



# ARASWF

## NEWSLETTER



Vol. XXI No. 6    The Journal of the Amateur Radio Association of Southwest Florida    June 2005

### Club Information

Meeting Time:  
4th Tuesday at 7:30 p.m.  
Red Cross Chapter House  
Northbrooke Plaza Dr.  
Naples FL  
Club Repeater:  
K4YHB— 146.670 (-600)  
EOC Repeater:  
WB2WPA— 147.030 (+600)  
Club Home Page  
<http://www.araswf.org>  
Club Officers/ Chairmen  
President: KB4ETT  
Corey Mugas  
Vice President: KI4AI  
Carl Pacini  
Secretary: KG4ZLB  
David Worboys  
Treasurer: K2ZEL  
Bill Reynolds  
Past President: WB2QLP  
Jordan Mash  
Technical Director: WA9ZIF  
Carl Foust  
Ops. Director: KI4DBI  
Rodney Smith  
Public Info. Officer: KI4HQP  
Elio Hernandez  
Awards Manager: KD4VRZ  
Gary Randall  
VE Liaison: AA4RX  
Howard Roux  
Newsletter: WD8RFL  
Mike Welsh  
Webmaster: KI4AIM  
Rik Conklin  
Social Chair: W2JQ  
Sigi Boernet

### *From The President's Shack:*

Hello, I am happy to report that the club repeater 147.67 is operational! Our machine was installed and put on the air. In time, we hope to increase the repeaters coverage of our community. There are still adjustments being made and I am sure that club members are glad that we have been allowed access to a great repeater site.

I thank everyone involved in this time-consuming, and essential project for our local communications capability. There were quite a few aspects to this project, from finding a site, meeting with building personnel, application to the Board of Pelican Bay for approval, repeater repair and testing, moving heavy equipment from one site to another, drilling holes in concrete block for antenna runs, and the list goes on. Thank you to those people who worked on this project and to those who continue to improve our repeater operations.

Field Day is almost here! Can you support the club activities for Field Day? This project will also take many hands to set up, operate, speak with county personnel that may attend to see our communications at work, and taking down our Field Day station.

It sounds like everyone is excited about this event, so please have a share. This is a time when we can work together and 'get on the air' and perhaps cultivate the interest of visitors to Field Day.

73,

Capt. Corey Mugaas -- KB4ETT President ARASWF

**Secretary's Report, from David Worboys, KG4ZLB:**

**Amateur Radio Association of South West Florida**

**Club meeting held at the Red Cross Building, Naples, FL on Tuesday March 22<sup>nd</sup> 2005.**

**In attendance:**

Corey Mugaas, KB4ETT- President  
G. William Reynolds, K2ZEL – Treasurer

Jordan Mash, WB2QLP – Past President  
David Worboys, KG4ZLB – Secretary  
Carl Pacini, KI4AII – Vice President

**Apologies:**

Rodney Smith, KI4DBI – Operations Director  
Carl Foust, WA9ZIF – Technical Director

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**MEETING MINUTES**

Corey, KB4ETT (President), acted as Chairman of the meeting and there being a quorum present, called the meeting to order at 7.30pm.

