HAMS Haywire News
July / August 2011
www.marc.org.za
PO Box 1076, Hilton, 3245

MIDLANDS AMATEUR RADIO CLUB

AFFILIATED TO THE SARL & IN ASSOCIATION WITH THE NATAL CARBINEERS

CLUB COMMITTEE 2010-2011

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The Chairman's Report

This edition is running a bit late, but it will be on time as I've decided to join the last two editions into one ☺. I had two articles ready nearly 6 weeks ago, but was holding back hoping that one or more articles would be miraculously submitted for inclusion. And then I got bogged down with work, which I am not complaining about in this fragile economy of ours. This is my excuse why the July edition is late...am I'm sticking to it.

On this note, please think of whether you can take over as HHN editor, or know of someone who can. I will still compile the next one, but it will be the last one from me, at least for the foreseeable future - I just don't have the time this publication deserves, at least not at the moment. I have enjoyed compiling them, but as an "illiterate inganeer" they took more time. Proof reading by Gudrun certainly helped and I bet that some of you might actually think that my spelling and grammar are not too bad considering my original profession...

I'm also grateful that at short notice I was able to extract useful articles from ZR5S, ZS5EFP and ZR5SF, which will add value to this edition.

Reflecting back on what happened since the last edition, I only now realise how much was achieved. Our repeater network got a make-over, or, at least serious inroads were made. (Read both Shaun's and Evert's reports later in this edition for more info). These upgrades and repeater site repairs were made possible mainly by Shaun ZR5S, who managed to source three new licenced clients to lease tower space at both World's View and Groenekloof. The increased income from this rental has enabled us to start upgrading and replacing our existing aging vhf network, as well as providing funds for much needed maintenance at our repeater sites. The work parties at Worlds View have already transformed that site to something we can be proud of again. A lot still needs to be done, and we are getting there. But the best news is that we did not have to increase membership subscriptions this year to make this a reality, nor to touch our fixed deposit, leaving it untouched for many years.

To buy new repeaters is the easy part. The tricky part is to integrate them into the repeater network. To populate and program the repeater boards and then convince the link radios and repeaters to work harmoniously together is where skill is necessary. Craig ZS5CID did a marvellous job in the past, but his busy schedule made us look for another volunteer for the job, and we pressured Evert ZS5EFP into this unenviable task. He spent many frustrating hours putting everything together, and finding ways to integrate the Motorola radios, which fought him all the way. Wendy, his xyl, also needs a medal for putting up with the extra work load we imposed on him and his family. I just hope that the good resulting product makes up for everything. Thanks Evert and Wendy, we really appreciate your efforts!

And then we had got an offer from ICOM Japan: they are donating D-Star repeaters on condition that we insure the unit and have it operational within 2 months. Once the insurance was arranged, Shaun, ZR5S, got down to the nitty gritty and programmed the repeater and installed it at Groenekloof. This was also no easy task, and he has more info about this in his article later in this edition....

The repeater news does not stop here: we are planning to install another repeater in the Richmond area (Burn Valley) which will serve our new members there. This one is still in the planning stages, but will hopefully be operational by the end of the year. The Estcourt repeater will also receive a new Motorola link radio (and maybe finals?). The Underberg repeater project is also underway again. Hopefully we will hear Craig, Phillip and Malcolm on air again soon, in addition to Tony, Ron and others from Ladysmith.

As most of you have gathered by now, two meetings ago we voted and agreed that we would pursue a new association with Rural Metro, who have kindly accommodated us in the last year with a room for our RAE lectures and exam. Rural Metro are allocating us a room for our shack in their new building after Des ZS5DDM negotiated this with his directors. This was confirmed in a recent meeting I had with Des and one of his directors. Some members expressed fears that there might not be enough parking on their premises for our monthly meetings. After assessing this we realised that we could fit at least 15 vehicles inside their property, and quite a few more if we stack the vehicles. This is more than sufficient, and there is quite a bit of secure parking in the street between their buildings.

