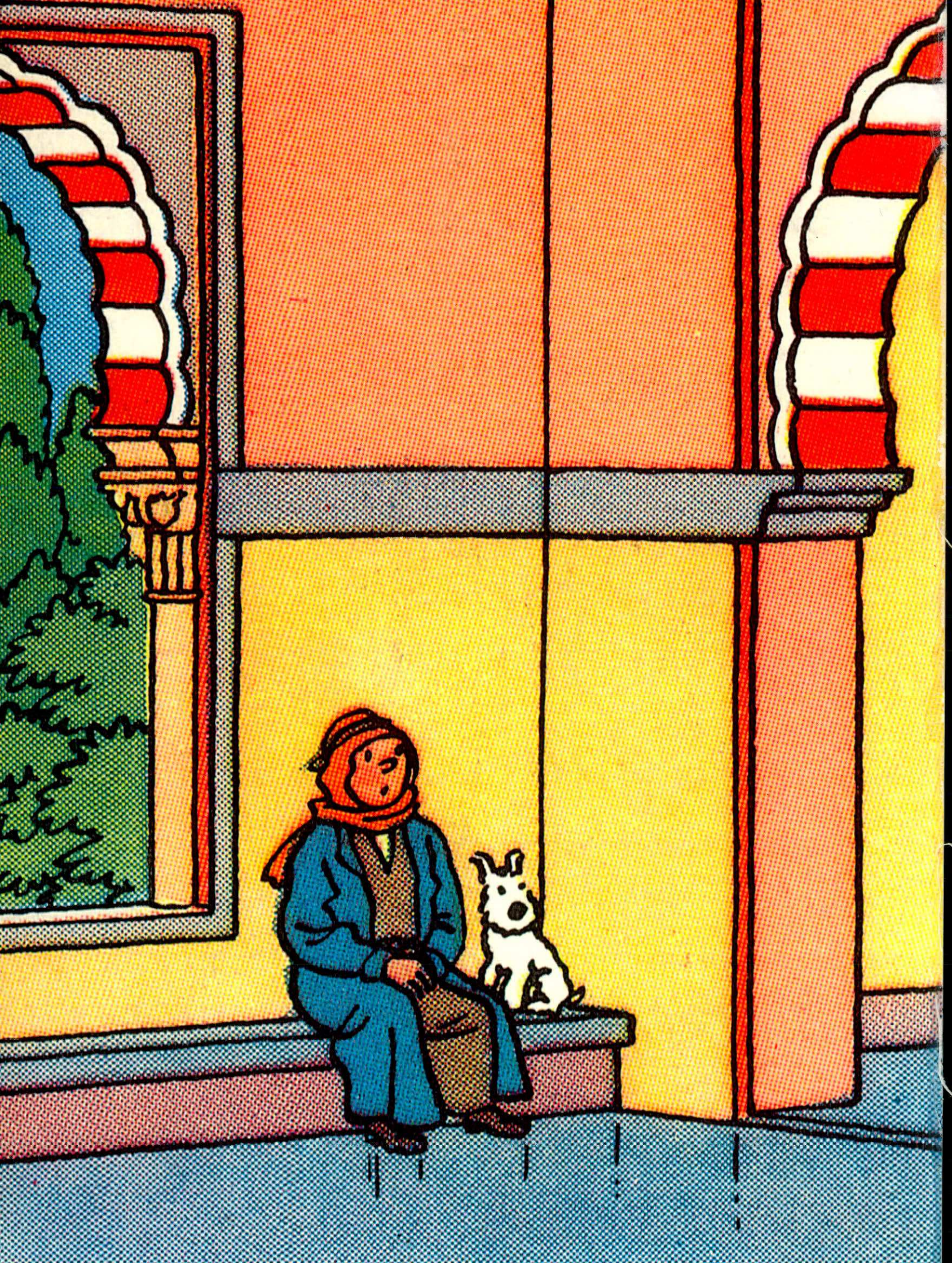# The Logica

88

Annual Review

Logica

Logica Annual Review 1988

From its earliest days Logica has had an international focus and presence. The projects we undertake in consultancy, software and systems development are frequently of global interest and relevance. Our clients, who are themselves often sophisticated computer users and international organizations, increasingly require support and services worldwide. Our staff work from over 30 cities in twelve countries around the world.

Wherever we work, we aim to combine this international outlook with a sensitivity for local culture. We cultivate an environment that encourages excellence and at the same time supports the individuality and creativity needed to meet the challenging requirements of our projects.

To illustrate our Annual Review this year we have chosen the visual theme of the cartoon strip. It is a very international medium that is found in almost every society, and it provides striking images to enhance the review of our activities. The theme also reflects some of the enthusiasm, energy, innovation and fun that are part of Logica's own culture.

Mumin. Lars Jansson. Sweden. ©BULLS.

Logica had a year of excellent growth in which pre tax profits increased by 30% to £14.7 million on turnover of £133 million. Consolidated revenues increased by 27%, and earnings per share of 18.1p were up 26% on the previous year.

The balance sheet at year end was further strengthened, with net liquidity increasing by £5.8 million. Of this, £2.1 million was generated by operations, and the balance was the net surplus arising from the rights issue during the year to fund the acquisition of Data Architects.

The directors are recommending a final dividend of 1.6p per share net, making 2.3p per share net for the whole year, up 35% on the previous year.

THE YEAR AT A GLANCE		
Turnover	£133m	+20%
Consolidated revenues	£127m	+27%
Pre tax profit	£14.7m	+30%
Earnings per share	18.1p	+26%
Dividends per share	2.3p	+35%
Staff at year end	3236	+20%

Staff numbers increased by 20% to 3,236. The graduate recruitment programme achieved its targets in almost all areas despite intense competition. Growth has been slightly uneven this year, affected by different factors in the various subsidiaries, but was good overall.

A key event in the year was the acquisition in March of Data Architects Inc, an American publicly quoted company with a successful track record in the design and development of software products, custom applications software and the provision of related management consulting services. Until 30 June 1988, Data Architects Inc and Logica's existing US operations traded separately. The units were merged and reorganized on 1 July to form a new integrated company, Logica Data Architects Inc. Data Architects' results for the last quarter are included in the overall results. Although affecting the 1987/88 figures only marginally, the acquisition will clearly have a significant impact in future years.

Operations

There has been a slight shift this year in the geographic and market sector splits of business. The analysis by client location shows that, although both Data Architects and the existing US operations exported a considerable proportion of business, particularly to the UK and Japan, turnover in North America increased to over 10% of the total; this component will be considerably larger in 1988/89.

The market breakdown shows finance growing as a proportion of turnover to 25%, reflecting both the contribution of Data Architects in the last quarter and the breadth of our capabilities in this sector. Also striking is the growth in the computing and electronics sector, indicative of our strength in large

scale software development and our international capabilities, and in the transport sector, an area where major developments are arising around the world.

The relative proportions of turnover by the type of work undertaken – custom software and systems implementation, consulting, and software product and systems kernels licences – remains fairly constant from year to year. This year we continued to invest in significant development programmes for kernels such as the FASTRADE™ trading information system, the CPLEX.400™ communications software, the GALLERY 2000™ digital picture library, and the MASTER CONTROL™ 2000 control and data acquisition system. The former Data Architects products – such as BESS® and Bankmaster in the finance sector and C3 and SONAR in telecommunications – are also being developed further.

As expected, Data Architects' business is proving to be a good fit with the rest of Logica's worldwide operations. The proprietary computer applications software products which Data Architects marketed principally to the banking and telecommunications industries complement Logica's existing products and kernels, and there are opportunities to exploit their US success worldwide through our international subsidiaries. Data Architects' experience in the insurance sector has potential application both to other insurance companies and, because the systems being installed are fundamental core systems, to other industries. Even without the addition of Data Architects, Logica's US operation had an outstanding year. Work for computer vendors, especially for IBM, has been a strong business stream, and the large integrated control system for the San Francisco rapid transit system progressed well. The formation of the 500 strong company substantially strengthens our presence in the US where we are now able to address larger, more complex prospects.

During the year Logica acquired Jardine Matheson's 50% interest in our joint venture company in the Far East. From our Hong Kong and Kuala Lumpur offices we worked on assignments in Hong Kong, Malaysia, Taiwan, Thailand, Indonesia and the Philippines. Although business development has been slow, sales of our retail financial software, ON/2, have been particularly successful in the Far East.

In Australia, as is the case elsewhere in Logica, the provision of software development services to computer vendors has been rising significantly in importance. Logica has also been able to establish a solid presence in the defence market this year, benefitting from the well founded skills and experience transferred from the UK.

In continental Europe our performance has been good overall. We have restructured the smaller subsidiaries along market sector lines in order to concentrate on areas with the strongest growth potential. In Sweden, Logica had an excellent year. Interesting work started on major new projects, including the Swedish State Lottery system, and cooperative initiatives with computer vendors have already proved fruitful. In Belgium new work in space, banking and government, especially for the European Commission, helped to compensate for a slow year in industry. Typical of our current work for the Commission are two computer requirements studies, one for the European Court of Auditors and the other in relation to the intended European Trademarks Office. Logica in Germany made good progress on the large Bremer Lagerhausgesellschaft port project that led to completion just after year end, and we finished the product development for Olivetti. Important new sales were made in Switzerland. In Denmark the finance sector continues to provide a steady stream of business. We have carried out a finance related project for IBM Denmark during the year as part of our increasing work for computer vendors.

Bidhi Chand. India. ©India Book House Education Trust.

In the Netherlands Logica had a successful year and entered 1988/89 with a healthy backlog of sales. The award of the contract to control shipping in the Westerschelde estuary consolidated our position in the transport sector, an area of good potential. There was also an increase in telecommunications work in the Netherlands and continued strong sales in the finance market. The regional office in Groningen which was opened last year is building a base of clients in the industrial and government sectors.

Our joint venture, Logica General Systems, made steady progress in established business areas in Italy. Interesting new communications work was won, and finance sector business continues to expand. Substantial sales of software packages to industrial companies have led to increased demands for our professional services, a trend which we expect to continue. We are also undertaking key management consultancy assignments, such as that for Pininfarina, which not only have broad strategic importance but are also leading to information systems implementation work.

Growth across the extensive UK operations was good overall and excellent in some of the six subsidiary companies. Business development in Logica Space and Defence Systems was slower than in previous years because of the well publicized funding difficulties in space and a continued slowdown in defence spending. Nevertheless the subsidiary achieved commendable increases in both revenue and profits, and a marked upturn was noted in the latter part of the year. We worked on several of the very large projects that are becoming a feature of UK defence work, including the UK Air Defence Command Information System with EASAMS and the Type 23 Frigate command system with Ferranti. The issue of UK government funding for the Columbus programe was resolved in the spring and since May we have been working on the next stage of the project.

Logica Energy and Industry Systems had an excellent year with strong sales, especially of supervisory control and data acquisition (SCADA) systems. The award of a major contract by Yorkshire Water confirmed our leading position in supplying the water industry. We also completed the national pipeline control system for British Gas which places us in a strong position to win similar business from regional gas authorities. The electricity sector emerged as an important area for new developments. In the manufacturing sector, diversification and growth led to sales of quality management, computer integrated manufacture and materials handling systems.

In Logica Communications and Electronics Systems there were several particularly successful areas. Fierce competition has arisen since deregulation, causing broadcasters to seek quality and cost effectiveness through systems such as GALLERY 2000 and studio automation. We have been able to exploit this situation and sales increased strongly. In the central government market, opportunities are good, although procurement cycles are long. We won interesting new work including the radiation monitoring system for the Department of the Environment and completed the jobmatching scheme for the Northern Ireland Department of Employment. As elsewhere in Logica our communications work and projects for computer vendors remained strong areas.

Logica Financial Systems performed extremely well. In view of the effects of the October stock market crash, we consider this a powerful demonstration of the breadth and strength of Logica's business in the financial sector. Significant new business arose because retail and wholesale banking operations, such as those at Barclays Bank and G-Bank, were seeking large scale replacement systems to remain competitive. The International Stock Exchange in London, placing a turnkey contract for the first time, awarded Logica a major project for the first stage of an international equity trade confirmation system called SEQUAL. Further sales of Logica's financial products were made, and the capacity planning product range was expanded to feature a network planning tool.

WHAT'S THAT?

MY LADDER TO SUCCESS

Betty Boop. USA. ©King Features Syndicate Inc.

The other two UK companies continue to work across all the market sectors, and both have realized a more international dimension this year. Logica Consultancy expanded its client base and provided management consultancy in a broader range of information technology fields, covering all aspects from strategy and infrastructure to performance. A highlight of the year was the important quality management system study for the UK Government which firmly established Logica as a national leader in this area. We published eleven successful market reports during the year; the authoritative television broadcasting study made a clear contribution to understanding future developments in satellite broadcasting.

Working closely with the systems companies, Logica Cambridge has seen the fruitful application of its advanced technologies research to many client projects this year. Expert systems and human computer interaction expertise have been incorporated in applications ranging from audit trails to astronaut training. At year end important new projects were beginning to come through under the next ESPRIT European research programme: we are leading the SUNDIAL project which is the largest collaborative speech understanding venture yet to be undertaken in Europe. Logica's core software methods policies, implemented company wide, continue to be developed and supported by Logica Cambridge.

In addition to its investment in research and development, Logica has made substantial investment in technical infrastructure this year, introducing new software engineering tools, office systems, data networks and development computers.

To accommodate growth, we acquired large new premises in central London – Stephenson House is being completely renovated to provide 10,000 square metres of space early in 1989. A large section of Logica Energy and Industry Systems moved into a new building outside London in Leatherhead. As central London commercial property costs rise we envisage further expansion of offices outside the capital in addition to our existing regional bases in Cambridge, north west England and Aberdeen. In the US, the merger of the two operations and the transfer of the head office to Waltham, Massachusetts, has enabled us to dispose of one of the New York offices.

Staff
Logica's training programme plays a large part in the recruitment, retention and career development of its staff. This year we have made many additions to an already extensive range of courses. Our core software methods policy is supported by in depth training in all the recommended tools and methods as well as in broader project management and software design and development issues. Quality assurance and commercial awareness offerings have been developed centrally and by subsidiaries. Regular seminars are held on topical issues, enabling staff to be brought up to date in specialist fields by experts from Logica and elsewhere.

Current information on technical and company developments is also promulgated through other techniques. Horizontal and vertical meetings at all levels and a variety of company wide and local staff magazines and newsletters are used to communicate with staff around the world to ensure the transfer of expertise, market knowledge and culture as Logica grows.

An essential element of Logica's culture is the high level of participation in sports and social activities almost everywhere. The light hearted theme of this year's Annual Review not only mirrors the variety of cultures in which our staff work, but also conveys something of the sense of enjoyment and originality that is characteristic of Logica people.

