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 PROJECT PLAN (2015 EDITION) 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 Article 6(3)(d),

Having regard to the Financial Regulation of Fusion for Energy[2] adopted by the Governing Board on 22 October 2007, last amended on 25 November 2011[3] (hereinafter "the Financial Regulation"), and in particular Article 30 thereof;

Having regard to the Implementing Rules of the Financial Regulation[4] adopted by the Governing Board on 22 October 2007, last amended on 27 March 2015[5] (hereinafter "the Implementing Rules");

HAVING REGARD to the comments and recommendations of the Administration and Finance Committee, Executive Committee, Technical Advisory Panel and the Bureau;

WHEREAS:

(1) The Director should, in accordance with Article 8(4)(c), draw up and regularly update the Project Plan;

(2) The Governing Board should adopt the Project Plan.

HAS ADOPTED THIS DECISION:

Article 1

The Project Plan (2015 Edition) of Fusion for Energy annexed to this Decision is hereby adopted.

Article 2

This Decision shall have immediate effect.

1 OJ L 90, 30/03/2007, p.58.
2 F4E(07)-GB03-11 Adopted 22/10/2007
3 F4E(11)-GB21-10c Adopted 25/11/2011
4 F4E(07)-GB03-12 Adopted 22/10/2007
5 F4E(13)-GB28-14.2 Adopted 11/12/2013

Done at Barcelona, on 2 December 2015

For the Governing Board

Joaquín Sanchez
Acting Chair of the Governing Board

Romina Bemelmans
Secretary of the Governing Board

Fusion for Energy Project Plan (2015)

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INTRODUCTION

The European Joint Undertaking for ITER and the Development of Fusion Energy or 'Fusion for Energy' (F4E) was created under the Euratom Treaty by a decision of the Council of the European Union.

F4E was established for a period of 35 years from 19th April 2007 and its main offices are situated in Barcelona, Spain. The objectives of F4E are three fold:

- Providing Europe's contribution to the ITER International Fusion Energy Organisation (IO) as the designated EU Domestic Agency for (DA) Euratom;
- Implementing the Broader Approach (BA) Agreement between Euratom and Japan as the designated Implementing Agency for Euratom;
- Preparing in the longer term for the construction of demonstration fusion reactors (DEMO).

In accordance with the Financial Regulation of F4E and its Implementing Rules, this Project Plan (PP) lays down an indicative programme of activities that are foreseen to cover five years (i.e. 2016-2020). This information is complemented by the Resource Estimates Plan.

As far as the ITER project is concerned, this document is supplemented by an on-line annex, linked to the F4E Integrated Reporting System (IRS) and available internally to F4E staff, containing specific information on the main machine systems that are the EU in-kind contributions to the project. The information presented is an extract of the available on-line data as per F4E's October 2015 integrated schedule.

As far as the Broader Approach is concerned, the information provided in this document is supplemented by three individual project plans (i.e. Satellite Tokamak Programme, IFMIF/EVEDA and IFERC) due to be submitted for endorsement to the BA Steering Committee.

REFERENCE SCHEDULES

Input's timeframe: The PP covers 5 years; from 2016-2020 both inclusive (except for the Appendix IV Main Milestones which will cover only significant short-term milestones in the time 2016-2018 both inclusive)

DWS (Detailed Work Schedules) current date: according to October's 2015 Integrated schedule.

DWS Submitted date: according to the schedule submitted by F4E to ITER Organization at the end of September 2015

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Overall Scenario

The F4E Detailed Work Schedules (DWS), on which this Project Plan is based, provide the schedule for the ITER components with special emphasis on those on the critical path for the machine construction.

After every DWS submission, usually at the beginning of each month, ITER IO carries out an integration of the DWSs received from all DAs and derives an integrated project schedule that takes into account all schedule input from the other DAs (and IO) and readjusts the dates to take into account, possible delays in input data from IO and in supplies also between DAs. Therefore further adjustments to the overall schedule can happen after the integration work. The integrated schedule is then used by F4E for the monitoring and reporting exercise.

In the past 18 months, F4E has been working together with the ITER Organization Central Team (IO-CT) to define a new schedule, based on realistic data, to be then used as basis, together with the schedules from IO-CT and the other Domestic Agencies (DA), for the definition of a new project schedule with a new first plasma date to be presented at the ITER Council in November 2015. Until an update is agreed for the ITER Construction Phase, the current reference first plasma date is still kept (i.e. November 2020).

The dates used in the F4E Project Plan are in line with the new project schedule to be proposed to the ITER Council in November 2015.

The long-term schedule exercise carried out by F4E in collaboration with the IO-CT takes into account:

- the latest input and developments of the schedules from the F4E suppliers;
- the most realistic assumption of 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 most realistic assumptions on the data availability from ITER 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 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 are signed, a common effort is in progress in F4E and ITER IO to better identify the requirements linked to each 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 analysed, integrated into the overall F4E schedule in Primavera.

It should also be mentioned that the main milestones listed in Appendix IV are present in the project schedule and are among those to be monitored within F4Efor the advancement of the project through specific Key Performance Indicators (KPIs). The 2016 ones are also included among those provided in the F4E Work Programme 2016.

It should also be borne in mind that, until a decision is taken by the ITER Council on a new first plasma date, due to the delays declared by F4E and by the other DAs, there is a consistent misalignment between milestones as declared in the DWS vs. the dates included in the current Strategic Management Plan (SMP) baseline which is still considering a first plasma date of November 2020.

The new ITER project DG at the time of its appointment has provided an action plan that is tackling many important project issues aiming at solving the identified critical problems. Among the adopted measures, a Reserve Fund has been established with specific rules to finance changes approved at project level through Project Change Requests (PCRs) thus replacing the MAC-10 guidelines that had been used up to now to allocate additional credits The Reserve Fund also aims at increasing the cost awareness of the whole project and allowing an efficient cost containment.

Table I shows a summary of the *key* delivery dates, as submitted and integrated, for main components with special emphasis on those on the critical path (i.e. buildings, magnets and vacuum vessel). An extended version of this table is shown in Appendix III.

The dates in the schedules of the main critical components have either been supported by contractors working in these areas or by an analysis carried out within F4E.

Risks are being evaluated internally in F4E in order to put in place, where possible, the necessary mitigation actions to avoid any impact that would cause a delay on the date of first plasma.

Milestone Name	DWS Date Integrated (October 2015)	DWS Date Submitted (October 2015)	DWS Date Integrated (October 2014)
Toroidal Field Coils			
IPL > Delivery of TF11 (EU 01) by EU-DA to ITER Site	29/03/2019	05/10/2018	07/12/2018
IPL > Delivery of TF09 (EU 02) by EU-DA to ITER Site	02/05/2019	27/11/2018	04/03/2019
IPL > Delivery of TF06 (EU 03) by EU-DA to ITER Site	23/09/2019	04/04/2019	07/06/2019
IPL > Delivery of TF04 (EU 04) by EU-DA to ITER Site	04/11/2019	07/06/2019	04/09/2019
IPL > Delivery of TF05 (EU 05) by EU-DA to ITER Site	24/02/2020	29/08/2019	30/10/2019
IPL > Delivery of TF03 (EU 06) by EU-DA to ITER Site	12/03/2020	09/10/2019	16/01/2020
IPL > Delivery of TF01 (EU 07) by EU-DA to ITER Site	18/06/2020	03/01/2020	04/03/2020

IPL > Delivery of TF18 (EU 08) by EU-DA to ITER Site	08/07/2020	12/02/2020	12/05/2020
IPL > Delivery of TF17 (EU 09) by EU-DA to ITER Site	28/09/2020	14/04/2020	13/07/2020
IPL > Delivery of TF14 (EU 10) by EU-DA to ITER Site	27/10/2020	02/06/2020	03/09/2020

Poloidal Field Coils

IPL > Delivery of PF5 Coil by EU-DA to IO	16/01/2019	15/01/2019	22/08/2019
IPL > Delivery of PF6 Coil by EU-DA to IO	30/04/2019	29/04/2019	14/05/2019
IPL > Delivery of PF2 Coil by EU-DA to IO	06/06/2019	05/06/2019	18/12/2019
IPL > Delivery of PF4 Coil by EU-DA to IO	07/07/2020	06/07/2020	18/09/2020
IPL > Delivery of PF3 Coil by EU-DA to IO	22/03/2021	19/03/2021	03/06/2021

Main Vessel

IPL > Delivery of Sector 5 & all VV Splice Plates by EU-DA to ITER Site	30/09/2019	27/09/2019	05/07/2019
IPL > Delivery of Sector 4 by EU-DA to ITER Site	07/02/2020	07/02/2020	30/09/2019
IPL > Delivery of Sector 3 by EU-DA to ITER Site	27/02/2020	27/02/2020	10/04/2020
IPL > Delivery of Sector 2 by EU-DA to ITER Site	28/05/2020	28/05/2020	09/06/2020
IPL > Delivery of Sector 9 by EU-DA to ITER Site	19/08/2020	17/08/2020	01/06/2020
IPL > Delivery of Sector 8 by EU-DA to ITER Site	26/10/2020	23/10/2020	05/10/2020
IPL > Delivery of Sector 7 by EU-DA to ITER Site	19/03/2021	04/03/2021	22/01/2021

Buildings and Civil Infrastructures

IPL > Assembly Building (13) RFE 1A (RFE #1)	07/04/2017	07/04/2017	07/04/2017
IPL > Tokamak Building (11) RFE 1B stage 1(RFE #1) for Radiological Protection	08/02/2018	08/02/2018	08/02/2018
IPL > Tokamak Building (11) RFE 1B – Stage 2 (RFE #1)	26/04/2019	26/04/2019	n/a
IPL > Tokamak Building (11) RFE 1C (RFE #1)	09/09/2019	09/09/2019	12/07/2019
IPL > Tokamak Building (11) RFE Level L3 Stage1 (RFE #2)	28/11/2019	28/11/2019	n/a

IPL > Tokamak Building (11) RFE Level L4 Stage1 (RFE #2)	09/06/2020	09/06/2020	n/a
IPL > Tokamak Building (11) RFE Level L5 Stage1 (RFE #2)	09/06/2020	09/06/2020	n/a
IPL > Tokamak Building (11) RFE Level R1 Stage1 (RFE #2)	09/06/2020	09/06/2020	n/a
IPL > Tokamak Building (11) RFE Stage2 (RFE #2)	25/08/2020	25/08/2020	n/a
IPL > Construction of Tokamak Building (11) Completed	22/03/2021	22/03/2021	18/08/2020

Table I – Summary of Key milestones variances in days

THE ITER PROCUREMENT ARRANGEMENTS (PA)

F4E has defined, according to the rules for a sound project management, its own Work Breakdown Structure (WBS), a way to represent the work to be executed into a tree of activities broken down and propagated down to different levels. This is a common basis across the whole organization to allow the integration of scheduling, estimating, procurement and finance systems. The WBS consists of 7 levels, where the 4th is at PA/ITA level and the 6th one is the level of the contract execution.

This work has been supplemented by the definition of specific Cost Centers, to be used for costing and funding management purpose. Some adjustments are still in progress following the cost estimate at completion exercise carried out in the period May-September 2015. Table II shows, according to the current F4E WBS, the credited Procurement Arrangements and the ITER credit associated to each of them, taking into account the refinements agreed through Project Change Requests (PCRs) and approved by the ITER Council. The table also displays the credit officially received by F4E up to now for each PA and the forecasted dates of signatures of those PAs that have not been signed, yet.

As for the credit, it is worth mentioning that, in most of the cases, the increased credit through PCR in favour of F4E doesn't fully cover (by far) the real additional costs borne by F4E.

In order to see the evolution of the PA, the credit cells show the comparative values amongst the original, current and received-up-to-date credit within the same PA.

The last table of the sequence composing Table II, shows the grand totals of the three credits types; original, current and received.

The ITER credit attributed to specific PA milestones was the system originally agreed by the ITER partners to provide metrics for Earned Value Management (EVM). Therefore it is a valid system that can be used to measure progress. However, IO distributed the credits within PAs predominantly towards the end and this has been identified as a problem that needs to be corrected. F4E and IO-CT have already started discussions to solve the issue by reviewing credit distributions in the CAS (Credit Allocation Scheme) central database within IO. This

EVM approach has been also discussed at the F4E Governing Board in the frame of the new action plan which has been developed as a consequence of the change of top management within the ITER Organization. F4E has gauged its strategy and decided to bolster the use of ITER Units of Account (IUA)[1] as its reference earning rule metric for EVM, thus ensuring a greater integration agreed between IO and F4E and proving the right level of information for the ITER Council as well where integrated reporting from all DAs is the only proper measure of the project progress. An EVM report based on the current system of ITER credits is already being used since the first quarter of 2015 as a standard report in the F4E reporting system. The overall graph for all EU in-kind procurements is shown in Fig. 3.

EU.01.11 - Magnets

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.11.01.51	PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	89.74000	89.74000	3.90000	n/a	June 2008
EU.01.11.02.51	PA 1.1.P2A.EU.01 Pre Compression Rings	0.6	0.60000	0.0000	n/a	May 2010
EU.01.11.03.53	PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	41.40	40.86000	0.0000	n/a	June 2009
EU.01.11.04.51	PA 1.1.P6A.EU.01 Toroidal Field Conductors	43.39000	43.39000	28.44000	n/a	December 2007
EU.01.11.04.52	PA 1.1.P6C.EU.01 Poloidal Field Conductors	43.39000	11.22881	1.86841	n/a	May 2009

EU.01.15 - Vacuum Vessel

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.15.01.51	PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	92.06000	92.19000	0.0000	n/a	November 2009
EU.01.15.02.51	PA 1.5.P1A.EU.02 Blanket Manifolds	4.52200	4.52200	0.0000	n/a	July 2016

[1] One ITER Unit of Account (IUA) is defined as the equivalent purchase power of US $ 1000 in January 1989.

