ANNUAL REPORT 1983

CAP GEMINI SOGETI

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CAP GEMINI SOGETI is a group of some thirty DP service companies primarily engaged in professional services: consulting on the use of DP resources, implementation of software enabling government and corporate users to employ these resources, design and implementation of complex DP systems, development and marketing of software packages, assistance to computer operations, training, consulting in office automation and corporate organization.

Active throughout Europe, the United States and Africa, CAP GEMINI SOGETI is one of the world's foremost DP service firms.

Summary of CAP GEMINI SOGETI consolidated results US $, in millions	1979	1980	1981	1982	**1983**
CONSOLIDATED REVENUES	54.5	69.5	98.6	123.0	**168.1**
Gross CASH FLOW	7.8	9.9	12.6	16.3	**19.5**
NET INCOME after taxes	2.6	3.5	5.2	6.2	**8.6**
SHARE HOLDERS' EQUITY (after current result)	9.8	12.5	15.9	21.8	**31.6**
TOTAL OF BALANCE SHEET	35.2	41.7	59.8	77.1	**101.9**
TOTAL NUMBER OF EMPLOYEES (*) as at 31 December	2725	3104	3577	3995	**3957**
NUMBER OF PROFESSIONAL STAFF (*)	2332	2638	3003	3345	**3324**

(*) Including through 1982, the workforce for the data entry activity, sold at the beginning of 1983 (totalling 365 employees as at 31 December 1982)

CAP GEMINI SOGETI

Société Anonyme au capital de 54.000.000 F
RCS : Grenoble B 067 502 575
Siège Social, 6, boulevard Jean Pain
38005 GRENOBLE (FRANCE)

MEMBERS OF THE BOARD OF DIRECTORS as of 1 April 1984

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Executive Chairman

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Vice-Chairman

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Michèle KAMPF

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James P. UTTERSON

STATUTORY AUDITORS

Jacques BOURGUIGNON

Bernard PUGNIET

CERTIFIED PUBLIC ACCOUNTANTS

COOPERS & LYBRAND

The Executive Committee of CAP GEMINI SOGETI consists of 7 members:

Seated, left to right:

Daniel SETBON
Financial Director
Michel BERTY
President, USA Group
Michel JALABERT
Vice President, Corporate Development

Standing, left to right:

Alain LEMAIRE
President, FRANCE Group
Jean B. RENONDIN
Vice Chairman
Serge KAMPF
Executive Chairman
Christer UGANDER
President, EUROPE Group

LETTER FROM THE EXECUTIVE CHAIRMAN

They number five million worldwide: only a handful, in comparison with the Earth's population. Given their role in the evolution of our society, however, they are five million people whose influence probably outweighs their share of the world's brainpower.
Yet very little is said about them. Much is said about data processing itself, about the upheavals it is going to bring into our lives, about the jobs it might abolish and those it is going to create, about the new ambitions it seems to offer a humanity that was beginning to reach the end of its tether. Much is said about the battle of the titans taking place between the Americans and the Japanese... and between the Americans themselves, since President Reagan's decision to "deregulate". Much is said about the big computer manufacturers and the little wonders with which they are flooding the market at a pace which keeps even the experts guessing. Because industry is involved, people don't neglect to speak about the brilliant hobbyist who put together three circuit boards and a display tube to create a gizmo that might find a couple of hundred buyers. Because products are involved, people also talk about "packages" and about the performance levels they can squeeze out of the most inert hunk of hardware. People talk about users and the fabulous systems at their fingertips. Although less frequently, people also talk about the service companies which have helped bring these systems into being (*).

In the long run, however, people have very little to say about the DP professionals themselves, the men and women who work in the wings of this gigantic theater to design, manufacture, market, operate and maintain all of this hardware and all of this software. The employment advertising pages in the major newspapers are practically the only voices to note their existence and laud their skills, even though the public at large might fail to grasp why there seems to be much of a scramble for their favorable attention.

For the past nine years, CAP GEMINI SOGETI has been devoting the bulk of its Annual Report to a motif related to the DP profession. Last year, it was information engineering; the year before that, research; in 1980, the DP industry; in 1979, the new applications of data processing, and so on. This year, the *DP professionals* are our chosen theme. All DP professionals: those working for hardware users, those working for manufacturers and, of course, those working for service companies. Who are they? Where do they come from? What do they want? What are their good qualities and what – if any – are their failings? The substance of this Annual Report (50 out of 76 pages) has been set aside to introduce and explain them to you.

(*) *A satisfying moment of 1983 occurred when the French Minister of Posts and Telecommunications inaugurated our Electronic Directory system in St-Malo on 4 February, ten months before that of our friends – and competitors – from SESA (a rivalry which has now turned into full cooperation, as the extension of the Electronic Directory program has just been entrusted to a consortium bringing together CAP GEMINI SOGETI, SESA and BULL.)*

The remainder discusses CAP GEMINI SOGETI, its results and its organization.

– The Group's results for 1983 are in line with those of preceding years, and are in agreement with what we had announced ("somewhat imprudently", in the opinion of some) fifteen months ago: consolidated revenue totalling FF 1.4 billion (**), for an increase of 37% over the preceding year's figure, and net income after taxes slightly in excess of 5% of revenue (FF 72 million). Need we point out that these results indisputably place CAP GEMINI SOGETI at the forefront of European service companies? This stated, however, we must immediately add that, converted into dollars (with the dollar at FF 8.35, the official rate at 31 December 1983), these results are less impressive and still place our Group far behind its two or three main American competitors.

– Our organization, in turn, is both constant and changing. The same people have been managing and overseeing the Group since its creation and, when you think about it, this is not all that common in our profession. But our organization is also evolving in step with the strong growth of our activities and with the "recentering" at which we have been patiently working since 1973. The year was thus marked by two significant events:

- The first was the disposal, in February, of our data entry activity, which had registered total 1982 revenues of about FF 40 million. This divestiture, following that of EURINFOR in 1976 and that of SORINFOR in 1981, marks our complete – and probably definitive – withdrawal from processing activities. The scope of this recentering will become more evident if it is recalled that ten years earlier, in 1973, machine-based services accounted for 56% of the SOGETI Group's total revenues.
- the second was the consolidation of our activities in the USA: virtually nonexistent in 1980, our US revenue has successively risen to

– $ 23 million in 1981
– $ 36 million in 1982
– $ 47 million in 1983

For 1983, then, the USA contributed 28% of total Group revenue, while it had accounted for less than 1% only four years ago! Our French revenue doubled during this same interval (despite the divestitures noted above), while that of other European countries grew by a factor of 2.4...

With regard to profitability, of course, it must be acknowledged that the USA Group's contribution of overall income – although already significant – does not yet match up to its share of total revenue. Achieving home-town performance levels at a distance of 3,000 miles is not as easy as it might seem! nonetheless, 1984 should enable the USA Group to increase this contribution very substantially without thereby having to brake the growth of its revenues too severely.

Other significant events highlighted 1983, of course, such as an increase in capital from FF 44.2 million to FF 54 million (half by incorporation of reserves and half by a call to shareholders), or the year's exceptional performance by the Europe Group, which practically doubled its 1982 results, or our preparations for a new France Group organization, installed on 1 January 1984 to a flurry of commentary in the French press. On the whole, however, 1983 was just what we wanted it to be: generally peaceful.

All of which goes to show that CAP GEMINI SOGETI is calmly advancing along its plotted course. A service company and proud of it, its concern is to help its customers derive the greatest benefit from their data processing resources; a company of DP professionals, its ambition is to aid its people in pursuit of the most rewarding careers possible in a profession which makes great demands on them, but which has a lot to offer them in return.

I'm not saying that this course was the only one possible; still, even more than past performance – satisfactory as it has been – the future is undoubtedly going to demonstrate that we have chosen the right one.

Grenoble, 14 April 1984
Serge KAMPF

(**) *Note that these are consolidated revenues (i.e., in which all transactions between Group companies have been eliminated), and not aggregate revenues derived from all sources by subsidiaries more or less specializing in DP services.*

CAP GEMINI SOGETI: GENERAL ORGANIZATION

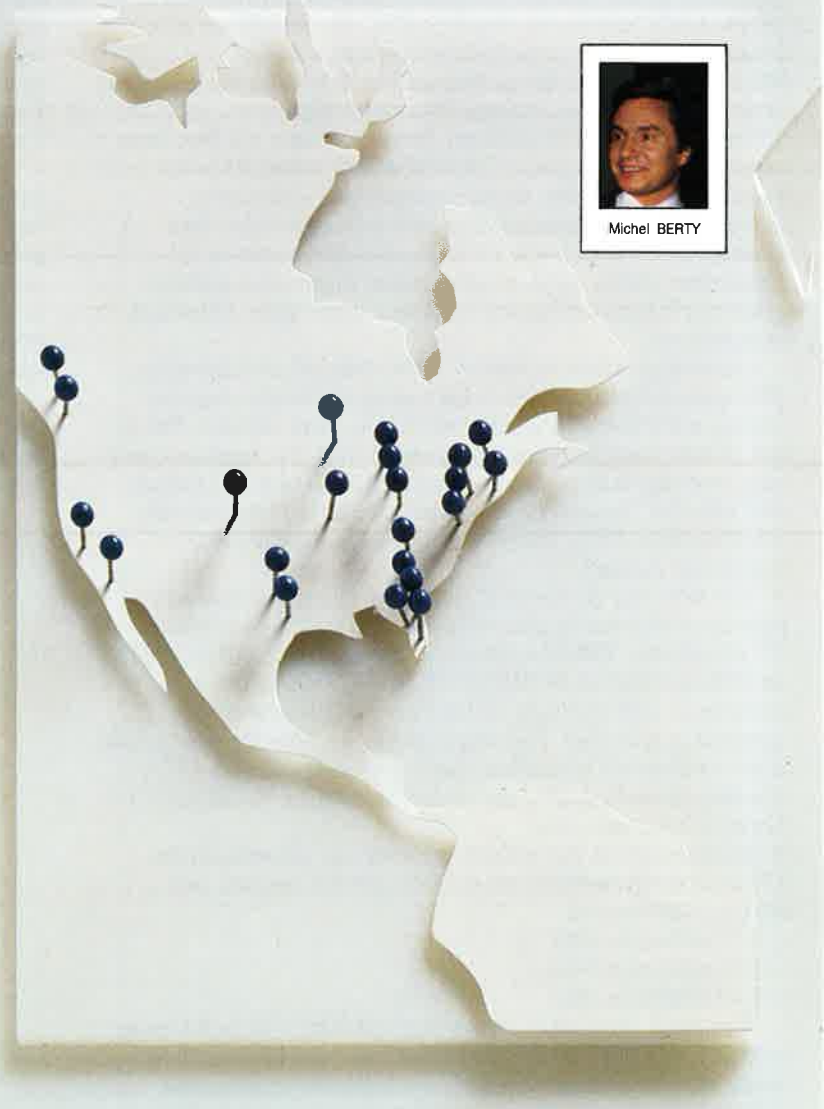
CAP GEMINI SOGETI's overall structure is a conventional one: an executive staff and operational groups. This organization, meeting a straightforward concern for efficiency, has been inspired by four guiding principles:

- ensure substantial operational decentralization by means of highly autonomous "branches". The branch is the Group's basic operational unit. It is at once sufficiently small (an average of 40 employees) to enable the branch manager to be personally acquainted with each of his customers and each of his subordinates, and sufficiently large to let him assume responsibility for his resources and his results. Branches are brought together to form companies or regions; these in turn are grouped into operational groups;
- maintain overall cohesion and ensure the Group's efficiency through a shared technical, commercial and financial policy, taking care that its structures are continuously adapted to this policy and to the prevailing situation, and staffing the Group's holding companies with small executive teams, thoroughly familiar with operational realities;
- ensure matching of the Group's services and products to market demand, by analyzing information on market trends and by setting up structures capable of meeting new customer requirements, as well as through substantial R&D investment in all areas which promise to encourage the short and medium-term growth of computer service activities;
- prepare for CAP GEMINI SOGETI's development on the major international markets, both through reinforcement of its European and North American presence in the form of wholly-owned subsidiaries and through direct exports and the systematic establishment of cooperative ties with a number of countries.

Overall coordination is provided by two steering bodies:

- *the Executive Committee,* which brings together the Group's leading executives under the chairmanship of Serge Kampf, Executive Chairman of CAP GEMINI SOGETI S.A., at bimonthly intervals to prepare decisions of major importance to the Group and lay down its broad strategic guidelines.
- *the General Management Committee,* made up of the Managers of major operational units, which advises on general guidelines and on technical or commercial matters involving the Group as a whole. As a rule, the General Management Committee meets three times yearly.

There are four operational groups: three (FRANCE, EUROPE and USA) exercising geographic responsibilities, and the Development Group. A full presentation of the organization and activity of each group is given in pages 58 to 67.



Michel BERTY


Christer UGANDER
CAP GEMINI SOGETI S.A.
Jean B. RENONDIN
Philippe DREYFUS
Serge KAMPF
Michel JALABERT
Daniel SETBON
Alain LEMAIRE

Eric PLANTE, project manager, RIJSWIJK – THE HAGUE

Peter MARCUS, systems analyst NEW YORK

Yves GUIONIE, operations engineer, PARIS

Jean-Louis BOUR, Group Procedures officer, PARIS

THE DATA PROCESSING PROFESSIONAL

In its first issue for 1983, TIME magazine bestowed its "1982 Man of the Year" accolade on... the computer. If the man of the year is a machine, just what can we say about the people who minister to its needs? Is it really true that they are obscured by its long shadow?

The mass media have sung the praises of the computer's conquests, and in doing so they have helped to spread its use and make it a more familiar object. Despite editorial talent, however, the public's view often touches on only a handful of aspects of the immense movement sparked by our industry. The man in the street witnesses a success here and a failure there, his interest is piqued by an alliance between industrial giants, his enthusiasm is stirred by this or that astonishing feat or supersophisticated gadget. And he is growing increasingly aware that those tangible devices could never run without their software input. Still, software remains a thing of mystery to the average person, who would be greatly surprised to learn that if the professionals (and especially those working for service companies) were not constantly rolling back the frontiers of software capability, progress would come to a grinding halt and users would quickly turn to pastures greener than data processing.

Today, software alone makes it possible to design Large Scale Integration circuits which turn inert matter into computers so complex that they can no longer be approached pencil and paper in hand.

Today, software is the brain which guides the industrial robot.

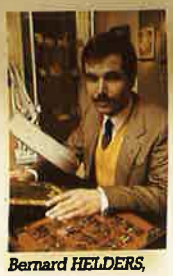
Today, software is the brain which recognizes images and spoken words.

Does the public — and even that initiated public of "decisionmakers" — really understand what is going on? Can it still see that there are people behind all these new products or applications? People who have sometimes been presented as posturing gurus or high priests, when in fact they have simply evolved with their profession and their era?

PROFESSIONALS TALK ABOUT PROFESSIONALS: WHO BETTER?

The reader will be able to answer this question himself after having read the comments of a selection of CAP GEMINI SOGETI professionals, in marginal highlights to our central report. These commentators represent a wide range of positions, skills and nationalities, mirroring the Group's own diversity. Identical questions were put to all of these professionals, who themselves selected their interview site; our interviewer was the only other person present. The extracts published in this report, selected with the approval of their sources, are a free, spontaneous reflection of the thoughts of CAP GEMINI SOGETI professionals. We thank the following for having contributed to this document:

Virginie HOSPICE, videotex representative, PARIS



Bernard HELDERS, programmer, UTRECHT

Larry PANKEY, project manager, DALLAS

Marc TRIQUENEAUX, engineer, PARIS

Danielle SKENADJI, job preparer, PARIS

Sandy CLAIREAUX, chief engineer, project manager LONDON-YIEWSLEY

Mark GAUBATZ, systems engineer, SAN FRANCISCO

Jerry FLEMING, programmer-analyst, MILWAUKEE

Maurice SCHLUMBERGER, director, GRENOBLE Research Center

Ursula HUBER, systems analyst, ZÜRICH

Whence the theme of this Annual Report: this year, we're going to throw the spotlight on the actors of this drama, on the professionals of data processing. We'll see how they learn to master their skills; we'll go backstage and, looking at concrete examples (taken from CAP GEMINI SOGETI's experience, of course), understand just what their job is all about. We'll see the drudgery of rehearsal that always precedes the glamor and excitement of the curtain call; we'll observe the deep-seated motivations that underlie the masks. And we mustn't forget that, without the participation of an "audience" of users, our cast of DP professionals would be superfluous, useless: a fertile, creative bond of interaction exists between the two.

Data processing users and professionals have to work together and advance together; it is thus appropriate that they get to know one another better. Information engineering experts must know, measure and satisfy their customers' needs as a matter of professional necessity. And users at all levels must have a better understanding of the role played by the DP professional if they are to engage in genuine dialogue and mutually-profitable cooperation. The aim of this Annual Report is to contribute to this mutual understanding.

A study on the psychosociology of the DP professional, then? In a sense, perhaps; but not like an investigation of some strange, remote tribal entity: DP professionals are firmly and comfortably ensconced in today's world. A profession has been born in just a few decades. Computer professionals are at work in practically every aspect of economic life. Their future has never seemed more attractive. This report intends to look at these three assertions in three sections:

- The DP professional's job,
- The DP professional at work,
- The DP professional's future.

Terry FRAZIER, branch manager MINNEAPOLIS

Pascal BAUDRY, programmer-analyst, ORLEANS

Christian SOUCHON, branch manager, LYONS

Lars Olof NORELL, branch manager, STOCKHOLM

Hans VIGMOSTAD, consultant, OSLO

Jean-Marc SCHAUVLIEGE, director, Group Communications, PARIS

Jacques MOREL, project manager, PARIS

Guy OLIVIER, methods officer, PARIS

Pascale SATRE, programmer PARIS

THE DP PROFESSIONAL'S JOB

It took only a couple of decades for the little community of pioneering DP professionals – computer manufacturers, users and founders of the first service firms – to create a true profession: varied, structured and now numbering some four million members in the Western world. But do people really understand what this profession is all about?
After sketching an outline of the component trades of data processing, we will see that – in spite of current workforce numbers – this profession is laboring under a serious and evidently lasting personnel shortage which, in the long term, can be offset only by a gigantic training effort.

THE DP TRADES

The trades of the data processing industry work to design, implement, market, install and maintain "DP resources", i.e., hardware (central computers, peripherals, telecommunications equipment, etc.) and software. Groupings of hardware and software of various types and origins are often called "systems"

Not all of the computer-related trades are staffed by DP professionals. To take a lone example: manufacturers – whose prime function is to design and build computers – employ many workers whose vocations are classified among the manufacturing trades.

In order better to delimit the DP professional's field of activity, we refer to the table of trades shown next page. These trades are categorized by major function, and the most frequently (but by no means exclusively) encountered employer types are indicated by an X in one or more of the four "Employer" columns:

One year I did a holiday job at an art gallery in Delft specialising in Roman orthodox ikons. Since then I have returned several times when they need an extra guide...

After having mastered in biology I changed to the graduate school of management in Delft and meanwhile, through an exchange program, I had a D.P. management course at the University of Michigan. I decided to choose DP because it's actual, it's growing... a very good business to be in and especially a software house because of the variety you get there: different clients, different assignments, different experiences. I joined CAP GEMINI NEDERLAND after a general meeting with some 15 applicants. Everyone in the group explained who he was, why he was there, and there was a little test; afterwards we had an interview for one or two hours with Mr. Van BREUGEL, the general manager of the company. Then we had a 3-months course on COBOL, background on computers, data organization, data processing. We had a teacher who very much improved the atmosphere. So it was a very good socialisation process for all of us. Such an intake really makes a group mentality. At the end of this course some of us went to a project situation and the others got an extended course.
My first contract was in the pharmaceutical industry. I was there just as a trouble shooter on the programming level. This customer had a programmer who made beautiful programs but no documentation at all and he left the company. My job was to document and clean up the programs so that the system would work and they could see what to do next. Now I do technical design and programming at a Public Agency concerned with collecting tax money for the purpose of clearing sewage waters and draining the canals in Amsterdam.

Bernard HELDERS
Age 28, single

SUMMARY TABLE OF THE DATA PROCESSING TRADES

FUNCTION	JOB TITLE	EMPLOYER			
		Users	Manufacturers	Service Firms: Machine-based services	Service Firms: Software services
MANAGEMENT	• DP manager	•	•	•	
	• Design manager	•	•	•	•
	• Operations manager	•		•	
	• Research manager		•	•	•
	• Marketing manager		•	•	•
	• Sales manager		•	•	•
	• Technical manager	•	•	•	•
	• Manufacturing unit manager		•		
CONSULTING	• Consultant (generalist)				•
	• Expert (specific technique)	•	•	•	•
	• Expert (area of activity)	•	•	•	•
RESEARCH & DESIGN	• Physicist		•		
	• Logician		•		
	• Applied research engineer		•		•
	• Systems architect (hardware & operating systems)		•		
	• Electronics engineer		•		
	• Systems designer and architect (information, telecommunications, office automation, special systems, etc.)	•	•		•
	• Applications functional analyst (management, production, aid to decisionmaking, scientific, etc.)	•	•	•	•
	• Applications package designer		•	•	•
	• Data base manager (dictionaries, database management, security, etc.)	•		•	•
	• Systems packages designer (databases, teleprocessing monitors, librarians, etc.)		•		•
	• Software engineering tools designer		•		•
DEVELOPMENT & MANUFACTURING	• Project manager	•	•	•	•
	• Systems designer	•	•	•	•
	• Programmer-analyst	•	•	•	•
	• Programmer	•	•	•	•
	• Methods officer	•	•	•	•
	• Documentation officer	•	•	•	•
	• Validation & quality control officer	•	•	•	•
	• Systems engineer	•	•	•	•
	• Systems programmer	•	•	•	•
	• Engineers and technicians :				
	– laboratory		•		
	– industrial engineering		•		
	– methods	•	•	•	•
	– manufacturing		•		
	• Specialists :				
	– startup/scheduling		•		
	– surface treatment		•		
	– technical support		•		
	• Manufacturing shop workers				
	– assemblers		•		
	– inspectors		•		
	– finishers		•		
	• Quality control engineers & technicians	•	•	•	•

FUNCTION	JOB TITLE	EMPLOYER			
		Users	Manufacturers	Service Firms: Machine-based services	Service Firms: Software services
PLANNING MARKETING	• Marketing officer		•	•	•
	• Product plan officer		•	•	•
	• Product line officer		•	•	•
	• Product promotion officer		•	•	•
	• Documentalist		•		
	• Marketing editor		•		
	• Competitive analysis specialist		•		
TRAINING	• Training officer	•	•	•	•
	• Instructor	•	•	•	•
	• Training supervisor	•	•	•	•
OPERATIONS	• Production manager	•			
	• Operations chief	•		•	
	• Workshop chief	•		•	
	• Shift supervisor	•		•	
	• Security officer	•		•	•
	• Systems engineer & programmer	•		•	•
	• Systems officer	•		•	•
	• Network manager	•			•
	• Network monitor	•		•	•
	• Technical job operator	•		•	•
	• Job operator	•		•	•
	• Operator	•		•	•
	• Console operator	•		•	•
	• Graphic screen display designer	•			•
	• Keypunch supervisor	•		•	
	• Keypunch operator	•		•	
SALES	• Sales & business engineer		•	•	•
	• Applications sales engineer		•	•	•
	• Salesman (specialized by product)		•	•	•
MAINTENANCE	• Maintenance inspector		•		
	• Maintenance technician		•		
	• Software support engineer		•		
	• Project manager	•		•	•
	• Engineer	•		•	•
	• Programmer-analyst	•		•	•
	• Programmer	•		•	•
NEW ACTIVITIES	• Micro-electronics specialist		•		
	• Special components designer		•		
	• Ergonomics specialist		•		
	• Information center manager	•			•
	• Information center consultant	•			•
	• DP auditor	•			•
	• Operations analyst	•			•
	• Technical editor		•		•
HIRING	• Recruiter	•	•	•	•
	• Psychologist	•	•	•	•
EDUCATION	• Instructor				
	• Assistant				
	• Researcher				

- Column 1 ("**Users**") primarily represents the DP departments of corporations, civilian and military government agencies, etc.
- Column 2 ("**Manufacturers**") consolidates computer manufacturers and producers of "integrated" hardware (telephone exchanges, scanners, robots, etc., that is, products whose basic functions are performed by computerized sub-assemblies).
- Columns 3 and 4 indicate **Service firms**, with a distinction drawn between companies providing machine-based services and firms working with software alone. The former primarily use their own computers for processing their customers' jobs, with applications ranging from ordinary business management to scientific number-crunching, database access, and so on. The latter concentrate their activities on the development of general-purpose or dedicated sofware products and to the implementation of consulting, technical assistance and training services, aimed at optimizing customer use of his DP resources. The larger software service companies also handle the design and engineering of large DP systems, in which case they earn the title of "DP engineering" firms. In this report, we will use the term "**software professionals**" for the people who perform these services. Some of these software service firms – CAP GEMINI SOGETI, for one – also provide consulting and assistance to computer operations: experts tasked with these activities will be termed "**operations professionals**".

It should be noted that these three (or four) employer categories, while offering 80% or 90% of job opportunities available to DP professionals, do not completely monopolize the market: education, university research laboratories and government agencies administering the DP sector also employ data processing professionals. These are active as teachers, research engineers and government planners and administrators.

In this report, we will focus our attention on DP professionals whose trades are underscored in grey in the table. Like any inventory or classification ours is imperfect and arguable. While the user who makes "pushbutton" use of computerized products – such as games or simple robots – is obviously not a "DP professional", the same cannot be said of the professional user, and certainly not of the specialist who wears two hats. For example, an engineer specializing in computer-aided design and working with a team of DP experts to develop a new application – one which he alone is able to finalize, due to the skills in mechanical or electronic engineering that is required – might perfectly well be counted among the ranks of computer professionals. Nonetheless, the statistics do not as a rule put him in this category.

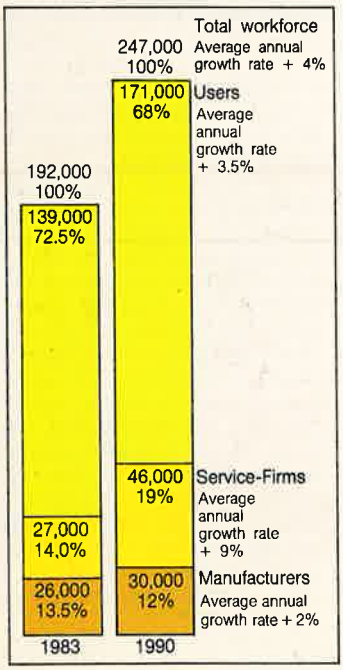
MAIN AREAS STAFFED BY DP PROFESSIONALS

THE WORKFORCE OF DP PROFESSIONALS

Figures are hard to arrive at. The statistics generated from country to country are not very consistent and are always subject to severe criticism. As an example, we might take a look at the situation in France, the USA and the Netherlands, as shown in the tables opposite:

- A current population of roughly 45,000 professionals in the Netherlands, 200,000 in France and 1,500,000 in the USA, yielding one professional per 270 inhabitants in the Netherlands and France, and one per 160 inhabitants in the USA. At least these figures have the merit of confirming that the degree of computerization is substantially lower in Europe than in the United States! In passing, we note that this population is youthful (average age under 35) and it includes a relatively high proportion of women: 20% to 25%, depending on country.
- A proportion of software professionals numbering approximately 50% in France and the Netherlands, and exceeding 62% in the USA: this difference can doubtless be attributed to the existence of a larger applications inventory in the USA, applications requiring substantial personnel numbers for their maintenance alone.
- An average growth in workforce numbers of the order of 5% annually, with the number of software professionals growing more rapidly in the Netherlands and France than in the USA. Some people think that these forecasts are too conservative:for example, Bruce Gilchrist, Director of Data Processing at Columbia University, bases himself on an examination of 1970 and 1980 census data published by the US Department of Commerce to forecast an annual growth of 9.7% for systems designers and 7% for programmers during the present decade (source: DATAMATION, September 1983). This opinion is shared by SYNTEC, the French industry association, which foresees – for service firms, at least – workforce growth of 9% annually between 1983 and 1990. Regardless of the rate adopted, these figures clearly indicate the profession's force in the job-creation field.

Estimated trends of the French DP professional workforce by type of employer (Source : SYNTEC)



I guess the assignment I had at the candy company has probably been the most rewarding for a number of respects. The first is because it was pretty much a solution to a business need. What happens is that the company sells candy to stores and will take the items back after a certain length of time if it is close to the expiration date. One of the things they strive to protect is their image of freshness, and they don't want to have their products on the shelf too long. They had a much larger total unsaleable credit than they would have liked and, needless to say, they felt that that figure could and should be reduced. We have been able within ten months to give them a system that they were quite happy with; starting from the very beginning, meeting with the users group that was going to be utilizing the system and so very concerned with this problem; finding out from them exactly what kinds of information they needed, what kinds of reporting capabilities they wanted, what would help them the most, how they wanted the reporting functions done by regions, product and so on. So it really made me feel good that I was able to attack a business need that they had and help them solve that problem. The second reason is in fact the type of responsibilities that I had on the assignment: I was in charge of the project management for the system. I did a lot of the designing and coding work myself, but I also had other people that I had to supervise.

