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SCIENCE AND ENGINEERING RESEARCH COUNCIL
RUTHERFORD APPLETON LABORATORY

COMPUTING DIVISION

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TRIP REPORT

issued by
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(see next page)

1. INTRODUCTION

David Talbot and RWW went to France on 17 and 18 May 1984 to get a quick view of French software research. They visited the British Embassy, a sub-department of the Ministry of Industry and Research and the Agence de l'Informatique. The overwhelming impression gained on this short trip to France was the tremendous commitment of the French to Information Technology in its widest sense. The French are clearly determined to succeed in the high technology areas and are willing to put major national resources into the area.

2. BRITISH EMBASSY

We met Jeffrey Ling and Geoff Owen. Jeffrey Ling is the technology councillor of the Embassy in Paris and Geoff Owen works for Ling. Ling is one of the authors of an excellent report called 'Innovation and New Technologies in France and Germany. Background to Government Policies' by Mr J Ling, Paris Embassy and Dr G W Chantry, German Embassy. This is a publication available from the Overseas Technical Information Unit, Department of Trade and Industry, Ebury Bridge House, 2-11 Ebury Bridge Road, London SW1 W8QD, tel: 01-730-9678 ext: 375. The presentation of this report was held in February 1984. Dr D A Duce attended on behalf of Computing Division.

Mr Ling opened by discussing the structure of the Embassy which is given in his report quoted above. The Embassy is currently involved in negotiations on behalf of Cocom regarding the American technology embargo. Geoff Owen is a member of Ling's staff responsible for microprocessors and Alvey-type activities.

Ling reported that successful Anglo-French collaboration was now taking place in the bio-technology area. France had recently launched a new bio-technology initiative. Ron Coleman and someone from the SERC Bio-technology Directorate (Potter ?) spent four days in France. They went through a series of visits to Bio-technology Centres arranged by Ling. Ling suggested that Oakley does a similar style of tour of French Information Technology sites in July.

The Embassy view was that the Plan Calcul launched by France in the 1970s was a failure. This was their first major computing initiative. In 1981 Jack Liance, the Head of INRIA, launched an 'ATP'. This is a mechanism to construct the proposal for something akin to a Specially Promoted Programme or Alvey Initiative. The 'ATP' activity lasted from 1981 to 1983 when it produced a report out of which came the C³ activity (see Nivat's activity). The work of the ATP is more clearly spelt out in Rault's papers appended to my report.

The Embassy staff then went on to tell us about France's plans to establish a European Centre for Scientific Calculation in Toulouse based on the Marianne and ISIS projects to produce a 500 megaflop scientific super computer. See my memo to Geoff Manning attached. The Marianne super computer is seen as being a public utility ie only one will ever be built and it will be operated as a public service possibly on this European basis. There is no real commercial drive to putting the thing into production. The machine is being built by Bull. The project is being done for 'French independence' so that they are free of American domination. Marianne is to a large extent being built and driven by the French MoD. The French are not seeing themselves as going into the super computer business.

Geoff Owen used to work at ASWE where John Alvey was director before he moved to British Telecom. Owen said that the staff at ASWE had tremendous respect for Alvey.

The Embassy then went on to try and brief us a bit about Nivat's role and the Agence de l'Informatique. These activities are more fully covered in subsequent visits.

It seems that there are two sides to the French Information Technology industry. One side is firmly driven by the Government, this tends to be the hardware manufacturers such as Bull, who are nationalised, and a certain fraction of the research community. The French software industry seems to be, to first order, independent of Government control and seems to be doing extremely well without such control. Clearly the French software industry has 'got its act together' in the way that Alvey wishes to coalesce the UK industry. There was considerable evidence, for instance, that the French software industry are working as France Limited to attack the American market. This was quite an impressive piece of news.

The Embassy also told us about the club Peri Informatique, which is an industrialists talking shop. Club Peri Informatique seems much more commercially aggressive than the UK CSA. CPI sorts out a combined French strategy for penetrating the USA market which is the prime French software export target. The individual members then execute the agreed plan eg the CPI will decide how to promote an individual product. The CPI members will also, for example, work collectively to achieve Government backing for a particular project. Kenneth Baker has recently addressed them. The Embassy feel it is worth Brian Oakley meeting the club Peri Informatique members if he visits France. The Embassy felt that the French software industry was currently doing very well in the USA market.

The French have an initiative in the robotics area. One of the main centres here is at IMI in Grenoble. Peter Davey seemed to have covered the French activity fairly well when he was coordinator of SERC's Robotic's Programme.

The Embassy indicated that quoted figures for France investment in R&D are unreliable. This is because research budgets are allocated at the beginning of the year but financial cuts are made arbitrarily thereafter. Such cuts are currently in hand because of the problem of recession and unemployment which affects France just like it does the UK. However, it must be seen that the cuts are reducing the increase in R&D spending in 1984 from 15% down to 10% ie the French still plan to increase R&D spending in Information Technology by 10% this year in spite of the recession. This tremendous commitment to High Tec generally, and information technology particularly, came through very strongly in the subsequent visits.

3. MINISTRY OF INDUSTRY AND RESEARCH

Talbot and I went with Jeffrey Ling to see Monsieur Levieux who works with Monsieur Nivat. Nivat is non civil service (although everyone in France seems to be a civil servant!) acting as chairman of the 'technical merit' committee; Levieux is the professional civil servant who has access to the funds and is supposed to 'run' the committee - thus he 'balances off' Nivat rather than acts as a subordinate, but Nivat will see him as 'his deputy'!

Monsieur Levieux did not seem terribly well briefed for our visit. We suspect that Nivat, who had talked to David Talbot earlier this year, had not given Levieux instructions as to what he might and might not say. Furthermore, it became clear subsequently that Levieux would not feel obliged to take his policy line solely from Nivat. Levieux was thus extremely cautious and moderately uninformative. He introduced himself as not being a software engineering specialist but was obviously one of the high powered career civil servants. It seems that in France high status goes in the following way:

- (1) Technically competent civil servants.
- (2) Engineers.
- (3) Other professions such as doctors and lawyers.
- (4) Academics.

