MIDWEST VHF-UHF SOCIETY

Vol. 20 No. 5 **www.mvus.org** **June / July 2006**

Club Memorial Call W8KSE 10 & 3.4 GHZ Beacon, presently in Repair.

Meeting at the Old Country Buffet ! near SR 725 and Yankee Rd. in Centerville

June Meeting on **Fri 23 June** 7:30 PM

MVUS Sunday Net at 14:30 GMT (currently at 9:30 **AM** local time, EDT). The net frequencies are primarily **144.280 Mc and 28.960 Mc.**

Contents

Upcoming Events!

CSVHFS Conference July 28-29, 2006 **40th Anniversary!**

Bloomington, MN, Ramada Mall of America (formerly the Thunderbird)
(Across from Mall of America) Program see back of bulletin!

MVUS Picnic and Measurements scheduled for 26 August

Microwave Update 2006, 20-22 Oct in **Dayton**, Ohio

Volunteers

We are in the planning stage for MUD 06 and need help. Please offer your services! Wether you like to present a paper or volunteer a few hours for check in or some other activity. Contact Tom at THolmes@woh.rr.com or Gerd at WB8IFM@AMSAT.org Tel: (937-253-3993)

De N8ZM.

Well, it has been a month almost since Hamvention, and I am still trying to find time to play with the new toys. Somewhere in the past week or so, too, was the June VHF Contest, which featured an awesome 6M opening that lasted almost all day Saturday. We worked all kinds of stuff west of the Mississippi, and had 20 over S9 signals from the West Coast all day! Sunspot minimum?

Now is the time for the work on MUD 2006 to really get serious, and we will need to draw on everyone's talent, experience, and time to bring it all together. I still have a need for a couple of committee chairs, so if you'd like to help, by all means please let me know.

The extra booth at Hamvention that we used to promote MUD produces mixed results. When some of the well-known uWaver's were there, like Bob, K8TQK, and Lloyd, NE8I, there was a crowd of folks there to chat with them. Otherwise, it sat mostly empty. I think we took in a total of three advanced registrations there, but we did sign up several new MVUS members over the weekend. John Human, Gerd Schrick, Steve Coy, Clyde Schaffnit, and Mike Schulsinger are to be commended for the amount of time they put in to setup up the booth and see that it was staffed all weekend. Thanks, guys!

Thanks also to John Human and Mike Suhar for their efforts to get the tower replacement on the Hara roof completed so that we could install the beacons. Things worked pretty well except for an emergency repair caused by some reversed power leads. Hey Joe, it could have happened to anybody! You were there helping out, and that's what matters. All in all, it was a pretty great weekend. Thanks to everyone who pitched in for MVUS and MUD 2006!

We have scheduled our annual picnic and measurements at Daun's place for the 26th of August. The usual format for food and foolishness will be followed again, barring violent objections from our hosts and/or our spouses. SO let's talk about details at the June meeting, since there won't be one in July. Also let me know what you'd like to measure so we can try to have the right stuff to measure it. I hope this will be a shakedown cruise for the antenna measurement setup that we'll use at MUD, if Daun has time to get it going by then.

See you on the 23rd at the Olde Country. Oh, by the way, when we were there last month they told me they were making some changes in the place, but that it shouldn't have a major effect on us. New owners and slight change in format, I think. Let me know what you think about it.

73, Tom, N8ZM.

We are still looking for Volunteers!

Hamvention Report

Hamvention Chairman Jim Nies, WX8F, gave a report at the last Dayton Club Meeting: Attendance was practically the same as in 2005, at around 20k. The flea market had about 140 empty spaces, but on the inside everything was packed and many dealers expressed their satisfaction with sales going strong. The bus service worked fine with only one temporary glitch: service to the campground.

However for next year we have to get creative with parking. The Salem Mall is being torn up!

The club has recovered from the red and legal efforts regarding Hamvention were settled, finances are again in the green and things are looking up! The club gave a donation of 5k to AMSAT and 15k to the ARRL.

