RSRS Newsletter

No. 143 APRIL 1973

HIGHLY SUCCESSFUL SPACE EXPERIMENTS

(The recent sequence of rocket launches at S. Uist has been the subject of an SRC Press Notice. This is here reproduced for the general interest. Ed.)

On April 3 seven British 'Petrel' rockets were launched during a twelve hour period from the Royal Artillery rocket range on South Uist in the Outer Hebrides. Each rocket carried a payload constructed at the Science Research Council's Radio and Space Research Station, Slough, with multiple experiments for investigation of the ionisation in the upper atmosphere at altitudes above 60 km (40 miles).

This is the first time that more than three 'Petrel' rockets have been launched in a day. The experimental data will provide a clear demonstration of the development of the D-region of the ionosphere through a day and will be used in conjunction with theoretical work which is in progress at RSRS.

The rockets all reached altitudes of about 140 km (90 miles). The measurements were transmitted by radio telemetry link from each rocket to the ground station at South Uist and recorded on magnetic tapes. Examination of "quick look data" which has been produced since the flights shows that valuable results were obtained from every flight.

Each payload included the following experiments:

1. measurements of electron concentration and electron collision frequency from Faraday rotation and differential absorption at three radio frequencies transmitted from the ground to the rocket;

2. measurements of electron concentration fine structure, using a Langmuir probe;

3. measurement of the intensity of solar ultra violet radiation at 1216 Å (Lyman alpha) and of the molecular oxygen concentration derived from atmospheric absorption of this radiation;

4. measurement of solar X-rays (2 to 8 Å);

5. an experiment newly developed in collaboration with the Max Planck Institut at Lindau, West Germany and the University College of Wales, Aberystwyth, to measure the concentration of atomic oxygen in the ionosphere from corrosion of thin silver films;

6. in addition, each payload was instrumented to measure the attitude of the vehicle with respect to the sun, the slant range of the vehicle from the launch site, instrumentation temperatures and other housekeeping functions.

With the exception of the failure of the nosecone to deploy on the last flight, all facilities (rocket motor performance, telemetry, radar tracking, nosecone release) worked perfectly on every flight, while the experiments also had a very high proportion of success including the prime experiment (No 1) on the last flight. The campaign was not without difficulties, including postponements due to gale-force winds and an unwanted but spectacular aurora. The operation required closely planned team work using the simple but effective ground equipment at South Uist.

The project scientist, Dr. P. H. G. Dickinson of RSRS, has expressed his appreciation of the support provided by staff of the UK Atomic Energy Authority who included meteorological, telemetry and launcher teams, and by the Army which was responsible for range safety, including surveillance radar on St. Kilda.

The project was made feasible by the fact that the 'Petrel' rocket (seven and a half inches in diameter and nine feet long, including the payload) has shown itself safe to be launched in near gale-force winds, even from South Uist where the safety standards are exceptionally high.

The rocket was designed for SRC and is made by Bristol Aerojet, Banwell.

SAFETY NOTICE

Emergencies

In the event of an emergency during official hours staff may find it useful to remember that valuable time may be saved by using the red telephones. Calls from these are given over-riding priority at the exchange.

Plain Words

A new edition of Sir Ernest Gowers' book, with this title, has just been published. It is a much-needed reminder that clear communication by the written word has made slow progress compared with the technical advances in other means of communication. Indeed, the rapid growth in the latter may be linked with the poor status of the former. Consider the following examples, taken at random from material on an RSRS desk :-

"Two important points of agreement between this effort and that of other authors is that great weight is given to the desirability of agreeing closely with available data and no method is offered for fitting new data to any models that distinguish propagation mechanisms, but only a simple adjustment of level for each percent time is proposed to accommodate specified situations that differ in a discrete rather than a continuous and predictable fashion."

Even with the comma the author has graciously inserted the passage remains incomprehensible. At the other extreme, consider the commas in :-

"Such a receiver containing solid-state circuits was, however, made, which, although not permitting measurements over a wide frequency range, did allow somewhat greater precision to be obtained."

As Dr Johnson (might have) said : "I will accept two commas in immediate proximity; I might even tolerate three; but I'm damned if I'll accept four!" And what would he have said of the phrase "somewhat greater precision"!

And how we love the guarded and qualified conclusion! "The precise significance of these results in relation to propagation theory is still being examined but there appears no reason to doubt the validity of the procedure outlined above as an aid to the investigation of ionospheric structure". In other words, he should have worked for another six months before putting pen to paper. Similarly, another author asserted : "Although the results were variable and at times difficult to interpret, it is considered that fifteen metres should be an adequate horizontal spacing for the receiving aerials, with a tendency towards smaller values for vertical spacing". With the opening phrase, plus the "considered that", and the cautious "tendency", what has he really told us?

Another author thinks it important to state : "These facts might lead one to believe that there are great inherent advantages to be gained from working in the microwave part of the spectrum. However, I do not believe that this is necessarily so, certainly not in all fields. Despite this, new devices are not altogether impossible in the microwave field. Experiments which were previously hopelessly impracticable, have come well within the bounds of possibility."

Whose side is he on?

Why are the authors so easily lured into these polysyllables; into what H. G. Wells' hero Mr Polly called "sesquippledan verboojuice"? Churchill called it "the talent for compressing the maximum of words into the minimum of meaning".

Four of the five examples quoted above are from RSRS published papers. Can you guess which ones?

Peter Simple

STAFF NEWS

Congratulations to

Mrs. E. D. Stephenson	now Typist I
Mrs. I. Harris	now Typist I
J. G. Firth	now H.S.O. (Culham)
V. P. Sandal	now C.O.

