The InnovAntennas five-element 15m OP-DES Yagi

The Yagi in position for testing.

BACKGROUND. InnovAntennas, run by Justin, GOKSC, is progressing very well since its inception and is now selling into the US market, with an office in Colorado. After testing one of its five-element monoband Yagis for 15m (21MHz) to test.

This wideband design uses what InnovAntennas calls an Opposing Phase Driven Element System (OP-DES). The OP-DES is patented technology that Justin claims offers maximum performance and a wide-bandwidth. Specifically, it offers a 50Ω feed-point impedance without resorting to gamma or other types of matches. The impedance transformation is done within the driven element itself – note the L-shaped driven element in the photographs.

Justin claims that this offers a minimum loss method of ensuring the 50Ω impedance your rig wants to see for maximum power transfer.

COMPUTER DESIGNED. The antenna is computer-designed to ensure minimum side and rear lobes. Justin prides himself on using the latest computer optimisation techniques to maximise gain and obtain the best possible radiation pattern. No detailed tests were done to check the precise side and rear lobe rejection, but it was found to be substantial – around 25dB front to back. It paid to have the station you wished to work ‘on the nose’ of the beam.

CONSTRUCTION. The 15m Yagi uses many of the construction techniques used in the 2m beam we tested last year. The main boom is 1.5 inch 16SWG square section aluminium and the elements are lightweight aluminium tubing. This antenna is made with 3/4 inch element sections in the centre of each element, followed by 5/8 inch and 1/2 inch outer elements. The L-shaped end sections on the driven element are 3/8 inch tubing.

Extensive use is made of marine-grade stainless steel for the fittings and the elements are bolted to the boom using InnovAntenna’s trademark Staff connectors with Allen key-driven fastenings.

This antenna version tested was 6.849m long, although the design has now been modified with two models being available – one 6.2m long and the other with a longer boom at 8.5m. The turning radius was 4.730m and, fully built, it weighed in at 11.47kg.

It could easily be picked up by one person, although fitting it to the tower is another matter. It definitely needs another pair of hands as you are likely to be standing at the top of a step ladder to get it on the mast.

This antenna had a claimed gain at 21.250MHz of 9.36dBi (7.21dBd), with a front-to-back ratio of 26.22dB. In fact, at 15m above the ground InnovAntennas claims the gain is more like 14.56dBi (12.41dBd). Without access to antenna test facilities we were unable to confirm these figures and this review really concentrates on the construction and usage of the Yagi and not the accuracy of the maker’s figures.

The antenna is best constructed on a large lawn. It comes part-built, with all the insulators and boom-to-mast brackets in place. The individual elements need to be added and the driven element needs to be carefully measured and adjusted once it is fitted.

The instructions give you the measurements you need and the whole process is not too onerous.

The end result looks and feels relatively light, but InnovAntennas claims it can withstand winds of 111mph (a 125mph version is available upon request).

All you then need to add is a simple choke balun – InnovAntennas recommends 14 turns of RG213 or similar, wound on a former such as a large spray can. The ends of the connecting coax also need to have two M4 round connectors soldered on for bolting to the boom.

It is important that you waterproof this carefully. Take care, use plenty of self amalgamating tape and silicone sealer, otherwise you will end up with water getting into the braid. The manual recommends using a rubber/ aerospace sealant, which is the preferred method.

SETTING UP. We then fixed it to one of Chris, GODWV’s towers, after setting the height of the stub mast at about 11ft off the ground so that we could slide it on with the driven element towards the bottom.

This worked reasonably well, but you obviously need enough space to do it. We then cranked the mast up a little so that the driven element was about five/six feet off the ground. At this stage we tested the SWR to make sure it was in the 15m band – we found it to be lowest at about 21.079MHz so continued cranking up to the test height of about 45-50ft.

Once completely upright we found that the SWR was very low across a wide range. It remained at 1:1.1 across the whole of the 15m band – only rising to 1:3:1 when we went as low as 20.7MHz and as high as 21.7MHz. Admittedly this was at the end of 120ft of RG213 coax, but I think the manufacturer’s claims of low SWR and wide bandwidth were substantiated.

IN USE. Now this is where it gets tricky – running off a list of DX worked or a comparison of signal reports with another antenna isn’t terribly scientific, for which I apologise. Having said that we found that the antenna equalled or outperformed Chris’s Force 12 C-31XR beam on his other tower by about 1 S-point fairly consistently.

Noise levels were roughly the same. We worked 6V7S (Senegal) with 100W on...
the first call and then VU2XO north of Mumbai, also on the first call, both with the obligatory 59 reports. What was interesting was that this was done without a linear amp and in competition with other callers. After an afternoon with less than perfect ionospheric conditions (SFI: 117, A index: 16, K index: 2) Chris and I came to the conclusion that the Yagi works well.

Over the next few days other DX worked included JA3KVT (Japan), V26E (Antigua and Barbuda) and HZ1TT (Saudi Arabia). In all, Chris concluded that the InnovaAntenna beam at 45ft performed about as well as his Force 12 C31XR did at 65ft. When mounted at the same height, the InnovaAntenna beat the Force 12 quite consistently.

If you were looking for a 15m monoband Yagi, perhaps for a contest station, then the InnovAntennas’ model should be on your list of antennas to consider.

**AVAILABILITY.** The five-element 21MHz OP-DES Yagi (6.2m) is priced at £589.95 (including VAT). The 8.5m boom version is £679.95. Our thanks to Justin at InnovAntennas for the loan of the antenna. Both antennas are available from Waters & Stanton plc and InnovAntennas direct.

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**Inovantennas Competition**

In the May issue of *RadCom* there was a competition to win an InnovAntennas 9-element 2m LFA Yagi. The winner is Mr S R Smith, MOSRS, who correctly answered 1D, 2B, 3C. Our thanks to Waters and Stanton and InnovAntennas for the prize.