

Phased Delta Flag Arrays

Dallas Lankford, 2/21/09, rev. 5/17/11

The delta flag antenna is a variant of the flag antenna. The earliest delta flag antenna I am aware of was designed by [K6SE](#) and constructed by ON4UN for use by FO0AAA some time before June 2000. While it was designed for the 160 meter ham band, it probably worked well in the MW band. I became interested in phased delta flag arrays because I wanted to experiment with quad phased flag arrays for splatter reduction in the MW band; see my article "Phased Flag Arrays." My flag array experiments were inspired by the phased rotatable 160 meter band dual flag arrays of [NX4D](#) and [N4IS](#), but inexpensive masts are not good for MW flag construction because of sag problems. A delta flag, on the other hand, can be kept taught with only one mast and two ground stakes at the ends of the base of the triangle.

As a matter of fact, dual flag arrays are not cheap mast friendly either, so a dual delta flag array is a better choice than a dual flag array. At right is a photo of one of the delta flag antenna elements which were used in a quad delta flag array. The mast was a telescoping 20' BREAM STIX BS20 fishing pole, with the top two elements removed. The base was a 0.5" ID galvanized conduit. Clear flexible 0.5" and 1" tubing was split and slipped over the end of the conduit, and the butt of the fishing pole was slipped over the 1" flexible tubing. The fit was tight, exactly what was wanted. A ground clamp was installed snug against the bottom of the tubing so that the clear tubing would not move when the butt of the fishing pole was installed. Details of the conduit, ground clamp, and split clear tubing (all bought at Lowes) on which the pole was mounted are shown in a photo below. To prevent the telescoping pole from collapsing, cable ties were used just above the end of each section.



Pole Clamps

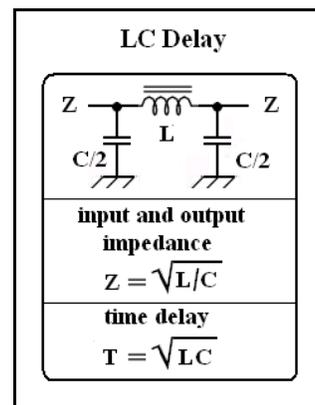
Cheap telescoping fiberglass fishing poles like the BREAM STIX BS20 tend to collapse when relatively little weight is attached to the top. I decided to try nylon cable ties under tension (at the joints). With the top two sections removed, there were three joints to be secured. I used a 6" cable tie (Radio Shack) for the smallest joint, and 8" cable ties (Lowes) for the larger joints (one of them shown in the photo above right). This may not be the best long term solution, but it works well for the short term. It was mentioned on a hams web site that stainless hose clamps work well for this purpose. However, I decided not to use that approach because the fiberglass near the joint could be cracked if the hose clamp is tightened excessively. To increase the cable tie tension if necessary or desired, slip the cable tie up the pole section several inches, maybe more, pull the cable tie tight, and slip the tightened cable tie back down.



LC Delay

When I began to consider testing a quad flag array with its potentially better nulls, the prospect of multiple coax delay lines was not attractive. In theory, two capacitors and an inductor can be used to do the same thing as a long length of coax, provided the right power combiner is used. The first time I tried the LC delay circuit with the combiner used previously for the coax delay circuit, the LC delay circuit was a failure... the nulls were variously unstable or not as deep as they should have been. So a new combiner based on a schematic in the 1992 MiniCircuits RF/IF Designer's Handbook was designed. After the new combiner was tested, the LC delay circuit worked very well with dual flag arrays, and later with dual and quad delta flag arrays.

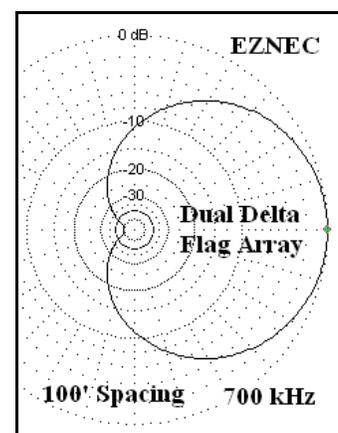
Note that the LC delay phaser has no controls. The quad (or dual) delta flag array is optimized for maximum splatter reduction by orienting the array. It does not matter if the array maximum is not pointed exactly in the desired direction because the beam width is quite broad. The goal is to orient the array so that as many undesired signals as possible are nulled as deeply as possible.

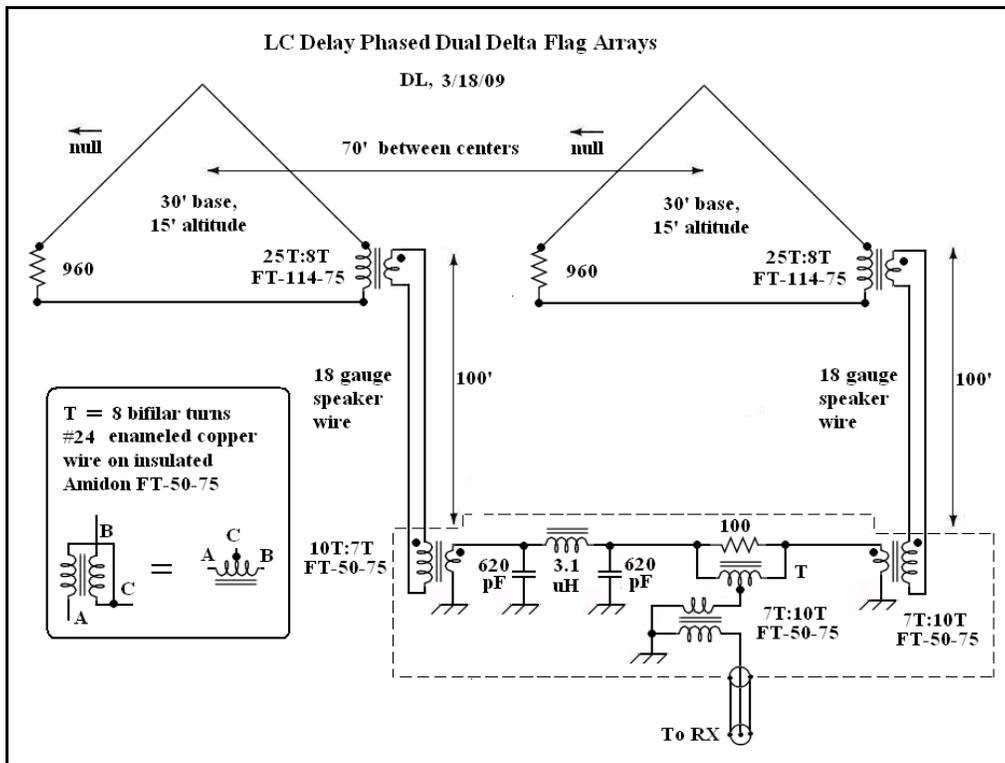


The time delay T in nanoseconds along a ray with arrival angle θ connecting two antennas with centers spaced a distance s apart in feet is $T = 1.02 s \cos(\theta)$ (nanoseconds). For a 30 degree arrival angle and 70' spacing $T = 62$ nS. Previously this was converted into a length of coax to provide the necessary delay for phasing. The coax length has been replaced by the LC delay circuit at right, which resembles a low pass LC filter, and used in the dual and quad delta flag arrays discussed in this article. Its input and output impedances Z are the same. For a 50 ohm system, such as the dual and quad arrays, take $Z = 50$ which gives $2500 = L/C$, or $L = 2500 C$. Taking $T = 62 \times 10^{-9}$, which was calculated above, both sides of the time formula at right are squared, namely $3844 \times 10^{-18} = LC$, after which substitution of $2500 C$ for L by the equation above gives $3844 \times 10^{-18} = 2500 C^2$, or $C = 1240$ pF. Thus $C/2 = 620$ pF, and $L = 2500 \times 1240 \times 10^{-12} = 3.1$ μ H. The capacitors should be mica, and the inductor may be two parallel Miller 6.2 μ H inductors, Mouser 542-4610-RG. Or use FT-50-61 toroids and an accurate inductance meter to make the required 3.1 μ H inductors. L and $C/2$ values for other frequencies can be obtained by multiplying the values for 70' spacing by the ratio of the spacings. For example, for 100' spacing, $L = (100/70) \times 3.1 = 4.4$ μ H, and $C/2 = (100/70) \times 620 = 886$ pF mica capacitors.

LC Phased Dual Delta Flag Arrays

The pattern of a 100' spaced dual delta flag array at 700 kHz is shown in the figure below right. The schematic and diagram of a dual delta flag array with 100' spacing is shown on the next page. For insensitive receivers 10 dB or more of preamplifier gain may be needed. For example, when using Perseus at Grayland with the quad delta flag array an additional 20 dB preamp was definitely needed. Figures later in the article contain diagrams and information for quad delta flag arrays. If you don't have the space for a quad delta flag array, or simply don't want to deal with the complexity of a quad array, the dual array may be adequate in some cases even though its null aperture is not as wide as the quad array. As with dual flag arrays, the delta flag arrays are not intended as general purpose null steering arrays, but rather as wide null aperture fixed arrays for use at coastal DX sites to reduce splatter throughout the entire MW band. The original dual delta flag array was implemented with coax delay (phasing) like the predecessor flag arrays; see my "Phased Flag Arrays" article. Later it was replaced with an LC delay circuit and an improved combiner as described above. The two 100' long twin leads (speaker wire) in the schematic and diagram on the next page are part of the signal delays. So the two twin lead lengths must be equal if you use lengths other than 100'.