Directors
Cliff Preddy, managing director of Logica Energy and Industry Systems Limited, became a plc board member assuming responsibility for two further subsidiaries and for international business development in manufacturing, utilities and energy sectors. Martin Cooperstein, chairman and chief executive officer of Logica Data Architects, was appointed to the main board of Logica and Norman Zachary, the subsidiary's president and chief operating officer, was named as his alternate.
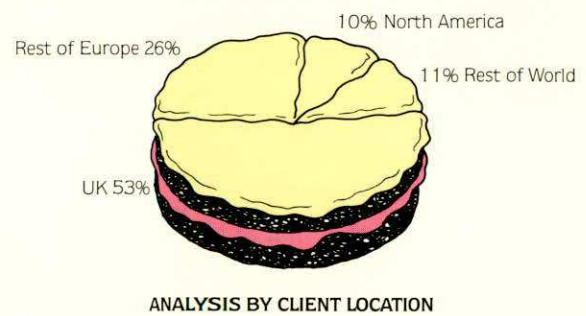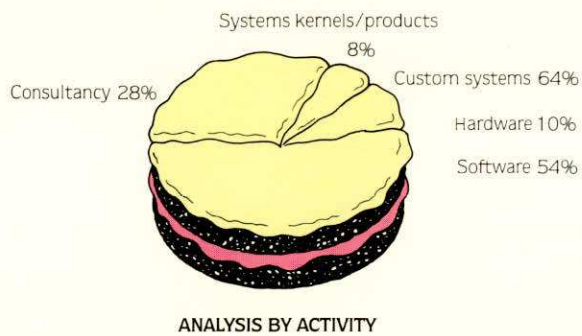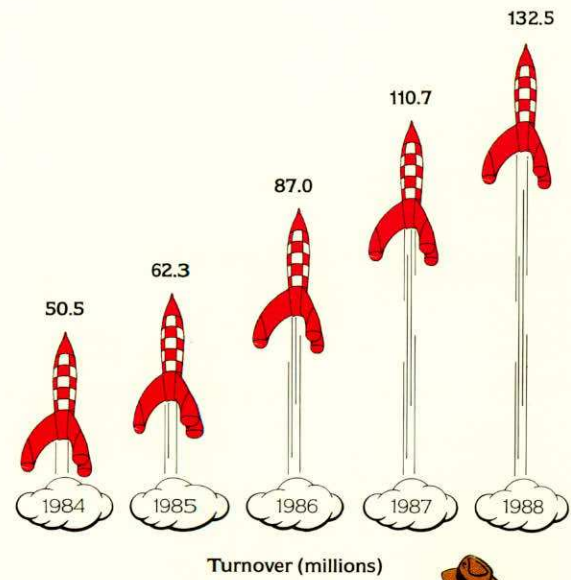
Clive Hollick was appointed as a non-executive director. He is managing director of MAI plc, the international financial, media and information service group, a non-executive director of Hambros Bank Limited and a member of the National Bus Company.

Prospects
The year has seen considerable activity in acquisition and merger within the industry, largely aimed at creating new groups more international in their activities. Since its inception in 1969, Logica has consistently pursued a strategy of building an independent, international group, both by establishing its own worldwide subsidiaries and, where desirable by making acquisitions. The excellent growth of the past year, which included a substantial acquisition in the US and further organic growth, is evidence of the success of this well established policy.

The Directors are confident that Logica's international reputation and spread of activities will ensure continuing strong growth of business in the year ahead.

1,563
1,843
2,348
2,682
3,236

1984 1985 1986 1987 1988

Staff numbers

50.5
62.3
87.0
110.7
132.5

1984 1985 1986 1987 1988

Turnover (millions)

Tin Tin: "Objectif Lune". Belgium.
©Hergé/Casterman.

Systems kernels/products
8%

Consultancy 28%

Custom systems 64%

Hardware 10%

Software 54%

ANALYSIS BY ACTIVITY

10% North America

Rest of Europe 26%

11% Rest of World

UK 53%

ANALYSIS BY CLIENT LOCATION

Defence 10%   Space 3%

Central & local government 8%   Energy & utilities 9%

Other 2%   Post & telecommunications 10%

Manufacturing 6%

Broadcasting & media 4%   Transport 6%

Finance 25%   Computing & electronics 17%

Betty Boop. USA.
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ANALYSIS BY MARKET SECTOR

ogica's business in the financial area continued to grow steadily despite last October's Stock Market crash. This can be attributed to the fact that we provide services internationally and across the full spectrum of the industry – in retail and corporate finance as well as in the area of investment systems.

A particularly strong area of growth has been our involvement in major software development projects. An increasing number of banks and other institutions are embarking on the replacement of their core systems in retail, wholesale and investment finance. Logica's extensive project management skills and experience of completing developments on time and to budget are leading to our participation in an increasing number of joint projects alongside client staff.

Our software products have continued to sell well. In retail banking, ON/2 software for handling automatic teller machine and point-of-sale transactions has made a significant contribution. The strong position of FASTWIRE™ as a financial message switching kernel has been confirmed and with the addition of the BESS funds transfer system to our product portfolio we are now the leading supplier of such systems worldwide. Our dealer support product, FASTRADE, is being enhanced to provide foreign exchange and money market facilities while continuing to succeed in the equities front office environment for which it was developed.

Logica's reputation as a major supplier to stock exchanges throughout the world continues with the award of contracts for the International Stock Exchange in London and another European stock exchange. An increasing area of our activity, strengthened considerably by the acquisition of Data Architects, is in support of insurance industry clients as they develop new services and diversify into other financial areas.

Our work for the **New York Life Insurance Company** began with a study undertaken by Data Architects, Inc., before its merger with Logica. This covered current and required electronic capabilities and concluded with recommendations for an overhaul of the company's data processing structure, upgrades to the technology and the introduction of a number of new systems, all within the framework of an approved migration strategy. The proposed systems would create a new architecture for data processing and enable a client's total business relationship with the company to be seen, making it possible for the company to broaden the range of financial services on offer.

We continue to work for New York Life and are currently developing a number of applications, including: a Client Information System, shifting data processing from policy orientation to client orientation; an Individual Policyholder Service System, tracking claims and contract changes with automatic on-line follow up, and providing other automatic functions; a Variance Information Processing System, facilitating speedy response to computer generated messages, warnings and action requests; a New Business System allowing rapid introduction and support of new or enhanced products; and an Integrated Data Entry and Accounting System. This ambitious programme covers the whole field of the company's data processing and will have involved several hundred man years' effort by the time it is completed.

A new global banking information system is being developed by **Barclays Bank** and Logica to replace the bank's existing systems. Barclays Global Banking System (BGBS) will provide comprehensive operational and management support for individual branches throughout the world, and supply information to regional, international and corporate management systems.

BGBS is part of Barclays' global information systems strategy, based on the use of DEC VAX* hardware in each branch. Logica is managing and directing the joint development team, which includes Barclays' staff specializing in business and user oriented systems.

"Les Pionniers de l'Aventure Humaine". Boucq. France. ©Casterman.

Lo Fu Ji. Hong Kong. ©Ng Hing Kee Publishers.

Andy Capp. UK.
©Daily Mirror Newspapers.

A trade confirmation system is being developed by Logica for the **International Stock Exchange** in London. The system, called SEQUAL, will give traders control over market exposure by providing round the clock global access to on-line equity trade matching.

A range of services will be developed in later phases for integration with SEQUAL: these include links with other trade matching systems, settlement instruction routing and reporting to regulatory authorities worldwide. SEQUAL is the first contract for a turnkey system placed by The International Stock Exchange.

Consultancy on relocation was provided by Logica to **Prudential-Bache Securities**, a leading financial institution, when it expanded its operations in London to coincide with the deregulation of the International Stock Exchange. Logica assisted with the relocation of the systems and communications department to a new data centre, where it was required to provide comprehensive support facilities for computer and communications services in London and across Europe.

Technical advice was given on the provision of services for staff, computer and communications equipment, and building services. Logica was subsequently retained to provide a project director with responsibility for the construction and fitting out of the new premises, and for the relocation of staff and equipment to the new facility.

A rapid installation of the ON/2 electronic funds transfer software package in only 13 weeks has given 750,000 cardholders access to 300 automatic teller machines (ATMs) throughout Malaysia. Logica completed the project ahead of schedule for the **Malaysian Electronic Payment System (MEPS)**, a consortium of major Malaysian banks. The system is connected with the ATM network of each of the five member banks through their main computer system.

Also in Malaysia, Logica is supplying ON/2 software to control an Electronic Funds Transfer at Point of Sale (EFT/POS) network for **Southern Bank Berhad**. The ON/2 system will enable the bank to run its ATM and POS terminal network for 24 hours a day.

The ON/2 system is linked to the bank's mainframe for data exchange with the credit card management system and the retail banking system. It also interfaces to major international credit card networks and MEPS. Since ON/2 was introduced in 1984, it has been installed in more than 100 locations worldwide.

The Arbitrage Department of **G-Bank**, Belgium's largest commercial bank, chose Logica to carry out integration and development work on its new IBM System/88**. By working closely with the client, Logica identified in the initial stages a number of specific applications which are now being addressed as separate projects to match the requirements of management and traders.

Three main projects are currently being undertaken in a complicated environment to produce developments specific to G-Bank. The projects are: a database design for a management information system; a rates database system which will convert rate information from Reuters to a digital format and integrate it with the IBM System/88 to support front office activities; and a reporting system, producing batch reports and operating a real-time dealer and management enquiry system. Once the programme has been completed, G-Bank will have one of the largest and most complex systems of its type in Belgium, providing support for management and traders and integrating the IBM System/88 with other G-Bank systems.

Clients in this sector include:
ANZ · Arab Banking Corporation · Association Tripartite Bources · Bank of England · Bank Simpanan · Barclays Bank · CL-Alexanders Laing and Cruickshank · Den Danske Bank · EPSS · G-Bank · Iduna Baudsparkasse · The International Stock Exchange · JP Morgan Guaranty · Midland Bank · New York Life · Postbank · Prudential-Bache Securities · Rabobank · Rainier National Bank · Royal Bank of Canada · Southern Bank Berhad · Sovran Bank · Westpac Life · Wheeler Grace Pierucci

Andy Capp. UK. ©Daily Mirror Newspapers.

Jane. UK. ©Daily Mirror Newspapers.

Post and Telecommunications

*I*n the liberalized market created by deregulation in the US and the UK, post and telecommunications organizations are looking to automation to give them a competitive edge. They continue to introduce computer systems to increase efficiency and to enable them to provide new services and improved quality.

With the expertise it has developed in the UK and US, Logica is well placed to win more business as further European telecommunications services are liberalized. Logica's comprehensive experience in the applications of a wide range of communications technologies is also helping telecommunications organizations to expand into new business areas with the introduction of services such as paging and telephone enquiries. The projects in the Netherlands, Italy and Denmark, described below, demonstrate the variety of opportunities that exist.

A prime example of our work in this sector is the project in which we are assisting British Telecom to provide the largest customer services system in the world, already available to seven million customers. In the US we sell our SONAR system which enables regional telephone companies to provide new services. Another US product, C3, which is for management of voice networks, is installed at more than 20 locations.

A wide range of sophisticated services will be offered by the **Danish PTT** through advanced Olivetti terminals which are to be installed in post offices over the next four years. Logica was involved in the shortlisting of vendors for the system and has been responsible for the development of a system to take care of the financial monitoring of all the hardware supplies during the project.

The project will involve the rebuilding of almost all the 1,000 Danish post offices. Once operational, customers will be able to avail themselves of a variety of payment services, so that the Danish PTT will gain competitive advantages in the financial markets.

The long term nature of the hardware installation has made it necessary to create a flexible system which will take into account possible developments over the next four years, such as changes to configurations, post offices, prices and plans in general.

The market for services in an Integrated Services Digital Network (ISDN) was studied for **SIP** in Italy by Logica General Systems and Logica Consultancy Limited. The collaboration between the two companies enabled us to combine experience of the Italian markets with broadly based consultancy skills.

The study was in preparation for a pilot service that will be introduced in seven cities in 1990 with approximately 2,000 users with a view to a full service being launched in 1992. Logica interviewed potential users to discuss their ISDN requirements and opinions on possible services. The study also included comparisons with information from other European users, gained from Logica's knowledge of the European ISDN market, services and product launches.

The information gained from the study enabled Logica to advise SIP on marketing strategy: how much to charge, what services to include and which ISDN services required most marketing in order to inform users of the benefits. The improved quality of communications and the potential of bearer services such as virtual private networks were examples of benefits on which potential users needed more information.

Swamp. Australia. ©King Features Syndicate Inc.
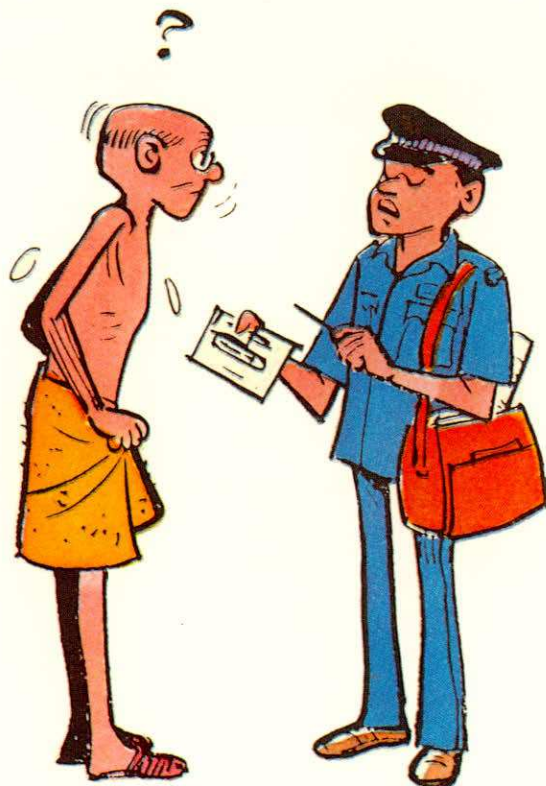
Lo Fu Ji. Hong Kong. ©Ng Hing Kee Publishers.

Ginger Meggs. James Kemsley. Australia. ©Jimera Pty. Ltd.

The X.400 message handling systems have been recognized by the **Dutch PTT** as providing the wider infrastructure necessary for modern, integrated services. X.400 enables text, graphics and digitized voice to be exchanged using existing telephone, telex and packet switched networks. Logica has been asked to specify an X.400 system based on our own CPLEX.400 systems kernels.

The client requirement is for a message handling system that would enable the quick and efficient exchange of customs declarations between the tax authorities and import companies. Logica is seen as a trusted supplier and a regular source of new technology which has a tradition of working closely with the Dutch PTT.

Logica's CPLEX.400 system was the first to exploit the 1988 CCITT X.400 standards as its design model and one element, the User Agent, has already been successfully demonstrated.

GTE Hawaiian Telephone Company has awarded Logica a subcontract for a local administrative and maintenance management system for the Department of Defense Japan Telephone Upgrade project. The system is a full featured UNIX based telecommunications system based on our Communications Control Center (C3) product, a network management and administration facility for complex telecommunications networks.

The system will be installed at the Marine Corps Air Station in Iwakuni, Japan. It is part of a total communications upgrade for the base. System modules include subscriber inventory, call detail recording, traffic data, call rating, billing, directory assistance, service order entry, trouble reporting and tracking, equipment inventory, cable inventory and administration.

