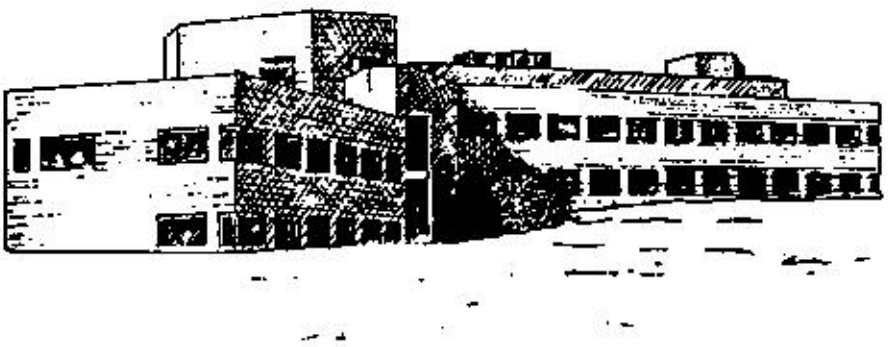
UEA
NORWICH
COMPUTING
CENTRE

ANNUAL REPORT

1989 - 1990



Contents

1. Acting Director's Report

It is some years since the Computing Centre issued an Annual Report. Although it takes an appreciable effort to compile, I believe it to be a valuable exercise for managers to review publicly their achievements over the past year as all too often a successful service is taken for granted by its users, mainly because it has been supplied without fuss and drama. For the Centre itself, the report is a valuable document as a source of historical material when questions are asked about today's achievements in four or five years time.

The Computing Centre came to the end of an era in July, 1990 with the retirement of its first Director, Professor Peter Stocker. He created the Centre as part of the School of Mathematics and Physics in 1967 in the University Village. He oversaw its move to a purpose-built building and independence on the Plain in 1968 and guided its growth and development through the many changes of computing practice to today. The robust health of the Centre and its involvement in practical computing and communications right across campus owes much to his vision and foresight. The University and especially Centre staff hope that his retirement will be as happy and positive as his years as Director.

Life in the Computing Centre is not for the faint-hearted. If variety is the spice of life, we must be very satisfied. The pace of technological change refuses to slow down and it affects all staff from computer operators and secretaries right up to the Director. During the year, due to increasing automation, our operators became computer assistants with more of their duties outside the computer room than inside. During the forthcoming academic year with a radical change in Advisory planned, they will meet users on a daily basis as the team on the Help Desk; a far cry from the monastic environment they used to lead.

The senior staff are expected to be computer and subject experts in an ever wider range of subject areas. With a limited number of staff it was felt that we were becoming less useful to users at the leading edge of their disciplines, and we have plans to specialise in future in a limited number of subjects chosen to be of positive help to highly rated research groups upon which the future of UEA depends.

During the year as a direct result of the publication of the University Strategy Plan, Growth and Change 1990-95, great efforts have been made to produce a coherent plan to upgrade the University Data Network that will not only bring fast Ethernet connections to every academic's desk, but also lay the groundwork for an even faster FDDI network in the mid-1990s. At this time, application has been made to the Joint Network Team, the Computer Board and the University for the appreciable funds that will be required to achieve the required objective.

Proposals have also been sent to the Computer Board regarding the purchase of computing equipment for the midterm review to tide the University over until their major review of computing service in two years time. This has been a difficult exercise as no longer is a central mainframe a cost effective way of providing computing power to users yet software for the symbiotic use of

appropriate distributed processors has not been fully developed for the University community. It is likely that a variety of workstations will be provided to support our most demanding users and some UNIX platforms for Computing Centre staff training, so that UEA will be well experienced in the new approach to computing by the time of the major review in two years time.

Finally no report can end without a most sincere appreciation of the efforts made by all the staff of the Computing Centre. Their team work and dedication in providing a 24 hour/day, 7 day/week computing service to the rest of the University is of the highest order. Without them there would be no Computing Centre and the University would be the poorer for it.

J.P.G. Roper

2. Systems

The activities can be covered under three general headings: (i) maintenance and development of existing services; (ii) implementation of new services; (iii) planning for new systems. With mature, primarily VAX/VMS based services in place, the main efforts have come under the latter two sections.

2.1 Maintenance and Development

The DIGITAL (DEC) VAX systems in place at the beginning of the year were:

System	Mnemonic	User base
DEC VAX 8650	"CPC865"	Research
DEC MicroVAX II	"CPCMC"	General teaching
DEC MicroVAX II	"CPCMB"	[Teaching cluster for Accountancy
DEC VAX 11/780	"CPC780"	[Computing and Electronics
DEC MicroVAX II	"CPCMA"	Information service

The operating system was upgraded to VMS version 5.1 at the start of the year and this was the first year of operation of a teaching cluster. All the nodes were connected by DECnet over Ethernet, with each node serving a distinct user base.

We have continued to refine two techniques developed over recent years to balance user demand and system response. This has always been a difficult balance for the essentially "free" resource of a university computing service. The first mechanism distinguishes students logged in to supervised, scheduled laboratory classes. Each student has an identifier (or several) for the relevant class. The identifier is "ON" during the scheduled slot and students with the identifier displace casual students without it. No resource limits are imposed on the class, except at the request of the lecturer.

The second mechanism is intended to persuade casual student work and research users to moderate the demand which they place on the system, according to the overall load. The main objective is to maintain interactive response for all users, by displacing work at busy periods to less busy periods. The system maintains and reports a "demand factor" which is a function of process states. This function rises high *before* response time degrades. The demand factor is used as a multiplier for the base cost of central processor use, input/output etc., so the charge made for a particular task can vary dramatically from quiet to busy periods. The charge is made against a fixed daily quota, once exhausted the user cannot login until the next day. Whilst this has had the desired effect of spreading the load over the day and evening, it has also exposed the problems of allowing secure access to terminals at night, particularly for students.

Demand for the University online information service (INFO) was generally higher than the capacity of the host MicroVAX, the number of concurrent users consistently in the 20s and sometimes 30s. The program enforces "waits" before accepting new queries in order to maintain response times for committed queries.

