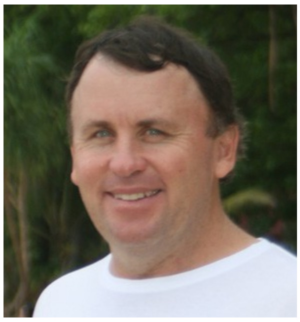
Editorial by Greg VK4VBU

Hello to all,



This is my first newsletter and I would like to thank John VK4FXLO for the great job he has done in the past year. I have just spent a couple of days back in Gympie region and I was amazed at how far the Gympie club has come since I moved away from the area 15 months ago.

The new club room looks fantastic and is in the early stages of being setup. I had the pleasure of assisting Roger VK4BNQ with getting the EasyPal repeater back online after a long break and thanks again to Erik VK4AES for hosting the repeater at his QTH while we had no club rooms. The EasyPal repeater is now running through a diplexer with our 70cm repeater through the new outside Diamond antenna..

It's really good to see new members joining the club and this is something that we need to keep happening so we can keep our club growing, the old saying many hands make light work is true and credit must go to our dedicated members who have given up their valuable time and donated their many skills into making the club into what it has become today. I'd like to welcome our new members Chris VK4BX and Bill VK4AYM into the club.

Our club is a very technically active club with many projects taking place at present; we now have wireless set up at the clubrooms which is essential for all the modern communications to work. I also notice that a lot of members have donated some very useful items and two that come to mind are the repeater rack donated by Isaac VK4FIBN and the backup batteries that were donated by Bob VK4MR.

Some of these items being donated are very valuable items and it's great to see the true spirit of amateur radio alive and well in the Gympie region. In the coming weeks we will see our radio station at the clubroom become operational, this will be a fantastic day for our club to finally have a place to call home and to have VK4GYM up and running, I'm sure the original founding members of the original Gympie Amateur Radio Club in the early 1920's would be proud of the efforts made by the amateurs in the Gympie region in keeping the hobby going from strength to strength in tough times.

In closing I would like to also thank Bob VK4MR for his regular articles in the newsletters, I would also welcome other members to do the same and submit and stories of items of interest to **newsletter@gceginc.org.au**

73's Greg VK4VBU

GCEGinc. OFFICE BEARERS

PRESIDENT: ED FISHER VK4ABX - president@gceginc.org.au
TREASURER: BARRY MOLKENTIN VK4KKN - treasurer@gceginc.org.au
SECRETARY: ISAAC NEUMANN VKFIBN - secretary@gceginc.org.au

From MVHR Newsletter

Snippet about our Club and also the Café:
President Tony Hallam's Report.

The Gympie Amateur Radio Club has a lease on one of the buildings in the Gympie Station complex. Members of this club have been donating time and material to upgrade this building for their use. This has been a mighty effort considering the heat over the past weeks and their future headquarters is starting to take shape. My thanks goes to MVHR management who were involved in the negotiations for the Gympie Amateur Radio Club to be based at Gympie Railway Station.

Bianca Nagy is operating the Refreshment Rooms café at Old Gympie Railway Station and provides a wonderful meal. It is encouraging to hear of groups and individuals who are supporting Bianca and this venue. The Refreshment Rooms café revenue has been reduced since the suspension of passenger services and your support of Bianca's venue is encouraged.

Amateur Radio to the rescue in the China earthquake

The very recent devastating earthquake in South Western China has once more showed the shining example of just how important it is in having Radio Amateurs, their experience and equipment to hand when things go horribly wrong and the prime first line support is overwhelmed or destroyed.

This is a brief run down on what happened when all regular communications was lost across a huge area of China leaving an urgent need for reliable communications to be re-established.

This was a magnitude 7 earthquake in the Ya'an province of China, the China Amateur Radio group sprang in to action and with their repeater network still working they immediately setup an emergency Communications centre for the public. This involved BV8DX and, BV8AAA along with BG8FUW who established the link in Lushan. Some Amateurs went on to HF radio or went to the area to help with communications and rescue.

The amateurs setup communications links on all HF bands which was then link in with the VHF and UHF traffic links from the local repeaters allowing them to pass emergency traffic throughout the critical first hours and days of the disaster.

As with many countries around the world, that embrace the amateur radio service, we see a very positive outcome during such times, sadly that is not generally the case here in Australia where many front line authorities charged with the care of the population show little if any interest in having a well-supported emergency resource, like the Amateur Service, to hand in times of dire need. As so often happens, it takes a real emergency to find the true weaknesses in many, if not all, of the first line response groups, particularly where it involves some local Councils.