The Japan Telephone Upgrade project is part of the US Department of Defense programme to upgrade telecommunications systems for all military branches around the world. This programme includes converting military telecommunications networks to digital switching systems, providing more efficient control and management as well as reducing telephone costs. Logica is also involved in two other projects in the programme: the Korean Telephone Upgrade and the Continental US Telephone Modernization Program.

Clients in this sector include:
AT&T · British Columbian Telephone Company · British Telecom · CNET · Danish PTT · Dutch PTT · Eutelsat · Finnish PTT · GTE Data Services · ITS · Jutland Telephone Company · Postverket · SIP · Southern New England Telecommunications Corporation · Telic Alcatel · UK Post Office
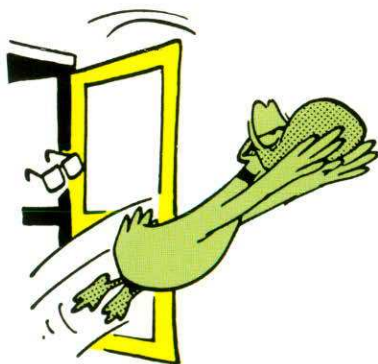
Swamp. Australia.
©King Features Syndicate Inc.

Ginger Meggs. James Kemsley. Australia. ©Jimera Pty. Ltd.

"Valentina". Guido Crepax. Italy. ©Rizzoli-Milano Libri.

*T*he dawn of satellite television broadcasting is prompting television companies to take measures that will give them an advantage in a highly competitive market. In countries such as Britain, where restrictions on commercial broadcasting are gradually being lifted, concern about competition is particularly acute. Systems which will increase efficiency or improve quality are therefore essential.
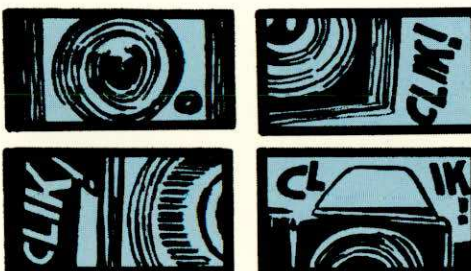
Logica's GALLERY 2000 television still picture library enables high quality graphics to be included rapidly in programme output, and its initial success has been followed this year by further strong sales internationally. It is now being used by television companies in Austria, Britain, Canada, Denmark, Germany and the United States. CBS has already purchased GALLERY 2000 and we look forward to substantial future US sales.

As the GALLERY 2000 system raises graphics quality and speed of handling, so studio automation improves efficiency. The systems Logica is building for Thames Television and HTV are typical of an increasing requirement to automate many functions in television studios.

The GALLERY 2000 system for still picture management has been expanded and enhanced as sales continue around the world. GALLERY 2000 uses optical disk storage to facilitate the creation of very large libraries; a purpose designed index, and poly-photo displays, to aid research; and multiple workstations and programme list management to serve the still picture needs of a complete broadcasting centre.

Thames Television and **HTV** in the UK have both purchased large GALLERY 2000 systems, including a mechanical optical disk handling device, allowing up to 44,000 pictures to be on line at any time in a single unit. Logica also developed the QDIO, a digital picture transcoder, which permits the exchange of pictures with the Quantel Paintbox† without distortion or degradation.

Other sales of GALLERY 2000 and GALLERY DPA (the Digital Picture Archive – a library system without the picture management facilities) included those to **BBC** and **ITN** in London, **Scottish Television**, **CBS** in New York, Denmark's new television channel **TV 2**, and **ORF**, the Austrian broadcasting authority.

Fully automatic control of transmission will be provided for the UK's HTV by Logica's transmission playout automation system. HTV is the independent television contractor for Wales and the West of England which is carrying out a major programme of modernization, including the installation of GALLERY 2000 systems and Sony LMS (Library Management System) Beta-SP playout machines.

Two of Logica's transmission playout automation systems will be installed, to take input from HTV's programming schedule system and control the Pro-Bel transmission switcher, the Sony LMS and GALLERY 2000. The system provides a great deal of flexibility for last minute changes – to advertising spots, for example – while the use of two systems will allow advertising to be matched with the different characteristics of HTV's Welsh and English viewers.

"Valentina". Guido Crepax. Italy. ©Rizzoli-Milano Libri.

The impact of deregulation on the structure of European television broadcasting and changing technological and commercial pressures were analysed in an authoritative Logica report. **Television Broadcasting in Europe – Towards the 1990s** predicts the growing domination of European broadcasting by large media groups whose wide interests in production and distribution will match programme supply with advertising demand.

The report is the first comprehensive research study for over ten years to deal with both the terrestrial and satellite aspects of current and future European television broadcasting. A detailed analysis was provided of the 29 national broadcasters and 67 broadcast or satellite channels, with comprehensive regulatory, financial, organizational, programming and viewing details.

Broadcasting and media companies across Europe are using the report to plan future strategies, predict market trends and anticipate the influence of future technologies. Over 200 copies of the report have been sold.

Clients in this sector include:
Axel Springer Verlag · BBC · CBS · The Daily Telegraph · HTV · ITN · ORF · Scottish Television · Sender Freies Berlin · Thames Television · TV 2

Tin Tin: "Tin Tin au Pays de L'Or Noir". Belgium. ©Hergé/Casterman.

ncreased government recognition of the need for good computer systems and a willingness to buy more turnkey systems has made government work a rapidly growing area of Logica's business internationally.

Logica has achieved some notable successes in this market in the past year. In the UK we led a consortium required to install the first phase of the national radiation monitoring network (RIMNET) for the Department of the Environment within a tight timescale. Among the wide range of consultancy and implementation work undertaken for other government departments is the installation of the job matching scheme for the Northern Ireland Department of Employment and our continuing computer security evaluation work for the UK Government.

Central and local government work has also featured strongly in most other countries in which we operate. In the Netherlands, for example, we are working for the Ministry of Education, and in Belgium, work for the police and the European Commission continues.

The procurement pattern for government contracts is lengthy and the large scale of the projects involves a degree of risk. However, the rewards are great, and Logica carefully evaluates its chances of success before competing for any project. We expect this area of our business to remain buoyant in coming years.

The UK **Department of Trade and Industry** has launched an initiative to ensure that industry is made aware of the necessity to build quality into all products and services. As part of this programme, Logica undertook a major study of quality management standards which involved detailed research and interviews with executives and specialized quality personnel, and utilized both our consultancy skills and the experience of our quality assurance department.

The study concluded that the international standard ISO 9001 provided a feasible and acceptable basis for a harmonized approach to quality management, but that an authoritative guide for the application of the standard to software development is required. The study recognized that the use of an international standard would be of advantage to UK firms once non-tariff trade barriers are removed within the European Community by 1992.

In considering the role of software engineering in relation to quality management, the study concluded that there needs to be a synthesis of the two areas, providing a basis for the integration of quality management systems with software engineering standards, methods and tools.

Svenska Penninglotteriet AB (the Swedish State Lottery) operates a manual system for different lotteries, sending out tickets to its retail outlets by registered post after conducting a forecast of sales. However, the number of tickets required by each outlet is difficult to predict and the reallocation of returned tickets is expensive.

Logica is developing software for a test system which will use five intelligent on line terminals to handle the printing of tickets and the paying out of prizes of a certain value once the draw is made. The terminals will be linked to the central system, running on IBM System/88 fault tolerant hardware, by the nordic public data network, an X.21 system. If the test is successful, the full system will use approximately 1,000 terminals in retail outlets all over Sweden, with a capacity of 25 transactions per second.

The use of on line terminals will give the lottery a much higher visibility. Customers can choose their own numbers, it will be easier to introduce new lottery systems, and the system will provide better tracking of sales and profit distribution through the different retail outlets.

Rupert Bear. UK. ©Express Newspaper Limited.
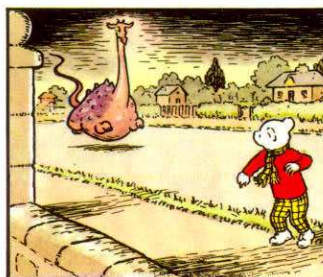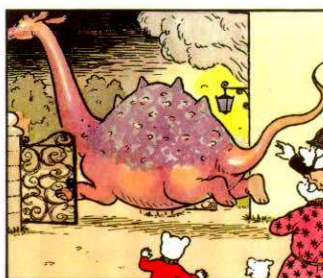
Obelix. France. ©Ed. Albert Rene 1988 Goscinny/Uderrzo.

Security officers in the UK government trace breaches of computer security using audit trails which document the use of computer resources. The manual search for unusual patterns of behaviour is lengthy: a Logica study recognized the potential of knowledge based programming in developing a tool for automatic inspection of audit trails. Logica is developing a demonstrator system for the **Central Computer and Telecommunications Agency** to act as a focus for further research. The security officers use a special purpose language to specify behaviour patterns which, in their experience, indicate a possible breach of security. As security officers increase their understanding of patterns of behaviour, they can alter the filtering criteria and build up a library of filters based on this knowledge.

The system is already being used to demonstrate the advantages of knowledge based programming in this area to UK government departments. An experimental system may be refined if this is considered to offer significant benefits for security officers in all types of multiuser computer installations. It represents an important initiative in taking knowledge based programming into widespread operational use.

To enable a quick response to events such as the Chernobyl diaster, a Radiation Incident Monitoring Network is being built for **Her Majesty's Inspectorate of Pollution** in the UK. Logica is the lead contractor and will be supplying the computing and communications facilities in the first UK nationwide system for monitoring radiation from accidents that may occur overseas.

Hourly readings of gamma radiation will be taken at 46 UK sites. The information is sent via the network to a central database and a back up location. The databases may also hold information collected on the contamination of foodstuffs, water and air. Logica will provide the applications software to interpret and interrogate radiation data, making comparisons with normal radiation levels for each site and plotting geographic trends.

In the event of sustained abnormal levels of radioactivity being detected, alarms are activated automatically. Logica is responsible for the development of procedures to be followed in the event of an incident and for staging a simulation exercise to prove them. An emergency control room will be provided with communications facilities for receiving and disseminating information concerning any incident that is identified.

Clients in this sector include:

Belgian Gendarmerie · Belgian Ministry of Public Works · Central Computer and Telecommunications Agency · Commission of the European Communities · Dutch Ministry of Education · Dutch Ministry of Justice · GCHQ · Greater Manchester Police · Her Majesty's Inspectorate of Pollution · HM Coastguard · Kingston Polytechnic · New Zealand Department of Treasury · Powerhouse Museum, Sydney · Regione Veneto · Svenska Penninglotteriet AB · UK Department of Health and Social Security · UK Department of Trade and Industry · UK Foreign and Commonwealth Office · UK Home Office

DUM FRÅGA. DET VAR DOM. ETT 'A' FÖR JA.

Mumin. Lars Jansson. Sweden. ©BULLS.
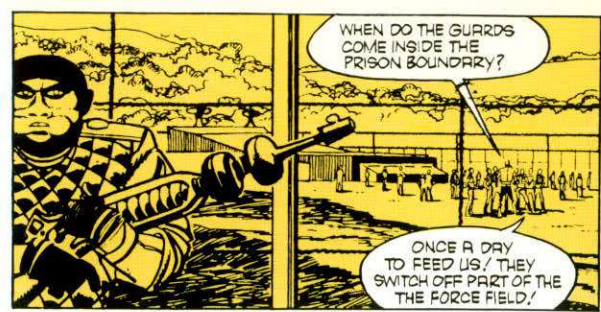
Garth. UK. ©Daily Mirror Newspapers.

Defence

Several interesting trends in defence procurement have emerged during the year which are likely to impact future systems development significantly. In the UK, the increasing application of the competitive procurement policy has resulted in the Ministry of Defence looking for contractors to take responsibility for larger scale projects. Although further extending an already lengthy process, this has enabled companies like Logica to act as prime contractor on substantial projects and to play a significant role alongside the major electronics companies in very large developments such as ADCIS, and the design of the command system for the Type 23 frigate work.

Defence establishments are concentrating increasingly on achieving value for money and on procuring systems that provide the availability, reliability and maintainability to keep through life costs at reasonable, predictable levels. More analytical studies are being performed to hone understanding of requirements, and prototypes and demonstrators are being used to enable requirements to be refined realistically as work progresses. System functionality is becoming a strong focus throughout the development life cycle. This approach requires sophisticated project management expertise of the type for which Logica is well known. In addition, Logica's quality system, its company wide software engineering infrastructure, and its ability to exploit synergy with sectors such as energy, finance and transport - where reliability is also crucial - are all being brought into play to meet these new demands.

This year we have begun to realize our aim of becoming internationally competitive in the defence arena. We have been successful in winning contracts in both Australia and the US, including the project for the Royal Australian Navy detailed below. We have been retained by the US Department of Defense to undertake an operational analysis of the European aspects of a joint defence initiative. Our work in international teams on NATO programmes continues.

On the technical side, our work in signal and image processing is capitalizing on new developments in video technology. We are seeing considerable demand for systems that can not only extract significant information from indistinct and complex image or sonar sensor data more precisely and quickly, but present it in a more understandable and usable way. Another key area where we have extensive capabilities encompasses safety critical software, secure computing and high integrity systems. Among the major contracts in this field is our continuing computer security evaluation work for the UK Government. Our work in knowledge based systems, particularly in computer aided instruction, is seen to have potential in the defence sector where it is often necessary to train large numbers of people with varying experience on complex procedures in short time frames. Continued investment in hardware and extensive training for the Ada programming language enable large teams to be fully up to speed quickly for major projects such as ADCIS.

A distributed Air Defence Command and Information System (ADCIS) is being developed and supplied for the UK Ministry of Defence by **EASAMS Limited** with Logica as principal subcontractor. The system will allow safe use of airspace by friendly aircraft and enable increased effectiveness against enemy aircraft by timely passage of control orders to ground based air defence weapons.

Powerful software modules supporting the dissemination of control orders and automating a number of headquarters procedures will be designed and implemented in Ada. Automated procedures

"Valentina". Guido Crepax. Italy. ©Rizzoli-Milano Libri.

NEXT FEED TIME WE'LL GRAB SOME AS HOSTAGES!

THE PRISON COMMANDANT WON'T PARLEY, GARTH!

ARE YOU SURE? I'M GOING TO TEST HIM!

R214

Garth. UK.
©Daily Mirror Newspapers.

will include the planning of future air corridors, air defence weapon sites and air defence weapon ammunitions stocks. They will also provide warning to troops of hostile air raids and nuclear, biological and chemical contamination.

The contract for ADCIS was awarded after a series of competitive feasibility and engineering studies by EASAMS and Logica spanning a period of four years.

An advanced terminal for image processing has been developed by Logica for the **Royal Signals and Radar Establishment (RSRE)**, following a feasibility study for the UK's **Ministry of Defence.** Previously, the RSRE has used a number of special interfaces to deal with separate vision signal sources. Logica's system is an all purpose high performance digital video scan converter, using a specially designed video input processor to accept a wide range of video signals, from radar to broadcast video.

Previous systems have suffered from low resolution display: Logica's system converts the signals, in real time, to a single, very high resolution flicker free television standard which provides for low operator

fatigue. In use, the workstation supports a user friendly and responsive man machine interface which has been designed to allow the rapid analysis of highly detailed imagery. The video workstation is designed in an extendible architecture, allowing a variety of custom options to be added.

