



## NEXT MEETING - The Annual General Meeting.

At this time each year it is necessary to pause and take stock of the administration of our Society. The announcement of the meeting in itself may not appear to be very exciting but it is most important that as many members as possible attend because the reports prepared by individual members of the retiring committee are delivered, the subscription rate is reviewed and the election of the new committee must be accomplished.

As the majority of the present committee have volunteered to serve again, the transition into the 1993/94 season should be reasonably straightforward and the meeting will be able to move into a Technical Forum session which we know you all enjoy, however, the evening is dependent on the participation of all the attending members:-

1. Nominations for committee vacancies.
2. Voting for the committee election.
3. Suggestions for future meetings and A.O.B.

To add interest to the evening we will make the Bumper Draw for the free annual subscription fee as well as the usual monthly fund raising draw with interesting prizes.

The meeting also includes the announcement of nominations and voting for our Annual Award of Merit.

Proceedings will begin at 7.30pm on Tuesday 5th October in the Marconi College, Arbour Lane, Chelmsford. Looking forward to see you there. Note:- Bar facilities, see details on page 2.

### DATES FOR YOUR DIARY

5 Oct. C.A.R.S. ANNUAL GENERAL MEETING.  
8/10 Oct. RSGB HF CONVENTION - Old Windsor.  
29/30 Oct. LEICESTER AR SHOW - Granby Halls.  
2 Nov. CLUB MEETING - The Annual Junk Sale.  
17 Nov. DF EVENT - Mid-Essex Trophy - Long Melford

### TECHNICAL FORUM

In preparation for the session to be held after the AGM, please think of a question to address to the audience; remember last year we all learned why some 5¼ inch floppy disks have 10 holes!

### CARS AWARD NOMINATION - John, G8DET

I would like to nominate Fred, G2HNF for this Award for 1993. Fred provides month after month a quiet advice service at the start of each CARS Meeting and during the Tea Break.

Between Meetings he also helps with Members individual projects and problems; providing his wide range of experience to assist others. A pleasure to have as a Club Member.

### DF NEWS - Dick, G3WHR

#### The fourth Chelmsford event - Friday 27th August.

This time it was my turn to provide the hidden station. Since it was the Bank Holiday weekend I decided to make it a short distance event thereby avoiding travel on the main roads. I found a site at Tolleshunt Knights, just 3 Km from the start, which meant adjusting the transmitter power and aerial height to give a 'distant' strength signal. One team did go as far as Colchester Zoo but my second transmission soon brought them back. Philip was first on-site, but he failed to spot where I had tee'd-in to the aerial and he overshot the Tx. By the time he returned, Andrew and Roy had already been in.

Results

1. Andrew Mead	8.29
2. Roy Emeny	8.41
3. Philip Cunningham	8.49

### COMMITTEE MEETING

The October Committee meeting will be held in the Telford Lodge at 7.45pm on Wednesday 13th October, you are welcome to join us.

### VISIT TO STANSTED AIRPORT - Brian, G3CVI.

On September 9th a group of eleven members was privileged to be taken round the National Air Traffic Service's control tower and radar room on a conducted tour. Small numbers only can be accommodated due to space and security problems

Once cleared by the gate house we met our guides who issued individual ident cards and we went to view a video which covered the general aspects of Air Traffic Control as directed by The Civil Aviation Authority who set the pattern for NATS which has RAF overtones also.

Then we divided into two groups, one to the Radar and the other to the Tower...the 'Holy of Hollies'. The tower with its magnificent view of the runway and peri-track was "manned" by a lady and two men whose duties were to handle arrivals and ground movements and departures. The controller who was dealing with the ground matters caused much amusement when, having filled out and FPS tally he tossed it with spot-on accuracy onto the other controller's desk saying "This one is yours mate"...within a few seconds the aircraft named on the FPS was airborne and clearly visible on its climb-out. Neat, quick and virtually foolproof!!

It was obvious by this time that we were going to overrun our time (to our delight, of course) so a call was made to the second venue of the day across the other side of the drome viz; the huge hangar where we were due at mid-afternoon. They kindly adjusted the schedule without complaint.

In the tower was the airfield lighting board set out as a scale model of the runway peri-track and taxiways. Coloured LEDs indicated which lights were selected at the time. We were reminded of the constant vigilance required to keep all aircraft moving or securely at the holds. On this day the vis. was perfect thanks to a sweeping rain scud which left clear skies in its wake so no actual runway lighting was required.