**Guest Speaker:** In a departure to the normal course of club business, Corey opted to delay the meeting proper until after the guest speakers presentation whereupon he introduced to the meeting Charles Fueschel, who was to talk about NASA space communications. Charles is a former Director of Space Communications and Technology at NASA, and a PhD and MA as well! Charles explained that he had been an engineer for NASA scientific space stations that is, un-manned operations. Initially Charles posed the question as to why we would wish to communicate with space stations and he explained that there were three specific reasons. Firstly for command and control (the transmission of telemetry data and commands and computer memory load), voice and video for human crew and for the return of scientific data. Charles explained that "mass" is very costly to put into space and that power generators (the force required to insert the vehicle into orbit) are large and massive and additional redundant equipment must be included in case of primary equipment failure – all of these instruments and equipment need a communications link. Charles advised that in years gone by, NASA used VHF (between 136 and 149MHz) but this is now not the case. Air to ground communication is via UHF but primary data transmissions are via the S. Band (2.2 – 2.3 GHz), X Band (9 GHz), KU Band (14 GHz) and KA Band (34 GHz). Charles explained that antenna gain versus frequency is a critical calculation and that the diameter of the receiving beam antenna is limited by Fraunhofer diffraction. Two types of NASA missions are flown, Near Earth which is between 100 and 500 miles from earth and the Deep Space missions. An example of a near earth mission was the Hubble Space Telescope which was 300 miles from Earth. As regards its communications, Hubble is equipped with two parabolic antennas neither of which are pointed towards earth. The reason for this is that transmissions from Hubble are picked up by other orbiting satellites and then re-transmitted to the facility at the White Sands Missile facility in New Mexico. As regards the tracking and relay data system, there are three geo-synchronous orbiting satellites that pick up the transmissions for onward transmission to earth. Charles explained that there was no earth bound antenna on the NASA Mars Rover as it communicated directly with the orbiting Mars Express via UHF and then the data was packed into S, K or X Band and transmitted back to Earth to be received by one of the three DSN (Deep Space Network), 34 meter beam wave guide antennas located around the earth. Voyager I and II, which were launched in 1977 had now covered some 10 billion miles and was still transmitting data back to earth using a 16w transmitter and a 3 meter antenna. As far as he was aware, this represented the longest two-way transmission ever, some 12 hours taken to upload and download to and from the spacecraft

although the upload was achieved via a 70 meter dish antenna and some 20kw of transmitted S Band. Charles said that it would take Voyager another 40,000 years to reach our nearest star, Alpha Centauri. Voyager is expected to continue communicating until 2020 and it transmits to earth radiation and space physical data. Charles then discussed "noise" and the fact that it came from many sources; man made, from power lines and RF; atmospheric from lightening and ionic disturbance and from stars by way of black body radiation.

Charles explained that data transmitted to and from the spacecrafts were now by way of packet data in BPSK and QPSK and by using spread spectrum technology. Finally, Charles told the meeting that some of the topics covered in his presentation are for one semester graduate courses.

Bill, K2ZEL and Corey, KB4ETT thanked Charles on behalf of the Club for taking the time to attend the meeting and give such an informative presentation.

**Treasurers Report:** Bill, K2ZEL presented the Treasurers report for the period to May 24<sup>th</sup> 2005. During the period the club had gross receipts of \$122.00 made up of membership subscriptions, and the proceeds of last months 50-50 donation. Expenses were nil and the net total in club funds amounted to \$3270.40.

**Meeting Minutes:** The Minutes of the previous meeting had already been published in the April 2005 newsletter and were taken as read.

**Governors Hurricane Conference:** Bill, K2ZEL, told the meeting about some feedback received from the recent Governors Hurricane Conference. He advised that, with immediate effect, Incident Commanders would not accept outside deployed volunteers (Radio operators in our case) unless they have completed and passed the appropriate training. This involved not only the ARRL sponsored, ARECC (Amateur Radio Emergency Communications Course), but also FEMA sponsored courses which were available via their website and were free of charge. Bill felt that it was necessary for the club to provide some sort of training to interested members over and above the on-line course ([www.fema.gov](http://www.fema.gov)) Bill would address the club meeting with this news and try and arrange some Saturday morning class work for those interested.

**Field Day:** Jordan, WB2QLP, reported on the necessary preparations for the upcoming Field Day. It was anticipated that set-up at the Red Cross building would commence at around 4.00pm on the Friday, or after the close of normal business at the Red Cross. Jordan explained that Field Day was not a formal contest but that in practice, participating stations tended to be quite serious about the event. It was anticipated that the club would operate 4, possibly 5 stations being 40, 20, 15, 10 and possibly 6 (depending on band conditions). The Club transceiver would be the GOTA (Get on the Air) station and it was incumbent upon the membership to bring in their own radios. Historically, there tended to be more radios than operators! Last years event had revealed a problem in that other operating stations were receiving interference from the 40m CW station but Jordan explained that we now had stump filters which would avoid this interference.

