone
IFMIF-EU-PA-12	Cryoplant Installation and Acceptance Test Report at Rokkasho BA Site	Q2-2017	Used as WP17 milestone
REC (Remote Experimentation Centre)	Deliver software tools and codes	Q4-2017	Used as WP17 milestone

EXPECTED RESULTS, TARGET AND INDICATORS

JT-60SA

- Majority of the toroidal field coils delivered to the Naka site
- Switching Network Units delivered to and installed at the Naka site
- Cryostat Vessel Body Cylindrical Section delivered to the Naka site
- Common activities in support of JT-60SA as required by the progress of the work carried out

IFMIF

- Beam commissioning @ 5 MeV (Phase B) started
- Cryoplant installed at the Rokkasho BA site and the acceptance test report is prepared and approved

IFERC

- Software tools and codes for the Remote Experimentation Centre delivered

The target for all three projects is the credit value of 92.751 kBAUA for 2017

HUMAN RESOURCES ASSIGNED TO THE ACTION

F4E will be supporting this action during the year 2017 with 31.86 FTEs

PROCUREMENT PLAN			
Main Procurement initiatives			
Scope description	**Time of call**	**Type of Contract**	**Credit type**
Materials and components for LIPAc installation	Q4-2017	Supply	Not credited
Engineering support for installation in Rokkasho	Q4-2017	Service	Not credited
Grants and Specific Grants			
Scope description	**Time of call**	**Indicative Amount**	**Budgetary line**
N.A.	N.A.	N.A.	N.A.

ANNEXES

ANNEX I. 2017 Work Programme 1st Amendment Budget Summary

Budget article		Fist amendment to the Work Programme Commitment appropriations (EUR)	Original Work Programme From MAP2017-2021 adopted 21/02/2017 Commitment appropriations (EUR)
3 1	ITER construction including site preparation	344,901,997.00	~~348,272,997.00~~
3 2	Technology for ITER	5,630,000.00	~~7,100,000.00~~
3 3	Technology for Broader Approach & DEMO	12,485,000.00	~~8,600,000.00~~
3 4	Other expenditure	4,356,000.00	~~3,400,000.00~~
3 5	Appropriations from the ITER Host State contribution	145,000,000.00	~~145,000,000.00~~
Total Title III of the Budget		**512,372,997.00**	~~**512,372,997.00**~~
3 1 to 3 4	Additional non-budgeted revenue	24,378.00	~~P.M.~~
3 5	Host State contribution carried over from previous year (Available in July)	22,009,115.00	~~P.M.~~
3 6	Additional revenue from the Reserve Fund Allocation scheme with ITER Organization	40,000,000.00	~~P.M.~~
Total amount available for the operational expenditure		**574,406,490.00**	~~**512,372,997.00**~~

Work Programme		Fist amendment to the Work Programme Commitment appropriations (EUR)			Original Work Programme From MAP2017-2021 adopted 21/02/2017 Commitment appropriations (EUR)		
		Grants	Procurement	Cash	Grants	Procurement	Cash
3.1+3.5 +3.6	Expenditure in support of ITER Project credited by IO	8,202,000.00	442,711,490.00	101,022,000.00	~~14,200,000.00~~	~~282,572,997.00~~	~~196,500,000.00~~
	Sub total ITER construction		**551,935,490.00**			~~**493,272,997.00**~~	
3.2	Design and R&D in support of ITER, not credited	105,000.00	228,000.00	5,297,000.00	~~250,000.00~~	~~1,550,000.00~~	~~5,300,000.00~~
	Sub total technology for ITER		**5,630,000.00**			~~**7,100,000.00**~~	
3.3	Expenditure in support of Broader Approach		7,779,000.00	4,706,000.00		~~5,600,000.00~~	~~3,000,000.00~~
	Sub total Technology for Broader Approach and DEMO		**12,485,000.00**			~~**8,600,000.00**~~	
3.4	Other Expenditure (EU.PM.PM)		4,356,000.00			~~3,400,000.00~~	
	Sub total Other Expenditure		**4,356,000.00**			~~**3,400,000.00**~~	
Totals Operational Expenditure		***8,307,000.00***	***455,074,490.00***	***111,025,000.00***	~~***14,450,000.00***~~	~~***293,122,997.00***~~	~~***204,800,000.00***~~
		574,406,490.00			~~**512,372,997.00**~~		

