Welcome to AntennaSelect™ Volume 36 – February 2018

Welcome to Volume 36 of our newsletter, AntennaSelect™. Every two months we will be giving you an "under the radome" look at antenna and RF Technology. If there are subjects you would like to see covered, please let us know what you would like to see by emailing us at: info@micronetixx.com

In this issue:

TV Transmitter Displacement Window

The FCC just announced a special filing window for certain LPTV and translator stations. The window will run from April 10th to May 15th at 11:59 P.M.; Eastern time zone. Stations that were licensed or had a license to cover applications filed by April 13, 2017 are able to participate in this Filing Window.

Displaced LPTV's, translators, plus analog to digital replacement translators can file. The good news about this filing window is applications are treated equally and are not first-filed dependent. That will give station owners and their engineering and legal representatives more time to prepare.

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All displaced LPTV and translator stations will be repacked in the spectrum from channel 2 to 36. It is expected that in crowed portions of the county there will not be enough spectrum to accommodate all stations. Limited space might be available in high band VHF or low band VHF, where UHF space is not available.

At Micronetixx we are ready to help. We offer a number of options for LPTV and translator operators in all three bands. We take on a lot of custom applications that are **not** in competitors' catalogs. For example, our low power slot antennas, the **LP-1900** Series are built in one-bay increments from 4 to 12 bays. Larger bay count antennas are built in two bay increments up to 32 bays. We customize the beam tilt and null fill as needed – and there is no extra charge.

For azimuth patterns, we have a large catalog of patterns we have provided. Getting the right pattern to make your filing work is something we love to do.

For VHF high band and VHF low band, we offer lightweight antenna options. Both of these options are circularly-polarized, which is essential for optimal performance and reception.

Two bay THV antenna

A 4-bay THV high band VHF antenna on channel 10, has a weight of 77 lbs, a wind load area of 2.4 square feet, and needs just 19-1/2 feet of clear tower space. The 4-bay model has a power gain of 1.30 and can produce an ERP of 5 kW (Circular Polarization). And the best thing of all – a 4-bay THV antenna is only $11,525.00.

FM Translator Antennas – Questions Coming In:

The FM translator filing window is over. Now comes the hard part; -how to implement the antenna system. So here are some of the questions we have been getting:

One customer has a small-face Rohn tower he would like to use. The problem is that there is not enough space vertically. So he was wondering if he could get a new top section with a tapered top to allow mounting something on the order of a 15 foot pipe extension above the tower top. From a mechanical standpoint, with our FML FM bays, the loading on the pipe would be small. Two bays would mount on the pole and two bays would mount on the tower itself. We indicated that this would not be ideal as having part of the array pole mounted and part tower-leg mounted could affect the tuning of the antenna. The best approach would be to extend the tower and place an offset pole about 18 to 24 inches off the tower leg or face, with the antenna mounted to that pole. With more uniform spacing between the bays and the support or mounting structure, the array when installed should work beautifully. As a side benefit, there will be less azimuth scattering, making the pattern more omni-directional.

Another operator has use of a water tower. It is a 1960's design with 4 legs and a tank on the top. There is a catwalk around the tank with a ladder accessing the top. Several cell antennas are mounted around the catwalk. Where is the best place to mount the FM translator antenna, and is there a bay-count that is optimum?

Assuming that a minor change in height could be approved, mounting the antenna at an elevation above the top of the tank would be ideal.

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In his case, there were ample places to secure a mounting pole or small-faced tower to structural members at the catwalk. The consulting engineer who did the analysis of the structure saw no problem with adding a pole or small-face tower.

So the solution was to use a small face tower, (12 inch face-width), and install a monopole on top of it. The bottom bay of the antenna needs to be mounted at least 15 feet above the top of the tank. So to minimize de-tuning from the tank, we chose a half wave spaced design. Two **FML** antenna bays will be mounted to the pole. The radiators are spaced about 5 feet apart, with the pole extending 5 feet above the top bay, and the bottom bay placed about 5 feet up the pole from the tower top. Since the half wave design has the lowest axial radiation moment at steep depression angles, there will be a vey small amount of energy directed downward.

These **FML** antennas work beautifully. When they are optimally mounted, coverage is optimum as well. Ask us for advice on getting the best coverage from your Micronetixx Antenna.

Slot antennas – Standing Wave vs. Traveling Wave

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Any one of us who have been in the RF Engineering Circles in the Television Broadcast business for any length of time, particularly on the antenna side have usually heard of the so-called “Traveling-Wave” TV Broadcast Antenna. We have most likely also heard of a standard “Pylon” TV Broadcast Antenna. (Some folks also call these standard Pylon antennas, “Standing-Wave” Pylon antennas.) But, what is the difference? What exactly is a “Traveling-Wave” antenna? Why is it referred-to as a traveling-wave antenna? And finally, why is the other popular antenna called a standing-wave antenna? In this 3-part article, we will answer these questions.

