Colonial Virginia Aeromodelers

Chapter 1474
Newsletter Volume XXIII • Issue 02

March 2023
Editor: Alan Fry

Presidents Column: John Backes

Upcoming Meeting Schedule
The guestbook will be used to provide updates.

March – Saturday March 11 @ 1:00 – Rain date Sunday March 12.
April – Saturday April 15 @ 1:00 – Rain date Sunday April 16.

Activities
The outlook for the coming year is much better that it was at this time last year. We will begin planning for a full schedule and then modify if needed. I would like to see us get back closer to our traditional schedule. Right now, we only have two events scheduled:

September 16th - CUB Fly
October 14th - Warbirds Over Williamsburg

Hampton Roads RC events:

June 10th - Summer Fly In (S)
August 12th - National Model Aviation Day
September 9th - Scale Meet (S)
October 14th - Toys 4 Tots

Remote ID
Beginning September 16, 2023, if your drone weighs over .5 Kg and doesn't have Remote ID, you are only able to operate within a FAA-Recognized Identification Areas (FRIAs). A FRIA is a defined geographic area where drones can be flown without Remote ID equipment. Both the drone and the pilot must be located within the FRIA's boundaries throughout the operation. In addition, the pilot of the drone must be able to see it at all times throughout the duration of the flight. The CVA flying field will be designated as a FRIA. The FRIA application to the FAA must be submitted through the AMA. I submitted the application about 1 month ago and have received confirmation that the AMA has received it but have no other communication.

Club Membership
It is time to renew your club membership. Club membership for 2022 expires at the end of the year. The fee for returning members is the same whether you renew now or wait until May or June. Remember to make sure that your AMA membership is current.

Show and Tell
We are going to have a short show and tell at the end of each meeting. Hopefully Santa was good to you. Bring out your new things to show.

Contact Me
Phone: 757-870-0854 (NOTE new phone number)
Email: jb753@cox.net
Address: 8630 Diascund Road, Lanexa, Va. 23089

Secretary's Report: Fred Hill

CVA Meeting – January 1, 2023
The meeting was called to order at 1:05 pm by Randy Rogers. The meeting was held at the Field. A total of 20 members were present. The November 2022 meeting notes were approved.

Treasure's Report – Jon Persons
There were 19 renewals

The following bills were paid:
SB Cox $106.00 paid
Mark Motter $116.56 for badges.

The operating fund, Mower Fund totals were reported.

Site Improvements – Randy Rogers
No improvements

Activities
The next scheduled meeting is March 11

Newport News RC club swap meet February 18, 2023. See website for directions.

Safety – Cliff Case
No report.

Training – Bob Juncosa
No report.

Old Business
There was a general discussion about extending the concrete slab from the pavilion.
Bob Juncosa will have quotes on the two options. – 1) Do it ourselves 2) Have a contractor do the entire project. He will have this ready for the next meeting.

New Business
No new business

Show and Tell
No Show and Tell

Training: Bob Juncosa

"Antennas: Part 1 – Size, Does it Matter?"

"The hobby really changed when we move into the "short antenna" club!"

-R.D. Juncosa

One thing is certain, when we fly, we all use antennas. Yet have you ever thought about why they are the way they are, how they work, and most importantly, how they should be mounted in your plane. If so, then read on.

This subject can get super heavy with mathematics which neither this writer nor you the reader want. For that reason, some simplifications were made.

Most of us are old enough that when we started in this hobby, the majority of our radios used frequencies in the 72 MHz band, ranging from 72.010 MHz for channel 11 up to 72.990 for channel 60. The antennas for the transmitter were long telescoping affairs and long wires for the receivers. In the early 2000s, thanks to cell phone technology, 2.4 GHz radios entered the hobby and that brought much shorter antennas, but why?

The answer lies in physics and the nature of things. As it turns out, pretty much anything that travels in waves, like light, radio waves, sound, and even ocean waves, conform to a very simple formula. The speed at which a wave travels is equal to its wavelength times it's frequency.

Consider the example shown in Figure 1. The next time you are at the beach, watch the waves. The speed at which each wave travels is the same. The separation distance between the waves is their wavelength, in feet. How often the waves occur is the frequency, usually in waves per minute. The relationship between how often a wave comes in and the distance between each wave is constant. If more waves come in over a set period of time, i.e. at a higher frequency, they have to have a shorter distance between them, the wavelength. Conversely, the longer the distance between each wave, the less often they will reach the beach. The same is true for radio waves but on a much different scale.

Figure 1. Waves following wave theory.

Fine, but what does that have to do with the length of an antenna? The reason is for optimum energy transmission. The transmitter's goal is to get as much transmitter power out of the transmitter and into the air. The receiver's goal is to maximize its sensitivity by receiving as much of that power as possible. There are several factors that contribute to those goals but one of them is the efficiency of the antenna and that depends on the antenna's length.

Consider a wave as it makes its way down the transmitter's antenna as shown in Figure 2. Depending on the length of the antenna, fractions or multiples of the wave's wavelength will fit in the antenna before it reaches the end. At that point, the power is radiated out.