EU.01.16 - Blanket

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.16.01.52	PA 1.6.P1A.EU.01 Blanket First Wall	40.33000	40.33000	0.0000	n/a	October 2015

EU.01.17 - Divertor

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.17.01.51	PA 1.7.P1.EU.01 Cassette Body and Assembly	11.20000	10.88	0.0000	n/a	April 2012
EU.01.17.02.51	PA 1.7.P2B.EU.01 Inner Vertical Target	20.20000	19.62000	0.660	n/a	March 2010
EU.01.17.03.51	PA 1.7.P2E.EU.01 Divertor Toroidal and Radial Rails	2.38000	2.38000	0.0000	n/a	December 2016

EU.01.23 - Remote Handling

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.23.02.51	PA 2.3.P2.EU.01 Divertor Remote Handling System	9.62000	9.62000	0.0000	n/a	October 2012
EU.01.23.03.51	PA 2.3.P3.EU.01 Cask and Plug Remote Handling System	17.31337	17.31337	0.0000	n/a	June 2015
EU.01.23.05.51	PA 2.3.P5.EU.01 Neutral Beam Remote Handling System	6.00000	6.00000	0.0000	n/a	June 2013

EU.01.31 - Vacuum Pumping and Leak Detection

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.31.01.52	PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps	4.82200	4.82200	0.0000	n/a	March 2018
EU.01.31.01.53	PA 3.1.P1.EU.04 Neutral Beam Cryopumps	2.464	2.464	0.0000	n/a	September 2019
EU.01.31.01.54	PA 3.1.P1.EU.01 Warm Regeneration Lines	0.20000	0.20000	0.0000	n/a	September 2013
EU.01.31.01.55	PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	1.08000	1.08000	0.0000	n/a	May 2016
EU.01.31.02.51	PA 3.1.P3.EU.01 Primary Leak Detection and Localization System	4.40000	4.40000	0.0000	n/a	October 2016

EU.01.32 - Tritium Plant

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.32.01.51	PA 3.2.P3.EU.01 Isotope Separation System	1.65600	1.656	0.0000	n/a	August 2020
EU.01.32.02.51	PA 3.2.P5.EU.01 Water Detritiation System - Tanks	2.55200	2.55200	1.577	n/a	December 2012
EU.01.32.02.52	PA 3.2.P5.EU.02 Water Detritiation System - Main System	2.13108	2.13108	0.0000	n/a	February 2017

EU.01.34 - Cryoplant

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.34.01.51	PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	30.67700	26.37110	4.15700	n/a	June 2011

EU.01.41 - Electrical Power Supply and Distribution

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.41.01.53	PA 4.1.P1A-8B.EU.01 Engineering design of Steady State and Pulsed Power Electrical Network	7.00000	6.93810	4.90000	n/a	October 2009
EU.01.41.01.54	PA 4.1.P8C.EU.01 Material Procurement for Steady State Electrical Network	5.00000	5.00000	0.0000	n/a	December 2013
EU.01.41.01.55	PA 4.1.P8A.EU.01 Material Procurement for SSEN Emergency Power Supply	5.70000	5.70000	0.0000	n/a	December 2013
EU.01.41.01.56	PA 4.1.P1A-8B.EU.02 Inst'n & Commissioning of the SSEN & PPEN and SSEN cables	27.52284	29.48893	0.0000	n/a	December 2013

EU.01.51 - Ion Cyclotron Heating and Current Drive

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.51.01.51	PA 5.1.P1.EU.01 Ion Cyclotron Antenna	3.96000	3.96000	0.0000	n/a	January 2020

EU.01.52 - Electron Cyclotron Heating and Current Drive

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.52.01.53	PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher	5.78000	11.28200	0.0000	n/a	March 2017
EU.01.52.02.51	PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons	8.01000	7.95511	0.0000	n/a	January 2017
EU.01.52.03.51	PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply	11.62800	11.62800	2.350	n/a	May 2012

EU.01.52.05.51	PA 5.2.P1B.EU.01 Electron Cyclotron Control System	6.90200	1.40000	0.0000	n/a	December 2014

EU.01.53 - Neutral Beam Heating and Current Drive

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.53.01.51	PA 5.3.P1.EU.01 Neutral Beam Assembly and Testing	3.80000	3.8000	0.0000	n/a	June 2017
EU.01.53.02.51	PA 5.3.P2.EU.01 Heating Neutral Beam Beam Source	3.89300	3.89300	0.0000	n/a	November 2018
EU.01.53.03.51	PA 5.3.P3.EU.01 Heating Neutral Beam Beamline Components	3.90000	3.90000	0.0000	n/a	April 2019
EU.01.53.04.51	PA 5.3.P4.EU.01 Heating Neutral Beam Vacuum Vessel, Passive Magnetic Shield & Front-End Components	9.02500	11.90000	0.0000	n/a	October 2016
EU.01.53.05.51	PA 5.3.P5.EU.01 Heating Neutral Beam Active Correction Coils	4.40000	4.40	0.0000	n/a	September 2016
EU.01.53.06.51	PA 5.3.P6.EU Neutral Beam Power Supply	31.38200	31.38200	2.20000	n/a	July 2009
EU.01.53.07.51	PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	27.00000	27.00000	1.51000	n/a	October 2010

EU.01.55 - Diagnostics

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.55.01.51	PA 5.5.P1.EU.01 Diagnostics - Magnetics	1.11200	22.96797	0.0000	n/a	December 2011

**Total Diagnostics Systems PA credit 22.96797 kIUAs, as the total scope for Diagnostics1.13968 kIUAs have been signed out of the total as part as the Magnetics part of the PA.*

EU.01.56 - Test Blanket

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.56.01.07	Integration Engineering	n/a	n/a	n/a	n/a	September 2014
EU.01.56.01.07	Integration Engineering	n/a	n/a	n/a	n/a	September 2014

EU.01.57 - Remote Handling IVVS

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.57.01.51	PA 5.7.P1.EU.01 In-Vessel Viewing System	6.80000	6.80000	0.0000	n/a	December 2014

EU.01.62 - Buildings and Civil Infrastructures

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.62.02.53	PA 6.2.P2.EU.01 Poloidal Field Coils Fabrication Building (55)	12.80000	12.80000	6.40000	n/a	November 2008
EU.01.62.02.54	PA 6.2.P2.EU.02 Services (Architect Engineer)	55.75430	55.754	10.75000	n/a	May 2009
EU.01.62.02.55	PA 6.2.P2.EU.03 Excavations Tokamak Complex	31.00000	31.000	6.20	n/a	May 2009
EU.01.62.02.56	PA 6.2.P2.EU.04 Anti-Seismic Bearings	6.20000	6.20000	6.20000	n/a	May 2009
EU.01.62.02.57	PA 6.2.P2.EU.05 Buildings and Site Infrastructure	349.47000	350.25689	0.0000	n/a	May 2010
EU.01.62.02.59	PA 6.2.P2.EU.06 Headquarters Building	13.8500	13.85000	13.85	n/a	October 2012

EU.01.64 - Radiological and Environmental Monitoring

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.64.01.51	PA 6.4.P1.EU.01 for Design of REMS	0.60000	0.60	0.0000	n/a	September 2013
EU.01.64.01.52	PA 6.4.P1.EU.02 for Manuf,Assembly,Inegration,Installation, Comm'g and SAT of REMS RENAME	3.60000	3.6	0.0000	n/a	December 2017

EU.01.66 - Waste Management

		Credit (kIUA)			Signature Dates	
WBS	WBS Name	Original	Current	Released up to date	SMP Baseline	F4E Current
EU.01.66.01.51	PA 6.3.P1.EU.01 Type A Radwaste Treatment and Storage System	10.10000	9.22831	0.0000	n/a	March 2016

Total Original credit	Total Current credit	Total up to date credit
1118.2923	1117.03497	94.96

Table II- Procurement Arrangements and the ITER credit associated to each of them, taking into account the refinements agreed through Project Change Requests (PCRs) and approved by the ITER Council.

ITER CREDIT

The current charts show the various data on PA status and credit.

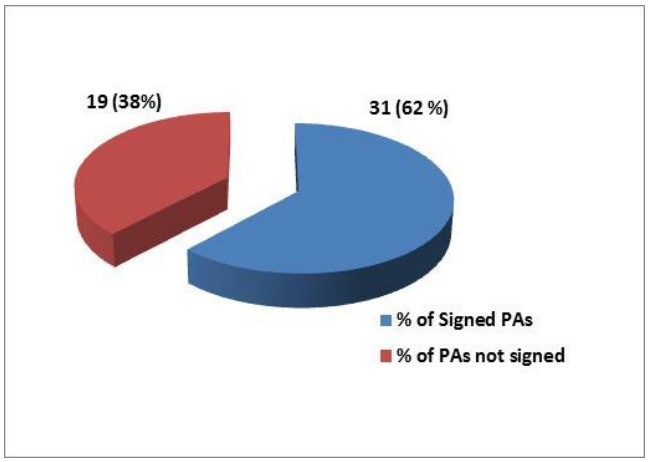


Fig. 1.Number of Signed/not Signed EU PA (status October 2015)

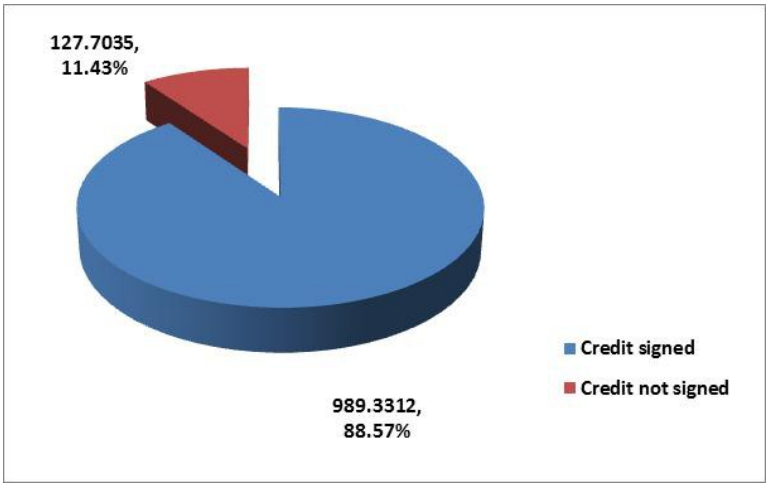


Fig. 2.Value of Signed/not Signed EU PA (Status October 2015)

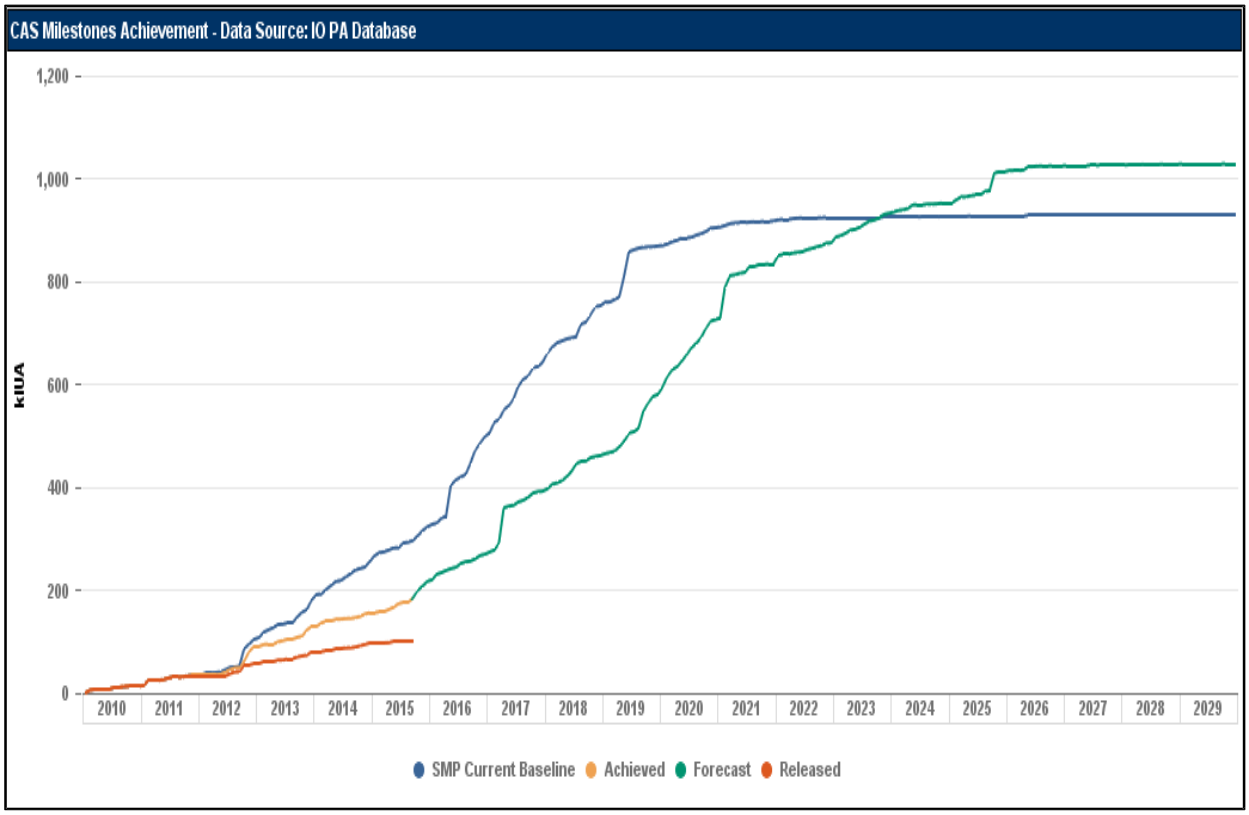


Fig. 3 Credit Graph for all EU in-kind procurements.

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. Initially, all payments were carried out following the acknowledgment by ITER IO of the achieved milestone and the associated credit. Following the new F4E agreement with the Japanese DA (JA DA), for specific procurements, F4E provides a yearly payment based on the forecasted milestones achievement for that specific year. The initial allocation of the milestones with relative EU payments is agreed at the time of the signature of the relevant Japanese PA, but it can shift due to delays in the progress of the contract. Therefore an update is provided by JA DA twice a year. The table shows the percentage and the value (in kIUA) of the EU contribution together with the F4E payments from the signature date of the Japanese PA until end of October 2015 (also in kIUA). In orange are the Japanese PAs already signed. An extra contribution to Japan of 75,000,000 Euros (2014 value) will be provided by EU (through F4E) after 2020 as a consequence of the settlement agreed in January 2014 between Euratom and Japan.

System	Description	Percentage of System financed by EU through cash contribution to JA (approximate %)	Value of Cash Contribution (kIUA)	F4E Payments until end October 2015 (kIUA)
Magnets	Toroidal Field Magnet windings 1B	8.96%	7.7362	**0.5552**
	Toroidal Field Magnet Structure 2A	90%	46.2600	**20.650**
	Toroidal Field Magnet Structure 2B	6.5%	3.1005	**2.4892**
	Toroidal Field Magnet Conductors	10%	21.5000	**21.500**
	Central Solenoid Magnet Conductors	100%	90.000	**70.283**
Tritium	Atmosphere Detritiation	50%	15.1	**0.00**
Neutral Beam H&CD	Beam Source and High Voltage Bushing	21.8%	2.0750	**1.7638**
	Power Supply for Heating Neutral Beam Padova	46.5%	22.6220	**17.5051**
	Power Supply for Heating Neutral Beam Cadarache		20.296	**0.00**

Table III - EU cash contribution to Japan

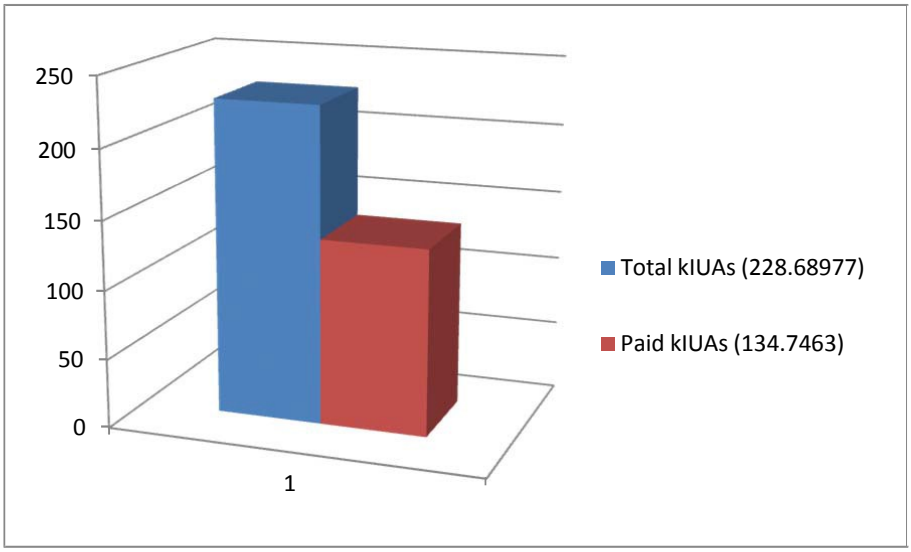


Fig. 4 - EU cash contribution to Japan (kIUAs)

CASH CONTRIBUTION TO ITER IO

For the *Net in cash*, F4E considers the year of the contribution while IO the year of payment.