Let's hope that we never ever see such a tragic outcome here, however be that as it may we still should hope for the best but plan for the worst. Now that we have established our new club rooms one of the components of this facility needs to address the possible input we could make were we to face any sort of emergency and communications became an issue. This new clubhouse is high, flood free and offers one of the very best radio sites in Gympie.

Bob Dixon VK4MR

BARC FEST

The Brisbane Amateur Radio Club will be hosting the annual BARCfest on Saturday 11th May 2013. This will be the 30th BARCfest held by the club and we would like to have as many people as possible attend this event. The event will be held at the Mt Gravatt showgrounds.Doors open at 9.30am and admission is $7.00. Setup will be from 7.30am for those who have booked tables.

Les Parker VK4SO barcfest co ordinator
ph 0411 729 642
email parkerlf@optusnet.com.au

Sausage Sizzle Club Fundraiser Dates

Saturday May 18, 2013
Saturday July 13, 2013
Saturday August 3, 2013
Saturday August 31, 2013

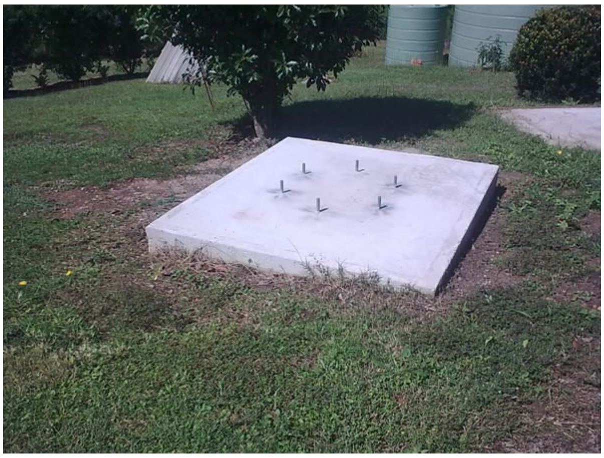
Please let Barry VK4KKN know if you can help out.

Putting Up a Radio Tower – Part 2

As you recall, I had come up against a problem. The tower is slightly out of shape The problem is at the top of the box section of the lower support part, where the hinge point is.

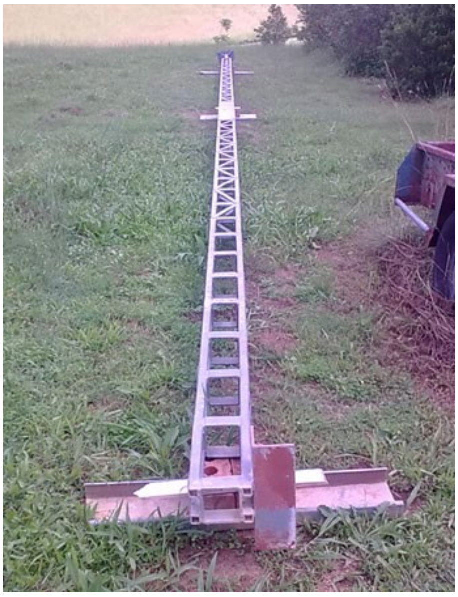
Bob VK4MR had machined up a pin for the tower to the specifications that I gave him but it didn't go through both halves of the tower because the holes were out of alignment. It's looking like the tower may have been dropped rather roughly when brought down but that's only a guess.

Concrete base poured and levelled.



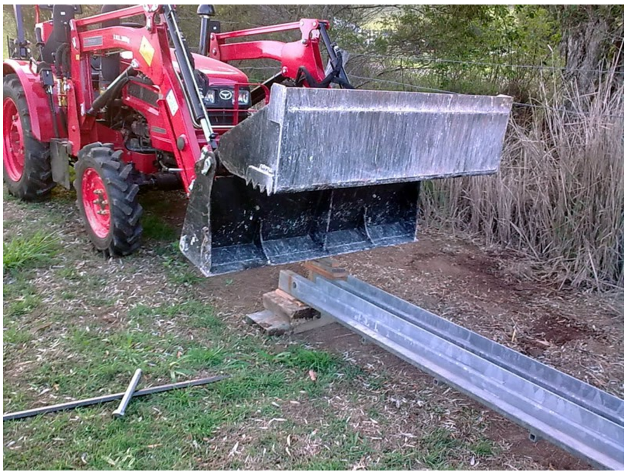
The cured base now without the stud template.

