

## Multi beam antenna *Wavefrontier TOROIDAL-90*



With an antenna like this you should be able to receive as many as 10 satellites having an EIRP of approximately 50 dBW at your site – without a motor! In the Ku-band, a 90-cm reflector leaves almost nothing to be desired these days, given the number of powerful DTH satellites that populate the orbit. So it was with great expectations that we installed and tested the TOROIDAL-90.

The shape of a regular offset or prime focus dish results in an exactly defined focal point. If three LNBS are mounted on a single dish, only one can be in the focal point, the other two have to be offset. A toroidal antenna, on the other hand, has a focal *line* rather than a focal point. Each LNB can therefore enjoy the same level of amplification.

The main reflector measures only 96.7 cm by 108.6 cm and the sub reflector is 36.1 cm by 83.6 cm – and they effectively replace several single 90-cm dishes with a gain of 40.1 dB at 0° azimuth and 39.2 dB at 20° azimuth (at 12.5 GHz).

## Installation

The package we received included all necessary components of the antenna. Only the LNBs and the appropriate DiSEqC switches do not come with the set. We already knew from previous experience that only small L-shaped LNB's could be installed on the antenna. And since we had the new coloured mini-LNB's from ALPS also waiting to be tested, we used them for this purpose.

Assembling the antenna was extremely easy. The assembly manual that comes with the package guides you through the process step by step. Also, the new model now has a 60 mm pole fixing.

Two robust support arms lead to the front from behind the main reflector and carry the sub reflector. A slightly angled rail is fixed between the two reflectors – this is where the LNBs are to be mounted. To raise it up, it is mounted on plastic bases that are screwed to the support arm from below. The fixing of the rail on the bases is now very robust, unlike that of the TOROIDAL-55.

## Antenna alignment

All satellites (for UK, in our case) are included in an illustration that comes with the package, complete with the correct information about which satellites can be received with the 90-cm dish. A transparency is also included and if you place it over the illustration you can find out which satellites can be seen from your current location. In a first test all satellites between Europe\*Star and Eutelsat W1 could be received, which is an elevation difference of approximately 13°. And all this with a single fixed antenna! At 0° tilt an azimuth range of 50° is practical, and if you use the small ALPS LNBs you can even achieve 3° spacing between satellites. Which means that it is theoretically possible to receive up to 16 satellites, providing you also use appropriate DiSEqC switches.

At our test location (51° north/0.5° west) HOTBIRD was selected as the central satellite for our second test, while to the left and to the right, converters for ASTRA 1 and 2,, EUTELSAT W1 and W2, SIRIUS, THOR, and TELECOM 2 were set up. The azimuth scale on the LNB rail is almost identical to the real angular separation of the satellites in degrees. This way the individual positions for the LNBs can be identified in only minutes. After setting the basic elevation the antenna only had to be carefully aligned towards the south until the antenna signal meter detected the best signal from HOTBIRD. The remaining 9 satellites were also aligned perfectly and no correction was required.

The C/N values for ASTRA and HOTBIRD ranged between 10 and 21 dB, depending on the digital transponder. TELECOM is lower in UK, which means we had to accept a C/N level of 24 dB., THOR and came in with a C/N level of 10 dB again. For home reception these are acceptable results. The further you look for satellites to the east or to the west from your own position, the

lower the elevation angles for the individual satellite become, which normally means that TURKSAT, for example, could only be paired with EUROPE\*STAR. Not so with the TOROIDAL-90, because the dish is tilted in itself in order to accommodate the steep elevation change so that all satellites positioned within the 50° azimuth range can be received. As soon as we had installed 8 LNB's and performed an automatic search we found that the 3000-channel memory of our satellite receiver was too small to retain all the receivable channels.

## **Conclusion**

The TOROIDAL-90 is a genuine innovation. If you want to receive several Ku-band satellites east or west of your basic south direction, this antenna is superior to any rotary system. LNBs are very inexpensive these days, and the prices for a TOROIDAL with several LNB's and a rotary system with one LNB, will be about the same in the end. The TOROIDAL does not have any mechanical parts that are exposed to wear and tear. Even more important is the lack of any noise whatsoever when changing satellites. And even if a new satellite needs to be included all you need to do is spend £40 on another LNB. Of course you need the corresponding DiSEqC switches to control all the LNBs. The manufacturing quality of the antenna is top notch, the installation is very easy and the alignment doesn't take more than a few minutes. All this is a decisive plus when compared to a polar mount antenna. Whilst we had criticised some aspects of the TOROIDAL-55, we can recommend the 90 model without restriction for multi-satellite reception.

Model: TOROIDAL-90

Function: fixed antenna with sub reflector for several LNBs

Maximum no. of LNBs: 16 (practically)

Gain: 40.1 dB at 12.5 GHz (0° azimuth), 39.2 db at 12.5 GHz (20° azimuth)

Efficiency: 65-80 %

Reception range: 10.95-12.75 GHz

Wind load: max. 45m/sec.

Azimuth: +/- 25° (total 50°)

Elevation: 0-90°

Pole size: 60 mm