There are a few reasons why the move is deemed necessary. The first one is that the Natal Carbineers are trying to convert the base back into a full military base, with access control. We will all have to get identity cards sometime in the future for access. Logistically this will be difficult. We will probably all have to come in and have our mug shots taken. Our personal details will have to be recorded and confirmed. It is however not insurmountable. But it will be difficult to bring visitors onto the base. They have indicated that in times of crisis, access will be limited to Defence Force personal, which is understandable. This however denies us access to our shack for emergency radio communications during these times, and we, and Hamnet, will have to make alternate arrangements.

We have spent quite a bit of effort and money renovating our current shack. During these renovations we were informed that they have been granted funds for renovating and upgrading buildings in their base. They are going to replace the ceilings and roofs of the buildings which house our shack. Our shack was cleared of all radios and other valuable equipment in anticipation of these repairs. This is however taking much longer than planned, and they cannot give us a completion date any more. We have been without a shack for many months now, and it could be a long time before we can move back in again.

Recently the Carbineers have also experienced theft of some very expensive medals and other items from the rooms we used for our monthly meetings. Obviously they have to safeguard their remaining valuables, resulting in locking these rooms and only making them available for themselves. We still have access to the band room, but conference facilities are limited there.

At the recent monthly meetings with the Carbineers and other sports clubs, we were told that we do not have an association with them, other than that we rent a room from them for our shack, and that they would never approach us for any help regarding radios and communication. This is contrary to what some of our older members were led to believe previously. Goals have obviously changed and we cannot hang onto what once was. They have to move on in their professional world. And so do we.

We are very grateful to the Natal Carbineers for accommodating us until now with a shack and providing us with the use of their facilities for our meetings, lectures and exams. But the time has come to move on. Many of us will retain fond memories of our past “association” with them.

We are equally grateful for our new association with Rural Metro. Our shack there will be a showcase for our hobby when we are finished with it. It will probably be located on the same floor as the communications hub of Rural Metro, and be visible to them and their visitors. In times of disaster, our club, and possibly Hamnet, will be able to use it effectively with all the necessary resources close at hand. It is centrally located, but far enough from the city centre ensuring easy access.

Our next meeting will be on 20 August, followed by our AGM on 17 September. Please think of who you would like to represent you on the committee. We have many capable members in our club. The ground work for the revival of our hobby has been made, and the progress with repeater and other equipment upgrades has started in our club, and needs to be taken through the next stages. Our fantastic hobby is far from dead. In fact, world wide it is experiencing good growth. It is worth looking after.

See you at our next meeting in 2 weeks time at the Natal Carbineers.

73
Mike ZS5ML

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Diary of Events

20 Aug	MARC monthly meeting
21 Aug	3rd leg of SARL Digital competition
28 Aug	SARL HF CW competition
10 Sep	Hamnet quarterly meeting, 12h30 for 13h00, Signals Unit, Dbn
17 Sept	MARC AGM at 11h00, at Rural Metro

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Ham Bulletin Readers

14 August - ZS5AZ
21 August - ZS5SF
28 August - ZS5V
4 September - ZS5ML
11 September - ZS5AZ
18 September - ZS5SF

The M.A.R.C. Infrastructure

Voice Repeaters (FM) *Visit www.marc.org.za/pages/freq.htm for updates of this list*

VHF	Tx	Rx	Equipment
Hilton	145.6625MHz CTSS 88.5	145.0625 MHz	SCR200 20W, Diamond X-200 rx and tx
Estcourt	145.700 MHz	145.100 MHz	Emcom SA256 25W, Diamond X-200 rx
Franklin	145.725 MHz	145.125 MHz	GE MVP 10W
Worlds View	145.750 MHz CTSS 88.5	145.150 MHz	Emcom SA256 25W, Diamond X-200 rx and tx
Greytown	145.775 MHz	145.175 MHz	Home Brew @ 20w, Diamond X-200 rx and tx
Underberg	145.7875MHz CTSS 88.5	145.1875MHz	Q8000 30W
Windy Hill	145.700MHz	145.100MHz	Hamnet repeater.
UHF			
Mt Gilboa	439.225 MHz	431.625 MHz	Vertex Standard VXR-9000, Diamond X-200 rx and tx
Zwartberg	438.775 MHz CTSS 110.9	431 .175 MHz	GE MVP 15W

