

Second Century



Participating in Science

In March 2021, when I gave the keynote address to the QSO Today Virtual Ham Expo hosted by Eric Guth, 4Z1UG, I briefly mentioned the advent of the new solar cycle, Cycle 25, and went out on a limb. Up to that point, most space weather scientists were calling for a lackluster cycle similar to Cycle 24. However, there were some opposing predictions, based on evolving science, that the new cycle was going to be, as I stated then, “gangbusters.” These predictions were based on looking beyond the smoothed numbers and instead looking at the granularity of the data points to see exactly how long or short the previous cycle was, to determine the potential of the next cycle.

Now, that said, predicting weather is not an exact science. Even on Earth, where we have a network of technologies reporting real-time data from the surface, air, and space, look at how difficult it is to get a reliable forecast. Now, extend that to space weather. Our tools become vastly less capable, not only of measuring what’s happening, but also of helping us understand what’s about to happen — and ultimately, for us amateur radio operators, what the impact on propagation will be.

With the internet came the ability to collect significant amounts of real-time data to help us measure what is happening right now. From the Reverse Beacon Network (RBN) using CW signals to PSK Reporter’s use of FT8, we now have the ability to measure and report what is happening on the bands. This can be extremely valuable for a few reasons. First, you can measure how your station is performing with the current set of conditions. Second, using predictive tools like VOACAP, you can compare how you think conditions should be performing for you versus how they really are. As you spend more time understanding how propagation is affecting your own station, you’re getting into the science of propagation. You’re building a personal correlation between what is being reported about the sun, the solar weather, and conditions on Earth.

Hams are not the only ones using this data. In study after study, space weather scientists are using our data as a basis for understanding their own views and theories on science to evolve stronger predictive tools and reports in the future.

How do you get more involved in the science of propagation? Here’s a quick checklist:

Prepare: Take advantage of the various informational resources from articles and books, to blogs and YouTube to gain a strong understanding of what we do know and what the vernacular and data definitions mean. This is one of the reasons we brought out a new book for Cycle 25, *Here to There: Radio Wave Propagation* (www.arrl.org/here-to-there-radio-wave-propagation), to give a primer on the latest space science learning for hams.

Operate: Experiment with your station. Use different antennas with different takeoff angles. Use various power levels.

Try using WSPR at very low power levels to see how propagation is affecting your ability to be heard. It takes less than 30 seconds to get on a band, call CQ using CW, and see on the RBN where you were heard.

Participate: Set your WSJT client to report what you’re hearing back to PSK Reporter. A weakness RBN has — a small number of reporting stations — is dwarfed by the huge number of stations around the world that are reporting into the PSK Reporter server. If you have a software-defined radio and can set up a node on RBN, please do so! Participating in these reporting networks and others helps add data points in real time to our ability to measure and understand what is happening with space weather.

Investigate: Expand your own knowledge of how things are working by getting into the fundamentals of your station and determining why things seem to be performing the way they are. Assume nothing. Make sure you understand your antennas, how the ground and terrain affect their performance, and how you would expect signals from your station to be working based on the current solar weather indexes, and try to eliminate variables so you can focus on the science.

Analyze and Report: Science evolves because we are able to learn from others. Join online groups and share what you’ve learned. Be prepared to be told you’re wrong! Learn while sharing.

These solar conditions benefit everyone. The HF bands become more interesting. VHF bands become exciting from the thrill of bouncing signals off aurora. Everyone should be taking advantage of this gift of an active and exciting opportunity to delve into space weather, its science, and furthering the knowledge base and understanding of propagation. Be radio active, be a connector by getting local Technicians on 6 meters and 10 meters to experience propagation, and share the results with us at ARRL!

A handwritten signature in black ink, appearing to read 'David A. Minster', with the call sign 'NA2AA' written in a smaller font to the right.

David A. Minster, NA2AA
Chief Executive Officer