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AMATEUR TELEVISION QUARTERLY

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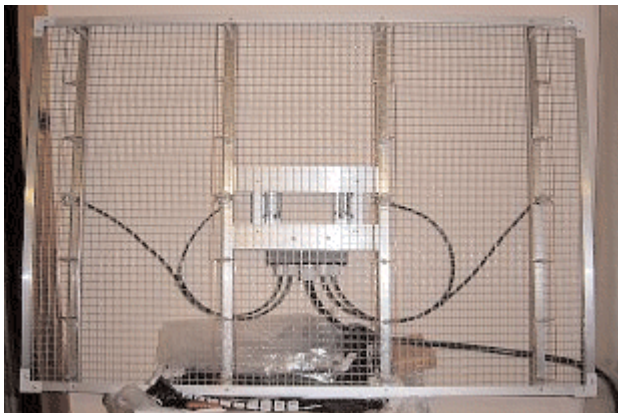

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ATV 10 GHz - New World Record
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ATV Application notes, DX chart, links, catalogue, price list, etc.

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Homebrew antennas, construction articles, ARES/RACES app notes, repeater design, and more on page 3.

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ATV

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App notes available on our web page 3

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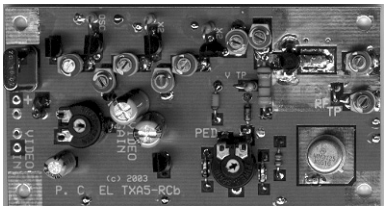

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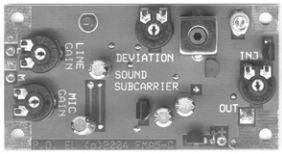

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Amateur Television Quarterly

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ATVQ Notes

We need to keep some of our friends in mind at this time:

Henry Ruhwiedel, AA9XW's wife Shirley is recovering from a stroke. The most recent information I have is from October 10, 2004 from Henry:

Last week Sylvia was moved to Methodist Hospital to recover from the stroke. She will be receiving intensive therapy and various other aids to help her mechanically regain strength, the ability to stand and walk and realign her twisted foot / ankle.

Methodist Hospital, room 3109, Merrillville, IN It's about 2 blocks South of the last place. She has her cell phone, 219-776 7307.

Regards - Henry (**A9xw@cs.com**)

And another good friend, Don Miller, W9NTP, has had an automobile accident with a brand new red convertible. He has been recovering for a couple of months now at different hospitals and care centers.

The more recent information I have is from Farrell Winder, W8ZCF:

September 24, 2004
I just received the GOOD News from one of the telephone technicians at the hospital, confirming Ben's earlier report, that Don will be returning back to his home today! If anyone would want to send Don a note, it would probably reach him faster by directing it through his brother-in law Ben at: **BenB3127@aol.com** (Ben has been very faithful in keeping us informed over the last 2 months of Don's status and progress) Don's E-Mail is **wyman@svs.net** but it may be a while before he has time to check the mail from this address. I believe we will be hearing him back on the air soon.

On October 04, 2004, Ben reported that Don is on the radio sometimes. He still cannot do the computer e-mail routines. Maybe next week!

He purchased another Sebring convertible although he cannot drive any car -- not even the golf cart. He is restless and is doing great walking.

And Farrell Winder, W8ZCF (**fwinder@fuse.net**) reported the same day: Have talked to Don on 20 m and 75 m. He sounds very normal, so keep a listen for him. Just great that he is back but understand that he still has more therapy to complete.

ATVQ wishes everyone the best for a healthy recovery.

Please note on page 34 that the Amateur Television Network of Illinois has their repeater up at the final site and on the air. It took a while to get all the permissions accomplished, but it was a worthwhile wait. We are getting good reports from the surrounding area.

There will be follow-up articles to come. We have had requests from others to publish articles on "how to" for ATV repeaters and we will follow through, including an article in this issue by our friend Mike Collis, WA6SVT. Enjoy!

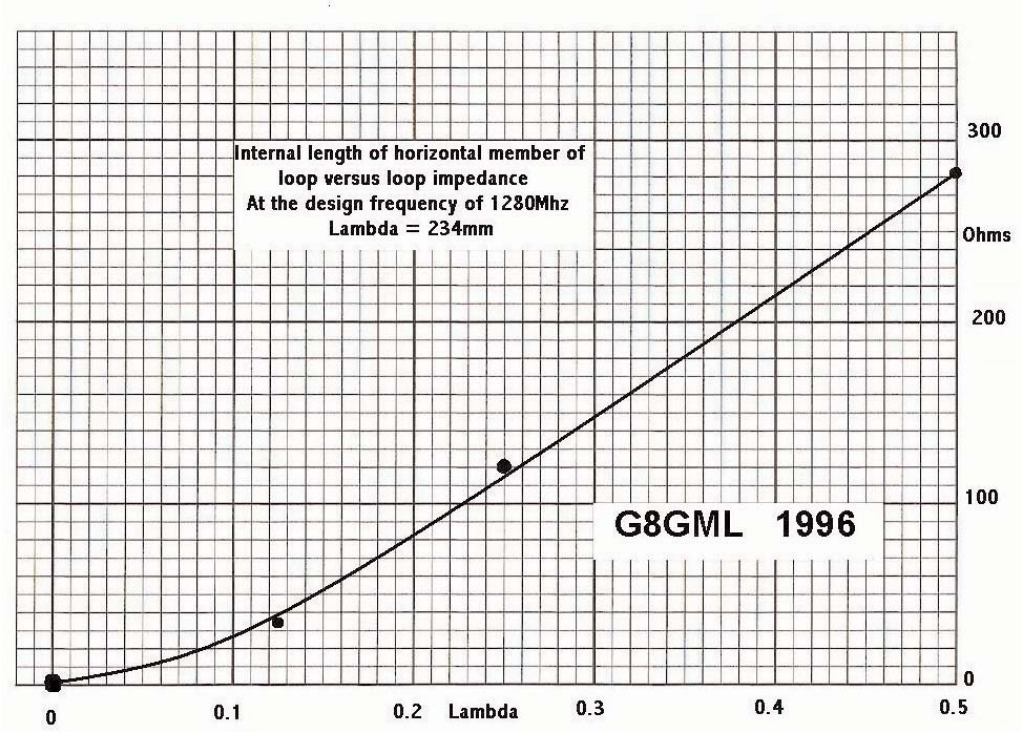
Gene Harlan - WB9MMM

ATVQ

UHF Panel Antennas

By: Paul Melbourne - G8GML - Email: paul.melbourne.g8gml@ntlworld.com

When I started on 23 cm ATV some 10 years ago I found that I needed a high gain antenna to enable me to put a quieting signal into our local repeater. The problem was that since I live on the South East side of Cambridge City and the ATV repeater, GB3PV, is to the west my signal has to plow its way through the city center, multi-story car parks, buildings twice as high as my antennas etc., you know the story.



So I set about building most of the designs I could find. The designs investigated included,. corner reflectors, DL6WU very long yagis, commercial yagis, bow tie antennas, to even a double Rhombic. In all eleven different designs were tried with various degrees of success.

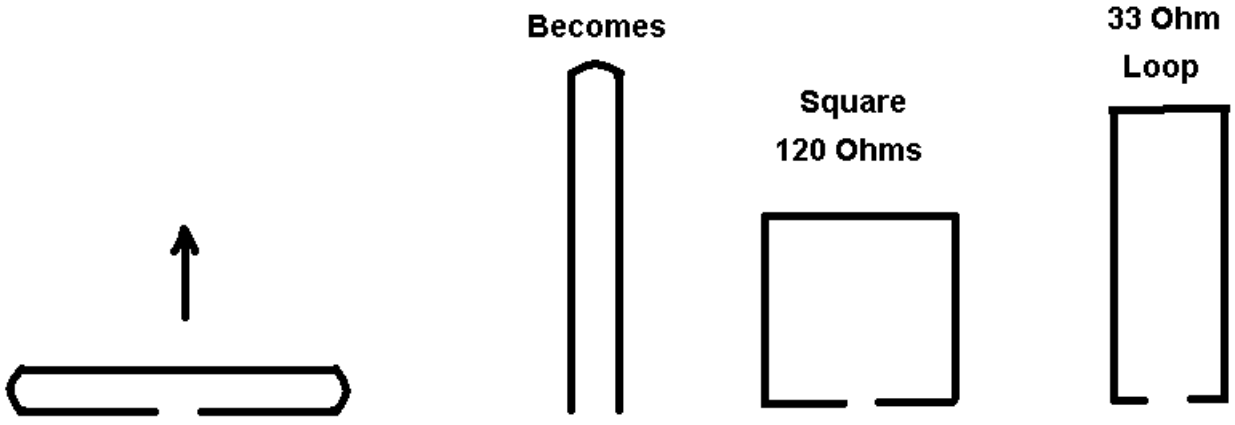
One of the problems encountered was that some of the higher gain antennas tended to detune in the rain, so I was looking for a stable high gain antenna.

Another problem was that some of the designs needed matching networks because they were not 50 ohms and the matching networks could also be susceptible to bad weather.

Thinking about full wave circumference radiators I remembered that you could control the impedance of them by altering their aspect ratio. If you get hold of the top of a folded half wave antenna in the center and pull it out vertically it becomes a shorted half wave line which equates to zero ohms.

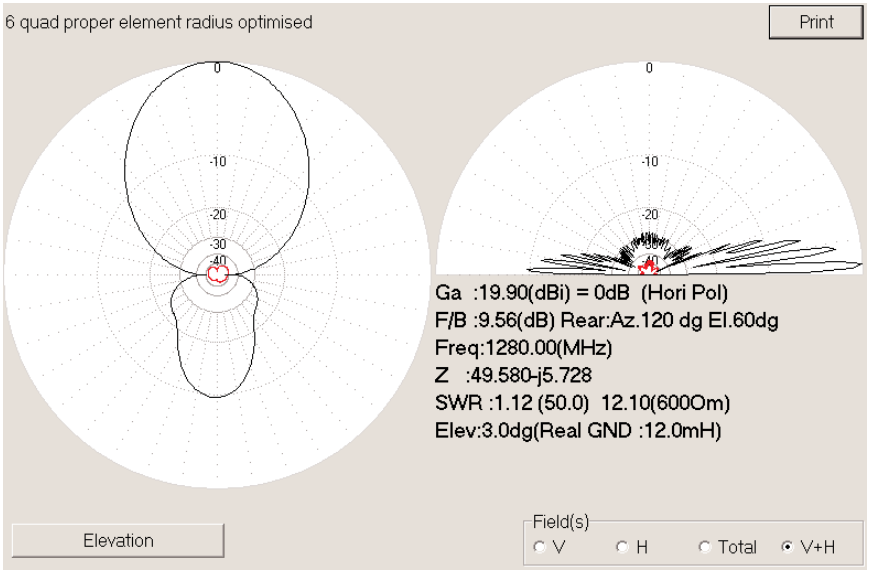
The graph shows the two extreme cases, also a square loop 120 Ohms and one I chose for the design, a loop of ~33 Ohms.

Why 33 Ohms? Well, as I was going for maximum gain, I



Folded Half wave~280 Ohms Shorted Half wave>0 Ohms

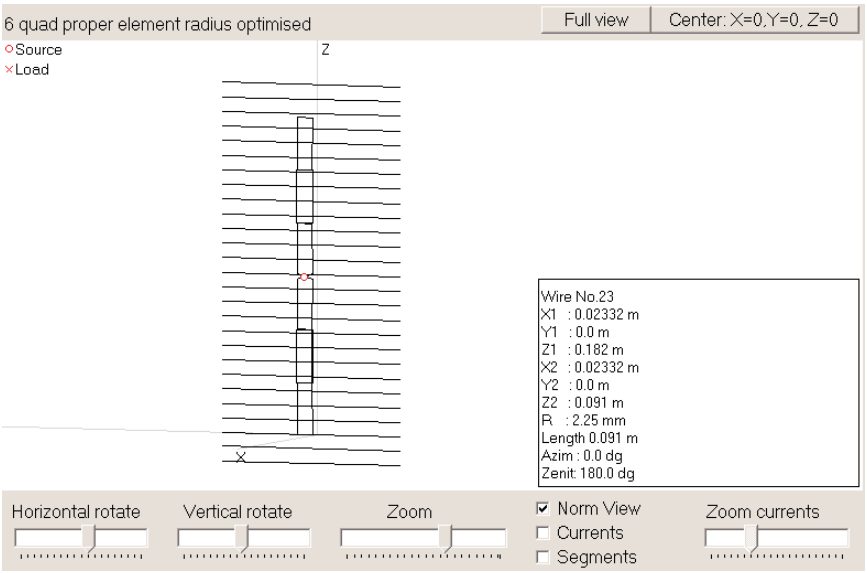
thought I would combine a lot of quad loop radiators in front of an aperiodic reflector. The first design that seemed to offer promise was made of two of these joined at the feed point.



Gain nearly 20 dBi match 1.12 : 1 for 50 Ohms

As you can see it is 3 loops in series. 3 times 33 is about 100 Ohms. Join another in parallel at the feed point and you have a 50 Ohm antenna.

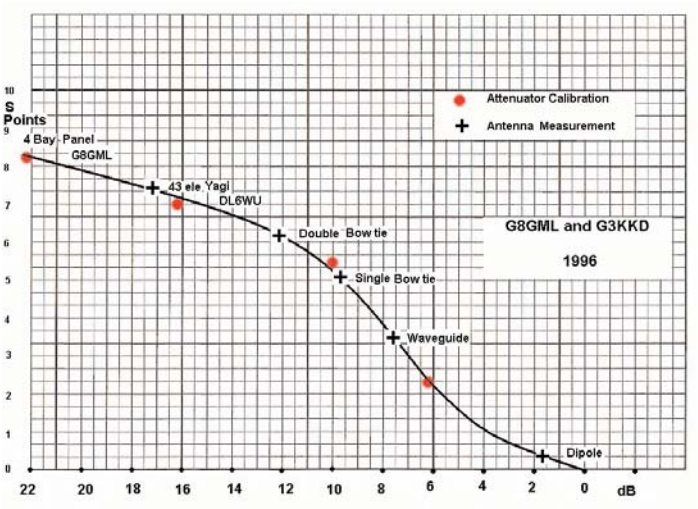
Being as greedy as the next ham, I decided to make an antenna by baying four of these driven elements on a reflector 2 feet high by 3 feet wide. This I reasoned should give another 5 dB or so of gain. It certainly seemed to, so I set about trying to measure the difference in performance of the antennas built so far.



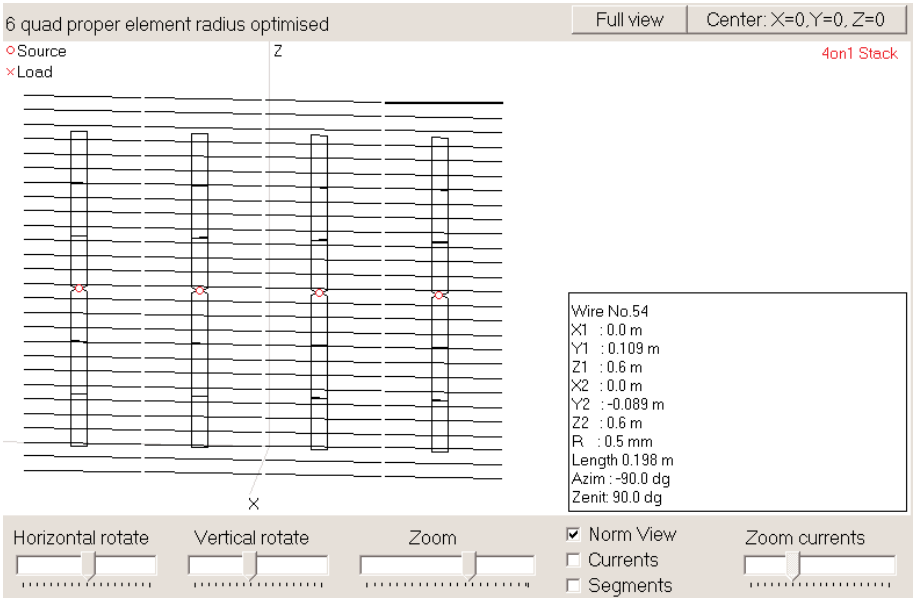
About a mile from my location there is a very large aircraft hanger from which I could receive, by reflection, a 23cm beacon. This reflected signal was always stronger and more stable than the beacon received on the direct path so I compared this signal as obtained on the different antennas. Starting with the antenna that gave the strongest signal, the 4 bay 6 loop antenna, and using as reference antennas a circular waveguide dish feed and a 43 element DL6WU long yagi, I constructed this graph of the results using attenuators in line on the signal from the panel antenna.

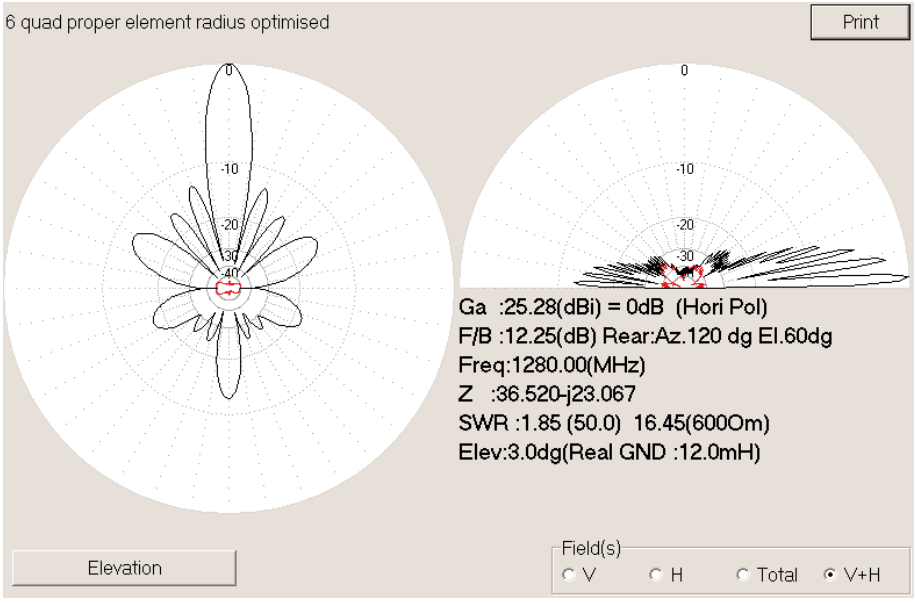
This is what it looks like in MMANA antenna design application. The easiest way to model the reflector was as a series of parallel wires though in practice a piece of galvanized hardware mesh was used. Half inch mesh is ideal though one inch works well.