This is an interesting contrast to the UK! Levieux said that in his opinion the French Software Engineering Programme was technically very similar to the Alvey Software Engineering Programme but it started one year earlier. He said that in a couple of weeks time they would be starting a new AI Academic Programme which would be run by Nivat.

The French projects are not coordinated with Esprit proposals. Levieux said that all French companies were free to bid to Esprit because Esprit was aimed at the twelve major companies of which France has three of the majors, CGE, Thompson and Bull, who between them represent 60% to 70% of the French Information Technology industry. We were disinclined to believe this as it is clear that things are far more centralised and controlled in France than they are in Britain.

Levieux said that France was planning a formal methods programme.

Levieux said that he saw quite a lot of Anglo-French scientific exchange taking place particularly in the area of Formal Methods. Again our view of the way things are controlled and centralised in France meant that details of this was clearly fed back to the central coordinators whereas no such thing happens in the UK.

The Ministry of Information and Research currently has four main programmes. In Rault's paper (see appendix) these are described as joint research projects (PCRs). They are:

- (1) C³ communication, cooperation and control which is essentially a communicating sequential processes type activity. This is run by Roucaeol of the CNRS.

- (2) Advanced Programming. This is Formal Methods and Proofs etc rather like Alvey Formal Methods. It is run by Cori, who is professor at the University of Bordeaux.
- (3) The Third Generation databases. This is to be a new generation of data management systems to include inference. It is run by Bancilhon of INRIA.
- (4) Civil aspects of artificial intelligence - this is the new programme referred to earlier. It will generate a software kernel for AI concentrating on tools for expert system production rather than expert systems themselves and will be run by Haton of the University of Nancy and Couseneiu from the University of Paris VII.

Each of the above four programmes is academically based, each has an associated industrial club where the industrialists do not participate but achieve technology transfer via information interchange. These four programmes are renewed annually.

This business of annual review comes up later in Rault's analysis of problems. It is clear that the annual nature of financing for research programmes gives the French problems.

The Director of Levieux's group is an ADI council member. Levieux saw his activity as being long term whereas ADI was short and medium term research and development programmes.

According to Levieux, Marianne and ISIS were funded by the French MoD but with some civil input. For instance, INRIA is doing a software project for Marianne. Levieux was extremely reticent to give any details about Marianne and said that we must 'ask the French Ministry of Defence as this project is somewhat classified'. He did go so far as to say that the C³ programme was not directed at producing parallel software for Marianne. (Do we believe this?)

Levieux offered the view that although budget and funding sources made comparisons between the French and Alvey programmes difficult, their SE programme was approximately two thirds of the Alvey SE programme. (Do we believe this?)

4. AGENCE DE L'INFORMATIQUE

David Talbot and I met Jean-Claude Rault, whom Rob Witty met at the Orlando Software Engineering Conference, where Rault and he both gave talks on their respective national programmes. Rault was a complete contrast to Levieux. Rault had prepared for our visit. He gave us a large amount of publications to bring back with us and answered all our questions and swapped information very freely and was extremely friendly and helpful. He also lined up his boss, Monsieur Mahl, who joined us for the period just before and throughout lunch. Monsieur Mahl was also extremely friendly and helpful taking personal charge of the demonstrations of the Sol and SM90 computer system.

ADI was set up in 1980 to promote the use of Information Technology throughout France and French industry. It has three major objectives:

- (1) Small and medium sized industry, business and DP support.
- (2) Education for engineers and the use of Information Technology in education.
- (3) Research and Development (Rault's bit).

The Research and Development activity was based on existing INRIA activity which now forms kernel of ADI. It has a budget of 4-500m Ffr per year, split equally between the 3 categories above, and has ten professional staff in area (3) under Rault. It is basically a funding organisation like Alvey but for some reason it was doing a small amount of research and a networking project was actually based in the ADI offices in the Tour Fiat. People are seconded into ADI very much like the Alvey style. Rault was able to give us by far the clearest picture of the scene in France and had gone to the trouble of preparing papers especially for us, the best of which is called 'Fifth Generation Computer System Plans in France' which is rather more broader than just Fifth Generation computers and is the best document I have seen. I will not repeat this document in the trip report here, you should see the appendix.

Various pilot national projects began in 1973 with the Cyclade projects on networks and the Sirius on distributed databases and Kayak on Office Automation which finished in December 1983. 1981 saw the beginnings of the Nadir project on satellite communications and Rhin also on ground base networks and protocols. In 1978 the Surf project was begun, this was on reliability and has now finished, and in 1979 the Sol project commenced - this has finished formally now - having produced a version of UNIX system 3 written in Pascal. However this project does seem to be continuing somewhat, see later.

All of these national pilot projects were supposed to last for three years and then actively transfer into industry where results would be exploited. For instance, Kayak has now been taken over by Bull and continues there. Many of the Kayak research people have physically moved to Bull. The French Transpack network originated in the Cyclade pilot project and again many of the people moved from the Cyclade project to set up Transpack. The Sol project has now found its way into industry and is marketed by three companies and we have details.

In 1981 the change of Government caused various ministries to be reorganised. This reorganisation gave rise to the 'Filiere Electronique' which was to be a widespread all embracing Information Technology Initiative which would do absolutely everything in IT; a 'no holes' policy. La Filiere began its national programme in July '82 with projects in the area of CAD, Basic Components and Sub Systems, Software Engineering, Displays, Automatic Natural Language Translation, Artificial Intelligence, the SM90 computer project and with a link to the Marianne super computer project of the French Ministry of Defence. All of these projects were designed to be inter-ministerial, but as this does not seem to work too well, it seems that each individual project is run by an individual ministry. The ministries concerned are the Ministry of Telecommunications, the Ministry of Industry and Research and the Ministry of Defence.

