



# THE EASTERN IOWA DX'ER

SUMMER 1995

CLUB NEWSLETTER OF THE EASTERN IOWA DX ASSOCIATION

## Comments from WØ Scarborough Reef

What is all of this talk on the bands about Scarborough Reef? Is it really going to be a new DXCC country? Why is the west coast so strongly in favor while the east coast seems to be just as strongly against? Is there something unique about Scarborough?

These are some of questions I've heard in the past weeks. What is the truth? That depends on who you ask. Like many things in life, especially politics, the answer seems to be in the eye of the beholder.

On Friday, June 30th, W1AW sent out DX News Release #35 which announced the DXAC vote on Scarborough. It said that, "the DXAC voted 9 to 7 against recommending the addition of Scarborough Reef to the DXCC countries List". That should take care of it, or will it? How is it possible that these "experts" could split the vote? Doesn't it "meet the Criteria" as the supporters claim? Chod Harris says that it should count, as does OH2BH, JA1BK, W6CF and almost everyone else in California. How can it be that such an august group can believe it counts without a question, and the DXAC vote a majority against it? Let me try to explain.

Contrary to what you may believe, the DXCC Countries Criteria is not the be-all, end-all document that can be used to resolve any issue in a country determination. In fact, it is sort of a loose outline that requires "judgment" and "interpretation". That is what the DXAC does. To illustrate the point, the entire DXAC almost NEVER votes the same way on any issue! If it were so clear cut, most votes would be 16 to 210. The Criteria is fairly clear as far as "islands" go although I have a biased view (I was chair of the subcommittee who rewrote it in 1988). There is one hole, however, that causes a serious problem with Scarborough. There is no definition of an "island"! This means that each DXAC member can define an island to be whatever he wants it to be. When the first photos and video were shown to the DXAC at Dayton 1994, the unanimous reaction was that Scarborough was not an island. That caused us to attempt to define an "island" for DXCC purposes with the Minimum Size Rule. The Minimum Size Rule was only an attempt to replace the individual subjective judgments of each DXAC member with an objective definition. This should yield more consistent country determinations--at least that is the idea. The Scarborough supporters cried foul and claimed that we were creating a rule retroactively. The Minimum Size Rule became the issue instead of appropriateness of Scarborough as a DXCC country. After Visalia and Dayton, this became an extremely heated battle leading to an official Minimum Size Rule effectively being set after the Scarborough application. I can argue both sides of this, but the important thing is that the objective

definition of an island was thrown out and we went back to a subjective judgment. Some of the supporters have told me that a piece of land even as small as 1 square foot at high tide should count if it meets the other requirements. That would mean that an entire operation could be carried out by someone standing with a backpack radio. It would sure be tough on 160! Ridiculous, you say! Exactly where between 1 and 100, or 10,000, square feet does it turn from "ridiculous" to a DXCC country?

So, many of the DXAC members felt that Scarborough is not an island but a rock. .... A rock of less than 100 square feet at high tide. ....A rock that requires a platform to operate in a reasonable manner.....A rock that is so small that the operators returned to the boat to eat and sleep. The DXAC members were also influenced by DXers within their divisions who opposed Scarborough. It is interesting to note that even after the strong pro-Scarborough appeals to write the ARRL made at Visalia and Dayton, more letters were received against than for Scarborough.

Well, is the Scarborough question settled? Unfortunately, it still has another opportunity to rise from the ashes. Some directors plan on bringing up the Scarborough question and make it a country over the DXAC objection. Since they are the Board, and the DXAC is only a bunch of advisors, it is within their power to make it a country by divine decree. The next Board meeting is in mid July, so stay tuned.

I hope that this gives any of you that are interested some insight into the Scarborough Reef controversy. By the way, I voted "No" as did the current DXAC chairman and the other two former chairmen and most of the senior DXAC members. If you have any questions, I'll be ready at the next EIDX meeting.

jls 7/4/95

#### Midwest Division Director Election

Lew Gordon, K4VX, has been the Midwest Division Director for nearly two years. He is now up for re-election to this office. Lew has visited our club twice in the last 15 months. These were the first times I have ever chatted with a director (or vice-director) for more than a few minutes, and about MY little niche in this hobby no less: DX (and the DX contests that many of us gravitate to). His presentation at the spring 94 club meeting left many of us inspired to try to upgrade our antenna farms, no matter how large/small an area we each might have to work with.