It has an impact on the value of the contribution, from the exchange rates used.

Table IV shows the yearly cash contribution already paid to ITER IO and the current forecast for 2016, 2017 and 2018(not considering the revised resources submitted to IC in Nov 2015).

Contribution	Net in-Cash		In-Cash from Staff in-Kind		In-Cash from ITA in-Kind		Total In-Cash Contribution to IO	
	Amount (EUR)	Value (IUA)	Amount (EUR)	Value (IUA)	Amount (EUR)	Value (IUA)	Amount (EUR)	Value (IUA)
2006	2 046 000.00	1 425.04	-	-	-	-	2 046 000.00	1 425.04
2007	19 948 000.00	13 594.67	5 814 255.00	3 962.40	-	-	25 762 255.00	17 557.07
2008	36 234 990.34	24 186.33	4 174 642.71	2 783.80	149 815.55	100.00	40 559 448.60	27 070.13
2009	41 011 930.34	26 500.51	4 220 556.69	2 722.55	309 518.00	200.00	45 542 005.03	29 423.06
2010	55 717 039.12	35 894.60	3 510 933.10	2 268.96	6 019 586.72	3 878.00	65 247 558.94	42 041.56
2011	68 863 226.00	43 665.29	3 155 372.37	2 000.77	10 519 813.89	6 670.48	82 538 412.26	52 336.54
2012	87 274 631.00	53 884.87	2 810 278.03	1 735.11	7 714 938.77	4 763.34	97 799 847.80	60 383.32
2013	62 373 352.00	37 570.91	2 092 787.90	1 260.60	6 108 338.78	3 679.39	70 574 478.68	42 510.90
2014	79 418 854.00	47 486.86	2 412 032.00	1 432.84	14 618 812.00	8 684.15	96 449 698.00	57 603.86
2015 (Budget)	74 639 710.00	44 254.40	2 247 024.00	1 329.51	3 855 001.00	2 280.90	80 741 735.00	47 864.81
2016 (Forecast)	121 521 513.00	71 614.68	1 914 730.00	1 128.38	5 630 831.00	3 318.34	129 067 074.00	76 061.40
2017 (Forecast)	166 639 019.00	96 277.63	1 944 727.00	1 123.59	10 447 169.00	6 035.97	179 030 915.00	103 437.19
2018 (Forecast)	163 572 011.00	92 652.58	1 952 506.00	1 105.96	2 705 068.00	1 532.24	168 229 585.00	95 290.78
Total	979 260 275.80	589 008.39	36 249 844.80	22 854.47	68 078 892.71	41 142.82	1 083 589 013.31	653 005.68

Table IV- Yearly EU cash contribution to IO

Risk Management

The Risk Management at F4E currently consists of two different levels: Corporate and Project Level. Cost risks are also taken into account in the costing environment (i.e. Estimate at Completion) and are being integrated into the whole risk environment. The Project Risk management implementation started in 2011, while the Corporate Risk Management implementation started in the second part of 2012. Recently Project Risks registers have been moved to the Primavera planning tool which offers Risk Register management features.

Project Risk Assessment for In-Kind Procurement

As far as the EU in-kind procurements are concerned, risk analysis has progressed through in-house analysis and feedback from the suppliers (whenever a manufacturing contract was in place).

Mid 2015, more than 30 Projects (with at least 1 PA each) were analysed from a risk point of view. The diagram below shows the number of the currently identified and assessed risks compared with those of previous years.

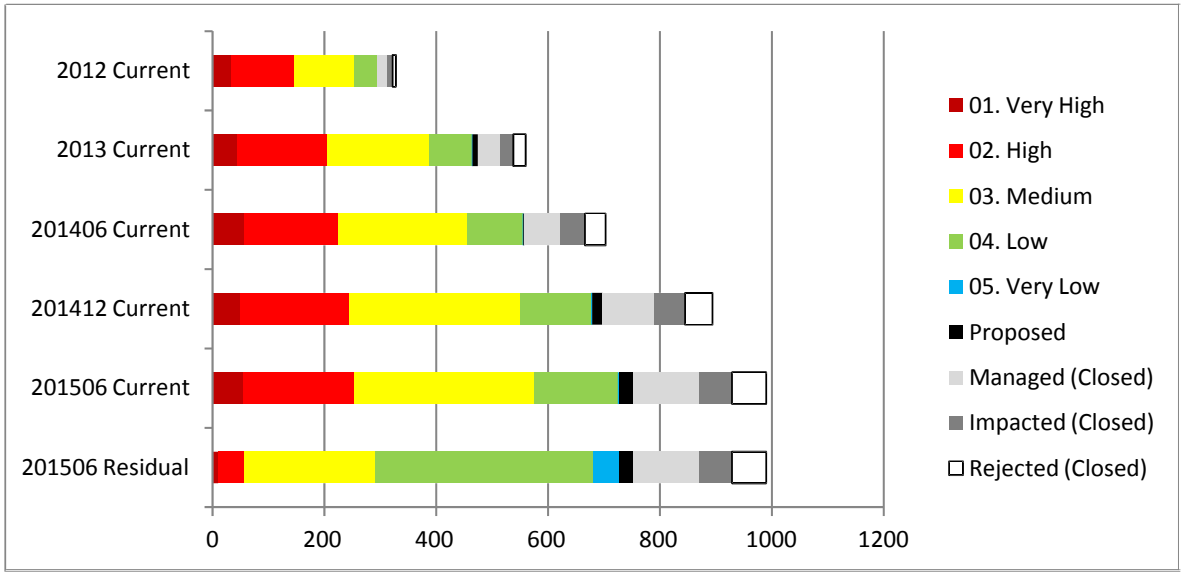


Fig. 5- Number of the currently identified risks compared with those of previous years.

Following the F4E Risk management process, a Probability/Impact Diagram matrix (PID matrix) has been defined for the risk level ranking in order to define priorities on risk handling. In 2015 all PA risk registers were reviewed with the goal to keep the data both:

- consistent within each register,
- and homogenized among all registers. Risk

metrics are provided in Appendix II

DISTRIBUTION OF RISKS PER CATEGORIES

The current Risk Breakdown Structure (RBS) is a categorization of the risk proposed by ITER IO, and it consists of the following categories:

1. *Requirement/Scope Definition*: risk regarding the definition and maturity of the requirements and the understanding of the scope of the project;
2. *Design*: risk regarding the design complexity, maturity, development and integration;
3. *Stakeholder/Regulatory/Environmental*: risk regarding 3 different categories, such as stakeholder (EU, ITER IO, F4E), Regulations and possible environmental risks;
4. *Safety/Security/Quality*: risk regarding safety, security and Quality risks;
5. *Supply Chain/Contractor Capability*: risk regarding the suppliers' aspect, e.g. lack of competition or unavailability of facilities;
6. *Technology/Information Technology*: risk regarding the status of the technology (R&D), IPR, and possibly either on IT or specific software;
7. *Fabrication/Manufacture*: risk regarding mainly uncertainties in manufacturing;
8. *Construction Strategy/Construction*: risk regarding the construction strategy or the construction itself;
9. *Interface/Integration/Assembly:* risk regarding the management of the interfaces both within this project or with other projects (DA's);
10. *Testing/Operations*: risk that can arise during the testing or operation phase. In most of the cases the operation is out of the scope of F4E projects;
11. *Other:* Free category.

The distribution of open risks mid-2015 through the Risk Breakdown Structure is shown in the following chart. The current risk level provided in the Project Plan 2014 is also given as comparison.

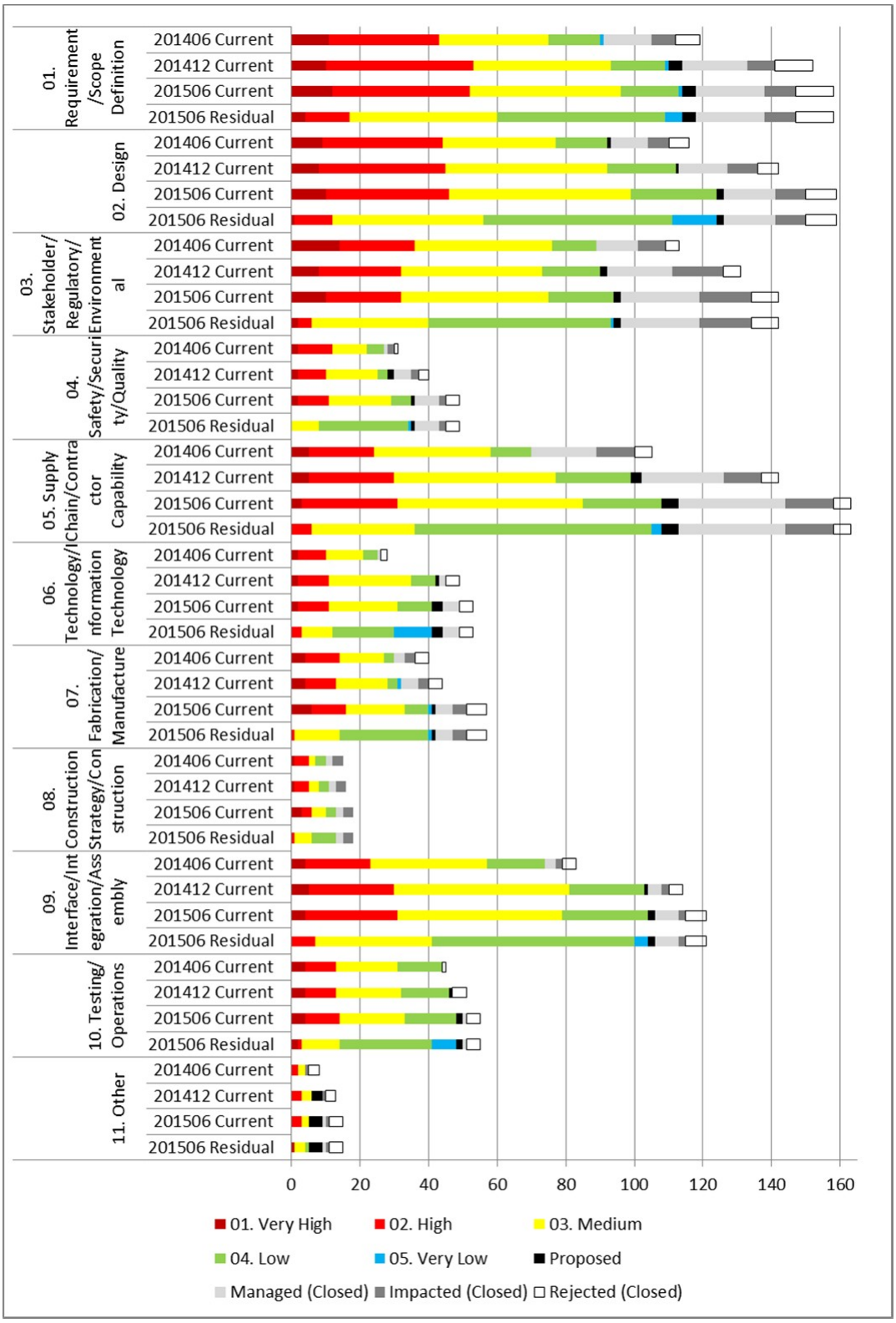


Fig.6- Distribution of Risks per category.

Quality Management

QUALITY FRAMEWORK

The Integrated Management System being applied merges the requirements of the two control environments in which F4E operates since the beginning: - the (ISO-based) ITER-wide Quality System, which is intended to ensure the performance of ITER and the compliance with the nuclear safety requirements, and the (COSO-based) Internal Control Standards as implemented by the European Commission.

This system is implemented through Quality Management which provides an effective and efficient method to perform the tasks, a perspective on the organisation and its risks. It allows F4E to continually improve the way of working and to reinforce the F4E corporate culture towards the stakeholder's expectations.

Fig. 7- F4E Integrated Management System

QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) RELATED TO ITER PROCUREMENTS

The F4E Quality Management System implements, for safety relevant components and activities, the requirements of the INB Order of the 07 February 2012 (replaced from the 01 July 2013 the Quality Order of 10 August 1984), emphasising putting the application of quality to assure safety.

The overall framework to achieve the quality criteria for items and services provided by F4E to the ITER project is established in the F4E QA Programme for the ITER Project (a specific project QA Programs of the quality system). This QA Programme (for the procurement of the EU in-kind components) is approved by the F4E Director and by IO.

As part of the formalisation and approval of the F4E commitments toward the ITER Project, F4E develops a strategy proposal for each project. Based on this strategy, F4E issues a Project Management Plan describing and defining:

- the provisions implemented to comply with the customer requirements and the project reporting rules;
- all interfaces within the project and in particular those between F4E responsible officers;
- the division of the project in the various work-packages that have to be contracted with economic operators.

Suppliers are bound to follow a Quality System for their work. They provide a dedicated Quality Plan that describes the quality provisions to be implemented in order to comply with the F4E *Supplier Quality Requirements* as defined in the call and contractual documentation. Once approved by F4E, it can be used and is physically transferred to F4E at the end of the collaboration in order to ensure traceability of the delivered products over the whole project life.

Quality Assurance (QA) and Quality Control (QC) Related to Broader Approach Procurements

For the BA projects it was introduced a project-wide Common Quality Management System (CQMS).

The CQMS describes general features of common work within each project, allowing the Integrated Project Team to function as a single team with shared procedures and tools. In addition the Home Teams in each project are bound by their respective JA and EU Quality Management Systems, which themselves point to the Quality Management Systems of the actual procuring institutions concerned.

The specific Procurements QA and QC follow the same rules and principles as the ITER Project procurements.

Quality Assurance (QA) and the Quality Requirements

Quality Assurance (focused on providing confidence that quality requirements will be fulfilled) encompasses several tasks, including:

- Support Project Teams in preparation and implementation of ITAs and PAs, ensuring compliance with the F4E QA Programme;
- Support Project Teams in preparation and implementation of Contracts and Grants, ensuring compliance with the F4E QA Programme;
- Ensure that quality processes and procedures are complied with, and in particular the configuration control and configuration management activities;
- Training on QA and Nuclear Safety to all the operational officers and main Protection Important Components (PIC) Suppliers;
- Verification of the Suppliers Quality Plans and all the contract implementation quality documentation, including supplier quality audits and surveillance;
- Coordination of Nonconformities raised and registered in F4E.
- Support to and liaison with the management in all topics involving QA.

