

Why that's my dainty Ariel! I shall miss thee;

Ariel V one of the world's first satellites dedicated exclusively to the young science of X-ray astronomy, re-entered the earth's atmosphere on 14 March, and finished its life in a blaze of glory.

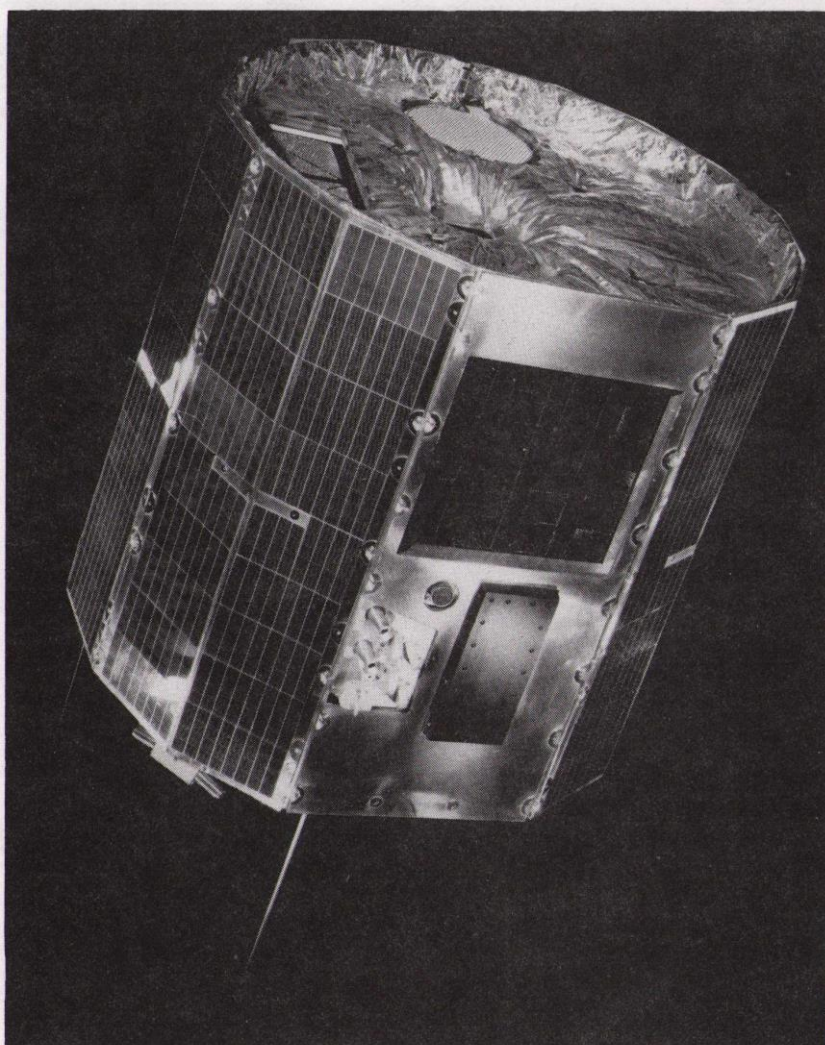
The Team from the Appleton Laboratory who controlled the satellite throughout its life are quite sad to see it go. Said Tony Lowe, manager of the Ariel V Control Centre, "it's like saying goodbye to an old friend".

Five Year Mission

Ariel V was launched on 15 October 1974 from the Italian San Marco range Kenya to observe cosmic X-ray sources. Designed to operate for two years, its life span has exceeded five, and was still transmitting information up to the time of re-entry. The spacecraft designed and constructed by Marconi Space and Defence Systems contained six experiments, relaying information to scientific teams from University College London, Leicester, Imperial College, Birmingham and the U.S. Goddard Space Flight Center.

