R20

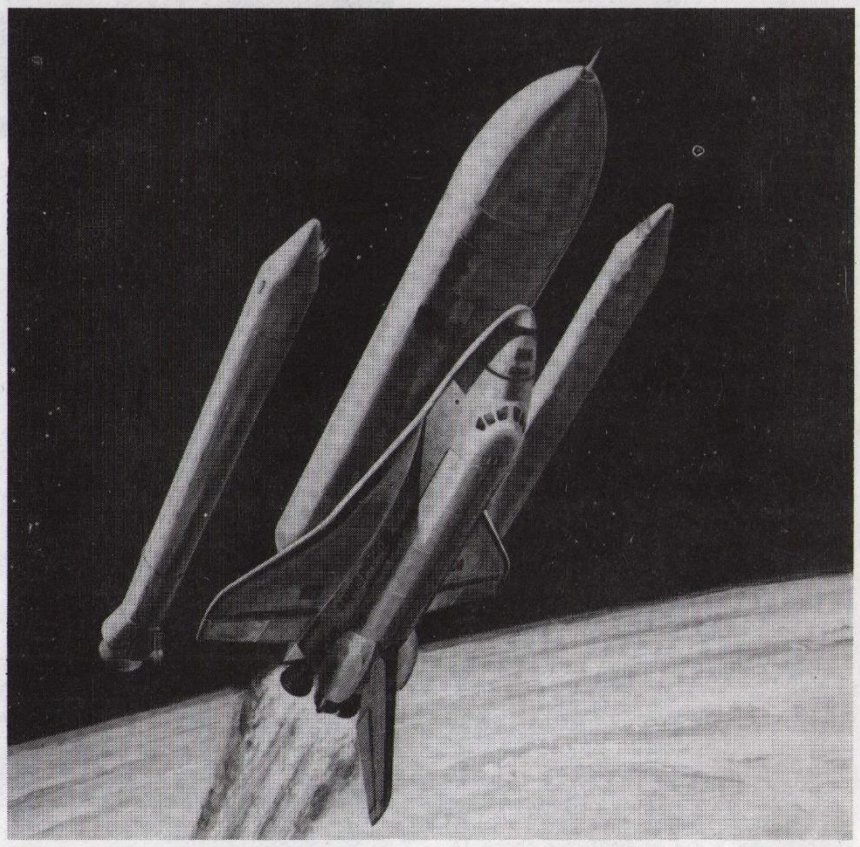
Bulletin

of the Rutherford and Appleton Laboratories 27 May 1981 No.9

A Boost for Space Projects

The launch of Space Shuttle was watched by most of us with bated breath. Members of Space and Astrophysics Division watched even more intently for on the successful outcome rested much of their future in 'Space'. Martin Courtier, tells us in the following article, why.

Nine years of insight and engineering behind the US Space Shuttle programme were dramatically transformed from concept to reality with the successful first flight recently. The year when NASA first committed funds to developing shuttle coincided with the launching of SRC instruments on ESRO's TD1A, and the NASA Copernicus (OAO IV) and Nimbus 5 satellites; all were forerunners to some of the RAL current interests in space. Since then, the prospect of the Space Transportation System (STS) has overshadowed the future opportunities for UK experimenters in space, and many of the Labs' scientists and engineers have staked their aspirations on its success. Thus, Columbia's return had special significance for some of the current activities at Chilton.



Space Shuttle boosters jettisoned at around 43km altitude. NASA

Orbiter's Role

Like conventional transport, the STS orbiter will carry both passengers and freight. It also provides a remote manipulator system for unloading and loading cargo under microgravity conditions. Primarily a launcher, the orbiter is designed to deliver more to orbit than it can safely return to earth. Load carrying ability must be progressively tested during subsequent flights of Columbia, and will be increased with later orbiters to the full payload carrying capability (29.5 tonnes despatch, 16 tonnes return). About one quarter of the early operational programme will be devoted to scientific research, either using instruments which remain in the cargo bay (ie on Spacelab) or with satellites which are deployed. The Space and Astrophysics Division headed by Dr Alan Gabriel has an interest in both these modes of operation.

