Bulletin
of the Rutherford Appleton Laboratory
11 Mar 1983 No.4

Minister Inaugurates Project UNIVERSE

At the centre of the UNIVERSE stand, the Minister talks to Professor J F C Kingman and Dr J H H Merriman, Chairman of the Project UNIVERSE Steering Committee. (83 RB 1623).

A unique project approached in á unique way, was how Project UNIVERSE was described by Mr William Shelton, MP, Parliamentary Under Secretary of State for Education and Science, at the Barbican Centre, London where on Tuesday 22 February the project was presented to the public for the first time, as part of the INFO 83 Exhibition.

Speaking at a press conference which followed a tour of the Project UNIVERSE stand with Professor John Kingman, Chairman of the Science and Engineering Research Council, Mr Shelton cited the project as a model of the type of joint undertaking which, he was sure would become more common in the future. "It proves beyond doubt that Britain is at the very heart of the information technology revolution," he said.

An advanced research telecommunications network involving satellite links, Project UNIVERSE was conceived as an academic research project but quickly expanded into a collaboration between Government, the universities and industry. Congratulating the project's partners, Mr Shelton expressed his pleasure that the project concept had originated through the universities and SERC. "Never before has such a consortium achieved such a feat in combining local and trunk communications networks," he said "The project has already established itself in the first division of telecommunications research projects in the world. It has indeed been cited as an example of an area of information technology where the research lead is passing to the United Kingdom".

History of the Project

Project UNIVERSE grew out of two earlier projects, a project to develop the Cambridge Ring-type of Local Area Network at the Computer Laboratory, University of Cambridge, and the STELLA Project to investigate the transmission of high-bandwidth digital data between high energy physics laboratories in Europe, including Rutherford Appleton Laboratory (RAL), via the Orbital Test Satellite (OTS). *(continued over)*

And Visits IRAS

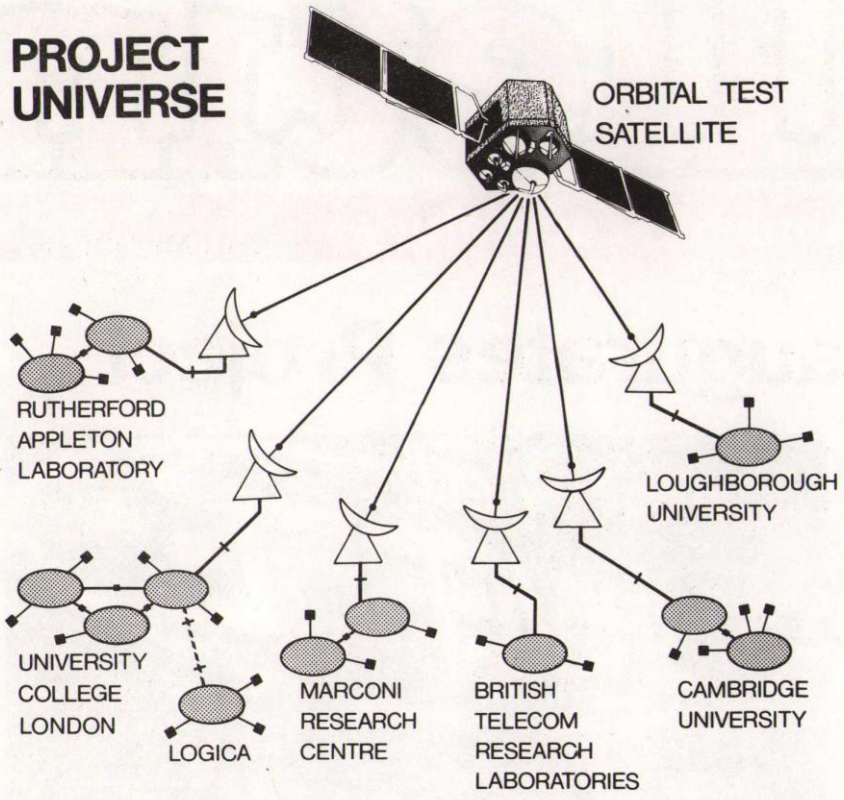
Collaboration was also the theme of the Minister's congratulatory remarks to the IRAS team when he visited the Control Centre at RAL on Monday 21 February.

