BSRS NEWSLETTER

No. 96 April, 1969

AN EXTRA GUY FAWKES DAY: THE DECAY DAY OF COSMOS 253 ROCKET

On the 20th November 1968 a rare event occurred causing headlines in the national newspapers: the first decay of a man-made space object to be widely observed over Britain.

People have always been fascinated by fires, by explosions, by anything burning and moving - anyone who has attended our firework display has noticed he was surrounded by a surprisingly large family of co-religionists on the ritual day.

Bonfiremen spend a lot of ingenuity and hard labour to produce their results. You pay; you go and you are sure to get it. When space scientists launch a future firework (I mean a short-life satellite), they spend on a larger scale, the same ingenuity and work but you don't pay (space budget does that for you) and you don't go (it is visible from half Britain). Unfortunately, you have to calculate accurately where you are able to see this and then you can't be absolutely sure. Still it is not a loss for everybody, other members of the Commonwealth may get it. Twenty hours before the decay, an inaccuracy of only 2% in an actual fantastic rate of change of the period of revolution and Australian newspapers should be full of reports of flying saucers ..... instead of yours. A further error of half a revolution in predicted decay time is likely to happen, owing to the fact that the calculations are theoretical and the rocket only uses practice. On top of this the solar activity has some words to say about things and it could increase or decrease more than you thought, altogether bringing your total error to $\pm$ 2 revolutions.

The beginning of a decay is so low (110 km) that one or two transits only are reachable from a particular site and, relative to the length of the last revolution, (86.3 mins) the duration of the phenomenon looks rather short; one to three minutes generally, and one particular observer can at best see only 60 seconds of it. All in all the chance of observing a decaying satellite over Britain at night, in a clear sky, is about 1/300.

Do you know there are people who are not discouraged by the bitter cold and the long odds and are still watching for decays after 200 failures. After all they know they'll get "their" decay before the neighbour gets "his" £25,000 from the Premium Bonds. A good observer has to be optimistic about weather and pessimistic about the timing and accuracy of decays. So far 2200 objects have decayed; the author has calculated 1200 of them, watched 600 and got 4 (two of them through clouds or between clouds). These figures, though lucky, are not very inspiring. Nevertheless, the chance, when it comes, provides an opportunity to collect a harvest of rare data.

On the occasion of the decay of Cosmos 253 rocket, accidental observers spent their time in wondering what could be the strange stream of lights crossing their sky for about 40 secs. If they knew by making use of our predictions that such a phenomenon was likely to happen they would have been able to pick up something more accurate than the waking memory of a dream.

Why and by whom are decays observed?

(1) Mathematicians calculating their chance, using the law of probabilty and not encouraged by the small outcome; they watch desperately.

(2) Non-mathematical observers do not know their chance is so poor; they watch courageously and hopefully.

(3) The man in the street doesn't know anything; he doesn't watch.

At first sight, specialized people should be in a better position to make these observations than the man in the street. In fact, specialists are a small minority compared with the rest of the population and 99% of the sightings are unofficial ones. Women doing their washing-up and workers in the street are potential observers of decays glimpsed through kitchen windows or between blocks of houses. Their attention is caught by an unexpected light coming from the sky. Should the decay happen to be along the axis of a road at low elevation all drivers facing that way reduce their speed simultaneously, except the ones who intend to park quickly to get hold of their binoculars.

Now let us climb a higher step of the ladder of luck - meteorologists making their forecast and checking how good that forecast is, and people using the forecast and checking how bad it is, are both good candidates for decay observations.

However, people without any critical mind who happen to be in their back garden for an innocent breath of the evening air have the same chance level, though perhaps a little less than those who love the stars, dream of an ocean of multicoloured diamonds twinkling on an ebony backcloth, forget about their feet in snow and their wide open astounded mouths, and get more often a cold than a decay.

But finally, according to the number of reports received, the record of luck belongs to the kind of population who have something to do with aerodromes, and flying staff, particularly, have a distinct advantage over the "crawling" staff. What of cloud interference? Well everybody and the Thames knows that Britain is surrounded by water and overhung by water.

