

POWER PLANT PHYSICS & TECHNOLOGY PROJECTS

ANNUAL WORK PLAN 2015 & WORK PLAN 2014-2018

CALL RESPONSE FORM for the project

WPDC: Diagnostic and Control

1 SUMMARY

Table 1: Identification

BENEFICIARY	<i>name</i>			
CONTRACTUAL CONTACT PERSON	First name	Surname	E-mail	Phone
TECHNICAL CONTACT PERSON	First name	Surname	E-mail	Phone

Information in this table has to be copied over to the ECoM proposal system.

Table 2: ECoM Input Summary

PROJECT AREA	<i>Proposed Human Resources 2015 (ppy)</i>
D&C System Engineering and Design Integration	Subtotal A1
Development and verification of the overall DEMO control concept	Subtotal A2
Studies on feasibility, lifetime and performance of components and subsystems	Subtotal A3
Total	A

The **Totals** in this table have to be copied over to the ECoM proposal system.

2 REFERENCED DOCUMENTS

The following documents provide descriptions for the technical content, key deliverables, milestones, foreseen facilities, opportunities for industrial innovation and training/development opportunities for each Project. It is essential that the relevant sections are read and understood before completing this Call for Participation:

	<i>Document Title</i>	<i>Version</i>	<i>Section(s)</i>
[1]	GRANT AGREEMENT, ANNEX 1: WORK PLAN FOR THE IMPLEMENTATION OF THE FUSION ROADMAP IN 2014-2018 https://idm.euro-fusion.org/?uid=2MKKGB	10 Jun 2014	3.4 WP no. 23 & Headline 6.8
[2]	ANNUAL WORK PLAN 2015 <i>Annex 7 Annual Work Plan 2015 Issue</i> https://idm.euro-fusion.org/?uid=2JNWWU	25 Sep 2014	2.1.2 & 2.2.23 - WPDC

3 INTRODUCTION

This document is to be used in conjunction with the EUROfusion ECoM System in order for a Research Unit to respond to the Call for Participation in Work Plan 2014 – 2018 [1] and Annual Work Plan 2015 [2].

The purpose of this document is:

- To set out the required roles and associated competencies that are foreseen in order to execute this Project.
- To allow Research Units to indicate where and how they have resources with a good fit to the role profiles described herein.
- To allow Research Units to indicate a proposed resource level against each role for 2015.
- To allow Research Units to propose an on-going resource profile in each project area for the period 2016 to 2018.
- To allow Research Units to propose involvement in the R&D activities foreseen in some project areas (hardware / use of facilities).
- Where appropriate, to allow Research Units to propose the involvement of industry.
- To calculate the required input for ECoM.

Finally, please note that no provision for allocation of mission resources is made in the present Call. These will be allocated following individual approvals by the Project Leader using the mission application system. The indicative budget is ~3-5% of the foreseen manpower per project per year. However each Research Unit may fill the box in section 10 at the end of this document to include comments on the mobility related needs for participation to this Work Package.

4 GUIDANCE NOTES FOR SUBMISSION OF THE CALL RESPONSE FORM

The following notes describe the procedure for completing this document and the related ECoM submission:

1. Fill in the information where required in Table 1 in section 1 above.
2. Read the relevant sections (see section 2 above) of the Work Plan and Work Programme Documents

Roles & Competencies → section 5

3. In section 5 below, indicate against each role in each project area, where resources with a good fit to the competence profile would be available within your Research Unit to participate in this project.
4. Against each role that you wish to propose for the project, briefly describe in column 3 the relevant skills and experience within your Research Unit and how this fits with the identified competences.
5. For lead roles (highlighted in light red), a named individual from your Research Unit is required and, in addition to the requested information, a CV for this candidate shall also be uploaded to ECoM.

6. Against each proposed role, indicate in column 4 a proposed resource level in PPY for 2015.
7. For each project area, sum all human resources for 2015 in column 4 and report this in the subtotal row i.e. Subtotal (A1-An) and then transfer this value to Table 2.

Hardware expenditure related to R&D activities

8. For each project area where hardware procurement or use of facilities is foreseen:
 - a. Indicate which activity you would be interested in participating by briefly describing the relevant skills, experience and facilities available to your Research Unit and how this fits with the identified R&D area.
 - b. Indicate in column 3 a proposed procurement level in k€ for the period 2015 to 2018. Note: For reference, an indicative procurement budget profile for the period 2015 to 2018 is provided in column 2; however, the actual scheduling of project procurements will be defined in detail by the Project Leader in the Project Management Plan (PMP).
 - c. For each project area, sum all R&D resources proposed for 2015 and report this in the subtotal row i.e. Subtotal (B1-Bn) and then transfer this value to Table 2.
9. Summarise any relevant publications from the last 5 years for each project area in the table provided.
10. In Table 2, sum all human resource subtotals i.e. (A1)+(A2)+(A3)+(A4)+.....(An), and report this in Cell A (orange colour).
11. In Table 2, sum all hardware resource subtotals i.e. (B1)+(B2)+(B3)+(B4)+.....(Bn), and report this in Cell B (blue colour).
12. The figures in Cell A, Cell B and Cell C should then be transferred to ECoM.

