Centre de recherche INRIA Saclay - Île-de-FRANCE

Rapport Hcéres

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

Section des Unités de recherche

Evaluation report

Research unit:

Saclay-Île de France

INRIA

march 2009

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INRIA

Le Président de l'AERES	Section des unités de recherche
	Le Directeur
Jean-François Dhainaut	**Pierre Glorieux**

march 2009

Evaluation report

The research unit :

Nom de l'unité : Saclay-Île de France

Label demandé :

N° si renouvellement :

Nom du directeur : Mr Michel BIDOIT

Other institutions and research organizations:

INRIA

Dates of the visit:

3 & 4 February 2009

Members of the visiting committee

Chairman of the committee:

Mrs Brigitte Plateau (Grenoble INP-Ensimag, LIG)

Other committee members:

Mrs Isabelle Bloch (ENST, Paris, France)

Mr Giuseppe Buttazzo (Univ. Pisa, Italie)

Mr Stéphane Canu (INSA de Rouen, France)

Mr Pierpaolo Degano (Univ. Pisa, Italy)

Mr Denis Dochain (Univ. Catholique de Louvain, Belgique)

Mr Michael Fourman (Univ. Edinburgh, UK)

Mrs Anne Doucet (Univ. Paris 6, France)

Mr Mads Nielsen (Univ. Copenhagen, Danemark)

Mr Philippe Palanque (Univ. Paul Sabatier, Toulouse, France)

Mr Charlie Perkins (WiChorus Inc., San Jose, USA)

CNU, CoNRS, CSS INSERM, INRA, INRIA, IRD….. representatives :

Mr Guillaume Hanrot (INRIA Nancy - Grand Est)

Observers

AERES scientific representative:

Mr Luis FARIÑAS DEL CERRO

Research organization representative(s):

Mr Claude Puech, Université Paris 11

Evaluation report

1. Short presentation of the research unit

The centre has a total of 380 people (53 INRIA researchers (46%), 62 other academics (among which 49 teaching), 47 support staff, and about 200 PhD's, Postdocs and CDDs) spread over 25 research groups (19 of which are with partners), and 9 support groups. It has grown rapidly between 2005 (when there were 12 teams) and now.

It addresses 3 major research themes (RT): Security and software reliability (6 teams), High performance computing and distributed Data on the Web (8 teams), Modelling, simulation and optimisation of complex dynamic systems (11 teams), which are coherent with INRIA's scientific priorities. It conducts its research with 8 partners (CNRS, CIRAD, CEA and 5 universities and "grandes écoles").

Detailed figures can be found in the document "grille". Briefly, 49 HDR, 17 PEDR, all PhdD Students are fully supported and 93 PhDs defended over the period for a current total number of 150 (23 per year- but considering the growth, this average is hard to interpret). For the same reason, the total number of publications cannot be averaged: it includes 395 in Int. Journals, 554 in Int. Conferences, and 102 chapters of books or books edited. Three academic members are "non-publishing" according to AERES criteria. The cumulated grant income over the period is 8.5 ME.

The overall scientific plan is to stabilise and reinforce the 3 research themes (especially the small teams) and consolidate their partnerships within Digiteo, Systematic and with "SME". New buildings are also planned.

2. Preparation and execution of the visit

Evaluation session:

The evaluation session was very well conducted and managed. We had plenary sessions (the general centre presentation, the support group's presentation, the demo session, the meeting with students) and parallel scientific sessions. Two lunches and dinner where we could meet the team leaders and the directors of the partner labs. The documentation provided was complete and we had very quick answers to all our questions. We wish to warmly thank the centre for its work and congratulate them for the result. The program was the following:

- tuesday morning: Overall presentation of the INRIA Saclay research centre and Scientific activities
- tuesday lunch: meeting with directors of partner labs + Digiteo
- tuesday afternoon: Research team individual presentations (3 parallel sessions)
- tuesday evening: dinner with the leaders of the research teams
- wednesday morning: Research team individual presentations
- demo session
- focus on support services for research
- meeting with PhD students
- wednesday lunch: meeting with centre management team + scientific chairs of Saclay committees
- wednesday afternoon: Meeting with INRIA representatives and with the director of Saclay centre
- private meeting of the visiting committee

3 • Overall appreciation of the activity of the research unit, of its links with local, national and international partners

Global assessment of the unit, its evolution, and local, regional and European positioning :

During these past 4 years, all research themes (RT) have grown considerably, and INRIA has put more effort in RT 3 (+14), then RT 1 (+10) and finally RT 2 (+4), to reach rather balanced numbers. RT 2 has more university staff. The center is very well engaged with the major local scientific conglomerates (Systematic, Digiteo, Paritech, etc). It participates in all the major national research groups (GDR, etc), and runs an impressive number of national (ANR, FUI, etc) and international (CEE) contracts. The CR report is very detailed on this point. They also have a large number of international collaborations (visible through common publications), which can be meaningfully seen through the activity of each research group.

Assessment of unit functioning (management, human resource, communication):

The CR has the traditional inner INRIA centre organisation. The 9 support groups seem to have developed very nicely over the last 4 years. We had interesting presentations from 3 of them. In terms of communication, they participate actively in the INRIA dynamic. In terms of human resource, we can focus on the PhD students: we had a meeting with about 40 of them. They expressed themselves entirely satisfied with the opportunity to work within the INRIA environment, as a complement to their graduate school and their university lab. It seems that INRIA was able to provide efficiently support and facilities they would not otherwise have (such as more administrative support, help and easy access to any publication in the field). As the centre is geographically spread over many locations, people do not meet very often. Maybe in the future, as the centre consolidates its recent growth, events could be organised to bring together the doctoral students and scientific staff from the various groups across the centre. It seems, for example, that the demo session was a good event for the CR members themselves.

4 • Specific appreciation team by team and/or project by project

4.1 Alchemy

Assessment of the scientific position in an international context:

The project has contributed to a very widely used platform, namely the GCC compiler suite, and exhibited strong performance improvements. Given the emergence of more and higher-degree multi-core products, the project is directly involved in an area of strong current relevance and need.

Scientific productivity:

The publication record is very strong, and the venues for publication are among the top in the field. The software contribution is substantial; there was not any mention of patents. The number of contracts and industrial partners is impressive, both nationally and internationally.

Visibility, Impact, Engagement:

The number of professional activities, chairing workshops and participation on program committees, is quite good.

Partnerships:

This is one of the strong areas for the project. There are over a dozen collaborations and industrial partners with contracts shown. The technology transfer occurs by making available software for optimizing GCC as well as the simulation package for CMPs and evolved processor architectures.

Teaching and doctoral studies:

ALCHEMY has averaged multiple Ph.D. every year, as well as providing research topics for HdR and post-doctoral research.

