

# NEWSLETTER

No. 94

February 1969

## NEW BRITISH SCIENTIFIC SATELLITE

The Science Research Council announces the undertaking of a new scientific satellite - to be known as UK-4 in the Anglo/American series. The prime scientific purpose of this satellite will be to explore the interactions between the plasma, charged particle streams and electromagnetic waves in the topside of the ionosphere. The experiments will be four from British universities and the SRC Radio and Space Research Station, with in addition an important experiment involving measurements on charged particles, to be provided by an American experimental group, thus making a significant step forward in British/American collaboration on scientific satellites.

The Council will fund and manage the project through its Space Research Management Unit. The Ministry of Technology will act as agents for the Council and the Ministry's Royal Aircraft Establishment, Farnborough, will be the R & D Authority. (It is hoped to publish further details of UK-4 in the next issue.)

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Launch of ISIS-A, 30th January 1969

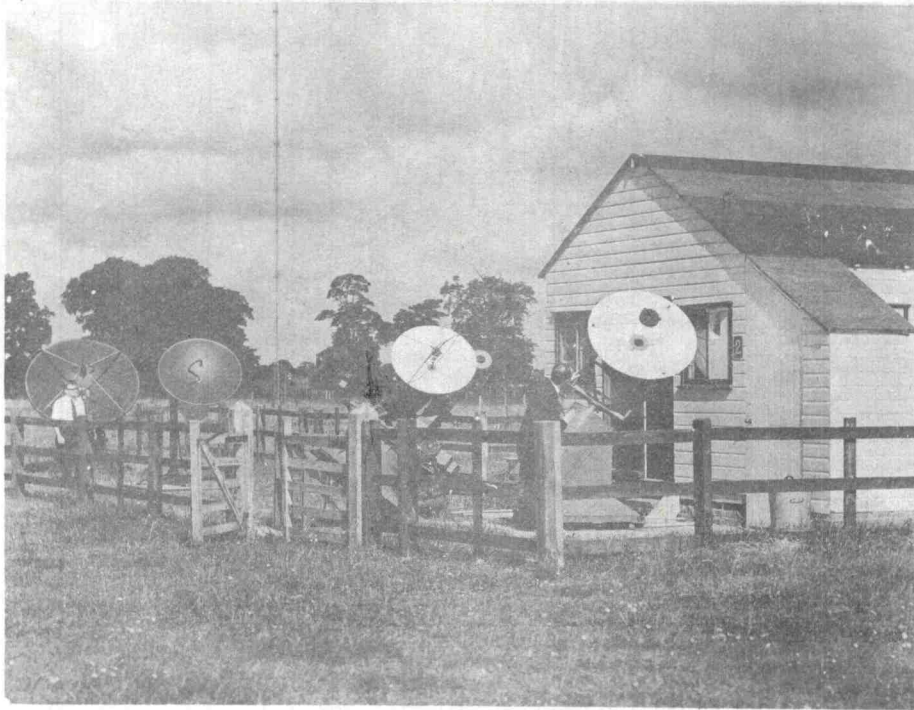
The launch of a new satellite no longer causes a major upheaval of normal station activity at Winkfield.

Detailed launch simulation exercises both for the station and the network, ensure that by the time of launch, everyone is familiar with the signals to be expected from the satellite and the functions to be performed by the station during the critical hours of launch and early orbit. It does occasionally happen however that the work required to be done by a station is more than ordinarily detailed. The success of the new satellite may depend on these early measurements of systems' performance, and under these circumstances the atmosphere in the operations room does become a little tense as the AOS time (Acquisition of Signal) approaches. The work done at Winkfield during the ISIS-A launch was of this kind, and included the first switch on command sent to the satellite. The correct interpretation of the telemetered data was sufficiently important to warrant DRTE sending a senior engineer from the satellite manufacturers (R.C.A. Victor) to Winkfield to observe the first 20 or so passes. From the time Jo MacNally arrived on 22nd January we were immersed in detailed discussions on the expected performance of the satellite and the way in which we could best read out all the answers required in those first 3 passes. It was obviously going to need detailed planning and practice. By the start of launch count on the evening of 29th January, we were ready. The launch count was held for 16 minutes for gantry removal from the rocket and lift off occurred at 0646.15 U.T. Work on other satellites was, of course, still going on and it was not possible to rig the mass of receiving and data processing equipment ready for pass number one until 28 minutes before AOS. The station was in communication with DRTE, Ottawa, WTR Launch Site, GSFC Operations Control, Johannesburg and Madagascar. These last two stations received satellite CW beacon transmission before Winkfield and confirmed that despun had occurred by observing fluctuations in the received signal strength. At 0813 the CW beacon signal on 134.410 MHz was received at Winkfield and 5 minutes later, at 0818 U.T., the first 'telemetry on' command was transmitted. The satellite response was immediate and the signal strong on 136.590 MHz. Now the hours of thought and practice paid dividends. The first series of measurements were sounder antenna lengths and antenna motor currents. These confirmed that the antennas were fully extended and the motors switched off. There had been some concern at DRTE that in the event that the third stage of the rocket did not separate from the satellite, the extending antennas would cause the whole system to flip over suddenly and the antennas would either break off or wrap round the satellite. Winkfield's first readings together with confirmation of third stage separation, set a lot of minds at rest.

