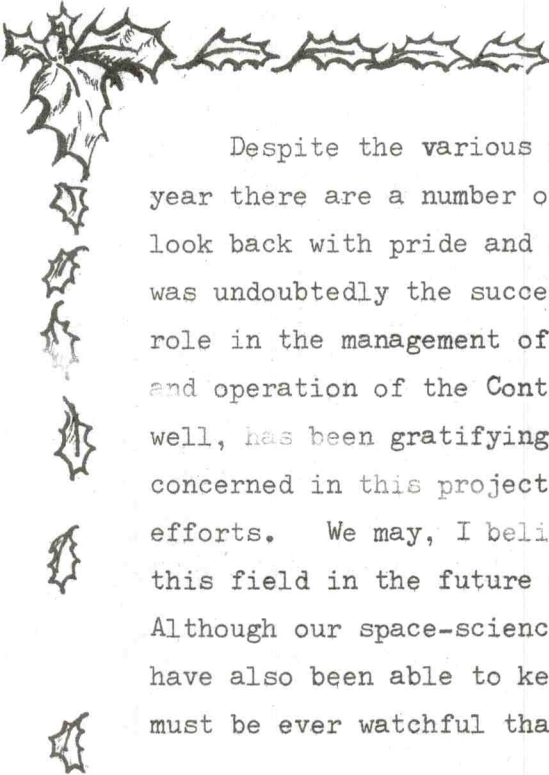




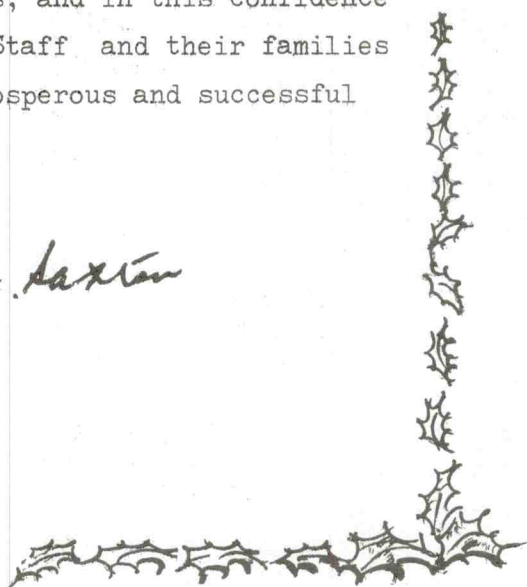
APPLETON LABORATORY NEWSLETTER

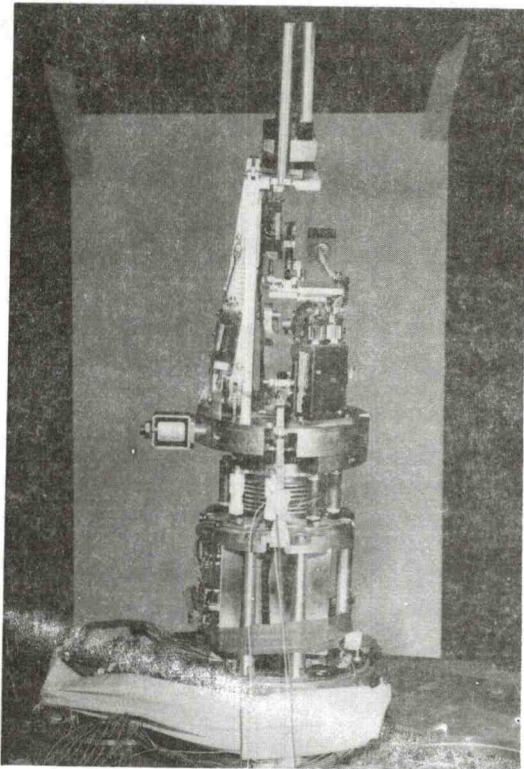


Despite the various problems we have had to face during the past year there are a number of successes in our work on which we may look back with pride and satisfaction. The high-point of the year was undoubtedly the successful launch of Ariel 5 and the Laboratory's role in the management of this project, together with the setting-up and operation of the Control Centre, which has functioned extremely well, has been gratifyingly praised by the experimenters. All concerned in this project deserve the highest commendation for their efforts. We may, I believe, look forward to further successes in this field in the future as other space projects come to fruition. Although our space-science support work becomes steadily more onerous we have also been able to keep a good research programme going and we must be ever watchful that this continues.

