

The VHF Journal

<http://vhfgroup.rochesterny.org>
Club Memorial Call: W2UTH

August 2001



Official Beer of the
August 2001 Perseids

Astronomers Admit They Made Neptune Up

LONDON-- An elaborate, 155-year-old hoax was revealed Monday, when the Royal Astronomical Society confessed that the planet Neptune does not exist.



"It appears to have begun in 1846, when Johann Galle needed a big discovery to give his career a jump-start, so he fabricated this new planet," said Royal Astronomical Society president N.O. Weiss. "Ever since, every astronomer who's wanted some attention has come up with some new report on 'Neptune' and made up some rubbish to support it. I swear, we meant to come clean eventually, but the whole thing just kind of snowballed."

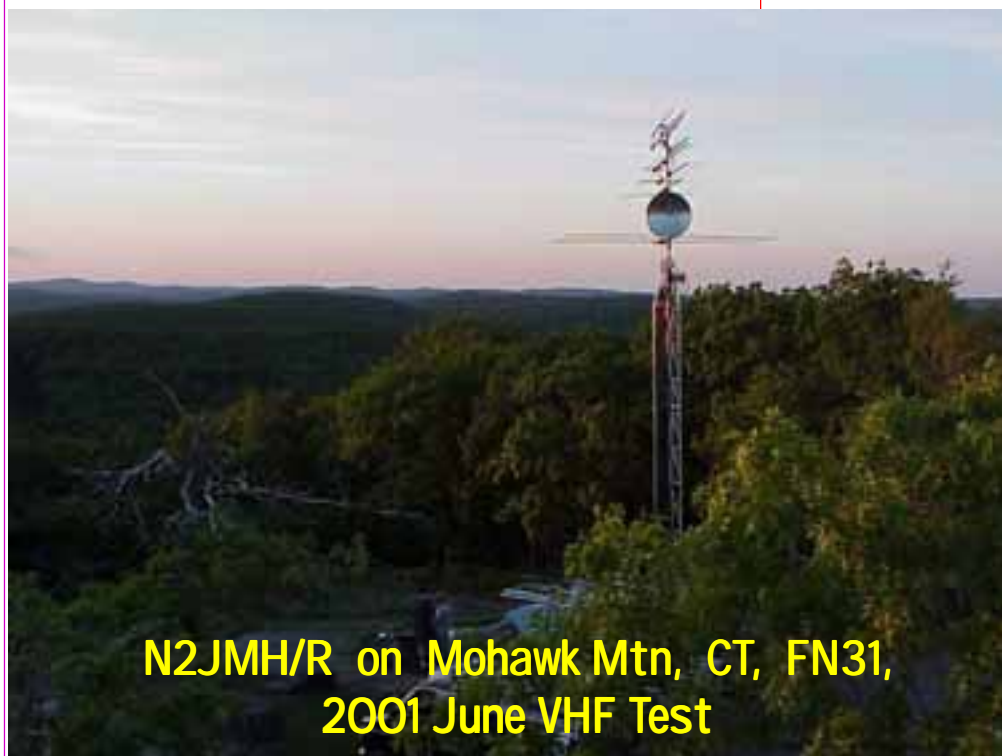
FEATURE ARTICLE: PHASING 6m Yagis

by VE3BFM

Ready for the
PICNIC?

How about the
UHF Test?

The 10GHz
Cumulative Test?
September VHF
QSO Party?



N2JMH/R on Mohawk Mtn, CT, FN31,
2001 June VHF Test

VHFBILL

Welcome to the July 2001 WEB ONLY edition of the VHF Journal.



Well, **not a SINGLE complaint** about Acrobat 5.0! We'll assume that means folks had no problems with it (or didn't bother to admit they did). We certainly are getting a lot of downloads from the club website- I love it when a plan comes together.



Well, on the cover this month we have The Official Beer of the August Perseids! And where can you get it? Well, I got mine at a tavern in Montreal, where they had it on tap. A pliable waitress got a generous tip for providing the new .5 Liter pilsner glass whose logo graces your August Journal. (Next trip: They had a plisner glass for Boreas Beer- with silver detailing, a polar bear, and the Northern Lights on it.)

At left: The editor gets ready for summer fun at the RVHFG PICNIC in K2AXX's POOL !