Peter MARCUS
Age 35, Married, 2 children

Estimated trends in DP professional workforce and average annual growth rate

	NETHERLANDS (Pierre Audoin Conseil study)			FRANCE (Tebeka report)			USA (Bureau of Statistics, Department of Labor)		
	1982	1985	annual Δ	1982	1985	annual Δ	1982	1995	annual Δ
Systems design	6,500	8,400	+ 9 %	37,400	46,700	+ 8 %	254,000	471,000	+ 5 %
Applications development & maintenance	13,000	15,500	+ 6 %	57,000	70,000	+ 7 %	266,000	471,000	+ 4.5 %
Subtotal, software professionals	19,500	23,900	+ 7 %	94,400	116,700	+ 7 %	520,000	942,000	+ 4.5 %
Operations (excl. data entry)	14,500	15,500	+ 2 %	86,000	95,500	+ 3.5 %	260,000	451,000	+ 4.7 %
Miscellaneous (incl. hardware maintenance)	8,500	9,600	+ 4 %	6,900	8,000	+ 5 %	55,000	108,000	+ 5.3 %
TOTAL	42,500	49,000	+ 5 %	187,300	220,200	+ 5.5 %	835,000	1,501,000	+ 4.5 %

PERSONNEL REQUIREMENTS AND SHORTFALLS

In face of the relative uncertainty surrounding the exact numbers and probable growth rates for DP professionals, a survey of the real situation signals at least one hard fact: there is a serious shortage of people in the field.

Evidence of this may be seen in the following facts:

- A 1983 study performed by "Computerworld" magazine indicates that the main headache confronting American DP executives is the long waiting-line of applications to be developed. Dr. L. Kleinrock, professor of data processing at UCLA, estimates the backlog at about four working years!
- Supporting evidence from Mr. Kobayashi, President of Nippon Electric Company (NEC): "The software development lag due to a lack of experts in the industrialized nations is two to three years..."
- A major computer manufacturer recently placed the backlog in his software development at three million lines of code.
- In France, job offers for DP professionals positions represented 18% of all 1983 employment advertisements.

Not only is there an undeniable personnel shortage today; everything would seem to indicate that the gap is not going to be bridged quickly, for one simple reason: there is a substantial shortage of teachers at the university education level. This is true for both the United States and Europe: at a major 1980 convention in the USA, top-level educators and manufacturers gathered to discuss the problem od the deficit in PHD-level DP experts in education and research, a deficit recognized as one of the most severe being experienced by the country in terms of skilled personnel for its leading-edge industries. Meeting again in 1982, convention delegates had to regretfully confirm that the two intervening years had brought virtually no improvement: only 250 doctorates in data processing are being awarded yearly, whereas the demand is for about five times that number... and there is no cease to the proliferation of education-hungry students.

The consequences of this drought – and its "self-accelerating" dynamics, where shortage encourages turnover of DP personnel, which in turn slows down work in progress, thereby further increasing personnel requirements – are obviously serious ones. In the forefront stand those consequences which involve training itself, which is often excessively concentrated on short-term results and does not provide future DP professionals with the necessary vocational "culture". Moreover, the lack of qualified professionals places an overload on the shoulders of existing personnel, preventing them from spending the necessary time on the development of more productive tools. Communication between designers and users is difficult, as the latter are not adequately familiarized with the possibilities offered by data processing, and the former are often ignorant of users' needs. This situation sometimes breeds inappropriate decisions, defective tools and mismatched applications and systems.

I'm in charge of both local and regional office-level area network supervision at Crédit Électrique et Gazier (CREG). Every morning, I supervise terminal startups for all of France. Everything has to get moving very quickly because the people using the terminals have to answer queries by CREG customers who come to check their accounts. After that, we offer a technical assistance service, by telephone, for all users having problems: there's a bit of "public relations" involved in this. If the fault is traced to the telephone lines or the hardware, we get in touch with the PTT or the manufacturers. In any case, a solution has to be found. Once all the screens are up and running, we monitor the network on the basis of statistics derived from developments in problems reported. The rule of the game is to turn out a maximum of solutions in a minimum of time; in other words, it's a whole event-management process. We also provide training for terminal users. We visit their offices and explain to them how to use a terminal, a modem, a display monitor... As for the retail distribution network, our job is to start up and process "Passcard" systems for all the Carrefour and Casino chain stores in France, as well as the "Accord" systems fot the Auchan chain.

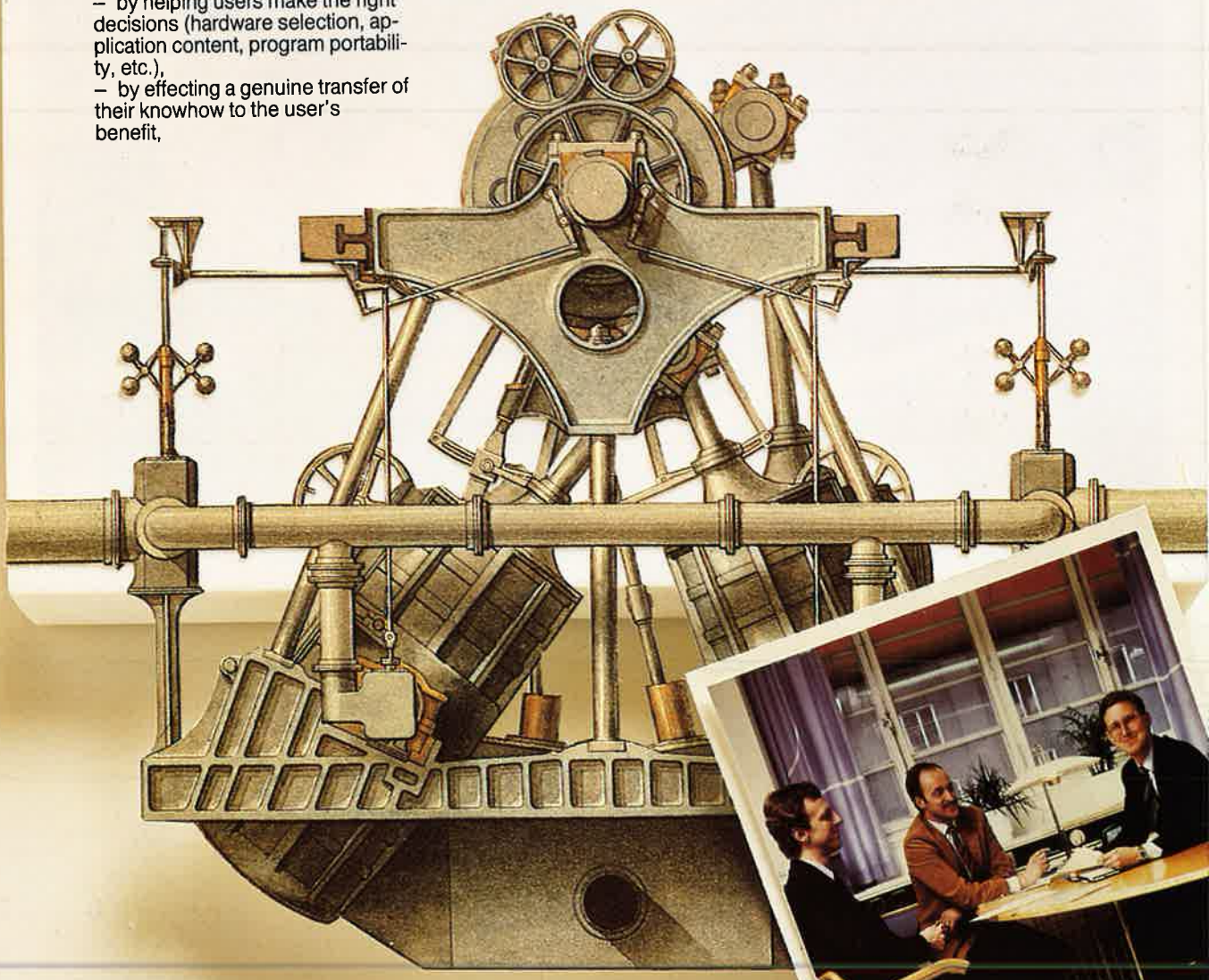
Danielle SKENADJI,
Age 23, Single

Gym... a question of balance.

The regulating function of service companies

When responding to the requests of their customers, service firms allocate their professional capabilities where they are most needed, and thereby help offset the negative effects of the shortage in DP professionals. But service companies also exercise this smoothing function in many other ways, for example:

– by helping users make the right decisions (hardware selection, application content, program portability, etc.),
– by effecting a genuine transfer of their knowhow to the user's benefit,
– by enhancing productivity, thanks to the creation of systems development and maintenance tools and methods,
– by assuming a substantial share of recruiting and supervisory tasks on their customer's behalf, thereby enabling the customer's DP department to devote its management time to meeting the needs of in-house users,
– by training DP professionals both for their own needs and, to be frank, for the rest of the industry. In point of fact, many service-company employees, after having acquired extensive professional experience, decide to continue their careers with a user firm (a recent study by Pierre Audoin Conseil shows that 65% of professionals leaving service firms take up jobs with users).



A GIANT TRAINING EFFORT

The clear increase in the number of DP professionals needed leads to training requirements which substantially exceed the absolute values of this growth alone, as training must additionally confront unavoidable recycling needs within every existing job category (change of professional orientation, career development, specialization, retirement, etc.). In France, for example, SYNTEC forecasts an annual net growth of the DP workforce of 9,000 professionals; this figure must be increased by about 6,000, however, due to an estimated annual recycling rate of 3% applied to the current population of 200,000 DP professionals. In face of this total annual requirement for 15,000 professionals, the influx of graduates from the public education system will not exceed 8,000, resulting in an annual deficit of nearly 50%.

A comparable situation exists in the USA: the Department of Labor places the net requirement for DP professionals at around 45,000 annually up to 1990. But higher education can barely meet this demand halfway at present, as only 25,000 B.S., M.S. and Ph. D. degrees in data processing were handed out for the 1981-82 academic year.

We shall see that the supplementary training workload is primarily borne by the DP industry itself, and by service companies in particular.

From the qualitative standpoint, the main characteristic of this profession is probably its demand for adaptation to continuing and very rapid change in both technology and needs, and there is hardly a job offer which does not feature a threefold requirement list: professionalism, specialization, adaptability.

In point of fact, both users and service companies look for professionals who are at once:

- **experienced** and ready for quick assignment, presupposing that – following initial theoretical training – they have acquired the concrete experience needed to make them good basic professionals (and there is no point in concealing that this requires at least several years on the job),
- **specialized**, if possible in several technical areas or application categories, such as familiarity with a database management system or microcomputer software, together with experience in banking applications, production management or implementation of automated tools for operations, etc.
- **adaptable**, i.e., capable of continuously updating their knowledge of increasingly-sophisticated techniques and putting them efficiently into practice as needs develop.

Concern for meeting this increasing demand for DP professionals leads us to examine the problem from the standpoints of both initial training and continuing education within the professional context, both at the time a consultant commences his or her career and throughout the duration of his or her working life.

One of the most important events in my life has been when, after two years in the Group, I got the opportunity in 1974 to go down to PARIS to help in the implementation of the Europe products Division. I enjoyed very much the five years I spent in PARIS because I had lots of international contacts, and that of course gave me lots of good memories.
Right now my mission, as I really see it, is to build up a branch here in STOCKHOLM which will be the leading branch in Sweden because of the market place we have here.
I feel that a leading branch should be an aggressive one, taking care of these large business opportunities, and also a "culture place", if you can call it that, where you create some kind of team spirit, of company spirit within that branch, where you have some kind of branch personality.
My first job now is to sell and motivate, those I think are the two important things. As far as my clients are concerned, things are changing. The EDP manager becomes more and more a true professional manager, talking more about strategies, about goals, how to involve information engineering into the product development, how to use the resources of the company better.
When I started as a salesman in '73, I very much thought of selling as a kind of technical process where you had to prove that your solution was always better than the other, but it's very much more a question of confidence, that is to reach the other person, to be able to look into his eyes saying that really I'm going to solve your problem, this is the solution you are going to choose. Not really selling on price or selling on a very very advanced solution, but to get the customer confident that you understand his problem and really to show him that you are determined to give him the right solution. I have also to motivate my professionals. I think there is only one question in motivation: that is to be there, to share their job, their trouble and their joys; really to be there.

Lars Olof NORELL
Age 36, Married, 2 children

"Formal logic, analyzed with reference to the meaning of propositions, is in itself insufficient for an understanding of the truth, but it must be studied if one is to grasp the formal structures existing between true and false judgments"
Russel and Whitehead (Principia Mathematica)

I'm a beginner programmer at CAP SOGETI TERTIAIRE, and I'm currently working on conversion of a large insurance company's accounting system. I've done a major portion of the printouts in PGI – that is, everything involving policy cancellation orders, payment reminders and auxiliary journals... but I've also worked with the accounting departments. Generally speaking, my work is divided into three main parts. First, I go over the systems analysis, which takes more or less time depending on whether the evaluation of requirements was well done or otherwise, and whether special circumstances have been taken into account. So it's always necessary to check the quality of the analysis, and very often to supplement it.

Next comes the program writing phase, most frequently in COBOL, and finally the test phase, which is generally the most stimulating because it lets us judge the programs we've created. This might be a somewhat simplistic view of things, given the fact that I've only been working for six months. But I already know that I'd like to see my work move toward real-time in the short term.

Pascale SATRE, Age 24, Single

Initial training in data processing

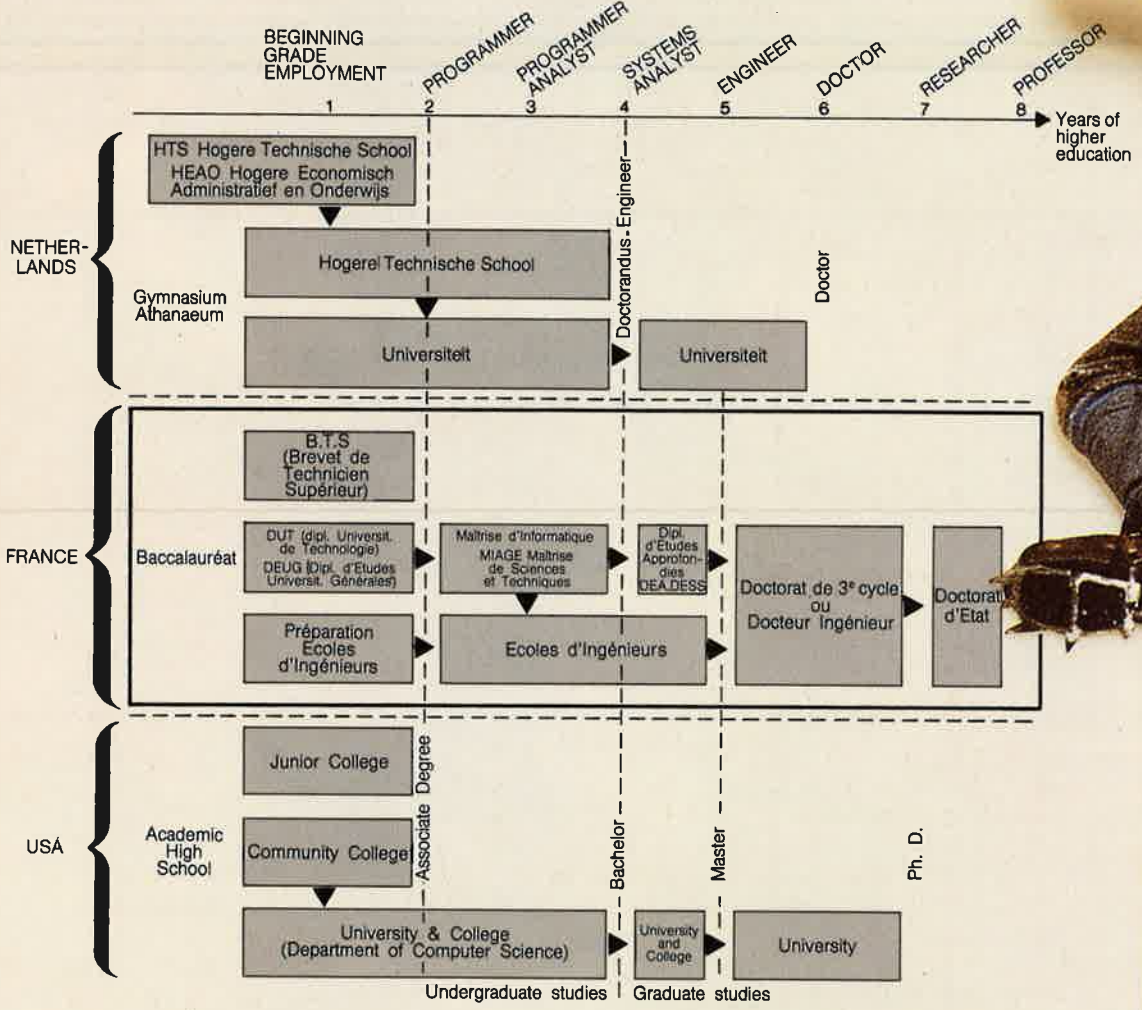
In a recent report, Prof. Maurice Nivat, a member of the University of Paris VII's data processing department, stated: "An essential – and too often neglected – point is that data processing is a difficult subject, particularly in its software aspects... It's time to stop pretending that data processing is a snap, that you can learn it when you need it. An education in data processing requires as much time as for any other discipline."
Prof. Nivat thus emphasized the importance of **initial** education, which must enable the future professional to acquire not only "pure" knowledge, but knowhow and broader culture as well. The goal of this education is:

- to teach the theoretical foundations and basic concepts of data processing: computer structure, file systems and operating systems, algorithms, programming methods, software life cycles, etc.;
- to pass on the practical information required for solving real, concrete problems (which demands not only a mastery of methods and tools, but the availability of substantial hardware and software resources as well);
- to get across the thought patterns, the methods for tackling problems, the inductive and deductive reasoning processes and the heuristics which will enable the student to assimilate the qualities of thoughtfulness and meticulousness required of a DP professional.

The need for such education has been pointed out by MIT faculty members, who state that they have already encountered significant difficulties in correctly training people who have acquired bad habits by developing just a few microcomputer BASIC applications without guidance.

Obviously, the burden of initial training must be given priority assignment to the university-level education system.

Higher education in the Netherlands, France and the USA



The table below outlines the higher education systems existing in the Netherlands, France and the USA. It indicates certain similarities with regard to the three main levels of education:

- an initial two-year phase for training programmers and operations technicians,
- a second phase, lasting two to three years, yielding equivalents of the B.S., M.S. or graduate engineer diplomas, training future systems analysts and designers,
- a third phase, commencing after five years of university-level study, which forms the doctoral program in data processing, still sparsely attended (as indicated above, only 250 doctorates are awarded yearly in the USA).

If I have a DP project carring me a problem I sometimes dream about it at night. But when I am to go fishing, at night I dream of fishing.

I became a DP professional a bit by chance, as I already had a chemical engineering degree when I joined CAP GEMINI SOGETI but, like most chemists, I wasn't able to find a job in my field of specialization. One day, while looking through the employment ads, I noticed that a DP company was recruiting with a three-month training contract, so I sent in my application... and here I am. This training period not only allowed me to make the shift from chemistry to data processing – today I wouldn't dream of doing anything other than data processing – but also enabled me to make friends within the Group. Now the tables are turned, and I'm the one who's teaching courses, especially on interfaces. I think that CAP GEMINI SOGETI puts a lot of stress on training, even where there doesn't seem to be an urgent need for it. Right now I'm busy observing Electronic Directory traffic, but I can always go to take advanced courses in CPLI on Mini 6, and I can also request training which doesn't have a direct connection with my present work: if I want to take courses on COBOL or real-time, I'll be given the green light. You have to be able to stimulate new needs... When I was younger, I wanted to build bridges. Today, it's software that I'm building, not bridges. Writing programs requires a lot of creativity; I'll be happy to be able to leave something concrete behind me.

Marc TRIQUENEAUX,
Age 26,
Single

Professional training

As we have indicated, higher education's training capacity thus falls far short of the mark. This is why the profession – users, manufacturers and service companies – must shoulder the full remaining training burden.

A substantial share of this load is taken on by service firms, characterized by SYNTEC as "the largest private data processing university" in France, for both:

- supplementary training of beginners, (or even training – period – if they have not already received basic instruction in data processing), and
- continuing education and recycling for employees throughout the duration of their careers.

As an example, we might note the case of a number of CAP GEMINI SOGETI Group subsidiaries which twice yearly select a group of recent university graduates – preferably science majors – which is given an intensive three-month seminar lasting several months and devoted to programming languages, basic methodology and major management applications. These young professionals may then take advantage of a five-year training plan with alternating work in the field (where they are continuously supervised by their project leader) and participation in complementary training courses.

In the case of employees with training already under their belts, the CAP GEMINI SOGETI companies have established a "personalized" training plan, drawn up with reference to individual experience and probable career development. The program for this individual plan includes:

- technically-sophisticated courses on subjects such as databases, telephony, real-time executives, ADA, microcomputers, image processing,
- courses on systems design and technical methods,
- courses on project management,
- courses on human relations, written and oral expression, languages, meeting management, etc.,
- technical information sessions dealing either with topics such as CAD, artificial intelligence or optical fibers, or with descriptions of large projects presented by the professionals who implemented them,
- "à la carte" training opportunities, including free access to a "workshop" equipped with microcomputers and terminals connected to a number of networks.

Our DP professional now trained, identified and ready to advance along his career path, we next meet him in his working context

The night I went to DASD for the interview, I still remember: it was in July, very hot, a 20 mile drive without air conditioning. I'd had a long day at work, I was tired and didn't feel like going. However I got there, filled out an application, and started talking with Gary KRIEGER. I wish that I had a tape of Gary doing that interview because his enthusiasm was so contagious. By the time that interview was over I really wanted to go to work for DASD. I was absolutely certain of it. I don't think I've ever been so excited about a job in my entire life, not even the very first job I had out of school. Then I got in my car and I drove ten miles in the wrong direction before I realized it!

Right now – almost eight years later – I am the branch manager for the North Central States Branch covering five states. We have about fifty people working in this branch, mainly in the Twin Cities, Minneapolis and St Paul, so I see my branch growing a lot, because there are many business opportunities not yet explored.

I normally go into the office early to have some time to plan my day, to do some of the paperwork that's waiting, answer some of the memos, read my mail, respond to some of the information requests that I get from the region or from corporate. Then I usually have some calls to field from other employees.

There are employee performance reviews to do. I try to get out on a number of sales calls for the customers that I provide service to. In addition to that, we do a lot of interviewing. Interviewing is an ongoing process. We try to interview – I say we, because I think every branch manager does this – people every week. Because we are always looking for good, talented people and it's tough to find them, so we just look constantly. What else do I do? I spend quite a bit of time doing planning and now that I have my PC, I use that to do some forecasting of what my business is going to be, and I discuss it with Tom PATTI, our Vice President. Of course, we do monthly formal forecasts for the region. We invest a great amount of time matching the skills of our professionals to the requirements of our customers. We also try to let our people know as precisely as we can what the environment is going to be like on a project we are going onto and also what their responsibilities are going to be like. So if I really look at it that way, there is a lot of time interfacing with other people: interfacing with our clients, interfacing with our employees, interfacing with other branch managers and with my managers. It's definitely a people business.

Terry FRAZIER
Age 36, Married, 2 children

« I have my heart set on robots. The robot I want, which is due out in next august, is called "BOB". It stands for Brains On Board. It laughs, sings, dances, tells jokes and teaches kids mathematics. »

THE DP PROFESSIONAL AT WORK

Most of our contemporaries see the DP professional as someone who uses a language which the computer understands for describing algorithms to be executed by the machine. In a more general view, the DP professional designs applications and fabricates software. But this definition actually encompasses only "software professionals", and the diversity and complexity of systems design and implementation assigned to this group have led to the growth of a commensurate variety of specializations and skills. Likewise, the operation of computers (and, today, networks) has also given rise to a number of distinct occupations.

The insets below feature definitions of selected functions related to DP systems development and operation. Abstract and somewhat rigid, these descriptions are no match for the extraordinary variety of tasks and situations encountered in this profession, which offers unusually promising career prospects under current economic conditions.

This section successively analyzes the working communities, the career opportunities, the personality profiles, the motivations and the turnover of DP professionals.

DESCRIPTIONS OF SELECTED FUNCTIONS

Programmer
The programmer possesses adequate technical skills for the writing and debugging of programs on the basis of systems analysis documentation or general flowcharts. Along with programming techniques, he has mastered at least one programming language. He knows how to organize his work: processing flowchart, coding test data assembly, compile run and testing, immediate generation of program documentation.

Systems Analyst
By definition, the systems analyst is a champion of dialogue. Highly experienced in programming, he has extensive familiarity with operating systems, applications and systems analysis and design. He performs functional analysis of a problem on the basis of a specification (or merely a definition of targets, if the application is not too complex) and he is capable of participating in organization of the information system. As a rule, he is also tasked with problems related to program sequencing, functional testing and program startup. Naturally, his participation might also be required in actual programming activities.

Consulting engineer
The consulting engineer has at least ten years' experience. He must handle the technical, organizational and human aspects of DP applications – all at the same time. He has an accurate understanding of the possibilities and limits of technical potential. He is familiar with the state of the art, and must demonstrate inventiveness and imagination. He has a well-developed feel for group dynamics. He is able to work at all levels of authority. As a rule, his services take the form of diagnostics, audits, DP master plans, DP structural analysis and a wide range of technical analyses. Obviously, he is himself capable of managing large projects.

Systems engineer
Responsible for the implementation, correct operation and maintenance of operating (and other) systems software, the systems engineer is also capable of evaluating these tools and making all necessary technical recommendations in their regard to other members of a DP department.

WORKING COMMUNITIES

Seamen work for a shipowner and make up a ship's crew. Masons are employed by a construction contractor and work at a construction site. Like these seamen and masons, DP professionals often belong to two communities: on the one hand, a company's DP department or a service firm's branch office; on the other, a project or an operations team. Now, these two communities can have very different working environments, command structures, personnel interrelationships and even life spans.

The project team: the project brings together DP professionals and specialists in the application to be developed. Together, they form a team whose structure varies as the implementation progresses. This team takes form at a manager's initiative. It expands with the selection of its first members. It acquires substance when its targets are defined. It takes on an organization. It adapts its capabilities to successive requirements. It designs and develops the system. It completes the last system tests then, upon final acceptance of its work by the user, it is dissolved. It might consist of a single expert; it might also be very sizeable.

The successful completion of a project depends substantially on the men and women who implement it. Obviously, the choice of its leader and of the technicians who will work with him is of decisive importance. Ultimate authority lies in the hands of the project owner: the user. He can call in the consulting skills of a service firm. This firm might also be asked to subcontract a segment of the work, or even assume the role of engineer for the overall project.

Regardless of the formula adopted, operations begin with definition of project specifications, drafting of the execution plan, determination of completion deadlines and calculation of costs. These tasks are performed by the project manager with the assistance of experienced professionals.

These are highly sensitive tasks. In point of fact, by simultaneously taking user expectations and implementing-team potential into account, they establish the terms of the challenge to be accepted by the project implementors. Moreover, the costs and deadlines for a DP project are harder to evaluate than those of conventional industrial operations (involving buildings, machinery, production or extraction units): the difference lies both in the abstract nature of the "material" being worked and the difficulty of estimating coordinating operations.

As a rule, implementation of a DP project involves the assembly of a large number of highly-interdependent program modules. Each is at once the origin and the termination of numerous links joining it to many other counterparts. Both the complexity and the necessary coherence of this network of links are

the fruit of lengthy, expensive coordinating operations whose true value is hard to assess and which are generally underestimated.

As for project lifetime: it is also not devoid of interest or variety. Analysts and designers perform a substantial portion of their work alone, whether behind their desks or seated at their **software engineering** terminal*. They design console displays. They write program instructions. They perform tests. They check intermediate results, compliance with specifications, performance levels.

They meet during progress and coordination meetings led by the project manager. This is the point at which decisions are made for dealing with inevitable unforeseen events, for correcting deadline and cost variances, for coming up with modifications to the initial specifications necessitated by concrete circumstances or fresh customer requests.

Construction of a high-quality DP project also involves the drafting of documents intended to make system use easy, complete and effective. This procedure also includes technical arrangements and the writing of special instructions to facilitate subsequent modifications, additions and corrections.

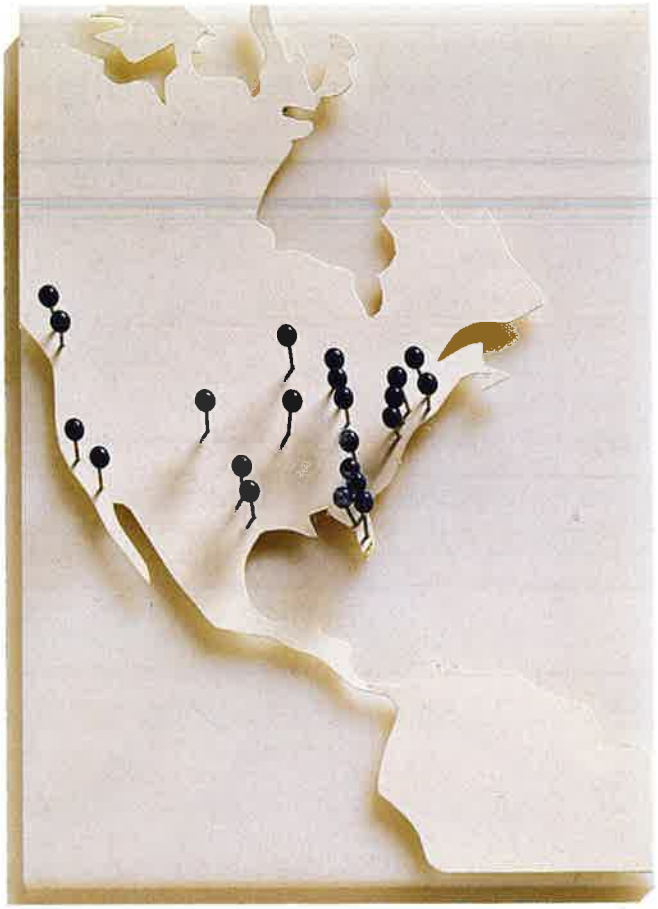
The project manager is responsible for making the environment in which teams perform these tasks a pleasant one, and for keeping it that way. This job is not always an easy one, as there is no shortage of pitfalls; demands change, and people, systems and machines are not always available at just the right moment.

