



Mid Sussex Matters



Mid Sussex Amateur Radio Society Members Newsletter

February 2010



Chris Saunders G4ZCS giving his talk on NVIS in January

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From The President's Corner

The good news is that band conditions on 15m are at last beginning to improve and we are hearing our US friends on a daily basis once again. No big romping signals but at least we are able to exchange greetings with Bob N4XAT and some other members of the Cape May Club once again. That's a good reason for you to join us on 15m whenever possible.

Recent work by a dedicated few saw the G5RV reinstalled on top of Cyprus Hall once again but tests soon revealed that more needs to be done to prevent breakthrough of our transmissions into the Hall's audio amplifier system.

Clearly we need to resolve this matter once and for all if we are to use the extensive facilities we have in the shack. Moves are therefore now afoot to identify the problem and fit whatever components are required to allow us to transmit on any bands at any time in the future.

This work is long overdue, we are after all a Radio Club, and whatever outside activities we participate in we should be able to use our home base station whenever we wish to. We have the knowledge to resolve this problem within MSARS, let's make it a priority to do so now!

In the meantime, let me hear more of you on the nets.

73

Ken Gibson G3WYN

From The Chair

I am very pleased to be able to report that the G5RV aerial was re-erected a week or so ago and is back in full use from our shack. The work was carried out by a local firm - Aerialbeam - and is guaranteed for two years and is covered by their insurance. Thankfully, the riggers reported that there is no damage to the rear wall of Cyprus Hall and they fitted four new brackets to support the metal pole which, in turn, supports the G5RV and the 'white stick' three band antenna. In addition, they also fitted a continuous halyard and marine quality pulleys which will allow us to lower and raise the wire aerial whenever we need to. At some point when the better weather arrives, we need to organise a working party to fit a similar halyard system to the front of the Hall but I believe that we shall be able to do this ourselves, from a ladder, without too much difficulty.

Now that the G5RV aerial is back in service, we shall be able to resume the work of tracking down and rectifying the causes of the slight breakthrough affecting the P.A system in the Starford (Upper) Hall. Quite a lot of work has already been done and I would like to thank those involved for their work and expertise on behalf of the Society - Ken Gibson, Chris Childs, Kim Newland, Rob Ashman, Alan Cragg, and Chris Saunders. Hopefully, a complete 'cure' will soon be found and the other users of Cyprus Hall will be able to enjoy uninterrupted use of the P.A system during their meetings.

May I also thank Kevin Murphy and Stella Rogers for their work in respect of our QSL card collection. Stella has spent a lot of time completely sorting into call sign and date order our large collection of QSL cards and Kevin has overhauled and brought up to date our QSL responding system. Finally, we are planning to hold several outside events this year and hope that you will feel able to assist and take part in these events.

1. Mills on the Air over the weekend of 8/9th of May at Jill windmill.
2. VHF field day at Keymer Post over the weekend of 3/4th of July (date to be confirmed)
3. HF Field day at a venue to be confirmed over the first weekend in September.

Please do remember that all of these outside events are quite labour intensive and if members do not volunteer and come along to help with the work of setting up and breaking camp as well as operating and logging, then the Committee will have to consider whether these events should go ahead or not.

Have a good month, until March

73,

Gavin Keegan G6DGK

Membership Renewal Reminder

The Society Constitution says that subscriptions must be paid no later than 31st March each year, so if you haven't paid yours for 2010 yet, now is the time to do so. Subscriptions are still £35 (£25 conc.) this year. Please contact Mike Pollock G8KMP for a renewal membership form.

E-mail address is: mike.g8kmp@virgin.net

Or you can write to him at: 25 Meadow Lane, Burgess Hill, West Sussex RH15 9HZ

Editorial

Despite what I said in my November editorial I have to apologise again for the late distribution of the printed copies of the December issue of the newsletter. This was due to confusion at the printers. Talking of which it would appear that the Committee has to review how we have a printed version produced in future. As you will know, we have benefited from sponsorship in the past which, in the current economic situation, is no longer viable.

As it is two months since the last issue it would appear timely to draw member's attention to the shortage of contributions to the newsletter. At present there is nothing "in stock" so the appearance of a future issue of Mid Sussex Matters depends upon you, the membership, providing me with the material. On this same topic you will see that our President, Ken G3WYN, is putting all you potential authors to shame by having 2 articles published as well as his regular column. I do wonder, however, how many of us have a garden that could support the 175.58 feet version of his Cuckfield Window.