Extending the resources for INFO will be a high priority for the midterm review next year.

The Computing Centre has continued to develop the catalogue search part of INFO on behalf of the Library. These searches account for approximately two-thirds of the queries made on INFO.

2.2 Implementation and introduction of new services

A Silicon Graphics IRIS system was jointly purchased by the Computing Centre, Chemistry and Biology mainly for molecular graphics research. The Centre mounted the Charm and Quanta software over UNIX for the three-dimensional display of complex molecules. We also established the network access to international databases of proteins etc. to enable the scientists to use the IRIS as a production tool for the display and investigation of relevant compounds.

A SUN 4/60 was jointly purchased with Environmental Sciences along with the ARC/INFO GIS (Geographic Information System). This represents a significant investment of time and money for both parties, with two goals. Firstly the short term goal of the display and analysis of satellite images. Secondly using ARC to pull together disparate data sets which exist and are increasingly available to academic research. Several disciplines at UEA are studying data which is spatially distributed. This second goal will come under development in 1990/91 and subsequent years too.

In both of these projects the Computing Centre took an initiative which has enabled modern computing technology to be applied to highly rated UEA research - a "pro-active" role in the current jargon. These projects have made the Computing Centre and departments realise the benefits of joint venture.

The use of GINO-F was phased out completely during the year, in favour of UNIRAS. This package has very wide use on the VAX but the frustration caused by the continued absence of a viable PC-MS/DOS version has inhibited an even wider user base and the CPC aim to integrate packages across several hardware platforms.

Although INGRES, version 6, was available earlier in the year, we decided to stay with version 5 for the academic year 1989/90. The year end saw some 30 active databases in the research service and twice that number for computer science undergraduates. Again limitations of the PC-MS/DOS version frustrated the goal of uniform INGRES use across PC and VAX platforms.

2.3 Future Planning

The Computer Board Mini Midterm Review required a detailed appraisal of user requirements for the period up to the major review in two years time. This work was undertaken at the same time as planning for the implementation of a new fibre optic backbone communications network was taking place, in response to the University's Strategic Plan to provide network access in every office.

Workstation evaluation in the context of our users' requirements (real and perceived) was both difficult and exciting in a rapidly changing market. There is a

large body of users who need "more of the same", which at UEA remains a VAX/VMS based production environment with stable and reliable software tools.

There are, however, a widening range of mature applications available under the UNIX umbrella. For example the ARC/INFO image processing options under 2.2 above. Cheap RISC processing power also comes with UNIX and is a requirement for some UEA applications.

For both UNIX and VMS, the best price/performance ratios are found at the bottom of the ranges. This approach is consistent with the usual University project development where the number of people involved in any one project is small.

The plans to be taken forward to 1990/91 are the purchase of six MicroVAX 3100s and two RISC UNIX systems. With a campus-wide network, capable of OSI protocols, maximum interconnectivity of departmental central and individual workstations is anticipated.

K.L. Woods

3. Operations

The staffing of the section has seen changes in duties to fit in with the ever moving changes in hardware and software technology.

The running of the University Teaching and Research service continues to be the major computer operating task, but a fast growing area is communications monitoring and fault finding which has become a major area over the last few years.

3.1 Staffing

The operational aspects of the Computing Centre are managed by the Operations Manager who reports to the Director. The group is divided into three parts: Computer Operations, Reception and Data Preparation.

3.1.1 Computing Operations

The Chief Operator supervises a group of four Computing Assistants (CAs). The Computing Assistants were formally Computer Operators, who now have general computing duties. These cover the installation of microcomputer hardware and software, general computer administration, communication equipment installation as well as computer operating. The year has been one of change as the CAs take on more duties outside of the computer room, and many of the computer room tasks are being automated. A system of matrix management has been introduced to allow CAs to have time slots working for other groups within the Centre as required. Operations cover is Monday to Friday, 8 a.m. to 8 p.m. while the computer systems are operational 24 hrs./day and 7 days/week.

3.1.2 Reception

The reception desk is open between 9 a.m. and 6 p.m. during vacations, extended to 10 p.m. during the term, Monday to Friday. The duties of the receptionist are sixfold:

- To receive visitors and users as they enter the Computing Centre and give help on where to go and who to see.
- To sell computer consumables e.g. printer ribbons, disks etc.
- To distribute and sell Computing Centre documentation.
- To loan software and manuals for use on the equipment in the Computing Centre.
- To ensure the equipment is secure and not abused.
- To debatch and send out computer output to the users' pigeonholes.

Staffing is normally by the Reception personnel with back-up provided by the Data Preparation Supervisor and the Computer Assistants.

3.1.3 Data Preparation

The Data Preparation Supervisor deals with all aspects of data preparation, with additional duties concerning the user area terminals, printers and associated equipment. The supervisor also acts as the Computing Centre librarian and as a Back-up to the receptionist.

3.2 Equipment installation 1989/90

The first half of the year was mainly concerned with enhancements to the University communications network by the installation of a thirty-two channel terminal server, and two extra bays to the MICOM automatic contention switch for terminal access allowing expansion to continue. Connections by Schools and Departments to the communications network is growing rapidly.

The second half of the year was taken up with the Computer Board's midterm review of the central computers and the planning of enhancements to the research and teaching systems to accommodate growth over the next three years.

Requirements for the UNIX operating system prompted the installation of a SUN Sparcstation as a GIS (Geographical Information System). Following the installation of the Silicon Graphics' Iris system last year, further specialised SUN UNIX workstations have been installed this year.

An Apple MacII was given to the University by Apple to enhance the Macintosh Laboratory set up in 1989 under the Apple Macintosh Laboratory initiative. The laboratory is situated in the Computing Centre Reception area and contains three Macintosh SEs, one Macintosh Plus, the new MacII, an Imagewriter and laser printer. The equipment and software is available for evaluation and limited production use by the whole of the University.

