

Optibeam OB10-3W 10-element Yagi for 20-17-15 metres

The Optibeam OB10-3W is a 10-element Yagi covering the three bands 20, 17 and 15 metres which was released at Friedrichshafen in 2004. Bob Whelan has been trying it out ...

The Optibeam OB10-3W has three elements each on 20 and 17 metres and 4 elements on 15, with no traps. The boom length is 5.86m and the beam is fed via a balun (with 5kW rating!) and a single feedline. The elements are isolated from the boom. The claimed performance is: 20m 5.3dBd, 17m 5.3dBd, 15m 6.5dBd gain and at 20metres high 12.9dBi, 12.9dBi and 14.2dBi respectively (Optibeam figures).

There was a review of the Optibeam OB9-5 antenna in *RadCom* [1] which covered many of the mechanical aspects of the Optibeam design approach, so these will not be repeated here. It is well worth reading for more details.

WHY AN ANTENNA THAT DOESN'T COVER 10m?

Unfortunately the levels of solar activity are not expected to support much propagation on 12 and 10 metres for some years. Thus the importance of 20, 17 and 15 metres will *increase* as DX contacts become concentrated on these three bands. 17 m is already carrying a lot of DX contacts and is becoming congested at times. I had already designed and built a highly effective beam for these bands [2] but it was quite large and showing signs of corrosion and metal fatigue. It was time it was replaced.

In March 2004 I had the good fortune to meet Tom, DF2BO, during my RSGB Commonwealth Contest operation as V26DX from Antigua. V26DX is equipped with the Optibeam OB16-7, a most impressive beam – but a bit too big for my garden! Talking to Tom about antennas he showed me the EZNEC plots for a new beam he would release at Friedrichshafen in 2004, the OB10-3W. I decided that this would fit in well with my style of operating and agreed to take one of the first models.

MECHANICS



The antenna is packed in a 2.5m box which just fits into a normal car with the back seat lowered – which is how it came home from Friedrichshafen. On unpacking it was clear that high quality materials have been used. All the components were very clearly marked and grouped. There is really no need to even have a tape measure as all positions on the boom and elements are marked. The taper sections of the elements fit together unambiguously using the Optibeam locknut and capscrew arrangement. The three boom sections are joined with internal fishplates with captive nuts. This results in a very strong and well aligned joint. The drilling is so good that not a single hole had to be 'eased'. Allen keys and a tube spanner are supplied to cover all screws and locknuts – a nice touch and one which saved time looking for the right tools or even worse using the wrong sized ones. A few spare screws and nuts were included too – a sign that Optibeam know what happens when assembling antennas! I used an automotive thread grease to guard against corrosion as the air quality is still quite corrosive in the UK. However, as the OB10-3W does not have traps this results in far fewer joints per element than a

The Optibeam OB10-3W up in the air at G3PJT.

trapped beam. Fewer joints mean fewer corrosion possibilities.

ASSEMBLY

I always assemble my home antennas by myself so I know what my physical limitations are in terms of antenna size and weight. I have a tilt-over tower and I assemble antennas on the tower stub mast in the tilted over state.

The approach I followed with the OB10-3W was as follows:

- ♦ Assemble all the half-elements undercover in the garage.
- ♦ Assemble all the element-to-boom plates on the three boom sections.
- ♦ Fix the mast-to-boom fitting on the centre boom section (this is the only time a tape measure is needed).
- ♦ Fit the centre section of all the elements into their respective clamps.
- ♦ Fit the phase line tubes on to the centre section including the balun. These are slightly sprung when fully tight.
- ♦ Paint all the exposed aluminium with matt light colour outdoor paint (this reduces corrosion and environmental impact – see later).
- ♦ Fix the boom centre section to the stub mast and align with rotator etc. Attach the feedline.
- ♦ Assemble the elements on to the centre section.
- ♦ Partially raise the tower and fit on one end of the boom and then the respective elements for that boom section.
- ♦ Raise the tower to vertical and rotate the antenna by 180 degrees.
- ♦ Luff the tower over again and fit the third boom section.
- ♦ Tighten the truss to support the boom.

In this way one person can easily handle the 33kg of the OB10-3W since all the parts which have to be lifted are within the physical ability of a normal person.

The enormous benefit of the square boom now becomes apparent. It ensures that the boom is at right angles to the stub mast and that the elements are all also at right angles. It is almost impossible to achieve the same degree of alignment with a conventional round-section boom. Total assembly time is about two or three days though I have heard that a team of two assembled a similar Optibeam in an afternoon.

ENVIRONMENTAL ISSUES

The fact that the elements are all in the same plane reduces the apparent visible size of the antenna. This is a direct result of superior element and boom alignment and the absence of traps. Although Optibeam have used

dullish finish alloy, a coat of light colour matt paint (green, grey or blue) further reduces the visual impact of this antenna by reducing glint when the sunlight shines on it. I think it looks smaller than it really is and doesn't catch the eye. Good news for your neighbours and you too.

PERFORMANCE

It is almost impossible for the amateur to make quantitative assessments of HF antennas – even the professionals struggle. So what follows will have to be some views from a reasonably experienced HF operator.

The first impression was that the antenna seemed to be 'quiet'. That is, it does not seem to pick up noise. I believe this indicates a good clean azimuthal pattern with good balance on the feed point. The front-to-back ratio seems to be around 20dB on most signals, bearing in mind the various angles of arrival of HF signals and the inevitable QSB. The beam width is as predicted by *EZNEC*.

It does seem that the performance

	Lower band edge	Mid-band edge	Upper band edge
21MHz	1.3	1.05	1.3
18.1MHz	1	1	1.05
14MHz	1	1.2	1.4

on 17m especially is much better than I expected. I based this view on its 'pile-up cracking ability'. Also I have had some good longer chats with DX stations on 15m – a sure sign that you are a good signal. There is of course a 'new antenna effect' in this assessment.

I made a few SWR measurements and these are shown in **Table 1**.

These are very good and show that Optibeam must have really mastered the *EZNEC* design software they use. The SWR figures are very flat and should not cause a problem with any transmitter. Further, they should allow any output filters to work correctly.

CONCLUSION

The Optibeam OB10-3W represents a first class antenna for the coming

low sunspot years. An excellent standard of design and construction means that it should last a lifetime. Its low environmental impact represents a further added advantage.

The Optibeam range of antennas, including the OB10-3W, is available in the UK from Vine Antenna Products, Taranaki, Four Crosses, Powys SY22 6RJ; tel: 01691 831111; e-mail: info@vinecom.co.uk The list price is 1369 euros (approximately £959), but please check with Ron Stone, GW3YDX, at Vine as fluctuations in the exchange rate can affect the UK price.

REFERENCES

- [1] 'The Optibeam OB9-5 Multiband Yagi Reviewed' by Peter Emmerton, G4IOV / 3W2EA, *RadCom* August 2003, page 31.
 [2] *CDXC Digest* (the members' newsletter of CDXC, the UK DX Foundation), September 2002, page 33.

WEB SEARCH

Optibeam: www.optibeam.de
 Vine Antenna Products: www.vinecom.co.uk