Bulletin
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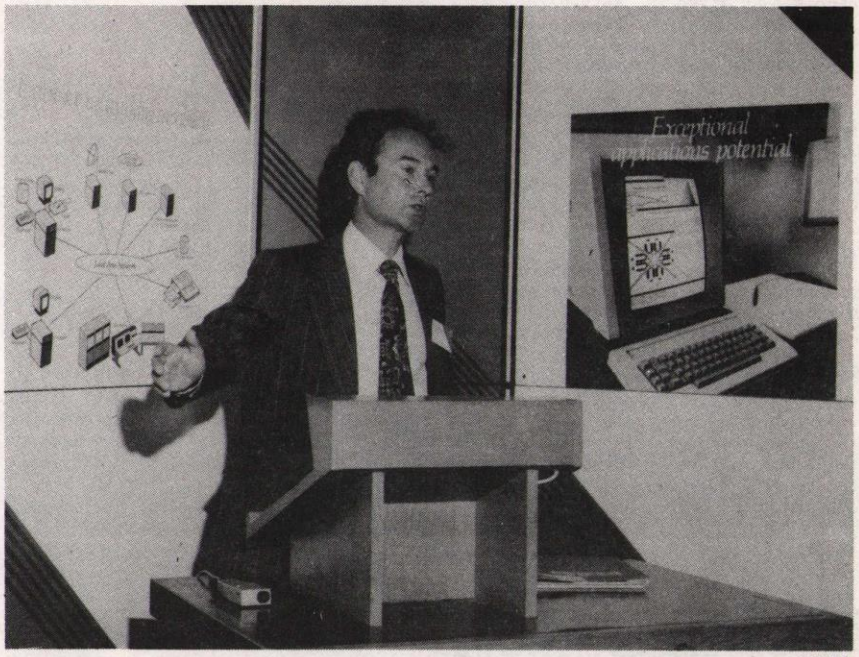
PERQ

Another step forward in the SERC's overall strategy for Distributed Interactive Computing, was signalled on Tuesday 29 September, with the announcement that eleven 'PERQ' personalised workstations had been installed at RAL's Atlas Centre. The announcement was made at a Presentation, arranged in co-operation with ICL, to display the capabilities of PERQ and its place in SERC's plans for the future, to the UK Press and interested potential users.

For the past five years RAL's computer Networking Teams have been building up an extensive wide-area network linking SERC establishments, international laboratories and universities. This uses British Telecom's Data Communications services. Development work using communications satellites and local area networks based on Ring and Ethernet technologies is in progress. The PERQ, which has been under evaluation for the past two years will provide an excellent vehicle for this concept of distributed computing. "The Laboratory regards PERQ as an excellent workstation for the purpose" said Geoff Manning, at the presentation; "It is an extremely powerful single user machine."



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Dr Geoff Manning explains the role of PERQ, at the Press Conference.

Its Place in the System

PERQ will form the basis of an interactive workstation, linked to other stations on a Local Area Network. Mainframe connections are needed only for the largest scale computing since it has the necessary power for scientific and engineering use. It has very high quality graphics, which are displayed on an A4 size flicker-free screen, with special features which enable all or part of the display image to be changed by a single instruction. Input interaction is excellent. The keyboard is designed to help improve the ease of interaction, with keys such as 'OOPS' and HELP! A graphics tablet and stylus gives users a more natural method of communicating with the computer. The computer's response to this device is fast enough to permit realistic freehand sketching and displayed item manipulation. The graphics cursor is programmable within a 64 x 64 pixel area which does not interfere with images already displayed. The machine supports a speech synthesizer which will be able to output arbitrary stored speech data from pre-recorded files on the system disk.

Apart from the Local Area Network interface for high speed communications there is also an RS-232 socket permitting a wide range of standard communications protocols to be supported such as connection to SERCnet. An IEE 488 General Purpose Instrumentation BUS will allow connection to local peripherals, laboratory instrumentation and control facilities.

Software Standardisation

All software is currently based on PASCAL with some extensions. The operating system supports the large virtual memory offered by 32 bit addressing. The file system is tree structured. The powerful display is supported by a "Window Manager" which partitions the screen into a series of windows each of which displays the output of a program. This software support requires some development before the PERQ can be distributed for general use in SERC research programmes. The policy approved by Council requires a high degree of standardisation to eliminate the need for research workers in scientific and engineering fields to write their own system software. The primary objective will be to provide an Operating system based on UNIX which will bring with it a rich environment of programming languages, utilities and application packages. This work will be carried out in collaboration with ICL.