The video workstation will assist the RSRE's reconnaissance and surveillance work, but has other applications in military programmes and in remote sensing, television standards conversion and document processing.
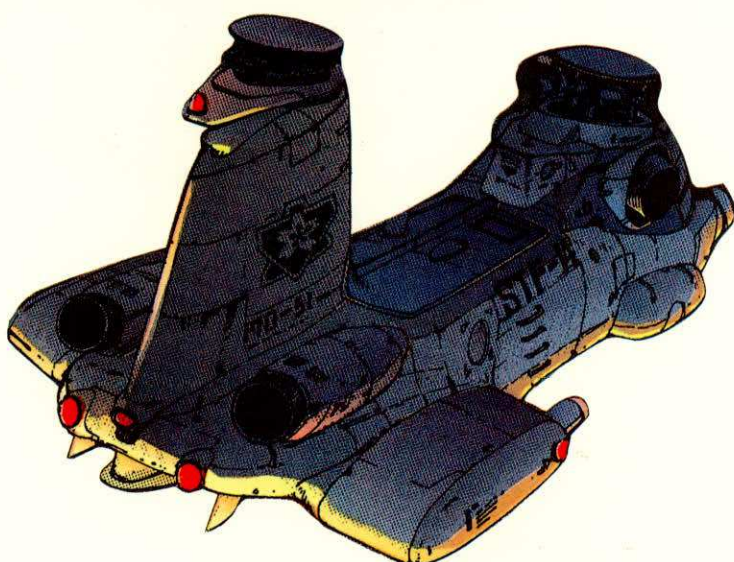
A simulation model was developed by Logica to assist the **Royal Australian Navy** investigate the effectiveness of a range of telecommunications systems. Logica's Royal Australian Navy Tactical Communications Network Study set out to analyse, design and develop an information analysis software model with which communications staff could assess current facilities and potential systems. This will be of significant value in evaluating the effect on fleet communications caused by the addition, removal or reassignment of shore based communications in various combinations.

"Akira". Katsuhiro. Kodansha Ltd. Japan.
©MASH-ROOM Co. Ltd.

The model will be particularly useful in assessing the circumstances in which a ship is incapable or unwilling to acknowledge transmissions, using advanced statistical analyses to predict the probability of a message being received at an acceptable bit error rate.

Ultimately, the model could form the heart of a new system providing a number of operational services. Logica produced a plan to suggest system enhancements for the simulator.

Clients in this sector include:
Australian Army · Base Ten Systems · Computing Devices Company · EASAMS · Ferranti International · NATO · Racal · Royal Australian Navy · UK Ministry of Defence · US Department of Defense · Westland Helicopters

I nvestment by the UK water industry in operations management systems has gained momentum as water authorities prepare for privatization. Systems being developed now in the UK are among the most advanced in the world. Logica's leading position in this area was confirmed when we were awarded a major contract by Yorkshire Water to integrate many aspects of its operations. The potential for further sales to other UK water authorities and in international markets is great.

Our MASTER CONTROL supervisory control and data acquisition (SCADA) software forms the basis of many of the systems we have implemented for energy companies and utilities; for example, it is at the heart of the systems which control the on shore high pressure gas pipeline networks for the whole of the UK and the Netherlands. We continue to enhance our systems kernels and began work this year on a new generation of MASTER CONTROL systems which incorporate the latest technology in order to bring cost advantages to our clients.

Energy and utility companies are improving their information management systems to enhance competitiveness. Logica undertakes a growing number of business systems projects for these clients, having worked on production reporting and accounting systems for Arco British Limited, BP, Hamilton Brothers Oil and Gas, and on the data collection system for Mobil Oil described below. Staff safety is also a concern of these companies and we continue to provide personnel tracking systems to operators in the offshore oil and gas industries.

Logica offers both consultancy and implementation expertise, building on its well established background in the provision of operations management systems and information management systems.

The water industry continues to benefit from Logica's technical experience and innovation, reducing operating costs and improving the levels of service to customers. For **Yorkshire Water** we are providing a region wide operations management and telemetry system, featuring advanced telemetry and plant automation plus integrated management information and decision support facilities.

The Yorkshire Water scheme is based on Logica's MASTER CONTROL 2000 SCADA core system software and MICROMEDINA™ intelligent telemetry outstations. The MASTER CONTROL 2000 system provides an open systems infrastructure, supporting a range of telemetry equipment at the plant level and giving access to higher level data processing systems. The MICROMEDINA outstation has wide and local area networking capabilities that allow the interconnection of adjacent or distant outstations supporting automatic control across a related group of sites. This provides greater efficiency in operations and allows for future expansion to be planned cost effectively.

Logica has worked with **Anglian Water** since 1983. Having installed telemetry across the whole of the Anglian Water region, there has been greater emphasis on the provision of an integrated set of operational systems. Following a study to address these requirements, Logica is assisting Anglian Water in the implementation of a region wide DEC VAX computer network. New systems, again based on MASTER CONTROL 2000, will allow Anglian Water to move towards fully integrated regional systems, independent of the organizational structure.
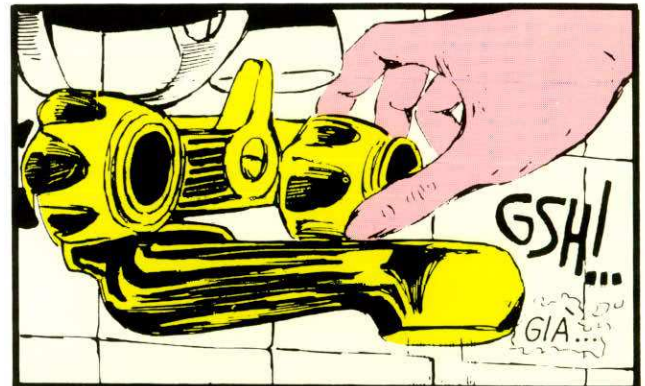
"Valentina". Guido Crepax. Italy. ©Rizzoli-Milano Libri.
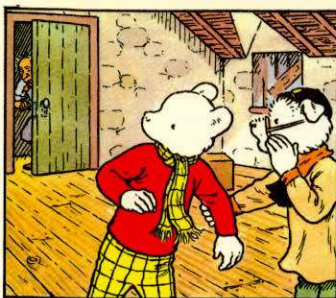
Rupert Bear. UK. ©Express Newspaper Limited.
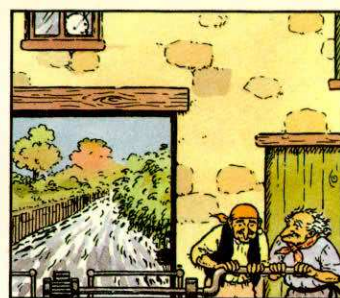
Process control operations in **Mobil's** Coryton refinery in the UK provide management with information in a variety of formats and on a variety of systems. Logica has implemented a data collection system for Mobil which communicates between Foxboro, Honeywell, Ferranti and Enraf systems within the refinery to collect key operational data. The data is transmitted from the refinery to Mobil's computer centre in another part of the country where it is fed into a database on an IBM mainframe system. All levels of management can access the data via terminals and personal computers located throughout the refinery.

Logica's data collection system provides a valuable means of monitoring the current status of process units and acquiring up to date information for generating reports. The system is designed to be flexible and can easily be extended or upgraded if required: it has possible applications to any organization which has a need to pool information from many different computer systems in different locations.

Faster reporting of fault locations will be one result of the pilot telemetry control system which Logica is supplying to the UK's **Eastern Electricity Board**. Logica's system is based on our MASTER CONTROL SCADA package with MEDINA intelligent outstations and will provide for the remote monitoring and control of polemounted electrical switchgear.

Many locations in the Board's area have switchgear and transformers on poles which presently require manual control. The location of faults can therefore prove time consuming. Using the MASTER CONTROL system and MEDINA outstations, users will be able to communicate with the outstations via colour displays on terminals to provide rapid location of faults and rapid restoration of supply.

This is the first application of the versatile MASTER CONTROL system to the electricity industry.

An interactive graphics system was specified by Logica to help the engineers of the **Eastern Electricity Board** supervise the largest high voltage distribution network in the UK. At present, wall diagrams measuring 600 feet by 8 feet are used in two control centres to denote the 100,000 remote sites, with pins and labels to indicate the operational state of the network. Engineers are involved in complex and time consuming safety procedures to ensure an item of plant is inactive before repair or maintenance work can proceed.

The Control Room Operations Support System will present the network diagrams on interactive displays using high resolution computer graphics. The system will record all control operations and allow fast access to plant records, telemetry data and computer models.

Clients in this sector include:
Anglian Water · Arco · BP · British Gas · Eastern Electricity Board · Electricity Council · Gearhart Geodata · Hamilton Brothers Oil and Gas · KSEPL · Mobil · North West Water · NV Nederlandse Gasunie · Saga · Shell · Statoil · Total · Yorkshire Water

"Valentina". Guido Crepax. Italy. ©Rizzoli-Milano Libri.

"La Ville Qui n'Existait Pas". Bilal & Christin. France. ©Dargaud Editeur Paris 1977.
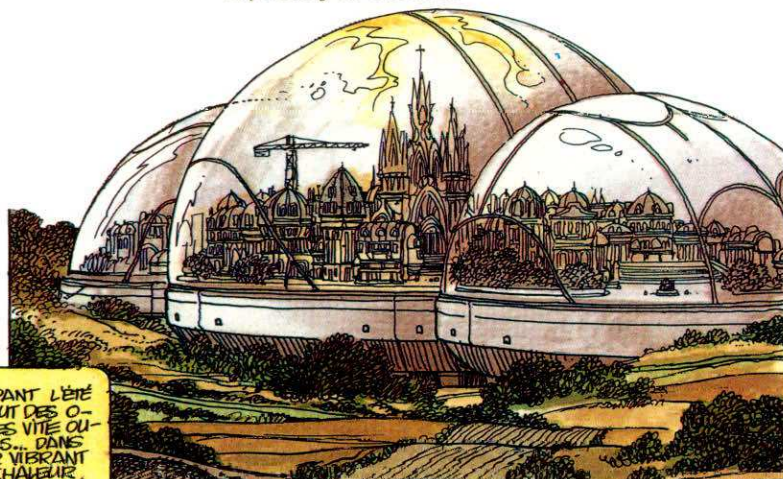
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Manufacturing

Key objectives of manufacturing companies are to reduce production lead times and keep costs down while improving quality. One essential consideration in meeting these goals is the use of integrated systems solutions. Changes of this nature, involving high capital expenditure, can only be successfully effected after an overall strategy has been agreed at the most senior level. The timescale for implementation may be extended over a number of years in carefully determined stages. Logica offers management consultancy to companies considering their future manufacturing organization and strategy and has been working in this way with various companies including Pininfarina, the prestigious Italian car body designer and manufacturer, and Pirelli in the UK.

In the past year too we have increased the breadth of our offering to manufacturers. We have arranged licensing agreements for products such as the Factorial system for shop floor management and Siman/Cinema for production process modelling. We have also expanded our client base into new industry sectors. For example, we are developing a legislative administration system for Pfizer, and anticipate further work for the pharmaceuticals industry.

Manufacturing companies continue to automate their warehouses and inventory handling systems to improve their competitive position. This has proved fruitful for Logica. We are currently working on major warehouse control and automation systems in the UK and Belgium.

Quality demands led Caterpillar to employ Logica to develop a system, installed this year, which assists operators testing vehicle hydraulic systems and saves valuable time.

In the process industries in particular there is concern that efficient production of a reliable quality product should be allied to readily accessible management information about the whole process. Logica's work for Whitbread is one illustration of our capability in this area.

Logica has been awarded a major project with **BASF Aktiengesellschaft** to consult and train their staff members in the field of software engineering. BASF is a chemical company based in Ludwigshafen, West Germany, with a turnover of more than 40 billion DM and 134,000 employees worldwide in 1987.

BASF is drawing on Logica's experience of project management and software engineering to strengthen its project oriented work. BASF now has a number of project groups with Logica staff providing supervision and instruction, particularly through software engineering support and project life cycle definition.

Logica's work has led to requirements specifications being produced for production planning information systems and quality control systems for chemical products. The project demonstrates Logica's capability to advise organizations on large scale implementation using software engineering and other emergent technologies.

Improved monitoring of brewing and fermentation operations at **Whitbread's** Magor brewery in the UK has been achieved through a process control system developed by Logica. The new system integrates seven computer control systems and uses Logica's MASTER CONTROL software kernel for supervisory control and data acquisition to manage the plant and processes in developing the system. Logica upgraded the existing hardware and retained and enhanced all of the existing operator interfaces.

The new system offers significant advantages in the control of operations through the automation of data collection and the rapid production of management information, such as fermentation and maintenance reports. Changes in plant and processes can be incorporated by the system, which can also cope with modifications to recipes.

A new accounting system was required by an Italian private steel company to control and predict its operation overall and provide greater flexibility in reporting. Logica General Systems is developing a single integrated system for the client, providing maximum flexibility in reporting and creating an environment in which new and current procedures can be integrated.

Clients in this sector include:
BASF · Brown Boveri · Caterpillar · Fiat · Johnson and Johnson · Pfizert · Picañol · Pininfarina · Schenk · Volvo Parts · Wellcome · Whitbread
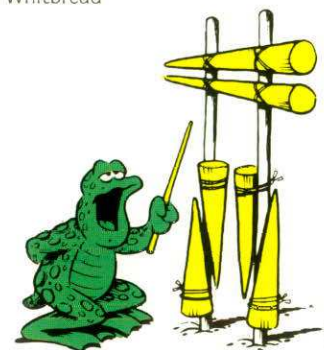
"La Ville Qui n'Existait Pas". Bilal & Christin. France. ©Dargaud Editeur Paris 1977.

Transport authorities are grappling with the problem of constantly growing congestion as more and more people and greater volumes of freight move throughout a finite infrastructure. Computer technology can improve the levels of precision and control with which vehicles are directed in all types of transport systems.

This year we began writing the software for a vessel traffic management system to control shipping in the Westerschelde estuary in the Netherlands which leads to Antwerp harbour in Belgium. We have also provided consultancy for the computerization of another major port. In both projects the eventual goal of the client is to alleviate congestion or to improve the flow of goods and shipping.

As the airlines sector undergoes deregulation and change, consortia have been formed to build a new generation of reservation and travel systems. Airlines are concerned to improve their customer marketing and their fraud prevention methods, and to make their automatic ticket selling and check in procedures more efficient. All these factors offer great potential for Logica to increase its business in the transport sector in the immediate future.

Logica's investment in research and development benefits clients in many areas because we can apply the resultant advanced technologies to provide innovative solutions for their requirements. We successfully completed the systems development for the automated ticketing now being brought into service on London Underground, and followed this by building an experimental expert system for fault monitoring as part of an investigation for London Underground Limited on new generation tube trains.

A Vessel Traffic Management System for the Westerschelde estuary, a busy waterway linking Antwerp harbour with the North Sea via the southern Netherlands, is being procured by **Projectbureau Schelderader**, a collaboration between the Dutch and Belgium governments. The system will be of great significance in improving the flow of river traffic, providing more efficient deployment of navigation services and allowing for the efficient handling of incidents such as spillage. Logica is building the Information Processing Subsystem, one of the two major subsystems, under contract to Hollandse Signaalapparaten BV which is responsible for the delivery of the complete system to the main contractor, Philips Nederland NV.

