Exaggeration

Dallas Lankford, 8/4/2011, rev. 8/8/2011

From a Wellbrook advertisement, referring to a dual ALA-100 array: "This Antenna system is **only** Broadband Phased Array to offer a uni-directional pattern similar to the Beverage..." [sic]

Does The QDFA Have Superior Splatter Reduction Compared To A Dual ALA-100 Loop Array?

You Bet It Does!

During the first two days of the Grayland tests of the QDFA in April 2009, while the QDFA was "crippled", Guy Atkins attended the Grayland QDFA tests. He brought with him his dual Wellbrook ALA-100 array, set up his ALA-100 array about 100 feet to the South of the QDFA, attached it to his Perseus, and recorded the entire MW band during the first two nights. His recordings from his ALA-100 array and mine from my QDFA were used for performance comparisons. In fact, that is mainly how the poor to non-existent low band nulls of the "crippled" QDFA were discovered. Guy took down his dual ALA-100 array and left Grayland the morning of the 3rd day of the tests. While Guy was taking down his dual ALA-100 array, I was taking down two of the QDFA delta flag antenna elements and configuring it as a dual delta flag array (DDFA) hoping that would help determine the cause of the poor low band QDFA nulls. The 3rd night of tests the DDFA had excellent nulls from one end of the MW band to the other. That suggested the poor low band nulls of the QDFA were due to the 300 feet of additional lead in (which had not been tested in North Louisiana prior to the Grayland tests), and it turned out to be the case. The "fix" of the "crippled" QDFA was discovered and implemented for the 4th and last day of the QDFA Grayland tests, namely an isolating amplifier between the output of the phaser and the 300 feet of twin lead.

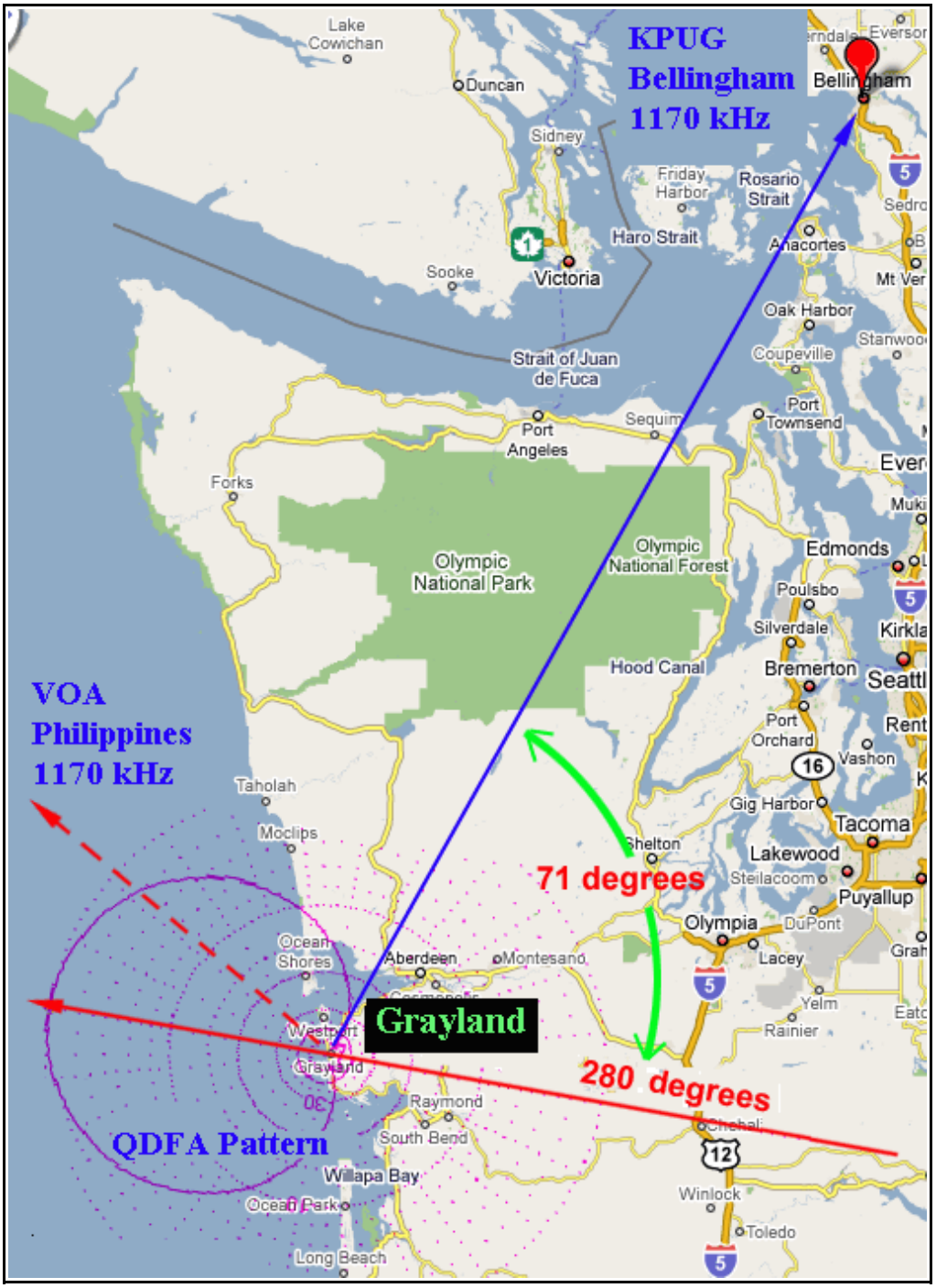
The superior splatter reduction of the QDFA compared to the Wellbrook dual ALA-100 array was demonstrated after the Grayland DXpedition was completed on many frequencies by comparing recordings made on the 19th and 20th of April. In this article only two comparisons are discussed, namely receptions and non-receptions of Malaysia 1475 kHz and VOA Philippines 1170 kHz. The many hours of careful listening to recordings of signals on 1475 kHz and 1170 kHz are summarized as follows.

