Detail information regarding the OptiBeam DYA design (Driven Yagi Array)

Usual logarithmic periodic antennas, as fully driven systems, include the following disadvantages:

a. Too low number of elements on the corresponding boom length.

b. Too short booms.

c. The above two criticisms are the result of a too low design factor (high percentage length difference from one element to the other) and of a too small distance factor (short distance between the elements).

d. Based on a stiff mathematical logarithm all elements are driven, hereby especially the lowest and highest frequency range suffer in performance.

e. Usage of a lossy phase line system (usually crossed wire connection between the elements).

In the consistent optimization of our successful Log Yagi system, the above disadvantages are now eliminated more than ever.
Our new DYA design is characterized by the following design parameters:

a. These are Yagi elements, fed in a very special way (see below), plus one plain parasitic director for the two highest frequency ranges, which even shows some efficiency on the other lower frequency bands.

b. The self-resonant frequency of the longest element is defined in a way that it acts in terms of a real (though driven) reflector for the lowest frequency range.

c. Termination of the rearmost = longest element by a stub (short-circuit bar), which works as an active part of this element, thereby increasing gain and making the antenna quieter on the receiving side.

d. Usage of a low impedance loss free square tube phasing line system for the driven = fed part of the antenna.

e. No consequent crossing of the phasing line between the fed elements, instead partially crossing = 180 degrees phase shift between two elements and partially no crossing = two elements fed in phase.
The decision whether a 180 degrees phase rotation or a feeding in phase should be the case is determined by means of a special automated antenna design optimizer.

f. The distance between the individual elements within the fed area is not based on a special logic, their arrangement likewise is a result of the analysis of the automated antenna design optimizer.

g. Taking into account the minimum required physical distance between the parasitic director element and the foremost fed element, use of the maximum boom length for the fed area.

h. Choice of the resonance frequency of the parasitic director element in a way that it produces the maximum amount of gain/performance for the two highest frequency ranges.

i. As a result of the above design specifications, other elements (almost all others) interact for each band range in addition to the mainly radiating elements, whereby the largest possible active radiating area is achieved, which causes an additional increase in performance.
The short parasitic director, as a still current-carrying element, still has an influence on gain and general performance behavior of the antenna even on the lowest frequency band in the hundredths of a dBd range and on the mid frequency area of the antenna in several hundredths of a dBd range.

Due to the factors described above, these antennas are de facto fully driven Yagi systems, which we call "**DYA**" = Driven Yagi Array.

Compared to our previous Log Yagis, a DYA design with the same boom length requires a lower number of elements and at the same time delivers even more performance.
For example, the smallest 20-17-15-12-10m fiveband DYA design, the OBDYA12-5, represents an optimized 3el monoband Yagi on each of the five bands, but compared to the monoband Yagi offers almost 100% stability regarding gain and radiation diagram over the complete respective frequency range.
The Log-Yagis are now being successively replaced by corresponding DYA designs.

For the DYA designs, as with the Log Yagis, the aim is not to replace our multiband Yagis, no, the intention is to offer a corresponding alternative and at the same time an extension of our multiband Yagi program.

Compared to the OptiBeam Multiband Yagis, there are still certain advantages:

1) Despite comparatively longer booms no optical “burden” due to the frontwards noticeably shorter becoming elements.
2) Particularly attractive elegant optical appearance.
3) Electrically extremely weather insensitive.
4) Mechanically disproportionately robust.
5) Very stable regarding gain and radiation pattern accross the entire band ranges.
6) Practically enhanced performance above the purely calculated gain values due to the big actice radiation area.