Summary of Human Resources by Project Area → section 6

13. Complete the table in section 6, to indicate the proposed human resource profile that your Research Unit and Third Parties can make available in the period 2016 to 2018 against each project area.

List of proposed activities to subcontract → section 7

14. Complete the table in section 7, if applicable, to indicate the proposed activities to subcontract against each project area.

Proposed Facilities & corresponding Costs per Unit → section 8

15. Complete the table in section 8, if applicable, to list the facilities proposed to undertake the R&D activities and indicate the cost per day for each facility listed.

Indicative List of Potential Contributors → section 9

16. Complete the table in section 9, if applicable, to list the proposed potential contributors from your Research Unit and Third Parties in this project.

Additional Comments and Requirements → section 10

17. Please add additional comments or describe requirements your Research Unit might have in order to participate to this Work Package.
18. Once this document is finalised, upload a MS Word version to your ECoM proposal.

5 FORESEEN ROLES & COMPETENCIES BY PROJECT AREA

5.1 D&C System Engineering and Design Integration

5.1.1 Roles & Competencies

1	2	3	4
Role Title	Required Competencies	Brief description of relevant skills and experience. List and describe briefly relevant examples (max. 200 words)	PPY proposed for 2015 ¹
System engineer	<ul style="list-style-type: none"> Experience with system engineering, mechanical engineering and design integration activities for fusion diagnostic components and actuators In depth knowledge on the requirements for a fusion reactor, in particular: nuclear safety, neutronics, vacuum, remote handling, material properties, thermal, structural, thermo-hydraulic and electromagnetic aspects Ability to support PL in managing project office activities (administration, monitoring, reporting, and industry procurement, etc.). 	<i>For this role please propose a named individual from your Research Unit and provide, in addition to the requested information above, the CV for this candidate (to be uploaded to ECoM)</i>	
Design engineer	<ul style="list-style-type: none"> Expert in engineering design for construction. Experience on fusion diagnostic design. Knowledge on design requirements for blanket, divertor, and vacuum vessel design. Familiarity with relevant design criteria. In-depth understanding of thermal / structural / thermo-hydraulic / neutronics aspects. Familiarity with CAD and FEM codes (Catia and ANSYS). Experience in structural analysis 		
			SUBTOTAL (A1)

¹ Proposed human resources of your Research Unit including resources made available by Linked Third Parties or Third Parties providing in-kind contribution.

5.1.2 Hardware expenditure related to R&D activities

No hardware budget is foreseen in this project area.

5.1.3 Summary of relevant publications

List of most relevant publications in this Project Area (in the last 5 years)

Title	Author(s)	Year of Publication

5.2 Development and verification of the overall DEMO control concept

5.2.1 Roles & Competencies

1	2	3	4
Role Title	Required Competencies	Brief description of relevant skills and experience. List and describe briefly relevant examples (max. 200 words)	PPY proposed for 2015
Plasma physicist	<ul style="list-style-type: none"> Expert in control oriented modelling of fusion plasmas In depth knowledge on operational limits in a tokamak as related to power exhaust, plasma position and shape control, density and radiation control, MHD control Experience in the development of plasma control systems on a tokamak Experience in operation of a larger tokamak (session leader or equivalent) Experience in modelling in at least one of the following 	For this role please propose a named individual from your Research Unit and provide, in addition to the requested information above, the CV for this candidate (to be uploaded to ECoM)	

	fields: a) fusion power, plasma density, radiation and power exhaust (including divertor); b) plasma position and shape; c) MHD instabilities		
Control engineer	<ul style="list-style-type: none"> Expert in development of control models and control simulation Experience in control experiments on a larger tokamak Experience in control simulation of fusion plasmas 		
			SUBTOTAL (A2)

5.2.2 Hardware expenditure related to R&D activities

No hardware budget is foreseen in this project area.