Due to complex reorganisations the Ministry of Telecomms is now a sub part of the Ministry of Industry and Research, but Telecomms still has its own protective budget. ADI's money principally comes from the Ministry of Telecommunications. It gets a smaller amount from Levieux's Industry and Research Ministry but ADI does not report directly to the Ministry of Industry and Research.

ADI is run overall by a board which includes industry people and representatives of the Telecomms and Industry and Research ministries. The ADI Director reports directly to his Board, although he has a scientific committee which monitors the overall programme from the technical standpoint. Nivat is a member (Chairman?) of the scientific committee. Nivat's programme is much more concerned with long term research and development. It does not interact with the education or technology transfer functions of ADI, only the research side. The national projects are funded by both the Nivat/Levieux programme and the ADI. Therefore, there are some problems because there is no one final authority on projects. The Filiare Electronique is run by an inter-ministry committee which has no chairman, but has three secretaries. This is a problem! Levieux is the secretary for the national projects. Levieux started life apparently in INRIA but he is basically an administrator. He used to be in the Dieli part of the Ministry of Industry which manages the component and robotic side.

Bull is managed by the Ministry of Telecomm because it is a nationalised industry.

Levieux does not have enough money to fund all of the C³ programme so he will be asking ADI for money. Until today Rault actually funded the C³ programme as a set of individual projects which only recently has been collected together as the C³ programme. C³ is one of the PRC set which were first presented in March '84. All of the activities which are going in to the four PRC projects were until recently funded by ADI, therefore many of the PRCs are not new because they are a renaming of previous ADI projects. The new element is the increased separation of long term research from technology transfer which the PRC gives. Nivat's mission in creating the PRCs has been to try to get increased security for long term research. This relates to research funding being reviewed on this annual basis with significant budget change from one year to the next which has meant that it has been very difficult plan long term research. Nivat has apparently not yet achieved his goal of a multi year commitment (like the SERC gives on a three year grant) because funds are insecure. Rault does not think he will achieve his objective.

The PRCs have a review board for approval of individual technical projects. This is called 'Nivat's Committee'. This body however does not debate the funding issue. Funding of projects is kept very securely in the hands of the administrators like Levieux. The approvals board is run by Nivat, who is described as a strong character with a theoretical rather than practical outlook, something of an elitest and an 'Ayatollah'.

The Mentor project will be transferred to the PRC on advanced programming.

Rault then mentioned the Greco activities which are CNRS 'clubs'. Each has its own very small fund to run the club eg one million francs to be shared amongst twenty members for travel and meetings etc. The members are fiercely independent so the clubs cannot give direction to the labs.

ADI projects have monitoring officers rather similar to Alvey projects. They are subject to public review and must publish in the ADI's journal which is called the TSI or else they lose five per cent of their budget! The reports are often late by up to two years because of bad management. The TSI journal is now available in English, translated and published by the North Oxford Academic Press (is this who Jack Howlett works for?). Rault complained that his research projects do not write code to good software engineering standards, do not produce good documentation user manuals etc!

The national programmes on CAD for the VLSI, CAD/CAM, which are funded by the Ministry of Industry and Research and by the ADI were supposed to be industrial and lab collaborative projects, but industry dominates. Because of this the PRCs were invented to generate and secure more basic academic research. Thus France has three major ways of doing Information Technology research

- (1) The National Programmes of ADI
- (2) The PRCs of Nivat
- (3) The Grecos (see Rault's paper on Fifth Generation planning in France for more details).

The ADI's national programmes include the Sycamore project which is CAD for VLSI but using software engineering methods such as specification, formal verification, towards such tools as the silicon compiler. It includes Bull; it is based in Paris and Grenoble and is centred around an ADI funded INRIA project. Because it is led by INRIA industry is not the major leader, therefore it is a fairly long term project. To balance this long term effort CNET, Matra and Dassault are doing a short term project for CAD for the VLSI based on putting together current components such as databases and simulation tools.

At this point we were whisked off to see a demonstration of a network monitoring tool. This was part of the network research project which was actually taking place in the Tour Fiat. The network monitor consisted of some kind of microprocessor device which could log traffic going along an X25 line for off-line or on-line analysis. Essentially the device operated at the network service level ie nothing below level 3 of X25 could be handled. It allowed protocols at the network service and above level to be debugged by monitoring all the transactions that went up and down up to sixteen X25 virtual circuits. Network packets were presented in moderately high level form given knowledge of the protocols. It looked like a practical and useful development and seemed to be being done by a French software house.

The second demonstration we saw was of Sol which is the French reimplementation of UNIX. System 3 UNIX is implemented. The French have spent fifty million French francs developing Sol. Sol is matched to and implemented on the SM90 computer which is a M68000 with 2 megabytes of memory, 120 megabytes of fixed disc and a 10 megabyte exchangeable disc in a typical configuration which would have 8 RS232 lines. The thing is built in a modular form in a nineteen inch rack so that extra modules can be added. A hundred and fifty SM90 machines have already been built and installed in French universities. The SM90 seemed to be a way of stopping the French from buying VAXs, again the idea of 'independence'. Some four hundred SM90s are predicted as being built in the next year or so. Of the one hundred and fifty SM90s installed in academic departments, only twenty-five per cent actually runs Sol, the other seventy-five per cent run real UNIX. It seems that French academics still prefer real UNIX. Although the Sol project has formally finished and been transferred into industry it was clear that ADI was still funding some activity to get the bugs finally out of Sol because it is not quite running perfectly yet and to do further porting of UNIX utilities, although from what I could see most of them had been put across. There was no virtual memory facility on the SM90 nor apparently was there any virtual memory in Sol.

