LSV - Laboratoire spécification et vérification

Rapport Hcéres

agence d'évaluation de la recherche
et de l'enseignement supérieur

Department for the evaluation of research units

AERES report on unit:

Laboratoire “ Spécification et Vérification “

LSV

Under the supervision of the following institutions and research bodies:

ENS Cachan

Centre National de la Recherche Scientifique - CNRS

December 2013

agence d'évaluation de la recherche
et de l'enseignement supérieur

Department for the evaluation of research units

On behalf of AERES, pursuant to the Decree of 3 november 2006[1]*,*

- Mr. Didier HOUSSIN, president
- Mr. Pierre GLAUDES, head of the evaluation of research units department

On behalf of the expert committee,

- Mr Martin WIRSING, chair of the committee

[1] The AERES President "signs [...], the evaluation reports, [...] countersigned for each department by the director concerned" (Article 9, paragraph 3 of the Decree n ° 2006-1334 of 3 November 2006, as amended).

Evaluation report

This report is the result of the evaluation by the experts committee, the composition of which is specified below.

The assessment contained herein are the expression of independent and collegial deliberation of the committee.

Unit name:	Laboratoire "Spécification et Vérification"
Unit acronym:	LSV
Label requested:	UMR
Present no.:	8643
Name of Director (2013-2014):	Mr Laurent FRIBOURG
Name of Project Leader (2015-2019):	Mr Laurent FRIBOURG

Expert committee members

Chair:

Mr Martin WIRSING, Ludwig-Maximilians-Universität München, Germany

Experts:

Mr Philippe DE GROOTE, INRIA, Nancy

Mr Roberto DI COSMO, Université Paris Diderot - Paris 7 (representative of the CNU)

Mr Matthieu LATAPY, CNRS (representative of the CoNRS)

Scientific delegate representing the AERES:

Mr Olivier ROUX

Representative(s) of the unit's supervising institutions and bodies:

Ms Sylvie POMMIER (École Normale Supérieure de Cachan, École Doctorale n°285)

Ms Brigitte VALLÉE, CNRS

1 • Introduction

History and geographical location of the unit

The LSV (Laboratoire "Spécification et Vérification") was founded in 1997; it is located on the grounds of the École Normale Supérieure (ENS) de Cachan. LSV is the Computer Science laboratory of the École Normale Supérieure de Cachan and the "mixed unity of research" UMR 8643 of the Centre National de la Recherche Scientifique (CNRS). It hosts also three project teams (équipes-projets) of INRIA. The research of LSV is centred on studying the security and verification of software and embedded systems. Currently, LSV consists of five research groups:

- DAHU aims at making database-driven systems more reliable and more efficient,
- INFINI is working on the automated verification of infinite systems,
- MEXICO aims at verifying distributed and concurrent systems,
- SECSI investigates the security of information systems,
- TEMPO focuses on modelling and verifing timed systems.

Management team

The director of the LSV laboratory is Mr Laurent FRIBOURG and the deputy director is Ms Patricia BOUYER-DECITRE.

AERES nomenclature

ST6 Sciences et technologies de l'information et de la communication

Unit workforce

Unit workforce	Number as at 30/06/2013	Number as at 01/01/2015
N1: Permanent professors and similar positions	11	11
N2: Permanent researchers from Institutions and similar positions	13	13
N3: Other permanent staff (without research duties)	4	4
N4: Other professors (Emeritus Professor, on-contract Professor, etc.)	2	1
N5: Other researchers from Institutions (Emeritus Research Director, Postdoctoral students, visitors, etc.)	3	1
N6: Other contractual staff (without research duties)	3	1
TOTAL N1 to N6	**36**	**31**

Unit workforce	Number as at 30/06/2013	Number as at 01/01/2015
Doctoral students	16	
Theses defended	28	
Postdoctoral students having spent at least 12 months in the unit	1	
Number of Research Supervisor Qualifications (HDR) taken	8	
Qualified research supervisors (with an HDR) or similar positions	16	17

2 • Assessment of the unit

The laboratory focusses his research on the modelling and analysis of computer systems. Mathematical approaches are used to study the correctness of systems and to develop formal specification and verification techniques as well as support tools. The laboratory is also engaged in teaching at the master and PhD levels.

Strengths and opportunities related to the context

The laboratory has an outstanding international and national academic reputation and an excellent publication record. Several members of LSV have received national and international academic prizes and recognitions. LSV is also very successful in acquiring national and international funding.