3.3 System availability

As can be seen from the fault list in Appendix C2, the hardware reliability of modern computer systems and peripheral devices is increasing. The aim of the Centre is that all computer systems and communications systems are available 24 hours a day, 7 days a week, 52 weeks of the year. During this year the only major fault was an electrical supply fault which allowed high voltage on the incoming line and damaged the power supplies of most of the computers within the computer room. The full system was not operational for a whole week, but the majority of systems were available again within four days. This was an exceptional situation, the first in the history of the Centre.

The system availability to users has been very high. The aim is to hide most faults from our users and so most faults, hardware upgrades, software upgrades have been scheduled for the quiet parts of the vacation or in the early part of the mornings. Minor hardware faults are repaired at the convenience of the user service, whereas major faults are repaired as quickly as possible.

A.J. Coombe

4 Data Communications

4.1 Existing facilities and expansion plans.

The main network facilities installed are:

Circuit switching

A Micom terminal connection exchange, installed in the Computing Centre, controls the connection of users' asynchronous terminals/personal computers to a variety of services viz., host computers, the X25 packet service, DEC Ethernet and a second switch in the School of Information Systems.

Terminal login-to-host features are provided plus the ability to use a file transfer package, for example Kermit, to transfer data files between a host and a micro PC machine at a maximum speed of 9600 bps.

The data exchange can also connect any two authorised lines together. Data can then be passed between any two co-operating connections. Approximately 650 terminals, distributed between 20 Schools/Departments, are currently connected to the exchange. Details can be found in Appendix C6.

Special arrangements have been made for LAW because of the location and the nature of the structure of Earlham Hall makes cable routing difficult. A 12-channel statistical multiplexor was installed during the year, together with a new cabling system within the building.

DEC Ethernet

DEC's Ethernet interconnects the University's VAX computers and their peripheral servers. Approximately 200 terminal server ports are installed. DECnet traffic is increasing with the introduction of new machines. For example, MicroVAX machines, remote DEC terminal servers and personal computers (PCs) are using DEC protocols to interwork.

X25 Packet Switching

A central GPT 4160 campus packet switch exchange, located in the Computing Centre, interconnects departments to provide terminal access, electronic mail and file transfer facilities to X25 host computers and the JANET academic network. The JANET link via Cambridge allows access not only to all UK universities but also to a wide range of international networks and British Telecom's Packet Switch Service (PSS).

The switch has 22 ports connected to a number of host computers and packet assembler/disassembler (PAD) terminal servers distributed throughout the University. Plans are in hand to install a second higher performance X25 switch with a gateway link to Ethernet. This will allow users to make remote X25 packet calls with only an Ethernet connection supported on their own machine.

The new switch will add another 10 ports and higher grade interfaces. It will incorporate global addressing to meet new international standards and permit the currently overloaded link to Cambridge to be upgraded to Kilostream speeds.

A Name Registration Scheme (NRS) server, installed on an IBM 6150 machine was delivered during the year and will perform name look ups for addresses contained in the NRS name tables plus local additions as required.

Other Local Area Networks (LANs)

Some departments have local networks with connections to a embryonic central backbone network. These are a mixture of Apple Macintosh networks, Ethernet and other LANs.

Currently Ethernet backbone links are in place to Chemistry, Mathematics & Physics, Economic & Social Studies, Information Systems and the Computing Centre.

Telex

The telex facilities accessed from the main service DEC VAX 8650 computer continues to be in demand. Telex registered users can send telex messages from any department via DEC compatible terminals or emulators.

This service is commonly used to exchange messages internationally. More than 80 different countries were contacted by telex during the year.

4.2 Network Expansion

Plans are in hand for the development of a new University Data Network. The network is in response to Strategy 17.3 of the University's "Strategic Plan 1990-1995" "to provide network access points in all office accommodation and unify the information sources within the University."

Within the forthcoming year it is intended that the majority of University departments should have access to the new network as the first part of the first phase of a new office network infrastructure. The costs of networking offices alone, will be in the order of £0.5 million pounds (including the cost of the office microcomputer interfaces). Bids to fund the network have been made to the Joint Network Team for the Universities, the Computer Board and UEA. A proportion of the funding is expected from each of these sources with some supplementation by the user departments themselves.

The Plan

The aim of the plan is to provide a data communications port in each office so that information and data can be exchanged between any office and any computer on campus. Access to remote sites will be also possible using the JANET network.

A high speed backbone consisting of fibre optic cables will interlink all buildings. The links will currently operate at Ethernet speeds (10 Mbits/sec.) but will be capable of simple enhancement to the next generation of high speed networks (100 Mbits/sec.) in the future.

Within each building the backbone will connect via an Ethernet bridge to a thick Ethernet riser cable, servicing Ethernet multiport repeaters on each floor. The final connection to each office will be made using thin Ethernet cables from the repeater. In the first phase only selected floors will be cabled.

Detailed work for each building in planning, organising, placing contracts and supervising contractors necessary for each individual building has commenced. For example work on the new Sainsbury Centre for Visual Arts' extension has resulted in an in-building network of Ethernet and Wang cabling ready for building occupancy in the autumn of 1990.

The new network is primarily intended to support PC users and workstation users. Although workstations are usually provided with an Ethernet interface, PC users will have to purchase an Ethernet card to take advantage of the increased speed of the new network.

The Development Program

Work is planned in four phases, with phase 1 planned for completion within 12 months of commencement.

Phase 1 comprises installation of the initial backbone hub with cables to each floor of each major building. Then one floor in each building will have office wiring so that a total of about 400 PCs can be supported initially. (See Figure 1.)