This and That 6-06

- **Flashlight or the First Pushbutton.** How did the "flash" get in that name? Well, 100 years ago batteries were marginal and so were the little light bulbs. The new contraption could only provide light for a brief period unless you didn't care how often you'd change batteries and bulbs. To help you conserve the flashlight it had no slide switch only a pushbutton that you had to hold down.[WB8IFM]

- **Laptop.** This gadget runs on a battery and is always in danger of running out of power. Therefore a clever timing circuit has been incorporated that powers the thing down into a "sleep mode" after a preset time has elapsed since the mouse was last moved or a key depressed. That is akin to the "dead man stick" a train operator has to hold to keep the train moving. In the early days of making dynamite the operator watching over the delicate "nitration process" was sitting on a one legged stool. [WB8IFM]

- **Shoes. "**The worst thing that ever happened to feet was shoes. Or perhaps the second worst after concrete. These two products of urban civilization have finally conquered the human foot which in its primitive state crossed continents, pursued wild game and danced for days on end." [Dr.George Sheehan]

- **Split Bottom.** "One of the most charming sights in Beijing is the exposed backside of babies, whose clothes are traditionally split at the seat so they can easily relieve themselves. [Anna Quindlen]

- **Disease Mongering.** This is the medicalisation of ordinary conditions, which thereby opens markets for drugs to treat them as illnesses. [Steve Mirsky, in Scientific American]

- **Equalizer.** We got a new radio for the kitchen, which like all appliances these days, sprouts numerous pushbuttons. One of them is labeled "EQ". Pushing this button the following words appear in a round blue window which functions as an LCD screen: Classic, Jazz, Rock, Pop and nothing or blank. How about voice? Why would you want that! Because I mostly listen to news and weather! Except for the Classic position all the others basically add various amounts of base to it. That's what the kids like! [WB8IFM]

- **History**. What experience and history teach is this -- That people and government never have learned anything from history, or acted on the principles deduced from it. [G.W.F. Hegel]

- **Shake Fake.** Horst, W3/DJ7LC, found one of these "Just Shake No Battery Survival flashlights" at a Dollar store. Well, there was a small working battery inside but the shake mechanism was a total fake! The description on the back of the bubble pack was in three languages and explained this "Hi-tech" gadget like this: "The electron is used up removably." This sentence flabbergasted the translator and it was used "as is" (in English) and the other two translations.

- **Jumbo Mumbo.** These hearings were the dullest event in the history of the universe since the creation of sedimentary rock. They were the sort of hearings doctors prescribe to patients who have developed nervous disorders from watching paint dry.
  [David Brooks about the Hayden Hearings before the Senate Intelligence Committee]

- **Out of the Mouth of Babes.** Gravity was invented by Isaak Walton. It is chiefly noticeable in autumn, when the apples are falling off trees.

- **Electricity.** In the US .08% of houses do not have electricity. That doesn't sound much but it amounts to 100,000 houses. [Time Magazine]

- **Impressive Charger.** My cell phone came with a charger weighing in at only 3.1oz and that includes a 6' cord. Ratings are 100-240 VAC, 50/60 Hz, 150 mA input and 4.6V output @ 775 mA. [Gerd-WB8IFM]

Report from Hong Kong (Jun 13, 2006)

Hawking Says Humans Must Go Into Space
By SYLVIA HUI

HONG KONG (AP) - The survival of the human race depends on its ability to find new homes elsewhere in the universe because there's an increasing risk that a disaster will destroy the Earth, world-renowned scientist Stephen Hawking said Tuesday.

The British astrophysicist told a news conference in Hong Kong that humans could have a permanent base on the moon in 20 years and a colony on Mars in the next 40 years.

"We won't find anywhere as nice as Earth unless we go to another star system," added Hawking, who arrived to a rock star's welcome Monday. Tickets for his lecture planned for Wednesday were sold out.

He added that if humans can avoid killing themselves in the next 100 years, they should have space settlements that can continue without support from Earth.

"It is important for the human race to spread out into space for the survival of the species," Hawking said. "Life on Earth is at the ever-increasing risk of being wiped out by a disaster, such as sudden global warming, nuclear war, a genetically engineered virus or other dangers we have not yet thought of."

The 64-year-old scientist - author of the global best seller "A Brief History of Time" - is wheelchair-bound and communicates with the help of a computer because he suffers from a neurological disorder called amyotrophic lateral sclerosis, or ALS.

Hawking said he's teaming up with his daughter to write a children's book about the universe, aimed at the same age range as the Harry Potter books.

"It is a story for children, which explains the wonders of the universe," his daughter, Lucy, added.

They didn't provide other details.