"The project involves the co-operation of three countries together with three university groups, demands work at the forefront of technology and is a perfect example of the type of thing done so well at RAL," he said, "Congratulations to all involved who have worked so hard. It now remains for them to reap rewards in scientific results."

Mr Shelton was present in the Centre during the 17.20 hrs pass of IRAS, was talked through the pass-sequence by Mr Alan Rogers (Deputy Mission Operations Manager) and told of the remarkable amount of information that had been culled from just fourteen days of the survey.

First results obtained from a scan of the galaxy nearest our own, the Large Magellanic Cloud, have revealed more than has ever been known about this well studied galaxy's infra-red emission. The maps of the Tarantula Nebula, where thousands of stars are being born, show dozens of dust clouds *(cont.p2)*

Mr Shelton (left), Mr Alan Rogers (centre) and Dr Geoff Manning (right) watch Mr John Wright (shift leader) as he monitors a pass. (83RC1566).



The Project UNIVERSE network joins the seven experimental sites. It is based on Cambridge Ring Local Area Networks coupled by high speed wide area communication using the OTS satellite (83 FB 1531).

In June 1979 the idea was conceived at RAL (by John Burren) of joining together a number of independent sites each with a Local Area Network into a Wide Area Network using High-bandwidth satellite links via OTS, thus utilising the research output of the two earlier projects. Three universities showed immediate interest in working with RAL on the project, Cambridge, Loughborough and University College London, and were soon joined by GEC-Marconi, Logica and British Telecom. RAL was appointed to co-ordinate the collaboration, funding being provided by the Department of Industry, the Department of Education and Science and British Telecom.

The Network

The project combines ground-based Cambridge Rings and other types of local area network with satellite links to form a powerful new technique for high-bandwidth transmission of data between computers. Six sites in the UK are equipped with an Earth station consisting of a three metre diameter dish aerial, 14 GHz radio transmitter and 11 GHz receiver. Together these will provide a two-way link from each site to the Orbital Test Satellite. This satellite, operated by the European Space Agency, is positioned in a geostationary orbit 36,000 km above the equator. The six sites are at the Universities of Cambridge and Loughborough; at University College London; Marconi Research Centre at Chelmsford, Essex; the British Telecom Research Laboratory, Martlesham Heath, Suffolk; and the Rutherford Appleton Laboratory. A high-speed land link connects the rings at University College London with the ring at Logica.

At each site a cluster of computing devices connect into a network directly coupled to the Earth station at that site. In this way, each computer at a particular site can communicate with all computers at the same site via the local area network, and with any computer at one of the other sites via the satellite links. These links pass digital data between sites at a transmission rate 100 times faster than the current leased telephone lines used for data communication.

The high-bandwidth network of Project UNIVERSE enables entirely new concepts in computer science to be studied for the first time. Individual computers at separate sites can be made to work collectively and simultaneously on a single problem just as though they were all located in a single room. The high transmission capacity of the links enable a distant computer, perhaps of a very specialised type, to be accessed remotely with no penalty in performance over that available to local users. The speed of the network also allows slow-scan TV pictures or illustrations and photographs to be transferred quickly and efficiently from one site to another. Voice communication can also be carried over the network. The flexibility of the UNIVERSE technology was amply demonstrated by the ability to install a local area network and a mobile satellite ground station to serve it in a matter of days, and to run high bandwidth communication right into the exhibition stand at the Barbican Centre.

The current project is only a first step in the study of integrated systems based on high performance communication. New possibilities have opened up since the inception of the Project. Terrestrial links operating at megabit rates are now widely available and the speeds of local area networks continue to increase. A trend towards progressively closer integration of data processing, voice and video communication is expected, and new types of office system allowing coordinated management of many types of information need to be investigated.

Most of the equipment used on the project is of British origin. The Earth station for the satellite links are manufactured by GEC-Marconi Communication Systems. GEC link-driving computers are used. The Cambridge Ring equipment is purchased from Logica and SEEL. BBC micro-computers manufactured by Acorn-Orbis are used extensively. Much prototype equipment has been designed and developed.

The operational life of the Orbital Test Satellite is expected to extend until at least 1984, which will allow two year's operational experience with the system.

For detailed information on the project, please contact Dr P Linington Ext: 5498.