When I purchased my first PC last year I checked my slide rule sums using MMANA and it gave results like this. For a single driven element about 3 cm in front of a piece of mesh about 9 inches wide and 2 feet high, with ground gain at a height of 12 m above real ground.



4 Bay Panel





The side lobes are about -12dB to -16 dB for this first version.

Ian Waters, G3KKD, brought round all his antennas as well and we spent all afternoon checking and double checking all the measurements. Everything seemed to be very consistent. The waveguide dish feed should be about 8dBd and the long yagi about 17dBd. There is that amount of difference between them on the graph and the panel seemed to give about 22dBd.

Building an antenna array is always a compromise between spacing the elements for maximum gain or cleanest side lobe and the baying distance of 24.5 cm used in the first instance seemed about right for my situation. Of course what suits me might be different to what others might want so I used MMANA to look at the effect of varying the baying distance on gain and side lobes. **See next page ->**

An alternative to a 4 bay antenna is to use a 2 over 2 array. This gives a wider horizontal beam width and also makes it easier to get a cleaner side lobe pattern at the expense of a narrower vertical beam width.

The driven elements are usually made of 2mm diameter copper wire. If you need a greater matching bandwidth then it can be achieved by using something like ~5mm diameter automobile copper break line.

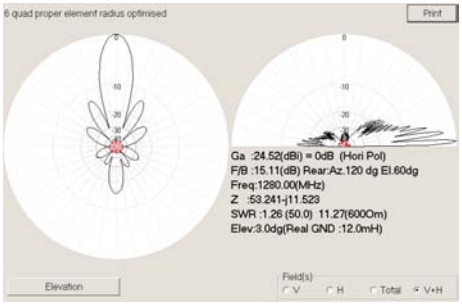
Most people have built the early 4 bay version and find them satisfactory but lately the 2 over 2 version has become popular. Many different configurations are possible. Using the graphs you can select the loop impedance in case you want to try other than 6 loops in the driven element, though I would think that the limit would be 8 or 10 loops because of radiated losses in the feeding loops. Or you might want to feed with 75 Ohm feeder, etc.

It is difficult to say how widespread the use of this antenna is but it has been used mainly in its basic one driven element version for 23cm packet repeaters in Holland, 23cm and, by scaling, 13cm repeaters in France, ATV repeaters in Sicily and Italy including the repeater in Rome, and personal use in New Zealand, etc.

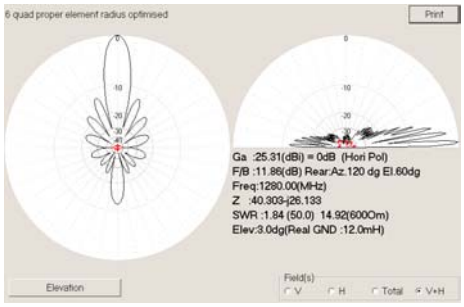
Construction

Apologies for the long URL, but it links you to an Italian web site by IK1HGI who devotes it to the construction of this antenna with many pictures. He says that he can make one in 20 minutes and it enabled him to see stations as far away as 200 km. His construction methods are better than mine. I tend to stick everything together with hot melt glue which is an excellent dielectric.

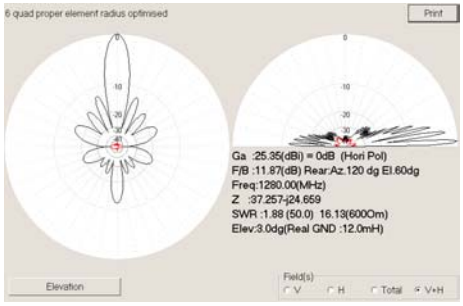
16.5 cm



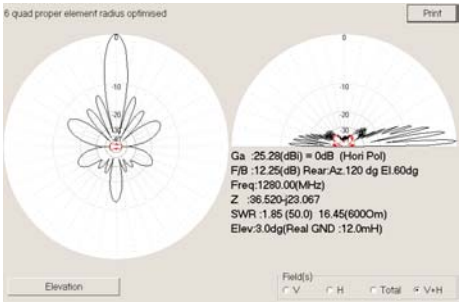
20.5 cm



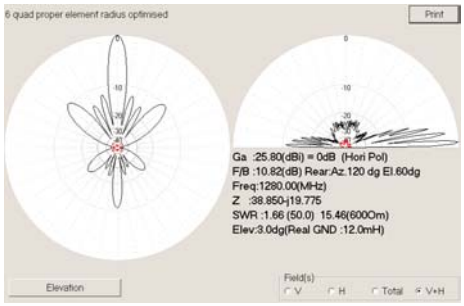
22.5 cm



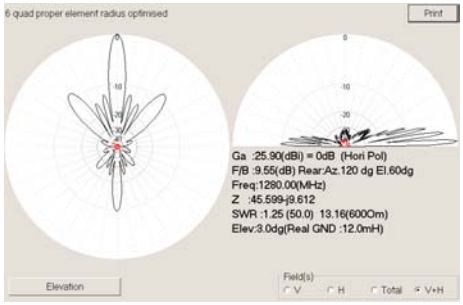
24.5 cm



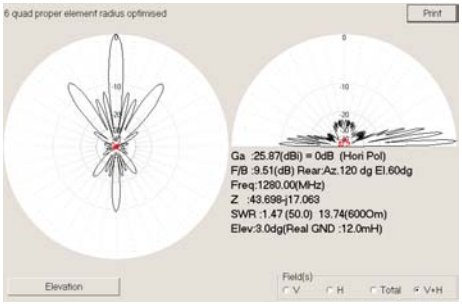
29.5 cm



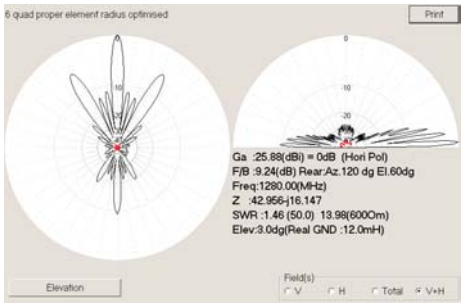
33 cm



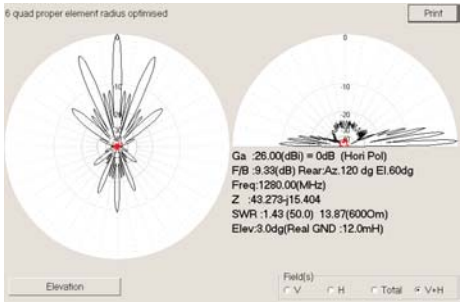
38 cm



43 cm

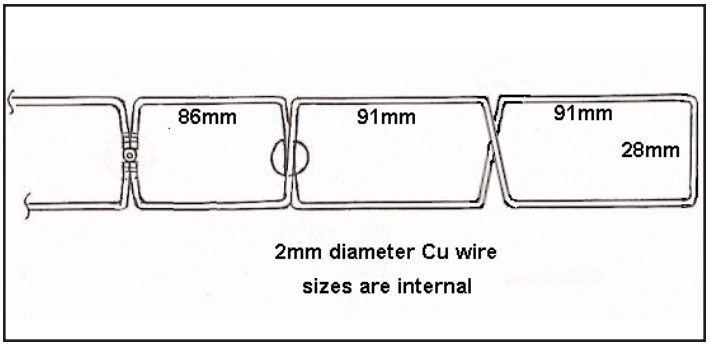


60 cm



http://translate.google.com/translate?hl=en&sl=it&u=http://www.qsl.net/ik1hgi/atv/12ant.htm&prev=/search%3Fq%3Dg8gml%26hl%3Den%26lr%3D%26ie%3DUTF-8

They say that a picture is worth a thousand words so:-

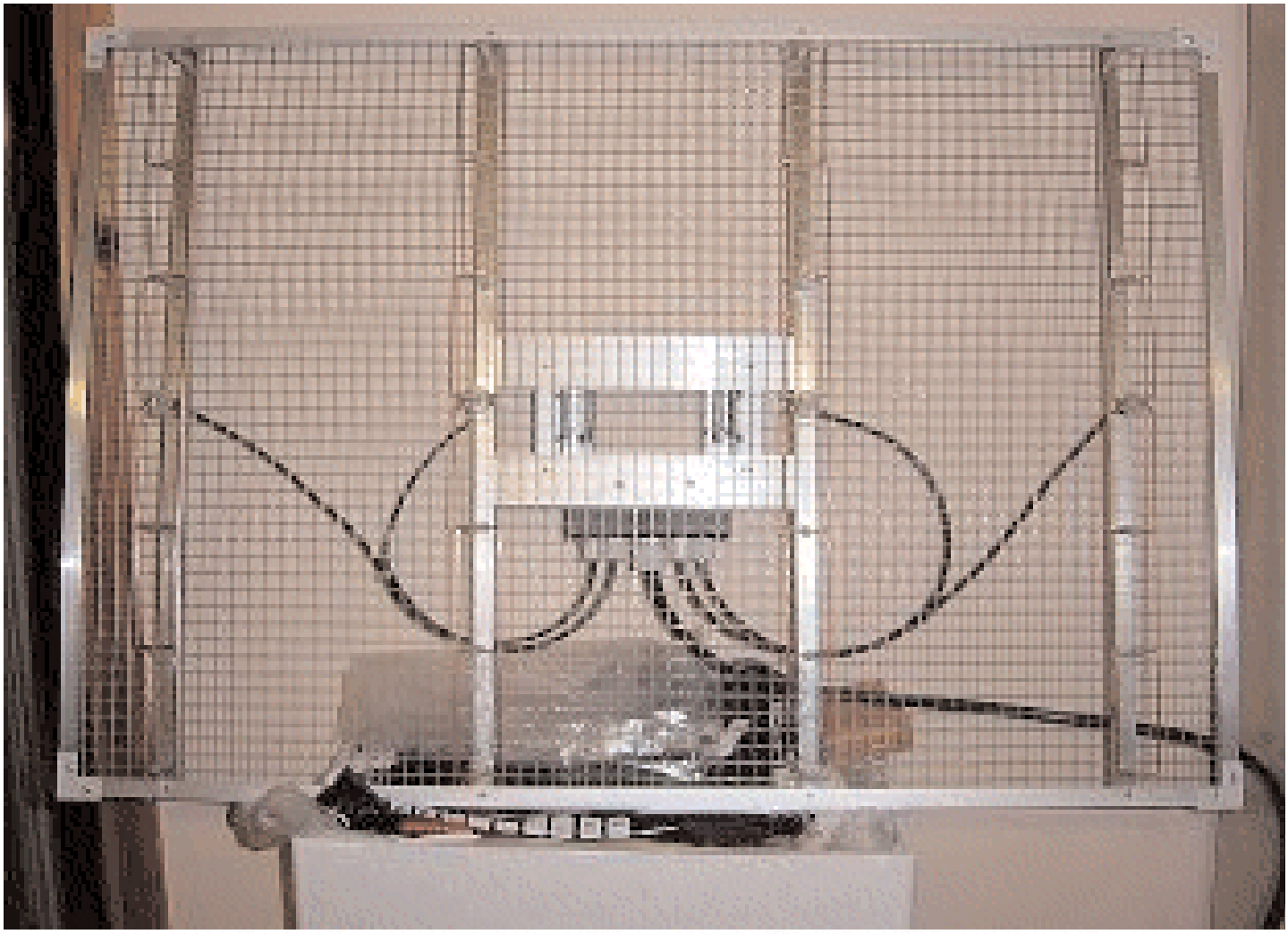


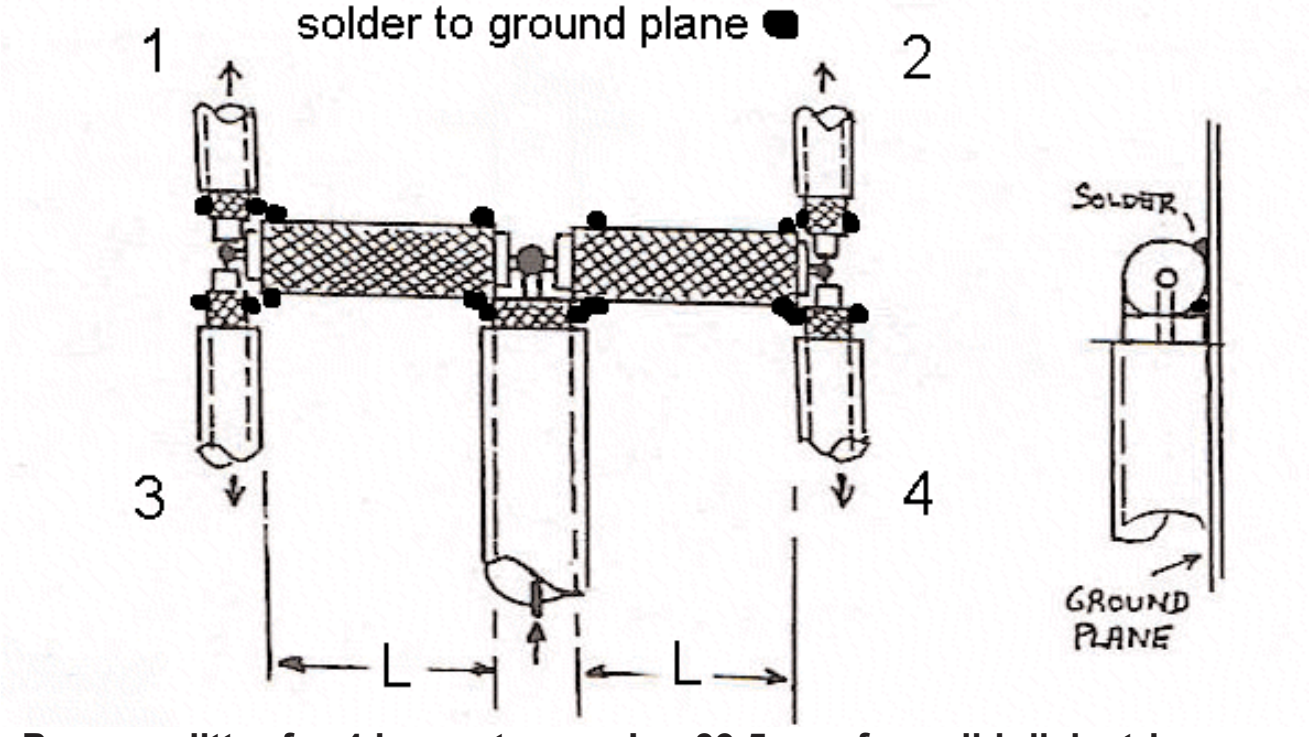
The driven element is spaced 26mm from the reflector. For this I use hot melt glue sticks because it is quick and easy. But as long as a good dielectric is used other methods will work. Mounting is at the center of the cross over which is a high current point, antinode, not on the long side which is a voltage antinode.

All distribution cables 1, 2, 3, 4 are of identical length and soldered to the driven element maintaining phasing, i.e. connect inner to one side; say left side, on all the connections. Although theoretically a balun should be used at the element connection in practice it has not been found necessary to do so and the antennas were modeled in MMANA without one.

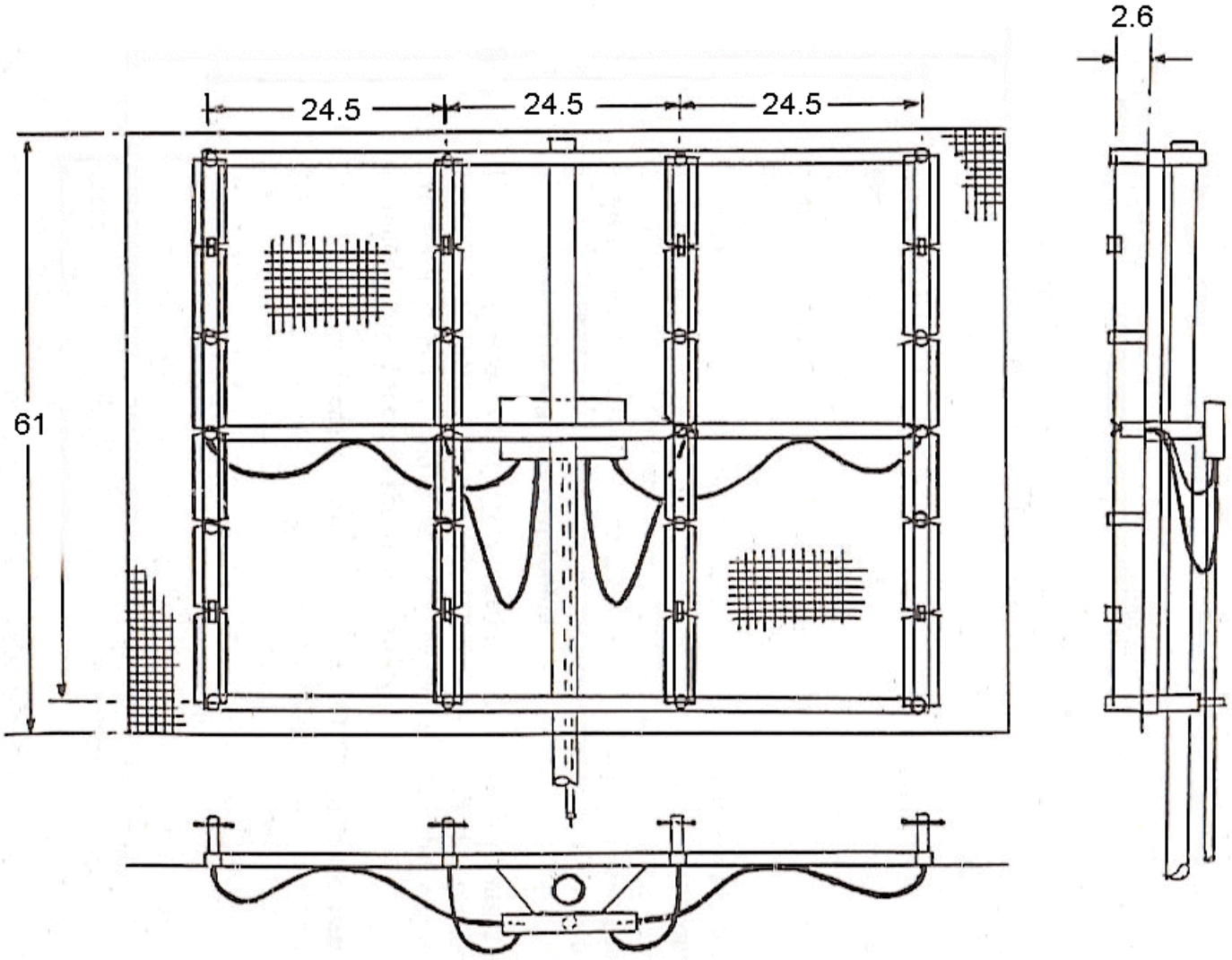
I then weatherproof the splitter and driven element connection by potting them in the hot melt glue using an electric glue gun.