(AP) Renowned astrophysicist Stephen Hawking from the University of Cambridge, front, is accompanied by his daughter Lucy

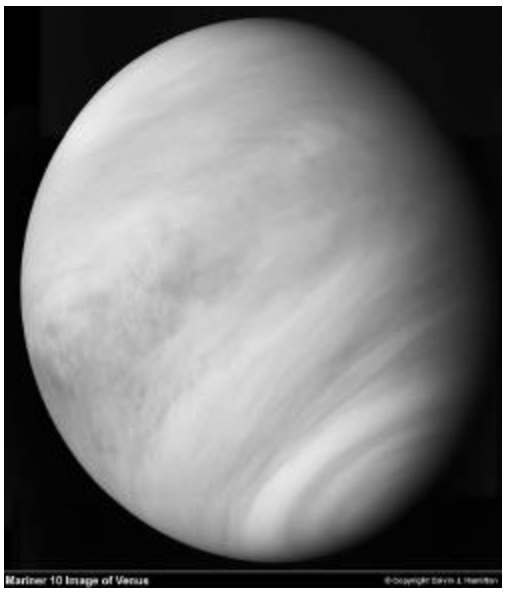
Venus

2005 by Astrophysics inreach (web)

Venus is the second planet out from the sun, and is just slightly smaller than earth. It is 12,102 km across, which is about 95% the size of earth. You can see venus in the sky in the morning or evening as a very bright "star". In fact, for a long time it was called the "morning star" or "evenstar". It is always pretty close to the sun in the sky because it is close to the sun in the solar system. You might think, since it's about the same size as earth, but is closer to the sun, Venus would be a nice place to live. It would be nice and warm, maybe the whole planet's a tropical paradise! Let's go!

You might want to reconsider. Here's why. About the only thing Venus and the earth have in common is their size. Venus is a really awful place. Try to think of the most unpleasant place imaginable, and I bet Venus is still worse. There's no water on Venus, but it has a very thick atmosphere. At the surface, the pressure is 92 times the pressure here on earth. The whole planet is covered in clouds (that's why is shines so brightly in the sky, clouds are pretty reflective). Not just any clouds though. The clouds on venus are made mostly of sulfuric acid. As if that wasn't bad enough, Venus is the hottest planet in the solar system. That's right, even hotter than Mercury! The reason for this is the greenhouse effect. The atmosphere on venus is almost all carbon dioxide, the same gas that is causing global warming on earth. What happens in the greenhouse effect is, energy from the sun comes in and then gets trapped by the atmosphere and can't leave. On venus, the surface temperature is 482 degrees C (900 degrees F!). Unlike mercury, it doesn't cool down much at night thanks to the blanket of clouds.

For a long time, nobody knew what the surface of venus looked like because all those clouds were in the way. Luckily, radar came to the rescue. Radio waves can go through the clouds easily. Radar works by sending out a bunch of radio waves, and then measuring how much gets reflected back. Several probes have been to Venus, and almost the whole surface has been mapped using radar. Here's what it looks like underneath the clouds.



Visible Image Clouds Hiding Details

Radar Image from Spacecraft

Venus has a structure similar to earth. It has an atmosphere, and a thin crust. Unlike Earth, Venus' crust is all in one piece.

EVE (Earth Venus Earth)

Back in January this year (2006) an attempt was made using 700 watts of power in x-band and the 20-meter dish of Bochum, Germany, to bounce signals off Venus. A 30-meter dish in Weilheim was also listening in on the return signal. So far the results are **inconclusive**, but there is still some signal processing done. Hartmut, DL1YDD, who was part of the team, describes their efforts in the March/May issue of the AMSAT-DL journal. Other members of the team at Bochum were, Karl, DJ4ZC, James, G3RUH, Herman, DK8CI and Thilo, DJ5YM. [WB8IFM]