We spent an extremely useful and busy time at ADI. They were extremely cooperative and clearly are somebody that we would do well to stay friends with. In our short visit it was clear that further contact would be extremely useful and further Alvey members going to France should stop off and be nice to ADI.

IN CONFIDENCE

M E M O R A N D U M

To: Dr G Manning

From: R W Witty

copy: F R A Hopgood
D Talbot

Date: 23 May 1984

Subject: EUROPEAN CENTRE FOR SCIENTIFIC CALCULATION

David Talbot and I visited the British Embassy in Paris on 17 May 1984. The Technology Councillor, Mr Jeffrey Ling, told us that the French Government is intending to try to establish a European Centre for scientific calculation in Toulouse. The justification for this is that scientific super computers are now becoming so large and expensive as to be comparable to high energy physics price and thus there is a requirement for a European Centre in the same way that CERN acts as a European Centre for physics.

The French are proposing Toulouse because Toulouse is the Centre of a large French super computer project. This is actually two projects, one called Marianne and one called ISIS. Essentially one project is building a 64bit vector processor and the second project is looking at ways of bolting multiple such processors together to form a highly parallel vector processor. The overall power of the machine will be in the five hundred megaflop range.

Geoff Owen, who works for Jeffrey Ling, has arranged for a meeting to be held in the Paris Embassy at which the British Embassy staff will be briefed by the Toulouse people. This meeting should occur next month. Owen will send details to me.

Neither David Talbot nor I had heard about this initiative. I am writing to you to ask if you have heard anything about it. Clearly if the French establish such a European Centre it will have an impact on the way scientific computing is done in Europe and that has implications for SERC.

Subsequent discussions with various individuals elicited the further information that Toulouse is to become the Centre of a European Transonic Wind Tunnel. It does seem likely that such a hardware wind tunnel should be naturally complemented by the need for a high powered computational software wind tunnel. I have certainly heard several people suggest that the cost of wind tunnel experiments has grown so large that they must be undertaken on a European basis, and that if only large enough computers can be built so that the wind tunnel equations could be solved by simulation rather than actual experiment massive savings could be achieved. Thus the concept of matching the hardware wind tunnel with a software wind tunnel in the same location seem to make a lot of sense. Thus the wind tunnel decision gives added impetus to the European Scientific Computational Centre being sited in Toulouse.

Unless you have any hard information to add to mine I suggest that we wait until after more details are available from the British Embassy next month but I thought you should know about this piece of news as soon as possible.

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ref: EL/France/gen

G L O S S A R Y

CESTA	Centre d'études des systèmes et des technologies avancées
CPE	Centre de prospective et d'évaluation
DESTI	Direction du développement scientifique et technologique et de l'innovation
DGESR	Direction Générale des enseignements supérieurs et de la recherche
DGEMP	Direction Générale de l'Energie et des matières premières
DGI	Direction Générale de l'Industrie
DGRT	Direction Générale de la recherche et de la technologie
DICTD	Direction des industries chimiques, textiles et diverses
DIELI	Direction des industries électroniques et de l'informatique
DR	Direction de la Recherche
MIDIST	Mission interministérielle de l'Information scientifique et technique
ADI	<i>Agence de l'Information</i>
ANVAR	Agence Nationale de la valorisation de la recherche
CEA	Commissariat à l'énergie atomique
CERN	Centre européen de recherches nucléaires
CGE	Compagnie générale d'électricité
CNET	Centre national d'études des télécommunications
DRET	Direction des recherches, études et techniques
GERDAT	Groupement d'études et de recherches pour le développement de l'agronomie tropicale
INRA	Institut National de la recherche agronomique
INSERM	Institut national de la santé et de la recherche médicale
ONERA	Office national d'études et de recherches aérospatiales
ORSTOM	Office de la recherche scientifique et technique d'outre-mer
DPCR	Direction de la Politique Générale de la Recherche

SOFTWARE ENGINEERING THRUST IN FRANCE

Jean-Claude RAULT

In France, Software Engineering is definitely recognized as a key factor of industrial and economic development. While software engineering has been around for many years, it is only at the end of 1978 that it was considered formally as a specific engineering science. At this time, the first software engineering curriculum appeared (University of Rennes) and a national Software Engineering committee has been established ; the purpose of this committee is two-fold :

- . determining orientations and priorities for R & D in software engineering ;
- . making recommendations regarding projects to be funded by Agence de l'Informatique

This committee consists of experts drawn from public research laboratories, computer manufacturers, software houses, and users from industry (electronics, avionics, automotive industry, etc.). No one category predominates.

During the past four years, roughly 50 R & D projects have been funded ; they cover the whole spectrum of software engineering tools, techniques and procedures. These projects concern basic research or applied research and correspond most often to joint ventures among industry and public research laboratories.

In early 1981, the third request for proposals concerned the detailed specification of a common environment on which forthcoming software engineering environments could be based ; three competing projects have been funded subsequently. In 1982-1983, a choice was made among them to give birth to the two main projects on which the present French software engineering thrust is based.

The first project, called "Projet National Génie Logiciel" has been launched in 1983 concurrently with six other covering key areas of information technology. Schematically, it consists of two complementary sub-projects. The first one, known as EPICEA, concerns the refinement and actual implementation of the common environment recalled above. The second one, known as the Tools Project, concerns, on one hand, the development of specific tools meant to be integrated by means of the EPICEA environment and, on the other hand, the implementation of fully integrated software engineering factories parameterized with respect to specific languages and development procedures. Most of candidate tools take their origin in the projects funded in the earlier software engineering requests for proposals. Planned on a three year period, the National Project is intended to lead to commercial products exhibiting a technology jump when they are released. Participants are mainly industries with some collaboration from public research laboratories. The French ministry of industry shares roughly 50 % of the cost with industrial participants.

