



SARA Newsletter

September 2006

Shreveport Amateur Radio Association

Meeting:

First Thursday of each month at 6:30 P.M. in the Bossier Main Library History Center

Local Amateur Information

Available at:

www.K5SAR.com

or

www.qsl.net/nwlarl/

SARA Repeaters:

145.050 - K5SAR

DX Packet Cluster

145.110 - N5FJ

146.700 - K5KDO

146.820 - K5SL

440.900 - N5FJ

SARA

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2006 Club Officers

President – [Richard Lee, N5PFZ](#)

Vice President – [Paul Blankenship, KD5RUI](#)

Treasurer – [John Stewart, AA5KV](#)

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The Z-Match Tuner: How to Get Rid of the Balun

A Simple, Inexpensive, (Almost) Balanced Tuner

John Stewart, AA5KV

Many hams bands using a antenna fed or other "open The old is a good McCoy argued simplest and effective random length with ladder wire. Provided



work the HF multi-band with ladder line wire feeder". "McCoy dipole" example. (1) that the perhaps most antenna was a "dipole" fed line or open the total length was 88 feet or longer, the antenna was reasonably efficient on 80 through 10 meters. The loop antenna is another example of a simple and highly versatile antenna. The typical loop is cut for a half wave at the lowest frequency of use. Formed into a rectangle, triangle or some other shape, the loop is also normally fed with open wire. Hams today are slowly recognizing that open-wire is amazingly efficient. Even with long lengths of feed line and high SWR conditions, power loss in open-wire is barely perceptible. Simple and efficient...you can't beat that!

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LONG-SILENT SUITSAT-1

KEEPS GOING AND GOING

When SuitSat-1 -- the novel satellite built in a surplus Russian Orlan spacesuit -- was launched during a spacewalk from the International Space Station last February 3, those familiar with orbital mechanics predicted it would stay in orbit for 120 days at best. As of August 25, some 203 days (nearly seven months) later -- largely forgotten and its ham radio voice long since silent -- SuitSat-1 has defied the odds and remains in orbit some 155 miles above Earth.

A project of the Amateur Radio on the International Space Station (ARISS) program, SuitSat-1, identifying as RS0RS, transmitted its voice greetings on 2 meters plus an SSTV picture thousands of times. Although its signal was far weaker than it was supposed to be for reasons never determined with any certainty, SuitSat-1 remained operational for more than two weeks.

ARISS International Chairman Frank Bauer, KA3HDO, had credited ARISS-Russia's Sergei Samburov, RV3DR, and his colleagues with coming up with the SuitSat concept, called Radioskaf or Radio Sputnik in Russian.

The SuitSat-1 mission proved to be an Amateur Radio public relations bonanza. In addition to prompting dozens of news items on Web sites and in journals around the world, Reader's Digest judged SuitSat-1 "Best Empty Suit" in its "America's 100

Best: The 2006 List" Popular Science ran an article about SuitSat-1 in June's issue called "Tossed in Space."

To keep the SuitSat-1 momentum going a bit longer ARISS and AMSAT in May announced a "Chicken Little Contest" <<http://www.amsat.org/amsat-new/ariss/suitsatContest.php>>, in which participants pick the date on which they believe SuitSat-1 will drop out of orbit and burn up in Earth's atmosphere. Entrants are only allowed one guess, and the winner will be the individual who picks the date closest to SuitSat-1's actual demise. Those who have not already entered may do so by filling out the online entry form on the AMSAT Web site. The odds could be in their favor.

Certificates will go to winners in each of three age groups. Winners not only earn bragging rights, but the fame and notoriety associated with successful satellite re-entry prognostication.

Even before SuitSat-1 went silent, ARISS and AMSAT already were discussing the possibility of a SuitSat-2 with contacts in Russia, although plans remain tentative at this stage. ARRL ARISS Liaison Rosalie White, K1STO, is among those named to the SuitSat-2 team, which will meet prior to the ARISS International Meeting/AMSAT Space Symposium October 5-10. Among other things, the team will look into the possibility of equipping SuitSat-2 with solar panels instead of just batteries, to extend its usable life. No formal announcements about SuitSat-2 are expected until around mid-October.

Meanwhile, the time grows nigh when Suit-Sat-1 will pick up enough additional drag from Earth's atmosphere that friction-generated heat will cause it to burn up and vaporize. Just when that will happen is still anyone's guess.

Need DX?