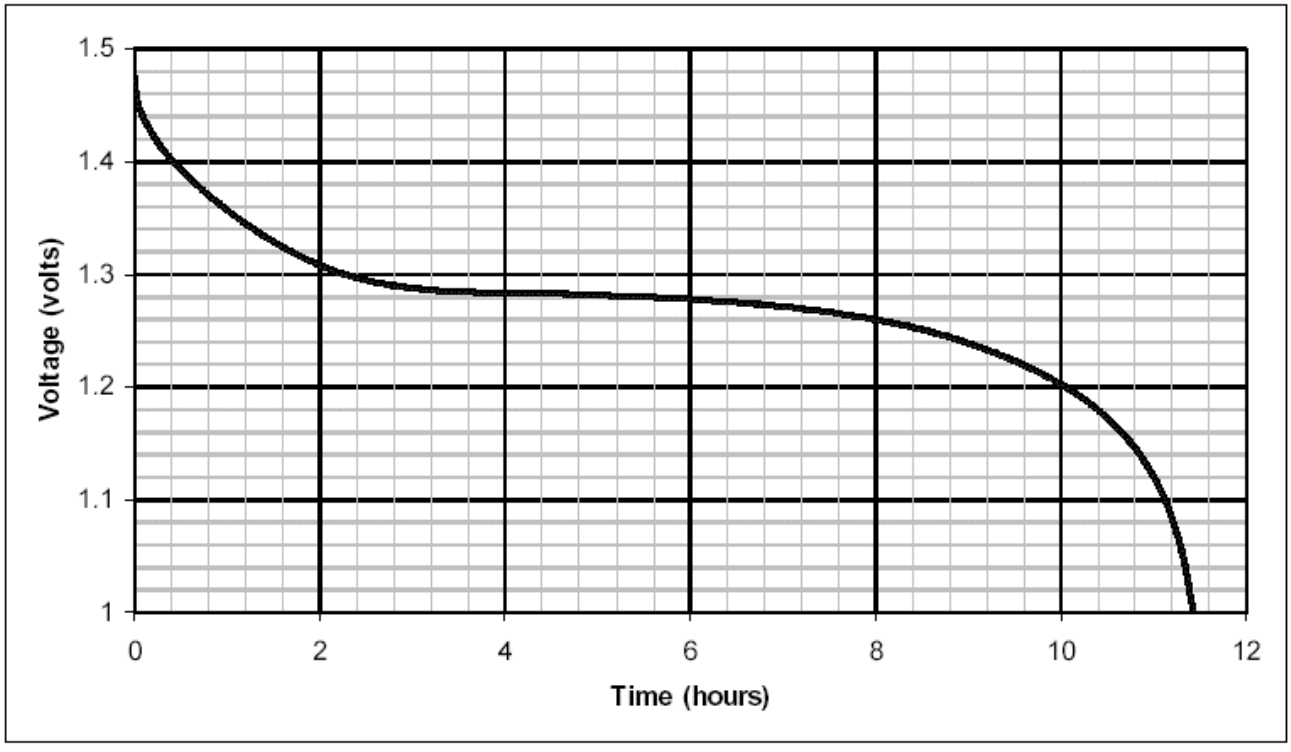
The Problem.

Signals from earth have been bounced off the sun, which is way out there but a huge target! Not sure whether this has been done with Venus, certainly not by hams. How does this compare with EME, the ham's "gold standard"? Well the Bochum group ran a test and received signals from the moon with 43dB over the noise in a 20Hz bandwidth, which is close to S9 (at 5dB per S-unit). Now in January Venus was relatively close to Earth at 40 million km, which is about one hundred times the distance to the moon. With Radar the distance relationship goes by the 4^{th} power meaning we have a signal drop of 100ex4, which amounts to 80db. Now Venus, about the size of Earth and therefore about 13.4 times (or ~11db) bigger than the moon would give us a that much higher return signal provided the reflectivity is the same. Still the comparable signal is now 43dB – 80dB + 11dB = -26dB below the noise, a tall order for signal processing (trading bandwidth or time for signal strength). The 30 m dish in Weilheim would only chop off another 3.5 dB, but in these situations every dB counts. [WB8IFM]

Aside. To compare LOs in Bochum and Weilheim, a contact was made on 10Ghz between the sites over a distance of 300 miles, in itself quite a feat! The mode of propagation unknown!

Typical NiMH Cell Discharge Curve

Figure 3.7.2 C/10 Discharge Profile @ 25°C



Some Additional Comments on NiMH Cells / Batteries

With Data from from the Harding Battery Handbook:

- **Storage.** A fully charged battery does selfdischarge at a slow rate. This can be reduced by cold storage according to the following table:

Storage Temperature / Maximum Storage Time =(Frequency of Cycling)	
40°C to 50°C (104°F to 122°F)	**Less than 30 days**
30°C to 40°C (86°F to 104°F)	**30 to 90 days**
-20°C to 30°C (-4°F to 86°F)	**180 to 360 days**

- Batteries can be **trickle charged** in order to maintain their full charged state but it must be done right i.e. there ought to be an overcharge protection.