At "half time" we changed with the other group and entered the radar room where activity was indeed intense. There was a Fly-in at your scribe's home field at North Weald and there were very many machines within the Stansted airspace all calling for routing instructions and weather up-dates etc.

We watched fascinated by the computer augmented displays

(continued on page 2.)

(Visit to Stansted, continued.)

showing in superb detail the positions of dozens of aircraft each within its squawked ident or callsign and height, altitude or flight level as advised. Gone are the days of ill-defined blobs with that ever rotating vector, now one sees a tiny dot for each pass of the beam so that movement and speed can be easily estimated at a glance.

Surprisingly at the next chair sat a lady whose task was to act as "Nanny" (hope she does not read this) to the flocks of helicopters and other craft continuously operating among the North Sea oil rigs. Her brief was entirely advisory but we noted how frequently she was called by pilots wanting traffic up-dates and weather reports etc. Her screen had pre-programmed coastlines and area boundaries already visible so we could see the zone of activity concerned, "but the pilot always has the final say", said our guide.

Very reluctantly we had to take our leave of a most impressive group of folk who were so pleased to answer our questions and spared no effort to explain their working system. It was high time to follow your scribe round the maze of roads to the second venue...so expressing our sincere thanks to Linda and Bob we joined convoy to the FLS hangar.

The un-English expression "Gi-normous" is most suitable for describing the Diamond Hangar as it is called. After clearing security, more simply this time, we were taken to a viewing gallery about fifty feet above workshop floor level where we found ourselves looking directly into the pilot's windows of a 747 which was under overhaul for the long term total strip-out. Every demountable item was stacked on the floor in orderly piles...seats, lamps, speakers, galley items, windows, you name it, it was there awaiting inspection for re-assembly. Our hostess Julie, said that they had 60 days in which to do the entire job and be ready for air-inspection!! Such was the size of the hangars that there was, in the next bay, another giant machine nearing completion...the largest unsupported roof in Europe...we needed no proof.

All good things come to an end and so we returned to ground floor via the passages passing the clean rooms and dust-free areas where specialists were servicing flight instruments and small electronic units...no-go areas naturally to visitors...all tightly sealed behind glass panels with controlled ventilation systems.

Thanking our hostess for a most interesting and informative visit and accepting her invitation for a second one later, we departed for home having had a most wonderful day.

## DF NEWS - Dick, G3WHR

### The fifth Chelmsford event - Friday 17th September.

For our final event Peter Graves provided the hidden station. My start bearing went towards Halstead but an inaccurate second bearing from near Feering went much further East which caused me to take a long detour via Wakes Coln. At one road junction I met up with Mike Hawkins but the transmitter went off before I could take a bearing. I followed Mike to the end of a footpath but then lost Mike and my own way in the darkness. I kept following the set, through woods - stream - sheep, until I eventually came to where Peter had parked his car. By this time everybody else had found the Tx and I was nearly the object of a searching party. Needless to say there were no points left for me.

#### Results

1	Daphne Mead	8.35
2	Peter Larbalestier	8.35.30
3	Roy Emeny	8.36
4	Andrew Mead	8.40
5	Philip Cunningham	8.42
6	Mike Hawkins	8.55
7	Dick Brocks	9.00

#### Future Events

The Mid Essex Trophy will be held on Sunday 17th October using the Bury St Edmunds OS map. The start will be from Long Melford green, NGR 867467 at 1.20pm. Afterwards we have been invited to Pat and Mike Hawkins house at Gt Cornard for a Bring-a-Bite tea.

## LAST MONTHS MEETING

*Editors note. It was with great pleasure that we welcomed Pat Gowen, G3IOR on his return visit to the rostrum.*

*Pat in his usual style provided a wealth of information to his audience and in particular kept Geoff, G3EDM and John, G8DET busy taking notes for the report that they had volunteered to write for this Newsletter. Such was the detail provided, particularly by Geoff, that yours truly decided that the report could not be watered down in any way, so hang the expense, the whole report is published herewith as a supplement to this months edition.*

## NEW FACILITY FOR CLUB MEMBERS

We have been advised by the Manager of Telford Lodge (which is the residence attached to the Marconi College) that the fully licenced bar can be made available to club members from 7.00pm to 7.30pm on the Tuesday evenings before the our club meetings.