So how about Journal content in the coming year? Well, I'd like to see a tech article every month- which means a construction article. This could be an **antenna**, how to **wire your shack**, putting **transverters on your tower**, putting a **rover tower on your YUGO**-anything! I'd like to see monthly columns for all the bands- we now seem to have a regular 6M column! Who will step up and submit for the other bands? Dont just bitch about activity on the bands-report on it!

...CUL es DXOM Tom VE3IEY FN14pd

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-Commentary and articles: via e-mail to editor VE3IEY: tantonn@kingston.net. Use standard ASCII text, Corel's Word Perfect or send as regular e-mail.

-Photos and drawings: via e-mail, and can be sent in any format that is available (JPG, GIF and TIFF are most common). **EXCEPTION:** We don't like MS PowerPoint (*.PPT) files!

-Assistant Editor, Printer, Membership & Data-Magician: Judy, N2KXS

-Production Czar and Supreme Downloader of the Word: Fred, W02P

-Advertising space is now available in the Journal. Contact the editor for One thru Twelve month rates. **Layout services are free of charge.**

-This publication is Copyrighted by the Rochester VHF Group. It has been created using Corel's Word Perfect 2000, Adobe Photoshop 6.0, Adobe Pagemaker 6.52, Adobe Image Ready 3.0, and Adobe Acrobat Distiller 5.0. **It is designed to be read with Acrobat 5.0** Other NFP publications may excerpt articles herein provided subscription information (or [www address](http://www.vhfgroup.rochesterny.org)) to the Journal is reprinted with it.

THE VHF JOURNAL was compiled, edited, and typeset on
Amherst Island, in Ontario, Canada (FN14pd)

It was published in Rochester, New York, USA (FN13)

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The Rochester VHF Group

* Club memorial call: W2UTH *

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Jeff, KB2VGH sez: "There is only *one* mailing list [you'll ever need...]"

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It is set up to broadcast to all RVHFG members

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AUGUST VHF GROUP PICNIC

THE ANNUAL ROCHESTER VHF GROUP PICNIC WILL BE HELD ON SATURDAY AUGUST 11, 2001 AT THE HUMBLE BUT SUPER VHF DX LOCATION OF K2AXX. THE PROCEEDINGS WILL BEGIN LOOSELY AT 2PM !!!

Please bring a dish to pass...
hot's, burgers, condiments and
soft drinks will be provided.

For those needing to test their 10 ghz. narrow and wide band equipment, we will hopefully have working radio's on hand for test QSO's. We will also try to be set up to do 5ghz stuff as well.

Please RSVP to Scott Ballou via e-mail:
aa2wv@monroe.eduASAP. Last years
picnic was a real fun time so....don't miss out!

Directions are on Page 4

MISSED OUT ON THE VHF GROUP BOOTH AT THE ROCHESTER HAMFEST? WANT TO KEEP GETTING THE JOURNAL? YOU NEED TO RENEW !

(form on back page) !

SEND \$10USD FOR WEB, or

\$15 USD FOR MAIL DELIVERY RIGHT NOW TO:

RVHFG

PO BOX 92122

Chairman's Rant

This summer has proven rather quiet. No big events, no "major" openings - no big weather weirdness - almost TOO quiet!

I've been thinking a lot recently about my station & how I can improve things. I'm now really seriously planning to build a shed at the base of the microwave tower, run 110VAC out to it from the main panel, and put all of the uWave junk there. That would allow me to gain the following flexibility:



- 1) One less 6' rack in the shack. It would make space for me to do other things.
- 2) The feedline run reduces from 130' to just over 60', which makes ground-mounting 5GHz much more a reality than previously thought. It ALSO makes me think 10GHz, provided I find some EW-90 waveguide or similar - doing the same thing. I can also run separate feedlines for each band, reducing the number of annoying relays I need to have in line.
- 3) All that would need to run outdoors from the shack is a single run of RG-8 type coax, some control lines, and PERHAPS a power meter of some form. That's easy!

SO - with that decision in mind, I guess I'll have to start detailing some of it, taking pix along the way. My transverters aren't "state-of-the-art", but they seem to work OK. I'm gonna modify the LO to use a PTC thermistor to have some form of temperature compensation. That means, my frequencies should stay about the same regardless of outside temperature.