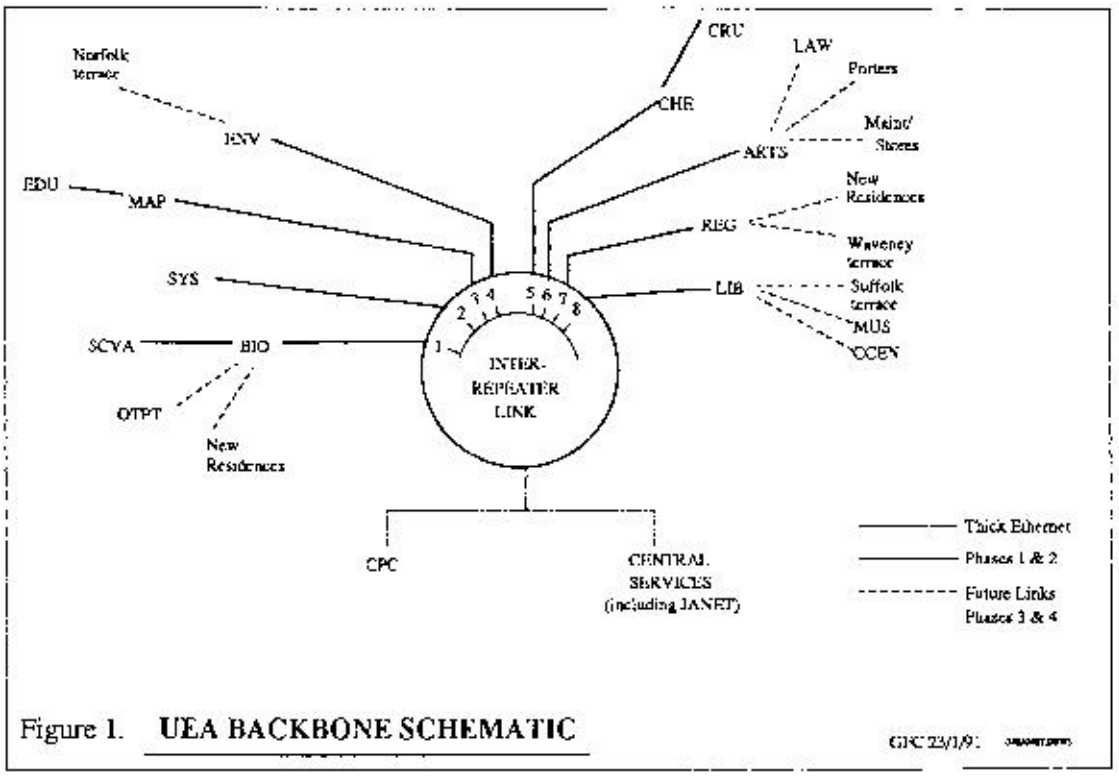


Figure 1. **UEA BACKBONE SCHEMATIC**

Phase 2 will extend office cabling to all floors in the designated buildings.

Phase 3 will link the smaller buildings into the new network. A variety of solutions will be required for this work as some buildings such as Earlham Hall (LAW) are remote from the campus.

Phase 4 has not yet been developed in detail. However, it will be dealt with elsewhere when Strategy 17.1 of the Strategic Plan is considered. Strategy 17.1 states "Provide communications points in all new residences and investigate the cost and location of points for graduates and undergraduates in existing buildings."

Implementation & Staffing

The work outlined will no doubt be accompanied by the networking of research and teaching laboratories, residences and other buildings.

The new network will support a wide range of new network software operating different protocols. Much effort is required in this area for many different and often incompatible protocols are likely to co-exist on the network. The understanding and management of these protocols is also a major task.

The rate of demand for network expansion is high. The new University network should meet most of these needs, but to succeed additional staff and training will be required. It is important to note that without the availability of skilled staff to develop the network, the demands for new and complex data communications networks will not be met.

G.F. Charles

5. User Services

This year has seen the continuing evolution of User Services, the most significant step forward being in our approach to teaching. The year also saw an internal review of the provision of advice to computer users, to consider ways in which this might be accomplished even more effectively as both the technology and its applications continue to change.

Although many who come to universities are novices in computing and computing applications, a steadily increasing proportion are already computer literate. A dual approach to teaching has therefore been introduced during the year.

To better meet the needs of those with some existing expertise in computing, a range of self-paced modules has been introduced. These have the major advantage of being available "on demand", and users of these materials can seek assistance from the Help Desk if necessary. The initial provision introduces users to some twenty different items of software, or aspects of computing, as listed in Appendix C7.

Also, Introductions to MS-DOS and VAX/VMS were routinely offered as conventionally taught courses. This is particularly important to those for whom computer technology is new, and who typically view it as rather daunting. These taught courses have been offered to the general user community several times during the year, and additionally the MS-DOS course has been run specifically for members of staff in the Library and LAW.

The Microlab and Help Desk have both continued to offer much valued services. They are generally well used by most Schools, although the increasingly cross-machine nature of computing suggests that a single advice point may be beneficial. In terms of applications, queries on e-mail and networking now vie in frequency with the traditional areas of programming, graphics and statistics packages, although the overall range of technical questions is extremely wide. Usage of the Help Desk is summarised in Appendix C8.

The routine day-to-day work and advice from the Microlab and Help Desk is complemented by the provision of advice in specialist areas. User support in graphics, database and GIS have been particularly strengths during this year, but the Centre has been limited by lack of specialist staff in certain applications areas. Following recent appointments, the situation should improve next year.

CPC Notes, Newsletters and on-line information have been maintained and coverage extended, so that major aspects of micro and mainframe computer use are covered. Of the wide range of new material and information made available, it is appropriate to highlight the fairly regular Newsletter features on CHEST deals concerning software purchase, and also articles on access to various online information systems and libraries of software via JANET. The revised CPC Note 33 "OHP foil and 35 mm production" is also important, since this now gives guidelines for the production of good ohp foils by computer - an activity which has very wide application across the University community.

In summary, CPC User Services have continued to make a strong input to the computing community at UEA. However, like the technology with which they deal, such services cannot be static in nature. CPC is committed to an evolutionary and innovative policy to ensure that future user needs are properly addressed.

P. Anstey

6. Microsystems

6.1 Equipment

This year the Microlab has disposed of most of its obsolete equipment. Concentration has been solely on the IBM-PC and compatibles, and the Apple Macintosh. Two BBC-Bs and an Amstrad PCW are retained solely for file transfer facilities - thus no longer providing user support for these ranges. A Toshiba T1600 laptop portable computer was purchased for use both as a demonstration machine and as a diagnostic tool for asynchronous communications problems.