Our hopes of last year that 1974 would see easier times than 1973 were not realised and one cannot be optimistic that the corner has yet been turned. Yet we have much interesting work before us with the only difficulty being that of deploying our efforts adequately to meet all the demands. I have no doubt that, given the will, we can surmount all our problems, and in this confidence I sincerely hope that all members of the Staff and their families will have a very Happy Christmas and a prosperous and successful New Year.

J. Daxton





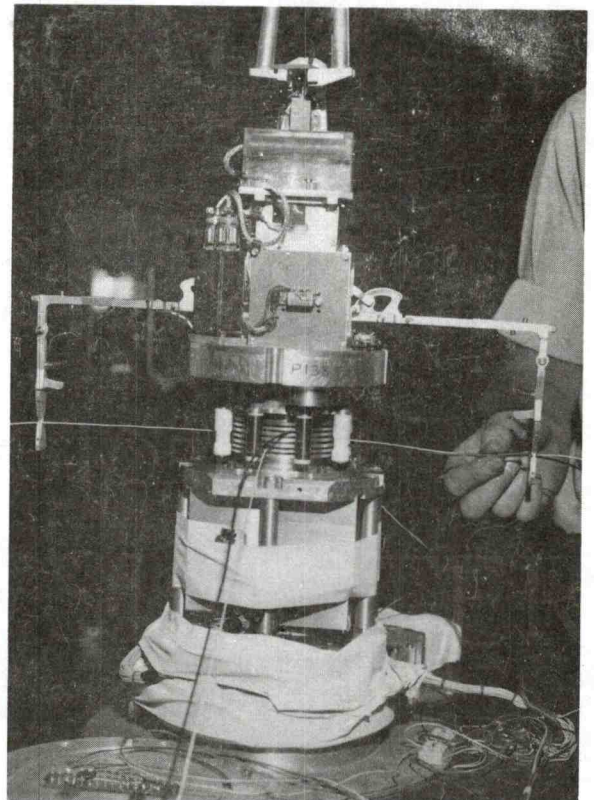
PICTORIAL NEWSLETTER

SCIENTIFIC APPLICATIONS

"High speed cine!" that is what the chap on the 'phone asked for. "High speed cine" I echoed, "What for". "To record our probes at high speed of course!" he retorted. I asked if we could begin with the requirement and let me evolve a solution. Thinking he was wasting his time he began.

It appeared that he had 3 rounds, as plate 1, and he was going to spin these, one at a time, and record the attitude of 1 of its 4 probes, the one with a strain gauge linked to a UV recorder. These probes would be deployed after launch and when fully extended 2 diametrically opposite ones were grabbed by two arms, these can be seen in plate 2, and then waggled 15 times a second, the resultant oscillation needed to be photographed to evaluate the extent of movement, and calibrate the strain gauge. There was a constraint, it was to be done in a vacuum chamber.

After discussion I summed up the proposal. A 40 inch probe, spinning at 9 revs per second and at least 15 spins to be recorded. I rang off to work out a solution. I felt high speed cine was not the right tool, because the peripheral speed of this probe was 2,260 inches per second and to resolve 0.1 inches a frame rate of 11,300 frames per second and a shutter speed of $1/22,600$ of a second, 400

