



# GETTING ELEVATION FOR SATS

ANOTHER N3BYR IDEA

# BACKGROUND

I have been starting to play with satellites lately and have enjoyed them. Not only have I made many contacts that I would normally not make on VHF/UHF, but I have had some spectacular contacts like contacting Dr. Kjell Lindgren of NASA on the International Space Station. My setup is low budget, but I'll get there over time... there is a way to get into satellite work with minimal equipment and I'm doing it currently, but you hit a point where you want a little more reliability. My first attempts to work the birds was done on my weak signal station, catching them at low elevation, but I had to be quick! My next iteration was taking two of my older weak signal antennas for 432Mhz and 144Mhz and retuning them for 145 and 435 where satellite typically reside. After a retune on the antennas I bent a piece of EMT conduit at 25 degrees, mounted the two retuned antennas, and strapping it to a cheap TV rotor (RCA with 2-digit readout), and have been able to hit almost all the birds except above 65-degree elevation. The next two changes should be obvious... I needed elevation and RHCP (Right Hand Circular Polarization) to address signal losses and elevation losses. One other consideration is I want to try some EME, and I need a bit more to do EME... like stacked yagi's.



# MY FIRST TRIPOD FOR SATS

- My first iteration on the tripod was two yagi antennas on a pole bent back 25 degrees
- This was perfect for most passes except directly overhead.. A simple RCA TV rotator works wonderfully



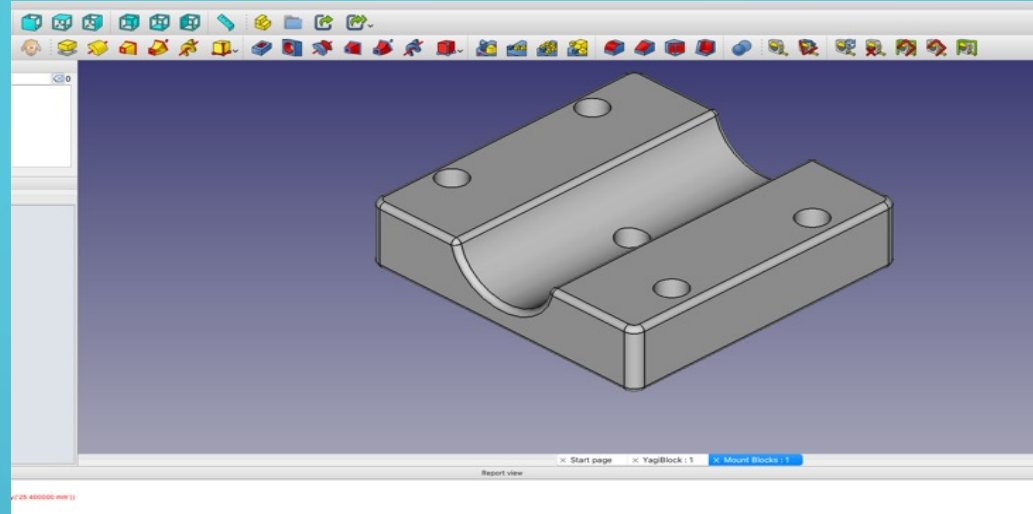
## PARTS ACQUIRED....

Talking to a ham in Florida Terry (N4TWX) said he had an old alliance rotor laying around somewhere that had a through hole. When he located it, he sent a picture to see if I could use it. The rotor is an older (maybe circa 1970 or 1980) TV rotor, but oddly has a straight through the center mast mount. I decided to give it a whirl and he shipped it up to GA. When it arrived, I plugged it up and rotated it a few times on the bench. Hardware would need to be replaced, mounting bracket would need to be changed somehow to mount it at 90 degrees, and an H-Frame would most likely need to be constructed... I set to work early Sunday morning...

The first order of business was to remove all the old mounting hardware and get measurements. Most of the hardware was toast, and Florida has plenty of corrosion enhancing air. Removing the carriage bolts proved interesting, trying to keep the swaged material in tack to use again. Once the hardware was removed, I debated on how to set up a mount. Since I am by trade a former machinist and fabricator, I took to 3D printer early on and already had a homebrew 3D printer. I took my measurements off to the computer room to toil away on the CAD software and make something basic. The overall mount is a split block (identical opposing pieces) with 4 bolt holes for the mount point. A fifth hole was added to the center of the block to go through a 8" section of mast to pin the mast and prevent slipping on azimuth or drifting down the mast.



# SOME PLANNING AND ASSEMBLY



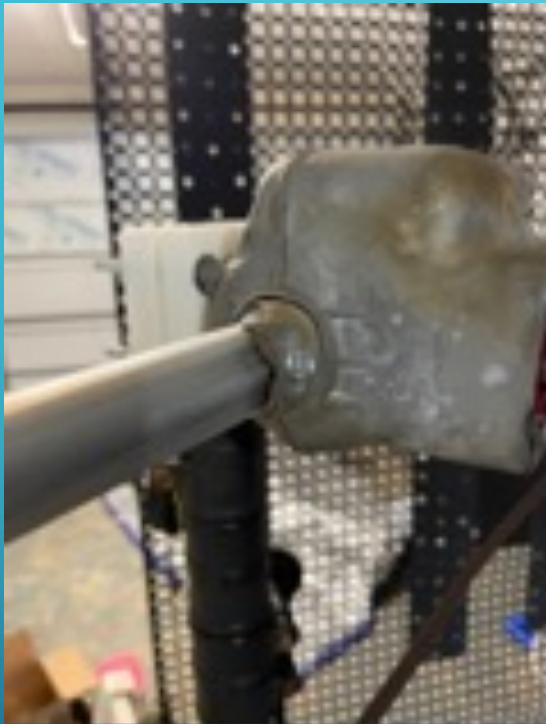
## SOME FITMENT AND ASSEMBLY....

After testing the fitment of the newly printed blocks that took about 4 hours to print, I mounted the rotor on a test tripod in the shack and took measurements of the mast hole on the rotor. Because I planned to use 1" diameter EMT conduit for a small H-Frame, I needed to print bushings. The diameter of the rotor hole was around 1-3/8" and EMT conduit is around 1-1/8". After printing the bushing, I slid the mast section in with the bushings and pinned the mast with two large sheet metal screws to prevent slipping on the elevation axis. Now to build the H-Frame that will hold some lightweight antennas

A quick run to the hardware store provided me with another section of EMT, 8 U-bolts, and a slab of steel plate stripping. I marked out and split the EMT into half, then marked, cut, and drilled holes into two small pieces of plate that I cut from the steel strip. This provided me with a good 90-degree bracket to mount the cross masts with. I may later drill a center hole through both pieces of conduit to pin them, for now they appear to hold great. Since the whole assembly will not be higher than 8-10' off the ground, I can make those modifications later. A few tests and everything looks good to go and I'm ready to move the new elevation assembly outside to start mounting some antennas



# SOME MORE ASSEMBLY





AND NOW WE HAVE ELEVATION....