Now followed readings of battery voltages and load currents and measurement of spin rate by observing magnetometer outputs and solar pippet data. The aspect of the satellite was measured by observing the output of the 8 solar aspect sensors. The main supply voltage to the experiment packages was measured and then a series of status flags which indicated if the experiments and main satellite systems were powered. Everything looked good and as the mass of punched paper tape and yards of 8 channel paper chart were whisked away for more detailed analysis, the last observation was made on the first pass, the automatic timer on the satellite operated and telemetry transmissions ceased. 80 separate pieces of engineering information were read out during those hectic 16 minutes. Much more remained to be checked before the engineers would be satisfied that experiments could be switched on but that first pass had confirmed that ISIS-A was a Go System. Orbits 2 and 3 were also Winkfield's responsibility but with a 24 minute timer operated, life was much more leisurely. Within 24 hours, ISIS-A, now known as 1969-09A, was a routine bird and Jo thankfully packed his bags and headed for home. It was not until 4 days after launch that the top-side sounder was switched on. Apart from the engineering type measurements to be made before switching the sounder, it was necessary to allow all gas to leak away from the satellite to prevent any ionisation leak ever occurring when high voltage experiments were operated. At the time of writing, DRTE say that ISIS-A is operating well. Some small difficulties have arisen over commanding the satellite in certain modes, but these are not uncommon with a complex satellite and should not limit its scientific usefulness.

If the launch of this satellite did nothing else, it disproved to one Canadian all the horrible stories he had heard about UK weather. During the 11 days he was in England, it rained once, noon temperature never dropped below 50°F and the sun shone brilliantly. The fact that the ogre of winter lashed us with his icy breath as soon as Jo was over the horizon will fortunately not destroy the picture he has of England in January. What price a winter resort?

H. Bevan



R.S.R.S. SOLAR RADIO OBSERVATORY

The first of what is hoped to be an occasional series of illustrations of work at Ditton Park is the Solar Radio Observatory.

Located in West Park ( $51^{\circ}29'N$  :  $0^{\circ}34'W$ ) the equipment at present consists of (L to R) a 2.8 GHz correlation polarimeter and radiometers operating at 10 GHz, 19 GHz and 71 GHz. A further radiometer operating at 37 GHz is under construction, and equipment for studies of atmospheric attenuation (a joint experiment with the Post Office) will shortly be installed.

The work of the Observatory, though relatively recently begun, has featured several times in the scientific press, particular interest being shown in the program for examination of radio emission related to Solar Proton Events.

ARIEL III COMPLETES 10,000 ORBITS

"Thou has't done well, fine Ariel"

The first all-British satellite Ariel III circles the Earth for the 10,000th time on 25th February and, like Prospero's "industrious Servant", has done well. In satellite language most systems are still "go" after nearly 22 months in orbit.

Ariel III continues to send back real-time data from the experiments while orbiting at a height of about 320 miles at approximately 17,000 mph.

The SRC Radio and Space Research Station, Birmingham University and Sheffield University experiments are producing valuable information. Recent analysis of the Jodrell Bank experiment data has shown that the radio noise bands observed by Ariel III are probably generated by radiation from electrons in the aurorae; new experiments to confirm and extend this knowledge are being planned for UK IV.