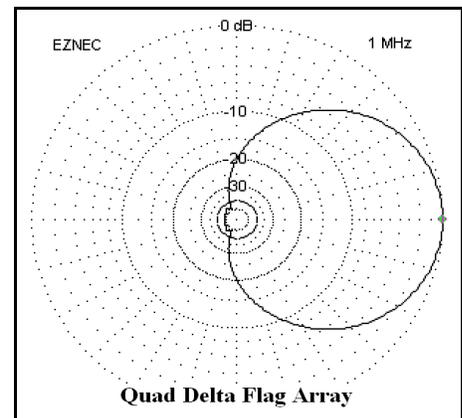




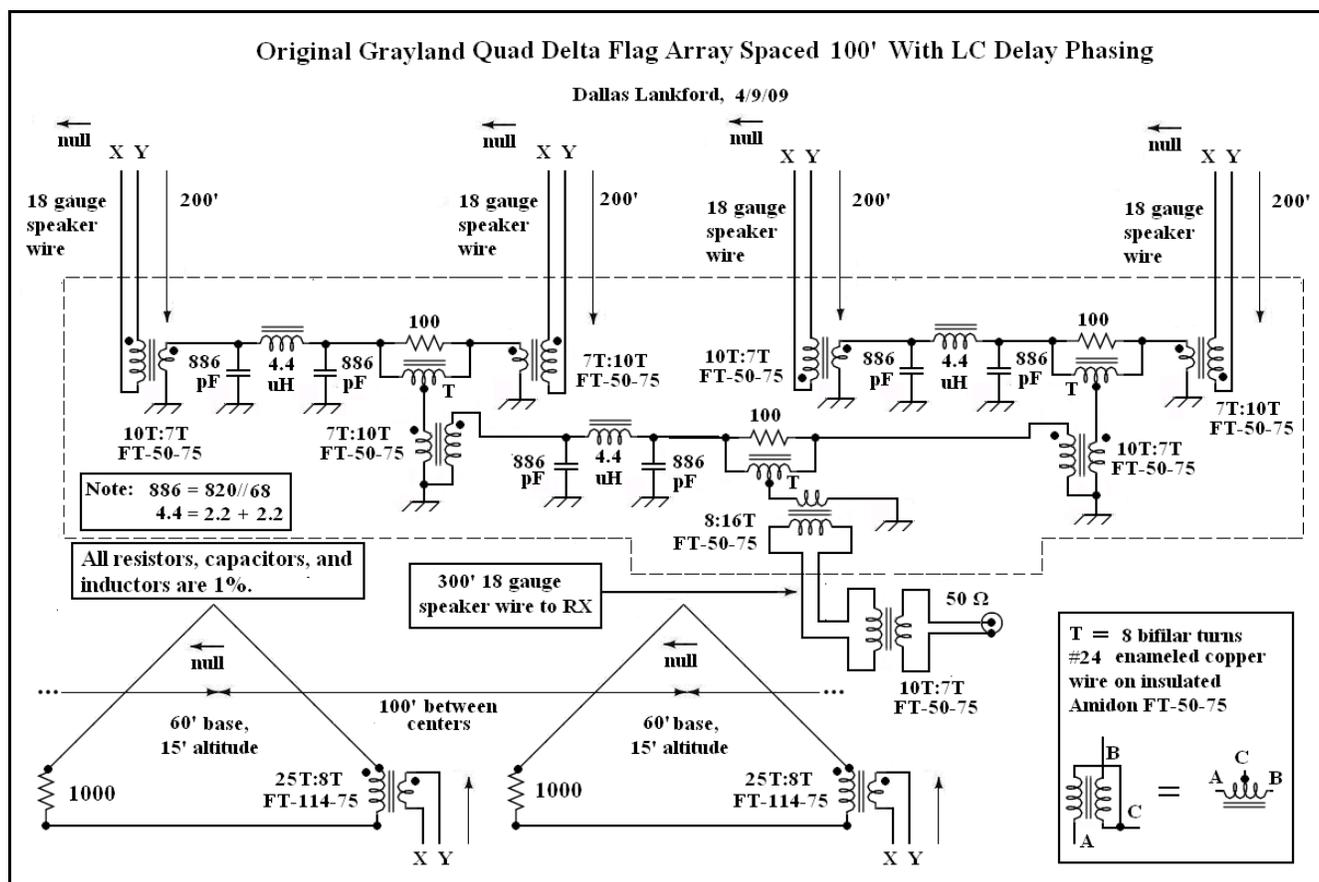
It should be mentioned that the ham versions of these antennas have different design objectives than the MW versions. For example, NX4D and N4IS have designed their dual flag arrays for maximum RDF in the 160 meter ham band which maximizes the signal to man made or atmospheric noise ratio. This is what is needed for 160 meter CW DXing because narrow bandwidth (~20 Hz) CW sensitivity is generally limited only by man made or atmospheric noise. However, maximum RDF is generally not a high priority for MW DXers. What usually limits MW DXers ability to hear foreign splits at many MW DX sites is splatter from adjacent domestics or domestics themselves. Thus maximum splatter reduction and attenuation of domestics due to wide aperture nulls is the MW analogy to maximum RDF for the 160 meter band. Both the dual and quad array patterns in this article and in other articles in The Dallas Files have been designed for maximum attenuation over wide (dual array) and extremely wide (quad array) null aperture angles. These arrays are effective mainly when they are used at a coastal MW DX site for which most undesirable signals are “behind” (in the null of) the antenna, such as at Quoddy Head, ME and Grayland, WA. Using one of these wide aperture null arrays is of virtually no benefit for me here in North Louisiana when trying to hear TA's or TP's because there are so many undesirable signals coming from the same direction as the desired signals.

The First Quad Delta Flag Array (QDFA) Test

A 70' spaced QDFA became operational about 4 pm CST 2/20/09 using a coax delay phaser. 70' spacing between centers was used because a 100' spaced quad array would not fit on my lot. Note that for the 70'spacing $C = 620 \text{ pF}$ and $L = 3.3 \text{ } \mu\text{H}$. After many hours of testing this short version of the QDFA appeared to be operating correctly. At some times and for some signals, a dual flag array used for comparison produced deeper nulls. But more often than not the quad delta flag array produced nulls as deep as the dual array or deeper. The front to side ratio of the quad array (at $+90^\circ$ and -90° from the maximum axis of the array) was noticeably better than the front to side ratio of the dual array,



Original Grayland Quad Delta Flag Array Spaced 100' With LC Delay Phasing



by about 10 dB. The delta flag array performed the same with both coax delay phasers and LC delay phasers. On nights when signals to the North (the maximum null direction) were stronger than normal and signals to the South were weaker, the dual flag often had better nulls at lower MW frequencies. But when signals to the south were stronger, nulls of the dual flag and quad delta were often about equal. It was determined that this is normal, assuming that EZNEC accurately models patterns of flag and delta flag arrays. The schematic above and pattern above right describe the quad delta flag array which was taken to Grayland. Note that the spacing of the Grayland QDFA is 100' and its LC values are different from the LC values for the 70' spaced QDFA. Note also that 300' of twin lead from the phaser to the receiver is used because of placement of the Grayland QDFA. Component tolerances need not be 1% or better, but rather matched to within 1%.

Non-standard QDFA Phasing

Normally a quad delta flag array would be implemented by spacing the delta flags 100' between centers, phasing the 1st and 2nd pairs identically (say, for a 30 degree elevation null) in the standard way (delay equal to the spacing along the 30 degree elevation null between two vertical lines spaced 100' apart + anti-phase [180 degrees]), and then phasing the two pairs as if they were two single antennas twice as far apart (also for a 30 degree elevation null). However, EZNEC simulation shows a disappointing 120 degree 30 dB attenuation aperture for such an array... hardly worth the effort compared to a single pair of phased delta flags. But as was the case for quad flag arrays, if the phasing between the two delta flag pairs is the same as the phasing between each adjacent pair, then the 30 dB null aperture is 150 degrees. There is about a 3 dB additional loss for this "non-standard" phasing compared to the "standard" phasing, but that seems like a small price to pay for an additional 30 degrees of 30 dB or more null aperture. So that is what has been implemented for the QDFA.

Grayland DDFA And QDFA Tests April 19-22, 2009

The 100' spaced QDFA was tested at the Grayland Motel MW DX site near the Pacific Ocean in the State of

Washington. An aerial view of the Grayland area and the quad array location is given in the figure at right. The DDFA was in the same location, but half the length of the QDFA. The Grayland aerial map shows the quad delta array pointed due West. However, for optimum splatter reduction the array should probably be rotated 10 degrees to the north of west for better attenuation of southern California stations.



Winner!!! (after a field change)

At first there was a problem: the QDFA had degraded nulls for the lower frequencies of the MW band. The problem was eventually determined to be due to the untested long 300' twin lead which was required at Grayland because of the QDFA placement. But where a fair comparison could be made, namely in the upper half of the MW band, and especially the upper third of the MW band, the QDFA was clearly superior to a (dual ALA-100) Wellbrook array. Some DX was heard on the QDFA which was not heard at all on the Wellbrook array. Other DX was merely heard better on the QDFA. A more detailed account of the problem and the “fix,” and some of what was heard on the QDFA are contained in the article “Grayland Quad Delta Flag Array Report” in [The Dallas Files](#). A short account of the problem and the “fix” is given below. The “fix” below is different from the “fix” which was done at Grayland because some of the impedances for the “fix” were not matched correctly in the “Grayland fix.” In the “fix” below the impedances are matched correctly. In any case, after the long 300' twin lead was isolated from the QDFA with a push-pull Norton transformer feedback amplifier, the QDFA performance was outstanding.

The Fix

The schematic on the next page shows a fix similar to the one which was done at Grayland to make the QDFA fully operational for the lower frequencies of the MW band, namely a push-pull Norton transformer feedback amplifier to isolate the 300' twin lead from the phaser. The photo at right shows one version of the fix. The Norton amp is attached to the “front” side of the phaser which contains the 12 volt DC feed via Pomona gold plated banana jacks and the output to the 300' of twin lead also via Pomona gold banana jacks. The “rear side” contains 8 banana jacks for 200' twin lead each to the 4 delta flag elements. The transformers and LC phase delay circuits are mounted on insulated standoffs. Faucet washers were used for strain relief on the back sides of the Pomona banana jacks after several rear insulators shattered during initial installation. All banana connectors are gold plated to eliminate oxidization. Everything fits neatly inside a Hammond 1590E cast aluminum box. The Norton amp PC board was professionally manufactured by ExpressPCB. This is the phaser which was made for the beta test site at Kongsfjord. It was retrofitted with gas discharge surge arrestors for static and other transient voltage protection after it failed at Kongsfjord at the end of October 2009, and has been modified to a LIN with 14 dB gain and 0.9 dB noise figure vs. 10.3 dB gain and 1.7 dB noise figure for the standard Norton.



Dual Delta Flag Array Test

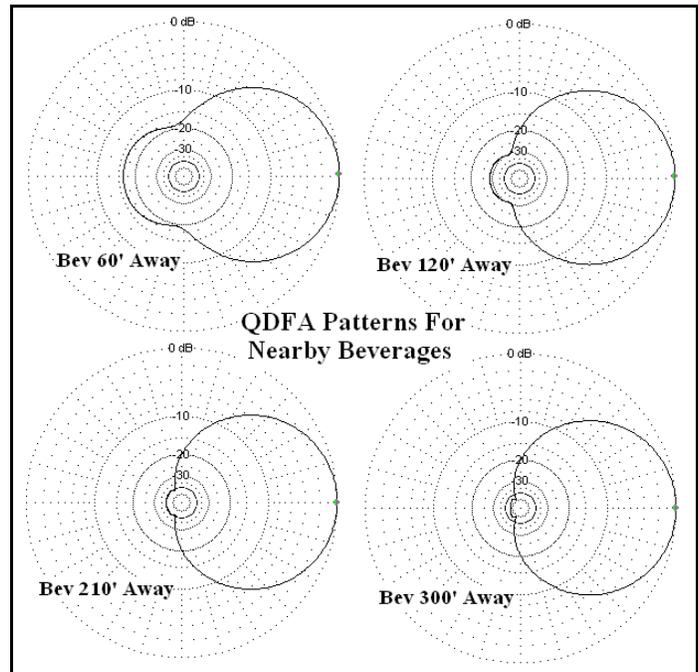
As an intermediate step in fixing the QDFA, for the night of 4/21 the array was operated as a dual delta flag array (DDFA) with two of the four delta flag antenna elements removed. All receptions in the Grayland log dated 4/21 were made with the DDFA. In the log (which follows) you will find a number of good receptions with the DDFA, including the DXAM Philippines 1017, VOA Philippines 1170, Malaysia 1475, Micronesia 1503, a few Hawaiians, and lots of Alaskans. If you don't have space for a QDFA, you should consider a DDFA. A DDFA (or DFA) will work almost as well as a QDFA.

Insulated Toroids

Winding high permeability toroid transformers has been a chore because they were individually insulated by hand before winding the the turns of wire. High permeability ferrite toroids should be insulated because the ferrite is a semiconductor and the hardness of the ferrite can break enameled insulation resulting in shorted turns. Recently Jack Smith, K8ZOA of Clifton Laboratories called my attention to Steward epoxy insulated ferrite toroids which are sold by Digi-Key. The Steward part number 35T0501-10H ($A_L = 3659$, Digi-Key catalog number 240-2524-ND) is an almost exact copy of the Amidon FT-50-75 ($A_L = 2725$) used in the phaser and Norton amplifier below, except that the Steward toroid is epoxy insulated. And the Steward part number 35T1417-00H ($A_L = 4543$, Digi-Key 240-2528-ND), also epoxy insulated, is an appropriate, albeit slightly larger, substitute for the Amidon FT-114-J ($A_L = 3170$) which is used for the antenna transformers of the QDFA. Europeans can obtain suitable epoxy insulated Ferroxcube ferrite toroids from ELFA: Ferroxcube part numbers TN13/7,5/5-3E25 ($A_L = 2810$) and TN25/15/10-3E25 ($A_L = 5620$), ELFA part numbers 58-760-99 (FT-50-75 equivalent) and 58-761-72 (FT-114-J substitute). If you order any of these ferrite toroids, you should verify the part numbers, characteristics, and catalog numbers before placing your order.

Nearby Antennas

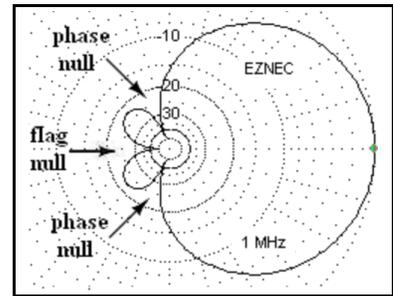
Nearby antennas, especially beverages, can spoil the pattern of a QDFA or DDFA. EZNEC simulations at right, for an unterminated beverage, with open circuit input, illustrate some of the QDFA patterns for nearby beverages. For a beverage connected to an independent 450 ohm source, the QDFA pattern is not degraded as much. However, it is not known if these EZNEC simulations give an accurate description of the skewed QDFA patterns. As a rule of thumb I would recommend that no part of a beverage antenna be closer than 300 feet to a QDFA or DDFA, and even that may not be enough. I do not know of any way to settle these issues. Other antennas may not degrade the QDFA pattern as much as beverages, but who knows?. Personally, I would not use any other antenna near a QDFA. EZNEC simulation also shows that nearby power lines can significantly degrade a QDFA pattern, especially for a power line at one end of and perpendicular to a QDFA.