The organisation and life at the Laboratory with its weekly meetings and yearly retreats is almost ideal and could be an inspiring model for other laboratories and teams.

The achievements of the laboratory in training through research are very impressive. The laboratory has considerably improved its contacts with industry and the engagement with the public and the media.

Through the means of the Farman Institute LSV is also strongly engaged in interdisciplinary cooperation.

Weaknesses and threats related to the context

There are no apparent weaknesses.

An imminent threat is the moving from Cachan to Saclay. This may endanger the cooperation and the relationships with the institutions located in Paris and elsewhere. It may also be the reason for some LSV members to leave ENS and move to other institutions located in Paris or its vicinity.

Recommendations

The committee recommends that the laboratory develops a strategy for attracting more PhD students, e.g. one of the measures could be to increase the international cooperation and to make the cooperation visible on the website.

The committee supports the unit's plans and recommends to get INRIA as a third "co-tutelle".

The laboratory should also develop a strategy to minimize the threats associated with the relocation of the laboratory to Saclay.

3 • Detailed assessments

Assessment of scientific quality and outputs

LSV excels by the quality of its scientific research. Its focus on mathematical modelling and analysis of software systems is well-chosen and tackles fundamental scientific questions of computer science. In the past five years, several outstanding results have been obtained, ranging from important theoretical data on program complexity and synthesis of distributed and timed systems to more practical findings concerning XML with incomplete information and the analysis of security APIs (Application Programming Interfaces). The latter result attracted the attention of the media worldwide with articles in New York Times, the Süddeutsche Zeitung and other media.

The scientific production was outstanding with over 570 publications, a large number of them appearing in prestigious international journals and highly rated international conferences.

Assessment of the unit's academic reputation and appeal

The laboratory has an excellent academic reputation at all levels, nationally, at the European level as well as internationally in America, Asia and Australia.

During the past five years members of the laboratory received several important scientific prizes: a chair at the College de France, two silver medals of the CNRS and one Presburger prize. The laboratory was also successful at the European level; one member received a ERC advanced grant and another one a starting grant. Several members were invited speakers at international conferences; moreover, the laboratory organized four international conferences.

The laboratory has also very strong national and international cooperation. Among others, this is examplified by the recent creation of the Indian-French laboratory INFORMEL with an LSV member as French co-director, and by the large number of joint publications together with external researchers. More than 60% of the publications have external co-authors, many of them being international top researchers.

Assessment of the unit's interaction with the social, economic and cultural environment

During the past five years the laboratory has considerably increased its interaction with the social, economic, and cultural environment.

One senior researcher was nominated as member of the “Comité National du Numerique”; he was also very active in the media by giving many interviews to the press and to radio stations. The laboratory was also very engaged in disseminating their software security analyses to the national and international media and raising the awareness of the public to software security threats.

Other members were very active in the design of the computer science curricula for the French high school system, and in the continuing education in computer science of high school teachers.

The laboratory was also very successful in obtaining external funding from ANR and Europe, and in concluding several contracts with industry for performing joint projects and/or licensing their software tools. A start-up company was created in order to commercially exploit one of the software prototypes.

Assessment of the unit's organisation and life

Internally, the laboratory is very well organized. Administrative and scientific meetings are hold on a weekly basis; they are open to the whole laboratory including PhD students; once a year all members gather in a retreat for discussing strategy and exchanging scientific and administrative information. In this way, the laboratory managed to create cohesion and form a real group. This organisation and life is almost ideal and could be an inspiring model for other labs and teams.

LSV makes considerable contributions to the interdisciplinary research at ENS Cachan. The current director of LSV is also co-directing the Institut Farman which coordinates and supports interdisciplinary projects at ENS Cachan. LSV participated in eight FARMAN projects.

The laboratory has strengthened the relationships with INRIA, as shown by three common project teams (DAHU, MEXICO and SECSI) and several PhD and postdoc grants sponsored by INRIA. Plans for getting INRIA as a third "co-tutelle" are under way.

A threat may be the moving from Cachan to Saclay. This may cause some LSV members to leave ENS and move to other institutions located in Paris or its vicinity. As a consequence, the excellent common life of the group may be at stake.