Scientific project:

The project is coherent, albeit bifurcated between simulation and practice. This is reasonable given the circumstances. Furthermore, embarking on large-scale multiprocessing architectures is a good fit for today's horizons while still avoiding only safe research territory.

Strong points:

These are mainly the project strategy, future opportunities, collaborations, publications, contracts and grants.

Points for improvement:

The team should be aware of the danger of lack of focus and the need to carefully moderate time requirements for support of software and the simulation packages.

Recommendations:

Continue the excellent work, try to establish focus on highest priority and most rewarding commitments.

4.2 Alien

Assessment of the scientific position in an international context:

The team leader of the Alien project team is a prominent scientist in the field of system theory and automatic control, and several of the other members have a strong international scientific reputation.

Scientific productivity:

The scientific output is undoubtedly of very high quality. Moreover the results obtained within the framework of the ALIEN project have resulted in two patents. The activity of the ALIEN project team covers therefore a very large spectrum and is both theory and application oriented.

Visibility, Impact, Engagement:

The team leader has recently received the prestigious biennal Jacques-Louis Lions prize of the Academie des Sciences. The activities of the project team have been promoted in diverse workshops and summer schools.

Partnerships:

The scientific network of ALIEN includes collaborations with important scientists in different countries, including Mexico, Germany, Austria, Tunisia, Brazil, USA and UK. It has also research contacts with companies like EDF and PSA.

Teaching and doctoral studies:

The members of ALIEN are involved in substantial teaching activities, and two members have obtained their HDR in 2006 and 2008, respectively.

Scientific project :

Although the presentation given during the evaluation was not extremely helpful in this respect, it is obvious that the activities of the ALIEN project team explore new challenging directions in system theory and automatic control, that have led and are about to lead in the future to important scientific and practical results.

Strong points:

The ALIEN project team is a research group with prominent researchers exploring challenging scientific issues. The research activities have led to substantial publications as well as industrial applications (including two patents)

Points for improvement:

The activities of the ALIEN project team are distributed over two INRIA centres (Saclay and Lille), and the centre of gravity of the project team is not clearly identified.

Recommendations:

It appears to be important to reinforce the presence of ALIEN at Saclay, in particular when considering the activities of the associated member institutions in the Saclay area in the field of system theory and automatic control.

4.3 Apis

Assessment of the scientific position in an international context:

This is a joint team with Ecole Centrale. Its research activities focus on irregularity analysis in biology and medicine. The methodologies are a logical follow-on of previous activities of the INRIA members of the team. The domain of application is new. The positioning of the methodological tools is clear and well recognised. The application domains are less visible for the moment (they are recent), and could probably benefit from a narrower focus to allow a deep investigation of a few application problems.

Scientific production:

The team has a good level of publications. Matlab toolboxes have been developed and are widely used by the scientific community. The team has numerous collaborations, both at national and international levels.

Visibility, Impact, Engagement:

The team leader is recognised internationally for his involvement in the animation of the scientific community in evolutionary algorithms.

The attractiveness for young researchers could be reinforced, and the team would certainly benefit from a larger number of PhD candidates.

Partnerships:

The partnerships are good and a start-up has been created in 2005.

Teaching and doctoral studies:

One of the team members is professor at ECP. The other team members have some teaching activities that allow them to have contact with students. This could probably be reinforced, and the new positioning with ECP could be of great help.

Scientific project:

The proposed project aims at studying irregular stochastic processes, by proposing new adaptive evolution operators for EAs, and focusing on medical applications. The new orientation of the team towards biomedical applications is challenging,

Strong points:

- collaborations with ECP
- contributions in the field of evolutionary algorithms and regularity analysis

Recommendations and points for improvement:

The links with TAO should be clarified. The relationships between the main research topics (for instance between regularity analysis and evolutionary algorithms) need to be clarified.

4.4 Asap

Assessment of the scientific position in an international context:

The topics tackled by the Saclay members of the ASAP team (P2P systems, wireless sensor networks) are important and innovative. These are very dynamic fields, studied by well-known North American and European researchers. The ASAP team has taken the innovative step of combining these two domains.

Scientific productivity:

The group has a good number of publications in top-level international journals and conferences (IEEE transactions on parallel and Distributed Systems, PODC, Eurosys, IEEE P2P Computing). It also has several contracts including industrial partners.

Visibility, Impact, Engagement:

F. Lefessant is co-founder of the Move & Play start-up. He is recognized as an expert in P2P systems, and is (like A. Carneiro Viana) a program committee member of several international conferences. There are several post-docs in the team, but no visiting senior scientists.

Partnerships:

The team has several strong European collaborations (for instance with EPFL, VU Amsterdam, network of excellence RESIST). They also have national collaborations (mainly with other INRIA groups), as well as industrial contracts. F. Lefessant is actively involved in the creation of the Move & Play start-up.

Teaching and doctoral studies:

The team has no PhD students in Saclay as yet. Both members are teaching, mainly at Ecole Polytechnique. We encourage them to teach also in the universities, which would allow them to recruit PhD students.

Scientific project:

The scientific project is ambitious and tackles interesting problems. It brings together researchers from various and complementary fields (including distributed systems, resource management in P2P systems, mobile sensor networks). Emerging topics, such as user communities, and P2P social networks, are considered. A strong collaboration between the two parts of the team will be necessary to attain these objectives.

Strong points:

- the research topics are innovative
- the team has several publications in top-level journals and conferences
- technology transfer, via the Move & Play start-up, is in progress

Points for improvement and recommendations:

The experts found it difficult to evaluate only one part of a two-part project, and not the whole team. The members of Saclay, who are two young researchers, work on different topics and have few interactions. The two senior researchers of the ASAP team are both located in Rennes. Even if the collaboration with them is intensive and fruitful, this could explain some weaknesses in visibility and appeal of the Saclay part of the team. We recommend that the two members of Saclay improve and develop their scientific activities by working together and supervising PhD students.

4.5 Aviz

Assessment of the scientific position in an international context:

The project aims at developing research activities in the field of information visualisation. This field of research is very active in some EU countries (Germany and UK for instance) but mainly in the US with several laboratories (HCIL Maryland, GVU Georgia Tech, Microsoft Research,…). This field is mainly connected with Human-Computer Interaction but organises large and prestigious conferences such as IEEE InfoVis (since 1995). The members of AVIZ are leading experts in the field both in France and in an international context both by contributing steadily in relevant conferences and by playing leading roles in their organisation.

Scientific productivity:

AVIZ project started in 2007. The scientific production for these two years and such a small group is outstanding. 9 papers in international journals for the years 2007-2008 and 9 papers in major conferences.

Visibility, Impact, Engagement:

The AVIZ team has numerous publications with co-authors from many research centres worldwide (10 since the creation of the team). The 2 members of the team are involved as PC members or chairs of the main conference in their research field. The team managed to attract 2 visiting research scientists from the US.