ANNEX II. Essential selection, award criteria and Upper funding limits for Grants

With regard to grant actions referred to in this work programme, the essential selection and award criteria are:

Essential Selection Criteria

- The applicants' technical and operational capacity: professional, scientific and/or technological competencies, qualifications and relevant experience required to complete the action.
- The applicants' financial capacity: stable and sufficient sources of funding in order to maintain the activity throughout the action.

Essential Award Criteria

- Relevance and quality of the proposal with regard to the objectives and priorities set out in this work programme and in the relevant call for proposals.
- Effectiveness of the implementation as well as of the management structure and procedures in relation to the proposed action.
- Cost-effectiveness and sound financial management, specifically with regard to F4E's needs and objectives and the expected results.

With regard to the specific action, more details will be provided in the call for proposals. Thresholds and weighting for the essential and additional award criteria will also be indicated in the call for proposals.

A proposal which does not fulfill the conditions set out in the Work Programme or in the call for proposals shall not be selected. Such a proposal may be excluded from the evaluation procedure at any time.

The timetable and indicative aggregated amounts for the actions are defined in this Work Programme.

Upper funding Criteria

With the entry into force of the recast F4E Financial Regulation and Implementing Rules on 1st January 2016, the following upper funding limits apply for grants:

1.	Research, technological development and demonstration activities	40%
2.	Purchase/manufacturing of durable equipment or assets and of ancillary services approved by the Joint Undertaking as necessary to carry out such activities	100%
3.	Coordination and support actions, including studies	100%
4.	Management activities, including certificates on the financial statements, and other activities not covered by paragraphs 1 and 2	100%

ANNEX III. Mapping of Organizational Breakdown Structure (OBS – F4E Teams/Units). WBS level 3 and relevant Procurement Arrangements

F4E UNIT (OBS)	WBS REF. (LEVEL 3)	WBS NAME (LEVEL 3)	PAs relevant
Magnets (MG)	EU.01.11.01	Toroidal Field Coils	PA 1.1.P1A.EU.01
	EU.01.11.02	Pre Compression Rings	PA 1.1.P2A.EU.01
	EU.01.11.03	Poloidal Field Coils	PA 1.1.P3A-B.EU.01
	EU.01.11.04	Magnet Conductors	PA 1.1.P6A.EU.01 PA 1.1.P6C.EU.01
Vacuum Vessel (VV)	EU.01.15.01	Main Vessel	PA 1.5.P1A.EU.01
In Vessel (IV)	EU.01.15.02	Blanket Manifolds	PA 1.5.P1A.EU.02
	EU.01.16.01	Blanket and First Wall Panels	PA 1.6.P1A.EU.01
	EU.01.17.01	Divertor Cassette Body and Assembly	PA 1.7.P1.EU.01
	EU.01.17.02	Divertor Vertical Target	PA 1.7.P2B.EU.01
	EU.01.17.03	Divertor Rails	PA 1.7.P2E.EU.01
Remote Handling (RH)	EU.01.23.01	Remote Handling Common Activities	PA 2.3.P2.EU.01 PA 2.3.P3.EU.01 PA 2.3.P5.EU.01 PA 5.7.P1.EU.01
	EU.01.23.02	Divertor Remote Handling System	PA 2.3.P2.EU.01
	EU.01.23.03	Cask and Plug Remote Handling System	PA 2.3.P3.EU.01
	EU.01.23.05	Neutral Beam Remote Handling System	PA 2.3.P5.EU.01
	EU.01.57.01.	In Vessel Viewing System	PA 5.7.P1.EU.01
Cryoplant and Fuel Cycle (CF)	EU.01.31.01	Cryopumps	PA 3.1.P1.EU.01 PA 3.1.P1.EU.02 PA 3.1.P1.EU.03 PA 3.1.P1.EU.04
	EU.01.31.02	Leak Detection and Localization System	PA 3.1.P3.EU.01
	EU.01.32.01	Hydrogen Isotope Separation System	PA 3.2.P3.EU.01
	EU.01.32.02	Water Detritiation System	PA 3.2.P5.EU.01 PA 3.2.P5.EU.02
	EU.01.34.01	Liquid Nitrogen Plant and Auxiliary Systems	PA 3.4.P1.EU.01
	EU.01.64.01	Radiological and Environmental Monitoring System	PA 6.4.P1.EU.01 PA 6.4.P1.EU.02
	EU.01.66.01	Radiological and Conventional Waste Treatment and Storage	PA 6.3.P1.EU.01