Welcome to:

Mrs. C. E. Walsh	C.A. (Culham)
H. W. Sanders	S.C.S.

Resignations

Mrs. M. Bull	C.A.
R. J. Risk	H.S.O. (returned to R.R.E. after secondment)

Other Changes

D. J. Finch	Ex.O.	Transfer to R.O.E.
R. D. Galley	S.O.	Left Falkland Is.
E. Golton	S.S.O.	Now Div. 2 Group 3
G. R. Thomas	S.S.O.	Now Div. 1 Group 2
G. M. Courtier	S.S.O.	Now Div. 1 Group 1

STATION NEWS

The Director will leave for U.S.A. on 6th May where he will be leading the U.K. Delegation to the Scientific and Technical Sub-Committee of the U.N. Committee on the peaceful uses of Outer Space.

Afterwards he will be visiting Washington for discussions with NASA, including the Goddard Space Flight Center and at COMSAT.

He will also visit the laboratories of the Institute of Telecommunications Sciences; National Oceanic and Atmospheric Administration; and the National Center for Atmospheric Research, all of which are in Boulder, Colorado.

On May 29th Dr. Horner will attend the Inter Union Commission for the Allocation of Frequencies for Radio Astronomy and Space Research.

Dr. King will attend the COSPAR Plenary Meeting, from 24th May to 6th June and Dr. L. Thomas will be a member of the COSPAR-URSI-IAGA Symposium on the Lower Ionosphere from 23rd to 25th May. These meetings will all be held at Konstanz.

SPORTS AND SOCIAL CLUB NEWS

Bridge Club

The return match against NPL on 27 March at RSRS was won by NPL by 27 International Match Points.

In the semi-final of the C.S.C.B.A. Pairs Championship held at Bracknell on 29 March, Barry Martin and Mike Johnson finished in second place, only one point below the leaders. The first seven pairs qualified for the final.

Attendance at club evenings has increased during the last few months and on 12 April we actually managed to fill 4 tables again.

Wine Circle

Following the A.G.M. on 2 April 1973 the new Committee is as follows:

Chairman	Mr. F. Bennett
Treasurer	Dr. G. Bennett
Secretary	Mrs. K. Shand
Literature Organiser	Mr. T. Edwards

We remind members that subscriptions are now due and should be paid to the Treasurer as soon as possible.

We welcome any enquiries from anyone interested in joining the wine circle.

Badminton Club

The club had a highly successful season, not losing a single match. Not winning any either! A thought for next year! Does the club want to become competitive?

The badminton hall, otherwise known as the elephant shed, was in use at least once a week throughout the season until the key disappeared. On Wednesday evenings, the usual club evening, the players usually numbered between 4 and 6, though on one never to be forgotten evening 8 people were seen huddled together for warmth in the corner nearest to the electric fire.

Badminton is an excellent way to keep fit in the winter for all those summer sports that the staff of RSRS indulge in, so why not join us in large numbers next year. Who knows, if there is enough of you, perhaps the heat from your bodies will melt the ice of centuries encrusted on the walls of the elephant shed.

R. Burdett

LETTER TO THE OUTSTATIONS

Dear Colleagues

The ionosonde, like the celebrated eartrumpet of the postilion,has been struck by lightning. In common with Soothsayers, Economists, Political Commentators and suchlike rabble, editors are supposed to read the runes, so what's it all about?

Well, as many doubtless know, atmospheric probing has been the trade plied upon this spot for upwards of half a century. Certainly all of four decades have passed since the sounder's electric hand, licensed by the spirit of enquiry, if not the Post Office, roved among the New Found Land of the upper conducting layers.

Forty years, though time enough for an understanding human relationship to develop, is, it seems, insufficient in matters atmospheric. We have gone too far too fast and received a cosmic slap in the face as a result.

The effects of this rebuff were quite spectacular. Aerial switchgear lost interest and was hurled about the field; an ironclad switch blown apart; bits of floor tile embedded in wall and ceiling; a thorough fusion job done on the main fuses - and holders - and the instant recorded for posterity by a stopped clock. Presiding over this havoc, two meters veiled their faces for ever in a black deposit of some sooty substance, and stood, perpetual mutes, their moving coils never to move more.

Presumably it was guilt by association that drew down wrath upon sundry equipment in the Solar Observatory and mm.-wave propagation groups. All suffered punishment-by-induction so to speak. The total damage amounts to a tidy sum.

It's true to say that local residents have from time to time complained about our broadcast interference, but this time the point has been made by someone rather more senior. We can take a hint, will do our best to mend our ways, and humbly beg pardon for making so bold.

It might be well, to ensure this contrite message reaches the right reader, to earmark a copy for delivery by hand of Hermes. Originally, publication by Olympia Press had been envisaged, but, on second thoughts, perhaps they wouldn't be quite the right people to handle this effort by,

Yours sincerely,

The Editor

List of Reprints - April 1973

D. Eccles
J. W. King
A. J. Slater

ISIS 1. Satellite observations of the ionosphere at high southern latitudes.
JATP 1973. Vol 35. 625-632

J. D. Burge
D. Eccles
J. W. King
R. Rüster

The effects of thermospheric winds on the ionosphere at low and middle latitudes during magnetic disturbances.
JATP 1973. Vol 35. 617-623

D. L. Croom

Solar microwave bursts and Polar cap absorption
Planet Space Sci. 1973 Vol 21. 707-709

Internal Memoranda

I.M.	360	Ideas on F Layer Storms	H. Rishbeth
No.	361	Report of a Symposium on U.K. Participation in the ATS-F Geostationary-Satellite mm-wave Experiments	I. Greenan et al.