Fine Performance

Professor Peter Willmore, Ariel V's project scientist, explained the reasons for the satellite's outstanding success. Although only the world's second satellite dedicated to X-ray astronomy, it was never-the-less equipped with a most powerful set of instruments, placing it in a strong position for making an exceptional number of discoveries. Backed by a fine performance by the spacecraft and the Appleton Control Centre, that position was fully exploited by the scientific teams. The results therefore, cover all the varied and dramatic objects that occur in cosmic X-ray sources: active galaxies, galaxy clusters, supernova remnants and compact stars. Scientific observations have been made by Ariel V which have established the U.K. groups at the forefront of X-ray astronomy.



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Aid to Future Projects

The technical expertise built up in the Control Centre at Appleton Laboratory in the fields of satellite

and data management have proved an invaluable aid in the management of the subsequent space projects, Ariel VI and IRAS. They could also be important factors in the U.K. involvement in future international space programmes.

INTERNAL Events

NIMROD LECTURES LECTURE THEATRE - 1400 hrs

- 31 March: Dr R Orr/CERN
"A Study of Neutral Current
Processes using Counter
Techniques (WA18)"
- 7 April: Prof P van Nieuwenhuizen/
Stony Brook
"Supergravity"

HEP SEMINARS CONFERENCE ROOM R61 - 1100 hrs

- 2 April: Prof C Callan/Princeton
"How Instantons Set the
Scales of Hadron Physics"
- 9 April: Dr W Zakrzewski/Durham
Title to be advised
- COMPUTING SEMINARS
COLLOQUIUM - ATLAS CENTRE - 1400 hrs
- 25 March: D H Lord/CERN
"The 169E System"

RUTHERFORD LECTURE LECTURE THEATRE - 1515 hrs

- April 17: Kurt Hoffman/SRP Sussex.
"Appropriate Technology in
the Third World: Unexplored
Potential or Unfilled
Promise"

EASTER CELEBRATION LECTURE THEATRE - 1230 hrs

- 1 April: Rusty Russel will lead the
Laboratories' Christian
Fellowship Easter celebration.
All are welcome.

EXTERNAL Events

PHYSICS COLLOQUIA BRISTOL - 1700 hrs

- 21 April: Prof Sir Peter Hirsch, FRS/
Oxford
"Structure of Dislocations
and their Effects on
Electronic and Mechanical
Properties of Semiconductors"

THEOR. PHYS. SEMINARS T.P. CONF. RM B424.4 - AERE - 1400 hrs

- 25 March: Dr A B Lidiard/AERE
"The Growth of Colloids in
Irradiated Ionic Crystals"

NPD COLLOQUIUM CONF. RM H8 - AERE - 1530 hrs

- 27 March: C Grove-Palmer/ETSU
"UK Wave Energy Programme -
Past, Present and Future"

IRAS - Settled and On Schedule

The Bulletin published on 4 June 1979 described the purpose of the IRAS mission, the UK involvement and how we intended to carry out our responsibilities.

It is now just over a year since the Science Research Council decided to move the IRAS project to Chilton, and we have already passed several major milestones. The most notable of these was just before Christmas when we successfully held the Radio Frequency compatibility tests; the IRAS Flight transponder was brought to Chilton and we carried out a programme of tests with the IRAS antenna which showed that there were no incompatibilities in this important area of satellite/ground communication. This milestone was set long before the decision to move the project and we were always aware that we were working to a very tight schedule. That we were able to satisfactorily meet this deadline, in spite of the additional problems posed by the move, was a great tribute to the enthusiasm and dedication of the Rutherford and Appleton team that planned the move and tests, and augers well for the future of the combined Laboratories.

The IRAS project is now concentrated in the old IBM room in R1 and all personnel have been housed in R16 and R32. Our move was carried out according to the plans made last year and the Tracking Station staff together with the real-time software staff moved here in September; all the remaining staff arrived in January and on 1 January we

could boast that the complete team was established and housed on the new site.