5.2.3 Summary of relevant publications

List of most relevant publications in this Project Area (in the last 5 years)

Title	Author(s)	Year of Publication

5.3 Studies on feasibility, lifetime and performance of components and subsystems

5.3.1 Roles & Competencies

1	2	3	4
Role Title	Required Competencies	Brief description of relevant skills and experience. List and describe briefly relevant examples (max. 200 words)	PPY proposed for 2015
Diagnostic physicist	<ul style="list-style-type: none"> Expert in diagnostics of fusion plasmas Experience in quantitative assessment of measurement accuracy and time resolution In depth knowledge and experience on calibration of fusion diagnostics Experience in quantitative prediction of lifetime of diagnostic components, e.g.: mirror degradation by erosion or deposition; nuclear irradiation effects on conductors, insulators and optical components In depth knowledge and experience in one or more of the following methods: <ul style="list-style-type: none"> Microwave diagnostics (reflectometry and ECE) Infrared interferometry/polarimetry Passive spectroscopy from IR to SXR, measurement of radiated power Neutron and gamma spectroscopy Magnetic diagnostics (coils and Hall sensors) Thermo-currents at divertor target plates (detachment control) FW and divertor coolant temperature, flow and pressure Measurements related to gas/beam/pellet fuelling and gas exhaust Diagnostics related to safety, e.g. on Tritium Retention and dust accumulation Other plasma diagnostic methods not mentioned above but relevant/needed for DEMO control 	<p><i>For this role please propose a named individual from your Research Unit and provide, in addition to the requested information above, the CV for this candidate (to be uploaded to ECoM)</i></p>	

Diagnostic engineer	<ul style="list-style-type: none"> Expert in engineering design of fusion diagnostic systems Experience in diagnostic design for ITER or JET Experience in quantitative prediction of lifetime and reliability of diagnostic components, e.g.: modelling of first mirror lifetime related to erosion and impurity deposition; lifetime prediction of diagnostic components according to nuclear effects; FMEA analysis; RAMI analysis Experience in prototype testing of fusion diagnostic components 		
			SUBTOTAL (A3)

5.3.2 Hardware expenditure related to R&D activities

1	2					3				
Indicative list of , hardware, procurements and use of facilities	Indicative procurement budget profile (k€)					Proposed hardware (k€)				
	2015	2016	2017	2018	TOTAL	--	2015	2016	2017	2018
Hardware for prototype testing of diagnostic components and DEMO relevant control demonstration experiments on existing tokamaks (the actual specific hardware items to be tested will be selected based on the most urgent needs and priorities as arising from the results obtained in 2015+16, taking into account the budget limitations. Nevertheless, suggestions for specific	0	0	200	200	400					

hardware testing are welcome already now)										
Brief description of relevant skills, experience and available facilities (max. 200 words)										
TOTAL	0	0	200	200	400	SUB TOTAL (B3)				

5.3.3 Summary of relevant publications

List of most relevant publications in this Project Area (in the last 5 years)

Title	Author(s)	Year of Publication

6 SUMMARY OF HUMAN RESOURCES BY PROJECT AREA

1	2					3				
Project Area	Indicative human resource budget profile (ppy)					Proposed human resources (ppy) (affiliated subcontractors)				
	2015	2016	2017	2018	TOTAL	2015	2016	2017	2018	TOTAL
D&C System Engineering and Design Integration	1.4	1.4	1.4	1.4	5.6	A1				

Development and verification of the overall DEMO control concept	1.8	1.8	1.8	1.8	7.2	A2				
Studies on feasibility, lifetime and performance of components and subsystems	1.8	1.8	1.8	1.8	7.2	A3				
TOTAL	5.0	5.0	5.0	5.0	20	A				

7 LIST OF PROPOSED ACTIVITIES TO SUBCONTRACT

<i>1</i>	<i>2</i>
Project Area	Activity
D&C System Engineering and Design Integration	
Development and verification of the overall DEMO control concept	
Studies on feasibility, lifetime and performance of components and subsystems	

8 PROPOSED FACILITIES & CORRESPONDING COSTS PER UNIT

List the facilities proposed to undertake the R&D activities that were proposed in section 5 above and indicate the cost per day for each facility listed.

<i>1</i>	<i>2</i>	<i>3</i>
Project Area	Proposed facilities	Cost per day (k€)
D&C System Engineering and Design Integration		
Development and verification of the overall DEMO control concept		
Studies on feasibility, lifetime and		

performance of components and
subsystems

9 INDICATIVE LIST OF POTENTIAL CONTRIBUTORS

List potential contributors (members of your Research Unit) to be involved in this Work Package/Project

<i>No.</i>	<i>First Name</i>	<i>Surname</i>	<i>E-Mail</i>	<i>Phone</i>
1.				
2.				
3.				
4.				
5.				

10 ADDITIONAL COMMENTS AND REQUIREMENTS

Please add, if necessary, additional comments or describe requirements your Research Unit would like to express and that are necessary to contribute to this Work Package.

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