The standard quality and management requirements are defined in the ‘Supplier Quality Requirements’ (F4E-QA-115). For every procurement, the contractual Management Specification refers to that specification, as a base for requirements, defining the applicability of each requirement to the Supplier’s project organisation and the

dispositions implemented to ensure a proper monitoring of the contract or grant agreement. The management specification governs the relationship between F4E and the supplier and it requires a 'Quality Plan' from the supplier/tenderer describing the provisions it will implement in order to ensure that the contractual requirements will be met and maintained.

QUALITY CONTROL (QC)

Quality Control (focused on fulfilling quality requirements) is applied during the whole project life cycle and includes the following:

- monitoring the quality of the deliverables and processes is being met and detecting defects by using the established tools, procedures and techniques;
- analysing possible causes of defects;
- determining the preventive actions and deviation requests;
- communicating the corrective actions and deviation requests to the appropriate project organization members.

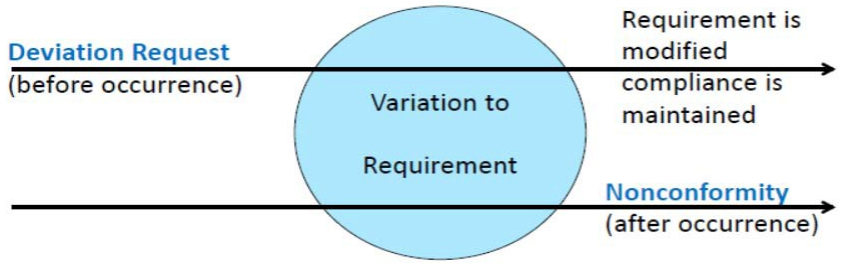
The Quality Control of the contracts/grants implementation is under the responsibility of the Project Teams with the technical support and guidance of the Quality Officers, ensuring the adequate monitor and surveillance of the contract/grant implementation by the Supply chain. This includes regular visits, scheduled quality audits and follow-up of the specific work-package control plan.

The supplier monitoring and surveillance is being supported by a framework contract of inspectors for manufacturing follow-up.
The Supplier shall maintain a Deviation, Nonconformities and internal non-compliances management system to monitor and record the quality of the work performed by the Supplier in comparison to the original specification for the Works.

As per QA-115, the Supplier's Quality Requirements document, F4E demands to the supplier that any divergence from the original specification for the Works must be documented and approved by F4E in accordance with the provisions set out in the Contract.

Nonconformity is a non-fulfilment of a requirement. This requirement might come from the procedures, the items and services specifications or from the stakeholder. F4E has defined a process for handling all aspects of the detected nonconformities.

All F4E personnel are responsible for the identification and reporting of any detected nonconformity.



Any deviation (or modification) to a specified requirement identified by F4E or the supplier shall be handled by the dedicated deviation procedure and the F4E configuration management process. A detailed process exists at F4E for the management of deviations.

The supplier's deviation procedure shall be described in the contract Quality Plan as required by the Management Specification.

Deviations and Nonconformities are assessed in F4E taking into account their impact on customer's requirements (ITER IO), F4E Requirements and the cost impact. The F4E classification is as follows:

Impact	Nonconformity	Deviation
on customer critical requirements	Major	Level C
on customer non-critical requirements	Minor	
on F4E contract, but not on customer requirements	Relevant	Level B
no impact on F4E contract or customer requirements	Technical Exception	Level A

Table V- Impact –Non-Conformity type - level relation.

All raised nonconformities, to be accepted, have to be presented with the correspondent remedial action (correction of the specific situation). For the closure, both the result of that action and the corrective action to be implemented to avoid repetition of the same problem have to be available.

All Deviations are assessed for impact on performance, cost and schedule before a decision is taken whether to accept them or not.

The table below displays the overall statistics of the registered Deviations and Nonconformities at F4E for the past years.

Deviation level	2010		2011		2012		2013		2014		2015 (<Jun)	
Level A	21	*9%*	15	*5%*	10	*3%*	5	*1%*	10	2%	3	2%
Level B	127	*52%*	180	*62%*	161	*51%*	185	*41%*	250	46%	47	31%
Level C	84	*34%*	67	*23%*	124	*39%*	154	*34%*	198	36%	76	49%
Cancelled/to be defined	13	*5%*	30	*10%*	22	*7%*	105	*23%*	87	16%	28	18%
total	245	-	292	-	317	-	449	-	545	-	154	-

Table VI- statistics of the registered Deviations and Nonconformities at F4E

Nonconformity level	2010		2011		2012		2013		2014		2015 (<Jun)	
Major	11	*11%*	33	*37%*	34	*20%*	67	*19%*	109	*22%*	23	*12%*
Minor	3	*3%*	17	*19%*	16	*9%*	173	*50%*	224	*45%*	98	*50%*
Relevant	47	*47%*	34	*38%*	107	*61%*	102	*30%*	159	*32%*	68	*35%*

Exception	38	*38%*	6	*7%*	17	*10%*	2	*1%*	3	*1%*	6	*3%*
total	99	-	90	-	174	-	344	-	496	-	195	-

Deviations (by initiator)	2013		2014		2015 (<Jun)	
F4E DR (deviation request by F4E, internally or to ITER IO)	79	*18%*	60	*11%*	26	*17%*
Supplier DR (deviation request by the Supplier to F4E)	175	*39%*	252	*46%*	73	*47%*
ITER IO DR (deviation request by ITER IO towards F4E)	11	*2%*	16	*3%*	6	*4%*
Deviation Notice/Order (deviation by F4E towards supplier)	184	*41%*	217	*40%*	49	*32%*
Total	449	-	545	-	154	-

Table VII and VIII- Statistics on Deviation Requests (DR) and Nonconformities (NC)

In F4E the Sign-Off Authority (review and approval) for each Deviation and Nonconformity document is defined considering the significance of the document and the impact on related activities to ensure technical adequacy, completeness of document, and appropriateness of quality.

The integration of the F4E Configuration Management processes with the ITER Configuration Management is dealt by a dedicated 'F4E-ITER Project Configuration Management Plan' developed within the framework of the F4E quality system.

QUALITY AUDIT

The annual Quality Audit Plan detailing the specific criteria of selection of auditees, approved by the Director, is performed to verify the state of the Quality System and Quality Plans in accordance with the quality criteria and stakeholder requirements. The methodology regarding the planning, preparation, implementation and recording of internal and external quality audits is defined in a documented process.

The objective of the Quality Audits is to:

- Assure the conformity of the implemented quality system,
    1. Internal: Relative to defined Internal and/or stakeholder requirements;
    2. External: Relative to the Quality Plan;
- Verify the effectiveness of the quality system implemented and its maintenance;
    1. Review of the methods and procedures implementing quality throughout the project life cycle;
    2. Supply the necessary suggestions to the adequate functioning of the quality system.

The quality audit results are recorded and analysed, and may trigger corrective actions, arising from nonconformities, or preventive actions, arising from comments. The reports of internal quality audits are one of the main inputs of the quality improvement. In 2013, F4E performed 18 out of the 19 planned quality audits (1 supplier quality audit postponed

to 2015 due to a delay on the contract implementation to be audited). The table below displays the o global results of the quality audits at F4E for the past years.

Audit Result	2010		2011		2012		2013		2014	
with an Acceptable Result	10	*100%*	19	*90%*	24	*92%*	23	*96%*	*17*	*95%*
with an non-Acceptable Result	0	*0%*	2	*10%*	2	*8%*	1	*4%*	*1*	*5%*

Audit Finding	2010		2011		2012		2013		2014	
Strong Areas	32	*26%*	46	*23%*	44	*18%*	43	*16%*	*23*	*13%*
Improvement Areas	78	*62%*	148	*74%*	190	*76%*	201	*72%*	*134*	*73%*
Nonconformities	15	*12%*	7	*3%*	16	*6%*	35	*12%*	*25*	*14%*
Total	125	-	201	-	250	-	279	-	*182*	-

Table IX- Global results of the quality audits at F4E for the past years

BROADER APPROACH ACTIVITIES

Fusion for Energy is the Implementing Agency for the EU contribution to the 3 BA projects, designated by the European Commission to discharge its obligations as defined in the BA Agreement. In particular, F4E is the organisation delegated to agree and conclude Procurement Arrangements (PAs) with the Japanese Implementing Agency (JAEA).

With few exceptions, most of the activities to be undertaken in the frame of the BA agreement are carried out in-kind by EU-Voluntary Contributors (VC). These are some of the member states represented in the Governing Board of F4E which pledged to contribute to the BA projects, namely Belgium, France, Italy, Germany, Spain, and Switzerland (which has now withdrawn). In turn, each VC channels its contributions through the procurement arm of "Designated Institutions" (VC-DIs). F4E concludes Agreements of Collaboration (AoCs) with the VC-DI, to secure delivery of the EU contributions to meet the requirements of each Procurement Arrangement. The direct contribution of F4E through its own budget is therefore limited in general to a supporting, qualifying or integration role, with some direct procurement for agreed EU contributions not covered by the VCs.

Each of the BA Projects, while having some important differences, shares the common feature of being based on a collaboration in which the Parties contribute both to the definition of the overall integrated design and to the detailed design and realization.

The implementation of the projects is governed by the Parties through the Broader Approach Steering Committee (BASC) and its advisory bodies - the Project Committees (PCs) for each project. The organization put in place for their implementation includes at the technical/operative level an "Integrated Project Team" which executes the project, formed by the union of a Project Team (with just a few staff), a European Home Team, and a Japanese Home Team. The European Home Team of each project is managed by F4E staff. The IPT for each project operates under a Common Quality Management System (CQMS), which has a similar structure in each project and some common elements shared between the projects. This regulates the collaboration of the IPT members, identifying the common templates and procedures, for example for configuration and procurement management. At the European level each project has its own QMS, which defines how the project operates with the VCs, and how it interfaces with F4E QA Management.

In 2015, discussions have taken place to extend the BA projects until the end of 2019. This extension will be submitted for the approval of the BA Steering Committee on 11 December 2015. The proposal for extension includes the transfer of 2580 BAUA from the IFERC Project to the IFMIF-EVEDA Project. The F4E planning takes into account the extension.

Project Implementation Plans

For each BA project, individual Project Plans covering the whole duration of the project and that include both European as well as Japanese activities are prepared by the Project Leaders and submitted annually to the BA Steering Committee (BASC) for approval. A summary is given below, reporting status as of September 2015. These Project Plan

will be submitted for approval at the BASC on 11th December 2015. The F4E Project Plan to manage the European contribution to BA activities is constrained by these individual project plans endorsed by the BASC.

SATELLITE TOKAMAK PROGRAMME

Background

The mission of the JT-60SA project is to contribute to the early realization of fusion energy by supporting the exploitation of ITER and research towards DEMO by addressing key physics issues associated with these machines, in particular by designing, constructing and operating a device:

- capable of confining break-even equivalent class high-temperature deuterium plasmas lasting for a duration longer than the timescales characteristic of plasma processes;
- pursuing full non-inductive steady-state operation with high plasma beta close to and exceeding no-wall ideal stability limits.
- establishing ITER-relevant high density plasma regimes well above the H-mode power threshold.

The primary reference for the Satellite Tokamak Programme is the Project Plan yearly revised and submitted for endorsement to the BA Steering Committee (see BA SC 16-8.5).

The schedule of construction of JT-60SA foresees the first plasma in March 2019 (see fig 8).

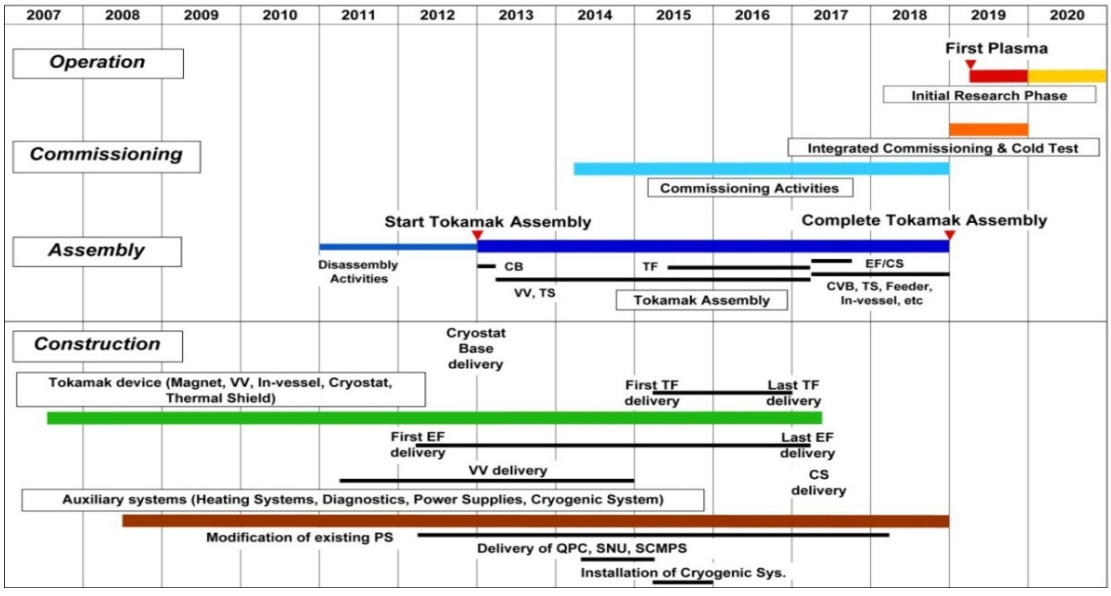


Fig.8 - High-level Project Schedule (as endorsed by the BASC in 2012)

The European contributions are in line with the above schedule, with a good level of confidence since almost all the Procurement Arrangements (see Status of EU Contributions) and the corresponding industrial contracts have been placed and are well underway. To be noted that the construction and delivery of the TF Coils is presently running with an

estimated delay of about seven months (with respect to baseline completion date in January 2017), which is anyhow expected to be recovered in on-site installation activities, leaving the general project milestones unchanged.

After the achievement of the first plasma, JT-60SA will be upgraded step by step according to a phased operation plan (Table X).

	Phase	Expected Duration		Annual Neutron Limit	Remote Handling	Divertor	P-NB	N-NB	ECRF	Max Power	Power x Time
Initial Research Phase	phase I	1-2y	H	-	R&D	LSN partial monoblock	10MW	10MW	1.5MW x100s + 1.5MW x5s	23MW	NB: 20MW x 100s 30MW x 60s duty = 1/30 ECRF: 100s
	phase II	2-3y	D	4E19			Perp. 13MW Tang. 7MW			33MW	
Integrated Research Phase	phase I	2-3y	D	4E20		LSN full-monoblock			7MW	37MW	
	phase II	>2y	D	1E21	Use						
Extended Research Phase		>5y	D	1.5E21		DN	24MW			41MW	41MW x 100s

Table X: STP Operation phases and availability of key components

Exploitation within the Broader Approach (BA) period is planned to cover the first part of the Initial Research Phase, where the main aim will be the integrated commissioning of the system with and without plasma operation (till end of 2020, see fig. 8).
A collaboration between F4E through Eurofusion is on-going with JAEA for the preparation of the research plan and the joint exploitation phase of the device. A "JT-60SA Research Plan" was established at the end of 2011 and the latest version was released in February 2014.