The ICL 2960 computer is now established as the IRAS mainframe machine and the two PDP 11/134 computers together with the API20B array processor are in their final position in the Satellite Control Centre. The Software for IRAS Ground Operations and for the Preliminary Science Analysis is proceeding to schedule and in June this year we should have completed writing the bulk of the computer programs, and shall hold a pre-integration review of the UK part of the project.

For the remainder of 1980 we shall integrate the complete system and throughout 1981, carry out a series of complete data system tests and simulations with the dual objective of proving the system and providing operational training for the staff. In Holland, work on the spacecraft is also proceeding to schedule, but in America some problems have been encountered, associated with the development of the infra-red detectors, which may have an impact on the projected launch date of August 1981.

Summarising, the move of IRAS to Chilton is now complete and all our work is on schedule. We still have much to do, but hopefully all our major problems are now behind us. (We are indebted to Dr Barry Martin for keeping us up-to-date on this project).

Training

COURSES

NATIONAL CENTRE OF TRIBOLOGY

- 15 April: "Rolling Element Bearings"
29 April: "Dynamic Seals"

UNIVERSITY OF SALFORD

- 14 - 18 April: "Microprocessor
Applications"

UNIVERSITY OF SHEFFIELD

- 28 April to
2 May: "The Design of Industrial
Hydraulic Circuits"
2 - 6 June: "Hydraulic Servos and
Systems Analysis"

BRUNEL UNIVERSITY

- 7 - 9 May: "Failure Analysis in
Engineering Components"
4 - 6 June: "Failure Analysis in
Welded and Joined
Components"

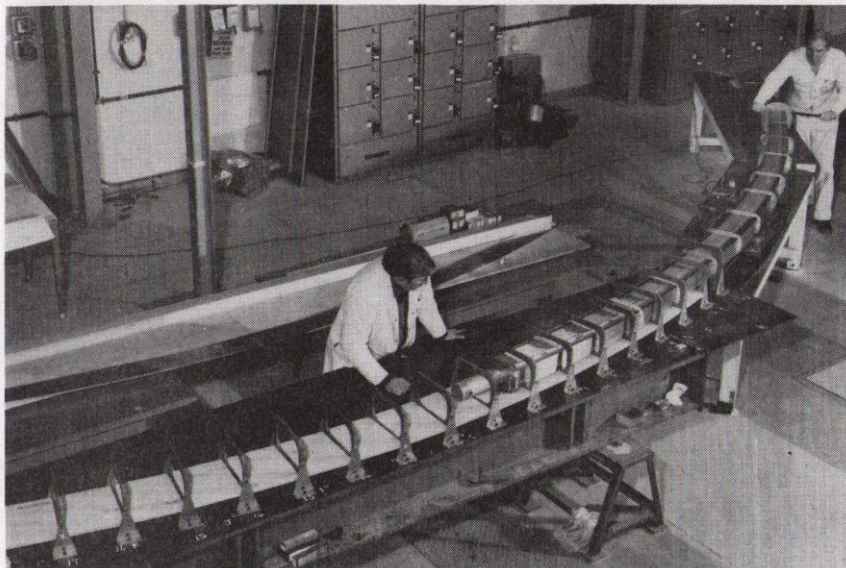
CONFERENCES

INSTITUTION OF ELECTRICAL ENGINEERS

- 10 - 12 June: "Developments in Power-
System Protection"
24 - 26 June: "Power Systems Moni-
toring and Control"

Further details of these events can be obtained from the Training Section R20 Ext 6285/266.

Prototype RF Shield for SNS



Frank Lloyd and Vic Pancolt after assembling the Prototype Dipole RF Shield are shown inserting it in a simulation of the Dipole Ceramic Vacuum Chamber. The chamber is to be made of short lengths of ceramic tube glass-bonded together. The gauge frames shown are at the positions of the joints and represent the minimum internal dimension of the chamber. 31555

A prototype Radio Frequency Shield has just been completed for the SNS. Designed to be inserted into the ceramic vacuum chamber for the SNS dipole magnets, its purpose is to minimise the coupling impedance between the beam and the surrounding magnetic structure.