It is kind of nice to have a DXer/Contester representing us at the highest level of our national organization. I urge each of you to seriously consider supporting Lew for another term as our Director.

ed

1995 EIDX A Officers

President: W0SR Jim Spencer  
V. Pres: WBBZRL Tom Vavra  
Sec/Tres: K0GT Gary Toomsen

10 Years ago

Repeater Committee:  
K0VN Al Groff  
W0MJN Joe Finkstein

Solar Flux was just like now, in the 70s and 80s. And the disturbances were just as frequent.

Membership Committee:  
W0SR Jim Spencer  
W0IZ Dale Repp

The following are in the log from September on 40M: N7DF/TT8, DL0MAR/9G, FT8XA, VK9NM/1h, and 9Q5MA. Here's hoping that this fall is as productive.

EIDX A Repeater:  
145.190 W0MJN

T31AT was very active during July on 20M on SSB, CW, and RTTY.

DX Cluster:  
147.51 WBBZRL  
144.91 223.40  
CR NetRom Freqs

S92LB was an attraction on 20 SSB.

ZC4 was active nearly each day by several different operators.

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PacketCluster Data Bases

XU1SS was starting to work the world, and was in great need. His QTH may not have really been in Cambodia.

- SH/QSL W6GO LIST
- SH/CONTEST Contest Calendar
- SH/DEALER Ham dealer addresses and phone numbers
- SH/DXNODE Cluster nodes by state
- SH/EIDX A EIDX A member's address/phone #
- SH/HAM Hamcall (subset of CallBook)
- SH/IOTA IOTA info

The DXAC, by a vote of 9-7 (does that number look familiar?), recommended that the Pribilof Islands be accepted for DXCC credit. Hmm, is there a precedent for not listening to the DXAC recommendation??

The recent QST contained the DXCC Honor Roll. Seventeen club members had their calls listed. Also listed were silent keys K0GVB and N0EL.

AB0M, K0GT, K0IIR, K0JGH, K0VZR, KC0Q, KF0H, KK0U, N9OK, NK0N, NM0F, NY0V, W0IZ, W0NB, W0SR, WBBZRL, WD0AWL

Congratulations to each of you, and a special tip of the hat to W0IZ who is listed on the Top of the Honor Roll in Mixed, Phone and CW.

VKØ, HEARD ISLAND  
from  
OhioPenn Bulletin 212

Two press releases were sent to OPDX, one from Ralph, KØIR, and the other from Peter, ON6TT, which reported the following: Plans are firmly in place for a DXpedition to Heard Island. A multinational team is scheduled to sail for Heard Island from Fremantle, Western Australia on November 1, 1995. The Australian Antarctic Division has issued permit number 95/1 allowing a full-scale amateur radio operation. All environmental assessments and letters of indemnification have been filed and approved. A separate proposal for scientific work during the stay is expected to be approved. Ralph states he has the signed permit for the operation in his possession.

A 140 foot vessel has been chartered for the 5,000 mile round trip to Heard Island. The team is expected to arrive at Heard Island on November 12th. Landing will occur whenever weather permits and operation will commence as soon as possible.

An all band/all mode operation, including satellite and RTTY will, occur thanks to support from Yaesu, Cushcraft, and ETO. Some new innovations tested on Easter Island & Salas y Gomez this fall will be implemented if practical.

Departure from Heard is expected to occur on December 1, 1995 (+/- weather) with an arrival back in Australia on December 12th. Hopefully, all team members will be home for Christmas.

The DXpedition was organized by 3YØPI veterans KØIR (Expedition Leader), KK6EK (Scientific Coordinator) and ON6TT (European Coordinator). The team also currently includes another 3YØPI team member HB9AHL, plus N6EK, PA3DUU, K5VT, DJ9ZB, and JH4RHF. Additional support will come from JH1AJT (Japanese Coordinator) and VK2BEX (Australian Coordinator). Sir Edmund Hillary has consented to be the teams' Honorary Expedition Leader.