The Information Processing Subsystem deals with data management, traffic monitoring and the planning of pilot and lock use. The system will manage a database with information on 45,000 seagoing vessels, 15,000 barges and the 5,000 hazardous materials which may be carried through the area as freight. The database will also hold details of companies and agents involved in shipping.
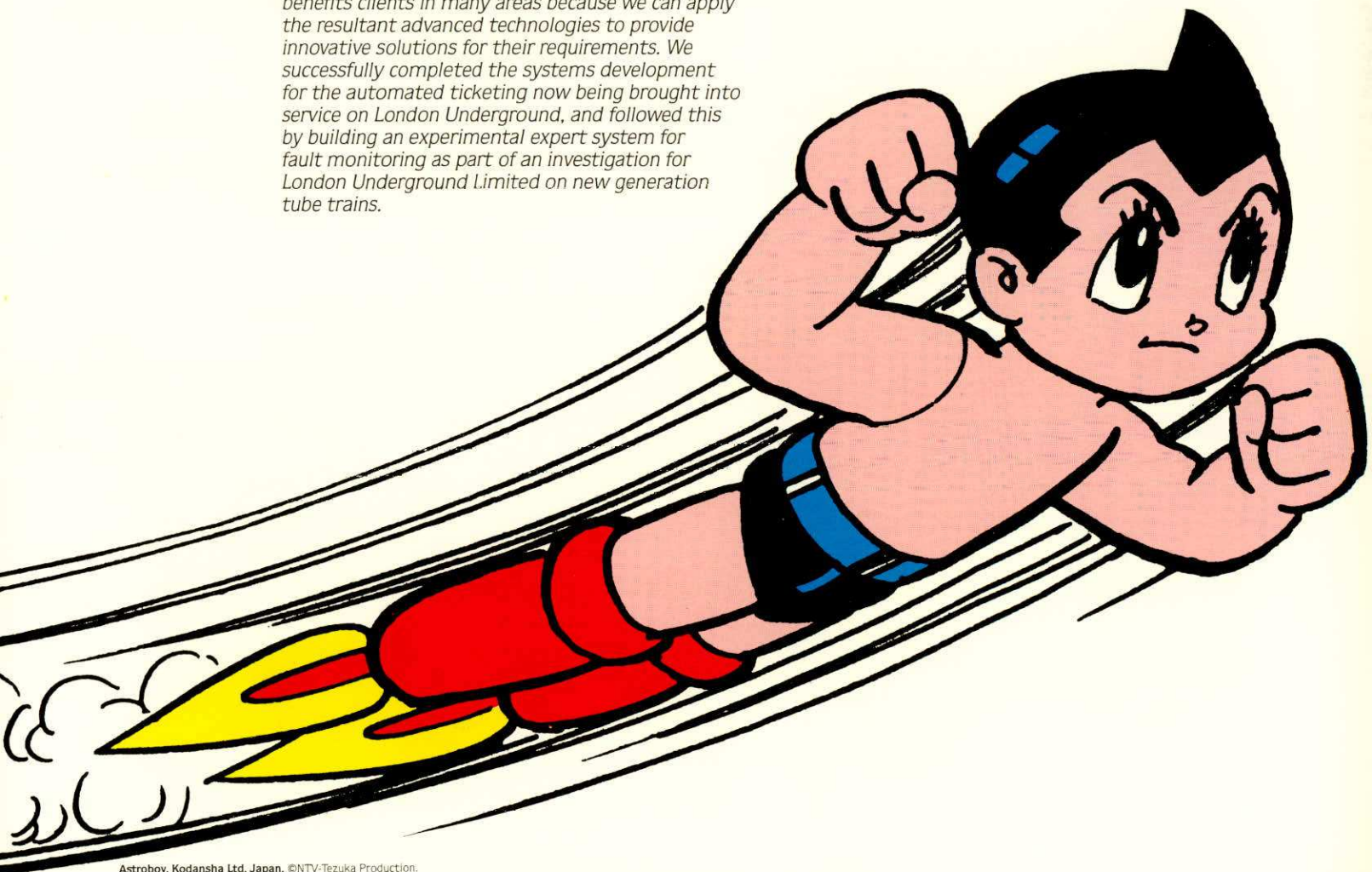
"Akira". Katsuhiro. Kodansha Ltd. Japan. ©MASH-ROOM Co. Ltd.

The system will communicate with other systems to speed the dissemination of information affecting navigation, such as the Westerschelde's radar observation system and the Zeeland Hydro Met Centre for weather data.

Highway maintenance, planning and safety require regular information on road conditions and street furniture such as lamps, barriers and signs. Logica has enhanced **3M's**†† INVENT†† system through the use of integrated relational database skills, advanced interactive video and high resolution colour graphics, and made the system more flexible and more automatic.

The INVENT semi automated system is used by the highways departments of a number of UK local authorities. High quality video images recorded from a vehicle mounted camera are linked with computerized data to produce a database on video disk. Logica's highway inventory display system provides a powerful display and analysis tool that can relate images to data and location, derive data on features such as road widths and model possible road developments.

A demonstration simulator for aerodrome control was the result of a research project by Logica for the UK's **Civil Aviation Authority**. The demonstration intelligent training system uses high resolution graphics displays and shows an airfield and fast, real time simulation of up to twelve simultaneous flight path movements. The system automatically adjusts the level of tuition to match the student's capabilities, monitoring performance continuously and offering appropriate actions to correct mistakes.

Convinced of the value of this new technology, the Civil Aviation Authority awarded Logica a contract after year end to develop a system to provide basic instruction in aviation to new Air Traffic Control Officer Cadets. The system will address areas such as flight theory, aircraft recognition and characteristics.

Clients in this sector include:
Bremer Lagerhausgesselschaft · BMW Leasing Company · British Airways · Civil Aviation Authority · EMO · Hollandse Signaalapparaten · London Underground Ltd · Scandinavian Multi Access Systems AB (SMART) · Statens Järnvägar · 3M

"The Ideal Son-in-Law on the Back of a Dragon". Chinese Fables. Hong Kong.
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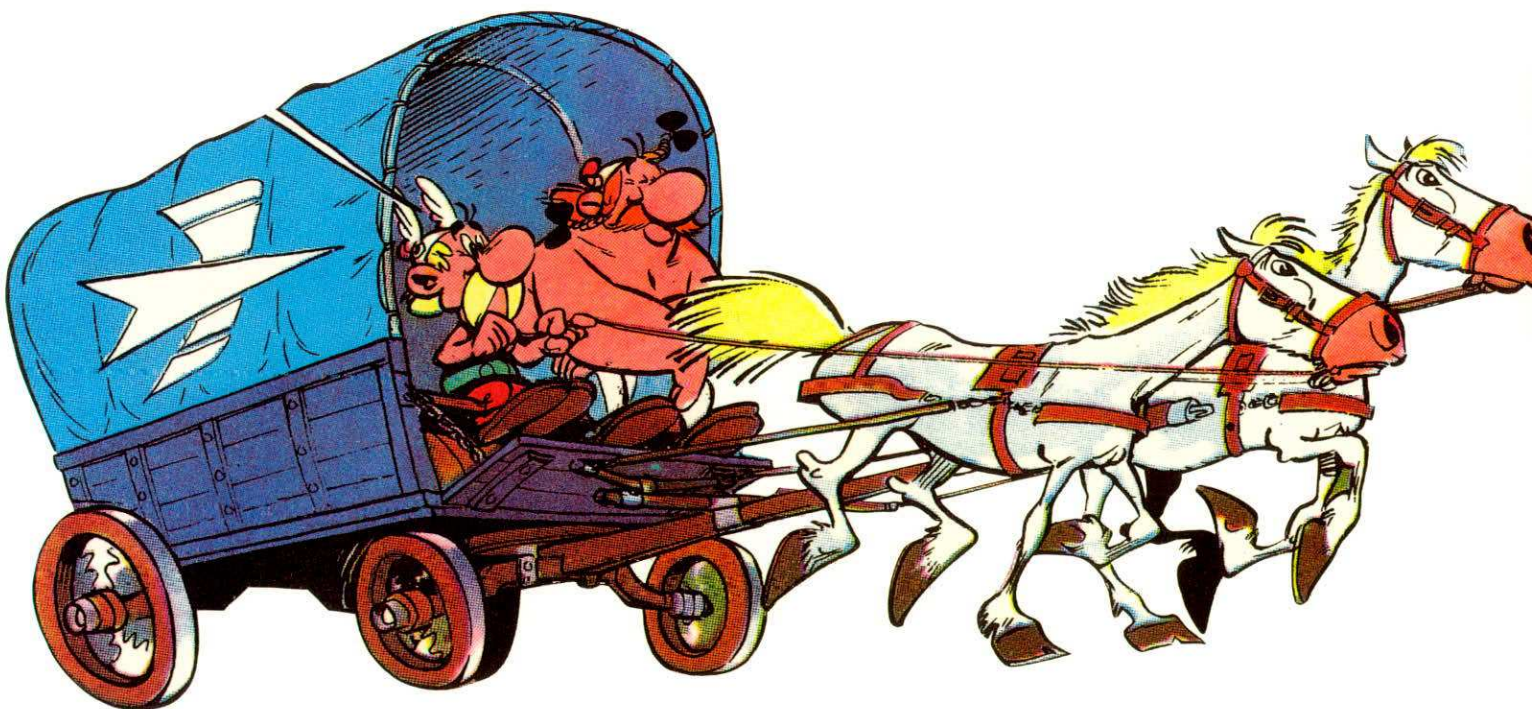
Asterix. France.
©Ed. Albert Rene 1988 Goscinny/Uderrzo.

*F*or a number of years computer manufacturers have recognized the need to establish themselves as systems integrators because of the growing demand by end users for complete solutions. They appreciate that there is a significant role for software houses as they adopt this approach. Discussions with major computer manufacturers have resulted in Logica developing mutually beneficial business relationships in this area.

Another accelerating trend has been for hardware manufacturers to turn to the software industry to help provide the large amount of software they require to add value to their products in the face of stiff competition. Again this provides excellent growth potential for Logica, and in the past year we have worked for all the main computer manufacturers. For Digital Equipment we have been working on a value added network. One of our projects for IBM in the US is described here.

Our communications expertise also contributes to our sales to computer manufacturers. Logica has developed a series of portable message handling software kernels known as CPLEX.400 which meet X.400 international communications standards. We have sold a number of CPLEX.400 kernels to computer manufacturers and PTTs to enable them to develop open systems networks.

The IBM System/88 International Funds Transfer System (IFTS) has been developed by Logica in the US for **IBM**. IFTS represents a significant development for IBM, combining fault tolerant System/88 hardware with funds transfer software for banking and communications applications.

IFTS has already been installed at a test site, providing message switching interfaces to CHIPS, S.W.I.F.T. and IRC telex networks. Further developments to IFTS are currently being undertaken to extend functionality and supporting networks. Software engineering tools and methods were used throughout the project life cycle to increase efficiency.

The time an ambulance takes to reach an incident will be reduced from ten to a targetted six minutes through the use of a computing and communications network being developed for the Metropolitan Ambulance Service in Melbourne by Logica in conjunction with **NCR**.

The multi million dollar computer aided despatch system is based on NCR's proven Public Safety System (PSS) using fault tolerant 9800 series hardware. Logica was chosen to enhance the system because of its experience in large scale systems integration.

The modifications to the PSS system include: the complete redesign of the file containing street and building locations to represent the Melbourne and metropolitan area; the construction of a booking and scheduling system; and the development of interfaces to mobile digital terminals for each ambulance, used to communicate despatch and medical information between the ambulance and the communications centre and, ultimately, the casualty department of the admitting hospital.

The new system will be installed at two sites to provide contingencies for any breakdown in communications. It will offer advantages not only in speed and efficiency, but also in the better utilization of resources, such as in the availability of ambulances for non emergency patients.
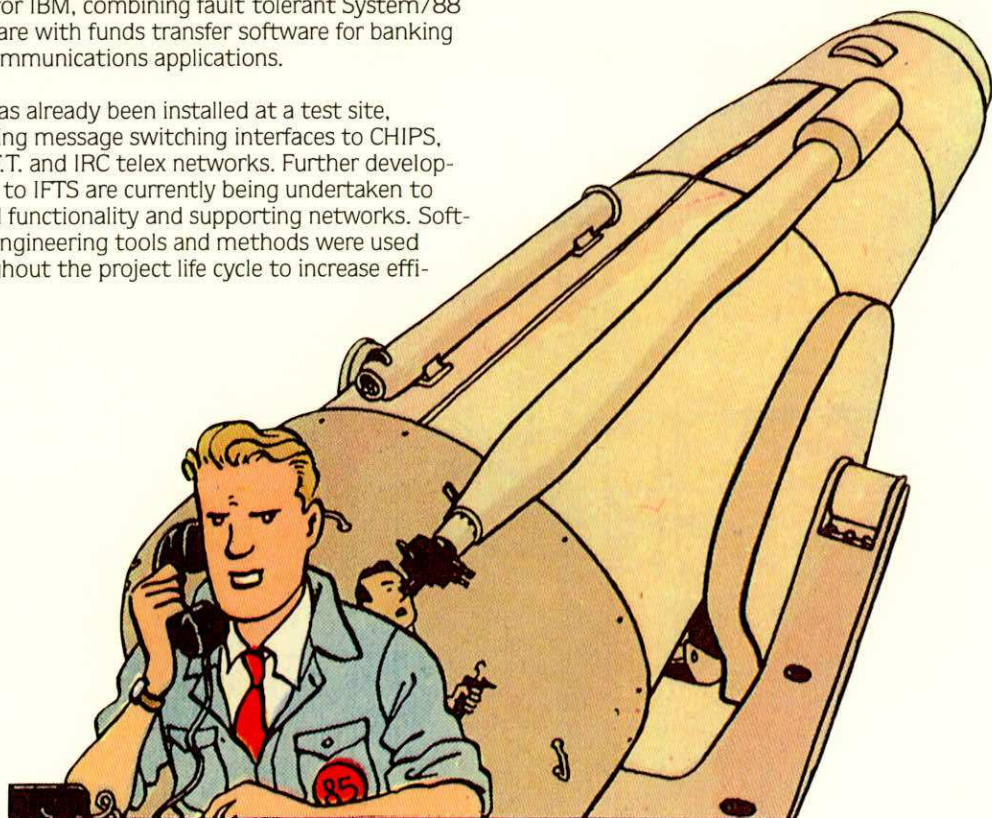
Tin Tin: "Objectif Lune". Belgium. ©Hergé/Casterman.
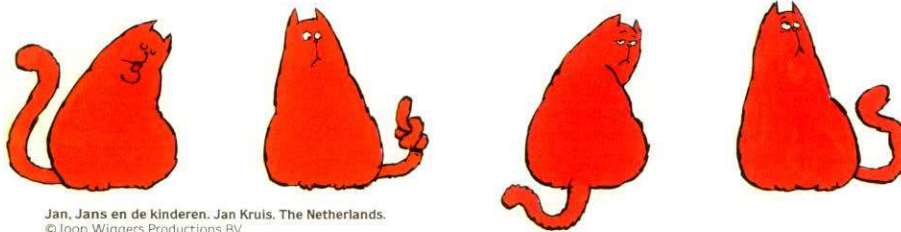
Jan, Jans en de kinderen. Jan Kruis. The Netherlands.
©Joop Wiggers Productions BV.