RAL Shuttle Projects

NASA invited early proposals for conducting experiments from the orbiter which led to a payload selection for the second Spacelab mission consisting of eleven US and two UK investigations. One of these is the Coronal Helium Abundance Spacelab Experiment (CHASE) being developed in cooperation with University College, London. The instrument will measure the electron density, temperature and ionisation balance and the Helium to Hydrogen ratio in the solar corona from spectrographic observations at UV wavelengths.

Current theories maintain that the proportion of Helium in the Universe has not changed significantly since its creation in a 'big bang', furthermore conditions at the Sun are believed to represent this abundance today. CHASE, by making more accurate measurements than ever before should help us to understand the early state of the Universe and the formation of stars like our Sun.

The other UK instrument, developed by Birmingham University, involves us in project management and thermal design. It will measure the X-ray spectra of cosmic sources and study the spatial distribution of emission from extended objects and glusters of galaxies. This tells us about the intergalactic material, its temperature and associated magnetic fields, and should identify some new and large-scale astrophysical processes.

(See over)

SPACELAB *(continued)*

These two instruments are scheduled for launch in 1984 on the 7th flight of Challenger - the rebuilt orbiter, Enterprise.

For a later flight an experiment proposed by RAL, the University of Leicester, and American Science and Engineering Inc, has been accepted by NASA to make Solar Active Region Observations from Spacelab (SAROS) using an X-ray telescope/spectrometer. This instrument is expected to form part of a sun observation mission after 1986.

Space Telescope

Shuttle is an essential vehicle for the Space Telescope (ST) project; too heavy for launch by any other means. We are playing a vital role in providing image processing software for the most sensitive detector element of this system. It will extend exploration of the universe to distances 7 times that which can be observed with the most powerful ground-based telescopes, looking back to a time when the universe was believed to be one twentieth of its present age. The ST launch is currently planned for late 1983 and it is proposed to visit the instrument for in-orbit maintenance with later shuttle flights.

Other Payloads

Another shuttle-launched project is the Roentgensatellite (ROSAT), and we are working with UK universities on a proposal to extend the capability of this German X-ray survey satellite. Addition of a UK soft X-ray telescope to complement the German instrument increases the wavelength coverage from 0.6 to 30 nanometers overall. The spacecraft will share the orbiter cargo bay with other payloads and, after removal and release by the STS remote manipulator system, will use its own propulsion system to manoeuvre under ground control to its operational altitude of around 500 km.

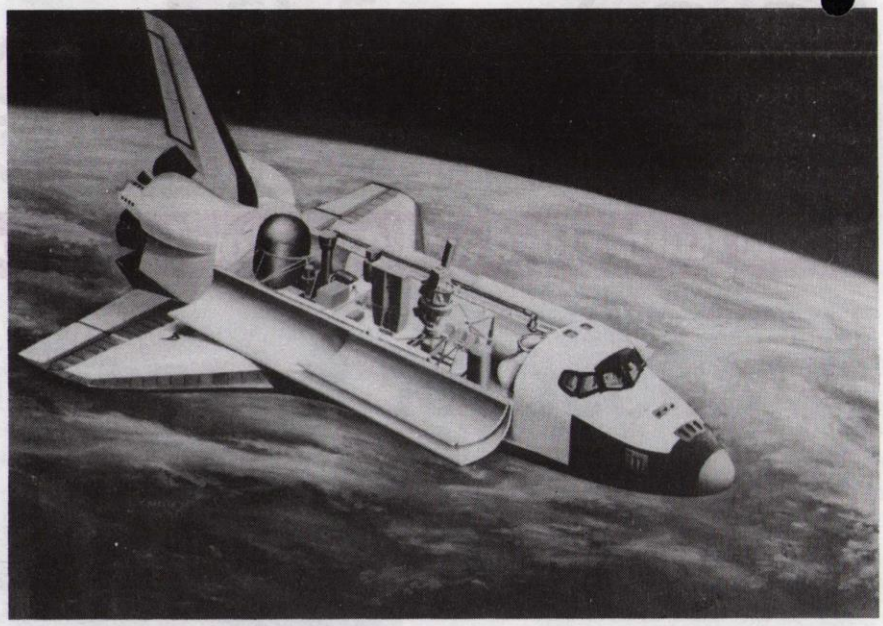
A variety of other payloads for the shuttle have been investigated and are being considered at RAL; if there is further development of the manned aspects of the STS perhaps RAL staff involvement in shuttle-related projects will literally take off the ground within the decade.