Information provided by QRZ DX, the OPDX Bulletin, 425 DX News, The Daily DX, DXNL, Contest Corral from QST and the ARRL Contest Calendar and WA7BNM web sites.

MONACO, 3A. Patrice, F5RBB, will be active as 3A/F5RBB from September 2 to 10. Activity will be on 40, 20, 15 and 10 meter SSB. QSL via his home callsign.

CYPRUS, 5B. Possibly ZC4. Colin, G3VCQ, will be active as 5B/G3VCQ until September 6. Activity will be on all HF bands. Colin may also be active from the U.K. Sov. Base Areas on Cyprus (ZC4) from time to time if a call sign is allocated. QSL via G3VCQ.

CROATIA, 9A. Gery, HB9TQF, will be active as 9A8TQF until September 6. Activity will be from Grid Square JN83. Bands of activity were not provided, but he will be using CW, SSB and FSK.

ISLE OF MAN, MD0. Operators DF1LON and DL1ECG will be active as MD0LON and MD0ECG, respectively, from September 7 to 11. Activity will be on all HF bands, CW and SSB. QSL via their home callsigns.

TANZANIA, 5H. K1JD will begin an African Safari on September 9 and hopes to be QRV as 5H2JD in his spare time. Most likely this will be in the late afternoons his time, mostly around 14025, 10120 and 7025 kHz.

GUINEA, 3X. 3XD2Z was heard on 7030 kHz on CW listening up. Meanwhile, 3XM6JR was working RTTY first on 14083 kHz at 1000Z and then on 18103 kHz at 1130Z. QSL both via UA6JR.

DENMARK, OZ. NX1S will sign /OZ from Roemoe Island from September 9 to 16, primarily on 20 and 40 meters. QSL via DL4OK, bureau is ok.

BOTSWANA, A2. A22VB continues to show up on 3503 kHz between 0100 and 0330Z. QSL via UA4WHX.

KYRGYZSTAN, EX. EX15ID delighted prefix hunters on RTTY on 14085 kHz around 1630Z. QSL via EX8AB.

DJIBOUTI, J2. Jean-Claude, J28JA was QRV on 18080 kHz around 1300Z.

QSL via F5JFU.

SVALBARD, JW. JW5E was in search of Japan on 14203 kHz at 1300Z.

QSL via LA5NM.

LEBANON, OD. Look for Hani, OD5TE on 14290 kHz between 1600 and 1700Z. QSL via K3IRV.

NAMIBIA, V5. V55O was logged on 75 meter SSB around 2200Z. QSL via DJ4LK.

HONG KONG, VR2. Look for VR2VAC and VR2XMT on 20 meter SSB between 1130 and 1300Z. Also, watch for VR2AJ, VR2MX and VR2UW on 20 meter CW.

But like everything else in life, “there’s no free ride”. First, we have the problem of routing open-wire to the shack. Unlike shielded coax, open-wire should be kept away from conductive objects as much as possible (exactly how far is debatable). For most of us, this is a formidable challenge. For others, it’s impossible and coax is the only alternative. Secondly, we have to connect the unbalanced output of our transceiver to the balanced feed line. Unless you’re fortunate enough to have a “balanced tuner”, you must make some accommodation to match the balanced and unbalanced conditions. Many hams interpose a balun between the antenna tuner (ATU or transmatch) and the antenna. Some commercially produced ATU’s designed to work with unbalanced line include an optional balun at the output. These tuners are easily recognized by terminals labeled “bal” in addition to the SO-239 at the rear of the unit. At about one-twenty-fifth the price of 7/8 inch hard-line, the extra effort to use open-wire is well worth it (2).

John Stewart was first licensed in 1961 as WV2VUL. He retired from LSU Medical Center in 2005 after 28 years of teaching and research. John is currently treasurer of the Shreveport Amateur Radio Association (SARA) and secretary/treasurer of the ArkLaTex Chapter of the Quarter Century Wireless Association (QCWA). John enjoys working CW on the 40 and 80 meter bands, and PSK on 20 meters. His email address is aa5kv@yahoo.com.

I decided to try a McCoy “dipole” (a tuned doublet) after using a G5RV for many years. I ended up with 134 feet of wire fed with 300 ohm twin lead (slightly more lossy than 450 ohm ladder line but acceptable nonetheless). My ATU was a MFJ 901B, a cheap tuner that I purchased some years ago. The 901B is a good little tuner for the price. Although the 901B is a T-network, high-pass tuner designed for unbalanced line or coax, MFJ included a balun at the output of the tuner for use with balanced line. I was in business.