Antennas and Plasma Engineering (PE)	EU.01.51.01	Ion Cyclotron Antenna	PA 5.1.P1.EU.01
	EU.01.52.01	Electron Cyclotron Upper Launcher	PA 5.2.P1B.EU.02
	EU.01.52.05	Electron Cyclotron Control System	PA 5.2.P1B.EU.01
	EU.01.PE.01	Plasma Engineering	
	EU.01.PE.02	Plasma Control System	
Neutral Beam and EC Power Supplies and Sources (NB)	EU.01.52.02	Electron Cyclotron Gyrotrons	PA 5.2.P3.EU.01
	EU.01.52.03	Electron Cyclotron Power Supplies	PA 5.2.P4.EU.01
	EU.01.53.01	Neutral Beam Assembly and Testing	PA 5.3.P1.EU.01
	EU.01.53.02	Neutral Beam Source and High Voltage Bushing	PA 5.3.P2.EU.01
	EU.01.53.03	Beamline Components	PA 5.3.P3.EU.01
	EU.01.53.04	Pressure Vessel and Magnetic Shielding	PA 5.3.P4.EU.01
	EU.01.53.05	Active Correction and Compensation Coils	PA 5.3.P5.EU.01
	EU.01.53.06	Neutral Beam Power Supplies	PA 5.3.P6.EU.01
	EU.01.53.07	Neutral Beam Test Facility	PA 5.3.P9.EU.01
	EU.01.53.08	Neutral Beam non credited activities	
Diagnostics (DG)	EU.01.55.01	Magnetics	PA 5.5.P1.EU.01-02-16-17-19
	EU.01.55.02	Bolometers	PA 5.5.P1.EU.01-03
	EU.01.55.03	Plasma Position Reflectometry	PA 5.5.P1.EU.05
	EU.01.55.04	Pressure Gauges	PA 5.5.P1.EU.07
	EU.01.55.06	Tokamak Services	PA 5.5.P1.EU.01
	EU.01.55.07	Radial Neutron Camera - Gamma Spectrometer	PA 5.5.P1.EU.15
	EU.01.55.08	High Resolution Neutron Spectrometer	PA 5.5.P1.EU.15
	EU.01.55.09	Core-plasma Thomson Scattering	PA 5.5.P1.EU.01
	EU.01.55.10	Low Field Side Collective Thomson Scattering	PA 5.5.P1.EU.09
	EU.01.55.11	Core-Plasma Charge Exchange Recombination Spectrometer	PA 5.5.P1.EU.04
	EU.01.55.13	Equatorial Visible/Infrared Wide-Angle Viewing System	PA 5.5.P1.EU.06
	EU.01.55.14	Port Engineering Systems	PA 5.5.P1.EU.10-11-12-13-14
	EU.01.55.15	Diagnostics Common Activities	PA 5.5.P2.EU.01
TBM and Materials Development (TB)	EU.01.56.01	European Test Blanket System Arrangement	
	EU.01.56.02	Test Blanket Systems Research & Development	