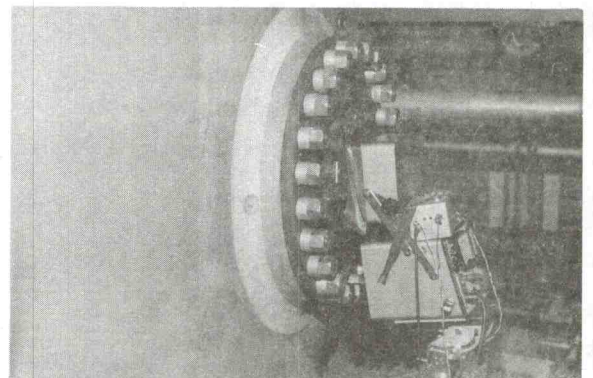
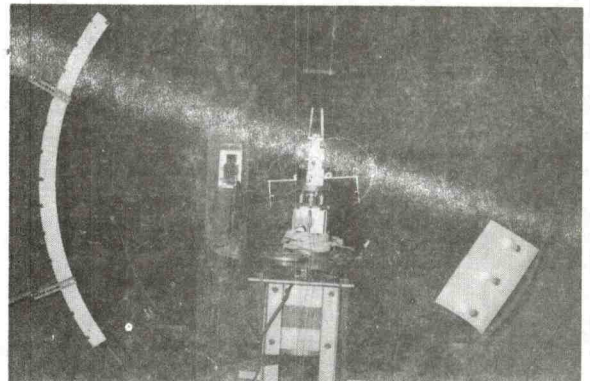
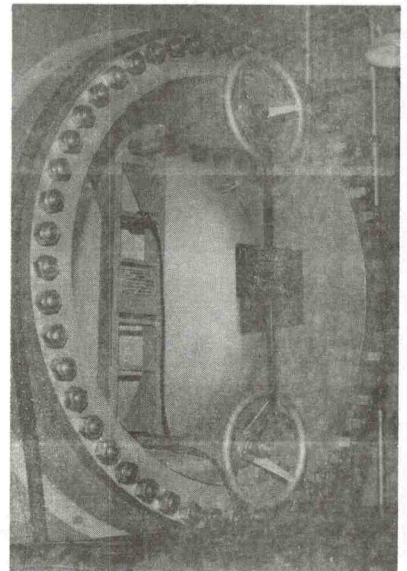
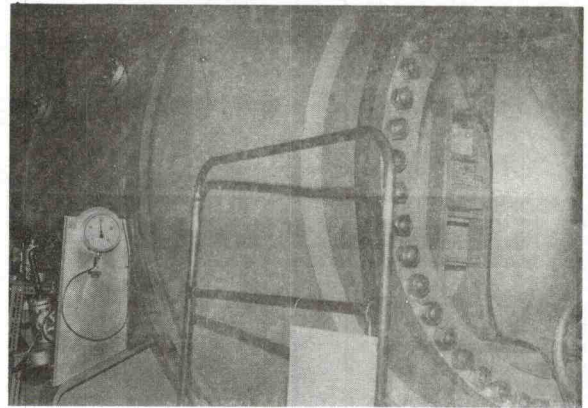


foot of film at 11,300 fps would last 1.4 seconds but 15 spins at 9 rps would need 1.7 seconds so that decided it. We would use high speed flash where 1/22,600 second is no problem and 15 overlaid exposures on one frame; as the probe will not be in the same place twice it will not mask information, also with a scale adjacent one can read off maximum swing in each direction directly.

I rang this chap and informed him of my thoughts, he then said "Could you do it for us". "Who is us" I asked. "Billy Wilson and Chris Goodall of Birmingham University, we are on the UK Collaborative project and our contact at Appleton Laboratory is Charles Whitlock". He said he had approached other photographic units who could give him no help, so would we.

It was decided to help out this need, so I asked for details and a programme of work. They required a range of spins 4-9 revs per second, and 3 takes at 1 flash, 1 take of 15 flashes, therefore 4 frames per spin speed and 3 spin speeds, 12 frames per pump down, 1 roll 120 film. This showed a need for a motorised camera of 6 x 6 cm which can work in a vacuum chamber of 4×10^{-2} Torr. The only camera which could fit this bill would be a Hasselblad EL so I phoned Hasselblad about the vacuum level and the gentleman said "No problems at all sir!" with an air of disdain "except the film will suffer from static arc exposure" and he was so right, they certainly know their space at Hasselblad.

The time came to go to Potton Island, South Sea island over the sea! No Southend Island over the mud, part of Shoeburyness range. The vacuum chamber, plate 3, was like a large sparklet bottle and one walked into it via the neck, plate 4, inside the camera was fitted onto a shelf in the chamber, aimed at the centre of the probe length, plate 5, and the flash had unfortunately to be sited outside the chamber, as plate 6, this cut down the light available due to angle, distance, perspex window and it clipped the size.