**Club Repeater:** Peter, KK4PG, advised the members about the latest news on the 670 machine. It was anticipated that a work party would be required sometime in the following week and another larger party to retrieve the items currently still situated at the former repeater location; possibly some of this equipment could be auctioned off to the club membership.

**Previous and future events:** Rodney, KI4DBI, gave the meeting a brief report on the success of the simulation exercise at Naples Airport and of the fact that all radio communications had been made using simplex frequencies rather than using a repeater. Rodney also queries whether the club wished to participate in the Swamp Buggy Races due to be held later in the year. The membership raised the possibility of conducting a special event station at some time and this topic was held over for later discussion.

**50/50 Raffle:** The 50/50 raffle was drawn by Anthony, KB2SFA and won by Fred, KI4MJJ

A motion to close the meeting was proposed by Anthony, KB2SFA, and seconded by Rodney, KI4DBI, and there being no further business, the meeting was adjourned at 9.10pm.

David A. Worboys  
KG4ZLB  
Secretary

## \*\*\* FIELD DAY \*\*\*

No Meeting in June

Setup for Field Day will be on June 24<sup>th</sup>  
at the Red Cross Chapter House

Operations commence 1800 UTC June 25<sup>th</sup>, and conclude 2100 UTC June 26, 2005

Please Participate if you are able!

~ Of Interest to All ~

### ***Update from June 5th Fitness Challenge Triathlon, Rodney Smith, KI4DBI:***

First of all, I would like to thank Luna, KI4HEW, for putting the info packets together for the radio operators. KI4HEW called out the times as the runners passed the one mile mark, in a three mile(5K) race. Next, the runners switched to bikes for a 15k bike race, as they crossed over the bridge on Harbour Drive. Their progress was reported to race control by Jessie, KI4HEU and Tim, KC4SSD. Then they progressed north on Gulf Shore Boulevard to its end. Next, the bikers headed for the south end of Gulf Shore Blvd. to be reported in by Jack, KI4HQQ, then back over the bridge once again as they headed for the Naples Beach Club to turn in the bikes, then run to the beach, for a 1/4 mile swim. This swim and finish was reported by Luna KI4HEW. As she, and the race director, watched the race, they could not be sure who won, as the finish was 39/1000 of a second. At race control, we had R.L., K4GP and Rodney, KI4DBI.

During the bike part of the race, Jessie, KI4HEU and Tim, KC4SSD called in for a biker that had picked up a pin in her rear tire, and had stopped at the bridge with a flat tire. We were the only comms able to get the bike repair van to her location for the repair.

Jack KI4HQQ worked the south turn of Gulf Shore Blvd. He checked the course at the end to make sure there were no stranded bikes. R.L KK4GP and Rodney KI4DBI passed the message to the race director, We even tried our hand at relaying messages over the course of the morning. The rain held off until well after the breakfast on the beach, watching the awards ceremony. The Radio Club was told that we did a great job, and asked if we would like to repeat it again next year. Yes!

73's Rodney KI4DBI. Oh yeah... check those GO BOXES!

### ***Several Items From Jordan Mash, WB2QLP:***

## **2-Meter Homebrew**

1. from [KE7BFD](#)

Website: [Alan R Fallis](#) on May 16, 2005

[View comments about this article!](#)

Hello and let me introduce myself, My name is Alan R Fallis and my call sign is KE7BFD and yes this call sign was issued to me, by the FCC, not a Vanity call. I use Big Fat Dog! This is amateur radio after all!

Ok, enough with the nonsense, I received my Technician ticket (license) in June of 2004, since then I have dived into this hobby, just to see what I can do! Experimentation has been, and hopefully will always be a part of this wonderful hobby! There are many factors when experimenting, but my main factor has always been curiosity followed closely by money! Yes I might be cheap, but so what? I found some 2 meter radios cheap that needed a little TLC and then started on the main course! **The antennas.**

I have read many articles about antennas and found out later, it is in the "Now Your Talking" book that no matter how expensive your radio, without a good antenna, you won't get your signal out! This started me on my quest for a homebrew antenna that preformed well, if not great, that was CHEAP and easy to build!