Assessment of the unit's involvement in training through research

The achievements of the laboratory in training through research are very impressive. They are excellent in teaching at master and PhD levels, in international teaching and research collaboration as well as in taking initiatives for interdisciplinary cooperation.

In the past five years, 18 students from doctoral school 'Sciences Pratiques, ED 285, have successfully completed their PhD within an average duration of three years. Eight members have obtained a "habilitation" (HDR); four of them have already got offers from other institutions and have left LSV.

LSV is strongly involved in the Paris master of science studies in Research in Computer Science, where LSV is offering many courses. During the period, two LSV members were the directors of this degree; 100% of the master students of LSV entered a PhD programme at LSV or elsewhere.

LSV is also a key institution for the new Indian-French laboratory INFORMEL. The French co-director is from LSV; several exchanges of PhD students have already been organized, and the collaborations with Indian researchers have already produced joint publications.

It is remarkable that members of the laboratory published several excellent books for bachelor, master and PhD level students; moreover, members of LSV have contributed to several summer schools for PhD students.

Assessment of the strategy and the five-year plan

At the review meeting the laboratory presented a clear strategy which relies on the development of the very successful research of the last five years. The strategy focusses on the main strengths and risks of the lab. In particular, the five-year plan aims at : maintaining the unique internal coherence of the lab and the strong thematic research focus; coordinating the relationships with industry through the Farman Institute; fostering international cooperation for attracting international PhD students; and minimizing the risks involved in the relocation of the laboratory to Saclay. The plan is in line with the recommendations of the evaluation committee. In the opinion of the committee, the plan is a good basis for reinforcing the outstanding academic reputation and scientific excellence of the unit, andn therefore, it was very well appreciated by the evaluation committee. The LSV has all needed background as well as a leading role, puting it in a good position to identify and define strategic scientific directions and challenges for future research in its area.

4 • Team-by-team analysis

Theme 1: DAHU

Manager's name: Mr Luc SEGOUFIN

Workforce

Theme workforce in Full Time Equivalents	As at 30/06/2013	As at 01/01/2015
FTE for permanent professors	1	2
FTE for permanent EPST or EPIC researchers	2	2
FTE of other permanent staff without research duties (IR, IE, PRAG, etc.)	0,73	0,73
FTE for other professors (PREM, ECC, etc.)	1	1
FTE for postdoctoral students having spent at least 12 months in the unit		
FTE for other EPST or EPIC researchers (DREM, etc.) excluding postdoctoral students		
FTE for other contractual staff without research duties		
FTE for doctoral students	3	
TOTAL	**7,73**	**5,73**

• Detailed assessments

The global goal of the DAHU group is to make database-driven systems more reliable and more efficient. In this regard, it very well fits the topic of the whole laboratory, while bringing an original focus on data-oriented issues. DAHU thus gathers top-level experts in database theory and in verification in order to address, in an original and fruitful way, challenges at the intersection of these two areas. Group members study, for instance, specification and verification problems raised by web services relying on large databases, distributed data, incomplete data, and query management. In such contexts, data are poorly structured, heterogeneous, partial, erroneous, and/or unreliable, which raises crucial challenges from both fundamental and practical points of views. The group develops formal approaches, languages and algorithms to handle these issues. It publishes its results in the best conference in both the database research area and the verification one, which is remarkable.

DAHU was created in 2008, and it is supported by INRIA, ENS Cachan and CNRS. It is a small group relying on the top-level activity of its few members, with a policy based on excellence and temporary stays of external colleagues.

The members of DAHU are strongly involved in dissemination of their work and of scientific culture in general. This includes important actions towards general public and young researchers, key involvement in institutions framing the future of research and teaching of computer science, as well as involvement in practical applications, software implementations, publications of reference books, and, of course, classical dissemination into the academic world.

They receive support from many prestigious institutions, notably through an ERC Advanced Grant and a STREP European project with high visibility. They attract many extremely well renowned foreign visitors who are leading experts in their field and realize important advances with them.

Conclusion

- **Overall opinion of the theme:**

The track record of the group is excellent, with many papers published in the best conferences and journals, both in database theory and verification. The involvement of researchers of the group in management and dissemination of research is exemplary, and their work has great potential impact both on theoretical questions and on applications.

- **Strengths and opportunities:**

The group gathers top-level researchers with wide national and international visibility (including the general public). The research topic at the intersection of databases and verification is original, and the group is well connected to other groups with similar research interests. The group has clear practical motivations, with important potential impact on real-world applications. Its involvement in the research community, and in particular in dissemination actions, also is a strength that opens great opportunities for promoting research, in general and in their particular area.