The weather during the weeks around Christmas and the start of this Year led to the cancellation of some activities by members. No doubt the snow that deluged us for a while really tested antennas and their supports at that time. I know that some members with susceptible beams, wire, masts etc. suffered from the unusual weight of snow and hope that any material damage has now been rectified.

Since the last issue of the newsletter we have had two excellent talks at Cyprus Hall. In January, Chris G4ZCS gave a presentation on NVIS which was much appreciated by the large turn out of members. In February we had Eddie G0ECW telling us about the Newhaven Fort Museum. The displays there, showing receivers such as the CR100, R1155, AR88 and other WWII "surplus" rigs, certainly took me back to my own SWL days in the 1950s.

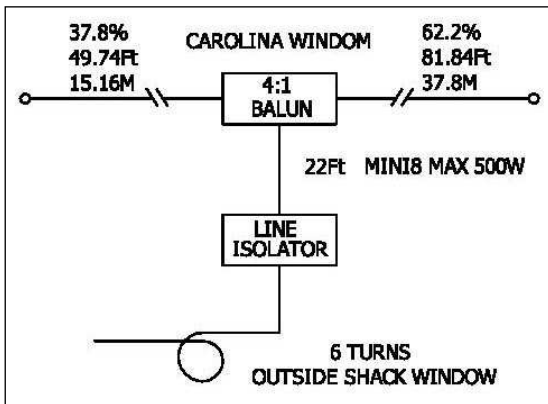
Eric Willox MOBKX

A CUCKFIELD WINDOM, 11 BANDS ON ONE WIRE

Although I have a lot of room here for antennas, the house and shack are towards the front of the property and all attempts to feed a long doublet resulted in feeder lengths of 200 feet or more to reach the centre from the shack. This length of coax would have too many losses and 400 ohm line attracted successive gardeners who continually cut through the feeder.

As it is essential for me to have an antenna which works well on 80m and puts a good signal into Dublin my thoughts turned to a Windom, an off centre fed dipole, fed approximately one third from one end. This would fit into my plot and considerably reduce the feeder length. Since this type of antenna has been around for years there are many versions of the Windom. Single wire fed, or fed with either 300 or 400 ohm line designs abound but the most popular type these days is the so called "Carolina Windom" fed with coaxial cable.

The drawing shows the design for an 80m version similar to the commercial CW 80, with a short length of 49.74 feet and a longer length of 81.84 feet giving 131.58 feet overall, fed via a 4:1 balun at the mast head by 50 ohm coax.



This places the feedpoint 37.8% from one end of the antenna and 62.2% from the other and means that the impedance at the feedpoint will be far from 50 ohms. In fact the feedpoint impedance will be in the region of 300 ohms but this will depend on the frequency in use.

The design also calls for part of the vertical coaxial feed line to radiate, in this case 22 feet at which point a "line isolator" is fitted in the hope that the coax below this will not radiate and bring RF into the shack.

Although commercial Carolina Windoms are available it is not my policy to purchase wire antennas and a search of the junkbox soon revealed sufficient parts to make up an antenna to suit my needs. The balun at the feed point could be a 6:1 ratio and would suit the 300 ohm/50 ohm transformation suggested by the design but 6:1 baluns are invariably heavier than 4:1 versions and the balun would not be looking into 300 ohms if the frequency used changed. I therefore made up a standard 4:1 balun on a single ferrite ring using plastic covered wire from a length of 13 amp flex. This was fitted into a small plastic box with a PL259 socket on the bottom and a small dogbone insulator araldited and tie wrapped to the top as a strain relief to which the two antenna wires were terminated before being fed through two holes in the box to connect to the balun. This small balun is easily coping with 400 watts input to the antenna.

Mini 8 50 ohm coax was used as the feed line and after connecting this via a PL 259 plug to the balun, 22 feet was measured off from the balun and the Line Isolator formed by winding 12 turns of the Mini 8 around 4 half inch x 6 inch ferrite rods which had been taped together in a bundle. The Mini 8 was secured by tie wraps around the rods and then continued down to the shack window at which point a 6 turn 6 inch diameter coil of Mini 8 was formed as a further choke as a precaution against RF getting into the shack causing common mode interference. The antenna is installed with the feedpoint directly above my head at about 38 feet high, the shorter length being almost at the front gate the antenna going over the extension with the longer length being in the back garden.