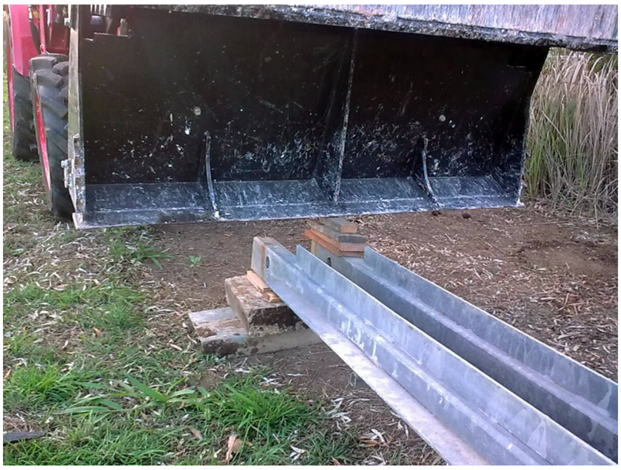
The top pipe insert of the tilting part with the rotator and antenna mount is also bent slightly out of shape and will also need to be sorted before putting the structure up. (far end of this photo)

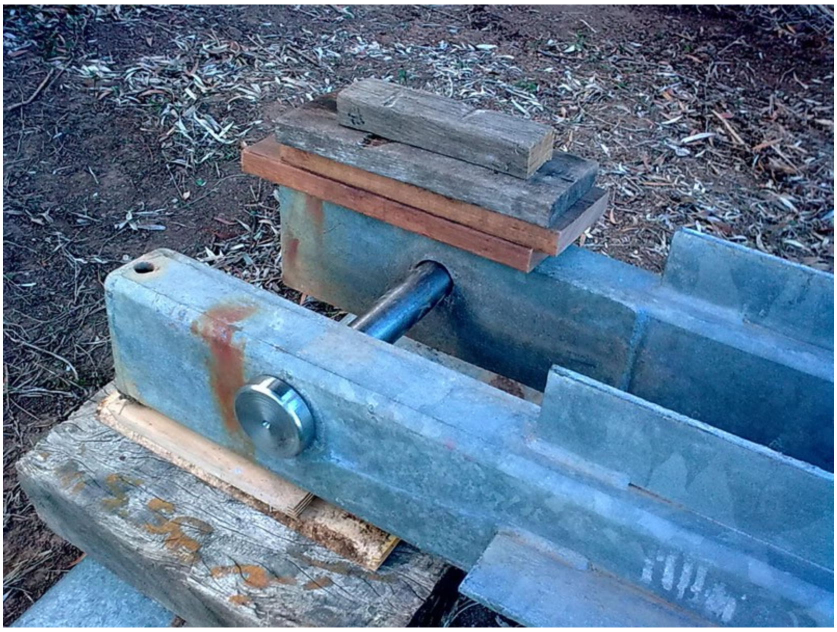


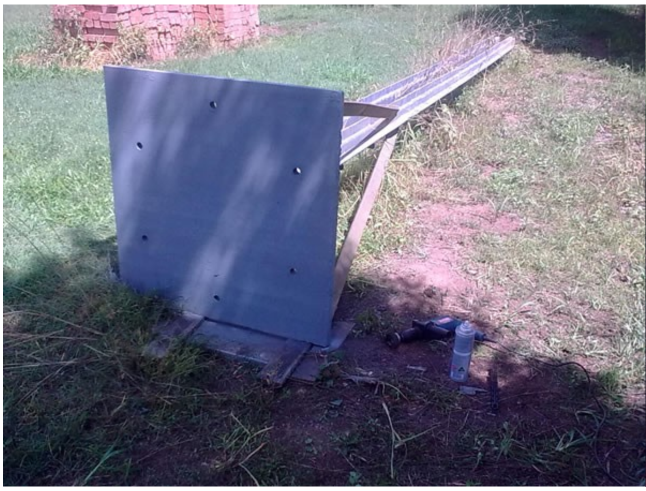
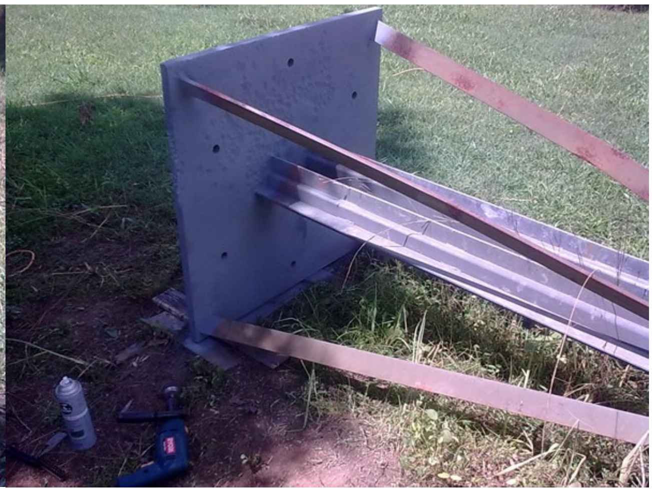
The near end of this picture is the bottom of the tilt part that holds the counter weight. As you add more antenna weight, you can add more cement blocks or whatever to keep the tower balanced and thus it takes little effort to tilt it. A simple rope will do the trick to pull it up or down by hand, no winch etc. should be necessary.

