



PES Antenna Pointing

Distribution:	All Engineers
Category:	Installation
Effective Date:	09/04/2002

Overview.

The HNS PES product range has a built in pointing facility, which enables installer to accurately align the antenna to the correct service.

The method uses relatively low cost equipment, without the need for expensive spectrum analysers.

The Recommended equipment to point an antenna is as follows:

- Compass
- Inclinator
- HNS DIU editor software 5.55
- GPS
- Voltmeter
- Full installation tool kit

Site specific information.

To successfully and quickly point the antenna the following information is required:

1. The Latitude and Longitude of the antenna to be installed (as accurate as possible)
2. The satellite required
3. The Receive polarity
4. RPR form for site to be installed (including MSB/LSB)

NOTE:

This following procedure assumes the antenna is already on its mount, with the RFU in position and has the IFL cable connected.

Procedure.

1. Obtain your exact location with a GPS and record the given information.
2. Launch DIU editor 5.55 on your PC.
3. Select 'Utils' then 'Latlong'
4. Enter your Latitude, Longitude and your required Satellite location as shown below and hit 'Compute'.

REMOTE SITE INFORMATION											
Latitude :	52	deg	3	min	N	Longitude :	0	deg	45	min	W

SATELLITE INFORMATION								
Satellite name :	Satellite #1	Satellite #2	Satellite #3	Satellite #4				
	Eutelsat	Nothing	Galaxy 3R	GStar 4				
Satellite location (Longitude)	10	E	1	W	1	W	1	W

COMPUTED ANTENNA POINTING PARAMETERS				
LM46 Space Timing Offset (usec) :	20302	20803	20803	20803
UMOD Space Timing Offset (usec):	20082	20583	20583	20583
Remote timing offset (ticks) :	0A7C	C878	C878	C878
Beam elevation (degs) :	29.6	30.5	30.5	30.5
Round reflector elev (degs) :	7.0	7.8	7.8	7.8
Rectangular reflector elev (degs) :	18.3	19.2	19.2	19.2
Azimuth angle (degs) :	166.5	180.3	180.3	180.3
Horz Polarization angle (degs) :	8.3	-0.2	-0.2	-0.2

5. A number of pointing parameters will appear, as in the example above.

We are interested in the following:

- Remote timing offset (ticks) 0A7C (used as initial timing offset)
Used while programming the PES for the initial timing offset
- Beam elevation (degs) 29.6 (used to calculate antenna elevation)

Note: Each HNS antenna has a built in 'offset' angle, this means that if the antenna back plate is at 0° Vertical/Perpendicular, it actually looking at an angle of between 15° and 18°. So when calculating the angle we must minus the antenna offset from the beam elevation to get the angle to which we look for on our inclinometer.

Prodelin antenna offset angles-	89cm	15.80°
	98cm	16.14°
	1.2M	17.30°

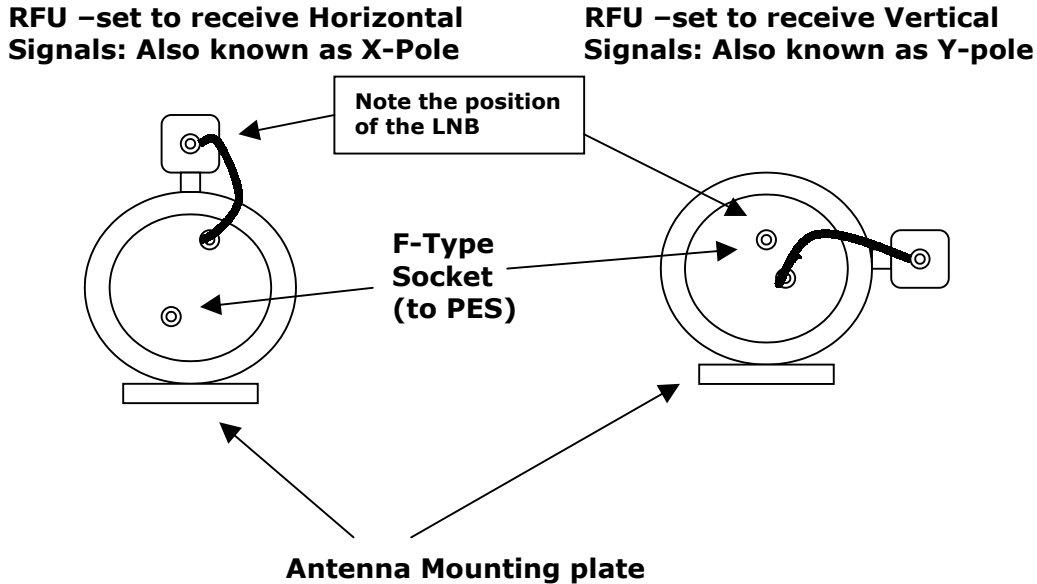
e.g. 89cm antenna has an offset of 15.8°, so we minus 15.8 from 29.6=13.8
With our inclinometer set for 0° at vertical we simply adjust the elevation until we reach around 13.8° before we attempt pointing.