Status of EU Contributions

EU Procurement Arrangements completed:

PA reference	PA title	Credit (BAUA)
EU-QPC	Supply of the Quench Protection Circuits for Poloidal and Toroidal Field Coils	19,150
EU-CB01	Supply of Cryostat Base	4,348
	Completed PAs - Total JT-60SA	23,498

EU Procurement Arrangements on-going:

PA reference	PA title	Credit (BAUA)
EU-TFC	Supply of the Toroidal Field Magnet	99,414
EU-STFC	Supply of One Spare TF Coil	5,197
EU-PAS	Toroidal Field Coil Pre-assembly	2,950
EU-HTSCL	Supply of HTS Current Leads for the TF, CS and EF coils	3,420
EU-TFCTF	Setup of a Cryogenic Test Facility and the Performance of Tests of the TF coils	18,603
EU-SCMPS	Supply of Toroidal Field, Poloidal Field, and Fast Plasma Position Control Coils Power Supplies	20,080
EU-SNU	Supply of the Switching Network Units for Central Solenoids	7,080
EU-CB02	Supply of Cryostat Vessel Body Cylindrical Section	13,042
EU-CRYO	Supply of the Cryogenic System	35,250
EU-RWM	Power Supply to control Resistive Wall Modes	1,150
EU-ECPS	EC Power Supplies	3,730
	Ongoing Pas - Total JT-60SA	209,915

Table XI: Procurement Arrangements on-going

EU Procurement Arrangements to be placed:

Operation: The remaining credit (complement to to 236,414 BAUA, i.e. 3000 BAUA) is foreseen for EU share of the support of integrated commissioning and initial operation of JT-60SA, up to the end of 2019.

IFMIF/EVEDA

The original objective of the Engineering Validation and Engineering Design Activities (EVEDA) of IFMIF was "to produce a detailed, complete, and fully integrated engineering design of the International Fusion Materials Irradiation Facility (hereinafter "IFMIF") and all data necessary for future decisions on the construction, operation, exploitation

and decommissioning of IFMIF and to validate continuous and stable operation of each IFMIF subsystem". The initial duration of the project was set for 6 years, starting from June 2007.

Four main lines of activity were foreseen:

- engineering design of the IFMIF facility, which is the principal objective of the EVEDA phase in view of preparing the construction of IFMIF;
- design, construction, commissioning and operation of the low energy prototype part of the two IFMIF accelerators (called LIPAc, Linear IFMIF Prototype Accelerator), an ambitious project to demonstrate a full beam current performance and reliability in continuous wave;
- engineering design and engineering validation activities for the Target Facility, which depends in particular on the design, the construction and the operation of the Li Test Loop;
- engineering design and engineering validation activities for the Test Facility.

The last two lines form two sets of R&D programmes to provide the databases needed to proceed to the engineering design of the IFMIF facility integrating the accelerator design with the Target Facility and the Test Facility designs.

A re-scoped Project Plan was proposed in 2012 by the EU Voluntary Contributors involved in the IFMIF/EVEDA project:

- giving higher priority to the validation activities, and in particular to the prototype accelerator;
- providing an engineering design of IFMIF with less detail than originally envisaged, in particular all conventional facilities would be at a preliminary design level (since the site is unknown), enabling nevertheless a reasonable estimate of the plant value.

The main points of the IFMIF/EVEDA Project Plan as agreed in 2013 were the following ones:

- give the highest priority to the LIPAc validation activities, assigning all allowable Project Team resources to it, through a new organization of the Project Team including a new Integrated LIPAc Installation and Commissioning (ILIC) Unit.
- identify three phases for the LIPAc experiments as follow:
    - the Injector alone;
    - the Injector + RF Quadrupole + Medium Energy Beam Transport line + Diagnostics Plate + Low Power Beam Dump;
    - the whole accelerator with its Superconductive Cavities, High Energy Beam Transport and its Beam Dump, for which about one year of operation is planned, from mid-2016 to mid-2017, the end of the IFMIF/EVEDA project under the BA agreement.
- scheduled delivery of the "Intermediate IFMIF Engineering Design Report" by mid-2013 (achieved).
- resolve technological barriers for IFMIF in the area of:
    - the Accelerator Facility;
    - critical components for Test Facilities: HFTM in the HELOKA loop and capsule prototypes irradiation in the BR2 reactor;
    - the Lithium Target Facility: free surface diagnostics, erosion/corrosion tests and remote handling for bayonet backplate;
    - the Lithium Target Facility: hot trapping of N and H impurities in the Oarai EVEDA Li Test Loop (ELTL) and manufacturing of a EUROFER removable backplate.

  The first three bullet points above should be validated by the end of 2015, whereas the items in the last bullet point will remain to be validated.

The Project Plan was last updated in April 2015 with the IFMIF/EVEDA Master Schedule as given in Fig. 9.

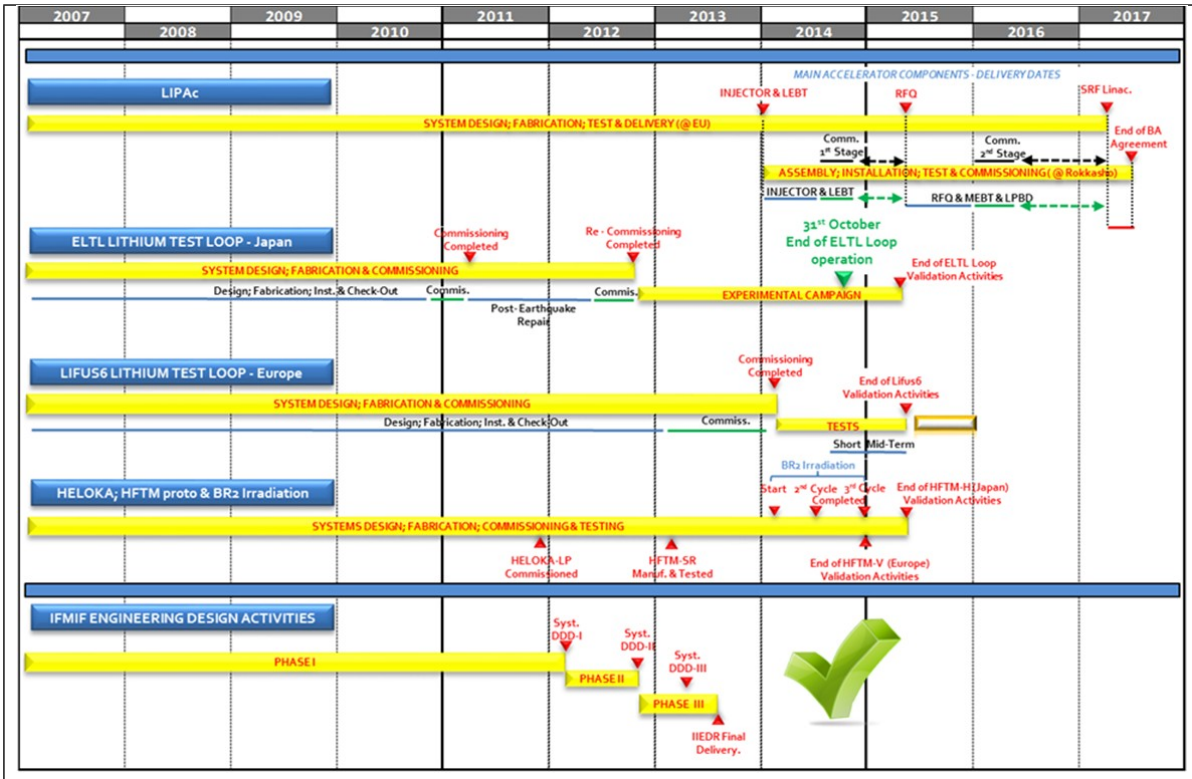


Fig. 9 - IFMIF/EVEDA Master Schedule as of Project Plan updated in April 2015. The Project Plan underlying the proposal for extending the IFMIF/EVEDA project is continuing the Assembly, Installation, Test and Commissioning Phase till end of 2019, which is then also the end of the studies in the framework of the BA Agreement.

According to the resource loaded Project Schedule which was set up to propose the Project Plan for an extension of IFMIF/EVEDA till December 2019 the remaining main project milestones are following ones:

- **December 2015:** Termination of the Lithium **Target Facility** validation activities,
- **June 2017:** Start of integrated commissioning/operation of LIPAc in Rokkasho (to be re-evaluated)
- **December 2019:** End of the studies in the framework of the BA Agreement.

EU Procurement Arrangements (signed) :

PA reference	PA title	Planned Credit (BAUA)
TF01	Engineering Design of HFTM (EU)	2,065
TF02	Irradiation Tests in Fission Reactor (EU)	1,850
TF04	Other Engineering Validation Tasks (EU)	5,260
LF01	EVEDA Li Test Loop (EU)	800
LF03	Erosion/Corrosion (EU)	1,220
LF04	Purification (EU)	490
LF05	Remote Handling (EU)	1,710
AF01	Transversal Activities of the Accelerator Prototype (EU)	16,700
AF02	Injector (EU)	4,580
AF03	* Radiofrequency Quadrupole (EU)	26,370*
AF04	First Cryomodule of SRF LINAC (EU)	6,110
AF05	Medium Energy Beam Transport line MEBT (EU)	3,470
AF06	RF Power (EU)	23,200
AF07	High Energy Beam Transport line HEBT and Beam Dump (EU)	5,490
AF08	Auxiliary Systems (Control Systems and support) (EU))	1,600
AF09	Diagnostics (EU)	1,520
AF10	Installation, Checkout, Start-up & Commissioning (EU)	11,400
AF12	Cryoplant (EU)	2,490
ED01	Eng. Design of IFMIF Plant (EU)	2,610
ED02	Eng. Design of Accelerator Facility (EU)	6,360
ED03	Eng. Design of Lithium Target Facility (EU)	800
ED04	Eng. Design of Test Facility (EU)	4,270
	Total IFMIF	130,365*

Table XII: Procurement Arrangements signed

*Figures quoted here and below are in line with the IFMIF Project Plan input to the BA SC14, and in addition include a further 1 kBAUA transferred from IFERC to IFMIF at the BA SC14 meeting.

EU Procurement Arrangements to be placed:

One PA for the F4E Workpackage for LIPAc Installation, Checkout, Start-up & and Commissioning (PA AF10-EU-WP4) to credit with 1150 BAUA covers the provision of man power during the LIPAc installation and Commissioning period, including the provision of the permanent F4E On-site representative. The remaining sum left for the total EU credit of 145780 BAUA is predominantly for European staff of the Project Team in Rokkasho (whether F4E or Voluntary Contributor seconded staff), as well as for the yearly cash contribution for their expenses and the common fund for prototype accelerator commissioning and operation.

Under current agreements and commitments, the amount credited by the end of 2014 for these purposes was already 11760 BAUA.

IFERC

Background

The IFERC activities include three sub projects - DEMO Design and R&D activities, establishment and operation of a Computer Simulation Centre, and establishment and operation of a Remote Experimentation Centre - as well as the construction of the buildings to house all these activities. The following sections outline EU contributions to these areas.

DEMO Design Activities

After an initial phase analysing common elements for DEMO (2007-2010), the work moved on to a consolidation of knowledge, to define a sound common basis for DEMO design, and definition of priorities for R&D tasks(Phase Two-B), with detailed studies to

a. follow-up work on key design issues and options and narrow down design options on which concentrate further analysis work;
b. adjustment of design criteria, design equations, and cost models;
c. evaluate sets of DEMO parameters as a function of uncertainties;
d. prepare intermediate documentation.

Phase Two B was completed and reflected in the Intermediate Design report. The activities are now in Phase Two-C, (Jan 2015 – Jun 2017) in which pre-conceptual design options for DEMO are being developed. It is expected that this design activity will also suggest specific R&D activities, some of which would be carried out on ITER, or on the Satellite Tokamak (JT-60SA) and other facilities.

DEMO R&D Activities

DEMO R&D aims at establishing a common basis for a DEMO design from the technology viewpoint. Five R&D tasks proceed under Procurement Arrangements.

- T1: SiC/SiC Composites
- T2:Tritium Technology
- T3: Materials Engineering for DEMO Blanket
- T4: Advanced Neutron Multiplier for DEMO Blanket

- T5: Advanced Tritium Breeders for DEMO Blanket

Following a peer review in 2012 of the DEMO R&D activities, and the input from the DEMO Design Activities, the ongoing activities were adapted to the needs expressed by the DEMO Design Activities members.

Computer Simulation Centre (CSC) Activities

The Helios supercomputer, which at the time of its first operation was one of the top 10 fastest machines worldwide, was provided in Rokkasho by Europe at the end of 2011 and continues to be maintained and enhanced by Europe, with all site supporting interfaces provided by Japan.

Operation started on schedule in January 2012 with “lighthouse projects” during the first three months, followed by a 6 month first shared use cycle, and thereafter by successive yearly shared use operational cycles up to the end of 2016. The system has minor planned upgrades in 2014, 2015 and 2016, and is used as main supercomputing tool by the EU fusion community.

It is planned to dismantle Helios in the 1st semester of 2017.

Remote Experimentation Centre (REC)

The Remote Experimentation Centre in Rokkasho aims to facilitate broad participation of scientists into ITER experiments. Remote experimentation techniques will be tested on existing machines, such as JT60-SA. A working group reviewed the requirements for ITER and JT60-SA remote experimentation and the schedule in 2012. In 2013 a Procurement Arrangement to define in detail the requirements of REC was signed, and the first technical PAs have been signed to test and prepare remote data access, focussing mainly on software development. In 2016 the PAs focus on procurement of initial hardware and on simulation.

IFERC SITE

Site activities within the scope of the BA Agreement include the construction of the IFERC buildings and preparation of site infrastructure, and contribution to the management of the site, office equipment, insurance, and utilities (including data networks). The construction of the Administration and Research Building, CSC and REC Building, and the DEMO R&D Building was completed in March 2010. PAs for further adaptations of these buildings were completed in 2011, before installation and operation of the computer. An extension to the DEMO R&D building will be completed in 2016.

Overall Schedule

An extension of all BA Projects until the end of 2019 is in course of approval by the BA SC. IFERC will have completed its scientific missions in 2017 as planned, and is extended to support the IFMIF-EVEDA activities, and to maintain the links established between the technical communities during BA while discussions take place between EU and JA on a possible new agreement of collaboration after 2019.

