

Seaside Tsunami Amateur Radio Society

The WA7VE



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Issue 3

Area Nets

The STARS ARES net meets on the WA7VE repeater on 145.490 Mhz. (PL=118.8) at 7:00 PM on Wednesday evening.

The Clatsop County ARES net rolls at 7:00 PM on Monday night on the 145.450 repeater. This net also includes Washington via the Beach-Net repeater system.

The WHONet (Women Ham Operators) meets on the W7BU repeater at 145.450 (PL=118.8) at 8:00 PM Sunday evenings.

The OEN (Oregon Emergency Net) rolls at 6:00 and 7:00 PM on 3980 kHz daily.

The regular STARS membership meeting will be held on Saturday, March 10th. at 5pm at the Clatsop Community College in Seaside.

The Seaside Food Bank urgently needs your help. Please bring an unopened jar of peanut butter for the Food Bank. More than one jar is even better. As an alternative, you could bring personal care items.

STARS ARES Net Stats

February check-ins totaled 91 with 4 different net controls. Awesome job, folks. If you have not participated in this net lately you should become active again.

Are you interested in being Net Control? If not, you should be; it is easier than it sounds. It is a great training opportunity and a real confidence builder. Contact Pat Love (KE7RBM), or email your club at wa7ve@wa7ve.org to schedule your Wednesday night adventure in ham radio.

SSTV and Crossband Repeaters on Glider and Balloon

SSTV and a crossband repeater payload developed by LU will be flown on a High Balloon 3rd and 17th.



We are pleased to inform you that Saturday March 3rd 2012 from 12hs (GMT-3), Amsat-LU and friends flew from Zarate (Route 193, km 19 from Buenos Aires) a UV repeater including APRS + SSTV + CW + DTMF thru several flights aboard a manned glider, as test for LUSEX (LU Satellite Experiment), being developed by Amsat Argentina.

On Saturday March-17 from 12hs-LU on (GMT-3), a free balloon will fly the same payload from the city of Junin (Club of Gliders, Lagoon of Gomez), 250Km west of Buenos Aires City.

The payload will operate as an UHF to VHF crossband repeater, with CW, APRS location and SSTV emissions on both local and space frequencies.

Continued on Page 9

Indoor Garage Sale Feb 18th & 19th

STARS participated in the Rotary Clubs' 2nd annual Community Indoor Garage Sale at the Seaside Convention Center.



We jumped in on short notice and without a lot of planning but lots of members chipped in and worked hard and it was a profitable venture. The club earned a few shekels. We had loads of fun and we informed the community about ham radio. Thanks to everyone that donated and/or participated.



The '45 Net Stats

This net includes hams all over Western Oregon and Washington. In January, the net had 131 check-ins. In February they had 89 check-ins. If you are not active on this important net, please consider jumping in on Monday evening at 7:00 PM.

ISS is Active on 145.800 MHz

Astronaut André Kuipers (PI9ISS) was calling CQ from the International Space Station on 145.800 MHz FM on both Saturday and Sunday afternoon, Feb. 25-26. André mainly worked Dutch stations although one UK Foundation holder Paul Waddington M6WAD was lucky enough to have a contact with him on Sunday. Paul says "I am absolutely thrilled to have had a QSO with the ISS. I just thought I would put out a random call, as



done so many times in the past, and he me. I must say, did reply, I believe tongue tied relief!!! I use a FT7900 to a GP-15N Trienna." When nauts work

I have times in answered when he came a Y a e s u C o m e t band an-

the astro- other radio amateurs back on Earth they transmit on 145.800 MHz FM but operate "split" listening for replies 600 kHz lower on 145.200 MHz. If you are lucky and hear them calling CQ just remember to activate your rig's repeater shift to ensure you reply on the correct frequency. You should never transmit on 145.800 MHz. Listen to the International Space Station at:

<http://www.uk.amsat.org/3491>

Latest Tech Class Grads

KF7TPJ	Mandee Brown
KF7TPK	Randy Everson
KF7TPL	Stanwood Gandy
KF7TPM	Stephen Pustis
KF7TPN	Patrick Sherman
KF7TPO	Joshua Thompson
KF7TPP	Roger Tower
KF7TPQ	Brian Zvaigzne

Doud Harrod (KF7TLO) passed both his Technician Class and his General Class test in one sitting. Way to go, Doug!

DCC - Amateur Radio Emergency Communications

Curt Bartholomew N3GQ of the FCC gave a talk to the 2011 TAPR Digital Communications Conference about using digital modes in Amateur Radio Emcomm.

Please watch this important ARVN video titled 2011 DCC - Digital Modes for EmComm - FCC

Amateur Radio Video News (ARVN)
<http://www.arvn.tv/>

Payroll Tax Bill Includes Provision for Amateur Radio Study

The ARRL reports on a bill that could result in recommendations to remove unnecessary restrictions on amateur radio residential antenna installations. A bill that has passed both the House and the Senate includes a provision for a study of the uses and capabilities of Amateur Radio Service communications in emergencies and disaster relief.