(to be continued) P. Neirinck

U.K.4. News

The Particles and Fields Sub-committees of the NASA Space Science and Applications Steering Committee met on 8th April in the Astrophysics and Space Research Laboratory of the University of Chicago. Mr. Dalziel gave a short talk to the Sub-committee on the scientific objectives of the satellite payload, and described the sort of energetic particle experiment that would best complement the other experiments. There were eight applications from American particle groups to perform this experiment in U.K.4. The committee discussed these eight proposals. Then, after asking Mr. Dalziel (and Mr. J. Smith of S.R.M.U. who also attended to describe the spacecraft) to leave the meeting, they narrowed the choice down to three, placing them in order of merit. The final choice will be made by higher committees, in much the same way as happens in the U.K., and will be announced soon, we hope.

The role played by the R.S.R.S. in U.K.4 has been increased by the appointment of Dr. Eric Dunford as systems analyst. He will be responsible for seeing that all stages of the data processing and analysis run smoothly to meet the needs of the experimenters. His most direct responsibility will be for the "Satsep" computer programmer which includes experimenters' subroutines (also his responsibility) and which finally separates all the experimental data after inserting all sorts of auxiliary information. At this point, each experimenter should go away happy and work on his results in the way he had planned!
Mr. Luscombe will have the same responsibilities as he has held on the earlier satellites in this series. The next processing stage, instead of being run on the "Stretch" at A.W.R.E. will be run by Mr. Martin on our 1905. The computer

program for this bears the unfortunate name of "Satan" and has to be re-written by Mr. Martin. The "Satsep" program will be tested on our 1905 until the Atlas Laboratories have installed their new 1906A. It will then be run on the latter machine.

Innovations from Industry - a very occasional series

The Current-to-Voltage Converter

Impedonics Inc. of Pasadena, California, U.S.A. recently announced the tentative specifications for a new device which may have possibly widespread applications as an extremely useful passive circuit element.

The basic property of this device, the Current-to-voltage (C/V) converter, or current-sensitive proportional voltage dropper, is that it develops a voltage across its two terminals which is algebraically proportional to the current flowing through it.

Its most remarkable feature is the very wide range of operating conditions under which it meets its specifications. For example, the very impressive linearity is independent of frequency from D.C. to high frequencies which, although not yet specified, are believed to exceed 1 GHz if proper screening precautions are taken. A further advantage is that it is of rugged solid-state construction throughout, requiring well-established production techniques, and so is expected to be available in large quantities very cheaply; also its design lends itself quite easily to miniaturization and even micro-miniaturization methods of construction.

The basic parameter of the device is the current-to-voltage conversion ratio, R. Impedonics' development engineers claim that devices will soon be on the market with discrete values of R ranging from less than unity to well over 10^8 volts per ampere!

This combination of compact solid-state, construction, diverse operating conditions, and cheapness means that the C/V converter stands a good chance of fulfilling Impedonics' claim that this device will find its way with every form of electronic instrument in the not-too-distant future.

Passive Probe

Station News

Mr. Dalziel is the I.E.E. representative for this Station and will be glad to inform members of Staff on matters relating to the I.E.E. and its activities, and to advise on requirements for membership.

Dr. Horner is attending a conference at the Administrative Staff College, Henley, from 29th April until 2nd May.

Station Open Days have now been scheduled to begin on 14th October.

Dr. Owolabi, from the University of Ife, Nigeria, is here for five months as a guest member of Mr. Lane's division.

Mr. Johnston (Officer-in-Charge Stanley outstation) will be in U.K. for two months from May to July.

Mr. Hammond and Mr. Moosajee are going to Aberdeen to install a 16 khz receiver for measurements of the field from GBR at Rugby.

The E.S.R.O. 1 satellite has now been in orbit for over six months.

At the Royal Society on 22nd April, papers were presented by Dr. King, Mr. Dalziel and Dr. G. Thomas when they attended a discussion on U.K. experiments using N.A.S.A. and E.S.R.O. satellites.

Among visitors to R.S.R.S. this month are Dr. Danilkin of the University of Rostov-on-Don, U.S.S.R., Dr. McClure from Jicamarca Observatory near Lima, Peru, and Professor Carman of the University of Botswana Lesotho and Swaziland.