The second main cooperative project, dubbed CONCERTO, follows a somewhat different line. While its purpose and structure are similar to those of the National Project, it is more deliberately long range. It is not intended to lead to full-fledged products at completion (end of 1985) but rather working prototypes based on real life investigations and upon which implementations, after refining and pruning, could be made. The CONCERTO project is conducted by CNET (National Center for Telecommunications Studies) in cooperation with several public research laboratories and software houses spread in four main geographic locations. (Grenoble, Lannion, Paris, Toulouse).

Software engineering projects are complemented by other fundamental or applied research projects known as PRC (Joint Research Projects) ; in particular, one should mention the Advanced Programming Project and the C3 Project (Communication, Concurrency and Cooperation) ; these are definitely long range endeavours.

FIFTH GENERATION COMPUTER SYSTEMS PLANS IN FRANCE

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Like other industrialized countries, France is currently enjoying a widespread vogue for artificial intelligence and, more generally, for hardware and software components and structures for the design and implementation of the computer applications of the 90's.

Since the October 1981 public announcement of MITI's Fifth Generation Project, the French scientific and industrial communities are exhibiting an increasing craze for AI languages, expert systems, man-computer interaction, novel computer structures, and, as a whole, knowledge-based computer systems. To be anecdotal, the choice of the Prolog language by the Japanese project has allowed many of our fellow countrymen to be aware of the existence of an AI basic tool designed mainly in France.

In spite of the present fashion, often kept by the journalistic milieu, it would be inaccurate to consider that the French fifth generation projects go back to the Japanese announcement. Most certainly, the MITI project has been a catalyst for a certain ministerial and industrial awareness, but most of ongoing projects originate from earlier work.

However, one cannot identify in France an only grand cooperative project gathering all the facets of MITI's Fifth Generation project ; in France, Research and Development initiatives relating to these various facets correspond more to a set of distinct projects that complement each other by their technical scopes as well by their scientific and industrial objectives.

Accordingly, what follows will not describe a single project but rather will provide rather a survey of the various French initiatives concerning hardware and software technologies aimed at fifth generation computer systems and applications. In this respect, the National Projects (PN), the Joint Research Projects (PRC), and the CNRS Cooperative Research Groups (GRECO) and Thematic Research Programs (ATP) will be outlined.

1. THE NATIONAL PROJECTS

While setting its policy for research and industry in 1981, the French Ministry of Research launched the concept of "filière" (a French expression for the whole mill) ; according to this concept, to be successful and competitive, the French electronics industry should master all the technological ingredients from basic technologies and components to software products and end products incorporating hardware and software subsystems.

With a view to implement this policy a committee was appointed in the Fall of 1981 ; its role was to assess strong and weak points of the French industry (electronics, computers, software, services) and make appropriate proposals. This committee concluded its work in May 1982. Among various proposals regarding industrial strategies, the role of nationalized companies (Bull, CGE, MATRA, THOMSON-CSF, ...), education and research and development, it was proposed to launch several R & D projects (called national projects) through which industry and public research laboratories should collaborate in the medium range (roughly 3 years) development of products based on advanced research prototypes.

In July 1982, a list of seven projects was drawn : VLSI CAD tools, Software Engineering, CAD/CAM, Computer Aided Instruction, Automatic Translation, Display Hardware, Basic Components and Sub - Systems for Micro and Mini-computers ; subsequently, evaluation committees, one for each project, were appointed ; their role was assessing proposals made jointly by R & D public organizations and industry.

As one can guess from the titles listed above, most of the topics relating to the fifth generation are included in the national projects ; one will perceive some similarity with other national or international cooperative projects such as the Alvey programme, ESPRIT, the BMFT program in FRG or the four projects of MCC in the United States.

The National Projects have been officially kicked off in 1983. At this moment, most of them are in the detailed specification stage ; descriptions concerning their actual content and organization should be publicly released in the forthcoming months.

To these projects one should add the super computer project managed by the French Ministry of Defense.

2. THE JOINT RESEARCH PROJECTS (PRC). (Nivat)

By construction, the National Projects are essentially technology transfer projects ; for this reason, it was felt necessary to complement them by long range research initiatives. So, after the national projects were opened in 1983, the main research organizations have set several fundamental research cooperative projects dealing with basic computer engineering ; one objective of these projects is gathering around a common topic and common resources the many research groups, most often spread and of small size, dealing with fifth generation issues. Still in the preparatory stage, these projects concern, among others, advanced programming, basic problems relating to concurrency, cooperation and communication (C3) in computer systems, fifth generation data base management systems (BD3), the various facets of AI, advanced electronic components and man-machine communication.

Participants in these projects are the main research organizations such as CNRS, CNET, INRIA, universities and the large industrial laboratories performing basic research (Bull, CGE, Thomson - CSF).

3. THE CNRS COOPERATING RESEARCH GROUPS (GRECO) AND THEMATIC RESEARCH PROGRAMS. ~~(AIP)~~

Besides the two categories of projects described above which draw the main part of public funds for Research and Development in computer science and engineering, one should mention the cooperative research groups managed by CNRS (The National Center for Scientific Research). These groups gather, less formally than in the case of national projects, various laboratories conducting research in a same field ; several of them are relating to fifth generation issues. Among others are the "Speech" group, the "Symbolic manipulation" group, the AI group or the Advanced Robotics group (ARA). Several of these groups have recently given birth to a Joint Research Program (PRC).

These groups, whose members conduct projects of their own, are meant mainly to enhancing contacts and communication among laboratories working in a same area.

NB. Some information regarding projects connected to the three categories of initiatives described above may be found in several scientific papers appearing in Technology and Science of Informatics, an English translation of the French journal TSI published by North Oxford Academic.

Detailed information concerning software research prototypes is available from ANL (Action Nationale du Logiciel) which publishes catalogs and maintains a computerized documentation data bank. (Contact is Jacques DUCLOY, ANL, Campus Scientifique, BP. 239, 54506 VANDOEUVRE CEDEX).

