COST Action IC1404
Multi-Paradigm Modelling for Cyber-Physical Systems (MPM4CPS)

3rd Call for STSM Applications for Missions Occurring between 10 February 2018 and 31 March 2018

The final deadline for applications is 15 March 2018.
The call is continuously open till the deadline. Prospective candidates should apply as soon as they have all the required documents ready.

Short Term Scientific Missions (STSMs) are aimed at supporting individual mobility and strengthening the existing networks and fostering collaborations by allowing scientists to visit an institution or laboratory in another Participating COST Country, an approved NNC institution, or an approved IPC institution. A Short Term Scientific Mission should specifically contribute to the scientific objectives of the COST Action IC1404, while at the same time allowing applicants to learn new techniques or gain access to specific instruments and/or methods not available in their own institutions.

This STSM call aims to attract applications from researchers wishing to contribute to the following tasks of the Action's Working Groups (WGs):

WG1: Foundations - Intra and inter-Disciplinary Interaction

Task A: Select one *example setting* available for CPS modeling and (1) *characterize* it informally according to expressiveness, ease of learning the languages, tool support, degree of use, stability of the languages and tools, level of standardization, development methods / processes making use of the languages, integration with other formalisms, scalability, etc. Then, (2) try to use a *mega model* (under development by WG1) to define the involved models and model operation links and integrate all the elements of the informal characterization. (3) Derive from the results of (2) a *case study* for model management that can be made publicly available with mega models (language specification, model integration, model operations, views integration, semantic domains, development processes, etc.) for the most relevant elements of (2) that is sufficient to *study the challenges* of MPM for CPS.

Task B: Study *integration techniques* employed for CPS modeling as discussed in the literature by (1) *characterizing* informally for which cases each of the techniques is employed and what are the capabilities as well as limitation of the technique, as well as

(2) capturing the typical *requirements for the integration of languages* for the development of CPS. Then, based on (1) in an additional step (3) the techniques should be analyzed with respect to their role concerning integration *at the level of mega* models for the use of MPM for the development of CPS. Finally, (4) a *catalog* of integration techniques for use of MPM for the development of CPS that compare their characteristics based on a list of identified typical requirements (see (2)) exploiting the results of (3) to present them all in the unified view of mega models.

WG2: Techniques

Select some MPM4CPS t*echniques, methods and tools* and test them using a few examples with different complexity, to (1) contribute to State-of-Art *description* of MPM4CPS techniques and tools; to (2) *evaluate* them on efficiency w.r.t. modelling effort, simulation, design support, analysis support. If applicable, give reasons why the chosen approaches (1) are candidates for *best practices*; (2) embody *standards*, or can embody standards in the future; (3) can contribute to/inspire *future* MPM modeling techniques.

Exact *criteria, metrics, way of describing* for the above is still in development. Contributions to this are highly appreciated.

In order to avoid repetition of work, the selected techniques, tools and application areas must be stated in the proposal. A second best set may be indicated, to allow smooth decision of the selection committee on topics to be covered.

WG3: Application Domains

Assess MPM4CPS techniques, methods and tools concerning their state of practice in *industrial* application, to (1) Identify to State-of-Practice description of MPM4CPS *techniques and tools*; to (2) evaluate them on *applicability* (e.g., scalability, completeness of covered aspects, confidence of analysis results). If applicable, give reasons why the chosen approaches (1) are candidates for best practices; (2) embody standards, or can embody standards in the future; (3) identify gaps in MPM4CPS from an application point of view.

A candidate organization for assessment must be identified, accompanied by a declaration of Interest of the organization. Leadership of the organization in an identified application domain must be documented.

WG4: CPS Education and Dissemination

Elicit and validate the *profile* of the Cyber-Physical Systems experts while identifying their core skills and profile variants. Starting from an analysis of the existing courses and literature, an iterative methodology is to be put into place to aggregate and filter out the input given by both academia and practitioners. Another strand of work will focus on

the configuration of training schools and evaluation of the training actions and methodologies. A particular emphasis will be put on setting up educational running examples/case studies and on iterative improvement.

Science, Technology, Engineering and Mathematics (STEM) education candidates are welcome to apply, as well as those with a background in education science and/or social sciences but interested in STEM.

Moreover, candidates are expected to contribute to the planning and execution (targeting both academia and industry experts) of the above-mentioned tasks, in particular in what concerns rigorous and scientifically-valid questionnaires and data treatment.

Who is eligible

STSM applicants must be engaged in a research program as a postgraduate student or postdoctoral fellow, or be employed by or officially affiliated to a public or private institution (home institution):

- from a participating COST Country or Cooperation State to:
  - another Participating COST Country or Cooperation State;
  - an approved NNC institution;
  - an approved IPC institution;
  - an approved Specific organisation;
- from an approved NNC institution to:
  - a Participating COST Country or Cooperation State;
- from an approved European RTD Organisation to:
  - a Participating COST Country or Cooperation State.