Only after I built all these antennas did I realize there is no free lunch, and not all things cheap are good! With ham radio it seems there is a pile of equipment and antennas that just don't give you the best bang for your buck. Check out he reviews section at <http://www.Eham.net> and you will see what I mean.

Back to the "**Fun stuff**" building antennas can be rewarding and frustrating. You don't need to know a lot of the technical stuff to build an antenna, but having some knowledge does help.

Please keep in mind all the plans for the following antennas were downloaded from the internet from various locations. If you need help finding the plans, please **search first, ask second!** You can reach me at [KE7BFD@sbcglobal.net](mailto:KE7BFD@sbcglobal.net) if you need help finding a project that suits you!

Ok, lets go!

Sooo... You want to build an antenna eh! Several questions come to mind!

What band(s) or frequency(s) are you going to use this on?

Does it need to be directional or not?

What materials can you get your hands on?

How much money do you want to spend?

Do you have the time and effort? Not to mention tools!

Where is the antenna going to be used? Location, Location, Location!

Is it ok with the wife? Other than doing the honey do list! Keep her happy and she **might** not care!

After you answer all these questions, one final question comes to mind. Is this a matter of money or curiosity? If money is the only issue, save your money and buy an antenna that suits your needs! I want everyone to be curious, experiment and LEARN!

There are as many types of homebrew antennas as there are hams. What I mean is everyone wants a “cheap” antenna that performs “great”, and that means the variety of antennas you can build is endless!

I have built eight different 2 meter antennas, two of which are dual band (VHF/UHF) and have learned one thing! Get an antenna analyzer - beg, borrow or whatever, just get one!

Now that I have said that, let's look at the types of antennas I have built!

Project 1. J pole i.e.. **Copper cactus**. This was a interesting project as it was my first and it worked well without the need for that analyzer (I did check it later and it needed a little tuning) There are many different plans for this antenna and they are easy to build and tune! For beginners, this is a good starter project.

Project 2. J pole Again, another theme on the J pole, however this was a dual band antenna and required some minor skills that the aforementioned copper cactus did not require. This antenna was made from **1 piece of aluminum angle and three aluminum rods**. Threading the aluminum rods was the most technical part and as a reminder, thread first, cut second. Easy to tune! Also a good beginner project!

Project 3. J Pole Again! Seem to be stuck, but that is going to change! Same as project 2 but used **1 inch aluminum tubing**. Why? Because I can. I really don't know. Mainly due to fact I needed another antenna as a backup and I wanted to see if the gain was better using larger diameter materials! IT WAS! Yippee! **Warning**, this required some strange engineering, and might be more difficult, due to the use of 1 inch diameter aluminum pipe!

Project 4. J Pole Still stuck, but wait a minute, I needed something simple and portable and of

course CHEAP! One piece of PVC 4 foot long and some **300 OHM TV** line and yippee again! This ¼ wave antenna worked well and tuned up ok! Great for field trips and general ht fun!

Project 5. Yep still stuck on J poles! However good learning experience! Small lightweight and above all CHEAP! **One SO 239 connector**, a couple of coat hangers (wife will never miss them, she hasn't counted them in weeks) and the appropriate tools! Another ¼ wave worked! Another starter! So easy anyone can build this!

Project 6. Ok, no more J Poles. The **Moxon** project was about to begin! Take a deep breath and dive in! Some PVC, some brass rod and a couple of days (due to my inexperience, and failure to read all the directions), and lots of patience, and I had successfully built this little wonder of a antenna. It actually worked and it worked **GREAT!** It has a strange pattern, kind of like a yagi, but with a lower front to back ratio! It was much more broad banded Than a Yagi and I could hit repeaters I never could with the previous antennas! Tuning this Pain in the \_\_\_\_ was not easy, but it can be done! Approximate size is 3 feet tall by 2 feet wide by 8 inches deep! And yes you can place it in your window!