Ralph states, "We face a difficult task. Heard is the most challenging of the subantarctic islands. Winds regularly exceed 100 mph and blow snow, sleet, rain, and sand ... all at the same time. There is no reliable source of fresh water on the island. Landing and departure can be extremely difficult. However, we will give this expedition our best effort and will proceed with confidence. Thank you in advance for your support and encouragement." 73 -- Ralph Fedor - KØIR

The DXpedition needs your support. Contributions to help defray the high cost of transportation are needed. Please forward these to:

USA: KØIR Heard Island DXpedition,  
P. O. Box 563, Waite Park,  
MN 56387-0563.

# Yagi Wind Loading

## Aerodynamic Balancing Yagi Antennas

by Dick Weber K5IU PE

In a previous article in *The DX Magazine*, I discussed the wind loading of Yagi antennas. In that article it was shown the current method that has been used for at least the past thirty years isn't correct. The article then went on to show how to find Yagi wind loads using the "cross flow principle." Two important differences result when comparing the methods. First, predictions for element and boom force magnitudes as a function of the angle relative to the wind are quite different. This is shown by Equation 1 that's based on the "variable area" method and by Equation 2 that's based on the "cross flow principle." Second, and most significant, element and boom forces aren't in the directions previously assumed. It was originally thought that the force on a tube was in line with the wind for any angle of the tube relative to the wind as

shown in Figure 1. The actual force is perpendicular to the tube's axis as shown in Figure 2. Both of these differences taken together greatly affect the predictions of Yagi wind loads used to help design a structurally sound tower installation and affect the steps taken to make a Yagi more aerodynamically balanced.

$$F = C_p PL D \sin(\text{ang})$$

Eq. 1: Variable Area Method

$$F = C_p PL D \sin^2(\text{ang})$$

Eq. 2: Cross Flow Principle

Beginning in the Summer, 1994, issue and finishing in the Winter, 1995, issue of *Communications Quarterly*, there appeared a long, math-intensive, article covering the aerodynamic balancing of Yagi antennas using wind loading predictions based on the "cross flow principle." In addition to being math-intensive, it covered a number of alternate ways to balance a

Yagi and several related issues. To make the article's key points and findings more applicable without having to wade through the original, I have written this summary version of my longer article. I hope, with the information presented here, you'll be able to make mechanical changes to an existing Yagi or incorporate techniques into the design of a new Yagi antenna that is easier to turn in strong winds and puts less torsional loads into your rotor and tower under high wind, storm, conditions.

The net torque to turn a Yagi is the sum of the torques due to elements and the boom. The net torque has to be overcome by the rotor to turn the antenna into the wind or the rotor brake has to resist it to hold the antenna in place during a storm. Let's cover the torque due to elements first. Since the force on a tube is perpendicular to its axis, the resulting element forces are down the length of the boom as shown in Figure 3.

Since the sum of the element forces is transferred to the mast via the boom, a torque is created by the sum of the element forces acting through the distance S as shown in Figure 3. The resulting mast torque is found using Equation 3. In Equation 3, P is the dynamic wind pressure,  $A_e$  is the sum of the individual element broadside (projected) areas and S is the distance from the