Null Steering Would Be A Mistake

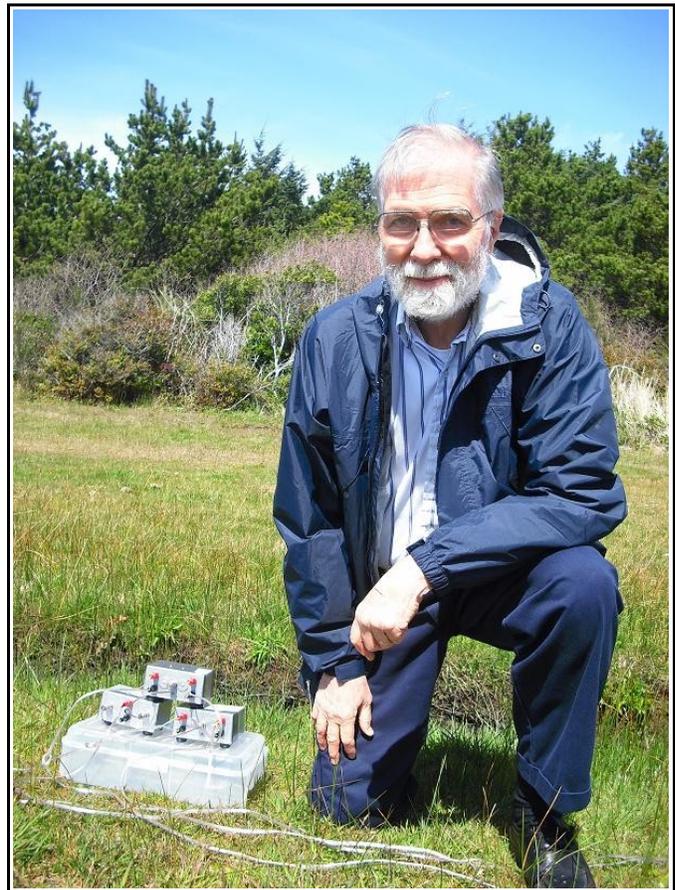
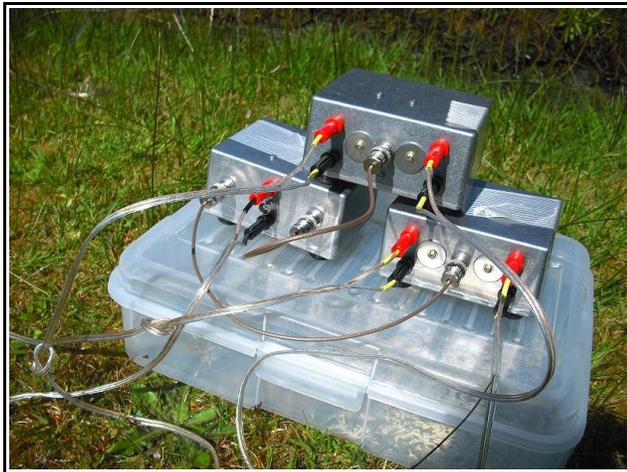
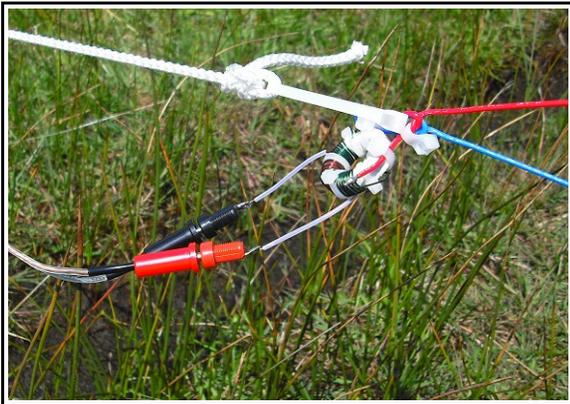
It would be a mistake to null steer an array consisting of two antennas with cardioid-like patterns, such as K9AY's, EWE's, flags, delta flags, and others because null steering would degrade the wide aperture nulls of these arrays, and make them much less effective for broadband splatter reduction and domestic attenuation, especially for a recording receiver like Perseus which can record the entire MW band. The figure at right

illustrates null steering in the “backward” direction for a dual flag array according to EZNEC simulation. Other arrays with cardioid patterns, such as delta flags, Ewes, and K9AYs, have similar patterns according to EZNEC simulations.



QDFA Photos

The photo on the next page shows the QDFA stretching out across the Grayland back 40 towards the Pacific Ocean about 800 feet away. The photos on this page show me beside the phaser (phaser = 3 small Hammond cast aluminum boxes) on top of a plastic box to keep the phaser above potential rain water. The 3 boxes, with rubber feet, were taped together to prevent contact with each other during windy CX. The phaser and plastic box were covered with a larger plastic box (not shown, but visible in the photo on the next page) to protect them from rain.





The Grayland QDFA

Note that the ground is saturated soil.

Some Of The 4/19-22/09 Grayland Loggings

Dallas Lankford

receiver = Perseus,

computer = Clevo D901C quad w/ 3x500 Gb internal HD's,

recordings = BlacX eSATA external caddy, IOGear eSATA 3 Gbps Express Card /34, 1.5 Tb ext. HD's,

antennas = 4/19, 4/20 QDFA not fully operational, 4/21 DDFA, 4/22 QDFA fully operational

- 531 Japan**, Morioka (presumed) + two other low power synchros, //594//603, Japanese talk and short music selection, way under someone, 1130 and later, 4/22
- 540 Japan**, various low power synchros, //531, 1240 and later, 4/22
- 549 Australia**, Orange, presumed, distinctive fanfare just after 1100, 4/22, poor
- 550 Alaska**, Anchorage, KTZN, IDed as "AM Five Fifty KTZN Anchorage, This is The Zone," about 1200, 4/21
- 550 Hawaii**, Wailuku, KMVI, IDed as "[unintelligible] ESPN Radio Station KMVI [unintelligible] Five Fifty Wailuku" about 0700, 4/22
- 558 South Korea**, Yeong-il, //603, presumed Korean talk and some pop music, underneath someone, 1130 and later, 4/22
- 560 Alaska**, Kodiak, KVOK, IDed as "AM Five Sixty KVOK Kodiak," about 1300, 4/21
- 567 New Zealand**, Wellington, English male talker, EZ listening song and music, //675, 0835 and later, 4/22
- 567 Japan**, Saporro, male Japanese singer, //594//666//675, about 1125 and later, 4/22
- 576 Russia**, Oyash, R. Mayak (at 1 MW Oyash dominates the other Russians on this frequency), good Moscow Nights interval signal, about 1200, 4/22; also about 1100, 4/21, with Moscow Nights interval signal, weak but the IS was easily heard and the language had the right sound and cadence for Russian
- 576 Australia**, Sydney, ABC National, // 585, about 1325, 4/22
- 580 Alaska**, Petersburg, KRSA, about 0500, 4/22, with "KRSA Petersburg" ID
- 585 Australia**, Hobart (Tasmania), ABC National, // 576, about 1325, 4/22
- 590 Alaska**, Anchorage, KHAR, IDed as "KHAR Five Ninety, Anchorage," about 1000, 4/21
- 594 Australia**, Horsham, 3WV, male and female English talkers, distinctive fanfare at top of the hour, //612, poor to fair, about 0900, 4/22
- 594 Japan**, Tokyo, //531//603, Japanese talk and short music selection, way under someone, 1130 and later, 4/22
- 603 Japan**, Obihiro, //531//594 established definitely with time pips at 1200, 4/22
- 603 South Korea**, Namyang, //558 at 1132:20, 4/22
- 603 Australia**, various, distinctive fanfare just after 1100, 4/22, poor
- 612 Australia**, Brisbane, 4QR, male and female English talkers, distinctive fanfare at top of the hour, //594, fair to good, about 0900, 4/22, distinctive fanfare just after 1100, 4/22, good
- 620 Alaska**, Homer, KGTL, 0859, 4/21, IDed as "KGTL Homer," strong interference from at least two others on frequency, a mess
- 621 China**, Harbin, presumed (200 kW which vastly overpowers all other Chinese on this frequency per asiawaves), good, yet another (a 3rd) CRI or CNR interval signal, about 1200, 4/22, which is strange because Harbin is an RGD station, as are all the others on this frequency except Yichang (10 kW) which is not explicitly affiliated with CNR or CRI
- 621 North Korea**, Chongjin, interval signal played four times beginning about 1200, 4/22
- 630 Alaska**, Juneau, KJNO, IDed "The Capital's Information Station, Six Thirty, KJNO, Juneau, Alaska," about 1200, 4/21
- 639 Japan**, Shizuoka, Japanese talker //774, mixing with Fiji about 1259 and later, 4/22
- 639 Fiji**, R. Fiji 1, Lautoka, good to excellent dawn enhanced island music from about 1259 to after 1330, very clear harmony style island music after 1315, 4/22
- 640 Alaska**, Bethel, KYUK, IDed as "Hello, I am [unintelligible name] from Bethel, Alaska, [unintelligible]"

KYUK Six Forty AM in Bethel, Alaska,” about 1100, 4/21

648 Russia Ussuriysk, VoR, poor, interval signal (Pictures at an Exhibition, AKA "Great Gate of Kiev") at 1100, 4/22, later fair to good, same interval signal just before 1200

650 Alaska, Anchorage, KENI, IDed as “News Radio Six Fifty KENI,” about 0700, 4/21

650 Hawaii, Honolulu, KRTR, about 0539, 4/22, with “This is Hawaii's place for great news.” ID, strong but with frequent shallow fades, mostly in the clear, sometimes trading places with CISL Vancouver

657 New Zealand, Wellington, //882//909//963, EZ listening music, 0815 and later, 4/22, male and female talkers, 1050 and later, “Radio New Zealand ” ID at 1056, 4/22

666 Japan, Osaka, male Japanese singer, //567//594//675, about 1125 and later, 4/22

670 Alaska, Dillingham, KDLG, about 0629, 4/21, “KDLG” ID followed by the weather report, strong over KBOI Boise

670 Hawaii, Hilo, KPUA, IDed as “I am Gordon Deal reminding you that The Wall Street Journal This Morning will continue right after the latest news on Sixty Seven AM KPUA Hilo, your source for news, sports, and information,” about 1300, 4/21, strong, clear, and almost alone on the frequency

675 New Zealand, Christchurch, //756, semi-classical music, 0957 and later, 4/22

675 Japan, various, male Japanese singer, //567//594//666, about 1125 and later, 4/22

680 Alaska, Barrow, KBRW, IDed as “You are tuned to North [unintelligible] Public Radio, Six Eighty KBRW Barrow,” about 1312, 4/21, but now I can't find this ID on the 4/21 recording anywhere near 1312. I know I heard Barrow, but apparently I made an error in the time or date or both when writing my notes.