Project 7. Actually decided to try my hand at a **full wave 2 meter Vertical antenna**. This was a little more advanced than I thought it would be! Having to make a Balun,(never did it before) and using plans that are not too specific, really made this one a challenge! Three pieces of aluminum tubing, Some annulled wire, 4 aluminum rods, and some PVC pipe and 6 hours later, I had a made a full wave 2 meter antenna that matched 1:1 and had similar characteristics of a commercial antenna! GREAT GAIN! Yep everything I learned from the J poles was needed to make this happen! Without the antenna analyzer, this one would have ended in the Junk pile!

Project 8. Weird, strange, unique, and very different antenna! Take piece of **5/8 inch copper**, bend it into a loop 8 Inches in Diameter (yea right!) and mount it horizontally, 3 inches off a 10 inch square piece of Aluminum. Now I know you think I have lost my mind! In reality this little beast acted like a 5/8 wave vertical antenna! Gain is about 2db, but what a deal!

What does the future hold?? Well now that you have asked, I plan to make some yagi antennas for satellite work and also for the 2 meter 70 cm band! If you have to ask why, you haven't been listening!

In summary I have learned many things! Don't give up. Ask your elmers lots of questions. Follow the instructions; learn the math, and above all **have fun!**

73's

KE7BFD

## ***VHF Distant Communication or DX***

1. *By John Wendt, WA6BFH*

The title of this article is almost an oxymoron to much of the Ham radio community. I used to get a bunch of e-mails asking me about 6 Meter DX. Often the e-mailer would tell me he had just gotten a new radio, and would ask what would be the best antenna for it. I would suggest a few different beams, and the desirable goal to achieve at least 10 decibels (dB) of antenna gain. I would ask which radio that this Ham had just acquired, and be answered that it was a new cute little "handheld"! Often too the respondent would indicate that they did not want to go to the trouble and bother of "putting up a beam and rotor and all that -- couldn't he just get a vertical omni with 10 dB's of gain?" Sure, it will be about 1 dB shy of 10 dBd, and be 72 feet tall! Why not?

I have written articles in the past about Ham FM activity. I actually enjoy FM on 10 and 6 Meters, and I own three different repeaters within our VHF and UHF spectrum. This article though will be about DX. This means no wideband 16 kHz bandwidth Frequency Modulation! It's about 3 kHz bandwidth Single Sideband, and even narrower iCW! The object is to attain a good "Signal to Noise" (atmospheric noise) ratio.

VHF DXing can be very challenging, and immensely rewarding! It never fails to thrill and delight me when I work someone several states away, or a different country via a frequency that used to be channel 1 television! On the higher frequencies to work someone in another state via a 144 or 222 MHz, signal is tantamount to an experiment in physics! The wonder of working someone in Arizona or at the far end of California, yet 400 miles away can be done every day though, and I savor the science involved!

Therefore, what does it take to accomplish this? The major hardware is a good antenna, and that's not very hard to provide. Even a four element 2 Meter wavelength band Cubical Quad on a 66 inch long boom and fabricated of wood and wire will provide 10.1 dBd of gain. A 50-foot boom Yagi on 6 Meters is an antenna better than 2.5 wavelengths long. If you tried to build such a Yagi for 20 Meters, the boom would be just short of 176 feet! The elements on a 6 Meter Yagi are only about 9 feet long; the antenna is very small from a perspective of mass or wind load. On 6 Meters, it is quite common for serious VHF Ham's to stack and phase 2 or even 4 such Yagis. One though is quite good. Even two 4 element Yagis on 12 foot boom's can be a very effective tool, or one 6 element Yagi on a 24 foot long boom!

On the higher bands of 2 Meters and 1.35 Meters, antennas are very easy. A Yagi with elements only about 2 feet long, and a boom just slightly over 32 feet in length can provide 16.2 dBd gain! The same antenna if scaled to 20 Meters would require a boom length of about 492 feet! It is very feasible to assemble a phased array of several of these VHF antennas. Have you ever seen someone phase four 20 Meter Yagis with 400 foot long booms? Antenna height is also a very important consideration. Thirty feet above ground and other obstructions is the break-point for this installation engineering. Below thirty feet, VHF antennas will appear to lose gain. Above this point, signal gain is effectively improved. Be careful though because as this height increases, losses in feedline can offset gain!