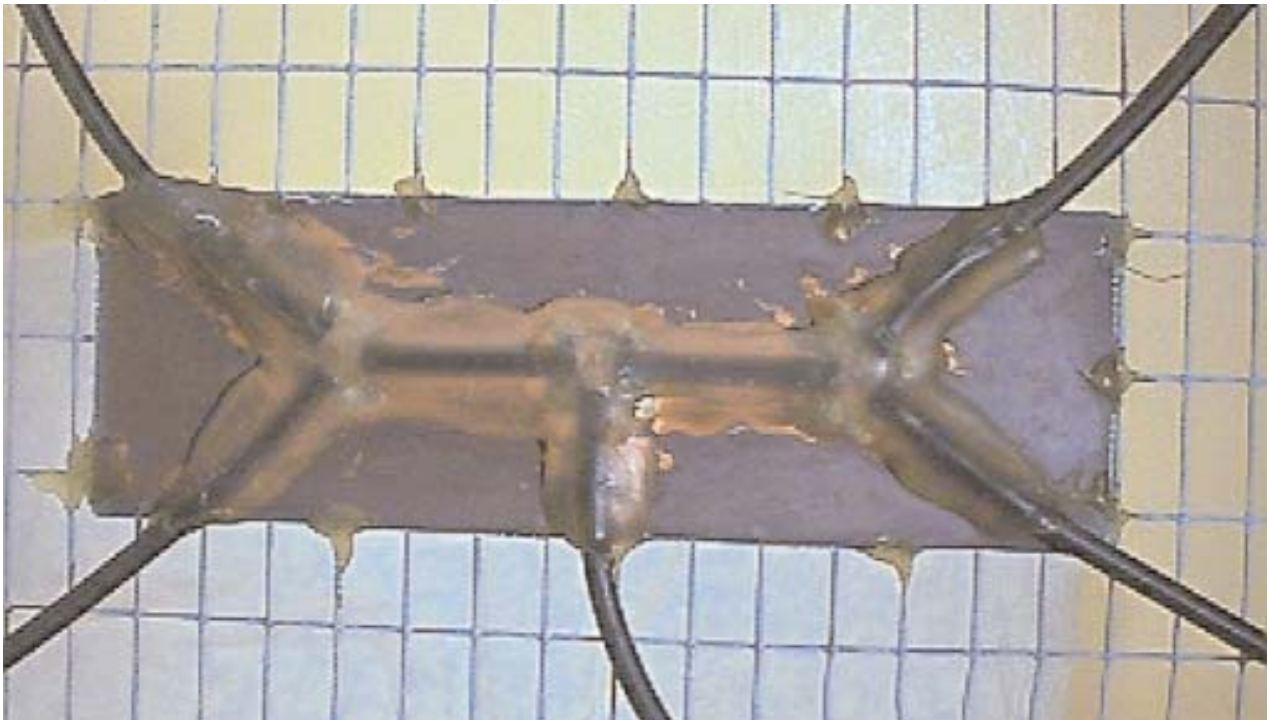
ATVQ





Power splitter for 4 bay antenna L = 39.5 mm for solid dielectric
47.5 mm for foam dielectric





All cables are 50 Ohm e.g. UR 43 Braids soldered to ground plane.

ATV Contest 2004

By Gene Harlan - WB9MMM Email: ATVQ@hampubs.com
5931 Alma Dr.
Rockford, IL 61108

This year we did not have the band opening that we would have liked to see, but the totals from those that participated show that you can still rack up the miles on ATV. This year we had six participants, down one from last year. I am sure that if we had more band openings, the number of entries would have been higher.

The big winner this year is our friend, Bob Delaney, KA9UVY, Mr. Always Looking For A Band Opening! Congratulations! As you can see it pays to be looking for those openings. If you do not have the equipment on, it is hard to work anyone.

The results are as follows:

Call	Distance Miles	Total Points
KA9UVY	4709	10,530
N9XHU	3364	6,728
KC8LZC	1780	3764
KA9EGM	1725	3450
AA9MY	970	1940
K0PFX	531	1062

Station of KA9UVY, EM58ng

70CM Station:

TX: Blonder Tongue AP-60 Agile Processor driving a Mistubish M67705M brick+Mirage D-1010+ K2RIW 2x4CX250B's for a final avg
power of 100W.

RX: ARR Preamp + PC Electronics Downconverter board with synthesized option for 70 Mhz IF output filtered with a military surplus saw filter module. Driving an IC-706 MKIIG for carrier detect and a tuneable GE VCR for Demodulation. Panasonic 5" broadcast monitor and others for video display. RX/TX switching handled by an external Toshu Relay.

Antenna: Directive Systems DSFO25ATV at 68ft.

23CM Station:

TX: COP module driving 2 Down East amps for 22 watt output.

RX: Bensat with Down East amp driving 2 gain blocks.

Antenna: Directive Systems 45 el. Loop Yagi up 75 feet fed with Andrew 7/8" Hardline.

33CM Station: Not complete before contest.

Station of N9XHU, EM59et

2 Meters

Yaesu all mode tranceiver FT-847
Mirage B2516G, 160 watt amplifier
LMR600 feedline
Antenna - Cushcraft 148-20T vertical and horizontal Yagi at 55 feet

70 cm

Receiver
P.C. Electronics downconverter TVC4G with 16 db preamp
2 Sharp 13 inch color cable ready televisions
Antenna - M2 440-21 ATV Yagi at 55 feet
LMR600 feedline

Transmitter
Homebrew by B. T. Bryant, K9KKL
Blonder Tougue FAVM 450 Agile modulator with a P .C. Electronics 20 watt brick. Puts out 6 watts with video.
Homebrew tube amplifier 4CX250B 100 watts with video. Built by Bill Bryant, K9KKL.
Computer driven slide with call. Black letters on a white background.
Antenna - M2 440-21 ATV Yagi at 55 feet.
LMR 600 feedling.

Accessories
Sharp VC-A410 VHS tape player and recorder.
Hyundai CO1120 auto electronic switcher.
RCA Small Wonder cam recorder.

Station of KC8LZC, EN80ic

Equipment:
2m - Yaesu FT-847 50w into Cushcraft 10 element yagi mounted at 42ft.

70cm - Transmitter is a PC Electronics 1.5 watt attenuated and fed into a RF Concepts RFC 4-110 used to drive an AM-6154 FAA amp that usually runs 70 – 80 watts. Antenna is a KLM 27 element, horizontal at 45ft.

23cm - Transmitter is a 50mw CommTech module from WA8RMC driving a DEM brick to about 20 watts. Antenna is a 21 element yagi of unknown origin, vertical at about 47ft.

13cm - Transmitter is another CommTech module. The antenna is a 65 element, 21dB gain yagi, vertical at 50ft. The amplifier is a Spectrian commercial amp purchased on Ebay. It is usually run with 20dB attenuation on the exciter for 20 watts out. Attenuation can be reduced to 9dB for a confirmed output of 100 watts, if you dare.

All antennas are fed with 110ft of 7/8 Andrew hard line plus 40ft of ½ Andrew Super Flex. This should be reduced to less than 80ft total for next year.

Soapbox

KA9UVY - Crazy WX and tough conditions made the log fill with many P-1's and no new states this year. Best opening was hands down July 13th with P-5 signals from N. Illinois and my personal best 23CM contact ever working Ron, W9ZIH at 252 miles. Most other big signals came by way of temp inversions and not Tropo so timing was everything. The new 120 foot tower is not complete so the 100 element array will have to wait for next year.

KC8LZC - Antenna height is not that great, but, I am located on very flat, wide open farm land that is 978ft above sea level. I can't wait to turn in my contest log. It has been a very disappointing three months for us though. Very, very limited openings.

Where can you find ATV over land distance records. Where can I find them? I have done several searches and only come up with voice or cw contacts for the U.S.. Maybe you could publish the top 3 or so for each band in ATVQ? Just a thought.

Keep up the great work and 73.

ATVQ

Call: AA9MY Grid Sq.: EN50fm Class: Home

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
N9XHU	P2	P2	02:01	6/2/04	439	EM59et	49	98
KA9UVY	P2	P1	12:25	6/3/04	439	EM58ng	158	316
WA9IZV	P3	P3	12:50	6/4/04	439	EM58tj	159	318
KB9WLM	P5	P5	12:57	6/4/04	439	EN40xn	26	52
KB9LII	P1	P1	13:07	6/4/04	439	EM58km	140	280
KA9EGM	P2	P3	13:18	6/4/04	439	EM58km	140	280
KA9UVY	P1	P1	03:52	8/21/04	439	EM58ng	158	316
KA9EGM	P2	P2	03:56	8/21/04	439	EM58km	140	280
					MILES: 970		SCORE: 1940	

Call: K0PFX Grid Sq.: EM48sr Class: Home

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
KB9LII	P1	P1	12:58	8/9/04	439	EM58km	71	142
KA9EGM	P2	P2	12:57	8/9/04	439	EM58KM	71	142
KD0FW	P2	P1	03:24	8/9/04	439	EM29tc	214	428
N9XHU	P1	P1	13:25	8/9/04	439	EM59et	86	172
KA9UVY	P2	P2	12:56	8/10/04	439	EM58ng	89	178
					MILES: 531		SCORE: 1062	

Call: KA9EGM Grid Sq.: EM58km Class: Home

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
W9TZB	P2	P2	00:15	6/1/04	439	EM58nh	19	38
AA9MY	P2	P3	01:15	6/4/04	439	EN50gm	139	278
N9XHU	P2	P1	01:13	6/4/04	439	EM58et	93	186
KB9WLM	P4	P2	01:30	6/4/04	439	EN40xn	149	298
K0PFX	P3	P1	02:00	6/5/04	439	EM48ts	69	138
K9KKL	P2	P2	01:30	6/18/04	439	EM59ds	91	182
K9SM	P2	P2	01:30	6/20/04	439	EM59gd	46	92
WA9IZV	P1	P1	01:45	6/21/04	439	EM58tj	41	82

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
N9XHU	P1	P1	01:00	7/9/04	439	EM58et	93	186
W9ZIH	P4	P4	01:30	7/13/04	439	EN51nh	236	472
WA9EUN	P5	P5	02:15	7/13/04	439	En51rq	220	440
K9SM	P4	P4	01:30	7/16/04	439	EM59gd	46	92
K9KKL	P2	P3	01:15	7/16/04	439	EM59ds	91	182
K9KKL	P1	P1	00:15	8/3/04	439	EM59ds	91	182
N9HXU	P1	P1	00:17	8/3/04	439	EM59et	93	186
K0PFX	P2	P2	01:00	8/10/04	439	EM48ts	69	138
AA9MY	P2	P2	05:00	8/20/04	439	EN50gm	139	278
					MILES: 1725		SCORE: 3450	

Call: KA9UVY Grid Sq.: EM58ng Class: Home

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
N9UQD	P-2	P-3	0:11	6/1/04	439	EM58QI	14	28
KB9LII	P-3	P-3	0:25	6/1/04	439	EM58KM	21	42
KA9EGM	P-3	P-4	1:16	6/1/04	439	EM58KM	21	42
W4HTB	P-1	P-1	12:45	6/1/04	439	EM66TX	163	326
W9TZB	P-5	P-5	0:18	6/2/04	439	EM58NH	2	4
N9XHU	P-2	P-2	11:38	6/3/04	439	EM59ET	113	226
AA9MY	P-2	P-1	12:27	6/3/04	439	EN50GM	158	316
KB9WLM	P-3	P-2	12:35	6/3/04	439	EN40XN	169	338
K9KKL	P-2	P-3	12:22	6/4/04	439	EM59DS	112	224
WA9IZV	P-4	P-4	13:14	6/4/04	439	EM58TJ	28	56
K0PFX	P-2	P-2	14:05	6/5/04	439	EM48TS	88	176
K9SM	P-1	P-2	13:29	6/18/04	439	EM59GD	68	136
KB9JGF	P-1	P-1	12:14	6/20/04	439	EN70MB	243	486
WD0FCH	P-4	P-4	12:50	6/20/04	439	EM48SR	91	182
K9KKL	P-1	P-1	11:58	7/1/04	439	EM59DS	112	224
N9XHU	P-3	P-2	21:56	7/5/04	439	EM59ET	113	226
KB9WLM	P-1	P-1	12:47	7/9/04	439	EN40XN	169	338
KB9PWQ	P-2	P-2	13:25	7/13/04	439	EN61CX	262	524
W9ZIH	P-5	P-3	13:31	7/13/04	439	EN51NW	252	504
W9ZIH	P-4	P-2	13:40	7/13/04	1280	EN51NW	252	1512
WA9EUN	P-4	P-3	14:35	7/13/04	439	EN51RQ	236	472
N9TWH	P-2	P-2	2:58	7/26/04	439	EM57MT	31	62
KA9JJS	P-1	P-1	23:52	7/29/04	439	EM58NH	2	4
KO0Z	P-2	P-1	3:07	8/1/04	439	EM48QS	100	200
N9XHU	P-1	P-1	3:27	8/1/04	439	EM59ET	113	226
K9KKL	P-3	P-3	13:15	8/1/04	439	EM59DS	112	224
W4HTB	P-1	P-1	12:26	8/2/04	439	EM66TX	163	326
K4VXP	P-1	P-2	0:06	8/3/04	439	EM77HI	201	402
N9SHA	P-5	P-4	12:36	8/7/04	439	EM57OX	20	40
KDOFW	P-3	P-1	1:27	8/9/04	439	EM29TC	302	604
K0PFX	P-3	P-2	12:58	8/10/04	439	EM48TS	88	176
N9AZZ	P-4	P-3	0:45	8/15/04	439	EM57MV	26	52
N9AZZ	P-4	P-3	1:27	8/15/04	1265	EM57MV	26	156
AA9MY	P-1	P-1	3:50	8/21/04	439	EN50GM	158	316
KC8LZC	P-1	P-1	12:05	8/21/04	439	EN80IC	325	650
KB9JGF	P-2	P-2	12:50	8/21/04	439	EN70MB	243	486
WD0FCH	P-3	P-1	1:20	8/28/04	439	EM48SR	91	182
KK9N	P-2	P-2	0:39	8/31/04	439	EM58KM	21	42
					MILES: 4709		SCORE: 10530	

Call: N9XHU Grid Sq.: EM59et Class: Home

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
K9KKL	P5	P5	00:10	6/1/04	439	EM59ds	5	10
AA9MY	P2	P2	02:01	6/1/04	439	EN50gm	50	100

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
KA9UVY	P2	P2	11:38	6/3/04	439	EM58ng	114	228
KB9WLM	P5	P5	12:42	6/3/04	439	EN40xn	56	112
WA9IZV	P3	P3	12:48	6/4/04	439	EM58tj	119	238
KB9LII	P2	P2	13:00	6/4/04	439	EM58km	93	186
KA9EGM	P2	P1	13:18	6/4/04	439	EM58km	93	186
W9NTP	P1	P1	11:24	6/4/04	439	EM69pk	158	316
K9SM	P2	P3	01:14	6/17/04	439	EM59gd	47	94
KB9JGF	P1	P3	11:50	6/20/04	439	EN70mb	248	496
KA9UVY	P2	P2	21:56	7/5/04	439	EM58ng	114	228
KA9EGM	P1	P1	12:58	7/9/04	439	EM58km	93	186
W8ZCF	P1	P1	11:08	7/13/04	439	EM79tb	286	572
KB9JGF	P2	P2	11:18	7/13/04	439	EN70mb	248	496
WA9IZV	P4	P3	13:11	7/13/04	439	EM58tj	119	238
W9TZB	P2	P2	13:13	7/16/04	439	EM58nh	111	222
KO0Z	P1	P1	02:51	7/20/04	439	EM48qs	90	180
KB9LII	P1	P1	12:09	7/27/04	439	EM58km	93	186
KA9UVY	P1	P1	03:27	8/1/04	439	EM58n	114	228
KB9JGF	P2	P2	12:59	8/2/04	439	EN70mb	248	496
WA9IZV	P2	P2	13:38	8/2/04	439	EM58tj	119	238
KA9EGM	P1	P1	02:22	8/4/04	439	EM58km	93	186
K9IDQ	P5	P3	04:22	8/4/04	439	EM59bx	18	36
KO0Z	P1	P1	13:08	8/9/04	439	EM48qs	90	180
K0PFX	P1	P1	13:25	8/9/04	439	EM48sr	87	174
KB9LII	P1	P2	12:50	8/10/04	439	EM58km	93	186
N9TWH	P1	P1	13:10	8/14/04	439	EM57mt	143	286
KA9JJS	P4	P4	23:55	8/23/04	439	EM58nh	111	222
W9TZB	P1	P1	00:07	8/24/04	439	EM58nh	111	222
					MILES: 3364		SCORE: 6728	

CALL: KC8LZC GRID SQ.: EN80ic CLASS: HOME

Station worked	rpt sent	rpt recd	UTC	Date	Freq	Grid sq.	Miles	Points
K8TPY	P3	P5	1430	6/6/04	439	EN80ma	20	40
W8SMK	P5	P4	1435	6/6/04	439	EN8Olh	20	40
WB8LGA	P3	P5	0305	6/7/04	439	EN80oj	55	110
KB8VUM	P1	P1	0138	6/8/04	439	EM89gm	41	82
KA8MID	P1	P1	0138	6/8/04	439	EM89ic	69	138
KB8ZLB	P5	P5	0150	6/8/04	439	EM89hh	55	110
KC8OZV	P2	P3	0226	6/9/04	439	EM89kw	16	32
K8AEH	P3	P3	2338	6/10/04	439	EM89ox	30	60
KC8OVP	P1	P1	1210	6/12/04	439	EM89fd	67	134
KB9JGF	P2	P2	0136	6/16/04	439	EN70mb	86	172
N8KQN	P1	P1	0207	6/16/04	439	EM89lw	19	38
W9ZIH	P4	P3	0245	6/16/04	439	EN51nw	315	630
KB9CJR	P1	P3	0248	6/16/04	439	EN61aq	265	530
KB8YMQ	P5	P5	1650	6/26/04	2433	EN80ic	2	20
W8DMR	P2	P3	0020	6/29/04	439	EM89mx	21	42
W8RVH	P4	P4	0200	7/8/04	439	EM79xw	39	78
KB9JGF	P2	P2	0205	7/8/04	439	EN70mb	86	172
KA8LWR	P1	P3	0150	7/23/04	439	EN80mt	51	102
WB8CJW	P5	P5	0255	8/6/04	1280	EN80ke	12	72
W8RRF	P1	P3	0208	8/9/04	1280	EM89ot	35	210
KC8WRI	P1	P2	0235	8/11/04	439	EM89kv	18	36
KA9UVY	P1	P1	1205	8/21/04	439	EM58ng	323	646
KB8OFF	P1	P4	1220	8/21/04	439	EM79wr	49	98
KB9JGF	P3	P5	1223	8/21/04	439	EN70mb	86	172
					MILES = 1780		SCORE = 3764	

Midwest ATV DX Report

By: Bob Delaney - KA9UVY - Email KA9UVY@hotmail.com
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Mt. Vernon, IL 62864
DX Hotline 618-242-7063

07/13/04
KB9JGF, Bill from Lynn IN. caught a nice opening North across the border and into Canada. He worked 2 stations on ATV from the province of Ontario.Al, VE3SQB and, John, VE3KIZ of Ottawa. Contacts across the border are rarely made that far south and all involved were running less than 50 watts!