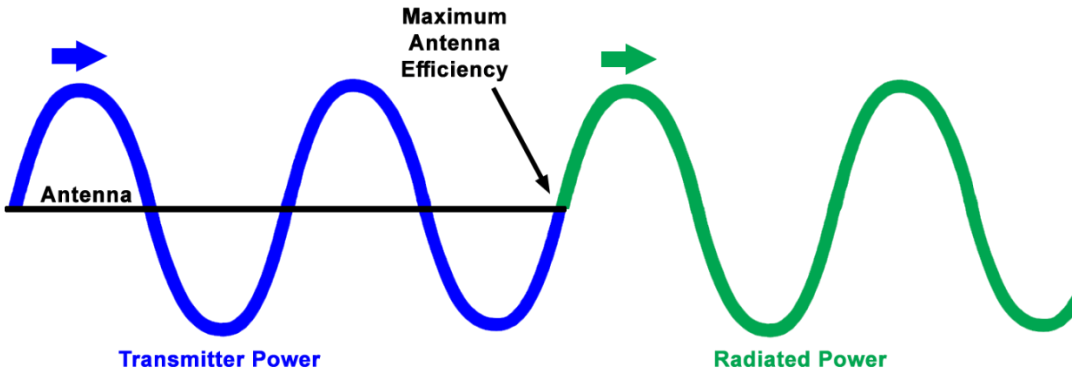

Figure 2. An antenna with maximum efficiency. 100% of the transmitter power is radiated out of the antenna.

The efficiency of an antenna is stated as the ratio of the power generated by the transmitter and the radiated power that leaves the antenna. This ratio is called the Standing Wave Ratio (SWR). If that wave crosses the zero point right when it reaches the end of the antenna, it will radiate out of the antenna and keep right on going without any loss in power. This perfect antenna will have a SWR of 1:1, meaning that all of the transmitter power is being effectively radiated, as shown in Figure 1.

However, if the signal does not cross the zero point at the end of the antenna, the radiated power will be reduced. The rest of the power will be reflected back into the antenna going the other way as shown in Figure 2. The more the mismatch, the more energy will head back into the transmitter.

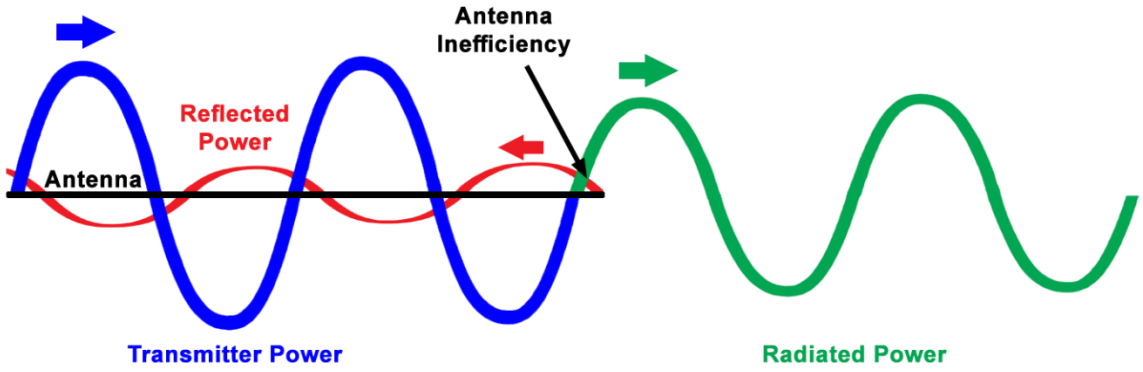

Figure 3. An antenna with reduced efficiency. Some of the transmitter power is reflected back to the transmitter.

Have you ever seen a warning not to use a transmitter without an antenna? Well now you know why. Without the antenna, pretty much all of the transmitter power is reflected back into the transmitter. This could damage the output stage of the transmitter electronics.

Now here comes is the big finale. For a transmitting antenna to be most efficient, it's length should be one wavelength or whole multiples of wavelengths! (The same goes for receiving antennas.)

If we go back to the days of 72 MHz, the optimum wavelength for the antenna on my old MRC channel 58 radio (72.95 MHz) would be 161.8 inches long! As it turns out, antennas work very well and can have low SWRs if they are at multiples or divisible-by-two fractions of a wavelength (1/2, 1/4, 1/8, etc.). For practical reasons, RC antennas back then were "quarter wave" antennas, or ¼ of a wavelength in length. That put my old antenna at a much more manageable 40.5 inches.

Now let's consider modern 2.4 GHz radios. Using that same relationship, one wavelength at that frequency is a measly 4.9 inches. That's a full wavelength! A half wave antenna is just a paltry 2.45 inches and a quarter wave antenna is a miniscule 1.23 inches. That's just one of the many benefits of our modern 2.4GHz radios.

There you have it. Now you know why your antennas are the way they are but there is one more point to make. Back in the old days, it was not always easy to perfectly mount such a long receiver antenna wire. We put bends in them to get them out of the plane and the ends flapped around while we flew. All this changed the effective length of the antenna, thus reducing its efficiency. The good news is that small dimensional changes out of 40 inches don't make a very big difference in antenna efficiency. (Big changes however, like when you forget to raise your transmitter antenna, make huge differences!)

We can't get away with that with 2.4GHz antennas. They are not as forgiving. Small changes in length compared to just 1.23 or so inches makes a big difference so don't go fiddling with your modern antennas.

We will cover more about this in the next part on antennas.

Happy Landings.

Bob Juncosa
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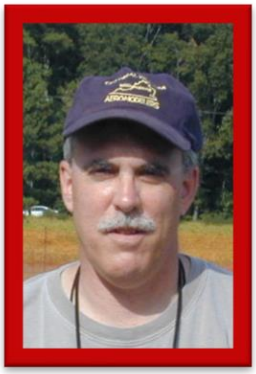
Safety Officer: Cliff Casey

Fly Safe, Be Safe



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