On the night of 4/19 around 1330 UCT the "crippled" QDFA produced a fair to poor sign off with national anthem for Malaysia 1475 (parts of the sign off were missing due to splatter) while the dual ALA-100 array produced no Malaysia sign off audio at all. On the night of 4/20 around 1330 the "crippled" QDFA produced clear (and virtually complete) audio of the Malaysia sign off with anthem, while the dual ALA-100 produced poor to non-existent audio of the Malaysia sign off. It is unlikely that the Malaysia national anthem could have been identified from the dual ALA-100 array recording as such unless one first listened to the clear QDFA recording. Based on tests made on previous occasions by John Bryant, the Wellbrook dual ALA-100 performance is about equal to, if not superior to, the usual 700 foot Grayland beverages. I have no reason to doubt this, especially in view of the 700 foot beverage patterns and dual ALA-100 patterns below based on EZNEC simulations. Bryant's opinions are also supported by, for example, the fact that the Malaysia 1475 kHz sign off anthem has never before been reported on any previous Grayland DXpedition; see the so-called Grayland master list .

Also on the night of 4/19, on 1170 kHz, starting about 1258 UCT, the "crippled" QDFA produced the following: "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." The dual ALA-100 produced at most only two words of the above quote, namely "coming up," an one phrase, namely "VOA." The "crippled" QDFA produced considerable clear audio from VOA Philippines 1170 kHz from about 1230 to after 1300 while the dual ALA-100 array produced virtually none.

There are 5 loggings of VOA Philippines 1143 kHz in the Grayland master list, all of them dated 2001 or earlier, and none of VOA Philippines 1170 kHz in the Grayland master list. The Grayland master list seems to be incomplete and to have been (at least partly) 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 did not attenuate Bellingham significantly.



I am sure there are other examples, probably many other examples, on other frequencies, probably many other frequencies, where the QDFA produces audio but the dual ALA-100 produces none, and where the QDFA produces good audio but the dual ALA-100 produces poor audio or none. For splatter reduction in the MW band the QDFA leaves a dual ALA-100 array in the dust. Some may be inclined to claim that a "new improved dual ALA-100 array" with a fancier Wellbrook phaser will "hear" better than Guy's vintage 2009 dual ALA-100 array. But that is nonsense. All of the Wellbrook phasers are variable phasers, and it is impossible to adjust any of them for the best possible null depth and null aperture of a dual loop array. Even if a fixed LC delay phaser were used for optimal dual loop array

