

Bulletin

of the Rutherford Appleton Laboratory

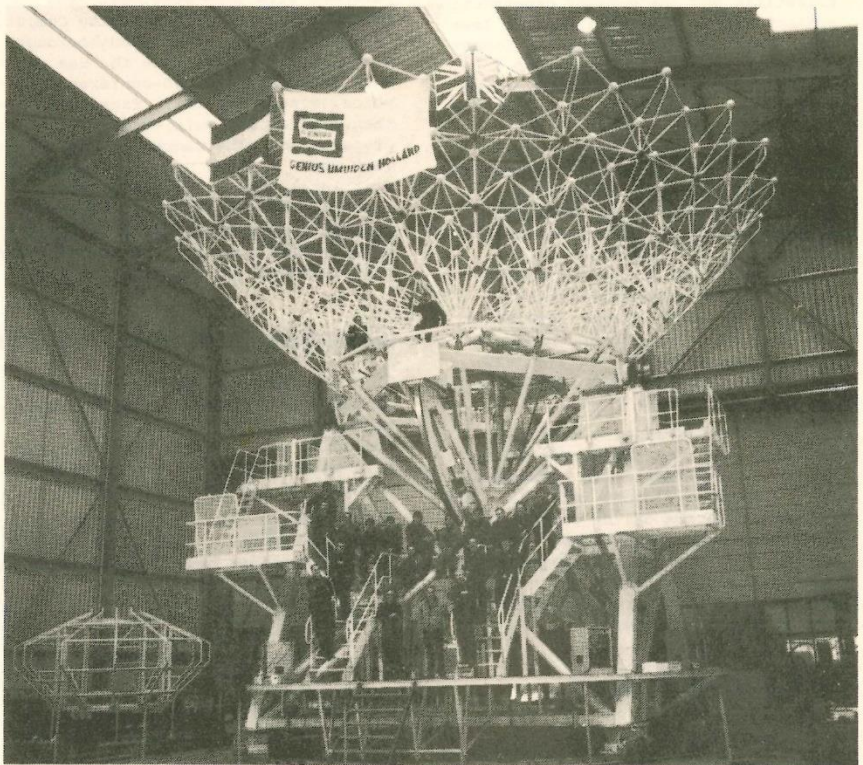
1 April 1985 No 4

Assembly Complete

On 22 February 1985 the final step in the trial assembly of the Millimetre Wave Telescope (MT) occurred as the backing structure, which supports the reflecting surface, was lifted carefully into place. The structural steelwork has been manufactured to an RAL design by Genius Fabricage BV at IJmuiden near Amsterdam and the picture shows the workforce celebrating their success. Their achievement was worth a celebration as they have completed the 15 m diameter antenna to a manufacturing accuracy of a few millimetres and on schedule.

The white appearance of the steelwork is produced by its overcoat of flame-sprayed aluminium. This is one of the many features included in the design to ensure that the telescope keeps its shape. Gravitational, wind-loading and temperature effects have all had to be taken into account and the aluminium finish is there to control the thermal coupling of the antenna with its surroundings. The wind-loading which can be a major problem, has been avoided by having the antenna in an enclosure, the carousel, which incorporates a sail-like membrane to cover the viewing aperture to give full protection from the wind. The effects of gravitational deformation have been allowed for in the design by using the so-called homology approach to maintain the surface in a paraboloidal shape as the dish tips in elevation. The picture shows the mesh of small members making up the backing structure of the telescope surface which is a consequence of this subtle design.