Dr. Rishbeth, Mr. Eccles, Mr. Piggott and Dr. Bryant attended a conference in Norway from 9th-18th April. The subject was the Polar Ionosphere.

Staff News

Congratulations to:

John and Marie Smith, on the birth of their daughter, Julie Elizabeth on 26th March.

David and Margaret Willis, on the birth of their daughter, Katherine Sarah Ann on 4th April.

Tony and Joyce Dagnall, on the birth of their daughter, Jane Elizabeth on 7th April.

David and Peggy Llewellyn-Jones, on the birth of their daughter, Sarah Mari, on 16th April.

Mr. F. E. Evans, now H.E.O.

Mrs H. Lennon, now C.O.

Welcome to:

A. A. Handley	Executive Officer, perm.
F. Goodall	E.O. - perm.
S. H. Phey	T.O. (Singapore)
P. Muzlish	Eng. II, perm.
J. S. Moore	Leading Draughtsman, perm.
M. R. Rees	Sandwich Course Student
R. Harrison	Sandwich Course Student
E. E. Freeman	Skilled Labourer
D. Stewart	Handyman, Falkland Is.
J. Gorman	Labourer

Resignations

T. Y. Leo	T.O. Singapore
Miss P. Mead	Sh/Typist, non perm.
Miss M. Stacey	Photoprinter Grade I, non perm.
Miss J. B. Turner	Executive Officer, perm. on loan to Civil Service Dept.
Miss E. Bambridge	S.A., Perm.
K. C. Roberts	S.A., Perm.
F. J. Clark	Driver
D. A. Thom	Handyman, Falkland Is.

Other changes

Miss J. M. Wood	S.O. transferred from Divn. III to Divn. V.
A. J. Rogers	S.S.O. transferred from Divn. III to VI.
V. D. P. Foley	Executive Officer transferred from Office Services to Establishment.
M. A. Pender	Returned to R.S.R.S. Divn. I from Falkland Is.

SPORTS AND SOCIAL CLUB NEWS

Bridge Club

The only match since last month was for the ex-R.S.I.R. cup on Sunday 20th April at Crowthorne, when R.S.R.S. were unable to regain the trophy which was won by the Warren Spring Laboratory. The three R.S.R.S. teams were placed 3rd, 5th and 7th, but the B team did beat the winners in the round when they played each other.

R. J. Pratt

Advertisement

Those of us, who in our travels along the Great Corridor, have stopped and gazed awhile at the notice boards, have no doubt already acquainted ourselves with the particulars regarding our Olde Bare(?) Tournamente. For those, who in fact have managed to miss the vast pieces of artwork acclaiming this as the event of the year - my condolences, and may I offer the following information?

Tournament

To be held in the Bar and Billiard room over the next three months. Six games are available out of which contestants must choose three games.

The games available are:-

Billiards, Cribbage, Darts, Dominoes, Draughts, Shove Ha'penny. Entrance fee is one shilling (1/-), and the prize of a bottle of spirits is offered as an incentive to invest this vast sum.

For more information, or to part with your shillings, please see

your own,

Hon. Sec.

Pat Dadds

Tennis

The tennis season has now started. Regular club evening is Wednesday from 5 o'clock until dusk. Match practice evening is Monday (from 17.00). Occasional arrangements are made to have a club afternoon on Saturdays. New members are welcome.

Subscriptions are now due:

£2 ordinary member

£3 husband and wife

£1 under 21s

If anyone requires further information please contact Richard Smith (121), Veronica Lovell (D48) or Marie Huggins (Computer Room).

Veronica Lovell

Dinner Dance at Boulters Lock Inn

Fifteen and a half couples found their devious ways to the Boulters Lock Inn at Boulters Lock on the evening of 26th March. For some, who were strangers to the area, the way was very devious indeed - Maidenhead's one-way traffic system did not help!

The decor and riverside surroundings of the dining room brought back many nostalgic memories of a hostelry in Singapore to several members of the party who had served tours there.