If passed into law, Section 6414 of the Middle Class Tax Relief and Job Creation Act of 2012 mandates the completion of the study, with a report of the findings to the House Committee on Energy and Commerce and the Senate Committee on Commerce, Science, and Transportation.

This study would "use the expertise of stakeholder entities and organizations" to recommend how to best use radio amateurs in emergency communications and disaster relief efforts, and how to best utilize the Amateur Radio Service in coordination with the federal government in these efforts. In addition, the study would also discuss the effects of unreasonable or unnecessary private land use restrictions on residential antenna installations and recommend ways to remove such impediments.

Read the full ARRL story at

<http://www.arrl.org/news/payroll-tax-bill-includes-provision-for-amateur-radio-study>

'Twisted' Waves Boost Capacity of Wi-Fi and TV

Radio amateur Bo Thidé SM5DFW has developed a new means to boost the information-carrying capacity of radio waves. Bo Thidé SM5DFW of Swedish Institute of Space Physics and a team of colleagues in Italy are exploiting an entirely new physical mechanism to fit more capacity onto the same bandwidth. The technique exploits what is called the "orbital angular momentum" of the waves - imparting them with a "twist". Varying this twist permits many data streams to fit in the frequency spread currently used for just one. A demonstration of this technique has taken place across the lagoon in Venice, Italy.

Read the full BBC story at:

<http://www.bbc.co.uk/news/science-environment-17221490>

Bo Thidé SM5DFW

<http://www.lois-space.net/~bt/>

Encoding many channels on the same frequency through radio vorticity: First experimental test can be seen at:

<http://iopscience.iop.org/1367-2630/14/3/033001/article>

The radio amateurs who took part in the Venice demonstration were: Vittorino Boaga (I3BQC), Michele Del Pup (I3MDU), Martino Rizzi (IK3RIY) and Francesco Carraro (IW3GSH). The press release issued by the Venice branch of the Italian National Society ARI can be seen at:

<http://www.arrl.org/files/file/Media%20&%20PR/EmergencyRadio.org/Orbital%20angular%20momentum.pdf>



No matter what amateur radio activities you engage in, I hope that you will engage in them safely. Every year, we lose amateur radio operators because of injuries they sustained while putting up antennas or doing things that could be dangerous.

Typically, amateur repeater stations are located in places where there are transmitters for other radio services, such as cell phone and pager services. These sites should be regularly evaluated so that RF field strengths don't exceed the MPE limits. When evaluating a site with multiple transmitters operating at the same time, the operators and licensees of **each transmitter that produces 5% or more of its MPE exposure limit at accessible locations** are responsible for mitigating over-exposure situations.

Perhaps the most common danger is from RF exposure. The dangers from RF exposure differ from those posed by exposure to radioactive materials. What, if any, are the differences between the radiation produced by radioactive materials and the electromagnetic energy radiated by an antenna? **Radioactive materials emit ionizing radiation, while RF signals have less energy and can only cause heating in the human body.**

RF exposure is not the only danger posed by an amateur radio station. For example, in emergency situations, you may want to use a gasoline-powered generator. One of the dangers posed by a gas-powered generator is that its exhaust contains carbon monoxide. Dangerous levels of carbon monoxide from an emergency generator can be detected **only with a carbon monoxide detector.**

The amount of heating is proportional to the specific absorption rate (SAR). SAR measures **the rate at which RF energy is absorbed by the body.** In general, the SAR increases as the frequency increases. **Localized heating of the body from RF exposure in excess of the MPE limits** is an injury that can result from using high-power UHF or microwave transmitters.

Some of the materials used in electronics pose a danger to amateur radio operators. They are used because they have some desirable electrical property, but may be dangerous if used improperly. For example, **beryllium oxide** is an insulating material commonly used as a thermal conductor for some types of electronic devices that is extremely toxic if broken or crushed and the particles are accidentally inhaled.

One of the potential hazards of using microwaves in the amateur radio bands is that **the high gain antennas commonly used can result in high exposure levels.** The FCC, as you might expect, has a lot to say about RF exposure. They have set limits on the field strengths that humans may be exposed to. These limits are called maximum permissible exposure, or MPE.

Polychlorinated biphenyls, or PCBs, is a material found in some electronic components, such as high-voltage capacitors and transformers, that is considered toxic.

The MPEs for the electric field and magnetic field of an electromagnetic wave differ. **All of these choices are correct** as to why there are separate electric (E) and magnetic (H) field MPE limits:

To learn more about PCB's and their dangers go to the link below:

- The body reacts to electromagnetic radiation from both the E and H fields
- Ground reflections and scattering make the field impedance vary with location E field and H field radiation intensity peaks can occur at different locations.

<http://www.epa.gov/epawaste/hazard/tsd/pcbs/index.htm>

One way to make sure that the field strengths that your transmissions expose you and others to is to measure the absolute field strengths. Unfortunately, this is not easy to do. The equipment used to measure field strength is very expensive and difficult to use. An alternative is to use software that calculates field strength. **Using an antenna modeling program to calculate field strength at accessible locations** would be a practical way to estimate whether the RF fields produced by an amateur radio station are within permissible MPE limits.

Ready for Some Satellite Comm?