What are YOU up to this summer? I know of a few major/minor projects - send me a note if you're building/breaking/fixing something. I'll try to collect em for the September Journal - might be something fun to see.

Mark, K2AXX

MORE PICNIC DIRECTIONS AND INFO!!!

Well, to echo AA2WV's comments - we're looking for any RSVP you'd be willing to offer! I know I'll be there. Seriously, if you don't think you can make it either - also let Scott know. We don't want to over-buy.

Again this year, it will be held at my QTH in Geneseo, NY (FN12cs). The house address is 5519 Lakeville-Groveland Road, right off Rt 20A. For those of you who'd attended last year, same directions. For those of you who haven't been, here's the best route from the north (majority of people - if other directions email AA2WV@monroe.edu for better details)

1) Find Rt 390 South at any point. Heading south, look for the LAKEVILLE EXIT of 390S.

2) At the end of the ramp, turn LEFT (south) onto Rt 15.

3) Approx. 2 miles south on Rt 15, it will split. BEAR RIGHT, this takes you onto Rt 286.

4) Continue SOUTH on RT 286, until reaching a stop-light. Minnehan's Restaraunt on your left, Woody's Car Lot on your Right. This is the intersection of Rt 20A.

5) At this intersection, turn RIGHT (WEST) onto Rt 20A.

6) Approx. 1/2 mile west, make your first LEFT onto Lakeville-Groveland Road. There is a pond at this corner, and some construction is taking place on the road.

7) Approx. 8 miles south on Lakeville-Groveland Road, our house is on the Left-hand side of the road. There is a Horse Barn, Green house and grey 2 car detached garage on the property, along with the 64' tower. If you go too far, you'll see ONE of those.

The driveway is a horseshoe, with the 2nd part your turn in. Please park in the grass by the garage, and c'mon out & enjoy the country.

Soda, meats & stuff to be provided - bring a dish to pass & your own adult beverages. Will have games (some - if you want others BRING EM ALONG) and the usual **147.51FM talk-in frequency** (simplex). Will be running the

Check-in contest again this year, with a REAL SUPRIZE gift (read: junk from my shack!) as your reward! 50/50 raffle, other fun ways to spend an afternoon.

Rewinding 24V relays to 12V

from the OVHFA reflector, by VE3OIL

I have rewound a 24VDC solenoid and a 6.3VAC solenoid for 12V. There are articles that give detailed directions and exact methods for finding the correct wire gage. Using some ampere-turn thought experiments I came to the conclusion that a 24V coil can be converted to 12V by using two coils half of the original size running in parallel.

24v coil, 1A, 100 T

At 24V there are 100 A-T

At 12V, .5 A there are 50 A-T, not enough
cut the coil in half, 50T

At 12V now 1A, 50T, 50 A-T

Add the second half of the coil in parallel,
2x 50 A-T

I just unwound the 24VDC solenoid onto a pair of nails at opposite ends of the garage. I then got a new spool of wire the same gage as that originally used. I rewound the original wire and new wire in parallel. When the spool looked full I stopped. The time constant is probably not what the designers had intended but it pulls in solidly and reliably and does not draw too much current.

The number of turns put on won't affect the pull in voltage, unless the resistance of the wire is low or high enough to disturb the power supply. The fewer turns that are put on the more power is used but the faster the action of the relay

For the 6.3 VAC I discarded the original wire and used a gage that looked the same as I found on other 12V coils, same result.

I needed to walk back and forth across the garage many times, expect a lot of winding time.

Russell

In the words of the great Lemmy Kilmiester, "You ain't gonna live forever, so you better live right now."

50MHz - The Magic Band - showing its magic!

DX REPORT: If you don't have 6 meters running at your shack - YOU DON'T KNOW WHAT YOU'VE BEEN MISSING! Here's a brief rundown of the goodies you could be working this past month!

North America / South America
Prefixes worked: FG5, YV1, KP4, PZ5, VP2V, 8R1, OX3, TI2, VP9, VE2A (CQ Zone 2), KG4 (Gitmo)

Europe Prefixes Worked:
DL7, F5, EA6, G3, IO, GU6

BELIEVE ME, this summer has been pretty good. These all were worked during July, running 100w output to 7 elements at 28'. IF you've got something similar, YOU could have been working it too!