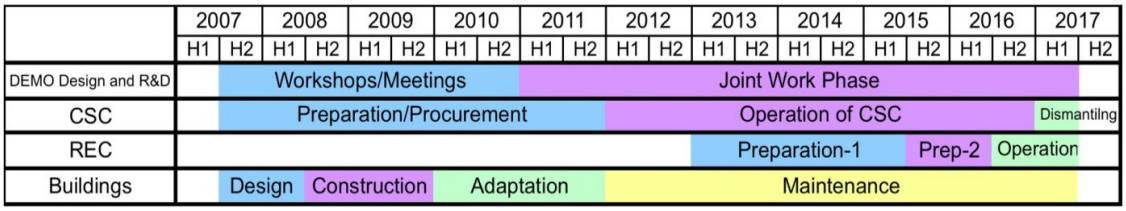


Fig. 10 - IFERC High Level Project Schedule

Activities beyond May 2017 will be defined at a later stage.

The main project milestones remaining are bulleted below:

- **October 2016-March 2017: test of REC**
- **December 2016:** End of supercomputer operation and start of dismantling
- **Mid 2017:** Completion of main IFERC mission of the BA Agreement
- **December 2019**: Completion of activities agreed for BA extension

Procurement arrangements signed :

PA reference	PA title	Planned credit BAUA
IFERC-CSCPA01-EU.CEA	Supply of the supercomputer and peripheral equipment for the IFERC project (CSC activity)	91,500
IFERC-CSCPA01-EU.CEA	Supply of the supercomputer and peripheral equipment for the IFERC project (CSC activity)	6,320
IFERC-T1PA01-EU.CIEMAT	DEMO R&D Activities on SiC/SiC Composites for the IFERC Project	2,849
IFERC-T1PA01-EU.ENEA	DEMO R&D Activities on SiC/SiC Composites for the IFERC Project	442
IFERC-T1PA02-EU.ENEA	DEMO R&D on SiC/SiC Composites for the IFERC Project: erosion/corrosion of SiC and SiC/SiC in liquid metal	1,032
IFERC-T3PA01-EU.KIT	DEMO R&D Activities in DEMO Blanket for the IFERC Project	2,647
IFERC-T3PA01-EU.SCK.CEN	DEMO R&D Activities in DEMO Blanket for the IFERC Project	825
IFERC-T3PA01-EU.CRPP	DEMO R&D Activities in DEMO Blanket for the IFERC Project	425
IFERC-REC01-JA.EU	REC Requirement definition	100
IFERC-REC01-EU	REC Data Access Software	1,500

IFERC-DDA01-JA.EU	Phase two DEMO Design Activities	5,440
IFERC-T3P02-EU.JET	JET dust and tile analysis (T retention)	440
	Total IFERC	113520

Table XIII: Procurement Arrangements signed

In addition, credit is assigned to cash contributions (200BAUA) and personnel seconded to the Project Team (1320BAUA).

EU Procurement Arrangements to be placed:

After the transfer of 2580BAUA from IFERC Project to IFMIF-EVEDA Project, the total credit for IFERC is 116250 BAUA

The remaining credit foreseen for IFERC (2520 BAUA) will be deployed for:

REC Main System:

It envisages the purchase of specialised computer hardware to allow prototypical remote experimentation from Rokkasho (cash contribution to JA 500 BAUA)
Software for REC and support to tests activities: 460 BAUA
Other activities in support of the extension until 2019:250 BAUA

APPENDIX I: Table of Acronyms and Abbreviations

A/E	Architect Engineer
AGPS	Accelerator Ground Power Supplies
ALARA	As Low As Reasonably Achievable
ANB	Authorized Notification Body
ANS	Analytical System
ASN	Autorité de Sûreté Nucléaire
AVDEs	Asymmetric Vertical Displacement Event
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.
BSM	Blanket Shield Module
BtP	Build-to-Print
CD	Current Drive
CFC	Carbon Fibre Composites
CMM	Cassette Multifunctional Mover
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
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
FS	Functional Specification

FW	First Wall
FWP	First Wall Panel
HAZOP	HAZard Operability
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
I&C	Instrumentation and Control
ICH	Ion Cyclotron Heating
IFERC	International Fusion Energy Research Center
IFMIF	International Fusion Materials Irradiation Facility
INB	Installation Nucleaire de Base
IO	ITER Organization
IR	Infra Red
ISEPS	Ion Source and Extraction Power Supplies
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
JAEA	Japan Atomic Energy Agency
LD&L	Leak Detection and Localization
LFS-CTS	Low Field Side – Collective Thomson Scattering
MAR	Materials Assessment Report
MDR	Modified Design Reference
MHB	Material Handbook
MHD	Magneto-Hydro-Dynamic
MIG	Metal Inert Gas
MV	Medium Voltage
NB	Neutral Beam
NBI	Neutral Beam Injector
NBPS	Neutral Beam Power System
NBTF	Neutral Beam Test Facility
NHF	Nominal Heat Flux
ODS	Oxide Dispersion Strengthened
ORE	Occupational Radiation Exposure
P&ID	Process and Instrumentation Diagram
PA	Procurement Arrangement
PBS	Product Breakdown Structure
PE	Plasma Engineering

PF	Poloidal Field
PFC	Plasma Facing Components
PFD	Process Flow Diagram
PIE	Post Irradiation Examination
PMU	Prototypical Mock-Up
PP	Procurement Package
PPC	Pre-Production Cryopump
PrSR	Preliminary Safety Report
PTC	Prototype Torus Cryopump
QA	Quality Assurance
R&D	Research & Development
RAFM	Reduced Activation Ferritic Martensitic
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	Super Conductor
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
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
Vis	Visible
VS	Vertical Stability
VV	Vacuum Vessel
WAVS	Wide Angle Viewing System
WBS	Work Breakdown Structure
WDS	Water Detritiation System

APPENDIX II: RISK METRICS DETAILS

1. THREAT RATING (risk with negative impact)

LIKELIHOOD of risk occurrence

Value		Description	
Not Credible	1	probability of occurrence < 1%.	the probability of the risk is very low
Unlikely	2	probability of occurrence > 1% but <10%	the probability of the risk is low or if its occurrence is late in relation to the lifetime of the project.
Not Likely	3	probability of occurrence > 10% but <40%	
Likely	4	probability of occurrence > 40% but <80%	the risk is identified. There exists a high probability that it will occur
Very Likely	5	probability of occurrence > 80%	the probability of the risk identified is almost certain

TECHNICAL / OTHER IMPACT

	Impact on				
Value	Technical Performance	Human health, safety and well being	Environment	Reputation and Image	Political
Negligible 1	Minimal or no consequence to technical performance	No injuries	No environmental impact	No damage to reputation/image	No political/ organizational impact
LOW 2	Minor reduction in technical performance or supportability, can be tolerated with little or no impact on program	Minor injuries; no public health risk; short term well being impact	Minor,/recoverable short-term isolated/ localized environmental impact	Recoverable / short term local damage to reputation/image	Local political / organizational impact
MEDIUM 3	Moderate reduction in technical performance or supportability with limited impact on program objectives	Limited public health risk &/or injuries requiring medical & mental health treatment	Moderate, medium term, medium spread environmental impact	Medium term / regional damage to reputation/image	Regional political / organizational impact
HIGH 4	Significant degradation in technical performance or major shortfall in supportability; may jeopardize program success	Major public health risk &/or major injuries/well being impact	Serious, long term, widespread environmental impact	Long term/ state damage to agency reputation/image	State political / organizational impact
VERY HIGH 5	Severe degradation in technical performance; Cannot meet baseline or key technical/ supportability threshold; will jeopardize program success	Significant public health risk &/or human deaths/ long lasting well being issues	Irreversible environmental impact	Long term / (inter) national damage to reputation / image irreversibly impacted	National political / organizational impact

COST IMPACT

Value		Budget Change by
Negligible	1	CHANGE < Budget * 0.01
LOW	2	Budget * 0.01 ≤ CHANGE < Budget * 0.1

MEDIUM	3	Budget * 0.1 ≤ CHANGE < Budget * 0. 2
HIGH	4	Budget * 0.2 ≤ CHANGE < Budget * 0. 4
VERY HIGH	5	CHANGE ≥ Budget * 0.4

SCHEDULE IMPACT

Value		DELAY on Milestone (at project level Integrated Project Schedule Milestones)	
		NON Critical Path Milestone	Critical Path Milestone
Negligible	1	No delays on milestones (< 1 month)	No delays on milestones (<1 week)
LOW	2	1 month ≤ DELAY < 3 months	DELAY < 1 month
MEDIUM	3	3 month ≤ DELAY < 6 months	1 month ≤ DELAY < 3 months
HIGH	4	6 month ≤ DELAY < 1 year	3 month ≤ DELAY < 6 months
VERY HIGH	5	DELAY ≥ 1 year	DELAY ≥ 6 months

2. OPPORTUNITES RATING (risk with positive impact)

LIKELIHOOD of opportunity realization

Value		Description	
Not Credible	1	Probability of realization < 1%.	Probability of realizing the opportunity is very low
Unlikely	2	Probability of realization > 1% but <10%	Probability of realizing the opportunity is low or if its occurrence is late in relation to the lifetime of the project.
Not likely	3	Probability of realization > 10% but <40%	
Likely	4	Probability of realization > 40% but <80%	Opportunity is identified. There exists a high probability that it will be realized
Very Likely	5	Probability of realization > 80%	Probability of the opportunity being realized is almost certain

TECHNICAL / OTHER IMPACT

Value		Impact on				
		Technical Performance	Human health, safety and well being	Environment	Reputation and Image	Political
Negligible	1	Minimal or no consequence to technical performance	No injuries	No positive environmental impact	No improvement to reputation/ image	No political/ organizational positive impact
LOW	2	Minor improvement in technical performance or supportability, can be achieved with little or no impact on program	Minor improvement to public health & mitigation against minor injuries ; short term well being positive impact	Minor,/short-term isolated/ localized positive environmental impact	Short term local improvement to reputation/ image	Local political / organizational positive impact
MEDIUM	3	Moderate improvement in technical performance or supportability with limited impact on program objectives	Limited improvement to public health & mitigation against injuries requiring medical treatment ; medium term well being positive impact	Moderate, medium term, medium spread positive environmental impact	Medium term / regional improvement to reputation/image	Regional political / organizational positive impact

HIGH	4	Major improvement in technical performance or supportability; will improve program success	Major improvement to public health & mitigation against major injuries : Positive well being impact	Major, long term, widespread positive environmental impact	Long term/ state improvement to organization reputation/image	State political / organizational positive impact
VERY HIGH	5	Significant improvement in technical performance; Meets baseline or key technical/ supportability threshold; will significantly improve program success	Significant improvement to public health & mitigation against deaths ; Long lasting positive well being impact	Significant positive environmental impact	Long term / (inter) national improvement to reputation / image	National political / organizational positive impact

COST IMPACT

Value		Budget Change by
Negligible	1	CHANGE < Budget * 0.01
LOW	2	Budget * 0.01 ≤ CHANGE < Budget * 0.1
MEDIUM	3	Budget * 0.1 ≤ CHANGE < Budget * 0. 2
HIGH	4	Budget * 0.2 ≤ CHANGE < Budget * 0. 4
VERY HIGH	5	CHANGE ≥ Budget * 0.4

SCHEDULE IMPACT

Value		IMPROVEMENT on Milestone (Contract Milestones)	
		NON Critical Path Milestone	Critical Path Milestone
Negligible	1	No improvements on milestones (< 1 month)	No improvements on milestones (<1 week)
LOW	2	1 month ≤ IMPROVEMENT < 3 months	IMPROVEMENT < 1 month
MEDIUM	3	3 month ≤ IMPROVEMENT < 6 months	1 month ≤ IMPROVEMENT < 3 months
HIGH	4	6 month ≤ IMPROVEMENT < 1 year	3 month ≤ IMPROVEMENT < 6 months
VERY HIGH	5	IMPROVEMENT ≥ 1 year	IMPROVEMENT ≥ 6 months

Risk Level Definition (Threats and Opportunities)

Following the F4E Risk management process, the following Probability/ Impact matrix (PID matrix) has been used for the risk level ranking in order to define the priorities of the risk events.

PID Matrix		Impact				
		Very Low	Low	Medium	High	Very High
Probability	Very Likely	5	20	45	80	125
	Likely	4	16	36	64	100
	Not Likely	3	12	27	48	75
	Unlekely	2	8	18	32	50
	Not Creditable	1	4	9	16	25

Level	Actions
VERY LOW	They are included in the risk file and reviewed by TPO concerned. Actions are evaluated in order to reduce the risk.
LOW	They are included in the risk file and reviewed by TPO concerned. Actions are evaluated in order to reduce the risk.
MEDIUM	An owner is appointed to monitor the risk evolution and report to the TPO concerned. Actions are evaluated in order to reduce the risk.
HIGH	Same as level MEDIUM plus definition of specific mitigation actions. These actions are defined by the TPO concerned with the risk, which identifies also possible trigger events to start them. The owner monitors the risks and these trigger events.
VERY HIGH	Planned mitigation actions are started as scheduled. The risk owner is designated directly by the PM, who closely monitors the effectiveness of the mitigation actions at each project review meeting

Appendix III: Key Milestones extended version

Milestone Name	DWS Date Integrated (Current)	DWS Date Submitted (Current)
Toroidal Field Coils		
IPL > Delivery of TF11 (EU 01) by EU-DA to ITER Site	29/03/2019	05/10/2018
IPL > Delivery of TF09 (EU 02) by EU-DA to ITER Site	02/05/2019	27/11/2018
IPL > Delivery of TF06 (EU 03) by EU-DA to ITER Site	23/09/2019	04/04/2019
IPL > Delivery of TF04 (EU 04) by EU-DA to ITER Site	04/11/2019	07/06/2019
IPL > Delivery of TF05 (EU 05) by EU-DA to ITER Site	24/02/2020	29/08/2019
IPL > Delivery of TF03 (EU 06) by EU-DA to ITER Site	12/03/2020	09/10/2019
IPL > Delivery of TF01 (EU 07) by EU-DA to ITER Site	18/06/2020	03/01/2020
IPL > Delivery of TF18 (EU 08) by EU-DA to ITER Site	08/07/2020	12/02/2020
IPL > Delivery of TF17 (EU 09) by EU-DA to ITER Site	28/09/2020	14/04/2020
IPL > Delivery of TF14 (EU 10) by EU-DA to ITER Site	27/10/2020	02/06/2020
Poloidal Field Coils		
IPL > Delivery of PF5 Coil by EU-DA to IO	16/01/2019	15/01/2019
IPL > Delivery of PF6 Coil by EU-DA to IO	30/04/2019	29/04/2019
IPL > Delivery of PF2 Coil by EU-DA to IO	06/06/2019	05/06/2019
IPL > Delivery of PF4 Coil by EU-DA to IO	07/07/2020	06/07/2020
IPL > Delivery of PF3 Coil by EU-DA to IO	22/03/2021	19/03/2021
Main Vessel		
IPL > Delivery of Sector 5 & all VV Splice Plates by EU-DA to ITER Site	30/09/2019	27/09/2019
IPL > Delivery of Sector 4 by EU-DA to ITER Site	07/02/2020	07/02/2020
IPL > Delivery of Sector 3 by EU-DA to ITER Site	27/02/2020	27/02/2020
IPL > Delivery of Sector 2 by EU-DA to ITER Site	28/05/2020	28/05/2020
IPL > Delivery of Sector 9 by EU-DA to ITER Site	19/08/2020	17/08/2020

