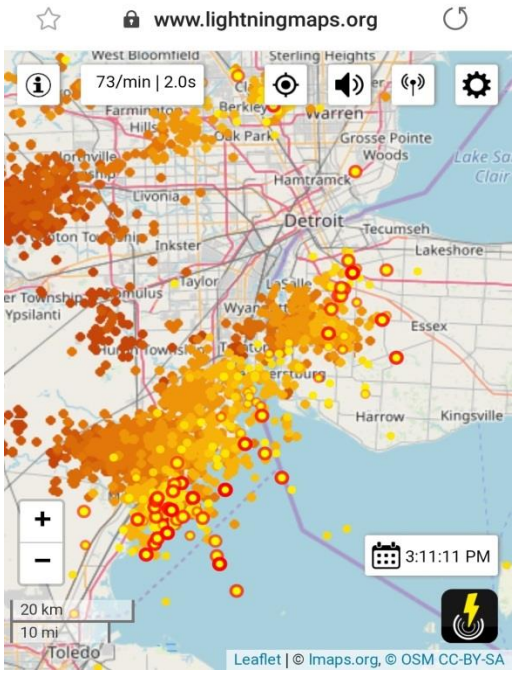
Lightning and your QTH in Essex County

A cautionary tale

Our hobby requires, for the most part, we all want highest elevations for our antennas no matter the bands. Even a small station can have antennas up above the roof level; dipoles inverted Vees, beams, U/V verticals.

Weather organizations like Environment Canada show our area is prone to many months of the year on average when lightning is possible. EC reports that the Windsor area is the "LIGHTNING CAPITAL OF CANADA" and averages 50 days a year of lightning activity. So us amateurs here need to be aware of the danger of lightning strikes …or even close strikes.



Typical local storm showing cloud-to-ground lightning strikes. Each dot shows position of a strike.

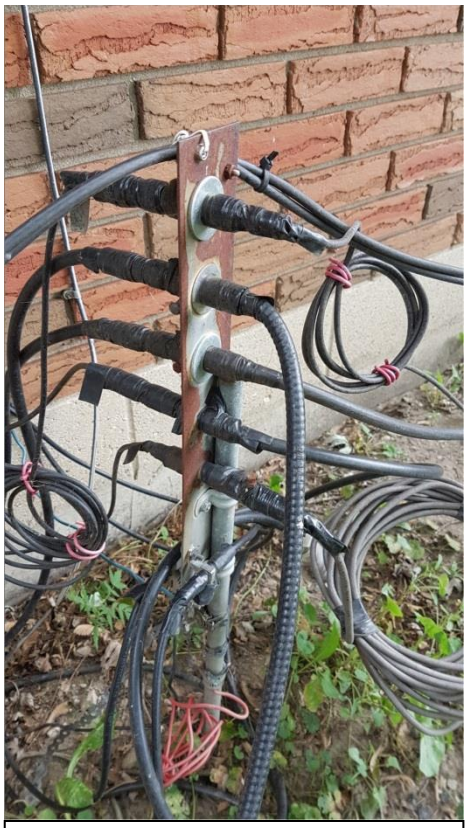
A common practice: keep lightning surges outside the shack. Although it is less common in urban locations it is still possible to/for lightning to hit.

Because antennas are low resistance metal rods pointing at the skies they are good conducting targets for charge bleeding and direct discharge of cloud to ground lightning.

Here is an example of protection I carried out for my station when I lived out in the county. I'll show how effective this was, a small station with relatively low antennas.

My approach to lightning protection was:

1. **Grounding of any unused antenna lead-ins.**
2. **Arc suppression devices on entering feedline cables connected to outside 10' ground rods.**
3. **Terminating grounded cables at the inside entry point so no radios were connected when not in use.**



Feed through arc suppressors outside on 10' ground rod

Inside terminated & shorted lines disconnected from all radios

I thought I had done my homework on protection for my radio station but it didn't work...sort of.

On a hot July day I watched a storm approach with NOAA and EC warnings, lightning active. Hearing distant thunder I knew all my antenna lines were disconnected but remembered my computer was still up and running and I did not want the Hydro to blip and crash my hard drive.

I sat down at the computer desk in the shack and proceeded to close Windows on the computer to power it down.

As the screen on my monitor showed "WINDOWS IS NOW SHUTTING…." *BANG!!!* The room lit up with a blinding flash simultaneously, the big BANG like someone had just fired a shotgun next to my ear!

I recall seeing the mouse still in my hand with what looked like LIGHT coming from its bottom. This mouse was NOT an LED mouse.

As I gathered my wits and started looking around, first, the DVD, Satellite TV Receiver and TV displays in the shack were all dark. The computer had not shut down but the CRT monitor display looked like a twisted Paisley pattern. NOT GOOD!

I now realized I had just experienced a lightning incursion, the computer monitor had just gone through an EMP, an Electro Magnetic Pulse, a brief burst of electromagnetic energy.

I checked the shack equipment for fire, fortunately none. Ran through the house checking to find the upstairs VCR, DVD, Satellite Receiver were all dead!

So after all my precautions to protect my equipment *it didn't work*? Actually for the radio gear it did. But other electronics failed. WHY?

As soon as the storm passed I went outside to check my antennas and feedlines to see if there was any visible damage. Initially the only thing I found was the vertical element of a discone antenna, that was mounted on a tripod supporting a 5' mast on the roof, was missing. I found it now laying on the grass at the side of the house. Was this what got hit? APPARENTLY. But why? The element's base loading copper coil was gone, its base sheared off.