Partnerships:

The AVIZ team is very active in terms of national and international collaborations. The newly created team managed to gather funding at the national level (by means of 2 ANR), at the EU level with the coordinated action MasterVis, and at the international level through the joint research centre with Microsoft Research.

Teaching and doctoral studies:

The research team has little involvement in teaching (one lecture course of 24 h in one institution).

Scientific project assessment:

The scientific project of the team is in line with its current activities and fits with the current funded projects they are involved in.

Strong points:

- important topic with high potential impact
- high level international collaborations
- strong leadership, with high visibility both at national and international levels
- very good, strong scientific production
- demonstrated capability in fund raising

Points for improvement:

The team should try to get more involved in teaching activities so that improving dissemination of its expertise in an important domain insufficiently taught in France. As pointed out in the description of the team this would also support the recruitment activities.

Recommendations:

The team size is very small (2 members) with currently no PhD students. The team should be strengthened to ensure its viability and the success of the many projects it is involved in. Investment in research projects and a strategy to handle that should be defined.

4.6 Commands

Assessment of the scientific position in an international context:

The project deals with a very interesting field in applied mathematics: optimal control for dynamical systems. In particular, trajectory optimisation is investigated in all its aspects, from geometric to stochastic controls, dynamic programming and Hamilton-Jacobi-Bellman equations.

Scientific productivity:

All three permanent researchers have a very good record of publications and active collaborations at national and international level, as do the associated members of the team.

Visibility, Impact, Engagement:

The project has a very high appeal for young researchers, as shown by the several PhD students and post-docs, also from abroad. On the international level the visibility of the team is excellent, thanks to the scientific quality of its members and in particular of the scientific leader who is recognised as a major expert in the field of optimal control.

Partnerships:

The relations with industry are excellent, as well as the collaborations with other research teams in Europe and worldwide.

Teaching and doctoral studies:

The members of COMMANDS are all involved in substantial teaching activities; although the project started only recently, the training of young scientists, is well established.

Scientific project assessment:

The scientific leader manages the team efficiently and the team is highly homogeneous in its interests, as shown by the number of joint publications by team members. The Evaluation Committee fully appreciated the project, from its presentation, made in a very professional way, to the quality of researches, the management, the formation of young scientists.

Strong points:

The subject under investigation is very much studied internationally; the exchange of knowledge with other groups and the collaborations are strong points that the team has developed very well. The scientific leader provides a very efficient and stable framework, from both the scientific and management perspectives, and excellent international visibility.

Points for improvement:

The Evaluation Committee did not find weak points, apart perhaps the too small size of the team.

Recommendations:

Continuing this research in the field of dynamic optimisation is certainly a very good plan for the next future. We suggest that the team should continue to focus on the formation of young scientists, and to try, within the limits of the budget possibilities, to increase the number of researchers.

4.7 Comete

Assessment of the scientific position in an international context:

The team is a leader in the area of quantitative semantics for concurrent and mobile calculi, in particular their probabilistic versions. Their work is also a reference for people interested in the expressiveness of mobile calculi, and in security, especially for guaranteeing anonymity within the quantitative and the information-theoretic approaches. Some decidability results in LTL are also relevant, and appreciated.

Scientific productivity:

The team is working on theoretical issues and their production mainly consists of papers. The number of publications is good and their quality excellent.

Visibility, Impact, Engagement:

The members of the team have been very active in organising and chairing an impressive number of high-quality conferences and workshops, in participating in various associations and working groups, in serving in editorial boards etc. A large number of well-reputed researchers have been attracted to cooperate with and visit the team, including R. Milner, Turing award winner and Blaise Pascal Chair.

Partnerships:

The team has excellent international cooperation and good national ones but it is not very active in technology transfer.

Teaching and doctoral studies:

The team has good teaching activity, in international advanced schools and in French under- and post-graduate courses. The number of PhD students is high, given the team has only two permanent researchers, and so is their quality (see the G. Kahn prize for one PhD thesis).

Scientific projects:

The team aims at obtaining high-quality scientific results, in new and curiosity-driven topics, such as novel approaches to security.

Strong points:

The team has produced relevant scientific results, has high international visibility, an excellent record of publications in top journals, and good teaching activities, including at PhD level.

Points for improvement:

The team is clearly under-staffed and urgently needs a couple of additional permanent researchers to keep its quality high; management issues should be improved, and technology transfer ones addressed; dissemination of results to non-experts could add value.

Recommendations:

The small size of the team might make it necessary to concentrate efforts on selected topics and to share others, e.g. implementation issues, with cooperating groups.

4.8 Dahu

Assessment of the scientific position in an international context:

This project aims at exploring the connections between two fields, databases and verification, whose interactions are considerably increasing with the development of Internet.

This new field of research has been recently instigated by several North American and European research teams. The members of Dahu are in close contact with the main research groups in this field, through steady collaborations. The STREP Project FoX, lead by L. Ségoufin, is a good illustration of the scientific positioning of Dahu.

Scientific production:

The Dahu project started in January 2008. The scientific production in 2008 is excellent: 11 papers in major conferences in both fields (database and verification), 2 national (ANR) and 2 European grants (ERC Webdam and STREP Fox).

Visibility, Impact, Engagement:

The Dahu team currently has 8 international collaborations. The list of visitors for 2009 is noteworthy in terms of both quantity and quality. The members of the team are PC members or co-chair of major conferences.

Partnerships:

The Dahu team has several collaborations with national and international eminent research groups. The collaborations are essentially academic collaborations, due to the foundational and theoretical nature of their work.

Teaching and doctoral studies:

Most members of the team have a regular teaching activity (average of 20h per year, per person in prestigious schools and masters, such as Polytechnique and MPRI).

Scientific project:

The scientific project is ambitious and includes important topics. Due to the high expertise of the members of the group, both in the database and in verification fields, the strong leadership, the relevant collaborations, there is no doubt that the goals will be attainable.

Strong points:

Dahu is a dynamic new team with high visibility, working on an important and timely topic. The leader of the group has set up strong and interesting collaborations. The scientific production after one year is excellent and the group has a strong leadership.

Points for improvement and recommendations:

The scientific project is ambitious with a broad, probably too broad, focus. The experts suggest concentrating on some crucial points and making those points more salient.

4.9 Defi

Assessment of the scientific position in an international context:

The team is among the international leaders in the field of shape analysis and inverse problems, and the participants bring together a deep knowledge of theoretical problems and tools in the field with the numerical ability to treat very challenging problems, often very hard to approach by standard methods.

Scientific productivity:

The scientific production is at the top level; the three permanent researchers of the team as well as the associate members are often plenary speakers in international meetings and their publications appear on high level scientific journals. In particular, a book by a permanent member of the team represents a very important work for scientists in shape optimisation.

Visibility, Impact, Engagement:

The number of PhD students and young researchers involved in the project shows the dynamism of the team, whose international visibility is very high.