The construction is very solid but I was able to exert enough force with the bucket on my front loader to push down on one side (half) only and bend it back to where it should be.







Because of the wet weather we'd had and other work commitments, I haven't got a lot more done apart from de-rusting with wire brushes etc. and spraying with cold-gal to help preserve the exposed steel of the base, welds and top parts. There's a bit more work to do to line things up better before I can mount the rotator but I hope to have at least the lower base section standing within the next couple of weeks. I already tried to do this with my front loader but I couldn't get the lift height to do it safely and the other tilt section will certainly need a crane to lift it into place. Meanwhile, Paul has apparently placed the first component of his tower project, he is catching up now...

End of part two. 73, Roger - VK4BNQ

2m Club Net Roster

13th May	Roger VK4BNQ	24th June	Owen VK4FAAQ
20th May	Greg VK4VBU (via EchoLink)	1st July	Roger VK4BNQ
27th May	Ed VK4ABX	8th July	Greg VK4VBU (via EchoLink)
3rd June	Paul VK4YPM	15th July	Ed VK4ABX
10th June	Erik VK4AES	22nd July	Paul VK4YPM
17th June	Bob VK4MR	29th July	Erik VK4AES

Propagation, Space Weather and Solar Activity . . . What does it all mean?

Article sourced and contributed by John VK4FXLO

Activity on the sun can have a wide-ranging effect on the Earth. For example, radiation from the sun removes electrons from atoms in the upper regions of the earth's atmosphere, forming the ionosphere. The existence of the ionosphere allows the use of High Frequency (HF) radio as a means of communication over long distances. An HF signal transmitted from the earth may travel some way through the ionosphere before being "bent" back down towards the ground. This occurs due to the interaction between the HF signal and electrically charged particles in the ionosphere. The signal can then "bounce" off the ground back into the ionosphere, return to the earth again, and so on. The distance a given HF signal will travel depends on the frequency, transmitter power, take-off angle relative to the ground and the state of the ionosphere through which it is travelling.

For any given distance and time, there will be a certain range of HF frequencies that are most likely to provide successful communications; frequencies outside that range will work poorly or not at all. Simply increasing the power of an HF signal will not help if the frequency is too high for the distance required. Increasing the power may help if the frequency is too low, but using a higher, more suitable frequency is the best option. The highest frequency which may be used for reliable HF communications is known as the Maximum Usable Frequency (MUF).

How Do Conditions Affecting the Use of HF Vary Over Time?
Extreme Ultraviolet (EUV) radiation from the sun creates the ionosphere. The EUV radiation arises from the bright and hot regions which overlie sunspots (areas of strong magnetic fields on the sun's surface). As the sun progresses through its eleven year cycle of activity, the number and size of sunspots will vary, as will the level of EUV radiation. Changes to the ionosphere that result from this mean that conditions affecting the use of HF radio will also change over the solar cycle.

At the low point of the solar cycle, only the lower frequency HF signals can be transmitted over a given distance. At the peak of the cycle, the higher frequencies in the HF band can be transmitted over the same distance. Other factors important in determining the range of usable HF frequencies include the seasons, the time of day and the relative locations of the transmit and receive points.

What Are The Factors That Contribute To HF Propagation?
Geomagnetic field (GMF): The magnetic field which originates from the rotation of the molten iron core of our planet. This magnetic field produces the well known magnetic flux lines which run

between the two magnetic poles allowing us to navigate by use of a compass. The shape of the geomagnetic field, GMF, is very similar to a water drop, with the tail pointing away from the sun. This shape is formed by a constant stream of charged particles originating from the sun (i.e. solar wind) and exerting a constant "pressure" on the side facing the sun. The GMF plays a major role in the dynamics of the earth's atmosphere and without the protection of our GMF, which traps charged particles before they reach the earth's surface, our planet's surface would be undergoing a constant bombardment of these charged particles. Furthermore, without this charged particle trap, the ionosphere would cease to exist and without an ionosphere, sky wave propagation wound not exist and neither would DX contacts! The GMF is weakest near the Polar Regions and strongest near equatorial regions and on the night side of the earth opposite the sun, the GMF can extend millions of kilometers into space. Because of the importance of the GMF in trapping charged particles necessary for sky wave propagation, the short term variability of the GMF influences propagation; therefore, these short term variations are included in propagation forecasts. These forecasts categorize the GMF into the following categories: quiet, unsettled, active, minor storm, major storm, severe storm, very severe storm (very rare).