APRS
The national APRS frequency is 144.800 MHZ (Tx & Rx). The I-Gate is at Hilton (ZR5S). Fixed stations should beacon at approximately 30min intervals with a path of WIDE5-5. Mobile stations should beacon at approximately 1min intervals with a path of "WIDE1-1, WIDE5-5". We have aprs digi's throughout KZN. A PBBS (mailbox) is on ZS0PMB-1 for emergency use. A KA-NODE is on ZS0PMB-7

Packet Radio
No packet radio frequency. However, limited packet radio facilities are available on 144.800MHz

ECHO-LINK "voip"
Our node number is 244279 Call Sign ZS5PMB. This Echo-link facility is available on the Midlands linked Repeater network.

E-QSO "voip"
We are in the "101ENGLISH" virtual room, on the "repeater.dns2go.com" server. This is linked to RF at Hilton on 433.000 MHz simplex. Temporarily on 145.450MHz

BEACON
Greytown 50.321 MHz (Tx) ZS5SIX FSK (Not active at the moment)

Banking Details
Account Name: Midlands Amateur Radio Club
Account type : Cheque
Bank: First National Bank
Acc #: 62057756507
Branch: Bank St
Branch Code: 220825

WEB SITES
MARC'S very own website www.marc.org.za
SARL's website www.sarl.org.za
HAMNET website www.hamnetkzn.org.za

Regular Events

The KwaZulu Natal Net (Early Birds):
Starts at 06h00 on 7.055 MHz. in winter and 3.650Mhz in summer and continues until 07h40. Colin ZS5CF hosts the net from 06h00 & Gary Potgieter (ZS5NK)-takes over later on.

MARC Sunday Morning Net:
Time:08h00 call in, followed by the bulletin
Frequencies:VHF:145.750MHz, 145.6625MHz, 145.775MHz, 145.700MHz
UHF:439.225MHz
HF : 7.089MHz or 3. 620 MHz (on demand)

Hamnet Bulletins: Sundays at 07h00 on 145.625MHz and 3.760MHz
Wednesdays at 19h30 on 145.625MHz

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News from Shaun, ZR5SF

There is a possibility of 7 students sitting the next RAE exams, of whom two are new members. Two are rewrites and two are upgrades. We had our first session on Sunday 7 August.

Planned Events: A trip to Richmond is planned on 13 August so that the club can assess the feasibility of installing a repeater in the Burn Valley area. This repeater will hopefully serve hams as far as Kokstad and the South Coast.

We must also not forget JOTA which is coming up soon. This will be held at the Howick Scout Hall.

The 54th Jamboree On The Air will take place on 15 and 16 October 2011. This year's theme is: “Peace, Environment and Natural Disasters”. Yes, I know it is still two months away but we do have some preparation to make and hopefully all will be done in time.

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Midlands D-Star repeater news update by Shaun ZR5S

I am very proud to be an active member of the Midlands Amateur Radio Club. We have been one of the more pioneering and pro-active clubs in South Africa since since I first joined in 1991. And I am sure it was just as much a leader in the decades before I was licensed.

Four of our more recent notable achievements has been the successful linking of our 7+ FM repeaters, our KZN VHF and HF APRS network (4 linked digi-peaters), our addition of Echo-Link on simplex and the linked rptr network, and our huge new ham recruitment drive. Echo-Link and E-Qso are about to be re-introduced because the old fm radio we where using, had no CTSS tone guard. So necessary in our modern-day over crowded RF spectrum.