07/13/04
12:00z-15:00z
A nice opening developed from S. Illinois north through Chicago land and into S. Wisconsin. Several P-5 contacts were made from W9ZIH and WA9EUN to S. Illinois stations KA9EGM, KA9UVY, KB9LII and W9TZB. W9ZIH and KA9UVY even completed their first ever 2-way 1.2 FM ATV contact at 252 miles! KA9EGM sent in this photo of W9ZIH taken during the opening.

Jim also forwarded a picture taken of his signal coming into St. Louis by Mel, K0PFX (next column).

08/01/04
Some ducting developed from Illinois into the Kansas City and Oklahoma City area. Broadcast UHF stations were in all day on the 1st and finally dropped out by the morning of the 2nd. No ATV contacts were reported during this opening.

08/02/04
23:00z-01:00z
A very short duration opening occurred from W. Kentucky into Southern Illinois. I came in from mowing during the hot evening and found W4HTB, Hank in Bowling Green, KY working several stations in S. Illinois at near P-5 signal levels. Hank worked KA9JJS, W9TZB and KA9UVY @ 160+ mi. Paul, K4VXP, of Campbelsville, KY. also came on the air and completed 2-ways with KA9JJS and KA9UVY at 200+ miles.

09/18/03
03:10z
Tropo developed from S. Illinois west toward Kansas City, Mo. on the morning of the 17th. UHF TV stations filled the dial all day and finally a 2-way ATV contact was made with KD0FW of Independence, Mo. by 03:10z 09/18.

This opening moved overnight and by Saturday morning very intense Tropo existed from S. Illinois to Southern Alabama and the Atlanta GA. This opening lasted all weekend finally moving NE by Sunday morning the 19th. There seemed to be a complete lack of activity did everyone give up on DX??

09/21/04
12:40z
N9XHU, Leonard of Springfield IL reports working Bill, KB9JGF, of Lynn, IN at P-4 signal levels and again the following morning around the same time at P-2 level. The distance 248 miles.

NOTICE

If you are reading this column and want it to continue please take the time to send me any info on DX contacts that you have

made or others you have heard about. I do not want this column to only reflect my log book or become Bob's Midwest ATV DX. If the lack of participation continues you will not see this column next year in ATVQ. I am sure that ATV DXing will continue especially in the midwest. It only takes a few minutes to drop me a note but it seems that many of the operators involved in this mode cannot find those precious minutes to spare. Feedback positive or negative is always welcome here but seldom received so we shall see what comes in and play it by ear. It's all up to you.

DX Tip: Who do I look for?

As this column has developed I have tried to let you know when and how to spot those elusive openings that make ATV possible beyond line of sight. If you have been following along you can see that there are many factors that come into play when a DX contact is made. We as ATVers can only control a few of the elements involved. The single most important of these elements is the fact that we are active and on the air. Unfortunately none of us can simply be on all of the time, and few would want to. If you have been DXing ATV for several years as I have, you already have an idea of who to look for in event of an opening to a certain area. If you are new to this style of operating then you are faced with hours of unanswered CQ's that can crush your spirit and turn you away from ATV Dxing entirely.

That is why I am forming a list of ATV operators who are active in DXing. This list would be available from me in e-mail or printed form and will be offered for print in ATVQ.

IMPORTANT

To be included in this list you must contact me via phone, e-mail or simply drop me a note with your information. The info I would like to have is simply your call, name and location. Optional info is important if you are willing to schedule for contacts or exchange phone numbers for a quick run during an opening. Other helpful info would be your hours of operation and station ERP and antennas etc. If you are reluctant to take a call from someone at 4:30 in the morning then offer your e-mail and monitoring frequency as a substitute. This list could be one of the most important tools you have if you are serious about ATV DXing. Be sure and send me your info so others will look for you when the band is open.

Important notice:

The tropo forecast page has changed address and is now at:

http://home.cogeco.ca/~dxinfo/tropo.html

7 Years Of Flying High

Don Pfister KA0JLF
Founder HABITAT SkyLab

HABITAT SkyLab will be flying our 7th anniversary flight on September 11, 2004 in Herington, KS. The airport manager has asked us, once again, to fly a high altitude balloon for their Open House.

It is hard to believe it has been 7 years since we started flying balloons to high altitudes. Our first flight flew to an altitude of over 98,000 feet. We have successfully flown balloons every year for the last 7 years. We have a success record next to none. We have flown several record setting flights. We have continued to prove our theories and understanding.

We continue to have a groundbreaking program. We have, from the very first flight, been an inclusive group. While many have accepted to title the hobby as "Amateur Radio High Altitude Ballooning", we continue to use many services available to all for our flights. This spirit of 'inclusion' has allowed us to include students and others besides HAM radio operators in our activities. Not only do we use means that allow these non-hams to participate; we have been able to expose them to the benefits of HAM radio, not only as a hobby but also as a tool.

This approach has allowed us to gain new hams. In one month alone (July 2004) we had two new hams pass their license testing and get their ticket. To date we have been privileged to encourage or assist no less than 6 to get their ham license and expand their ham activity. This continues to be one of our goals; create, develop and attract new hams. Exposing them to various modes of operation.

Seven years ago, our first two flight gatherings, we had only 3 hams present with around 15 non-hams helping get not only our program, but also our balloon off the ground. Our launches have always been made up of a large number of non-hams working with our ham members.

We have used CB, FRS, 49mhz and other part 15 devices, not only for data collection, but also for these non-hams to stay in contact with the balloon payload and us. Our first flights included a 49mhz transmitter onboard transmitting a voice thermometer, giving temperatures both inside and outside the capsule. We had a six-year-old young man monitor the entire flights. He had a great time! At numerous flights you would see him wearing his headset radio monitoring the payload and passing information on to the rest of us.

Our non-ham payloads have played such an important part in our flights. They have made the difference between a successful flight and possible failure or lost capsules. Their data storage capabilities have provided valuable data for post flight analysis. They continue to extend the horizon of this fine hobby.

EVERY THING YOU NEED TO KNOW TO BUILD AN ATV REPEATER

By Mike Collis WA6SVT Email: WA6SVT@aol.com
POB 1594
Crestline, CA 92325

By overwhelming requests from subscribers of ATVQ, This article on building ATV repeaters is presented.

INTRODUCTION:

In general ATV repeaters can be classified into two types. They are "in band" and "cross band". There are advantages and disadvantages to both types. In band repeaters are almost always in the 70 cm band and cross band repeaters usually use the popular 23 cm band for the output frequency while a few use the other microwave bands. Some cross band repeaters use 2.4 GHz or 10.4 GHz for a primary or a second input.

In band repeaters have been popular over the years in the Midwest and some East Coast States; this allows existing simplex ATV equipment to be used by the area ATVers. A disadvantage is the tight filtering and shielding required preventing the repeater transmitter from interfering with the receiver. The transmitting ATV station usually cannot see their own picture in the repeater so they can make adjustments to their station for best picture.

Cross band repeaters do not have as much problem with self interference and the ATV station accessing the ATV repeater can see his picture coming back. Another advantage is the local ATV intercom usually 144.34 MHz or 146.43 MHz NBFM audio can be mixed with the ATV audio at the repeater site allowing the ATV transmitting station to hear comments from other ATV stations in the distance beyond simplex range about what he is showing. A disadvantage is the area ATVers may have to build or purchase a down converter and antenna for the repeater output frequency in the other band.

Mike, WA6SVT, and Matt, KC7GSA, on New Mexico ATN site with Photo by Earl KS8J the trustee

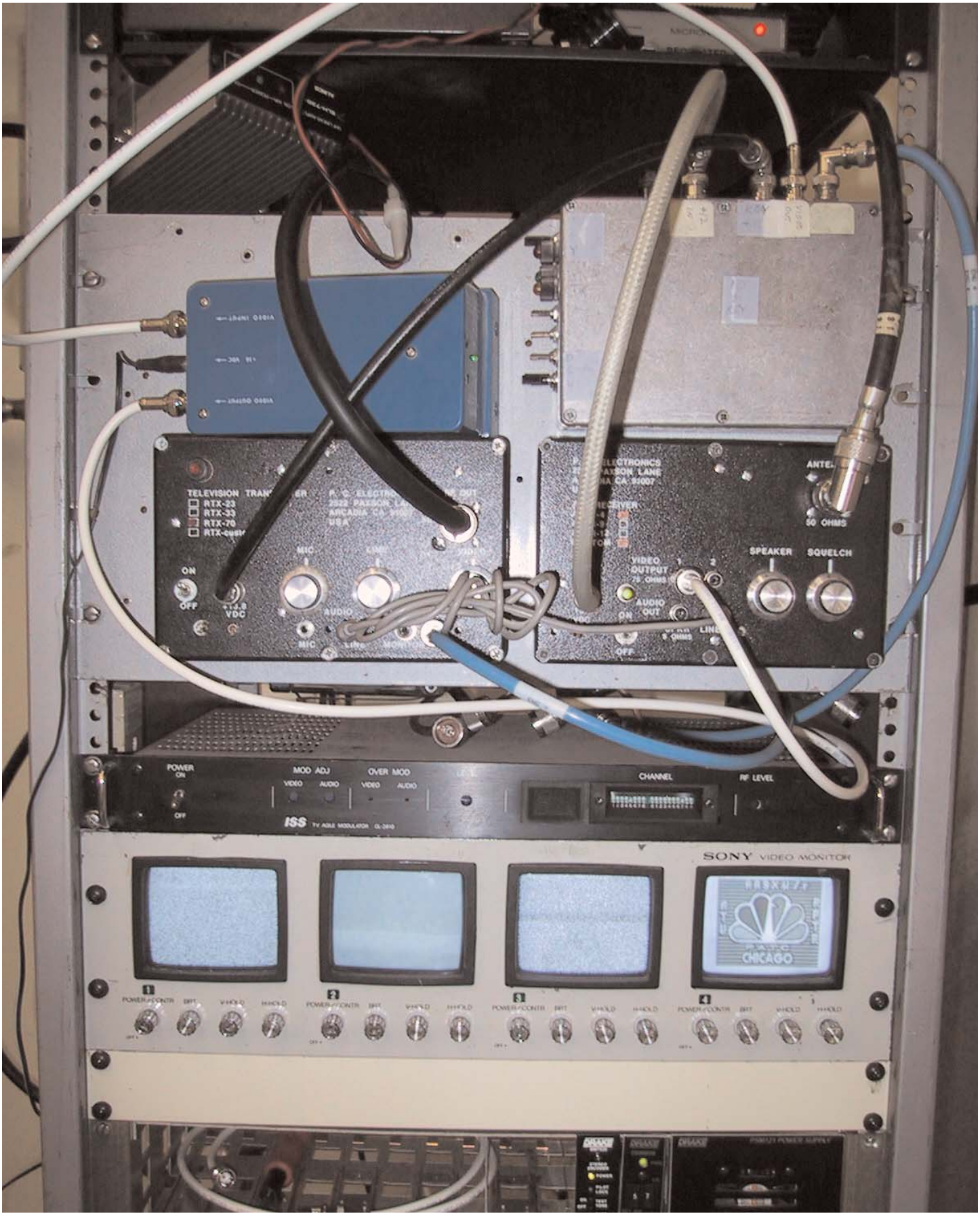
FM ATV is becoming popular hear in America as it has been in Europe over the past 20 years. Some 70 cm in band repeaters have added a 23 cm FM input and repeaters with 23 cm band outputs have added a 2.4 GHz or 10.4 GHz input. Repeaters can be linked to form a network of repeaters. Amateur Television Network (ATN) has been running linked repeaters for over 15 years with 8 linked repeaters in California and Nevada. ATN has repeaters in several other states with linking in progress (see **www.atn-tv.org** for more information).

PLANNING:

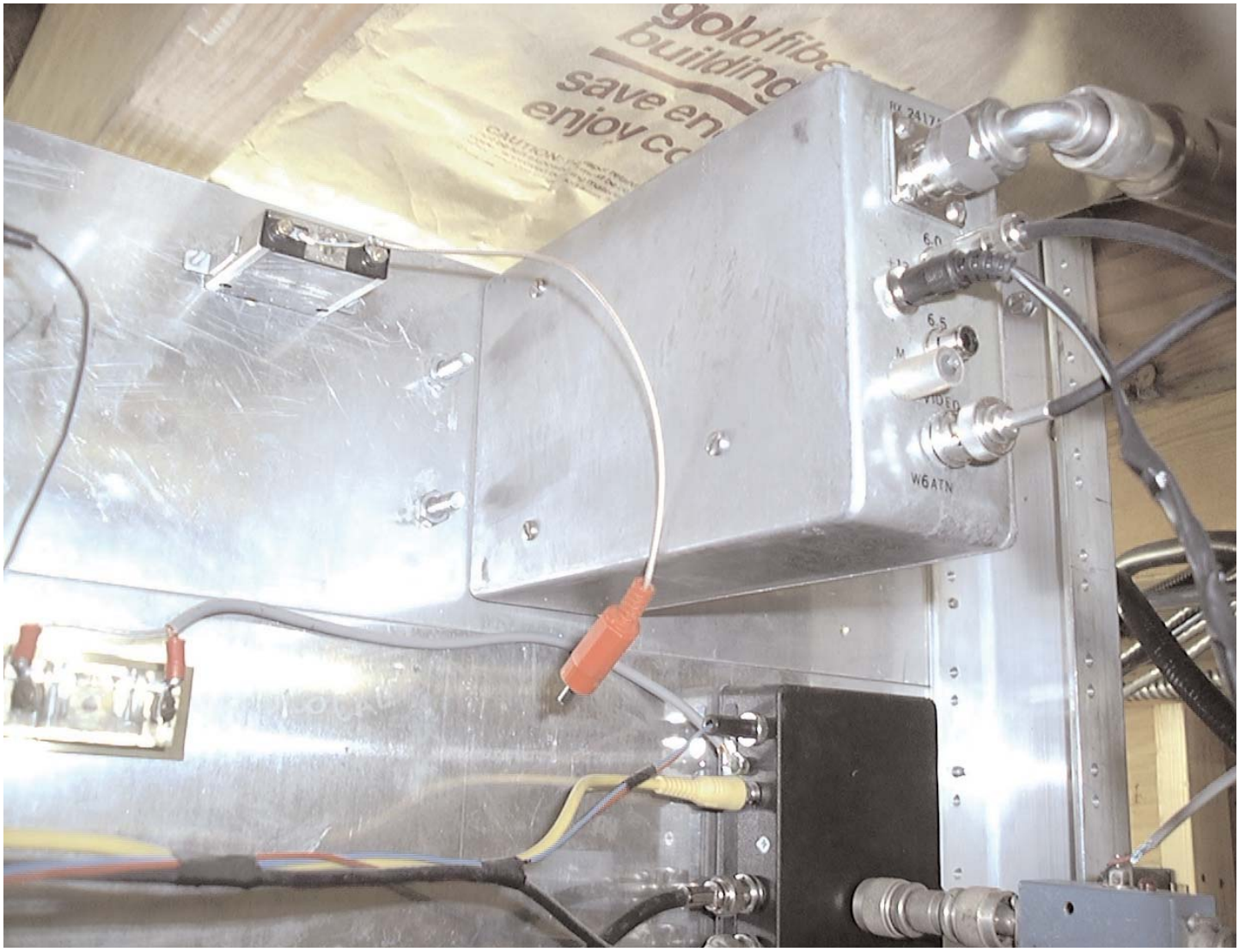
Before you start your ATV repeater some planning is in order, this will allow your group to expand in the future. Give your repeater the best quality and coverage you can build into it. Frequencies are few for ATV and site selection is one of the most important decisions you can make. The site needs to be located to provide line of site coverage to the areas you want to cover. Were and how many antennas you can install on the tower is important. In addition to the repeater antenna(s) you will probably need a control system antenna and an ATV intercom antenna and if you need to link, a dish antenna is usually needed.