This facility is already used as the assembly point for committee meetings and can equally host early arrivals who wish to enjoy a glass of soft or hard refreshment with friends.

## VISIT TO HARLOW RALLY - Ela, G6HKM

After our usual Sunday morning ritual, listening to the RSGB News, we departed for Harlow. We just missed parking in the main Car Park but were fortunate enough to get a spot on the hard standing on the corner as you approach the Sports Centre. Heavy rain had been forecast, so it was not far to the car should the skies open up.

We had to queue for about 10 minutes in a very cold wind, but it was quite entertaining listening to the chatter. Immediately in front of us was a group of young men discussing packet, the conversation went like this, "my equipment is tied up with packet so I don't get on air these days, did you get my message on packet?" the reply was "yes, I sent a couple of replies", "Oh did you, I didn't get them", I piped up with "sounds as though you two would do better to talk on air to get the messages through".

When we paid our entry fee we were given a ballpoint pen engraved "Harlow Radio Rally 1993" and "See you again September 1994".

There were plenty of visitors to the Rally, the gangways were wider and this made it more pleasant to get around. Computing equipment was in abundance and generally speaking the presentation of stands, packaging of components etc., was better. It was nice to see some of the new rigs at first hand, especially the new TenTec HF mobile rig, with the facility for slotting in modules for individual bands, before leaving we collected a few useful goodies.

We saw quite a few familiar faces and Club members and I would think the Organisers would be pleased with their efforts. Hope to see you there next year.

73 from Roy & Ela Martyr, G3PMX & G6HKM



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## MEMBERS ADVERTISEMENTS

### FOR SALE

MICRONTA Electronic Analogue Multimeter, 10 Megohm input res., reads DC & AC Volts, Current up to 10 Amps, dB scale, etc. Cost £40, is boxed and brand new. Will accept £20, Colin, G4IIK, enquiries via Roy, G3PMX.

### FOR SALE

TRIO R-600 Communications Receiver, 150KHz to 30MHz, AM, SSB and CW, suitable for 240VAC and 13.8VDC operation. Boxed and in very good condition, little used. £165 Contact Roy, G3PMX.

# Chelmsford Amateur Radio Society

Supplement to Newsletter No. 333

October 1993

## Talk given by Pat Gowen, G3IOR on HF Satellite Communication. Commentary and illustrations by Geoff, G3EDM/VK3EDM.

Pat introduced the subject by emphasising the unique part which the world's 2 million radio amateurs, of which some 600,000 are Japanese, could play; saying that commercial researchers would pay an arm and a leg for the opportunity to have so many observers. Radio amateurs observe many things but unless they commit their observations to paper (even though they may not understand the ramifications of their observations) others will not have the opportunity to investigate further.

For example, Pat said that most textbooks simply refer to the ionosphere as a mirror in the sky for HF signals (those between 3 and 30 MHz), whereas in reality a mirror reflects; the ionosphere, in fact, bends the signal by refraction. This important difference is lost if for example we try to explain the transmission of HF signals on 14 MHz (20m) in terms of simply multiple hops between the ionosphere, acting as a mirror, and the ground (also acting as a mirror). See figures 1 & 2.

Having myself worked over 2260 Australian stations on 20m, 15m & 10m the signal strengths received cannot be accounted for by multiple hop transmission over the 14,500 mile (23,220 km) path when firing the beam over S. America and the Pacific ocean (Known as the LONG PATH) to Melbourne, Australia (Beam heading 240 degrees).

The SHORT PATH to Melbourne (Beam heading 60 degrees from North) is some 10,500 miles (16,800 km).