Partnerships:

Shape analysis and inverse problems are very challenging fields which are involved in many problems and models from many applications in Mechanical Engineering, Acoustics, Electromagnetism, Medicine. The team possesses the necessary knowledge and tools to achieve excellent results. Their relationship with industry is also well established.

Teaching and doctoral studies:

Although the project started only recently, the dynamism of the team, in the formation activity of young scientists, is well established.

Scientific project assessment:

The Evaluating Committee appreciated the fact that the scientific leader of the team is a young researcher: his enthusiasm in the approach to new and challenging problems is certainly a strong point for the team life and management.

Strong points:

The strong points of the DEFI team are the high international visibility of the participating members, that represent a pole of attraction for several young scientists from France and from abroad. Also, the number of different applications the group is able to handle is impressive, as shown by the various partnerships with industry.

Points for improvement:

The Evaluation Committee does not actually see weak points, apart the perhaps too small size of the team.

Recommendations:

Continuing to invest as much as possible in the formation of young researchers is crucial for the team. The theoretical background on mathematical analysis, PDEs and variational problems is with no doubt essential for a top class research in a difficult field such as shape analysis. Also, an effort should be made, within the limits of budget possibilities, to increase the size of the team, for instance including the associate members as regular members.

4.10 Digiplante

Assessment of the scientific position in an international context:

DigiPlante is developing its activities in a field that is clearly largely undiscovered in particular with a rigourous view on modelling and identification of plant growth systems, in partnership with one of the most scientifically renowned research groups (University of Wageningen).

Scientific productivity:

DigiPlante has a significant scientific output in different important scientific journals. The team has also initiated a series of symposia that is aimed at disseminating the knowledge, developments and recent results in the field of plant growth which is of great interest both from a scientific point of view and in terms of real-life applications.

Visibility, Impact, Engagement:

Apart the scientific publications, DigiPlante has developed software (Green Lab) whose impacts, for scientific investigations and practical applications, are obvious.

Partnerships:

DigiPlante works closely with major laboratories involved in plant growth (including the University of Wageningen in the Netherlands) and has developed a strong collaboration with Chinese partners.

Teaching and doctoral studies:

The activities of DigiPlante and its members in teaching and doctoral studies are consistent and the balance between local and Chinese PhD students is a good indicator of the strong collaboration with the Chinese partners in particular.

Scientific project assessment:

All the indicators related to the scientific activities of DigiPlante are very positive. **DigiPlante** provides unique expertise in the field of plant growth modelling via an approach that guarantees the high reliability of the models developed. Future scientific plans are challenging and in line with the present expertise of the project team.

Strong points:

DigiPlante is a highly impressive research group that performs very rigourous research in a very important field both from a scientific and application viewpoint.

Points for improvement and recommendation:

The DigiPlante project team should be very quickly reinforced by at least one new staff member in order to guarantee the continuity of this scientifically rich activity.

4.11 Galen

Assessment of the scientific position in an international context:

The group presents itself as doing medical image analysis and machine learning. The major technical focus is on the interplay between data, models, and optimisation of fitting models to data.

Here the group has a strong international standing using graph-cut methodologies for registration and segmentation in the general setting.

Scientific productivity:

The group is present at the most prestigious conferences like NIPS, MICCAI, ECCV, CVPR and also publishes in the most high impact journals in the area like IEEE-TMI, IJCV, MedIA and the like. Publications in the machine learning journals are not present yet.

Visibility, Impact, Engagement:

The group is internationally very visible due to their conference presence, and also through participation in editorial boards, program committees and conference organisation of the most prestigious events.

Partnerships:

The group collaborates informally with local INRIA groups on brain imaging and machine learning and with two local hospitals. However they have not yet identified major clinical results that can be transferred to the daily work of clinics worldwide.

Teaching and doctoral studies:

The group has a fine balance of 2 permanent staff, 1 post doc and 6 PhD students.

Scientific project assessment:

The group has made a methodological contribution that should applicable in clinical practice. Here the excellence is obvious. The strategy of how to select clinical problems and build a clinical profile seems less clear.

Strong points:

- strong methodological stand point
- great visibility in conferences and journals
- very popular software disseminated

Points for improvement:

The clinical profile is not yet well developed, and especially how to bring improvements to clinical practice.

Recommendations:

To develop clear clinical goals, strategic partnerships could be formed reaching out from the radiology departments into the clinical disciplines. Increase in size of the group to do this is recommended as the methodological strength should not suffer from greater clinical involvement. A clearer positioning with respect to the activities carried out in Sophia-Antipolis (ASCLEPIOS project-team), and potentially joint projects, could be interesting.

4.12 Gemo

Assessment of the scientific position in an international context:

The Gemo team was created in 2002 by merging a database group with a knowledge-based team, with the goal of developing Intelligent Web Information Systems. Both domains (web data management and semantic web) are separately studied by several excellent international research teams, but few teams combine them. Gemo has an original, creative and pertinent approach, with excellent results, which places it as one of the leading groups in this field.

Scientific production:

The team has a large number of high quality scientific outputs : 21 journal publications in the most prestigious journals (ACM Tods, TCS, Sigmod Records, ACM Transactions on Internet Technology, JDS, JACM, JDOS, …) and more than 40 papers in major conference proceedings (PODS, VLDB, ICDT, SIGMOD, LICS, …). 3 software outputs have been developed; two of them are in Open Source within the ObjectWeb Forge.

Visibility, Impact, Engagement:

The team has excellent international visibility, recognised by very strong participation, as PC members and PC chairs, in major conferences, and numerous awards and grants received by members of the team (ACM recognition of Service Award, ACM PODS Test-of-Time Award, Member of Académie des Sciences, ERC Webdam, Prix EADS,...). The Gemo team has also several fruitful international collaborations with eminent researchers.

Partnerships:

The Gemo group is engaged in many national and international projects, often including industrial partners. The WebContent ANR project is a good example of successful industrial collaboration.

Teaching and doctoral studies:

The Gemo team makes significant contributions to teaching and doctoral studies: 5 “master 2” courses at Paris-Sud University are given by members of the Gemo team. 11 PhD theses and 2 HdR have been defended during the period 2005-2008.

Scientific project:

The merging of two related but different domains such as databases and knowledge base systems and the focus on Web information processing are very relevant and ambitious. The research deals with both theoretical and practical aspects. Several areas are studied, including a new one (diagnosis and diagnosability) since 2005. The group, composed of qualified and complementary members, is strong. There is no doubt that the goals can be achieved.

Strong points:

- excellent leadership, with high visibility
- scientific production of top-level quality
- collaborations with top international scientists

Points for improvement and recommendations:

the Gemo project has successfully taken up the challenge of bringing people from different areas together. Further effort is still needed to integrate the new activity of diagnosis and diagnosability. Joint publications are expected.