Remember to include your neighbors when evaluating RF exposure levels. In some cases, your antennas may actually be closer to your neighbors' houses than they are to your house. When evaluating RF exposure levels from your station at a neighbor's home, you must **make sure signals from your station are less than the uncontrolled MPE limits.**

Adrian Engele, AA5UK says he will be traveling to Hawaii between March 21 and April 4. This is primarily a vacation trip for sightseeing and scuba diving but satellite operation is also planned.

He will try to get on the satellites as often as his schedule permits within vacation activities. His primary focus will be on FO-29, VO-52 and AO-7 Mode B passes. SO-50 and AO-27 may be attempted if conditions permit.

March 22-25 - Operation from south of Hilo.
March 26 - April 1 - Kailua-Kona, Big Island.
April 2 - April 4: Oahu, Waikiki beach.

Adrian invites you to stay tuned via AMSAT-BB and his Twitter feed @AA5UK for latest schedule information. He will also update his page on QRZ.com in the coming weeks with additional information.

Repeater Names

Amateur radio operators tend to have names for their repeaters. This is normal, because the typical V/UHF Ham has access to a number of repeaters, each with a distinct coverage area and a “personality”.

Commercial, “Land Mobile Radio” operators may have access to one or two repeaters. Fire, Law Enforcement and other Public Safety folks may have access to several, but of course these folks only use their radios in the performance of their work.

Many Hams use an abbreviated frequency to name 2-meter repeaters. Here in the Pacific Northwest, our 2-meter repeaters are established on 20-kHz steps, and in three sub-bands at 145, 146 and 147-MHz. The way the frequency assignments are made within these sub-bands are such that, in the 145 segment, the frequencies are all odd numbers, with 145.490 being an example. In the 146 segment, they are all even numbers and the “suffix” is greater than 500, for instance, 146.660 or 146.760. In the 147-MHz segment, the numbers are again all even, but now the suffix is less than 500, 147.180 or 147.020 show this.

This peculiarity allows us to drop all but the first two numerals of the suffix (the hundreds and tens of kilohertz) and have a unique designator. For the above, these would be: “49”, “66”, “76”, “18” and “02” respectively. This shorthand system completely describes the frequency pair. Again, here in the Pacific Northwest, all 145-MHz repeaters are “negative offset”, as are all on 146-MHz. The repeaters in the 147-MHz area are “positive offset”. So, if our shorthand name is an odd number, or greater than 50, and even, it has to be “minus”. If it is even, but less than 50, it would have a “plus” offset.

By the way, these should be pronounced as two digits, for instance, “49” should be said as “four-nine”. If you call it the “forty-nine” you may get some side-long looks, since this is actually a truncation of “four-ninety” (or “four-nine-zero”).

Can I use this system on 70-centimeters? No, afraid not. There are just too many pairs on that band. To pick one frequency, “440.925”, for example, can I call this “the nine-two-five”? Well, I could, but if there is a 441.925; 442.925; 443.925 or 444.925 in the neighborhood, there will be confusion.

What about the CTCSS tone? Commonly called “PL”, short for “Private Line”, the Motorola registered trademark for their strain of this common signaling system. This is kind of like saying “Kleenex” (PL) to ask for a “facial tissue” (CTCSS). There are only about 39 of these tones that are normally used. The highest tones, in the range of 200-Hz, can be hard to filter out of the audio, and thereby cause a “hum” in the speaker that is not desirable. The lowest tones, in the range of 70 Hz, take a longer time to decode. The decoder circuit needs a certain number of cycles to do its job, and at the low frequency end of the spectrum, this just takes longer. Many areas adopt a “local tone”, and if you know what that is, it’s a great place to start your search.

Most repeaters will tend to use tones near the middle of the spectrum. If I don’t have a clue as to the tone, I will start at 100.0-Hz and step up, checking to see if I can get the repeater to come back to me.

Continued in the next column.

It will only respond to the correct tone. If I reach 136.5-Hz (9 steps) without success, I will return to 100.0-Hz and step down from there.

The next time you hear someone talking about the “‘86” 2-meter repeater, you’ll know exactly what the frequency and offset is, and have a pretty good idea how to find the PL tone.

de NM7R

STARS Board of Directors

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Hams & Eggs in Seaside

We normally meet at 8:00 AM Thursday at Pudgy’s restaurant. On the first Thursday of each month we meet at a different restaurant. The location will be announced the night before on the Wednesday evening STARS ARES Net.

Seaside Food Bank Needs Help

The Food Bank needs peanut butter and personal care items such as combs, brushes, bath soap, deodorant, tooth brushes and toothpaste. The Dollar Tree in Warrenton is a good place to pick up personal care items very inexpensively. If you could help out with more than one small jar of peanut butter, they would appreciate it very much. The need is great. Bring your items to the membership meeting and we will aggregate your donations and deliver it in the name of STARS.