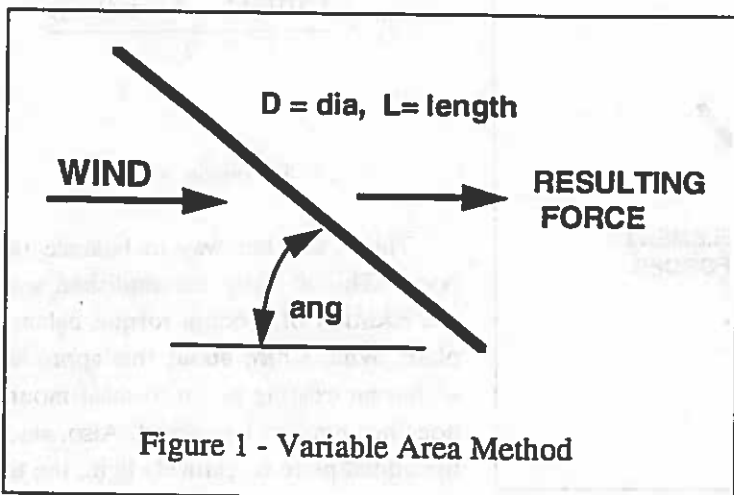


Figure 1 - Variable Area Method

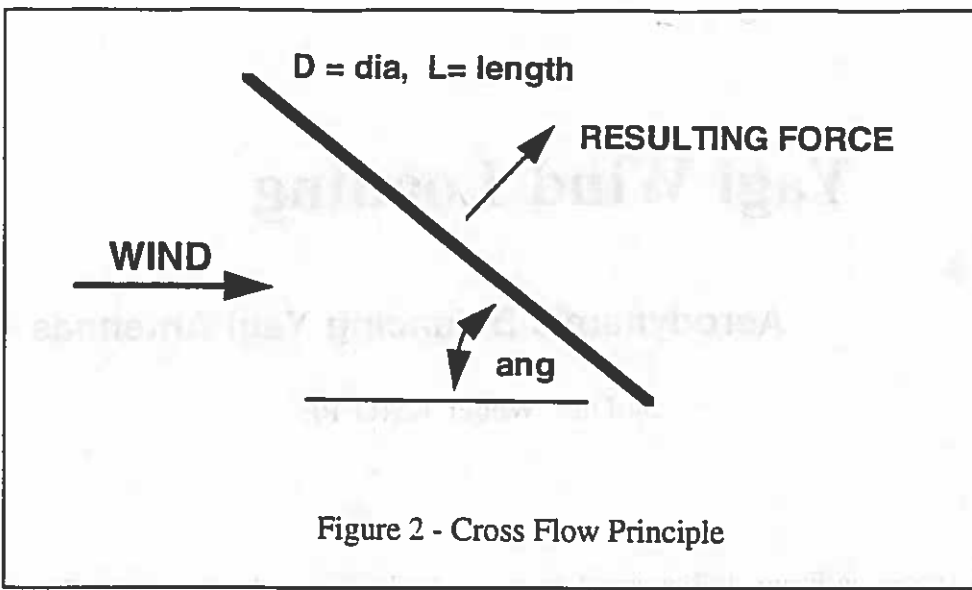


Figure 2 - Cross Flow Principle

boom centerline to the mast axis of rotation. In Equation 3 the drag coefficient  $C_d$ , as shown in Equation 2, was set at 1.2 which is for a long, round tube.

$$T_e = 1.2PA_s \cos^2(ang)$$

Equation 3

Fortunately, for the vast majority of amateur Yagis the contribution to the net torque due to elements is not very large, but there are some things that can

be done to minimize it. To begin, you should have a boom-to-mast mounting arrangement that minimizes S. If you're looking for a challenge, you could design and build a boom-to-mast mount that has the centerline of the boom in-line with the axis of the mast. This effectively sets S to zero. The only other things you can do is use elements with smaller broadside areas or have fewer elements. I don't suggest you consider either of the later two approaches, because for most Yagis the contribution of the elements to the net torque is not significant when S is 3 to 5 inches. One last thing