Buildings infrastructure and Power supplies (BIPS)	EU.01.62.02	Buildings infrastructure and Power supplies	PA 4.1.P1A-8B.EU.01 PA 4.1.P8C.EU.01 PA 4.1.P8A.EU.01 PA 4.1.P1A-8B.EU.02 PA 6.2.P2.EU.01 PA 6.2.P2.EU.02 PA 6.2.P2.EU.03 PA 6.2.P2.EU.04 PA 6.2.P2.EU.05 PA 6.2.P2.EU.06
Technical Support Services (TS)	EU.01.ES.01	Engineering Support and Integration	
	EU.01.ES.02	Engineering Analysis and Nuclear Data	
	EU.01.ES.03	Embedded Control Data Access and Communication	
	EU.01.MF.01	Materials and Fabrication Technologies	
	EU.01.PM.04	CE Marking	
	EU.01.NS.01	Nuclear Safety	
	EU.01.TR.08	Transportation	
Project Management (PI)	EU.01.CC.01	Cash Contributions to ITER Organization	
	EU.01.CC.02	Cash Contributions to Japan Domestic Agency	
	EU.PM.PM.02	Risk Management	
	EU.PM.PM.03	Planning and Scheduling	
	EU.PM.PM.04	Project Management	
	EU.01.PM.01	Programme Management -Quality Assurance	
	EU.PM.PM.09(*)	Additional Operational Expenditures (*)	
System Engineering (SE)	EU.01.PM.03	Technical Integration	
	EU.01.PM.05	Systems Engineering	
	EU.01.PM.06	Configuration Management	
Broader Approach Common (BA)	EU.BA.01.01	Transportation	
	EU.BA.01.02	On site activities	
	EU.BA.01.03	PA Monitoring	
	EU.BA.01.04	Legal Costs	
Satellite Tokamak JT-60SA (JT)	EU.BA.02.01	Satellite Tokamak (JT-60SA) Common Activities	
	EU.BA.02.02	Toroidal Field Magnet	
	EU.BA.02.03	Assembly	
	EU.BA.02.04	Power Supply	
	EU.BA.02.05	Cryogenic System	
	EU.BA.02.06	Materials	
	EU.BA.02.07	Cryostat	

IFMIF (IF)	EU.BA.03.01	IFMIF-EVEDA Project Common Activities	
	EU.BA.03.02	LIPAc Activities	
IFERC (BA)	EU.BA.04.01	International Fusion Energy Research Centre Common Activities	
	EU.BA.04.02	Remote Experimentation Centre	
	EU.BA.04.03	Computational Simulation Centre	
	EU.BA.04.04	DEMO Design	
Legal Service (LS)	EU.PM.PM.09.95	Additional Operational Expenditure-Legal Specific Contractual Support	
Information and Communication Technology (ICT)	EU.PM.PM.09.93	Additional Operational Expenditures-ICT	
Corporate Services (CS)	EU.PM.PM.09.92	Additional Operational Expenditures-Corporate Services Unit	

ANNEX IV. Mapping of Action, WBS L3 and WP reference.