Three Comcen-XT workstations were upgraded with 20 Mbyte disks at the beginning of the year. Experience of some software piracy from these machines has been countered by date stamping all DOS commands issued and also by fitting keylocks, requiring the users to register their usage. These techniques together with other security actions have been relatively successful. To date, three users have been caught attempting to steal software.

A batch of Opus 386-SX computers have been ordered for the re-equipment of the teaching area in the Computing Centre. It is hoped that they will be operational by the start of the 1990 Autumn term.

6.2 Microlab Consultancy Service

The number of users contacting the Microlab or using Microlab facilities has risen by about 50% from last year keeping the staff very busy. On average, some 50 enquiries are dealt with each week, each consultation averaging about 20 minutes. The enquiries are broadly divided into the following categories:

a) Suitability of software and hardware packages for various tasks.
b) General guidance on the practical applications of software.
c) Installation of hardware and software.
d) Fault diagnosis and repairs.

The number of requests to install and commission systems, and to repair malfunctioning equipment has increased tremendously since last year.

The use of the diskette conversion service has remained steady over the whole of the year but the requests for retrieving software from the Lancaster Public Domain and Shareware archives has dropped since the introduction of a flat rate financial charge for the service. The charge was designed to limit the excessive demand prevailing before its introduction.

6.3 Software deals

As many of the software deals negotiated by CHEST are for microcomputer systems, the group handle all the purchases. The following negotiated site licences for IBM-PC and compatible computers have been purchased. The numbers in brackets indicate the numbers of licences issued to faculty research groups:

Ingres (15), Teemtalk (14), Uniras (2), NAG (3), NAG graphics (1).

The following software deals have been signed up and will shortly become available to users:-

Medline, Hazardous Chemicals Database, ARC/INFO, Bartholomews Digital maps, ISI Databases and CGM Tools.

Local bulk purchases were organised for Chemword, Mathword and MathCAD.

6.4 Indexes to periodicals

The MIM periodical index covering the periodicals PC User, Mac User and IBMPCUG has been updated regularly throughout the year. It is available to all registered users of the CPC865 service.

6.5 Viruses

During the Spring term following the installation of the Winchester disks, the Centre's general access microcomputers were repeatedly infected with the Stone virus. This was due to the users booting the systems from their own (infected) diskettes, ignoring the advice given by warning posters. The problem was solved by changing the firmware in the machines to inhibit booting from a diskette. Although the reverse engineering of the system software in the various machines took a large amount of effort, the results were worth it - only one PC has since been infected. Preparations may be made to develop this software technology for porting to other makes of PC-based processors to other departments if they are prepared to fund the conversion and to undertake to maintain the confidentiality of the modifications licensed from us.

The virus announcements from the global academic community are closely monitored and the Microlab is holding the latest versions of the anti-viral software products. A shell to execute viral detection software at predetermined specific times has been developed.

6.6 Other activity

The original CP/M-based data preparation software has been ported and enhanced to the MS-DOS environment. It is used by our data preparation staff and also by the School of Environmental Sciences. We have been contracted by departments within UEA to develop DOS-based software to their specific requirements.

Following the installation of the Ethernet cabling within the Computing Centre, the group has run conformance tests on the various types of PCs within the Computing Centre that may eventually be attached to the network.

L. Benfield

Appendix A

Staff in post at July, 1990

Director	Professor P.M. Stocker, MSc (Manchester), FIMA, FBCS, CEng
Assistant Director	J.P.G. Roper, BSc (Dunelm), MBCS, CEng
Systems Manager	K.L. Woods, BSc (East Anglia)
Operations Manager	A.J. Coombe, AMBCS, MIDPM
Systems Programmers	M.C. Bristow, BSc (Loughborough) P.J. Newby, BSc (London) K.M. Worvill, BA (Lancaster), PhD (East Anglia)
Communications Specialist	G.F. Charles, CEng, MIERE, MBCS
Microcomputer Specialists	L.S.K. Benfield, BA (Essex) D.F. Belisario
Senior Adviser	P. Anstey, BSc, PhD (Exeter)
Programming Adviser	D.J. Smith, BA (Nottingham), PhD (CNAA)
Secretaries	J.A. Robinson L. Huang
Accounts Clerk	A.P. Reeve
Chief Operator	J.M. Bailey
Computing Assistants	A. McConnell A.G. Paxton I. Reeman G.J. Warner
Data Preparation Supervisor	W.E. Wharton
Senior Receptionist Receptionist	W. Noller A. Ping

Appendix B

User Representatives

School	Representative
Art History and Music	Mr. A.J. Coombe
Biology	Dr. A. Davy
Chemistry	Dr. M. McCoustra
Climatic Research Unit	Dr. P.D. Jones
Computing Centre	Mr. K.L. Woods
Development Studies	Mr. I.J. Gillespie
Education	Mr. B. Labbett
English and American	Mr. C. Matthews
Environmental Sciences	Dr. A. James
External Users	Mr. A.J. Coombe
Information Systems	Ms. G. Hall
Law	Mr. A.J. Coombe
Library	Dr. C.J. Aslin
Mathematics	Dr. T. Evans
Modern Languages	Mr. J.D. Fox
Physics	Dr. A. Walker
Registry	Mr. M. Howard
Small groups	Mr. A.J. Coombe
Social Studies	Ms. A. Lewis

Appendix C1

Central computer equipment

1. Research systems

1.1 Digital VAX 8650 (CPC865) (installed April 1986)

- 32 Mbytes main memory
- 3 x Unibus private disks
- 32 Asynchronous lines used for printers and terminals
- LN03 laser printer
- Apple laserwriter
- Parallel line printer
- X25 communications to campus network and JANET
- Ethernet interface (DECNET) connecting the VAX to terminal servers, network printers and the VAX cluster
- Disk filestore is available from the HSC controller via the Computer Interconnect. The HSC provides 8 Gbytes of disk space