- **Capacity (mAh).** You practically never get the nominal capacity that is printed on the cells, that is because of the funny industry definition (like the 2x4 never measures 2inches by 4 inches!!!) Here the definition:

3.7 NiMH Discharge Characteristics

The discharge characteristics of NiMH batteries (both cells and battery packs) depend on many factors. These factors include capacity, voltage, discharge rate, discharge termination (or voltage cutoff), matching (of cells within a battery pack), internal resistance, and temperature.

3.7.1 NiMH Capacity

Engineers and designers are usually most interested in how long a battery will supply the current needed to run a piece of equipment or a device. The length of time is directly proportional to the capacity of the battery and discharge rate. Defined as C, capacity is the electric current content of a battery expressed in ampere-hours (Ah) or milli-ampere-hours (mAh).

The capacity of a battery is determined by discharging the battery at a known constant current until a predetermined end voltage is reached. Therefore, a battery would be rated at 1500 mAh if it was discharged at a rate of 150 mA to an end voltage of 1.0 volt per cell and it lasted for 10 hours.

For clarification, the rate of current (charge or discharge) that is applied to a battery is often defined in terms of the rated capacity C of a battery.

Of course any charge or discharge current different (usually greater) than the one used for determining capacity will not attain the rated capacity.

One of the biggest misconceptions regarding NiMH cells is that rated capacity is the capacity that will be received by the user. This would only be true if the user charged and discharged at the same rates of current at which the cell was graded.

Rated capacity has been defined by the International Electrotechnical Commission (IEC) in document **#61436.1.3.4**, as a charge at a rate of 0.1C for a period of 16 hours. This is followed by a discharge of 0.2C to a voltage of 1.00V per cell.

However this number sometimes can be convoluted by **Maximum, Typical, and Minimum** cell ratings. For example, a lot of 1000 cells might range from 1000 mAh to 850 mAh. **The maximum capacity would then be 1000** even though only a small number of the cells attain this capacity. The nominal capacity would be 900 mAh, and the majority of the cells tested would attain this capacity. All those cells must conform to the minimum of 850 mAh.

We have found that to be considered with other manufacturers, we must also conform to this cell rating procedure Results derived when testing NiMH technology battery packs for capacity can change dramatically with variation in:
Temperature • Charge Rate • Discharge rate

Plop & Drop

The latest investor in green energy - the CIA **Within hours, solar and wind energy units can be up and running in war or disaster zones.**

By John Dillin | Correspondent of The Christian Science Monitor (October 18, 2005)

ARLINGTON, VA. - What if you had a power unit that generated substantial electrical energy with no fuel? What if it were so rugged that you could parachute it out of an airplane? What if it were so easy to set up that two people could have it running in just a few hours?

Now there is such a device - built by a small Virginia start-up - and the federal government has taken notice.

SkyBuilt Power Inc. has begun building electricity-generating units fueled mostly by solar and wind energy. The units, which use a battery backup system when the sun is down and the wind is calm, are designed to run for years with little maintenance.
Depending upon its configuration, SkyBuilt's Mobile Power Station (MPS) can generate up to 150 kilowatts of electricity, says David Muchow, the firm's president and CEO. That's enough to power an emergency operations center, an Army field kitchen, or a small medical facility.

Privately owned SkyBuilt now has a new investor - In-Q-Tel, a venture capital firm set up by the US Central Intelligence Agency. Skybuilt and In-Q-Tel will announce Tuesday that they have signed a strategic development agreement, including an investment in SkyBuilt.

In-Q-Tel's support is a breakthrough for the small firm. (The "Q" in In-Q-Tel is a whimsical play on the movie character "Q" who supplies James Bond with nifty gadgets.) SkyBuilt provides innovative energy solutions with the potential to help meet a wide variety of critical government and commercial power needs, says Gilman Louie, In-Q-Tel president and CEO.
The power stations could have important uses for disaster relief, homeland security, military operations, intelligence work, and a variety of commercial applications. The units are not yet designed for use by homeowners.
Though it is not mentioned, SkyBuilt units would have obvious applications in places like Afghanistan and Iraq, where soldiers risk their lives over long supply lines to truck in fuel for generators.

After hurricane Katrina, SkyBuilt units could have been rushed to the scene and set up in hours, restoring power to hospitals, evacuee centers, police and fire departments, and cellphone towers.