- **Weaknesses and threats:**

The small size of the group clearly is a serious weakness: in such a configuration, the departure of one or two members may simply put the very existence of the group in danger. Given the great potential impact of the work done in the group, one may also expect a strongest involvement in applications.

- **Recommendations:**

The group should seriously consider opportunities for recruitments, including mutations from INRIA and/or CNRS (and/or other LSV groups). A more precise long-term project, that may take benefit of the unique expertise present in the group and potential applications, would also be an important contribution.

Theme 2: INFINI

Manager's name: Mr Alain FINKEL

Workforce

Theme workforce in Full Time Equivalents	As at 30/06/2013	As at 01/01/2015
FTE for permanent professors	2	1
FTE for permanent EPST or EPIC researchers	2	2
FTE of other permanent staff without research duties (IR, IE, PRAG, etc.)	0,4	0,4
FTE for other professors (PREM, ECC, etc.)	1	1
FTE for postdoctoral students having spent at least 12 months in the unit	1	-
FTE for other EPST or EPIC researchers (DREM, etc.) excluding postdoctoral students		
FTE for other contractual staff without research duties		
FTE for doctoral students	3	-
TOTAL	**9,40**	**4,40**

• Detailed assessments

The size of the INFINI research group has further increased during the period due to the recruitment of two new members (in 2008 and 2009). The group now consists of five permanent members who are strong at the international level: the senior members have a confirmed international reputation; the younger ones are clearly on their way.

The general research direction of the INFINI theme is the automated verification of infinite systems (typically, programs that manipulate unbounded data, mutually recursive communicating processes, parameterized systems ...). Their approach consists in identifying classes of models for which they can establish decidability results that allows model checking algorithms to be derived. More specifically, INFINI mainly focuses on well-structured transition systems, which is somehow their trademark.

The scientific results are of a high quality and give rise to an excellent publication records, both from a qualitative and quantitative point of view. The members of INFINI publish in first-rank journals (such as Information and Computation, Journal of Computer and System Sciences, Theoretical Computer Science, Formal Methods in System Design, Annals of Pure and Applied Logics) and well-renowned international conferences (such as LICS, ICALP, STACS, CAV, CONCUR).

The members of INFINI collaborate with other French teams which are among the best ones in the domain (LIAFA, LaBRI, VERIMAG). They also collaborate with the team of Prof. J-F. Raskin (Université Libre de Bruxelles, Belgium). These scientific relations are in the frame of ANR collaborative projects. One of the members of the group has been awarded a Marie Curie international outgoing fellowship, and is currently visiting the ACSys team at New York University.

Conclusion

- **Overall opinion of the theme:**

By addressing the problem of infinite state system verification, the INFINI group follows a line of research, which is still quite relevant. Their work, which is mainly of an academic nature, is primarily concerned with foundational issues. Nevertheless, its potential applicative impact is rather important. INFINI is a strong research group whose publication rate in highly selective journals and conferences is impressive.

- **Strengths and opportunities:**

The members of the INFINI group are working with a well-focused research direction, which allows them to have a good scientific visibility. Their scientific production is of very high quality. The group is small, but its members collaborate extensively with other members of the LSV.

- **Weaknesses and threats:**

One of the next objectives of the group is to explore the landscape of complexity beyond Elementary, and to develop the adequate notions of complexity classes and reductions. This objective is very interesting but quite ambitious. It is unlikely that such an objective could have its full impact without an effective collaboration with scientists specialized in complexity theory. This threat has been identified by the members of the group.

- **Recommendations:**

The group should consider opportunities for recruitments and address the practical impact of its research by case studies.

Theme 3: MEXICO

Manager's name: Mr Stefan HAAR

Workforce

Theme workforce in Full Time Equivalents	As at 30/06/2013	As at 01/01/2015
FTE for permanent professors	4	5
FTE for permanent EPST or EPIC researchers	2	3
FTE of other permanent staff without research duties (IR, IE, PRAG, etc.)	1,23	1,23
FTE for other professors (PREM, ECC, etc.)		
FTE for postdoctoral students having spent at least 12 months in the unit		-
FTE for other EPST or EPIC researchers (DREM, etc.) excluding postdoctoral students		
FTE for other contractual staff without research duties	1	
FTE for doctoral students	5	-
TOTAL	**13,23**	**9,23**

• Detailed assessments

The leader of the group MEXICO as well as the senior members are scientists with high international reputation. For example, one of the senior scientists received the Outstanding Paper Award at Petri Nets 2013 and at the International Conference on Applications and Theory of Petri Nets 2011. MEXICO aims at the verification of distributed and concurrent systems and uses diverse mathematical models such as automata, logics, and Petri nets for developing methodologies for designing, verifying, and monitoring distributed systems.