The experts note some disparities among the publishing activities of the various members of the team and suggest that the less-productive members should be helped to publish more.

4.13 Geometrica

Geometrica is a very strong bi-localised project. The actual centre of gravity of the project is located in Sophia while the Saclay part of the group is small, for the moment, but very dynamic and with a clear scientific strategy. It is in the process of spin-off creation and it is doing well. It benefits from the synergies with the Sofia part to develop its own specificity.

Assessment of the scientific position in an International context:

the scientific problem is well posed: face some of the main challenges of computational geometry regarding the development of well founded theory for geometrical and topological inference. The idea of collaborating at the interface with statistics (collaborations with SELECT) and machine learning looks very promising. The group is very well positioned in an international context.

Scientific productivity:

The scientific production is very good, with high-quality papers. It is involved in two DIGITEO projects and has an industrial contract with Dassault systems.

Visibility, Impact, Engagement:

The group is very attractive especially for good students because of its topic and its location. But the group is still small to claim an outstanding visibility.

Partnerships:

Partnerships are outstanding. The Saclay part of Geometrica is involved in two ANR projects and in a strong collaboration with Stanford (associated team). Common work with SELECT is in process.

Teaching and doctoral studies:

This point cannot be assessed for the Saclay part.

Scientific project assessment:

The scientific project is clear, coherent and promising in particular on the emerging topic of interfacing geometrical inference with machine learning.

Strong points:

Scientific quality, scientific project and the strategy are very strong points.

Points for improvement:

The number of PhD students is not as high as it could be. This may be explained through the actual bi-localisation of the project.

Recommendations:

The group should grow and become an autonomous project. To this end particular attention has to pay to the future recruitment. From the scientific point of view the development of the relations between geometric inference and manifold learning looks a good strategy.

4.14 Grand Large

Assessment of the scientific position in an international context:

The project deals with a very hot topic in computer science: computing on Large Scale Distributed systems. In an area which is scientifically very active, the team has made a clear contribution in the area of Desktop Grid Computing and related data-management, algorithms, programming models, and reliability problems. It had also a major role in the establishing the the national GRID'5000 platform.

Scientific:

The scientific production is top-ranked: participation in the major conferences, numerous grants, and evidence of experimental software.

Visibility, Impact, Engagement:

The group is very well-known nationally and internationally.

Partnerships:

Their international collaborations are well-chosen. They have numerous industrial partnerships supported through national and international grants, but apparently few direct industrial partnerships.

Teaching and doctoral studies:

This is a point where the team is very, very strong.

Scientific project:

The scientific project targets Petascale computing, with a deepening of the issues of programming models and fault-tolerance. A new subject is opened on scalable numerical algebra. It is good that the team is able to adjust its scientific strategy to its human resources.

Strong points:

The strong points of the team are its impressive scientific production and it's very good positioning, its leadership in France and at the international level. The strong collaboration with the U. of Illinois is a major point.

Points for improvement:

If it seems relevant and feasible to the members of the group : develop direct relationship with an industrial partner and open one « very prospective » line of research (the type of ideas that are very risky).

Recommendations:

Continue with the same level of dynamism, and keep an engagement at the national level.

4.15 Hipercom

Assessment of the scientific position in an International context:

HIPERCOM has established leadership in some important areas, particularly including IETF standardisation for proactive routing and neighbourhood discovery.

Scientific productivity:

The project, although technically quite new, is an evolution from a previous project with a good history of publications. The recent production has tapered off a bit, perhaps due to transitional issues as the new project becomes established. Recent publications have been concerned with scaling issues in massive ad hoc networks.

Visibility, Impact, Engagement:

Having made the choice to participate in the IETF standardisation process has given HIPERCOM and INRIA a great deal of visibility. The OLSR protocol has attracted attention from other research groups around the world, notably Fokus in Germany and Keio University in Japan.

Partnerships:

HIPERCOM is strong in international partnerships, with industrial and academic partnerships around the world. The evidence for collaborations and business relationships with French national partners is less in evidence. There are a huge number of users for OLSR around the world. It is certainly one of the two most popular choices for routing protocols for ad hoc networks; by some measures it is arguably the most popular.

Teaching and doctoral studies:

HIPERCOM staff has significant teaching activity and 14 grad students, some of whom were in evidence during the demonstration hour.

Scientific project assessment:

The project clearly has scientific merit, and the new areas are very attractive and relevant.

Strong points:

- excellent participation in standards activities and providing projects for grad students
- this indicates that the work has a pretty strong attraction for new researchers and projects

Points for improvement:

Recent decline in number of refereed publications produced during the last year. The drop-off in « contributions » is not as serious, but the number of journal publications is of more concern.

Recommendations:

The application of OLSR and related technologies to Vehicular Networks looks very exciting. The standardisation work seems to be reaching numerous milestones with documents currently sitting in the RFC Editor's queue; this will provide a useful checkpoint for the work and ability to evaluate future standards directions. The team should continue to look for new applications for the protocol and additional field tests. The group is located on 3 different geographic sites and this might be unhelpful for the scientific coherence of the team. The document should be more detailed and explicit.

4.16 In-Situ

Assessment of the scientific position in an International context:

The IN-SITU project targets several objectives in the area of Human-Computer Interaction (HCI). The domain of HCI is very large and as a whole is the biggest SIG in the ACM. Despite its highly competitive nature, the In-Situ team has become (within its short life span) one of the most highly rated research groups worldwide. Some team members have acquired a very strong scientific reputation allowing them to take leading roles in the scientific committees of societies, journals and conferences in the HCI field.

Scientific production:

The IN-SITU project is one of the first projects to be created within the INRIA-Futurs schema and was created in 2002. The scientific production over the years has been irregular but the team has managed to publish in the main conferences in the field. The team is also active in producing software systems and making them available on the web. This has been possible because of the adequate number of engineers supporting the team and their active involvement in the research activities. Over the last 4 years the team has produced 31 papers in A+ international conference and 5 papers in scientific journals. Such a publication record is compatible with the current size of group but it is important to note that the size of the group has increased recently (over the last 2 years).

Visibility, Impact, Engagement:

The team attracted 2 PhD students and 3 post-docs from abroad during the reporting period. The senior members of the team have outstanding scientific visibility in the field. It is important to note that this visibility mainly targets the North American continent.

Partnerships:

The IN-SITU team has several funded research projects both at a national level (through the ANR and the "pôles de compétitivté" schemas) and at an international level (through the newly created ReActivity joint project with Microsoft VIBE group).

Teaching and doctoral studies:

The team is strongly involved in teaching activities at Paris Sud. This covers all levels of LMD and is directly related to the research themes of the team.