Aurora: A favourite propagation.
When more than the usual levels of charged particles arrive at the earth (i.e., increased solar wind), as a result of a CME or coronal stream, many of these charged particles penetrate the weakest parts of the GMF near the polar regions. This is because the GMF field lines guide these charged particles into these regions; at these Polar Regions, extreme ionization can result at altitudes up to 1000 km. Due to this increased ionization, a dynamic curtain shaped layer develops instead of the more typical horizontal shaped F2-layer. This Auroral layer may reflect radio waves from the HF-band (3-30 MHz) all the way up to and including the entire UHF-band (300-3000MHz). However, due to its very irregular shape and constant movement, heavy fading (QSB) is common in the reflected radio signals. This QSB can also result from multiple reflections within these Auroral layers, causing rapid phase shifting. An Auroral signal is easily recognized at 30 MHz as a bubbling sounding modulation or "under-water-like" modulation. Finally, because of the extreme and sudden phase shifts, narrow band modes such as CW and digital are the most reliable modes for DX contacts.

Backscatter: A useful form of propagation which mostly occurs when the maximum usable frequency (MUF) rises above 30 MHz. During these conditions, when radio waves reach the ionosphere (usually the F2-layer), they are reflected towards the earth's surface at a larger detectable continuum of angles than usual. In other words, a detectable fraction of a radio signal is

now reflected at a very sharp angle back into region just surrounding the transmitting station but usually beyond the range of ground wave communications (i.e., blind zone). The blind zone is the area around a radio station which cannot normally be worked by either ground waves or normal Ionospheric sky waves. Therefore, backscatter signals are heard within a radius of 2000km from the transmitting station. Backscatter signals are generally weaker than the normal reflected radio waves and during periods of low solar flux, only radio stations using directional antennas can produce readable signals. However, during periods of very high solar flux, even small stations using 10 Watts and vertical ground plane antennas may produce readable signals. Backscatter signals are generally very stable and rarely influenced by QSB. Finally, backscatter signals are easily recognized as a "hollow" or "barrel-like" sound originating from the expected blind zones of a radio station.
Trans-Atlantic: A mysterious and rare type of propagation named after the mysterious openings that occur between Europe and North America during the summer months, at a sunspot minimum, and well after sunset. In theory, openings such as these are unlikely, but there have been many occasions in 1995, 1996, and 1997 when such openings like these have occurred which allowed DX contacts across the Atlantic when DX seemed impossible. Even more mysterious is the fact that TV-amateurs received signals across the Atlantic well into the VHF-band during these openings. The mechanism of propagation is still unclear, but one proposed theory suggests that a gigantic Es-cloud forms above the entire Atlantic resulting in sky wave propagation.

Trans-Equatorial Propagation: This is another form of mysterious radio wave propagation which occurs during the spring and fall months during the sunspot minimum. This form of propagation allows two stations at nearly identical middle latitudes on opposite sides of the geomagnetic equator to communicate at frequencies up to 150 MHz. For example, communications can occur between Italy and South-Africa or between the West Indies and South America. Like Trans-Atlantic propagation, there is no widely accepted scientific explanation for this type of propagation.

The Ionosphere and its Components
Ionosphere: A collection of ionized particles and electrons in the uppermost portion of the earth's atmosphere which is formed by the interaction of the solar wind with the very thin air particles that have escaped the earth's gravity. These ions are responsible for the reflection or bending of radio waves occurring between certain critical frequencies with these critical frequencies varying with the degree of ionization. As a result, radio waves having frequencies higher the lowest usable frequency (LUF) but lower than the maximum usable frequency (MUF) are propagated over large distances. Finally, predictions for the LUF and MUF at different times and regions around the world can be found by searching the world wide web for propagation forecasts.