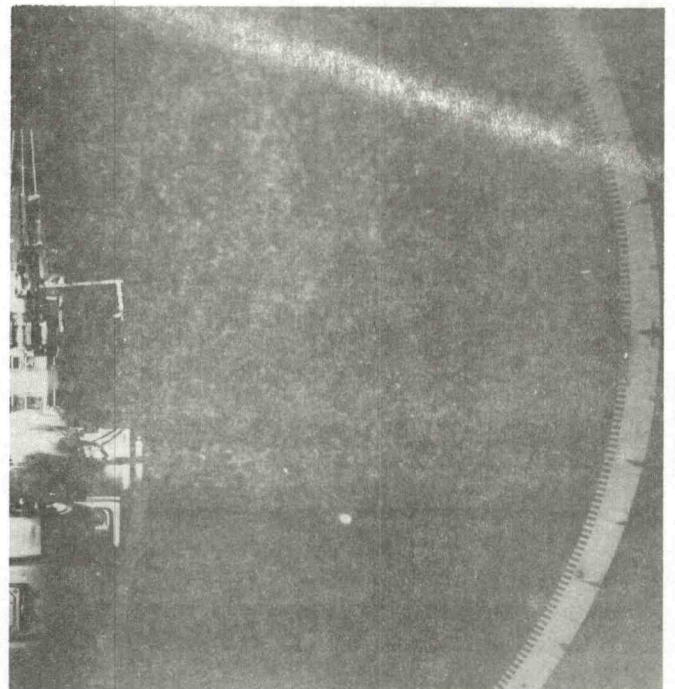
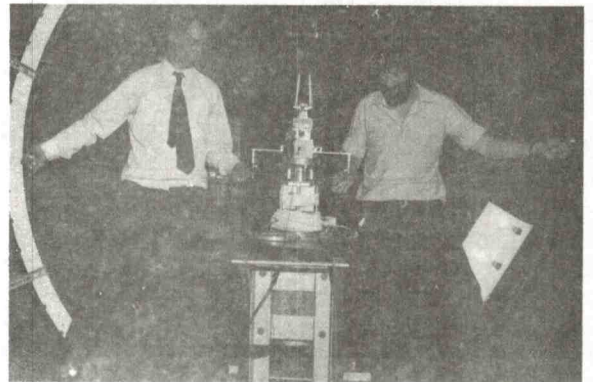
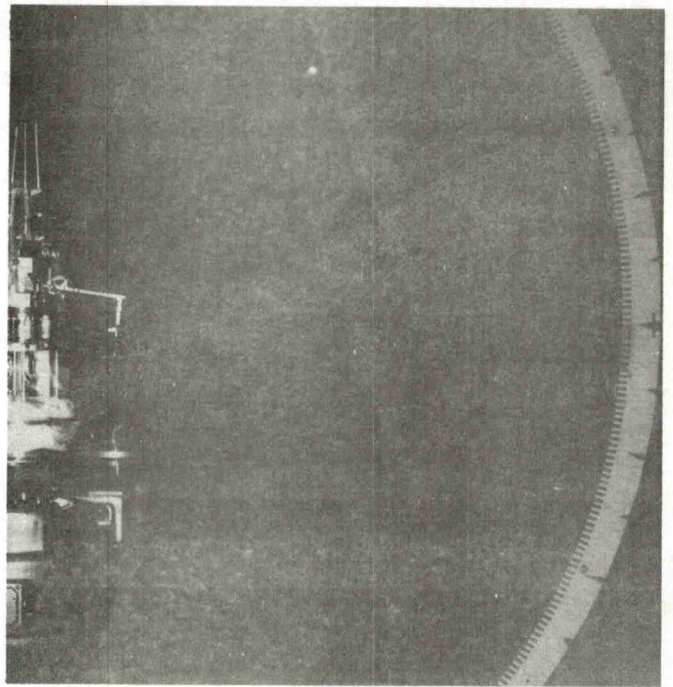


The light available meant forced processing of high speed panchromatic film at full lens aperture, which at f2.8 gave us only 1 inch of sharp focus at the scale, this close tolerance was of use as only correct flash images were sharp, spurious ones were unsharp, plate 7.