General Ham Radio Class

Fri., Sat. & Sun.- Apr. 20 - 23

Location: Clatsop College in Seaside

Friday 5:30pm to 9:00pm (Class - Day 1 of 3)

Saturday 9:00am to 5:00pm (Class - Day 2 of 3)

Sunday 9:00am to 5:00pm (Class - Day 3 of 3)

Exam date will be announced during the class

Antenna Gain

It is one of the most misunderstood topics in amateur radio. Here is why:

Antennas don't really have gain in the same way that an amplifier has gain. When you use a linear amplifier, you get more power out than you put in. Since transmitting antennas are passive devices, there's no way to get more power out than you put in.

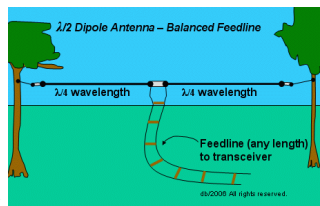
It's not easy to measure antenna gain. There is no antenna gain meter that you can simply hook up to an antenna to measure its gain.

So, what is antenna gain? Antenna gain is the ratio relating the radiated signal strength of an antenna in the direction of maximum radiation to that of a reference antenna. What this means is that when you talk about antenna gain, you have to know what kind of antenna you're comparing it to.

When talking about antenna gain, antenna engineers often refer to the "isotropic antenna." An isotropic antenna is a theoretical antenna used as a reference for antenna gain. An isotropic antenna is an antenna that has no gain in any direction. That is to say it radiates the power input to it equally well in all directions.

Let's take a look at a practical example. I often say that the 1/2-wavelength dipole antenna is the most basic amateur radio antenna. Well, the dipole actually has some gain over isotropic antenna. The reason for this is that it is directional. The signal strength transmitted broadside to the antenna will be greater than the signal strength transmitted off the ends of the antenna.

The gain of a dipole in free space compared to an isotropic antenna is 2.15 dB. Sometimes this value as dBi denotes that antenna is being



1/2-wavelength space have compared to an isotropic antenna is times, you'll see 2.15 dBi, where and isotropic antenna used for this comparison.

Since the isotropic antenna is a theoretical antenna, some think it's better to compare an antenna to a dipole antenna. An antenna will have a gain 3.85 dB compared to a 1/2-wavelength dipole when it has 6 dB gain over an isotropic antenna. **You obtain this value by simply subtracting 2.15 dB from the 6 dB figure:**

$$(\text{Gain over a dipole}) = (\text{gain over an isotropic antenna}) - 2.15 \text{ dB} = 6 \text{ dBi} - 2.15 \text{ dBi} = 3.85 \text{ dBd}$$

Sometimes, the gain over a dipole is denoted as dBd.

Similarly, an antenna has a gain of 9.85 dB compared to a 1/2-wavelength dipole when it has 12 dB gain over an isotropic antenna.

$$(\text{Gain over a dipole}) = (\text{gain over an isotropic antenna}) - 2.15 \text{ dB} = 12 \text{ dBi} - 2.15 \text{ dBi} = 9.85 \text{ dBd}$$

Paper Calls for Digital EMCOMM



Fierce Homeland Security, a website for domestic security leaders, reports: In a [paper](#) (.pdf) dated Jan. 24, the National Institute for Standards and Technology (NIST) Visiting Committee

on Advanced Technology says unlicensed spectrum in the 2.4 gigahertz to 5 GHz spectrum, television white space and possibly even 60-100 GHz spectrum could augment the planned national broadband network.

In addition, the network should incorporate Internet protocol packet switching technology to permit ad hoc network formation, the paper says. "Use of the Internet Protocols does NOT necessarily imply use of the public Internet," it emphasizes.

This is just what amateur radio operators do when we set up nets in response to an emergency, although networks are usually voice-only. Why aren't we doing any digital networking? Well, for one thing, there's currently no commercial equipment available for purchase, and many of those involved in ham radio emergency communications are just not interested in investing the time and money required to get a digital network like this up and running.

I'll say again what I've said before. We need a group like AMSAT that's devoted to advancing the state-of-the-art in emergency communications. Unless someone really takes the bull by the horns, amateur radio is going to fall farther and farther behind in this area.

HSMM - High Speed Mesh

HSMM-MESH (High Speed Multi-Media) is a great new technology that we as amateur radio operators can take full advantage of. It is Wi-Fi on steroids! We do not have to be hobbled by part 15 limitations, we can also use OUR frequency allocations, and avoid a majority of interference by part 15 devices. Common, inexpensive off the shelf equipment is used and or simply modified for this application.

HSMM-MESH can enable hams to have a robust mesh network for uses such as VOIP, callbook look-ups, communication, SAR, mapping, EM-Comm, etc. The applications are endless!

More information at <http://hsmm-mesh.org>

Talk to Jeff Holwege about it and check HSMM out on Facebook as well.

Me And Morse Code

As I've mentioned before, my attempts at learning Morse code or CW as a teenager were unsuccessful. While I've mentioned my excuse was too many distractions (girls, cars, football, did I mention girls?). I also believe my failure was a learning block which I could not overcome. Perhaps another way to word this was a learning block I didn't know how to overcome.

Since getting my license in 2005, CW has been a mode I've wanted to operate. I will admit that I've fiddled around in Ham Radio Deluxe DM780 and have also downloaded and installed other software applications to decode via the computers soundcard to text translation. I've decoded many times, but have never actually attempted to send via these mechanisms.