The development of value added network services and the dramatic growth in the range and style of personal financial services have been brought together in a project in which Logica has assisted **Digital Equipment Company Ltd** in the UK.

Logica developed software to Digital's functional specification to allow up to date financial product information from a wide range of institutions to be made available on Digital's value added network as part of a range of financial services. Logica's software provides facilities for intermediaries to record client details, and review and select products in accordance with the needs of individual clients.

The system operates across a national network of local processors connected to a dual site central system. The software operates within the VAX Information Architecture product set to distribute code and data to maximize flexibility, availability and performance.

Government policies on communications and computing were studied in **International Informatics Policy – From Participation to Regulation**, a Logica report. A detailed analysis was provided of policies on regulation, competition, research, promotion, employment and international trade in six major countries and in the international policy making arena.

The most striking trends noted in the report were that government policies were being directed away from direct intervention towards regulation, from the supply to the demand side of the industry, and from the protection of local markets to policies designed to attract international vendors and multi-national users.

The report was based on original research, incorporating interviews in Europe, East Asia and the US with government departments, regulatory bodies, PTTs, trade associations, pressure groups, policy research organizations and informatics vendors.

Clients in this sector include:

Digital Equipment Corporation · Econocom · GEAC · Hewlett Packard · Honeywell Bull · IBM · NCR · Olivetti · Rank Xerox · Siemens Belgium · Tandem

Jan, Jans en de kinderen. Jan Kruis. The Netherlands. ©Joop Wiggers Productions BV.

Tin Tin: "Objectif Lune". Belgium. ©Hergé/Casterman.

Mumin. Lars Jansson. Sweden.
©BULLS.

*L*ogica's reputation for excellence and innovation rests on its continuing programme of research and development, not only at its research centre in Cambridge but also in smaller specialist groups throughout the company.

In recent years, Logica has devoted considerable effort to the development and use of advanced software engineering techniques in its work. Logica is one of the leading proponents of formal methods which are now employed in much of our software development work. These techniques are particularly important in one area where we have a leading role – building safety critical systems.

The goal of our research endeavours is to bring technologies to a point where they can be transferred into operational applications. Our knowledge based systems work has reached this stage of maturity. Some 20 systems which incorporate these techniques are being developed in different parts of Logica. We are working with the UK Government's Central Computing and Telecommunications Agency to define a methodology for developing knowledge based systems using structured systems analysis and design methodology (SSADM). This will ensure acceptance for such systems by incorporating the strict verification and validation laws that govern their construction.

Logica has invested considerable resources to remain at the forefront of developments in automatic fingerprint recognition. This year we built the results of our latest research into a sophisticated system to demonstrate the use of parallel arrays of transputers for high speed matching of fingerprints.

A major influence in all our systems development is our work on human computer interaction. This aims to reduce the barrier between people and machines by developing techniques that facilitate interaction. Our work on speech technology is a notable example, and we have a leading position in Europe in the development of natural language and adaptive dialogues.

Because information technology relies increasingly on large networks, the importance of communications cannot be underestimated. Logica is involved in the development of ISDN, of X.400 standards software and recently in network management.

Logica continues to invest in the development of kernels and products for a number of global markets. This year we have invested heavily in our MASTER CONTROL, FASTRADE and CPLEX.400 kernels while continuing to enhance other products such as signal and image processing systems.

Computer systems that can be used over the telephone are the aim of a major European research project into computer speech understanding which is being led by Logica. Applications include home banking, travel information systems and order entry.

The project, known as SUNDIAL (Speech UNderstanding and DIALogue), has been selected for support by the Commission of the European Communities for the second phase of the ESPRIT programme. The project will require 170 man years of effort from the consortium over five years making it Europe's largest collaborative project in speech technology.

Logica's recognized experience in this field has won it a place in two other new ESPRIT projects, one investigating speech recognition algorithms for use in noisy environments such as factory floor operations and in vehicles, the other project developing methods for the assessment of speech technology to improve the design of practical systems.
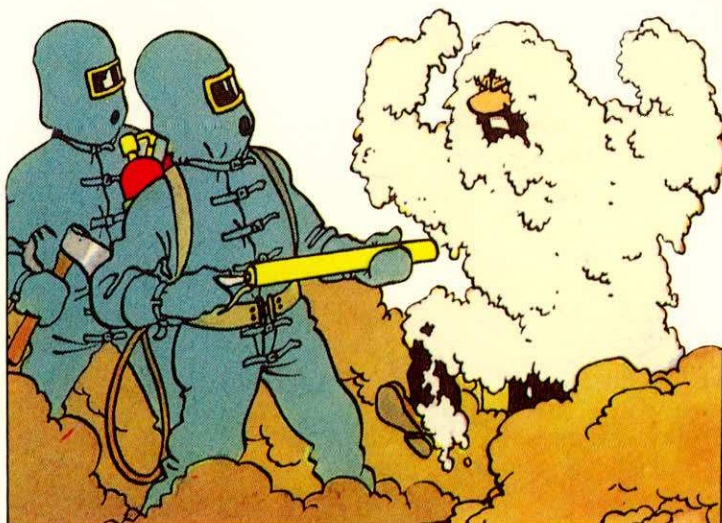
Tin Tin: "Objectif Lune". Belgium. ©Hergé/Casterman.
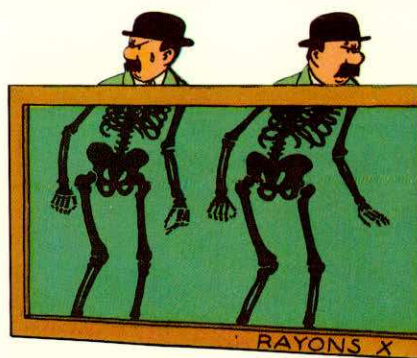
Tin Tin: "Objectif Lune". Belgium. ©Hergé/Casterman.

"Les Pionniers de l'Aventure Humaine". Boucq. France.
©Casterman.

Interactive video offers opportunities for storing and integrating pictures with databases for applications such as training systems. A multi media interface to enable rapid cataloguing, storage and retrieval of information on video disk is being developed through the Intelligent Interface for Integrated Knowledge Systems (IIIKS) project. Logica is part of the consortium working on IIIKS, which was launched under the UK's Alvey research programme.

Logica is particularly involved in the design and development of hierarchical user modelling and dialogue management tools. This work will enable user models to be evaluated so that the skill and experience of the user will help determine the level of interaction with the system.

Additional modules and product improvements are under development for BESS, which is already established as a fully functional, modular global funds transfer system. BESS automates wholesale electronic funds transfer, communications and payment operations for large banks and financial institutions around the world.

There are four main current developments. One is a gateway system which provides extremely high speed interfaces for large volume domestic banks in the United States using Fedwire and CHIPS. Another development makes use of BESS's networking capabilities to allow users to set up their own internal networks, for example, for message handling using least cost or alternative routing. The third is an enhanced security package, initially defined by a BESS user group committee, with additional terminal and password security. Fourthly, BESS's connectivity is being expanded to use its communications options for linking electronically to a variety of other systems or computers.

Investment has continued in the development of the FASTRADE family of front office trading systems. FASTRADE was originally developed in conjunction with UK securities house Phillips & Drew to support trading in UK and international equities. Recent additions to the system have included enhanced support for dealers through the provision of links to the International Stock Exchange's Marketline service and the SEAF (SEAQ Automatic Execution Facility). The equities version of FASTRADE is being developed further to include gilts and other interest bearing securities, including fixed and variable interest and index linked issues.

Development is now well advanced of a new FASTRADE system that will provide comprehensive trading support for foreign exchange, money markets and a range of other financial instruments, including FRAs, bills and bonds, and off balance sheet instruments. The initial release of the new system will address foreign exchange, and loans and deposits.

Logica's development of kernels to implement the CCITT X.400 recommendations for message handling systems has now come to fruition with a number of important sales around the world.

Logica's CPLEX.400 message handling system is the first implementation to incorporate major features of the 1988 X.400 standards. One of these is a message store which acts as a user's mailbox. In the 1984 model, if the user agent were not on line when a message was being delivered, then the attempt would fail, resulting in the non-delivery of the message. The message store, however, safely receives and retains messages on behalf of users. It allows them to carry out their usual business on a PC or workstation and later, when convenient, to execute a user agent process to access the message store.

We are continuing to develop BankMaster, which is sold as ProfitMaster in Europe. This is an interest rate risk analysis and financial management system designed specifically for commercial banks and thrifts.

Two current enhancements of the system's functions deal with the prediction of pre payment behaviour of consumer mortgages (dependent on the perception of interest rate changes) and the incorporation of non par instruments in the handling of asset liability management.

The user friendliness of BankMaster is also to be developed. This will use the technology and the experience gained from enhancing the BankVision system, an executive tool which uses a PC and mouse to provide easy manipulation of data, with fast response and graphical displays. BankMaster will develop a generic front end system for different types of user.
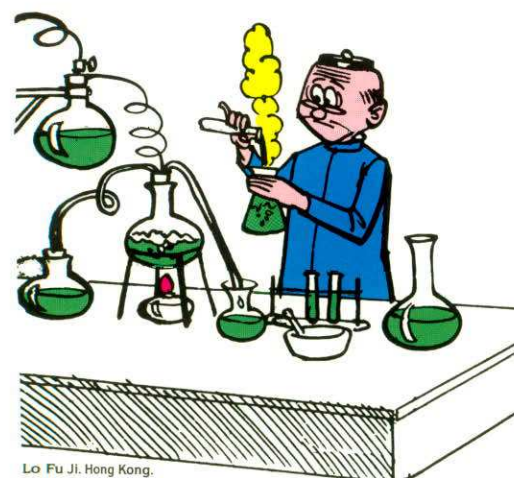
Lo Fu Ji. Hong Kong.
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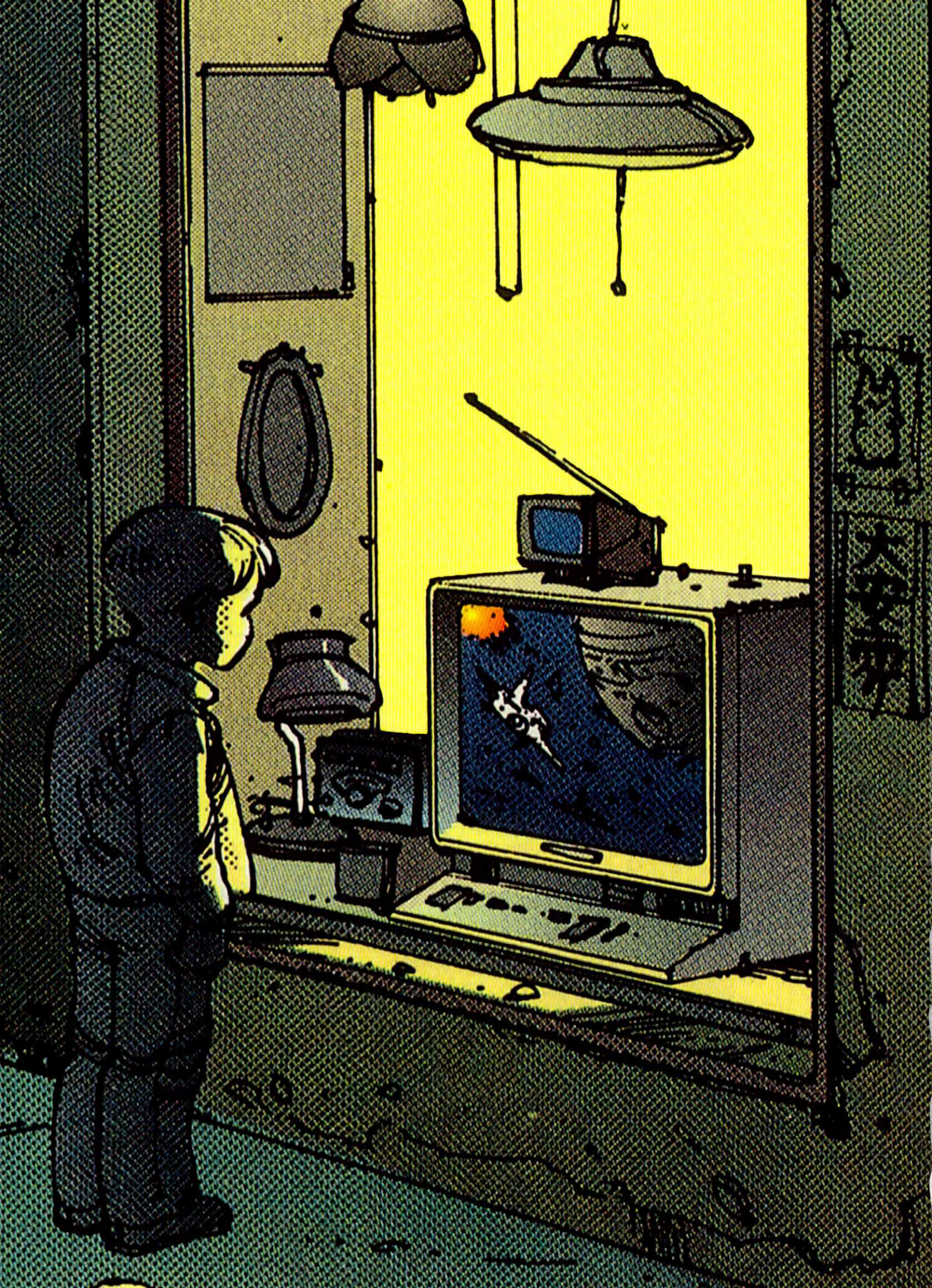
Directors

P A B Hughes	(Chairman)
D W Mann	(Managing Director)
M Cooperstein	(alternate N Zachary)
A L Karney	
I Macleod	
B V Martin	
G G Moore	
C S F Preddy	
C G Rowland	
P D C Stevenson	
P G Bosonnet	(non-executive)
C J F Böttcher	(non-executive)
C R Hollick	(non-executive)
L A Taylor	(non-executive)

Secretary
G G Moore

Registered office
64 Newman Street
London W1A 4SE

Registrars
Close Registrars Limited
Arthur House
803 High Road
Leyton
London E10 7AA

Directors

Philip Hughes, 52
Chairman
As one of Logica's founders, he was first managing director and then chairman from 1972. Before establishing Logica he worked for Shell and Scicon.

David Mann, 44
Managing Director and Chief Executive
He joined Logica from Scicon in 1969, soon after the company was formed. Having served on the board since 1976 and as deputy managing director since 1982, he took over the role of managing director from Len Taylor in 1987.

Martin Cooperstein, 64
Cofounder with Norman Zachary of Data Architects Inc, he was appointed to the board in May 1988. He is chairman of the board and chief executive officer of Logica Data Architects Inc. Before founding Data Architects, he was director of engineering for GTE's military and aerospace Information Systems Division.