There have been openings this summer to ALL 48 CONTINENTAL STATES, and VE1,2,3,4,5,6,7,8,9 and VO1,2. Heard the VE8 beacon for hours on end... What I'm trying to get across is you need to TURN ON your stuff and TUNE IN (no, not trying to be the reverse Acid Test. . .). I don't think you'll be disappointed.

Look for VY0AAA in FP53 (Really is VE3FN). Ray will be in Iqualit territory for a while - new grid & it's Zone 2 for those WAZ collectors.

FS/N30C in FK88 - Now until August 2. HF + 6m.
FS/W6IZT - August 5 - August 12th.
This is one island I need! If you hear em, work em!

COOL STUFF ON THE WEB: If you've not been there before, <<http://www.kb3cws.com/chat/chat6.asp>> Is perhaps the coolest thing you'll ever see. It is a chat room, where 6m dxers and enthusiasts get together & swap lies & propagation reports. TONS OF FUN.

Also, check out <<http://www.n1rz.com>> - Tim has an EXCELLENT SITE - with Packet Spot maps showing where propagation is being reported from/to.



SOAPBOX: Something I've noticed on the band, is the tendency to - when trying to bust a pileup, of using the "Last-2 Letter" approach. You hear a station, and you say "Xray Xray" instead of your whole callsign. That defeats the purpose of calling in the first place. If a station is running a pileup, they want to hear full callsigns. Hearing just 2 letters causes them to acknowledge 2 letters only - then you have to complete your callsign - THEN you can have your QSO. If you're loud enough to have 2 letters heard, chances are you're loud enough to have your whole callsign heard. With the sporadic nature of openings on 6 - that can make the difference between someone else making a QSO and not. SO - PLEASE send your entire callsign when trying to work a station. It's illegal if you don't, and it's better operating practice.

TREASURERS REPORT by N2OPW 07/24/01

CHECKING ACCOUNT

Previous Balance.....	\$1174.74
INCOME:	
Dues.....	90.00
EXPENSES:	
Newsletter Supplies...	00.00
10GHz Power Amps.....	460.00
CURRENT BALANCE.....	\$ 804.74

SAVINGS ACCOUNT

Previous Balance.....	\$1275.90
INCOME:	
Interest.....	2.72
EXPENSES:	
Transfer to checking..	0.00
CURRENT BALANCE.....	\$1278.62
TOTAL:	\$2083.36

Thank you Paul for a job well done- good luck in your retirement from the treasurer's position.
... de abcley

This article excerpted from the
proceedings of the 2001
OVHFA "VHF DO"

Stacking and Phasing Techniques for 6m Yagis

Bob Morton, VE3BFM

You never really seem to have enough gain in an antenna system. Over the years on the VHF and UHF bands, I have gone from a single short boom yagi to a single long boom yagi, then a stacked pair of long boom yagis, then a quad array of long boom yagis, and then an 8-bay yagi array. There is always those weak signals you can hear and wish you had another 3dB of antenna gain.

On 6m, often referred to as the magic band, there are numerous modes of propagation that occur. Without going into details on these, I want to look at the vertical angle at which the signals arrive.

Having the highest antenna is not always going to give you the strongest signal. Ground reflections create nulls in the vertical pattern, and if the signal is arriving at an angle where your antenna has a null, it will be seriously attenuated. Working signals via aurora scatter is a prime example of not wanting an antenna pattern with the main lobe at the horizon; elevation of the pattern is required. A station in Tennessee that is aiming at the horizon for an aurora contact often will not be heard in Southern Ontario because we will need to direct our signal up approximately 30° to see the same point in the aurora that the southern station sees. A 6m yagi mounted up either 40 feet or 60 feet above the ground will have a null in its vertical pattern at 30° . A 6m yagi mounted up either 30 feet or 50 feet will have a peak in its vertical pattern.

It is not practical to have a tower that you can raise and

lower to achieve the optimum height for receiving the signals. You can, however, do something about filling in these nulls in the vertical pattern, but you need to have a pair of antennas vertically stacked on the tower.