I hear from ZR5SF, that he is installing a WinPSK email station for the MARC. Another feather in our cap.

The latest treasure your MARC committee have secured, is the acquisition of a brand new VHF Icom D-Star repeater. (Shown in the picture below). Icom Japan's latest marketing strategy was to "loan" the 5 most potentially active D-Star South African cities with an Icom repeater. Local Icom agent, Multisource where asked to deploy these 5 repeaters.

The requirements where stringent (and rightfully so).
The main 3 being that we would install it at a suitable secure site with an internet connection and PC, within 2 months,
that we would insure the equipment fully, and
that we would assist members interested in D-Star to get on-air asap.

Insurance was easy, but comes at a price. We scratched around and came up with the money. Site choice seemed simple, and we chose the Hilton Groenekloof site for the following reasons;
It did not have an existing VHF repeater,
It does have a PC and a sponsored internet connection already,

It covers PMB very well (because it is VHF and because it is digital)
It also covers back towards Howick and the Midlands,
It should also reach about 30% of Durban hams,
It is not too far to get to, in case of maintenance,
It had existing Diamond dual-band antennas suitable for a d-star repeater on VHF AND UHF,

2x Duplexer's have been ordered to incorporate our HomeBrew UHF d-star repeater into the same Hilton antenna's. Have a listen on the uhf and vhf bands for the digital signal. It starts off with a short audible tone hand shake, then you hear what sounds like white noise, only louder. D-Star uses GMSK modulation, the same modulation technique that your cell phones use. In fact, the only difference is the freq and the codec.

The UHF rptr (ZS0PMB B) runs on 438.200MHz and we chose 145.6875MHz (ZS0PMB C) for the Icom VHF repeater.

Spare VHF channels are challenging to find, but this one we hope, will not hinder any current FM repeater operations.

Even if the signal is only S1 at your QTH, you will still hear crystal clear communications. This is the nature of digital comms and I have witnessed it myself.

The D-Star concept is mainly about the digital codec used, the GMSK modulation used, the call-sign routing feature, call-sign identification and DPRS, and the international connectivity. BTW, technically you do not need to announce your call-sign when having a conversation because your call sign is transmitted digitally with every transmission, automatically. But it would be advisable in a net, to keep control of who to hand the proverbial "mic" to next.

I would like to present another D-Star presentation to our club members once we settle into our new club house. The finer details on how to operate the D-Star repeater will be repeated. In the mean time, treat yourself to a D-Star transceiver and be transported into a whole new fascinating world of digital radio communications. The way of the future.

Those Nay-Sayers that insist FM analogue communications will be around forever, are CORRECT! There are always a passionate few that keep the older modes alive. We have AM nets on HF, CW nets, Valve-Only clubs, and one day we will see FM nets. I'll probably be a member of the "antique packet radio association" in the year 2020. We'll need clever programmers to enable my WinPack to run on Windows-18.

I could copy and paste 100's of d-star articles here, but that would be impersonal. Google is your friend, so get reading on your I-Pad2 in your cozy bed, and convince your wallet that you deserve to be a part of the digital radio revolution.

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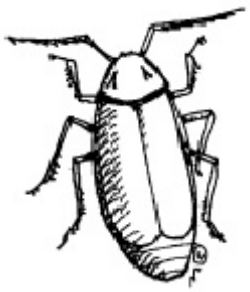
Amateur Radio: The "Cockroach" of Communications by Craig LaBarge WB3GCK

(Link to this article was found on the SARL forum)



No, I'm not trying to insult Amateur Radio operators; quite the contrary. As you read on, you'll see that I am actually paying the Amateur Radio Service a very high compliment.

Consider the fact that the lowly cockroach has been around for about 350 million years. During that time, while many other creatures have become extinct, the cockroach has earned a reputation for being a true survivor. For example, the cockroach is reported to be able to withstand between 67,500 and 105,000 REMs, depending on the species. That's about the equivalent of a thermal-nuclear explosion. By contrast, a lethal dose of radiation for humans is about 800 rems. So, if we were to experience a nuclear holocaust, scientists theorize that approximately
three-quarters of the world's cockroach population would survive unscathed.