Film Badge Notice

It is period 6, Colour strip PURPLE. Please make sure that you are wearing the correct film badge, and return all old ones.

NEXT FILM CHANGE
Monday 15 June

Please inform Mrs J Coates Ext 430 of any change of Building number.



Spacelab-2, scheduled for launch in 1984, carries two instruments in which RAL is involved. *NASA*

Archive/Record Office

Save office space and put your non-current files into the RAL Archive (R61 Stack). They can easily be retrieved whenever needed and will not be destroyed without your consent.

The Archive also hold a wide range of older documents such as minutes, papers, specifications and other technical data, which have been computer indexed under several headings. If you are searching for this type of material or for a particular document consult the archive index, it may well be there!

WHAT'S NEW?

Lecture Theatre - 1515 hrs - 11 June

IRAS MISSION CONTROL
by
B R Martin

'The prime objective of the Infra-Red Astronomical Satellite (IRAS) is to carry out a complete sky survey at infra-red wavelengths, using a large cryogenically cooled telescope. A subsidiary objective is to carry out additional observations of objects of particular interest.

The Operation Control Centre in R1 will provide facilities for orbit determination, observation planning, satellite control and data acquisition, engineering data processing and 'quick look' scientific analysis of the telescope data. All these facilities are critical to the success of the IRAS mission, and the main emphasis of the lecture will be on mission control.'

SRC Becomes SERC

Her Majesty, on the advice of Her Privy Council, has agreed that the Science Research Council should now be known as THE SCIENCE AND ENGINEERING RESEARCH COUNCIL (SERC).

The new name recognises the increasing importance SRC has placed on ensuring that engineering research departments in universities and polytechnics have the necessary resources to produce the innovative technology and highly qualified manpower urgently required by UK industry.

Through collaborative schemes most large companies are well aware of the help SRC has given in funding academic partners and providing assistance for postgraduate work. It is hoped that the change of name will also encourage smaller companies to view the Council as a medium through which research and training collaboration with academics can be undertaken.

Logo

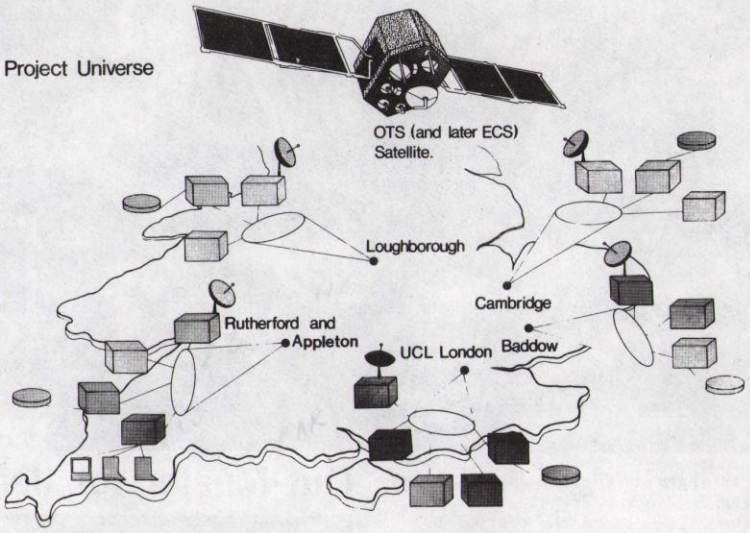
On a lighter note, it has been agreed that a new logo will be required for SERC. Arrangements are being made for a Council-wide competition to be held in order that ideas for a suitable replacement can be obtained. Pending the announcement of the competition staff may wish to give this some consideration.

Trade Exhibition

There will be a one-day exhibition by Lynwood Scientific Developments Ltd of intelligent visual display units with particular emphasis on high resolution graphics capability and word processing in R12 Conference Room from 10.00 to 16.00 hrs on Thursday, 11 June.