Scientific project assessment:

The scientific project of the team is broad (it nearly covers all aspects of HCI from interactive systems development to usability evaluation) but the research activities carried out fit perfectly with this project. The team has received grants via projects for each of the research objectives demonstrating a clear strategy. The creation of the AVIZ team seems a good strategy to avoid dispersion over too many research themes.

Strong points:

Important broad topic with high potential impact; Strong international collaborations; Strong leadership, with high visibility both at national and international levels; Very good scientific production

Points for improvement:

The team has very limited involvement in EU cooperation and EU projects. Improving the visibility and activity at this level may increase the potential impact of the research activities. Publication in journals is limited.

Recommendations:

As described in the activity report, efforts will be made in publishing in journals and this should be encouraged. Indeed, journal papers typically propose more detailed contributions with stronger related work comparisons. Increasing activities in the EU research area should also be investigated.

4.17 MaxPlus

Assessment of the scientific position in an International context:

The team project MAXPLUS has numerous interactions with different researchers from various countries (India, Argentina, United Kingdom, USA, Belgium, Russia, Romania).

Scientific productivity:

The scientific production is undoubtedly of very high quality with publications in top journals in the field.

Visibility, Impact, Engagement:

The team project MAXPLUS has an acceptable visibility with activities in various committees and editorial boards.

Partnerships:

The scientific network of MAXPLUS includes collaborations with research centres in Tunisia and Russia as well as several research groups in France. It has also a research contract with France Telecom.

Teaching and doctoral studies:

The members of MAXPLUS are involved in substantial teaching activities. The number of doctoral students is substantial with regard to the number of team members.

Scientific project assessment:

The project handles important and challenging issues related to some rather unused concepts of tropical geometry and its applications to different fields including biological systems, one of the priority of INRIA. It provides a good balance between theory and applications. The activities of the team are characterised by a high level of enthusiasm.

Strong points:

One of the strong points of MAXPLUS is its capacity to handle challenging scientific problems related to application issues.

Points for improvement:

there is probably room to improve the visibility of the team project MAXPLUS in the future (which should not be a major problem due to the enthusiasm of the team).

Recommendations:

No specific recommendation except maybe to continue in the same direction.

4.18 Parietal

Assessment of the scientific position in an international context:

The team has a clear positioning, both with respect to other INRIA teams, and groups in France and abroad, on a very challenging topic. This is particularly impressive for this very young team. It addresses state of the art problems in brain imaging, with a focus on machine learning, statistical analysis, for assessing the functional architecture of the brain, group analysis and modelling brain function. Links with genetics are being established as well.

Scientific productivity:

Outstanding level of publications. It should be noted that although the official INRIA team has only one researcher, another permanent researcher of Neurospin/CEA is a full member of the team and also participates in the research and publication list. The team has successful collaborations within national and international projects. Software such as modules for BrainVisa have been developed and used by the community.

Visibility, Impact, Engagement:

The visibility of the team is very good, through its positioning and publications. It currently has 4 PhD candidates and one post-doc, which demonstrates its attraction for young researchers.

Partnerships:

The partnerships are highly relevant, and collaborations with excellent teams in the domain are realised through meetings, common projects and grants.

Teaching and doctoral studies:

None mentioned in the documentation.

Scientific project assessment:

The project is very good. The risk is to tend to be spread over too many different topics. Although they are all interesting, such a small team may find it difficult to make outstanding contributions over such a large variety of problems.

Strong points:

Very good project, with a strong implementation in Neurospin and concrete collaborations. Collaborations with several INRIA teams, with a clear positioning with respect to their activities (common projects, working groups), as well as with other groups in the domain. Very good level of publications.

Points for improvement:

The size of the team is rather small, although interactions with Neurospin and other INRIA teams are very active.

Recommendations:

Try to hire one more permanent researcher. The status of the team leader is granted for 5 years, and this may raise questions after this period, which should be anticipated. Identify a few strong points and focus on them, in order to avoid the risk of spreading the activity too thinly.

4.19 Parsifal

Scientific productivity:

This group has an application-driven agenda for research in the foundations of computation. Specifically, it is driven by a conviction that deep understanding of proof theory will enable the production of better tools for automated and interactive reasoning about operational semantics. The group is recognised, within the international community of researchers working to develop a fundamental understanding of computation, for its originality, relevance and rigour. This team is working on foundational issues and their major outputs are papers and prototypes. The number of publications is good and their quality excellent. There are also software prototypes.

Impact and engagement:

The team is well-engaged with peers in the international community working at the same level of foundational research. Such foundational research provides the base for a "food-chain" of ideas and systems. Practitioners within industry sit at the top of this food-chain. The immediate users or consumers of this foundational work are other researchers. The team should aim to develop an international community of users. The planned system-building activity will provide a means to do this.

Partnerships:

The Minnesota and ANU connections are healthy – but small-scale. The group should establish collaborations with others investigating new fundamental models of computation and interaction – particularly with those in systems biology, which is stimulating the development of such models – to support and guide their development of tools for reasoning about these models. There should be further opportunities for international engagement with other researchers closer to applications (for example, in systems biology).

Teaching and doctoral studies:

The group is recently established. Only Miller has graduated PhD students thus far. The teaching is, it appears, primarily directed to future researchers in this area. Thought should be given to the development of teaching for future users of the results.

Scientific plans:

The group is to be commended for a clear and ambitious scientific vision. As the self-assessment points out, there is still work to be done on integrating the various theoretical strands.

The next stage of systems-building activity will require addition and management of a different kind of resource, and engagement with users, as well as peers.

Strong points:

- intellectual leadership
- strong individuals

Points for improvement:

- integration of theoretical strands
- establishment of systems-building activity
- dissemination of systems to next level of food-chain

Recommendations:

Resource should be planned to support the development and dissemination of systems. This activity should build on the foundational work of this group and experience of others (eg. from TYPICAL) who have developed and deployed systems for specification and verification of systems. A long-term goal for the group should be to develop a network of users, internationally, who will test these ideas against practice.

4.20 Proval

Assessment of the scientific position in an international context:

This team works at the interface between automated and interactive deduction, and systems engineering practice. It rests on earlier fundamental work, and continues to make fundamental contributions, but its particular strength is in integrating formal tools with practical languages – addressing the issues of expressiveness, scale and efficiency. It is world-leading in this area, and impressive in its ability to draw on a variety of techniques, formalisms, and technologies to address practical problems.

Scientific production:

In addition to scholarly publication in the leading journals and conferences (JAR, IEEE Transactions, ACM Transactions, CAV, CADE, POPL, etc.) of continuing fundamental contributions, there is a major output of well-engineered systems and case studies.

Impact and engagement:

The group is recognised and respected, world-wide, among the small circle of leading researchers in formal verification.

Partnerships:

The industrial engagement (which is excellent) is primarily limited to France.

Teaching and doctoral studies:

The team teaches a number of masters courses. The team is relatively recently formed, so the PhD statistics may be misleading. The number of PhD students is still low for the number of permanent staff – but is growing.