Andrew Karney, 46
Following experience with STC and GEC, he joined Logica in 1973 and was appointed to the board in 1986. He is managing director of Logica Communications and Electronic Systems Limited and has responsibility for several other subsidiaries and the development of communications, computing, government, transport and broadcasting sectors internationally.

Ian Macleod, 44
He came to Logica in 1978, having previously worked for Scicon and IBM. He is managing director of Logica Financial Systems Limited and has responsibility for worldwide development of the finance sector and for a number of other subsidiaries. He joined the board in 1986.

Brian Martin, 50
Following a career in professional services and local government, he joined Logica in 1980 and was appointed to the board in 1986. He is responsible for corporate communications and resources and is chairman of Logica Consultancy Limited.

Graham Moore, 53
He joined Logica and the board as finance director in 1986, having held similar positions with The Wiggins Teape Group and Tozer Kemsley and Millbourn (Holdings) plc.

Cliff Preddy, 41
He joined Logica as a new graduate in 1969 and was appointed to the board in 1987. He is managing director of Logica Energy and Industry Systems Limited and is responsible for international business development in those sectors and for several other subsidiaries.

Colin Rowland, 44
Following several years in research in physical and theoretical chemistry in the UK and France, he came to Logica in 1971. He has served on the board since 1982, and is responsible for several subsidiary operations, and for international business development particularly in the space and defence sectors.

Steve Stevenson, 44
He joined Logica in 1973 after working in the telecommunications industry with GEC and ITT in the UK and France. He was appointed to the board in 1987. Having served as president of the US subsidiary until its merger with Data Architects, he is currently vice chairman of Logica Data Architects Inc.

Norman Zachary, 62
Cofounder of Data Architects Inc., he was appointed to the board as alternate to Martin Cooperstein in May 1988. He is president and chief operating officer of Logica Data Architects Inc. Before founding Data Architects he had been director of the Computing Center at Harvard University and a vice president of General Telephone.

Paul Bosonnet, 56
He joined the board as non-executive director in 1986. He is deputy chairman of The BOC Group plc and a non executive director of British Telecom.

Frits Böttcher, 73
He has been a non-executive director on the main board since 1979. He has been a member of the supervisory board of Logica BV and of other Dutch companies, including Hoogovens, Gist-Brocades, Pakhoed, Stork-VMF, Volker Stevin, Drukker, Organon Teknika, Enraf-Nonius, Elsevier Scientific Publishers, Brown Boveri Nederland and Estel.

Clive Hollick, 43
He joined the board as a non-executive director in 1987. Managing director of MAI plc, he is also a non-executive director of Hambros Bank Ltd and a member of the National Bus Company.

Len Taylor, 53
One of the company's founders, he left Scicon to establish Logica in 1969. He retired as managing director and became a non-executive director in 1987, and undertakes ad hoc consultancy assignments for Logica's management.

The Directors present their report together with the accounts of the Company and its subsidiaries for the year ended 30 June 1988. These will be laid before the shareholders at the Annual General Meeting to be held on 8 November 1988.

PRINCIPAL ACTIVITIES
The business undertaken by Logica companies throughout the year included:

the marketing, design, production and maintenance of custom built software and associated hardware systems

consultancy and project management in the field of information technology

the design, development, implementation and marketing of software products and the re-usable elements of applications software, called systems kernels.

RESULTS AND DIVIDENDS
Pre-tax profits for the year ended 30 June 1988 increased by 30% to £14.7 million on turnover of £133 million. Consolidated revenues increased by 27%, and earnings per share of 18.1p were up 26% on the previous year. At year end the number of staff employed worldwide was over 3200.

The results include three months' contribution from Data Architects Inc, Logica's recent US acquisition. Data Architects has now been merged with the existing Logica operations in the US; the enlarged company is performing well and in line with expectations stated on acquisition.

The balance sheet at year end was further strengthened, with net liquidity increasing by £5.8 million. Of this £2.1 million was generated by operations, and the balance was the net surplus arising from the rights issue during the year to fund the acquisition of Data Architects.

The directors are recommending a final dividend of 1.6p per share net, making 2.3p per share net for the whole year, up 35% on the previous year. The final dividend, if approved, will be paid on 9 November 1988 to eligible shareholders on the register at close of business on 14 October 1988.

ACQUISITIONS
On 31 March 1988, the company acquired Data Architects Inc at a cost of £25.7 million. This was funded by a rights issue of 11,000,291 ordinary shares, details of which are given in note 18 to the accounts.

On 25 April 1988, the company acquired the remaining 50% of Jardine Logica Ltd which then became a wholly owned subsidiary.

BUSINESS REVIEW
A review of the development of the business during the year is given on pages 2 to 26. Included in the review are references to research and development activities and the Company's future prospects.

DIRECTORS
During the year there were the following changes in the composition of the board:

C R Hollick and C S F Preddy were appointed to the board on 11 November 1987. M Cooperstein was appointed to the board on 18 May 1988, with N Zachary as his alternate.

The interests of the directors in the shares of the company are shown below.

	30 June 1988			30 June 1987 or date of appointment		
	Beneficial	Non-Beneficial	Options	Beneficial	Non-Beneficial	Options
P A B Hughes	2,051,600	601,375	35,000	2,000,000	786,375	0
D W Mann	482,400	135,708	69,966	465,000	128,912	39,966
A L Karney	44,696	0	49,966	49,696	0	29,966
I Macleod	24,866	0	45,000	22,345	0	25,000
B V Martin	39,261	0	45,000	37,850	0	25,000
G G Moore	10,250	0	27,903	10,000	0	25,000
C S F Preddy	31,375	0	44,966	30,500	0	24,966
C G Rowland	110,337	135,708	54,966	110,960	128,912	34,966
P D C Stevenson	125,500	0	49,808	125,500	0	29,808
C J F Böttcher	0	0	0	25,000	0	0
L A Taylor	1,576,362	238,112	0	1,700,296	230,001	4,966
Employee Shareholder Trusts	0	42,840	0	0	119,482	0

The Employee Shareholder Trusts' shares are held by P A B Hughes, L A Taylor and D W Mann acting as trustees.

On 22 July 1988 L A Taylor disposed of 76,362 Ordinary Shares in the Company in which he had a beneficial interest and 38,000 shares in which he held a non-beneficial interest. During the period from 1 July to 22 September 1988 there were no other changes to the interests set out in the above table.

M Cooperstein and N Zachary have service contracts which expire on 18 May 1991. None of the other directors are employed under service contracts.

None of the directors had a material interest in any contract of significance to which the parent Company or a subsidiary was a party during the financial year.

SUBSTANTIAL HOLDINGS
The directors' interests are described above. In addition the Company has been notified that funds managed or advised by Scottish Amicable Investments Managers Limited hold 6.31 per cent of the Company's ordinary share capital, and that the British Coal Staff Superannuation Scheme and Mineworkers' Pension Scheme hold 5.02 per cent of the Company's ordinary share capital.

DISABLED PERSONS
It is the Company's policy to give full and careful consideration to applications for employment from disabled persons, to continue wherever possible the employment of members of staff who become disabled, and to ensure that their training and career development are encouraged.

EMPLOYEE PARTICIPATION
It is Company policy regularly to hold meetings with staff when matters concerning them and their area of business are discussed. All staff receive the annual report and accounts.

FIXED ASSETS
The changes in the fixed assets of the Company and its subsidiaries are disclosed in Notes 9 and 10 to the accounts.

TAXATION
The Company is not a close company within the provisions of the Income and Corporation Taxes Act 1970.

AUDITORS
Price Waterhouse have expressed their willingness to continue in office. A resolution will be proposed at the Annual General Meeting for their re-appointment as auditors and authorising the directors to fix their remuneration.

EMPLOYEE SHARE OPTION SCHEMES
Under the existing rules of the Company's employee share option schemes any change to certain provisions of the schemes which is to the benefit of option holders requires the prior consent of shareholders. It is proposed to amend the rules of the schemes to enable the directors of the Company to amend the schemes to take account of certain events (such as changes in relevant legislation) without seeking prior shareholders' approval, provided that the changes do not affect the basic principles of the schemes concerning eligibility, the number and percentage of shares available for the schemes, the extent to which an individual may participate, the amount payable on the grant and exercise of an option and the voting, dividend, transfer and other rights attaching to the shares and options, and are, in the case of approved schemes, acceptable to the Inland Revenue.

Accordingly, a resolution to this effect is proposed as Resolution No. 9 in the Notice of the forthcoming Annual General Meeting.

AUTHORITY TO ALLOT SECURITIES
Under Section 89 of the Companies Act 1985 equity securities in the Company may not be allotted for cash (otherwise than in respect of an employee share scheme) without first being offered pro rata to existing shareholders, unless the prior approval of the shareholders in General Meeting is given. The Directors consider that it is in the best interests of the Company that the relevant authority given at the Extraordinary General Meeting in April 1988 should be renewed in similar terms. Accordingly a Special Resolution to this effect is proposed as Resolution No. 11 in the Notice of the forthcoming Annual General Meeting. The proposed authority expires at the date of the 1989 Annual General Meeting and permits the Directors during this period to issue equity securities up to 5% of the authorised share capital without first offering them to existing shareholders.

By order of the Board

G G Moore
Secretary
22 September 1988

Consolidated Profit and Loss Account

For Years Ended 30 June	Note	1988 £'000	1987 £'000
Turnover	1	**132548**	**110774**
less adjustment to exclude turnover of related companies		8556	9281
Consolidated turnover		123992	101493
Operating profit	2	**13866**	**10545**
Interest receivable	4	872	778
Profit on ordinary activities before taxation		**14738**	**11323**
Taxation on ordinary activities	5	5400	4210
Profit on ordinary activities after taxation		**9338**	**7113**
Dividends paid and proposed	6	1315	842
Retained profit for the year		8023	6271
Earnings per share on ordinary activities	8	**18.1p**	**14.4p**
Dividends per share		**2.3p**	**1.7p**

Consolidated Balance Sheet

at 30 June	Note	1988 £'000		1987 £'000	
Fixed assets					
Tangible assets	9	15580		10636	
Investments	10	1196		1258	
			16776		11894
Current assets					
Work in progress	12	10206		4321	
Debtors	13	36978		27430	
Cash and bank balances		16470		9588	
		63654		41339	
Creditors due within one year					
Bank loans and overdrafts		(1296)		(195)	
Other	14	(34477)		(23251)	
		(35773)		(23446)	
Net current assets			27881		17893
Total assets less current liabilities			44657		29787
Creditors due after more than one year	15	(879)		(623)	
Deferred taxation	16	(732)		(151)	
			(1611)		(774)
Net assets			43046		29013
Capital and reserves					
Share capital	18	6050		4950	
Share premium account	19	9534		8905	
Special reserve	19	4807		0	
Other reserves	19	2179		2140	
Profit and loss account	19	20476		13018	
		43046		29013	

P A B Hughes
D W Mann

Directors
22 September 1988

Consolidated Source and Application of Funds

For Years Ended 30 June		1988 £'000		1987 £'000
SOURCE OF FUNDS				
Operations				
Profit before taxation		14738		11323
Depreciation		2354		1891
Profit/(loss) on sale of fixed assets		(23)		65
Exchange differences and miscellaneous items		(501)		(309)
Related companies' profits less dividends received		(43)		(196)
		16525		**12774**
Capital				
Issue of shares (net of expenses)		24990		0
Reduction in fixed assets		70		428
Discontinued activities		0		273
		41585		**13475**
APPLICATION OF FUNDS				
Capital purposes				
Acquisition of Data Architects (see note below)		25695		0
Increase in investments		0		263
Increase in tangible fixed assets		5597		5474
Dividends and taxation paid				
Ordinary dividends		941		742
Taxation		2328		1428
Working capital				
Increase/(decrease) in work in progress	3574		(1540)	
Increase in debtors	2936		7535	
(Increase) in creditors	(1569)		(1500)	
Increase in working capital		4941		4495
		39502		**12402**
MOVEMENT IN FUNDS				
(Increase)/decrease in bank loans and overdrafts		(1101)		113
Increase in cash and bank balances		3184		960
Increase in net liquid funds		**2083**		**1073**
Note: the assets of Data Architects comprised:				
Fixed assets		1610		
Goodwill		18454		
Work in progress		2311		
Debtors		5294		
Creditors		(5672)		
Net liquid funds		3698		
		25695		

34

Company Balance Sheet

At 30 June	Note		1988 £'000		1987 £'000
Fixed assets - Investments	10		**17703**		**18075**
Current assets					
Debtors	13	32328		5427	
Cash and bank balances		197		262	
		32525		5689	
Creditors due within one year	14	(6411)		(5078)	
Net current assets			26114		611
Net assets			**43817**		**18686**
Capital and reserves					
Called up share capital	18		6050		4950
Share premium account	19		9534		8905
Special reserve	19		23261		0
Profit and loss account	19		4972		4831
			43817		**18686**

P A B Hughes
D W Mann

Directors
22 September 1988

	1988 £'000	1987 £'000
1 TURNOVER		
Turnover by location of client was as follows:		
United Kingdom	70323	59631
Rest of EEC	30729	30146
Rest of Europe	3942	2969
North America	13704	8375
Rest of World	13850	9653
	132548	110774
Less adjustment to exclude turnover of related companies	8556	9281
Consolidated turnover	123992	101493
2 OPERATING PROFIT		
Consolidated turnover	123992	101493
Change in work in progress	3388	(1407)
Revenue	127380	100086
Raw materials and consumables	99	983
Other external charges	24886	17703
Staff costs	64144	50739
Depreciation and other amounts written off tangible and intangible assets	2354	1891
Auditors' remuneration and expenses	163	152
Hire of plant and machinery	414	48
Operating lease rentals	6650	5214
Other operating charges	14909	13043
Operating charges	113619	89773
	13761	10313
Share of profit of related companies	105	232
Operating profit	13866	10545
3 STAFF		
STAFF NUMBERS		
Staff employed at 30 June were based as follows:		
	Number	Number
United Kingdom	1903	1690
Non UK	1333	992
Total (including related companies)	3236	2682

The average number of staff employed in the UK during the year was 1842 compared with 1569 in 1987.

	£'000	£'000
STAFF COSTS		
Wages and salaries	56356	44670
Social security costs	5609	4602
Other pension costs	2179	1467
	64144	50739

There are voluntary pension schemes in the UK, Netherlands, Belgium, Hong Kong and Australia funded by fixed percentage and voluntary contributions. There are no unfunded liabilities in these schemes.

	1988 £	1987 £
DIRECTORS		
Directors' emoluments including employer's pension contributions and benefits in kind	896863	693650

Included in the above are the emoluments of:

	1988	1987
the chairman	85460	83659
the highest paid director	105292	111107

The table shows the number of directors, other than the chairman and the highest paid director, and higher paid employees in the United Kingdom whose remuneration excluding pension contributions were within the bands stated.