"GRECO"
COOPERATIVE RESEARCH GROUPS

- . MANAGED BY CNRS

- . PARTICIPANTS
 - CNRS ASSOCIATE LABS

 - OTHER PUBLIC LABS
 - CNET
 - INRIA
 - IRISA

 - INDUSTRIAL LABS
 - BULL
 - CGE
 - THOMSON-CSF

GRECO "PROGRAMMATION"
1980

MAIN TOPICS

- . PROGRAMMING & SPECIFICATION LANGUAGES
- . TRANSLATORS
- . SPECIFICATION TOOLS & TECHNIQUES
- . PROOF OF CORRECTNESS
- . PROGRAM TRANSFORMATION
- . REWRITING SYSTEMS

COMMON TOOLS

- . COMPUTERS : MULTICS - VAX
- . MAIL BOX SYSTEM

COORDINATOR

R. CORI - UNIVERSITY OF BORDEAUX

PARTICIPANTS

- . UNIVERSITIES :
 - BORDEAUX
 - GRENOBLE
 - METZ
 - NANCY
 - PARIS 6, 7, 11
 - POITIERS
 - RENNES
 - STRASBOURG
 - TOULOUSE
- . PUBLIC RESEARCH LABS :
 - CERT
 - CNET
 - EMP - SOPHIA ANTIPOLIS
 - INRIA
- . INDUSTRY :
 - CGE
 - THOMSON-CSF

GRECO "CALCUL FORMEL"
1980

SYMBOLIC MANIPULATION

PARTICIPANTS

IMAG - GRENOBLE
INRIA
UNIVERSITY OF STRASBOURG
UNIVERSITY OF POITIERS

COORDINATOR

D. LAZARD - UNIVERSITY OF PARIS 7

GRECO "C3"

COMMUNICATION - COOPERATION - CONCURRENCY
1983

COORDINATORS

G. ROUCAIROL & M. NIVAT

GRECO "PAROLE"

SPEECH SYNTHESIS & RECOGNITION

COORDINATOR

J.-P. HATON - UNIVERSITY OF NANCY

ARA - ADVANCED ROBOTICS

COORDINATOR

G. GIRALT - LAAS

ATP - IA

ARTIFICIAL INTELLIGENCE
1979-1983

BD3 : THIRD GENERATION DBMS

FUNDING AGENCIES

. MINISTRY OF INDUSTRY & RESEARCH - MIR

RESEARCH & TECHNOLOGY BUDGET

DIELI
ANVAR

. AGENCE DE L'INFORMATIQUE

. "FRENCH TELECOM"

CNET
DAII

. MINISTRY OF DEFENSE

DRET
SEFT

NATIONAL PROJECTS

. SUMMER 1981

THE "FILIERE ELECTRONIQUE" CONCEPT : A GLOBAL VIEW OF ELECTRONICS
INDUSTRY OR THE NO-HOLE PHILOSOPHY

. JUNE 1982 THE CONCEPT OF NATIONAL PROJECTS

. SEPTEMBER 1982 to JULY 1983

SPECIFICATION

PLANNING

ASSESSMENT

RFP

RECOMMENDATIONS

. TOPICS :

CAD FOR VLSI

CAD/CAM

CAI

CAT - COMPUTER AIDED TRANSLATION

DISPLAY SYSTEMS

MINIS & WORKSTATIONS

SOFTWARE ENGINEERING

INDUSTRY

AMD

BULL

CAP-SOGETI

CGE

CIMSA

CISI

CRIL

EDF

ELF-AQUITAINE

ESD

EUROSOFT

FRAMATOME - FRAMENTEC

IBM

ITMI

MATRA

MONDIAL - COM

SCHLUMBERGER

SEMA

SIMTEC DATA BANKS

SNIAS

SYSECA

THOMSON-CSF

PUBLIC RESEARCH

. CNRS, INSTITUTES OF TECHNOLOGY & OTHER PUBLIC LABS

CERT

CMi

CNET

EMP

ENSMSE

ENST

ENSEEIH

EHESS

INRIA

IRISA

LAAS

LIMSI

LISH

. UNIVERSITIES

GRENOBLE (IMAG)

