

COST Grant workplan

I. ACTION PROFILE

Domain: **ICT**

Action no. and title: **IC0901**

Rich Model Toolkit - An Infrastructure for Reliable Computer Systems

Chair: **Viktor Kuncak**

START date: **30.10.2009**

END date: **29.10.2013**

Number of signatories: **20**

Number of non-COST members: **1 intention (South Africa)**

Number of COST country entities (institutes, etc.) currently participating: 40

Number of non-COST entities (institutes, etc.) currently participating: 0

Number of MC Members: **35**

Number of MC substitutes: **12**

Working Groups with numbers, titles and approximate number of members:

WG1. Rich Model Language (11)

WG2. Decision Procedures (15)

WG3. Analysis (16)

WG4. Synthesis (12)

(The membership is overlapping and also includes MC substitutes.

Moreover, MC members also actively participate in work groups.)

II. DETAILED BUDGET

(1) MEETINGS

Management Committee Meetings

MC Meeting #1

Location: **Tallin, Estonia** (co-located with ETAPS 2012)

Date: **30 March—1 April 2012**

Number of participants to be reimbursed: **35**

Travel costs: **24.500 €**

Organisational support (including also WG meetings): **1.500 €**

MC Meeting #2

Location: Manchester, UK (collocated with IJCAR 2012)

Date: **29 June—1 July 2012**

Number of participants to be reimbursed: **35**

Travel costs: **24.500 €**

Organisational support (including also WG meetings): **1.500 €**

Working Group Meetings

WG Meetings co-located with MC meeting #1

Working Group 1-4 Meeting

Location: Talin, Estonia (collocated with ETAPS 2012)

Date: **30 March — 1 April 2012**

Number of participants to be reimbursed, in addition to MC: **16**

Travel costs: **11.200 €**

Additional organisational support: **0 €**

WG Meetings co-located with MC meeting #2

Working Group 1-4 Meeting

Location: Manchester, UK (collocated with IJCAR 2012)

Date: **29 June—1 July 2012**

Number of participants to be reimbursed, in addition to MC: **16**

Travel costs: **11.200 €**

Additional organisational support: **0 €**

(2) SHORT TERM SCIENTIFIC MISSIONS (STSMs)

Number: **8**

Average cost per STSM: **1000 €**

Cost: **8.000 €**

(3) TRAINING SCHOOLS

Summer School on Satisfiability and Verification Algorithms

Location: **Trento, Italy, 18-21 June 2012** (tentative date)

Number of Trainees to be reimbursed: **12**

Trainees Grants: **6.000 €**

Number of Trainers to be reimbursed: **3**

Travel costs: **2.400 €**

Organisational support: **1.600 €**

(4) PUBLICATIONS, DISSEMINATION, OUTREACH, WEBSITE

Title: Web Site Support

Cost: **1.000 €**

(5) FINANCIAL & SCIENTIFIC ADMINISTRATION AND COORDINATION (FSAC)

Up to 15 % of (1 to 4)

Costs: **10.800 €**

III. WORK PLAN

(1) OBJECTIVES

Continue work on the Rich Model Language (RML) (the core activity for WG1), in particular its relationship to the SMT-LIB standard.

Introduce new decidable logics into the SMT-LIB standard, and deploy their first implementations within SMT solvers.

Start evaluating the suitability of RML for encoding decidable logical fragments (WG2), verification problems (WG3) and synthesis problems (WG4).

Formulate the notion of Verification Modulo Theories builds on results of WG1, WG2 and WG3. Establish toolkit around numerical transition systems and explore its connection to Verification Modulo Theories.

Improve efficiency of techniques for analyzing rich models, including SAT, SMT, superposition-based decision procedures, new decidable fragments (data structures, real numbers), symbolic execution, model checking (bounded, regular, SMT-based) and testing (for executable rich models)

Increase the applicability of the above techniques by exploring their integration (e.g., symbolic execution and model checking, symbolic execution and theorem proving, testing and theorem proving) as well as by extension to new decidable fragments. Develop new decidability results and abstraction algorithms for parameterized systems and actor-based systems. Improve the practicality of techniques for synthesizing executable systems from RML descriptions (WG4), including the problem of synthesis for data structures, and implicit programming language constructs whose execution is based on integration of SMT solvers (WG2) and synthesis algorithms.

These activities present a step towards the primary objective of the Action. Through meetings at public conferences they also contribute to the secondary objective.

(2) ACTIVITIES

- **Meeting in Tallinn, Estonia**
 - Focus on numerical transition competition
 - updates on new algorithms developed in WG2,WG3,WG4
 - selected talks on results of STSMs
 - major event for Action, reaching wider community
 - presentation of Rich Model Language Definition
 - selected talks emphasizing results and challenges in terms of reaching the remaining objectives above
 - discussion of preliminary results and goals, in particular for analysis and synthesis
 - invited speaker and members to provide external input
- **Meeting in Manchester, UK**
 - Focus on exploring the connections with intermediate verification languages such as Boogie developed in

Microsoft Research

- updates on new algorithms developed in WG2,WG3,WG4
- selected talks on results of STSMs
- summary of main achievements during the year
- discussion of impact of rich model format on tools

(3) OUTPUTS PLANNED FOR YEAR

- Significant publication contributions expected in the following venues:
 - Computer-Aided Verification (CAV)
 - Tools and Algorithms for Construction and Analysis of Software
 - Conference on Concurrency Theory (CONCUR)
 - Formal Methods and Models for Co-design (MEMOCODE)
 - Formal Methods for Computer-Aided Design (FMCAD)
 - Automated Software Engineering (ASE)
 - Interactive Theorem Proving (ITP)
 - Conference on Automated Deduction (CADE)
 - Automated Reasoning with Analytic Tableaux and Related Methods (TABLEAUX)
 - Information Security Conference
 - Formal Verification of Object-Oriented Systems (FoVeOOS)
 - Formal Methods for Components and Objects (FMCO)
 - Symposium on Information, Computer and Communications Security
 - Journal of Automated Reasoning (JAR)
 - Journal of Computer Security
 - Journal of Computer and System Sciences
 - International Journal of Foundations of Computer Science
 - Software Tools for Technology Transfer (STTT)
 - Theoretical Computer Science (TCS)
 - IEEE Computer
 - IEEE Security & Privacy
 - Handbook of Model Checking
- Scientific report containing the results of each Work Groups (part of Monitoring Progress Report)
- Reports on the outcomes of Short-Term Scientific Missions

Web site output:

- Numerical Transition Systems description and tools
- Verification Modulo Theories description
- New SMT theories, including collection data types
- Rich Model Language description
- Tools developed by Action members

COST Grant budget plan

Action no. and title: **IC0901**

Rich Model Toolkit - An Infrastructure for Reliable Computer Systems

Grant period: 01.01.2012 – 31.12.2012

Allocated budget: 104.200 €

A. SUMMARY BUDGET

(1) MEETINGS € **74.400**

(2) SHORT-TERM SCIENTIFIC MISSIONS € **8.000**

(3) TRAINING SCHOOLS € **10.000**

(4) PUBLICATIONS, DISSEMINATION, OUTREACH € **1000**

(5) OTHERS € **0**

B. TOTAL SCIENCE EXPENDITURE (sum of (1) to (5)) € **93.400**

C. Financial & Scientific Administration and Coordination

(max. of 15% of B.) € **10.800**

D. TOTAL EXPENDITURE (B+C) € **104.200**