For possible STSM scenarios see COST Vademecum (particularly Chapter 7). The list of IC1404 participating countries is available at: http://www.cost.eu/COST_Actions/ict/Actions/IC1404?parties

Application procedure

In order to receive a STSM grant, the applicant must:

1. Obtain the written agreement of the host institution, before submitting an application;
2. Complete the online application form (see https://e-services.cost.eu/stsm);
3. Fill in the verification sheet;
4. Send the completed file as an e-mail attachment together with the necessary supporting documents to the STSM coordinator (ivan@uns.ac.rs) and the STSM host institution. The supporting documents include: a) written agreement of the host institution; b) CV; c) full work plan (including the WG where the application's

topic belongs); d) list of publications; e) motivation letter; and f) recommendation letter from the home institution;

5. Receive a confirmation email from the STSM Coordinator stating that the application was received. If the confirmation is not received within one week, the applicant should send an enquiry.

Evaluation process

The evaluation, grading and ranking of the STSM applications will be the task of the STSM Committee. The MC has agreed that the STSM Committee consists of the STSM Coordinator (Ivan Luković) and the WG Leaders (Antonio Vallecillo, Holger Giese, Jan Broenink, Bernhard Schaetz, and Paulo Carreira).

The applications are sent to the STSM coordinator by email. The STSM coordinator will send the proposals for evaluation to the STSM Committee. The STSM Committee will grade each, the full-working plan and the motivational letter with a maximum of five points (excellent) to a minimum of 1 point (rejected). They will return their results to the STSM Coordinator. Additionally, the STSM Coordinator will add 0.3 points to each PhD student or early stage researcher (researcher within at most eight years of receiving their PhD). In the case of conflict of interest, a member of STSM Committee is excluded from a particular evaluation.

After all results are gathered, the STSM coordinator will rank all the proposals and, according to the host institution, he will suggest the specific grant amount for each application and can suggest also the duration. For this call, the duration of the STSM is from a **mininum of 5 to a maximum of 30 days**. Both the duration and the amount of grant can be reduced by the STSM Committee. Before the results are published, the fully compiled table will be sent by email to the Core Group members for their final approval. After all of them agree, the results will be published on the website of the IC 1404 Action within 1 week after the deadline of the call. The STSM Committee can decide to favor certain proposals in order to promote the geographic, institution, and gender balance. Once approved by the STSM Coordinator, the Grant Holder needs to receive the approval and then send a grant letter generated from e-COST to the applicant.

After the STSM

The grantee is required to submit a short scientific report to the host institution (for information) and to the STSM coordinator for approval within 30 days after the end date of the STSM. The short report is to include:

- Initial purpose of the visit;
- Description of the work carried out during the STSM;
- Description of the main results obtained;
- Future collaboration with the host institution (if applicable);

- Foreseen publications/articles and other contributions resulting from the STSM (if applicable);
- Confirmation by the host institution of the successful execution of the STSM;
- Other comments (if any).

The failure to submit the scientific report within 30 days will effectively cancel the grant;

The STSM coordinator is responsible for approving the scientific report and informing the Grant Holder that the STSM has been successfully accomplished. After receipt of the approval by email, the Grant Holder will execute the payment of the grant.

Financial support

A STSM grant is a fixed contribution based on the budget requested by the applicant and the evaluation of the application by the STSM Committee. The aim of this grant is to support the costs associated with the exchange visit. This grant will not necessarily cover all expenses; it is intended only as a contribution to the travel and subsistence costs of the participant.

According to the MC decision, the financial support can include not more than 2500 EUR in total, approved to the grantee, while the following constraints are to be satisfied:

- no more than 500 EUR for the travel expenses; and
- the reimbursement rate per day is country dependent and also subject to the decision of the STSM Committee. The upper limits are given in the table below:

Country	Daily rate in EUR
Austria	90
Belgium	90
Bosnia and Herzegovina	70
Croatia	70
Czech Republic	80
Denmark	100
Estonia	80
France	90
FYR of Macedonia	70
Germany	90
Greece	70
Hungary	80
Ireland	90
Israel	100
Italy	90
Latvia	70
Netherlands	90

Norway	100
Poland	80
Portugal	80
Romania	70
Serbia	70
Slovenia	70
Spain	80
Sweden	100
Switzerland	100
Turkey	80
United Kingdom	100

Others

For all other rules, regulations and procedures, applicants should refer to the COST Vademecum.

STSM Coordinator

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