Please understand that what I'm going to say next is my opinion and only my opinion. But if I have to use computer software to send and receive CW signals, I might as well stay away from that mode. Again...this is my opinion for my own operational style and my own way of thinking.

So having said that, I am in the process of researching methods of learning Morse code. I've spent some time talking to some friends and researching information on the internet. I plan to wrap up this discovery phase and get started in the next few weeks.

While I know many learned CW from simply studying the dots and dashes which make up each letter or from listening to code tapes. When I was a kid the local club stuck me and my friend Jim in a tiny room with a cigar smoking maniac. We split before the first session was over. We could not stand the smoke.

Now I'm looking for alternative methods as I've tried the code tapes and studying an A is .- with not much success in the recent past. Of course, I also understand I'm a much different person now than I was 45 years or so ago. Most of this will be similar to overcoming my obstacles with earning extra a few months ago. For that, I headed for Oklahoma and immersed myself in the study guide for a full month. I just need to focus and get it done, but at the same time not setting unnecessary pressures on myself.

Morse code is very much alive on the bands and it is a mode I dearly want to enjoy. I'll be certain to most frequent updates to share both my successes and frustrations along my Morse journey.

Tallest Broadcast Tower

The world's tallest free-standing broadcast tower has been completed in Japan. It is a massive tower called the Tokyo Sky Tree has been completed ahead of schedule. Standing 634m (2,080ft) high, it is the world's tallest free-standing broadcast tower - and the second tallest building in the world after the Burj Khalifa in Dubai. Watch the BBC News report at: <http://www.bbc.co.uk/news/world-asia-17234847>

Around the World

10 Meter CW Balloon

Bob Bruninga WB4APR brings news of an around the world balloon attempt on March 5/9 that'll carry a CW transmitter on 28.223 MHz.

It will be launched on either 5 or 9 March 2012 in Annapolis Maryland and go East towards Europe. The balloon payload will only weigh about 50 grams. About the mass of two standard 9v batteries. It will use about 10 Mylar Party balloons to achieve constant-pressure flight level above 40,000 feet. The Telemetry will be in CW on 28.223 MHz and will contain only Battery voltage, and inside and outside temperatures.

The CW format will be something like this. It is assumed that all outside temperatures will be below zero or negative so the minus sign is not transmitted. The inside temperature might get above 0 during sunlight. So assume the I inside temperature is positive and the outside temperature is negative in Degrees C. When the inside temperature goes negative then the I will change to IN to indicate negative temps. The outside Temp is always negative. If it goes positive, then the value will be replaced with an X.

. . . W3ADO I nn T nn APRS.ORG . . . <== inside temp positive and outside negative

. . . W3ADO IN nn T X APRS.ORG . . . <== inside temp negative and outside positive

The CW message will be repeated once a minute or so. The WEB page may be only send on every other beacon.

TRACKING: The balloon has no GPS. All tracking will be done by HF DFing. All APRS users are assumed to know how to enter an APRS DF bearing report so that their DF bearing line shows up on global APRS maps. Check the APRS site for latest information on: <http://www.aprs.org/>

Amateurs Asked to Listen for RS-39 Satellite

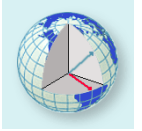
The Chibis-M microsatellite, also known as RS-39 (RadioSputnik 39), was jettisoned from the Progress M-13M cargo spacecraft Tuesday evening (UTC). The satellite is designed to study atmospheric phenomena such as Terrestrial Gamma Ray Flashes (TGFs) associated with lightning. RS-39 has CW beacons on 435.315 and 435.215 MHz and amateurs are asked to submit reception reports via email to the Space Research Institute of the Russian Academy of Sciences at amateur-rs39@chibis.cosmos.ru.

Each report will be acknowledged with a special QSL. The CW telemetry format is available [here](#). Telemetry decoding software written by Mike Rupprecht, DK3WN, can be downloaded [here](#).



Nuggets for Newbies

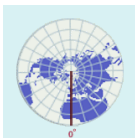
Have you heard the term Grid Square or Maidenhead Grid Square? For example, Seaside, Oregon is in CM85BX. If you go to <http://oregon-coast-hams.info> you can find your grid square. So why can we not use latitude and longitude? Lets review latitude and longitude. And you will understand why. The most common way to locate points on the surface of the Earth is by standard, geographic coordinates called latitude and longitude. These coordinates values are measured in degrees, and represent angular distances calculated from the center of the Earth.



So, what is latitude? We can imagine the Earth as a sphere, with an axis around which it spins. The ends of the axis are the North and South Poles. The Equator is a line around the earth, an equal distance from both poles. The Equator is also the latitude line given the value of 0 degrees. This means it is the starting point for measuring latitude. Latitude values indicate the angular distance between the Equator and a point north or south of it on the surface of the Earth. A line connecting all the points of the same latitude value is called a line of latitude. This term is usually used to refer to the lines that represent values in whole degrees. All lines of latitude are parallel to the Equator, and they are sometimes also referred to as parallels. Parallels are equally spaced. There are 90 degrees of latitude going north from the Equator, and the North Pole is at 90 degrees N. There are 90 degrees to the south of the Equator, and the South Pole is at 90 degrees S. When the directional designators are omitted, northern latitudes are given positive values and southern latitudes are given negative values.