Unfortunately, the 'Brum lads' had 'teething troubles' and had to abandon the first trial due to the spin motor not operating in a vacuum, but we could test the camera system, which was all O.K. We returned when a hydraulic motor had been installed, but as time was running out, and the catching arms were not 100%, it was decided to hand link the wire probe into the catchers, plate 8, and do all spin rates required on one round at one go, this meant that 40 photographs at one loading was needed. We got hold of a 70 frame magazine with no difficulty but obtaining the film was not easy for just 1 roll. Each pump down and let up to air took 2 to 3 hours a time, so we could save many hours by doing all tests on one round at one pump down.

The processing of 10 ft. of film on site presented difficulties in drying it without anyone walking into it. The film had to be processed to align it with the UV record of the strain gauge, which was the only requirement not possible with that particular set up.

The days at Potton were long, never less than 14 hours and often over 20, but the results were successful and I returned to Datchet with the films and we made 10 x 8 prints off each frame on to dimensionally stable base and posted them off to Birmingham. Results were similar to plates 9 and 10.

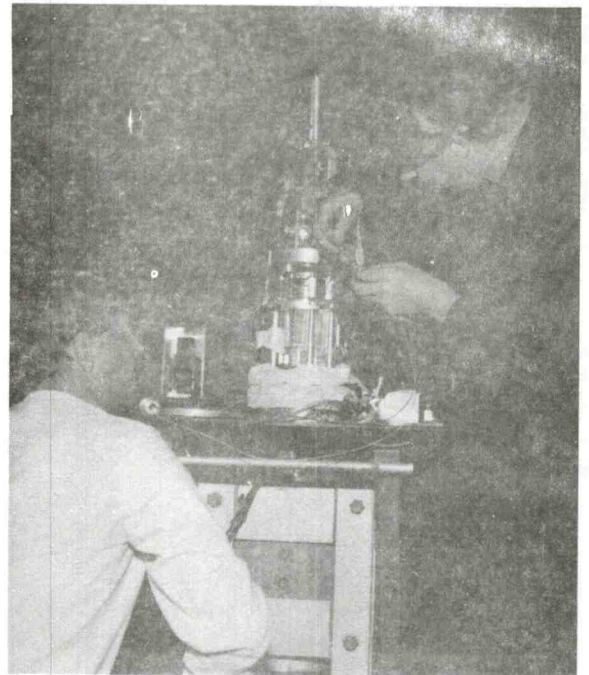
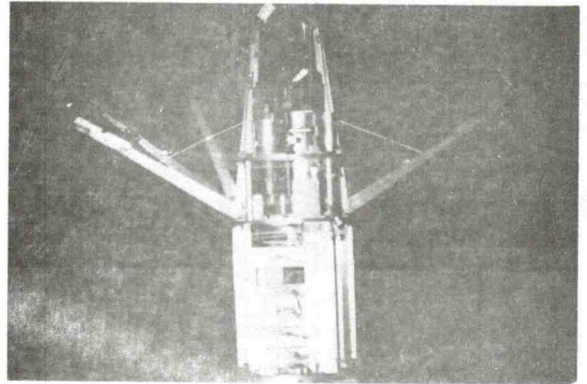
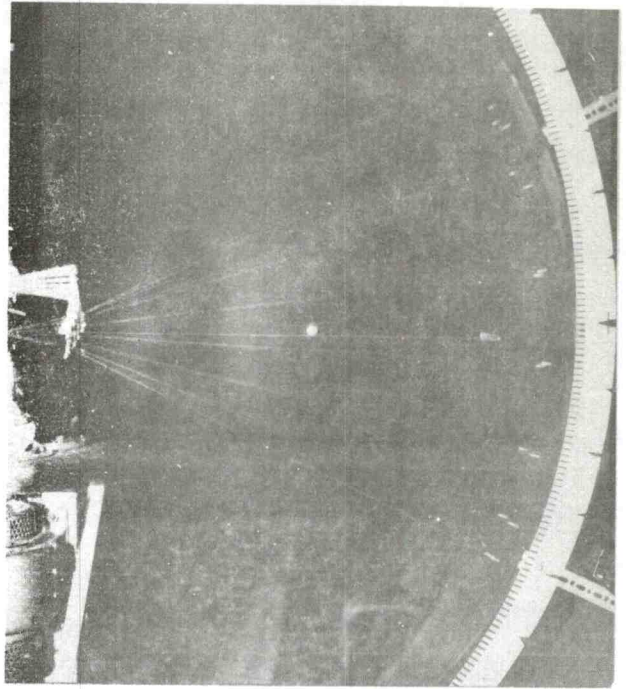