The structure will remain assembled for the next two months while tests on the azimuth and elevation drive systems are carried out by a team from MRAO Cavendish Laboratory, Cambridge, who have responsibility for the control system, and RAL who designed the drives. The antenna has already been driven over its full range of azimuth and elevation but much work remains to be done on characterising the servo system and trimming it to produce accurate pointing and tracking on an astronomical object while maintaining the ability to slew rapidly from source to source. The pointing requirement of better than 5 arc sec and tracking requirement of 2 arc sec is as good as that of many optical telescopes and both of these must be achieved blind without the benefit of guide stars. For comparison, it may be noted that Venus as it now appears in the evening



The assembled structure of the UK/NL Millimetre-wave Telescope stands in a building specially constructed for it at IJmuiden near Amsterdam. The most significant missing items are the surface reflection panels which are being made at RAL. The "lobster pot" on the left is the Cassegrain receiver cabin which fits directly behind the dish. When drive system tests are complete, the structure will be dismantled and shipped to Hawaii in May.

sky has a diameter of about 50 arc sec and few of us have eyes good enough to resolve it.

The opportunity will also be taken to trial fit some of the reflector panels and their three-point adjusters. These will allow the total surface to be set to the desired paraboloid to an overall accuracy at least as good as 50 μm rms, the thickness of cigarette paper. The panel manufacture was developed at RAL using an aluminium honeycomb construction. The honeycomb is first crushed to roughly the correct shape and the panels are built up in contact with an accurately machined steel mould starting with a stretched-formed sheet of quarter millimetre thick aluminium over the mould. Seven moulds are used for the seven rings of panels. The manufacture at RAL is well underway,

two thirds of the 276 panels are now complete and the rest will be ready by next September.

In May, the antenna will be dismantled, packed and shipped to Hawaii where it will arrive in early July. The sectors of the structure will have their electrical wiring fitted at sea-level and then the antenna will be trundled up the 14000 ft mountain, Mauna Kea, piece-by-piece to be re-assembled inside the carousel. Assembly will be followed by technical trials and then by scientific commissioning before the telescope is handed over to the Royal Observatory Edinburgh for the start of its astronomical observing programme in March 1987.

J E Hall



The next lecture in this series will be held on Thursday 18 April 1985 at 3.00 pm in the R22 Lecture Theatre.

ON THE DYNAMICS OF
TETHERED-SUBSATELLITE SYSTEMS

by

PROFESSOR PETER M BAINUM
DEPARTMENT OF MECHANICAL ENGINEERING
HOWARD UNIVERSITY, WASHINGTON

A brief historical background of the Shuttle-Tethered-Subsatellite (STS) Project will be followed by a discussion of different proposed scientific and space-based construction applications. Alternate control laws based on an application of the linear regulator problem are developed for possible use in the operation of the STS system. Control is assumed to be provided only by modulating the tension level in the tether as a function of the difference between the actual and commanded tether line length, length rate, in (orbital) plane swing angle, and swing angle rate. By proper selection of the penalty matrices it is possible to obtain faster responses with no increase in maximum power levels for use in station keeping as compared with alternate control strategies. Deployment and retrieval strategies are also discussed.

Finally, the effect of a massive, flexible tether on the system stability during station-keeping is considered using a Mathieu-Floquet analysis. For particular ratios of the tether wave frequency to the orbital rate, tether lengths, and mass ratios, parametric instabilities may result which could be significant for proposed applications with the space platform.

Restaurant Influx

On Wednesday 10 April at 1 o'clock a visiting party of 160 people will be using the Restaurant.

We would therefore wish to warn RAL staff that it might be advisable to eat early that day.

Film Badge Notice

It is period 4, colour strip GREEN.

Please be sure you are wearing the correct dosimeter and return old ones.

Happy Easter to all Jenny's film wearers!

Library Notice

The Library's copy of "Radio Regulations Vol 2" produced by ITU is missing. Could it be returned as updates for the volume are now available.

Computing Seminars

This lecture will take place in the Atlas Centre Colloquium at 3.15 pm on Tuesday 16 April

'THE UNISON PROJECT AND
THE ALVEY HIGH SPEED NETWORK'

by

Chris Adams
Technology Division, RAL

This is a project to investigate the use of high speed digital networks for handling multi-media information; text, graphics and voice.