HAUTE-SAVOIE

MAINE

MARSEILLE - GIA et LAIM

NANCY

PARIS 6, 7, 8, 11

TOULOUSE - UPS, LE MIRAIL

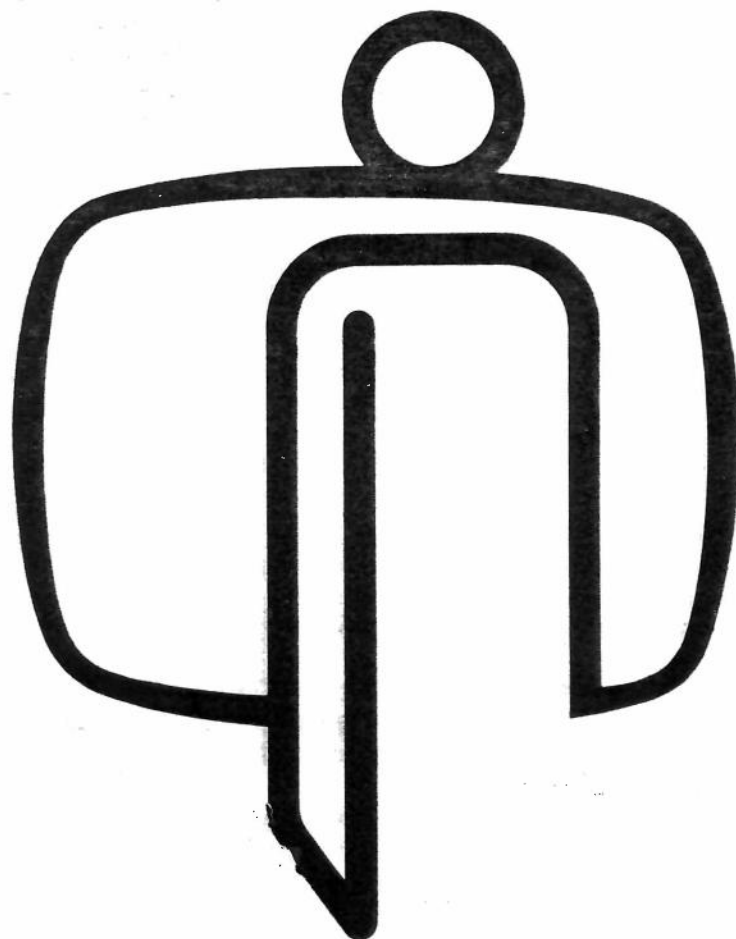
. MEDICAL SCHOOLS

PITIE SALPETRIERE

MARSEILLE

SOURCES OF INFORMATION

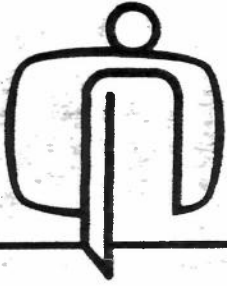
- ARIA - DIRECTORY OF FRENCH RESEARCH IN COMPUTER SCIENCE & ENGINEERING
- "ANL" - DATA BANK & CATALOGS FOR SOFTWARE PROTOTYPES
- TSI - AFCET
ENGLISH VERSION : NORTH OXFORD ACADEMIC PUBLISHING CO



Agence de l'Informatique

Établissement Public National

**A PUBLIC AGENCY
TO PROMOTE THE EFFICIENT USE
OF INFORMATICS AND COMMUNICATIONS TECHNOLOGIES**



AGENCE DE L'INFORMATIQUE

A PUBLIC AGENCY TO PROMOTE THE EFFICIENT USE OF INFORMATICS AND COMMUNICATIONS TECHNOLOGIES

Background

The evolution of information technology concerns more and more sectors of society, creating:

- new requirements
- new forms of distribution and maintenance
- new opportunities
- new risks

It influences the economy, the social balance and the cultures. At the same time, several questions arise:

- who defines the information requirements?
- what are the limits of pure market interaction?
- how best to utilize and multiply rare human resources?
- how to obtain faster the benefits that new technology can offer?
- how to overcome social inertia?
- has government a new role to play?

France, perhaps because of its national traditions, has been one of the first nations to feel that government should involve itself in such matters—not only for industrial policy and regulatory reasons, but above all to look after the interest of the user.

A unique organization

The Agence de l'Informatique, set up by the French government at the beginning of 1980, is composed of a small multi-disciplinary group of professionals from the computer and services industry, researchers, users, teachers,... It is run on an industrial and commercial basis, and its structure enables it to be responsive to the rapidly changing needs and requirements of the user community.

Dialogue with all partners, private and public

The action of the Agence de l'Informatique is focused on current and future users of informatics. With, and on behalf of, these users, the Agence maintains a dialogue with hardware manufacturers, software and service companies, the telecommunications industry, public services and researchers in order to conceive new applications, combining the various contributions of data processing, automation and telecommunications.

Decentralization of information and decision making

The Agence de l'Informatique plays the part of a discoverer, finding out the needs of the user community and also the capabilities of the computer industry. Through its understanding of user needs and its action of orientation and support of research, the Agence de l'Informatique promotes and encourages the research-application dialogue, fostering in this way the creation of new products and services.

The Agence de l'Informatique is in contact with over 500 professions and user groups, providing financing and guidance for the research and development of computer applications adapted to the specific requirements of the various business sectors.

The 1981 budget of over 300 million Francs, provided by the Ministry of Industry, the Ministry of Research and Technology and the PTT, with some revenue from royalties on products developed, illustrates the depth of the actions of the Agence de l'Informatique. It was allocated as follows:

- | | |
|---|------|
| • research and experimentation | 33 % |
| • application development and dissemination | 33 % |
| • training and education | 25 % |
| • regional activities | 3 % |
| • international affairs | 3 % |
| • economic and legal studies | 3 % |

THREE MAIN ACTIONS:

RESEARCH AND EXPERIMENTATION

New architecture
 Languages & programming
 Man/Machine interface
 Design aids
 Automation, robotics
 Computer assisted training
 Security
 Translation

Long term-research aid

Requests for proposals on specific themes are issued periodically by the Agence de l'Informatique. Public and private research laboratories together with companies from the computer industry are awarded funds for projects in selected areas.

Medium term-Pilot Projects

Themes are selected for coordinated research and development, the Pilot Projects provide the framework for this activity. Each project runs for 4-5 years and brings together research organizations, industry and the user community to work in a concerted effort in areas of specific interest.

Seminars, conferences, publications provide the means of disseminating state-of-the-art information to the various interested parties.

APPLICATION DEVELOPMENT AND DISSEMINATION

Regional associations
 Professional associations
 Chambers of Commerce

Dialogue with user representatives

Development of specific applications

This central activity of the Agence de l'Informatique provides help to the user community—in particular the small user—for the development of computer applications tailored to the specific requirements of each business sector. By working with relay organizations such as professional trade associations, special interest groups, ad hoc groupings, the Agence de l'Informatique encourages and contributes financially to the development of specific applications these may then receive a wide distribution with the particular business sector and thus contribute to the sharing of development costs. The Agence de l'Informatique provides methodological guidance and financial support for the specification and development phase and receives royalties on the subsequent distribution of the applications product.

TRAINING AND EDUCATION

Universities
 Secondary schools
 Engineering schools
 Micro-electronics institutes

Development of computer education and literacy

Development of informatics as a tool for education

Training and education is seen by the Agence de l'Informatique as being essential for the widespread and efficient use of informatics. In cooperation with the various education authorities and training establishments the Agence de l'Informatique provides the means for increasing the number of computer science graduates, for the development of training in specific high technology areas, for the introduction of computer education into secondary schools, for the development of user-oriented courses and for the development of computer assisted instruction systems and their associated courseware.