The DP professional passes the bulk of his working time in this — frequently intensive — working context. This is where he truly acquires the experience that he lacks. This is where he enjoys the satisfaction of a job well done. And this is where he forms lasting friendships.

(*) *"Software engineering" is the full complement of methods, tools and procedures required for the implementation and review of all stages in the life of a software product: specification, programming, production control, testing and debugging, qualification, maintenance, documentation, etc.*

I was assigned to the AT&T Information Systems project at Orlando, Florida in April of last year. The day after my arrival, I was asked to plan a meeting with the User and participate in the selection and hiring of project team members while in the process of finding a place to live.
The project and experience gained was very good. It's very difficult to express the variety of things experienced during that portion of the project's life. I learned so much about managing people, activities, and my time.
The project team consisted of programmers from AT&T-IS, CAP GEMINI DASD employees and contract programmers from three other firms. I played a key role in the interview and acceptance process. My goals were to accept the most qualified and readily available candidates, because we needed a good project team almost immediately... so as candidates were presented from the various firms, we either accepted or rejected each candidate based strictly on the individuals qualifications and availability. Of those selected, only one had real problems in performance of assigned tasks. This person was assigned help from another team member, reassigned task completion dates and given less challenging tasks all in an effort to make him worth keeping on the project. When this person was selected, I thought he was the right man for the job... but as circumstances would have it, his life was in the process of taking an unexpected turn. He was experiencing, unknown to me, family and health problems. I think I've made my point, he was not getting the job (for which he was being paid by the client) done. As the project leader and the team member responsible for the overall project, I felt that the only correct action was to replace this individual with one who could accomplish the assigned tasks.
To release an individual from the project, knowing that he was having personal problems and that action will only add a new problem (possibly an income problem), must have been one of the toughest things I've ever had to do.
Successfully managing a project and project team of that size was very gratifying and should better prepare me for future projects and management assignments.

Larry PANKEY
Age 37
Married, 1 child



Principal locations in the United States

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	St Louis	16 North Central Avenue,	CLAYTON, MO 63105	1 (314) 721 01 23
	Tampa	Riverside Plaza, 100 West Kennedy Boulevard,	TAMPA, FL 33602	1 (813) 273 00 59
	Washington DC	301 Maple Avenue West	VIENNA, VA 22180	1 (703) 938 22 07
CAP GEMINI SERVICES, INC.	Washington DC	301 Maple Avenue West	VIENNA, VA 22180	1 (703) 281 20 60
CAP GEMINI SOFTWARE PRODUCTS, INC.	Dallas	2350 Valley View Lane,	DALLAS, TX 75234	1 (214) 247 54 54

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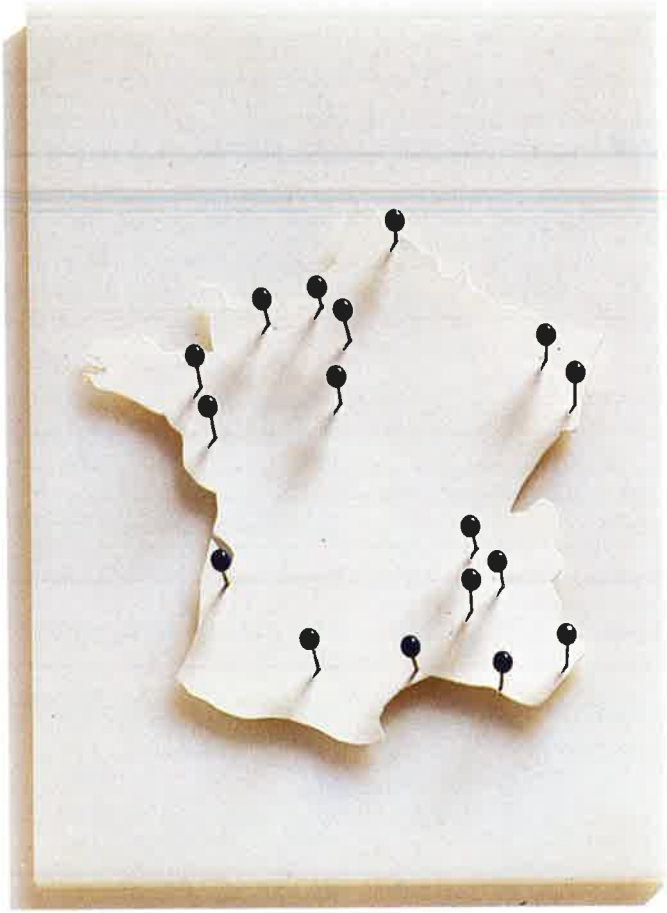
		Münich	Ridlerstrasse, 35 A	8000 MÜNCHEN 2	49 (89) 51 99 10
		Hamburg	Kanalstrasse 44	2000 HAMBURG 76	49 (40) 227 09 54
FINLAND	CAP GEMINI BRA	Helsinki	Annankatu 16b	00120 HELSINKI 12	358 (0) 64 86 48
NETHERLANDS	CAP GEMINI Nederland	Utrecht	Jutfaseweg 205	3522 HR UTRECHT	31 (30) 89 35 44
		Rotterdam	Westblaak 96	3012 KM ROTTERDAM	31 (10) 11 02 20
	PANDATA	Rijswijk	Sir Winston Churchilllaan 366	2285 SJ RIJSWIJK	31 (70) 94 93 25
		Amsterdam	Burghogguerstraat 787	1064 AMSTERDAM	31 (020) 13 46 46
		Eindhoven	Stationsplein 39	5611 BC EINDHOVEN	31 (40) 43 95 18
		Zwolle	P.O. BOX 1444 Oude Vismarkt 21	8001 ZWOLLE 8010 TA ZWOLLE	31 (38) 22 44 42
NORWAY	DATA LOGIC	Oslo	Torggt. 5	OSLO 1	47 (2) 42 07 60
		Bergen	Nygaårdsgt. 2	5001 BERGEN	47 (5) 31 11 17
		Trondheim	Kjøpmannsgt. 8	7000 TRONDHEIM	47 (7) 53 37 65
		Skien	Telemarksgt. 8	3700 SKIEN	47 (35) 27545
		Stavanger	Løkkeveien 14	4000 STAVANGER	47 (4) 52 29 35
SPAIN	CAP GEMINI España	Madrid	58 Nuñez de Balboa	MADRID 1	34 (1) 431 43 04
SWEDEN	CAP GEMINI BRA	Stockholm	Kungsgatan 38	11135 STOCKHOLM	46 (8) 24 55 40
		Göteborg	Stora Badhusgatan, 18-20	41121 GOTEBORG	46 (31) 10 06 10
		Karlskoga	Kungsvägen 33	69131 KARLSKOGA	46 (586) 503 80
		Sundsvall	Storgatan 10	85230 SUNDSVALL	46 (60) 12 55 40
SWITZERLAND	CAP GEMINI Suisse	Geneva	8c avenue de Champel	1211 GENÈVE 12	41 (22) 47 88 00
		Bâsel	Steinenring, 23 Postfach	4011 BASEL	41 (61) 23 41 41
		Bern	Laenggass-Strasse 7	3012 BERN	41 (31) 23 71 72
		Lausanne	14 avenue d'Ouchy	1006 LAUSANNE	41 (21) 26 31 33
		Zürich 1	Brauerstrasse 60	8004 ZÜRICH	41 (1) 242 28 26
		Zürich 2	Brauerstrasse 60	8004 ZÜRICH	41 (1) 241 06 70
	CAP SOGETI EXPLOITATION	Geneva	8c avenue de Champel	1211 GENÈVE 12	41 (22) 47 88 00
UNITED KINGDOM	IAL GEMINI	London	133 High Street	YIEWSLEY UB7 7QL	44 (895) 444 022
		Manchester	80 Manchester Road	ALTRINCHAM WA14 4PL	44 (61) 941 19 22

Associated Companies

UNITED KINGDOM	IAL	Southall	Aeradio House, Hayes Road	SOUTHALL UB2 5 NJ	44 (1) 843 24 11
ITALY	SYNTAX	Milan	8 via Gaetano Negri	20123 MILANO	39 (2) 87 74 44

CAP GEMINI SOGETI

HOLDING Company
Head office: Grenoble
6, boulevard Jean Pain-BP 206
38005 Grenoble
☎ 33 (76) 44 82 01
Finance: Lyons
241, rue Garibaldi
69422 Lyon Cedex 3
☎ 33 (7) 860 43 10
General Management: Paris
17, avenue George V
75008 Paris
☎ 33 (1) 723 61 85



Principal locations in France

CAP SOGETI OPERATIONS	Paris	92, boulevard du Montparnasse	75014 PARIS	33 (1) 320 13 81
CAP SOGETI SYSTEMES	Bordeaux	31, rue de l'Ecole Normale	33200 BORDEAUX	33 (56) 02 00 57
	Caen	9 rue du Général Giraud	14000 CAEN	33 (31) 85 12 69
	Grenoble	6, bd Jean Pain	38005 GRENOBLE Cedex	33 (76) 44 82 01
	Lille	276/6, av. de la Marne	59700 MARCQ-EN-BARŒUL	33 (20) 72 95 09
	Lyons	241, rue Garibaldi	69422 LYON Cedex 03	33 (7) 860 90 03
	Marseilles	90, av. de Mazargues	13271 MARSEILLE Cedex 8	33 (91) 76 52 91
	Montpellier	Allée Jules Milhau, Immeuble Le Triangle	34000 MONTPELLIER	33 (67) 92 20 17
	Mulhouse	14, bd de l'Europe	68100 MULHOUSE	33 (89) 45 10 60
	Nancy	25, rue de Saurupt	54000 NANCY	33 (8) 351 43 96
	Nantes	9, rue Marcel-Sembat	44000 NANTES	33 (40) 43 67 57
	Nice	42, av. du Maréchal-Foch	06000 NICE	33 (93) 62 02 78
	Orléans	33-35, avenue de Paris	45000 ORLÉANS	33 (38) 53 86 50
	Paris	21, rue Leriche	75015 PARIS	33 (1) 539 22 25
	Rennes	107, av. de Crimée	35100 RENNES	33 (99) 51 95 99
	Rouen	Pl. de la Verrerie-St-Sever, Immeuble Le Montmorency	76100 ROUEN	33 (35) 63 50 45
	Toulouse	1, Ch. du Pigeonnier de la Cépière	31100 TOULOUSE	33 (61) 40 55 58
	Valence	Le Métropole 2 10-12, rue du Parc	26000 VALENCE	33 (75) 42 56 19
CAP SOGETI LOGICIEL	Paris	5, rue Louis Lejeune	92120 MONTROUGE	33 (1) 657 13 31
CAP SOGETI INDUSTRIE	Paris	41, rue Ybry	92200 NEUILLY-SUR-SEINE	33 (1) 758 11 10
CAP SOGETI TERTIAIRE	Paris	26, rue de la Pépinière	75008 PARIS	33 (1) 293 22 00
CAP SOGETI EXPLOITATION	Paris	207, rue de Bercy	75012 PARIS	33 (1) 346 95 00
CAP SOGETI FORMATION	Paris	92, boulevard du Montparnasse	75014 PARIS	33 (1) 320 13 81
		83-85, boulevard Vincent-Auriol	75013 PARIS	33 (1) 584 15 40
CAP SOGETI INNOVATION	Paris	15, rue de la Vanne	92120 MONTROUGE	33 (1) 656 52 08
	Grenoble	Avenue du Vieux Chêne - ZIRST	38240 MEYLAN	33 (76) 90 80 40
CAP SOGETI INSTRUMENTS	Paris	15, rue de la Vanne	92120 MONTROUGE	33 (1) 656 52 08

Associated Companies

Groupe BOSSARD	Paris	12, rue Jean-Jaurès	92807 PUTEAUX	33 (1) 776 42 01
SESA	Paris	30, quai National	92800 PUTEAUX	33 (1) 776 41 00
VIDEOGRAPHIE SYSTEMES	Paris	23, rue de Courcelles	75008 PARIS	33 (1) 563 12 12
SICSI	Abidjan	46, avenue Charles-de-Gaulle	ABIDJAN	(225) 32 84 26

XV - MANUFACTURING OF PROGRAM-PRODUCTS

(in thousands of US dollars)	1982	1983
Program-products manufactured in France	299	864

Program-products manufactured during the 1983 fiscal year, but which do not meet the group criteria for capitalization (see note I e) are written-off as expense.

XVI - OTHER REVENUE

(in thousands of US dollars)	1982	1983
These include:		
• Interest	682	804
• Sales of program-products, hardware and miscellaneous	3 882	4 263
TOTAL	**4 569**	**5 067**

XVII - INCOME TAXES

a/Effect of income taxes

(in thousands of US dollars)	1982	1983
Current charge to income	6 126	6 389
Effect of the benefit from consolidation of fiscal results (note XVII b)	(247)	(715)
Net deferred charge to income	860	1 039
	6 739	**6 713**

b/Consolidation of fiscal results

Effective January 1, 1980, CAP GEMINI SOGETI S.A. and French subsidiaries in which it holds at least a 95% interest are able to benefit from the terms of Article 209 (6) of the French general Tax Code for a period of five years, and will therefore be able to combine the fiscal results of those companies.

c/Tax losses

in thousands of US dollars)	1982	1983
Temporary tax loss carryforwards	1 370	804
Indefinite tax loss carryforwards	447	504
Total tax loss carryforwards	1 817	1 308
Potential tax savings (at 50%)	908	654

Because of its uncertain future realization, this tax receivable is only recorded when corresponding tax loss carryforwards are effectively offset against taxable profits.
At December 31, 1983, the expiring dates of these tax loss carryforwards are the following:

Years	Amounts (in thousands of US dollars)
1985	72
1986	329
1987	395
1988	8
TOTAL	**804**

d/effective rate of income tax

In 1983, the effective rate of income tax is 43.5% (1982: 51.5%). The benefit from the combination of fiscal results (note XVII b) has allowed the group to offset the tax losses of certain French subsidiaries. The difference between the effective rate and the normal French rate is due on the one hand to the use of loss carryfordwards of foreign subsidiaries, and on the other hand the application of the provision of a 1983 French law favoring research by French companies.

XVIII - AFFILIATED COMPANIES

1. Consolidated companies

	%
Subsidiaries of CAP GEMINI SOGETI S.A.	
CAP SOGETI FRANCE	100
CAP EUROPE S.A.	100
CAP GEMINI DASD (United States)	100
DATA LOGIC (Norway)	100
GEMINI COMPUTER SYSTEMS INC (United States)	100
Subsidiaries of CAP SOGETI FRANCE	
CAP SOGETI EXPLOITATION	100
CAP SOGETI FORMATION	92
CAP SOGETI INDUSTRIE (1)	100
CAP SOGETI INSTRUMENTS	100
CAP SOGETI LOGICIEL	100
CAP SOGETI SYSTEMES	100
CAP SOGETI TERTIAIRE (1)	100
Joint subsidiaries of CAP GEMINI SOGETI S.A. and CAP EUROPE S.A.	
CAP GEMINI SWITZERLAND	98
Subsidiaries of CAP EUROPE S.A.	
CAP GEMINI BELGIUM	100
CAP GEMINI BERLIN	100
CAP GEMINI BRA (Sweden)	100
CAP GEMINI SPAIN	100
CAP GEMINI NETHERLANDS	100
CAP GEMINI LUXEMBOURG	100
I.I.C. (Switzerland) (2)	70
Subsidiaries of GEMINI COMPUTER SYSTEMS Inc	
CAP GEMINI GERMANY	100
CAP GEMINI U.K.	100
I.A.L. GEMINI U.K.	51
I.A.L. GEMINI MICROCOMPUTERS	51
PANDATA (Netherlands)	100
Subsidiaries of CAP GEMINI DASD	
Group SPIRIDELLIS	100
CAP GEMINI SOFTWARE PRODUCTS	100

2. Investments accounted for on the equity basis

GROUPE BOSSARD S.A. and subsidiaries	49
SESA and subsidiaries	42
CAP SOGETI OPERATIONS (ex. CAP SOGETI SAISIE)	100
CAP SOGETI INNOVATION (ex. SESI)	100

(1) Companies created at the end of October, 1983. These new companies will assume all the activities of CAP SOGETI LOGICIEL and CAP SOGETI SYSTEMES. This new internal structure has no effect on the consolidated financial statements.
(2) Information Industry Consultants, company created in 1983 with a common stock of Swiss francs 400 000 (revenue for the year: 103 thousand US dollars).

V - UNCONSOLIDATED INVESTMENTS

At December 31, (in thousands of US dollars)	1982	1983
These include:		
• Investments over 50% (dormant companies)	18	3
• Investments ranging from 20% to 50% (with neither an option to acquire a controlling interest nor a substantial degree of management influence)	69	146
• Investments below 20%	694	588
• Less amortization	(13)	(15)
TOTAL	**768**	**722**

VI - TAXES - RECOVERABLE

At December 31, (in thousands of US dollars)	1982	1983
These include:		
• Income taxes	77	1 401
• Taxes other than income taxes	1 056	1 061
• Deferred taxes	1 605	732
TOTAL	**2 738**	**3 194**

VII - OTHER RECEIVABLES

At December 31, (in thousands of US dollars)	1982	1983
Included under this heading are:		
• Unbilled work performed under time and materials contracts and work performed under contracts extending over more than one financial year and not yet billed (note I g). Represents 3.5% of 1983 turnover (1982 : 4.1%)	5 064	5 904
• Prepaid expenses	1 114	2 524
TOTAL	**6 178**	**8 428**

VIII - SHAREHOLDERS' EQUITY

At December 31, 1983, the shareholders' equity includes: (in thousands of US dollars)

• Issued share capital of CAP GEMINI SOGETI S.A. (540 000 shares par value 100 FF, authorized and issued)		6 467
• Retained earnings of CAP GEMINI SOGETI S.A.:		
– non distributable portion	529	
– distributable portion, after tax deduction	4 204	
– distributable portion, free of tax	1 826	
Subtotal	6 559	6 559
• Group's equity in earnings of subsidiaries subsequent to their acquisition (including the translation adjustments)		12 586
TOTAL		**25 612**

IX - LONG-TERM DEBT

At December 31, (in thousands of US dollars)	1982	1983
These include:		
• CRÉDIT NATIONAL	378	291
• Other long-term loans:		
– France	7 168	9 955
– Ouside France	2 234	2 834
TOTAL	**9 780**	**13 080**

Long-term debts include loans owed by Group companies that are always denominated in the national currencies. At December 31, 1983, the weighted average rate of interest is 12.1% (1982: 12.5%). Of loans totalling 13 080 thousand U.S. dollars (1982: 9 780), 8 641 thousand U.S. dollars (1982: 6 952) relate to notes renewable quarterly. These funds can therefore be drawn in accordance with individual company needs.

At December 31, the redemption dates of these loans are the following:

Years (in thousands of US dollars)	1982	1983
1984	2 076	–
1985	3 281	4 233
1986	2 456	3 407
1987	1 498	3 677
1988	23	18
1989	26	20
Subsequent years	420	1 725
TOTAL long-term portion	**9 780**	**13 080**
TOTAL short-term portion	**1 167**	**1 881**

Mortgage guarantees have been given in respect to 120 thousand US dollars of the above total loan outstanding at December 31, 1983 (1982: 395 thousand US dollars).

X - OTHER NONCURRENT LIABILITIES

At December 31, (in thousands of US dollars)	1982	1983
• Balance due on acquisition of investments	3 420	2 252
• Employees	172	333
TOTAL	**3 592**	**2 585**

XI - TAXES - PAYABLE

At December 31, (in thousands of US dollars)	1982	1983
These include:		
• Income taxes	3 123	1 423
• Taxes other than income taxes	1 718	2 268
TOTAL	**4 841**	**3 691**

XII - ACCRUED LIABILITIES

These represent expenses attributable to the current year ended December 31, but not yet due at that date. They include principally:

At December 31, (in thousands of US dollars)	1982	1983
• Accrual for vacation pay	3 536	4 423
• Value added tax on trade receivables (due on collection)	3 321	3 196

XIII - COMMITMENTS AND GUARANTEES GIVEN

At December 31, (in thousands of US dollars)	1982	1983
• Commitment (excluding secured loans, see not IX)	395	120
– Discounted notes, not matured	697	357
– Other commitments	78	17
TOTAL	1 170	494
• Guarantees given to the company or its subsidiaries (on Crédit National loan)	335	251

XIV - CONSOLIDATED REVENUE (VAT excluded)

(in thousands of US dollars)	1982	1983	Variance %
Group FRANCE	60 253	76 413	+ 26.8
Group EUROPE	32 285	42 992	+ 33.2
Group U.S.A.	28 790	46 993	+ 63.2
Group DEVELOPMENT	1 639	1 799	+ 9.8
TOTAL	**122 967**	**168 197**	**+ 36.8**

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(in thousands of U.S. dollars)

I - ACCOUNTING POLICIES

The consolidated financial statements have been prepared in accordance with current statements of accounting practice issued by the International Accounting Standards Commitee (I.A.S.C.).

Consequently, the accounts of each consolidated company (prepared in accordance with the accounting principles and legislation of the related country) are restated to conform with those statements of accounting practice, of which the following is a resume:

a/Consolidation

The consolidated financial statements include the accounts of CAP GEMINI SOGETI S.A. and all of its majority owned (directly or indirectly) subsidiaries.

Investments in affiliated companies owned 20% to 50%, and in which the group has either an option to acquire a controlling interest or a substantial degree of management influence, are accounted for on the equity basis. The gross value of investments in these companies is consequently adjusted for the group's equity in undistributed earnings subsequent to the acquisition of the related shares and, if necessary, for the goodwill amortization.

All other investments have been accounted for at cost.

All intercompany transactions have been eliminated.

b/Valuation method

Effects of Inflation

No adjustment has been recorded to take into account the effects of inflation.

Foreign currencies translation

Assets and liabilities in foreign currencies and profits and losses of foreign subsidiaries are translated into French francs at the closing rates of exchange. Profits and losses on translation are not included in the profit and loss account but are accumulated in consolidated reserves (note VIII).

c/Deferred taxation

Deferred taxation is recorded in the statement of income and the balance sheet for timing differences originating from expenses or revenues recognized for tax purposes in periods different from those in which they enter the statement of income (in France, these items relate principally to provisions for vacation pay, employee profit sharing and foreing investment).

Reserves are established for taxes to be paid upon distribution of certain foreign earnings.

d/Property, plant and equipment

Property, plant and equipment is stated in the balance sheet at cost. Depreciation is calculated on the "straight line" method over the estimated useful lives of the assets concerned.

Depreciation is based on the following asset lives:

Building	30 years
Furniture and fixtures	10 years
Equipment	7 years
Vehicles	5 years

Fixed assets acquired under long-term lease/purchase contracts are recorded at their market value on the date of the contract and are written-off over their estimated useful lives.

e/Intangible fixes assets

Program products:

"Other fixed assets" include program-products, either acquired or manufactured by the group, and are stated at cost. In order to be capitalized, expenditures on program-products manufactured by the group must comply with the following two criteria:

- they must give rise to an increase in the economic capacity of the company;
- they must constitute marketable assets.

Program-products realized under contracts signed in France with official organizations are amortized over the duration of the contract for the part financed by those organizations. Other program-products are amortized over a period not exceeding 5 years.

Goodwill:

Goodwill represents the difference at the date of acquisition between the purchase price of investments in consolidated companies and the group's share of the net assets of the companies concerned is amortized over a maximum period of 40 years.

f/Research costs

Research costs are written-off in the year.

g/Revenue recognition for long-term contracts

The income on long-term contracts is recognized according to the percentage of completion method. Services relating to fixed price contracts which extend over more than one financial year are valued at their sale price reduced, for the sake of prudence, by a variable percentage taking into account the specific characteristics of each contract. Only services rendered but unbilled as of the balance sheet date are included in other receivables (note VII).

Revenue on time and materials contracts is credited to income as and when the work is incurred.

II - FIXED ASSETS

At December 31, (in thousands of US dollars)	1982	1983	Variance
Land	129	233	104
Buildings			
Gross amount	1 015	1 333	318
Depreciation	(244)	(285)	(41)
Net amount	771	1 048	277
Equipment			
Gross amount	4 115	6 054	1 939
Depreciation	(1 678)	(2 349)	(671)
Net amount	2 437	3 705	1 268
Furniture and fixtures			
Gross amount	2 317	2 541	224
Depreciation	(1 110)	(1 353)	(243)
Net amount	1 207	1 188	(19)
Other fixed assets			
Gross amount	2 725	4 131	1 406
Depreciation	(1 250)	(2 060)	(810)
Net amount	1 475	2 071	596
Total property, plant and equipment	**4 544**	**6 174**	**1 630**

III - GOODWILL

At December 31, (in thousands of US dollars)	1982	1983	Variance
Gross value	14 260	16 662	2 402
Amortization	(1 259)	(1 892)	(633)
Net value	**13 001**	**14 770**	**1 769**

The increase of the gross value of goodwill is mainly attributable to translation of goodwill relating to foreign subsidiaries.

IV - EQUITY INVESTMENTS IN AFFILIATES

At December 31, 1982 and 1983, the investments accounted for by the equity method include:

- two investments in companies where CAP GEMINI SOGETI S.A. owns more than 20%:
  - BOSSARD S.A. and subsidiaries 49.2%
  - SESA and subsidiaries, acquired on December 31, 1982 ..... 41.9%
- and SESI and CAP SOGETI SAISIE, wholly owned subsidiaries, the activities of which were sold on March 1, 1983.

The main financial data relating to the BOSSARD and SESA groups are the followings:

(in thousands of US dollars) (unaudited figures)	Group BOSSARD S.A. 1982	Group BOSSARD S.A. 1983	Group SESA 1982	Group SESA 1983
• Stockholders' equity at December 31,	1 424	1 329	1 608	2 814
• Revenue	17 245	24 670	51 497	63 431
• Net income	301	(94)	–	1 205
• Equity of CAP GEMINI SOGETI S.A. and Subsidiaries in 1983 undistributed earnings	148	(46)	–	505
less goodwill amortization	(9)	(9)	–	(170)
less acquisition costs	–	–	–	(84)
Equity in 1983 undistributed earnings – net	**139**	**(55)**	**–**	**251**

CONSOLIDATED STATEMENTS OF RETAINED EARNINGS
(in thousands of U.S. dollars)

	Retained earnings	Common stock	Total
Shareholders' equity at December 31, 1981 (net income of the year excluded)	6 817	5 293	12 110
Net income for the year 1981	5 149	–	5 149
Dividend paid	(1 324)	–	(1 324)
Cumulative translation adjustment for the year 1982	1 373	–	1 373
Shareholders' equity at December 31, 1982 (net income of the year excluded)	12 015	5 293	17 308
Net income for the year 1982	6 167	–	6 167
Issuance of common stock (cash)	–	587	587
Issuance of common stock (by appropriation of retained earnings)	(587)	587	–
Dividend paid	(1 853)	–	(1 853)
Cumulative translation adjustment for the year 1983	3 403	–	3 403
Shareholders' equity at December 31, 1983 (net income of the year excluded) as shown on balance-sheet (page 68)	19 145	6 467	25 612
Net income for the year 1983 as shown on balance-sheet (page 68)	8 661	–	8 661
Shareholders' equity at December 31, 1983 before distribution	27 806	6 467	**34 273**

CONSOLIDATED STATEMENTS OF CHANGES IN FINANCIAL POSITION
(in thousands of U.S. dollars)

SOURCES OF FUNDS	1982	1983
Net cash flow		
Net income	6 167	8 661
Equity in undistributed earnings of affiliates	117	51
Minority interest in net income	42	18
Depreciation of property, plant and equipment	1 045	1 872
Amortization of goodwill	366	641
Deferred taxes – long-term	1 371	908
Long-term exchange loss	–	(37)
TOTAL NET CASH FLOW	**9 108**	**12 114**
Issuance of common stock (cash)	–	587
Long-term debt increases (net of short-term transfers and advanced payments)	2 879	3 300
Increase in other noncurrent liabilities	25	26
Increase in employee profit sharing fund	885	367
Effect of translation	515	705
Data entry companies accounted for on the equity method	571	–
TOTAL SOURCES OF FUNDS	**13 983**	**17 099**
USES OF FUNDS		
Acquisition of new consolidated companies		
• Fixed assets (net)	428	8
• Goodwill	2 389	–
• Noncurrent liabilities and minority interests	61	(55)
• Equity in affiliates (data entry companies excluded)	4 294	–
Increase of capital (data entry companies)	–	2 932
Addition to property, plant and equipment	2 740	3 893
Dividend paid	1 324	1 853
Increase in working capital	2 747	8 468
TOTAL USES OF FUNDS	**13 983**	**17 099**
INCREASE IN WORKING CAPITAL CONSISTED OF:		
Accounts and notes receivable	8 019	10 118
Cash	(2 147)	2 818
Other current assets	2 830	5 138
	8 702	18 074
Current liabilities	(5 955)	(9 606)
Increase in working capital	2 747	8 468

The notes on pages 71 to 73 are an integral part of these financial statements

Note to the reader: for the purpose of the English language version of this report, these financial statements have been translated into US dollars using a uniform rate for 1982 and 1983 amounts of US $ 1 = FF 8,35. The auditors' report relates only to the French version of the financial statements expressed in French francs which are included in the company's annual report in French.

AUDITORS' REPORT

To the shareholders and Board of Directors of CAP GEMINI SOGETI S.A.

We have examined the consolidated balance sheets of CAP GEMINI SOGETI S.A. and subsidiaries as of December 31, 1982 and 1983 and the related consolidated statements of income, retained earnings and changes in financial position for the years then ended, all expressed in French francs. Our examinations, which were made in accordance with generally accepted auditing standards except for the company SESA, as mentioned in the paragraph hereunder, accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. We did not examine the financial statements of certain foreign subsidiaries, which statements reflect 9.0% and 18.0% respectively (1982: 9.0% and 9.3%) of the total consolidated assets and income for the year ended December 31, 1983. These statements were examined by other auditors whose reports thereon have been furnished to us. Our opinion expressed herein, insofar as it relates to the amounts included for such subsidiaries, is based solely upon the reports of these auditors.

