4 x 6el LFA-3 @ JA7QVI

Third generation LFA (Loop Fed Array) Yagi

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Agenda

- Development of the LFA over 10 years
- Overview and statement of development of the LFA-3
- Signal to Noise ratio optimisation – the difference
- Hy-Gain produced LFA-3's
- Hy-Gain R&D photos

4 x 5el 50MHz LFA-3 @ KD7DCR

Development of the LFA over 10 Years

- Introduction of the Loop fed Array (LFA) Yagi in 2007
- Low Noise, Wide Band, Ultra-high efficiency
  - No Matching Loss (not heating and thus, no input power limit)
  - Direct 50Ohm feed
- Closed loop = lower noise/static
- Now loop has DC ground
  - Grounded to boom opposite feedpoint
- Out-of-phase ends of loop
  - Assist in very high Front to Side ratio
  - Assist in reduction/removal of side lobes
- Optimised in the elevation plane
  - Ensures maximum suppression in both planes
  - Front to Rear exceptional compared with traditional Yagis

6 x 7el WOS LFA-2 at W7EW

Development of the LFA over 10 Years - 2

- Original LFA
  - Loop paid flat on the boom
  - Standard (straight parasitic elements)
- LFA-2
  - Bent reflector to enhance F/B
  - Enhancement in bandwidth too
- LFA-3
  - Careful, long-term optimisation
  - Boom length increased
  - Element spacing increased
  - Maintained stability in wet weather
  - Even ice coverage shows little change
  - VHF/UHF stability established

2el LFA-2 shows best the bent reflector

Overview and statement of development - LFA-3

''There were two parameters I wanted to achieve when designing the LFA. The first was to produce a Yagi the was designed with Signal to Noise ratio being the a key performance indicator. In addition, to being a Yagi that was unaffected by nearby objects (other antennas) around the antenna or in the field of view along with still being usable in rain, snow and ice.

In order for this objective to be achieved, elements had to be closer together than was considered usual resulting in short antenna to element ratios.

The LFA-3 is the result of many hundreds of hours of re-optimisations while gradually extending the boom length periodically. The result, (the LFA-3) is a much longer, wider spaced Yagi that is both stable in wet or icy conditions, is quiet and delivers high-end performance in terms of gain, per foot of boom.

Justin G0KSC''

Signal to Noise ratio optimisation – the difference

The YouTube video below was recorded by a Canadian ham VA3NCD who had the benefit of two towers. One had his original US designed and produced 7 el 50MHz Yagi and the second, the 7el WOS LFA-2.

The signal to noise ratio difference is clear to see in the display of the IC-7600 as the antennas are switched and also, audibly. The signal strengths are very similar between the two equally sized antennas although weak signals are heard much better on the LFA.

If you can't hear them, you can't work them!

https://www.youtube.com/watch?v=WcFib4PV_RA&t=101s

If there is time, Front to Back Ratio comparison by CT1HZE. 5el traditional Yagi against 10el LFA. There should be 5dB difference in F/B ratio between the two.

No detectable signal on the LFA, S6 on the 5 element!
https://www.youtube.com/watch?v=1eE7j0rvFpU

Hy-Gain produced LFA-3 Yagis

- Working with hy-Gain to produce LFAs
  - 6m, 2m, 222MHz and 430-440 version so far
  - 50MHz 4,5,6,7 and 8 element versions
- Original Hy-Gain hardware and methods
- LFA-3 wide-spaced designs examples below
  - 4el – 12'8'' 10.7dBi, 30dB F/B
  - 5el – 22' 4'' 11.9dBi 30dB F/B
  - 6el – 27' 12.8dBi 28dB F/B
- Available from stock from MFJ/Hy-Gain dealers

Hy-Gain 4el 50MHz LFA-3

Hy-Gain Development Photos

- 5el Hy-Gain 50MHz LFA-3 on test!
- 2'' diameter boom
- Tapered element
- 5, 6, 76 and 8el all HD versions

Hy-Gain Development Photos

- 7el Hy-Gain 50MHz LFA-3 on test!
- 2'' tapered-wall boom
- Tapered element and truss
- 5, 6, 76 and 8el all HD versions
- Stacked configurations available

Hy-Gain Development Photos

- 8el Hy-Gain 50MHz LFA-3 on test!
- 2'' tapered-wall boom
- Tapered element and truss

Questions?

- Thank you for your time!