Action	F4E-WP Action	Project Name	WBS L3
1	Magnets	Toroidal Field Coils	EU.01.11.01
		Pre Compression Rings	EU.01.11.02
		Poloidal Field Coils	EU.01.11.03
		Magnet Conductors	EU.01.11.04
2	Vacuum Vessel	Main Vessel	EU.01.15.01
3	In Vessel - Blanket	Blanket Manifolds	EU.01.15.02
		Blanket and First Wall Panels	EU.01.16.01
4	In Vessel – Divertor	Divertor Cassette Body and Assembly	EU.01.17.01
		Divertor Vertical Target	EU.01.17.02
		Divertor Rails	EU.01.17.03
5	Remote Handling	Remote Handling Common Activities	EU.01.23.01
		Divertor Remote Handling System	EU.01.23.02
		Cask & Plug Remote Handling System	EU.01.23.03
		Neutral Beam Remote Handling System	EU.01.23.05
		In Vessel Viewing System	EU.01.57.01
6	Cryoplant and Fuel Cycle	Cryopumps	EU.01.31.01
		Leak Detection and Localization System	EU.01.31.02
		Hydrogen Isotope Separation System	EU.01.32.01
		Water Detritiation System	EU.01.32.02
		Liquid Nitrogen Plant and Auxiliary Systems	EU.01.34.01
		Radiological and Environmental Monitoring System	EU.01.64.01
		Radiological and Conventional Waste Treatment and Storage	EU.01.66.01
7	RF Heating and Current Drive	Ion Cyclotron Antenna	EU.01.51.01
		Electron Cyclotron Upper Launcher	EU.01.52.01
		Electron Cyclotron Gyrotrons	EU.01.52.02
		Electron Cyclotron Power Supplies	EU.01.52.03
		Electron Cyclotron Control System	EU.01.52.05

8	Neutral Beam Heating and Current Drive	Neutral Beam Assembly and Testing	EU.01.53.01
		Neutral Beam Source and High Voltage Bushing	EU.01.53.02
		Beamline Components	EU.01.53.03
		Pressure Vessel and Magnetic Shielding	EU.01.53.04
		Active Correction and Compensation Coils	EU.01.53.05
		Neutral Beam Power Supplies	EU.01.53.06
		Neutral Beam Test Facility	EU.01.53.07
		Neutral Beam Not Credited Activities	EU.01.53.08
9	Diagnostics	Magnetics	EU.01.55.01
		Bolometers	EU.01.55.02
		Plasma Position Reflectometry	EU.01.55.03
		Pressure Gauges	EU.01.55.04
		Tokamak Services	EU.01.55.06
		Radial Neutron Camera - Gamma Spectrometer	EU.01.55.07
		High Resolution Neutron Spectrometer	EU.01.55.08
		Core-plasma Thomson Scattering	EU.01.55.09
		Low Field Side Collective Thomson Scattering	EU.01.55.10
		Core-Plasma Charge Exchange Recombination Spectrometer	EU.01.55.11
		Equatorial Visible/Infrared Wide-Angle Viewing System	EU.01.55.13
		Port Engineering Systems	EU.01.55.14
		Diagnostics Common Activities	EU.01.55.15
10	Test Blanket	European Test Blanket System Arrangement	EU.01.56.01
		Test Blanket Systems Research & Development	EU.01.56.02
11	BIPS	Buildings Infrastructure and Power Supplies	EU.01.62.02
12	Cash Contributions	Cash Contributions to ITER Organization	EU.01.CC.01
		Cash Contributions to Japan Domestic Agency	EU.01.CC.02

13	Supporting Activities	ITER Programme Management	EU.01.PM
		Transportation	EU.01.TR
		Engineering Support and Integration	EU.01.ES.01
		Engineering Analysis and Nuclear Data	EU.01.ES.02
		Embedded Control Data Access and Communication	EU.01.ES.03
		Materials and Fabrication Technologies	EU.01.MF.01
		Nuclear Safety	EU.01.NS.01
		Plasma Engineering	EU.01.PE.01
		Plasma Control System	EU.01.PE.02
		F4E Programme Management	EU.PM.PM
14	Broader Approach	Common Activities	EU.BA.01
		Satellite Tokamak (JT-60SA)	EU.BA.02
		IFMIF-EVEDA Project	EU.BA.03
		International Fusion Research Centre	EU.BA.04

ANNEX V. Indicative Value of Financial Resources, for the actions in WP2017 1st Amendment.

The WP2017 first amendment represents the financial decision to be adopted by the Governing Board in order to allow F4E to commit budget for the listed activities. The budget requested by F4E (see Annex I) is lower than the one covered by the planned activities.
The table below shows the following information:

- the most likely total level of commitments planned for the projects/actions in 2017 by taking into account the progress and the available manpower. This value is the target of the organization;
- the indicative share of the 2017 available budget assigned to each action (or group of actions).