1.2 SUN 4/60 Sparcstation (CPCS1) (installed September 1989)

- 16 Mbytes main memory
- Two internal 100 Mbyte disks
- 1.4 Mbyte internal floppy drive
- 2 Asynchronous RS232 ports
- 290 Mbytes of disk filestore
- 600 Mbytes private filestore
- Cartridge tape drive
- 16" Trinitron colour monitor
- Ethernet interface connecting to the University network
- Configured as a Geographical Information System (GIS)

1.3 SUN 4/60 Sparcstation (MEIKO) (installed May 1990)

- 16 Mbytes main memory
- Two internal 100 Mbyte disks
- 1.4 Mbyte internal floppy drive
- 2 Asynchronous RS232 ports
- 2 x 500 Mbytes of disk filestore
- 600 Mbytes private filestore
- Exabyte tape drive
- 19" Monochrome monitor
- Ethernet interface connecting to the University network
- Configured as Meiko transputer host

1.4 Silicon Graphics Personal Iris 4D (IRIS) (installed July 1989)

- 8 Mbytes main memory
- 300 Mbytes of disk filestore
- 3D graphics hardware
- Cartridge tape drive
- Ethernet interface connecting to the University network
- Configured as a molecular graphics system workstation

2. Teaching systems

2.1 MicroVAX II (CPCMB) (installed April 1986)

- 11 Mbytes main memory
- 140 Mbytes of disk filestore
- TK50 tape drive
- Ethernet interface (DECNET), connecting the VAX to terminal servers, network printers and the VAX cluster

2.2 MicroVAX II (CPCMC) (installed April 1986)

- 10 Mbytes main memory
- 400 Mbytes of disk filestore
- TK50 tape drive
- Ethernet interface (DECNET), connecting the VAX to terminal servers, network printers and the VAX cluster

2.3 VAX 11/780 (CPC780) (installed 1983)

- 16 Mbytes main memory
- 32 Asynchronous lines used for printers and terminals
- Ethernet interface (DECNET), connecting the VAX to terminal servers, network printers and the VAX cluster
- Disk filestore is available from the HSC controller via the Computer Interconnect

3. Information system

3.1 MicroVAX II (CPCMA) (installed April 1986)

- 11 Mbytes main memory
- 140 Mbytes of disk filestore
- TK50 tape drive
- Ethernet interface (DECNET), connecting the VAX to terminal servers, network printers and the VAX cluster
- Configured as the University Information system including the Library catalogue access

4. Communications systems

4.1 GEC 4160 x X25 packet switch for connection of UEA hosts and JANET.

4.2 MICOM 600 contention switch for connection of over 700 UEA asynchronous terminals and PCs to central host computers.

4.3 Network terminal servers

- Decserver 100 . . . . . .4 x 8 lines
- Decserver 200 . . . . . .2 x 8 lines
- DECSA (Ethernet controller) . . . . . 1 x 32 lines
- P4000 (Lat) . . . . . 2 x 32 lines

4.4 IBM 6150 campus name server for management of network names and addresses.

5. Terminals and PCs for users within the Computing Centre

5.1 Teaching area

- 16 x Televideo VT220 terminals

5.2 Users' area

- 4 x BBC model Bs for graphics
- 7 x Televideo VT220 terminals
- 12 x Newbury VT100 terminals
- 1 x Dacol T4010 graphics terminal
- 3 x PC XTs for general software
- 1 x PC AT for colour graphics
- 1 x Pericom colour terminal and printer

5.3 Macintosh Laboratory

- 3 x Macintosh SE, 20 Mbyte disk and 800K 3.5" floppy
- 1 x Macintosh SE, 2 x 800K 3.5" floppy drives
- 1 x Macintosh II, 5 Mbytes main memory, 40 Mbyte disk, 800K 3.5" floppy drive and CD ROM player

These systems are on Localtalk and have asynchronous lines to the University communications network.
- 1 x Imagewriter connected to Localtalk
- 1 x Laserwriter connected to Localtalk

5.4 Printers within the Centre

Network printers CPC1 and CPC2 available to all the Centre VAXs.
Direct printer (CPC5) to the Vax 8650 research system.

Appendix C2

Central Computer Equipment faults (August 1989 - July 1990)

Environmental equipment	
Power supply	1
Air-conditioning	0
Heating	0
Printers	16
Terminals	10
IBM PCs or compatible	2
Apple Macintosh	1
Communications equipment	
MICOM	1
GEC switch	5
Modems	1
Multiplexors	2
Telex Hasler box	1
JANET line to Cambridge	1
VAX computers	
Processors	10
Magnetic tape decks	6
Disk drives	8
Communications devices	5
Consoles	7

Appendix C3

Overall And Departmental Usage 1989/1990

1. Overall usage

System	Major Use	Total Interactive Logins	Total Batch Logins	Total Units
CPC865	Research	173,991	30,291	440,720
CPC780	Teaching	21,920	3,163	34,012
CPCMA	Information	44,314	52	59,419
CPCMB	Teaching	18,305	46	24,675
CPCMC	Teaching	48,877	4,652	78,505
Total		307,407	38,204	637,331

2. Departmental use of central research systems

School/Department	Resource Units	Percentage
School of Biological Sciences	8,825	1.9
School of Chemical Sciences	12,541	2.7
Climatic Research Unit	76,766	16.2
Computing Centre	11,386	2.4
School of Environmental Sciences	97,860	20.7
School of Information Systems	43,195	9.1
School of Mathematics	120,466	25.5
School of Physics	18,529	3.9
Other Schools	15,123	3.2
External users	551	0.0
Information Services*	67,980	14.4
	473,222	100.0

* Information Services was moved from the research service to a dedicated system part way through the year.

3. Departmental use of central teaching system

School/Department	Resource Units	Percentage
School of Art History and Music	137	0.1
School of Biological Sciences	3,062	2.9
School of Chemical Sciences	7,325	7.0
School of Development Studies	744	0.7
School of Economic and Social Studies	9,686	9.3
School of Education	47	0.0
School of English and American Studies	1,121	1.1
School of Environmental Sciences	8,245	7.9
School of Information Systems	56,744	54.2
School of Law	215	0.2
School of Mathematics	15,111	14.4
School of Modern Languages and European History	2,253	2.2
	104,690	100.0

Appendix C4

Software Availability 1989/1990

1. Software on VAX Systems

Not all these products are mounted on any particular VAX. Each node is configured for its user group.