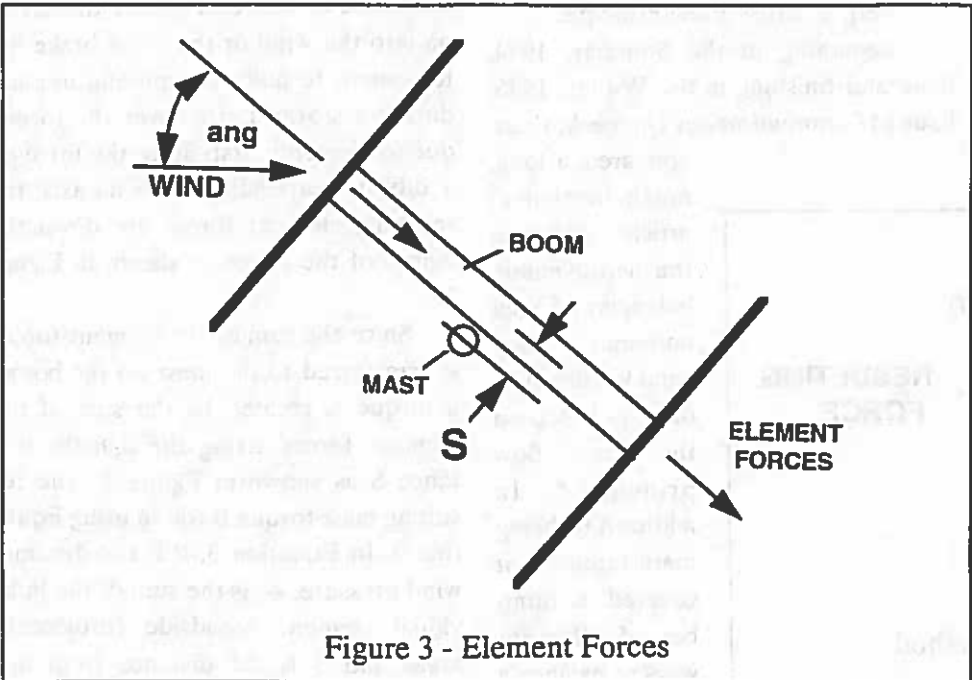


Figure 3 - Element Forces

about element torque. The position of elements on the boom is not important. At first this seems counter to common sense. But when you know the element forces are down the boom centerline, it's clear that element position isn't important.

The biggest barrier to having low turning torques in high winds is the boom. As a result, all reasonable efforts should be taken to minimize the contribution of the boom to the antenna's net torque. For the boom this is relatively easy to do. First, let's look at a boom that has the same outer diameter along its entire length as shown in Figure 4.

For a boom of constant diameter, D, Equation 4 describes the torque due to the boom as a function of boom diameter and lengths with a dynamic wind pressure of P. It can be seen that for boom of constant diameter to be balanced, the boom should be the same length to each size of the mast. Or, L1 must equal L2. All you have to do, if you have a constant-diameter boom, is to have the boom-to-mast mounting arrangement at the midpoint of the boom. Although this is easily said, it may create a problem. The boom midpoint is not usually the location where you achieve a weight balance. If you find the boom is not weight balanced, you can add a weight inside the light end of the boom. I have done this with one beam I have built and found it to be a tedious, but achievable, task.

$$T_b = \frac{1.2DP(L_1^2 - L_2^2)\sin^2(ang)}{2}$$

Equation 4

There is another way to balance the boom. This is easily accomplished with the addition of a boom torque balance plate. What's nice about this approach is that an existing boom-to-mast mount does not have to be moved. Also, since the added plate is relatively light, the te-

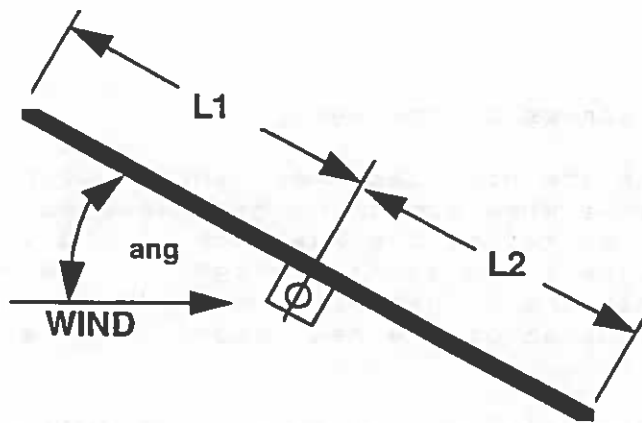


Figure 4 - Boom Geometry

dious effort to bring the boom back into weight balance does have to be endured. That is, unless you enjoy such tasks. Equation 5 can be used to find the "effective" area,  $A_{pe}$ , of a square plate mounted on the short side of the boom. Once  $A_{pe}$  has been found, Equation 6 is used to yield the dimensions of a square plate based on  $A_{pe}$  that comprehends the amount of boom hidden from the wind by the plate itself. To build such a plate, a square aluminum sheet metal plate of dimensions W by W is fastened to the boom with two U-bolts. Figure 5 shows this approach.