After wining and dining, most of us executed a Brownian movement on the postage stamp dance floor for a time, to the accompaniment of a 3-piece band.

Towards the close of the evening, the tables were being set out for breakfast. However, despite the attractions of breakfasting whilst enjoying a view of the river, the party dispersed for home long before the witching hour was over.

Our thanks are due to Edith Knight and Mike Farman for organising a very successful evening.

D. E. Mortimer

Letter to the Editor

R.S.R.S.
23rd April 1969

Dear Mr. Editor,

I wonder whether you, Sir, as one whose command of the English language is demonstrated so clearly every month in your essay on our local affairs, share my concern over our declining standards of written composition? The reputation of this station has hitherto been high in this respect; but for some reason many of us no longer take any great pride in the style and clarity of our reports and memoranda.

We have forgottem basic grammar and elementary spelling. For example, "propogation", with three o's, is in widespread use; "data" is generally used in the singular; and the utmost confusion prevails regarding "while" and "whilst". Unrelated infinitives and participles flourish and American jargon finds increasing favour. I see, Sir, that our experts in computation have now allowed "programme" to become degraded into "program". Perhaps such contraction was inevitable. But what do you think of:- "Dr. X. has authored (!) twenty-nine papers"? Or 'This Establishment contains a large research complex"? This last example does not refer (as you might suppose) to a commendable zeal for discovery but to a lot of buildings!

Furthermore, why are we so shy of using the first person in our writing? Why do we fear the positive statement and take refuge in so many conditional clauses? Let us have the courage to write "I tried to find a correlation between x and y, but I failed". Even if our seniors deplored our lack of scientific ingenuity they would surely commend our brevity.

In short, Sir, I am pleading for more Churchilliana in our composition, less Americana in our spelling, and for a return to our previous high standards of "English". Following Sir Winston's example on this theme I date this letter as from St. George's Day. Unlike him, however, I am fearful of the wrath of my colleagues. I sign this therefore as

Yours sincerely,

Peter Simple

Letter to the Outstations

Dear Colleagues,

As many of you will know, an hypothesis advanced some years ago, concerning Station staff, was expressed more or less in these terms: 'Whatever changes the staff are subjected to, the total number remains unchanged'.

A long series of measurements has shown this to be an over-simplification, for a slow but steady increase in numbers has been observed. This might be made out to be some function of the total entropy of the system, and there is, indeed, some historical justification for suggesting that our establishment may have its origins in a cataclysmic event such as the explosion of a primal ur-scientist containing wisdom packed to an almost inconceivably high degree.

Recently, however, a staff survey goes some way to rehabilitate part of the original steady-state thesis, which, implying as it does, continuous creation of staff, possesses an aesthetic charm inviting efforts in its defence. Random movement of personnel, probably thermal in origin, has long been noted; but in addition, it has been found that certain hitherto empty areas of space have been filled by permanent members of staff never before identified.

When the observed rate of discovery of 'new' staff is offset by the superannuitive loss-rate, the overall increase rate resulting is found to greatly exceed that obtained as a result of extensive long-term observations. Some additional loss-mechanism needs to be invoked. Perhaps the most plausible idea is that, on closer examination, a small, but significant, number of anti-staff exist. Between such bodies and staff a very strong interaction can be set up which eventually leads to the retirement of the anti-staff. Much work remains to be done in this field. For one thing, non-conservation of parity needs to be explained; it is always anti-staff who disappear as a result of couple formation and the disappearance is seldom instantaneous. Despite this, the idea is an attractive one, and a good case can be made out for this extra loss-rate giving a total slow increase well within observed limits.

Further evidence against cataclysmic origins is that no member of staff has ever been seen to pulsate, or to move fast enough to produce any shift at all, any red-shifts noticed being relativistic, and attributable to the extreme density of that particular individual. The one solitary, subjective and unreliable piece of evidence for a general recession at high speed has been when requests are made for a newsletter article by,

Yours sincerely,

The Editor

Reprint List

J. A. Lane

Scintillation and absorption fading on line-of-sight links at 35 and 100 GHz.

I.E.E. Conference Paper, pages 166-172.

Internal Memoranda

NIL