693 Japan, Tokyo, loud with female talker in Japanese about 1100, //774, 4/22

700 Alaska, Anchorage, KBYR, about 0600, 4/22, “KBYR Anchorage” ID

702 Australia, Sydney, presumed, poor, English female talker, //738, about 1039, 4/22, later distinctive fanfare just after 1100, 4/22, poor

711 Korea, Sorae, HLKA, //891, about 1200, 4/22

720 Hawaii, Eleele, KUAI, ID “Just about 10 o'clock. You are listening to Kauai's Radio Station from Eleele, Seven Twenty,” about 0800, 4/22, strong, no sign of KDWN Las Vegas

729 Japan, Nagoya, about 1030, 4/22, male and female Japanese talkers, fair to poor, //594//666

738 Australia, Grafton, presumed, English female talker, //702, about 1039, distinctive fanfare just after 1100, 4/22, poor

738 Tahiti, Papeete, already producing fair to good audio on the “uncrippled” QDFA at 0430, 4/22 (*never any audio with the “crippled” QDFA on 4/19 and 4/20*), audio quite good by 0700 with a female and male French talkers, finally some music around 0730, but it could hardly be called island music, more like a French ballad, reception continued to be good to excellent until other signals began to appear on frequency after 0900 or so

738 Taiwan, Baisha, BEL2, 100 kW, Yuye Guangbo Diantai (Taiwan Area Fishery Broadcasting Station), nice male or female Chinese singing with EZ listening music, 1252 and later, 4/21, mostly extremely weak, //1143

747 Japan, Sapporo, // 1125 // 1152 // 1386 // 1467, NHK2 interval signal, about 1100, 4/22

750 Alaska, Anchorage, KFQD, IDed as “Seven fifty KFQD News Talk, Seven Fifty,” about 0700, 4/21

756 New Zealand, Auckland, //675 confirmed @ 1046, semi-classical music and talk, 4/22

760 Hawaii, Honolulu, KGU, on the DDFA, IDed with “You are listening to AM Seven Sixty, KGU, Hawaii's Christian Talk,” 0559, 7/21

770 Alaska, Valdez, KCHU, IDed as “KCHU, Public Radio for Valdez, Prince William Sound, and the Copper River Valley,” about 0700, 4/21

774 Australia, Melbourne, presumed, distinctive fanfare just after 1100, 4/22, weak but clear way under Japan

774 China, various, CNR/CRI interval signal, about 1200, 4/22

774 Japan, Akita, powerful when tuned about 1015 with English lesson, 4/22, // 1017

780 Alaska, Nome, KNOM, IDed as “KNOM in Nome,” about 0900, 4/21

790 Alaska, Glennallen, KCAM, IDed as “Great radio for the great land, this is The Voice Of The Copper River Valley, KCAM, Glennallen,” about 0900, 4/21

792 Australia, Brisbane, weak or faded most of the 4/21 recording, but fair to good around 1300 with distinctive fanfare and into ABC news; distinctive fanfare just after 1100, 4/22, poor

792 New Zealand, Hamilton, //1287, talk, “Welcome to Sport Radio” ID at 0810:10, 4/22

800 Alaska, Juneau, KINY, IDed as “Alaska's Capital City, Hometown Radio,” about 0900, 4/21
801 Guam, KTWG, Agana, religious programming faded up out of an empty channel except for weak splatter, weak but quite clear “KTWG” ID embedded in a religious sermonette by female announcer in American English about 1324, 4/22, followed by religious song by female in American English, a beautiful dawn enhanced reception
820 Alaska, Fairbanks, KCBF, ESPN program, IDed as “Eight Twenty Sports Fairbanks,” about 0700 4-21
819 Korea, Gwangji, HLCN, MBC interval signal, about 1200, 4/22
828 Japan, Osaka, English lessons, 0930 4/19, // 774
828 Australia, presumed, distinctive fanfare just after 1100, 4/22, poor
830 Alaska, Sand Point, KSDP, long weather report followed by ID “KSDP Sand Point, Alaska,” 0709, 4/22
830 Hawaii, Honolulu, KHVH, IDed as “From the big island Maui and covering the entire Aloha State, this is news radio Eight Three KHVH,” about 0706, 4/22. I was unable to associate the station identification with programming because there were at least two other stations on frequency. Despite this, the ID was crystal clear. I guess the others went silent or faded momentarily. I heard them and verified them many years ago when I lived in Texas and they were on 1040 kHz.

837 Australia, various, distinctive fanfare just after 1100, 4/22, almost inaudible
846 Australia, Canberra, distinctive fanfare just after 1100, 4/22, poor, weak but in the clear, about 1335, 4/22, //792, nice song “I remember you,” also heard earlier around 1000 while accumulating information on Kiribati

846 Kiribati, Betio, carrier appeared about 0600, audio beginning to appear about 0640, fair to good audio by 0700, with male and female talkers, presumably in *te taetae ni Kiribati* (the Kiribati language), then music and brief singing by a male followed by more music (but did not sound like island music), very clear male talker about 0725 to 0730 and shortly after 0730, mostly male and female talkers throughout the reception, one island music selection noted around 0920, recovered audio poor to fair to good to very good from 0640 to after 0930 when other signals began to appear on frequency, 4/22, on the “uncrippled” QDFA (*not heard at all on 4/19 and 4/20 with the “crippled” QDFA; heard poorly on 4/21 with the dual DFA*)



These four Kiribati receptions and non-receptions make it abundantly clear how important it is to reduce splatter even at a coastal location where MW DX signal levels are considerably higher than, say, a mile inland, and, I believe, also demonstrates how the QDFA beats the DDFA in some situations. It is unlikely that propagation conditions during the 4 nights I recorded at Grayland were significantly above or below average for late April.

850 Alaska, Nome, KICY, Voice Of The Arctic, religious song just before 1300, 4/21, then IDed by a fast talking female as “[unintelligible] KICY Nome”
850 Hawaii, Hilo, KHLO, IDed as “KHLO Hilo,” then into Sports Center, about 1300, 4/22
870 Alaska, McGrath, Ided as “You are listening to KSPN Radio Eight Seventy AM Radio in McGrath,” about 0900, 4/22
873 Japan, //774//828 about 1100, 4/22, good strength, female Japanese talker before the hour, then brief interval signal like music at the top of the hour
882 New Zealand, Auckland, //657//909//963, EZ listening music, 0815 and later, 4/22
891 Japan, Sendai, JOHK, // 594, Japanese male talker, good, but with some splatter, 4/22
891 Australia, Adelaide, presumed, male accented English talkers, about 1300, 4/22
891 Korea, Busan, HLKB, //711, about 1200, 4/22
900 Hawaii, Kahului, KNUI, from before 1300, 4/22, and later, Fox Newstalk program, IDed about 1321 as

“Fox News, Nine Hundred KNUI, The Talk Of Maui”

909 New Zealand, Napier, //657//882//963, EZ listening music, 0815 and later, 4/22

909 Philippines, various, fast male Tagalog talker mixing with an undetermined oriental talker from before 1100 to after 1300, 4/22, no ID heard, but I did not listen continuously

920 Alaska, Soldotna, KSRM, IDed as “News Talk Ninety Two KSRM,” about 0700, 4/21

930 Alaska, Ketchikan, KTKN, IDed as “Nine Thirty Ketchikan, Alaska,” about 0700, 4/21

940 Hawaii, Waipahu, KKNE, off key female singer in Hawaiian with accompanying music, non-stop through the top of the 0600 hour, continued for quite some time, then a second (?) female singer, signal strength fair to poor, finally a male singer in Hawaiian with music, very nice, signal much stronger, continued through top of the hour again with no ID, but eventually about 0703 an English ID “AM Nine Forty KKNE Waipahu, Hawaii”

963 China, usually given as unknown location, but Dalian is 5 times as strong as any other Chinese on this frequency, also, Dalian has been reported in the past as a CNR or CRI station on 963, time pips 3 low and 1 high, CNR or CRI interval signal, about 1300, 4/19

963 New Zealand, Christchurch, //657//882//909, EZ listening music, 0815 and later, 4/22

972 South Korea, Dangjin, HLCA, one note interval signal at about 1200, 4/22, male and female (presumed) Korean talkers, //1134 (but I want to recheck this; see the following); again 4/21 about 1300, partial KBS interval signal after time pips at the top of the hour, not //1134 but the 1134 interval signal was the same

981 China, various (but virtually certainly Changchun and Nanchang because they are lots higher power than the others), there was a slight echo at times, “different” CRI or CNR interval signal just after 1200, 4/22, //1035//1375//1593

990 Hawaii, Honolulu, KHBZ, IDed as “You are listening to KHBZ Honolulu,” about 0700, 4/22

1008 New Zealand, Tauranga, //1035//1044//1098//1278, talk, 0650 and later, 4/22

1017 China, Changchun, quite clear audio 1254 and later with very off key male singer in oriental language, CNR or CRI interval signal at about 1300 on 4/22

1017 Japan, Fukuoka, JOLB, with EE lesson, 1015 and later, 4/22, // 0774

1017 Philippines, Davo City, DXAM, faded up to excellent level with nice musical selection “Dancing Queen” in American English followed by fast talking male in Filipino (sometimes referred to as Tagalog Plus), then IDed as “Radyo Rapido,” 1235:32, 4/19, and later at 1238:14 IDed as “DXAM, Radyo Rapido, diyas disisiyete (ten seventeen),” *notice the call letters!!!* I begged for the Philippines and I received them.

1017 Philippines, Davo City, DXAM, faded up about 1250, 4/20 (maybe earlier, I have not listened continuously). I did not hear any definite ID's (apparently they all occurred during fades), but the announcer's voice was unmistakable, and the lotto drawing starting about 1314 was as good as a positive ID.

1017 Philippines, Davo City, DXAM, here it is August 21 and just yesterday I got around to listening for DXAM on my 4/21 recording from the dual delta flag array, and about 1248 a fast male Filipino talker appeared, followed by a somewhat off key female singer, then about 1259 a “Radyo Rapido” ID, followed by a badly off key female singer “Falling In Love With You” in English, and about 1301 “DXAM, Radyo Rapido, diyas disisiyete (ten seventeen)” ID, after which the signal weakened until about 1310 when another off key singer was noted, followed by a lengthy announcement of “winning numbers,” namely various one digit lottery numbers, a mention of Super Lotto, and a lottery number consisting of six 2 digit numbers, also mentioned was “9 pm drawing” which is consistent with a 1300 UTC drawing, more details could have been included, this was the clearest of the 4 receptions of DXAM.

1017 Philippines, Davo City, DXAM, faded up from out of nowhere with “Radyo Rapido” ID and then shortly afterward “DXAM, Radyo Rapido, diyas disisiyete (ten seventeen)” ID about 10:59:30, 4/22, later about 1110 quite good with a fast talking male in Filipino, then weakened somewhat, and later perhaps a female Filipino vocal about 1120, afterward mostly faded for about 40 minutes, though occasional clear fast talking male in Filipino and at one point a badly off key male (?) Filipino singer, still later another “Radyo Rapido” ID again about 12:57, but faded fast until about 1309:20 when a male Filipino talker began reciting “winning numbers” (3 single digit, 4 single digit, and 6 two digit) in both English and Filipino, what a treat this was many weeks after my DXpedition to Grayland, thanks to Perseus, no religious programming noted on any of DXAM programming from the four nights of recording. Based on these four loggings, the lotto drawings starting at about 1314 are a nightly feature of DXAM.

1017 Philippines (t), unidentified, believed to be a male Filipino talker between about 1100 and 1300, 4/22 mixing with DXAM

1017 Tonga, Nuku'alofa, presumed, sign off in presumed Tongan with anthem, 0958, 4/19 with the “crippled” QDFA, much clearer 4/22 with the “uncrippled” QDFA with music and talking in presumed Tongan from before 0830 to 1015 when they were virtually suddenly replaced by JOLB (propagation discontinuity?)

1035 China, various, but likely Dalian because its power is 14 dB greater than the others, “different” CRI or CNR interval signal just after 1200, 4/22, //981//1377//1593, poor signal, underneath someone

1035 New Zealand, Wellington, //1008//1044//1098//1278, talk, 0650 and later, 4/22

1035 Solomon Islands, Honaira, R. Hapi Isles, Solomon Is. BC Corp., 0737, 4/19, island music with male singer, 0742 nice music and male singer, followed by male and female talkers, then faded, then reappeared at 0813 with male and female talkers, followed by music and male singer, all on the “crippled” QDFA

1040 Hawaii, Honolulu, KLHT, The Pure Light of Hawaii, K-light, Christian programming, including religious songs (one in Hawaiian) and preaching while I was listening from before 0600 to after 1400, 4/22, but never an ID, although I did not listen continuously

1044 China, Changzhou, presumed because it is 10 times the power of the other Chinese on frequency, about 1300, 4/19, time pips 3 low 1 high, CNR or CRI interval signal

1044 New Zealand, Dunedin, //1008//1035//1098//1278, talk, 0650 and later, 4/22

1080 Alaska, Anchorage, KUDO, IDed as “This is Alaskan Progressive Voice News Ten Eighty KUDO Anchorage,” about 0700, 4/21

1080 Korea, Yeosu, HLAT, MBC interval signal, about 1200, 4/22

1089 Japan, Sendai, // 774, about 1200, 4/22

1098 Marshall Islands, Majuru, V7AB, Radio Marshalls, island music and singing just before 0700, 4/19, time pips (5 + 1 long), talking and more island music and singing which faded about 0711, good after 1100, all this on the “crippled” QDFA

1098 New Zealand, Christchurch, //1008//1035//1044//1278, talk, 0650 and later, 4/22

1110 Alaska, Big Lake – Houston, about 0600, 4/22, “KAGV Eleven Ten Alaska” ID

1110 Hawaii, Kiehei-Maui, IDed as “It's 4 o'clock. KAOI AM Seven Ten,” about 1400, 4/22

1116 Australia, Brisbane, 4BC, first noted before 0900 quite weak, mostly talk with some advertisements, slowly gained strength throughout the evening, local advertisement mentioned Brisbane about 0950, “Eleven Sixteen 4BC” ID at about 0954, 4/22

1125 Japan, various, // 747 // 1152 // 1386 // 1467 about 1100, 4/22

1134 South Korea, Hwaseong, KCBS, one note interval signal at about 1200, 4/22, male and female (presumed) Korean talkers, //972, but PAL says Kimpo

1140 Alaska, Soldotna, KSLD, IDed as “This is Eleven Forty KSLD, The King, Soldotna,” about 0700, 4/21

1143 Taiwan, Baisha, BEL3, 100 kW, Yuye Guangbo Diantai (Taiwan Area Fishery Broadcasting Station), heard with classic American English song “Love Letters In The Sand” a few minutes before 1300 (another American English song before 1258 believed to be Taiwan), 4/19, followed by a female Chinese talker at the top of the hour who continued in the clear for many minutes thereafter, // 1593.