One big drawback of solar energy until now has been that it was a "custom industry," says Scott Sklar, vice president of SkyBuilt. Components are usually put together on-site, and differ from location to location. "When you buy a car, do they ship in all the pieces to your front yard and have somebody assemble it? I'm afraid not. We [at SkyBuilt] learned something from Henry Ford," he adds.

SkyBuilt follows the Ford model. Its MPS units are what Sklar calls "plop and drop, plug and play."
It works this way: Parts for each Skybuilt unit are packed into standard-size shipping containers. The containers, specially modified and strengthened, can be moved by ship, truck, train, or even dropped by a laser-guided parachute to the most remote location.

Once on-site, the container is opened, and arms and poles are attached to the outside to hold solar cells and wind turbines.
A prototype built here in Arlington has been running steadily for more than a year without repairs or maintenance.
While SkyBuilt has 140 patent claims on its energy system, most of its individual component parts are widely available. Mr. Muchow explains that its MPS can use photovoltaic cells, small wind turbines, computers, batteries, and other parts from essentially any manufacturer.

This open architecture allows its MPS units to be upgraded whenever a battery or other manufacturer comes out with a better product. It also reduces costs.

This was attractive to In-Q-Tel. The government could develop its own advanced technology (as "Q" might do). But it is far less costly to support technology like SkyBuilt's that also finds a larger market in the private sector, says Troy Pearsall, vice president of technology at In-Q-Tel.

In-Q-Tel, meanwhile, has signed agreements similar to this one with more than 80 companies since it was set up in 1999. Its mission is to identify and invest in firms with cutting-edge technologies that can aid US national security.

40th Anniversary CSVHFS Conference July 28-29, 2006

Bloomington, MN, Ramada Mall of America (formerly the Thunderbird)
(Across from Mall of America)

Technical Presentations
Presentations really aren't necessarily technical--they cover the breadth of the VHF/UHF ham radio hobby. Highlights in past years have been demonstrations of Software Defined Radio and Laser Communication beyond line-of-sight. Presentations vary from 15 to 45 minutes and step you through the highlights of the topic at hand. Your speaker is available for follow-up questions throughout the remainder of the conference. Further, many times your presenters have full papers in the Proceedings.

Talks firming up for this year: (check back for updates!)
Technology; from ENTRY to EXTREME Roving -- KØMHC
Upper Midwest Roving Experiences -- KØPG+K9ILT
10/24 GHz Beacon Project & Brief VHF+ SDR Update -- KMØT
Recent Experiences with WSJT -- KØAWU
A look into the auroral zone after ten years of study -- KGØVL
AMSAT: Software defined transponders -- K3IO+N4HY
High Efficiency Feedhorns for Low f/D Dishes & Notes for 13cm EME -- WD5AGO
3Y0X Dxpedition & EME -- WØRUN
Twin Cities Microwave Beacons -- NØKP
Design of a 30" dual band dish & elevation sys. -- VE4MA
SETI League 1296 MHz EME Beacon -- N6TX
EN52 Beacon, design and history -- K3SIW
Mapping resources -- K9JK
Microwave Equipment Ideas For P3E -- KØSM
40 Years of CSVHF History -- W9FZ+others
Building 24 & 47 LNAs -- W2PED
SDR Update - New Software Architecture (Open Source) -- K5SDR

Antenna Range
Friday morning, we have an outdoor antenna range where you can have your own antennas tested against standards and determine gain. If you are driving to the conference, bring your antennas from 50 MHz through 47 GHz for testing. Even if you don't bring an antenna for testing, watching the range in operation teaches you about antenna theory, performance, and construction techniques. The Antenna Range also has much fine conversation and socializing during the morning.

Noise Figure Testing / Pre-amp Workshop
You can learn much about Pre-amp design and performance by bringing a pre-amp for testing or tweaking. Fellow members, who frquently are engineering professionals, will assist you while you fine-tune your pre-amplifier for testing. It's fun and always increases your knowledge. Bring your pre-amps for 50 MHz through 47 GHz.

Rover Row / Dish Bowl
All Rovers are encouraged to bring their Rovermobiles or portable stations. We will have a designated dog-pound for all on Friday morning. While the Antenna Range is in operation, many attendees will come see. Show your handiwork, others will gain ideas and motivation to construct their own systems.

Poster Sessions / Table-Top Displays All day Friday and Saturday

Also: **Surplus Tour / Dealer Area / Flea Market / Banquet / The Prize Table at the Banquet / Hospitality Suites / Pavek Museum of Broadcasting / More**