Additional budget, consisting of unused appropriations, will be requested to the Governing Board at the end of 2017 to match the final needs of the organization and fulfil the obligations of cash contributions to be paid to IO.
In any case, the GB will be kept informed on the evolution of the budget implementation (both in commitments and payments) through the monthly report that F4E delivers to its Governance bodies. This report will also provide an adequate warning if the additional budget from the unused appropriations will be needed.

		1st Amendment WP2017		WP2017	
Action No	Action	Assigned Financial Resources (Total)	Available Commitment Appropriations	Assigned Financial Resources (Total)	Available Budget
1	Magnets	€8,912,585	€8,900,000	€16,354,810	€11,300,000
2,3,4,10	Main Vessel systems	€80,347,016	€80,000,000	€29,406,510	€20,500,000
5	Remote Handling	€15,561,434	€15,500,000	€16,198,910	€11,000,000
6	Cryoplant & Fuel Cycle	€23,253,962	€23,000,000	€25,220,000	€17,500,000
7	RF Heating & Current Drive	€5,623,679	€5,500,000	€6,604,160	€4,500,000
8	Neutral Beam Heating & Current Drive	€32,462,747	€32,000,000	€31,360,520	€22,000,000
9	Diagnostics	€25,096,009	€25,000,000	€25,141,980	€17,300,000
11	Buildings, Infrastructures & Power Supplies	€251,652,531	€250,000,000	€279,101,570	€200,000,000
12	Cash Contributions	€187,464,580	€101,021,490	€186,854,580	€186,854,580
13	Supporting Activities	€21,731,237	€21,000,000	€18,952,440	€12,818,417
14	Broader Approach	€12,485,000	€12,485,000	€8,596,640	€8,600,000
	Total	€664,590,780	€574,406,490	€643,792,120	€512,372,997

List of Acronyms:

A/E	Architect Engineer
AGPS	Accelerator Ground Power Supplies
ANB	Authorized Notification Body
ANS	Analytical System
ASN	Autorité de Sûreté Nucléaire
ATS	Air Transfer System
BA	Broader Approach
BAUA	Broader Approach Unit of Account. In July 2012 the BAUA corresponded to the value of 783.503 Euros.
BA SC	Broader Approach Steering Committee
BSM	Blanket Shield Module
BtP	Build-to-Print
CD	Current Drive
CDR	Conceptual Design Review
CFC	Carbon Fibre Composites
CMM	Cassette Multifunctional Mover
CQMS	Common Quality management System
COSO	Internal Control standard
CVB	Cold Valve Boxes
CVD	Chemical Vapour Deposition
CXRS	Core plasma charge-exchange Recombination Spectroscopy
DA	Domestic Agency
DACS	Data Acquisition and Control System
DCLL	Dual Coolant Lithium Lead
DCR	Design Change Request
DEMO	Demonstration fusion reactor
DIV	Divertor
DNB	Diagnostic Neutral Beam
DTP	Divertor Test Platform
DT	Deuterium Tritium
DWS	Detailed Work Schedule
EAF	European Activation File
EB	Electron Beam
EBBTF	European Breeding Blanket Test Facilities
EC	Electron Cyclotron
EC UL	Electron Cyclotron Upper Launchers
ECH	Electron Cyclotron Heating
EFDA	European Fusion Development Agreement
EFF	European Fusion File
ELM	Edge Localized Mode
EPC	Engineering Procurement Contract
EUDA	European Domestic Agency
EURATOM	The European Atomic Energy Community
F4E	Fusion for Energy