The Alvey High Speed Network based on mesh of 2.048 Mbps Megastream links will be used to interconnect the five partners with ISDN services. The partners, Cambridge University Computing Lab, Logica VTS, Acorn, Loughborough and RAL will investigate the use of this network for video-conferencing, voice, electronic mail, facsimile transmission and multi-media document preparation. The Cambridge Fast Ring (100 Mbps) will be used to develop a fast local switch for inter-LAN routing, and the use of a staged transport service based on "agents" will be developed for the transmission of multi-media documents.

Colloquia in Atomic Physics

Dr H P Summers at JET has undertaken to organise a series of colloquia in association with local laboratories including RAL. Usually the meetings will be held at 10.00 hrs on Monday mornings at JET (Room K1/1/87).

Unfortunately this announcement is too late for the first Colloquium, but further meetings have been arranged as follows:

- 12 April Dr T Kato/Nagoyo Univ.
'Activity on Atomic Processes in Plasmas at Nagoyo University'
- 22 April Dr T Greenland/Harwell
'Aspects of Charge Exchange'
- 20 May Dr S Rose/RAL
'Some Aspects of the Atomic Physics of X-Ray Lasers'

For further information please contact Dr Summers at JET. Tel. Culham (short code 3020) Ext 4941.

David Baugh Collection

The collection in memory of David Baugh raised £84, which was divided equally between "The British Heart Foundation" and "The Samaritans".

Both organisations have expressed their appreciation and the letters may be seen in the Accommodation Office, Room 2.58, R1.

Thank you to all who gave so generously.

Sales to Employees

The sale of scrap materials will take place on 12 & 26 April, 12-12.30, R24 Scrap Compound.

Obituary

Mr HW (Bill) Campling

We deeply regret to announce the death of Mr Horace William Campling on Thursday 7 March.

'Bill' Campling joined the SERC (then NIRNS) in 1962, to work in the Nimrod Power Supplies Group and was soon promoted to Shift Manager, a position he held until the close down of Nimrod.

Whereas, to this point his career had been predominantly associated with heavy electrical engineering, he nevertheless transferred to new fields which included the testing of the ferrite for the SNS radio frequency cavities, with equal competence and became a valued member of the team developing and testing diagnostic equipment.

A quiet man with a very pleasant personality, Bill was always ready to share his expertise and in discussions could be relied upon to produce original ideas. He could also be relied upon to carry out his duties with meticulous care. He will be greatly missed by all who knew him.

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

Missing

The following item is the subject of a lost report. Would anyone having any knowledge of its whereabouts please contact B Holsman, Ext. 6339. 'Blundell Harling Beam Compass' Label No. R018238.

The whereabouts of the items listed below is required, please:

Grundig Stenorette
Inventory No: X002879
Serial No: 413061

Phillips Transcriber 516
Inventory No: R035073
Serial No: 23308746

Phillips Transcriber 186
Inventory No: X004400
Serial No: 043375

Phillips Transcriber 185
Inventory No: X004398
Serial No: 192737

Phillips Transcriber 185
Inventory No: X004399
Serial No: 192739

IBM 72 Typewriter
Inventory No: R005142
Serial No: 923032676

IBM 82 Typewriter
Inventory No: R005135
Serial No: 924035942

Please relay enquiries to Myra Gilbert, Ext. 6143 or Jack Wheeler, Ext. 5570.

SERC Indoor Sportsday

SERC's Indoor Sportsday was held at the 'Oasis', Swindon this year - a venue that proved popular in the past and, once again provided the pleasant setting for this very enjoyable social event in the SERC calendar.

Coaches carrying the RAL contingent having left in good time, arrived well before the nominal starting time, which gave them a chance to sample the cuisine and admire the swimming pool (and some of its occupants), until battle commenced.

At six o'clock, competition over, the prizes were presented by Dr Ashley Catterall, Secretary to the SERC, and it emerged that the Bridge tournament had been won by RAL as had the Darts, Squash and Table Tennis events. The day ended with a disco at Central Office - and a good time was had by all.