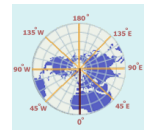


What is longitude? Lines of longitude, called meridians, run perpendicular to lines of latitude, and all pass through both poles. Each longitude line is part of a great circle. There is no obvious 0-degree point for longitude, as there is for latitude. Throughout history many different starting points have been used to measure longitude. By international agreement, the meridian line through Greenwich, England, is currently given the value of 0 degrees of longitude; this meridian is referred to as the Prime Meridian. Longitude values are indicate the angular distance between the Prime Meridian and points east or west of it on the surface of the Earth.



Our Earth is divided equally into 360 degrees of longitude. There are 180 degrees of longitude to the east of the Prime Meridian; when the directional designator is omitted these longitudes are given positive values. There are also 180 degrees of longitude to the west of the Prime Meridian; when the directional designator is omitted these longitudes are given negative values. The 180-degree longitude line is opposite the Prime Meridian on the globe, and is the same going either east or west.

How accurate can a lat/lon location be? Degrees of latitude and longitude can be further subdivided into minutes and seconds: there are 60 minutes (') per degree, and 60 seconds (") per minute. For example, a coordinate might be written 65° 32' 15". Degrees can also be expressed as decimals: 65.5375, degrees and decimal minutes: 65° 32.25', or even degrees, minutes, and decimal seconds: 65° 32' 15.275". All these notations allow us to locate places on the Earth quite precisely – to within inches.



A degree of latitude is approximately 69 miles, and a minute of latitude is approximately 1.15 miles. A second of latitude is approximately 0.02 miles, or just over 100 feet. A degree of longitude varies in size. At the equator, it is approximately 69 miles, the same size as a degree of latitude. The size gradually decreases to zero as the meridians converge at the poles. At a latitude of 45 degrees, a degree of longitude is approximately 49 miles. Because a degree of longitude varies in size, minutes and seconds of longitude also vary, decreasing in size towards the poles.

So, where in the world do those funny letter and number combinations for a grid square originate? At a conference in Maidenhead, England in 1980 an international group decided this type of coordinate system would be used because the older QRA locator system had the potential for a duplicate location outside of Europe. Maidenhead grid squares or simply grid squares represent a position on the earth based on latitude and longitude. The world is first divided into 324 large areas. These areas cover 10 degrees of latitude by 20 degrees of longitude and are called fields. Each field is divided into 100 squares. This is where the name grid squares come from. Each of these 100 squares represent 1 degree by 2 degrees.

Continued on the Page 8.

Nuggets for Newbies, continued.

The two letters that follow a grid square further define your location within that square by dividing each square into a sub-square. These sub-squares are 5 minutes by 2.5 minutes. If I remember my high school math, 1 minute of latitude is equal to 1 nautical mile.

The two letters that follow a grid square further define your location within that square by dividing each square into a sub-square. These sub-squares are 5 minutes by 2.5 minutes. If I remember my high school math, 1 minute of latitude is equal to 1 nautical mile. It is more difficult to calculate longitude, since 1 minute of longitude at the equator is equal to 1 nautical mile it decreases as it goes towards the poles. Therefore, each sub square, such as EL29hk is equal to 5 nautical miles by 2.5 nautical miles. And, the grid square, EL29 is equal to roughly 120 nautical miles by 60 nautical miles.

Ask An Elmer



I heard a couple of hams talking about RC Time Constants. What the heck were they describing?

When you put a voltage across a capacitor, current will flow into the capacitor and the voltage across the capacitor will increase until the voltage across it reaches the value of the supply voltage. This is not a linear function. By that I mean that the voltage will increase quite rapidly at first, but the rate of increase will slow as time goes on.

To see how this works, let's consider the RC time constant. The time constant of an RC circuit is equal to the resistance in the circuit times the capacitance, or simply $R \times C$. For example, the time constant of a circuit having two 220-microfarad capacitors and two 1-megohm resistors, all in parallel is 220 seconds.

The equivalent resistance of two 1 M Ω resistors in parallel is 500 k Ω . The equivalent capacitance of two 220 μ F capacitors in parallel is 440 μ F. The time constant is $R \times C = 440 \times 10^{-6} \times 500 \times 10^3 = 220$ s.

One time constant is the term for the time required for the capacitor in an RC circuit to be charged to 63.2% of the applied voltage. Similarly, one time constant is the term for the time it takes for a charged capacitor in an RC circuit to discharge to 36.8% of its initial voltage.

The capacitor in an RC circuit is discharged to 13.5% of the starting voltage after two time constants. Similarly, a capacitor charges to 86.5% of the applied voltage after two time constants. After three time constants, a capacitor is charged up to 95% of the applied voltage or discharged to 5% of the starting voltage.

You can use these percentages to answer the questions about how much time it takes for a capacitor to discharge. The key is to figure out what percentage the voltage given is of the starting voltage. In one case, the starting voltage is 20 V and you must figure out how much time it will take for the capacitor to discharge to 7.36 V.