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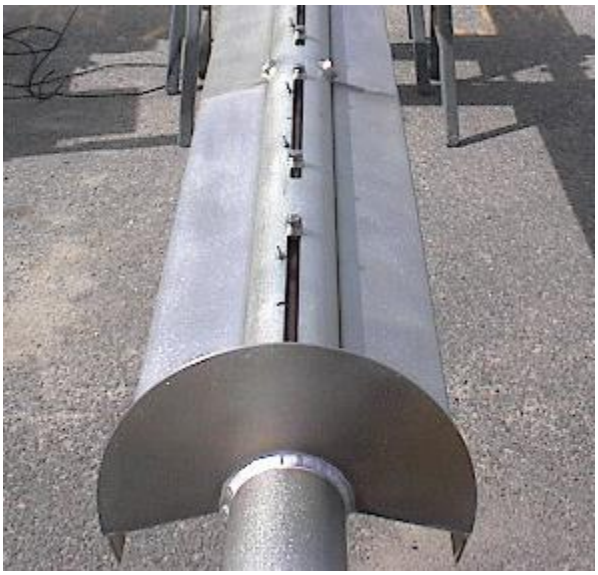
First, we need to understand that actually, both of these antennas are pylon-style antennas. That means basically, that both antennas are really based on a hollow metallic tube, (a Pylon). Both the traveling-wave and standing-wave antennas that are described in these articles are slot-style pylon antennas. That means that they are both fabricated from hollow pipes with axial slots that are cut through the wall of the pylon. These specifically-configured and strategically-placed slots along the axis of the pylon are responsible for actually radiating the transmitted signal out to the viewing audience.



To the left is a picture of a UHF slot antenna. The slots are spaced 1 λ apart and are about 0.8 λ long. For reference this antenna is being built for channel 42. 1 λ at channel 42 is 18.41 inches.

The swept back winglets form the azimuth pattern of the antenna, which is a broad cardioid.

The exact dimensions and relative location along the length of the pylon of these slots are specifically engineered and designed so that they will radiate a signal from the TV transmitter out to the viewing audience. The number of slots that are cut into the wall of the pylon, as well as their dimensions and location depend on the overall antenna design parameters. The slots are arranged in an array along the longitudinal axis of the pylon at specific locations so that they will radiate and develop the exact far-field antenna pattern and power levels that are required. This includes the station's licensed effective radiated power, (or ERP), its operating channel or frequency, power tolerance of the antenna and gain, as well as the precise azimuth and elevation patterns required.

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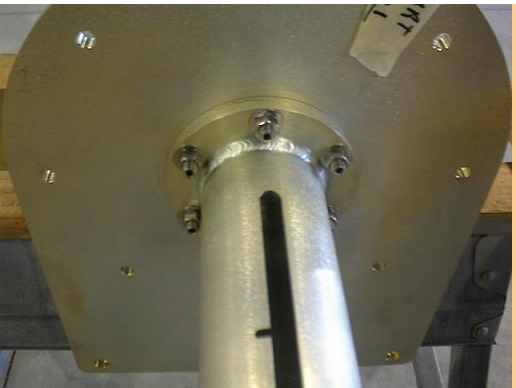
In addition to the metal pipe or pylon with the slots cut through its wall that radiate the signal out to the viewers, there is also a smaller-diameter conductor, (usually a pipe), that is placed inside of the larger-diameter pylon. This smaller-diameter pipe is centered about the circumferential inside diameter of the pylon using insulators. This structure now forms a coaxial transmission line, with the afore-mentioned carefully-placed radiating slots cut through the pylon, (or now, “outer conductor”), wall. Now, if the transmitter is connected to this coaxial pylon antenna and the slots are designed so that they will precisely couple to, and extract a specific portion or percentage of the total signal that is propagating inside of this coaxial pylon structure, a slot array antenna results.

Okay, so now we know what the basic design or topology of this slot-style TV Broadcast Antenna looks like. …But how does this traveling-wave vs. standing-wave designation come into the picture?

In order to answer this question, first we need to take a closer look at the electromagnetic waves that are present inside of the pylon, or in any coaxial transmission line. We will cover some of the basics with a little math in the next two articles in this series. We will start with V.S.W.R and how electromagnetic waves are present in slot pylon antennas and in coaxial transmission lines. This will be in the April edition of **AntennaSelect™**. And as always, if there are questions or suggestions for future articles, please let us know.

Be on the lookout for the next volume of AntennaSelect™ coming out in April



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