I had just been recuperating from open heart surgery with explicit orders to do nothing exerting or lifting. But I was determined to find out what happened up on that roof.

A few weeks before, we had decided to have installed a Satellite TV service as I couldn't do it myself in my condition. I had already read the install manual for the system showing grounded feed through arc suppressors required before the coax entered the building.

They were not in the kit.

The day the installer arrived I noted he was securing the satellite dish onto a chimney near my discone tripod. I warned him to stay away from that tripod with his coax run. He said he would. When he brought down two runs of coax feed to their entry points on the side of the house I said, "Where are the charge suppressors?" He replied, "We don't do that any more." and completed the installation.

Jump ahead again to the lightning strike day and I got my wife to help get a ladder up so I could examine what happened up on the roof.

What I found was the installer, contrary to my instructions, ran his coax feeds right through the base of the discone tripod, even tied the cable pair right to the tripod leg with electrical tape! So when the lightning struck the discone vertical it burned through the couple of turns of electrical tape then down the UNGROUNDED TV coax

runs right into the house and through the connected components.

A couple surprises were found later. The strike entered at the north end of the house but at the south end the garage door opener receiver was destroyed.

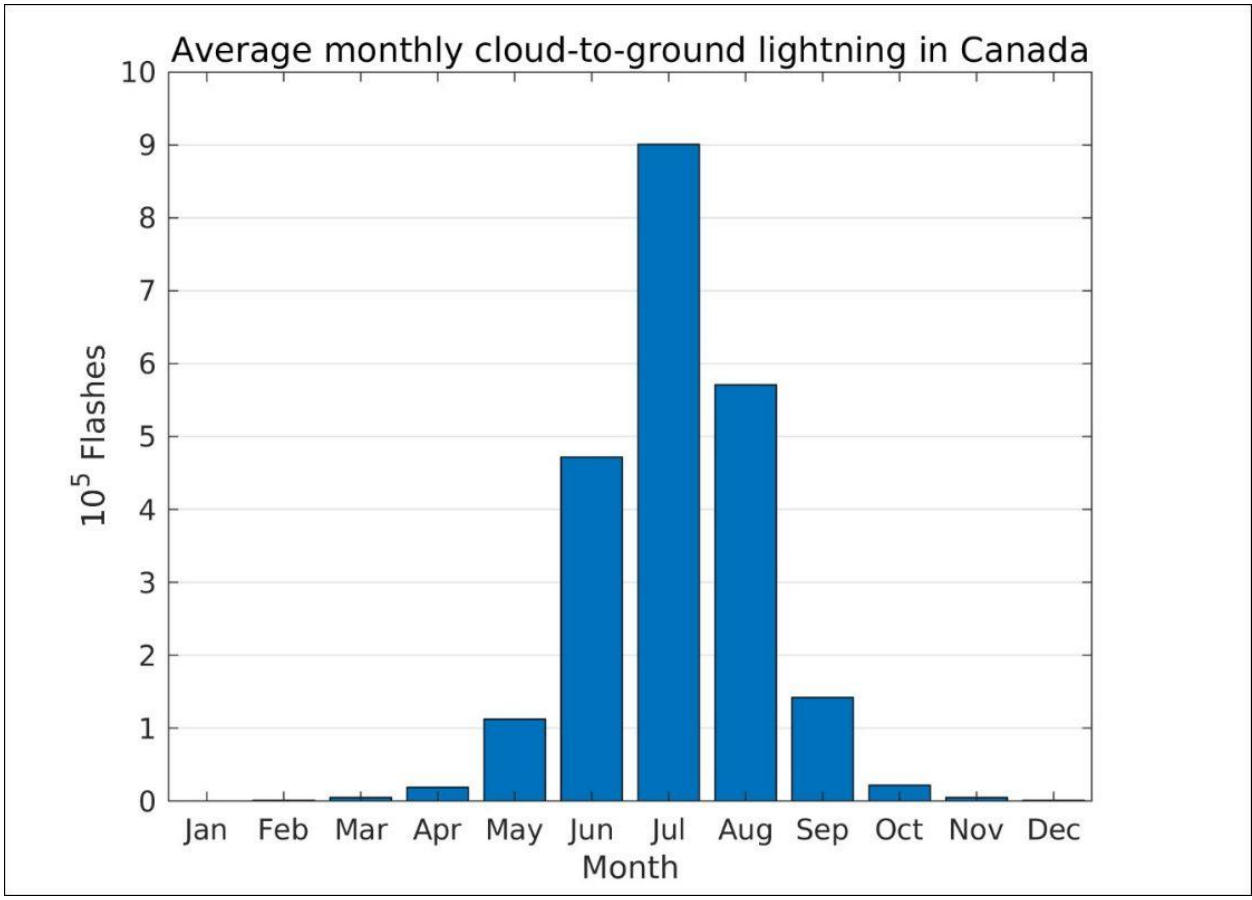
Later, as required by our insurance company, on inspection, an electrician found an arc-over from the wall receptacle above a kitchen sink to its stainless steel rim half way across the house from the surge entry point.

We called the satellite service company and reported what happened. They would only replace one of our two satellite receivers and told us we had to claim other components through our house insurance. They did, however, send a qualified technician to replace the system wiring, this time with the proper arc suppression grounding equipment. I was told at the time the original installer no longer worked for the company.

Properly installed satellite TV coax downleads with arc suppressor for both lines and ground wire leading down to 10' ground rod.

SO BE AWARE THAT LIGHTNING CAN STRIKE YOUR QTH with costly result… to equipment… and worse… YOUR LIFE!

And by the way, we've already had lightning strikes locally this month (March).



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