If you change the phasing of one of the two antennas, you will electronically steer the vertical pattern, thus redirecting the maximum signal from the horizon to some elevated angle. By putting in a delay in the upper antenna relative to the lower antenna, the lower antenna will start to radiate before the upper antenna, thus creating an elevated maximum in the signal. This is simple and very predictable if you are in free space and have no ground reflections.

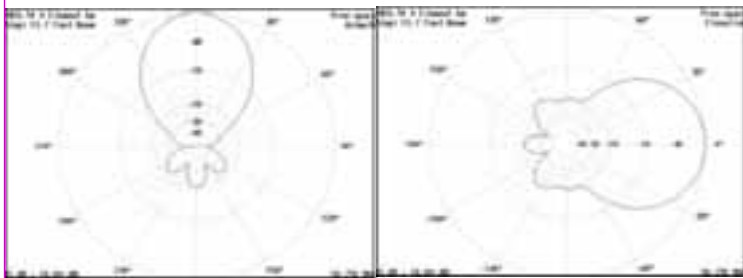
The phase centre of the array is basically at the mid point between the two antennas. Ground reflections will be in phase with this point so will tend to maximize at the horizon, thus affecting the actual phased pattern from the two yagis.

If the phasing of the two yagis are in-phase (0° , 0°), then the signals will tend to maximize towards the horizon. Peaks and nulls in the vertical pattern will be created depending on how high the antennas are above the ground. Nulls in the vertical pattern are created when the ground reflection comes back out-of-phase and cancels with the direct signal from the two yagi antennas. The simplest technique in eliminating these nulls in the vertical pattern is to phase the two antennas out-of-phase (0° , 180°). The ground reflections which cancelled the signal in the vertical pattern before, will now add with the ground reflection to create a maximum at that particular angle. However, the pattern maximums that you had with the two yagis in-phase originally, will now be the nulls in the vertical radiation pattern. This technique of feeding the yagis in-phase and out-of-phase is a common method used by stations so signals arriving at the angles of the nulls of the in-phase yagis can now be received much better.

The disadvantage of this in-phase / out-of-phase method is the continuous use of switching between the two combinations. The higher the antenna above the ground, the more nulls and peaks will occur in the vertical pattern. Another method, which I will be using with my array of 4-element 6m yagis, is to put in some different phase variation that will actually fill in the vertical nulls of the pattern, thus eliminating the need for

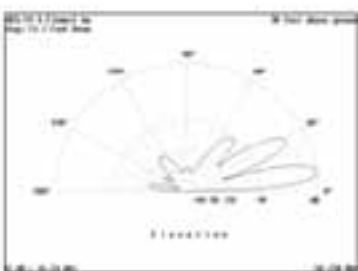
switching back and forth between the in and our-of-phase condition. This will be better in hearing all the signals that arrive from just above the horizon to just over 30° above the horizon. You will sacrifice 3dB or so of maximum gain, but you will be able to hear a station and maximize your chances of being able to work it.

The following sets of vertical radiation patterns show the effects of mounting a single and a stacked pair of yagis in free space, and then at heights varying from 30 feet to 60 feet. I have also included the horizontal and vertical free-space radiation patterns for a single 4-element 6m yagi so you can see what the starting reference points will be. For all examples, the antennas are horizontally polarized.

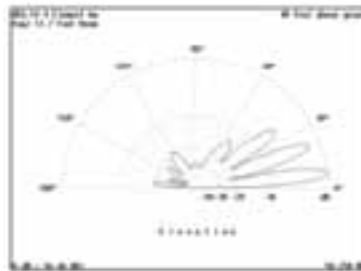


The above figure shows the element current distribution amplitudes for the 4-element yagi. The driven element has the highest current level.

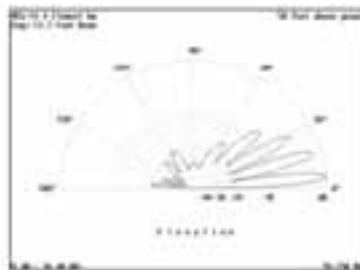
Below are computed vertical patterns for the 4-element 6m yagi at various heights above ground.