UNIVERSE~al Communication

All computers shall be able to 'speak' to all other computers if the philosophy behind the new RAL initiated experimental project for fast information exchange, UNIVERSE, launched on 1 May.



Joint Venture

The 3 year £3 million project was first conceived as a joint venture between RAL and the Universities of Cambridge and Loughborough and University College London, hence UNIVERSE (UNIVersities Expanded Ring and Satellite Experiment). However, by the time the proposal had been presented to the Engineering Board, the financial situation of the SRC had taken a slight knock and though liking the project, the Board suggested that this might be an opportunity for industry to be given the chance to participate in this potentially promising enterprise. This was not an easy time for industry either, and it says much for the idea and the enthusiasm of its proposers that GEC-Marconi Electronics, Logica and British Telecom agreed to join. Local area networks where computers, word processors and other electronic systems in an area which need to communicate, are linked into a ring, already exist. Projects such as STELLA (see Bulletin No 23 1979) linking ground stations via a satellite are also in operation. Combining the two types of system is the logical follow up.

Networks

A single local area network might, for example, cover an industrial plant, office block or research laboratory. On a larger site, such as a university campus, a number of separate rings would be installed, perhaps one in every department. Each ring would be coupled by a two-way communication channel into a master ring running round the whole campus. In this arrangement, each packet of data, tagged with the address of its destination in digitally-coded form, would be routed automatically to the correct station anywhere on the entire network. The type of network which will be used most widely in project UNIVERSE is the Cambridge Ring developed by the Computer Laboratory at Cambridge University.

Ground Stations

On each site the ring or group of rings will be connected to an earth station. Information will be transmitted to the Orbital Test Satellite (OTS) which will rebroadcast to the six earth stations participating in the experiment. Only packets of information intended for a particular earth station will be retained by that station, recognition being via a coded address within each packet. Only one station will be able to transmit at any one time, but transmissions from all six stations will be rapidly interleaved in time. Special scheduling will be used to divide up each time period to allow stations with the heaviest traffic to be assigned more time within a frame. The life of OTS is expected to extend to at least early 1984. This will allow the equipment for UNIVERSE to be procured and installed by early 1982, giving two full years experience with the system.

At RAL

Plans are now in hand for the construction of a ring between the Atlas Centre and Building R1, to be completed by the autumn, and a second ring within the Atlas Centre itself towards the end of the year. Further rings are contemplated when these are in successful operation.

We thank John Burren for the information contained in this article.

Sales to Employees

The sale of scrap metal and plastics as set out in RLN12/73 will be made on 5 and 19 June. Sales are now at the rear of R24 Store from 1200-1230 hrs.

Missing

A ½" Drive Socket Spanner Set contained in a red metal box dimensions 480mm x 190mm x 50mm, marked "R2 SHIFT FITTER" went missing from R10 tool cupboard between 1 and 6 May. Any information regarding its whereabouts would be appreciated by B W Fail, Ext 206.

Accomodation Needed

A French secretary on an exchange visit from ILL Grenoble, would like accommodation en famille in Oxford for 6 weeks from 13 July.

Please ring Judith Fontaine Ext 247 if you can help.

Thanks

Chris and Caroline Cooper thank all their kind friends for their wedding presents which are very much appreciated.

Acknowledgements

Frank and Richard Cooke wish to thank all friends and colleagues for their beautiful floral tributes, messages of sympathy, kindness and support during their sad loss.

Mrs Mary Wimblett and family would like to thank all Ron's friends and colleagues at the Rutherford and Appleton Laboratories for flowers and donations to the British Heart Foundation - also for their kindness and expressions of sympathy at a time when it was greatly appreciated.

Cymru am Byth

35577

After 18 years at Chilton John L Thomas is returning to the Principality. Hwyl (homesickness to the rest of us) has set in, Polarised Targets have palled and Cardiff Cryogenics beckon.

On Friday 8 May many of John's friends and colleagues gathered to say a sad farewell and to wish him the best of luck in his new career. Ron Newport thanked him on behalf of everyone for the very useful contribution he had made in the field of RAL Polarised Target work. For nine years John had provided all the PT material - he hated to think how many little glass beads that amounted to. As a 'Nimrod man' from '63 to '71 John had also made his mark in the design and construction of power supplies.

