



TEMPLATE FOR FP6 PROJECT REVIEWS

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Individual report
Consolidated report

Thematic Priority/Activity	FP6 IST B3G
Instrument type	STREP
Project no and acronym	
Project full title	IST-026905-STP - MASCOT Multiple-Access Space-Time Coding Testbed
Project start date	January 2006
Project duration	2006-2008
Project coordinator name and organisation	Christoph Mecklenbrauker, FTW
Period covered by report (from - to)	January 2007-December 2007
Date of (review) meeting	04/03/08
Name(s) of reviewer(s)	Alain Sibille, Raphaël Visoz, Vaia Sdralia
Name of reviewer drafting the report	Vaia Sdralia

Introduction

This template provides the structure for the review report that needs to be prepared for the project review

In completing Sections 2-8 of the report, independent reviewers should keep in mind that, in case they feel that they do not have the competence or the information to answer a question, they do not need to tick any of the boxes 'Yes', 'Partially', 'No' for that question, but they must complete the 'Comments' box.

If several reviewers are involved, it is preferable that a consolidated report be prepared by one reviewer chosen as 'rapporteur'.

The reporting requirements for FP6 projects are described in detail in the "Guidance notes on Project reporting in FP6" (downloadable from <http://www.cordis.lu/fp6/find-doc-management.htm#reporting>).

Questions to be answered by the reviewer(s)

1. OVERALL ASSESSMENT

a. Executive summary

Please follow the order of the individual sections of this report

Comments:

The MASCOT project main goal is to demonstrate the industrial interest of Multi-user MIMO techniques by developing VHDL reference designs and validating them on a hardware testbed. Generally speaking, this is a project with a rather scientific and technical content, very seriously conducted and managed. The consortium is excellent, the theoretical research results are of high quality and are close to the expectations. So far, the theoretical developments in WP1 end WP3 are impressive and gave rise to many prestigious academic journal papers. For example, the application of Random set theory in multi-user detection appears to be an original new academic research direction. There can be no doubt on the quality and originality of the research carried out in this project.

Main issues:

- WP2 is not focused enough on HW implementation. For example D2.1.2 contains theoretical considerations on random set theory applied to MU detection. It should also outline the difference between VHDL design, testbed functionalities and their respective scope. Following the review and understanding their testbed limitations, the project should analyse their chosen trade-off between innovation and complexity of the testbed in future deliverables.
- There is a grey zone, which is the real implementation potential of the work. Clearly the consortium should make an effort towards this goal, or try to launch a cooperation with industry members able to exploit the full benefit of the project.

- The inter-working, comparison between the described innovative techniques are not sufficiently addressed (WP1, WP3). For example, turbo multi-user detection is tackled for IDMA (chap. 3 and 4 D1.2.1) but the turbo principle seems to be ignored in the other studies. Indeed, iterative interference cancellation based on linear detectors (MMSE, ZF) may be an interesting alternative in terms of performance and complexity to Maximum Likelihood, i.e., Sphere Decoder, detection. Note that this kind of receiver would impact the design criterions at transmitter also.

To conclude, a high quality project on research results and dissemination, but some concerns on the testbed development and the validation of the algorithms in realistic environment.

- Good to excellent project (The project has fully achieved its objectives and technical goals for the period and has even exceeded expectations)
- Acceptable project (The project has achieved most of its objectives and technical goals for the period with relatively minor deviations)
- Unsatisfactory project (The project has failed to achieve critical objectives and/or is not at all on schedule)

b. Recommendations

- A detailed plan and timetable regarding task 2.3 activities during the remaining year is needed as soon as possible for successful and on time completion of the task. Specifically, clarify exactly what techniques are going to be implemented into the test bed. The reviewers understand that the real time testbed has limitations that preclude the implementation of downlink MU techniques but some precoding technique for the downlink could be tested in the non real time mode (Tomlinson- Harashima).
- There is a clear choice of the project to implement QR decomposition and tree search algorithms. It would be beneficial to explain why hard (or iterative soft) PIC and SIC structure involving channel decoding are dismissed (although presented in D1.2.1 chap.3.4)
- Explain the coherence between the different topics tackled, what has driven their choice: the possibility to implement them easily in a testbed, the performance complexity trade-off, the novelty etc.
- The project try to evaluate the algorithm performance as close as possible to real channels either using measurements obtained from external sources or from adequate channel models.
- Improve on the consolidation of algorithms implementation feasibility and on the stakeholders involvement when relevant. Try to incorporate the results of platform tests on algorithmic development/correction/improvement as relevant.