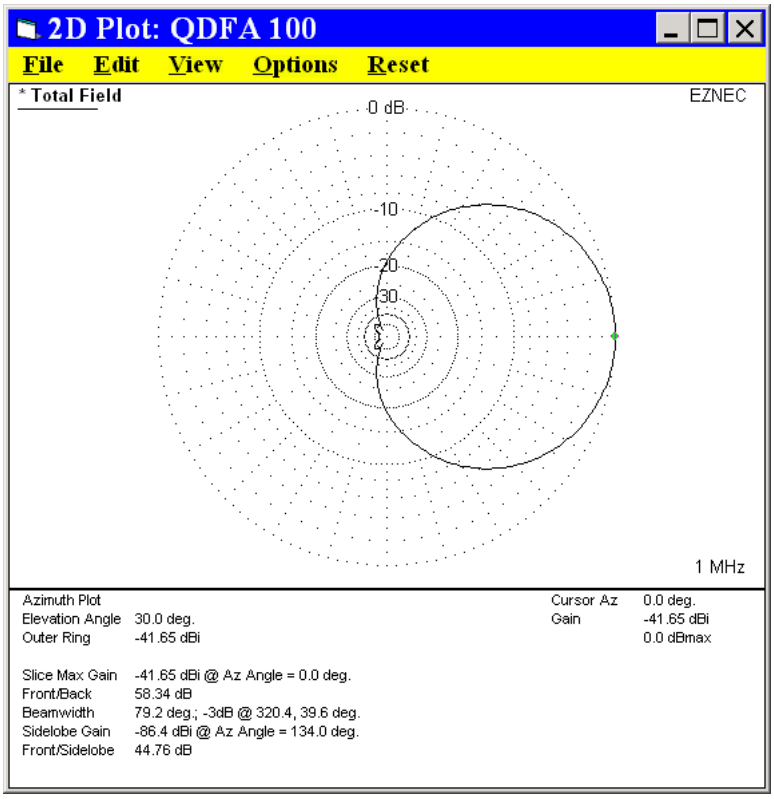
null depth and null aperture, the resulting dual loop pattern would not be anywhere nearly as good as a QDFA pattern.

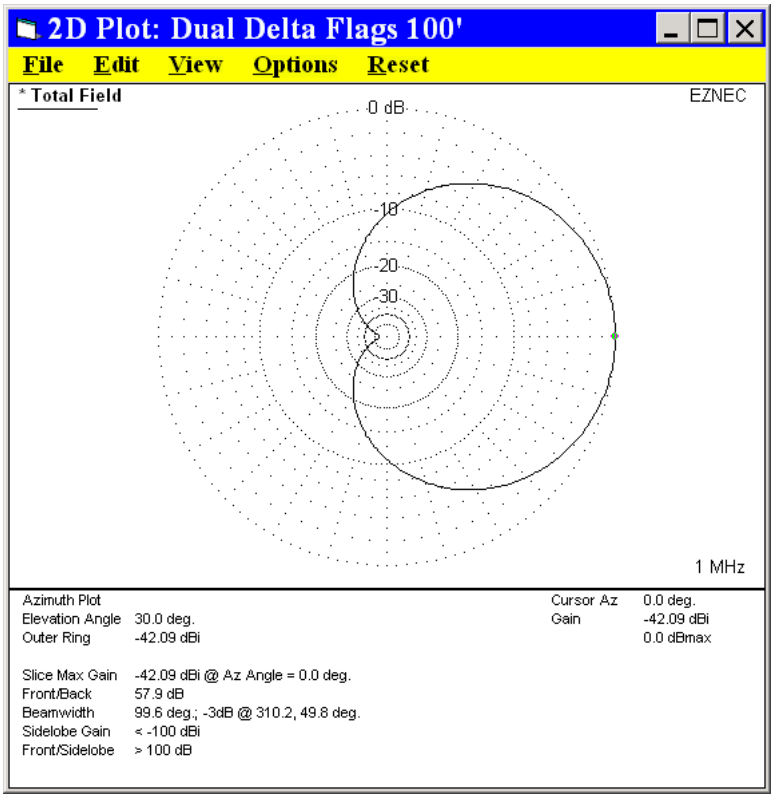
The dual ALA-100 array also does not have as wide null aperture as a DDFA. So if you opt to use a dual array, you are better off using a DDFA.