From the RealDX reflector: "Hello Guys, I heard this sound now. It's Amoy and ID of Fishery Radio Station in Taiwan. Announcer gave "Hi Giap Kon Po Den Tai" at after 15 second "Hi Giap Yuye." Shin Thanks to Bjarne for putting a short audio clip I made for this reception onto the RealDX reflector, and thanks to Shin for explaining the voice ID.

1152 Japan, various, // 747 // 1125 // 1386 // 1467 about 1100, 4/22

1161 New Zealand, Wellington, presumed, 0720 and later 4/22, non-EE male talker, only occasional bits of audio, but I did not stay with them non stop, 24h Maori per PAL, also noted 0630 and later 4/19 with the “crippled” QDFA

1161 Korea, Busan, HLKU interval signal per on line list and “MBC” ID about 1300 on 4/19

1170 Alaska, North Pole, KJNP, “You are tuned to One One Seven O, your Gospel Radio, KJNP, North Pole, Alaska,” about 0700, 4/21, strong and clear, not nearly as strong or clear an hour earlier, but nevertheless IDable with phrases like “Tonight at North Pole is [unintelligible],” “Not all Alaska,” and “This is Alaska.”

1170 Korea, Gimje, HLSR, “KBS World Radio” just after time pips at the top of 1100, 4/22, while concentrating on VOA Philippines

1170 Philippines, Poro Point, DWVA, Voice of America, first noted with the VOA interval signal partly obscured by Korea about 1100, 4/19, after few minutes a 2nd weak oriental talker was noted way under Korea, perhaps VOA in Chinese per PAL, then later at about 1230 a mention of VOA was heard, followed by their In The News program featuring Martin Tran (sp?), continuing with news commentary in English until about 1247, then a very clear announcement, “From Washington, the nation's capitol, the Voice of America has brought you [unintelligible] In The News. You can email your questions or comments to our panelists. Send them to VOA News at voanews.com. ... Join us next week at this time for [unintelligible] In The News,” followed by another very clear announcement starting about 1258, 4/19: “It's coming up on 13 hours universal time. Jazz America will be broadcast during the next hour on the following frequencies: 7.575, 9.51, and 9.76 MHz shortwave. You can also hear our program from the internet at voanews.com.” Curiously, the announcer did not say www.voanews.com. Also, no jazz was heard during spot checks of the 1300 – 1400 time period, but a 2nd oriental talker was heard mostly under Korea, perhaps VOA in Chinese per PAL.

1170 Philippines, Poro Point, DWVA, Voice of America, complete interval signal with a few notes missing under splatter at about 1100, 4/21, on the dual delta flag array (not the quad), 7 note part of the VOA IS with 2 notes missing due to splatter at about 1300, all underneath Bellingham, WA, a Korean (presumed), and a 3rd very weak English language station, or maybe it was VOA in English as some of their announcements are in English, but at times before and after 1100 there was a 2nd oriental talker which may have been VOA

1170 Philippines, Poro Point, DWVA, Voice of America, complete interval signal at about 1100, 4/22 with the QDFA, clearer than on the 4/21 recording, Korea on top this time with a nice clear “KBS World Radio” ID just after 1100, Bellingham waaayyy down, probably below VOA most of the time, the better audio recovery due to the QDFA compared to the DDFA was blatantly obvious

There are 5 loggings of VOA Philippines 1143 kHz in the Grayland Master Log, all of them dated 2001 or earlier, and none of VOA Philippines 1170 kHz in the Grayland Master Log. The Grayland Master Log seems to be incomplete and to have been discontinued by the end of 2007. All on line Grayland logs from 2004 to present were also searched for VOA Philippines 1170 kHz, and just one tentative was found, although it is likely to have been heard a few other times, but not well because Grayland beverages would not attenuate Bellingham significantly. It is very unlikely that far above average propagation between WCNA and the Philippines were responsible for these rare receptions; it is virtually certain that the DDFA and QDFA were responsible. At first I wondered why this 1000 kW VOA signal was not heard at every Grayland DXpedition. But then I noticed in the PAL that the VOA antenna is directional, presumably highly directional, and pointed at China or Southeast Asia, depending on the time. Maybe very little of the signal makes it in the direction of Grayland. In any case, to me these VOA receptions are among the high points of my Grayland adventure, even if heard for the first time long after the fact. What a great receiver Perseus is.

1188 South Korea, Inchon, HLKX ID at about 1200, 4/22

1205.970 China, Yanbian, 200 kW, presumed (although there is no other Chinese with anything like that power), per asiawaves, Chinese (presumed) male and female talkers from before 1000 to after 1300, quite good



at times (forgot to write down the day)

1215 China, Zhuhai (location per asiawaves and LEM239), IDed with a catchy jingle “You gotta have 7” in English and additional “7” vocalizations followed by “China National Radio 7” in English about 1232, 4/19, lots of Chinese (presumed) talk and a little EZ listening music from before 1100 to after 1300

1242 Japan, Tokyo, JOLF, Japanese male talkers, 3 low coo coo pips and one high at about 1200, 4/22

1251 New Zealand, Auckland, English talker about 0900, 4/22, VoR is in English at that time, but no VoR interval signal was heard at the top of the hour, only an English talker through the top of the hour and nothing else, weak, I backed up to 0733 (don't you love Perseus recording capability?) and got better audio with a woman in English discussing God, and then followed the programming back to 0900, so there is no doubt about it, this was the New Zealand Christian station

1251 Russia, Razdolnoye, 500 kW per asiawaves, VoR interval signal (Pictures at an Exhibition) at about 1200, 4/22. however 2008 PAL says Ussuriysk with no power listed

1269 Japan, various, // 1287, about 1100, 4/19

1270 Hawaii, Honolulu, KNDI, IDed as “KNDI Twelve Seventy,” about 0631, 4/22, Pacific island language programming from before 0500 to after 0632, including male and female talker, some music with singing which seemed to be mostly island music, also one religious musical selection with singing

1278 New Zealand, Eltham or Napier-Hastings, //1008//1035//1044//1098, (only Napier reported once previously from Grayland), NZ, talk, 0650 and later, 4/22

1287 Japan, Sapporo, “HCB Radio, Hokkaido” ID, about 1300, 4/19

1287 New Zealand, Westport, talk, //792 at 0817:30, 4/22

1314 South Korea, Jeonju, , religious music and singing, and preaching in English, about 1254, 4/19

1323 China, Huadian, 600 kW per new asiawaves addition April 2009, //963, faded up 1157, nice, clear (classical?) Chinese music, CRI or CNR chimes at about 1200, faded down just after the chimes, back up later around 1205 with (believed) Russian male talkers, still //963

1330 Alaska, KXLJ, Juneau, IDed as “KXLJ Juneau, the all new Thirteen Thirty,” 0800, 4/20

1332 Japan, Nagoya, // 1134, about 1100, 4/19

1332 China, various, CRI or CNR interval signal, about 1300, 4/19

1341 Japan, various, presumed, ID sounded like “You are listening to the NHK network,” about 1300, 4/19

1359 China, various, CRI or CNR interval signal, about 1300, 4/19

1377 China, Xingyang, “different” CRI or CNR interval signal just after 1200, 4/22, //981//1035// 1593, poor to fair signal

1386 Japan, various, // 747 // 1125 // 1152 // 1467 about 1100, 4/22

1386 New Zealand, Auckland, R. Tarana, male Hindi talker, nice Indian music, 0649 and later

1386 South Korea, Mokpo, HLAM, MBC chimes interval signal, about 1200, 4/21

1404 Japan, Kishiro, JOQL, //1449//1287, about 1300, 4/19

1420 Hawaii, Honolulu, KKEA, IDed as “[unintelligible] Hawaii's sports KKEA [unintelligible] ESPN Fourteen Twenty,” about 1300 4/22

1440 Japan, Sapporo, JOWF, presumed, Japanese male talker, 4/22, at about 1000, not //1287, no one on the channel with them, nothing audible on 1197

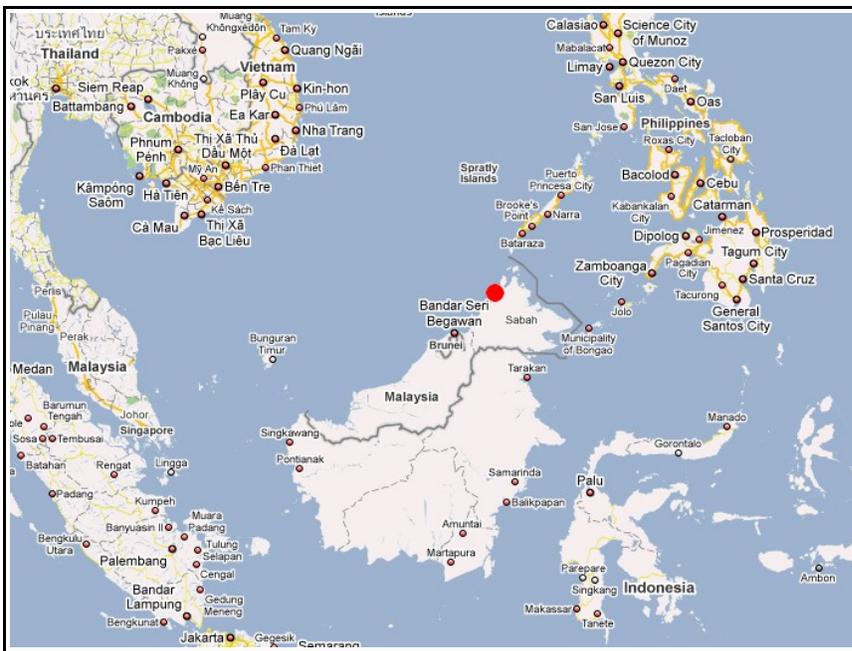
1449 Japan, Abashiro, JOQM, //1287//1404, about 1300, 4/19

1467 Japan, various, // 747 // 1125 // 1152 // 1386 about 1100, 4/22

1475 Malaysia, Kota Kinabalu, transmitter on with 1 kHz tone about 1047, 4/19, with the “crippled” QDFA, transmitter off about 1334:50, fair, sometimes good, audio about 50% of the time from about 1057 to about 1327, music, singing, and talking in presumed Tagalog (Filipino) with occasional very accented English words and phrases, perhaps a short program entirely in very accented English, 5 low time pips + 1 high time pip at the top of the 1100 and 1300 hours (the top of the 1200 hour faded), frequent QRM from 1476 and 1476.1, depending on the origin of the splatter sometimes off tuned (low) AM was used, sometimes USB with Perseus' wonderful notch filter was used, not heard on a dual ALA-100 array which was being recorded at the same time on a separate Perseus receiver, the word “Malaysia” was heard during sign on, but not much else because of low signal strength, although a native speaker would probably have heard more, sign off with choir version of Malaysian national anthem about 1333:50, transmitter off about 1334:50 shortly after the anthem

finished

1475 Malaysia, Kota Kinabalu, transmitter on with 1 kHz tone about 1047, 4/22, with the “uncrippled” QDFA, beautiful clear sign on starting about 1057 with “You are listening to... [the first 4 words in English, followed by an as yet unidentified language, perhaps Malay, with a mention of Malaysia and maybe Kota Kinabalu].” Audio quality varied among faded (nonexistent), poor, fair, and excellent throughout the 1047 to 1332+ broadcast of 4/22, arm chair listening at times, especially around 1330, with presumed Tagalog talkers and music, ending with choir version of the Malaysian national anthem starting about 1332:50, carrier cut about 1037. Time pips at 1300 on