- The reviewers also believe that a white paper at the end of the project summarising the challenges, bottlenecks, results etc will be useful to the scientific community.

2. OBJECTIVES

a. Have the objectives for the period been achieved?

Yes

Partially

No

Comments:

Overall objectives were achieved in the review period. Only issue appears to be the delay due to the redesign of the FPGA board which also affected the implementation of MU-MIMO MAC algorithms.
The first results from the test bed have not been provided as the M2.3.2 was not met.

b. Are the overall objectives (i) still relevant and (ii) still achievable within the time and resources available to the project?

(i)

Yes

Partially

No

(ii)

Yes

Partially

No

Comments:

See the recommendations

c. Do you recommend changes in objectives in order to keep up with the current state-of-the-art?

Yes

Partially

No

Comments:

The objectives are still considered as state-of-the-art.

3. WORKPLAN AND RESOURCES

a. Has the project as a whole been making satisfactory progress in relation to the Description of Work (Annex I to the contract)?

Yes

Partially

No

Comments:

The progress of the project is considered satisfactory. Only issue is regarding task 2.3 (testbed) and its milestones and deliverable. See recommendations.

b. Has each work package (WP) been making satisfactory progress in relation to the Description of Work (Annex I to the contract)?

Yes

Partially

No

Comments:

WP2 is late, problem linked with the testbed.
Other WPs have made satisfactory progress. Techno/economic difficulties have led to a reorganization of task 2.3, with consequent delays in providing MIMO-MAC extensions and testing of corresponding algorithms.

c. Have planned milestones and deliverables been achieved for the reporting period?

Yes

Partially

No

Comments:

Most of the planned milestones and deliverables were achieved in time. A few milestones are delayed (M2.3.1, M2.3.2), as well as the 2nd industry course (D4.6). D2.3.2 is however split in 3 parts and now spread over the last year, with D2.3.2a delivered at M24.

d. Have resources been deployed as foreseen in Annex I, overall and for each participant?

Yes

Partially

No

Comments:

Globally the budget has been used as planned. However some deviations need clarifications : +45% in equipment costs (85 vs. 59 k€) ; 91% of the PM have been used, but only 62% of the personnel costs (in-line with planned personnel costs). This means that the number of PM have been underestimated, and also that the average personnel costs/MM have been under-evaluated as well. There are also significant differences between partners, e.g. Polito, VUT and UNICAL who are specially concerned by this under-evaluation. However it is difficult to have a clear view about these issues, as in tables the incorporation of non-AC PMs is not always clearly stated. There are inconsistencies between some figures (e.g. STREP Efforts Form of the DOW, and fig. 1.8 of MASCOT_Periodic_Management_Report_2007.pdf)

e. Have costs incurred, i.e., personnel costs and other major cost items, been 1) necessary for the implementation of the project and 2) economic. Note that both aspects 1) and 2) have to be covered in the answer.

Yes

Partially

No

Comments:

f. For Networks of Excellence (NoEs) only:

f1. Is there evidence of real integration and restructuring of activities between partners (to be evaluated against Indicators of Integration, e.g., exchanges of personnel, shared infrastructures, joint research and training activities, changes of research orientation of individual partners to better integrate into the NoE, etc).

Yes

Partially

No

Comments:

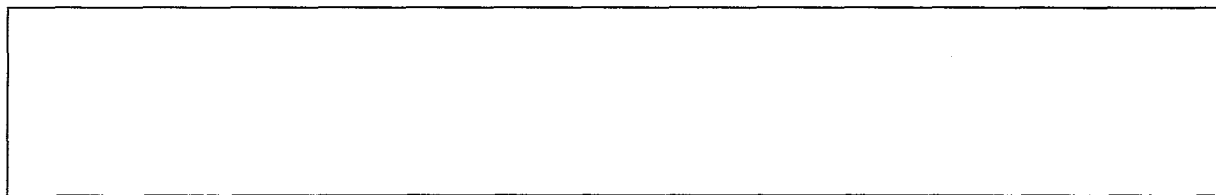
f2. Does the joint research performed under the NoE as a whole continue to qualify as excellent?

Yes

Partially

No

Comments:



4. WORK PLANNED FOR THE NEXT 18-MONTH PERIOD (NoEs and IPs only)

Is the proposed update to the *Implementation Plan* (IPs) or *Joint Programme of Activity* (NoEs) for the next 18-month period satisfactory

a. from a scientific/technical point of view?