Not unlike the cockroach, Amateur Radio has earned a reputation for coming out in the wake of a disaster to provide communications when other forms have been rendered useless. This capability to communicate during times of emergencies has been demonstrated time and time again over the years. You name the emergency – hurricanes, tornadoes, the events of September 11th – Amateur Radio has been there.

So, what is it about Amateur Radio that allows us to keep on communicating when other commercial forms of communications fail? Well, I believe there are two unique qualities that we possess, in terms of our

communications capabilities. First, we are self-sufficient. Each of us owns and maintains our own equipment. Properly equipped for emergency communications, we each have some sort of emergency power that allows us to communicate without commercial power. Because we are not dependent on a common infrastructure, we are a highly survivable form of communications. With an adequately stocked “go kit,” we are also highly mobile, taking this communications capability where it is needed most. As a goal, each of us should be capable of operating independently for up to 72 hours.

Second, we are interoperable. We are able to come together and form ad hoc communications networks on short notice. This is where we really shine. As individuals, our capabilities are somewhat limited. As a team, however, we are able to form ourselves into a flexible communications network that is able to quickly adapt to the situation at hand.

The use of standard procedures and techniques is what allows us to be effective when we come together as a network. Training and certification programs, such as the ARRL’s Emergency Communications Certification Course, provide the fundamentals and set the standards. By joining a local ARES or RACES organization and participating in drills, nets, and public service events, we practice and refine the skills and techniques we will need in an emergency to quickly become a cohesive team.

Our interoperability is further enhanced through the adoption of technical standards. Things as simple as using the standard Powerpole connectors on our rigs or pre-programming a standard set of frequencies increase our flexibility and versatility during a disaster.

So, in the aftermath of a disaster, not only will the cockroach survive; Amateur Radio will be there, too.

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The MARC Repeaters

by Evert ZS5EFP

It all started when the Estcort repeater, for some reason, lost its link with the rest of our MARC linked VHF repeater network. As you will see in this article we went full-circle as the Estcort repeater is no longer linked to our network.

In hindsight a lot of issues are now clear. But first more about me. I am have never worked on a repeater in my professional capacity so it was a very steep learning curve for me and those that suffered with me. This was also my first time at high sites, guys I tell you those sites get exposed to full range of weather.

The 145.700 MHz repeater on Griffins Hill was removed by ZR5S and the problem reported was that it can hear the rest of the network but the rest of network could not hear them. The fault was reasonably simple, the link radio had a blown final transistor. Considering the age of the said transceiver I decided to loan the club one of my ruff and tuff KYODO transceivers. So the repeater was returned and all was seemingly well.

With the onset of colder evenings the whole network got locked up, especially in the evenings. ZR5S was out in the vicinity of Griffins hill and ascertained that the noise came from that repeater that would lock up in TX for sometimes hours.

So that should have indicated why the first link radio got itself in to a sticking situation and thought it good to let the smoke out of the final transistor.

I re-soldered some possible bad solder joints plus added some major filtering on the link radio cable as I could not replicate the fault on the bench. The repeater was returned and once again we had a functioning network but alas nothing good last for ever and the fault returned. After days of hunting the Hilton repeater was found to be the culprit.

Parallel to this the Greytown repeater was brought in for poor scratchy audio to the rest of the network. The link radio was again the culprit this time being about 15 kHz off frequency, a realignment and a replaced cap got this one sorted. But there is another problem as the South Coast boys have a gateway on the same frequency with some guys triggering our repeater and their gateway simultaneously.

OK so while the network was now fairly stable with Hilton being disconnected the nighttime lock-ups reappeared and another trip up to Griffins hill was called for, in order to remove the link radio and leave it as a VHF only repeater.

