

Internet controlled 23cm EME beacon by OE5JFL

The station consists of a 5 meter dish (f/D=0.5), 100W SSPA at the RA3AQ feed, DB6NT preamplifier and transverter, FT817 and a webcam.



Access to dish control and the transmitter is possible via internet by a small microcontroller webservice.

The beacon can serve as a signal source with different power levels and you can measure sunnoise with it as well. So you have the possibility to make comparisons with your own equipment.

Now the functions in detail

Positioning of the dish to: MOON, SUN and STANDBY position

Transmitting a standard text for 1 minute with levels: 100W , 10W and 1W

Input of an offset +/- 9.9deg in azimuth and elevation for optimizing the position

To control the system go to the internet page:

<http://member.eduhi.at/OE5JFL>

There you find the **beacon frequency** and a link to the **beacon main page**,
(see the screenshot below)

EME-BEACON OE5JFL

2008-06-10 15:46

TARGET: MOON

AUTOTRACK ON OFF CONTROL FREE BUSY TX ENABLED DISABLED

RX: 05.6dB

STEP: 0.5

AZ_targ:	151.7	EL_targ:	+38.8
AZ_corr:	+0.2	EL_corr:	+1.2
AZ_ant:	152.0	EL_ant:	+40.0

[control](#)

This page is refreshed every 5 seconds automatically, it shows you the position of the moon (or the sun), the position of the antenna and it's correction values, and some status lamps.

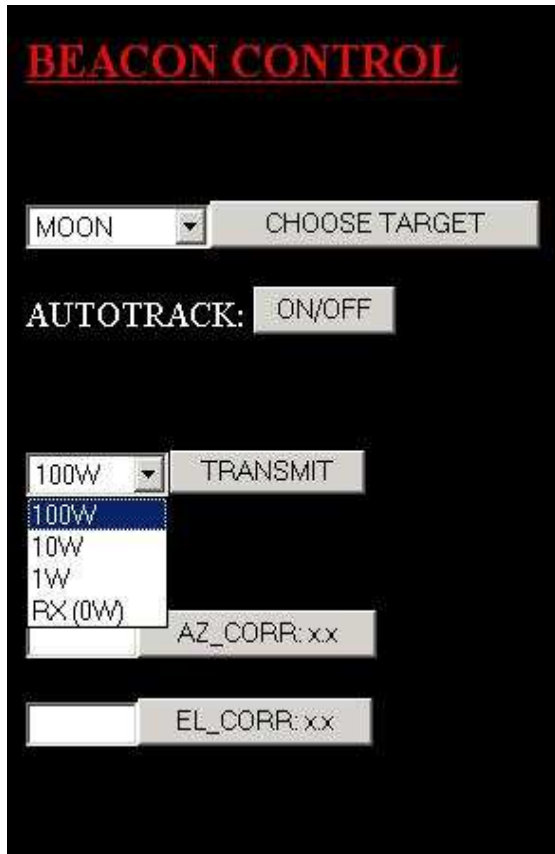
Sometimes the auto-refresh does not work very well, if the reloading of the page stucks, refresh it via your browser.

Click now at **control**, and a new page will open, asking for the login text.



Type the correct login text here (you can get it from me by email), and click “OK”

Now the **control page** will open, and you can activate the beacon step by step:



If the target is different from MOON (look at the main page), **choose MOON** now.

Then click AUTOTRACK, the **red lamp** on the main page (AUTOTRACK OFF) should **change to green** now (AUTOTRACK ON). You can see the changing dish position at the main page and watch the antenna movement via the webcam as well.

(The BUSY/FREE lamps switch from green to red, indicating that you are controlling the system.)

If the antenna is closer than 5 deg to the moon in Az and El, not blocked by the building, temperature and SWR o.k., **the TX will be enabled (green lamp instead of red on the main page)**

Now **click on TRANSMIT** with the power level of your choice.

A transmission will last for **one minute**, starting with text and then 2,5sec dashes with 2,5sec pauses between for the rest of the time at the 100W level, a continuous carrier at the 10W and 1W level. During the transmission you see the transmitted power indicated on the main page instead of the RX noise level.

Choosing RX(0W) from the menu, will immediately stop the transmission.

After some minutes of inactivity, the system falls back into the CONTROL FREE and AUTOTRACK OFF status. If you want to continue, don't forget to click AUTOTRACK again. Also be sure that the main page is refreshed.

For measuring sunnoise track the sun, read the noise in dB from the main page, then turn the dish away from the sun (the 9.9deg offset should be sufficient) and calculate the drop in noise.

Miscellaneous:

Squeezing all pages including the webcam picture into a single browser window is not possible with the very small microcontroller webserver, maybe I will replace it later.

Echo testing with the beacon gave the following results at perigee:

10W.....always audible

5W.....audible most of the time

2W.....sometimes audible, most of the time traces on waterfall screen

1W.....sometimes traces on waterfall screen

Therefore with a well designed system using a 2m dish the beacon should be heard without problems at the 100W level.

On that occasion I want to thank **GLYN** company in Germany, sponsoring us with four RA18H1213G modules, which gave us in combination the 100W at the feed.

The antenna is more or less blocked by buildings in some directions. To the east and to the south 20deg elevation are sufficient, but to the southwest 35deg are necessary. If the dish has no clear sight, the transmitter will remain in the disabled status. I plan to add some panorama pictures to the internet page mentioned above, so you have an idea what the best positions will be.

I plan to leave the transmitter switched on during weekends and on demand via email also during the week.

The whole system is at a school, so there can be a lot of internet traffic during the week and as a result a slower access to the beacon.

The antenna, position encoders, feed, SSPA and microcontroller systems for tracking and keying were built in the technical high school where I work as a teacher. Five of our pupils made this as their final project before leaving the school. They were very happy and excited to hear echos from the moon.

You can imagine that they got quite good marks from me for their work ;-)

Enjoy playing with the beacon!



OE5JFL