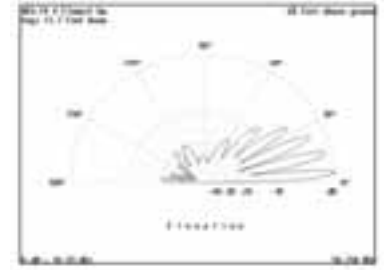
30 feet above ground



40 feet above ground



50 feet above ground

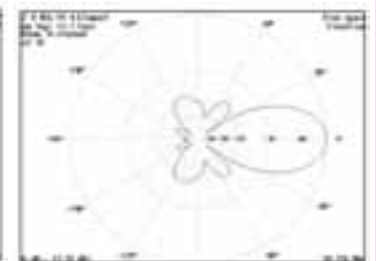


60 feet above ground

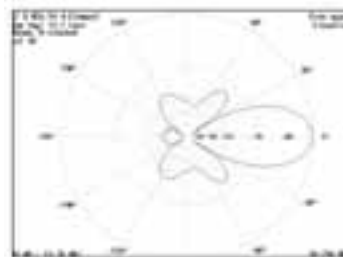
The following figures show the effects of different H-plane stacking for the 4-element 6m yagi. The first figure shows the current distribution on the antenna elements. The driven elements have the highest current. Optimum gain occurs around 18 feet. A 16-foot stacking will yield a cleaner vertical pattern.



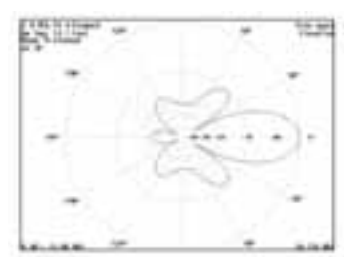
14 foot vertical stacking



16 foot vertical stacking



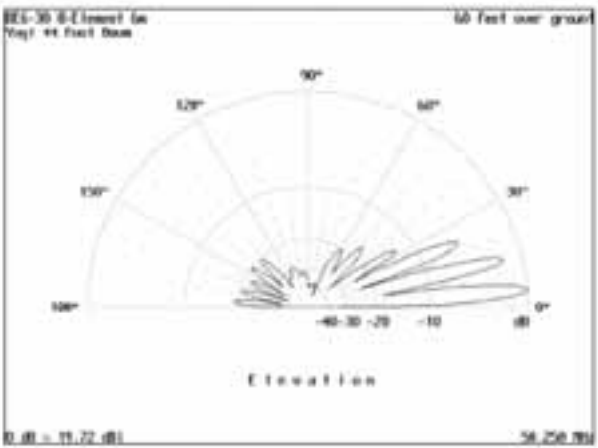
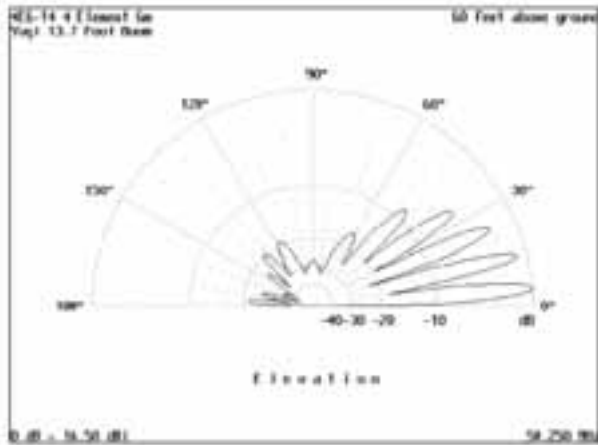
18 foot vertical stacking



20 foot vertical stacking

The higher the antenna is above the ground, the more gain it should have in order to minimize the higher lobes caused by ground reflections. The vertical radiation patterns below show the difference between the 4-element 6m yagi on a 13.7-foot boom, and an 8-element 6m yagi on a 44-foot boom. Note that the peaks and nulls in the pattern occur at the same angles, but the level of the higher angle peaks for the 8-element yagi are less than

those of the 4-element yagi at higher elevations.