CONSTRUCTION PRACTICES:

Shielding is very important for any receiver, transmitter or amplifier. Shielding is much more than mounting the board in a metal box. It requires all DC wiring to use feed thru capacitors or EMI feed though filters to strip off RF signals. The audio can be used with RCA connector with a ferrite bead directly on the wire as close to the connector as possible and a 470 pf disc cap with very short leads from the center connector contact to a ground lug on the connector. The video gets the same treatment as audio but use 100 pf so the higher video frequencies are not attenuated. All power amplifiers will need the DC power routed though feed thru caps but with higher current rating. All RF cables need to be double shielded like RG-142, 214 etc. Video and audio should have fully shielded cables. DC cables do not need shielding. In some cases with in band repeaters may need additional shielding and bypassing of signal and power cables.



Henry, AA9XW's repeater in Northern Indiana



Santiago Photo of packed 2.4 GHz link receiver

FILTERING:

All receivers need a channel filter before the first active stage. This is important to keep the repeater transmitter and other out of band signals out of the receiver. AM transmitters should have a VSB filter before the power amplifier to remove the lower sideband and 5th order sidebands. After the power amplifier a VSB filter is needed to remove any reinserted lower sideband signals and out of band spurs from reaching the antenna. This not only protects your receiver from QRM but also protects other receivers at the same or adjacent sites from getting garbage from your transmitter. The output filter will also keep out of channel signals from adjacent antennas at your site from reaching your power amplifier and mixing with your signal thus creating QRM.

If you use a CATV modulator that is VSB filtered, then a VSB filter is usually only needed after the last power amplifier. FM ATV repeaters need a channel filter usually 12 to 14 MHz wide on 1.2 GHz and 17 MHz wide on the other microwave bands. The number of poles of filtering will need to be determined depending on TX and RX separation and other undesired signals on the band you need to filter out. DCI Filters has been very good to help the ATV repeater builder select a custom filter to meet your needs.

FEEDLINES:

Heliax (Andrew Trademark) is best type of feedline to use, 7/8" is the most common used on ATV repeaters with larger sizes for runs over 150 ft. to save on losses. Repeaters with separate TX and RX antennas can use an outdoor box with room to house both a RX channel filter and a preamp to save on feedline losses and costs by using ½" feedline. Connectors should be type "N", "DIN" or other true 50 ohm connection. Stay away from PL-259 type connectors at ATV frequencies.

ANTENNAS:

Antennas should be commercial rated or if home brew built to commercial standards. It has been my experience that most of the cheaper ham type antennas we would use at our QTH would not withstand the weather conditions at repeater sites and most site owners/managers do not like them to be used at their sites.

Most in band 70 cm repeaters in the midwest use horizontal polarization because simplex activity in the same area and band use horizontal polarization. The slot antenna and big wheel arrays are the most common used 70 cm antennas. Usually a four bay system with about 6 dB is the most common.

Vertical polarization is used on most repeaters using 33 cm, 23 cm and 13 cm bands. 70 cm band in the western states and Georgia vertical is common. Vertical polarization allows a much larger selection of commercial rated antennas with gains to 10 dB and beyond.

With all repeater antennas the selection of gain, azimuth pattern and elevation beam tilt will depend on site location compared to the desired coverage area. Typical values used for medium to high gain antennas at sites elevated at 2000 ft above the desired coverage area is 1 degree down tilt. 2 degrees are common at 4000 ft above and 3 degrees for 8000 above coverage areas. This will put the maximum signal at the horizon and below as viewed from the site. Flat terrain repeaters on low or medium height towers and buildings should use non down tilted antennas.

MODULATION TYPE:

AM, VSB or FM? What is best? The answer is yes. It all depends on your chosen frequencies. 70 cm band VSB has to be used at the repeater site for transmission. AM uses about 9 MHz and VSB uses 6 MHz. The ATV receiver at 70 cm handles AM the same way as VSB due to the RF and IF filtering it has.

FM inputs can be done at 33 cm bands and above, FM has better signal to noise ratios as compared to AM or VSB above the P2 level. Snow free reception assuming 2 dB noise figure receiver set up for a 4 MHz deviated signal is about -85 dBm as compared to -65 dBm for AM or VSB. FM transmitters can run at full amplifier saturation power output levels unlike their AM or VSB counterparts that usually run at 2/3 saturated power output during the sync pulse and less than that on the active video.

FM also allows greater video bandwidth for the ATVer with a high resolution camera or computer generated pictures. ATN's Santiago Peak repeater has both an AM input at 434 MHz and a FM input at 2441.5 MHz. The repeater has a VSB output at 1253.25 MHz and a FM output at 5910 MHz. Running a 700 line resolution picture via the FM section of the repeater gives near HDTV resolution while the same picture yielded about 480 lines on the 1253.25 MHz VSB output.

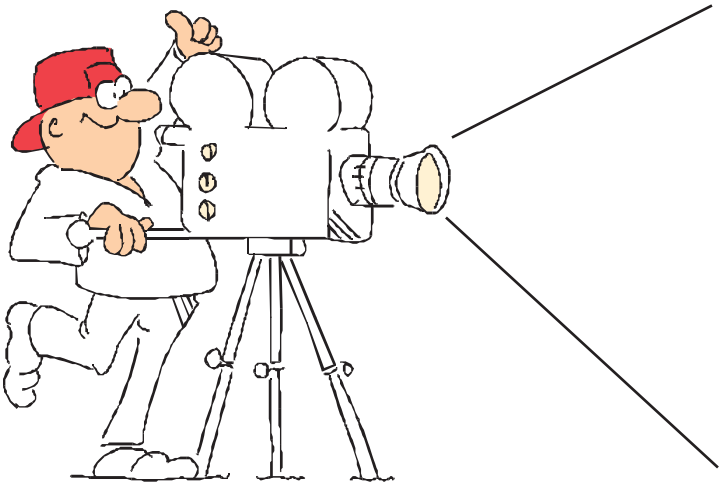
FM can capture out noise just 10 dB below the desired signal were the same desired/undesired ratio would provide terrible AM pictures into the repeater. At signal levels below P2 the FM signal rapidly fades away but AM and VSB signals fade linearly thus giving better very weak DX pictures usually just enough to see call letters. Most repeater links use FM to maximize signal quality between repeaters.

TRANSMITTER POWER:

How much transmit ERP for the repeater? Usually the higher the better, typical 70 cm TPO is 70 watts sync tip and about 150 ERP allowing for filter and feed line losses and using about 6 dB of antenna gain. This should provide about 50 mile snow free distance with the receive station using a 14 dB yagi and line of site to the repeater. On 23 cm VSB 100 watts TPO and about 500 watts ERP and a18 dB receive station yagi will give the same results. FM output with the same ERP will give a greater snow free distance than VSB output.

More details on this continuing article in the next issue of ATVQ. In the meantime if you need specific consultation concerning your repeater project, I can be reached at **wa6svt@aol.com**. ATVQ

Santiago Peak, 5 GHz TX and 8 port ATN controller



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History of the Great Plains Super Launch

By Paul Verhage - KD4STH Email: verhap@occ1sd1.k12.id.us
207 Crestline #3
Caldwell, ID 83605

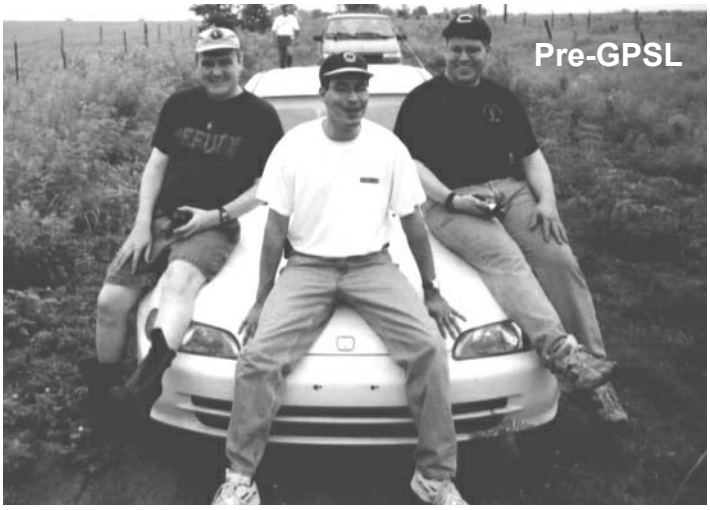
History of the Great Plains Super Launch

I became interested in flying experiments into near space in October 1994 after Pete Sias (WB0DRL) gave a presentation to my radio club, MAARS. Within two years I was launching my first near spacecraft. I flew a total of 19 flights in Kansas during the three and a half years I was there. These flights would eventually lead what is the largest amateur near space event, the Great Plains Super Launch (GPSL). As I write this, it amazes me to see how GPSL has grown so much in only four years. Here's a brief history of this annual event.

The Pre-GPSL Flight

Date: July 1, 2000
Location: Manhattan, Kansas
Near space groups involved: NSTAR and TVNSP (and perhaps NSBG)
Publications: None
URLs: **http://www.tvnsp.org/** (click on Flight Archives)

In the summer of 1999, I left Kansas for Idaho to teach high school science. I soon discovered that my chances to fly were a little more restricted, partly because of the terrain in Idaho and partly because beginning teachers just don't earn much money. Therefore in the summer of 2000, when I had a chance to go back to Kansas for a week, I decided to launch a balloon during my visit. I asked around by email and discovered that several people in the area were interested in helping out. It was a good thing that Mark Conner (N9XTN) was one of them, because I had lost my tracking module in May and could only launch stand-alone experiments in a separate module. Mark's capsule carried the APRS tracker we needed. The flight was one of the best things to happen to me since I started teaching (I was not a happy first year teacher).



L to R - Mark Conner, George Santamaria, and Paul Crone during recovery.

This flight was not a part of the Great Plains Super Launch, but I like to think of it as GPSL Number Zero. Participating in flight was Mark Conner, Paul McCrone (KC0KXR), George Santamaria (no callsign), Bill all (N0KKM), Bob Davis (K0FPC), Don Pfister (KA0JLF), myself, and a few others. The launch took place in overcast skies, so for the vast majority of the flight, we couldn't see the balloon. The winds aloft were low, so we had plenty of time to stop and wait for the balloon to burst. Because of our use of APRS, the chase crew was able to get close enough to the near spacecraft to see it break out of the low cloud deck under its recovery parachute (it's an amazing thing to be close enough to something that you can't see for three hours and to see it appear as predicted). Recovery was an easy walk in pasture land.

After recovery we stopped for lunch, which is typical for amateur near space launches.

GPSL 2001

Date: June 30, 2001
Host: L. Paul Verhage
Location: Manhattan, Kansas
Near space groups involved: HABITAT, NSBG, NSTAR, and TVNSP
Publications: Kimbra Cutlip, **Weatherwise**, November/December 2001, pp. 14-23, Vol. 54, No. 6
URLs: **http://www.tvnsp.org/** (click on Flight Archives)
http://www.nstar.org/NSTAR01D/GPSL2001album.html
http://users.crosspaths.net/~wallio/ (click on Amateur Radio High Altitude Ballooning)

Initially this Kansas launch wasn't going to be a significant event. That is until one of the editors (Kimbra Cutlip) at Weatherwise magazine contacted me by email. She was inter-

Line up at GPSL 2001

ested in the science that we at the university were doing with our balloons. When she found out I wasn't associated with a university and that this was only an amateur effort, I think she found it even more interesting. Ralph Wallio (W0RPK) suggested we make this a big launch and show the readers of Weatherwise just what we were up to. So with the help of HABITAT, NSBG, TVNSP, and NSTAR, we made the 2001 flight the first GPSL. By the way, the term GPSL was suggested by Bill All of NSBG for this event.

The launch took place south of Manhattan, Kansas, at the Johnson Near Space Center. This was a catered launch, thanks to my mother. As far as I know, this is the first catered launch in the amateur near space field. Three balloons, a record number at one time, were launched. Kimbra covered every aspect of the event, from prep, launch, chase, and recovery. Two of the flights recovered promptly after landing, Mark's and mine, in cut wheat fields. The land owners of Mark's recovery site were truly interested in what we were doing and even provided transportation service out to the recovery site. Bill All's capsule was lost during descent, but it was recovered safely a couple of days later.

After the search and recovery GPSL 2001 attendees had a late lunch at the Cracker Barrel restaurant in Junction City, Kansas. We spent the time telling Kimbra about our past near space experiences and answering her remaining questions.

GPSL 2002

Date: July 5 and 6, 2002
Host: L. Paul Verhage
Location: Manhattan and Herrington, Kansas
Near space groups involved: ANSR, Mike Bogard (KD0FW), Bill Brown (WB8ELK), EOSS, HABITAT, NSTAR, Project: Traveler, and TVNSP
Publications: L. Paul Verhage, **CQ VHF**, Summer 2003, 'The Great Plains Super Launch 2002', pp 6,7,72-74,76, Vol. 6, No. 2
Paul Verhage, **Amateur Television Quarterly**, Vol. 15, No. 4, Fall 2002, 'My Impressions of GPSL 2002', pp. 39-42

Shortly after launch the TVNSP near spacecraft recorded an image of it's lower module. Note that Mr. Potatohead is riding this module. He'll be released at 50,000 feet to parachute into Kansas farm lands.

URLs: **http://www.tvnsp.org/** (click on Flight Archives)
http://gpsl.eoss.org/
http://users.crosspaths.net/~wallio/GPSL2002.html
http://www.kd7lmo.net/ansr_gpsl2002.html

Since GPSL 2001 was so successful, we were determined to make GPSL 2002 an even bigger event. To start with, we made GPSL 2002 a two day event. Informally, GPSL 2002 actually began on the evening of the 4th, when several of us met for dinner at a Chinese restaurant in Manhattan. After dinner, several of the EOSS contingent headed out to see the town's firework display.

On Friday we held a conference, the first amateur near space conference since the conference hosted by EOSS in 1993. The conference took place at the Hale Library of Kansas State University, thanks to the efforts of my mother. The conference was emceed by Ralph Wallio, who kept us moving along. The conference gave the groups in attendance the opportunity to tell the rest of us about the status of their programs. This was a great way to see the current state of the art. After lunch at the Gold Fork restaurant, we reconvened for presentations on recovery methods, meteorology, and flight computers. After Friday's presentations and weather report we met for dinner. There we officially declared Bill Brown the father of high altitude amateur radio ballooning.

Because of wind concerns, the launch was moved to the Herrington Municipal Airport. If the balloons were launched from the Johnson Near Space Center as we initially planned, then they would have been recovered in the training range of the local army base, Fort Riley. There were a total of six launches that morning, a new record. Along with seven groups launching, Bobette (N5IS) and Jerome Doerrie (K5IS) brought a contingent from Texas to observe our launch. We had a little excitement when a very old balloon being filled by Bill Brown burst during the filling process. Fortunately, there was a spare balloon and extra helium laying around. The winds aloft were so light that all the chase crews were able to make a stop at the Dairy Queen in Herrington, where we must have made an impression on the locals. When the balloons began popping, it literally started raining parachutes in the farmlands outside of Herrington. Five of the flights used APRS and the third used DFing of its ATV signal for recovery. The DF'd capsule was recovered very quickly after landing.

Like the previous year, lunch was held at the Cracker Barrel restaurant in Junction City, but this time, many more people were present.

GPSL 2003

Date: June 13 and 14, 2003
Host: Edge Of Space Sciences
Location: Denver and Deer Trail, Colorado
Near space groups involved: ANSR, EOSS, NDHABG, and TVNSP
Publications: None
URLs: **http://gpsl.eoss.org/**

http://www.ryankramer.com/gallery/gpsl/
http://www.kd7lmo.net/ansr_13.html
http://www.geocities.com/ke0vh/

GPSL 2003 was the first to be held in conjunction with a university and its BalloonSat conference. EOSS arranged the details with the Space Grant at Colorado University in Boulder. Several people arrived a day early and had dinner at a restaurant in Boulder.

The conference was held at the Eaton Conference Room at the university, while college students met elsewhere on the campus to learn about constructing BalloonSats. BalloonSats are one pound capsules that students design to carry a camera, a couple of sensors, and a Hobo data logger. The BalloonSats are given two tests before launch. One test is with a thermal chamber made from a foam ice cooler and dry ice. The second test is the drop test, where the BalloonSats are dropped from an altitude to simulate the landing of the BalloonSats. As long as the BalloonSats survives both tests, it's ready for flight. Since BalloonSats don't carry trackers, they are attached to balloons carrying APRS trackers, hence the interest in having GPSL 2003 take place during the BalloonSat conference. Most of the GPSL attendees met for dinner after their presentations.

EOSS launches their near space flights from a town called Deer Trail, about an hour out of Denver. This keeps their balloon out of the way of approaching aircraft to Denver International Airport. Also launching during this time, but not officially a part of GPSL 2003, was Mark Caviezel (KC0JHQ) of ES-OS with his large, home-made, polyethylene balloon. Five weather balloons were launched at GPSL 2003, each carrying two

One of the TVNSP near spacecraft after recovery. This near spacecraft carried two balloonsats to 90,000 feet.

BalloonSats. The winds were extremely light again, with the balloons landing as little as three miles from the launch site. The most unusual landing was ES-OS's, when they recovered part of their payload on a Bison Ranch. The owner brought out bison treats so the payload could be recovered safely.

It was mostly the students who flew payloads that attended the late lunch after the recovery. Those that did attend were treated to a buffet of pizza and ice cream. During lunch, each student team described their experiences.

Lunch time during GPSL 2004. Bill Brown, WB8ELK, is the one in the NASA ball cap.