The feedline was then taken via an isolating switch to my external transmatch and fed into my Yaesu FT950 transceiver. Tests soon showed that the antenna would accept power on all bands from 160m to 50Mhz, giving a 1:1 match on 11 bands from this simple low cost wire antenna. Note that the antenna is not resonant but will accept power and radiate on all of these bands.

Having found that the antenna was useful and was fulfilling its design functions I looked to see how its performance could be improved. In my case the feedline had been reduced from more than 200 feet in the case of a doublet to less than 50 feet including the 22 feet radiating portion of the Mini 8. The feedline was however directly against the 25 feet aluminium mast on the roof of my extension and this was not giving the supposed radiating portion much chance to radiate. This problem was overcome by

replacing the 25 feet aluminium mast by a 28 feet glass fibre mast made up from two 20 feet glass fibre sections which telescoped one within the other and were glued together to form the required length. This new mast required careful guying to stabilize it at its new height but is now in place and the performance of the antenna away from the original aluminium mast has greatly improved.

After using the Windom for some weeks and evaluating it against my Delta loop I came to the conclusion that it was slightly down on the Delta loop into the US on 15m but gave a very good performance on 80m into Dublin whilst its performance on 50Mhz and the other bands came as a welcome bonus. Since I had more space in the garden I added another 44 feet to the long end giving a total length of 175.58 feet which put a major lobe into W6 land on 20m but disappointingly reduced the reports I had been getting on 80m. The extra 44 feet was therefore taken off and I was back to the dimensions given earlier in this article. Note that a half size version of this antenna could be made up and would still be a useful addition to your antenna farm.

Windoms are notorious for spreading RF around but with the Line Isolator and the second, precautionary choke, just outside the shack window I have no problems here. I have a 50 microamp meter arranged as an RF sniffer sitting in front of me on my operating bench and this gives no deflection when using the Windom. Indeed my Delta Loop puts more RF into the shack than the Windom!

My experience with the Windom does show that if you have the room and want an antenna that will give a very good performance on most HF bands then a Windom antenna can give very good results for minimum cost. If you want to see the finished antenna, come round to Cuckfield and just drive past the door, you can't miss the mast!

Ken Gibson G3WYN

NJ2BB

NJ2BB is located onboard USS New Jersey (BB-62), now a museum ship docked at Camden, New Jersey, USA.



In December 2009 a group of us visited the Battleship New Jersey Amateur Radio Station, NJ2BB, during their quarterly membership meeting. After the usual business and social meeting, Vice-President Ed Clark, W2KP, gave a tour of some of the shipboard spaces used by the group. Ed, whose father was one of the thousands who built the ship, explained how the curator had started calling the group Bean-jars, a nickname based on the radio stations initials, BNJARS.

Ed showed us Radio Central, FACCON 1¹, FACCON 2¹, two of the restoration shops and their ongoing work in what had been the radio room of WWII, the Korean conflict and the ship's time off the coast of Viet Nam. The room needs restoration because in 1982 the compartment was converted to a 400 Hz power generation space. At that time all radio communications was moved to the modern radio room located on the Main Deck excepting the transmitters.

Along the way Ed explained terms like "de-milled", a process during which the military removes any items that could be used by the fleet as repair or replacement parts or disables equipment by cutting wiring harnesses or literally taking an axe or hammer to it. Other sensitive equipment was also removed for security reasons. Much of the gear in the photos has been restored to operation, even if it does not have Ham capability; although most of the stuff will find its way onto the airwaves.

After the tour we met up with Dave Burgess, WA2TVS, the Chief Engineer for BNJARS. Dave continued our visit by explaining the history of the ship, BNJARS and what the future may hold for Amateur Radio aboard this piece of naval history.

To save space in this article, I suggest you visit WWW.NJ2BB.ORG and other sites for a complete history of the ship. High points are that the BB-62



is the second of four Iowa Class Fast Battleships designed in 1938. She is 86 feet 6 inches long (the longest of the four sisters and a story in and of itself), 108 feet wide with a designed displacement of 45,000 tons and a maximum displacement of 54,000 tons with a top speed of 34 knots. Her nine main guns are 16"

inside diameter, 66 feet long and each turret of three guns weights almost 1,100 tons. Launched on Dec 7, 1942 she was commissioned in May of 1943 and entered the conflict shortly after that date.