D-Layer: The lowest part of the ionosphere, the D-layer appears at an altitude of 50-95 km. This layer has a negative effect on radio waves because it only absorbs radio-energy, particularly those frequencies below 7 MHz. It develops shortly after sunrise and disappears shortly after sunset. This layer reaches maximum ionization when the sun is at its highest point in the sky and this layer is also responsible the complete absorption of sky waves from the 80m and 160m amateur bands as well as the AM broadcast band during the daytime hours.

E-layer: This part of the ionosphere is located just above the D-layer at an altitude of 90-150 km. This layer can only reflect radio waves having frequencies less than 5 MHz. It has a negative effect on frequencies above 5 MHz due to the partial absorption of these higher frequency radio waves. The E-layer develops shortly after sunrise and it disappears a few hours after sunset. The maximum ionization of this layer is reached around midday.

ES-layer: Also called the sporadic E-layer. This layer is characteristically very different from the normal E-layer. Its altitude may vary anywhere between 80km and 120km. This extraordinary part of the ionosphere is capable of reflecting radio waves well into the VHF-band (30-300 MHZ) and even into the lower parts of the UHF-band (300-3000 MHZ). It is still a mystery as to how this layer actually develops, but, it is clear that this layer appears mostly during the summer months and briefly at mid-winter, with the peak occurring in the early summer. Furthermore, it can appear at any time of the day, with a preference for the late morning and early evening. The sporadic E-layer may produce skip distances ranging from 400 km to 2000 km, with unusually high signal strengths. Even with a fraction of a Watt and a small ground plane antenna, long range contacts are very common.

F-layer: Highest part of the ionosphere. The F-layer appears a few hours after sunset, when the F1- and F2-layers merge. The F-layer is located between 250km and 500km in altitude. Even well into the night, this layer may reflect radio waves up to 20 MHz, and occasionally even up to 25 MHz.

F1-layer: The F1-layer is located between 150 km and 200 km in altitude and it occurs during daylight hours. Just before sunrise, the sun begins to shine on the upper part of the atmosphere containing the F-layer. Due to an unclear physical mechanism, the sunlight causes this F-layer to split into two distinct layers called the F1- and F2-layers. The maximum ionization of the F1-layer is reached at midday; this layer merges with the F2-layer a few hours after sunset to reform the F-layer. Finally, this layer reflects radio waves only up to about 10MHz.

F2-layer: The most common mode of propagation is sky waves reflected off the F2-layer of the ionosphere; these reflections are responsible for most DX contacts. This important layer of the ionosphere is the upper most part of the earth's atmosphere and it is located between 250 km and 450 km in altitude with occasional altitudes extending beyond 600 km. At the higher latitudes north or south of the equator, this layer is located at lower altitudes. Near the equator, this layer can be located at twice the altitude as compared to the higher latitudes. About an hour before sunrise, this layer starts to develop as the F-layer begins to split (see F1-layer above). The maximum ionization of the F2-layer is usually reached one hour after sunrise and it typically remains at this level until shortly after sunset. However, this layer shows great variability with peaks in the maximum ionization occurring at any time during the day, displaying its sensitivity to rapidly changing solar activity and major solar events. In contrast to all other layers of the ionosphere, the maximum ionization of the F2-layer usually peaks during the winter months. Most importantly, this layer can reflect radio waves up to 50 MHz during a sunspot maximum and maximum usable frequencies (MUF) can extend beyond 70 MHz on rare occasions.

What Are Types Of Propagation That Aren't Solar Related?
(Conditions that apply mostly to VHF and UHF)

Meteor scatter: A remarkable type of propagation caused by the ionization by meteors (also known as "shooting stars") entering the earth's atmosphere. Meteors are small rocks orbiting in space and every year on certain dates, the earth passes through streams of these meteors. When the earth crosses an orbit of meteors, meteors hit the earth's atmosphere at speeds of over 10.000 km/h causing them they burn up at extremely high temperatures. The resulting high temperatures leave traces of ionized air behind them at 80-150 km in altitude. Fortunately for radio operators, this trace of ionized air can reflect radio waves up to 500 MHz and sometimes beyond. It can also reflect HF signals in the range of 30 MHz. Each meteor entry results in a radio wave scatter that can be categorized into either a "ping" or "burst". Pings are short openings lasting a few seconds and bursts are openings lasting for minutes. During meteor storms (i.e., when meteors occur at high rates), both pings and bursts can occur so regularly that long QSOs are possible. The most famous meteor shower is called the Perseids and it occurs when the earth crosses the Perseid meteor orbit around August 12th of each year. This particular shower is known to have up to 120 meteors per hour. For instance, in 1994 the Perseids supported radio conversations having strong signal strengths for several hours and the skip distances ranged from 200 to 1800 km. However, meteor scatter contacts are usually briefer; and a result, APRS and VHF packet radio is considered to be a good means of communication during meteor showers due to the mode's short packets of data containing useful information such as the transmitting station's call sign as well as location in each packet sent.