Standardisation also means in the case of SERC, central procurement, and central support, and a tie-up with a large and stable company producing the right machine has always been envisaged. The fact that the Company chosen for involvement is the biggest UK manufacturer of computers is of course an added bonus.

To date 20 PERQs have been ordered through RAL and it is estimated that up to 200 will be needed throughout the network in the next two years. A project team is being built up at Atlas for the provision of software - the basis of a framework for continuing collaboration.

The AMPTE Mission

RAL is to play a major part in an international study of plasma physics in space. The study known as AMPTE (Active Magnetospheric Particle Tracer Explorers) will employ spacecraft from the USA, Germany and the UK. The purpose is to investigate how solar energy, carried by the charged particles of the solar wind continuously evaporating from the Sun, is intercepted and stored in the magnetic fields and charged particles that form the comet-shaped magnetosphere surrounding the Earth out to distances of more than 100,000 kilometres. The stored energy is important since it ultimately becomes deposited in the upper atmosphere, mainly at high latitudes, where it produces heating, ionisation and the spectacular phenomenon of the Aurora Borealis.

Three Spacecraft

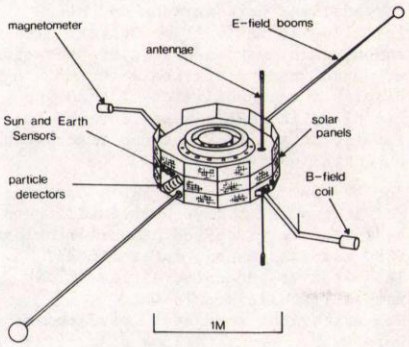
The plan is for a satellite being built in Germany at the Max Planck Institute for Extraterrestrial Physics, to release into the solar wind, some 10,000 kilometres upstream from the magnetosphere, minute quantities of lithium ions to act as tracers. An American satellite, being constructed at the John Hopkins University, orbiting closer to the Earth, is to detect the arrival of the ions and note the extent of their expected increase in energy. In addition to releasing the tracer ions, it will record with particle, wave and field detectors the disturbances expected to be triggered by the sudden deposition of lithium ions in the natural plasma of the solar wind. Seven releases of lithium and barium ions are planned for various points along the route taken by solar wind ions and electrons. One of the barium releases is expected to be easily visible from the ground (from the Americas) and for 30 minutes or so, have every appearance of a comet.

It was for the studies of the disturbance to the natural plasmas that a third spacecraft was required. Produced by RAL working jointly with the Mullard Space Science Laboratory of University College, London, the UK spacecraft will be a sub-satellite of the German one which it will track in tandem along the same orbit. There will be an on-board radar and gas propulsion system to enable this to be done. The sub-satellite, also capable of high resolution plasma measurements will add an extra dimension to the studies of observing the expanding edges of the ion clouds, helping to distinguish between temporal changes and spatial structures, an impossible task from a single moving vehicle.

Collaboration is the Key

The 'active' aspects of AMPTE, outlined above, form only part of the mission. Throughout most of the nine-month planned lifetime the three spacecraft will apply their advanced instrumentation to studies of the natural particles, fields and waves of the magnetosphere. The quantities to be measured from the UK spacecraft and the groups involved are:

Magnetic Fields	-	Imperial College with the University of California at Los Angeles
Positive Ions	-	The Mullard Space Laboratory
Electrons	-	The Rutherford Appleton Laboratory
Plasma Waves	-	The universities of Sheffield & Sussex with the British Antarctic Survey
Wave-particle Interactions	-	University of Sussex



RAL Lectures

1981-82 Series

DATES FOR YOUR DIARY

Thursday November 19

Dr H O Wüster (Director, JET Joint Undertaking, Culham) will describe

"The Present State of JET"

Two years ago Dr Wüster was presiding over the largest hole in Oxfordshire, sometimes referred to as the "Joint European Hole". It is now full of concrete and buildings have been erected with great rapidity. Dr Wüster will give a report on progress and describe future plans.

Thursday December 3

Professor K A Pounds, FRS (University of Leicester) will speak on

"Achievements and Prospects in X-ray Astronomy"

Professor Pounds needs no introduction to Appleton staff, at least. He is Chairman of the Astronomy, Space and Radio Board of the SERC and he and his group are famous for their distinguished work in X-ray astronomy.

Thursday January 7 (1982)

Dr E R Pike, FRS (Royal Signals and Radar Establishment, Malvern) will describe his work on

"Photon Correlation and its Applications"

Dr Pike and his team recently shared the MacRobert Award (£25,000) for technical innovation and his work led to the establishment of Malvern Instruments Limited who sell correlators. The subject is not as esoteric as it sounds!