4/22 were 3 high and one low. *WRT this 2nd Malaysia reception, Bjarne said, “Very good! Actually, Malaysia 1475 is rarely heard anywhere [outside of Asia, dl] (with the possibly exception of Malaysia). I recall hearing it once (for OJ’s reference: When Torgeir Nyen was here), and very weak at that. A very good catch.” The Malaysia 1475 sign on has never been reported in over 10 years of reports in the “Grayland Master Log” and most of the Grayland Master Log Reports have been for a carrier only, with no audio. I firmly believe that this outstanding reception was due almost entirely to the Grayland (“fixed”) QDFA, perhaps with a little help from above average propagation conditions.*

1475 Malaysia, Kota Kinabalu, transmitter on with 1 kHz tone about 1047, 4/20, with the “crippled” QDFA, little or nothing of the sign on was heard because the signal was weak, but was stronger at times over the next hour, quite clear at times, mainly presumed Tagalog (Filipino) talkers, and from before 1300 to about 1330 beautiful clear singing with accompanying music for the most part, sign off with the choir version of the Malaysian national anthem starting about 1330:50 and finishing about 1331:40, transmitter off immediately. *It is virtually certain that the QDFA is mainly responsible for these receptions of 1475 Malaysia*

1475 Malaysia, Kota Kinabalu, (*I am not surprised!*) transmitter on with 1 kHz tone about 1047, 4/21, few details at sign on because of weak signal strength, poor to fair to occasional good signal strength throughout the 1047 to about 1334 transmission period, sign off with weak but audible choir version of the Malaysian national anthem starting about 1332, transmitter off immediately about 1334.

1476.1 Philippines, Iligan City, DXRJ (Radyo Asencion / Radyo Asenso ?), presumed, 100 Hz het on 1476 heard many times when tuning Malaysia, no attempt has been made to obtain audio, DXRJ is definitely on 1476.1 per [Pilipinasdx](#) as of summer 2008

1500 Hawaii, Honolulu, KUMU, IDed as “You are listening to AM Fifteen Hundred Na-Too (not Koo-Moo as often reported, unless my ears suddenly failed), Honolulu” about 1400, 4/22

1503 Japan, NHK1, Akita (with other synchros perhaps helping a little), JOUK, // 594, very strong and clear about 1200, 4/22

1503 Micronesia, Kosrae Island, Tofal, V6AJ, Voice of Kosrae, faded up about 0711, 4/21 with harmony singing island music using the DDFA, weakened and then faded completely by 716, reappeared weakly with island music and singing about 0753, brief male talker about 0758 followed by female talker, quite strong at times, heavy Seattle splatter which started just before the top of the hour spoiled any chance for an ID, weak island music again after 0800, faded until island music with singing in harmony slowly faded up again around 0938, quite good at times by 0941, faded completely by 0955, but then appeared again about 1014 sporadically

with brief episodes of island music and singing in harmony, sometimes way under Japan. V6AJ was also heard on the 3 other days I was at Grayland, albeit poorly on 4/20 and 4/22, but reasonably well on 4/19 with the “crippled” QDFA from 0712 until after 1037. Even though no definite ID was heard, who else could it be? These 1 kW Micronesian receptions are among the high points of my trip to Grayland.

1540 Hawaii, Honolulu, KREA, broadcasting in Korean, Korean talker before 1400, then MBC interval signal about 1400, 4/22

1548 Australia, Emerald, weak or faded on most of the 4/21 recording, but occasional crystal clear audio such as around 1345

1556.975 Taiwan, Kouhu, CBS-RTI-VoTaiwan, Family Radio, at least three distinctive Family Radio interval signals about 1200, 1223, and 1300, 4/19, on the “crippled” QDFA, talking and singing, presumably in Chinese, poor to fair to good signal strength

1566 South Korea, Cheju Island, “HLAZ” ID at about 1100, Christian programming and talk, from before 0915 to after 1400, 4/22

1566 Australia, Wangaratta, presumed, way under South Korea, 1258 and later, 4/22, good around 1330 and later, mostly male and female English talkers occasional short music selection, but that format does not fit Wangaratta, a weak Chinese (?) was also there adding to the mix, after 1300 EE talk and music such as Mr. Tambourine Man, to after 1400, 4/22

1575 Thailand, Ban Phachi, Voice of America, around 1330, 4/19, quite clear, “You are listening to the Voice of America in Vietnamese,” “You are listening to the Voice of America, Washington, DC,” “Welcome to the Voice of America in Vietnamese,” and then into Vietnamese programming. There was a VOA interval signal in there somewhere but I could not figure out where it went from my notes. I will listen to the 4/19 Perseus recording again later.

1575 Japan, 3 low power AFN stations here, Iwakuni most likely, male and female American English talkers, IDed as “AM Fifteen Seventy Five,” and mentioned “watch cable TV channel 8,” about 1055, 4/22, then a few minutes later IDed again as “AM Fifteen Seventy Five,” just after 1100, 4/22

1593 China, Changzhou, “different” CRI or CNR interval signal just after 1200, 4/22, strong signal

1593 Japan, NHK2 synchros, with English lessons, //774, about 1300, 4/21

1593 New Zealand, R. Samoa, Auckland, presumed, with nice island music around 0635, 4/22, later talk and singing in unknown language, 0730 and later, probably New Zealand, but could be **Micronesia**

1593 New Zealand, Christchurch, presumed, EZ listening American rock and roll, 0711 – 0715 and later, 4/21

1593 Taiwan, Tocheng, 1 kW, Yuye Guangbo Diantai (Taiwan Area Fishery Broadcasting Station), difficult but definite // 1143, about 1300, 4/19, location and power from PAL, note that other sources do not agree with this location or power, or even that there is still a Taiwan station on 1593, only 4 previous loggings of Taiwan 1593 at or near Grayland were found in the Grayland Master List or other logs in Oct04, Mar07, Mar08, and Dec08. Perhaps Taiwan 1593 has increased power to 3 kW as stated by some sources. In general the other (738 and 1143) Taiwan FBS's have mainly been heard during the October Grayland DXped's, and none in August or early September which would most closely correspond to my late April reception. In any case, this is a nice catch, if I do say so myself, and again demonstrates the power of the QDFA, even when it was not fully functional.



1602 Japan, Yokote, //774, about 1100, 4/19

1628.990 Australia, various, presumed, country western song through the top of the 1300 hour, 4/22

1638 Australia, Melbourne or Sydney or both, presumed, male Arabic singer accompanied by middle East music, Big Ben chimes at 1300 top of the hour, last chime apparently synchronized with the hour, then the clock struck 1 o'clock, 4/22

1683.2 Australia, Sydney (Lakemba), Radio Club AM, presumed, lots of talking around 1300, 4/22, but the signal was too weak to provide any program details, reported previously as being on 1683.2 kHz in 2003 per PAL, as late as 2004 in DX Clusive 6/20/05, and in Yokohama DX! in 2006

1701.030 Australia, Brisbane, Radio Brisvaani 400 W, female Hindi singer surfaced briefly after 1251, quite good sporadically around 1258, 4/22, female leading group chanting started just before 1300, afterward several songs, not at all Indian sounding, slow and sung by a female in an undetermined language, strange, one and perhaps two others on 1700 kHz including the Arab chanter listed below

1701 Australia, Melbourne, Islamic Voice Radio, 400 W, male Arabic chanter, presumably the Qur'an, from before 1100 to after 1200, 4/22, at least one, maybe two others on frequency, but the Arabic chanter often dominated, quite clear 1251 and later

These four low power Australian receptions demonstrate that the QDFA is quite capable of capturing low power MW DX, not to mention 1 kW Micronesia 1503 and the low power AFN Japan 1575.

On 4/22 the QDFA also did very well on the Alaskans and Hawaiians (with a little help from the DDFA on 4/21 and the "crippled" QDFA on 4/20), perhaps better than any previous DXpedition to Grayland, with 26 Alaskans and 16 Hawaiians. The 10/05 Grayland DXped which was called the best ever for Alaskans had only 24 Alaskans (not counting tentatives) and a meager 4 Hawaiians. Either the QDFA was mainly responsible for the outstanding Alaskan and Hawaiian loggings, or propagation conditions for Alaska and Hawaii were the best ever for Grayland on 4/22/09, with a little help on 4/20 and 4/21. The odds of it being the latter are just about nil.

Some Log Statistics

The April 09 Grayland QDFA did very well on Australians with a total of 22. The average number of Australians for October Grayland DXpeditions from 04 to 07 was 10. The QDFA caught 19 New Zealands, while the Oct. 04 – 07 Grayland DXpeds caught a total of 4, for an average of 1. I am stunned. Apparently there were no attempts to log Alaskans or Hawaiians during the Oct 07 Grayland DXped, so only 04 – 06 were used for comparison: QDFA A = 25 and H = 16, while Oct. Grayland 04 – 06 averages were A = 14 and H = 2. In all of these cases, the April 09 Grayland QDFA performed well above the average for recent October Grayland DXpeditions with multiple beverages for Australians, New Zealands, Alaskans, and Hawaiians. The end of April is not considered to be a good time to DX the MW band from Grayland, while October is considered to be prime time for MW DXing at Grayland, which gives an advantage to the Oct. 04 – 07 DXped's. So it is virtually certain that the superior April 09 Grayland QDFA performance was not due to exceptional propagation conditions, but rather to the QDFA itself. Individual examples of the superior QDFA performance could also be given, such as receptions of VOA Philippines 1170 on 3 out of the 4 nights (one with just a dual delta flag array), and DXAM 1017 positively IDed on 3 of the 4 nights (on one night with only a DDFA), but they are already documented in the log above. Just to be complete, the numbers for Japan and China were Apr 09 QDFA J = 32 and C = 17, while the Oct 04-07 Bevs produced J = 46 and C = 32. No surprises here. The October Grayland high latitude paths had more hours of darkness than the late April Grayland high latitude paths. The only Grayland DXped I could find for a fair high latitude comparison was the one for Aug. 20-22, 2004 which had J = 14 and C = 4. In this case the QDFA with J = 32 and C = 17 came out on top.

What was my favorite logging?

Actually four of them, the DXAM 1017 Philippines loggings of 4/19 (QDFA not fully operational; see discussion above in sections **Winner!!!** and **The Fix**), 4/20 (no call letters or slogan, but their lotto program IDed them), 4/21 (dual delta flag array only, QDFA not operational), and 4/22 (QDFA fully operational).

***** Additional QDFA Tests *****

The Grayland QDFA was fully operational for only one night at Grayland, it was naturally desirable to have more thorough tests at good MW DX sites to determine if the QDFA null aperture and depth were as good as they seemed to be.

Kongsfjord QDFA Tests

What better place for a second test of the QDFA than Kongsfjord, Norway? I built a QDFA phaser for Kongsfjord, and Bjarne Mjelde and OJ Sagdahl did the rest... put up the masts with delta antenna elements, made the antenna transformers, made the lead ins, and so on. The Kongsfjord QDFA was pointed at North America. Testing at Kongsfjord started about September 4, 2009. At first we were all disappointed. The Kongsfjord QDFA had no nulls! This was somewhat like the initial Grayland experiences, only worse... no nulls at all. The three of us discussed the situation. One of our ideas was that the ground at Kongsfjord might not be good, which could account for the QDFA virtually nonexistent nulls. Bjarne and OJ put down radials, which fixed the null problem. Flag antennas are supposed to be ground independent, but that appears not to be the case. There is additional information about the tests on Bjarne's blog, including audio clips which compare the performance of the QDFA with the North American beverage, and numerous comments describing the construction and testing of the Kongsfjord QDFA, as well as an article written by Bjarne.

The following quotes from Bjarne's blog with dates summarize the Kongsfjord QDFA experiences.