STATION NEWS

The Assistant Director and a number of R.S.R.S. Staff recently met the Astronaut, Colonel Borman, during his visit to this country, when a number of official functions were given in his honour.

Dr. Rishbeth and Mr. Eccles are attending the European Colloquium on the Neutral Atmosphere which is being held in Paris from 23rd to 26th February.

Mr. Mason and Mr. G. Bennet have just returned from Kiruna, where Dr. Bryant's group are conducting experiments on the aurora.

A Ferranti, on-line, 'Argus' computer has been delivered to Chilbolton to be connected to the steerable aerial.

E.D.S. units (exchangeable disc units, to increase the size of the store) have arrived to be used with the 1905 computer at R.S.R.S.

STAFF NEWS

Congratulations to:-

Mr. Harendra S. Meswani on his marriage to Miss Purnima H. Nagori at Bombay on 27th January 1969.

Miss T. Mead and Mr. R. Hunt on their engagement.

Miss P. Dadds and Mr. L. Scammell on their engagement.

Welcome to:-

F. E. Packer

Labourer

Resignations:-

A. Marwaha

J. Riley

C. C. R. Church

J. A. Rae

E. E. Freeman

Sandwich Course Student returned to College  
A.E.O. Transfer to Communications Electronic  
Security Department

A.E.O. Resigned to join British Aircraft Corp.

S.A. Resigned

Skilled Labourer Resigned

Other changes:-

M. A. Trower

A.E.O. Returned to duty at R.S.R.S. from  
Falkland Islands.

Sports and Social Club News

Bridge Club

In the past three months there have been four bridge evenings and one match, as well as the regular lunch time bridge.

The bridge evenings which normally start at 5.30 p.m. have been rather poorly attended and new players will be welcome. The single match, against N.P.L., resulted in a heavy defeat:- 110 - 62 I.M.P.'s, but it is hoped that the return match during April will produce a satisfactory result.

The competition for the ex-DSIR cup is to be held at R.R.L. (Crowthorne) on 20th April and could all those interested please contact Dr. Bain or myself as soon as possible

Letter to the Outstations

Dear Colleagues,

Snow has come, gone, and will, I dare say, come again before spring, if not during it. Doubtless somewhere in Ditton Park the seasonal snowdrop, switched on and shoving up, may be seen by those who hunt for it. On the moat skaters have skated (skat?), but now the ice has become too thin. To the South the navigators bringing the main drain have stripped Datchet Green of its greenery, and lights of all colours render the night scene like the approach to Clapham Junction.

At the Station there have been some changes to the landscape. The venerable lattice mast, an early Savage, I believe, and almost forty years old, is now no more. Some weeks ago it was demolished along with several lesser specimens about Ditton Park. No cry of 'timber' marked its fall, no trumpet sounded, no bell rang. Our workshop staff, turned lumberjacks, skilfully brought about its passing. There may yet be some who recollect braving thunderstorms, standing on the lookout platform built into the structure, and calling such reports as: 'Ground stroke, NE,..... thunder, now!' with occasional extra coinments as stroke and thunder tended to coincide. Just the thing to impress newcomers with the wonders of meteorology, so, from within a warm dry laboratory, used to think.

Yours sincerely,

The Editor

REPRINT LIST

D. G. King-Hele,  
Doreen M. C. Walker  
& P. E. L. Neirinck

The decay of Cosmos 253 Rocket  
Nature 1968 221. 130-132

G. J. Bailey  
R. J. Moffett &  
H. Rishbeth

Solution of the coupled ion and neutral air equation  
of the mid-latitude ionospheric F2-layer.  
J.A.T.P. 1969. 31. 253-270

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INTERNAL MEMORANDA

318 Bryant, D. A.  
Courtier, G. M.  
Mason, R. W. N.,  
Wilson, A. S.

Attitude measurements on Petrel rounds P5H and P6H.

319 Harrison, V. A. W.

Proposal for a high frequency radio propagation  
experiment for the Black Arrow satellites.

320 Buckley, R.

Interplanetary scintillations - a review of the subject  
and a consideration of possible experimental work at  
Chilbolton.

322

Present and future trends in HF Communication. Summaries  
of papers presented at a Symposium 3.12.68.

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