The scientific results are of very high quality. They are published in highly rated international journals such as Logical Methods in Computer Science, Fundamenta Informaticae, Formal Methods in System Design, Information and Computation, Theoretical Computer Science, IEEE Transactions of Software Engineering and the best international conferences in the field such as LICS, CONCUR, FOSSACS, TACAS, MFCS, QEST. The publication rate is constantly very high, with around 130 publications since 2009.

Remarkable is the international engagement; one senior scientist is the co-head of the French-Indian Laboratory InFormel. Although mainly oriented towards theoretical research, the Mexico group started to develop several tools such as the statistical model checker COSMOS.

The group takes high responsibilities in teaching, and is well integrated in the bachelor and master formations. One of the senior scientists is the head of the Department of Computer Science of ENS Cachan and was also heading the Paris Master of Research in Computer Science.

The group has started to develop prototype tools but this is not yet very visible in the scientific community. MEXICO is involved in several externally funded projects including the EU-FP7 project UNIVERSELF, Network of Excellence HYCON2, and the ANR project IMPRO. Moreover, MEXICO is a common project with INRIA.

Conclusion

- **Overall opinion of the theme:**

The MEXICO group investigates the verification of distributed and concurrent systems. The members of the group are internationally well-known scientists and have a very good publication record. MEXICO has formal international relationship with the French-Indian Laboratory InFormel and takes responsibilities in teaching, in particular for the Paris Master of Research in Computer Science. The group is involved in several third party projects, at the European as well as at the national levels.

- **Strengths and opportunities:**

The group investigates a fundamental topic of research. The publications are of very high quality and are published in very good international journals and conferences. The group is engaged in international collaborations and takes high responsibilities in teaching.

- **Weaknesses and threats:**

Although the group has a clear research goal, the research methods and results appear to be rather diverse. Tool development has started but is not well visible in the scientific community.

- **Recommendations:**

The group should develop a more coherent research agenda and strengthen the development of tools and the relationships with industry.

Theme 4: SECSI

Manager's name: Mr Jean GOUBAULT-LARRECQ

Workforce

Theme workforce in Full Time Equivalents	As at 30/06/2013	As at 01/01/2015
FTE for permanent professors	3	3
FTE for permanent EPST or EPIC researchers	2	1
FTE of other permanent staff without research duties (IR, IE, PRAG, etc.)	0,73	0,73
FTE for other professors (PREM, ECC, etc.)		
FTE for postdoctoral students having spent at least 12 months in the unit		-
FTE for other EPST or EPIC researchers (DREM, etc.) excluding postdoctoral students		
FTE for other contractual staff without research duties	1	
FTE for doctoral students	2	-
TOTAL	**8,73**	**4,73**

• Detailed assessments

The number of researchers has not changed during the period; the group has lost one researcher but was also able to recruit an excellent young foreign researcher. The senior members of the group are internationally reknown; in particular, the group leadr and one of the senior researchers are top international scientists; e.g. in 2013, the group leader was invited as a keynote speaker at the Sixth International Symposium on Foundations & Practice of Security (FPS'2013) and at the 39th International Symposium on Mathematical Foundations of Computer Science (MFCS 2014); another senior member was invited to give a tutorial at LICS 2013 and in 2012 he was the editor of a special issue on Security and Rewriting of Journal on Automated Reasoning. Both researchers received the CNRS silver medal, one in 2008 and the other one in 2011.

SECSI investigates the security of information systems. Main goals are the verification of cryptographic protocols, intrusion detection and foundational studies on probabilistic and non-deterministic choice. The research on cryptographic protocols centres on symbolic verification methods, their soundness for computational models, and applications of these methods for e-voting, security of APIs and circuits.