$$A_{pe} = \frac{0.43D(L_1^2 - L_2^2)}{R_{pb}}$$

Equation 5

$$W = 0.43D + \sqrt{0.184D^2 + A_{pe}}$$

Equation 6

For most amateur Yagis an aerodynamically unbalanced boom is the major contributor to the net torque. A con-

stant-diameter boom can be balanced by having the boom-to-mast mount at the boom's midpoint. If the boom does not have a constant diameter, but is stepped, it can be balanced by having the boom portion to one side of the mast identical to the portion on the other side of the mast. In these cases, the boom will probably not be weight balanced. This is fixed by putting a weight inside the light end of the boom such that a weight balance is achieved. For a constant-diameter boom, a boom torque balance plate can be added using Equations 5 and 6. (A boom torque balance plate for a stepped boom can be built. If anyone is interested in this, let me know and I'll publish the design equations.)

The contribution to an antenna's net torque due to elements is small for typical boom-to-mast mounting arrangements where S is from 3-5 inches. To minimize the torque due to elements, you should aim for a design that minimizes S. I have calculated the net torque for many Yagis and can offer one piece of advice. If you want to make some modifications to a Yagi, balance the boom first. If you don't balance the boom, any efforts to reduce the net torque by working on the elements alone will yield no improvement at all. If you're interested in seeing the kinds of improvements that can be obtained, you might want to read the *Communications Quarterly* article which contain several examples with results shown in graphs.

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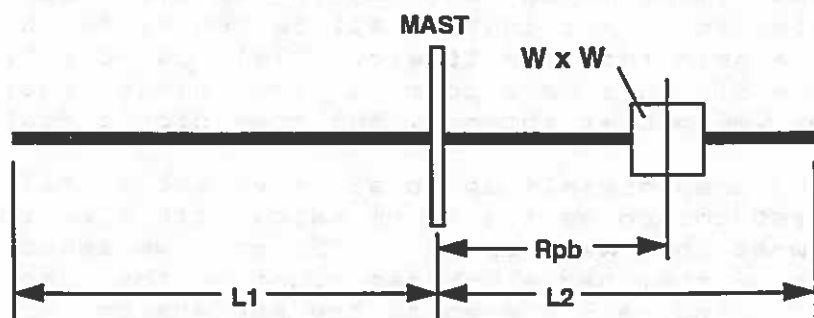


Figure 5 - Boom Torque Balance Plate

## One of the Mysteries of the Ages

One of the Local QRPers came up the hill last week and as soon as we saw him hopping from foot to foot, we knew something had happened. Just to make sure, we asked him if he had to use the washroom. "No", the QRPer responded, "but I guess I look a bit excited, right?" We had to agree. We decided he must have hit the DX jackpot. "What's new in the world of DX?", we said, "Tell us about the new stuff you've been working."

The QRPer sat in the chair and responded "You know, I haven't worked a single DX station in over a month. Did you know that?", he said in a low voice, and it was clear he was holding his joy back. We had to admit we had not heard the QRPer on the bands for some time. We assumed that we were just working different bands. What we were failing to understand was why he was so happy. As QRPers go, this one was a fair DXer. So we had to ask for clarification. "Why are you so excited?", we asked, our curiosity aroused, "Your HF station is one of the best around and we see your call logging into the Packet Cluster a lot. Why aren't you working the DX? Did your HF rig pack it in again?"

It was as if we had hit a nerve for he narrowed his gaze ever so slightly and began to glare at us with his beady little eyes. We were worried we had said something to cause the QRPer to lose the joyful moment. Not so, for the sly grin returned with his reply. "Well, no, the HF station is as good as ever . . . and I got all the antennas tuned up and with the seasonal enhancement, the HF bands are great. If only I had time to work the DX!" We were becoming thoroughly confused. "But you are in the shack all day, every day", we said, "because we see you on the Packet Cluster all the time." The QRPer replied, "That was my trouble. I had to keep logging on to the cluster every few minutes. I spent my whole day logging in to that stupid cluster!" This didn't make any sense at all. "But doesn't the cluster keep your call on the user list and send out spots to you like everyone else?", we asked, "And why do you keep logging in?" The QRPer's glare began to harden just a bit. We decided this would not be the time for us to smile, so we bit the inside of our cheek and listened.