Baluns Work....Kinda

I happily used the balun inside the MFJ 901B for several months and all was well. The 901B tuned the doublet to 1:1 SWR on 80 through 10 meters. Tuning on 80 was a bit “touchy” but the match was made with several notches of inductor left to spare. The antenna seemed to work fairly well.

Around this time, I read a product review in *QST Magazine* of five, fairly high priced, high-power ATU’s. I was amazed at how widely they varied in efficiency (3)!! Most of the ATU’s were fairly efficient at a high impedance load, but efficiency fell off dramatically for low impedance loads. I wondered about the efficiency of my tuner and balun arrangement. I looked inside the 901B and saw two relatively small variable capacitors with tight plate spacing. I especially worried about the balun. The balun in the 901B looked puny to say the least and appeared to be made from high permeability ferrite material. From my reading I gathered that a 4:1 balun did fairly well at a resistive load of around 200 ohms. But the impedance of a “tuned” doublet varies considerably over the HF bands (4). Under high SWR conditions, a balun, especially those made from highly permeable materials like ferrite, tended to “saturate” and lose their broadband transformer properties. As a result, at least some of the RF is converted to heat (i.e., wasted) and in the worse case scenario, the balun could suffer a catastrophic mechanical breakdown under the large voltages associated with high SWR. Furthermore, a 4:1 balun at the output side of a tuner had a nasty habit of converting a low impedance load, to an even lower impedance load, making it more, rather than less difficult to match the load at reasonable efficiency. This was exactly what led to the large inefficiencies in the ATU review described above. The solution was to use a **truly** balanced tuner, that is, one designed for balanced feed line, like the old E.F. Johnson Matchbox (5).

The Z-match

I searched for a good, commercially produced balanced tuner. “Good” tuners, like those tested and found reasonably efficient in publications like *QST Magazine*, were pricey to say the least. But after pricing the components, I understood why they were so costly. (Check a few websites for prices of “broadcast quality”, air-variable capacitors and roller inductors.) Another interesting observation is that a truly balanced, link-coupled antenna tuner is not commercially available at the present time (5). At best, you can look for a used Johnson Matchbox on eBay. I have seen some with bids in the range of 250 to 450 dollars, and that certainly is an option. But another option is to build your own, like the one described in the *Antenna Book* (Chapter 25). I decided to extend my search. I read about the z-match tuner on several reflectors and I was mildly interested. I finally did a web search on “z match” and discovered an article by Charlie Lofgren, W6JJZ, entitled “The Z-Match: An Update”(6). Charlie, it turns out, is the “Dean” of the z-match tuner, having written several articles in various magazines, including two that appeared in the *ARRL Antenna Compendium* (vols 3 and 5). I read his web article with great interest, but it wasn’t until Phil Salas (AD5X) described his z-match tuner in the January 2003 issue of *QST Magazine* (7) that I got seriously interested in building one. Phil’s tuner included a neat SWR indicator, which I didn’t need. My Jupiter’s had SWR metering. That reduced components and made the job even easier.

Several characteristics of the z-match project attracted my attention. First, it was simple. Without SWR metering, the tuner reduced to three basic components: two capacitors and a toroid. Second, "simple" meant relatively inexpensive. I liked that. Thirdly, there were only two components to tune, not three like most tuners. Fourth, measurements indicated that the z-match is relatively efficient and balanced to within one dB (6,8). But the Z3 match tuner is **NOT** a truly balanced tuner. It's best described as a "semi-balanced" tuner. It simulates an L network and remains balanced over a relatively large impedance range. But balance eventually degrades at higher frequencies, especially under high impedance loads (8). Still, the z-match is probably the simplest and cheapest "balanced" tuner in existence.

I decided build a rough version of the W6JJZ z-match.

Editor's Note: Next month John will discuss actually building the Z-Match and the techniques he used.

DXCC – Go for It

The premier operating award in all of Amateur Radio is the [DX Century Club](#). The basic certificate (which can be obtained in several categories--Mixed modes, Phone, CW, RTTY, Satellite, 160, 80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 meters) is awarded for working and confirming at least 100 entities on the [ARRL DXCC List](#). Endorsements are available in specific increments beyond the 100-entity level, culminating in the coveted [DXCC Honor Roll](#), for those at or near working them all! DXCC qualifiers are also eligible for a DXCC lapel pin, available at a nominal charge.