OK so lets do the sums a few trips to Griffins hill, a few to Hilton SAPS twice having been shown the door by very unfriendly guys in blue and a network that does not perform nearly as good as it used to. You can imagine I was getting disappointed, broke and a bit ggggggatvol.

In the meantime the club acquired two brand new Kenwood VHF repeaters and 7 good as new Motorola GM660 UHF transceivers. I had endless troubles and many frustrating moments to get the link PCB interfaced with the repeater and UHF radios. It was a fine balance between getting audio levels right so that DTMF remote control would work reliably as well as sounding good on air. Also the repeater had to programmed to no longer be a repeater but rather a full duplex radio. After about a month of many long evenings the first one was rolled out in the beginning of July.

Intensive testing and reporting from Joost ZS5S, Mike ZS5ML and few others identified a weird call sign being transmitted frequently as well as irregular timeouts. The call sign issue was resolved, after a DTMF reprogramming, and yet another 11pm trip to the site, and I am glad to say that today the 8th August 2011 I installed the second new repeater in place of the previous one and this should address the timeout issues.

So now the decision: shall we put the 1st new repeater up at Gretown of shall we use it in Escort as the repeater is now completely dead, R10-00 says the VHF final is also now kaput.

I would like to reflect on the following, besides a great VHF/UHF FM repeater network established by MARC (with Shaun ZR5S and Craig ZS5CID). We also have 2 D-Star repeaters, ECHOlink and various other modes like APRS, plane and ship spotting. Yes the systems sometimes fail, but coming from div 6 from probably the biggest club, I can assure you we have the best club in the country. Also the high sites are getting more and more transmitters and we need to tone guard all our repeaters to prevent intermittent break through.

Yes there are problems as some of our equipment is very old, but our progressive committee is addressing these issues.

So next time you press PTT and chat to a mate in town out of normal VHF range think of the behind the scenes inputs. Also think of the aging equipment that must work 24/7 in a glassfibre box in temperatures ranging from 40C to -5 C without supervision plus no reliable electrical supply ?

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To earth or not to earth (snippets from another discussion found on the radioshack forum)

This discussion comes up periodically whether one should protect your equipment with earthing or not, and I saw this discussion on one of the other forums. Here are two postings by Dick, ZS6RO (posted with his permission). The other postings are not necessary as you can deduce what was aksed or said in the other posts:

“I've been retired for on six years now ... I worked for the Spoories (Transtel Telecommunication Division) all my career life (40 years) in the Radio/uWave Section and for the last 20 years was installed at Head Office up here in Jo'burg. Part of my job description was to write the Hi-Site Repeater 'Bible' for all audio Technicians in the various Regions around South Africa Transtel ..

After a lot of deliberation and research, I wrote it and got it to all Regions. Because another part of my job was to travel countrywide for extensive periods of time and because I had (still have) a Packet Radio BBS (ZS0MEE) running 24/7 at my home QTH and I wasn't prepared to pull co-axes out of rigs and throw them out of the window when lightning storms occurred (also I would be away from home when storms occurred!!), I practised what I preached by incorporating many of the techniques I wrote about, on my QTH installation - and have never looked back !! ... I could 'disappear' at a moment's notice from home and I never worried about storms ...

ZS1AX and ZS6AF hit on a few 'requirements' in their posts ... The secret of a good lightning protection plan is to reduce Inductance !!! .. That’s why earth 'straps' are used in professional installations - less inductance in the strap compared to wire. Large bulkhead entry panels with earth straps on the outside of the buildng going straight down into the ground earth mat - all to reduce inductance ...

Each 90 degrees bend in a wire or even a strap introduces around 1uH of inductance .. Dressing the earth straps around the mast's concrete blocks and into the ground looks 'pretty' but is introducing inductance on every bend !! .. What is the purpose of all this earthing? - To get the lightning spikes, surges etc down and into the ground as soon as possible by the shortest electrical route .. Inductance impedes fast travelling voltage spikes and creates voltage drops over the earth cables/strapping ...