Scientific project:

The project has a clear agenda, expertise across a range of techniques, and the capacity to adjust and add to these where required. The team is producing innovative systems and appears well-balanced and effective.

Strong points:

- application focus
- technical breadth
- systems expertise

Points for improvement:

- engagement with global industry

Recommendations:

Strategically, it would be good to use recent work on Java and C to attract interest from global industry partners – and to develop tutorials that would engage users beyond the formal verification community.

4.21 Secsi

Assessment of the scientific position in an international context:

The team is very strong in security, particularly in its theoretical basis. Some results in the logical and in the algebraic approaches are innovative and pioneering, as well as some tools.

Scientific productivity:

The team has a very good balance of theoretical work and of development and experimentation with quite powerful analysis tools. The number of papers is very good and often published on excellent journals and proceedings of conferences.

Visibility, Impact, Engagement:

The members of the team have often been invited speakers at high-quality conferences and workshops, and participated in some programme committees, mainly of national conferences. H. Comon-Lundh received the CNRS silver medal.

Partnerships:

The team has many international scientific cooperations and some national projects with industries.

Teaching and doctoral studies:

The team has a good teaching activity; its members have graduated some PhD students and are supervising a reasonable number of them, as well as two HdR.

Scientific projects:

The scientific objectives are important and ambitious, and are carefully selected. They are placed in the hot and crowded field of security to which the team will certainly continue contributing.

Strong points:

The team produced new relevant scientific results, has good international visibility, an excellent record of publications, good teaching activities, and it notably strengthened all these aspects during the period under evaluation, becoming one of the leading groups in security.

Points for improvement:

The two main groups of the team seem not to be integrated enough; there may be too many topics to investigate, with a loss of focus.

Recommendations:

Improve the focus (and innovation) of the project by selecting (new visionary) topics of interest, e.g. e_voting may replace other more established research issues; increase the cooperation between the members of the group.

4.22 Select

Assessment of the scientific position in an International context:

The scientific objectives of the SELECT project are model selection and computer intensive statistical methods. These are two important up to date topics corresponding to important scientific challenges. Its scientific position consists in working on data driven penalties to perform model section and to work on random effect models regarding the computer intensive approach.

Scientific productivity:

publications, conferences and seminars, patents, licenses, contracts, etc.; the scientific production is a outstanding including two free software systems very useful to the community. The working group managed by SELECT on statistical learning at ENS (Ulm) is also very useful for the whole community.

Visibility, Impact, Engagement:

The SELECT project is clearly viewed internationally as one of the world leaders in its domain. It manages to attract talented students and world class researchers.

Partnerships:

Regarding national partnerships, the idea of having joint working groups is a very good scientific practice. For instance, the collaborations initiated with the Parietal and Geometrica (two other INRIA's projects at Saclay) are very promising. International collaborations are at the top level (see the number of joint publications).

The contract level is good (10 contracts in the period). Technology transfer is done by providing license free outstanding software (monolix and mixmod).

Teaching and doctoral studies:

All the SELECT members are teaching in various courses of different universities and in particular in the M2 "Modélisation stochastique et statistique" of University Paris-Sud. In the evaluation period a total of eleven PhD have been defended and one HDR. The group manages to attract good PhD candidates.

Scientific project assessment:

SELECT scientific objectives are clear and coherent. The emerging new application topics (neuro-imaging and computational geometry) are very promising. The idea to associate new staff members in these topics is clearly a good practice. New topics mentioned (random forest, computer experiments and regularisation tuning) are interesting directions.

Strong points:

SELECT is a very impressive group. Scientific vision, results and publications are a clear strong point of the group. Good scientific practices, such as efficient working groups, involvement of new colleagues and software development are also strong points.

Points for improvement:

The application domain of pharmacology is so strong that maybe others should now be pushed. In this perspective neuro-imaging looks a very promising perspective.

Recommendations:

Don't change the main scientific objective, methodology and good practices. Think about the replacement of a researcher who left the project and develop collaborations with Parietal and Geometrica. Also maybe put more emphasis on the development of the interfaces between statistics and machine learning.

4.23 Tao

Created in 2003, the TAO project focuses on cross fertilisation of the fields of evolutionary computation (EC) and machine learning (ML). The group is clearly at the top level in both domains but the presentation made to the committee did not meet its expectations. The MoGo Demo has illustrated the outstanding position of the group in machine learning and a review of the document provided has convinced the committee of the outstanding quality of TAO's research in the EC field. Although the idea of cross fertilisation of both domains is very interesting and the objective was clearly explained, its development does not seem to be much explored, as yet, and the presentation was not completely convincing from this point of view.

Assessment of the scientific position in an International context:

In both fields of evolutionary computing and machine learning TAO's position is outstanding. As an illustration we agree with self assessment that "the first ever victory of a Computer-Go program against a human player has been considered a major achievement of AI".

Scientific productivity:

The publication level is very good but can be improved regarding the number of journal papers.

Visibility, Impact, Engagement:

The visibility and attraction of the project are outstanding. Research topics of the group and results of the MoGo program are very attractive especially for students. The group has managed to attract a French professor for a two-year visit and five post-docs including four foreigners. No summary of the foreign visiting academics has been found.

Partnerships:

In both fields of evolutionary computing and machine learning TAO's partnerships are outstanding. The group is present in the editorial board of the most important journals of EC and ML and almost all major conference in ML end EC. Regarding Machine Learning, the project belongs the European network of excellence in the domain (PASCAL 2).

Teaching and doctoral studies:

The activity of TAO's in this field is good with 10 PhD's and 2 HdR in the review period. The project is present in the U. Paris Sud Master with a lecture on Data Mining and Machine Learning (24 h) and an other one in Artificial Evolution and Evolutionary Robotics (24 h).

Scientific project assessment:

The project team has been quite successful in its two research domains and has provided outstanding quality research and operational results such as the MoGo program. But its not so clear how the ambitious initial goal of mixing the two domains EC and ML has been reached and the risk of dispersion remains.

Strong points:

The long term strategy of mixing EC and ML. The overall scientific quality of the team project. The results especially on reinforcement learning. The attractivity of the project.

Points for improvement :

Concentrate on scientific objectives and try to avoid dispersion. Publications level can be improved.

Recommendations:

An effort should be made on good quality journal publication. Regarding the future it seems that choices have to be made. The scientific logic of the project is to reinforce the links between evolutionary computing and machine learning. A possible alternative is to prepare to split into two new projects: one about evolutionary algorithms and another on machine learning. Results in reinforcement learning are a major breakthrough so an important strategic question is how to capitalise on it. Robotic software can be an issue but the scientific strategy has to assess the dispersion risk.