The Problem..

The proton-beam circulating in the SNS vacuum chamber induces image currents in the surrounding structure, which produce electric and magnetic fields and forces acting back into the beam. These forces can result in unstable longitudinal and transverse collective motions of the beam and subsequent beam loss. For the SNS the frequencies of such unstable oscillations range from 100 KHz upwards. The forces on the beam depend on the beam energy intensity, and the strength of the coupling between the beam and the surrounding structure.

To operate the SNS at full intensity of 10^{15} protons/sec. requires a low impedance structure to be placed between the beam and the magnets. The fast cycling (50 Hz) of these magnets prohibit the use of solid metal above and below the beam. Large eddy currents would be induced in such plates, des-

troying the quality of the magnetic field and producing large power losses.

..and its Solution

The prototype shield is, therefore, made with 58 stainless steel wires, of 2mm diameter, positioned vertically above and below the beam, and 2mm thick stainless steel plates on either side. The wires and side-plates are arranged to follow the vertical and horizontal beam profiles and are supported on insulating frames. Each wire and side-plate is connected to the adjacent straight section shield by capacitors chosen to be of high impedance at 50 Hz. and low impedance at 100 KHz and above. The dipole shield is about 5m long and follows a 36° arc with a 7m radius. Similar shields are being designed for the quadrupole magnets of SNS.

Testing

The prototype dipole shield is undergoing mechanical tests to check that it can be easily inserted into the vacuum chamber. These tests are to be followed by radio frequency measurements to assess the effectiveness of the shields. (We thank Charles Planner for this news on the progress of SNS).

Professor Schopper for CERN

Last week the CERN Council unanimously supported the appointment of Professor Herwig Schopper as Director-General from 1 January 1981. Professor Schopper is currently the Director of DESY, and the driving force behind PETRA, the world-beating electron-positron colliding beam machine at the German national accelerator laboratory in Hamburg.

PETRA is, at present, the highest energy electron-positron colliding beam machine, producing beam energies in excess of 30 GeV. This machine has given Europe's scientists a head-start in studying new phenomena in this high energy region, and two major experiments at PETRA have UK participation. However this machine will appear quite small if Europe's new plans come to fruition - for it is proposed to build a Large Electron-Positron (LEP) machine on the CERN site in Geneva which will have a circumference of about 30 km and be capable of producing beams with energies from 22 to 130 GeV.

The recommendations to build LEP have been favourably received by the delegates of the CERN Member States and the stage is now set for a formal presentation of the project in June.

With the success of the PETRA programme to his credit, Professor Schopper is clearly the natural choice to guide the major LEP project.

Missing

Would anyone having knowledge of the whereabouts of AVOMETER Model 8, Inventory No. AL 4297 please notify L MARTIN, R32 Ext 6384.

Trade Exhibition

There will be an exhibition of machinable glass ceramic material by William McGeoch and Co Ltd on Tuesday 22 April in R12 Conference Room from 1000 - 1600 hrs. Presentations by a technologist are planned at certain times. Anyone wishing to attend a presentation should contact Mrs Sheila Davidson, Scientific Administration Group, R20 (Ext 6114) for advice on times.

Obituary

We regret to announce the death of Mr H Stone on Thursday 13 March, after a long illness.

Though with us for only a short while, Harry will be missed by his friends and colleagues at the Laboratory.

We extend our deepest sympathy to his wife Margaret and to all his family.

Film Badge Notice

Period 4 commences Monday 24 March. Colour strip RED. Please change your badges promptly and ensure that all old ones are returned.

Sales to Employees

Sales of scrap metal/plastics as set out in RLN 12/73 will be made on 11 and 25 April at the scrap compound rear of R40 from 1200 - 1230 hrs.