IRAS Visit *(cont. from p1)*

supporting current ideas on the birth of stars from interstellar dust. Cold clouds are seen just beginning to condense under their own gravity, and sources emitting infra-red at shorter wavelengths have probably completed the process, become stars and are shining by their interior nuclear reactions. Many such star formations are being found in our own Milky Way, which will be scanned for the next three months, ending with passes of the centre of the galaxy, an area hidden by cosmic dust and therefore invisible except to infra-red and longer wavelengths.

Information on the progress of the IRAS survey will soon begin to appear on a display board in the foyer of R1. Watch this space!

Christian Fellowship

RAL Christian Fellowship are pleased to welcome Professor R L F Boyd, FRS, Director of the Mullard Space Science Laboratory, Dorking who will be giving a talk entitled "Creation" on Tuesday, 15 March 1983, at 12.30 pm in the Lecture Theatre, R22.
All are invited to attend.

Glazebrook Medal for Dr A F Gibson

The Institute of Physics Glazebrook Medal and Prize for 1983 has been awarded to Dr A F Gibson, FRS for "his work in establishing and subsequently operating the laser facility at the Rutherford Appleton Laboratory."

Dr Gibson joined the Laboratory on 1 January 1977 as head of Laser Division and rapidly established the Central Laser Facility as a centre of high repute attracting increasing numbers of scientists from both the United Kingdom and overseas.

The medal, instituted in 1965 in honour of Sir Richard Tetley Glazebrook, first President of the Institute, is awarded annually for outstanding contributions in the organisation, utilisation or application of science.

Dr Gibson is the third member of the Laboratory to receive the Award, Dr T G Pickavance having gained it in 1979 and Dr G H Stafford in 1981.

The Institute has also announced the award of the Charles Vernon Boys Prize to Dr R J Cashmore of the University of Oxford, who has been closely associated with RAL for many years and is at present an SERC Senior Research Fellow. The prize was awarded for his original and outstanding contributions in the field of experimental high energy physics.

We extend our congratulations to both recipients.

Poster Prize

Mr Peter Champ of SNS has won first prize in the latest SERC Suggestions Award Poster Competition. The prize was a cheque for £75.

Arrangements are now being made for this poster (and that of the runner-up Mr M S J Parker of Central Office) to be printed and displayed throughout the SERC.

Congratulations Peter, - we look forward to the appearance of the finished product.

Missing

The following items are the subject of lost reports. All information concerning them should be transmitted to the enquirers named.

Commodore Calculator Type 4912
Serial No 72694 Inv. No X006726
Contact B O'Hagan ext 5378

Bandavelop flatbed copier
Label RHEL 5269
Contact D Mahoney ext 5694

4' step ladder (aluminium)
A THORNE scratched in large letters on one upright.
Contact A R Thorne ext 5120

RAL Lectures

The next lecture in this series will take place on Thursday 24 March at 3.15pm in the Lecture Theatre.

SPIRAL ARMS, COMETARY IMPACTS and TERRESTRIAL CATASTOPHISM

by

Dr S V M Clube
Royal Observatory, Edinburgh

The recent discovery that a large Apollo asteroid, Hephaistos, is in a potential Earth-crossing orbit similar to that of Encke's comet has transformed our understanding of cometary evolution. It is now very probable that Earth history is "catastrophic" and the result of episodic dissipation and replenishment of the Apollo asteroid population. These effects are in turn due to significant changes in the Solar System's cometary cloud as it traverses the Galaxy's spiral arms. The implicit consequence, that new spiral arms are packed with comets, means their origin by ejection from a "superdense" Galactic nucleus, as proposed by Ambartsumyan, is inherently more probable. The existence of "superdense" material poses unexpected problems for physics.

Without a Snag

Faced with the prospect of de-burring both ends of 8000 stainless steel wires of 2.4mm diameter with a file, Frank Lloyd had a quick flash of inspiration and came up with the idea that netted him the sum of £500, under the Suggestions Award Scheme.

During assembly of any RF shield for the SNS synchrotron, all wires need cutting to length, and their ends de-burred so that they can pass freely through carefully toleranced holes in their supporting frames without damage. To de-burr with a hand file was time consuming and did not produce a particularly neat finish either. The tool suggested is simple in concept and use, gives a neat radius on the ends of the wire and the job can be done in situ. In operation the tool is mounted in an air drill, the drill is gently pushed onto the wire, and a quick burst gives the desired result in seconds. As Dr Geoff Manning remarked when making the presentation of the award to Frank, "The tool reduced a boring job to a mundane one".