Well, 7.36 V just happens to be 36.8% of 20 V, so the time required will be one time constant. One time constant is $R \times C$, or in this case $0.01 \times 10^{-6} \times 2 \times 10^6$, or .02 s. So, it takes 0.02 seconds for an initial charge of 20 V DC to decrease to 7.36 V DC in a 0.01-microfarad capacitor when a 2-megohm resistor is connected across it.

In the second case, the starting voltage is 800 V and you must calculate the time required for the voltage across the capacitor to drop to 294 V. Well, fortunately, $294 \text{ V} / 800 \text{ V}$ is again 36.8%, so the time required will be one time constant.

In this circuit, $R = 1 \text{ M}\Omega$ and the capacitance 450 μ F. $R \times C = 10^6 \times 450 \times 10^{-6} = 450$ s. So, it takes 450 seconds for an initial charge of 800 V DC to decrease to 294 V DC in a 450-microfarad capacitor when a 1-megohm resistor is connected across it.

Now you know.

The CIA VS Wikipedia: Good DX Information

Before [Wikipedia](#), there was the Central Intelligence Agency. A decade ago, if I wanted to look up information about the new country I just worked on 10 meters, I would consult the online edition of the CIA's [The World Factbook](#). During the past 10 years, I changed my modus operandi and today, I will consult Wikipedia for information about that new country.

How did this happen? I have a simple explanation.

You will find nothing about Theodore Samuel Williams, Parcheesi, Hallicrafters or Kurt Vonnegut in the *Factbook*, but consult Wikipedia and you will find plenty. I used Wikipedia all the time to look up stuff and got out of the habit of using the *Factbook* to look up countries. As a result, Wikipedia became my go-to website to look up everything.

For old times' sake, I recently visited the *Factbook* website and discovered that it had changed a lot since my last visit years ago. In 2009, there was a complete redesign of the *Factbook* website, which included the addition of many new features. Also, weekly updates of the website began in 2010 replacing the biweekly updates begun in 2004.

When I pulled down *Factbook*'s drop-down "Select a Country or Location" menu, I selected the first item that I was clueless about: [Akrotiri](#), which is a British military base on Cyprus (the UK's version of the US's [Guantánamo Bay](#)).

Consulting Wikipedia, I find that Akrotiri is paired with [Dhekelia](#), another British military base on Cyprus. (Dhekelia has its [own page](#) on *Factbook*. On the other hand, Guantánamo has no *Factbook* page.) Also, I could not help noticing that *Factbook* is Wikipedia's source for its Akrotiri and Dhekelia maps.

Without spending days -- if not weeks -- comparing the Wikipedia and CIA *Factbook* pages of each entity, I will never know for sure which is better.

Considering the multiple sources of Wikipedia's content, the *Factbook*'s content is likely to be more consistent. On the other hand, Wikipedia may have content that the government will not reveal in their *Factbook*, so it is probably a wash as to which one is better.

That being said, if you have not used the *Factbook* in awhile, give it a try; I think you will be pleasantly surprised by its new face.

Did you know that (according to *Factbook*) "in order to align their time zones more closely with their main trading partners, the Pacific island nations of Samoa and Tokelau late last year moved from east to west of the International Date Line"?

Goodbye BMC—Hello SMA

I noticed that almost all of the new HTs are going with SMA, presumably because of the smaller size. In fact, I started thinking about it. Can you even you can buy an HT with a BNC? As HT's get smaller and smaller will a BNC even fit on them any more?

I looked at some of the ham radio dealer websites to see if I was right. These radios all have SMA connectors: Alinco DJ-175T, DJ-C7T, DJ-G7T, DJ-G29T, DJ-V17T, DJ-V57T; ICOM IC-80AD, IC-92AD, IC-T70A, ID-31A; Kenwood TH-D72A, TH-F6A, TH-K20A; Yaesu FT-60R, FT-250R, FT-270R, VX-3R, VX-6R, VX-7R, VX-8R. The Wouxun radios are SMA but with a male connector on the radio (opposite gender compared to the other manufacturers, but that is a topic for another day.)

I did find three ICOM models that have BNC connectors: IC-V80, IC-V82, IC-U82. The trend line is clear. The BNC is on the way out for amateur radio handheld transceivers.

Do I care? Yur' darn tootin' I do. (That is an Okie term.)

I have a several extended length antennas that are much more efficient than the standard "dummy load" rubber duck. These are great for portable operation. I have not found many of these antennas available with SMA connectors. Even if they were available, I am not sure I would want to attach them to an SMA connector on an HT. For example, a 1/2-wave 2-Meter antenna is about 38 inches long — I am skeptical that an SMA provides enough mechanical strength to support it. Even with a BNC, I have always been very careful to not put too much strain on the connector. I have an adapter on my TH-D7A Kenwood HT so it will accept a replacement antenna that is actually resonant in the ham bands. I have heard the small factory antenna was not even resonant on our 2 meter band. We will have to see where this leads but it seems that the BNC will fade away from amateur use. Goodbye, BNC, I am sure gonna' miss ya.'

