EFDA 2012 Work Programme

Core programming team

Technical specifications and evaluation procedure

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A. Introduction

The EFDA Integrated Tokamak Modelling task force (ITM-TF) has been in existence since 2004 and is a pan European effort with code contributors at different labs and universities. Its main purpose is to build up a comprehensive modelling capability for fusion plasmas, with particular emphasis placed on developing a predictive capability for ITER relevant plasmas. Such a capability is important for ITER for several reasons, e.g. in order to guarantee optimal performance while mitigating any risks to the device, discharges must be thoroughly simulated and reviewed before they are allowed to be carried out.

The ITM-TF has already developed a simulation infrastructure around the concept of Consistent Physical Objects (CPOs) [F. Imbeaux et al, Comp. Phys. Commun. 181 (2010) 987] and is using the open source software Kepler (https://kepler-project.org/) as the tool to design and execute Integrated Modelling workflows. This software, augmented with the ITM-TF developed specific tools, allows a User-Friendly coupling and orchestration of a large number of physics components which may be written in various programming languages (Fortran, C++, Java, Python and Matlab). Software and platform development are carried out on the ITM-TF gateway under the provisions of a *Gateway User Agreement*. An overview of the ITM-TF platform is given in Annex II.

Although the ITM-TF platform is already in operation and used to integrate a growing number of physics components, it needs continuous maintenance and development of new features. Support to Users of the platform and documentation of the tools are also key tasks. These missions are carried out under the Infrastructure Software Integration Project (ISIP), to which the Core Programming Team shall be attached. The Core Programming Team can be seen as a significant additional resource for ISIP, with guaranteed availability and a significant critical mass, which is required for some of the ISIP tasks.

B. Objective and scope of the support action

Constitute a team of developers, two or more, at an Association to augment the regular ISIP team by contributing to the 3 main ISIP missions:

- Support to Users, documentation and training
- Maintenance and Upgrade of the existing tools
- Development of new tools / features for the ITM-TF platform

The Core Programming team shall therefore work in close collaboration with the regular ISIP team and contribute to same missions. Nevertheless, the User Support task shall be preferentially carried out by the Core Programming Team since it requires permanent availability.

The Core Programming team will have its work managed by the ISIP Leadership and shall report results to the ISIP Leadership.

C. Time schedule

This support action will run over one year from the beginning of 2012 throughout the year.

D. Deliverables of the support action

The Association to which the support action will be awarded shall supply a team of two or more professionals, who fulfil the criteria in Annex 1. Full or part time work covering a substantial part of each person (at least halftime) can be envisaged. The reason to require a team of at least two developers is to ensure a good availability, which also implies that the personnel involved shall organise their work to give first priority to fulfil the needs of the ITM-TF, as expressed by the ISIP leadership.

The work carried out for the ITM-TF should be documented and reported to the ISIP leadership at six month intervals.

E. Milestones

The milestones for this support action are:

- Approval of Workplan by the ITM-TF Leadership (at latest 2 months after the start of the Support Action)
- Delivery of an Interim report by 30 June 2012.
- End of support action and delivery of Final report by 31 December 2012.

F. Organization of the work

To reach the objective of the support action, the personnel in the team will have to familiarise themselves with the tools of the ITM-TF. This will involve missions to the sites where the main developments are currently taking place (CEA Cadarache and RFX Padua). Once familiar with the tools, a detailed Work Plan will be decided by the ISIP leadership in consultation with the team.

When the Work Plan is accepted the team will carry out the work at their home laboratory, but with frequent contacts with the ISIP leadership, who will supervise the work, and other ISIP developers. One should foresee to have (remote) progress review meetings no less frequent than once a month with the ISIP leadership.

At least one member of the Core Programming Team shall be present to any major ITM-TF Code Camp (working sessions gathering several ITM-TF members generally lasting 2 weeks each) for providing Support to Users.

All missions to another European country carried under the Support Action are eligible to the Euratom mobility scheme. The estimated needed amount of mobility support shall be requested by the Associate to EFDA via the usual scheme.

G. Structure of the proposal

The applicants must submit a document consisting of two parts: the description of the proposal and the cost estimation.

I. Description

The description should be prepared considering the requirements formulated in Annex I. In particular, it should include:

- an introduction of the proposed members of the Technical Team;
- the description of the professional background and justification of the competencies of the team members.
- each team members availability as a percentage of a ppy for each reporting period.

II. Cost estimation

The proposal should include a detailed budget proposal in Euros. The cost of each item shall be indicated for the whole support action period and the exact method of calculation should be described in an understandable manner. The cost estimation should be based on well-established calculations.

- **Manpower costs**
- **Other costs,** any other cost incurring that does not fit into other categories.

The Community contribution will be up to 100% of the costs with a ceiling of 125k€ for 1 year.

H. Evaluation criteria

- **Eligibility**

The application must be submitted by the Head of the relevant Association before the specified deadline.

The implementation of this action will be through a Contract of Association. The involved team must therefore have a contract with either an Associate or an institution having relevant links with an Associate.

- **Procedure**

The evaluation procedure will be carried out by a Technical Evaluation Group. It will include a representative of EFDA Administration, members of the ITM-TF Leadership and ISIP project Leadership and an Officer of the European Commission Research and Innovation DG.

The evaluation will be based on the answer to the Call which shall have been sent before the specified deadline. After a first stage of evaluation, the Technical Evaluation Group may ask for additional information/clarification in view of finalising its assessment of the proposals.

The evaluation procedure will be concluded by scoring the items of the proposal as follows:

Component	Point	Threshold
Technical skills of the team: competence of the members of the team (Annex 1)	**50**	**30**
Organizational aspects of proposal: The quality of the proposal will be assessed to judge the organisational ability of the members of the team. (amount of time committed by the team members; their availability for ITM code camps; their availability for the remote support to ITM members; ability to work in large international project)	**20**	**10**
Cost effectiveness: The best proposal, in terms of ratio of technically relevant overall manpower (ppy) offered / overall cost, will be attributed a 30 point mark. The other proposals will be rated a mark in proportion of that same ratio.	**30**	**NA**
TOTAL	**100**	**NA**

Proposals failing to reach the threshold of 60 will be rejected.

The proposals will be ranked according to their total score, which shall reflect their quality. The support action will be awarded to the best proposal.

Annex I

Manpower and expertise needed for the core programming team

Given the continuing development and support needed, a team of two or more qualified professionals is expected, with personnel costs of up to **125 k€ for one year**. Part time work for the support action can be envisaged. In order to ensure an adequate engagement with the needs of the ITM-TF, personnel with the following qualifications is sought:

- Proven programming skills in Java, C and/or C++ (the main languages used in the ITM-TF platform). Since most of the contributed physics codes are written in Fortran, some knowledge of f90/f95 is an advantage. Proven programming skills in Python, also used in some of the tools, are an advantage.
- A good understanding of modern software engineering practices.
- Knowledge of XML, MySQL and High Performance Computing infrastructures (advantageous).
- A good ability to speak and write in English, which is essential to facilitate communication between members of the Core Programming team and the ITM-TF Leadership and contributors.
- Being already experienced with the ITM-TF platform tools is also an advantage since the Core Programming Team needs to become operational on a short time scale.

Annex II

Overview of the ITM-TF platform