Tropospheric scatter: The only form of propagation that is directly influenced by the surface weather of the earth. Our troposphere (0-10 km altitude) is composed of layers of air having different temperatures and moisture contents. When a sharp transition, called an inversion, appears between a cold dry layer and a warm moist layer of air, this transition causes refraction of radio waves. This is analogous to the refraction caused by the transition between water and air. For instance, when you put a stick into the water, it looks like it is bent. This same type of refraction occurs when a radio wave travels through a climate inversion; if the inversion is strong enough, radio waves can be refracted back to the surface of the earth after travelling significant distances (up to several hundred kilometres on the 6m band).

Ducting: On rare occasions, two or more inversions may appear at different altitudes. Sometimes certain radio waves can be transported between these two inversions. Therefore, this type of propagation is called "ducting" (or "tunnelling"). Records of over 2500 km have been set due to such ducting on VHF and UHF. Unfortunately, the effect is usually confined to 2M, but it can occur as high as 1.2 GHz (usually along frontal systems), and it almost never occurs below frequencies of 50 MHz. When ducting does occur on these frequencies, communication distances are typically in the range of 400 km. Inversions usually develop under the influence of high pressure weather systems when there is very little air movement. Also, low pressure systems may produce an inversion when a cold air mass collides with a warmer air mass (called a frontal system in meteorology). Inversions that occur along frontal systems support propagation along a line parallel to the weather front, and radio amateurs using frontal inversion often point their antennas parallel to the frontal system to take advantage of this form of propagation.

What Are Some Of The Means Used To Predict HF Propagation?
Fluxes & Indices Used For Forecasting: A- and K-index: Geomagnetic activity indices, high indices (K:>5 or A:>20) means stormy conditions with an active geomagnetic field. The more active: the more unstable propagation with possible periods of total propagation fade-out. Especially around the higher latitudes and especially at the Polar Regions, where the geomagnetic field is weak, propagation may disappear completely. Extreme high indices may result in aurora propagation, with strongly degraded long distance propagation at all latitudes. Sporadic-E is strongest during low indices. Low indices result in relative good propagation, especially noticeable around the

higher latitudes, when transpolar paths may open up. Maximum K-index is 9, and the A-index can exceed well over 100 during very severe storm conditions, with no maximum. The ARRL often reports the K-index from the Alaskan station where this index is known as the College K-index. Other stations reporting K-indices include Planetary and Boulder. In contrast, the A-indices are usually reported for the planetary station only. The higher the K-index, the more unstable propagation becomes, the effect is stronger at high latitudes, but weaker near low latitudes. When storm level is reached, propagation strongly degrades, possibly fade out at high latitudes.

Classification of K-indices are as follows:

*K0=Inactive

*K1=Very quiet

*K2=Quiet

*K3=Unsettled

*K4=Active

*K5=Minor storm

*K6=Major storm

*K7=Severe storm

*K8=Very severe storm

*K9=Extremely severe storm

As with the K-index, the higher the A-index, the more unstable propagation becomes.

Classification of A-indices are as follows:

*A0 - A7 = quiet

*A8 - A15 = unsettled

*A16 - A29 = active

*A30 - A49 = minor storm

*A50 - A99 = major storm

*A100 - A400 = severe storm

Solar Flux: This flux number is measured from the amount of radiation on the 10.7 cm band (2800 MHz). It is closely related to the amount of ultraviolet radiation, which is needed to create an ionosphere. The lowest possible number for this solar flux is 63.75. Single hop propagation already starts at 70 in lower latitude areas. Worldwide long distance propagation (DX) may turn up already with a solar flux at 120. From experience, an average solar flux of 180 seems to be ideal for 10m-20m bands QRP DX with good possibilities during these conditions to reach every possible part of the globe with a simple dipole running as low as 5 Watts!
As a rule, if good conditions exist for a length of days, those same conditions will return in about 28 days. This is because this is the length of time it takes the sun to make one complete revolution and those same favourable indices will also return. However, with the ever on going changes that can occur to the sun during the peak of a solar cycle, the exact opposite could be the case.