Thus, feedline loss considerations are important for such antenna arrays, and it is good to deliberate and be conscious of this. Coaxial cable is often referenced with statements by some Hams who say 'you MUST HAVE high quality Helix or hard-line coaxial cable to work VHF. If you look at these installations closely, you will find that they all have about 1 decibel of feedline



loss, a few tenths of a dB more, a few tenths less.

You will also often hear of Hams using coax from "The Feedline Man" or some such manufacturer. Now maybe these vendors have good coax, and maybe they don't? I am always a bit skeptical when I hear about cable that is designed for superlative low loss, and it's super flexible too! That kind of reminds me of guys that get a Volkswagen, and then try to turn it into a racecar! I use Belden cable. This is a company that you may have heard of, since they have been around for many, many decades. I use their Military specification (Mil Spec C17D) cables such as part number 8267. Many people call this RG8! It is in fact RG-213, a variant of the older World War 2 Mil-spec (JAN C17) RG-8A/U that I used as a kid. I usually wind up using about 50 feet or so, and consequently have about 8/10ths of a dB of loss over that length. Belden specs say 1.6 dB of loss at 100 feet on 50 MHz. I don't object to the idea of better coax, I just weigh all of the factors. I do typically use "Constant Impedance" coaxial connectors such as Amphenol type "N"! I also replace coaxial cable every 3 to 5 years.

Another facet of VHF DX is the physical nature of the ways in which these frequencies behave. Max Planck taught us that each time we double frequency we double energy level. A simple demonstration of this is to take a small power output transmitter, just a few Watts, on HF frequencies and touch the tip of its antenna with your finger. You will either feel nothing, or a small tingling. Do this with the same power level on UHF frequencies and you will get a painful RF burn! These energy levels though are our friend! They help us to explore and utilize the characteristics of the upper atmosphere, such as using Tropospheric Ducting, or bouncing signals off the roiled and disturbed air that is excited in the wake of jet aircraft, or even bouncing signals off the Moon! That's what I mean about experiments in Physics! It's just fun to play with this stuff!

The atmospheric noise level is considerably lower over most of the VHF spectrum. This factor along with the energy levels that can be produced by even modest power stations allow signals to be bounced off the trailing hot gasses of jet aircraft as mentioned in the earlier example. One prominent California 222 MHz Ham has carefully documented this. Other propagation effects allow for working distant stations merely by tropospheric ducting pathways, or by lower ionospheric layers than the F layer. The E-layer, during the months of spring will support 6 Meter DX over thousands of miles. Even the atmospheric D-layer will also convey these 6 Meter signals during the strongest solar flares, or Proton events. We all know about F-layer DX, when the Sunspot cycle peaks every 11 years. It's those lag years in between though that bother me -- that's another reason why I like VHF and above! I don't need the F-layer, when the E-layer will work just fine all year and every year!

The F-layer, actually F1, and F2 layers reside at a height of about 150, and 200 miles respectively, and when they are ionized to the extent that they will provide a high order of signal refraction, they work very well. The E-layer resides about 85 miles up, and is often ionized by many more regular occurrences. This allows typical E-layer signal skip to support communication to about 1200 miles in a single hop. Multiple hop skip also happens very often supporting communication out to 2500, or even 3600 miles. I have in the past worked stations in South America via a probable combination of E-skip, and possibly some ducting.

Aside from these longer oriented signal aids, Tropospheric ducting can support signal propagation

out to several hundred miles. A good antenna, and a decently engineered station can work "Tropo" very easily. It does not require a huge investment, only a bit of education and desire!