The financial statements of the company SESA for the year ended December 31, 1983 – accounted for on the equity basis in the consolidated financial statements of CAP GEMINI SOGETI S.A. and subsidiaries (Note IV) have not been examined in accordance with generally accepted auditing standards, at the date of our report. The CAP GEMINI SOGETI S.A. and subsidiaries' interests in the 1983 earnings of this company (acquired on December 31, 1982) amount to two hundred and fifty one thousand US dollars and are included in the consolidated statement of income under the caption "equity in undistributed earnings of affiliates".

In our opinion, based upon our examination and the reports of other auditors referred to above – except for the effect of such adjustments as might have been determined to be necessary, had an examination of the financial statements of SESA been made in accordance with generally accepted auditing standards – the consolidated financial statements referred to above all expressed in French francs, present fairly the financial position of CAP GEMINI SOGETI S.A. and subsidiaries as of December 31, 1982 and 1983 and the results of its operations and changes in financial position for the years then ended page 68 to 73, in conformity with the statements of accounting principles as defined by the International Accounting Standards Committee (I.A.S.C.), applied on a consistent basis.

Paris, April 4, 1984

J. BOURGUIGNON — B. PUGNIET
Statutory Auditors

Coopers & Lybrand

COOPERS & LYBRAND
Auditors

CONSOLIDATED STATEMENTS OF INCOME FOR THE YEARS ENDED DECEMBER 31,
(in thousands of U.S. dollars)

	1982		1983	
REVENUE (VAT excluded) (note XIV)	Amount	%	Amount	%
Fees from services rendered	118 099	96	162 266	96
Manufacturing of program-products (note XV)	299	–	864	1
Other revenue	4 569	4	5 067	3
TOTAL REVENUE	**122 967**	**100**	**168 197**	**100**
OPERATING EXPENSES (excluding VAT)				
Purchases	3 068	2	5 799	3
Wages and salaries	78 835	64	105 861	63
General and administrative expenses	23 946	19	34 635	20
Interest expense	1 178	1	2 417	2
Depreciation and amortization	1 740	2	2 641	2
TOTAL OPERATING EXPENSES	**108 767**	**88**	**151 353**	**90**
OPERATING INCOME	**14 200**	**12**	**16 844**	**10**
Employee profit sharing	(1 455)	(1)	(1 406)	(1)
Other profits and losses	320	–	5	–
NET INCOME BEFORE TAXES	**13 065**	**11**	**15 443**	**9**
PROVISION FOR INCOME TAXES (note XVII)	**(6 739)**	**(6)**	**(6 713)**	**(4)**
Equity in undistributed earnings of affiliates	(117)	–	(51)	–
Minority interests in net income	(42)	–	(18)	–
NET INCOME	**6 167**	**5**	**8 661**	**5**
GROSS CASH FLOW (net income before taxes + employee profit sharing, depreciation and amortization)	**16 260**	**13**	**19 490**	**12**
NET INCOME PER COMMON SHARE in US $ (540 000 common shares of par value FF 100; 1982: 442.000)	**$ 13,9**		**$ 16,0**	

The notes on pages 71 to 73 are an integral part of these financial statements

CONSOLIDATED BALANCE SHEETS AT DECEMBER 31, 1982 AND 1983

CONSOLIDATED BALANCE SHEETS AT DECEMBER 31,
(in thousands of U.S. dollars)

ASSETS	1982	1983
Current assets		
Cash	10 880	13 698
Accounts and notes receivable	29 947	40 065
Inventories	9	33
Taxes (note VI)	2 738	3 194
Other receivables (note VII)	6 178	8 428
Other current assets	1 786	4 194
	51 538	**69 612**
Noncurrent assets		
Goodwill (note III)	13 001	14 770
Equity investment in affiliates (note IV)	5 051	7 843
Unconsolidated investments (note V)	768	722
Other noncurrent assets	736	683
Property, plant and equipment, net (note II)	4 544	6 174
Other fixed assets (note II)	1 475	2 071
	25 575	**32 263**
TOTAL ASSETS	**77 113**	**101 875**
Guarantees given by third parties (note XIII)	335	251

LIABILITIES AND SHAREHOLDERS' EQUITY	1982	1983
Current liabilities		
Notes payable to banks	333	466
Current portion of long-term debt and short-term loans	1 705	3 339
Accounts and notes payable	11 217	14 058
Accrued liabilities (note XII)	14 573	20 721
Taxes (note XI)	4 841	3 691
	32 669	**42 275**
Noncurrent liabilities		
Long-term debt (note IX)	9 780	13 080
Employee profit sharing fund	3 418	3 785
Other noncurrent liabilities (note X)	3 592	2 585
	16 790	**19 450**
Deferred taxes – long-term	**4 159**	**5 798**
Minority interests	**20**	**79**
Shareholders' equity		
Common stock 540,000 shares of FF 100 each (1982: 442.000)	5 293	6 467
Retained earnings at beginning of year	12 015	19 145
Shareholders' equity (note VIII)	17 308	25 612
Net income for the year	6 167	8 661
Total shareholders' equity and net income	**23 475**	**34 273**
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	**77 113**	**101 875**
Commitments (note XIII)	1 170	494

The notes on pages 71 to 73 are an integral part of these financial statements

CAP SOGETI INSTRUMENTS

Chairman
Michel JALABERT
Deputy General Manager
Eric LUTAUD
Technical Manager
Bruno PERRIN
Sales Manager
Jean-Loup PERRIN

CAP GEMINI SOFTWARE PRODUCTS, Inc. (Dallas)

Chairman
Michel JALABERT
Deputy General Manager
Eric LUTAUD
Sales manager
Bryan L. AUSTIN

CAP SOGETI INSTRUMENTS designs, develops and distributes the Group's program products and the MULTIPRO software engineering workshop. CAP GEMINI SOFTWARE PRODUCTS, headquartered in Dallas, was established in 1983 for MULTIPRO distribution in the USA.

MULTIPRO is intended for use by software professionals, Each workshop contains from a dozen to several hundred workstations, providing each engineer with an integrated set of resources and tools for software development, documentation and maintenance, both for DP management applications and for technical or real-time systems implementation.

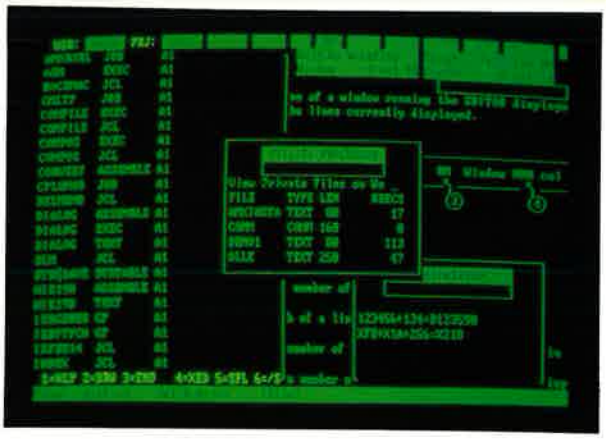
The MULTIPRO-L model has been marketed in France since 1982, and 200 workstations are currently in service.

The new model, MULTIPRO-X, has been available since 21 February 1984, the date of its worldwide unveiling at the SOFTCON software show in New Orleans. A first installation was already up and running at an American customer's site as of that date. Developed on the basis of MULTIPRO-L, MULTIPRO-X incorporates the features desired by our international clientele, as expressed during a survey conducted among 80 of the system's largest and most advanced users.

Analysts and programmers working at a MULTIPRO-X workstation can manipulate text and graphics, specifications and diagrams, source code and flowcharts at will. They can call, update and automatically chain forms or program blocks. Thanks to the multiple windows generated by MULTIPRO-X software, they can also simultaneously access an unlimited number of local or distant files, and transfer information between files. Working from a window which simulates a terminal, they can initiate tests on a distant machine while continuing to run local jobs.

The system's main tools include a full-page multi-window editor, a librarian, a document formatting processor and a number of housekeeping routines and communications modules.

The power of the MULTIPRO workstation makes it possible to gear down the effort of user analysts and programmers and, thanks to the resulting improvement in working conditions, to substantially increase their productivity and the quality of the applications they develop.



Four "windows" are displayed on this MULTIPRO-X workstation screen. Information which can be independently manipulated is entered in each window. In this illustration, we can see a background window which is emulating a 3278 terminal connected to a distant large IBM system under VM/CMS; partially concealed to the right, a specification document is being updated; in the center, a window which has been temporarily called for the scrolled display of a list of files; and, at the bottom right, another temporary window for a hexadecimal calculation.

CAP GEMINI DASD OPERATIONS SERVICES

John H. VANN
Senior Vice-President
Operations Services

CAP GEMINI DASD, Inc. Operations Services Division was created specifically to provide professional operations consulting to the data processing community in the United States. The Operations Services Division has been patterned after a European sister company, CAP SOGETI EXPLOITATION, which has been providing consulting and educational services to the computer operations side of the data processing shops in France for the past 8 years. Computer operations is the key element in the success of an EDP department yet it is often given much less attention than any other area of the DP shop. Perhaps operations is less prestigious, more mundane, and thus taken for granted. However, the function is growing more complex as computer technology develops further, calling for higher level personal skills in the operations department, as well as the need to extract the maximum performance from the hardware.

CAP GEMINI DASD Operations Services provides several levels and types of technical assistance designed to significantly improve the performance and productivity of a data center in the areas of:

- Batch production
- Teleprocessing production
- Technical support
- Systems programming
- Planning and control

By focusing on a production processing methodology, our highly skilled professionals have been subjected to a stringent selection process to insure that their skills can be quickly assimilated and used by your data center.

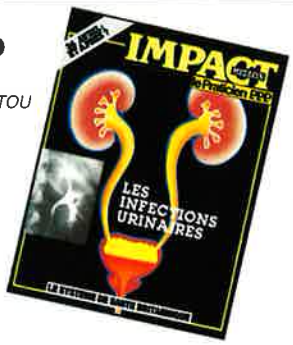
AT&T-IS

CAP GEMINI DASD has been working in conjunction with AT&T Information Systems personnel in providing operations and production support services for the AT&T-IS Contract Billing Systems group. The "CBS" application produces all bills that are associated with business telephone systems, sold or leased by AT&T-IS throughout the world. Eventually this application will bill over 4 million customers per month.

To support the "CBS" production runs, CAP GEMINI DASD consultants have provided data base analysis and tuning, space management, gathered performance statistics and performed related IMS tuning. Also, areas such as Release Control Procedures, Corporate Acceptance Testing, and the monitoring and problem resolution of the actual production runs have been performed by CAP GEMINI DASD consultants.

GROUPE BOSSARD

Chairman
Jean-René FOURTOU
Vice Chairman
Jean-Pierre AUZIMOUR
Financial Director
Georges GOURY



GROUPE BOSSARD, together with its subsidiaries, continued to grow during 1983. Its revenues exceeded FF 200 million, with an added value of FF 120 million.

Management consulting remains the dominant element in the activities of BOSSARD CONSULTANTS and its foreign subsidiaries. In a very rough breakdown, BOSSARD CONSULTANTS' operations were divided among:

- enhancement of corporate competitiveness, for 55%,
- development of strategic guidelines and marketing recommendations, for 20%,
- development of social consensus and personnel incentives, for 25%.

BOSSARD has perfected the lastmentioned activity to a such a degree that it was approached by an American counterpart, Diebold, for export of this technology to the North American market. To this end, a joint subsidiary – DIEBOLD BOSSARD ORGANIZATION DYNAMICS – has been established in New York.

Besides these conventional management consulting operations, 1983 was particularly marked by the strong growth of GROUPE BOSSARD's marketing, advertising and publishing activities in the medical sector.

FRANCE n° 1, with its satellites, accounts for one-third of the group's revenues. This company, which will be celebrating its 20th birthday this year, has thus further strengthened its position of market frontrunner.

In parallel, EDINTER is continuing to expand vigorously. Not only has its weekly magazine, "Impact Médecin", become one of the leading publications in medical publishing, but the company has also introduced two new titles onto the market:

- "Le Practicien", linked with "Impact Médecin » in terms of format and distribution,
- "Impact Internat", a monthly journal enjoying a large readership among medical students and interns.

SESA

Chairman
Jacques ARNOULD
General Manager
Michel FIEVET

SESA's 1983 revenues totalled FF 538 million in 1983, an increase of 21% over 1982. Consolidated net profit amounted to FF 10 million.

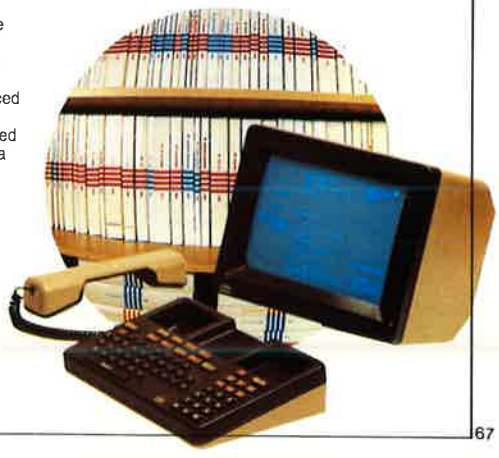
The company's expansion in the field of data transmission networks continued at a sustained pace, both in France – with extensions to the TRANSPAC network – and abroad, with the supply of numerous public and private networks. In Australia, for example, a sizeable order for extension of the AUSTPAC network was booked, while a number of large private networks are currently being installed in Italy. An agreement was signed with Paradyne for network marketing in North America.

The Electronic Directory service supplied by SESA for the Paris region and Picardy was opened in December 1983. Installation of the joint CAP GEMINI SOGETI/ SESA system, selected by the French PTT for expansion of the directory system nationwide, is continuing to go smoothly, and fresh orders were placed at the end of 1983.

An initial DP system for automation of the telephone information service has gone operational. The decision for extending it to a nationwide French information service should be made soon.

SESA's activity in the defense field, where it supplies turnkey command systems, and in the aerospace field, for information-processing ground stations, continued in 1983 with installation of a major system for the French Air Force and the booking of a number of large orders from the French National Space Research Center (CNES).

Finally, SESA is continuing its development in the industrial and service sectors, with special emphasis on market slots involving the application of advanced techniques (office automation, automated production, local area networks).



THE DEVELOPMENT GROUP

Seated, left to right:
Jean-Jack LOUDES, Director
Michel JALABERT, Vice President, Corporate Development
Jacques LESCAULT, Director

Standing, left ro right:
Eric LUTAUD, Deputy General Manager Cap Sogeti Instruments
Francis BEHR, Vice President,Corporate Development USA office

Since divesting itself of its data entry activity, CAP GEMINI SOGETI is devoting itself exclusively to DP software services. The sector represented by these services is characterized by a strong growth in demand, by a rapidly-changing technology and by a diversification in the types of services offered.

Obviously, a situation like this is a motor for development. It also makes it necessary for a group like CAP GEMINI SOGETI to make a sustained effort to keep itself technically up to snuff.

The Development Group acts to help identify these opportunities and the most significant new technical developments. It initiates new activities, opens up new markets, organizes the export of Group products and services and coordinates cooperation between CAP GEMINI SOGETI and the companies in which it is not a majority shareholder.

In this context, the most striking events during 1983 were as follows:

- Implementation of MULTIPRO-X, the second version of the MULTIPRO software engineering workshop, by CAP SOGETI INSTRUMENTS. Exploiting the power of 16-bit microcomputers, MULTIPRO-X offers unique performance characteristics: high-speed execution, multi-window editor, rapid file transfer between workstation and central computer, etc. Launched in the USA in February 1984, MULTIPRO-X is being marketed in that country and in France during an initial phase.
- On the basis of conclusions of a market study that we conducted in the USA, a service activity involving DP center operations was started up in that country at the close of 1983.
- Active cooperation in the electronic telephone directory field was established between the France Group and SESA, a competing firm in which we acquired a significant shareholding at the end of 1982.

At the close of 1983, finally, we established a US office to act as a sort of "technological lookout" on behalf of the entire Group and to smooth the technical and business exchanges between CAP GEMINI SOGETI's American and European units. Installed in New York, this office is managed by Francis Behr.

Michel JALABERT
Vice President, Corporate Development

MAIN MINORITY INTEREST

Groupe BOSSARD S.A.	49 %
SESA S.A. (Société d'Études des Systèmes d'Automation)	42 %
VIDÉOGRAPHIE SYSTÈMES	13 %

Lomas & Nettleton

LOMAS & NETTLETON is a $ 1 billion mortgage banking and real estate development company. LOMAS & NETTLETON INFORMATION SYSTEMS Inc. (LNIS) is a wholly owned subsidiary whose only business is data processing of mortgage loans. Headquartered in Dallas, Texas, they are one of the largest mortgage processing companies in the U.S.A.

CAP GEMINI DASD's Dallas Branch developed a software tool to facilitate the implementation of acquired loans onto the LNIS mortgage loan processing system. This product, the CAP GEMINI DASD Universal Data Translator (DUDT), reads foreign files and makes them acceptable to the existing loan processing system by changing, for example, character representations, or field types and sizes, or by add/delete/reformate functions. LNIS can now process and produce files from most computer hardware types, dramatically improving their ability to add new clients quickly to their system.

Rocky Mountain Bank Note

ROCKY MOUNTAIN BANK NOTE is the nation's second largest printer of bank checks and financial securities forms. The company has recently undertaken a project to provide sophisticated computer-based Order Entry and Production Support Services throughout its system of plant locations in eight western states. The new services require an integrated network of new systems. Systems specialists from CAP GEMINI DASD in Denver have been providing support for all phases of the project effort, including functional and detailed design specification, product evaluations, telecommunications network design and implementation, system and product benchmark and performance evaluations.

The DEC/IBM telecommunications network includes 22 network nodes. These new systems will allow ROCKY MOUNTAIN BANK NOTE to reduce their order processing turn-around time, improve quality and reliability in their printed products, and maintain a significant growth in market share with minimum expansion of facilities and staff.

Merrill Lynch & Co, Inc.

MERRILL LYNCH & Co, Inc. is one of the largest financial services companies in the world with over $ 20 billion in assets. They provide financial products and services to a broad range of individual and institutional customers.

CAP GEMINI DASD consultants are involved with many of the MERRILL LYNCH automated systems providing database design, analysis, programming and telecommunications expertise. Because of MERRILL LYNCH's dramatic success and growth, a standardization and expansion of the Customer Account Numbering Standard (based on a system allowing a unique access to any MERRILL LYNCH customer) is being undertaken, the largest data processing effort by MERRILL LYNCH to date. CAP GEMINI DASD is supporting this effort, helping convert more than 2,200 programs and more than 1,700 data sets involving more than 100 interdepartment systems.

Blue Cross of Washington and Alaska

BLUE CROSS OF WASHINGTON AND ALASKA processes Medicare claims for hospitals, nursing homes and Holmes Health Agencies in Washington and Alaska. A combination of federal and state mandates has resulted in several major changes to the way Medicare claims are processed.

For more than a year, a team of CAP GEMINI DASD people from the Seattle Branch have been heavily involved in projects to install the "Prospective Payment" system of claim payment for hospitals, convert to a new claim form, handle electronic media claim processing, and support several new types of facilities, such as Hospices.

Services provided by CAP GEMINI DASD include systems analysis, user workflow analysis, project management, program coding and testing, software rehabilitation (documentation, enhancement...) and technical consulting.

General Electric Corporation

GENERAL ELECTRIC CORPORATION, Medical Systems Division (GE/MSD), is a manufacturer of large X-ray equipment and body scanning equipment used in hospitals and clinics. GENERAL ELECTRIC has been a customer of CAP GEMINI DASD for over seven years. GE/MSD is currently in the midst of converting from a time-sharing service to a large IBM in-house system. This new mainframe with IMS database and CICS command level telecommunications, will allow a quicker access and a more sophisticated use of all the business information.

CAP GEMINI DASD has supported manufacturing, financial, sales and marketing application areas, and currently is helping to develop an information center utilizing 4th generation language. The new center will allow GE/MSD user departments to access their data files directly and to generate their own management reports.

Federal Conversion Support Center (FCSC)

In August of 1982, CAP GEMINI DASD was awarded the first contract issued by the Federal Conversion Support Center (FCSC), which was formed to help government agencies select tools and suppliers for the performance of conversions. The project for the UNITED STATES DEPARTMENT OF AGRICULTURE's Farmers Home Administration (FmHA) began early in September of 1982. Utilizing CAP GEMINI DASD conversion software, methodology, and people, an antiquated accounting system for loan processing, consisting of over 100 subsystems, was converted to a state-of-the-art environment including the use of IDMS database and data communication techniques. The project, successfully completed in late 1983, enabled FmHA to utilize the facilities of a regional government data center, and operate in a more readily maintainable technological environment. Additionally the new centralized database will support the planned future systems development activity.

SITA

SOCIETE INTERNATIONALE DE TELECOM-MUNICATIONS AERONAUTIQUES (SITA) provides services and software for airline companies worldwide. This requires continual real-time-on-line service with practically no downtime with 3-second response.

CAP GEMINI DASD was selected by SITA to assist in the development of several systems. One system containing subroutines is a reservations system for 32 international airline carriers. Also was developed a weather information system, a baggage tracking system to help decrease lost luggage, and a fare quotation system being codeveloped by SITA with AIR FRANCE. These systems are in Fortran on UNIVAC 1100 using TIPS and DMS-1100.

The U.S. Mint

The U.S. MINT with headquarters in Washington, D.C. is responsible for minting over 18 billion U.S. coins each year at three major facilities across the country. To maintain and maximize the efficiency of this immense manufacturing process in the future, the MINT asked CAP GEMINI DASD in Washington, D.C. to develop a long-range (1989) information systems plan for the agency. CAP GEMINI DASD performed a detailed requirements analysis and recommended a solution: the implementation of a distributed information system network to consist of four major applications systems – materials management, production control, financial and marketing – based on four minicomputer systems. The proposed system is being competitively acquired with installation scheduled for October 1984.

CAP GEMINI DASD also developed the draft invitation for bids (RFP) needed to acquire the mandatory support requirements, the special provisions, and the vendor evaluation plan.

THE USA GROUP

Seated, left to right:
Robert DUNAND,
Western Region Vice President
Michel BERTY,
President, U.S.A. Group
Robert J. BLAKE, Jr
Southern Region Vice President
John RADE,
Eastern Region Vice President

Standing, left to right:
E. James DALE,
Vice President, Marketing
Thomas PATTI,
Midwestern Region Vice President
Dan E. SCHROEDER,
Chief Financial Officer

The most youthful member of the CAP GEMINI SOGETI family, the USA Group continued along its path of strong growth and improved organization during 1983.

Our revenues have doubled in two years, and the USA Group today represents one-quarter of CAP GEMINI SOGETI as a whole. This growth has taken place smoothly on the foundation of existing branches, and extends over a great many sectors of professional activity. Every one of our branches has benefited from the experience accrued by their original parent firms: for example, CAP GEMINI Inc., for consulting, audits and feasibility studies; DASD, for conversions and development of software tools; Spiridellis & Associates, for training and systems consulting.

This development has been accompanied by the installation of an organization which better matches our needs: our 20 branches are now consolidated into four main regions, placed under the responsibility of four regional vice-presidents. This structure assists in providing our teams with identical standards of quality, identical management methods, helping us seek out a true synergism with all of our Group's vital forces. Moreover, the Marketing Management and Software Development Center provide and added element of support to our branches.

Entering a significant new phase in its qualitative and quantitative development, a unified, close-knit team like this owed it to itself to present an undivided image: faithful to Group tradition, we decided to adopt a single name, CAP GEMINI DASD, for our American activities as of 1 January 1984.

Thus united, yet covering the entirety of the USA, we are continuing our growth, we are offering our customers a guarantee of constancy and quality of service, and we are ceaselessly adapting ourselves to an exceptionally dynamic market.

Michel BERTY
President, USA Group

Branches and Branch managers

CAP GEMINI DASD

WESTERN REGION
- Denver
  Charles J. SPRONG
- Los Angeles
  David A. MORGAN
- Portland
  LaVelle DAY
- San Francisco
  Robert DUNAND (acting)
- Seattle
  David A. GANTT

MIDWESTERN REGION
- Chicago
  Warren L. SELKOW
- Indianapolis
  Charles M. HARRISON
- Milwaukee
  Gerald J. QUARTANA
- Minneapolis
  Terry L. FRAZIER
- St Louis
  Jon E. JENSEN

SOUTHERN REGION
- Atlanta
  Gary L. KRIEGER
- Dallas
  R. Tim FLYNN
- Houston
  Steve B. COFFMAN
- Jacksonville
  William S. DIXON
- Tampa
  John R. HAMON

EASTERN REGION
- Baltimore
  William M. FLANNERY
- New York
  Mark S. HENKIN
- Edison, New Jersey
  Steven J. DELUCA
- Philadelphia
  Richard E. SMITH
- Washington
  Myron H. MYERS

Other operations in the U.S.A.

CAP GEMINI DASD, Operations Services
- Tampa
  John VANN

CAP GEMINI SERVICES INC.
- Washington
  Leonard JACOBY

CAP GEMINI SOFTWARE PRODUCTS, INC.
- Dallas
  Bryan L. AUSTIN

Companies	Branches and their Managers					
Germany **CAP GEMINI DEUTSCHLAND** General Manager: Kaj GREEN (acting)	• Düsseldorf Werner BONGARTZ • Munich Klaus FEKETE	CAP GEMINI DEUTSCHLAND has established a leading position in the German market for conversions and videotex. Thanks to the use of automated tools and a proven methodology for the controlled transfer of	existing programs from one hardware to another, the company has successfully completed major conversions for such clients as PREUSSISCHE ELEKTRIZITATS-AKTIENGESELLSCHAFT	and B.A.T. CIGARETTEN-FABRIEKEN GMBH and is currently working on several large new projects including the transfer of all data processing for DEUTSCHE SHELL to IBM equipment. CAP GEMINI	DEUTSCHLAND also leads the field in software development and products for videotex users. Over 140 copies of the company's EDITEL product providing videotex editing facilities for IBM PC	machines have been sold, and the product was used by IBM to show the PC's qualities in videotex at demonstrations throughout Europe.
Belgium **CAP GEMINI BELGIUM** General Manager: Jean MILAN	• Brussels: Public Sector & Finance Jean MILAN (acting) • Brussels: Private Sector Jean PEETERS • Antwerp Robert MALOMGRE		NEW VANDEN BORRE is a Belgian distribution chain store, recently acquired by Electrolux, furnishing a wide range of household articles from 12 retail outlets. CAP GEMINI BELGIUM was selected to help transfer the DP facilities and in the choice of point-of-sale (POS)	terminals. In order to fulfil the latter requirement, a CAP GEMINI BELGIUM consultant became an acting sales asistant at the counter of a NEW VANDEN BORRE outlet where he analyzed the selling activity and studied the ergonomic requirements needed	to cope with retail clients. What he observed there led him to propose a revision of the initial specifications for the machine. Dedicated functions easy to learn and easy to operate by a sales person under pressure became primary requirements. Quick error correction, rapid	calculation of the change due, facilities for dealing with cheques and order forms and, finally, collection of management data were the other main requirements of the POS terminals to be ordered.
Spain **CAP GEMINI ESPAÑA** General Manager: Philippe DANGLADE	• Madrid Philippe DANGLADE	MECANICA DE LA PEÑA is the largest manufacturer of heavy equipment such as turbines, furnaces and high pressure piping for the private sector in Spain. As a result of installing special	software to control the production of the latter product, the company found its 9030 Univac-based installation saturated and decided to draw up a new data processing plan for its requirements. CAP	GEMINI ESPAÑA undertook this exercise, producing a plan, currently being evaluated by the client, that covers administrative applications such as stock control, billing	and personnel systems. An enquiry to be used in assessing computer manufacturers' proposals was also prepared. A packaged solution was suggested for production control	applications and the short term overload problem was solved through the use of a computer services bureau by the client.
United Kingdom **IAL GEMINI** General Manager: Jeff ENGLAND	• North Gerald PLIMBLEY • Information Systems Phil BENTON • Public Services Brian HARRIS	A team of 6 IAL GEMINI professionals are engaged on the system design phase of a project in excess of 20 man years for the MIDLAND BANK TRUST COMPANY to provide a computer system for its Corporate Services Branch in the City of	London. The new computer system, based upon twin DEC VAX-11/780's, will use tailormade software developed by IAL GEMINI to assist in the administration and processing of the wide range of activities performed by the Corporate Services	Branch. These include Corporate Trusteeship and Investment Custodianship for Pension Funds, Unit trusts, Debentures and Loan Stocks. At first for in-house use, the system provides for the possible future extension of on-line service to major clients	through linked terminals.	Midland Bank Trust Company Limited
Norway **DATA LOGIC** General Manager: Kai MARTHINSEN	• Oslo Svein WEINHOLDT • Bergen Arne OEN • Development Kai MARTHINSEN	DATA LOGIC was engaged to provide analysis and design of a new stock control and despatch system by the Norwegian lamp manufacturer OSRAM FABRIKKEN A/S. Developed for an IBM S/38 installation, the	system registers incoming orders and sorts them in post code sequence enabling the van transport, which moves an average of 40 cubic meters of goods per day, to be routed efficiently. The status of each order is	displayed, along with the estimated time taken to make the order ready so that transport delays can be avoided. The computer accesses these estimates from a knowledge base of typical readying times	previously fed into it. A system of tags attached to the packages carries all necessary data for picking and delivery and full freight documents are automatically produced. These facilities enabled	Osram to increase production without a corresponding rise in the labour force.
The Netherlands **CAP GEMINI NEDERLAND** General Manager: Chris van BREUGEL Sales Dev. Manager: Hans BOOM Technical Dev. Manager: Rob STARREVELD	• West Henk BREMER • Center Bert STRUIK • South Vrisou VRISOU van ECK	Holland's largest travel and tour operator, HOLLAND INTERNATIONAL, selected CAP GEMINI NEDERLAND for the software development of a fully-fledged reservations and booking system, using	mixed DP and videotex facilities. The system, based on an IBM 4381 configuration, will require about 50 man years of development work. The 100 sales offices of HOLLAND INTERNATIONAL will be connected to the	reservation computers through a private videotex network. CAP GEMINI NEDERLAND will also contribute significantly in starting up the client's data processing department; assisting in selecting and training	staff, besides handling a variety of organisational matters, such as departmental procedures under the new system. The development started in 1983 and functional design was completed early in	1984. First systems functions will be delivered in mid-1985 and the full system in 1986.
PANDATA General Manager: Aad UIJTTENBROEK Sales Dev. Manager: Ton KNÖTSCHKE	• Rijswijk Piet ADRIAANSE • Amsterdam Peter BUISMAN • Zwolle Ron LAVALETTE • Eindhoven Ton CASPERS • Training Peter van de RAADT • Organisation and Informatics Wim van de GEIJN	The Dutch government tasked PANDATA to design and implement a system to coordinate the varied interests and contacts that different departments of the MINISTRY OF ECONOMIC AFFAIRS have with the 600,000-odd commercial and industrial companies in	Holland. These include government-supported contracts, investment premiums and special regulations. The resulting system, to run on an IBM S/43 installation, has a unique structure allowing both the production of general purpose information and that for separate	departmental applications. It contains several databases whose communication and control is provided by an extensive set of definitions, codes and norms with intensive use of data dictionary functions. Many relationships with other systems such as the Chamber of	Commerce and Bankruptcy databanks must be permitted. For this development, the 4th generation online application development language ADS allowed the rapid production of the software.	
Sweden **CAP GEMINI BRA** General Manager: Kaj GREEN Sales Dev. Manager: Leif BJORDELL	• Products Christer ABERG • Stockholm Lars Olof NORELL • South Berndt OSMUND • North Lars SUNDBERG		CAP GEMINI BRA has designed and developed a totally new sales and warehousing system for TIBNOR, Sweden's largest steel merchant wholesaler. The system took two years to implement by a team that included 12	CAP GEMINI BRA professionals at its peak. It is helping TIBNOR management trim transport and administration costs and improve customer services by decentralising activities among the	corporation's 7 sales and stock centers. Based on IBM S/38 machines in each of the 7 centers, the system controls orders, invoicing, purchase, stock and distribution of 26,000 separate items. During system	development of this very large project, CAP GEMINI BRA professionals used methods from the company's own systems development handbook and standard company quality control procedures.
Switzerland **CAP GEMINI SUISSE** General Manager: Werner ZÜLLIG	• Basel/Bern Walter WEISS • Geneva Victor GANI • Lausanne Alain MARECHAL • Zürich 1: Commerce & Industry Arthur HOLENWEG • Zürich 2: Finance & Services Erwin ESTERMANN	A new Swiss law requires that all employees be fully covered by accident insurance, and provides a special fund known as Ersatzkasse in case of an injury where an employer has not complied with the law.	The regulations came into force on 1 January 1984. This deadline imposed severe time constraints on the development of a comprehensive system for the Ersatzkasse of the major Swiss insurance company HELVETIA	UNFALL. Thanks to careful design and intensive client involvement a three person team from CAP GEMINI SUISSE Finance and Services branch in Zurich was able to analyse the requirement, program and test the system in	10 man months, thus meeting the schedule required. The team adopted a strict methodological approach in order to adhere to the necessary project timetable. CGS has also been tasked to maintain this software,	which runs on IBM MVS and DL/1 with CICS.