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SSTV Continued From Page 1

According to estimates the balloon could reach 100,000 feet in altitude, traveling from 50 to 100 miles towards the East, thus allowing contacts between stations located in provinces of Buenos Aires, Santa Fe, Entre Rios, Cordoba, La Pampa, San Luis and Uruguay. See the coverage map on:

<http://www.amsat.org.ar/junincubr.jpg> and possible trajectory in <http://www.amsat.org.ar/junin120215.jpg>.

For these experiences, Amsat-LU works with and it is thankful to hams of Radio Clubs of Junin, QRM Belgrano, APRS Group, Don Bosco Ramos Mejia School, gliders Clubs of Zarate, Junin and Cañuelas, and the twelve Amsat-LU members development team as well as those who have actively participated and sent their reports in previous experiences.

Continued on Page 10

More information is located at:

http://www.amsat.org.ar/lu4aao/experimento_globo_y_parapente.htm.

Several flown experiments have been successfully operated during 2011 in manned-gliders, airplanes, captive and free Balloons allowing operational & practice for hams contributing to platform validation of LUSEX satellite (LU Satellite EXperiment) on development by Amsat Argentina. More on <http://lusex.org.ar>

In order to monitor the payload (if you are within 400 miles of launch area) you need just an FM receiver either handy or base, in 145.950 for repeater and/or 144.930 for APRS. The repeater, that is activated via 123 Hertz subtone, operates receiving voice FM in 435.950 Khz (-112dbm, 0,56 uV) and emits with 2W the received audio live on 145.950 Khz.

Simultaneously APRS data will be sent in Packet at 1200 bauds in 144.930, and also in 145.950.

The DTI APRS symbol would change from a Balloon (/O) during the ascent to a glider (/g) during parachute descent.

The payload would operate as voice repeater activated by 123 Hz subtone during 1 minute, a warning bip at 40 seconds will indicate telemetry is coming, which is emitted if the repeater is not in use, if in 20 seconds more voice repeater still in use a two bips will be heard signaling that short APRS packages will begin in the different frequencies, also every 5 minutes CW (telegraphy with tones of audio) with CQ + callsign (LU7AA), sequence#, ext. and int. centigrade temperatures and voltage of batteries, after which the cycle will repeat.

Experiment for the first time in these flights will emit SSTV pictures in ROBOT-36 (36 seconds) in real time, showing what glider/Balloon sees. Every 5 minutes during ascent/descent and more spaced at high altitudes. (It can be received among others with MIXW, MMSTV & RX-SSTV).

Payload would also carry on board two TV cameras (one towards earth and another towards horizon) recording video and sound during the flight. These captured videos could be recovered when payload is recovered.

APRS trajectory could be seen every minute, including speed, height, external and internal temperatures and 7.2v battery voltage using UI-View (download from the UI-View official site on <http://www.ui-view.org/>) and/or to see/follow from Internet connecting to <http://aprs.fi/?call=lu7aa-11> or locally via Packet at specified frequencies.

There are geo-referenced maps for UI-View in:

<http://www.amsat.org.ar/junin.jpg>,

<http://www.amsat.org.ar/junin.txt>

<http://www.amsat.org.ar/zarate.jpg>,

<http://www.amsat.org.ar/zarate.txt>,

<http://www.amsat.org.ar/lachoza.jpg> and

<http://www.amsat.org.ar/lachoza.txt>.

Download and place them in directory Program Files/Peak Systems/UI-View32/MAPS and rename files .txt to .inf. The experiment in 435.950 KHz besides voice, receives and accepts DTMF sequences commands on demand, I.E. sending B* (DTMF with handy keyboard on UHF) will return S5 in 145,950 VHF CW, reporting in CW signal strength received from your station, if S9+10 will returns P10.

There are also DTMF commands qualifying emission of CW tlm or APRS beacon or SSTV emission, commands that allows remote release of payload, mode changes, timers control, energy, power, etc.

Frequencies for previous coordination, announcements and flights will be 7090 Khz LSB +/-10 Khz and local repeaters. During the flights will remain active wide coverage AMSAT-LU APRS Igate LU7AA-10 on 144.930 and 430.930 KHz, operating from the Constituyentes Investigation Center transferring whatever is received towards Internet.

For being an experiment oriented to a next satellite, the contacts made between stations via this payload will be considered valid for the recently announced permanent, gratuitous and applicable Satellite Certificate that AMSAT-LU and RClub QRM Belgrano grants, more info on:

<http://www.amsat.org.ar/certsat.html>.

During the Balloon flight, amateur groups will chase the payload, aiming to locate and recover. Trapping ventures holds on this activity, as in the case of the Pampero 15 Balloon sent from San Miguel del Monte which landed in the middle of the Magdalena's state prison . See:

http://www.lu5egy.com/Proyecto_pampero/vuelo_15/n_1esk.htm

All reports are welcome. If you wish or can organize or want be part of control, or like to pursuit and recovery, or like operating and capturing data as an independent station, and/or wishes to join us personally in this adventure from the launching places to parapente . Email us at amsat.org.ar.

We appreciate reading of this information and thankful if distribution possible.