The next method of VHF signal propagation is I think probably the most fun, that's Meteor Scatter! Meteor showers occur as regularly as sidereal time allows. They are notable at calendar dates, and can be counted on to provide good results. Even a quarter-wave Ground Plane antenna on 6 Meters works for this! My favorites on 6 Meters are:

Scorpiids June 2nd-17th

Pons Winnecke June 27 - 30th

Cygnids July 14th

Capricornids July 18 - 30th

Perseids July 25 - August 4th

Ursids December 22nd

The next and last requirement is the radio hardware. Well-engineered transverters are best, although on 6 Meters there are very many high quality transceivers. With one of these transceivers, and transverters for each higher frequency band to be engaged and explored allows excellent operative potential. These transverters are designed with superior quality front-end RF amplifiers for the receiver stage, and the transmitter power is already at a respectable 25 Watts. Linear power amplifiers are common with serious VHFers, and the best of them can produce legal limit power levels with only a few Watts of excitation drive. These utilize high mu ceramic tetrode vacuum tubes but, quite a few Hams use only Solid State 'bricks' of about 100 Watts output. Some Hams just use the transverter's basic output and with a decent antenna and do quite well!

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Solar flash Tad "You Are the Sunshine of My Life" Cook, K7RA, Seattle, Washington, reports: Things got quite exciting last weekend. On Friday the Thirteenth at 1650 UTC, a tremendous explosion near Sunspot 759 blasted toward Earth. The impact on Earth's magnetic field was felt at 0230 UTC on May 15, producing an extreme geomagnetic storm. A geomagnetic storm is a disturbance of Earth's magnetic field.

The planetary K index reached 9 on Sunday, May 15. This is huge!. The middle-latitude, high-latitude and planetary A indices for Sunday were 44, 77 and 105 respectively—all very high values.

The A and K indices indicate the severity of magnetic fluctuations and, as a result, the disturbance to the ionosphere. K indices of 2 or 4 indicate unsettled or even active magnetic conditions--likely to be reflected in a degradation of HF conditions. An index of 9 represent a major storm that would result in an HF blackout.

## FOR SALE

BC-780 HLT Scanner Trunk Tracker Base (Erickson, Motorola, and LTR) 500 channels, 27 - 1300 MHZ, owners manual \$300

BC-3000 Conventional Hand Held Scanner 400 Channels 27-1300 MHZ, owner's manual, comes with case, AC and DC power cords, needs new battery pack (they cost about \$45) \$200

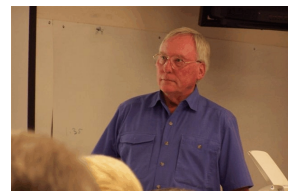
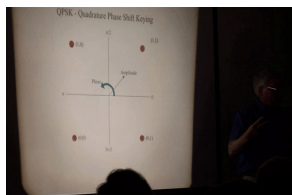
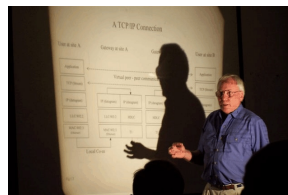
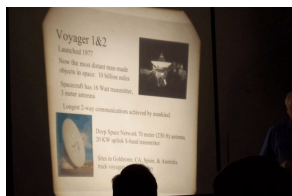
BC-245 Hand Held Trunk Tracker Scanner (Erickson and Motorola), 300 Channels, comes with 2 battery packs (1 high cap, 1 reg), case, cradle for charging extra battery pack, AC and DC power cords, owner's manual \$180

Pro-89 Radio Shack Hand Held Conventional Scanner "RACE SCANNER" 200 Channels, owner's manual, high capacity batteries, rechargeable AA, AC power cord, \$150

DX-440 Radio Shack All Band Short Wave Radio \$125

Rodney Smith, [ki4dbi@netzero.net](mailto:ki4dbi@netzero.net) or 239-304-1490

***Pictures from the May Meeting, from Elio Hernandez, KI4HQP:***



Visit our Club Web Site at: [www.araswf.org](http://www.araswf.org)

NEXT MEETING - TUESDAY - JULY 26, 2005  
7:30 PM - RED CROSS CHAPTER HOUSE