IPL > Delivery of Sector 8 by EU-DA to ITER Site	26/10/2020	23/10/2020
IPL > Delivery of Sector 7 by EU-DA to ITER Site	19/03/2021	04/03/2021

Blanket and First Wall Panels

IPL > Delivery of FW Row 1 by EU-DA to ITER Site	05/07/2022	04/07/2022
IPL > Delivery of FW Row 18 by EU-DA to ITER Site	07/05/2026	06/05/2026

Divertor Cassette Body and Assembly

IPL > Delivery at ITER Site of (CA-01)	23/12/2021	10/11/2021
IPL > Delivery at ITER Site of (CA-02)	21/02/2022	12/01/2022
IPL > Delivery at ITER Site of (CA-59)	11/12/2026	17/09/2026
IPL > Delivery at ITER Site of (CA-60)	11/12/2026	17/09/2026

Divertor Remote Handling System

IPL > DIVRH (Full) Delivered to ITER Site	21/03/2022	21/03/2022

Cask & Plug Remote Handling System

IPL > BRHS Cask #1 (Main) including CTS & Control System Delivered to ITER Site	15/11/2022	15/11/2022
IPL > BRHS Cask #2 (Intermediate) Delivered to ITER Site	15/11/2022	15/11/2022
IPL > NB components RH class 3 Cask Delivered to ITER Site	22/08/2023	22/08/2023

Neutral Beam Remote Handling System

IPL > EU NBRHS Manipulator & other remaining items Delivered to ITER Site	26/07/2023	26/07/2023

Cryopumps

IPL > Delivery of Torus & Cryostat Cryopumps by EU-DA to ITER Site	26/01/2022	26/01/2022

Leak Detection and Localization System

IPL > Delivery of Primary Leak Detection and Localisation by EU-DA to ITER Site	21/10/2020	21/10/2020

Hydrogen Isotope Separation System

IPL > Delivery of Hydrogen Isotope Separation System by EU-DA to ITER Site	31/08/2026	09/06/2026

Water Detritiation System

IPL > Delivery of of Columns, Feeding/HL Tanks by EU-DA to ITER Site	18/07/2023	18/07/2023

Liquid Nitrogen Plant and Auxiliary Systems

IPL > Delivery of LN2 Plant Refrigerator 2 by EU-DA to ITER Site	11/01/2017	11/01/2017

Electron Cyclotron Upper Launcher

IPL > Delivery 1st EC Upper Launcher from EU-DA to IO	12/07/2023	12/07/2023
IPL > Delivery 4th EC Upper Launcher from EU-DA to IO	30/01/2024	30/01/2024

Electron Cyclotron Gyrotrons

IPL > Delivery of 1st Set (1MW) of Gyrotrons Tubes by EU-DA to ITER Site	01/06/2022	01/06/2022
IPL > Delivery of 6th Set (1MW) of Gyrotrons Tubes by EU-DA to ITER Site	04/04/2024	04/04/2024

Electron Cyclotron Power Supplies

IPL > 1st Set of MHVPS & BPS Delivered to ITER Site by EU-DA	19/02/2018	19/02/2018
IPL > 8th Set of MHVPS & BPS Delivered to ITER Site by EU-DA	05/05/2020	04/05/2020

Neutral Beam Source and High Voltage Bushing

IPL > Ion Source NBI-1 Delivered to ITER Site by EU-DA	09/08/2023	09/08/2023
IPL > Ion Source NBI-2 Delivered to ITER Site by EU-DA	16/11/2023	16/11/2023

Beamline Components

IPL > Calorimeter NBI-1 Delivered to ITER Site by EU-DA	12/07/2023	12/07/2023
IPL > Neutralizer NBI-2 Available on Site	25/09/2023	25/09/2023

Neutral Beam Power Supplies

IPL > ISEPS of NBI-1 Delivered to ITER Site by EU-DA	20/09/2018	20/09/2018
IPL > ISEPS of NBI-2 Delivered to ITER Site by EU-DA	28/09/2018	28/09/2018
IPL > EU-HVD1 & EU-Bushing of NBI-1 Delivered to ITER Site by EU-DA	26/09/2019	26/09/2019
IPL > EU-HVD1 & EU-Bushing of NBI-2 Delivered to ITER Site by EU-DA	03/10/2019	03/10/2019
IPL > AGPS + GRPS of NBI-1 Delivered to ITER Site by EU-DA	23/01/2020	23/01/2020
IPL > AGPS + GRPS of NBI-2 Delivered to ITER Site by EU-DA	23/01/2020	23/01/2020

Diagnostics: Plasma Position Reflectometry

IPL > Delivery of PPR Captive Ex-Vessel Transmission Components for Building 11 to ITER Site by EU-DA to IO	28/05/2018	28/05/2018

Diagnostics: Tokamak Services

IPL > Delivery of cables, clips and connectors (In-Vessel Comp) for Vacuum Vessel 6th Sector to IO by EU-DA	18/04/2019	27/08/2018

European Test Blanket System Arrangement

IPL > Delivery & Acceptance TBM-Set 1 HCLL Complete	28/08/2024	28/08/2024
IPL > Delivery & Acceptance TBM-Set 2 HCPB Complete	28/08/2024	28/08/2024

In Vessel Viewing System

IPL > IVVS Delivered to ITER Site Unit #1	27/05/2022	26/05/2022
IPL > IVVS Delivered to ITER Site Unit #6	02/11/2022	01/11/2022

Buildings and Civil Infrastructures

IPL > Assembly Building (13) RFE 1A (RFE #1)	07/04/2017	07/04/2017
IPL > Tokamak Building (11) RFE 1B stage 1(RFE #1) for Radiological Protection	08/02/2018	08/02/2018
IPL > Tokamak Building (11) RFE 1B - Stage 2 (RFE #1)	26/04/2019	26/04/2019
IPL > Tokamak Building (11) RFE 1C (RFE #1)	09/09/2019	09/09/2019
IPL > Tokamak Building (11) RFE Level L3 Stage1 (RFE #2)	28/11/2019	28/11/2019
IPL > Tokamak Building (11) RFE Level L4 Stage1 (RFE #2)	09/06/2020	09/06/2020
IPL > Tokamak Building (11) RFE Level L5 Stage1 (RFE #2)	09/06/2020	09/06/2020
IPL > Tokamak Building (11) RFE Level R1 Stage1 (RFE #2)	09/06/2020	09/06/2020
IPL > Tokamak Building (11) RFE Stage2 (RFE #2)	25/08/2020	25/08/2020
IPL > Construction of Tokamak Building (11) Completed	22/03/2021	22/03/2021

Radiological and Environmental Monitoring System

IPL > Delivery of BE MONITORS Monitoring Package for REMS by EU-DA to ITER Site	19/04/2023	19/04/2023
IPL > Delivery of HVAC MONITORS Monitoring Equipment for REMS by EU-DA to ITER Site	19/01/2027	19/01/2027
IPL > Delivery of NUCLEAR MONITORS Monitoring Equipment for REMS by EU-DA to ITER Site	18/08/2028	18/08/2028

Table III - Summary of Key milestones-Extended version

Appendix IV: Main Milestones table

Magnets

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	Main	EU11.3A.40120	Contract Signed for Cold Test Engineering Study and Facility Construction (CTF)	31/03/2016
PA 1.1.P6A.EU.01 Toroidal Field Conductors	Main	EU11.6A.13980	EU.EU IPL > Delivery of UL(760m, 19 of 19) for EU07/VV9/TF01/rDP5 Conductor to EU-DA by EU-DA	25/02/2016
PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	Main	EU11.1A.27641	ATPC - IO Approval for Insulate, impregnate and Cure (8.3.5) TFWP11	03/03/2016
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	Main	EU11.3B.01980	Start Qualification of PF Coils	17/03/2016
PA 1.1.P6C.EU.01 Poloidal Field Conductors	Main	EU11.6C.0215	EU.EU IPL > Delivery of PF conductor (UL7) for DP4/PF6 from EU-DA to EU-DA	11/05/2016
PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	Main	EU11.1A.22380	Coil Insertion Facility Ready	11/11/2016
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	Main	EU11.3B.02620	HPC - IO Approval for Final report of Winding Qualification Test of Full Dummy DP of PF5 (8.14)	07/04/2017
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	Main	EU11.3B.02600	HPC - IO approval of Final report of Winding Qualification Test of Full Dummy DP of PF6 (8.14)	18/04/2017
PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	Main	EU11.1A.22800	Start of TF11 WP Insertion, Case Closure, Impregnation & Final Machining	04/09/2017
PA 1.1.P3A-B.EU.01 Poloidal Field Magnets 2,3,4,5,6	Main	EU11.3B.01040	< IPL Receipt of NbTi conductor UL03 (894m) for DP2/PF3 From CN-DA to EU-DA	03/04/2018
PA 1.1.P1A.EU.01 Procurement of Toroidal Field Magnets	Main	EU11.1A.22660	Delivery of TFWP14 to Cold Test and Coil Insertion site	09/08/2018
PA 1.1.P2A.EU.01 Pre Compression Rings	Main	EU11.2A.11395	IPL > Delivery of Lower Pre-Compression Rings (01 - 03 plus 3 Spares) from EU-DA to ITER Site	11/10/2018

Vacuum Vessel

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.1129030	Delivery of Forged Blocks for Sector 4 - Batch 2 from R-Kind Priority 1	12/02/2016
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.3008600	Rails Forgings Sector 5 & Sector 4 Ready for Machining	21/04/2016
PA 1.5.P1A.EU.02 Blanket Manifolds	Main	EU16.1A.11700	< IPL PA Signature of PA 1.5.P1A.EU.02 Blanket Manifold	01/07/2016
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.103150	F4E Checked Detailed Manufacturing Design of Sector 3 - C3	04/07/2016
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.106060	Start Fabrication - Sector 4 (Stage 4D)	12/07/2016
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.104860	PS1 VV5 Fabrication Complete	11/09/2017
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.103860	F4E Approve Detailed Manufacturing Design Sector Assembly - Sector 8	31/01/2018
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.105060	PS2 VV5 Fabrication Complete	06/03/2018
PA 1.5.P1A.EU.02 Blanket Manifolds	Main	EU15.2A.10200	Contract Signed for Tasks 1-2-3 (6 Sectors - 3 Sectors - Chimney Pipes)	07/05/2018
PA 1.5.P1A.EU.01 Vacuum Vessel - Main Vessel	Main	EU15.1A.104060	F4E Approve Detailed Manufacturing Design Sector Assembly - Sector 7	03/07/2018

Blanket

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
NA	Main	EU.16.01.20870	Delivery of FSP to Plzen, Czech republic - Lot 1	04/07/2017
NA	Main	EU.16.01.21550	(NP) Delivery of FSP to Plzen, Czech republic - Lot 2	04/08/2017
NA	Main	EU.16.01.25570	Delivery of FSP to Plzen, Czech republic - Lot 3	16/01/2018
PA 1.6.P1A.EU.01 Blanket First Wall	Main	EU.16.01.100050	Contract Signed for NHF First Wall Panels	29/06/2018

Divertor

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 1.7.P2B.EU.01 Inner Vertical Target	Main	EU17.2B.010733	IPL > Delivery of W TA-IT-PROTO1-02 by EU-DA to RF-DA Test Facility (OPE-138#01)	03/10/2016
PA 1.7.P2E.EU.01 Divertor Toroidal and Radial Rails	Main	EU17.03.1040	< IPL PA 1.7.P2E.EU.01 APFC Signed	16/12/2016
PA 1.7.P1.EU.01 Cassette Body and Assembly	Main	EU.17.01.1777	Factory Acceptance of the CB prototype-3 (Documentation) sent to IO (OMF-444-3)	10/02/2017
PA 1.7.P1.EU.01 Cassette Body and Assembly	Main	EU.17.01.3600	Factory Acceptance of the CB prototype-1 (Documentation) sent to IO (OMF-444-1)	10/02/2017
PA 1.7.P1.EU.01 Cassette Body and Assembly	Main	EU.17.01.2890	Factory Acceptance of the CB prototype-2 (Documentation) sent to IO (OMF-444-2)	24/03/2017
PA 1.7.P2B.EU.01 Inner Vertical Target	Main	EU17.2B.010776	HPC - IO approval for Final Acceptance Tests Documentation of Full W Prototype PFUs (OPE-138#01)	17/10/2017

Remote Handling

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 2.3.P3.EU.01 Cask and Plug Remote Handling System	Main	EU23.03.901410	Contract Signed for CPRHS Procurement Contract	12/04/2016
PA 2.3.P5.EU.01 Neutral Beam Remote Handling System	Main	EU23.05.20130	Task Order Signed for Preliminary Design first-priority items Phase 1 for NBRHS Signed	25/04/2016
PA 2.3.P2.EU.01 Divertor Remote Handling System	Main	EU23.02.05010	IPL > DRHS Preliminary Design Sent to review panel	10/01/2017
PA 2.3.P3.EU.01 Cask and Plug Remote Handling System	Main	EU23.03.90710	Task Order Signed for Preliminary Design for CPRHS Signed	24/01/2017
PA 2.3.P2.EU.01 Divertor Remote Handling System	Main	EU23.02.14042162	Task Order Signed for Final & Manufacturing Design for DIV RH Signed	07/08/2017
PA 2.3.P5.EU.01 Neutral Beam Remote Handling System	Main	EU23.05.172488	Task Order Signed for NBI Monorail (Incl. other first priority items) Final & Manufacturing Design Signed	27/07/2018

Vacuum Pumping and Leak Detection

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 3.1.P1.EU.01 Warm Regeneration Lines	Main	EU31.01.12113	Final Design Warm Regeneration Lines - Final Approval	29/04/2016
PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	Main	EU31.01.11540	< IPL PA 3.1.P1.EU.02 Front End Cryo- Distribution: Front End Cryopump Distribution signed	17/05/2016
PA 3.1.P3.EU.01 Primary Leak Detection and Localization System	Main	EU31.03.10120	< IPL PA 3.1.P3.EU.01 Primary Leak Detection & Localisation System Signed	18/10/2016
PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	Main	EU31.01.125640	Contract Signed for Manufacturing and Factory Testing of Cold Valve Boxes	28/02/2017
PA 3.1.P3.EU.01 Cryostat Leak Detection and Localization System (phase II)	Main	EU31.03.25800	< IPL PA 3.1.P3.EU.01 (Amendment for phase II) Cryostat Leak Detection & Localisation System Signed	23/06/2017
PA 3.1.P1.EU.01 Warm Regeneration Lines	Main	EU31.01.11570	IPL > Delivery of Warm Regeneration Lines by EU-DA to ITER Site	06/07/2017
PA 3.1.P3.EU.01 Primary Leak Detection and Localization System	Main	EU31.03.25660	Contract Signed for components for Primary Leak Detection and Localisation	11/07/2017
PA 3.1.P1.EU.02 Front End Cryopump Distribution Cold Valve Boxes and Warm Regeneration Box	Main	EU31.01.11910	Final Design Review Cryopumps Valve Boxes & Connecting Cryolines	24/10/2017
PA 3.1.P1.EU.03 Torus and Cryostat Cryopumps	Main	EU31.01.10320	< IPL PA 3.1.P1.EU.03 for Cryopumps: Torus & Cryostat Cryopumps Signed	15/03/2018
PA 3.1.P3.EU.01 Primary Leak Detection and Localization System	Main	EU31.03.25740	Preliminary Design Review of Primary Leak Detection and Localisation systems	15/03/2018
PA 3.1.P3.EU.01 Cryostat Leak Detection and Localization System (phase II)	Main	EU31.03.26280	Contract Signed for Cryostat of Leak Detection and Localisation	10/04/2018
PA 3.1.P3.EU.01 Cryostat Leak Detection and Localization System	Main	EU31.03.26560	Preliminary Design Review of Cryostat Leak Detection and Localisation systems	27/11/2018