Bridge

A total of eleven pairs competed in this event, all from RAL and Central Office. This gave opportunity for some to wander about for 20 minutes or to refresh parts other 'drinks' cannot reach, before it was someone else's turn to leave the confines of the room to indulge.

Having seen the start of some of the other events, the Bridge players started their mammoth session at 13.00 hours and finished at 17.30. When the last session was being played the tournament director - Terry Paterson and his partner started working out points, as they were the pair, not playing now. By the time last session was finished, scores were ready and as had become apparent earlier, Cliff Pavelin and Tony Gibson from RAL emerged as clear winners, thus defending successfully and retaining the trophy they won last year. Joint runners-up were Debbie Thomas and Alan Ridgley - RAL, and Terry Paterson and Bill Pollard - CO.

Other RAL participants who also enjoyed the competition were, Malcolm Currie/Mike Gunson, Don David/Dr Wright, Jackie Freeman/George Spalding, Peter Parry/Nigel West, Jim Hall/Ros Kirby and Dorothy Irvine/Hari Shah.

With more support from the *Bulletin* readers, who already know we play lunch-time Bridge on Tuesdays and Wednesdays in R61 Conference Room, we should be able to enter even more pairs next year. So come along and participate now.

Hari Shah
Chairman, RAL Bridge Club

Squash

The Rutherford A Team carried away the trophy they narrowly lost to Central Office last year. The number of entries of four teams reflects a general decline of recent years, however we all had a good day with just enough games not to feel too depleted by the end of the day.

The winners of the trophy were Rutherford 'A' team, with Malcolm Edwards, captain, ably supported by Will Johnston and Jenny Coates. A second RAL team of Nick Whitehead,



Dr Catterall presents trophies, for Darts to Stan Buckel



for Bridge to Tony Gibson



for Squash to Malcolm Edwards



and for Table Tennis to Eric Thomas and Tim Pett

Zoë Bowden and John Ballard also enjoyed a good days sport.

Table Tennis

Seven teams of 3 players entered and these were divided into groups of 3 and 4 with each team playing each other team in the group. As only 3 tables had been made available the format of play had to be reduced compared with previous years in order to finish in time. Each match consisted of 3 singles and a doubles. The best two teams in each group went through to the semi-finals.

RGO, winners for the last two years and Atlas 'A', had been seeded into separate groups. The Atlas team of Peter Kent, Eric Thomas and Tim Pett won their group as expected but RGO were pushed into second place by a determined Rutherford team of John Varley, Harry Jarvis and Peter Horton. In the semi-finals defeated RGO 3-0 (doubles not needed) but only after a mammoth struggle by Peter Kent to overcome RGO's star player. Rutherford were made to fight all the way by Central Office, the other semi-finalists, but just managed to take a very close doubles match for a 3-2 victory.

That produced an Atlas v Rutherford final which Atlas won 3-0 although Harry Jarvis gave Eric Thomas a fright before losing through too many unforced errors. So that put the Atlas name back on the cup after an absence of 2 years although Atlas will be hard pushed to retain it next year if its two best players have defected across the road!

Tim Pett

Darts

Rutherford 'A' (R18) team won the event again this year. On the way to the final they played the Ladies 'Atlas' team, and almost met their match when 'Morgan the Moon' (Tudor) was hammered by Chris Leigh, much to the delight of the spectators.

In the final 'Rutherford' played Daresbury. In a crucial game Trevor Fisher needing 130, heard a command from the byeline, 60, 20, Bull - and thats the way he went. The victorious team were Russ Jones (Captain), Stan Buckel, Fred Roberts, Ian Forster and Tudor Morgan (who took his little set-back with good humour).

Crib

In this competition RAL played well, but had very hard luck, the 'Rutherford' pair of Alan Saxby and Del Forsyth losing in the final to Central Office.