	Directors		Higher paid employees	
	1988	1987	1988	1987
£ 5001-£10000	2	2		
£30001-£35000	0	0	95	28
£35001-£40000	0	0	34	19
£40001-£45000	2	0	20	6
£45001-£50000	0	0	14	2
£55001-£60000	2	1	5	0
£60001-£65000	3	4	0	0
£65001-£70000	1	0	0	0
£75001-£80000	1	0	0	0
£80001-£85000	0	1	0	0

	1988 £'000	1987 £'000
4 INTEREST		
Receivable	962	844
Payable	(90)	(66)
	872	778
5 TAXATION		
Charge to UK corporation tax 35% (1987 – 35%)	3945	3703
Overseas taxation	184	267
Foreign tax in respect of overseas subsidiaries	1786	299
Relief for overseas taxation	(129)	(186)
Deferred taxation	(486)	61
	5300	4144
Overprovision in respect of prior years	0	(39)
Related companies	100	105
	5400	4210

There are unutilised tax losses in the Group amounting to approximately £4 million which may be available for the relief of the profits of certain subsidiaries in future years.

	1988	1987
6 DIVIDENDS		
Interim dividend of 0.7p (1987 – 0.5p)	347	248
Final dividend of 1.6p (1987 – 1.2p)	968	594
Total net dividend	1315	842
7 PROFIT ATTRIBUTABLE TO MEMBERS OF THE HOLDING COMPANY		
Dealt with in the accounts of the company	1456	931

As allowed by Section 228 (7) of the Companies Act 1985, the Company has not presented its own profit and loss account.

8 EARNINGS PER SHARE

Earnings per share of 18.lp are based on the profit after tax of £9,338,000 and on the weighted average of 51,575,100 shares after adjusting for the rights issue during the year. Last year's earnings per share of 14.4p were based on the profit after tax of £7,113,000 and on the capital of 49,500,000 shares.

9 TANGIBLE ASSETS

	Short Leaseholds £'000	Equipment and Plant £'000	Freehold Land and Buildings £'000	Total £'000
Owned assets				
Cost				
1 July 1987	2567	10651	2922	16140
Translation differences	(12)	190	0	178
In respect of new subsidiaries	425	2277	0	2702
Additions	1788	3707	34	5529
Disposals	(39)	(163)	0	(202)
30 June 1988	4729	16662	2956	24347
Depreciation				
1 July 1987	962	4823	265	6050
Translation differences	5	242	0	247
In respect of new subsidiaries	283	1099	0	1382
Provided	272	1876	20	2168
Released on disposals	(39)	(116)	0	(155)
30 June 1988	1483	7924	285	9692
Net book value 30 June 1988	3246	8738	2671	14655
Assets under finance leases				
Net book value 30 June 1988	0	925	0	925
Net book value all assets 30 June 1988	**3246**	**9663**	**2671**	**15580**
Net book value at 30 June 1987				
Owned assets	1605	5828	2657	10090
Assets under finance leases	0	546	0	546
	1605	6374	2657	10636

10 INVESTMENTS IN RELATED COMPANIES AND TRADE INVESTMENTS

Consolidated

	Related companies			Trade Investments £'000	Total £'000
	Shares at cost £'000	Retained profits £'000	Total £'000		
1 July 1987	624	342	966	292	1258
Currency translation	0	(15)	(15)	0	(15)
Additions	91	0	91	0	91
Share of retained profit for the year	0	53	53	0	53
Reclassification as subsidiary	(91)	(100)	(191)	0	(191)
30 June 1988	624	280	904	292	1196

The Group's share of the retained profits for the year of related companies is stated after deducting dividends received of £62,000.
All investments are unlisted.
During the year the remaining shares in Jardine Logica Limited were acquired and the company was re-classified as a subsidiary.

The Company

	Investments in group companies			Related companies £'000	Total £'000
	Shares £'000	Loans £'000	Total £'000		
Cost					
1 July 1987	14245	10101	24346	624	24970
Additions	0	255	255	0	255
Reductions	0	(627)	(627)	0	(627)
30 June 1988	14245	9729	23974	624	24598
Provisions					
1 July 1987	(787)	(6108)	(6895)	0	(6895)
Provided in the year	0	0	0	0	0
30 June 1988	(787)	(6108)	(6895)	0	(6895)
Net book value at 30 June 1988	13458	3621	17079	624	17703
Net book value at 30 June 1987	13458	3993	17451	624	18075

		1988 £'000	1987 £'000
11	**CAPITAL COMMITMENTS**		
	Capital expenditure authorised and contracted	276	474
	Capital expenditure authorised but not contracted	130	7
12	**WORK IN PROGRESS**		
	At cost or net realisable value	43308	29503
	Attributable profit	1658	869
	Progress payments on account	(34760)	(26051)
		10206	4321
13	**DEBTORS**		
	Consolidated		
	Trade debtors	28887	22167
	Amounts owed by related company	252	612
	Other debtors	1388	1071
	Investment in finance leases:		
	due within one year	0	26
	due after more than one year	0	0
	Prepayments and accrued income	2950	1157
	Taxation recoverable	2397	1079
	Advance corporation tax	1104	664
	Client contract deposits	0	654
		36978	27430
	The Company		
	Amounts owed by subsidiary companies	30922	4459
	Other debtors	304	304
	Advance corporation tax	1102	664
		32328	5427
14	**CREDITORS DUE WITHIN ONE YEAR**		
	Consolidated		
	Payments received on account	3682	3971
	Trade creditors	3605	3236
	Amounts owed to related company	0	160
	Other creditors	4720	4241
	Taxation and other state creditors	15188	8273
	Advance corporation tax	438	312
	Accruals	5520	2317
	Finance lease liabilities	356	147
	Dividends proposed	968	594
		34477	23251
	The Company		
	Amounts owing to subsidiary companies	4054	2892
	Other creditors	953	1016
	Taxation and other state creditors	(2)	256
	Advance corporation tax	438	312
	Accruals	0	8
	Dividends proposed	968	594
		6411	5078

An overseas subsidiary has provided its bankers with a charge on certain of its assets but had no relevant indebtedness at the end of the financial periods covered by this report.

		1988	1987
15	**CREDITORS DUE AFTER MORE THAN ONE YEAR**		
	Bank loans repayable over one and under five years	182	74
	Finance lease liabilities		
	over one and under five years	351	392
	more than five years	56	6
	Other creditors	290	151
		879	623

	1988 £'000	1987 £'000

16 DEFERRED TAXATION

Provision is made in the accounts for deferred taxation at the full potential liability as follows:

	1988 £'000	1987 £'000
Accelerated capital allowances	544	588
Other short term timing differences	(371)	(395)
Foreign subsidiaries	559	(42)
	732	151
1 July 1987	151	178
Translation difference	95	(1)
In respect of new subsidiaries	972	0
Provision in respect of current year	(486)	61
Overprovision for prior years	0	(87)
	732	151

17 OTHER FINANCIAL COMMITMENTS

There were annual commitments under operating leases as follows:

	1988		1987	
	Land and Buildings £'000	Other £'000	Land and Buildings £'000	Other £'000
Expiring within one year	619	686	192	374
Expiring in the second to fifth years	576	2174	1505	1615
Expiring after five years	2747	13	2605	0
	3942	2873	4302	1989

18 CALLED UP SHARE CAPITAL

	1988 £'000	1987 £'000
Authorised share capital 80,000,000 Ordinary Shares of 10p each	8000	6600
Called up share capital 60,501,602 Ordinary Shares of 10p each	6050	4950

The authorised share capital of the Company was increased from £6,600,000 to £8,000,000 by the creation of 14,000,000 new shares of 10p each by ordinary resolution at an extraordinary general meeting of the company held on 25 April 1988.

11,000,291 new ordinary shares were issued at a price of 236p per share, payable on 22 April 1988.

At 30 June 1988 there were 2,727,304 options granted under employee share option schemes at prices ranging from 149p to 405p and exercisable from 1988 to 1998.

19 SHARE PREMIUM ACCOUNT AND RESERVES

	Share premium account £'000	Special reserve £'000	Other reserves £'000	Profit and loss account £'000
Consolidated				
1 July 1987	8905	0	2140	13018
Exchange difference on translation of net assets at 1 July 1987				(425)
Premium on rights issue net of expenses	23890			
Reduction of share premium account	(23261)	23261		
Goodwill on acquisition written off		(18454)		(101)
Retained profit for the year				8023
Transfers to other reserves			39	(39)
30 June 1988	9534	4807	2179	20476
The Company				
1 July 1987	8905	0		4831
Premium on issue of new shares net of expenses	23890			
Reduction of share premium account	(23261)	23261		
Retained profit for the year				141
30 June 1988	9534	23261		4972

Following the Extraordinary General Meeting held on 25th April 1988, the High Court's agreement was obtained for a reduction of the share premium account by the sum of £23,260,658.

Goodwill has been written off in accordance with the Company's accounting policies and has been set against the Special Reserve.

20 CONTINGENT LIABILITIES
Subsidiaries have provided indemnities to their bankers in support of performance bonds and guarantees amounting to £4,187,143.

21 PRINCIPAL OPERATING SUBSIDIARIES
Logica UK Limited (Great Britain)
Logica Space and Defence Systems Limited (Great Britain)
Logica Consultancy Limited (Great Britain)
Logica Financial Systems Limited (Great Britain)
Logica Cambridge Limited (Great Britain)
Logica Communications and Electronic Systems Limited (Great Britain)
Logica Energy and Industry Systems Limited (Great Britain)
Logica BV (Netherlands)
Logica SA (Belgium)
Logica GmbH (West Germany)
Logica Svenska AB (Sweden)
Logica Data Architects Inc (USA)
Logica Technology Systems Inc (USA)
Logica Pty Limited (Australia)
Logica Technology Services Limited (Hong Kong)
Logica Technology Services Sdn Bhd (Malaysia)

At 30 June 1988 these companies were all wholly owned.

22 CHANGES IN GROUP STRUCTURE
With effect from 25 April 1988 Jardine Logica Limited became a wholly owned subsidiary. The name was subsequently changed to Logica Technology Services Limited.

During the year the issued share capital of Data Architects Inc was acquired and its activities merged with those of Logica Systems Inc. The combined company was renamed Logica Data Architects Inc.

23 RELATED COMPANIES
Logica General Systems Spa (Italy)
The Company holds 49.8% of the 793,550 ordinary shares of 1,000 lire each and 51.3% of the 204,350 preference shares of 1,000 lire each of Logica General Systems Spa.

The business activities of this company are similar to those undertaken by the other Logica companies.

1 **BASIS OF ACCOUNTING AND CONSOLIDATION**
The accounts are prepared under the historical cost convention in accordance with the Companies Act 1985. They are the result of the consolidation of the accounts of the Company and its subsidiaries and also include the relevant share of the results of related companies. The Group accounting policies conform with UK accounting standards and when necessary, adjustment is made to the statutory accounts of overseas subsidiaries in order to present the Group accounts on a consistent basis.

2 **TURNOVER**
Turnover represents amounts invoiced to clients net of amounts billed in advance and excluding VAT.

3 **RECOGNITION OF PROFITS**
Profit on contracts for the supply of professional services at pre-determined rates is taken as and when the work is billed irrespective of the duration of the contract.

Profit is taken on fixed price contracts whilst the contract is in progress, having regard to the proportion of the total contract which has been completed at the balance sheet date. Provision is made for all foreseeable future losses.

4 **STOCK AND WORK IN PROGRESS**
Physical stock and work in progress is valued at the lower of cost and net realisable value.

The valuation of work in progress on fixed price contracts is adjusted to take up profit to date or foreseeable losses in accordance with paragraph 3 above. The inclusion of this attributable profit supercedes the statutory valuation rules for current assets to enable the accounts to give a true and fair view.

Other work in progress is valued at cost or at estimated net realisable value if lower. Cost comprises:

- professional work in progress valued at the cost of salaries and associated payroll expenses of employees engaged on assignments and a proportion of attributable overheads.

- unbilled expenses incurred and equipment purchased for clients in connection with specific contracts.

5 **RESEARCH AND DEVELOPMENT**
Research costs are written off in the year in which they are incurred unless they are to be reimbursed by third parties. Development costs are also written off in the year in which they are incurred unless they are to be reimbursed by third parties or they result in the production of an identifiable, saleable product.

6 **DEPRECIATION**
Depreciation is provided at rates calculated to write down the cost of all tangible fixed assets over their estimated useful lives on a straight-line basis. The annual rates of depreciation used are as follows:

Office equipment	10%
Computer equipment	20%
Motor cars	25%
Plant	20%
Leaseholds	equally over life of lease

7 **FOREIGN CURRENCY TRANSLATION**
The assets, liabilities and trading results of foreign subsidiaries are translated into sterling at the rate of exchange ruling at the date of the balance sheet.

Differences arising on restatement of the net investment in foreign subsidiaries and related net foreign currency borrowings are dealt with as adjustments to reserves.

All other differences on exchange arising in the year are taken to the profit and loss account.

8 **DEFERRED TAXATION**
Provision is made for deferred taxation to take account of timing differences between the treatment of certain items for accounts purposes and their treatment for tax purposes. The provision is maintained to the extent that timing differences are not expected with reasonable probability to continue into the foreseeable future.

9 **TANGIBLE FIXED ASSETS**
Tangible fixed assets are shown at cost. Cost in this context includes the initial capitalised values of assets funded by finance leases.

Assets financed by leasing agreements that give rights approximating to ownership are treated as if they had been purchased outright. The amount capitalised is the present value of the minimum lease payments payable during the lease term. The corresponding leasing commitments are shown as obligations to the lessor. Lease payments are treated as consisting of capital and interest elements and the interest is charged to the profit and loss account on a constant periodic rate of charge basis.

10 **GOODWILL**
Purchased goodwill is written off against reserves in the year of acquisition.

11 **RELATED COMPANIES**
A related company is a legal entity, not being a subsidiary, in which the Group has an interest of between 20 per cent and 50 per cent and over whose commercial and financial policy decisions the Group exercises significant influence. The Group's share of the profits less losses of all significant related companies is included in the Group's profit and loss account on the equity accounting basis. The results are calculated from the latest available audited accounts adjusted to incorporate unaudited results for more recent periods.

Report of the Auditors

Report of the Auditors to the Members of Logica plc

We have audited the accounts set out on pages 32 to 42 in accordance with approved Auditing Standards.

In our opinion the accounts give a true and fair view of the state of affairs of the company and the group at 30 June 1988, and of the profit and source and application of funds of the group for the year then ended, and comply with the Companies Act 1985.

Price Waterhouse
Chartered Accountants
London

22 September 1988

Four Year Record

	1988 £'000	1987 £'000	1986 £'000	1985 £'000
Turnover	**132548**	**110774**	**87042**	**62284**
Operating profit	13866	10545	7457	4529
Interest	872	778	(649)	487
Profit on ordinary activities before tax	**14738**	**11323**	**6808**	**5016**
Taxation on ordinary activities	5400	4210	2574	2717
Profit on ordinary activities after tax	**9338**	**7113**	**4234**	**2299**
Shareholders' funds	**43046**	**29013**	**22831**	**18794**
Earnings per ordinary share	**18.1p**	**14.4p**	**10.1p**	**7.0p**
Dividends per share (net)	2.3p	1.7p	1.0p	0.35p
Staff numbers at year end	3236	2682	2348	1843

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