THE EUROPE GROUP

Seated, left to right:
Paul HOFMANN,
Vice President Sales
Christer UGANDER,
President, Europe Group
Werner ZULLIG,
General Manager,
Cap Gemini Suisse
Harry KOELLIKER,
Vice President Finance

Standing, left to right:
Aad UITTENBROEK,
General manager, Pandata
Jean MILAN,
General Manager,
Cap Gemini Belgium
Jean RONCERAY,
Vice President Administration
Chris Van BREUGEL,
General Manager,
Cap Gemini Nederland
Kaj GREEN,
General Manager,
Cap Gemini Bra
Jeff ENGLAND,
General Manager, IAL Gemini
Kai MARTHINSEN,
General Manager, Data Logic
Philippe DANGLADE,
General Manager,
Cap Gemini España

Main Support Functions:
Meinard DONKER de MARILLAC,
Director of Communications
Klaus FEKETE,
Director Conversion Support Center
Jean PRADES,
Director of Technical Development

For the Europe Group, 1983 has been a very successful year with targets met in all areas of our business

First, in size: revenue growth over 1982 was 22%, i.e. 16% above an average inflation of 6% in the countries where the Europe Group operates. In the same time, the staff grew by 14% to a point where we now exceed the 1.000 total people mark.

Second, a continuous trend toward larger projects with overall CAP GEMINI SOGETI project responsibility. Early studies, system design and project management showed a steady increase leading to a shift in our staff profile with more professionals having experience in these areas. The corresponding training program continued in order to continuously improve our management and professional methods and tools, thus enabling us to provide the best possible quality-price ratio to our customers.

And finally, a significant number of important projects have been finalized in areas of dedicated applications and advanced techniques such as conversions, command and control systems or videotex systems.

We plan on meeting the growing qualitative and quantitative demand. Among the corresponding actions being carried out in 1984 let us mention the following:

- the establishing of the first European Support Centers (ESC) to provide special knowledge in dedicated applications and advanced services: a Conversion Center in Munich and a Videotex Center in Paris
- a further recruitment and training effort taking into consideration the increased importance of study, design and project management capabilities
- a continued drive for improved quality using among other things the MULTIPRO workstation developed by CAP SOGETI INSTRUMENTS.

In 1983, some 135 members of the Europe Group staff from 10 different countries gathered in Madrid for a "Rencontres" during which the future challenges and demands of our business were discussed and analyzed.

We are grateful to be in a business with such a promising and interesting future. We are thrilled by the possibilities it offers to the society, to our clients and to ourselves. We will continue to do our utmost to respond to these possibilities.

Christer UGANDER
President EUROPE Group

CAP SOGETI TERTIAIRE

Chairman
Hervé JAHAN
Deputy General Manager
Jean SAINT-HUBERT
Administrative and Financial Manager
Martine BIGE
Director of Marketing and Sales Support
Christian CHEVALLIER
Director of Development and Technical Support
Léon LEVY-BENCHETON


Hervé JAHAN


Jean SAINT-HUBERT

Technical advances are accelerating our society's transformation into one of information, communication and services. CAP GEMINI SOGETI, working together with service-sector companies for over fifteen years, has ceaselessly developed its activities in this realm. This is the origin of CAP SOGETI TERTIAIRE, whose corporate goal is to contribute to the DP development of all areas of the service sector: banking, insurance, tourism, real estate, publishing, distribution, transportation, the professions and public and private service firms.

CAP SOGETI TERTIAIRE today numbers over 270 sector-oriented specialists: consultants, engineers and technicians. This specialization has enabled CAP SOGETI TERTIAIRE to turn its knowhow to profit. It has resulted in the implementation of "Standard Application Modules", a new approach to the construction of dedicated DP tools at costs much lower than those for conventional developments, with the support of skills stockpiled and enriched with systems analysis documentation, functional modules and program libraries. In contrast to "products", Standard Application Modules offer the advantages of personalization and wide latitude for expansion, while still guaranteeing processing reliability.

Service-sector companies are increasingly consulting CAP SOGETI TERTIAIRE for solutions to their new DP requirements:

- insurance companies, for the reworking of their DP systems, which heretofore were contract-based rather than customer-based, a restraining factor in their marketing operations,
- banks, faced with the proliferation of automated teller machines and financial terminals, in order to take advantage of the diversified experience of CAP SOGETI TERTIAIRE, which has worked with the majority of French financial institutions in the areas of electronic funds transfer and transaction security,
- distributors, for the integration of point-of-sale terminals and other new products (optical-reading cash registers, for example) into their systems,
- travel and tourism, for the installation of reservation systems.

The service sector is among the most dynamic in the area of technological innovation. This is why CAP SOGETI TERTIAIRE, aware of the need for transaction security, has worked together with CAP SOGETI LOGICIEL to develop a "smart card" software product. Thanks to its sophisticated information-enciphering capabilities, this product will permit failsafe identification of card bearers as well as offer high-security remote payment, prepayment and messaging services.

Nowadays, "communications" means "networks": CAP SOGETI TERTIAIRE is marketing a powerful switch which supports all vendors' or standard protocols. Its name: MULTIFOX. This is a software product which handles a great many datacom and office automation functions, with the following applications:

- interconnection of dissimilar systems,
- management and optimization of corporate networks,
- electronic messaging and electronic mail.

The search for new solutions is a preponderant factor in the evolution of corporate data processing, CAP SOGETI TERTIAIRE aims to join in this search, providing business with those services best adapted to the continuing changes in their needs.

Hervé JAHAN
Chairman

Branches and Branch managers

- Insurance
Jean-Luc CHATEAU
- Banking 1
Bernard SARRAZIN
- Banking 2
Paul LABE
- Banking 3
Guy PEUCELLE
- Services 1
Jean-Michel ROY
- Services 2
Jean-Louis PRADELS

A selection of CAP SOGETI TERTIAIRE's standard application modules

***ACTION**, a portable stock-market order management module whose functions cover all the events in the lifetime of an order:*
- *daily entry of client orders and of orders executed by brokers,*
- *daily processing operations,*
- *monthly processing of settlements.*

***TRANSFERTS**, a registered security management software module.*

***GIL**, a building rental management software module. Its main functions are broken down into five subsystems:*
- *management of sales and administrative operations,*
- *accounts receivable,*
- *accounts payable and technical management of buildings,*
- *general accounting,*
- *custodial payroll.*

Each of these five subsystems may be independently installed regardless of the number of parcels or tenants managed by the user company.

***LCBM-LCBI and FINOBAIL**, leasing-company management software modules which encompass all functions inherent to this activity. One major advantage of this software is its "office automation" functions: all correspondence, contracts and documents are automatically printed out by the system.*

CAP SOGETI EXPLOITATION

Chairman
Rémi DONNEAUD
Deputy General Manager
Georges COHEN
Administrative and Financial Manager
Thierry GAUTHIER
Director of Marketing and Sales Support
Georges COHEN (acting)
Director of Development and Technical Support
François NEANT
Director of the Operations and Systems Training Center
Alain LE BRETON


Rémi DONNEAUD


Georges COHEN

With the advent of networks, databases and automated production, there is no doubt that the "operations" activity is entering a phase of profound change. One might even speak of a completely new direction, at once affecting methods, procedures and people. A notable result is that DP center managers must increasingly adopt an "industrial" approach to the organization and management of operations.

If future transformations are to materialize, operations personnel must be suitably trained or reoriented, and new, high-level technical functions created.

This is the sort of operation which ceaselessly confronts our company due to the very nature of its activities.

Our engineers and technicians are enabling us to direct our work toward a broader spectrum of capabilities in technical operations through the technical assistance and consulting activity that they carry out in scores of DP centers.

We are in a position to detect new directions of development at an early stage, and to seek out solutions matching the changes taking place in DP centers, because we are always "close to the action".

Hence our awareness of the decreasing importance of traditional operations tasks, and the necessity of preparing for the arrival of new production functions.

With a workforce of nearly 300 professionals, a fund of knowhow enriched by experience and a familiarity with the true problems encountered in operations, we can offer high-performance professional potential. This is why CAP SOGETI EXPLOITATION is continuing to assert itself as a leader in its branch of activity. An active partner to its customers, it provides them with the technical expertise and assistance required for solving the many complex problems raised by rapid technological change and development in the '80s.

Rémi DONNEAUD
Chairman

Branches and Branch managers

- Branch 1
Jacques AUGER
- Branch 2
Gérard JAMAIS
- Branch 3
Luc-François SALVADOR
- Branch 4
Jean-Marc BY
- Branch 5
François NEANT (acting)
- Branch 6 (French-speaking Switzerland)
Claude BUGEY

Careers in operations

New skills have taken shape and new jobs have been created to meet the new requirements of DP centers and to prepare for the future. Beyond the conventional functions of operations, the general spread of teleprocessing and the proliferation of databases is leading to the development of new skills:
– network and data managers,
– communications and DBMS software managers,
– network controllers.

Moreover, automation of batch processing is resulting in a transformation of the conventional tasks of console and job operators toward the supervisory and support functions needed to ensure the smooth running of a complex ensemble.

To summarize, we might state that the functions inherited from "classic" data processing will gradually yield way to high-level activities for handling the operation of increasingly-complex units, for managing performances, for designing system architectures and for setting up organizational structures which generate high levels of operation. And these functions are being taken over by operations analysts and engineers.

Main types of activity

CAP SOGETI EXPLOITATION's activity is exercised on a nationwide scale, covering all sectors of the economy. A selection from its extremely varied range of services :
1. DP CENTER MANAGEMENT: Full management of operations at many DP centers, in IBM and Bull environments.
2. MIGRATIONS: Organization and implementation of migrations (e.g., VSE-to-MVS, GECOS 64-to-GECOS 8, etc.).
3. AUDITS: Review of processing procedures and operational organization at a number of DP centers.
4. ORGANIZATION: Installation of operational methods and structures.
5. AUTOMATION: Responsibility for installation of industrialization processes at a number of DP centers.
6. NETWORKING: Responsibility for the network "platform" in large corporations.
7. TRAINING: Intra-company and inter-company training courses for operations and systems personnel.

CAP SOGETI LOGICIEL

Chairman
Alexandre HAEFFNER
Deputy General Manager
Jean BISSELICHES
Administrative and Financial Manager
Dominique ILLIEN
Director of Marketing and Sales Support
Jean BISSELICHES (acting)
Director of Development and Technical Support
Christian DOEHR


Alexandre HAEFFNER


Jean BISSELICHES

Government agencies, defense contractors, manufacturers in the telephone and aerospace industries, France's national electricity and gas utilities: these are CAP SOGETI LOGICIEL's leading customers.

In point of fact, government policy, the ambitions of these giant agencies and corporations, the dimensions of the problems which they must confront are all factors which encourage the launching of forward-looking large projects. And CAP SOGETI LOGICIEL is a significant contributor to these projects with its experience, its technologies and its methods, maintained and enhanced thanks to continuing investment.

As an example, we might take CAP SOGETI LOGICIEL's contribution to the breakthrough of data processing in the communications field, where a veritable chain reaction is now taking place:
– to begin with, the telephone was automated thanks to computerization, the typewriter became a word processor, computers began to communicate with one another over networks;
– at present, new services – made possible by these advances – are proliferating. Just a few examples:
- telephone call forwarding,
- videotex and home banking,
- electronic messaging and electronic mail;

– expansion of these services will henceforth be requiring new infrastructures: local area networks, wideband networks, cable networks, videotex access nodes and, soon, videocommunications;
– as these infrastructures will have to be able to communicate with one another, there is a need for standards, an example of which is ARCHITEL (1).

CAP SOGETI LOGICIEL has made a substantial contribution to the development of these new techniques, as shown by a handful of examples:

(1) *ARCHITEL is a coherent architecture designed to ensure compatibility between elecronic information services (videotex, teletex, facsimile, messaging) and accessibility of these services via public networks.*

Branches and Branch managers

- Information Technology
Jacques TIXERANT
- Public Corporations
Jean ROCHET
- Government Agencies
Michel COFFY
- Military
Jean-Marie BARRE

- continuing development and enhancement of telephone exchanges, in cooperation with the telephone industry,
- transit switch software providing increased capacity for the TRANSPAC network,
- implementation of the MULTITEL videotex host product line and the MULTI "11" electronic telephone directory line for in-house corporate applications,
- wide-baseband network management center software on the TELECOM 1 satellite,
- assistance to definition of the ARCHITEL standard prior to its installation on host hardware.

CAP SOGETI LOGICIEL is helping promote the use of these new services and infrastructures through its studies and its concrete implementations.

To begin with, at the research and planning level:
- by investigating the potential markets for future services. For example, CAP SOGETI LOGICIEL took part in France Câble et Radio's market studies for TELECOM 1, contributed to INRIA's NADIR (New Applications for Distributed Data Processing) pilot project, and carried out a study of its own on American market potential;
- by helping its customers implement master plans for their development, as with the study on the City of Paris' network;
- by participating in the design of future systems, such as the French PTT's teleprinting system.

Next, after all the choices and all the decisions have been made, actual implementation must begin. This is where CAP SOGETI LOGICIEL offers to assume responsibilities matching the project type and the customer's wishes. These might range from implementation of part or all of required software to turnkey supply – hardware and software – of complete systems, as has been the case with a number of civilian and military networks, videotex host systems, or the French electronic telephone directory.

Alexandre HAEFFNER
Chairman

CAP GEMINI LOGICIEL's Government Agencies Branch developed and started up the ADEMAR system for assistance to sea freight customs clearance procedures for the ports of Le Havre and Rouen.

ADEMAR automates the exchange of documents under terms of port procedures governing the interaction between the customs service and forwarding agents, dockside shed operators and freight handlers. Paper movements have been replaced by electronic messages carried over a dedicated network with 110 terminals in Le Havre and 60 in Rouen.

ADEMAR dovetails with the nationwide SOFI customs clearance system, operations in since 1976. SOFI sends notifications on the customs status of freight to ADEMAR, over a real-time link; ADEMAR then distributes this information to the freight handlers concerned and the local customs office.

Thanks to ADEMAR, information traffic is now faster and more reliable, with a commensurate reduction in freight holding time.

CAP SOGETI INDUSTRIE

Chairman
Jean-Philippe GAILLARD
Deputy General Manager
Gilbert ELOIRE
Administrative and Financial Manager
Michel LAPEYRE
Director of Marketing and Sales Support
Gilbert ELOIRE (acting)
Director of Development and Technical Support
Gérard CROZET


Jean-Philippe GAILLARD


Gilbert ELOIRE

Within the framework of CAP GEMINI SOGETI's new organization in France, CAP SOGETI INDUSTRIE – created in January 1984 – is the Group company whose activity is devoted to the DP development of all industrial companies in the Paris region, including DP hardware manufacturers and engineering firms, regardless of their area of specialization. CAP SOGETI INDUSTRIE's customers share a basic viewpoint: they are increasingly looking upon data processing as a fundamental tool for efficiency, not only in terms of better management, but also in terms of better communication, better production and better marketing.

CAP SOGETI INDUSTRIE and CORPORATE MANAGEMENT

Consulting engineers, industry specialists and DP professionals assist corporate management in determining its DP policy as a function of the company's strategic goals and its developmental capacity, and in drafting the corresponding master plans and DP plans.

CAP SOGETI INDUSTRIE and ADMINISTRATIVE, FINANCIAL and SALES DEPARTMENTS

Its work increasingly characterized by close contact with users, CAP SOGETI INDUSTRIE offers solutions integrating Standard Application Modules (developed by CAP SOGETI INDUSTRIE itself and derived from the generalization of applications) to customer administrative, financial and sales departments. Development effort is thus concentrated on aspects specific to the client company. Confronted with problems related to the ever-changing hardware market, DP managers receive all necessary assistance from CAP SOGETI INDUSTRIE's systems engineers for guiding them in their choices and for successfully managing migrations and conversions of applications.

Branches and Branch managers

- Industry 1
Jean-Pierre REY
- Industry 2
Jean-Pierre FOUSSIER
- Industry 3
Théodore KLOCANAS
- Industry 4
Denis SERGENT
- Industry 5
Alexandre LEVY

CAP SOGETI INDUSTRIE and PRODUCTION

Data processing is increasingly penetrating into research, design and manufacturing units, as reduced cost is essential at each stage of production. Simulation systems, computer-aided systems (design, drafting, etc.) and process automation are all DP systems which enhance corporate productivity. Divided among five sector-oriented branches, the engineers and technicians of CAP SOGETI INDUSTRIE offer effective solutions based on their thorough familiarity with their trade.

CAP SOGETI INDUSTRIE and MANUFACTURERS

An entire branch devotes its full potential to meet the very specific need of DP hardware manufacturers. Design, analysis and programming services are supplied in the areas of basic software, teleprocessing monitors, real-time software, database development, program products and so on.

CAP SOGETI INDUSTRIE and ENGINEERING

Acting as an engineer or working jointly with industrial engineering firms, CAP SOGETI INDUSTRIE designs and implements information systems as components of complex industrial installations. The use of tested tools enables the company to achieve gains in productivity and to meet its deadlines.

CAP SOGETI INDUSTRIE and COMMUNICATIONS

Internal communications networks, videotex systems and electronic messaging systems are indispensable tools for aid to decisionmaking. The tools installed by CAP SOGETI INDUSTRIE offer the twin advantages of flexibility and performance, through the use of tested program products.

CAP SOGETI INDUSTRIE and CEM have jointly implemented an automated system for cement plant control and regulation in Irak.

The turnkey system, delivered at Badoosh, enables a single operator to control the central section of the cement plant, which has a nominal capacity of 3,200 tons of cement per day. Working in a central control room, the operator monitors the operation of the raw flour grinding shops, the preheater, the kiln and the finished cement mills. He continuously manages ten mimic diagrams, three displays for cement quality control and over 2,000 alarms.

CAP SOGETI INDUSTRIE's contribution specifically involved mill charge regulation. This regulation permits optimization of production by maintaining the mill charge level at an optimal value while eliminating hazards of clogging.

The advantages of this automation fall into three categories: industrial, by increasing the longevity of mill plating and reducing maintenance requirements; economic, through reduction of maintenance costs and adjustment of electric power consumptions; and quantitative, by cutting down on variations in fineness of the ground product.

With its 300 employees – 61% of them engineers – consolidating every skill level and structured in sector-oriented branches, CAP SOGETI INDUSTRIE delivers answers to management or production DP problems by providing solutions which integrate the most recent concepts and technologies of data processing.

Jean-Philippe GAILLARD
Chairman

The three following pages are devoted to the seven Group FRANCE operating companies, as well as to two of the main support groups of CAP SOGETI OPERATIONS tasked with assisting these companies.

CAP SOGETI FORMATION

Chairman
Jean-François DUBOURG
Deputy General Manager
Cornel SIMIU
Chief, Selection Department
Any BOULADE


Cornel SIMIU

CAP SOGETI FORMATION handles all of the France Group's activities in the areas of training (Collège Informatique seminars, as well as a wide range of other DP and office automation training services) and DP personnel recruiting (CAP SOGETI SELECTION).

Seminars held by the Collège Informatique in London, Amsterdam, Copenhagen, Stockholm, Frankfurt, Geneva, Zurich, Madrid and Rome – as well as in Paris – during 1983 were anchored by some 230 high-level experts, universally recognized as authorities in their fields. Seminars were also held for the first time in the USA – in New York and Los Angeles – during 1983. These two-to-three-day seminars are addressed to DP managers and their direct subordinates, and are designed to update participants on key fields of the data processing activity.

In turn, CAP SOGETI SELECTION, boasting a dual capability in data processing and psychological techniques, further bolstered its position as a front-runner in DP personnel recruiting on the French market during 1983.

CAP SOGETI INNOVATION

Chairman
Jean-Paul FIGER
Deputy General Manager
Roland VARENNE
Director, Grenoble Research Center
Maurice SCHLUMBERGER

The task assigned to CAP SOGETI INNOVATION is to blaze the trail for CAP GEMINI SOGETI's medium-term technological decisions and to help strengthen the Group's potential by escorting it into the leading-edge areas of data processing.

To this end, this high-technology company is locked onto four main targets:
- Acquisition of new skills by systematic cooperation with the world of research.
- Transfer of these skills to Group branches through the implementation of joint projects.
- Employee training and information on advanced technologies.
- Implementation of "advanced product" prototypes.

CAP SOGETI INNOVATION's activities, initially oriented toward the Group's French companies, benefit CAP GEMINI SOGETI as a whole; they are structured on the basis of research topics, selected from the following six fields as a function of the maturity of techniques and their possible areas of application;
– software engineering,
– expert systems,
– natural languages,
– man/machine communication,
– DP system infrastructures,
– industrial DP.

VIDEOGRAPHY

With 43 new customers and installations on 61 new sites, 1983 confirmed the success of MULTITEL, CAP GEMINI SOGETI's range of videotex systems. This achievement was accompanied by our first breakthroughs on the European export market when SE-Banken and Postgiro in Stockholm both installed MULTITEL 40 systems.

1983 was also marked by unveiling of the MULTI-11 line of electronic telephone directories, implemented on the basis of the system originally developed for France's Ille-et-Vilaine region and inaugurated by Mr. Louis Mexandeau, Minister of Posts and Telecommunications, on 9 March 1983.

This electronic directory product line consists of the following four models:
- MULTI "11" M, connected to a PABX and designed for small business applications.
- MULTI "11" MV, also designed to handle the needs of several thousand subscribers, and capable of being combined with a MULTITEL videotex host machine.
- MULTI "11", addressed to very large organizations and able to meet the requirements of a network serving tens of thousands of subscribers.
- MULTI "11" PTT, intended for PTT or telephone company information services and for companies managing "yellow page" directory advertising.

DEFENSE

In the realm of defense, DP systems intended for industrial applications and administrative applications meet the same requirements and constraints as for any civilian agency or corporation.

In contrast, "operational" data processing is based on a different set of concepts, as it involves the creation of systems which must meet needs which change with conditions that are purely political (routine operations, tension, crisis, intervention, war, etc.), with a system life cycle of 20 to 25 years.

These systems, which require the application of new technologies, meet the following criteria:
- "interoperability", necessitated by the variety of hardware types and information media used by the armed forces,
- maximum reliability, as failure cannot be tolerated in critical situations,
- operating safety and absolute security of information processed,
- "survivability" against attack of any kind.

"Operational data processing" covers the entirety of systems for communications, command information and aid to decisionmaking, as well as weapons systems.

As an example of work performed by Group companies in the area of military communications systems, we note:
- French Navy: study of a local area network for future fleet vessels, conducted jointly with INRIA, the French national institute for data processing and automation research; ARTIMON, the Navy's telegraph network, implemented jointly with THOMTIT
- French Army: packet-switching network for the Army, as subcontractor to Thomson.
- French Air Force: studies carried out for design of the Air Force's telegraph network.

CAP SOGETI SYSTEMES

Chairman
Jacques BERTHELOT
General Manager
Jean-Claude BUSELLI
Administrative and Financial Manager
Christian GLEYO
Director of Marketing and Sales Support
André WORONIAK (acting)
Director of Development and Technical Support
Jean-Marc PONTHUS


Jacques BERTHELOT


Jean-Claude BUSELLI

Branches and Branch managers

- Bordeaux
Joseph HURTUT
- Grenoble
Patric BARBEROUSSE
- Lille/Service Sector
Bernard LEUBA
- Lille/Industry
Marcel de TAEVERNIER
- Lyons 1
Christian SOUCHON
- Lyons 2
Jean-Pierre PANDIN
- Marseilles
Paul CHAFFARD
- Montpellier
Francis MORRA
- Mulhouse
Raymond PAWLOWSKI
- Nancy
Bernard REGNAULT
- Nantes
Bertrand de TROGOFF
- Nice
Charles-Henri LIMOUSIN
- Orléans
Jean-Michel PARMENTIER
- Rennes
François RIAS
- Rouen
Philippe de BEAUCHAMP
- Toulouse
Jean-Loup BOUDINEAU

With a workforce of 900 people divided among 16 branches, CAP SOGETI SYSTEMES, whose activities are targeted on regional France exclusively, covers the entire nation. The company successfully applies one of the CAP GEMINI SOGETI Group's unswerving policies by keeping close to its 600 customers. Its branches – veritable small local businesses – offer their customers and their employees every guarantee characteristic of a responsible corporation, concerned with the quality of its services and its image.

Through its organization, CAP SOGETI SYSTEMES meets the specific requirements of the regional market. In point of fact:
- CAP SOGETI SYSTEMES must be at once a generalist – to be able to provide the services of every type and size requested by its customers in every region and sector of activity – and a specialist – to handle each contract with the most up-to-date resources available.

To resolve this apparent contradiction, CAP SOGETI SYSTEMES has developed a high capacity for interchange between its branches, in order to tap the immense reservoir of skills that they represent.

In order to survey, coordinate, mobilize and disseminate this knowhow, the company has set up – besides technical information sessions and in-house publications – "skill circles" which regularly bring together specialists in specific areas of capability.
- CAP SOGETI SYSTEMES is a favored business partner for companies of nationwide scope: due to the Group's geographic distribution, these companies can turn to CAP GEMINI SOGETI at both the headquarters and regional-site levels.

But CAP SOGETI SYSTEMES' branches are also valued partners for purely regional companies, which do not have to go far afield to find responsible discussion partners who are familiar with these clients' specific problems.

To enable customers to benefit from experience acquired in other, similar companies under the best possible cost conditions, CAP SOGETI SYSTEMES has developed Standard Application Modules: reusable software products which it tailors for integration into customers' DP systems.
- CAP SOGETI SYSTEMES also brings advanced technology to regional business and industry, in the belief that the state of the art should not remain the province of a privileged few. The company's success in installing over 50 MULTITEL videotex systems has encouraged it to promote internal electronic telephone directories, mail and payment systems, assistance to network installation, and so on, for 1984.

Already known for the stringency of its own management system and the acknowledged effectiveness of its technical methods for project evaluation, analysis and management, CAP SOGETI SYSTEMES is currently installing MULTIPRO software engineering workstations in its branches in order to increase productivity while enhancing the quality of its software and related documentation.

Through its geographic spread, its organization and the wealth of its skills, CAP SOGETI SYSTEMES thus provides its customers with unmatched guarantees of local capabilities adapted to their needs, while offering its employees genuine career possibilities in a large company.