Supplier	
Digital	Third Party
VMS	UNIRAS
Fortran	Ingres
Pascal	SPSS-X
Cobol	Minitab
Basic	Glim
C	Powerhouse
ADA[1]	Simscript[1]
Lisp[1]	Poplog[1]
CDD	Famulus[1]
DTR[1]	OCP[1]
DBMS[2]	TSP[1]
RDB[1]	Modula-2
GKS[1]	OCCAM + TDS[1]
Volume Shadowing	NAG
DSV100[3]	NAG graphics
DSV200[3]	Ella[1]
TSV[3]	Cayley
DECnet	Simula[1]
PSI	Emulex[3]
CBS	Spice[1]
JTMP	Cosmic
	Gino-F[1]
	GEC X25

[1] Old versions, no longer maintained, best efforts support only.
[2] Loaned for teaching evaluation.
[3] Terminal servers.

2. Software on SUN Systems

Not all these products are mounted on any particular SUN.
Each node is configured for its application.

SUN/OS
OCCAM*
CStools*
Fortran*
C*
Fortran
DECnet
ARC/INFO
ARC/TIN

3. Software on Silicon Graphics System (Molecular Modelling Workstation)

UNIX
DECnet
CHARMm
QUANTA

4. Software on Amstrad PCW 8512 systems

Kermit
Locoscript
CPM Plus

5. Software on Apple Macintosh systems

Kermit
Hypercard
Claris MacWrite
Claris MacPaint
Claris MacDraft
Claris MacDraw
Claris Filemaker
Microsoft Word
Microsoft PowerPoint
Microsoft Excel
Ashton-Tate FullWrite
Ashton-Tate FullImpact
Aldus Pagemaker

* Meiko host, transputer development.

6. Software on BBC-B systems

OASIS SPP1000
Kermit
Wordwise
View
BASIC

7. Software on TORCH CPN systems

BBC Basic
DBase II
Kermit
Wordstar
Perfect Calc
Perfect Filer
Perfect Writer

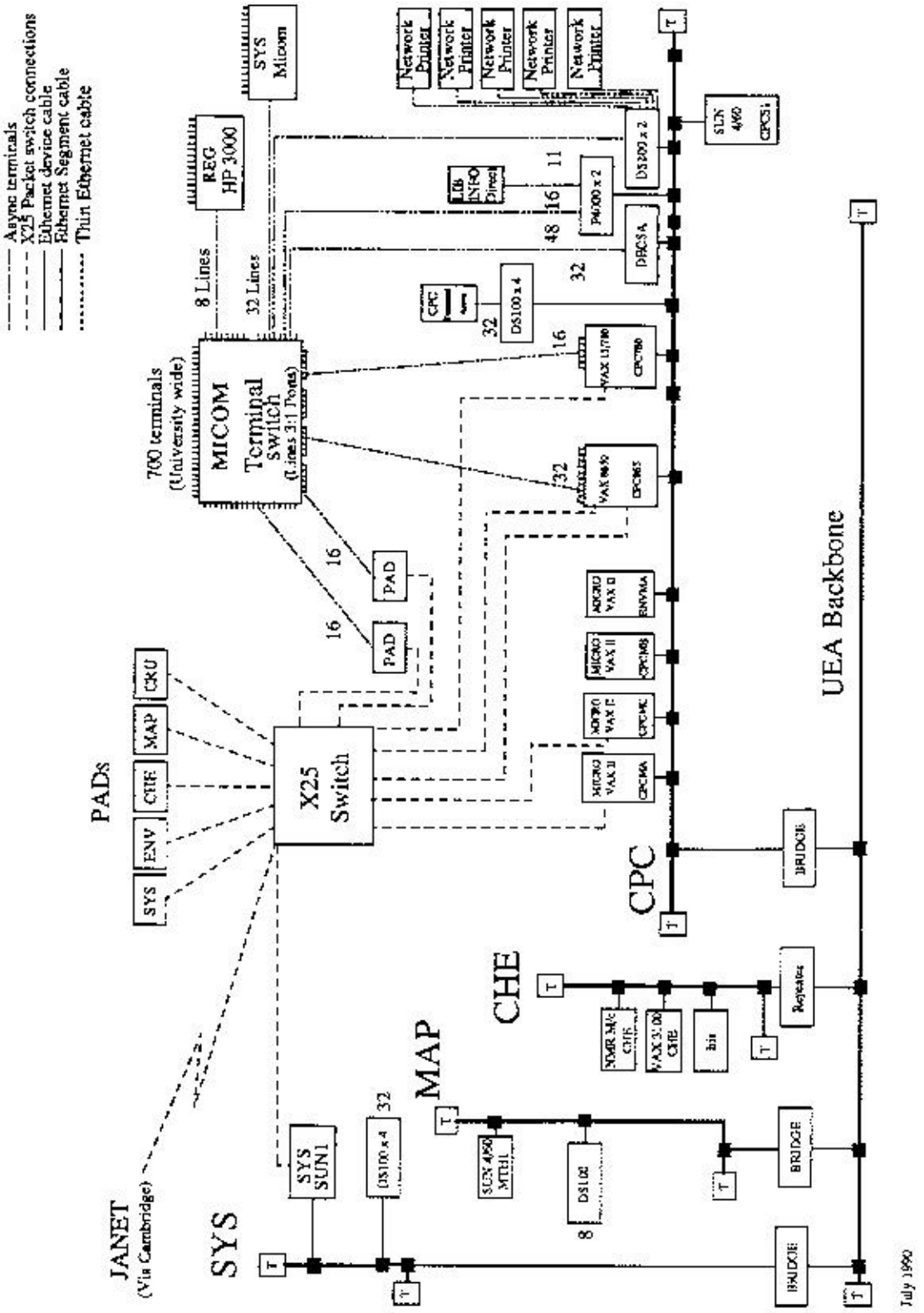
8. Software on IBM DOS systems

CHEMWORD
DBASE III Plus
DBFind
DESMET C v2.51
Digihurst Microeye 1C V2.0
DR HALO III
EIGHT IN ONE
Hercules GRAPHX
Hercules HBASIC
Hijaak v1.1C
HP Scanning Gallery
IBM 3101 Terminal Emulation
IBM DOS
IBM Graphics Terminal Emulator
IBM OS/2 Standard Edition
IBM PC LAN Manager
IBM PCIPS
IBM Professional Fortran v1.3
IBM Videotext Terminal v1.00
INGRES
Kermit
Lotus 123
LOTUS Freelance Plus
LOTUS Graphwriter
MATHCAD
MATHWORD
Microsoft C Compiler
Microsoft Fortran