Ian Forster

Badminton

Rules were changed this year, not a popular decision as only RAL and Central Office participated, so no mixed doubles and no chance for Kay Knight and A N Other to pull out their usual performance. The ladies from Central Office won the ladies only event, and the Men's Doubles have yet to be completed. The finals will be played in the near future between Roger Wolfenden and Dave Wootton, and Richard Lawrence and Alan Stevens, so we can assume RAL will emerge the winners!

The End of a Run



Reprographic Section ground to a halt on Thurs 14 March, when Ron Pike retired. At least it did from 11.30am to 12 noon, when Ron was fêted and showered with gifts by his colleagues at a crowded presentation ceremony presided over by Dr Nick Lawrence, deputy head of Administration Division. (I am reliably informed they're managing to struggle along again now!)

As leading operator in Reprographics since 1981 he has been the mainstay of engineering printing and microfilming in the Lab, coming to the new R3 complex from the old R25 Engineering Print Room which he joined in 1966. And if 1966 seems a long way back, it was even further back in 1958 that Ron first appeared on site as a transport driver to become Rutherford Director Gerry Pickavance's personal driver in 1960.

Now Ron is to pursue his hobbies of beating (pheasants not wives) shooting

The centre of attention. Ron, who is rumoured to have old fashioned ideas about a woman's place, surrounded by the ones who disagreed and joined his section.

and playing crib in and around the area of Great Shefford, hobbies in which the shooting stick with which he was presented will come in very handy. Gifts presented by Nick also included a beautiful carriage clock and a framed aerial photograph of RAL. A bouquet of flowers was presented to Mrs Pike.

Ron in reply thanked everybody for the gifts and for the good years he had spent at RAL. "I shall miss you all", he said, "but I hope to see you from time to time. Thank you everyone."

Sale of Paving Slabs

The Laboratory has a number of second-hand paving slabs, approximate size 2' x 2' x 2", which are to be offered to staff at £1 each. The time and date of the sale is not yet finalised, but the Stores Section would like some idea of the demand before going ahead.

If interested, please send a memo to Mr B Blissett R24, stating the number of slabs required. This will not guarantee you any slabs, but will help to plan the basis of the sale.

You are warned that the slabs weigh 1 cwt each and that you will be expected to remove them on the day of purchase.

Thanks

Des Ould would like to thank all friends at RAL for the gifts he received on leaving the Lab. "Cheerio and best wishes. If you are ever on Guernsey, look me up," he writes.

RecSoc AGM

This will be held on Wednesday 17 April in the R22 Lecture Theatre, starting at 12.30 pm.

Please would all members make every effort to attend.

Crib

The RAL Lunchtime Crib League competition has just ended with the reigning champions ACE HOLES again coming out top.

The matches have been keenly contested, just 10 points separating eight teams - not bad since a win can be worth 3 points.

The League positions did not change much throughout the season except for the rise of THE UN-NAMED with 11 points from their last 4 matches.

The League knock-out competition is now under way and this will be followed by our end of season Crib Evening to be held this year in the RecSoc building R58 in early May. Details later.

RAL Fund

It has been suggested, rather strongly by some, that an explanation would be welcome as to the reasons for the setting up of the Fund and the uses to which it would be put.

Don't panic! It is not intended that we should pass among you with a collecting plate. Donations are, on the whole, expected to come from senior staff of the Laboratory who, it appears, are willing to give to the Fund fees resulting from TV appearances and magazine articles, (though this does not preclude gifts from any of our altruistic colleagues).

The idea is to provide finance to pay for the small celebrations and ceremonies that naturally occur in the life of the Laboratory. Occasions such as large experimental and building programmes coming to successful fruition; for times when staff are honoured (like our BEM recipients) and in cases where traditions are being upheld. (Apprentices have their indentures presented in tankards - for which, at present, they have to pay).

As a publicly funded body, RAL has no official funds to provide these small tokens of appreciation. It is hoped that the Fund will help to finance these special occasions, which are at present funded by contributions from individual members of staff.

Bulletin

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