(phase II)				

Tritium Plant

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 3.2.P5.EU.01 Water Detritiation System - Tanks	Main	EU32.05.181550	Contract Signed for CON for Procurement of 5m3 and 12m3 WDS Tanks	26/09/2016
PA 3.2.P5.EU.02 Water Detritiation System - Main System	Main	EU32.05.01145	< IPL PA 3.2.P5.EU.02 WDS Main System Signed	21/02/2017
NA	Main	EU32.03.10194	Contract Signed for Preliminary Design for HISS	03/01/2018
PA 3.2.P5.EU.01 Water Detritiation System - Tanks	Main	EU32.05.181700	IPL > WDS Tanks (5m3 and 12m3) Bldg 14 delivered by EU-DA to ITER Site	04/06/2018
PA 3.2.P5.EU.02 Water Detritiation System - Main System	Main	EU32.05.13652	Contract Signed for Procurement of WDS Main including support to IO for Inst'n and Test	30/08/2018

Cryoplant

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	Main	EU34.01.22300	Contract Amendment Signed for Installation of Liquid Nitrogen Plant and Auxiliary System	24/03/2016
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	Main	EU34.01.10800	IPL > Delivery 80K Loop 1 by EU-DA to ITER Site	24/10/2016
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	Main	EU34.01.11916886	Contract Signed for Additional Activities of Liquid Nitrogen Plant and Auxiliary System	11/01/2017
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	Main	EU34.01.11917	Last Delivery to IO site (End of Lifting Activities)	21/09/2017
PA 3.4.P1.EU.01 Liquid Nitrogen Plant and Auxiliary Systems	Main	EU34.01.10940	Final Acceptance 80 K Loop 1 Approved by IO for EU-DA	27/11/2018

Electrical Power Supply and Distribution

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 4.1.P1A-8B.EU.01 Engineering design of Steady State and Pulsed Power Electrical Network	Main	EU41-43.1A.40100	HPC - IO approval of Detailed Assembly and Installation Design for SSEN & PPEN	28/04/2016
NA	Main	EU41-43.113410	Delivery of PBS 43 LC 03	13/12/2016
NA	Main	EU41-43.115610	Delivery of PBS 43 LC 14	16/12/2016
NA	Main	EU41-43.113210	Delivery of PBS 43 LC 02	23/12/2016
NA	Main	EU41-43.113010	Delivery of PBS 43 LC 01	10/05/2017
NA	Main	EU41-43.113610	Delivery of PBS 43 LC 04	09/08/2017

Ion Cyclotron Heating and Current Drive

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
NA	Main	EU51.01.135220	Task Order Signed for Design and analysis of FS bar	02/05/2016
NA	Main	EU51.01.214320	Contract Signed for Fabrication & Assembly of FS prototypes	28/06/2017
NA	Main	EU51.01.214340	Delivery of the FS prototypes	20/07/2018

Electron Cyclotron Heating and Current Drive

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
NA	Main	EU52.01.305110	Contract Signed for Waveguide prototype development and qualification	06/07/2016
PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons	Main	EU52.03.10778	Completion of the Development of EU 1MW CW Gyrotron Prototype for ITER (HP-2)	13/09/2016
NA	Main	EU52.01.221210	Contract Signed for Procurement of Mechanical Prototypes for the EC UL (FwC)	24/10/2016
PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons	Main	EU52.03.22165	Packing and Shipping of He-free Magnet II (M7)	26/10/2016
PA 5.2.P4.EU.01 Electron Cyclotron High Voltage Power Supply	Main	EU52.04.12575	Final Set #1 (1 Unit of MHVPS) Completed at Supplier Site (M3.1.2)	07/11/2016
PA 5.2.P1B.EU.01 Electron Cyclotron Control System	Main	EU.PE107350	Delivery report of Stage 1 EC Plant Controller signed by IO	23/12/2016
PA 5.2.P3.EU.01 Electron Cyclotron Gyrotrons	Main	EU52.03.10676	< IPL PA 5.2.P3.EU.01 EC Gyrotrons Signed by IO to EU-DA	20/01/2017
PA 5.2.P1B.EU.01 Electron Cyclotron Control System	Main	EU.PE106910	FDR for Development Stage 2 - EC Plant Controller	01/02/2017
PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher	Main	EU52.01.100200	< IPL PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher Signed	10/03/2017
NA	Main	EU52.01.115180	FDR approved by IO for EC UL Diamond Window	17/05/2017
NA	Main	EU52.01.115430	FDR approved by IO for EC UL Isolation Valve	08/11/2017
NA	Main	EU52.01.117430	FDR approved by IO for PP structure & BSM	18/01/2018
PA 5.2.P1B.EU.02 Electron Cyclotron Upper Launcher	Main	EU52.01.901160	PA 5.2.P1B.EU.02 Amendment signed - Annex B for EC UL Isolation Valve	20/03/2018

Neutral Beam Heating and Current Drive

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	Main	EU53.TF.17310	NP - Contract Signed - MITICA SF6 Handling Plant	16/02/2016
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	Main	EU53.TF.19230	NP - Manufacturing and Testing Completed - MITICA Vacuum and Gas Injection Plants	04/08/2016
PA 5.3.P5.EU.01 Heating Neutral Beam Active Correction Coils	Main	EU53.05.00100	< IPL PA 5.3.P5.EU.01 HNB ACC Coils Signed (as per ICT Table Jun15)	29/09/2016
PA 5.3.P4.EU.01 Heating Neutral Beam Vacuum Vessel, Passive Magnetic Shield & Front-End Components	Main	EU53.04.00520	< IPL PA 5.3.P4.EU.01 HNB (Vessels, Drift Duct, Fast Shutter, PMS) Signed (as per ICT Table Jun15)	03/10/2016
PA 5.3.P4.EU.01 Heating Neutral Beam Vacuum Vessel, Passive Magnetic Shield & Front-End Components	Main	EU53.04.40560	< IPL PA 5.3.P4.EU.02 for HNB BLV Exit Scraper Signed by IO (as per ICT Table Jun15)	03/10/2016
PA 5.3.P6.EU Neutral Beam Power Supply	Main	EU53.06.09680	HP - Delivery to Padua Site - EU-HVD1 & EU-Bushing of MITICA	16/03/2017
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	Main	EU53.TF.18330	Delivery of MITICA Vessel by EU-DA to PRIMA Site	13/04/2017
PA 5.3.P1.EU.01 Neutral Beam Assembly and Testing	Main	EU53.01.00060	< IPL PA 5.3.P1.EU.01 NB Assembly & Testing Signed	15/06/2017
PA 5.3.P4.EU.01 Heating Neutral Beam Vacuum Vessel, Passive Magnetic Shield & Front-End Components	Main	EU53.04.40570	< IPL PA 5.3.P4.EU.03 HNB Absolute Valve Signed by IO	04/01/2018
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	Main	EU53.TF.02400	HP - On-Site Testing Completed and Final Documentation Sent to IO - MITICA Vacuum and Gas Injection Plants	11/01/2018
PA 5.3.P6.EU Neutral Beam Power Supply	Main	EU53.06.08510	NP - Start of Manufacture of EU-HVD1 & EU-Bushing of NBI-1	16/04/2018
PA 5.3.P9.EU.01 Neutral Beam Test Facility Components	Main	EU53.TF.18585	NP - Delivery to Padova Site - MITICA Lower RMFCs	13/08/2018
PA 5.3.P2.EU.01 Heating Neutral Beam Beam Source	Main	EU53.02.00060	< IPL PA 5.3.P2.EU.01 EU-DA HNB Beam Source Signed	13/11/2018

Diagnostics

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 5.5.P1.EU.01 Diagnostics - Magnetics	Main	EU55.01.102665	Delivery of CER for Installation on the TFCS 14 Inboard (EU TF Structure 10) from EUDA to JADA	05/05/2016
NA	Main	EU55.15.202560	Contract Signed for FWC for Manufacturing Design (BTP Dwgs & Specifications)	17/06/2016
PA 5.5.P1.EU.01 Diagnostics - Magnetics	Main	EU55.01.300325	Contract Signed for Analysis Software Algorithm Design	06/07/2016
NA	Main	EU55.15.202450	Agreement Signed for Grant for Development and Design of Mirror Lifetime Optimisation	10/11/2016
NA	Main	EU55.07.100180	> Preliminary Definition of Interfaces and Test Requirements for RNC port-interspace/cell components Available - IO	02/02/2017
NA	Main	EU55.03.230590	Contract Signed for Procurement and Delivery for PPR Captive Ex-Vessel Transmission Components	31/05/2017
NA	Main	EU55.10.100420	< IPL PA 5.5.P1.EU.09 Amendment - Annex B for Low Field Side Collective Thomson Scattering Signed	12/06/2017
NA	Main	EU55.10.100410	> Delivery of Final Definition of CTS Interfaces and Test Req. (EQ12) by EU-DA to CN-DA (Certified by IO)	09/10/2017
PA 5.5.P1.EU.01 Diagnostics - Magnetics	Main	EU55.01.102577	IPL > Delivery of RH Platforms Baseplates for Installation on the Vacuum Vessel Deliver from EU-DA to IO	25/05/2018
PA 5.5.P1.EU.01 Diagnostics - Magnetics	Main	EU55.01.102695	IPL > OVC for Installation on the Vacuum Vessel Sector #6 Delivered to ITER Site	28/05/2018

Test Blanket

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
Integration Engineering	Main	EU56.01.410030	CDR Steering Committee decision	03/03/2016
NA	Main	EU56.01.106000	Published Call for Tender for TBM Sets Final Design & Finalisation of Final Design	01/07/2016
NA	Main	EU56.01.1218470	Published Call for Tender for Helium Cooling Systems Finalisation of PD, Final Design, Finalisation of FD & Procurement	01/07/2016
NA	Main	EU56.01.500290	Contract Signed for Fabrication Development & PMU and QMU Manufacturing	01/06/2017
Integration Engineering	Main	EU56.01.1213500	Preliminary Design Review panel Review (drafting report and chits)	25/07/2018

Remote Handling IVVS

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 5.7.P1.EU.01 In-Vessel Viewing System	Main	EU57.01.20130	Task Order Signed for Initial Scope Evaluation for IVVS Signed	07/03/2016
PA 5.7.P1.EU.01 In-Vessel Viewing System	Main	EU57.01.50025	Task Order Signed for Preliminary Design for IVVS Signed	01/11/2016
PA 5.7.P1.EU.01 In-Vessel Viewing System	Main	EU57.01.14043802	Task Order Signed for Final & Manufacturing Design for IVVS Signed	19/09/2018

Buildings and Civil Infrastructures

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.28119	NPC - Notice to Commence work of Hot Basin & Cooling Towers 67 (TB07)	12/01/2016
PA 6.2.P2.EU.02 Services (Architect Engineer)	Main	EU62.02.6006610	EU Submission of Construction Design for L3 level-B11,14,74	24/02/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.28719	NPC - Notice to Commence work of HRS Water Treatments + Heat Exchangers 64, 69 (TB07)	01/04/2016
PA 6.2.P2.EU.02 Services (Architect Engineer)	Main	EU62.02.6006660	EU Submission of Construction Design for L4 level-B11,14,74	31/05/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.28419	NPC - Notice to Commence work of CW Pumping Station 68 (TB07)	15/06/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.24209	NPC - Notice to Commence construction of Main AC Distribution Bldg (36)	16/06/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.29619	NPC - Notice to Commence construction of FDU & SNR Bldg (75)	24/08/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.272560	NPC - Notice to Commence construction of Bus-Bar Bridges (between B32 &74)	25/08/2016
PA 6.2.P2.EU.02 Services (Architect Engineer	Main	EU62.02.6006710	EU Submission of Construction Design for L5 level-B11,14,74	09/09/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.65420	NPC - Notice to Commence Assembly Hall cranes Installation	27/09/2016
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.490	IPL > Site Services Building (61) RFE (RFE #17)	04/11/2016
PA 6.2.P2.EU.02 Services (Architect Engineer	Main	EU62.02.60081	EU Submission of Construction Design for R1 level-B11,14,74	06/03/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.190	IPL > Magnet Power Conversion Building (32) RFE (RFE #7)	08/03/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.510	IPL > Hot Basin & Cooling Towers (67) RFE (RFE #15)	15/03/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.530	IPL > Cooling Water Pumping Station (68A) RFE (RFE #15A)	15/03/2017

PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.430	IPL > Cryoplant Compressor Building (51) RFE (RFE #8A)	21/04/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.090	IPL > RF Heating Building (15) RFE (RFE #13)	30/10/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.20910	NPC - RFOC Tokamak Building (11) level B2	10/11/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.20916	NPC - RFOC Tokamak Building (11) Central Pit	13/12/2017
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.010	IPL > Tokamak Building (11) RFE 1B - Stage 1 (RFE #1)	08/02/2018
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.20911	NPC - RFOC Tokamak Building (11) level B1	29/03/2018
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.650	IPL > Tokamak Building (11) RFE Level B2 Stage1 (RFE #2)	21/09/2018
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.20912	NPC - RFOC Tokamak Building (11) level L1	05/10/2018
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.570	IPL > Control Building (71) RFE (RFE #14)	19/10/2018
PA 6.2.P2.EU.05 Buildings and Site Infrastructure	Main	EU62.05.20915	NPC - RFOC Tokamak Building (11) Cargo Lift Shaft	20/12/2018

Waste Management

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
PA 6.3.P1.EU.01 Type A Radwaste Treatment and Storage System	Main	EU66.01.117260	Task Order transmitted to the Supplier for WMS Final Design	27/09/2017
PA 6.3.P1.EU.01 Type A Radwaste Treatment and Storage System	Main	EU66.01.12000	Preliminary Design Approved	15/05/2018

Plasma Engineering

Related PA	Objective Type	Code	Objective Description	DWS Date Integrated (Current)
NA	Main	EU.PE.104066	First Progress Report for Contract for Development of an EFIT like real time plasma boundary reconstruction code	30/03/2016

Joaquín Sanchez
Acting Chair of the Governing Board