September 11, 2009: “**The QDFA Strikes Back** I wasn't prepared to let tens of hours of work go down the drain. Several sources have indicated that antennas with vertical elements such as the EWE and K9AY depend on good ground to produce good nulls. And that radials is one way to improve their performance on poor ground. So I found some rather thick copper string, surplus from navaid upgrades at the airport, and laid the wire on the ground at 45 degree intervals. I don't know if it's the radials or conditions in general or what, but it appears that the QDFA is indeed functioning better now. I was able to null the slop from St. Petersburg 1494 enough to get a readable signal from Longyearbyen-1485. Furthermore, I tested 1557, where the 58-degree Asia beverage had Taiwan and France (backlobe) equal strength. The North America beverages had Lithuania very strong on their backlobes, while the QDFA (which points directly towards Lithuania on its back lobe) had Taiwan soundly on top with France underneath.”

September 12, 2009: “**Finally Confirmed - The QDFA Blows The [North American] Beverage Away** Yes, it does. At nighttime, when strong signals from Europe dominate the band, the QDFA has proven to be totally superior. In a large number of instances where EU QRM totally obliterated the NA frequency when using the beverage, the QDFA either brought audible levels, or even readable levels. If I had audible levels with the beverage, the QDFA produced readable levels. And in every instance where the beverage had readable levels from North America, the QDFA produced better readability.”

September 23, 2009: “**The QDFA is still performing well.** With two Perseus' running, one with the QDFA and the other with the 310 beverage, I could compare the two antennas at 0300Z, 42 minutes before sunrise. Even at this transition period, the QDFA was noticeably quieter than the beverage.”

September 26, 2009: “**The QDFA still proves to be superior at night,** while the 310 [beverage], connected to my other Perseus, dominate mornings. Actually, comparing the QDFA and the 310 is a bit unfair to the QDFA since the 310 has many of the European stations in its side null. It is somewhat more sensitive towards eastern North America and South America while the QDFA with its 350 degree bearing goes further west. To illustrate my point: At one instance on 1430, the 310 beverage had KLO on top and CKHT audible underneath, while the QDFA had KLO on top but KCLK Asotin WA close behind.”

September 29, 2009: “Interesting conditions today - OJ reports that **the QDFA has nailed its first Hawaiian** with 1500 KUMU Honolulu at 1300Z. We were complaining that the QDFA didn't work in daylight. OK so maybe it does...”

September 30, 2009: “**First September log of New Zealand in Kongsfjord.** Albeit only 8 hours away from October... Antenna in use: QDFA. We should have compared it with the original NZ antenna, the 58 beverage but we didn't pay attention to the stations until after we had recorded the full hour on the Perseus.”

KONG 19, Day 2, October 17, 2009: “**The QDFA is still performing admirably.** If it wasn't for its somewhat reduced sensitivity on the lower part of the MW band, we wouldn't need the [North American] beverages at all.” [the QDFA was aimed at North America, but, of course, has a very wide beam width]

It was found that the Kongsfjord QDFA is less sensitive than the beverages at the lower MW frequencies before sunset and after sunrise... during daylight. Why this is the case is presently unknown. There are potentially two ways that the low band QDFA sensitivity can be increased, namely (1) replace the delta flag antenna elements with flag antenna elements which have areas twice as large as the delta flags, which would increase the signal levels by 6 dB, and (2) add four 10 dB gain preamps, one at each antenna element. The four amplifiers would need to have equal gains and equal phase shifts. Together, these two changes would improve the QDFA sensitivity by 16 dB, probably enough to make it competitive with the beverages at the lower frequencies during daylight. Low band insensitivity might also be improved by using more and/or longer radials. None of these potential improvements have been tested.

Haida Gwaii QDFA Tests

Another wonderful MW DX location is Walt Salminaw's vacation site on one of the islands of Haida Gwaii (Queen Charlotte Islands), about 500 miles North of Vancouver, B.C. Walt's QDFA was aimed due North with one end a few feet from high tide. The following quotes are from Walt.

“I had the QDFA up and running on January 1st as I recall (perhaps the 31st...around 21:00 UTC). All my best middle easterns were via the QDFA....clearly outshone the 450' mini Beverage (N/S). My 750' was to the NW, and not really in the running for anything.”

“Wow, all I can say is that I've never experienced anything like these past several days here in Masset, on Haida Gwaii (formally the Queen Charlotte Islands, south of Alaska). I've heard stations that I've only dreamed of, and I'm sure that I've just scratched the surface. With several TB of Perseus SDR recordings, I think that I could be happy for the rest of my life just perusing these exotic treasures! For antennae, I have a number to choose from: ALA 100, oriented NE/SW, mostly for spotting, and SW (although it's my only LW capable antenna), a permanent N/S mini-Beverage of about 450 feet terminated into the surf of the north Pacific, a 750' Bog to the NW, and finally a spanking new QDFA designed by Dallas Lankford. This new antenna has been my star performer with excellent gain. I've yet to tweak the null, though, as things have been so hot of late. I erected it over several days in a N/S direction, with the null to the south. I had to bushwack and clear the thick salal, and alder to fit the 4 large delta loops, but it was well worth it!”

“My final night in Haida Gwaii involved packing and taking down my now little-used antennae. Since erecting the QDFA, it's been such a good performer that I haven't needed to use anything else. The first to go was my favourite, the 750 or so foot BOG to the NW. The first few mornings it was my main antenna, and always a good performer....until the QDFA. Yahoo! I next disconnected my permanent N/S mini-Beverage as in every case the QDFA vastly outperformed it. Having said that, those who have been at the cottage can attest that it has always been a good performer to Europe, and even Asia, above and beyond it's relative compact size (about 475' outstretched). I now have a Wellbrook phased array that is going to collect a bit of dust. Takers?”

The following are some of Walt's receptions with the QDFA.

648 INDIA AIR West Indore, Jan 2 1719 - I'm very pleased with this one, which I stumbled upon by accident. There was Indian music in the background. Suffers from domestic splatter. But I was able to 100% ID it to the // on 4760! They were running the same feed and also // to 684. My head is spinning! Listed as 200 kW. 4760 went off the air at 17:30, but 9425 appeared to still be in //. Wow!. (Walter Salmaniw, Masset, B.C.)

684 ANDAMAN AND NICOBAR IS (INDIA) AIR Port Blair, Jan 2 1702 - Started listening to a very strong Chinese regional when I noted Indian music underneath. Sure enough, it was // to 4760 making this Port Blair. At times over the CC station. Not as strong today as in past, and weaker than my 648. See below! A few minutes later, though, it came up to good strength, with the CC station barely there. 4760 went off the air at 17:30. (Walter Salmaniw, Masset, B.C.)

693 BANGLADESH Bangladesh Betar, Jan 2 1540 - Checked at 15:32 to note English news cochannel. Initially under JOAB, but within a minute totally dominated the channel. Over the next 15 minutes it continued to go back and forth. (Walter Salmaniw, Masset, B.C.)

702 INDIA AIR Jalandhar, Jan 2 1749 - I'm almost positive that I heard the External Service. My limited sources here have them in Urdu. Clearly audible under the more usual stations (North Korea, for example). Heard them mention Afghanistan. Audible through to about 17:35 when they faded. I'll need confirmation from a language expert on this one!. (Walter Salmaniw, Masset, B.C.)

765 RUSSIA (KARELIA) Radio Rossii, Jan 1 2128 - Surprised to hear this one with EZL music, and then into Russian a few moments later. Fair level. 150 kW from Pedaselga in the Karelia region near Finland. The trans-Polar paths are open!. (Walter Salmaniw, Masset, B.C.)

873 RUSSIA (KALININGRAD) Radio Rossii, Jan 1 2130 - A tentative logging for the site, as there are several Russian transmitters on this channel. Fair to good level with traditional Russian singing, and Russian talk. I'll check the TOH for any IDs. (Walter Salmaniw, Masset, B.C.)

963 FINLAND CRI, Jan 3 0406 - CRI's Russian program at good level with Russian (mostly Chinese) news. Not nearly as strong as a couple of night's ago. (Walter Salmaniw, Masset, B.C.)

999 MOLDOVA ? Sodruzhestvo program, Jan 1 1830 - Another fascinating channel. Often excellent level in Russian. Seemed to be one program to 17:30 and then another. At BOH, it faded down, while a Chinese station faded up to dominate briefly, but the Moldovan transmitter came right back into news. Golos Rossii ID at 18:32:30. (Walter Salmaniw, Masset, B.C.)

1035 ESTONIA Tartu Family Radio, Jan 3 0128 - Conditions are down a bit from the last 2 days, but still quite respectable for my last evening in Masset. Religious music (I recognized the work 'sertse' which means 'heart'. Lot's of Russian talk after 01:30. Appears to be right on 1035.001 on the Perseus. Another slightly weaker carrier is on 1035.031 which might just be Pakistan according to the MW offset list. Another very weak carrier on 1035.028 as well. No idea who that would be. Fair bit of splatter from 1040 domestic. Generally fairly good. Interesting, the 1035.028 transmitter just went off the air at 01:39. Ideas?? The fun just won't let up. Now the Asian station is dominating, and it's clearly from that part of the world. Could it be Iran, with Radio Payam in Yazda listed at 20/50 kW, or Jordan's Amman FM, or RTM Morocco, Rabat with 5 kW, or even Pakistan Brdcstg Corp. with 120 kW in Multan, Punjab. Wow! I've got the audio clip, but now it's back to Tartu at good level at 01:43. (Walter Salmaniw, Masset, B.C.)

1053 ROMANIA Radio Iasi, Jan 1 1946 - Who's on the channel playing all of the symphonic music on this frequency. Heard the same over an hour ago, and it's still going strong. My suspicion is Radio Iasi in Romania. I might have heard an ID at 19:49. Also mixing with Talksport from the UK weakly. (Walter Salmaniw, Masset, B.C.)

1089 RUSSIA Radio Rossii, Tbilisskaya, Jan 1 1849 - Under a very loud Chinese station, Russian is clearly heard, making this the interior Russian 1200 kW transmitter at Tbilisskaya. Almost 11:00 am local! Nice Golos Rossii at 18:53. Chinese station dominated until 20:00, but the Russian was totally dominating at 20:06 recheck with Golos Rossii ID. (Walter Salmaniw, Masset, B.C.)

1089 RUSSIA Radio Rossii, Jan 3 0406 - Suddenly out of the mud leaped Russian at good level with moderate amount of splatter. As I recall there's been some restructuring of Russian Radio, so don't know whether the various programs still exist (Sodruzhestvo, RIR). The latter is listed for this hour. (Walter Salmaniw, Masset, B.C.)

1098 IRAN IRIB, Jan 1 2146 - Suspect this is IRIB with their 1st program at very good levels at times with middle eastern music. Could also be Bayrak Radio, though, so will have to keep listening, as the latter signs off at 22:00. Darn! Faded down right at 22:00:30 but came back up again 20 seconds later (that's when there was an announcement, and not at the TOH). Nope, still there very strong at 22:09, so presumably Iran. (Walter Salmaniw, Masset, B.C.)

1134 CROATIA Glas Hrvatske, Jan 1 1903 - Croatian news at good level mixing with a number of other stations, but mostly dominating. By 19:04, either a Chinese or Korean dominated briefly, but by 19:05 Croatia was back clearly in English. Also in the mix was Arabic sounding music. What a wild ionosphere!. (Walter

Salmaniw, Masset, B.C.)

1152 SPAIN Radio Nacional 5, Jan 1 1911 - Good reception with a male/female announcers into EZL music. (Walter Salmaniw, Masset, B.C.)

1152 UAE Ras as Khaimah Radio, Jan 2 1804 - This is a tentative logging. PAL lists the Malayalam Service with 200 kW. Sure sounds like them. Initially quite good, but then faded by 18:07. Confirmation will be needed. The sheikdom would be a new country for me. (Walter Salmaniw, Masset, B.C.)

1161 EGYPT Mid-Delta Radio, Jan 3 0223 - This is my guess for this Arab station with Arabic chants, a brief sentence or two from the announcer and into more chanting. Pretty sure I heard 'Saleym Alechum' in there too. Good to very good level. 2 carriers on the display at 1161.002 and 1161.007. Other possibilities would be Iran and Tajikistan, and Algeria. I have a good audio clip available to our language experts. (Walter Salmaniw, Masset, B.C.)