In 1999 the care of the ship was turned over to the Home Port Alliance who planned to use her as a museum and education centre. This is when Ham Radio appears on the scene. A couple of local Hams joined forces to create BNJARS and approached the HPA about working on the ship as volunteers. With luck on their side the Hams discovered that the Curator had been a college room-mate of a Ham and had even been to the Dayton Hamvention. The first visit to the ship resulted not only in work requests but also a space that could be used as a Ham Shack.

In addition to the three HF operating positions that use modern day solid state transceivers, NJ2BB also has restored three AN/URT-23 HF transmitters, several R-1051 receivers and two R-390A receivers. The group occasionally operates in a "All Navy, All Battleship mode". The "all navy" part refers to the number of operators (4) needed to get on the air while the "all battleship" refers to the equipment used. For this reason most operating is with the more modern civilian transceivers.

BNJARS is still hard at work on completing the restoration of the WWII Radio Room. Currently this space is home to several restored RBA, RBB, RBC and RAL series receivers. Cables have been pulled that will allow Ham operations from this compartment, utilizing the TCK, AN/WRT-2 or the URT-23 transmitters located some 200 feet away in the Transmitter

Room. This form of operating is still a couple of years away, but someday the ship will once again be on the air from her original Radio Central and Transmitter Room which are located inside her armoured Citadel.



NJ2BB operating position

Dave closed our eyeball session by mentioning that BNJARS is also active with the Youth Overnight Encampment Program by offering classes for the Boy Scouts Communications Merit Badge.

Here I need to add that BNJARS is the sponsor of the annual Museum Ships on the Air Weekend held in early June of each year. In 2009 some 85 museum ships from around the globe participated in this weekend long event. Check out the above mentioned web site for details of this fun event. As one of the nearby members added, it's an event, not a contest.

Robert D'imperio N4XAT

1. The acronyms FACCON 1 and 2 stand for Facilities Control 1 and 2.

AN ANALYSIS OF THE CLUB HF NETS IN 2009

Reflecting the very poor HF conditions we experienced during 2009 the number of participants in the HF nets fell during the year compared to previous years. Nevertheless both nets were active and it was only on a very few occasions that I found myself talking to thin air!

Participation by MSARS members on the 15m net rose, which was encouraging, whilst less of you decided that the Sunday morning 80m net was worth supporting. Of course, it's entirely your choice whether you get up to join us and hear all the gossip on Sunday mornings.

THE SUNDAY MORNING 80M NET

We had 31 participants in this net, 17 MSARS members were supported by 14 visitors some of them very regular like John G0NOK. These figures compare with a total of 42 participants in 2008 and the fall off particularly in MSARS members from 23 to 17 was quite noticeable.

Sean EI7CV and I completed another 40 contacts bringing our total to 1476 at the time of writing this report.

THE WEEKDAY 15M NET

Here the poor HF conditions did affect results in that we had 40 participants compared with 48 in 2008. However, 23 MSARS members took part a rise of 6 over 2008's figures with more members calling in than to the Sunday morning fall out of bed net! Of the 17 visitors perhaps the best DX was Vlad UA9CVQ from Nizhny Taghil in Siberia. Some of us also worked Gavin who called in during his 8P9GK expedition.

The poor conditions meant that contacts with Bob N4XAT and David W1GN were hard to achieve. Indeed my first HF contact with David was a CW sked on 20m arranged via email on the 11th August and it was not until 26 October that he was worked on 15m SSB.

Bob didn't surface until two days later on the 28 October since when we began to hear him and David more regularly. I'd like to thank them both for the months of fruitless monitoring on 21.330Mhz before contact was eventually made.

We had no contacts at all throughout the Year with HO, K5CX in Houston who tells me that he just didn't hear us.

Overall we should be able to look forward to better conditions in 2010 and possibly more participation in the 15m net. The Sunday morning net doesn't need good HF conditions, it just requires those of you who wish to join Sean and I at 8am to get into your shack. You know that you will always be welcome!

I'm now on log book number 21 from here.