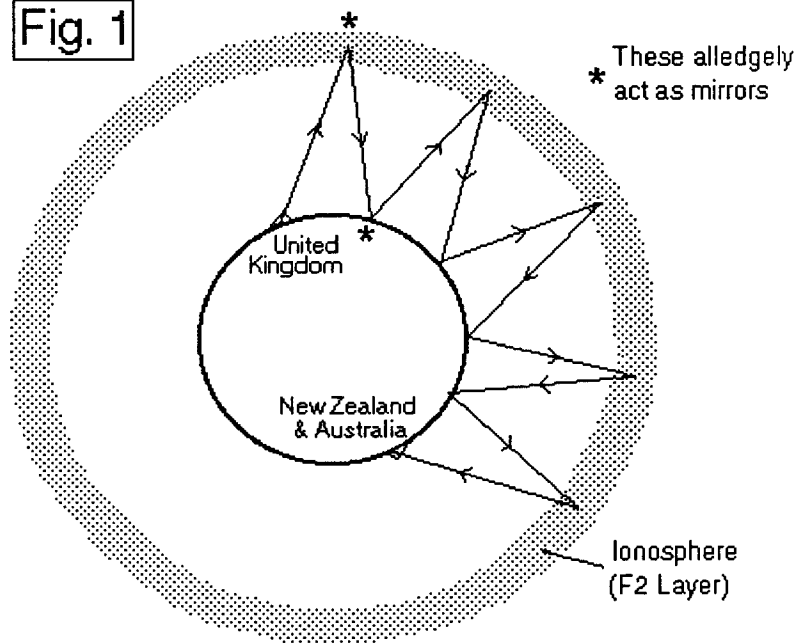
On the long path some signals come in, depending on propagation conditions, at S9 + 60 dB. That is to say stronger than local broadcast stations so even if the hams were exceeding their legal power output this would in itself not account for the tremendous signal strengths.

We are frequently told in the textbooks that reception and transmission are reciprocal effects; that is to say, if there is transmission in one direction then equal transmission applies in the reverse direction. A moment's thought will indicate that this cannot be generally true on HF since the paths in each direction are not physically the same. For instance, at the time the LONG PATH is open it is just dawn here and just dusk in Australia; thus our beams are firing into daylight and the Aussies are firing into darkness! The conditions in the ionosphere within the first few thousand miles at each end are quite different, so why should transmission (& reception) be reciprocal? In fact they are not; signal strengths received in Australia are stronger at the beginning of the openings whereas the Aussie signals are getting stronger here at the end of openings. (An opening maybe ½ to 3 hours depending on numbers of sunspots.. these latter affect the particles thrown towards our ionosphere by the sun and hence how well and in what manner the ionosphere works to assist our signals).

Pat indicated that with the aid of a satellite capable of transponding HF signals that we could have the equivalent of an aerial system 400 km high! Such a satellite would fire HF signals into the F2 layer of the ionosphere at a height of 400 km and a very shallow angle so the radio waves would be trapped within in it. Much as waveguide can be thought of as bouncing the microwave signal from wall to wall until it arrives at the far end of the waveguide (My words.. not Pat's). Thus attenuation (weakening) of the signal is exceedingly small; the signal is not bounced between ionosphere and earth as per conventional, simplified, theory which would lead to massive attenuation at each reflection i.e. perhaps only 10% of the signal would pass at each bounce and it could easily be less. Conventional theory might indicate 5 bounces at each of ionosphere and earth so total weakening would be 10% of 10% of 10% of 10% of 10% etc. ten times or 0.000000001 of 1%, that is to say 100 dB (decibels) of attenuation due to bounces in addition to path loss which itself is many dB. (This loss might be upward of 130 dB). For a radiated power of 100 watts this might mean a signal strength of, say, 20 microvolts per metre at the end of the LONG PATH to Australia if there were no bounces at all. However, with bounces at each hop this would reduce the signal to 0.6 microvolts per metre. All these figures are optimistic values and, in fact, reflections at the earth might well be very much less than 10% thus providing more attenuation. The amateur counters these losses, to some extent, by having aerials at each end with several dB gain; say around 12 dB at each end on 20m.

Evenso, under poor propagation (high attenuation) conditions I still manage to work Australia most mornings on 20m throughout the sunspot cycle.

Fig. 1



Pat indicated that he had worked ZL3QP through the Satellite on sked on a number of occasions and said that this was because of the antipodeal relationship between the UK and ZL. He doubted whether the satellite could be used for QSOs between UK and Australia... perhaps we can prove this to be incorrect.

The satellites used are in the Russian RS series; RS12/13 were launched on February 5th 1991 and Table 1 indicates the frequencies they use:-

TABLE 1		RS 12	RS 13
Mode K	Uplink	21,210 - 21,250	21,260 - 21,300
	Downlink	29,410 - 29,450	29,460 - 29,500
BEACONS		29,408 - 29,454	29,458 - 29,504
For full details refer to page 7, Oscar News No.89, June 1991.			