Presenting John with two quartz clocks, Ron enquired if John had some special experiment in mind. To which John replied in his address of thanks that one was for getting him up in the morning and one to remind him to go to bed at night. More seriously he thanked everyone for making his stay here so enjoyable - he had had some great times. 'I shall miss you all - you're a pleasant bunch of fellas' he said (causing raised eyebrows amongst the female contingent), 'please come and see us when you're in our locality.'

Thanks

Jack and June Townsend wish to thank all kind friends and colleagues who contributed to Jack's wonderful TV set and June's lovely flowers. Thank you also to all the people Jack didn't manage to thank personally - he did try! 'Good luck and best wishes to all.'

£1·60 per pound!

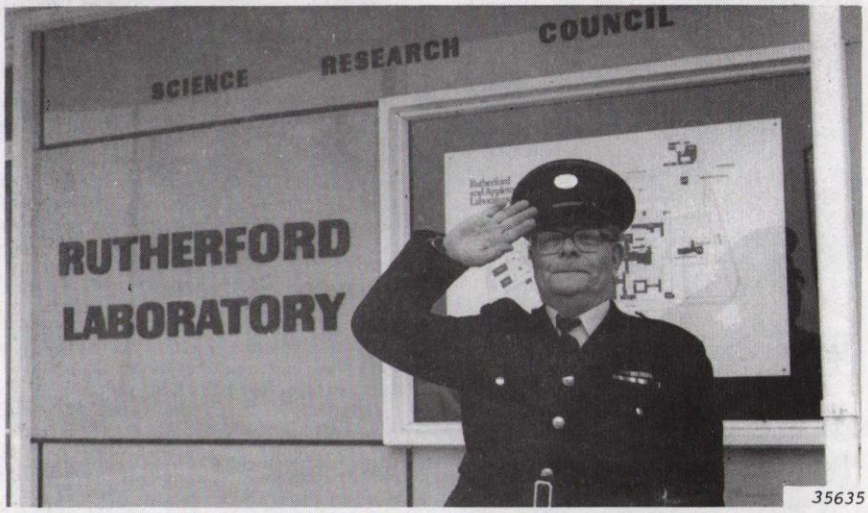
Earlier this year twenty six members of staff and their friends weighed in at 285st 11lbs and a month later when they were weighed again they had lost a total of 12st 11lbs (179lbs) and collected from their sponsors £287. This was a wonderful result and the Friends of the Churchill at Buckland are delighted with our efforts and send their sincere thanks to all slimmers and their sponsors. Just one small question, if anyone finds 179lbs floating round the Laboratories don't try to find the owners because they are very happy looking the way they are.

Chip Farming

It's an interesting thought computer controlled milking, feeding, planting, reaping and mowing? Would anyone like to see this concept a reality?

Please ring Elizabeth Marsh on Ext 6668.

Out-Muster for Jack



35635

Its hard to envisage, but RAL is going to have to manage without Jack Townsend. Jack, Security Warden on site for 20 years, retired on Tuesday 19 May.

At his farewell presentation on Wednesday 13 May, Jack was given a portable television set on behalf of his many friends and admirers. Hugh Roskell presenting our gift and our thanks for all his efforts on our behalf wished him every success for the future. We would, he said, miss him very much.

Jack was born in Gloucester and started work as a gardener at Sutton Courtenay. He joined the Royal Berkshire Regiment in 1938 and served until 1946 by which time he was a Sergeant Instructor at a pre-Officer Cadet Training Unit school. He joined the Air Ministry as a policeman at Milton in 1946 and moved from there to Harwell as a stoker in the main boiler house. In 1960 he joined the Rutherford Laboratory as a Security Warden and has been a charge-hand for many years always giving a helpful, pleasant 'car lights on foggy mornings' etc service for anyone and everyone.

Jack thanked everyone for the present and their good wishes. 'I can't say too much now' he said, overwhelmed by the occasion.

The ceremony ended with a delightful touch, a beautiful bouquet being presented to Jack's wife June, who had also worked at RAL for many years.

We wish them both many happy years ahead.

Bulletin

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