Jacques BERTHELOT
Chairman

SNIAS has installed five automated storage facilities in its Airbus manufacturing plant at Bouguenais: one for tooling and four for materials. Each storage unit is equipped with a handling automaton which carries out all placing and picking operations. To control these tasks, warehousemen are provided with a dedicated workstation including a keyboard display unit, a badge reader, a printer and an optical reader.

SNIAS requested CAP SOGETI SYSTEMES to perform a control software study for the complete storage installation in 1982, and contracted for software implementation in 1983. This software automates the following operations:
- *physical inventory management, including arrivals and departures.*
- *selection of empty storage spaces for entering materials,*
- *transmission of commands to handling automatons.*
- *failure management for all installations.*

This software product also establishes a link with the central computer, particularly for accounting inventory management.

THE FRANCE GROUP

Seated, left to right:
Hervé JAHAN,
Chairman, Cap Sogeti Tertiaire
Alain LEMAIRE,
Chairman, Cap Sogeti Operations
Edouard BAZEILLE,
Deputy General Manager, Cap Sogeti Operations
Jean-François DUBOURG,
General Manager, Cap Sogeti Operations

Standing, left to right:
José BOURBOULON,
Secretary General, Cap Sogeti Operations
Jacques DE COMBRET,
Human Resources Manager, Cap Sogeti Operations
Bernard LORIMY,
Director, Cap Sogeti Operations
Jacques BERTHELOT,
Chairman, Cap Sogeti Systemes
Rémi DONNEAUD,
Chairman, Cap Sogeti Exploitation
Alexandre HAEFFNER,
Chairman, Cap Sogeti Logiciel
Jean-Philippe GAILLARD,
Chairman, Cap Sogeti Industrie
Jean-Paul FIGER,
Deputy General Manager, Cap Sogeti Operations

Operations support managers:
Claude DENIAUD,
Technical Support
Jacques MASSON,
Special Projects
Christian GALLIN,
Defense
Claude FORSANS,
Alain WILBOIS,
Videography
André WORONIAK,
Sales Support
Alain SARRAZIN,
Planning and Marketing
Robert NOELL
Employee Relations
Jacques BROHLE
General Services

The France Group's 1983 performance was highly satisfactory. We had set ambitious growth targets, and we met them:

- The workforce, growing by 9% over the previous year's figure, passed the 2,000-employee mark (45% of this number in regional France) by the end of the year. In just twelve months, then, we created 170 new jobs, the equivalent of a fair-sized service company.
- This increase in workforce numbers went hand in hand with a rise in skill levels (and thus in the level of services performed), leading to a 28% increase in consolidated revenue, which exceeded FF 650 million.

This was the favorable context existing at the end of 1983, when we carried out a revision of operational structures established some four years before:

- We redrew the boundaries between operational units in order to adapt ourselves to changes in our market and to structural modifications in our environment.
- These operational units were elevated to full company status, in order to provide them with increased independence. And we placed them under the leadership of managers with demonstrated professional maturity.
- Finally, determined above all to further improve our ability to react speedily to customer needs, we made sure that the Branch – the cornerstone of the CAP GEMINI SOGETI Group's structure, and an entity close to the customer by its very nature – will also be as close as possible to decisionmaking bodies within the company. To this end, we have reduced the number of chain-of-command levels in our structure, in spite of the significant growth in workforce size over the past four years.

The France Group now consists of seven operational companies (described in the following pages):

- CAP SOGETI SYSTEMES encompassing all of our branches in regional France.
- CAP SOGETI LOGICIEL, CAP SOGETI INDUSTRIE, CAP SOGETI TERTIAIRE based in the Paris region, with each working in its own customer sector.
- CAP SOGETI INNOVATION consolidating our research and development teams.
- CAP SOGETI EXPLOITATION, CAP SOGETI FORMATION have undergone no change.

Finally, the France Group's decisionmaking, supervisory and support arms are united in CAP SOGETI OPERATIONS.

As a result, we are now better equipped to offer both a very high level of service to our customers and exciting career prospects to our employees, without paying the price of increased structural complexity.

Alain LEMAIRE
Président, FRANCE Group

CAP GEMINI SOGETI 1983

A SELECTION OF TYPICAL JOBS PERFORMED BY CAP GEMINI SOGETI PROFESSIONALS

Consulting and associated services

– Advise and perform studies: development of master plans, specification writing, consulting in methodology, in equipment selection, in program product selection, in selection of new technologies, operational audits, definition of organizational procedures for DP centers, etc.
– Plan and hold technical courses within customer companies.
– Carry out assistance assignments.
– Take full charge of a DP center's operations.
– Analyze job positions, select candidates for internal hiring or on behalf of customers.

Software implementation

– Fabricate basic software: specification of software functions and interfaces with the existing system, definition of portability and performance criteria, code writing and debugging, documentation writing, testing.
– Implement application software: analysis of customer requirements, definition of functional specifications, installation of implementing team, project management, analysis, program writring and debugging, documentation, user training, software installation and acceptance.
– Software maintenance and conversion jobs.

Systems engineering

– Take charge of engineering functions for large projects, performing the tasks of: customer negotiations, consultation with subcontractors (if applicable), technical and administrative project management, technical coordination, definition of system architecture, software development and debugging, hardware and software integration, system acceptance, subsequent maintenance, system resale (in association with the original customer), etc.

Development, sale, installation and maintenance of software products

– Design, develop and document CAP GEMINI SOGETI Group program products.
– Sell standard applications modules, conversion products, videographic processing centers, portable products for assistance to software development, software engineering workshops (MULTIPRO), telecommunications products.
– Adapt these or other products to customers' exact needs.
– Install and start up products, and train customers in product use.
– Perform preventive maintenance and troubleshooting on request.

Because of technological and psychosocial evolution I think our work changes more and more from a DP orientation to an end-user orientation. Everybody reads and knows about computing and information processing. Consequently you must have a good knowledge of the companies you talk to, know about their industry, their applications, their language. To get that in-depth knowledge of the fields into which the DP industry is going, you must have the expertise within the company.

For very specialized things you can use international people. So I think it is very positive to belong to a Group that means something within the industry, because of the research and development you can use and all the things a small company can't afford.
I believe in decentralized operation of companies. They are stronger than totally centralized companies. Their structure is good for our kind of work. What we have in common within the Group is the type of work we do. At central level the Group can see further in the future. When you add all different parts together you can see a trend that we would not identify at branch level or even at company level. But for our current operations the culture environment is very important. So people from that culture should do DP in that environment: the Japanese do their own type of DP, and I think also in France there is a different style than in Holland or Germany.

Eric PLANTE
Age 39, Married, 3 children

The system of continuing occupational education, together with business and industry themselves, are already playing a substantial role: these are undeniably advantageous channels toward "dual skills" (DP plus another discipline) for certain DP functions which are becoming increasingly prized by the market.

Educate? Of course. But also make better use of existing brainpower. For example, a significant effort is now being made – by the large service firms such as CAP GEMINI SOGETI, in particular, as well as by certain governments – to promote the software engineering techniques, which yield a substantial increase in the productivity of DP professionals.

Finally, efforts will be concentrated on software reusability: program products (or, better yet, semi-products) yield a savings in applied brainpower while very closely meeting the specific needs of a great many users.

Nonetheless, limiting factors will remain: organizations and, especially, governments – even those most oriented toward free enterprise – are already putting brakes on the untrammeled circulation of information and knowledge. Community and cooperative policies are advancing only very slowly, because each entity, each state, is handling the problem with an eye toward its own interests.

Within this web of demands and constraints, service companies will strive to play the basic role that users expect of them; and, by giving the reader a behind-the-scenes glimpse into our profession, the CAP GEMINI SOGETI Group hopes that it has contributed to an understanding of the magnitude and the limitations of this role, ... which is also its own.

I'm an engineer in the Insurance Branch, where I basically perform three types of activity. A supervisory activity, which primarily involves overseeing and coordinating a set of worksites; a methods promotion and installation activity; and a consulting activity; audits and assistance in defining DP plans for project development. In this case, my role is to keep tabs on implementations, to make sure that the progress schedule is followed, and to participate in general design meetings. These meetings are aimed at standardizing the entire structure of applications to make sure that they are consistent and can be expanded, with the knowledge that – in the sector where I'm involved – about 80 people are going to be in the thick of the fray at the customer site.
I have to base myself on my own past experience to form an idea of the types of problems that our people are likely to encounter, and foresee the assistance or technical support that they're possibly going to need on that basis. In any case, I bank heavily on a thorough familiarity with the company and the Group.

Guy OLIVIER,
Age 36,
Single

THE STRATEGIC ROLE OF BRAINPOWER

The spread of data processing within business and industry, within the nation raises a major policy problem for all concerned. What strategy should be followed? What educational system should be set up? What research policy should be pursued? And so on.

Computer people do not consider themselves competent to influence or even to comment on government policies. At most, they can – as in this report – hazard a few thoughts about their own experience.

The manpower shortage observed and described here is too radical and too structurally-embedded for any miracle solution. A concerted grouping of collective efforts alone can eliminate it, or at least mitigate its inflationary nature.

Naturally, the basic educational machine has a fundamental role to play. A number of governments have already taken measures to increase the output of DP specialists by their institutions of higher education. Public agencies and private organizations have defined or recommended curricula.

Everyone is in agreement in their belief that training programs should be theoretical enough to yield a basic mental infrastructure, applied enough to provide immediate tools, specialized enough to impart detailed, in-depth knowledge and, finally, organized in such a way as to give rein to creative imagination.

The basic content of this education is essentially that of data processing theory, mathematical logic, software engineering and, increasingly, artificial intelligence.

Still, it is not enough to increase the number of graduates if their quality is not continuously raised at the same time. We are therefore witnessing the appearance of basic data processing disciplines at increasingly-early stages in the educational process, to the point where – in certain countries – the bottleneck is occurring with the training in logical thinking at the secondary school level.

There is no easy basic educational policy, then. If we agree that years of ageing are required to bring out the full flavor of a good wine, we must also admit that many years are needed for training a true DP professional. It is better to make a large number of small improvements than to dream about some new, centralized institution: the time constants are too long.

"The machine is causing man to specialize in the human".
Jean Fourastié

Specialization

Increase in skill levels is accompanied by a strong trend toward specialization, going hand in hand with a "distribution" of data processing. It is probable that every resource type (networks, terminals, data, applications, systems, etc.) will make room for hierarchized specialties.

For example, network management is calling upon new skills:

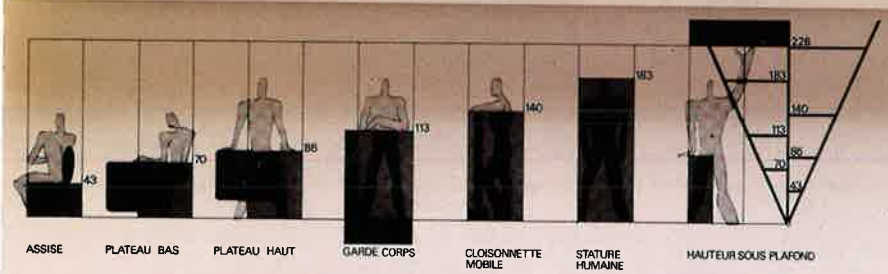
- knowledge of the status of standardization of the "layers" of the international interconnect model promulgated by the ISO,
- knowledge of the standard products and software offered on the market,
- ability to make decisions when standardization is still uncertain or products are still inadequate,
- ability to manage an inventory on differing echelons, to undertake total relations with suppliers and with users, etc.

With data management, likewise, one might go so far as to predict that there will soon be database managers, database designers, DP resource planners, etc., who will divide up the stock of theoretical skills for dealing with data structures, theoretical skills for dealing with existing management systems (and their limitations), and practical skills in dealing with users.

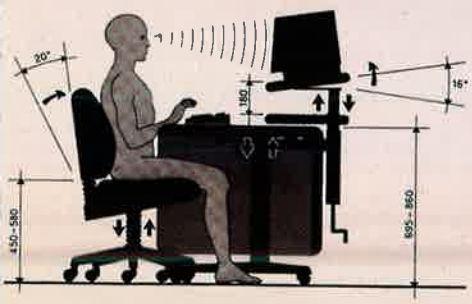
The universality of software skills

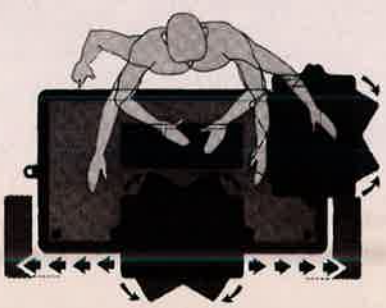
It is clear that a high level of software capability will be required in all specialties, including – for example – in hardware maintenance functions (automatic diagnostics). It is also certain that, in parallel, the "service" concept will grow at the expense of repetitive tasks. Likewise, we can reasonably predict the birth of many new jobs whose exercise will require acknowledged software skills: already, for example, we can point to security specialists, systems auditors, ergonomics engineers, etc. We can also probably guess that the "interface" between DP professionals and users is in many cases going to be handled by new personnel "layers": user-liaison people in DP departments and DP-liaison people in user departments.

These new interfaces might very well generate increased risk of misunderstanding, however, and some organizations will attempt to reduce this disadvantage by providing greater autonomy for users (to the detriment of coherent relations)...



"Ergonomics is an approach to problems encountered by man at work, and lies at the crossroads of methods borrowed from technology, the natural sciences (physiology) and the human sciences (psychology, sociology). It encompasses a program of research and applications aimed at adapting work to human needs".
Encyclopedie Larousse





THE DIVISION OF LABOR IN DATA PROCESSING

We have surveyed the DP professional from a bird's-eye viewpoint in the foregoing. As we have noted, however, the profession shows a very wide variety of trades and skill levels when seen closer up. What is the future of this diversity?

It is probable that, as a grouping of professions, data processing will itself undergo change analogous to the evolution it is causing in other industries.

Enrichment of tasks

Actual experience is demonstrating what the developments described above might suggest: a general increase in skill levels. This basic trend, combined with the DP professional's great mobility, explains the industry's dynamism. The DP professional is not afraid of the future: he is creating it. Cases of rapid promotion are more frequent than in any other industry. And it is true that also demands a continuing learning process.

Theoretical breakthroughs

The "basic research/applications" cycle has never been so short: only a few years separate significant theoretical breakthrough from the arrival of its resulting products on the market. Absorbing the most advanced skills without difficulty, the DP industry is undergoing a structural manpower shortage which is propagating through the entire skill pyramid, spurring every individual onward and upward.

Slow pace of change

It may seem somewhat paradoxical to suggest that changes in skills are slow in taking place, when the entire thrust of this report has been the DP industry's dynamism and the exponential progress of its technologies.

The two ideas are not contradictory, however. In point of fact, by concentrating on the future and the dramatic advances of technology, we often lose sight of the weight of the past and present:

- the inventory of installed DP hardware, terminals, telephones, telex machines, photocopiers, typewriters, etc., which is growing at a rate varying from 10% to over 30% annually, depending on type,
- the inventory of currently-installed application programs, whose adaptation, transposition, conversion or rewriting will demand a great deal of time: operationally irreplaceable, 80% of applications are still being written in COBOL today,
- the weight of habits and thinking patterns: all companies and organizations with enough lucidity and foresight are going to reserve plenty of time for organization of the personnel transfers and training programs required for the evolution of their DP staffs.

Change: the example of the operations trades

Certain nearsighted commentators have thought they could predict a shortage of job opportunities in this occupational category, showing a profound misunderstanding of its real evolution. If there is increasing demand for operations personnel, it is also due to far-reaching change in their skills: traditional functions (preparation, submission, checking) are increasingly being automated to cope with the growing throughput of machine configurations. Operations personnel themselves now handle only exceptions, but these – having grown more complex – require more sophisticated capabilities. While systems are more reliable, malfunctions are more difficult to clear up – under demands for increased speed, as well. And new hardware types, permitting storage of increased amounts of information, require even more advanced skills.

Operations personnel provide consulting services to designers tasked with determining the limits of automated production, and give technical assistance to users, increasingly encouraged to operate independently. Large companies are beginning to develop new functions such as data administration, network management, systems supervision: products of an evolution bringing the "systems" and "operations" functions closer together.

This development and change is leading to the recruiting, training and promotion of more skilled, more independent men and women, capable of greater initiative, having greater managerial capabilities and communications skills.

With automation, these methodologies become increasingly useful. This is why stress is being laid on designing fuller, more integrated "development environments". An example is MULTIPRO, an integrated software engineering workshop (developed by CAP GEMINI SOGETI): one of the first systems introduced on the market, it is used in the Group's operational units, of course, where it provides our professionals with the same advantages that users look for: ease of use, adaptability to the specific needs of each development type, clear interfaces, high degree of integration between development phases, etc.

The middle horizon: software "components" and the role of specifications

The future DP professional will work with standard software "components", performing a sort of macroscopic programming relatively free of detail work. Long years must pass, however, before the programmer will be able to page through true "catalogues" containing unambiguous specifications, known performance levels, etc.

Moreover, there are two facts which make it necessary for information engineering companies to seek to master the upstream segment of the production cycle, i.e., the actual process of specification of a problem:

- It is a fact that the cost of correcting a programming error is greater if the error is situated upstream and the correction takes place downstream; what is less known, however, is that this cost may vary by a ratio of 1 to 100!
- It is a fact that over half of the work performed by DP professionals today goes exclusively into the maintenance of old applications: transpositions, conversions, etc.

Return to theoretical foundations:

To gain control over the entire cycle of software and systems design, DP professionals are increasingly led to review the theoretical foundations of their discipline. A number of approaches are being explored concurrently in the outposts of languages, databases and artificial intelligence (approaches which exactly match the three main working themes of CAP SOGETI INNOVATION, the Group company specializing in R&D). As a rule, investigations are targeted on directly-executable "formal specification languages", where "bases" explicitly or implicitly maintain "filiations" in the classification of needs.

These are unquestionably huge areas of research, and we will observe continuing advances in the "mechanization" of programming tasks (program generators, inquiry languages, etc.), but much time will be needed before "automatic programming systems" take shape outside of certain very narrow fields, whereas the parallel growth of software development systems will provide DP professionals with an increasingly-sophisticated working environment (multimedia, graphics, voice input/output, combined peripherals, etc.).

Four "windows" are displayed on this MULTIPRO-X workstation screen. Information which can be independently manipulated is entered in each window. In this illustration, we can see a background window which is emulating a 3278 terminal connected to a distant large IBM system; partially concealed to the right, a specification document is being updated; in the center, a window which has been temporarily called for the scrolled display of a list of files; and, at the bottom right, another temporary window for a hexadecimal calculation.

DP professionals' productivity:
DP professionals are quite aware that their productivity is one of the major keys to economic growth over the next decade. Through past experience, they know that productivity is not increased in some miraculous way, but instead by a concerted effort applied to the entire cycle of software production, by a complete set of integrated tools ("workshops") and by a gradual working back to the theoretical foundations. A service-sector industry by excellence, data processing must also automate itself.

In their work, DP professionals are also DP users. This is perhaps the world's only profession whose tools so closely resemble its products. DP professionals share their customers' aspirations: gain ever-increasing mastery over the growing complexity which underlies needs, obtain an increasingly-firm grip on change and development, make use simpler and more pleasant. The unceasing demands of data processing are also those of DP professionals.

The near horizon: integration of tools
The productivity of DP professionals increases in stages with the use of a variety of software tools, thanks to increasingly-widespread application of high-level languages. Moreover, large information engineering firms and users make use of "development methodologies", introducing a systematic procedure at a relatively early stage in the development cycle: specification, design, development, operation, subsequent evolution.

As a consultant I am very concerned with developing business into new areas: CAD/CAM, Robotics, communications networks, the new programming methods, non procedural program languages, conversions, videotex...
We discussed this subject at the Group Europe Rencontres in Madrid, about the Group's strategic planning. I was very impressed in Madrid because I felt the feeling I was working in a very professional company.
[illegible] one of my most satisfactory professional experiences so far was with a little Norwegian Bank, with a manager who really wanted to use the DP of the future and go into such areas as image processors, local networks and so on. For example, when a client asked for a loan to build a house he wanted to be able to sit at his desk and get out the drawings of the house, assess the credibility of the customer and so on.
I was lucky with that type of consultancy role because often the organizations you work with are somewhat conservative. This time it was the other way round: a customer who was needing lots of information about the future, who wanted all immediately, and I was the one who had to hold back and say, not too fast. It's one year since the decision and the local network is running now!

Hans VIGMOSTAD
Age 31, Married
3 children

THE DP PROFESSIONAL AS DP USER

Beyond these explicit and implicit goals of their work, DP professionals are going to have to pay even more attention to their users's subjective needs: comfort, friendliness, ease of use.

Human engineering for software:

After the development of human engineering for hardware (color, display readability, shape and location of console keys, etc.), it is now software's turn. Superficial to begin with (formulation of instructions, "menu" formats), human engineering is now turning more toward the facilities of use that software must provide. DP professionals will themselves increasingly have to make decisions aimed at increasing users' psychological satisfaction, such as:

- reduction of the number of commands, and use of identical commands, for all "objects" (axes, lines, columns, titles, pages, etc),
- application of analogies with recognized human behavioral patterns (handling of documents on a desktop, information lookup in a book, filing, etc.),
- immediate visual response on display screens: "windows", "cockpits", "icons" have already been introduced, and still others must be dreamt up,
- learning of procedures by the system itself.

Increasingly creative work:

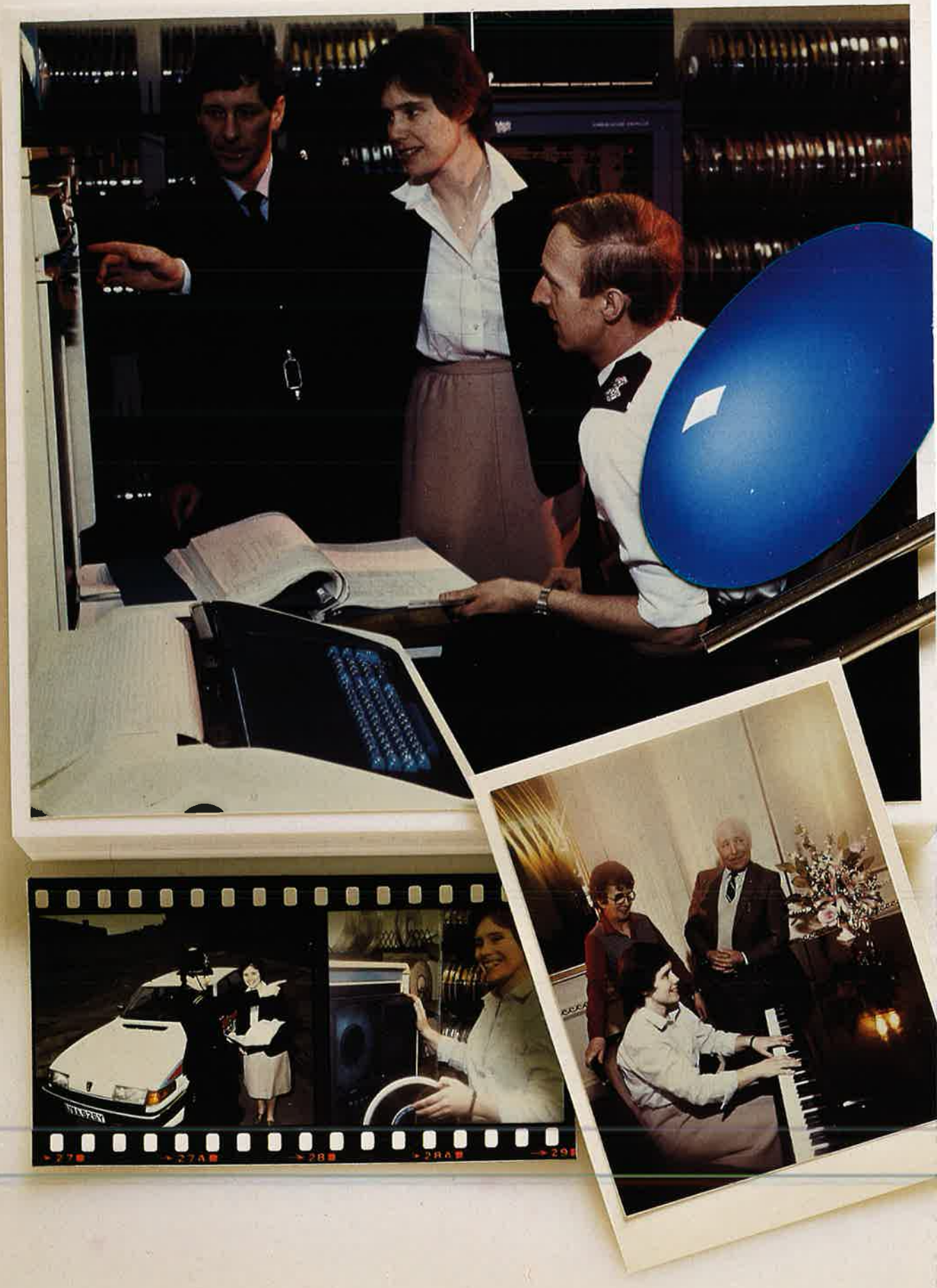
The work performed by design professionals is going to grow increasingly creative. Once having pinned down specifically-technical needs, they are going to have to organize their understanding of purely psychological requirements. Perhaps they will not themselves conduct consumer surveys, but they will be the only people able to translate survey results into the design of new and psychologically-enhanced software which, for example, is:

- capable of easily shifting from one "register" to another depending on type of communication, on the model of a telephone conversation between human beings,
- multisensorial, i.e., capable of drawing simultaneously upon sight, hearing and touch (and adapted to the specific media used, of course),
- capable of adapting by "learning",
- flexible, i.e., offers differing responses to novice or experienced users,
- tolerant of the use of synonyms and paronyms (the French electronic telephone directory being a very spectacular system from this standpoint).

I think the only reason I concentrated on Command and Control systems is because I have got a lot of experience talking to police forces and understanding where their problems are. You put yourself in the position of the customer in order to know how to design a system for him. The policeman needs to be able to use a terminal with as little effort as possible because all the time he's using it he's probably talking to a frantic member of the public. So if he's got to type in a lot of characters before he can get the information he needs then it's no good to him. He must be able to retrieve it in the shortest possible time and therefore in as few key strokes as possible. For instance, when I was recently in the control room somebody rang up and said he was being attacked. The constable put in details of this attack, and then found out that it was being carried out by a nurse. But within two seconds the system had told him that the call came from a mental hospital. He sent a car, anyway.

It's quite fascinating to see the system you designed actually working in real life emergency situations and it's quite effective... very effective.

Sandy CLAIREAUX
Age 31, Single



Media:

Machines are gradually going to become "multimedia" devices, through successive product generations marking the convergence of resources which have heretofore remained separate: audio disks, video disks, computers, robots, etc. Once again, one must imagine the mass of work that must be applied to software in order to define and process "objects" (letters, words, lines, paragraphs, pages, sections, images, sequences, movement, etc.), their structures and their relations with the user: command "languages", logical "representation" of these objects, coherence, and so on.

Disciplines:

This movement is further amplified by the convergence of disciplines: the computer's "intelligence" is growing. Users find the machine simpler and more flexible in use. The market is proliferating.

These changes have a long history. At the outset, DP professionals controlled the computer directly from a console. Next, they developed operating systems and high-level languages, seeking to make applications and basic software increasingly machine-independent. Still later, in an attempt to stem the pressure of change, they attempted to define and to separate stable data structures. Yet another step was taken by the separation, within programs, of applications from the unvarying logical "kernel", and with the formal representation of a number of areas of human knowledge. "Artificial intelligence" is thence to consist in the progressive deduction of the representation from the answers given by the user in response to system queries. Artificial intelligence thus encounters – and continues to encounter – new applications with greater ease as its capabilities are yoked with the other trends described earlier. Although servile, the computer will literally be able to see, hear, understand, know, recognize, move, grasp, react. In applications as distinct as medical diagnosis, technical repair or nuclear power station control, certain "expert systems" are already able to update the rules of knowledge for the field in question, and extract logical deductions which the machine draws from these rules.

Expert systems, language recognition, pattern recognition: all branches of artificial intelligence which are gradually going to invade the entire domain of data processing. The need for DP professionals exists and still grows, not only for assisting human experts in formalizing their rules of knowledge, but also for writing the "inferential engines", i.e., the mechanisms that expert systems will apply in order to exploit these rules.

Microcomputers will affect our business inasmuch as there will be more distributed processing within each shop. As computing will be done at more levels, we will not see the end of the mainframe computer – contrary to many opinions – but a redefinition of its task. Common data base management, high-speed data reduction, and the security of sensitive data are just a few of the items for which the mainframe will still be needed. There are currently many people who keep sensitive data on flexible disks for microcomputers. When they are done with the data, that disk is put into either a drawer or « secured » facility which is never as secure as the data warrants. You also do not know who has access to what data, and may be using outdated data without realization. As a systems programmer, it points up the need for better reliability in operating systems. The microcomputer operating systems that are commonly in use today are poorly designed. The microcomputer industry has not yet utilized the resources of what's been learned on the mainframes over the last 30 years. These industries are at the point where they have got to put people to work creating proper software tools. They are an absolute pain to use, completed with worthless documentation. There are a lot of good ideas in the software tools that have been created; however, most do not come up to what I would consider to be the base standard for reliability, serviceability and programability.

Mark GAUBATZ
Age 27, Married

Everything is converging:

Techniques:

The increasingly complete interleaving of telecommunications and data processing has been a reality acknowledged for nearly a decade now, whether under the label of "information technology" or otherwise.

A small army of professionals is now working on software for telephone central exchanges (programs often extending to several hundred thousand instructions in size), software for private branch exchanges, for network switching nodes, for control and supervisory centers. Within the corporate context, DP systems work to establish efficient communications between geographically-scattered units, primarily to gather information where it is produced and make it where it is consumed. With the mastered development of distributed data processing systems, allied with the possibilities of microcomputers, it is becoming increasingly attractive to make a certain amount of "local intelligence" available to users.

