

Q&A about Geodesic Parabolic Antenna at the Ham Fair 2004

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At the Ham Fair 2004 (August 21–22), my "Geodesic Parabolic Antenna" was put on display. (Big thanks to JA1DUC and JF1WKX)

I've put together a list of the questions I got at the booth and my answers to them. I hope this helps anyone thinking about building their own.



Photo-1 : The antenna on display with the builder, Mr. Ozawa (JA1DUC).
(Photo credit: Mr. Katsuma / JF1WKX)

Q1: Oh, I get it! You just bend it roughly into shape and then hunt for the focal point later, right?

A1: Actually, no. I design the parabolic surface and fix the focal point right from the start. I calculate the exact position of the screw holes to create that curve. You don't need to manually bend anything—when you tighten the screws at those specific spots, the material naturally curves into a (near-perfect) parabola on its own.

Q2: But isn't the surface accuracy kind of rough?

A2: At most, some spots are about 10mm off from the ideal design. Since the wavelength for the S-band is about 13cm, a 10mm gap is less than 1/10th of a wavelength. Any drop in performance is pretty much negligible.

Q3: Doesn't the frame sitting in front of the mesh mess up the reflection?

A3: Same reason as A2—the effect is so small you won't even notice it.

Q4: How did you cut the mesh pieces?

A4: I split it into 6 sections to keep it from wrinkling. There are 3 trapezoid pieces for the center and 3 triangular pieces for the outer part.

Q5: Do I need to align the mesh grid perfectly?

A5: No need. The mesh is fine enough compared to the wavelength that it doesn't matter.

Q6: This mesh feels so soft... is it just dummy nylon or something?

A6: Nope, it's stainless steel! It's only this soft because the wire is very thin and has a specific coating.

Q7: Doesn't that coating have a negative impact?

A7: Technically, it might cause a bit of loss. I personally use an uncoated aluminum mesh. But honestly, the difference is likely too small to even measure.

Q8: Do I need to be super precise with the construction?

A8: You don't need to stress over it. I built mine using just a hacksaw and a hand drill. Even by hand, you'll probably hit about 1mm precision, which is

plenty.

Q9: How long does it take to build?

A9: In my case, it took one day for the frame and another day to attach the mesh.

Q10: It looks really light. How much does it weigh?

A10: The reflector itself is only about 1kg. The base is actually the heavy part!

Q11: Wow, this tripod (owned by Mr. Ozawa) is impressive!

A11: Yeah, the real enthusiasts always seem more interested in the tripod!
(laughs)

Q12: Was this center plate in the middle hard to make?

A12: That's actually just a pie tin from a 100-yen shop! It's better if the plate isn't too big. If it's too large, the frame doesn't curve right when you tighten the screws—it ends up too flat. As I mentioned in the build guide, use washers to adjust the "bumps" of the frame.

Q13: What kind of wire are you using to tie down the mesh?

A13: Stainless steel wire. This specific thickness is the easiest to work with. If it's any thinner, it snaps too easily; if it's thicker, it's too stiff to handle.

Q14: What's the frequency limit for this?

A14: I'd love to experiment and see if we can push it up to 10 GHz.

Q15: What's the gain?

A15: Based on the diameter, I estimate it's around 23 dBi for the S-band.

Q16: The frame looks so thin... is it flimsy?

A16: Not at all! Since it's made of triangles, it's actually very sturdy. Plus, it's elastic, so if it gets bumped, it just snaps back into shape. Traditional antennas with pre-bent pipes can't do that; if they get bent further, they just stay bent or break.

Q17: Still, it must be a pain to bend all those frame pieces into shape, right?

A17: Like I said... you don't bend them! You just screw them together and—presto—you have a parabola! (Back to Q1 !)