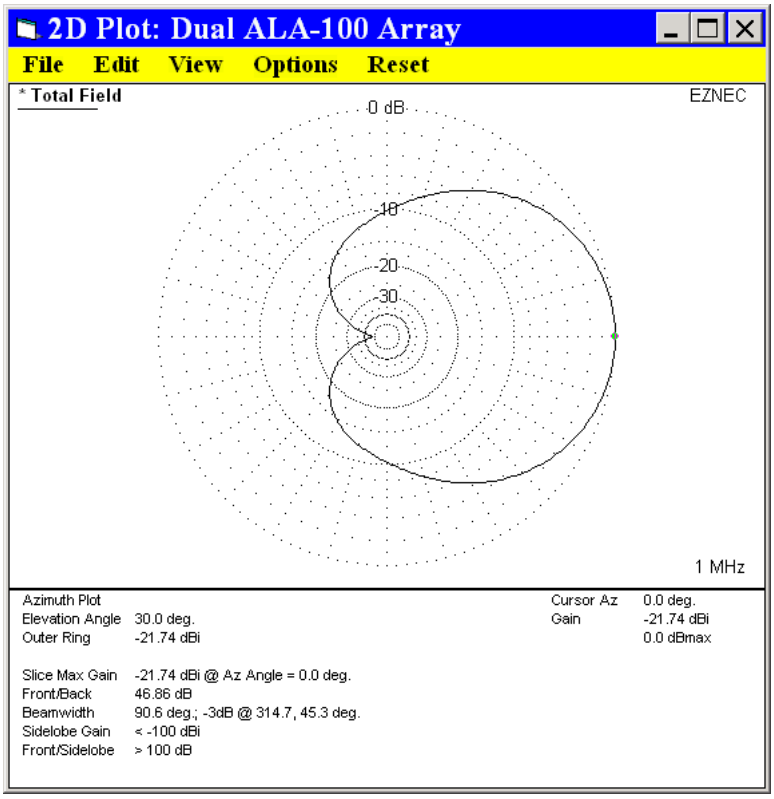
Finally, Wellbrook could not resist exaggeration when one of its dual ALA-100 descriptions claimed, "This Antenna system is **only** Broadband Phased Array to offer a uni-directional pattern similar to the Beverage..." The dual ALA-100 array, past and present, is a distant 3rd behind the QDFA, and inforior to a DDFA.

Two audio wav files are included with this article in the Exaggeration folder, (1) an audio wav file from the dual ALA-100 recording starting about 1258 UCT, 4/19/2009, and (2) an audio wav file from the QDFA recording starting about 1258 UCT, 4/19/2009. Listen to the ALA-100 audio wav file first (it helps to use headphones when listening to the ALA-100 wav file). Did you hear the phrase "VOA" or the two words "coming up"? Then listen to the QDFA audio wav file.

It only takes a glance at the EZNEC simulation graphics below to see why a dual ALA-100 is a distant 3rd behind a QDFA and also inferior to a DDFA. The 30 dB null apertures of (1) a dual ALA-100 is about 30 degrees, of (2) a DDFA is about 90 degrees, and of (3) a QDFA is about 150 degrees. All three EZNEC simulations are for antenna elements spaced 100 feet.




2D Plot: Dual Delta Flags 100'
File Edit View Options Reset
* Total Field
EZNEC
0 dB
-10
-20
-30
1 MHz
Azimuth Plot
Elevation Angle 30.0 deg.
Outer Ring -42.09 dBi
Slice Max Gain -42.09 dBi @ Az Angle = 0.0 deg.
Front/Back 57.9 dB
Beamwidth 99.6 deg.; -3dB @ 310.2, 49.8 deg.
Sidelobe Gain < -100 dBi
Front/Sidelobe > 100 dB
Cursor Az 0.0 deg.
Gain -42.09 dBi
0.0 dBmax


2D Plot: Dual ALA-100 Array
File Edit View Options Reset
* Total Field
EZNEC
0 dB
-10
-20
-30
1 MHz
Azimuth Plot
Elevation Angle 30.0 deg.
Outer Ring -21.74 dBi
Slice Max Gain -21.74 dBi @ Az Angle = 0.0 deg.
Front/Back 46.86 dB
Beamwidth 90.6 deg.; -3dB @ 314.7, 45.3 deg.
Sidelobe Gain < -100 dBi
Front/Sidelobe > 100 dB
Cursor Az 0.0 deg.
Gain -21.74 dBi
0.0 dBmax