The scientific results are of excellent quality, they are published in highly rated international journals such as Information and Computation, Mathematical Structures in Computer Science, ACM Transactions on Computational Logic, Theoretical Computer Science, International Journal on Information Security and the best international conferences in the field such as LICS, ICALP, CRYPTO, CCS, ESORICS, POST, CT-RSA. The publication rate is constantly very high with almost 170 publications since 2008.

The SECSI group has developed several tools; in particular, the ORCHIDS tool for intrusion detection and the Tookan tool for analysing APIs for cryptographic tokens. ORCHIDS is an open-source tool with users in France and Canada. Tookan was licensed to several companies; it got widespread interest from international press for making Bleichenbacher's "million message attack" practical on the PCKS#11 standard.

The group is involved in the ANR-funded research projects VERSO and CPP; in particular, the group is the scientific coordinator of the CPP project. Moreover, SECSI is a common project with INRIA, although currently no researchers from INRIA are members of the group.

Conclusion

- **Overall opinion of the theme:**

The SECSI group investigates the security of information systems, which is one of the currently most discussed topics in computer science. The members of the group are at the international forefront of research; they have an excellent publication record. The group has developed state-of-the-art research tools which enabled them to solve important problems and which are attractive for industry. SECSI is also involved in several externally funded projects, partly with industrial participation.

- **Strengths and opportunities:**

The group has chosen an important topic of research. The publications are of very high quality and are published in top international journals and conferences. Two CNRS silver medals show the impact and the visibility of the research in France.

- **Weaknesses and threats:**

Although the group is involved in ANR-funded research projects and even leading one of them, its implication at the European level is not visible.

- **Recommendations:**

The group should focus its research lines (as proposed by the group in its new scientific objectives). It should also continue and strengthen the development of tools and the relationships with industry. There is an opportunity to try to get involved in international projects and networks. Finally, it would be good to strengthen the relationship with INRIA, e.g. by attracting an INRIA researcher.

Theme 5: TEMPO

Manager's name: Mr Nicolas MARKEY

Workforce

Theme workforce in Full Time Equivalents	As at 30/06/2013	As at 01/01/2015
FTE for permanent professors	1	
FTE for permanent EPST or EPIC researchers	4	4
FTE of other permanent staff without research duties (IR, IE, PRAG, etc.)	0,4	0,4
FTE for other professors (PREM, ECC, etc.)	1	
FTE for postdoctoral students having spent at least 12 months in the unit		-
FTE for other EPST or EPIC researchers (DREM, etc.) excluding postdoctoral students		
FTE for other contractual staff without research duties	0,5	0,5
FTE for doctoral students	3	-
TOTAL	**9,90**	**4,90**

- Detailed assessments

The TEMPO group focuses on the modelling of time in verification issues, relying typically on automata, logics and games. It has a world leading expertise on the theoretical aspects of this challenge, with key contributions acknowledged at the highest level. More recently, the group worked on combining its expertise on timed systems with other aspects of systems like robustness, randomness, distributed nature, etc. In these directions too, the publication records are impressive.

The TEMPO group is strongly focused on fundamental research, with five CNRS researchers and another permanent member, a growing number of PhD students, and important (past and future) support for fundamental research from Europe (ERC, STREP) and ANR. It is also involved in interdisciplinary activities, mainly through the Farman institute, and develops prototype software implementing results from its research. The members of the group actively contribute to management of research, with the direction of several structures, participation to national and international committees, and several other actions.

Conclusion

- **Overall opinion of the theme:**

The group has an excellent scientific production and is a leader in its area, with a mostly theoretical results. It works on very general objects with great potential impact on many areas of science and on applications. The group researchers are strongly involved in management of research and importantly contribute to the community.

- **Strengths and opportunities:**

The group has excellent expertise on a key area of theoretical computer science, with high visibility and attractivity. It obtained an ERC starting grant, to which important opportunities are attached. The work of the group has great potential for practical impact and bridges to other areas of computer science (and other disciplines), which it only started to explore.

- **Weaknesses and threats:**

One threat for the group may be to derive more and more abstract variations of temporal automata and similar objects, on which the group has great expertise. The group may prevent this through more involvement in transfer towards applications and other areas of research. This may help in identifying the most relevant directions for future work.

- **Recommendations:**

The group may explore more opportunities for spreading their approaches, framework and results to applications and to other areas of research. It seems that they have all needed expertise and background to produce a reference book for non-specialists, for instance. It makes no doubt that the efforts they started in this direction will be fruitful. The relation to game theory, which seems prevalent in the report, may also be clarified. Finally, the group has the potential to identify and address key challenges for future work, both from theoretical and applied points of view.