If one transmits, for example, on 21,215 MHz then one should listen for ones own signal on  $21,215 + 8,201$  MHz, i.e. 29,416 MHz on the downlink. Pat said that if you possess a modern transceiver with electronic switching you should be able to hear yourself!

Pat said that it was possible to hear satellite signals coming down from an auroral reflection stronger than the directly received signal. A tape was played to demonstrate this.

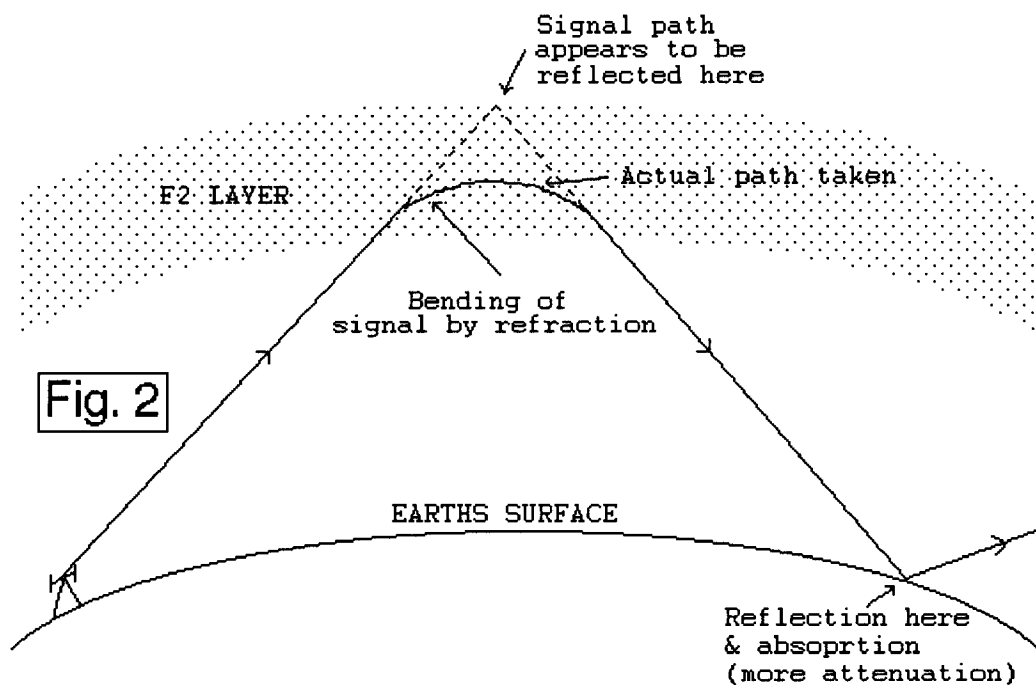


Fig. 2

## Talk by Pat Gowen, G3IOR - Part two - Report by John, G8DET.

After the Raffle was drawn Pat continued the evening by talking about his other interest, namely "The Environment", and in particular the North Sea.

Pat was very concerned about the pollution and sea level rises in the North Sea. Checking the water quality was something Pat has been involved with for sometime (last year he had a sore throat from accidentally swallowing water off the beach at Scarborough) - the biggest culprit being the Water Boards themselves being the dumping of untreated sewerage into the sea. The DOE had produced a Blue Flag award to a different criterion to that used by the EEC Blue Flag for water which is deemed safe for bathing. The solution is easy - provide 100% treatment of sewerage.

The rise in sea level is much more difficult to understand and possibly solve. Pat had personal experience of the effect of coastal erosion as his holiday home had disappeared at Hemsby in Norfolk. Partly this was caused by dredging sand from the sea for sale to the building industry in the UK and Holland. This means that the strong tides and storms now pound further up the beaches causing even greater erosion.

The greatest worry is when a deep depression travels from the Irish Sea across country towards Holland and is then followed by a high pressure area. This produces strong winds down the North Sea (from the north). If this weather pattern occurs at one of the higher tides in the spring or autumn and continues for 3 or 4 days then the worry is that general flooding can occur. In Jan. 1993 the water lapped over the Causeway at Maldon but the wind was very light so there was no flooding however in Norfolk a number of boats found themselves floating into the Car Park!

Pat felt that more should be done to prevent the possible widespread flooding which could result - without such action the use of RAYNET could become an everyday event.

On this note the Chairman thanked Pat and his Wife Norma for travelling to Chelmsford and pre-booked another Lecture in 2 years time after Pat's hospital treatment.