Frank's advice to everyone - if you have an idea, for goodness sake, tell!

Sales to Employees

The sale of scrap metal and plastics will take place, subject to the usual conditions, on 18 March at the R40 scrap compound from 12-1230 hrs.

Computing Seminars

This seminar will take place at 3.15 pm in The Atlas Centre Colloquium on Tuesday 15 March.

THE NEWCASTLE CONNECTION
by
Professor Brian Randell
University of Newcastle-upon-Tyne

A description will be given of the 'Newcastle Connection'. A software subsystem that can be added to each of a set of physically interconnected UNIX look-alike-systems. So as to construct a distributed system which is functionally indistinguishable at both the user and the program level from a conventional single-processor UNIX system. The techniques used are applicable to a variety and multiplicity of both local and wide area networks, and enable all issues of inter-processor communcations, network protocols, etc., to be hidden.

Safe Driving Awards

We are pleased to report that awards have been made by the Royal Society for the Prevention of Accidents to the following Laboratory drivers:

H G Paterson	25 and 26 year Badges (25 and 26 accident free years)
E A Smith	19 and 20 year Badges
J Culley	17 and 18 year Badges
D A Stock	15 Year Drivers Award Diploma for 1981 15 and 16 year Badges
A H J Hill	13 and 14 year Badges
P R Brown) M D Fitzgerald)	Diplomas for 1981 and 1982
B M Turner	Diploma for 1982

Congratulations gentlemen, and thank you.

Art & Crafts Exhibition

The fourth Art & Craft Exhibition is to be held in the R12 Conference Room on Tuesday 15 November, Wednesday 16 November, and Thursday 17 November during the lunch periods. It is hoped that staff of the Laboratory will be willing to display their work on these days.

Application forms will be available later in the year. Staff who exhibited in 1979, 1980 and 1981 will automatically receive an application form.

If you are interested or require further information about the Exhibition please contact either Jenny Coates Ext 5430 or Myra Gilbert Ext 6143.

Committee for 1983:

Jenny Coates	R12	Ext 5430
Myra Gilbert	R1	Ext 6143
Daphne Barrand	R1	Ext 6172
Cathy Doidge	R3	Ext 6580

New Preservation Line Open

The grand opening of Houghton Park Station on the Lugg Valley Line took place at 10.30am on Wednesday 16 February. The ceremony was performed by Professor John Houghton who remarked that he had never unveiled a railway station before and that he was honoured indeed to have been invited to do so.

After the unveiling, Professor Houghton was escorted on a tour of the station and environs by the Chairman of the Company, Mr D D Abbley and showed great interest in the antenna situated on the hill behind the station.

The layout was built with the intention of running stock of different railway companies and periods, so naturally a typical preservation line has been modelled.

The 'Lugg Valley Railway' to give it its full title, set in darkest Herefordshire, was opened in the 1860s as an independant company. It was later taken over by the GWR and just managed to survive until the start of the second World War. Then followed a period of joint GWR/LMS management to cope with wartime traffic, but later on in BR days this line was allowed to decline and finally closed in the 1960s. It was soon realised that the railway was ripe for preservation, and it now enjoys a good revenue from tourist and enthusiast alike.

Houghton Park is situated midway along the line with all the usual trappings of a small yard and goods shed, book and gift stall, etc.

Some consternation was caused in the mid 70s when the SERC decided to build a Satellite Tracking Antenna on the hill behind the station. There then followed the usual protest and enquiry into the siting of such a 'Dr Who' type structure in the country-side, but all is now peaceful again and the antenna itself has become the subject of wonder and awe.

So, you are invited to join our little people and enjoy the glory of a preserved railway in a rural setting.

The RAL model railway club will be exhibiting this 'rural gem' at the Abingdon and Distric Model Railway Club on Saturday 26 March at St Nicholas Church Hall, Abingdon, from 10.30am to 5.30pm. It is very much worth a visit.

Indoor Sportsday 1983

This years Sports Day will be held on Friday 15 April at the Aston Villa Sports and Leisure Centre, Birmingham. Listed below are the activities and local oranisers to whom entries should be addressed before 15 March.