AND THREE SUPPORT ACTIVITIES:

KAYAK office automation
NADIR satellite application
RHIN system interconnection
SIRIUS distributed systems
SOL software portability
SURF functional security

RÉGIONAL ACTIVITIES

With the assistance of regional representatives, the Agence de l'Informatique is kept informed of the specific problems and requirements of a region and can thus adapt its programmes and actions accordingly.

INTERNATIONAL AFFAIRS

By being aware of the technology, products and services available or under development in the various parts of the world, the Agence de l'Informatique is able to orient its own activities and enable the user community to benefit from such state-of-the-art developments. Its own experts, assisted by outside consultants and commissioned studies provide the necessary information as to trends and future developments. In addition, the Agence de l'Informatique participates actively in joint ventures in research and development, and cooperates with developing nations either directly or via international organizations.

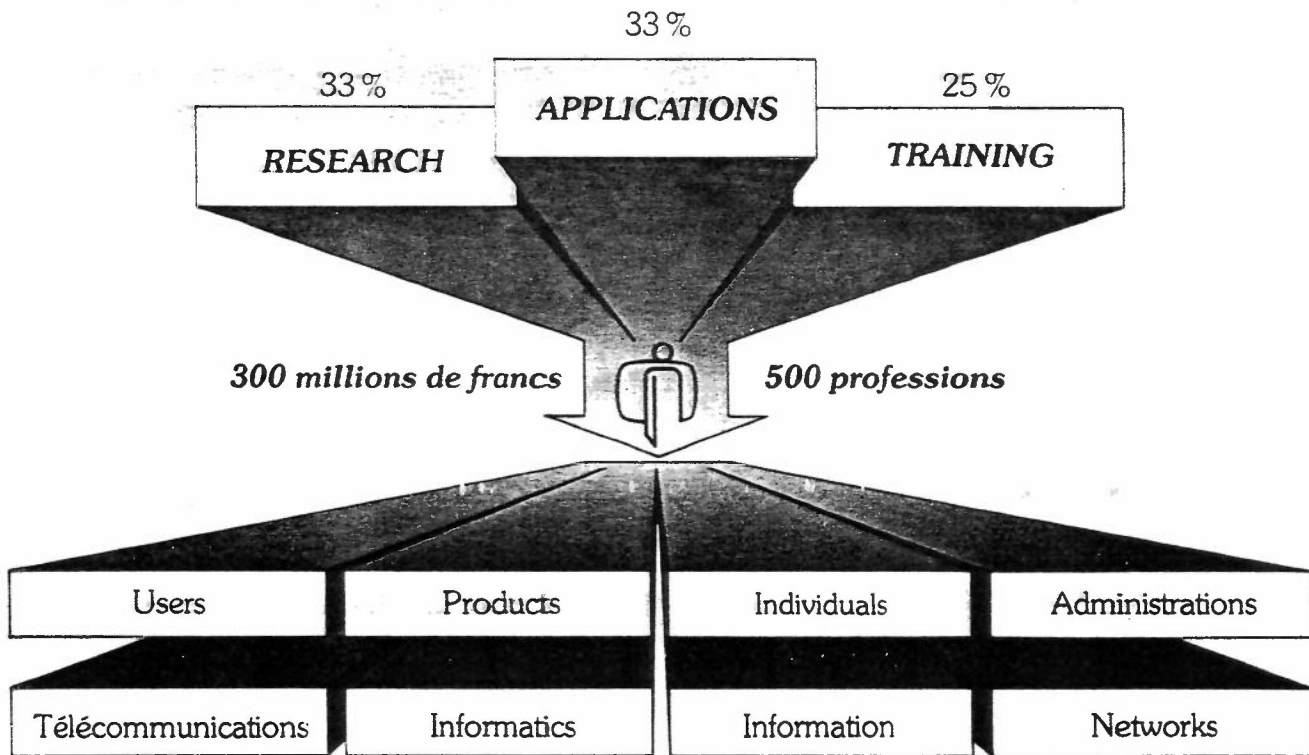
Banking, Finance
Small & medium industries
Local communities
General public
Agriculture
Liberal professions

ECONOMIC AND LEGAL STUDIES

Through general studies of an economic and legal nature, the Agence de l'Informatique measures and analyses the impact, penetration and consequences of informatics and communications technologies.

Computer aided instruction
Courseware
Teacher training

...STRATEGICALLY PLACED AT THE CROSSROADS



ACTIVITIES AND SUPPORTED PROJECTS A FEW EXAMPLES

General education

Specialized training

Higher education

Applied micro electronics

International trade

Electronic payment

Tourism

Press photographs

Sheet metal working

Fashion

Architecture

Wine industry

Pharmacy

Medical diagnostic

Seminars

Automotive industry

Computer engineering

Utilities

Computer aided instruction

Office automation

Robotics

Hotel trade

- introduction of microcomputers into secondary schools
- establishment of training courses in robotics, CAD/CAM, office automation
- agreements to increase the number of computer science graduates
- establishment of a specialized institute in Marseilles
- market survey and initial design studies for SIMPLEXCOM
- development of software for the initial trials
- development of a universal reservation language
- study of an experimental electronic archiving system
- specification and design of CAD systems
- feasibility studies for the use of CAD and automatic control procedures
- data bank of regulatory, technical and economic information
- feasibility studies
- establishment of functional requirements
- access via ANTILOPE to pathological information for country doctors
- office automation, software engineering, artificial intelligence
- application of CAD to the milling of gear wheels
- fundamental research into parallel processing
- decision support system for water distribution
- development of tools and courseware
- development of a methodology
- international study of the economics of flexible workshops
- study of products and services available worldwide