- Azimuth angle (degs) 166.5 (compass bearing for satellite location)

We can use this bearing to be within around $2/3^\circ$ of the satellite azimuth.

- Horz Polarisation angle (degs) 8.3 (skew adjustment of RFU)

When the RFU is set for Horizontal polarisation, we have + or – the given polar angle, by adjusting the RFU. For Vertical polarisation, we have to adjust the RFU 90° before we make polarisation adjustment.



6. 'Clear' all parameters from the PES before entering the information from the RPR into the PES as shown in the 5.55diu editor manual.

Remember to 'Write' when this is complete!

7. 'Switch' the PES into 'installation' mode, the PES resets and displays a voltage in the top right hand corner of the LCD display of the PES. Typically this is around 5-6v on the PES.

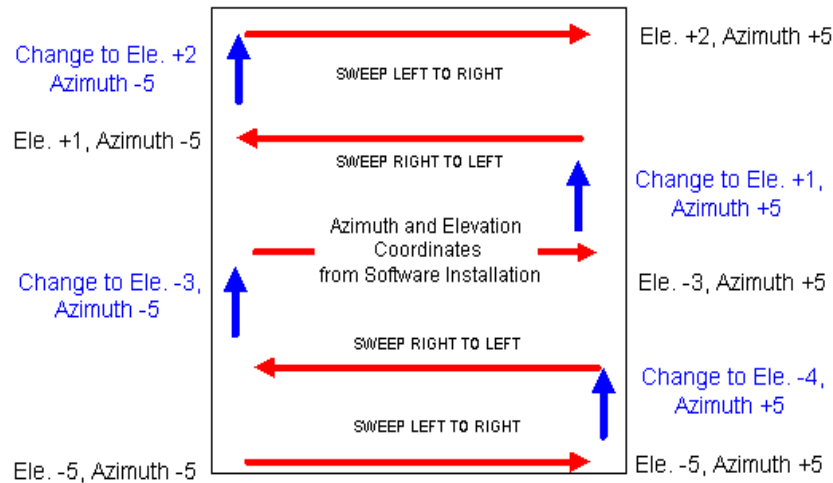
8. We now return to the antenna:

- a) Check/adjust the azimuth angle, so the antenna points in the direction of your compass bearing given by the DIU editor calculation. Lock the AZEL head in position, and secure it locking nuts (the azimuth adjustment rod should be in middle of its thread, so the antenna is balanced. This adjustment should be finger tight at this stage!).

- b) Check/adjust the elevation angle as described in (5),

- c) Connect your voltmeter to the 'AP' (antenna pointing) port of the RFU; use a 'F' to 'reference point' adapter to make a good connection.

- d) Select DC voltage (and if using a digital meter); ensure the 'range' is set to 00.0 volts (one decimal place), as the voltage will fluctuate greatly on a wider range.
- e) Drop the antenna elevation by around 5°, and move the antenna 5° off direction. Then slowly begin to sweep through the satellite direction, carefully watching the voltage for fluctuations. If no fluctuations are observed increase the elevation by 1° and repeat the process. As shown in the table below.



- f) The lower the voltage the better, around 5volts is a satellite, but not necessarily the correct satellite.
If you get a voltage around 5volts optimise for the lowest possible, it can take around 30 seconds for the PES to lock on to the signal. If the voltage does not drop it is not the correct satellite!

- g) Here is a brief guide in to the voltages:

6-8 volts	No satellite
Around 5volts	A satellite, but not the correct satellite
Between 4 & 0 volts	Correct satellite- optimise for the lowest voltage possible around 0.5 > 1.5 volts is typical.

- h) Be patient!
Antenna pointing can be difficult (or impossible!) if data is not entered into the DIU accurately.
Other factors can have a great impact on the time it takes to complete the antenna alignment.
e.g. If a mount is not installed perpendicular, any angle measured on the antenna will not be a true measurement.