5 • Conduct of the visit

Visit date:

Start:	Monday December 2nd of 2013, at 8.30 am
End:	Monday December 2nd of 2013, at 6.00 pm

Visit site:

Institution:	École Normale Supérieure de Cachan
Address:	61, avenue du Président Wilson, Cachan

Conduct or programme of visit:

8:30-9:00	Accueil du comité d'experts
9:00-9:30	Réunion du comité d'experts
9:30-9:40	Introduction par délégué scientifique AERES (M. Olivier ROUX)
9:40-10:30	Présentation bilan et projet unité (M. Laurent FRIBOURG)
10:30-10:45	Pause
10:45-11:15	Axe DAHU (M. Luc SEGOUFIN)
11:15-11:45	Axe INFINI (M. Alain FINKEL)
11:45-12:15	Axe Mexico (M. Stefan HAAR)
12:15-13:30	Déjeuner
13:30-14:00	Axe SECSI (M. Jean GOUBAULT-LARRECQ)
14:00-14:30	Axe Tempo (M. Nicolas MARKEY)
14:30-14:45	Pause
14:45-15:05	Rencontres représentants ingénieurs
15:05-15:25	Rencontres représentants étudiants
15:25-15:45	Rencontres représentants chercheurs
15:45-16:15	Réunion avec représentants des tutelles (CNRS/ENS Cachan)
16:15-18:15	Réunion du comité d'experts

6 • Supervising bodies' general comments

ENS CACHAN

Le président
Tel : 01 47 40 53 02
Pierre-paul.zalio@ens-cachan.fr

Cachan, le 14 MAR. 2014

à

Monsieur Pierre Glaudes
Directeur de la section des unités de recherche de l'AERES
20, rue Vivienne
75002 Paris

N/Réf.: PPZ/SP/CD 14-106

Objet : S2PUR150007924 - LSV - Laboratoire Spécification et Vérification - 0940607Z

Monsieur le Directeur,

L'Ecole normale supérieure de Cachan a pris connaissance du rapport d'évaluation du LSV. Au nom de l'unité de recherche, elle remercie vivement le comité d'experts pour la qualité de son travail et la pertinence des observations détaillées et des recommandations contenues dans le rapport.

L'Ecole normale supérieure de Cachan est heureuse de l'évaluation positive de l'unité de recherche et apprécie également l'analyse qui a été faite par le comité sur les évolutions du paysage régional et sur la stratégie du LSV dans ce contexte (insertion dans l'UPSay, déménagement de l'ENS sur le plateau de Saclay, association plus étroite avec l'INRIA).

L'établissement souhaite également remercier le directeur de l'unité et son adjointe pour leur action dynamique au cours des 5 dernières années et pour leur travail de réflexion pour le futur et attirer votre attention sur la réponse du directeur du LSV, Laurent Fribourg, que vous trouverez en annexe de cette lettre.

Je vous prie d'agréer, Monsieur le Directeur, l'expression de mes salutations distinguées.

P/ Pierre Paul Zalio
La Vice-Présidente Recherche
Sylvie POMMIER
Présidente de l'ENS Cachan

emailfribourg@lsv.ens-cachan.fr

Laboratoire Spécification & Vérification

LSV - UMR8643
ENS Cachan
61 av. President Wilson
94235 CACHAN Cedex
FRANCE

E-mail : lsv@lsv.ens-cachan.fr

Cachan, le 14 mars 2014

M. Olivier Roux
Délégué scientifique AERES

Monsieur le Délégué scientifique,

Au nom de tout le laboratoire, je tiens à vous exprimer, à vous et au comité d'experts, nos plus sincères remerciements pour le temps que vous nous avez consacré et l'intérêt que vous nous avez porté.

Nous sommes extrêmement heureux et fiers des forces et valeurs que vous nous reconnaissez. Nous vous remercions également pour les recommandations que vous formulez, qu'il s'agisse de poursuivre notre progression ou d'identifier les risques qui se présentent.

Votre rapport nous encourage à mettre tout en oeuvre pour continuer à progresser dans nos champs de recherche tout en gardant la plus grande exigence scientifique.

Bien cordialement,

Laurent Fribourg
Directeur LSV