GPSL 2004

Date: July 2 and 3, 2004
Host: Project: Traveler
Location: Hutchinson and McPherson, Kansas
Near space groups involved: Bill Brown, EOSS, HABITAT Skylab, NSTAR, ORB, PHS Reach for Space (to observe), Project: Traveler, and L. Paul Verhage
Publications: Clobes, Zack, **ATV Quarterly**, Summer 2004, 'The Great Plains Super Launch 2004', pp 30-32, Vol. 17, No. 3
Pfister, Don, **ATV Quarterly**, Summer 2004, 'HABITAT Skylab at GPSL 2004', pp 34-36, Vol. 17, No. 3
Clobes, Zack, **CQ VHF**, Fall 2004, "Great Plains Super Launch 2004", pp. 6-9,77-79, Vol. 7, No. 2
URLs: **http://gpsl.eoss.org/**
http://www.rckara.org/project_traveler/gpsl/
http://habitatskylab.org/GPSL04/
http://members.cox.net/hhm_74555/orb/orb11/

2004 brought GPSL back to Kansas. Zack Clobes (W0ZC) arranged for the conference to be held at the Hutchinson Community College. This is also the location of the Cosmosphere, the second largest aerospace museum in the United States. GPSL 2004 was also dedicated to the memory of Bob Davis (K0FPC). Bob was a balloon chaser in Kansas from the mid 1990's. He passed away a few months before GPSL 2004 and wasn't able to be with us.

The conference was held in the Shears Technology Center Conference room at the college on the second. Several presentations were given along with a demonstration on why the sky is blue. During the lunch break, some of us made a stop at the local hardware store for mud boots. During the previous day, Hutchinson experienced thunderstorms, so the farm fields promised to be muddy during Saturday's launch. At the conference, an announcement was made about the two prizes to be awarded during GPSL 2004. Awards for the highest altitude and the most accurate landing prediction were to be given and the sponsors who made this possible were Nuts and Volts magazine and Parallax, the manufacturer of the Basic Stamp.

Launch was on the morning of the third. Because of the speed and direction of the winds aloft, the launch was moved to the McPherson airport. Six stacks, involving seven groups and eight balloons were launched. ORB and Bill Brown shared a single balloon while HABITAT Skylab used three balloons in their stack. For the most part, the flights went well.

Project: Traveler won first place with a landing prediction error prediction of 5.27 miles and a maximum altitude of 94,467 feet. EOSS won second place with a landing prediction error of 11.44 miles and a maximum altitude of 88,999 feet. The recovery lunch was held in Newton, Kansas. Unfortunately, many of the attendees were in a hurry and couldn't wait for the last of the stragglers to show up.

GPSL 2005

Date: July 23 and 24, 2005
Host: NSTAR
Location: Omaha, Nebraska area
URL: **http://www.nstar.org/#GPSL**

Thanks to the efforts of Mark Conner and NSTAR, GPSL 2005 will be in conjunction with the University of Omaha. If you have any interest at all in launching your own near space flights, now is the time to start. You can get all the help you need from the currently active near space groups and be ready to participate in this super launch. Even if you have never launched before GPSL 2005, you may still be able to arrange for a lift with an established group. So what are you waiting for?

What's After GPSL?
There's no reason that GPSL should be the only super launch. If we can grow the amateur near space community large enough, there would be enough groups throughout the United States to support several super launches. One that I would like to see is a super launch out of Strato-Bowl, South Dakota, the site of the 1934 manned stratospheric flight, Explorer II.

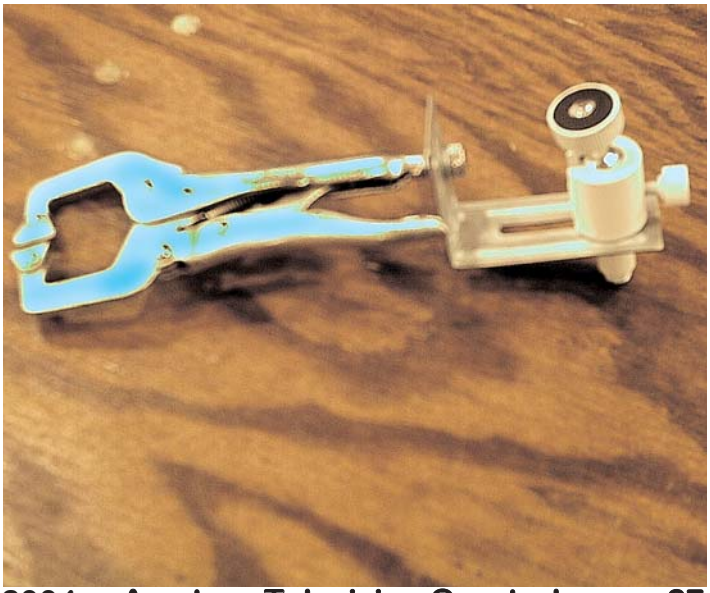
ATVQ

ATV Mobile

When Scott, N9GLL, showed me how he does Mobile ATV he also showed me how he keeps his camera on a solid mount while driving. The clamping pliers you can get at your favorite hardware store and the camera mount he got from American Science & Surplus (**www.sciplus.com**) and is part number 34349 list on the Internet at $7.95. Looks to me like it is pretty easy to attach one to the other.

Make sure you keep your eyes on the road though!

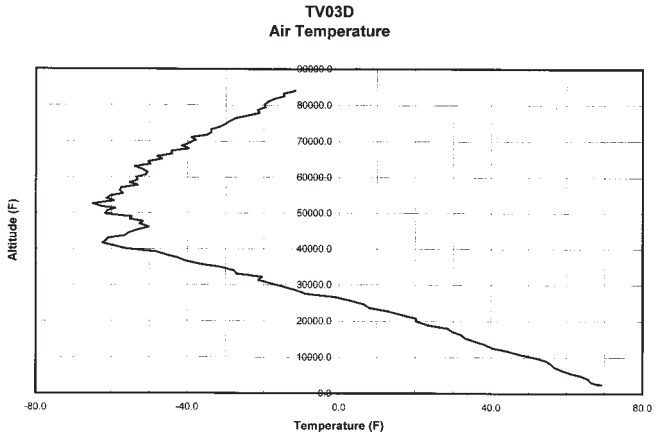
ATVQ



Keeping Near Spacecraft Warm

By Paul Verhage - KD4STH Email: verhap@occ1sd1.k12.id.us
207 Crestline #3
Caldwell, ID 83605

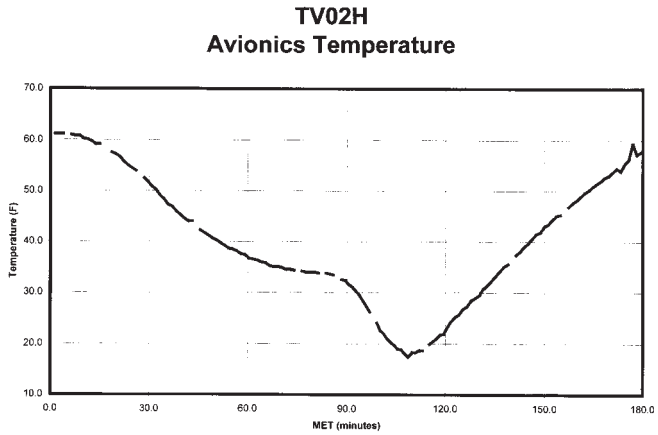
The Problem
It's cold in near space. As a near spacecraft approaches the stratosphere, air temperatures drop to a low of -60 degrees Fahrenheit in the summer and as low as -90 degrees in winter.



An early summer mission still experiences temperatures of -60 degrees at the tropopause, the boundary between the troposphere and stratosphere.

Since most near spacecraft modules are constructed of either foam or insulated lunch bags, the brunt of this cold is held at bay. However, the cold soaking experienced in near space still chills the avionics of near spacecraft to the point where cameras and batteries can fail and condensation can occur on optical surfaces.

There have been a few near space missions that appear to have experienced failures due to cold batteries. When the temperature of a battery drops low enough, its voltage lowers to the point that it can no longer supply the near spacecraft with sufficient power to continue to operate. At that point, the higher current devices like GPS receivers shut down. In addition to the cold-induced failure of avionics, optical windows over camera lens can fog due to condensation. Photographs returned from near space show what appears to be fog instead of crisp images of the Earth's edge.



Changes in the temperature inside the near spacecraft reflect the changes outside the near spacecraft. Due to its insulation however, the temperature changes inside a near spacecraft is not as extreme as it is outside. However, it can be seen that it still gets dangerously chilly inside the near spacecraft.

Some Solutions
Here are four solutions that I have tried using on past near space flights. They are, actively heating the interior of the near spacecraft, passively heating the interior of the near spacecraft, using different power sources, and removing or re-orienting optical surfaces that are susceptible to condensation.

Active Heat Sources
I have used two methods to actively heat the interior of a near spacecraft, inefficient electronics and chemical heaters. I have yet to try adding electrical heaters to a near spacecraft because of the potential fire risk it represents.

One way to keep the interior of the near spacecraft warm is to use inefficient electronics, especially motors and voltage regulators. Their waste of energy manifests itself in the production of heat. A really good example is the camcorder. In December 1997, KNSP launched its fifth near space mission. This particular flight carried a compact VHS camcorder

inside the near spacecraft. The camcorder recorded the view outside from an opening through the side of the airframe. The opening allowed cold air (what little there was of it) from near space enter the interior of the near spacecraft. The remaining open volume inside of the near spacecraft was packed with foam peanuts, as usual. Typically after a mission, the interior of the near spacecraft is cold enough to condense moisture from the outside air. So when the near spacecraft is opened up after recovery, metal surfaces inside frost over. Upon recovery of this mission, though, the interior of the near spacecraft was found to be quite toasty. In fact it was significantly warmer inside the near spacecraft than it was in the outside air at ground level. Condensation did not occur inside the near spacecraft in this case.

A voltage regulator converts the voltage difference between input and output voltage into heat. However, since this may only amount to one volt with a LM3904 voltage regulator, the amount of heat generated is significantly smaller than a camcorder. At best, a voltage regulator can keep the electronics in its immediate vicinity warm.

Chemical heaters oxidize powdered iron to generate heat. At sea level, there is enough oxygen in the air for chemical heaters to get quite warm. In near space, however, the amount of available air drops rapidly. As a result, there is less available oxygen to oxidize the iron inside the heater. A chemical heater in this case only provides heat very early in the mission. For the majority of the mission, the amount of generated heat should be insignificant. However, upon landing, the oxygen level increases to the point that the heater begins producing significant heat again, but only after the worst of the flight is over! So during most of the flight, the chemical heater is just excess weight.

Of the active heat sources, it appears that big electronics are the most effective. With the introduction of small, light-weight, digital cameras and camcorders, an effective source of heat is going the way of the dinosaur.

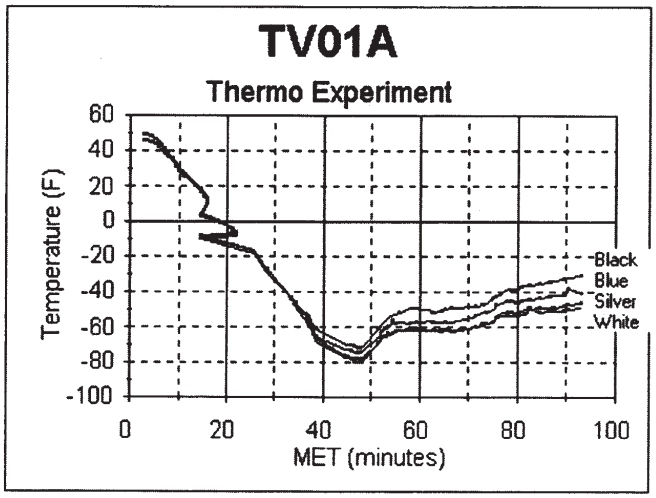
Passive Heat Sources

There's a big, 4.5 billion year old, heat source available in near space, the Sun. If the near spacecraft is coated in light absorbing materials, then the Sun will passively heat the interior of the near spacecraft. Unfortunately, it's not so simple. Not only must the material selected to coat the near spacecraft absorb light while reflecting very little of the incident light, it must also be a poor emitter of heat.

The radiant energy absorbed by a near spacecraft equals the amount of energy incident on the near spacecraft minus the amount reflected from the surface of the near spacecraft back into near space. The absorbed solar energy is eventually emitted back into near space. The rate depends on several factors, like the difference between the temperature of the near spacecraft and near space, the quality of insulation on the near spacecraft, and the emissivity of the face of the near spacecraft. Once the near spacecraft reaches a temperature equal to the air temperature around it, the heat flow out of the near spacecraft equals the heat flow into it.

The greater the difference in temperature between the near spacecraft and near space, the greater the heat flow out of the near spacecraft. Two ways to slow down this heat flow are adding more insulation and coating the near spacecraft with materials that do not allow high heat flow. Insulation cannot completely stop heat flow out of the near spacecraft, insulation only makes if more difficult for heat to flow out of the near spacecraft. However, since a near space mission is only a couple of hours, the amount of heat escaping in that time makes a big difference in the interior temperatures experienced.

The amount of infrared radiation that a body emits (compared to a perfect blackbody) is called its emissivity. The amount of energy it absorbs (again, compared to a perfect blackbody) is called its absorption. An ideal material to coat a near spacecraft with has a high absorption and low emissivity. A good material to use is aluminum. Aluminum has a high reflectivity, but once the incident energy gets in, the aluminum doesn't want to let the infrared get out. This is why we wrap our potatoes in aluminum foil before baking them.



Color makes a difference in near space. In this experiment, the black cube warmed to 20 degrees hotter than the same sized white cube.

I ran an experiment testing four different treatments of identical two inch square foam cubes. The coatings used in the experiment where aluminum tape, black spray paint, white spray paint, and bare blue foam. I expected the aluminum covered cube to be the best followed by the cube painted black. In the chart below, you can see the results of my experiment.

As you can see, the results are not quite what I expected. Perhaps one factor is the movement of air over the cube experiment. Moving air acts like a sink, drawing off energy. The aluminum metal may be more effected by this. So my next thermo experiment will compare two hollow black cubes, one with a coating of aluminum inside the black coating and one without an aluminum coating.

Power Sources

If you're tired of trying to make a near spacecraft warmer, then you must focus on making it tolerant to cold temperatures. Two approaches are to use cold rated electronics and fewer moving parts that may freeze up. The other approach is to use a power source that can handle the cold.

One power source that does well in near space is the photovoltaic array (solar cells). As a solar cell's temperature decreases, its efficiency increases. As long as at launch the skies are clear, then solar cells can provide power to operate the entire flight. If batteries are your main power source, then look at the cell chemistry. Some battery chemistries are more sensitive to cold temperatures than others. Carbon-zinc batteries are probably the worst. Even alkaline batteries suffer from the cold of near space. Lithium sulfate batteries are the ones typically used in near space, even professional near space balloon organizations use them. Lithium sulfate batteries are usually purchased by amateurs as surplus military batteries from surplus houses.

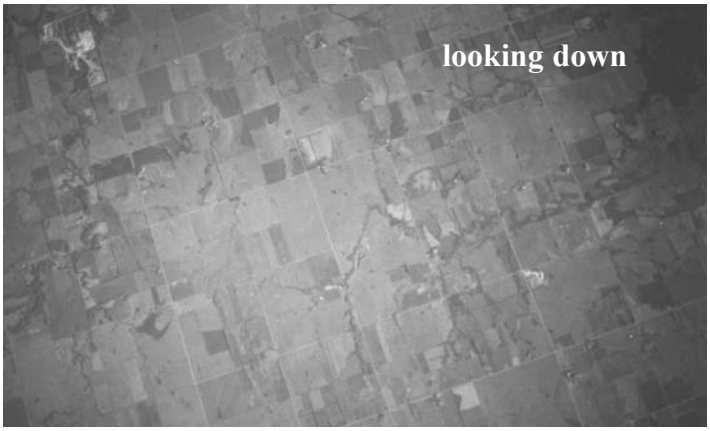
Another source of cold tolerant lithium cells is the photo-lithium cell. These are available at many camera stores and departments are rated to a low temperature of -60 degrees. In addition to their ability to function at very cold temperatures, they are also energy dense. They are among the lightest batteries you can purchase and pack a lot of capacity in a small package. I weighed a photo-lithium and alkaline "AA" cells and found the photo-lithium to weigh 14 grams and the alkaline to weigh 24 grams. The voltage of each cell was the same, but the capacity of the photo-lithium is several times higher. You can purchase photo-lithium "AA" cells at Wal-Mart for $9 for a package of four. They use a lithium-iron chemistry instead of lithium sulfate, so they only produce 1.5 volts per cell (lithium sulfates produce 3 volts per cell). They are rated to 2900 mAH of capacity, but I have found they that in near space applications, I only get 1900 mAH from each cell. Still, for a very lightweight "AA" cell, this is quite impressive.

Another option is to use the rechargeable lithium-ion cell. Surplus electronics dealers like All Electronics are now selling lithium-ion batteries. Through these

dealers, you can expect to pay only 1/10th the cost of the same batteries new. Lithium-ion batteries are rechargeable as well as energy dense and cold tolerant. My sample 7.2 volt, 1200 mAH capacity battery weighs just 3.2 ounces.

Removing Condensation Surfaces

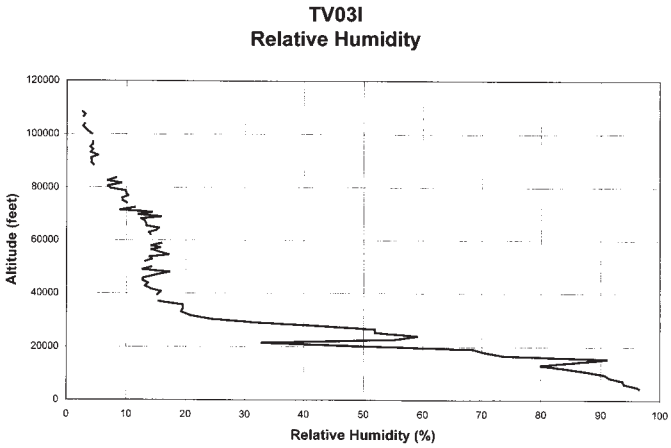
The camera is a popular payload for near spacecraft. On my first flight in November 1996, I covered the camera ports of my first near spacecraft with UV filters. The glass which was optical quality, was added to protect the lens of the two cameras inside the near spacecraft during landing. One camera was oriented horizontally to record images of the Earth's edge in near space and the second camera was oriented vertically downwards to record images of the ground. After recovery of the mission I discovered that images taken at high altitude through the horizontal camera were fogged with condensation and possibly even frost. However, images from the camera oriented towards the ground remained free of condensation for the entire flight.