Thursday January 21

Mr N J Phillips (Loughborough University of Technology) will describe his work on

"Holography"

Mr Phillips is the acknowledge UK authority on this subject. Amongst his recent commissions was the production of holographic pictures of the crown jewels in the Tower of London. The insurance cost of holograms is considerably less than the real thing!

Thursday February 18

Professor M J Rees, FRS (Director, Institute of Astronomy, University of Cambridge) will speak on

"Cosmology and the Constants of Physics"

Professor Rees is one of the world's leaders in Cosmology and this will be an occasion not to be missed.

Thursday March 18

Professor E G S Paige (Engineering Science Department, Oxford University) will speak on

"Surface Acoustic Wave Devices"

Acoustic devices are finding novel applications in many branches of electronics and Professor Paige has received prizes from the Institute of Physics and other bodies for his pioneering work in this field. He is involved with the work of RAL through his association with the Electron Beam Lithography Unit.

A sketch of the sub-satellite, which is to weigh less than 69 kilogrammes, is shown in the diagram. Its production is very much a combined effort at the Lab with contributions so far from Space and Astrophysics Division (management and ground operations) Geophysics and Radio Division (engineering, telemetry and electron experiment) and Instrumentation Division (power conditioning). The Launch is scheduled for August 1984 on a Thor Delta rocket from Cape Canaveral in Florida. In orbit, the UK spacecraft will be operated from a control centre at RAL via the 12 metre dish antenna, which is scheduled to have completed its work on IRAS just in time for this. Data will be received here and at the 25 metre dish antenna at Chilbolton which permits higher data rates. During releases over America control and data reception will be effected via the NASA Deep Space Network used for the Voyager planetary missions.

The time allotted for construction and testing of the spacecraft is very short. To date, the design is nearing completion, a mass model is about to undergo structure tests and a fully working prototype should begin a comprehensive series of tests next March. RAL will host an international meeting on data processing for AMPTE in November.

We thank Duncan Bryant for this introduction to the AMPTE project. He and Kim Ward (UK Project Manager) would be very pleased to provide further information.

Thursday April 15

Professor J F Davidson, FRS (Chemical Engineering Department, University of Cambridge) will describe

"Fluidised Combustion"

Professor Davidson is also no stranger to the laboratory, or at least that part of it which is contributing to the development of fluidised bed combustion.

Thursday May 13

The last lecture of the series will be given by Dr J H Fremlin (Birmingham University) on

"The Risk Business"

Dr Fremlin will discuss the public conception of risk versus statistical assessments with particular reference to energy production, work situations, etc. If there is one death by drowning in each 0.5 acre mill pond every 200 years, are water mills more or less dangerous than breeder reactors?

Our New Chairman

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Professor J F C Kingman, FRS became the new chairman of SERC on 1 October. This appointment is for a five year period.

Born in Beckenham, Kent 42 years ago Professor John Kingman was educated at Christ's College Finchley and Pembroke College Cambridge. A year's research in mathematics and statistics was followed by a brief period at Oxford before his return to Cambridge as Assistant Lecturer. He became lecturer in 1963 and in 1965 left for Sussex where he was appointed Professor one year later at the age of 26. In 1969 he was appointed Professor of Mathematics at Oxford, becoming Chairman of the University's Mathematical Institute and Head of Department in 1976. He was elected Fellow of the Royal Society in 1971.

The youngest Chairman of SERC, John Kingman is married to a Reader in History at Sussex University and has two children; John who is twelve and eight year old Charlotte. His home is, and will continue to be, in Brighton where he was a local councillor from 1968-71.

Young HEP Experimenters

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The Annual Summer School for Young Experimenters in High Energy Physics was held at RAL from 13-26 September. This year, the tenth in the series, was directed by Dr Roger Cashmore (University of Oxford). Twenty-eight postgraduate students - nearly all the first year PhD students in experimental particle physics in the UK - attended the intense course of lectures and tutorials.

The Course Lecturers included Dr David Bailin, Dr Peter Landshoff, Professor Alan Martin and Professor Chris Michael. Drs Gron Jones and John Storrow were the Course Tutors. Evening seminars were given on "Particle Physics Beyond the Standard Model", "Detectors with High Spatial Precision and their Application to the Physics of Short-Lives Particles" and "The CERN Proton-Antiproton Collider and Its Experiments".

Following the School Dinner, Dr Cashmore presented gifts of chocolates to Mrs Hunt and her staff for the excellent hospitality at Cosener's House and to Mrs Sherwen for her organisation of the School.