Yes

Partially

No

Comments:

n/a

b. from a management point of view including use of resources?

Yes

Partially

No

Comments:

n/a

c. concerning non-scientific activities (dissemination, exploitation, training, science-society issues, further integration etc)?

Yes

Partially

No

Comments:

n/a

5. CONSORTIUM PARTNERSHIP

a. Has the collaboration between the participants been effective?

Yes

Partially

No

Comments:

The organization of visits of researchers between partners and of a MASCOT workshop in Dec. 2007 indicate an effective interaction at least between academic partners.
However, there are not yet a lot of joint publications between the partners.

b. Have the partners contributed as planned to the project and tasks assigned to them?

Yes

Partially

No

Comments:

Overall yes. The consortium is made of highly competent individuals.
It is regrettable that Nokia, who is the sole true industrial partner in the project, does not seem involved in assisting the algorithm implementation on real hardware. This somewhat contradicts the DOW statement for NOK : "Algorithm development and concept development, in particular bridging theory and practice across the project tasks ; guiding the implementation feasibility of baseband transceiver algorithms".

c. Do you identify any conflicts or evidence of underperforming partners, lack of commitment or change of interest of any partners? Do you recommend any changes in responsibilities?

Yes

Partially

No

Comments:

6. MANAGEMENT

a. Has the scientific/technical management been performed as required?

Yes

Partially

No

Comments:

Although not much effort was used on the management, the project doesn't seem to have suffered. The regular meetings, the writing of reports and the general respect of the schedule give strong indications of a very good management performance.

b. Has the administrative and financial management been performed as required ((including proper handling of contractual matters, maintenance of the consortium agreement, intellectual property rights, technical collective responsibility, sub-contracting, competitive calls)?

Yes

Partially

No

Comments:

The management reports give a good indication of the proper handling of the management of financial aspects. However cost deviations have been mentioned in section 3.

c. Have (electronic) information and communication networks been established as required to support interactive working between the teams involved (if relevant)?

Yes

Partially

No

Comments:

Web site and electronic exchanges seem quite properly managed.

d. Is the consortium interacting in a satisfactory manner with other related 5th and 6th Framework projects or other R&D national/international programmes (if relevant)?

Yes

Partially

No

Comments:

The project should clarify the differences/overlaps with SURFACE project and identify if there are any redundancies and correct them accordingly.

7. USE AND DISSEMINATION OF KNOWLEDGE

a. Does the project have significant use potential (if applicable)?

Yes

Partially

No

Comments:

The licensing of the VHDL library to the industry would be an excellent result for the project. The techniques investigated in the project should be of interest for enhancing the radio networks capacities, if they can be proven to be applicable in practice.

b. Is the Plan for the Use and Dissemination of Knowledge developing in a satisfactory manner?

Yes

Partially

No

Comments:

The project has done extremely good dissemination of the results in terms of publications and workshops. However the effective contribution to standards, mentioned in the DOWS, seems to be fully absent. The licensing of VHDL reference designs is expected at a later stage. However it will critically depend on the performance of the algorithms developed in the project, which should be reliably assessed.

c. Have the contractors disseminated project results and information as foreseen by the contract and the plan for dissemination and use of knowledge (publications, conferences...)?

Yes

Partially

No

Comments:

The scientific dissemination in terms of international conferences and journals is truly remarkable, and in line with the high academic quality of the consortium. To this must be added the organization of an industry course, a tutorial, an open house event.

d. Are potential users and other stakeholders (outside the consortium) suitably involved (if applicable)?

Yes

Partially

No

Comments:

There is as yet only moderate evidence of contacts with potential future users of the know-how developed in the project. There may be a benefit from the various dissemination actions, but this remains to be consolidated.

8. OTHER ISSUES

a. Have policy-related and/or regulatory issues been properly handled (if applicable)?

Yes

Partially

No

Comments:

b. Have ethical issues been appropriately handled (if applicable)?

Yes

Partially

No

Comments:

c. Have safety issues been properly handled (if applicable)?

Yes

Partially

No

Comments:

d. Has progress on the Gender Action Plan been satisfactory (if applicable for this reporting period)?