Note that the image taken from the camera oriented downward is free of condensation, while the camera oriented horizontally was fogged over early in the mission.

Possibly the IR emitted by the surface of the Earth kept the downward oriented window warm enough to prevent condensation.

Better than orienting windows to keep them warmer is to remove windows from the near spacecraft. Let the cold, but very dry, air of near space freely circulate around the lens of the camera. As long as there is not a warmer and more humid surface next to a colder surface, then there condensation has no surface to form on. When the camera lens is exposed to the air of near space, humidity in the air around the camera is free to mix with the cold and dry air of near space.



The air becomes incredibly dry at altitudes above 20,000 feet.

To protect cameras from the cold, I cover mine in a black painted foam box with an opening only large enough for the lens and light sensor to poke out. Be sure you also leave an opening for any other range finders that may be included in the camera.

Any of the options discussed in this article will increase the ability of your near space mission to be recovered successfully and without a loss of data. Feel free to contact me if you have any questions regarding temperature effects in near space. ATVQ

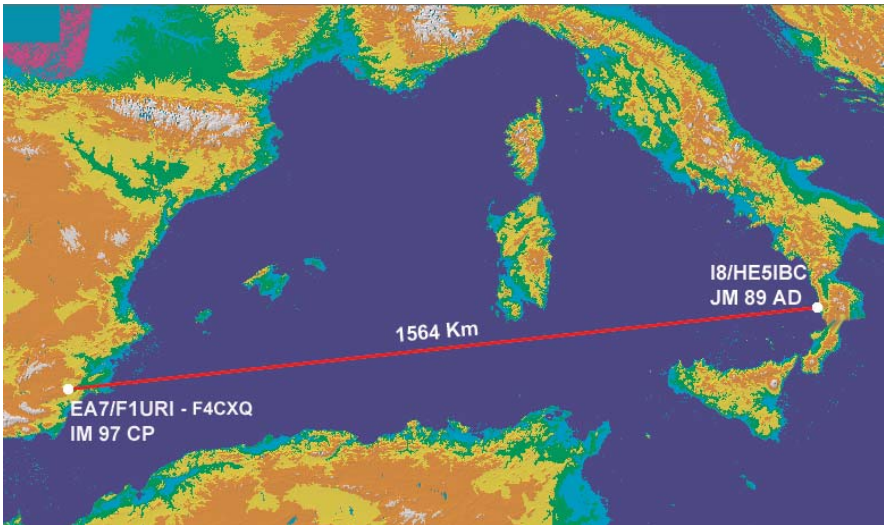
ATV 10 GHz - NEW WORLD RECORD

July 1, 2004, towards 12h00, the team EA7/F4CXQ-F1URI operated by F4CXQ/Hervé and F1URI/David as well as the team I8/HE5IBC operated by HB9DUG/Michel and HB9RXV/Paul, made the exploit to push back the distance of the ATV 10 GHz world record to 1'564 km! During nearly 20 minutes, B3-B4 images were exchanged and recorded.

The two teams wish to pay tribute to the holders of the preceding record for the motivation they transmitted to us, that is to say HB9AFO/Michel and EA/F1AAM/Jean-Pierre which realized, June 17, 1999 at 7h30 the distance of 1'031 km.

It is a team success! A big thank you to all the OM suppliers and friends who contributed, by their participation, to the success of this week "La Grande Bleue" and made it possible to push back the limits of the exploit radio TV amateur.

Station EA7/F4CXQ was in IM97CP, south of Spain and station I8/HE5IBC in JM89AD in the south of Italy. The trunk of 1'564 km, completely maritime, passes below Sardinia.



The path made

The equipment in EA7/F4CXQ: dish 150 cm, 15 watts SSB and ATV
The equipment in I8/HB9IBC: 2 dishes 120 cm, 25 watts SSB and 23 watts ATV
Altitude: 30 m asl in EA7 and 60 m asl in I8

Station EA7 / F4CXQ

Station I8/ HE5IBC

The attempts were numerous during the week to benefit from the experiments already accumulated in 2003. But also to test the many information read on these famous "ducts", kind of tubes, which leave under certain weather conditions to pass the signals at such distances, this in spite of the roundness of the ground. It is often between 11h00 and 15h00 that we noted on our SSB beacons the best signals allowing us to hope for an ATV liaison.

The pointing of the antennas was made with an half degree precision and we had just to wait until the propagation wanted to do its work well!

Picture received at I8 (JM89AD)

Picture received at EA7 (IM97CP)

Thank you to the OFCOM (Federal Office of the Communication of Switzerland) which allocate us the special call sign HE5IBC for this attempt. All the details are available on the site **www.swissatv.ch** under the heading "La grande bleue".

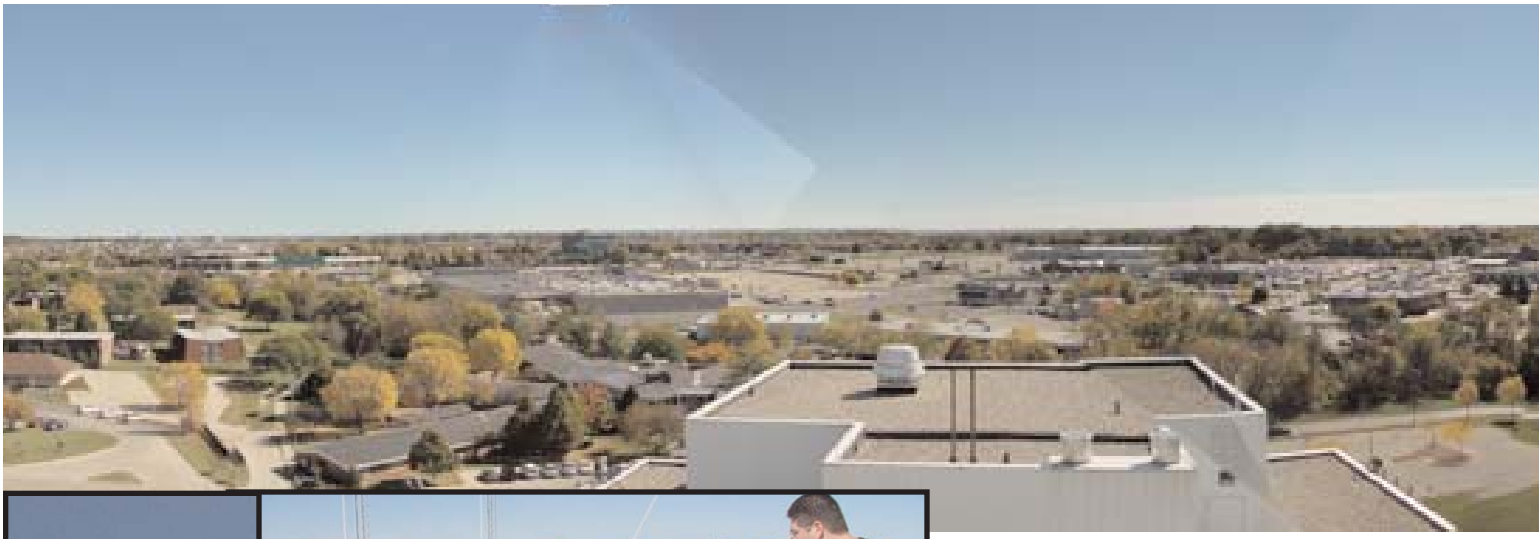
ATVQ

EA7/F4CXQ
F4CXQ/ Hervé and F1URI/ David

I8/HE5IBC
HB9DUG/ Michel and HB9RXV/ Paul

If You Move

Please send us your NEW ADDRESS! We pay 70 cents for each returned ATVQ. And we are usually nice and send another copy to your new address which costs us $1.29. Please help us from having to do this. Thanks!



W9ATN - Rockford,

By Gene Har

On October 9, 2004, W9ATN officially went on the air transmitting from its permanent location on OSF St. Anthony Hospital in Rockford, Illinois. The system had been running for over a year at our home, but only 40 feet off the ground while waiting for final permissions to mount the system at the hospital.

The system consists of a Blonder Tongue modulator with a 7 watt brick built in, 200 watt (theoretically) watt amplifier bought from Downeast, a G1MFG 1.2 GHz receiver, Intuitive Circuits controller, and an Elktronics ID'er.

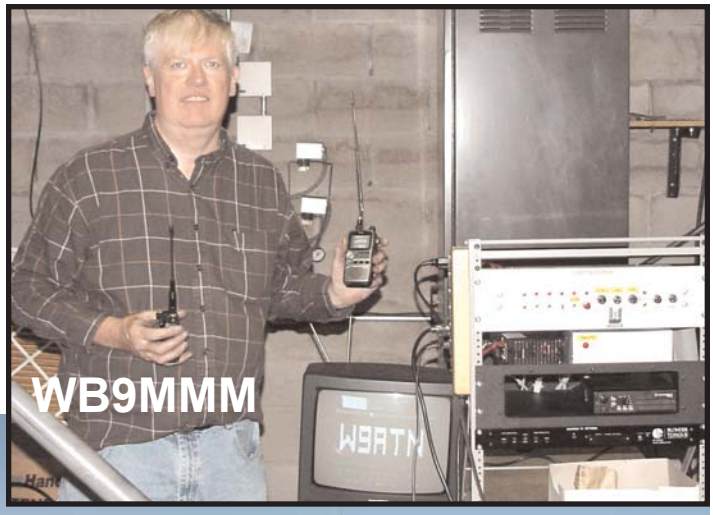
When letting it out of the bag that we were on the air, many ATV'ers around the Chicago area turned their antennas this way to see what they could see. Some reports that we got were: W9ZIH - P5 in Malta, IL; WA9EUN - P1/2 in Plano, IL; N9AB

Above - KA9PMM, KC9ATR, and KA9SKW completing the antenna work.

Left - The antennas up - Diamond 1.2 GHz/440 MHz on top for receive of video and control, rib cage for 440 MHz transmit, and 2 meter ringo for 144.34 MHz talk around.

Illinois On The Air!

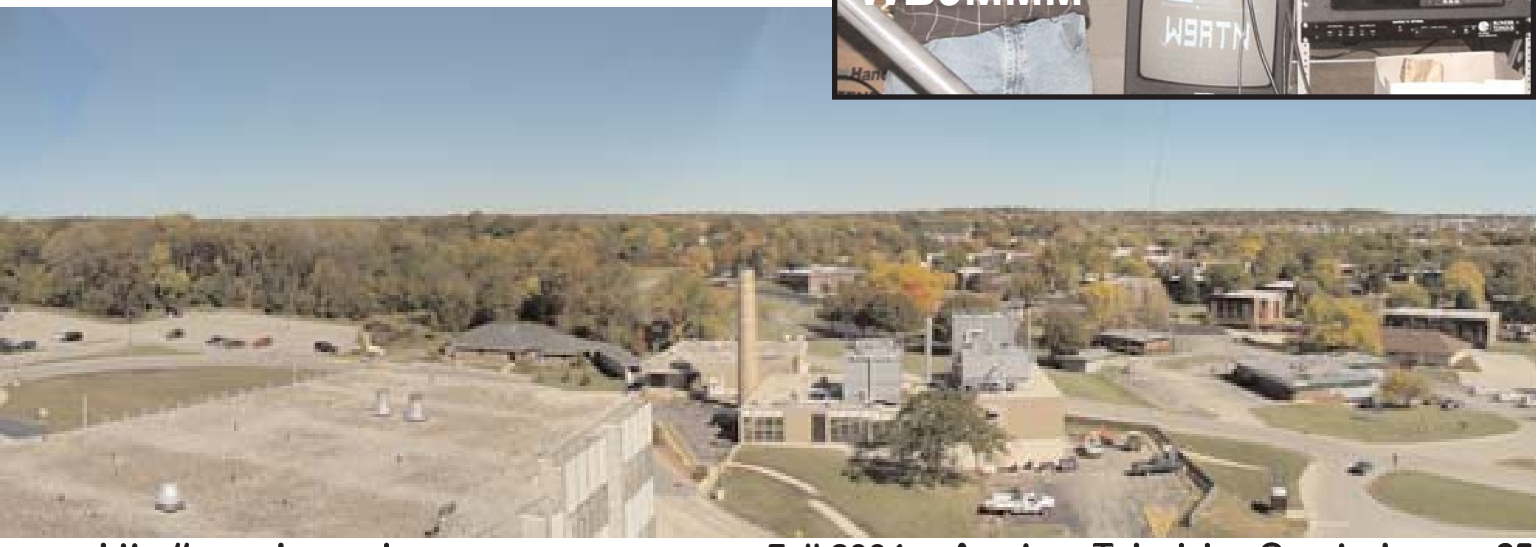
lan - WB9MMM Email: ATVQ@hampubs.com
5931 Alma Dr.
Rockford, IL 61108



- P1/2 in Mundelein, IL; KB9MMA - P1 in Racine, WI; KA9H - P1 in Downers Grove using 25 elements at 25 feet; and KB9PWQ - P2 in Harwood Heights, IL.

Two of those, W9ZIH and KB9PWQ tried to get in with over 100 watts on the input frequency of 1.253 GHz, but were unable to do so. We need to do much more testing and tweaking as we get time.

LOCATION: Lat 42-16-35 N Long 89-01-58 W
ALTITUDE: 877 ASML Feet
ANTENNAS: Output - rib cage horizontal - 6 db omni -
Input Diamond 1.2 GHz vertical.
Antennas are 110 feet above ground level.
OUTPUT: 421.25 MHz (VSB) 100 Watts Horizontal
INPUT: 1253 MHz (FMATV) vertical - SYNC activated
More info to come.



1Watt PA for 13 cm FM-ATV

By Torsten Fechner, DG7RO Email dg7ro@darc.de
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85757 Karlsfeld
Germany
Translation by Klaus Kramer, DL4KCK Email: DL4KCK@t-online.de

After building the 13 cm-ATV exciter (in part 4) we have to raise the output power from 300 mW to 1 Watt. This is done by a BFQ34 UHF transistor.

Construction

A double sided Epoxy board has to be etched and cut following the layout plan, then holes for trimmer, resistor and air capacitor are drilled. Collector and base connectors of the transistor are cut to 6 mm length, bent upwards, and a square hole for it`s broad connector plates is rasped through the board. In order to shield it we prepare a copper foil 3 cm x 3 cm, tin-plate it on one side and drill a small hole in it`s center for the ceramic body of the BFQ34.

The board (Platine) will be mounted just behind the cover (Boden) in order to pass the ceramic body through it and fix a heat sink at the bolt. So we mark the cover through this transistor hole and drill it accordingly. The heat sink (same size as the sheet metal case) gets equal drilling and is then test fitted together with transistor, board and case. The input and output connectors (BNC or N type) are mounted similarly close to the cover with the signal pins attached to the strip line (Leiterbahn)

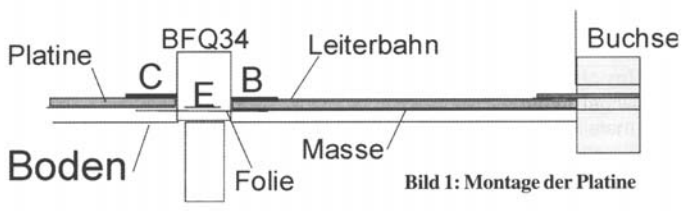


Bild 1: Montage der Platine

of the board, so the edges will be extending through the cover. The distance from cover to board should be around 3 mm, and a connector`s teflon flange hitting the board can be cut off. Now close the covers and solder the connectors with a big soldering iron and much solder. After it cools down put the board in it`s place and solder the ground side to all the sheet metal sides.

BFQ34 mounting

The board ground side around the transistor hole gets tinned, the collector side of the transistor should be marked with a pen on it`s body. Now put it through the hole from the ground side, bend the four connectors accordingly onto each circuit path and solder them. On the ground side the copper foil with it`s tinned side is laid onto the emitter connectors, pressed flat and soldered with high temperature. The tin should be squeezed out of the edges.

Assembly

Now the other parts are mounted and soldered onto the circuit path side, do not forget the supply voltage components. The Johnson trimmer capacitors 2.5 pF are mounted carefully with the red dot pointing to the ground connection hole.

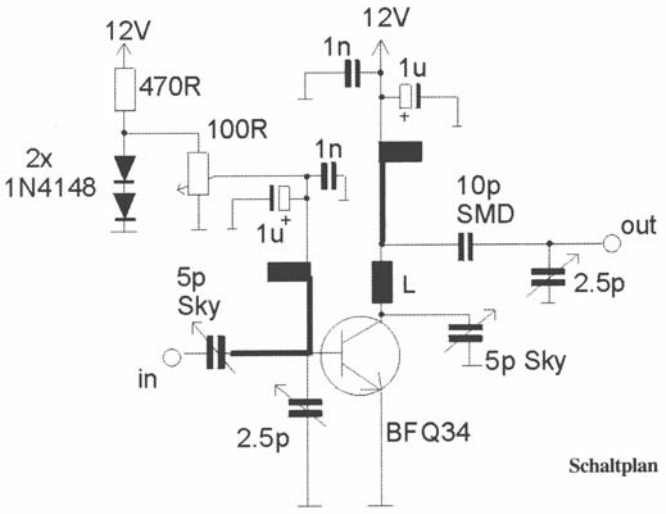
Alignment

For the air trimmers we need a small plastic pin with a flat end, for the Johnson trimmers there are special pins available, but DIY is possible. In every case be careful because the trimmer plates are fragile. Input and output have to be terminated by 50 Ohm, then apply the 12 Volt supply. The quiescent current is set to 150 mA using the 100 ohm trimmer, and with a power meter for 2 GHz at the output and a 250 mw transmitter at the input the air trimmers are set to maximum output. The 100 ohm trimmer has to be adjusted again for 150 ma maximum DC current. Now the Johnson trimmers are aligned carefully for peak output, in turn with the air trimmers. Each capacitor may have a second position for maximum output, then all other trimmers have to be realigned.