Professor Peter Fowler (University of Bristol) delivered the after-dinner talk on "High Charge Measurements on Cosmic Rays". The early scientific results were obtained from balloon and rocket flights - and there were even measurements on meteorites. The development of detectors progressed from the early triggered cloud chambers and ion chambers to the modern set of sophisticated counter systems. Professor Fowler gave a detailed account of the recent Ariel VI satellite measurements, of the techniques used to ensure the accuracy of the results and of the interpretation of the data. These kinds of measurements on Cosmic Rays are expected to have a strong bearing on several fundamental questions, especially on the creation processes within the universe.

Goodbye - with a difference

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Reg Atkinson retired from RAL on Wednesday 30 September but not, he was quick to point out, from active duty. An expert dog walker with a good knowledge of garden weeds, he feels he will not be underemployed for long. He is also reported to be a little influential on three Scout committees, skilled in the arts of shopping and washing up and is a practiced part-time lecturer. His younger days as a Petty Officer inclines him to think we ought to have what he calls 'a real Navy' - so he tries to sail a dinghy to make up for it.

Most of the SNS crew (plus a few from other craft) seemed to have turned out to help David Gray make the farewell presentation to Reg.

Arriving on site as an AERE man 28 years ago, Reg joined NIRNS in 1961 and for 20 years has been associated with all design aspects of Nimrod and SNS. Not only a fine engineer he is also a cartoonist well known at the Lab for his famous Farewell Cards. "We don't know what we shall do in the future" joked David "put them out to contract!" "Thank you from us all and from the Lab" concluded David as he presented Reg with a 'Workmate' and briefcase from all his friends and colleagues. "It has been a privilege to have worked with you".

For the next few minutes Reg kept his audience laughing, with tales of the old days. Then came the twist in the proceedings. When plans for the SNS control centre had first been mooted Reg had drawn some sketches of how it might look. Prominent in all, was a tree. "As my parting gift to the Lab therefore", said Reg "I present you with this Weeping Birch. Please put it where the drawings indicate and remember it as Reg's tree. Good luck to you all and thank you".

Professorship for Lance Thomas

Colleagues old and new, recently gathered together to wish well to Lance Thomas of Geophysics and Radio Division who is about to leave RAL to become Professor of Physics at Aberystwyth in succession to Sir Granville Beynon.

At the presentation to Dr Thomas, Professor Houghton referred to Lance's many contributions to ionospheric physics, particularly the physical chemistry of the D-region, a subject on which he has become an international authority. In reply Lance recalled the rivalries of his student days in Wales, remembering 'Aber' as the home of doughty opponents both on the rugger field and in less formal contests. He now looked forward to many future opportunities for cooperation between his new team and former fellow workers at Chilton and wished all success to the newly created RAL.

Calling Working Parents

A meeting is to be held in Room One, AERE Social Club at 12.30 on 19th October, 1981 to discuss the formation of a society to work towards providing communal child care facilities during working hours for the employees of the various laboratories in this area.

Among the things to discuss are possible buildings and sources of help in setting up the project.

Anyone interested in using such facilities or in helping to organise them is invited to come to the meeting.

NOTE: (For Non-members of the Social Club)
You will be allowed into the Social Club for this meeting if you notify the organiser K Crennell (Preferably in advance, but otherwise at the door).

For more information contact:
Kate Crennell, Computing Division, Atlas Centre, Rutherford Appleton Laboratory, tel SERC ext 6397

Bridge Club?

Hari Shah of R25 is interested in playing Bridge and in forming a Bridge Club. Would kindred spirits please contact him on ext.6518.

IPCS AGM

REMINDER TO ALL MEMBERS

The Annual General Meeting of the IPCS will be held in the Lecture Theatre on Tuesday 27 October at 12.45hrs.

Please make every effort to attend.

Music for Pleasure

Handel's 'Messiah' will be performed at the Albert Hall by the London Philharmonic on Monday 21 December at 7.45pm.

Tickets at very reasonable prices can be obtained by RAL staff from Nigel Angold Ext 6508/6509. For more information on this and other concerts in the "Classics for Pleasure" series, get in touch with Nigel.

Christian Fellowship

The Christian Fellowship will be holding two meetings in the Lecture Theatre in October. On Thursday, 22nd October at 12.30, a half-hour colour film will be shown which is especially appropriate in the Year of the Disabled, as it tells the story of a blind teenager who overcame his handicap & used his musical talents to help others.

On Thursday, 29th October at 12.30, Professor J T Houghton, Director Appleton, will be giving a talk entitled "Scientific thinking and the Christian Faith".

It is hoped that both these events will be well supported. A warm welcome is extended to everyone.

Bulletin

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