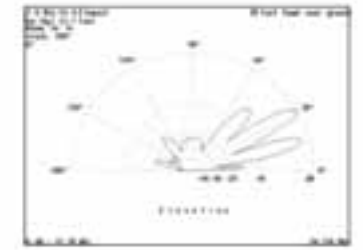
45° delay to upper antenna



90° delay to upper antenna



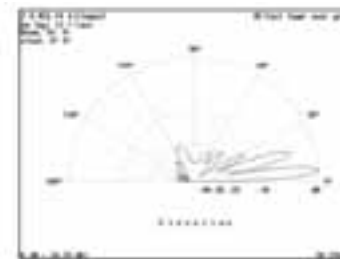
135° delay to upper antenna



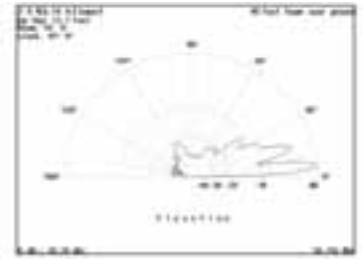
180° delay to upper antenna
(both antennas out-of-phase)

The following figures show the effects of varying the phase between the two 4-element 6m yagis with the lower yagi at a **height of 40 feet**. Vertical stacking distance is 16 feet. The phase of the upper antenna has a lag or delay, which means the lower antenna starts to radiate first. This has the effect of tilting the radiation pattern up above the horizon. 45° steps for this are shown so the variations can be seen. The 90° delay to the upper antenna seems to provide the widest vertical pattern.

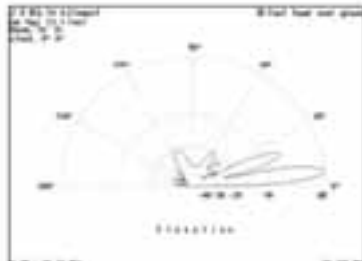
The following figures show the effects of varying the phase between the two 4-element 6m yagis with the lower yagi at a **height of 30 feet**. Vertical stacking distance is 16 feet. The phase of the upper antenna has a delay or lag, which means the lower antenna starts to radiate first. This has the effect of tilting the radiation pattern up above the horizon. I have shown 45° steps for this so the variations can be seen. The 90° delay to the upper antenna seems to provide the widest coverage.



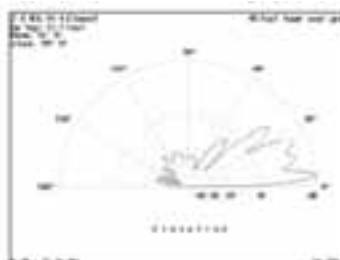
Both ants in phase (0°, 0°)



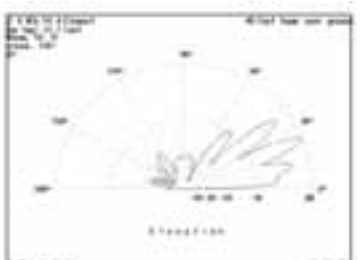
45° delay to upper antenna



Both antennas in phase (0°, 0°)

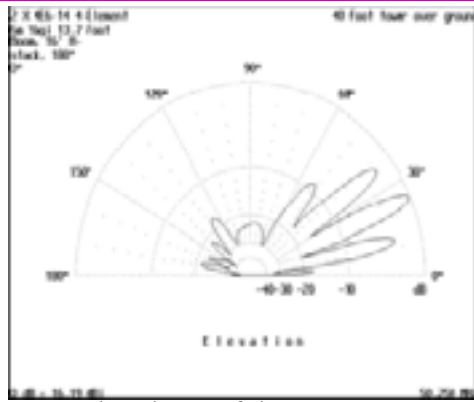


90° delay to upper antenna



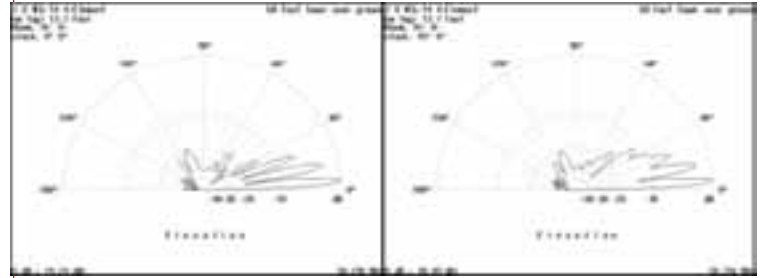
135° delay to upper antenna

The following figures show the effects of varying the phase between the two 4-element 6m yagis with the lower yagi at a height of 50 feet. Vertical stacking distance is 16 feet.