FDR	Final design Review
FP	First Plasma
FS	Functional Specification
FW	First Wall
FWP	First Wall Panel
GB	Governing Board
HCLL	Helium Cooled Lithium-Lead
HCPB	Helium Cooled Pebble Bed
H&CD	Heating & Current Drive
HHF	High Heat Flux
HIP	Hot Iso-static Pressing
HNB	Heating Neutral Beam
HV	High Voltage
HVAC	Heating Ventilation &Air Conditioning
HVD	High Voltage Deck
HW	Hardware
HXR	Hard X-Ray
IC	Ion Cyclotron or ITER Council
I&C	Instrumentation and Control
ICH	Ion Cyclotron Heating
ICRG	ITER Council Review Group
IFERC	International Fusion Energy Research Center
IFMIF	International Fusion Materials Irradiation Facility
INB	Installation Nucleaire de Base
IO	ITER Organization
IR	Infra Red
IRS	Internal Reporting system
ISEPS	Ion Source and Extraction Power Supplies
ISO	International standards Organization
ISS	Isotope Separation System
ITA	ITER Task Agreement
ITER	International Thermonuclear Experimental Reactor
IUA	ITER Unit of Account. In July 2012, the IUA corresponded to 1619.65 Euros
IVT	Inner Vertical Target
IVVS	In-Vessel Viewing System
KPI	Key Performance Indicator
LD&L	Leak Detection and Localization
LFS-CTS	Low Field Side – Collective Thomson Scattering
LIPAc	Lithium target Facility
MAR	Materials Assessment Report
MDR	Modified Design Reference
MHB	Material Handbook
MHD	Magneto-Hydro-Dynamic
MV	Medium Voltage
NB	Neutral Beam
NBI	Neutral Beam Injector
NBPS	Neutral Beam Power System
NBTF	Neutral Beam Test Facility

NHF	Nominal Heat Flux
ORE	Occupational Radiation Exposure
P&ID	Process and Instrumentation Diagram
PA	Procurement Arrangement
PBS	Product Breakdown Structure
PCR	Project Change Request
PDR	Preliminary Design Review
PE	Plasma Engineering
PF	Poloidal Field
PFC	Plasma Facing Components
PFD	Process Flow Diagram
PIC	Protection transportation Components
PID	Probability Impact Diagram
PIE	Post Irradiation Examination
PM	Project Management Dept.
PMU	Prototypical Mock-Up
PP	Project Plan
PPC	Pre-Production Cryopump
PrSR	Preliminary Safety Report
PTC	Prototype Torus Cryopump
QA	Quality Assurance
QC	Quality Control
QST	Japanese Implementation Agency
R&D	Research & Development
RAFM	Reduced Activation Ferritic Martensitic
REC	Remote Export Center
REM	Radiological Environmental Monitoring
RF	Radio Frequency
RFCU	Radio Frequency Control Unit
RH	Remote Handling
RMP	Resonant Magnetic Perturbation
RNC	Radial Neutron Camera
RWF	RadWaste Facility
RWM	Resistive Wall Mode
SC	Specific Contract
SDC	Structural Design Criteria/Code
SHPC	Safety and Health Protection Coordination
SiC-Dual	SiC/SiC composite material for electrical and thermal Insulation
SMP	Strategic Management Planning
S-NHF	Standard Normal Heat Flux
SOLPS	Scrape Off Layer Plasma Simulation
SR2FP	Straight Road to First Plasma
SS	Steady State
STP	Satellite Tokamak Programme
SW	Software
TBM	Test Blanket Module
TCS	Transfer cask System
TES	Test Extraction System

TF	Toroidal Field
TFC	Toroidal Field Coils
TFWP	Toroidal Field Winding Pack
TH	Thermal Hydraulical
TO	Technical Officer
UT	Ultrasonic
VC	Voluntarily Contribution
VCDIS	Voluntarily Contribution Design Institutions
Vis	Visible
VS	Vertical Stability
VV	Vacuum Vessel
WAVS	Wide Angle Viewing System
WBS	Work Breakdown Structure
WDS	Water Detritiation System
WP	Work Program
WPO	Work Program Objectives