Yes

Partially

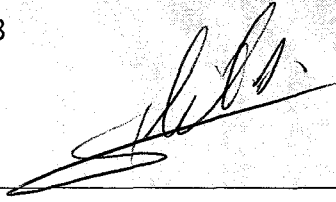
No

Comments:

Name (s) of the reviewer(s): Alain Sibille

Date: 04/03/08

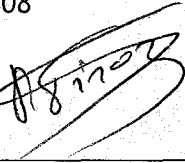
Signature(s):



Name (s) of the reviewer(s): R. Visoz

Date: 04/03/08

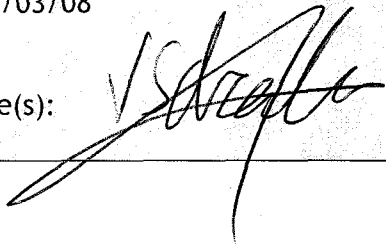
Signature(s):



Name (s) of the reviewer(s): Vaia Sdralia

Date: 04/03/08

Signature(s):



APPENDICES to the reviewers report

a. **Status of project reports and deliverables** (columns (a)-(h) to be pre-filled by the Project Officer; columns (i)-(m) to be completed by the reviewer)

Ref.	Deliverable	Project Months	Due date	Received	Status	Nature	Dissem. Level	Accepted by Reviewers
D1.1.1	Link layer adaptation and scheduling algorithms for MU-MIMO systems	12	1/01/2007	16/02/2007	Received	R	PU	yes
D1.2.1	Multi-user space-time code design and database of specific code constructions	18	1/07/2007	4/12/2007	Received	R	PU	yes
D1.3.1	Baseband transceiver algorithms preliminary version	24	1/01/2008	21/12/2007	Received	R	PU	yes
D1.3.2	Baseband transceiver algorithms final version incorporating feedback from WP3	36	1/01/2009		Planned	R	PU	
D2.1.1	Algorithm assessment criteria for hardware implementation	12	1/01/2007	16/02/2007	Received	R	PU	yes
D2.1.2	Selected transceiver algorithms and corresponding complexity-performance tradeoffs	18	1/07/2007	1/07/2007	Received	R	PU	yes
D2.2.1	VHDL Reference Designs	36	1/01/2009		Planned	P	CO	
D2.3.1	Hardware extension and MAC upgrade for MIMO testbed	16	1/05/2007	30/04/2007	Received	P	RE	yes
D2.3.2a	MIMO-MAC extensions and testing of corresponding algorithms	24	1/01/2008	31/12/2007	Received	R	PU	yes
D2.3.2b	Report on the testing of MIMO-MAC algorithms	30	1/07/2008		Planned	R	PU	
D2.3.2c	Report on results for second ETHZ open house event	36	1/01/2009		Planned	R	PU	

D3.1.1	Performance tradeoffs in MU-MIMO systems	18	1/07/2007	1/07/2007	Received	R	PU	yes
D3.1.2	Report on capacity regions of MU-MIMO systems	24	1/01/2008	31/12/2007	Received	R	PU	yes
D3.2.1	Performance tradeoffs in Ad-hoc MIMO networks	27	1/04/2008		Planned	R	PU	
D3.2.2	Signalling/routing strategies and outage properties in Ad-hoc MIMO networks (M35)	36	1/01/2009		Planned	R	PU	
D4.1	Launching of the MASCOT webpage	3	1/04/2006		Received	O	PU	yes
D4.2	Dissemination and exploitation plan	6	1/07/2006	16/02/2007	Received	R	PU	yes
D4.3	Full-week tutorial on MU-MIMO	13	1/02/2007	23/11/2007	Received	O	PU	yes
D4.4	First industry course on MU-MIMO	19	1/08/2007	21/12/2007	Received	O	PU	yes
D4.5	First ETHZ open-house event	24	1/01/2008		Received	O	PU	yes
D4.6	Second industry course on MU-MIMO	24	1/01/2008		Planned	O	PU	
D4.7	Second ETHZ open-house event	36	1/01/2009		Planned	O	PU	
D5.1	Project management and internal communication guide	3	1/04/2006	16/02/2007	Received	R	PU	yes
D5.2	Setup of a shared document environment	3	1/04/2006		Received	O	CO	yes
D5.3	First annual project review report	12	1/01/2007	16/02/2007	Received	R	PU	yes
D5.4	Second annual project review report	24	1/01/2008	31/12/2007	Received	R	PU	yes
D5.5	Final project report	36	1/01/2009		Planned	R	PU	

Specific Comments on Deliverables