Ken Gibson G3WYN

Surplus Equipment Sale 26 March 2010

Get in to those junk boxes, lofts, garages and so on and see if we can do better than last year. Here, Alan G8YKV seemed to be pleading for more last year, with John M5JWS just looking?



The Amateur Bands

Part 1

In recent months there have been a few new faces around the Society so I thought a short series of articles would be in order to give an introduction to each of the bands and what we might expect from them.

The last couple of years have seen a series of articles in RadCom on propagation for each band, but in these articles I will describe what might be expected under any conditions.

As this is for starters I will not go into detail of licensing requirements, other than to mention that some bands are only accessible with a full license and some require special permission to operate, (NOVs). However most are usable by all amateurs with some limits on power and restrictions on interference to other users.

The bands are grouped according to in which part of the electromagnetic spectrum they are located. VLF is from 30kHz to 300kHz, LF from 300 kHz to 3MHz, HF from 3MHz to 30MHz, VHF from 30MHz to 300MHz, UHF from 300MHz to 3GHz, and so on up the spectrum.

In the VLF (Very Low Frequency) band we have one allocation in the region of 136 kHz. We have two allocations in the LF (Low Frequency) part of the radio spectrum. These are around 500kHz, and full use of the 1.810MHz to 2 MHz (160m) band.

In the HF (High Frequency) bands we have several allocations. These are from 3.5MHz to 3.8 MHz (80m), spot frequencies between 5.25MHz and 5.45 MHz (60m), 7.0MHz to 7.2 MHz (40m), 10.1MHz to 10.15 MHz (30m), 14.0MHz to 14.35MHz (20m), 18.068MHz to 18.168 MHz (17), 21.0MHz to 21.450 MHz (15m), 24.89MHz to 24.99 MHz (12m) and finally 28.0MHz to 29.7 MHz (10m).

In the VHF band we have 50.0MHz to 52.0MHz (6m), 70.0MHz to 70.5 MHz (4m) and 144MHz to 146MHz (2m). In the UHF bands we have 430MHz to 440MHz (70cm) and many more allocations in higher frequency bands, virtually all of which are line of sight only.

First we need to consider the 11 year solar sunspot cycle. For those new to the hobby here is a brief introduction.

All amateur bands exhibit different characteristics and are affected by different atmospheric or ionospheric conditions. The VHF and higher bands tend to be affected by the weather and atmospheric conditions. These bands are primarily “line of sight” with contact possible in average conditions just over the horizon. So don’t expect to speak to Australia on 2 Metres (without the use of repeaters and telephone lines). Bouncing signals off the moon or satellites is not covered here as this is beyond my scope!

LF and HF communications are usually possible with line of sight in a similar manner to VHF (called ground wave) but, in addition, if we send signals up into the sky they get bounced back by layers in the ionosphere. These “Skywave” signals, as we call them, are produced by our antennas and propagate outward in a direction such that they meet the ionosphere as far away as possible, at about 1,000km. The signal is then reflected back down with the same angle as it arrived up there, coming back down to the ground about 2,000km away.

What has all this got to do with sunspots you might ask? Well, the ionosphere is a number of layers of ionised gas some 80km to 300km up above us. These rarefied gasses are ionised by radiations from the sun. As the sun cycles through its seasons of great or little activity, the levels of ionisation change with it. As the sun’s seasons run in approximately 11 year cycles we can expect the ionosphere to do likewise.

Now we get to the bit where I try to explain why this all matters to us. In a recent talk to the Society on Near Vertical Incidence Skywave (NVIS) communications I mentioned that some of the ionosphere’s layers absorb radio energy while others reflect it. As a general rule, the higher the frequency the more likely it is to go straight up through the ionosphere and out into space. This is great if you work for NASA and want to send signals to Mars, but we don’t! The very lowest frequencies however seem to bounce off just about everything. So, before describing what happens to each band, I will generalise on the layers of the ionosphere.