Microsoft GW Basic
Microsoft Basic
Microsoft Pageview
Microsoft Windows
Microsoft Windows/286
Microsoft Word
Minitab
Mouse Systems PC PAINT PLUS v2
MS-DOS
Multimate
NAG Graphics Library
PC File
PC FULLBAK+
PC Paintbrush Plus
PC-CALC
PC-Lint
Pinkbook
Poleroid Palette
Professional Fortran
Quarterdeck Desqview
RM Fortran
Sideways
Smalltalk/V
Storyboard Plus
SUNSHINE EPROM Programmers
TEEMTALK
TEX CDVI 2.02
TurboTex R1.0
UNIRAS PC Interactives
UNIRAS PC Libraries
Wordperfect
Wordstar
Zortech C Compiler

Appendix C5

The University Network 1989/90



Appendix C6

Data Connections 1989/90

School/Department	Approximate number of connections
School of Art History and Music	5
Audio Visual Centre	1
School of Biological Sciences	40
Careers Centre	2
School of Chemical Sciences	39
Centre for Overseas Student Programmes	9
Computing Centre	57
Climatic Research Unit	44
School of Development Studies	33
School of English and American Studies	6
Centre for Applied Research in Education	40
School of Environmental Sciences	160
School of Modern Languages & European History	5
School of Law	12
Library	48
Schools of Mathematics & Physics	70
Registry	24
School of Economic and Social Studies	17
School of Information Systems	32
Students' Union	1
Total	645

Appendix C7

Courses Available And Given 1989/1990

A full list of courses and details is published annually. There are two categories:

1. Taught courses

Presented normally for a minimum of eight participants.

	Times Offered	Times Given
Introduction to VAX/VMS	4	3
Introduction to MS-DOS	4	4

2. Self-paced courses

These courses are designed for individuals to use at their own speed. They are based on a variety of approaches such as videos, computer based modules, manuals etc. but all are accompanied by Centre produced leaflets describing each course in detail. These were introduced during the period of this report, and usage figures are not available.

Topics covered by self paced modules

Basic
The C programming language
CMS
dBase III+
Fortran
GLIM
INGRES
LaTeX
Lotus 1-2-3
Macintosh
Minitab
MS-DOS
Phoenix
Prolog
SPSS-X
Touch Typing
UNIRAS
VAX/VMS
Word
WordPerfect

Appendix C8

User Services 1989/1990

1. Availability and use of Help Desk

The Desk has been available 09.30 - 11.00 and 11.30-13.00h (i.e. 3h per day) Monday to Friday, through term-time and vacations.

Use of the Help Desk is logged in terms of query topic, username of the enquirer and contact time. The figures indicate that usage through the year has been very variable, with no discernable pattern emerging.

Average number of enquiries per day (3 hours) = 6

Average duration of user contact = 15 mins.

The figures do not reflect the overall provision of advice because extensive use (unlogged) is made of specialists within CPC. Users go straight to the specialist when an ongoing programme of support is in train, or may be referred to a specialist for further consultation by the Help Desk.

Furthermore, the time taken for the Help Desk (itself) to resolve a problem may be substantially longer than the (average) 15 minutes of user contact time. Some queries require investigations and/or follow up on the part of the Duty Adviser.

Use of Help Desk - by User Group

School	%total queries received	%time consumed by all queries
Environmental Sciences	29	30
Information Systems	12	14
Development Studies	8	13
Mathematics and Physics	8	7
Chemical Sciences	7	6
Climatic Research Unit	6	6
Economic & Social Studies	5	5
Biology	4	4
Others	21	15
	100	100

Use of Help Desk - by Topic

Topic	% Queries
VAX/VMS	25
Fortran	10
Electronic mail	8
Uniras	7
SPSS-X	7
JANET	7
Kermit	4
General Graphics	4
Minitab	3
Ingres	3
Others	22
	100

2. Computing Centre Publications

CPC Card:

Brief introduction to Computing Centre Services

Booklet:

CPC Courses 1989-1990

CPC Programming Notes :

Note Number	Title
1	The Computing Service at UEA
2	Guide to purchasing small computers
10	Using magnetic tapes
11	File transfer and terminal emulation
12	MAIL and Wide Area Networks
21	Introduction to Cambridge
30	Introduction to DOS
31	Introduction to WordStar
32	Introduction to dBase II
33	OHP foil and 35mm slide production
34	PC-WRITE Mini-Reference
35	EXPRESS-CALC Mini-Reference
36	MS-DOS utilities
37	PC-FILE
39	The CPC Apple Macintosh facility
40	Introduction to VAX/VMS at UEA
41	Student use of CPC VAXes
43	Writing DCL command procedures
44	Computing security and privacy
45	Using the VAX debugger
46	Laser Printing
50	FORTRAN on the VAX
51	POPLOG
52	Minitab

53	SPSS-X
54	GLIM
57	Using Telex on the CPC865
58	Printing adhesive labels
59	Document preparation using LaTeX
64	The NAG graphics routines
65	Use of the DACOLL graphics terminal
67	Use of the digitiser
68	Simple use of DATATRIEVE
69	Pericom MX2000 Colour Terminal
70	The LN03+ laser printer
71	Using INGRES at UEA
72	UNIRAS at UEA