One should bring coaxial cables down the mast all the way to the ground and then enter the building either on the ground surface or underground regardless of other earthing .. Why? .. Think of a typical mast alongside a building with coax cables coming down the mast to the level of the eves of the building (convenient) and then into the building ... You have a potential voltage divider here !! ... Think of the mast/coax as resistors .. Take a lightning strike at the top of the mast - say a million volts .. This strike travels down the mast and into the ground through the mast's earthing .. Great .. But now lets look again but with the coax leaving the mast at say halfway

down the mast and under the eves .. A million volts at the top of the mast - zero volts at the bottom of the mast (earth) .. Halfway down the mast we have half a million volts - all ready to travel along the coax and into the building !!!

So, run the coax and other cables down to the bottom of the mast (almost zero potential)!!! .. but don't feel safe yet - practice what ZS*** and ZS*** have said in their posts !!! .. Also run coax cables down one side of the mast/tower and the earth wire down another side of the mast - reduces induced currents into the cables .. Why have an earth wire down the mast? .. Usually masts/towers are sections bolted together ... Electrically the joints are not 100 % zero ohms ... A million volt strike at the top of the mast and say a 0.1 ohm 'dirty' joint, will provide a substantial voltage potential .. remember the idea with all this earthing is to get the destructive voltages down into the ground as soon and possible ...

Professionals earth coaxes at the top of the mast and also about a metre above the bend leaving the bottom of the mast (the entire mast is used for earthing - low impedance!) .. This takes care of the braid or outer coax conductor but does nothing for the inner or hot centre coax conductor !!! .. Use suitable coaxial arrestors designed for the job (another complete story on it's own) ...

You've heard of the two schools of thought regarding earthing everything together - or not !!! ... I personally earth the lot together to a central point (mains and mast earth) with arc-welding cable leads (low inductance remember) ... In my opinion I would have a strike coming into my installation and lifting everything up to the same voltage potential rather than some equipment lifting up and other equipment not, having a large different potential with the possibilities of flashing over and causing major damage ...

I could carry on but will stop here to prevent boredom *Grin .. One last thing - Someone mentioned that if one gets a direct strike your equipment is toast .. Not necessarily ... During my research way back, I was involved with CSIR in Pretoria and where I always thought the nearby mast/tower on the hill was a Sentech FM tower, it was in fact a research tower to collect lightning strikes and measure voltage and current !! ... To do this, the tower had to be connected to test equipment which had to survive direct and other lightning surges .. And it did ... I was told that the direct lightning strikes to this tower in any storm was in it's hundreds and they casually spoke about Mega-volts and Mega-currents !!! ... And that tower had proper earth protection !

So, do a proper job and you can enjoy ham Radio even with a raging lightning storm outside ..... “

And then a later post:

“my installation consists of crowfoot earthing and here again, one doesn't need to drive down long spikes 10-20 metres into the ground .. The inductance of each long spike will negate the effect .. Rather, many 1,2 - 1,5 metre spikes driven in the ground and spaced about 1,5 metres from each other and all bonded crowfoot style, will suffice ... (Earth each spike to a common point - "crowfoot" style) ...

Regarding earth resistivity measurements as ZS*** commented on - here again, note one can drive the spikes a few centimetres or metres into the ground and get virtually the same readings ... And yes, a mains earth (basically a 'DC' reading) versus a RF earth are two different kettles of fish ... And in my opinion it comes down to inductance - reduce inductance and you will be on the right path ... Granted lengths of RF earths also play their part with 1/4 lambda etc ... But remember, we are trying to get lightning into the ground as quickly as possible !

Depending on the earth resistivity measurements on hilly or rocky hi-sites we would put in an earth mat or/and crowfoot spikes ... Often crowfoot earths were not giving 'good' readings hence the mats to dissipate over a larger area ... Also used some chemicals around each spike (can't remember what it was) ...