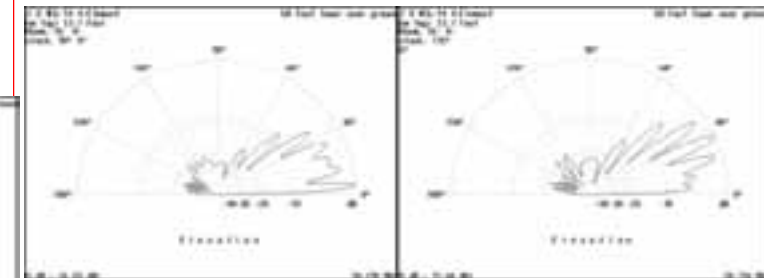
The phase of the upper antenna has a delay or lag, which means the lower antenna starts to radiate first. This has the effect of tilting the radiation pattern up above the horizon. 45° steps for this are shown so the variations can be seen. About 100° to 110° delay to the upper antenna would seem to provide the widest vertical coverage.

This has the effect of tilting the radiation pattern up above the horizon. 45° steps for this are shown so the variations can be seen. About 120° delay to the upper antenna seems to provide the widest vertical coverage.



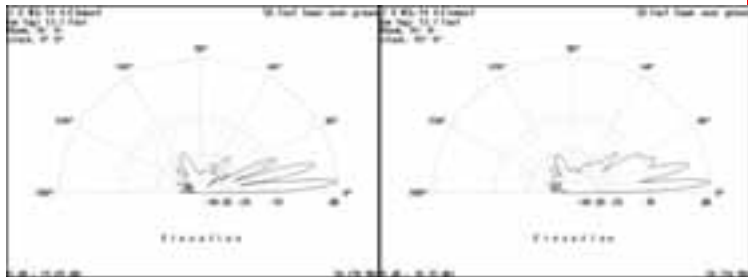
Both in phase (0°, 0°)

45° delay to upper antenna

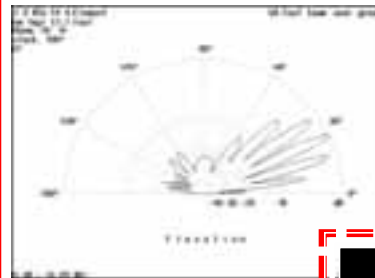


90° delay to upper ant

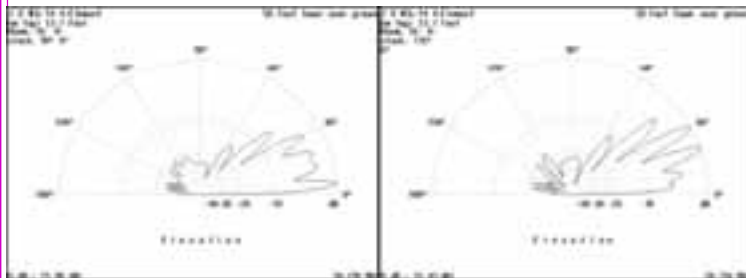
135° delay to upper ant



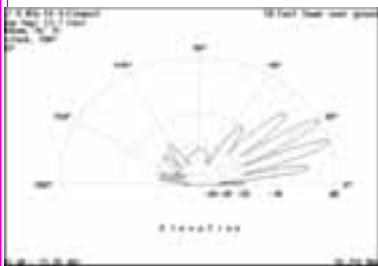
Both in phase (0°, 0°) 45° phase delay to upper ant



180° delay to upper antenna (out-of-phase)



90° phase delay - upper ant 135° phase delay -upper ant



180° phase delay to upper antenna (out-of-phase)

The following figures show the effects of varying the phase between the two 4-element 6m yagis with the lower yagi at a height of 60 feet. Vertical stacking distance is 16 feet. The phase of the upper antenna has a lag which means the lower antenna starts to radiate first.

FOR SALE



Definitions:

"Wiley" (why-LEE)
A reference to Wile E. Coyote of the Roadrunner TV cartoons.

Usage: "Ok, Wiley"
Used to cheer on someone doing something **incredibly stupid**, like using TNT as a rocket, hanging off a tower by one hand, testing HV with their fingers, or nose, etc.

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Icom IC-275H, 2 meter multimode,
Excellent condition, 100 watts,
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