1188 IRAN Radio Payam, Tehran, Jan 1 2214 - I'm thinking that this is the station here with fair to very good reception at times with music typical of that part of the world. Listed as 100 kW in Tehran. Male announcer at 22:17 mentioned 'Iran'. Very good point at this point! Sure sounds Farsi to my untrained ear! Into a CSNY song at 22:20. Powerful at 22:30 and into presumed news. I need to pinch myself to assure myself that this is really happening!. (Walter Salmaniw, Masset, B.C.)

1296 AFGHANISTAN Radio Ashna, Kabul, Jan 1 1731 - Another coup! Often excellent reception with many mentions of Afghanistan in presumed Pushto/Dari. Deep fades, but then comes in very well. Splatter from 1300 domestic. Has the VOA feel, so highly unlikely the listed Azerbaijani station! Wow, it's still super strong at 20:01 with a very nice 'Radio Ashna' ID and finally into some music (mostly it's been a lot of talking!). (Walter Salmaniw, Masset, B.C.)

1269 GERMANY DLF, Jan 1 1658 - 300 kW from Neumunster puts out quite well, with German talk. One of my first Europeans in our local morning. I'm not surprised after the fun from last night. Simply put, the most amazing propagation I've ever experienced! What a way to celebrate the new year! At 17:00 on came 'This is Moscow' and into VORWS in English. This is a relay from Yunnan, China. Excellent level. (Walter Salmaniw, Masset, B.C.)

1394.866 ALBANIA TWR, Jan 1 2013 - Excellent reception on the off-channel frequency. PAL lists Bosnian to 20:15 Fridays, and then Croatian, but I didn't not any break at 20:15. Het from another transmitter on frequency. All in the clear at 21:12, but not in the listed Polish, from my most recent PAL, but I suspect it's the time change. The previous PAL I have lists winter times, and this would be Croatian, which sounds more like this. Not certain in any case. (Walter Salmaniw, Masset, B.C.)

1395 HOLLAND The Big L, Jan 1 0027 - Excellent reception with very fast paced modern pop music in English. This station has recently reactivated. A fine signal here in Masset. By far the best night since I've arrived!. (Walter Salmaniw, Masset, B.C.)

1431 DJIBOUTI Radio Sawa, Jan 2 1839 - I've heard this one a number of times. This morning, it's cochannel with Ukrainian Radio 3rd program (Muz), with Ukraine mostly dominating at very good level! Music program on the latter with some call-ins as well. (Walter Salmaniw, Masset, B.C.)

1440 SAUDI ARABIA General Arabic Program, Jan 2 1902 - Very good reception well over the Japanese (and perhaps domestic) stations. Clear mentions of Arabiyah and Saudi. Nothing specifically heard at 19:00, but had to wait until 19:02 for any kind of ID. (Walter Salmaniw, Masset, B.C.)

1449 IRAN VOIRI, Jan 1 1605 - Often very strong signal in listed Turkmen with central Asian language and many mentions of Iran. Last night's amazing trans-Polar reception continues this morning!. (Walter Salmaniw, Masset, B.C.)

1449 IRAN IRIB 1, Jan 2 1904 - Tentative pending positive ID. Very strong and clean modulation. Doesn't sound like Arabic from Libya to me, but I stand corrected if it is! To me it sounds very much like a VOA type

broadcast, but nothing's listed in my resources that would match that. It could also be the 800 kW transmitter at Bandar-e-Torkaman which broadcasts both the IRIB 1 program and VOIRI. I did hear many mentions of Iran as I type this. Also one mention of Turkmenistan, which they do have a VOIRI broadcast from listed 15:00 to 17:30. Into regional music at 19:13. Quite certain that it is Iran. (Walter Salmaniw, Masset, B.C.)

1539 DJIBOUTI Radio Djibouti, Jan 2 1933 - I'm quite sure that I can hear French under VOA from Kuwait and Arabic sounding music, so this should be RTV de Djibouti. Kuwait occasionally fades down, allowing for better reception of this cochannel. (Walter Salmaniw, Masset, B.C.) **ARABIA** General Arabic Programme, Jan 1 2049 - Presumably the Saudi at often very good levels with Arabic music. No sign of any domestic, although at times the Saudi does fade somewhat. I continue to be amazed at this marathon!. (Walter Salmaniw, Masset, B.C.)

1539 KUWAIT VOA, Jan 2 1937 - Noted VOA news in English at 20:00 (noon local!) at excellent level, with occasional fade revealing possibly Djibouti underneath. Not listed in the PAL (the English program). This continued to 20:05 and went back into Urdu. (Walter Salmaniw, Masset, B.C.)

1566 BENIN TWR, Parakou, Jan 2 0335 - Not quite armchair copy, but very nice reception with ID for TWR in English and an email address. Wasn't sure for sure it was them until the ID as the programming was pretty much continuous music. By far the best I've ever heard them! I've struggled to hear much content, and even last night, they were at or above threshold. As I type this, when they fade up, they're a good '8/10' on my scale of listenability! Interesting, as the rest of the evening is no comparison to last night which was perhaps 'once in a lifetime' as far as I was concerned! They faded for a while and then came back around 03:53 with a preacher in vernacular, briefly at strong level. Went into a hymn shortly before 04:00, but faded down at the TOH. That ionosphere must surely be dancing around!. (Walter Salmaniw, Masset, B.C.)

Wow! I would love to hear the great DX Walt heard... all those Europeans, Middle Easterns, and Indians over the pole.

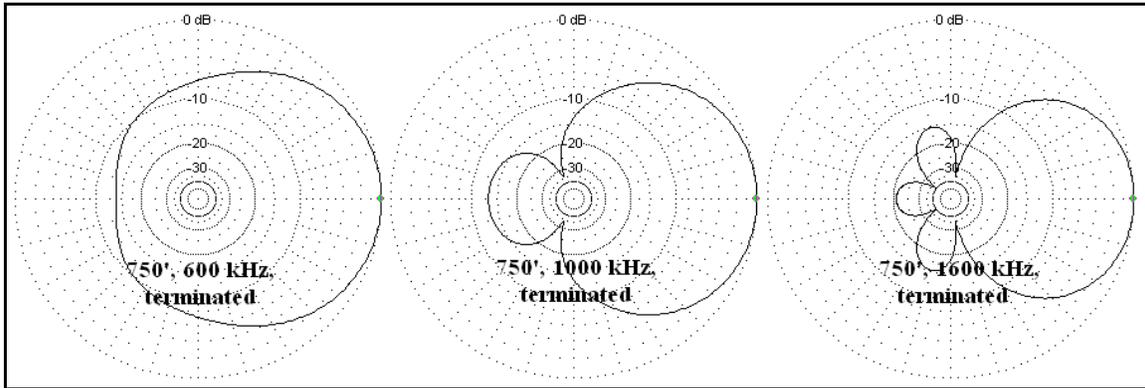
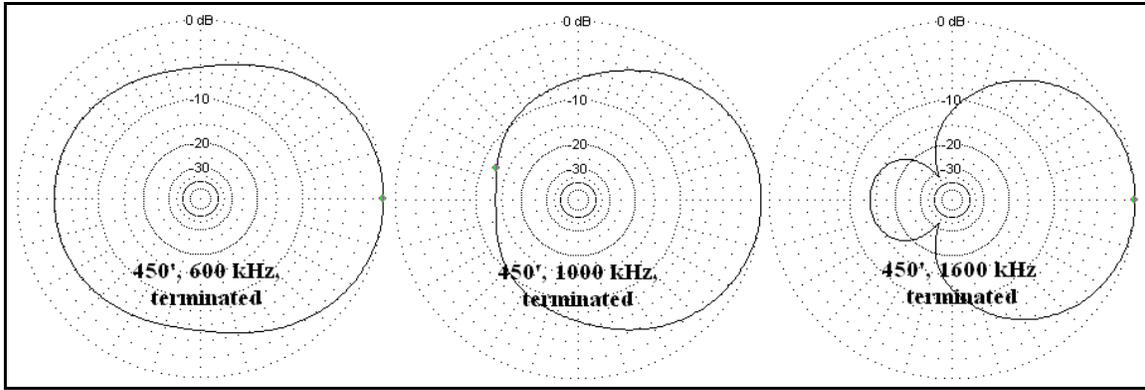
Dare I Say It?

This slightly edited "Dare I Say It?" was written shortly after the Grayland QDFA test. The Kongsfjord and Haida Gwaii QDFA tests have confirmed it. Yes, I will. At coastal sites where splatter is a problem for MW DXers, a quad delta flag or quad flag array will leave some beverages in the dust. Never mind what beverage true believers say. I was at Quoddy Head, ME where most undesirable signals were behind me or to the side of me. I used 750' and 1500' beverages at Quoddy Head, but splatter limited what I could hear. Phasing the beverages helped some, but not enough. No beverages were compared to the QDFA at Grayland because no beverages needed to be compared. It had already been established by previous [comparisons](#) that a dual broadband unterminated loop array was generally equal to and sometimes better than the typical 700' Grayland beverages. Based on those previous tests it follows that a dual flag or dual delta flag array is generally superior to a typical 700' Grayland beverage. And as pointed out above, the QDFA was superior to beverages at both Kongsfjord and Haida Gwaii.

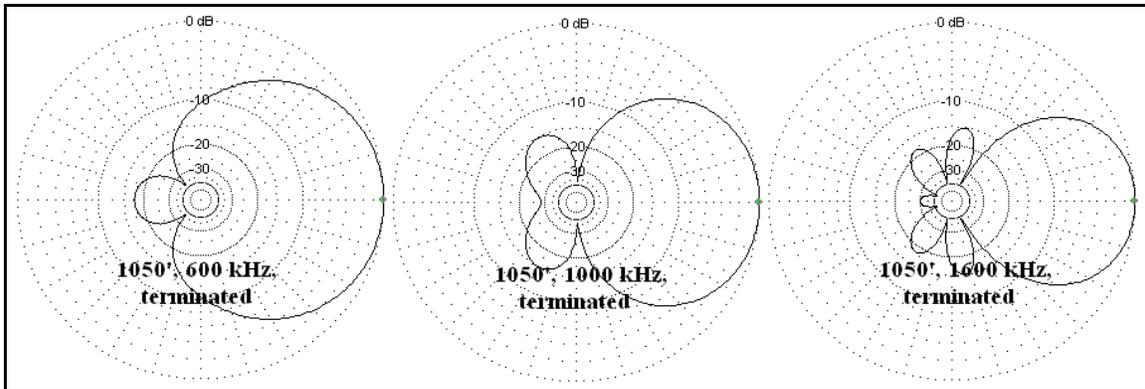
Beverage Patterns

To see why the QDFA beats various beverages, consider the following nine beverage patterns for beverages of three different lengths, 450', 750', and 1050'. For each beverage EZNEC was used to generate patterns for 600, 1000, and 1600 kHz. The heights of the beverages above ground was 4', and the beverages were terminated with 450 ohms. As can be seen, the beverage patterns vary with frequency, and in each case better splatter reduction improves as frequency increases.

The 450' beverage has very little splatter reduction, virtually none at all for mid band and low band MW frequencies. The 750' beverage has virtually no splatter reduction at low band frequencies, little at mid band, and fair at high band. The QDFA, by comparison (see the QDFA pattern above on page 4) has an excellent splatter reduction pattern at all frequencies. It should be mentioned that the comparison of the Kongsfjord QDFA with the Kongsfjord North American beverage (350 meters) was not exactly fair because the Kongsfjord



beverage was not terminated. On the other hand, the Kongsfjord NA beverage was not terminated because the poor ground (almost solid rock) at Kongsfjord gives poor, if any, termination. The comparison of the Haida Gwaii QDFA and beverages seems fair at least as far as ground quality is concerned. Although the 750' Haida Gwaii beverage was pointed NW, it had little attenuation to the North at low band and mid band frequencies. The difference in performance between the 750' beverage and the QDFA is due to the superior splatter reduction of the QDFA. It can be seen that as the length of a terminated beverage increases, the splatter reduction of the beverage increases.



With regard to splatter reduction in the MW band, it is likely that a dual flag or dual delta flag array (see the DDFA pattern on page 2 above, which is the same pattern as a DFA) will give splatter reduction which is about as much as or more than a 1000' or shorter beverage when most of the splatter sources are behind you. If splatter sources are to the side, the multiple side nulls of some of the beverages may give better splatter reduction at some frequencies.