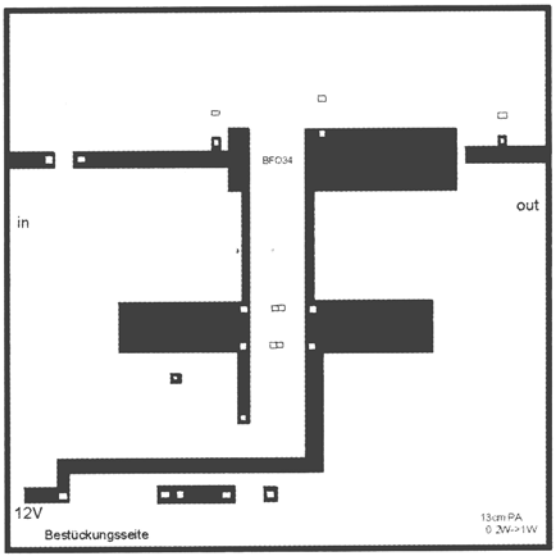
Parts Listing:

2 x BNC or N connectors
1 x resistor 470 Ohm
1 x trim resistor 100 Ohm
2 x diode 1N4148
2 x capacitor 1 uF
2 x capacitor 1 nF
2 x air capacitor trimmer 5 pF
2 x Johnson microwave trimmer 2.5 pF (type 5800)
1 x SMD capacitor 10 pF/EDPU
1 x sheet metal case 74x74x30 mm
1 x supply voltage connector
1 x heat sink (see text)
1 x transistor BFQ34
1 x copper foil 3 cm x 3 cm

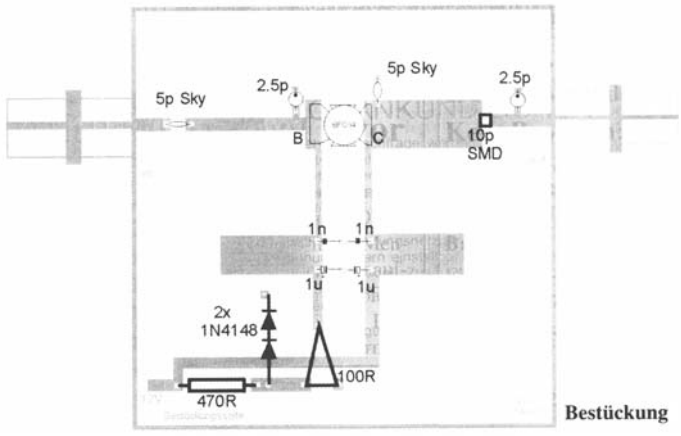
ATVQ



Schaltplan



Layout



Bestückung

ATV Meeting At Broadcast Station NDR Hamburg

More than 50 guests listened to interesting lectures from different readers. Everything was transmitted via DB0FS (Hamburg ATV repeater), around 30 percent of the guests are active there. We have plans to move it to a TV tower in 165 m antenna height gaining more coverage. TX frequency is 1288 MHz with hor. polarization, QPSK modulation with 5 Megasymbols/sec. Behind the receiving antenna a selective 40 dB preamp should be used in order to avoid overmodulation by mobile phone relay stations. Now the lectures:

1) Martin Fritz, DL2HAO, reported latest news from the inviting ATV group with 51 members now, existing since 1977 at two locations in Hamburg Lokstedt and Rothenbaum.

2) Norbert Huckfeld, DK6XU, gave an overview of DB0FS developments since 1978 and showed coverage diagrams. He discussed pros and cons of different ATV modulations in respect to TX power and rf bandwidth. So a 10 Watt FM-ATV signal equals to 180 KW AM-ATV, and digital QPSK gains some 6 dB more together with MPEG video compression for reduced bandwidth.

3) Stephan Reimann, DG8FAC, explained design and usage of his D-ATV components, digital satellite receivers are containing quite similar devices. Another supplier of rf components is Michael Kuhne, DB6NT.

4) Thorsten Schulze, DG1HT, discussed properties of different satellite receivers used for ATV, some update software for them can be found on his excellent homepage **www.dg1ht.de**

5) Iwo Schulz, DG0CBP, reported the present state of the ATV repeater linking project in northern Germany, comprising of DB0EUF on a 342 m telecom tower near Hoehbeck-Gartow with ATV links to Berlin, Hamburg (DB0DTV) and DB0HEX on the Brocken Mountain, homepage **www.db0hex.de**. He showed nice pictures from the tower and a software program used for calculating the range of a link (**www.cplus.org/rmw/english.html**).

6) Roberto Zech, DG0VE, from Brauna near Dresden introduced his components and explained construction of PAs with Motorola transistors specified for 960 MHz, but also useful at 1300 MHz, as well as alignment with Smith diagrams and layout design by a software called "PUFF" from **www.ukw-berichte.de**. Roberto's homepage is at **www.dg0ve.de**.

Catering with coffee and cakes completed a very interesting day which will be followed by more to come in a two months interval. Thanks to the organizers.

73 Manfred, DC2FK
Translation by Klaus Kramer, DL4KCK
Email: DL4KCK@t-online.de

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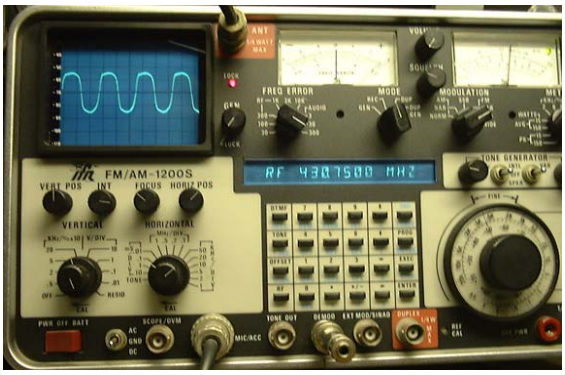
Web site: www.hamtv.com

Setting up the AM ATV Sound Subcarrier

There are 4 tweakable controls on the sound subcarrier board: FM deviation level, Mic and Line audio gain level, 4.5 MHz injection level, and subcarrier frequency. They should be adjusted by using test equipment, but most hams probably don't have spectrum analyzers or communications monitors available and maybe not even a frequency counter. Here are some indirect methods you can try that will get you in the ballpark if you have blind tweaked and can't find your way back to the factory settings.



FM Deviation Level: This pot sets the peak audio voltage after limiting to the varicap that swings the 4.5 MHz oscillator frequency. It is factory set between 25 and 40 kHz on a communications monitor. 25 kHz is the broadcast TV standard, but they can occasionally for a short time go up to 40 kHz (you suspected that on commercials didn't you). The soft limiter in the FMA5-F will start rounding off the peaks above 25 kHz as shown in the picture, but if the mic or line audio is hit hard, it will fully limit around 40 kHz. An easy way to indirectly set the deviation is to listen to yourself on a cable ready TV (cable CH 58 to 60) while speaking normally into your mic. Switch back and forth between your ATV signal and a local TV network channel. Set the deviation for about the same level as the broadcast stations audio. You may have difficulty with feedback and hearing yourself accurately, so if there is an ATVer close by who gets you P5, have them switch back and forth on their TV and talk you in on 2 meters.

Mic and Line Audio Level: The oscilloscope in the communications monitor is used to set the Line audio level with a 1 kHz sine wave applied to the point where the rounding is noted on the sine wave tips and the same with voice peaks on the mic gain. . If you do have an oscilloscope, you can connect the hi-z probe to the top of the deviation pot and look at the waveform. Indirectly, as with the deviation setup, you can listen for distortion to start as you increase the mic or line gain, and then back off slightly. On the new FMA5-G there is a LED that will blink off when the mic or line audio gain is set too high. One advantage for repeater transmitters with the new sound board with audio AGC is that it can be set with the line gain a little high so that received audio with low deviation will be at the same level as all others. However, it is best that all ATV transmitters be set to the standard levels.

4.5 MHz Injection Level: A spectrum analyzer is used to look at the relative level to the video carrier of the sound subcarrier. The injection level must only be adjusted after the RF drive and blanking pedestal or sync stretcher has been set up on the exciter board. For a mixed type of sound system, the level needs to be about -18 dBc but never less than -15 dBc or else the white peaks in the video which the sound rides on will swing down to zero carrier and put a buzz in the sound at the sync rate. Indirectly have a nearby ATVer talk the level in: Increase the level until the sync buzz increases and then back off a little. Too little injection and the audio noise will start rising - some TV sets have better sound sensitivity than others. Sound will normally drop out at P3. Too much injection also increases the triple beat cross hatch in the video. Triple beat is the 920 kHz intermod distortion generated in the modulated RF stages - 4.5 sound minus 3.58 MHz color subcarriers and added to the carrier.

4.5 MHz Frequency: A frequency counter connected to the sound board output and the oscillator inductor slug set to within 1 kHz of 4.500 MHz is the best and most accurate way to set the frequency. If you don't have a counter, but have a general coverage receiver, you can tune for a 1 kHz tone while tuned to 4499 kHz USB. Never set it by listening in a TV set as each will be different and might have automatic frequency control (AFC). Crosshatch can often be seen in the color video if the sound frequency is off more than a few kHz.

ATVQ TO PAY FOR ARTICLES! CONTRIBUTORS GUIDE

Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay $25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

Ideas

Do you have an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

Preferred method of receiving articles is from **Microsoft Word**, however **Wordperfect** is OK too. Next preference would be **ASKII text**, followed by **typewritten** or **hand written** (clearly). Diagrams or pictures (B&W or Color) can be sent in hard copy, or if you scan them in, save to PCX or JPG formats (actually I can read about anything). If you send a computer disk, make sure it is PC (not MAC) format.

When sending in articles in Microsoft Word, please SAVE with FASTSAVE OFF and save in Word 6 format. Also, articles written in any word processor, consider what will happen when it is re-formatted to fit the style that I might put it in. An example would be setting up tables or adding figures into the article. They can be very hard to strip out. If possible, put the tables, figures, each in a file by itself. This will help me to be able to import into the magazine format.

Articles can be sent to:
ATVQ, 5931 Alma Dr., Rockford, IL 61108

or to our email address: **atvq@hampubs.com**
Also note our web page address: **http://www.hampubs.com**

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Statement of Ownership, Management, and Circulation

1. Publication Title	2. Publication Number	3. Filing Date
Amateur Televison Quarterly	0 0 3 - 3 5 3	09-28-2004
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
4 Times per year	4	$20.00

7. Complete Mailing Address of Known Office of Publication *(Not printer) (Street, city, county, state, and ZIP+4)*
Harlan Technologies, 5931 Alma Dr., Rockford, IL 61108-2409
Contact Person: Gene Harlan
Telephone: 815-398-2683

8. Complete Mailing Address of Headquarters or General Business Office of Publisher *(Not printer)*
Harlan Technologies, 5931 Alma Dr., Rockford, IL 61108-2409

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor *(Do not leave blank)*

Publisher *(Name and complete mailing address)*
Harlan Technologies, 5931 Alma Dr., Rockford, IL 61108-2409

Editor *(Name and complete mailing address)*
Gene Harlan, 5931 Alma Dr., Rockford, IL 61108-2409

Managing Editor *(Name and complete mailing address)*
Gene Harlan, 5931 Alma Dr., Rockford, IL 61108-2409

10. Owner *(Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)*

Full Name	Complete Mailing Address
Gene Harlan	5931 Alma Dr., Rockford, IL 61108-2409

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☒ None

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12. Tax Status *(For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)*
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
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☐ Has Changed During Preceding 12 Months *(Publisher must submit explanation of change with this statement)*

PS Form **3526**, October 1999 *(See Instructions on Reverse)*

13. Publication Title: Amateur Televison Quarterly			14. Issue Date for Circulation Data Below: Summer 2004	
15. Extent and Nature of Circulation			Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies *(Net press run)*			1000	1000
b. Paid and/or Requested Circulation	(1)	Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. *(Include advertiser's proof and exchange copies)*	552	628
	(2)	Paid In-County Subscriptions Stated on Form 3541 *(Include advertiser's proof and exchange copies)*		
	(3)	Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution	60	60
	(4)	Other Classes Mailed Through the USPS		
c. Total Paid and/or Requested Circulation *(Sum of 15b. (1), (2),(3),and (4))*			612	688
d. Free Distribution by Mail *(Samples, complimentary, and other free)*	(1)	Outside-County as Stated on Form 3541		
	(2)	In-County as Stated on Form 3541		
	(3)	Other Classes Mailed Through the USPS		
e. Free Distribution Outside the Mail *(Carriers or other means)*			72	
f. Total Free Distribution *(Sum of 15d. and 15e.)*			72	
g. Total Distribution *(Sum of 15c. and 15f)*			684	688
h. Copies not Distributed			316	312
i. Total *(Sum of 15g. and h.)*			1000	1000
j. Percent Paid and/or Requested Circulation *(15c. divided by 15g. times 100)*			100%	100%

16. Publication of Statement of Ownership
☒ Publication required. Will be printed in the Fall 2004 (Oct) issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Eugene Harlan Owner — Date: 09-28-2004

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

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1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
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5. If the publication had Periodicals authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
6. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
7. Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of Periodicals authorization.

PS Form **3526**, October 1999 *(Reverse)*

ON THE NET: TEENS SET WIFI RECORD (Amateur Radio Newsline)

A group of teenage hams from the Cincinnati area got an ovation at the recent Las Vegas DefCon hacker conference. This, after organizers announced that the winners of this year's Wi-Fi shootout might have broken a world D-X record for ground distance in establishing a 55.1-mile Wi-Fi connection. Ben Corrado KC8RKO, Andy Meng N8MX, Justin Rigling KC8OIO and Brandon Schamer KG4NVK won the prize for greatest distance achieved for an 802.11b network. The teens, all 18 and 19 years old achieved the record using an amplifier and homebrewed antennas on both ends. This exceeded last year's distance winner by 20 miles. Then, when they established that record, they turned off their amplifiers and broke the record for an unamplified connection at the same distance.

Annual Banquet

The Central Illinois/St. Louis Area Amateur Television Club will hold their 19th annual banquet on November 21, 2004 at the Ariston Restaurant in Litchfield, Illinois. Last years attendance was over 50, and with the continued growth and interest in amateur television in this area, we anticipate a much larger number this year.

The banquet starts at 4 PM with a get acquainted hour and dinner served at 5 PM. Following the meal, awards will be presented including the club's annual ATV Operator of the Year plaque. A large prize drawing will follow.

There will be a small area for swap and for sale items. For further information contact Scott Millick, K9SM, at 217-324-2412, smillick@wamusa.com or 222 N. Jackson St., Litchfield, Il 62056.

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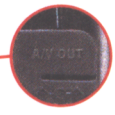

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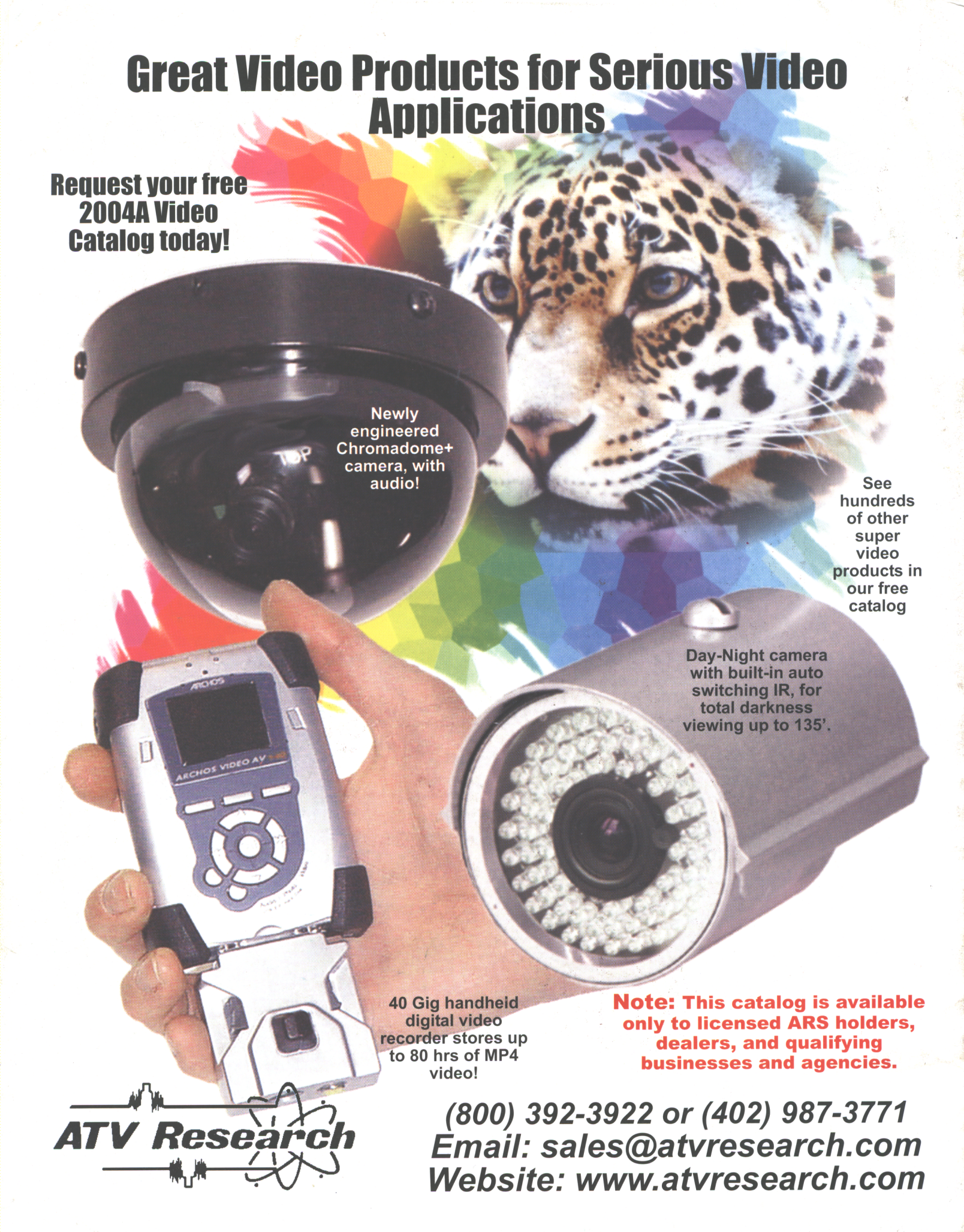

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