It is easy to imagine the gigantic tasks of design, standardization, adaptation and transposition required by this broad trend toward increasing interconnection: multiple-level network structures, moving from the scale of the planet, a continent, a country, and so on, down to the innards of the equipment itself; very wide range of transmission speeds, proliferation of switching nodes, diversification of equipment, increased level of interactiveness, enrichment of information (multiple character sets, graphics, animation, color, digitized voice, etc.). All of this basically derives from work on software, and this work is performed by DP professionals.

I am attracted by that which is unlike me. For example, I attend courses in oriental theology, where I meet fascinating personalities: priests, professors, politicians, philosophers...

"The more difficult the task, the more skill and courage it requieres".
Aristotele

THE DP PROFESSIONAL AND "NEW" TECHNOLOGIES

Interest in data processing, long the exclusive preserve of specialists, is now beginning to catch on in all sectors of economic and social life, where a snowball effect is starting to build up. Everyone is putting in his oar, at the risk of placing some mistaken ideas into circulation. Among them: "programmer-less" data processing. And tomorrow, why not data processing without DP professionals? No, data processing is not so simple a matter, and it is growing more complex daily. Here, again, we mustn't confuse what is happening onstage with what is going on in the wings; the simpler the act seems, the more painstaking the rehearsals, the more demanding the stagehands' work, the more ingenious the machinery.

True, real resources exist for the direct use of data processing, and their growth confirms a significant trend: instructions in quasi-natural language, so-called "fourth-generation" languages, ready-made programs for microcomputers are all moving to weaken the distinction between programming and outright use. Still, what a development effort is required to make true "products" out of microcomputer packages edited and distributed in consumer volumes! Shifted somewhat upstream, the professional's work might be less visible, but it will not be less substantial. Another example of the complexity of the DP professional's task: how many program instructions are required just for looking up a phone number from one of the French electronic telephone directory's MINITEL terminals? If computers are becoming increasingly simple to use, it's not by magic, but because the software that makes them run is increasingly rich and complex, and because the dramatic reduction in hardware cost is making this development economically feasible.

The data professional's field of action is expanding daily, and its unity is being increasingly confirmed. The compartmentalization of data processing into applications bearing different labels (production technology, robot technology, computer-aided design, office automation, etc) is no longer valid. DP professionals are increasingly able to integrate a company's varied functions into a single system, enabling the user to narrow the gap separating him from his global operational optimum.

It is easy to guess that this trend is shifting demand at once toward professionals who are more broadly-based, more adaptable, and toward professionals who are more highly specialized by technique and language than by application.

The DP professional will increasingly be a translator of skills. Faced with processes which are ceaselessly growing more integrated, complex and transient, his craft will be to make use not only of his technical knowhow, but also of his familiarity with problems and his knowledge of what is achievable: in short, engineering.

There's something very special and very interesting about an operations engineer's job: this is something I've really learned at CAP GEMINI SOGETI. You have an operations engineering that has absolutely nothing to do with design engineering. In point of fact, the methods and tools used in our field are highly specialized, and they're growing increasingly complex as production becomes "industrialized"... and this means you've got to be fairly advanced technically, to be able to come up with effective solutions. Operations is an extremely broad field. It involves aspects of valuation, of standardization, of automation, of industrialization, of training and so on.
I got my training on the job, and progressively acquired a full range of experience in every area of operations. At CAP SOGETI EXPLOITATION it's a rainbow of cultural origins, of social groupings, a really friendly and enriching environment. Maybe that's why the company runs so smoothly anyway, thanks to this element of adaptability. I think that we provide our customers with innovation and, above all, a special way – one that he doesn't have – of looking at the problem.
The added value of your work here is precisely your ability to analyze things, to innovate, to get your feet wet, to take risks, to accept challenges, to invest yourself: to be productive and provide results. You can't allow yourself to make mistakes or to be inefficient in a service company.

Yves GUIONIE,
Age 33,
Married, 1 child

"Any human adventure, no matter how singular it may seem, represents a commitment for all humanity"
Jean-Paul Sartre

THE DP PROFESSIONAL'S FUTURE

The DP professional exists: we have just made his acquaintance. Being trained, at work, in his team. The surplus of demand for his services strengthens his sense of usefulness. His profession is known and acknowledged, it is a force on the international marketplace and in all the large projects of today's world.

But what about the future? If, as all the experts believe, hardware costs continue to fall by 20% to 30% annually – for constant performance levels – over another ten to fifteen years before physical limits are reached, what will be the consequences of this unprecedented development? Are DP professionals going to be called upon to proliferate, to vanish, to metamorphose? Will it be possible to design the hardware itself without them?

In the face of these questions, we now propose to take a broader forward glance at three topics: the technologies of data processing, not as "new" as people think, are destined to grow increasingly complex; the DP professional is going to become a "user" of DP resources; and today's skill shortage will be overcome only by a many-faceted collective effort.

I've just come back to the Group after a two-year absence during which I went to teach computer sciences in the USA: a year at UC Berkeley and a year at San Jose State. It was a very enriching experience for me. Shortly after my return, I was offered the position of Director of the Grenoble Research Center.
I think that research is extremely important for the Group; otherwise, I'd never have accepted this job. We're striving to establish a link between the French university labs and CAP GEMINI SOGETI, that is, to do applied research to meet our branches' needs.
I believe that data processing is going to become increasingly specialized. I still can't see users mastering the complexities of the tools with which they're provided, and that's why the biggest efforts to be made lie in the area of communication. And this requires comprehension of many languages: that of the accountant, that of the machinist at his lathe. This is what we're already doing with expert systems, the goal being to make the machine expert in a given field. Today, though, the big problem lies in acquisition of human expertise: in point of fact, it's a matter of finding the person who speaks both the language of the machine and that of the human expert. For example, we are working on one study for radio signal recognition and another dealing with geological reconnaissance operations for building-site location, so we have to speak the languages of both the radio technician and the geologist.
The DP professional's role is thus going to be increasingly centered on communication. This is why the Grenoble Center's three basic research axes are currently man-machine communication, artificial intelligence and software engineering, three quite complementary fields.
We are also extremely interested in industrial data processing (flexible shops, robots), in relational image databases, in local area networks, and so on. In any case, we're ready to tackle any difficulty encountered by a branch.

Maurice SCHLUMBERGER,
Age 36,
Married, 3 children

PERSONNEL TURNOVER

If DP professionals are so happy, why do they change jobs so frequently? It is true that DP professionals show a high turnover rate*: 20% annually in the USA, according to Couger and Zawacki (1980 figure), 36% claimed for 1983 in the "Software Workers Survey" published by COMPUTERWORLD, 26% forecast by ORDIS for 1984 in France, 25% in French DP engineering firms (Pierre Audoin Conseil, 1982)... It should be added, however, that this percentage has not always been so high (in the USA, at least): 15% to 20% during the '60s, under 10% at the beginning of the '70s – that is, during a period of severe economic crisis! All this simply goes to illustrate a well-known phenomenon: turnover is high only during periods when job offer clearly exceeds demand in volume.

Two recent studies, one conducted in France, the other in the USA, would indicate that the main causes of turnover are the following:

- According to Pierre Audoin Conseil, personal convenience (change of residence, marriage, etc.), working conditions and work content each account for about 20% of all cases. Salary level ranks fourth only, figuring in about 15% of cases.
- A study by K.M. Bartol (University of Maryland) allocated the greatest responsibility for turnover to work dissatisfaction, closely followed by "lack of esprit de corps in the employer firm". These causes are followed by improved salary offers, and obstacles to high-quality work such as lack of time or material resources.

Regardless of who the employer is, turnover is very costly to him: no organization can lose over half of its DP professionals during a two-year period without damage to its scheduling, its financial results, its users and even its own projects managers! But this expense is not a complete loss to the community, which thus benefits from a kind of natural regulating valve. The ability to change jobs in case of, say, marriage or altered career ambitions obviates much job dissatisfaction and suppresses many internal crises. And if DP professionals are lucky to be able to select their employers, they are also able to move up along the path of individual enterprise. Experience would indicate that more and more of them are discovering that, in many cases, the lastmentioned solution is the wise one to adopt!

(*) *The criterion for measurement of employment change volume is called "turnover" and is expressed as a percentage. For example, a yearly turnover of 20% means that, of an average workforce of 100 professionals, 20 have changed employer during the preceding 12-month period.*

At present, I'm in charge of the Group Procedures. I think that having been a branch manager has given me a good preparation for this job.
The word "Procedures" often carries a negative connotation of regulation, of restriction. In CAP GEMINI SOGETI, however, this term takes on a much richer meaning: it's a set of rules, of customs, of methods representing the principles on which the Group bases its actions, on the one hand, and its knowhow in a complete spectrum of fields – technical, marketing, human relations and so on – on the other.
Two points are worth emphasizing. First, the Procedures are a living entity which is continuously being enriched by experience. Next, this entity respects the diversity of an international group such as CAP GEMINI SOGETI. While a single set of principles is applicable to everyone, thus creating a common language for all Group members, it also takes specific local conditions into account. For example, during a recent assignment to the USA to deal with a specific matter, I observed that the approach adopted by American branch managers was 95% identical to that of their French counterparts, with the remaining 5% accountable to local customs.
I must say that I've never forgotten the help that our "Bible" gave me when – arriving from outside the Group – I took up my job as branch manager. Old-timers may be familiar with a great deal of Procedures content through their own experience; a new employee can turn to them for guidance in his actions. Of course, this set of rules also acts as a kind of safety net for both the employee and the Group, and that's not the least of its virtues.
My experience in a "hands-on" position has convinced me that the Procedures are a very effective aid to initial integration into the Group, and subsequently a very professional day-to-day working tool.

Jean-Louis BOUR
Age 39, Married, 2 children

The distinction between the motivations of software and operations professionals reveals differences in behavior and situation between two job categories existing within a single profession. Similar differences also exist from the standpoint of employer type. Differing experiences of a job are observed depending on whether it is performed for a user or a manufacturer, in a small or large service company. As an example, we will take the case of large service firms, emphasizing the following points which seem to be characteristic of them:

- The motivating factors of the software professional's trades are reinforced. In point of fact, tasks become incomparably more varied due to the diversity of fields of application, techniques employed, system sizes and types, structures and customs of customer companies, problems to be solved, etc. Moreover, professionals in a large service firm such as CAP GEMINI SOGETI have the opportunity to familiarize themselves with most new technologies before their counterparts elsewhere, as they are among the very first to use them. Finally, the responsibility conferred upon them during work at a customer site gives them both a large measure of autonomy and a direct accountability. In point of fact, their work must be "evaluated" in both senses of the word: technical assessment on the basis of results obtained, and monetary appraisal by the customer firm which is paying for the service rendered. Immediate and objective "judgment" is rendered, a fact which provides incentive for good professionals.
- The work performed by operations personnel – as at CAP SOGETI EXPLOITATION, for example – takes on motivating features which are often lacking elsewhere. In particular, employees have the opportunity to work between a wide variety of sites and equipment types. They also have a chance to join teams tasked with solving varied technical problems, and to participate in the development of appropriate solutions.
- There is a very great diversity of career possibilities in a service firm of CAP GEMINI SOGETI's size, due at once to its growth rate, its exclusive dedication to data processing, its determination to offer customers a full spectrum of information engineering services, its systematic policy of internal promotion, its multinational character and its resulting direct access to the world's main DP markets. Most of the jobs shown in the "career cube" on page 29 may be exercised within the Group: jobs involving basic techniques, expertise in the majority of major application fields, consulting on DP planning and use of new technologies, sales of services and software products, project management, branch management, applied research, instruction, etc.

The motivations of operations professionals

For this population, study results are somewhat paradoxical. The investigation, dealing primarily with keypunch and console operators, indicated that they were on the whole satisfied, even though (Couger and Zawacki point out) the motivating potential of their work is low, with the exception of the third criterion listed above, invoking the significance of their activity: after all, who can deny the extreme importance of operations? Moreover, these people often conclude that they are barred from the professional growth which they greatly need. Only their desire for human contact in the working environment seems to be fully satisfied.

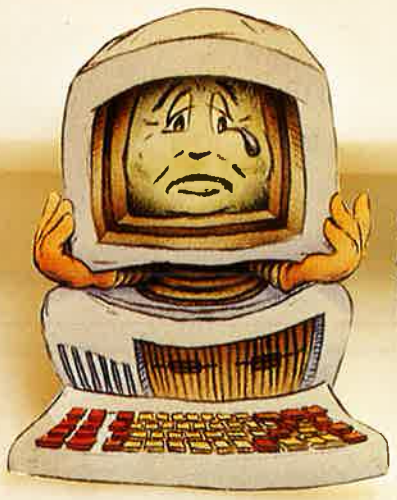
This paradox might be explained as follows: operations professionals know that they have a wide range of possibilities for advancement and, on the whole, promotion is rapid enough so that dissatisfaction does not have time to manifest itself.

To our knowledge, Couger's and Zawacki's investigations are the only ones dealing with the motivations and job satisfaction of DP professionals in a truly scientific way. Still, there are many other sources of information derived from surveys or from outright observation.

According to the conclusions of a survey carried out in France by ORDIS, motivating factors may be ranked as follows, in decreasing order of importance: working environment, job security and job interest. Promotion opportunities, salary levels and employment of time are also cited as factors of satisfaction, although to a lesser degree. Among areas of dissatisfaction, we note that indicated by console operators (and also 50% of women surveyed) with regard to their career prospects, and that of DP professionals in economically-threatened industrial sectors (steel, textiles, etc.) with regard to their salary levels.

The Dewar study indicates that the degree of job satisfaction is also very high (over 90%) in the USA, where primary motivations are job interest, personal growth and career prospects. With specific reference to software professionals, the most satisfying features of their jobs are creativity, acquisition of new skills and the handling of interesting problems. Least important are the practical aspects of their work (security, social status, even salary level). The major negative point: everything touching upon administrative activity!

Finally, CAP GEMINI SOGETI has observed from its own experience – although these observations cannot claim any highly scientific merit – the main causes of its employees' satisfaction and dissatisfaction: these are listed in the inset below.



What makes DP professionals happy?

- *Their freedom of job choice, hardly possible in other sectors under today's economic conditions.*
- *Continuing updating of techniques and consequent elimination of routine.*
- *The power bestowed by their knowledge.*
- *The possibility of:*
  - *following a professional career, even in the absence of formal education,*
  - *exercising a range of functions (design, systems, production, organization, management, etc.),*
  - *understanding corporate mechanisms thanks to their DP knowledge,*
  - *determining their own career paths,*
  - *committing themselves fully to their jobs.*
- *Their working environment, particularly including:*
  - *the team spirit prevailing there,*
  - *the homogeneity of age groupings.*
- *Their social status, their position in their company.*
- *The prestige attached to their profession (and to their employer's success, where applicable).*

What makes DP professionals unhappy?

- *The boredom encountered when they have completed one assignment and have not yet been assigned to another.*
- *A slowdown in career advancement when they have grown accustomed to rapid promotion.*
- *Stratification of line authority, when it interferes in team spirit between "boss" and "subordinate".*
- *Poor communication with users, when it interferes with project coherence.*
- *The inability to work on a project from start to finish.*
- *The fear of making mistaken technical decisions or of not being able to master complex situations.*
- *Demands generated by the shortage of professionals, obliging them to be available at a moment's notice and sometimes taking away time needed for training.*

At present, I'm the videotex representative for the Government Agencies Branch; I spend my time setting up meetings with customers, looking into their needs... I like my work because it fairly closely matches up with my need to communicate, to learn and to share. Obviously, if you're satisfied with your profession, you can only be satisfied with yourself, and vice versa. CAP GEMINI SOGETI is a really good experience for me, in the sense that – if only at the level of your fellow workers – there's a wide diversity of temperaments, of characters, of ways of seeing things and consequently of ways of thinking in a service company. If you're sensitive to that, you should be able to grow and develop under your own steam. At the customer level, too, things are seldom routine: every time you set up a meeting, something new is going to develop. The questions you put to them are roughly the same, but the personalities that you encounter are so different that every time it's a new event, a new perception of your professional life. Then, too, the fact of working in the Group gives me the feeling of being stronger: obviously, you can't do everything yourself, everyone has limits, but these limits are pushed back. Membership in the company broadens your horizons. Sure, not all of us have what it takes to become great experts in telephony, in databases or in networks, but the fact of being all in the same boat gives us strength if we all row together.

Virginie HOSPICE, Age 25, Married

The motivation of software professionals

Judged in light of the first four of the criteria listed above, the software professional's job is a highly-motivating and highly-satisfying activity, more so for programmer-analysts and systems analysts than for programmers. As they have a high need for achievement in the exercise of their jobs (the highest of all the occupations examined, according to Couger and Zawacki!), they derive a high level of satisfaction from their work. This is the study's main conclusion.

Three less positive aspects were also pointed out, however. To begin with, managers fail to provide their professionals with adequate information on the results of their work. Next, there is little requirement for human contact in the working context. Finally, where this contact does exist, the degree of satisfaction with the human-relations situation at work is relatively low.

According to the authors, these points are explained by the solitary nature of programming work and by the high level of concentration that it requires. Moreover, as most design professionals have begun their careers as programmers, they tend to remain marked by the lone-wolf features of their early work.

Another recent study (by Goldstein and Rockart of MIT) would indicate that factors such as ambiguity and the potential for conflict inherent in the design professional's role are among the most significant causes of job dissatisfaction. Among these factors, we note the frequent lack of precision in the definition of duties, the gap between user expectations and the technician's knowledge of his limits, the lack of resources (machine time, appropriate terminals, etc.).

"Loves and looks after her flowers. A certain style of life..."

MOTIVATIONS

Before moving into theoretical analysis, the main thing to keep in mind is that DP professionals, in contrast to many others, are hardly experiencing the crisis besetting most economies and most professions for some years now.

They are people of "the post-crisis era". For them, technological change and development is not an obstacle, it is an opportunity, it forms part of their daily lives. Their ambition is not to hang on to a job; instead, it is to continue to acquire skills, to engage in an attractive career and to make a lot of money. And, for most of them, there is nothing unrealistic about this ambition.

Likewise, they are not inhibited – or even troubled – by the stupendous growth of new technologies and methods: on the contrary, this growth excites them, for it enables them to apply increasingly elegant and effective solutions to their customers' or their employers' requirements. They enjoy the prestige attached to their profession, and sometimes go so far as to feel that their undertaking has been vested with a mission for progress.

It must be acknowledged that, behind these general observations, the real situation is a more complex one and that no DP professional exactly matches the model derived from statistical calculations. Was it not psychosociologist Jacques Piveteau who wrote that "all people are different; taken individually, none has a really clear idea of what he wants"? That "theories hew to a correct discourse whose only flaw is non-operational in concrete situations"? Having said this, it is nonetheless true that studies on the motivations of DP professionals – whether conducted in the USA or in Europe – arrive at the same general conclusion (taken from "Dewar's Career Survey", conducted in the USA in 1983): **"DP professionals work hard. They are highly satisfied, highly motivated and find a means of self-fulfillment in the exercise of their jobs."**

Professors Couger and Zawacki of the University of Colorado – authors of definitive works on DP professionals' motivation – have applied a model already tested on other occupational categories to a scientifically-calibrated population of 3,000 people. According to this model, presented in their book *Motivating and Managing Computer Personnel* (John Wiley and Sons, 1980), a job is stimulating if it offers the following five characteristics:

1 Wide variety of tasks and skills required for its accomplishment.
2 Possibility of implementing complete operations, identifiable from start to finish.
3 Involving execution of significant operations whose impact is real (or at least imaginable).
4 Possibility of working independently.
5 Clear visibility of results obtained.

These two authors have also estimated the degree to which professional achievement and quality in human relations are significant aspirations for DP professionals.

Results of the study are summarized in the following, where we distinguish between software professionals and operations professionals for purposes of increased accuracy.

there's one thing that means a great deal to me: worksite supervision. My customers also think it's great that, at least once a month, a CAP GEMINI SOGETI engineer comes to check up on work in progress, to talk with the customer about his concerns, his data processing. That's a proof of the quality of our service.

Pascal BAUDRY, Age 26, Single

The French DP professional: a composite portrait

(From an article in « Le Monde Informatique » on a survey of motivations of French DP personnel)

Relatively young (average age 35 years, 5 months) but not wet behind the ears (the overall active population in France averages 37 years, 7 months), the typical DP professional – if he exists – presented by this survey is somewhat individualistic and is primarily motivated by his work. He does not generally engage in team sports. He likes to read (preferably novels) much more than the average Frenchman. He is not particularly attracted to social organizations, whether professional associations, parent-teacher associations, religious groups or civic activities. With regard to political and union commitments, DP professionals are far from being activists. Only 3.6% of them claim to belong to or work on behalf of a political party, while 45.5% express no political opinion and 43.5% indicate a political preference. The situation is much the same with regard to unions: only 9.5% of DP professionals claim to be union members or activists, while 55.8% proclaim themselves indifferent to any definite union commitment. It should be noted that the DP population is concentrated into the "age 25-to-40" zone, with fewer "under 25s" and far fewer "over 40s" than the overall active French population. A populational structure which doubtless explains some of the attitudes and behavioral patterns of DP professionals.

Personality traits shared by most DP professionals: although it goes without saying that a DP professional must be logical and methodical above all else, that he must be able to listen, it might still be useful to recall these facts here. But while these qualities are necessary, they are nonetheless insufficient in themselves. The DP professional countered incompatibility between user demands and the logistics constraints of DP systems can create "hangups" and stress for people who do not have these qualities. Likewise, teamwork requires people who are open and tolerant, but not shorn of authority. Analytic skill is the chief prerequisite for being a DP professional, and professionals engaging in analysis do not hesitate to ask questions, and repeat them if necessary. They have to make decisions; to this end, they eliminate technically-unfeasible requests and seek out replacement solutions. Tenacious but not stubborn, they tolerate ambiguity but work to eliminate it. They are self-confident, but they are also lucid and they do not hesitate to question accepted truths whenever necessary.

Projects are generally managed by people with a capacity for personal investment enabling them to "identify themselves" with the project and believe in it. They are able to see things from the user's or the technician's standpoint, forming necessary bonds of solidarity between all participants. In a nutshell, they are leaders of men.

High-strung? Stolid? Neither! DP professionals are realistic people who don't let themselves be inhibited by worry. At most, it provides them with an energy boost toward better design and implementation. Their true motivations are generated by the challenge posed by the problem facing them and by the satisfaction of creation. Under these circumstances, it is easy to understand that they prefer to follow a project from beginning to end, from design to full implementation.

When speaking of the systems analyst and project leader, we stated that they are also experts in communication. The objection might be raised that the specific jargon, rituals and attitudes of DP professionals erect barriers before the smooth exchange of ideas. But it is overwhelmingly the case that communication between these people is rapid, non-redundant and unambiguous, precisely because of a unique professional vocabulary. But the computer professional's language should not be viewed as an instrument of power, however. It is simply a useful and convenient tool. Most technicians are quite capable of making themselves understood by laymen whenever necessary!

To summarize this composite portrait one might observe that it is made up of features which verge on the paradoxical; the DP professional is at once cooperative and competitive, painstaking and imaginative, the lone craftsman and the champion of communication. He is necessarily a good team player, but he frequently feels the urge to be a star performer. He takes pleasure in working in a world where work is no longer a sacred value. Just what, then, are his motivations?

Why do I like my job? Let's say that I feel comfortable in data processing. It's a trade which has brought me a great deal, both from professional and personal standpoints; it's a state-of-the-art trade, one that's constantly being rejuvenated. In data processing, if you fall asleep, you're left behind in a hurry! You always have to be on top of things, to keep questioning your own ideas from a professional standpoint. And if I'm still with CAP GEMINI SOGETI, it's for that very reason: there aren't that many good companies where you can do good data processing. I'm very pleased that, through CAP GEMINI SOGETI, I've been able to handle some genuinely important contracts. For example, I've had two very large contracts with IBM, and I'd say that ranks just as high as career advancement. High-level contracts are ultra-motivating, you have the impression of being a lot higher, a lot bigger than real life, even if you're also a bit scared... Then, too I've almost always worked on new hardware. And that's no disappointment, either. Furthermore, my work is varied and I'm independent; it's true that I have a fantastic sense of freedom. Still, there are days when things are rocky, when you feel a bit remote from the Group, when you're alone at a customer site, as I am now at Blois. That's why

"The wise man – unlike a vase, or an instrument with only one use – is suited for everything"
Confucius

PERSONALITY PROFILES

What is the basic human type from which a DP professional can be formed? What is the alloy best suited for casting in this industry's mold? To answer these questions, we will adopt here the approach generally followed by specialists in personnel recruiting, by first examining the intellectual profiles characterizing some of the profession's job categories and then defining the personality traits shared by most DP professionals.

Selected skill profiles:

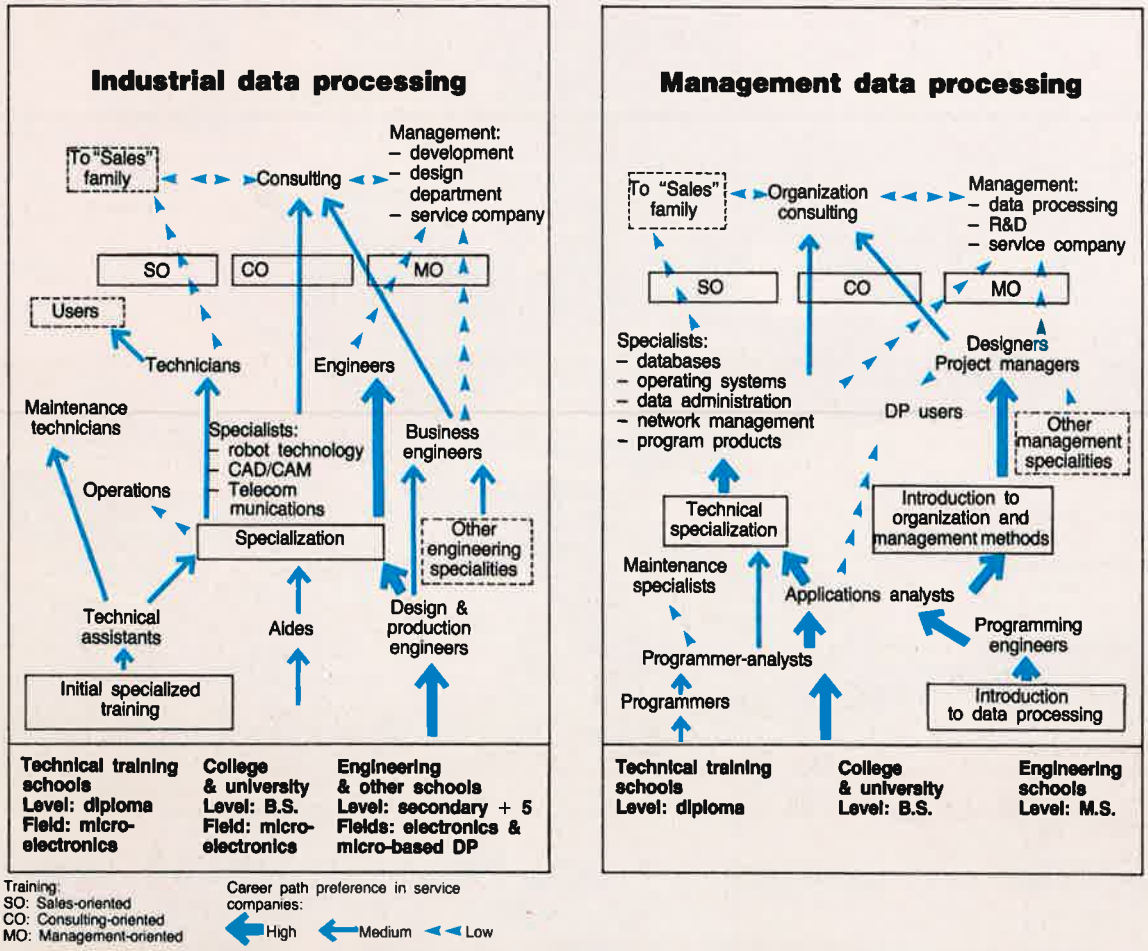
- Logical, demanding, organized, methodical, orderly to the point of meticulousness: the **programmer** must earn all of these epithets if he is to achieve the degree of reliability expected of him. He is necessarily practical, concrete, a doer, as these are the qualities of any builder, and that's undoubtedly what the programmer is!
- Promoted to the position of **programmer-analyst,** he has demonstrated his ability to "empty out" the content of a problem, item by item, then dismantle the remaining structure into its constituent parts. He has demonstrated both his sense of detail and his vision of the whole.
- To become a **systems analyst,** he has shown himself to be observant, realistic, capable of grasping complex problems. Creative, imaginative, with a gift for assimilation and integration, he has been able to pin down simple solutions and to express them clearly. Through his efforts, we know what is possible and feasible: results of simplification and weighting. The analyst also has a rare knack: he is able to **listen**. This is a question of attention, of course, but also one of language, of background, of aptitude. It is easy to guess the importance of this quality in a profession where varied and often complex needs, expressed by the user, must be translated into precise rules and then into programs. To be efficient, the analyst must also be organized and quick on the uptake. And he is able to observe from an objective distance, waiting until he has fully delimited and understood the problem at hand before tackling the design phase.
- A **project manager** has all of the analyst's talents, raised to a higher order of magnitude. A nimble thinker, he can handle a complex problem and has the duty of simplifying it. He organizes, he schedules. He must be even more concrete and even more gifted in communication, as he is the link between the user and the technicians on his team. He deals with a problem on multiple, concurrent levels of detail, without over letting the big picture escape from his view. In a way, he is both "architect" and "builder".