First and lowest at about 80km is the **D layer**. This is energised by ultra violet light and is only present on the sunlight side of the Earth, it disappears, or disperses, quite quickly in the dark. This layer tends to

absorb most of the frequencies in the LF band, pass the frequencies of the HF band and strangely reflect frequencies in the VLF band. The next layer up at about 150km is the **E layer**. The E layer is the first that can be considered to be a reflecting layer, but it tends to follow the D layer in that it is present only on the sunlit side of the earth. However it decays slower than the D layer so can be present for some time after local sunset and appear a little after dawn. Next higher is the **F layer**. This one comes in two parts, the F1 and the F2, and as a combined layer. During the day the sun ionises the F layers and they tend to split into two distinct layers with the F1 at about 300km and the F2 at about 400km. The night time combined layer is at about 350km as one would expect.

Now we get to the bands themselves. I don't know where most of you started, but I did with a 2 metre mobile station. As we were taught, VHF is primarily line of sight so a hand held or a mobile running about 10 watts to a vertical whip or flexible antenna will cover a radius of about 5 miles at ground level. If we can get the antenna up to roof height we are up to about 25 Miles, and if we go and park up at Jack and Jill windmills the range increases to about 50 miles. Unfortunately as we increase the range the signal strength drops away in accordance with the "square law". Double the distance, quarter the power, 10 times is 100th, etc. So, even up on the hills there is a limit, that of power. There are two ways to overcome this to increase range. First is to increase the power, but that option is not available if you have a Foundation licence. Second is to increase the gain of the antenna. Instead of broadcasting your signal in all directions from a single whip, try a multi-element Yagi type antenna. One with a gain of 10dB will increase your apparent power from 10 watts to 100 watts BUT only in the direction you point the antenna. Using this principle the club regularly operates field day with 25W and a 23 element beam. The result is that we work from Spain to the North of Scotland.

Generally working on 2m from a mobile station will require the use of the repeater network to maintain coverage over a reasonable area as you are driving about.

To be continued.

Chris Saunders G4ZCS

FOR SALE

MSARS has for sale an **Alinco DX 70 TH Transceiver**. The radio is in excellent condition, boxed, and comes complete with the manual and a mobile mounting bracket. This version of the DX 70 was the top of the DX range and covers all of the HF bands plus 6 metres and produces 100 watts output. It will be supported for service and parts for the foreseeable future by the UK importers Nevada. This radio was a bequest from Richard Sharman, a long time member of the Society, and is being sold to raise funds for the benefit of our members.

New, this transceiver would have cost circa £600 and is offered to members for **£180**. If you are interested in this excellent radio, please contact any member of the Committee.



Can you Help?

Alan Cragg G8YKV has very kindly been looking after four high capacity yellow lead acid batteries for some years, on behalf of MSARS, but needs the room that they take up. These batteries are used only occasionally during outside events and they don't take up too much room.

Are you able to help the Society by taking over the custody of these batteries and looking after them for MSARS. If you can help, please would you contact any Committee member.

MSARS would like to appoint a **Publicity Officer** to publicize the activities of the Society and to generally raise our profile in the locality, building on the foundations already laid by Stella Rogers - our Treasurer. The duties would involve writing short items detailing our activities and making contact with all of the local newspapers and magazines to get these items published as regularly as possible. Local radio is an area which could be explored and useful publicity gained. The duties are intended to be very much part time and not demanding.

If you are interested in this role and feel that you could make a useful contribution, please would you contact any member of the Committee to discuss the matter further.

Mid Sussex Happenings

2010

05 Mar	Friday	Quiz Night – Gavin, Stella and Alan
12 Mar	Friday	Radio Night
19 Mar	Friday	Volks Electric Railway by Ian Gledhill
26 Mar	Friday	Surplus Equipment Sale(Upstairs Hall)
02 April	Friday	No Meeting (Good Friday)
09 April	Friday	Electricity in the Home - J Narborough
16 April	Friday	Radio Night
23 April	Friday	Fox Hunt (Cyprus Hall closed)
30 April	Friday	Radio Night and Table Top Sale

All meetings are held in the downstairs meeting room of Cyprus Hall unless otherwise indicated.



Mid Sussex ARS Net Times – all times local

Sunday	0800	3.740MHz +/- QRM
Sunday	1100	145.350 MHz
Sunday	2000	433.125MHz (GB3HY)
Weekdays	1330	21.330 MHz +/- QRM
Tuesday	2030	3.725 MHz +/- QRM (SCARF)
Wednesday	2000	145.350MHz



Mid Sussex Amateur Radio Society

2009-2010

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Society Web Site www.msars.org.uk

Newsletter

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