One afternoon Paul Dickinson and Gordon Barnett arrived and did a vacuum test on their round, slightly different in operation but photographically recordable in very similar vein, plate 11. They required to strobe one frame during deployment of the arms and use spin/strobe rate to time deployment. I processed the film all O.K. and off they went.

Quite often the work was done within the chamber and it became quite a friendly place, as in plate 12, probably because we spent so many hours there.

This is an example of the work which the Photographic Section can turn their particular expertise to. When necessary they can, if not already equipped, beg, borrow, or hire equipment to fit the particular result, and quite often the result is presented in a far simpler form for interpretation than was originally envisaged. I trust we can serve you, and help you solve your problem at some time, there are many tricks in the Scientific Applications photographer's bag.

P. A. HICKS.



Station News

Mr. Meadows visited Sweden on October 24th to discuss with Professor Rybeck the provision of a ground station for the satellite ATS6. This satellite was also the subject of talks which Mr. Meadows and Dr. Allnutt held with ESRO in Paris on November 7th.

Mr. M. P. M. Hall attended an international working party of the NATO Special Panel for Radio Meteorology, which was held at the University of Ontario on December 3rd and 4th, in order to discuss the completion of a prototype high performance radiosonde.

Condolences

We very much regret to learn of the death of Betty, the wife of John Chicken of our Chilbolton staff. On behalf of all Staff we offer our deep sympathy to him.

Staff News

Congratulations to :-

Jeff Payne	on his engagement to Angela Hart
Mrs. A. Snowdon	now D/Shift leader
Miss B. Dorman	" " "

Welcome to :-

Mrs. M. W. Thrift	Typ. II P/T
H. C. Hoppe	Ex.O .
C. Nelson	S.O.

Resignations :-

Mrs. E. M. R. Grant	C.O.
Mrs. M. E. Wilding	C.A.
P. Landsberg	H.S.O. (U.S.A.)

Other Changes

C. R. Carter	S.S.O., on L.W.O.P. for three years w.e.f. 14.11.74
Mrs. J. M. Nasse	C.O., now Full-time.

By their names ye shall know them (given a bit of luck)

Rakio & Space Research Centre

R.S.R. (Slough) Appledon Works

Messrs. H.M.S.O. Ltd., Science Research Council, Ditton Park

Radop a?d S?ice Researcj Statop?

Rapid Reserch, Ditton Park

Science Research Castle Ditton Park

Letter to the Outstations

Dear Colleagues,

You will have seen from our list that, despite a year having passed, the variations on the theme of our style and title are largely based on R.S.R.S. Though few in number they range widely. Our progress is marked from the Balkan overtones of SACERESEARCJ (A remarkable new film of peasant endeavour from Bosnia) through the complimentary, if illiterate, RAPID RESERCH to the unfashionably ivory-towered concept of the SCIENCE RESEARCH CASTLE.

So far as the latter is concerned, a male visitor in need might well suppose himself to have wandered into a palace of science and culture. The main mens' lavatory has for the past month or two been continuously engaged by members of the Central Works Unit and their contractors; that necessary house has now been thrown open for more general (male) use. It is transformed. Patterned tiles adorn the walls. Fresh basins fitted with interesting taps and plungers afford hours of amusement and instruction. There are new-er-THINGS; the general atmosphere is one of comfort, not to say indulgence. It is homage indeed to Hygeia and, at last, a chance to quote. For this relief much thanks to C.W.U. and to you all a Merry Christmas and a Happy New Year from,

Yours sincerely,

The Editor