I think why many installations fail even when the installation looks correct is because initially it was correctly done .. It was AFTERWARDS that someone came along and added some radio equipment/repeaters and didn't earth it correctly (lack of knowledge or laziness) and thus, expensive damage occurs on the next storm ...

ZS*** comments on 'large currents down this path' with respect to earth mains and corroded Municipality earthing ... Why did we put in a mast/tower earth? - to dissipate many many hundreds/thousands of Amps of current and Voltage - technically the RF earth should be able to cope with the neighbourhood's electrical earth consumption - if not, beef it up *Grin ...

Nothing is perfect - there 'will' always be casualties - we can only try to reduce the number!!!”

And then another post in reply to a hard line earthed before and after a 1m bend at the bottom of the tower:

“... I mentioned that one should earth coaxes on a tower at the top and bottom - at the bottom, roughly one metre

above the bend.. As you described, dress the earth straps (all of them) gently downwards instead of trying to make it look 'pretty' and never take the earth-kit pigtails upwards on the tower because there happens to be a convenient bolt .. The lightning won't come onto the earth strap and turn sharp corners to the tower - it'll jump across and flash onto the tower lower down defeating the aim of 'guiding' or 'controlling' the surges down into the ground .. There is no real value of placing an earth-kit at the top and bottom of the coax bend - a metre above the top of the bend is sufficient .. Remember you should also be earthing at the cable entrance into the building ...

..... Do you have the earth lead coming down the tower on the opposite side, to seperate the earthing physically from the parallel running coax and other cables ?? .. Include the tower metal as earth (less inductance) - in the ground do the earth spikes resemble a 'crowfoot" - all designed to decrease inductance and are parallel enrtries into the ground for surges ...

.... a lightning earth and a RF earth are really two different things ... The lightning earth is to conduct heavy lightning strikes/surges down into the ground outside and away from equipment ... RF earthing is designed to giving you the other half of the antenna (take the Marconi antenna - long-wire antennas that need a ground connection) ... RF earthing would often use earth mats but sometimes a repeater hi-site might require an earth mat because the ground is too rocky or bad resistivity-wise for spikes for discharging lightning into the ground...

So, one should think about three earth systems - Lightning, RF and Mains earth - and here I maintain joining all three (to a single point), is a good thing - others may disagree - my argument here is that everything connected to whatever earth will all rise to the same potential and thus, less chance of flash-overs from differing potentials on equipment ...

You got to be wide awake for lightning ....”

I certainly found the discussion very useful and learnt a few things. One was to run my coax to the base of the tower - I did not even think of the tower as being one big potentiometer.

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If you have any useful articles for this newsletter, please email them to zs5ml@marc.org.za for publication. Any articles of interest to Amateur Radio, both technical and non technical, will be well received.

If you would like your own email address ending with @marc.org.za, please contact me zs5ml@marc.org.za

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Tailpiece (before the end....)

A magician worked on a cruise ship.

The audience was different each week so the magician did the same tricks over and over again.

There was only one problem: The captain's parrot saw the shows each week and began to understand how the Magician did every trick.

Once he understood, he started shouting in the middle of the show, "Look, It’s not the same hat!" or, "Look, he's hiding the flowers under the table!" Or "Hey, why are all the cards the ace of spades?"

The magician was furious but couldn't do anything. It was, after all, the Captain's parrot.

Then one stormy night on the Pacific, the ship unfortunately sank, drowning almost all who were on board. The magician luckily found himself on a piece of wood floating in the middle of the sea, as fate would have it ... with the parrot.

They stared at each other with hatred, but did not utter a word.

This went on for a day... And then 2 days. And then 3 days. Finally on the 4th day, the parrot could not hold back any longer and said....

"OK, I give up. Where's the b@%#y ship?"

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A contribution from Tubby, ZS5TUB, of a slant-wire antenna, which can be easily used for field station use.