4.24 Tanc

Assessment of the scientific position in an international context:

Despite its small size, this group is among the top players of the curve-based cryptology community, with a strong focus on genus 1 point counting, elliptic curve-based primality proving and complex multiplication theory. The group also has recently incorporated a specialist in curve-based coding theory.

Scientific productivity:

The scientific production is excellent both in quality and in quantity, with a solid number of publications in the standard best venues of the field (Math. Of Comp., J. Cryptology, ANTS, Eurocrypt, ISSAC). Several of these papers have obtained best paper awards. Software production is also quite impressive, though it might sometimes gain more recognition (and be a very valuable asset to the community) via better dissemination.

Visibility, Impact, Engagement:

The group is highly visible at the international level, as attested e.g. by the program committees, editorial boards, etc. to which its members participate.

Partnerships:

The team has a strong network of relations; on the one hand, they have close relations with other teams working on the same topics. On the other hand, they have interesting partnerships with project-teams working on more applied aspects of cryptology, which is a good means to disseminate all the curve-based technology. The collaboration with Hipercom sounds interesting and should probably be continued.

Teaching and doctoral studies:

Two of the members of the project-team have a strong teaching implication at Ecole polytechnique. All the permanent members of the project-team give master courses on a regular basis. The number of defended PhD. theses is a bit weak; this is probably related to the two longlasting theses (start 2003 for one, 2004 for the other). Solution for those situations should be seeked. Now that 2 HDR have been recently defended, the number of PhD thesis defended should naturally increase.

Scientific projects:

The scientific project is sound: the problems mentioned are relevant, naturally “on the agenda” and the group as it stands has the means to contribute to the solution of those problems. However, the overall project might show more global coherence. Further, the objectives remain quite ambitious with respect to the small size of the group (especially due to the imminent departure of a permanent researcher), which might thus benefit from hiring one further permanent member.

Strong points:

- publication record over the evaluation period
- software development
- international recognition

Points for improvement:

- number of PhD theses defended and duration of the theses
- the group should try to hire one further permanent member in order to consolidate its critical mass

Recommendations:

After a time of strong turnover in the permanent members, the team should take time to settle and develop its coherence.

4.25 Typical

Scientific production :

New developments are rigourously based and the theoretical advances upon which they are based are published in leading journals and conferences, as are more methodological contributions. The Coq system is a major tour de force. The system (with significant advances in recent releases) has a major impact on both theory and practice.

Impact and engagement:

Coq has hundreds of users internationally, and the Coq "brand" is also associated with the significant body of theoretical results. The headline results speak for themselves – they have afforded a brief spotlight in the public eye, a wider recognition reinforced by Dowek's book. There are also plenty of more traditional tokens of recognition such as involvement in programme committees.

Partnerships:

There is little or no direct engagement with industrial end-users – but the group should share some credit for the industrial engagement of PROVAL. There is good public engagement, using the grand challenges to stimulate attention and debate.

Teaching and doctoral studies:

There is an appropriate engagement in teaching and a reasonable flow of PhDs and HdR.

Scientific project:

The scientific project now appears to be of the "grand challenge" style, with the adoption of Kepler's theorem and the classification of finite groups as significant challenges. It is not clear what comes next.

Strong points:

- rigourous foundations
- scalable architecture
- strong user-engagement
- high visibility

Points for improvement:

I hope (and guess) that there is more interaction with PARSIFAL than is immediately evident from the documentation provided. It may be difficult to incorporate advances from PARSIFAL directly into Coq (that should not prevent a dialogue about this possibility); but it should certainly be possible to benefit from the Coq experience as PARSIFAL starts to build systems and interact with users.

Recommendations:

The group should identify a clear strategy to address two, possibly separate, issues. First, to establish a sustainable (distributed ?) structure for the continued development and maintenance of Coq. Second, to decide on the future research direction. Is the project to continue to develop Coq, perhaps by finding a new challenge; or to use Coq to develop new mathematics? The next challenge may be to identify another area of mathematics, beyond the four colour theorem, where formal assistance can help to demonstrate a new theorem. Or it might be to leave Coq to the users and to start again with a new logic to build the next generation of proof assistant (perhaps inspired by PARSIFAL?).

5 • Recommendations and advice

These are general conclusions for the centre. The details for each team can be found above, in their dedicated sections. We do not wish to extract specific points on individual teams from their context.

Strong points:

- the unit has managed its growth very well
- the partner labs are quite happy with their relationships with this INRIA centre: "It is complicated, but everybody wants to make it work, and it is a real benefit for the research groups"
- the research groups are of high quality and he centre includes some outstanding scientific personalities
- it is very well integrated into the Paris-Sud academic ecosystem
- the level of publications is generally very high, collaborations are effective and relevant, software outputs are intensively developed and distributed for widespread use by the scientific community

Points for improvement:

- the low number of PEDR is questionable (we suspect it is underestimated)
- the management of the centre has to cope with the geographic distribution of its groups. The centre is geographically distributed but administrative and technical support is given to all groups. It seems nevertheless, that the centre would gain from having some (one or two) scientific meetings each year where research teams members could interact, and where PhD students could meet each other (although the PhDs students appreciate the scientific environment and support provided by INRIA). Indeed, there is already the "comité des projets", which is a meeting point mainly for the group leaders

Recommendations:

- in the team recommendations, we sometimes question the critical mass of the team: it is probably inevitable that some teams have a "sub-critical" mass, as it is important for the centre to be able to start new activities. In this context, the centre will have to define a strategy for the resolution of the tension between this fact (many relatively small teams) and the probable stagnation of growth of numbers of academic staff in our discipline
- the centre is geographically distributed, it has severe space problems in Saclay. A new building is planned with an appealing design, which is a very good news. Nevertheless, it seems clear that not all teams will move to this new building, due to constraints from the academic partners. In our new scientific organisations – like the Saclay centre – collocation will be the exception, as they develop and evolve more rapidly than buildings grow, and there is an obligation to make a good use of legacy buildings. In this context, the centre could develop stronger links between its components in terms of "virtual organisation" – something to invent?
- to prepare for this evaluation, the centre had to collect much information, which was done effectively, and at a very high cost as the data was spread over many sources: the academics' brains or computers, the "excel" files of the administrative staff, or in the information systems of the "N" partner institutions. The centre could start to build a data repository, shared with partners, consistent for all parties, mining the information from its sources. This would be useful for the groups themselves, support the provision of management information and decision tools for the management of the centre and its partner labs, decrease the cost of future such evaluations

While these recommendations are relevant for Saclay centre, they are also relevant for many other locations in France. Saclay and the Paris-Sud community could play a major role in such initiatives, and progress could be shared by many.

In conclusion, we would like to emphasise that the Saclay centre achieves very high standards, in terms of its scientific achievements, organisation, relationships with partners and participation in the local dynamics. It is clear that "Paris ne s'est pas fait en un jour", keep up the good work!

Note de l'unité	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	A	A