"That's the way it's supposed to work!", he said, his voice beginning to rise, "but it keeps timing me out and logging me off. So I have to reconnect every few minutes. But that'll all be behind me by tomorrow.", he continued, with a grin from ear to ear. "Tell us more.", we asked. "A couple of the Big Guns were down a few weeks ago, pretending to help me fix up my VHF packet antenna, but they didn't fool me. No, not one little bit!"

He jumped out of his chair and drew himself up to all five and a half feet. "They tried to pull a fast one on me too.", he said, with glee in his voice, "but I figured out what they were up to!" "Go on", we asked, now becoming intrigued. "One of them had a VHF mag mount on the car. Just a quarter wave vertical! And he listened to the packets on his mobile rig and showed me that they were stronger than my beam. Tried to



convince me it was feedline loss, that's what he did!" We nodded for the QRPer to go on. "Well, I let them go ahead and replace my coax with hardline and fool around with another beam. But I knew what they were up to. I was right too! The hardline never made any difference. No difference at all! I still got disconnected every few minutes! So I fixed them! As soon as they left, I put back my old beam and my 300 foot run of RG-8. No difference than the hardline they put in!"

We weren't sure where this was going, so we decided to just listen for a bit. The QRPer continued, his voice raising ever so slightly, "It took me a while, but I figured out what they were up to. It was that car! That's what it was all along." We were thoroughly confused at this point. "What's a car got to do with DX Packet Clusters?," we asked. "Ground plane effect." the QRPer replied, sitting back down and looking at us knowingly, "they thought they fooled me because they had a solid ground plane under that mag mount antenna." We were starting to wonder about this QRPer, for he wasn't making any sense. "How can a quarter wave vertical outperform a multi-element yagi, ground plane or not?" The QRPer grinned ever the more. "More capture area. Bigger surface to hear the signal."

"Why that's absurd!", we shouted, "you should know better than that!" The QRPer was not to be deterred. "Nope, that's it. They were hearing better because they had more metal in that vertical and the car than I have in my yagi. And, what's more, I figured out how I can beat them, too!" We decided this was best left alone, but it's hard to stop a QRPer once he gets going. "Don't you see? They are all using their mobile stations for the Packet Cluster! They are connecting to the cluster from their cars! All I need is a bigger ground plane. I got a couple of really big clunkers in the shed I was going to restore. Real North American cars too . . . none of that imported stuff like those guys have. Well, Buster, one of them is out beside the house, right in back of the shack! I got my tractor and I dragged it right off it's blocks and around the back of the house. Got it right up against the wall of the shack. Biggest car I ever owned, too! And, I got a quarter-wave vertical on top of it."

We should have known better, but we asked anyhow. "So now you can connect to the cluster everytime?" "Heck no!", the QRPer replied, "don't you know anything about antennas and feedlines?" Son of a Gun! One of us was marching to the beat of a different drummer. "If you can't connect with it, why are you so happy?", we asked indignantly, "and what's this about antennas and feedlines, anyhow?" "It's got to be matched", the QRPer replied, sure-footed in his new found knowledge, "Don't you know anything? All I have to do is get rid of the ten feet of coax that's strung out through the window and replace it with my 300 foot run of RG-8. Perfect 50 ohm match. Sometimes I wonder about you", he said, as he skipped happily down the hill and off to get his coax hooked up. Son of a Gun! At times like this, it is better to turn off the rig and just go watch TV.

WITH APOLOGIES TO HUGH CASSIDY, WA6AUD, FOR INFRINGING ON HIS WRITING STYLE!

Best Regards, Paul VE1UK

**EIDXA MEETING NOTICE**

**Date:** 21st of July 1995 (Friday)

**Time:** 7:00 pm

**Place:** Building 120 at Rockwell Collins Cedar Rapids  
(NE corner of Collins Rd and "C" Avenue)  
Use the Cafeteria entrance (North side of the  
building the side the antennas are on)  
Parking surrounding the building, but please  
park in areas meant for parking.

**Agenda:** Business meeting, tour of the  
communications complex, and weather  
permitting, a tour of the antenna farm.  
Pizza Hut socializing after.

**Plan on attending**

TOM VAVRA WBBZRL  
682 Palisades Access Rd.  
Ely, Iowa 52227-9717



Jim Spencer W0SR  
3712 Tanager Dr. NE  
Cedar Rapids, Ia 52402