Badminton	(mixed prs)-R Wolfenden	R63
"	(mens prs)	
Volleyball	(teams of 8) J MacDougall	R16
Table Tennis	(teams of 3) T Pett	R27
Squash	(teams of 3 (2 male 1 female) N Whitehead) B Maddison)	R25
Chess	(individual) P Hemmings	R27
Bridge	(pairs) H Shah	R25
Darts	(teams of 5) A Forster	R2
Cribbage	(pairs) T Morgan	R18

Spectators are also welcome.

Angling

This years Champion is Eamon Capocci who has completed a good season with this achievement. In second place was Peter Craske, Geoff Kidd came third and Dennis Day, fourth.

Congratulations Eamon!

Well Done

Congratulations are in order to Steve Carr for his achievement at the Post Office.

Account Transferred

A most popular member of staff was how Christine Caldwell was described at her retirement presentation on 17 February and her friends and colleagues turned up in droves to endorse this.

Richard Lawrence-Wilson presented Christine with a fur rug, watch and chocolates and thanked her on behalf of the Lab for her many years of 'hard labour' in Finance and Accounts. He wished her the best of luck and a very happy retirement on behalf of everyone.

Christine replied that she was thrilled with the beautiful presents, - "It is most generous of you all", she said. "I have very happy memories of RAL and have made many very good friends. It is sad to come to the end of the road, but I shall pop back to see you."

Bulletin

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Deadline for insertions:

INTERNAL Events

CONDENSED MATTER SCIENCE SEMINARS
R3 CONF. ROOM - 1330 hrs.

15 March P Schofield/Harwell
"Scattering of Epithermal Neutrons - Twenty Years On"

ASTROPHYSICS SEMINARS
R61 CONF. ROOM - 1400 hrs

30 March Dr Joseph Silk/Berkeley
"Dwarf Galaxies: Signposts of Galactic Evolution".

HEP SEMINARS
R61 CONF. ROOM - 1100 hrs.

16 March Dr T Barnes/RAL
"Spectrum of Scaler Field Theories on a Lattice"

30 March Dr R W Tucker/Lancaster
"Fermions, Gravitation and the Kahler Equation"

COMPUTING DIVISION SEMINAR
COLLOQUIM - ATLAS CENTRE - 1515 hrs

15 March Prof. Brian Randell/ Newcastle.
"The Newcastle Connection"

NIMROD LECTURES
R61 CONF. ROOM - 1400 hrs

28 March Prof. T T Wu/DESY-Harvard
"Is There a Kubakov Effect?" (Monopole Catalysis of Proton Decay).

EXTERNAL Events

THEO. GROUP SEMINARS
DARESBURY - 1400 hrs

21 March Dr D A Greenwood/Bristol
'A Density Functional Approach to the Electronic Structure of Impurities in Simple Liquid Metals'

PHYSICS COLLOQUIA
BRISTOL - 1630 hrs

21 March Dr A Lyne/Jodrell Bank
'Pulsars and Supernovac'

THEO PHYSICS SEMINARS
QMC - London - 1330 hrs

17 March Prof J C Taylor/Cambridge
'Soft Gluons and Fast Quarks'

PART. PHYS DISC GP MEETINGS
BIRMINGHAM - 1615 hrs

18 March Dr N Jackson/Liverpool
'Search for Narrow Resonances in Ø Ø Production'

25 March Dr G T Jones/Birmingham
'Survey of BEBC Neutrino Experiments'

SHEP SEMINARS
SOUTHAMPTON - 1400 hrs

18 March D H Perkins/Oxford
'Experiments in Proton Decay'

THEO PHYS SEMINARS
TPD - Harwell - 1400 hrs

22 March Dr M J Phillips/Leicester
'The Digital Measurement of Engineering Surfaces'

25 March Prof Spaeth/Paderborn
'Magnetic Resonance of Excited States in Ionic Crystals.

SCHUSTER COLLOQUIA
MANCHESTER - 1615 hrs

16 March Prof John Dowell/Birmingham
'The Search for the Weak Intermediate Vector Boson'

Trade Exhibition

SCOPEX INSTRUMENTS LTD

There will be a one-day exhibition of low cost oscilloscopes, a function generator and the Voyager portable, digital storage, liquid crystal oscilloscope on Thursday, 24 March in R20 Conference Room, from 10.00 to 16.00hrs.