Gray-line: The area occurring along the sunset and sunrise zones (i.e. also called the terminator in astronomy) is known as the gray line and it has special significance to radio communications. Signals which travel along this gray line region often experience significant improvements in received signal strengths as compared to the direct shortest distance communications. This is because the radio wave absorbing D-layer disappears faster than the higher altitude radio wave propagating F2-layer around the time of sunset (and vice versa for sunrise). Because the F2-layer of the ionosphere remains strongly ionized along this gray line, HF signals often have less attenuation when they travel along the gray line as compared to the more direct shorter route.

Beacons: You will find several of these on the 28 MHz part of the bands. Most can be heard between 28.290 to 28.190 MHz sending signals in CW that give information as to their call sign, power output (usually very low, from 5 to 10 watts), type of antenna, and their location given as a grid square. The strength of their signals, even when there are no other stations on the air at the moment, can be helpful in knowing if there are favourable conditions to that part of the world.

What Kind of Disturbances Can Degrade HF Communications?

Geomagnetic storms: A worldwide disturbance of the earth's magnetic field, distinct from regular daily variations. (A storm is precisely defined as occurring when the daily Ap index exceeds 29.)
Initial Phase: Of a geomagnetic storm, that period when there may be an increase of the middle-latitude horizontal intensity at the surface of the earth. The initial phase can last for hours (up to a day), but some storms proceed directly into the main phase without showing an initial phase.
Main Phase: Of a geomagnetic storm, that period when the horizontal magnetic field at middle latitudes is generally decreasing, owing to the effects of an increasing westward-flowing Magnetospheric ring current. The main phase can last for hours, but typically lasts less than 1 day.

Recovery Phase: Of a geomagnetic storm, that period when the depressed northward field component returns to normal levels. Recovery is typically complete in one to two days, but can take longer.

Ionospheric Storms: Large scale changes in the chemical composition of the ionosphere resulting in changes to the MUF. Decreased MUFs restrict the frequencies available for use over a given distance. Ionospheric storms normally last for one to two days. Solar activity such as flares and coronal mass ejections often produce large variations in the particle and electromagnetic radiation incident upon the earth.

Solar Flares: Solar flares are large eruptions of energy and charged particles from the sun's surface. They are usually accompanied by coronal mass ejections and/or proton flares. Solar flares may last from minutes to hours Short-Wave Fade-outs: Short lived (up to two hours) disturbances, in which solar flare activity results in the absorption of lower frequency HF signals. These will only affect signals passing through the daylight ionosphere.
Proton Flares: An eruption of protons (positively charged nuclear particles) from the sun's surface. Protons usually reach the earth within an hour after the flare and they usually impact the earth at the Polar Regions where the magnetic field lines converge attracting these charged particles. Protons cause the ionosphere to absorb radio waves at the Polar Regions.

The letters associated with Solar flares are as follows ...
Scientists classify solar flares according to their brightness in the x-ray wavelengths. There are three categories: X-class flares are big; they are major events that can trigger radio blackouts around the whole world and long-lasting radiation storms in the upper atmosphere.

M-class flares are medium-sized; they generally cause brief radio blackouts that affect Earth's polar regions. Minor radiation storms sometimes follow an M-class flare.

Compared to X- and M-class flare events, C-class flares are small with few noticeable consequences here on Earth.

Coronal Mass Ejections (CME): Ejection of a large mass of plasma, including electrons, which are mostly caused by large solar flares. CMEs directed towards the earth usually impact the planet between 36 and 96 hours after the ejection. CMEs are responsible for increased A- and K-indices by increasing the solar wind velocities. These solar wind velocities may vary from 200 km/h (small flares) to 900 km/h.

Background X-ray level: This may vary from

* B (very low),

* C (low to moderate),

* M (moderate to high) to

* X (high to extremely high)

The higher the number after the letter, the stronger the X-ray radiation. So an X0.1 is stronger than an M9.9. High amounts of X-ray radiation causes intense ionization of the D-layer, resulting in strong absorption of HF-signals. Solar flares are commonly measured in the amount of X-ray radiation.
When the X-ray radiation emitted during a solar flare significantly enhances D-layer ionization and absorption (thereby elevating the LUF) it can cause a Short Wave Fade (SWF) Event. A SWF can occur over the entire sunlit hemisphere of the Earth facing the sun and it can last anywhere from tens of minutes to an hour or two. This enhanced absorption can become strong enough to close the HF propagation window completely, which is referred to as a Short Wave Blackout.

Info taken from various sources on-line and cobbled together

I hope it shed's some light on the lingo used in the various propagation forecasts found on here and other places...

MadMark1

Next Newsletter is due out around the end of July, 2013.
Please submit articles to **newsletter@gceginc.org.au**