Bird Brained



Even the wildlife on site is getting into the scattering business. Unfortunately, the pioneering spirit of the pheasant pictured above was short lived for when it tried its 'wing' at the spallation process, a gross miscalculation of input energy resulted in 'ultra-cold' production instead of the more usual 'Birdwellian' distribution familiar to most of the more usual feather scattering community. As our latest position - sensitive feather detectors were not in place (R2 workshop) at the time, no time-of-flight data were obtained. 31557

Folk Club

We would like to remind you that the next meeting of the Club will be on Friday 11 April at 8 o'clock in the Restaurant Coffee Lounge, featuring "Roaring Jelly" who don't often appear in this 'neck of the woods' and 'Jack Holt' from Reading who obviously does! Everyone is welcome, and tickets are available at the door price £1.40 or from John Ellis Ext 6369/494 or Alan Hodges Ext 6363 at £1.20.

Thanks

The following letter has been received from Cyril Briscoe.

Dear Friends,

I would like to thank you all for your good wishes and the parting gift which I received last Friday. My wife has already worked out which accessories to buy me for birthdays, so that I shall make full use of the drill. I shall certainly miss everyone of you and would like to take this opportunity to say "Thanks very much" and "Cheerio" to those I didn't see on Friday.

Table Tennis

This years Indoor Sports Day is to be held on Friday 18 April at the Oasis Leisure Centre Swindon - Trophies to be presented by Sir Geoffrey Allen. The Table Tennis Competition will be run as an American Tournament. Each establishment will be allowed only 2 teams; each team will comprise 3 players.

For further details contact John Varley Ext 6302.

Chess

As we come to the climax of this year's Chess Tournament, we have a very exciting finish in prospect.

Leading Positions

Peter Hemmings	8 points (8 games)
Peter Craske	7½ points (8 games)
Asoke Nandi	7½ points (8 games)

The remaining games involving the leading three contenders are:-

Hemmings	v	Craske
Nandi	v	Hemmings

Coffee at Cosener's

The April coffee morning will not be at the Cosener's House, but at the home of Mrs G Stafford, 'The Ferry Cottage' North Hinksey Village on Thursday 17 April at 10.30 a.m. For details of how to get there, or help with transport, please contact either

Dorothy Gibson Abingdon 25250
or
Gillian Litt Abingdon 26009

Subsequent coffee mornings will be held at our usual venue, the Cosener's House on the following dates, from 10.30 a.m. to noon.

Tuesday 6 May
Wednesday 4 June
Tuesday 8 July

Christian Fellowship

The Fellowship meets every Thursday in Conference Room 6, Building R2 at 1230 hrs, and all are very welcome. The next meetings will be on:-

27 March "Easter Interviews". What was the effect of the East events on those who witness them?
Interviewer: Meryck Wyard

1 April "Easter Celebration" led by Rusty Russel of Maranatha Christian Centre Oxford. This will take place at 1230 hrs in the Lecture Theatre.

Lunchtime Music

WEDNESDAY 26 MARCH
LECTURE THEATRE - 1230 hrs

'GENESIS' - "A TRICK OF THE TAIL"

'Genesis' was formed in the late sixties as a five-member band - all were ex-Charterhouse public school.

After several minor changes in line-up they suffered a major set-back in 1975 when Peter Gabriel, who had formed the group, left. To the rock world's amazement the band recovered to record arguably their best album "A Trick of the Tail" in 1976, which received unanimous acclaim.

Noted, particularly, for their spectacular stage presentation, the band has made many 'sell-out' tours of Europe and America. Their recent British tour had their followers queuing overnight for tickets as soon as the dates were announced.



RUTHERFORD LABORATORY

BULLETIN

Deadline for Insertions

1000 hrs Monday 31 March

Editor: Jean Banford

Room 23, Building R20
Rutherford Laboratory
Chilton Didcot Oxon OX11 0QX
Abingdon (0235) 21900 Ext 484

Published by the Scientific Administration Group