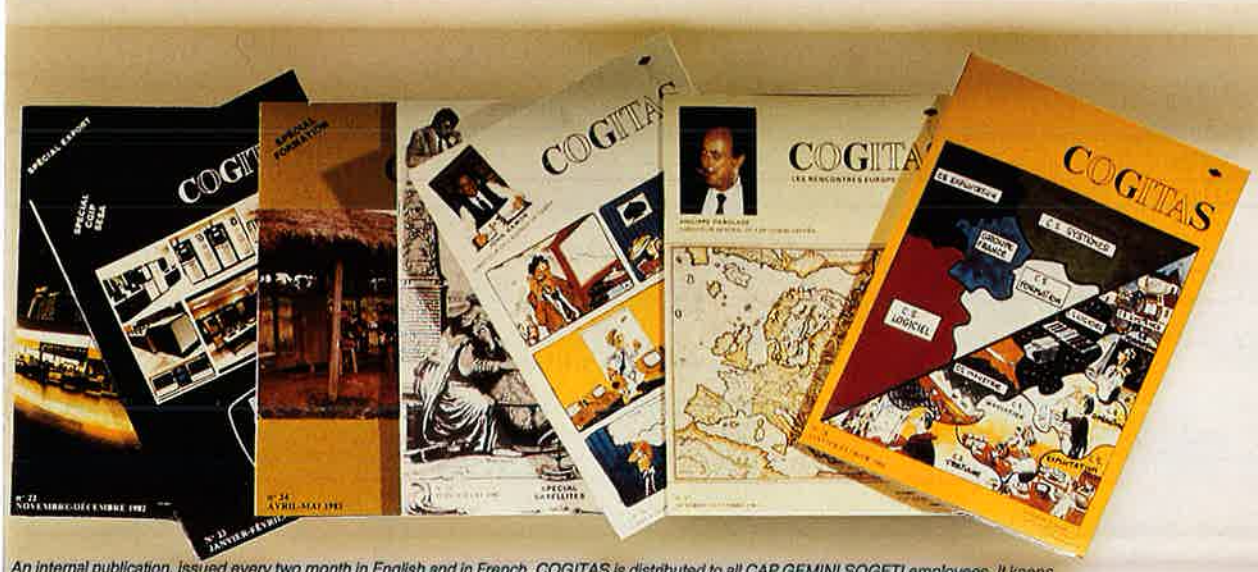
The thing that motivates me most, I think, and my prime target when I'm given a new assignment, is to wind up with a satisfied customer. That means: deliver him a service or a product which is polished, reliable and, obviously, on time. That also means: inspire his confidence. I want the customer to be convinced that he's going to be understood. And that's the task I set for myself. We shouldn't forget that our trade is one of creation, even art: so we're going to present the customer with something that we've created with our team of professionals. That's why everyone has to be involved, committed, so that the whole team has the same goal. And this means that the professionals have to feel that their project leader is capable of completely handling the customer's needs, the techniques to be employed and his project management duties. Obviously, I don't know everything, so I always encourage my people to teach me techniques that they're on top of. Personal commitment is the thing that works best; but it has to be accompanied by delegation of responsibilities. I think that if you set goals and then put your trust in people, they gain a freedom of mind and a capacity for initiative which gives them more enthusiasm for doing what's asked of them. Likewise, if problems arise, you shouldn't hesitate to lay them on the table.

Jacques MOREL,
Age 31,
Married, 1 child

"I am also a vexillologist: I study flags. In other words I am interested in everything made up of a piece of cloth or escutcheon that tries to sum up the identity of a human group".

SELECTED CAREER PATHS
(Source: SYNTEC)





An internal publication, issued every two month in English and in French, COGITAS is distributed to all CAP GEMINI SOGETI employees. It keeps every one of them informed about the main events of the Group's life.

The choice of functions, skills and techniques is so varied that every professional is in a position to find a career path matching his interests and his abilities. If his ambitions evolve, however, he can also change paths. The diagrams (opposite) show a selection of typical career configurations; obviously, many others are possible.

A "career" is one or more jobs with one or more employers. Although each of the three major employer categories (users, manufacturers, service companies) has its own characteristic career paths, it should be emphasized that the large service firms – i.e., those which engage in true information engineering – have the advantage of offering their employees opportunities in virtually the entire "career cube".

On the other hand it must also be realized that the professionals who seize these opportunities must demonstrate the qualities of availability, mobility and honesty inherent in the very spirit of the "service" concept. For an employee of an information engineering firm, service duties are characterized by a relatively high degree of autonomy, by the exemplary value attached to his or her work, by the obligation of professional confidentiality and by compliance with the procedures and structures of customer companies.

Above all, however, each professional's career development is ultimately his own responsibility: regardless of whom he works for, he is the one who will advance in his chosen career path, at his own rate, as a function of his own talents, his own experience and his own determination. Naturally, he should be placed in the best possible environment, one which will offer him the greatest chance of personal growth (and the large service companies are probably his best bet in this regard) but, in the long run, he is the one who will prove himself, who will measure himself against technical and human challenges, who will discover new perspectives and who will be able to seek out those which enable him to best satisfy his ambitions.

Career development at CAP GEMINI SOGETI

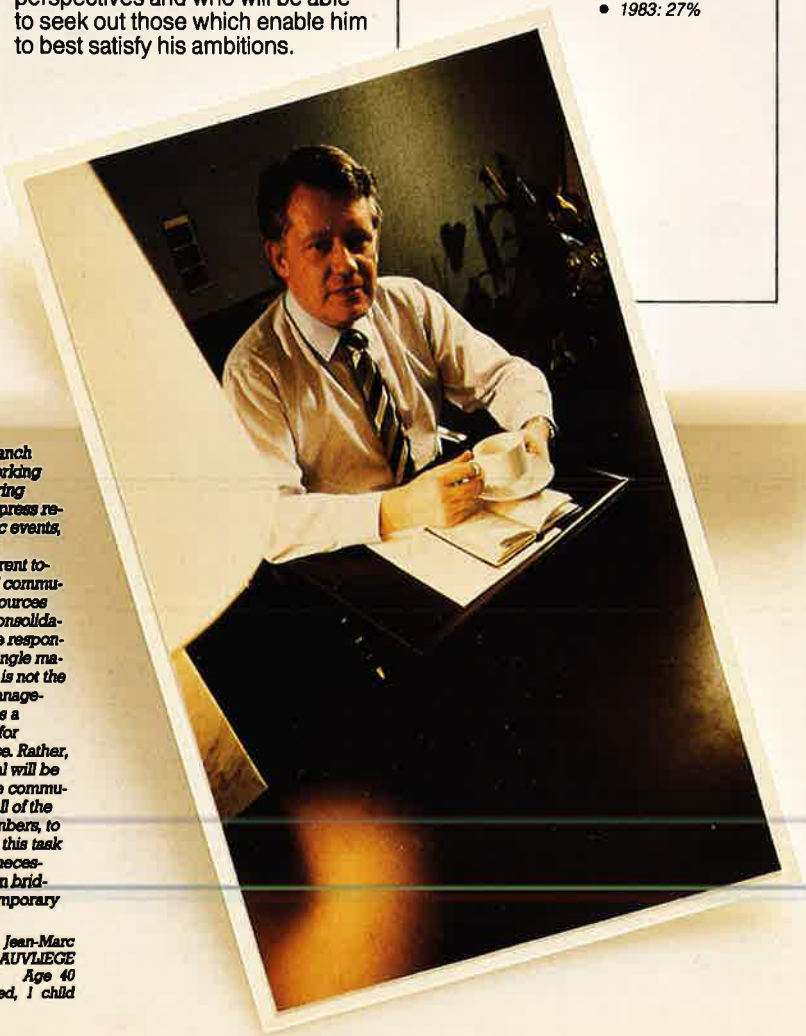
CAP GEMINI SOGETI's branch managers undertake a set of concrete, accurately-defined and tested actions to encourage their employees' career development:

- *they regularly meet with each of their professionals, whether at the time of site meetings or branch meetings,*
- *they regularly analyze documents reporting on work performed by each employee (weekly reports, site reports, end-of-project reports),*
- *they hold at least one career interview with each of their people. Carefully prepared by both parties, this interview takes place in the most objective and frank atmosphere possible. It concludes with specific, clear decisions in evaluation of the employee's performance levels, his career development goals, future assignment types and training activities.*

As a result, about 30% of all CAP GEMINI SOGETI employees – nearly 1,000 in 1983 – are promoted to a higher job level each year.

Some exact figures:

- *1979: 24.5%*
- *1980: 35%*
- *1981: 31%*
- *1982: 32%*
- *1983: 27%*



I was appointed to the position of Director, Group Communications Systems on 1 January 1984. I felt some regret at having to leave the Service Sector Division – which I had managed for four years – and a number of colleagues with whom I had worked over an eight-year period. But the position awaiting me offered a number of attractive features: breadth of scope, variety of activities, multiplicity of resources and, above all, continuing contact with the entirety of the Group.

Whether from inside or from outside of a business, the best form of communication is direct contact. Our organizational structure takes this fact into account, and our management is fully cognizant of it. Still, information – technical, commercial, financial or other – must circulate properly and arrive where it is needed when it is needed. And this requires tools: a telecommunications network, databases, in-house publications, management software, reporting procedures, etc. Also needed are standards: procedural guides, document formatting standards, and so on. Above all, however, it is necessary to foster opportunities for people to get together, and to assist them in drawing maximum benefit from these encounters: individual meetings, branch meetings, working groups, steering committees, press relations, public events, etc.

What is different today is that all communications resources have been consolidated under the responsibility of a single management. It is not the job of this management to act as a mouthpiece for everyone else. Rather, its prime goal will be to encourage communication by all of the Group's members, to help them in this task and, where necessary, to join in bridging over temporary gaps.

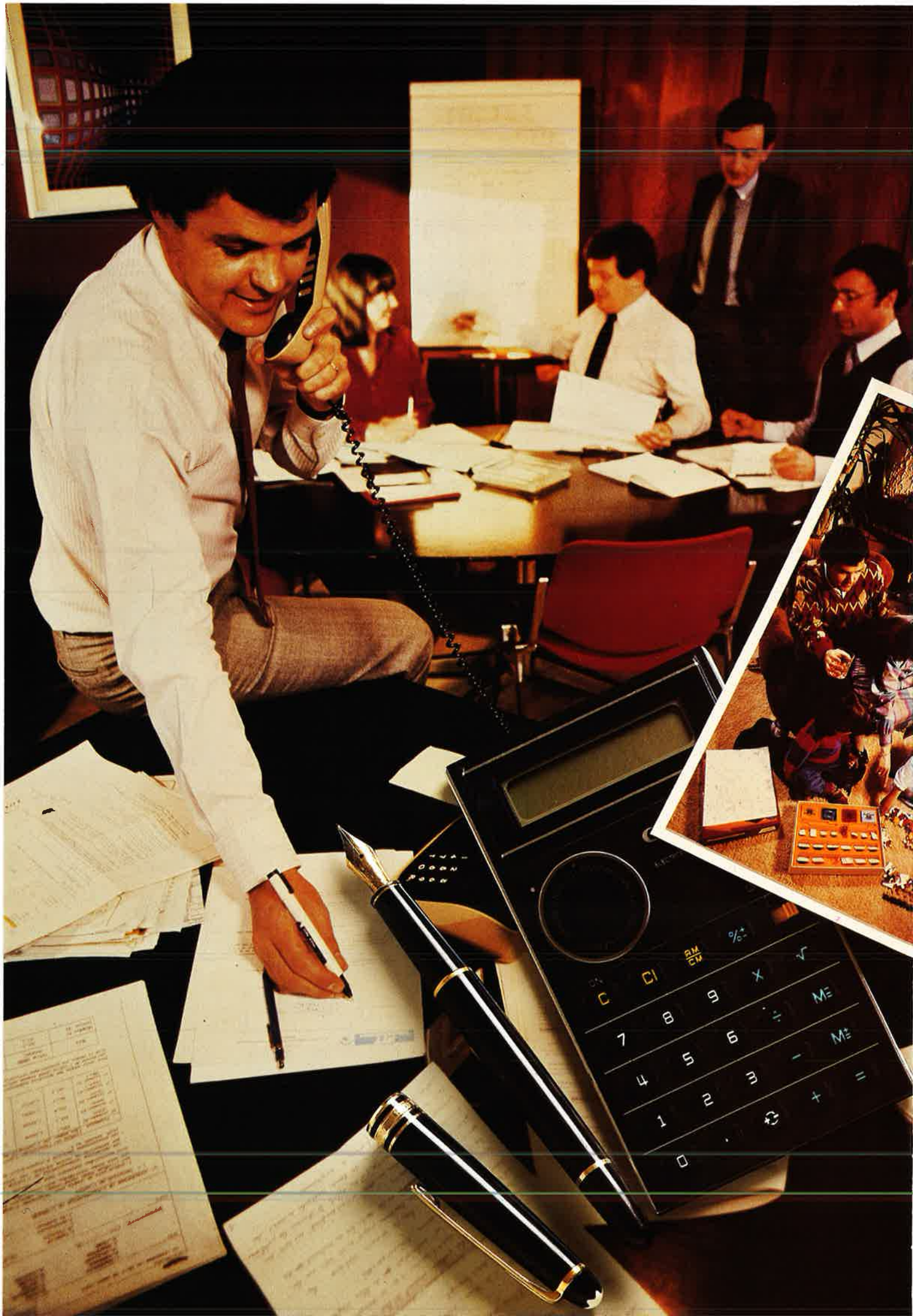
Jean-Marc SCHAUVLIEGE
Age 40
Married, 1 child

Genuinely possible career paths result from career orientations adopted in one of the following three directions:

- Specialization in a technique, involving either continuing concentration on the basic software technique or the acquisition of knowledge related to a new application field and its corresponding DP tools. For example, a systems analyst who wishes to specialize in videography should be acquainted with the various communications protocols, switching techniques, TV signal structures. He should be able to dialogue with telecommunications and television technicians.
- Enhancement of capability reflected in a step up the job ladder. For example, a programmer-analyst assigned to implement complex software entities should study – among other things – systems analysis and program sequencing. When he has mastered these new skills, he can be ranked as a full-fledged systems analyst.
- Assumption of responsibilities in a new function, involving the acquisition of new knowhow. Take the example of an operations analyst who is offered the chance to become a sales engineer representing operations-oriented services or products: he must undergo training in canvassing and sales methods, familiarize himself with marketing conditions, get used to negotiating with professional buyers. Assignment to a management position is also a change in function: besides requiring certain specific talents, this implies the acquisition of specialized knowledge in the art of group leadership, in goal definition and review techniques, in the evaluation of results, etc. These new skills are closely bound up with the field in which they will be applied: for example, the job of leading a team formed to implement a project is quite different from that of managing a team of sales engineers.

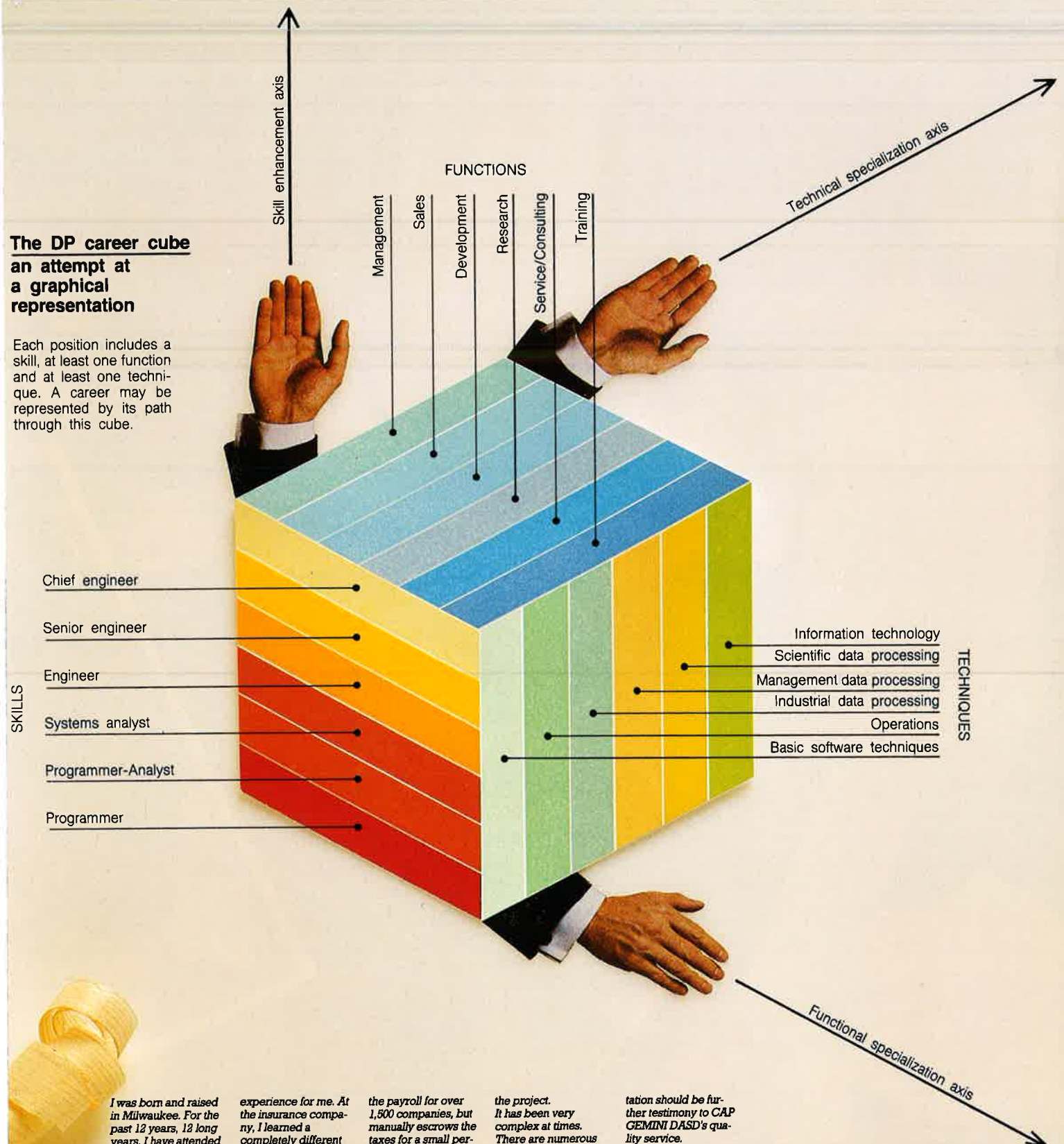
I had sent in unsolicited employment applications to practically every company in Lyons. As it turned out, Sogeti was interested, and it was my present boss, Jacques BERTHELOT, who recruited me ten years ago when he was the Lyons branch manager.
I started out as a beginner engineer. My first job was an assignment as programmer-analyst to Grenoble, then to Paris. After that I worked briefly in Lyons, then I became a project manager, which meant that I had to spend two or three days weekly in Dijon over a two-year period.
My skills? To begin with, a solid grasp of my work from the technical standpoint. It's true that the Group offers splendid technical career possibilities, but after three or four years I became interested in contract development. I was going to follow the technical/sales career path, that is, as a senior engineer tasked with site supervision, contacts with manufacturers, development of certain accounts, and so on. That was when a branch chief's position became available in Lyons.
At the outset, I was running a 23-consultant branch, which actually made me a sort of king-size project manager. Now the branch is three times larger, and I consider myself more of a manager than a computer expert. I think that the more time goes by – this is my third year as branch manager – the more your approach tends toward the development of activities on the basis of a set of market slots, of strategic guidelines. Our own brand of selling happens to be highly technical. If we don't know what we're talking about, we've had it...
But my greatest concerns and my greatest satisfactions come from managing people. For example, we have what we call the Career Steering Committee, a very time-consuming matter for a branch manager. He works on it twice a year, four days each. Eight days spent full-time on career management, on top of all the individual interviews, is just one way that my supervisory engineers and I have of being attentive to our professionals. When someone expresses himself – even if he expresses himself feebly – you're going to notice him, you're going to try to help him put some muscle in his wishes, to broaden his shoulders until he says 'I'm ready, what do you think about it?" We give him the advice he needs for getting ahead. In the long run, when I get into personnel management, that's the only thing I'm tackling: making it so that people can achieve their optimum and develop at their own speed. That's one of the fabulous opportunities of the service activity.
I also believe that a CAP GEMINI SOGETI branch manager should have a happy family life. My wife is a physician: we both have our professional work, and that's a very important balancing factor.

Christian SOUCHON
Age 36,
Married, 2 children



The DP career cube an attempt at a graphical representation

Each position includes a skill, at least one function and at least one technique. A career may be represented by its path through this cube.



I was born and raised in Milwaukee. For the past 12 years, 12 long years, I have attended the University of Wisconsin, where I have taken classes at night for my MIS degree. After 9 years of experience in data processing, I joined DASD in 1982 because of its reputation as a quality services company.
Since I've started with CAP GEMINI DASD, I have had three assignments, and they have all been in different industries: insurance, retail and banking. All three have been good experience for me. At the insurance company, I learned a completely different computer system, the Prime Computer,and that was very interesting. With the retail customer, I learned a little bit more about IBM software than I had previously known before. So each assignment has also been a learning experience. Currently, I am at the First Wisconsin National Bank in Milwaukee, the largest bank in Wisconsin, working on automating their tax escrow process. The bank processes the payroll for over 1,500 companies, but manually escrows the taxes for a small percentage of them. The new system will interface with payroll to escrow various taxes, produce balance reports and generate quarterly and annual government tax filings. I started after the preliminary design was done by another member of our staff and continued from the detailed design phase. We have implemented the first half and are in the programming, testing and debugging phase of the second half of the project.
It has been very complex at times. There are numerous rules and regulations in this system that we have to follow because of government requirements. The system on the whole isn't that complex conceptually, but it is the detail part of it, actually getting down to the nitty gritty, that makes it complex. So I would say it's difficult, but it is very challenging at the same time. The project has been getting a lot of visibility within the bank's management, and its successful implementation should be further testimony to CAP GEMINI DASD's quality service.

Jerry FLEMING
Age 31, Married
2 children

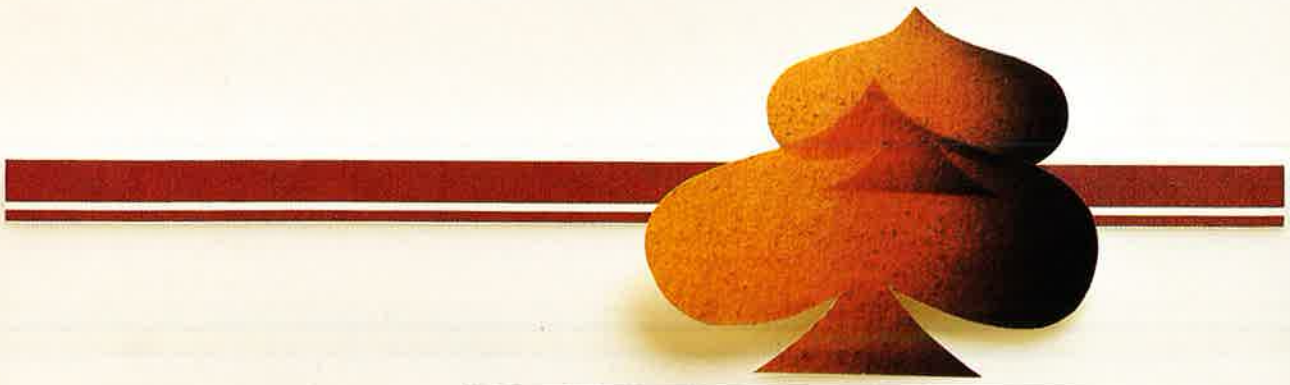
"Worthy is he who enters our learned company"
Molière

CAREER PATHS

Continuing expansion of the computer's field of action, ceaselessly-evolving technology, steady growth of the professional workforce: all good reasons for counseling friends and relations to steer their offspring toward data processing, if they have the necessary desire and aptitudes. In any case, 80% of the present population of DP professionals share this opinion, according to recent surveys conducted in Europe and the USA. But getting your friends' children into the data processing field is one thing; they still have to be told just what they can do once they are there. Let's attempt to describe, then, some of their possible career prospects.

A simple way of summarizing the largest number of possible paths – i.e., theoretically-accessible careers – is to represent the DP trades in the form of a cube (see opposite). The three axes of this cube are:

- **a "Techniques" axis**, along which we encounter the most important basic techniques: software and systems, operations, large application fields (industry, science, management, information technology, etc);
- **a "Skills" axis**, which gives a ranking of the job titles corresponding to each technique and function: programmer, programmer-analyst, systems analyst, keypunch operator, console operator, systems engineer, etc.
- **a "Functions" axis**, the most important component of which is the software and systems development function, but which also embraces research, marketing, training, services, consulting, management, etc.



The employees of a service company like CAP GEMINI SOGETI know that their Group can offer them a wide range of career opportunities. They maintain close contact with more experienced consultants, sales engineers and branch managers because, in most cases, these people were also technicians before moving up and into their current positions. Through discussions with them, junior professionals can become acquainted with the ways and means of career advancement accessible to them.

Many consultants would also like to manage a branch one day, because it is a job which combines the entrepreneur's boldness, the salesman's agility and the technologist's intellect. And they will in turn have to advise their less-experienced colleagues, to open the channels of necessary and desirable training for all, to make their branch come alive and thrive.

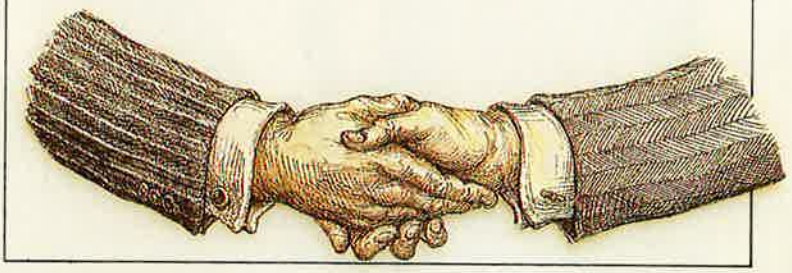
THE CAP GEMINI SOGETI PROFESSIONAL ON ASSIGNMENT

Throughout each of his assignments, the professional is assisted by the technical officer handling the project and by his branch manager.
When the professional receives his work order, the branch manager gives him an accurate description of the job type and environment in which it will be performed.
Whenever the necessity arises during the project, the professional is urged to seek advice from the technical officer, who assists him in one of the following ways:

– joint analysis of the situation
– assignment of an expert to the project
– research of appropriate technical information
– contact with another professional who has already encountered the same problem
– organization of a meeting with the customer's representatives, etc.

Each professional has a chance to review all aspects of his assignment during every site visit by his branch manager.
Branch meetings also offer an opportunity for extensive exchanges of information on individual experiences and problems.

The professional's activity takes place within a carefully-defined administrative framework which addresses the concerns of both the customer company and the professional assigned to it.
The system of review installed in the CAP GEMINI SOGETI companies is based on a number of documents, some of which are used as a medium of communication with customers:
– the "work order" stipulates the modalities of the job, as well as the nature and duration of work to be performed.
– the "activity report" provides supervisory information on the job, and is thus used for billing.
– the "event report" logs any unusual events occurring during project implementation, making it possible to troubleshoot operational problems as they arise.
– the "technical work report" is an in-house document noting the tasks performed during the month, any scheduling discrepancies, etc.
– The "end-of-contract report" terminates the job and provides a technical summary of work performed.



My current job is now with the CREDIT SUISSE. That is one of the three biggest banks in Switzerland with the biggest EDP department, employing some 700 people.
CREDIT SUISSE is about to redesign the securities departments – stocks and shares, and so on – and the administration of customers' portfolios. The project was first estimated at about 500 man/year capacity and meanwhile it has nearly doubled. It consists of several packages and we have just implemented package 1. There are several groups under a project manager. Our group is responsible for the securities data base. My special part in it was the quotations, everything that has to do with the value of securities.
On such large projects our main problems are not technical ones. It is not the programming, it is not how to bring it on the computer, but how to communicate well among people. This applies also to the consolidation phase in which we are now. I think it is the most busy part of the whole project. When there is a problem, the users call us and we must fix things up immediately. We have satisfying moments seeing the system work properly.

Ursula HUBER
Age 41,
Single

The DP department (or branch office): these two terms are broadly used to cover a manufacturer's design department, a company's DP department, a university research lab or a service company's branch office. In contrast to the project team – which takes form, lives and expires with the project itself – these are the permanent structures which recruit, train and pay DP professionals, schedule their assignments, distribute their workloads and coordinate the allocation of their skills.

These are the tasks performed by a CAP GEMINI SOGETI branch manager, for example, for the 30, 50 or 100 men and women for whom he is responsible: he himself recruits his people, makes sure they get the necessary additional training, advises them in the performance of their duties, guides their career development. He maintains a profile of extreme accessibility, as he does not wish to remain aloof from their concerns. His ability to listen is one of the criteria determining his assignment as branch manager.

The branch is also a structure for the shared communication of experience. Its professionals pool their knowledge into an extremely valuable "data bank". If this fund of knowhow is inadequate for the solution of a given problem, an expanded inventory of skills is available through other branches and even other Group companies. Even when confronted by a difficult or unfamiliar problem, then, CAP GEMINI SOGETI professionals are never alone or unequipped. Still, as they frequently spend most of their time within their project or operations team, and this team is itself frequently at work on a user site, many service company professionals pass very little time at the branch office itself: given this situation, how is it possible – as is the case – to create and maintain a solid esprit de corps at this level?

The answer: by the branch manager's activity and presence, by a high level of interpersonal contact in the field, by training and information, by the regular holding of branch meetings, and by the activities of an important person, the branch secretary, one of whose major tasks is to multiply and strengthen the ties between employees and their branch.

Whenever necessary, supervisory engineers, consultants and specialists carry their assistance and advice to the project site itself. They also constitute a key link with the branch and the entire Group. They disseminate acquired experience. They make sure that good ideas do not go unnoticed.

I have an interest in everything new, most recently it was bottling conserves.


CAP GEMINI SOGETI