For those who enjoy the thrill of the hunt on more than one band, [5-Band DXCC](#) can be earned for working 100 current entities on 80, 40, 20, 15 and 10-meter bands. 5BDXCC is a good test of the DXer's operating abilities, but is well within the reach of all of those willing to work for it. 5BDXCC qualifiers receive a handsome certificate and are eligible for an attractive plaque. The 5BDXCC award is endorsable for the 160, 30, 17, 12, 6 and 2-meter bands.

[#1 Honor Roll](#)--To qualify for a Mixed, Phone, CW or RTTY [#1 Honor Roll plaque](#), you must have worked every current entity on the DXCC List. Contact the DXCC Desk for details. #1 Honor Roll qualifiers receive a #1 Honor Roll endorsement sticker for their DXCC certificate and are eligible for a #1 Honor Roll lapel pin and a #1 Honor Roll plaque.

The [DXCC Challenge Award](#) is achieved by working and confirming at least 1,000 DXCC band-entities on any Amateur bands, 1.8 through 54 MHz. This award is in the form of a plaque. Plaques can be endorsed in increments of 500. Entities for each band are totaled to give the [Challenge standing](#). Deleted entities do not count for this award. QSOs for the 160, 80, 40, 30, 20, 17, 15, 12, 10 and 6 meter bands qualify for this award. Further information on the DXCC program can be found at: <http://www.arrl.org/awards/dxcc>.

JOTA 2006

JOTA is an annual event during the third weekend in October each year in which Boy and Girl Scouts and Guides from all over the world speak to each other by means of Amateur (ham) Radio. Scouting experiences are exchanged and ideas are shared via radio waves. Since 1958 when the first Jamboree-on-the-Air was held, millions of Scouts have met each other through this event. Many contacts made during JOTA have resulted in pen pals and links between Scout troops that have lasted many years.

With no restrictions on age or on the number of participants, and at little or no expense, JOTA allows Scouts to contact each other by ham radio. The radio stations are operated by licensed ham radio operators. Many Scouts and leaders hold licenses and have their own stations, but the majority participate in JOTA through stations operated by local radio clubs and individual radio amateurs. Some operators use television or computer-linked communications.

AMATEUR RADIO AWARENESS DAY IS SEPTEMBER 16

September is US Department of Homeland Security (DHS) National Preparedness Month, and Saturday, September 16, is Amateur Radio Awareness Day. For the third straight year, the ARRL and Amateur Radio Emergency Service (ARES) groups across the US will join a coalition of more than 200 national, regional, state and local organizations taking part in Preparedness Month activities. ARES is a partner with DHS through the Citizen Corps program.

ARRL Media and Public Relations Manager Allen Pitts, W1AGP, says local ARES groups and clubs will be making presentations to civic organizations, at schools and at regional fairs to showcase Amateur Radio.

"More than 4000 ARRL 'Hello' campaign <<http://www.hello-radio.org/>> brochures have gone out in the past few weeks alone to prepare for the month-long initiative," he said.

To highlight Amateur Radio Awareness Day, ARRL public information officers (PIOs) will promote the DHS's "[30 Tips for Emergency Preparedness](#)" to attract news media coverage. Some tips on promoting National Preparedness Month are on the ARRL public relations [Web pages](#).

BACKWARD SUNSPOTS" MAY HERALD START OF SOLAR CYCLE 24

The recent appearance on the sun of two so-called "backward sunspots" may mean solar Cycle 23 is drawing to a close and Cycle 24 now is under way or soon will be. At least that's the thinking of some scientists.

"We've been waiting for this," said Solar Physicist David Hathaway of the Marshall Space Flight Center in Huntsville, Alabama, after the first backward spot showed up. "A backward sunspot is a sign that the next solar cycle is beginning."

The term "backward" refers to the sunspots' magnetic polarity. One such sunspot appeared briefly July 31, then disappeared, but its significance was that its magnetic polarity was just the opposite of current Cycle 23 spots.

Another more robust backward spot, Sunspot 905, appeared in late August -- although it subsequently began to dissipate -- and some sun gazers are saying Cycle 24 already has begun. ARRL propagation guru Tad Cook, K7RA, this week called it "the second sunspot of the new Solar Cycle 24."

"Eventually there will be more of the new reversed sunspots than old ones from Cycle 23, and that occurrence is one way to mark the beginning of the next sunspot cycle," he said. Radio conditions will not improve any time soon but over a period of several years of the course of the 11-year cycle, perhaps peaking around 2010.